

GUERILLA
450

ROYAL ENFIELD SERVICE MANUAL

EURO V & REST OF THE WORLD - 2024

This page is intentionally left blank

Foreword

Welcome to the Guerrilla 450, a fiercely unique roadster that will revolutionize the way customer rides.

Fueling it is the all-new, liquid-cooled Sherpa 450 engine, which has been specially tuned to deliver torque and power across the rev range for fully usable real-world power. The suspension has been developed to enhance every kind of riding style, every day of the week.

This Service Manual has been designed to help you operate and maintain the customer's Guerrilla 450 the right way, allowing the customer to get the most out of their motorcycle. To ensure the Guerrilla 450 always gets the best care, please ensure the customer is availing the services of any Royal Enfield Authorized Service Centre. Do read through the removal, refitment, inspection procedures and other useful information given in this manual before servicing the vehicle.

- Team Royal Enfield

"© Copyright 2024 Royal Enfield (A unit of Eicher Motors Ltd.). All rights reserved. No part of this service manual shall be copied, distributed or otherwise dealt without the express permission in written form the Royal Enfield who remains the sole owner of this manual."

This page is intentionally left blank

TABLE OF CONTENTS

GENERAL INFORMATION	1
TECHNICAL SPECIFICATION	2
MAINTENANCE	3
GENERAL AND SPECIAL TOOLS	4
ENGINE	5
CHASSIS	6
FUEL SYSTEM	7
EVAPORATIVE EMISSION CONTROL SYSTEM (EVAP)	8
BRAKES AND ABS.....	9
ENGINE MANAGEMENT SYSTEM (EMS)	10
ELECTRICAL SYSTEM	11
INDEX AND GLOSSARY	12

CONTENTS

1. General Information..... 9

1.1 About this Manual..... 11

1.2 How to Use this Manual 12

1.3 Important Information..... 13

1.4 General Precautions 13

1.5 Prior to Service 14

2. Technical Specifications 22

2.1 Engine 24

2.2 Ignition System..... 24

2.3 Transmission..... 24

2.4 Chassis 25

2.5 Electrical System..... 25

2.6 Dimensions 26

2.7 Weights 26

2.8 Recommended Lubricants..... 26

3. Periodic Maintenance Schedule (PMS)..... 34

4. General and Special Tools..... 38

4.1 General Tools..... 40

4.2 Measurement Tools..... 43

4.3 Special Tools..... 44

5. ENGINE 50

5.1 Engine Removal From Frame 50

5.2 Engine Install To Frame..... 82

5.3 Engine Dismantling..... 128

5.4 Engine Inspection..... 160

5.5 Engine Assembly 194

5.6 Cooling system..... 234

5.7 Valve clearance..... 254

5.8 Engine Troubleshooting..... 321

6. CHASSIS 342

6.1 Air Filter Box Assembly 344

6.2 Handlebar 374

6.3. Exhaust Pipes and Silencers 389

6.4. Footrests And Stands..... 400

6.5 Mudguards/Number Plates/Grab Handle 419

6.6 Side Panels and Rider Seat..... 432

CONTENTS

6.7 Wheels	444	10.1 Engine Management System (EMS).....	605
6.8 Suspension.....	471	10.2 EMS Adaptaton procedure	654
6.9. Troubleshooting	499	11. Electrical System.....	656
7. Fuel System..	513	11.1 Battery Dismantling.....	659
7.1. Fuel System Components	514	11.2 Headlamp Dismantling.....	663
8. Evaporative (EVAP) Emission Control System	525	11.3 Tail Lamp Dismantling.....	668
8.1. Evaporative (EVAP) Emission Control System	526	11.4 Horn Dismantling.....	671
9. Brakes and ABS.....	541	11.5 Complete Wiring Harness	678
9.1. Brake - Front.....	543	Inspection.....	674
9.2. Brake - Rear	547	Assembly	675
9.3 Anti-lock Braking System (ABS).....	566	11.6 Complete Wiring Harness Assemble.....	675
9.4. Preparation (Front Disc Brake).....	587	11.7 Horn Assembly.....	678
9.5. Reassembly	589	11.8 Tail Lamp Assembly.....	678
9.6. Preparation (Rear Disc Brake).....	590	11.9 Headlamp Assembly	682
9.7. Reassembly	591	11.10 Battery Assembly.....	687
9.8. Brake Bleeding	592	11.11 Wiring Diagrams.....	692
10.Engine Management System (EMS).....	602	12. Index.....	705
		13. Glossary	706

GENERAL INFORMATION

CONTENTS

PAGE

1.1 About this Manual	10
1.2 How to Use this Manual	10
1.3 Important Information	11
1.4 General Precautions	13
1.5 Prior to Service	14

1. General Information

1.1 About this Manual

This service manual has been created primarily for use by a technically competent and trained service personnel to

- Get familiarized and understand the construction of various aggregates of motorcycles.
- Assist in carrying out the correct and factory-approved service and overhauling procedures of the motorcycles.

While it is not possible to comprehensively capture all the service practices in this manual, it is expected that the technically competent person would have a basic knowledge and understanding of carrying out systematic service and overhauling procedures.

We strongly recommend that personnel without basic understanding of repair techniques and procedures DO NOT attempt to service or overhaul any part of the motorcycle using this manual, as it might result in wrong diagnosis and repair and ultimately render the motorcycle unsafe for use and result in expensive repair costs for the customer.

We also STRONGLY recommend that any technician who wishes to service Royal Enfield motorcycles, undergo systematic technical trainings at our Royal Enfield training academies, where the correct servicing and overhauling procedures are imparted by experienced and competent trainers, providing hands on practical sessions.

Lastly, we would recommend and insist that the periodic maintenance and overhauling of the Royal Enfield motorcycles be carried out ONLY through authorized Royal Enfield service stations where factory trained and experienced service technicians are always available

1.2 How to Use this Manual

This service manual is divided into several chapters as detailed below. This will help the technical personnel to easily refer to the particular section of interest, for carrying out the correct maintenance and repair procedure as recommended by Royal Enfield.

Chapter No.	Chapters
1	General Information
2	Technical Specifications
3	Periodic Maintenance Schedule
4	General Tools and Special Tools
5	Engine
6	Chassis
7	Fuel System
8	EVAP (Evaporative Emission Control System)
9	Brakes and ABS (Anti-Lock Braking System)
10	EMS (Engine Management System)
11	Electrical System
12	Index and Glossary

There are elaborate details of CAUTIONS, WARNINGS, NOTES provided in this service manual in each of the individual chapters to highlight details of information and/or precautions that need to be taken while servicing the motorcycle aggregates.

1.3 Important Information

To enhance customer satisfaction and to improve the performance of the motorcycle, Royal Enfield will be carrying out modifications and changes in the motorcycles in the years to come. Such changes will be intimated periodically and continuously through service bulletins and notifications to the authorized Royal Enfield dealers and service stations and will also be included in the future editions of this service manual.

1.4 General Precautions

Important information and points that need special focus and attention while servicing the motorcycles are highlighted in this service manual as follows:

NOTE	<i>Indicates points of particular interest for more efficient and convenient operation.</i>
WARNING	Indicates points of particular interest for more efficient and convenient operation.
CAUTION	This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to the parts or vehicles.

WARNING

Stop the engine when servicing the fuel system. Do not smoke or allow any open flame or sparks near gasoline. Gasoline is extremely flammable and highly explosive, which could result in serious injury or fatal accidents.

Certain non-standard parts such as aftermarket and custom made extended front forks or suspensions, which may adversely affect performance and handling. Removing or altering factory-installed parts can adversely affect performance and could result in serious injury or fatal accidents.

CAUTION

Do not tamper or attempt any modifications to any part of the engine management, fuel injection, ABS brakes, exhaust and evaporative emission systems of the motorcycle as it is against the law and will render the motorcycle unfit and illegal for road use.

1.5 Prior to Service

Proper preparation is very important before commencing any maintenance or repair on a motorcycle. This will not only result in an efficient and accurate repair job but will also save time and result in "FIRST TIME RIGHT" and help the customer gain confidence in the technician's capability.

The following points are essential for carrying out maintenance or repairs on a motorcycle correctly:

- 1. Understand and record customer concerns accurately.**
- 2. Test-ride the motorcycle wherever required to understand the customer concerns accurately.**
- 3. Refer to the past history of maintenance and repairs carried out on the motorcycle.**
- 4. Water-wash and clean the motorcycle.**
- 5. Maintain the work area - cleanliness, lighting, ventilation, etc.**
- 6. Store appropriate general purpose and special tools for carrying out the maintenance.**
- 7. Perform systematic dismantling and reassembly of the aggregates in the motorcycle.**
- 8. Store required spares and consumables for the maintenance.**
- 9. Perform correct inspection and diagnosis of the motorcycle.**
- 10. Test-ride after repairs to ensure that motorcycle is performing correctly.**
- 11. Explain the repairs and maintenance carried out to the customer.**
- 12. Encourage customer to take a test-ride so as to gain confidence that the repairs have been carried out correctly and to his satisfaction.**

1.5.1. Customer Complaints

Discuss with customer to clearly understand their concerns and issues on the motorcycle.
Create a job card detailing all the complaints mentioned.

ROYAL ENFIELD - Chennai
JOB CARD
Job Card No: 20562
Date: / /
Area: / /
Technician Name: /
Customer Name: /
Address: /
Contact: /
Type of Service: /
Checklist of 20 items with OK, NG, N/A checkboxes.
Customer Remarks: /
Technician Signature: /
Service Center Signature: /

1.5.2. Test-Ride

Do a test ride wherever required to reconfirm issues mentioned by customer. This will also help to identify other issues if any.

1.5.3. Service Records

Check the service records.

Vehicle History
Table with columns: Vehicle Name, Brand, Model, Year, Color, Status, Remarks.
Vehicle Details panel on the right showing: Registration No., Engine No., Chassis No., Color.

1.5.4. Clean Work Area

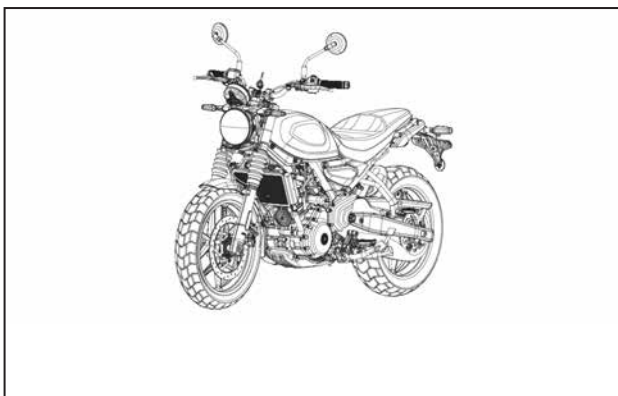
Ensure the work space is clean and adequately ventilated fresh air.

1.5.5. Cleaning

Cleaning before Dismantling and Inspection

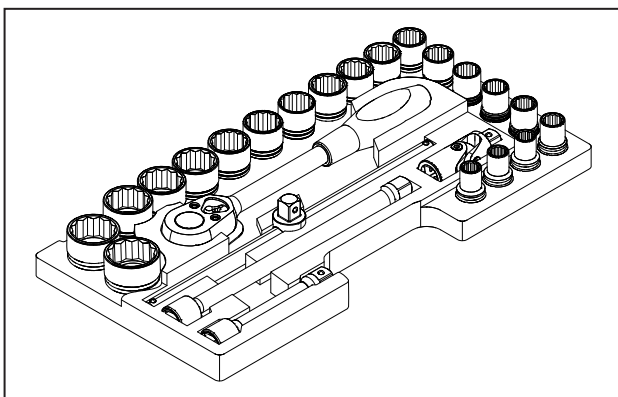
Water-wash and clean the motorcycle for a thorough inspection to uncover any visual damages such as breakages, leaks, misalignments, etc., and to clearly understand the issues raised by the customer.

Clean the motorcycle thoroughly before disassembly to avoid dirt or other foreign materials entering into sealed areas as it can cause excessive wear and damage to the parts.



1.5.6. General and Special Tools

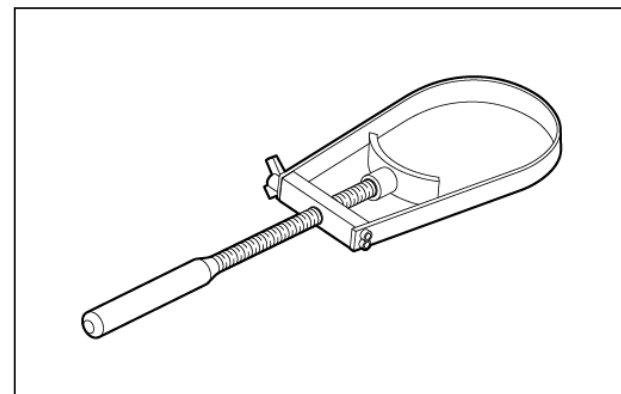
All general and special tools required for servicing are listed in the respective section of this service manual. Ensure that you have all the required tools for servicing. Place tools handy before beginning the service or maintenance.

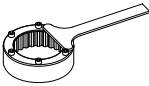


Special Tools

A list of special tools required for the dismantling and assembling of parts has been provided in each section.

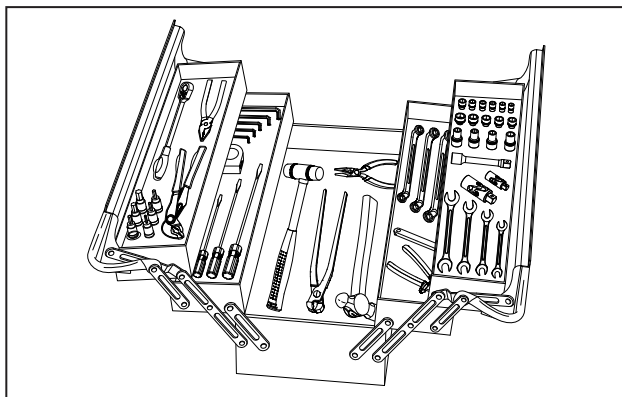
Ensure that only Royal Enfield recommended special tools are used wherever mentioned. Dismantling or assembling without the use of special tools may cause severe, irreparable damage to parts.



SPL 	Part No: ST-32065-a
	Part Name: Magneto Holding Tool

Storing Tools

After completing the job, ensure that all tools are cleaned and kept back in their designated place, so that they do not rust and can be easily found the next time.



Tool Usage and Safety

Use eye protection equipment when performing any task using air-operated tools.

Pneumatic tools should be used only for removal, and not for tightening.

Ratchets and Extension

Use an extension on a ratchet's handle or power handle at suitable places.

Torque wrenches should always be used only for tightening fasteners to their recommended torque.

Once you hear the click sound, stop tightening and remove the torque wrench from the fastener. Do not tighten further as it will cause damage to torque wrench and fastener.

Hammers and Mallets

Use eye protection equipment and gloves while using a hammer.

Use a hammer or mallet that is suitable for the job.

Use only a plastic mallet to remove or assemble delicate parts like Oil seals/dowels/bushes, especially in the engine. DO NOT use a metal hammer as it will cause damage to the parts.

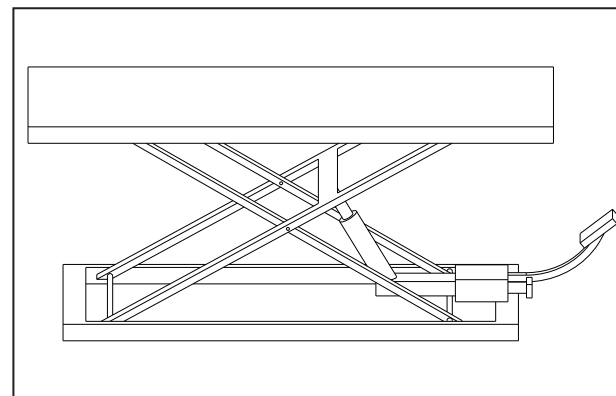
Screwdrivers

Use the right type and size of screwdriver at the right places.

Do not use a screwdriver for punching, chiseling or scraping, or as a lever to lift another object.

Use Ramp

Royal Enfield recommends the use of a suitable ramp to hold the motorcycle vertically in a convenient position for easy repairs.



1.5.7 Prior to Disassembly

Always ensure ignition switch and stop switch are in OFF position before dismantling any aggregate on the motorcycle.

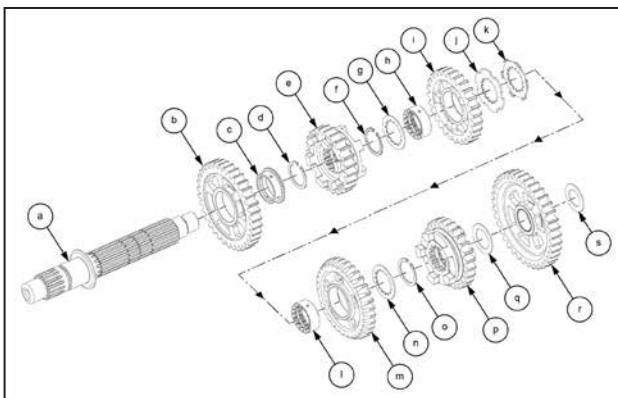
Always drain engine oil (in warm condition) whenever servicing any part of the engine/oil cooler.

Always drain fuel from the fuel tank whenever it is removed from the frame.

Always disconnect battery terminals whenever servicing the engine management system, ABS and/or any electrical wiring.

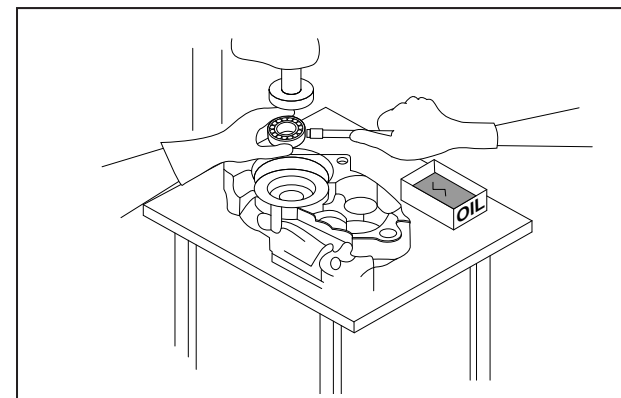
1.5.8. Disassembly/Assembly Sequence

Follow the disassembling and assembling sequence as given in the respective sections of this manual. In most cases assembly order is the reverse of disassembly. However, please follow the sequence provided in this service manual. If correct sequence is not followed, parts can be damaged.



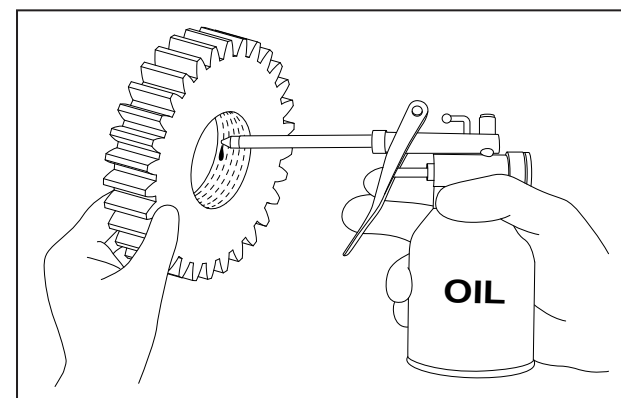
Removal of Bearings and Seals and fitting them in place

While removing bearings and seals, use correct tools mentioned in the relevant sections. Do not use excess force as it may damage parts. Similarly, while pressing bearings and seals in place lubricate them, use correct tools and visually examine if they are fitted in proper place. Bearings or seals should not be loose in the casing. Use of wrong tools, too much hammering or application of extra force may lead to damage of the bearings and seals.



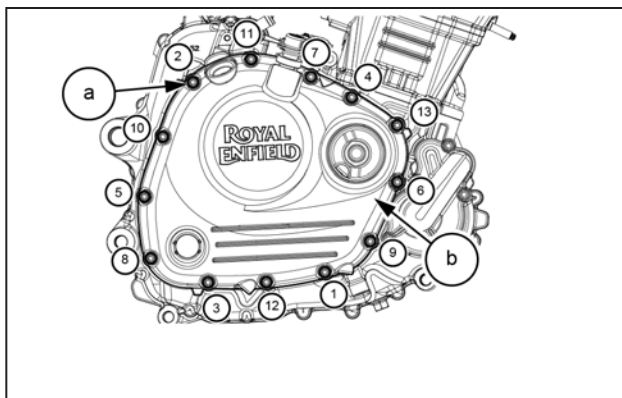
Lubrication

During assembly, ensure that all rotating and/or sliding parts are lubricated to minimize wear and tear during initial operation. Use Royal Enfield recommended oil and lubricants only. All brake system parts should be cleaned and lubricated with recommended brake fluid only (e.g., piston, master cylinder, etc.).



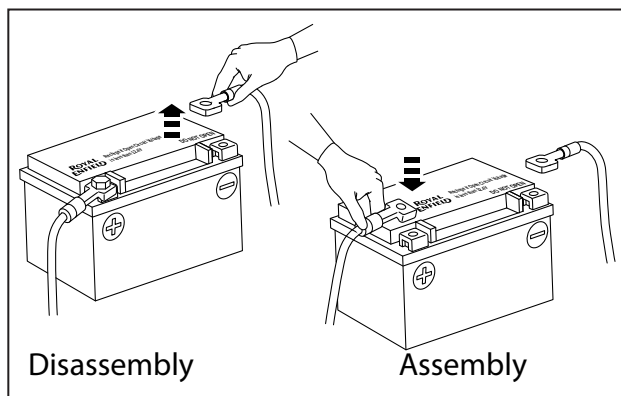
Tightening Sequence and Torque

The correct tightening sequence and torque has been provided in various sections of this service manual. Incorrect sequence or wrong torque will cause serious damage to parts.



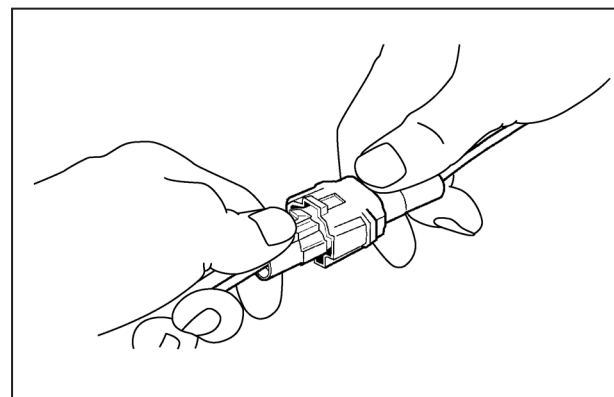
Battery Disconnection and Connection

When required, disconnect the battery cables from the battery. Disconnect the ground negative (-) terminal first and then positive (+) terminal to avoid short circuit. While connecting, first connect the positive (+) and then the negative (-) terminals.



Electrical Connectors

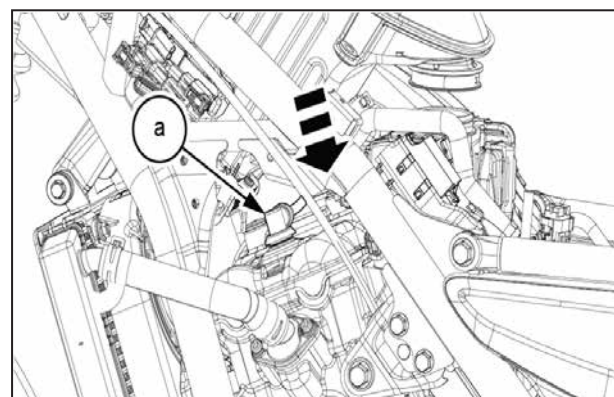
Ensure that lock is released in the connectors before disconnecting or connecting electrical connectors. Excessive force to pull out connectors without releasing the lock may damage the connector.



1.5.9. Safety

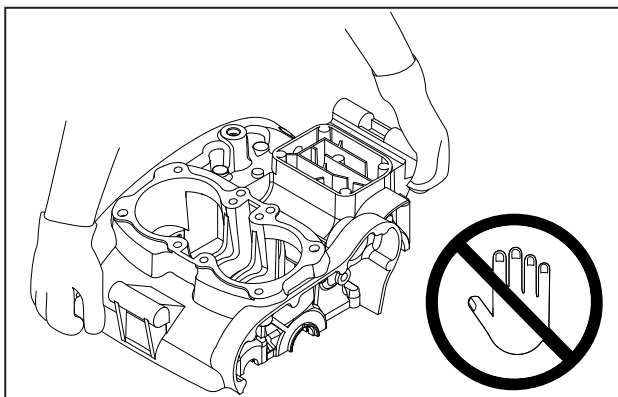
Ignition System

Ignition system produces high voltage. When working on any ignition system with the engine running, always keep your hands away from the spark plug wires.



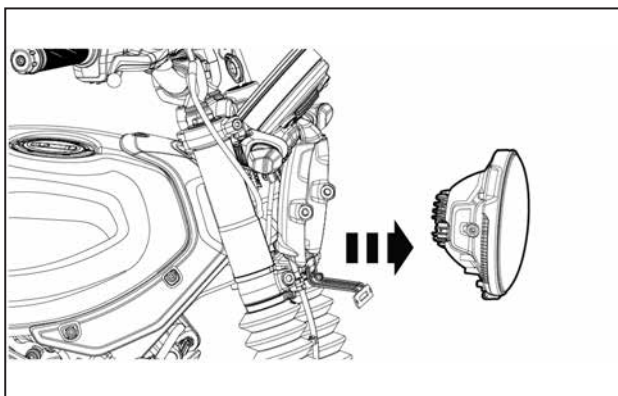
Handling Sharp-edged Parts

Wear hand gloves to prevent injury from possible sharp edges on the parts.



Handling Fragile Parts

Be careful while handling fragile parts like headlamps, indicators, bulbs, TFT clusters, etc. Use proper tools and do not apply undue force. After removing, store the parts in a safe place.



Welding

Royal Enfield does not recommend welding on the frame or any other parts of the motorcycle. Welding will make the frame weak and can also affect the balance of the motorcycle.

In motorcycles equipped with electronic control modules like EMS and ABS, welding will cause irreparable damage to the EMS/ABS system.

This will also void motorcycle warranty.

Tampering

It is illegal to tamper with the following:

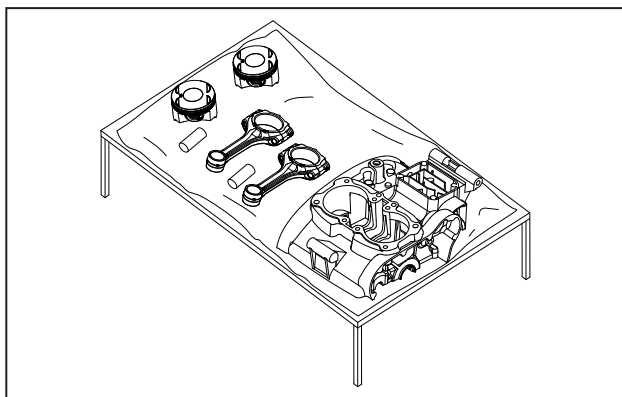
- a) Exhaust system
- b) Fuel systems
- c) Engine Number and/or VIN Information Plate
- d) Wiring harness
- e) Frame

This will lead to NON CONFORMANCE to the noise and emission regulations in force, causing serious performance issues besides irreparable damage to the motorcycle.

This will also void warranty of the motorcycle.

1.5.10 Storage of Removed Parts

After disassembly of all parts including sub-assemblies, clean and store them in a separate storage bin to prevent from dust and place the parts near the working area.



Protective Covers

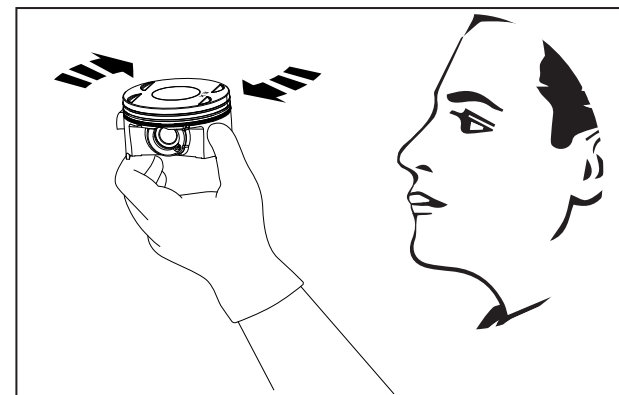
Use proper covers on the motorcycle to avoid scratching/damaging paint during service.

CAUTION

Please Take care while disassembling and assembling the seats, and sheet metal parts, as any sharp edges will lead to injuries.

1.5.11 Inspection

Reuse of worn or damaged parts may lead to serious malfunction and/or unsafe operation of the motorcycle. All removed parts should be cleaned and visually inspected for wear-out, corrosion, discoloration, damage, etc. Refer to the appropriate sections of this manual for service limits on individual parts. If any wear or tear has been found or if the part is beyond its service limit, replace the parts with Royal Enfield Genuine parts.



1.5.12 General

One-time Parts/Consumables

In the service manual, we have listed parts that are for one-time use only. Replace and do not reuse parts such as:

- a) Oil seals
- b) Filters
- c) Gaskets
- d) Rubber washers
- e) Cylinder head bolts
- f) Connecting rod bolts
- g) Crankcase bolts
- h) O - Rings

Spares/Lubricants/Consumables

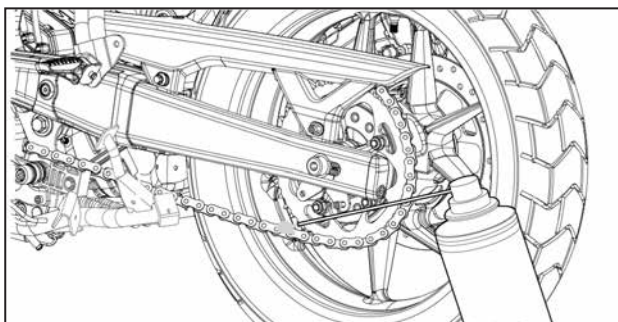
Ensure that you have all the spares/lubricants/ consumables required for the servicing of a particular section stored near you for easy access. Use only Royal Enfield Genuine parts.

ROYAL ENFIELD

Genuine Parts

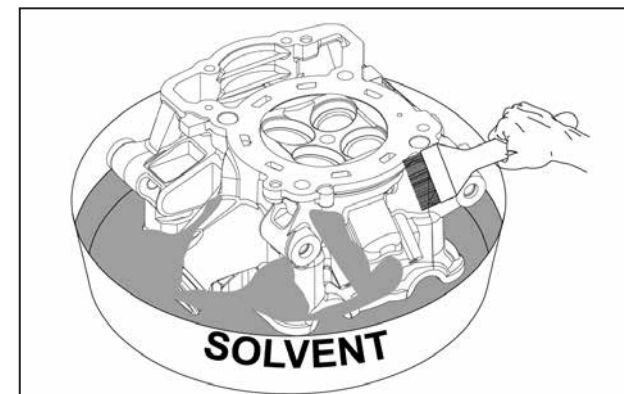
Rust or Corrosion Removal

In case a rusted or corroded part cannot be removed, apply recommended/reputed rust removal agents, wait for the removal agent to free up the rust/corrosion and then remove the part. Clean and inspect the part carefully to confirm it can be reused.



Solvents/Oils for Cleaning

Use correct solvents for cleaning to reduce fire hazards.



Hazardous Substances

Many liquids and other substances like fuel, lubricants, brake oil, adhesives, etc., used in automobiles are poisonous. Keep the fluids out of reach of children. Do not bring in contact with eyes and skin. Wash exposed skin thoroughly with soap and water. If any irritation persists, consult a doctor immediately.

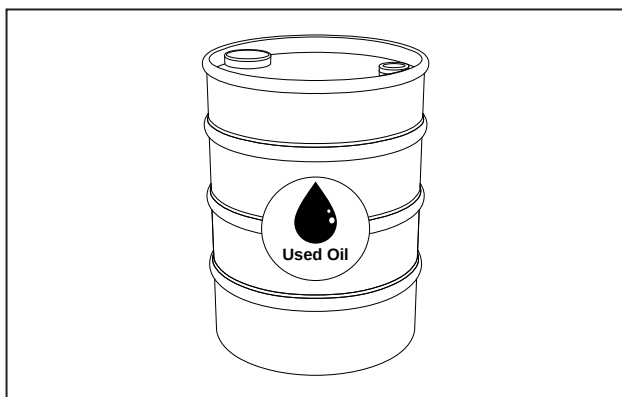


Environmental Protection

Dispose used oil and other consumables like gaskets, O-rings, oil filters through authorized waste-disposal agencies.

Do not spill brake oil on painted parts. It will damage the paint.

Do not use mineral-based grease in brake parts as it will damage the hydraulic seals.



Battery Acid

Avoid spilling battery acid on any part of the motorcycle or your body. Wash spillage immediately with water to avoid acid marks on the motorcycle or burns/injury to yourself.

Gasoline/Petrol

Gasoline/Petrol is highly flammable. Be careful while removing the fuel tank and handling Gasoline/Petrol. Store it in a safe place and ensure it is stored in a well ventilated area, away from the work area and fire.

After-market Parts and Accessories

Royal Enfield strongly recommends use of Royal Enfield genuine parts and accessories only.

A list of all accessories available from Royal Enfield can be obtained from Royal Enfield dealers.

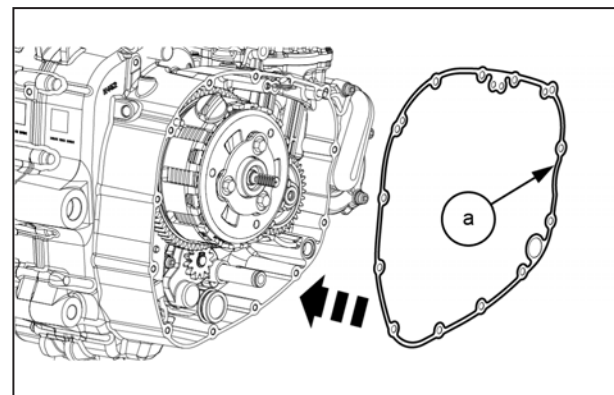
Yet, if you are using any after-market part that is not supplied by Royal Enfield, do ensure that it does not interfere with the functioning of any of the motorcycle parts.

Gasket and O-ring

If the gaskets and O-rings are hardened, shrunk or damaged after disassembly, their sealing performance will be reduced.

Remove used gaskets and O-rings. Clean the sealing surfaces thoroughly. Make sure no gasket or other material waste remains on the surface.

Always replace recommended gaskets and O-rings with Royal Enfield genuine parts once they are removed.



1.5.13 Final Inspection

Once the repairs/servicing is done, check and confirm that all tasks mentioned on the job card have been performed. Do a proper testing to ensure that all critical functions are working properly, all reported issues have been resolved and no new problem has been introduced.

Follow the final inspection checklist and sign out through the final inspector.

1.5.14 Delivery to the Customer

Ensure that the customer is informed about all the repairs that have been carried out. Also let he/she know about the parts that have been replaced and consumed during the repairs. Demonstrate to the customer that all his/her reported issues have been resolved. Insist on a test ride if required.

Please preserve the parts. Show it to the customer and dispose it with the customer's permission.

TECHNICAL SPECIFICATIONS

CONTENTS	PAGE
2 Technical Specifications	25
2.1 Engine.....	25
2.2 Ignition System.....	25
2.3 Transmission.....	25
2.4 Chassis.....	25
2.5 Electrical System.....	26
2.6 Dimensions.....	26
2.7 Weights.....	26
2.8 Recommended Lubricants.....	27

2.1 Technical Specifications

2.1 Engine	
Engine Type	Liquid cooled, single cylinder, DOHC, 4 Valves
Bore	84 mm
Stroke	81.5 mm
Swept Volume	452 cc
No of Valves	4 Nos
Compression Ratio	11.5:1
Max Power	40.02PS(29.44 kW)@8000 rpm
Max Torque	40 Nm @ 5500 rpm
Idle RPM	1300 rpm
Starting	Electric start
Air Filter Element	Paper element
Lubrication	Semi-dry sump
Cooling	Water cooled

2.2 Ignition System	
Ignition	ECU controlled
Spark Plug Gap	0.8 mm to 0.9 mm
Spark Plug	Champion

2.3 Transmission	
Clutch	Wet multiplate, slip and assist
Primary Drive	Gear
Primary Ratio	2.028:1
Gear Box	6 Speed
Gear Ratio	1 st 3.083 :1 2 nd 2.059:1 3 rd 1.600:1 4 th 1.286:1 5 th 1.087:1 6 th 0.958:1
Secondary Drive	Sprockets and chain (5/8 Pitch)
Secondary Ratio	3.000:1

2.4 Chassis	
Frame	Steel, tubular frame using engine as stressed member
Suspension	
Front	Telescopic forks, 43mm, front wheel travel 140 mm
Rear	Linkage type mono-shock, rear wheel travel 150 mm

Brakes	
Front disc	Hydraulic disc brake, 310 mm ventilated disc, double piston caliper
Rear disc	Hydraulic disc brake, 270 mm ventilated disc, single piston caliper
Brake system	Dual channel ABS
* Do not mix DOT 4 or other brake fluid together.	
Tyre Size	
Front (Alloy wheel)	120/70R17 58H (Tubeless tyre)
Rear (Alloy wheel)	160/60R17 69H (Tubeless tyre)
Tyre Pressure	
Solo	Front - 32 psi/ 2.25 kg/cm ²
	Rear - 36 psi/ 2.53 kg/cm ²
With Pillion	Front - 32 psi/ 2.25 kg/cm ²
	Rear - 36 psi/ 2.53 kg/cm ²

Steering Lock	Inbuilt
Fuel type	E5/E10 Unleaded gasoline
Fuel Injection	Electronic fuel injection, 42 mm throttle body, ride by wire system
Fuel tank capacity	11*L(2.42 Imperial Gallon)
Low fuel warning	2.5 L (0.55 Imperial Gallon)± 0.5* L(0.11 Imperial Gallon)
Dead stock	0.15* L (0.03 Imperial Gallon)
*The above values are approximate and the actual fuel filling capacity will vary from the values mentioned.	

2.5 Electrical system

Alternator Output	280 W @ 1200 rpm
Generation	Alternator, III Phase
System	12 V - DC
Battery	12 V - 8 Ah VRLA
Head lamp	12 V, FPL 1.5 W LED, low beam 12.12 W, high beam + low beam 14.22 W
Brake Lamp	12 V, 1.4 W
Tail Lamp	12 V, 0.31 W
License plate illuminator	12 V - LED
Instrument Cluster	Colour TFT (Thin Film Transistor)

Turn Signal	Front - 12 V, 2 W x 1 no Rear - 12 V, 4.2 W x 1 no
Hazard warning	Front - 12 V, 2 W x 2 nos Rear - 12 V, 4.2 W x 2 nos
Horn	12 V, 2.5 A
Starter Motor	12 V - 0.7 kW
Charger Port	USB 2.0 Type C - 5 V, 2 A output

! WARNING

Using bulbs/electrical gadgets other than specified rating will lead to overloading/erratic behavior/premature failure of electrical system. Modifications or fitments which are not approved by Royal Enfield, will seriously affect the performance of the vehicle and will render the warranty void.

2.6 Dimensions

Length	2145 mm (With Number Plate)
Width	833 mm
Seat height	780 mm
Height	1125 mm (Without mirrors)
Standard seat height	Adjustable 825 mm to 845 mm
Low seat height	Adjustable 805 mm to 825 mm
Wheel base	1440 mm
Ground clearance	169 mm

2.7 Weights

Kerb weight (90% fuel and oil)	184 kg
Gross vehicle weight	375 kg

NOTE

- Values / Dimensions given above are for your guidance only.
- In view of continuous improvements being done on our products, the specifications are likely to change without prior notice.
- Please advise the customer not to use the vehicle beyond the allowed gross weight. The suspensions and tyres are designed to perform only to the maximum gross vehicle weight.

2.8 Recommended Lubricants		
Engine Oil	Grade	10W40 API SN, JASO MA2, Semi Synthetic
	Capacity	1st Dry fill: 2.4 L(0.53 Imperial Gallon) Refill: 2.1 L for oil service (Including filter change)
Coolant	Grade	TOTAL COOLELF AUTO SUPRA -37 °C
	Capacity	Radiator: Dry fill: 970 ml Service fill: 840 ml Expansion Tank: Fill to max mark: 200 ml
Front Fork Oil	Grade	SS-8
	Capacity	540 cm3 (Each fork leg)
Brake Fluid	Grade	DOT 4*
	Capacity	Front: 88.3 ml Rear: 75.2 ml

NOTE

- Coolant is ready to use and does not require mixing.
- Recommendation subject to change without notice.
- The above values are approximate and the actual capacity will vary.

⚠ CAUTION

Use of wrong oil grade will reduce the life of the moving parts and seriously affect performance.

PERIODIC MAINTENANCE SCHEDULE

Applicable markets: Europe,
UK and North America

PERIODIC MAINTENANCE

The maintenance schedule detailed here will help you to maintain the customer's Guerrilla 450 motorcycle meticulously to get along trouble free service. The schedule provided herein is based upon an average riding conditions and indicates the km at which regular inspections, adjustments, replacements and lubrications are to be carried out. Kindly ensure the vehicle's maintenance frequency is shortened depending on the severity of the customer's driving condition or if the customer uses the motorcycle in a very dusty environment. Always ensure the customer to contact the nearest Royal Enfield Authorised Service Centre for expert advice and to carry out the required maintenance.

S.No	DESCRIPTION	PERIODIC MAINTENANCE (Whichever is earlier)					
	km (x 1,000)	0.5	10	20	30	40	50
	miles (x 1,000)	0.3	6	12	18	24	30
	Months	1.5	12	24	36	48	60
1.	Engine oil	R	R	R	R	R	R
		Check oil level every 1000 kms (or earlier as required) and top up as required					
2.	Engine oil filter	R	R	R	R	R	R
3.	Inlet and exhaust valve clearance		I&A	I&A		I&A	
4.	Spark plug			I		R	
5.	HT lead		I	I	I	I	I
6.	Rubber hose, air filter to throttle body		I	I	I	I	I
7.	Rubber hose, inlet manifold / adapter		I	I	I	I	I
8.	Evaporative emission equipment rubber hoses		I	I	I	I	I
9.	Air filter element with O-ring on cover		R	R	R	R	R
		Clean / Replace more frequently if operated in dusty condition					
10.	Vent pipe under air filter box		I	I	I	I	I

PERIODIC MAINTENANCE

S.No	DESCRIPTION	PERIODIC MAINTENANCE (Whichever is earlier)					
	km (x 1,000)	0.5	10	20	30	40	50
	miles (x 1,000)	0.3	6	12	18	24	30
	Months	1.5	12	24	36	48	60
11.	Coolant	I	I	I	R	I	I
		Check coolant level in expansion tank every 1000 kms (or earlier as required) and top up as required					
12.	Fuel pump (under tank) mounting		I	I	I	I	I
13	Fuel pump strainer				R		
14.	Throttle body					C	
		Throttle body should be removed from the vehicle and cleaned with a dry microfiber cloth. Usage of throttle body cleaners or any similar solvent or alcohol based liquids for cleaning is strictly prohibited. Throttle body cleaning every 40000 kms or 48 months whichever is earlier as required.					
15.	Clutch cable / lever free play	I	I	I	I	I	I
		Adjust every 1000 kms (or earlier as required)					
16.	Clutch lever & front brake lever pivots	L	L	L	L	L	L
		Lubricate every 1000 kms (or earlier as required)					
17.	Brake pads - front & rear	I	I	I	I	I	I
18.	Brake fluid - front & rear	I	I	R	I	R	I
19.	Rear brake pedal pivot	L	L	L	L	L	L
20.	Brake hose and banjo bolt - front & rear	I	I	I	I	I	I
21.	Steering movement	I	I	I	I	I	I

PERIODIC MAINTENANCE

S.No	DESCRIPTION	PERIODIC MAINTENANCE (Whichever is earlier)					
	km (x 1,000)	0.5	10	20	30	40	50
	miles (x 1,000)	0.3	6	12	18	24	30
	Months	1.5	12	24	36	48	60
22.	Rear wheel drive chain	I	I	I	I	I	I
		Clean, Lubricate and Adjust every 500 kms (or earlier as required), or after riding in wet/dusty/muddy conditions					
23.	Rear wheel cush rubbers			I		I	
24.	Earth wire eyelet tightness		I	I	I	I	I
25.	Battery terminals (apply petroleum jelly)	I	I	I	I	I	I
26.	Tyre wear pattern front & rear	I	I	I	I	I	I
27.	Side stand & centre stand pivots	L	L	L	L	L	L
28.	Rider & pillion footrest pivots	L	L	L	L	L	L
29.	Engine Mount, Swing arm, Front & Rear Wheel Spindle, T Stem Pinch bolts, Rear Sub Frame Mounting Bolts, Rear linkage	I	I	I	I	I	I
30.	Check for runout/faceout of rims	I	I	I	I	I	I

A : Adjust C : Clean I : Inspect (Clean, Adjust, Lubricate or replace if necessary) L : Lubricate R : Replace

NOTE

For maintenance after 50,000 kms (31068.56 miles), please repeat the same frequency specified above.

PERIODIC MAINTENANCE SCHEDULE

Applicable markets: Other than Europe,
UK and North America

PERIODIC MAINTENANCE

The maintenance schedule detailed here will help you to maintain the customer's Guerrilla 450 motorcycle meticulously to get along trouble free service. The schedule provided herein is based upon an average riding conditions and indicates the km at which regular inspections, adjustments, replacements and lubrications are to be carried out. Kindly ensure the vehicle's maintenance frequency is shortened depending on the severity of the customers driving condition or if the customer uses the motorcycle in a very dusty environment. Always ensure the customer to contact the nearest Royal Enfield Authorised Service Centre for expert advice and to carry out the required maintenance.

S.No	DESCRIPTION	PERIODIC MAINTENANCE (Whichever is earlier)										
	km (x 1,000)	0.5	5	10	15	20	25	30	35	40	45	50
	miles (x 1,000)	0.3	3	6	9	12	15	18	21	24	27	30
	Months	1.5	6	12	18	24	30	36	42	48	54	60
1.	Engine oil	R	I	R	I	R	I	R	I	R	I	R
		Check oil level every 1000 kms (or earlier as required) and top up as required										
2.	Engine oil filter	R		R		R		R		R		R
3.	Inlet and exhaust valve clearance			I&A		I&A				I&A		
4.	Spark plug					I				R		
5.	HT lead			I		I		I		I		I
6.	Rubber hose, air filter to throttle body			I		I		I		I		I
7.	Rubber hose, inlet manifold / adapter			I		I		I		I		I
8.	Evaporative emission equipment rubber hoses			I		I		I		I		I
9.	Air filter element with O-ring on cover			R		R		R		R		R
		Clean / Replace more frequently if operated in dusty condition										
10.	Vent pipe under air filter box			I		I		I		I		I

PERIODIC MAINTENANCE

S.No	DESCRIPTION	PERIODIC MAINTENANCE (Whichever is earlier)										
	km (x 1,000)	0.5	5	10	15	20	25	30	35	40	45	50
	miles (x 1,000)	0.3	3	6	9	12	15	18	21	24	27	30
	Months	1.5	6	12	18	24	30	36	42	48	54	60
11.	Coolant	I	I	I	I	I	I	R	I	I	I	I
		Check coolant level in expansion tank every 1000 kms (or earlier as required) and top up as required										
12.	Fuel pump (under tank) mounting			I		I		I		I		I
13.	Fuel pump strainer							R				
14.	Throttle body	Throttle body should be removed from the vehicle and cleaned with a dry microfiber cloth. Usage of throttle body cleaners or any similar solvent or alcohol based liquids for cleaning is strictly prohibited. Throttle body cleaning every 40000 kms or 48 months whichever is earlier as required.										
15.	Clutch cable / lever free play	I	I	I	I	I	I	I	I	I	I	I
		Adjust every 1000 kms (or earlier as required)										
16.	Clutch lever & front brake lever pivots	L	L	L	L	L	L	L	L	L	L	L
		Lubricate every 1000 kms (or earlier as required)										
17.	Brake pads - front & rear	I	I	I	I	I	I	I	I	I	I	I
18.	Brake fluid - front & rear	I	I	I	I	R	I	I	I	R	I	I
19.	Rear brake pedal pivot	L	L	L	L	L	L	L	L	L	L	L
20.	Brake hose and banjo bolt - front & rear	I		I		I		I		I		I
21.	Steering movement	I	I	I	I	I	I	I	I	I	I	I
22.	Wheel rim run out front and rear	I	I	I	I	I	I	I	I	I	I	I

PERIODIC MAINTENANCE

S.No	DESCRIPTION	PERIODIC MAINTENANCE (Whichever is earlier)										
	km (x 1,000)	0.5	5	10	15	20	25	30	35	40	45	50
	miles (x 1,000)	0.3	3	6	9	12	15	18	21	24	27	30
	Months	1.5	6	12	18	24	30	36	42	48	54	60
23.	Rear wheel drive chain	I	I	I	I	I	I	I	I	I	I	I
		Clean, Lubricate and Adjust every 500 kms (or earlier as required), or after riding in wet/dusty/muddy conditions										
24.	Rear wheel cush rubbers					I				I		
25.	Earth wire eyelet tightness			I		I		I		I		I
26.	Battery terminals (apply petroleum jelly)	I	I	I	I	I	I	I	I	I	I	I
27.	Tyre wear pattern front & rear	I	I	I	I	I	I	I	I	I	I	I
28.	Side stand & centre stand pivots	L	L	L	L	L	L	L	L	L	L	L
29.	Rider & pillion footrest pivots	L	L	L	L	L	L	L	L	L	L	L
30.	Engine Mount, Swing arm, Front & Rear Wheel Spindle, T Stem Pinch bolts, Rear Sub Frame Mounting Bolts, Rear linkage	I	I	I	I	I	I	I	I	I	I	I

A : Adjust C : Clean I : Inspect (Clean, Adjust, Lubricate or replace if necessary) L : Lubricate R : Replace

NOTE

For maintenance after 50,000 kms (31068.56 miles), please repeat the same frequency specified above.

ENGINE REMOVAL FROM MAIN FRAME

CONTENTS

PAGE

5.1 Engine Removal from Main Frame.....46

5.1.1. Pillion Seat.....46

5.1.2. Rider Seat.....46

5.1.3 Disconnect Battery Terminal.....47

5.1.4 Fuel System47

5.1.5. Side Panel LH.....49

5.1.6 Sump Guard.....49

5.1.7 Coolant Drain.....50

5.1.8 . Drain Plug51

5.1.9 . Gear Pedal52

5.1.10. Air Filter Box Assembly52

5.1.11. Radiator53

5.1.12. Sensor / Oxygen Sensor Connector(Front) 55

5.1.13. Exhaust Pipe56

5.1.14 Wiring harness bracket57

5.1.15 Canister 57

5.1.16. EMS Throttle Body58

5.1.17. Fuel Injector connector.....58

5.1.18. Oil pressure switch connector.....58

5.1.19. Engine Coolant Temperature Sensor59

5.1.20. RR Unit 59

5.1.21. FD Sprocket Cover 59

5.1.22. Rear Wheel (Increasing chain slack) 59

5.1.23. Remove Rear Chain from FD Sprocket 60

5.1.24. Starter Motor Connection 61

5.1.25. Clutch Cable 61

5.1.26. Swing Arm 61

5.1.27. Engine From Main Frame Mountings 61

5.1 Engine Removal from Main Frame

⚠ WARNING

Never open a radiator cap when the engine is hot.

The pressure released can make the coolant begin to boil and expand.

Boiling coolant could spurt out of the filler neck or reservoir, causing severe burns.

⚠ CAUTION

DO NOT perform any operation on cooling system soon after the motorcycle is OFF.

They can extremely hot and will cause serious injuries.

Wait until the engine temperature is the same as the outdoor temperature.

NOTE

- Ensure the motorcycle is upright on a firm and flat surface.

NOTE

- Drain the engine oil only in when the engine is warm.

⚠ WARNING

The engine and engine oil are very hot at operating temperature - be Careful not to burn yourself.

5.1.2. Seat Assembly

- Insert the key (a) on the seat key slot and turn clockwise direction.

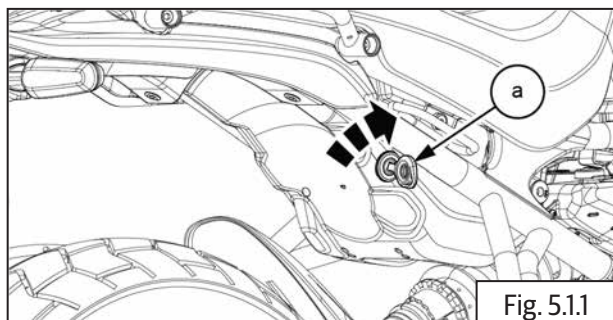


Fig. 5.1.1

- Remove the seat assembly (a) from vehicle.

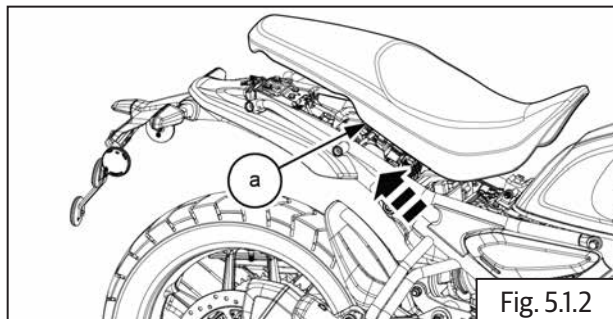


Fig. 5.1.2

⚠ CAUTION

Please Take care while disassembling and assembling the seats, and sheet metal parts, as any sharp edges will lead to injuries.

5.1.3 Disconnect Battery Terminal

- Ensure Ignition and stop switch are in OFF position before disconnecting battery cables.
- Switch "OFF" the engine and remove ignition key from the key barrel.

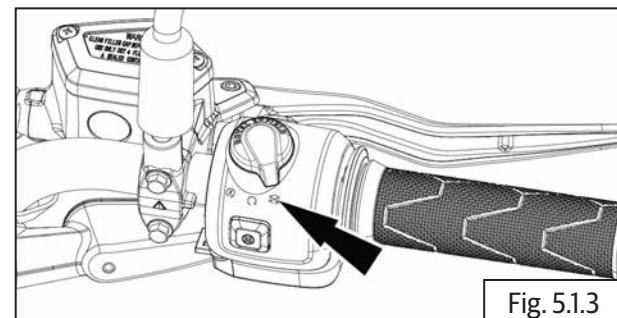


Fig. 5.1.3

- Disconnect the negative (-ve) coupler (a).

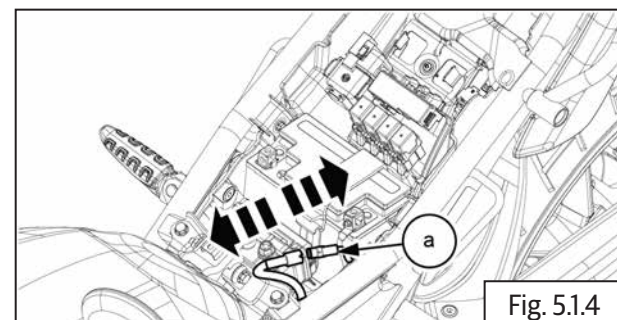
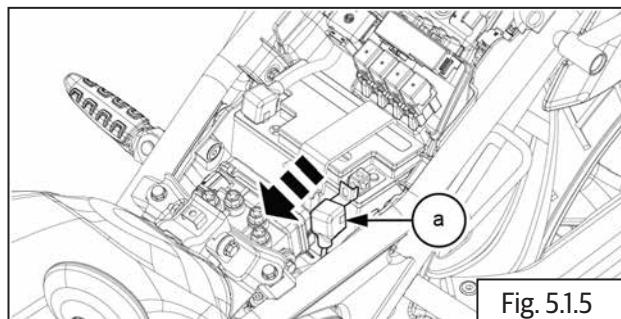
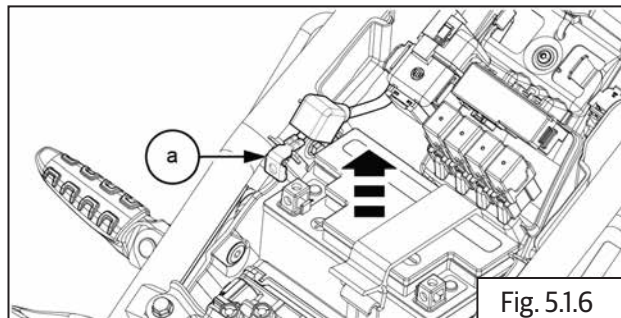


Fig. 5.1.4

- Disconnect battery negative (-ve) terminal bolt (a).



- Disconnect battery positive (+ve) terminal bolt (a).



5.1.4 Fuel System

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Please handle with care. Improper handling can lead to fatal accident or serious injury. Always drain/fill fuel only in a well ventilated area.

Ensure there is no scope for flames or sparks near by while draining/filling fuel.

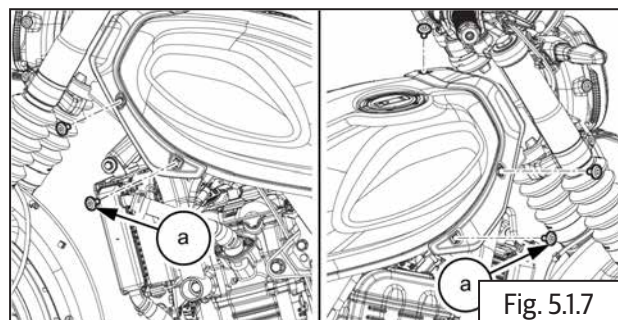
⚠ CAUTION

Make sure the fuel pressure is relieved before disconnecting the fuel connection.

⚠ CAUTION

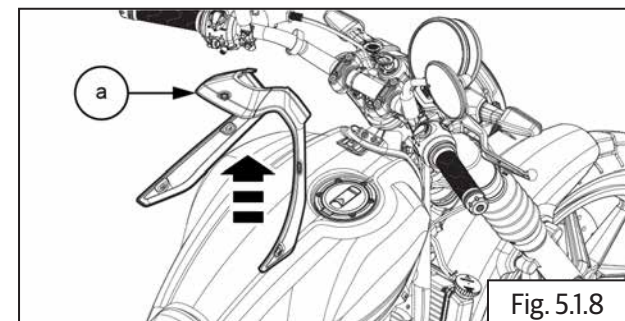
Be careful while connect and disconnect the electrical couplers. Do not damage pins of the couplers.

- Loosen and remove 5 Nos. Button bolts (M5) (a) from LHS and RHS of the fuel tank cover.

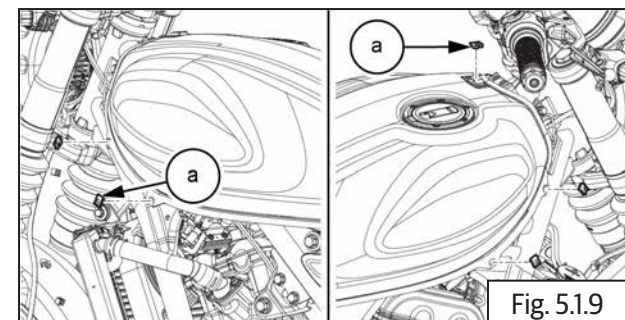


4mm Allen Socket with Ratchet

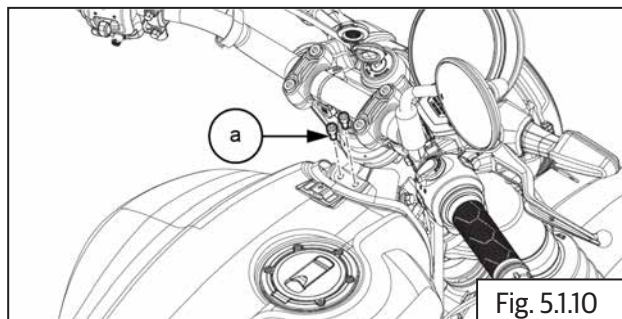
- Remove the cover (a) from the fuel tank.



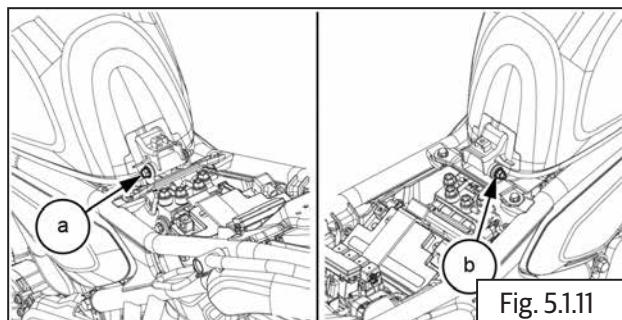
- Remove the 5 Nos clip nuts (a) from fuel tank.



- Loosen and remove 2Nos. cap bolts (M6) (a) from fuel tank front bracket.

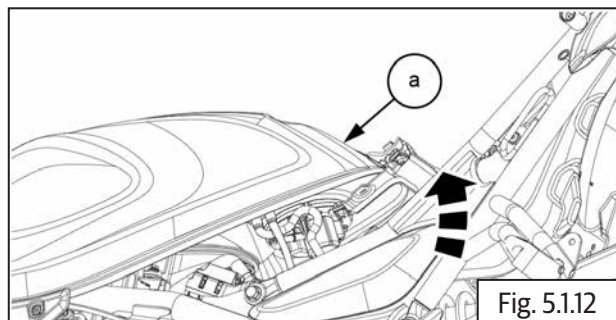


- Loosen and remove 3Nos cap bolts with washers (a) from tank mount bracket.



5mm Allen Socket with Ratchet

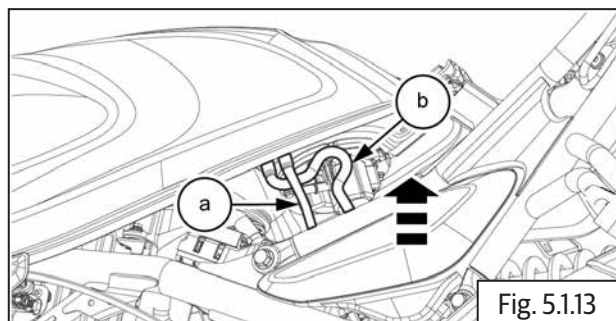
- Gently lift fuel tank (a) upwards and pull backwards slightly.



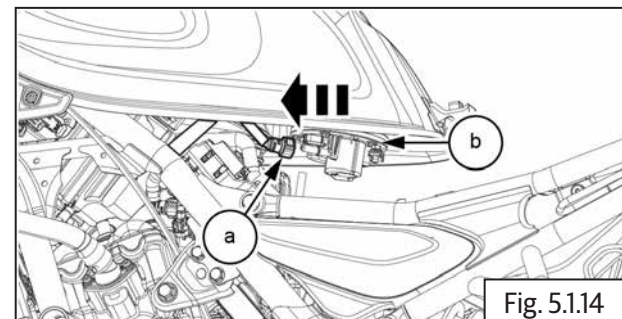
CAUTION

DO NOT lift the tank too much to prevent damage to connectors and brake hoses.

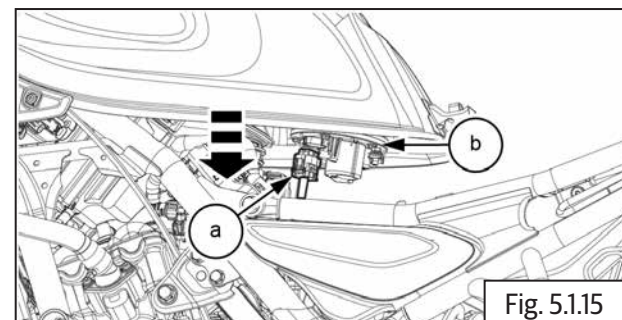
- Disconnect EVAP connection hose (b) from bottom of fuel tank.
- Disconnect drain hose connection (a) from bottom of fuel tank.



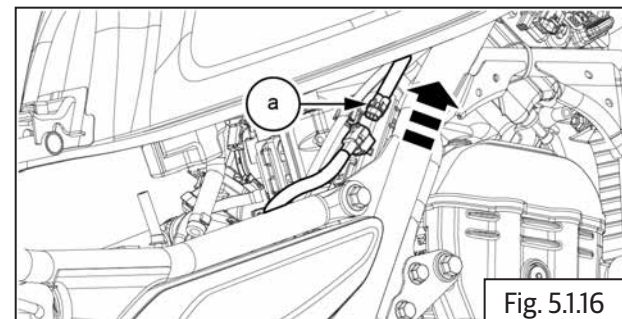
- Clean quick fix adapter area and disconnect by pressing lock button (a) from fuel pump (b).



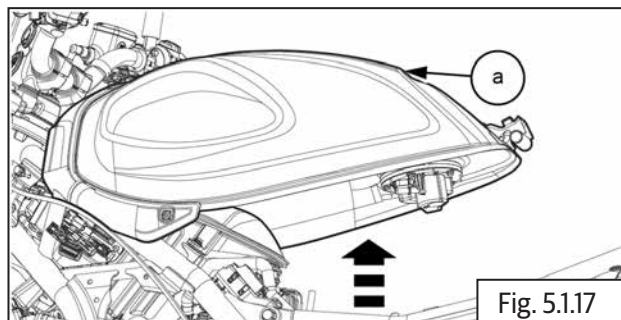
- Disconnect fuel pump connector (a) from fuel tank (b).



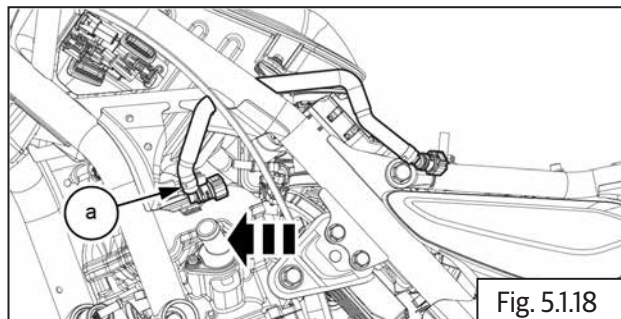
- Disconnect fuel gauge connector (a) from fuel tank.



- Gently remove fuel tank **(a)** from frame.

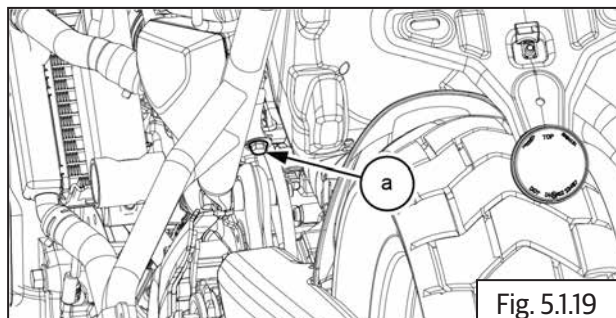


- Remove fuel hose **(a)** from injector cap.



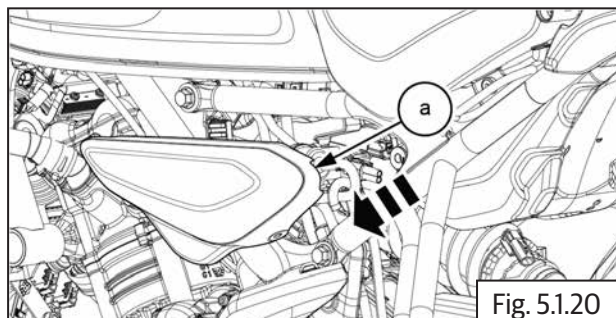
5.1.5. Side Panel LH

- Loosen and remove button head bolt 1no **(M6)** **(a)** along with washer **(b)** from LH side panel.



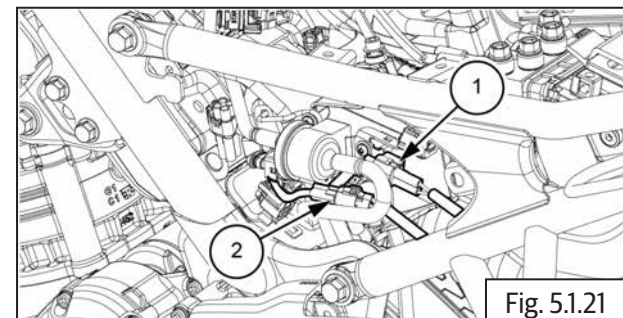
4mm Allen Socket with Ratchet

- Gently Pull the side panel LH **(a)** outside for opening the same.



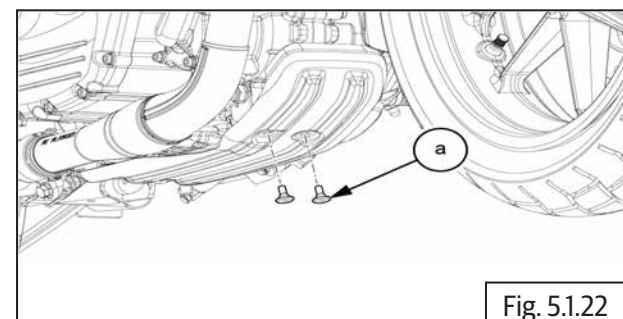
- Disconnect below listed couplers from LH bottom battery tray.

- 1. Crank position sensor**
- 2. Gear position sensor**



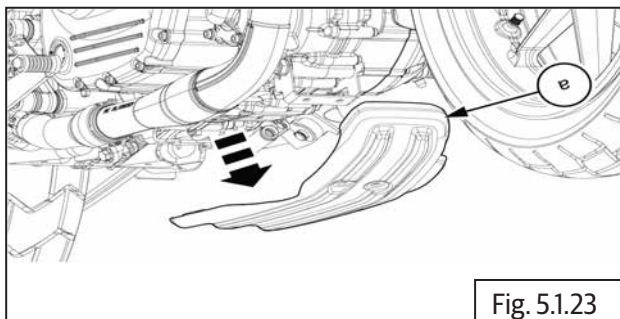
5.1.6 Sump Guard

- Loosen and remove button head bolts 2nos **(M6)** **(a)** from sump guard bottom.

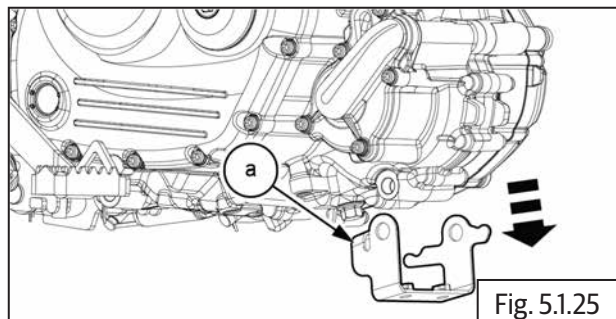


5mm Allen Socket with Ratchet

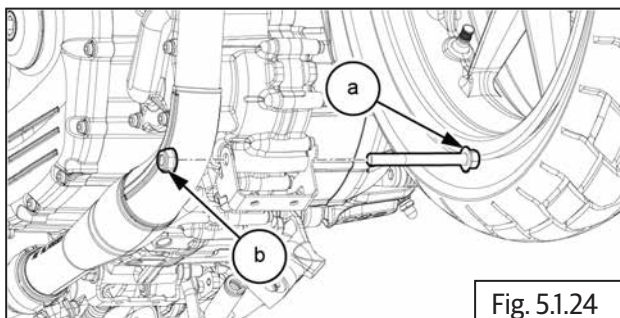
- Gently Pull the sump guard **(a)** outside from bracket.



- Remove the sump guard bracket front **(a)** from engine.



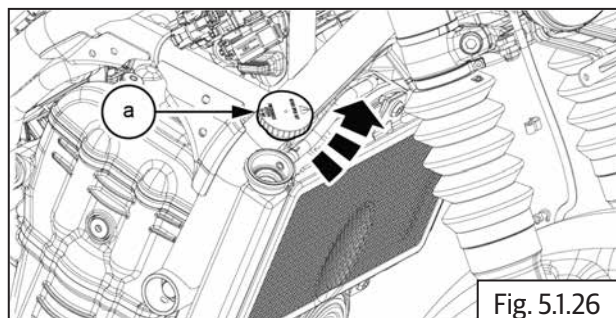
- Loosen and remove flange head bolt **(M10) (a)** with nut **(b)** from engine.



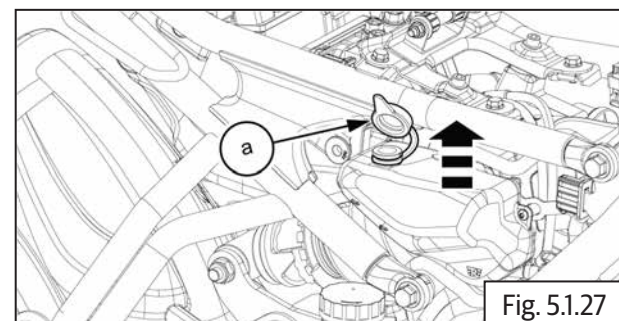
14mm Socket with Ratchet
17mm Double end Spanner

5.1.7 Coolant Drain

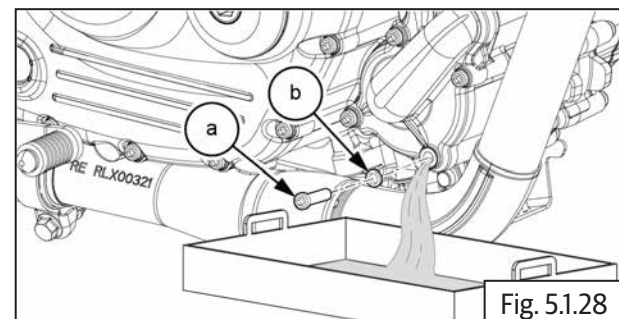
- Open the radiator pressure cap **(a)**.



- Open the expansion cap **(a)**.



- Place a tray under the engine, loosen and remove coolant drain bolt **(M6) (a)** along with copper washer **(b)** from the RHS water pump cover.



5mm Allen Socket with Ratchet

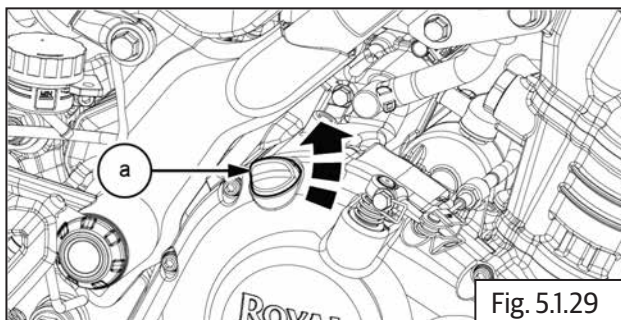
5.1.8 . Drain Plug

⚠ WARNING

The engine and exhaust system get extremely hot during normal operation and direct contact with skin can cause serious burns. Make sure engine is in normal temperature (OR) cooled before starting operation.

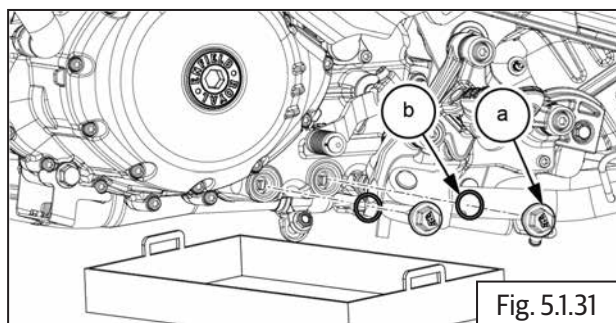
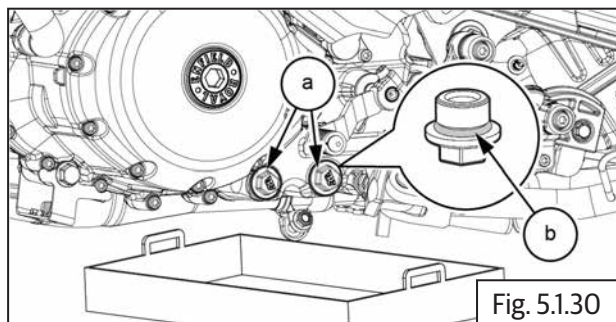
NOTE

- Ensure the motorcycle is upright on a firm and flat surface.
- Start the engine and allow the engine and oil to warm up for a few minutes and then turn it OFF to facilitate easy draining of oil.
- Loosen and remove oil filler cap (a) from the crankcase top on the RH side. Use an adjustable plier with soft jaws to unscrew filler cap if necessary.



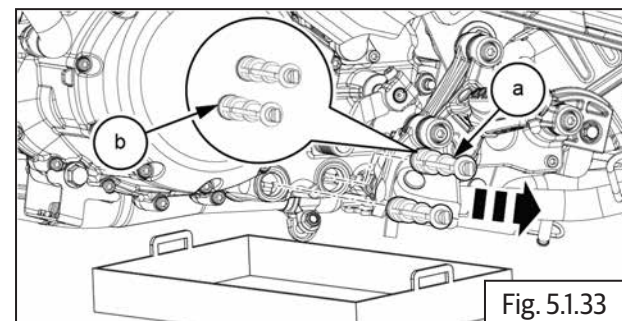
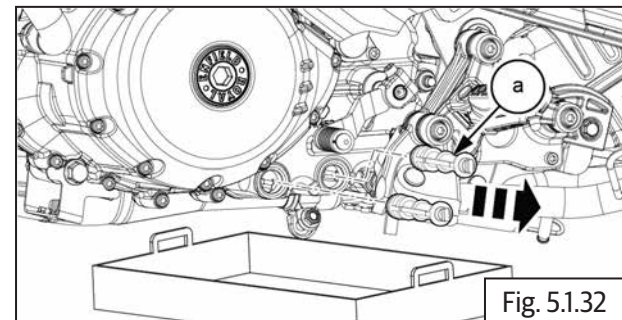
Adjustable plier with soft jaws

- Place a tray under the engine, loosen and remove 2Nos drain plugs (a) along with "O" Rings (b) from LHS oil sump.



17mm Socket with Ratchet

- Remove the 2Nos strainers (a) with "O" Rings (b) from LHS oil sump.

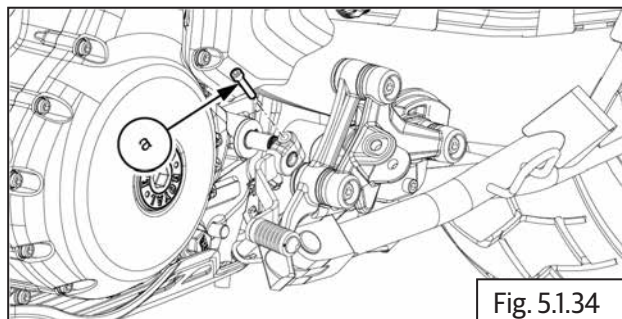


Nose Plier

- Allow the engine oil to drain out completely from the engine.

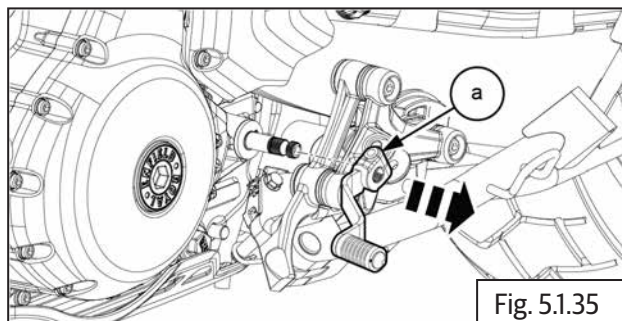
5.1.9. Gear Pedal

- Remove the cap bolt **M6 (a)** from gear pedal.



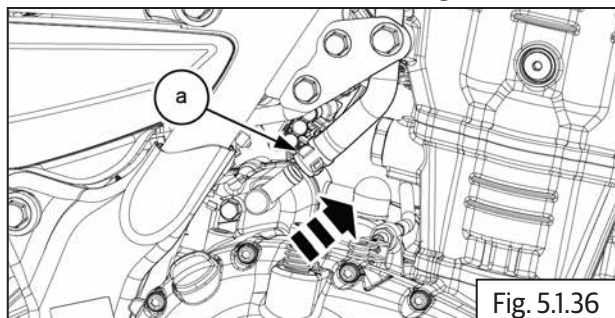
5mm Allen socket with ratchet

- Remove gear pedal from gear shift shaft.



5.1.10. Air Filter Box Assembly

- Remove the clamp **(a)** from bottom breather hose.
- Detach the breather hose from engine .



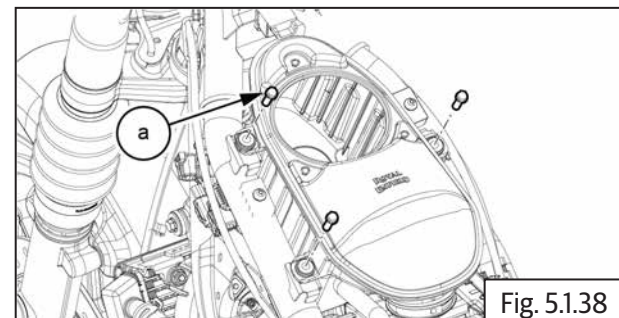
Plier

- Remove the clamp **(a)** from air filter bellow hose.



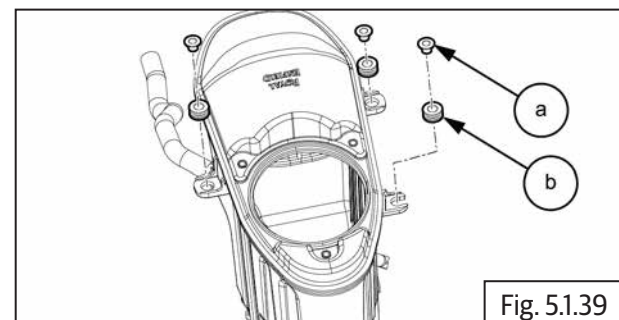
Clamp Removal and install tool

- Loosen and remove 3Nos Hex flange bolts **(a) (M6)** from air filter box.

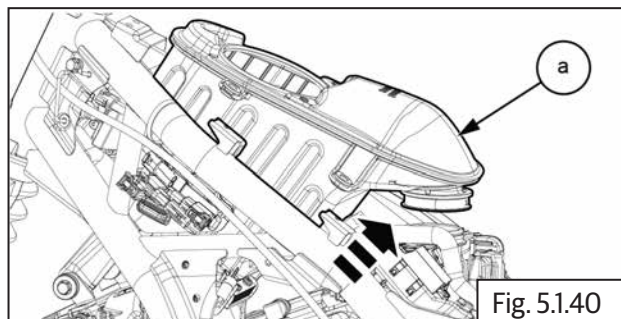


8mm socket with ratchet

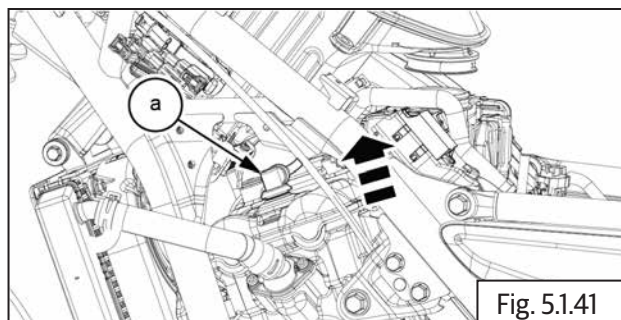
- Remove 3Nos sleeves **(a)** with grommets **(b)** from air filter box.



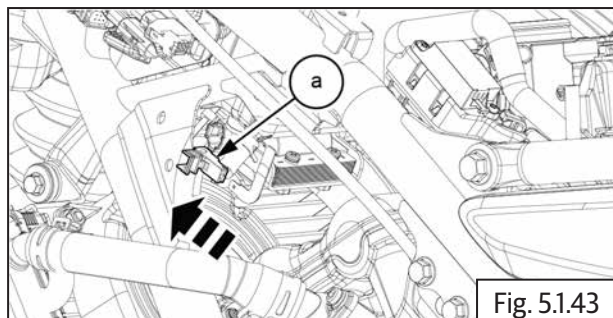
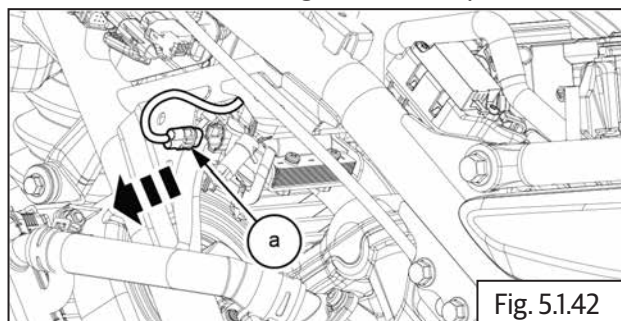
- Slightly lift the air filter box **(a)** to access the ignition coil connector.



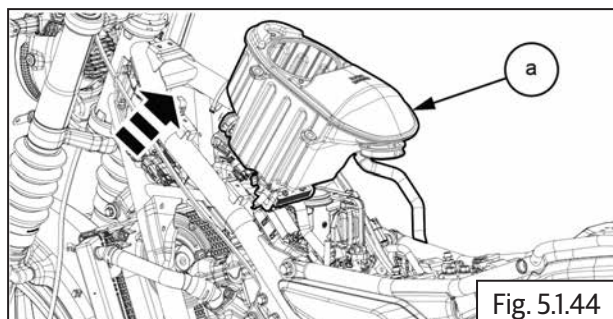
- Remove spark plug cap **(a)** from engine.



- Disconnect the 2Nos ignition coil couplers **(a)**.

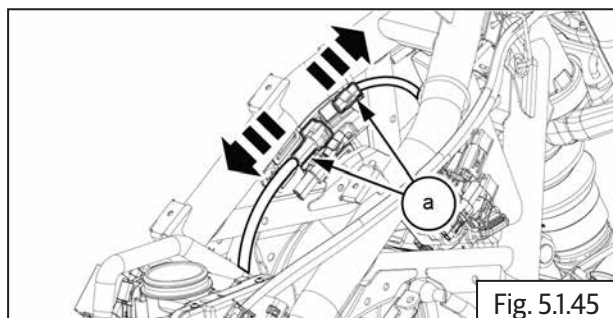


- Remove air filter box **(a)** with ignition coil.

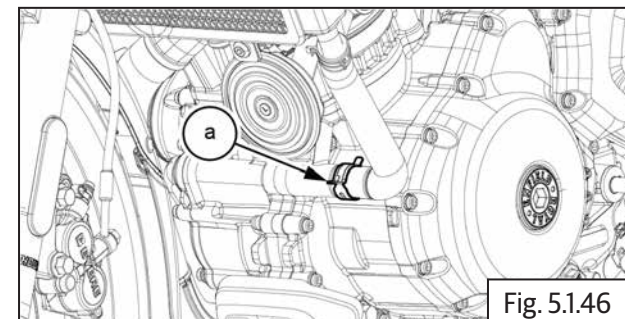


5.1.11. Radiator

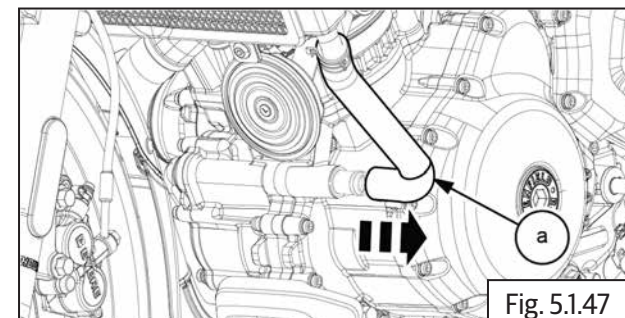
- Disconnect the cooling fan coupler **(a)**.



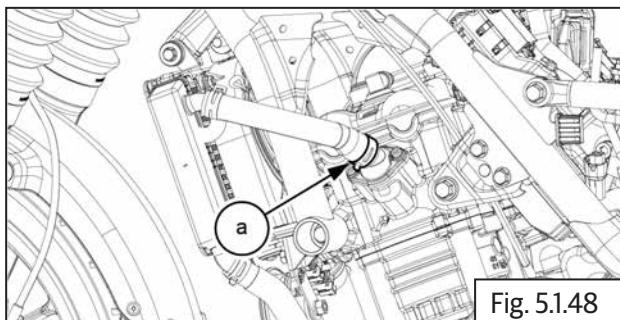
- Remove the clamp **(a)** from engine inlet hose.



- Pull and remove the hose **(a)** from engine.

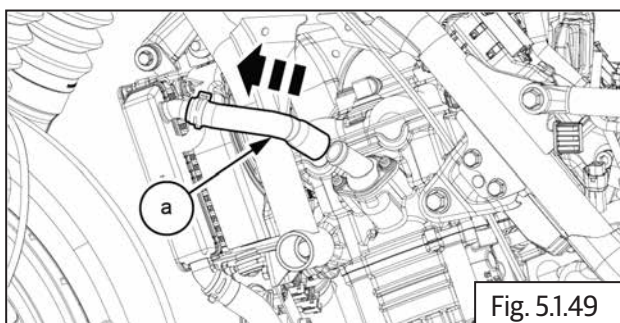


- Remove the clamp **(a)** from engine outlet hose.

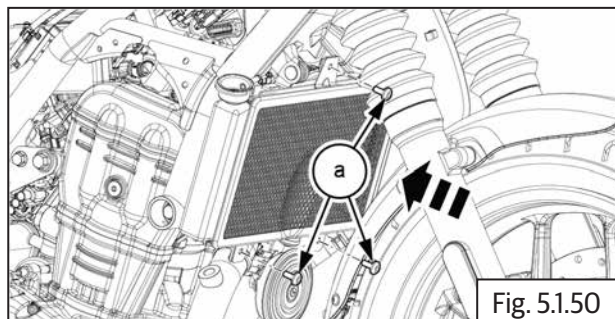


Plier

- Pull and remove the hose **(a)** from thermostat housing.

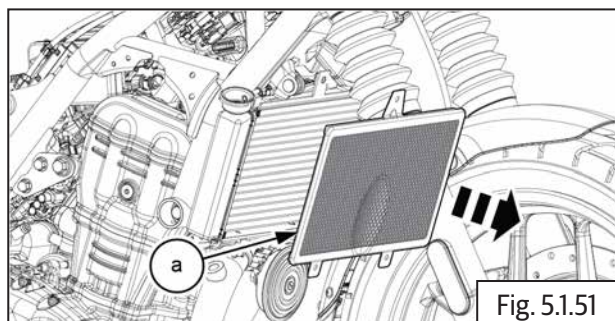


- Remove the 3Nos bolts **(M6) (a)** from radiator guard.

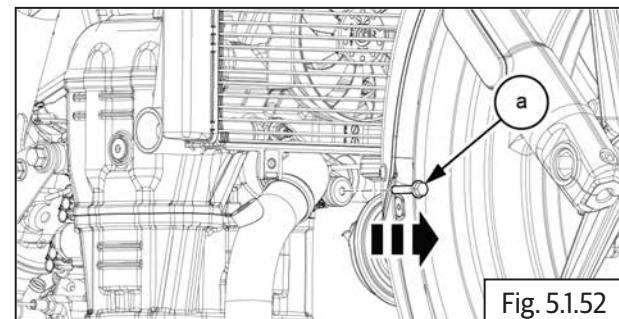


10mm Socket with Ratchet

- Remove the guard **(a)** from radiator.

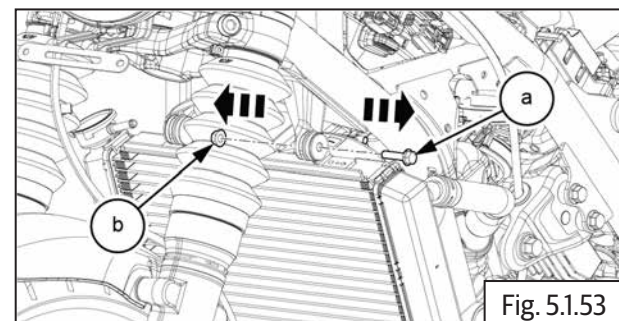


- Remove the 1Nos bolts **(M6) (a)** from bottom of the radiator.



10mm Socket with Ratchet

- Remove the 1Nos bolts **(M6) (a)** from top of the radiator.





10mm Socket with Ratchet

- Remove the radiator with hoses **(a)** from engine.

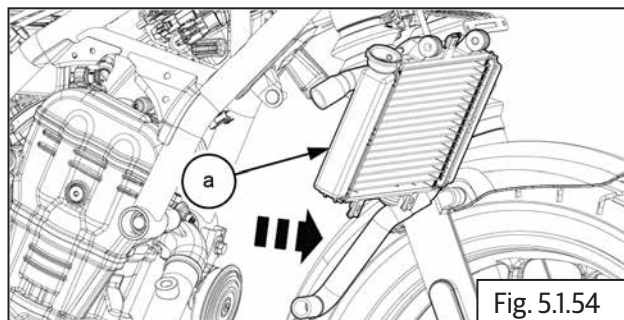


Fig. 5.1.54

5.1.12. Sensor / Oxygen Sensor Connectors (Front)

- Detach the 1Nos omega clips **(a)** from Oxygen Sensor wiring harness.

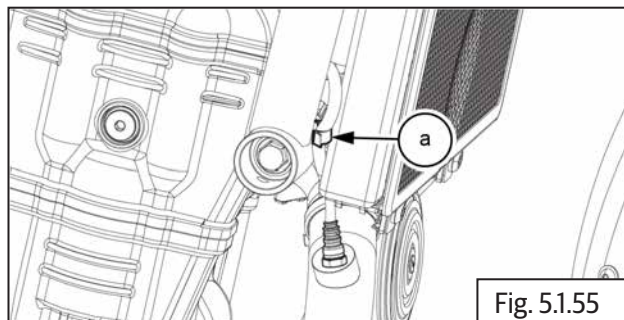


Fig. 5.1.55



Screwdriver

- Oxygen sensor coupler located on RHS chassis frame.
- Disconnect oxygen sensor connector.

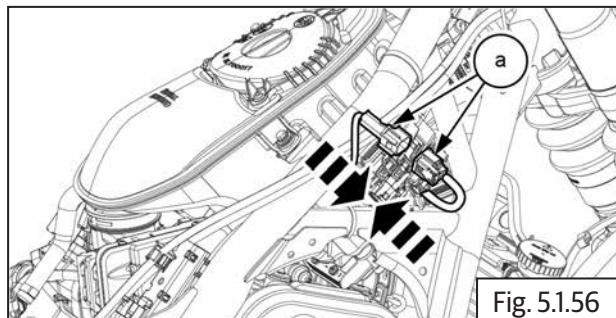


Fig. 5.1.56

5.1.13. Exhaust Pipe

Prior Removal:

- Remove the radiator.
- Loosen and remove 2 Nos flange nuts **(M8) (a)** from the cylinder head assembly.

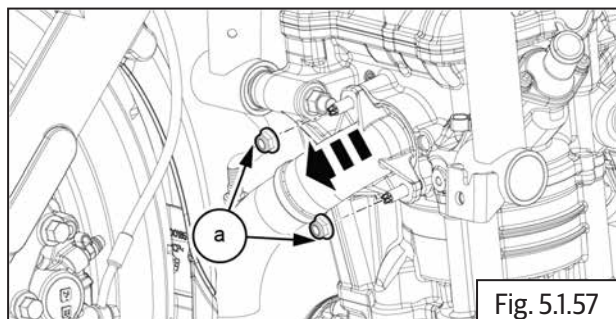


Fig. 5.1.57



12mm socket with ratchet

- Remove the exhaust pipe **(a)**.

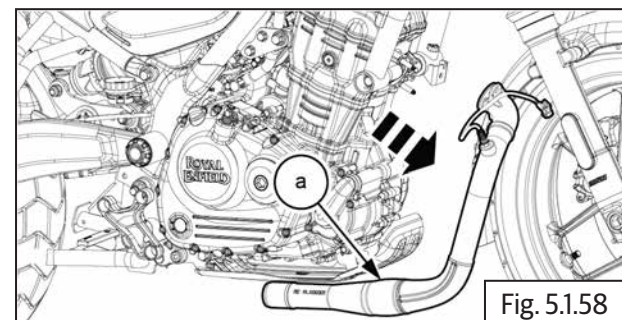


Fig. 5.1.58

- Remove the gasket **(a)** from the silencer rear end.

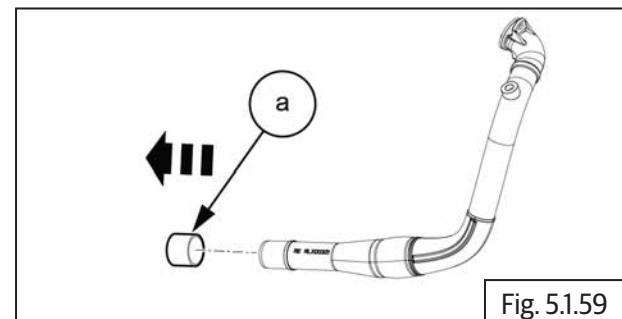
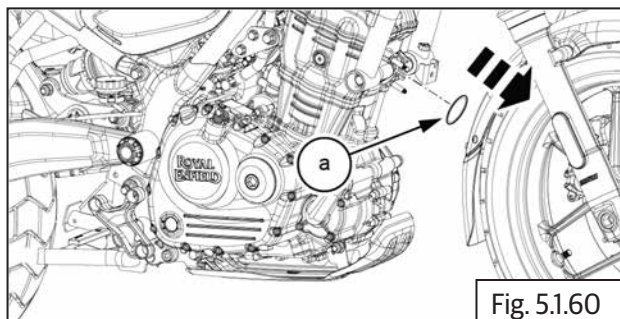


Fig. 5.1.59



Screwdriver

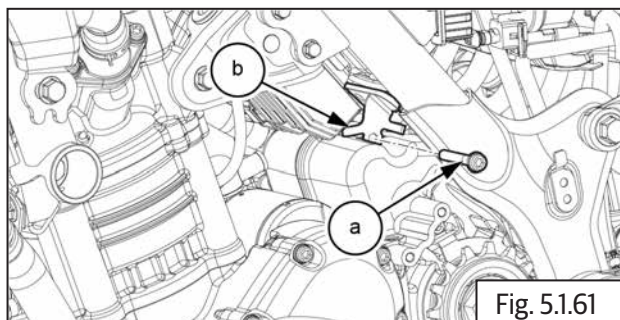
- Remove exhaust Copper Gasket **(a)** from cylinder head.



Screwdriver and Mallet

5.1.14 Wiring harness bracket

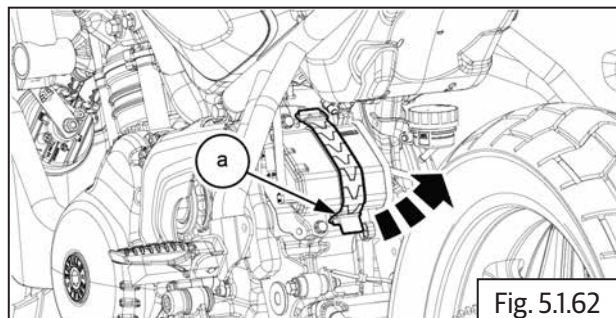
- Loosen and remove 1Nos. Hex socket head bolts **(M6) (a)** from clip bracket **(b)**.
- Remove clip bracket **(b)** from engine.



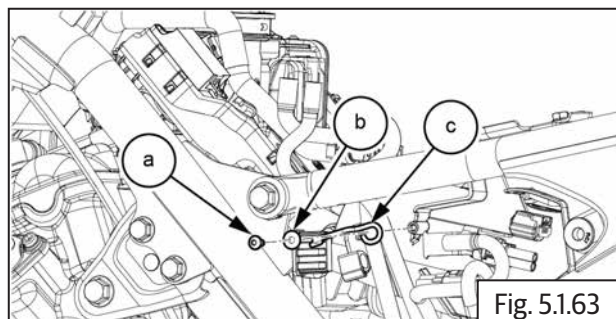
5mm Allen Socket with Ratchet

5.1.15 Canister

- Remove the strap **(a)** from canister.



- Remove the screw **(T40) (a)** with washer **(b)** from the wire guide.
- Remove the wire guide **(c)** from chassis frame .

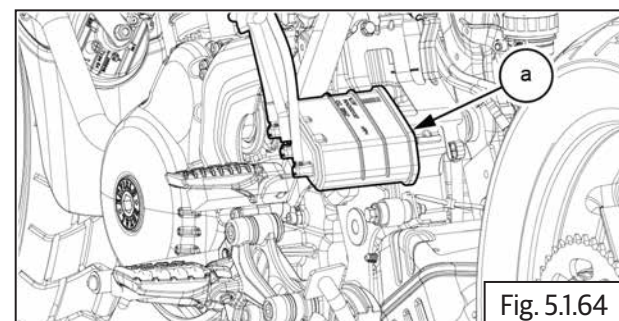


3mm Allen Socket with Ratchet

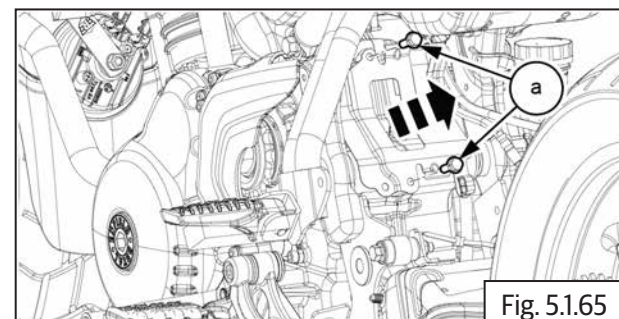
- Remove the canister with pipe assembly **(a)** from chassis frame.

! CAUTION

Do not apply excessive force to pull out canister with hoses as it will damage the canister and the hose pipes.

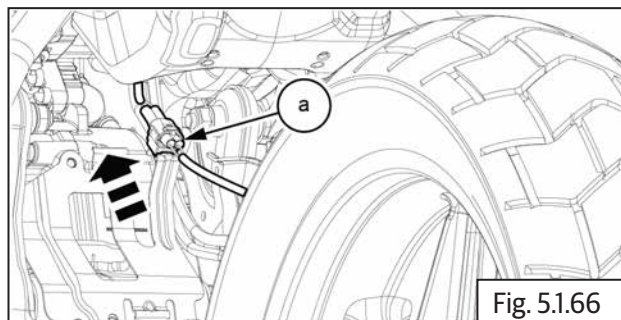


- Loosen and remove the flange head bolts **2 Nos (M6) (a)** from canister bracket.



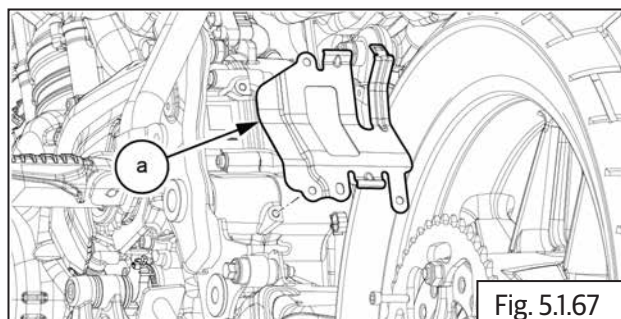
10mm socket with ratchet

- Detach the coupler clip **(a)** from canister bracket.



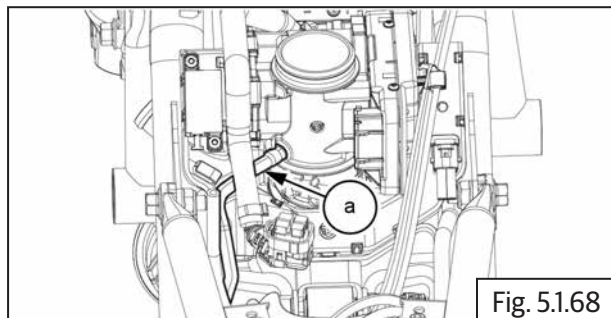
Connector

- Remove the canister bracket **(a)** from chassis frame.

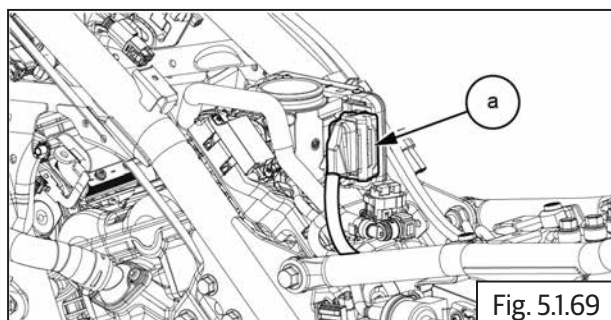


5.1.16. EMS Throttle Body

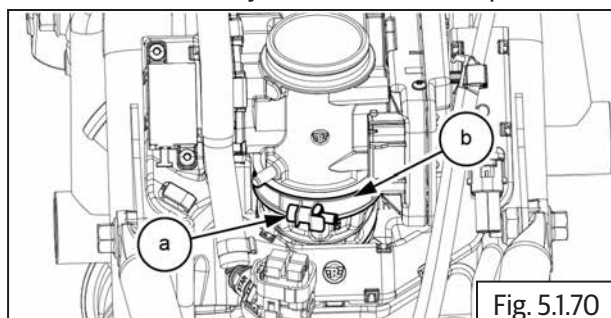
- Disconnect hose **(a)** from throttle body.



- Disconnect coupler from ECU.

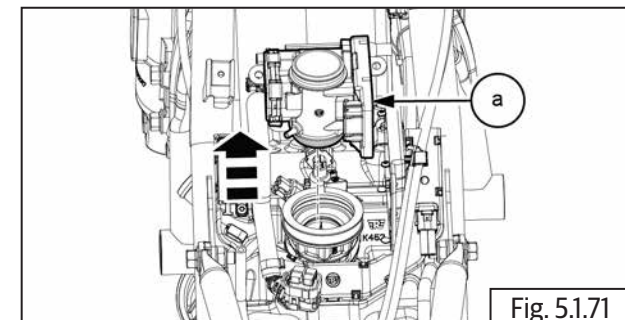


- Loosen worm clip screws **(M5) (a)** to a disconnect EMS throttle body **(b)** from transition piece.



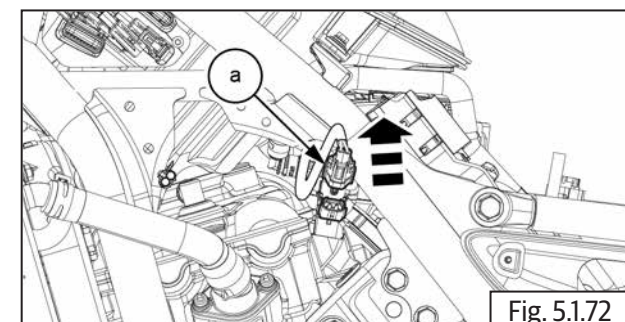
4mm Allen socket with ratchet

- Remove EMS throttle body **(a)** from transition piece.



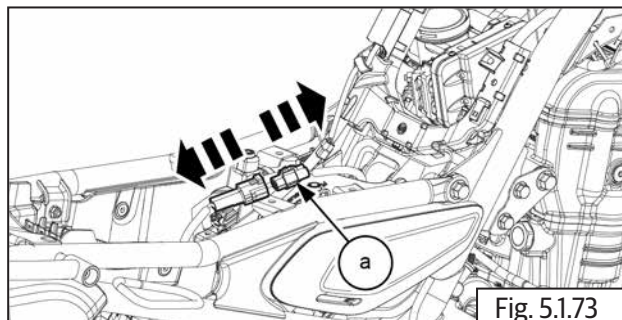
5.1.17. Fuel Injector connector.

- Disconnect the fuel injector coupler **(a)**.



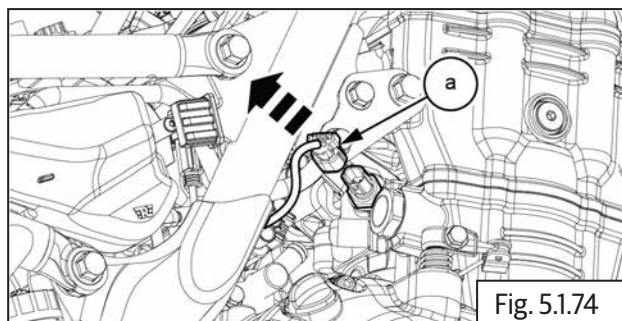
5.1.18. Oil pressure switch connector.

- Disconnect the oil pressure switch coupler **(a)**.



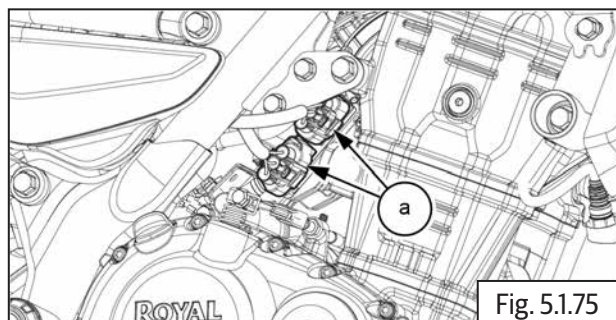
5.1.19. Engine Coolant Temperature Sensor

- Coolant temperature sensor located on rear side of cylinder head.
- Remove coolant temperature sensor coupler **(a)**.



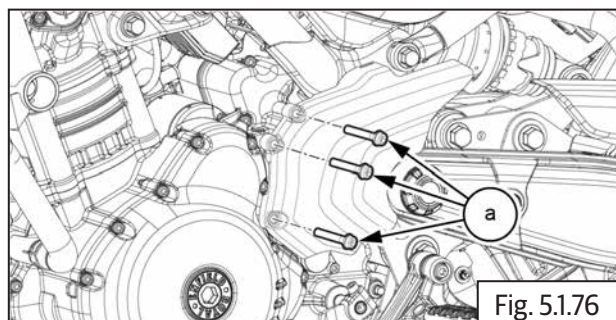
5.1.20. RR Unit

- Disconnect 2Nos electrical connector **(a)** from RR unit.



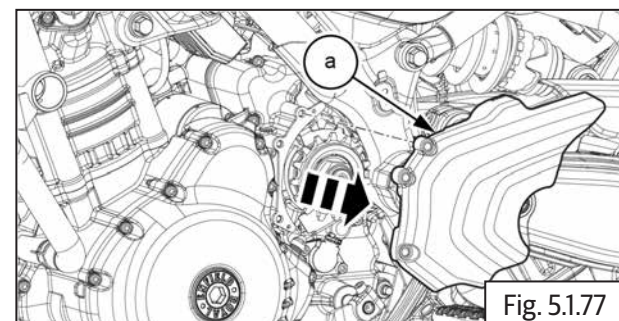
5.1.21. FD Sprocket Cover

- Loosen and remove 3Nos. Hex socket head bolts **(M6) (a)** from FD sprocket cover.



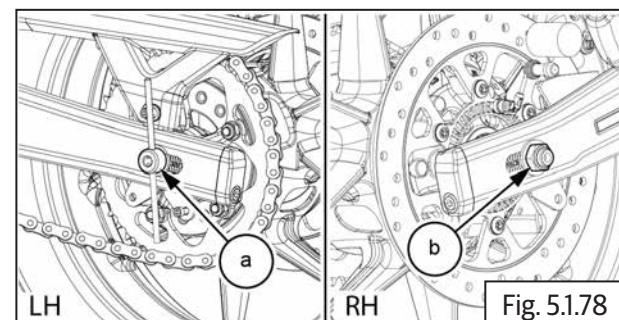
5mm Allen Socket with Ratchet

- Remove the chain sprocket cover **(a)** from engine.



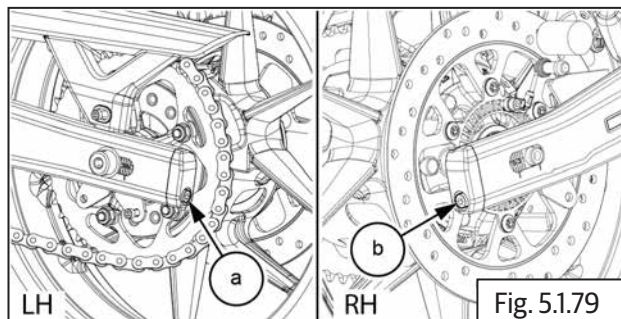
5.1.22. Rear Wheel (Increasing chain slack)

- Loosen the nut **(M16) (b)** from RH and hold other side LH spindle **(a)** with tommy bar increase the chain slackness/tension..



24mm Ring spanner and Tommy bar

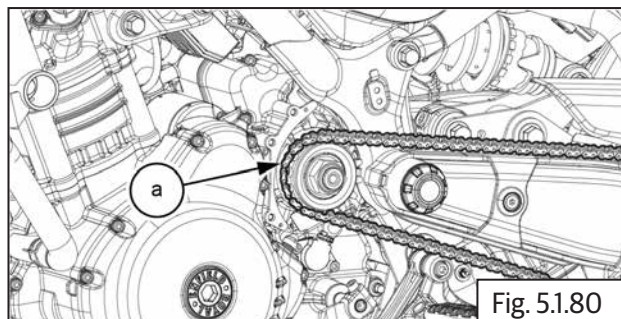
- Loosen the adjuster cap bolts **(M8) (a)** and **(b)** on both LH and RH swing arm.



6mm Allen Socket with Ratchet

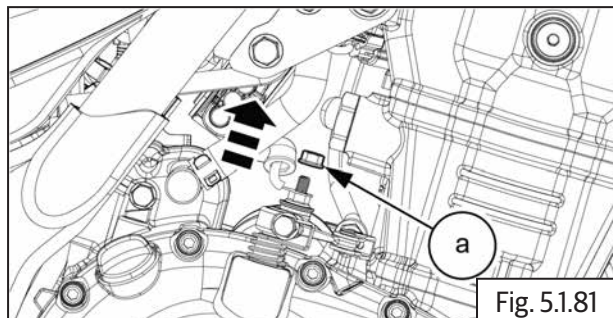
5.1.23. Remove Rear Chain from FD Sprocket

- Remove the drive chain **(a)** from the sprocket.



5.1.24. Starter Motor Connection

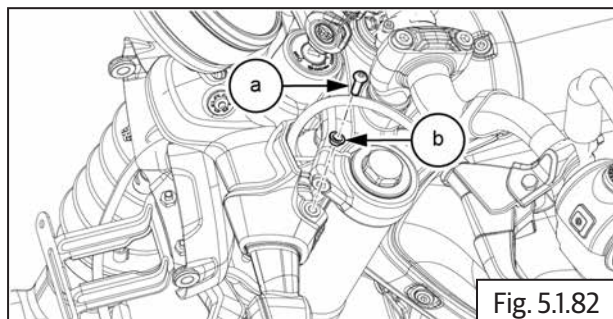
- Loosen and remove the nut **(a)** from self motor and remove the main cable.



10mm Socket with Ratchet

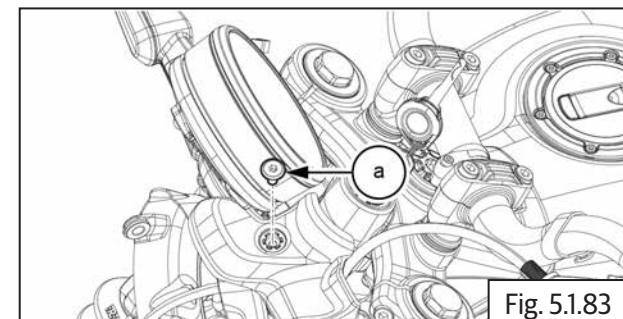
5.1.25. Clutch Cable

- Loosen and remove the button head bolt **(M5) (a)** with top hat washer **(b)** from the Trafficator upper mount cover.



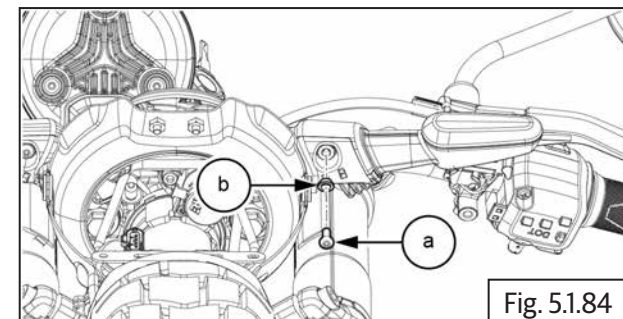
3mm Allen Socket with Ratchet

- Loosen and remove the shoulder button head bolt **M6 (a)** from the Trafficator upper mount cover.



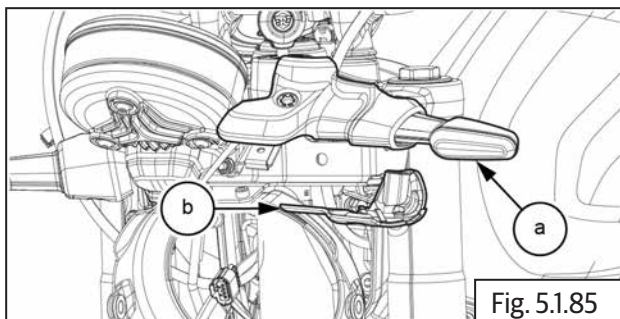
5mm Allen Socket with Ratchet

- Loosen and remove the button head bolt **(M5) (a)** with top hat washer **(b)** from the Trafficator lower mount cover..

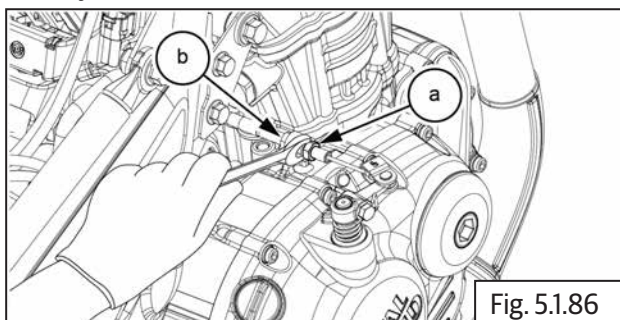


3mm Allen Socket with Ratchet

- Separate the top **(a)** and bottom **(b)** trafficator mount covers from the front frame assembly.

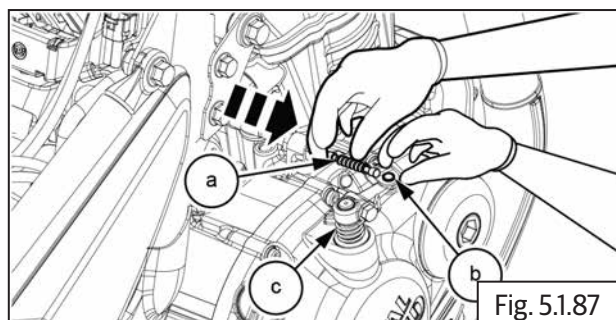


- Loosen outer lock nut **(M8) (a)** from rear of cable adjuster **(b)**.

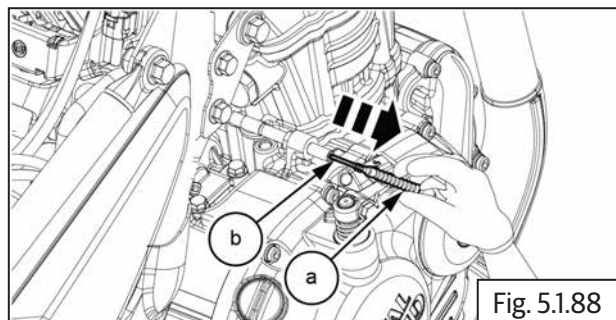


12mm Socket with Ratchet

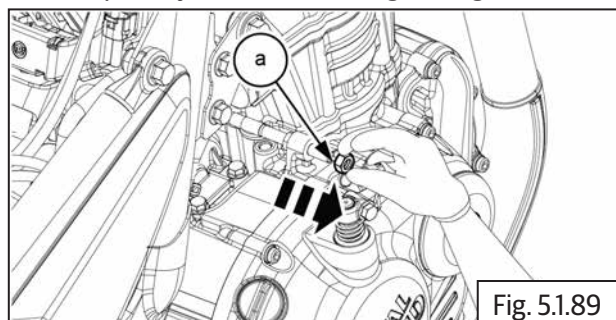
- Release inner cable **(a)** from clevis **(b)** on clutch actuating assembly **(c)**.



- Remove rubber grommet **(a)** from clutch cable **(b)**.

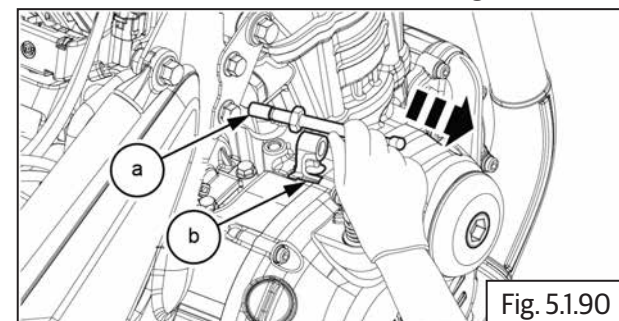


- Loosen and remove inner locknut **(M8) (a)** fully and pull adjuster from housing cable guide.

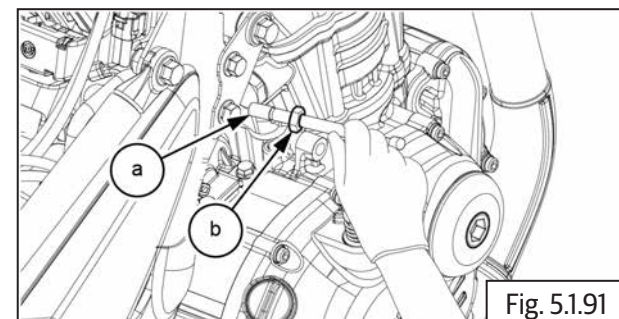


12mm Socket with Ratchet

- Remove clutch cable **(a)** from cable guide **(b)**.



- Remove outer lock nut **(a)** from clutch cable **(b)**.



12mm Socket with Ratchet

- Loosen lock nut and ensure adjuster **(a)** at the handlebar end is fully turned into the bracket LH to increase cable play.

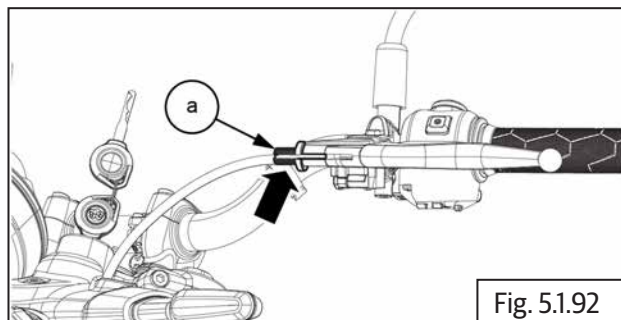


Fig. 5.1.92

- Pull out the clutch cable **(a)** from clutch lever.

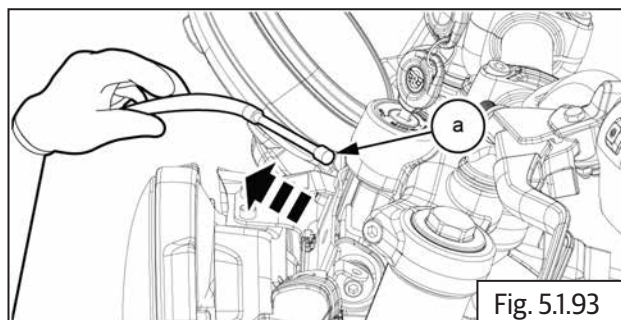


Fig. 5.1.93

- Remove the rubber strap **(a)** from frame.

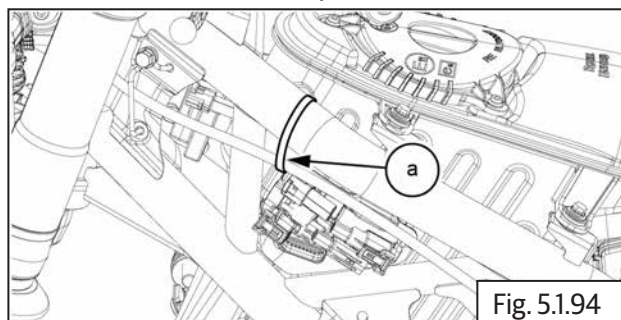


Fig. 5.1.94

- Remove the cable from the LHS cylinder head rear bracket.

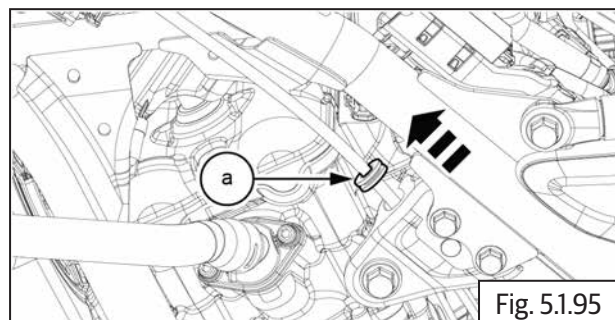


Fig. 5.1.95

- Loosen and remove harness clip bolt **(M6) (a)** from LHS chassis frame.

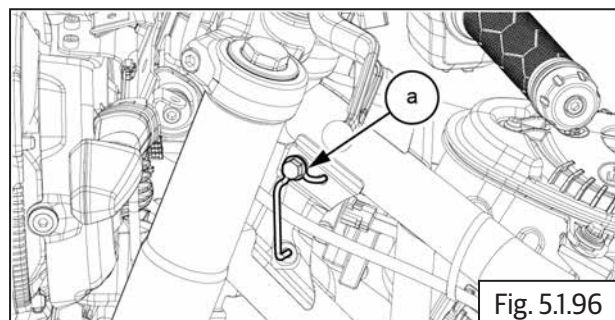


Fig. 5.1.96



8mm Allen Socket with Ratchet

5.1.26. Swing Arm

- Remove pivot cap **(a)** from LHS & RHS swing arm spindle.

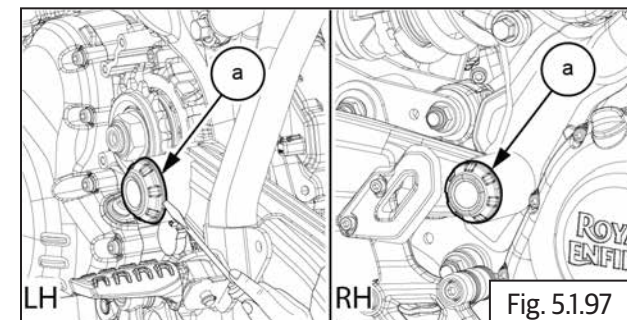


Fig. 5.1.97



Screwdriver

- Hold spindle bolt **(M16) (a)** in frame RH side and loosen and remove hex nut **(M16) (b)** from LH side.

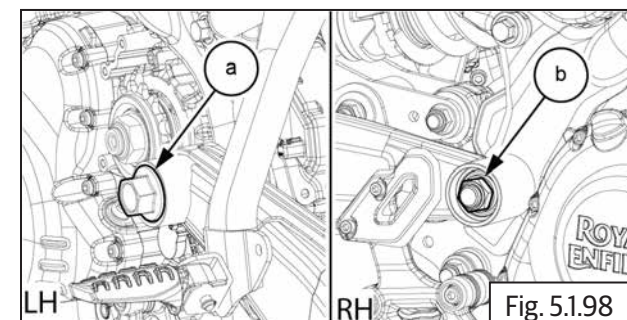
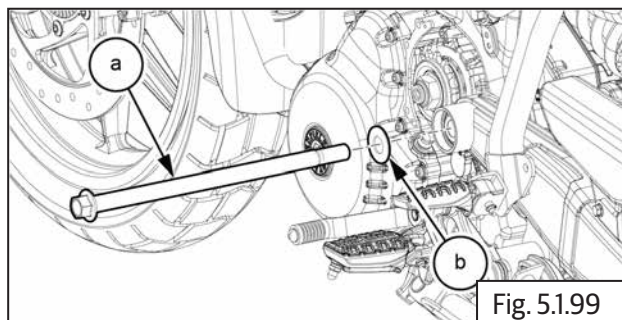


Fig. 5.1.98



22mm Socket with Ratchet
24mm Socket with Ratchet

- Remove the spindle **(a)** along with thrust washer **(b)** from LH side.

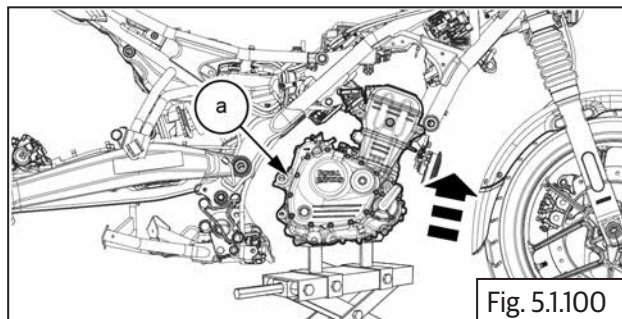


⚠ CAUTION

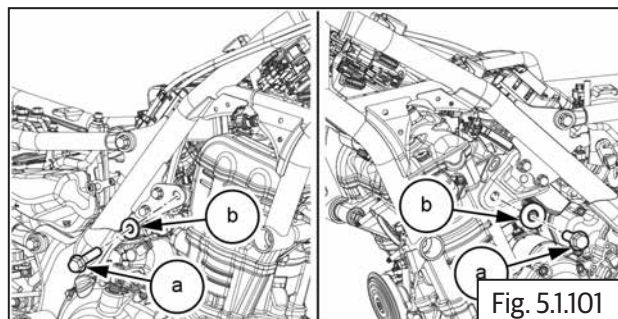
- Avoid resting the swing arm onto the CAT box as it will naturally tend to move down during this process..

5.1.27. Engine From Main Frame Mountings

- Support engine **(a)** with flat jack (a) so that it will not fall off when mounting bolts are removed.

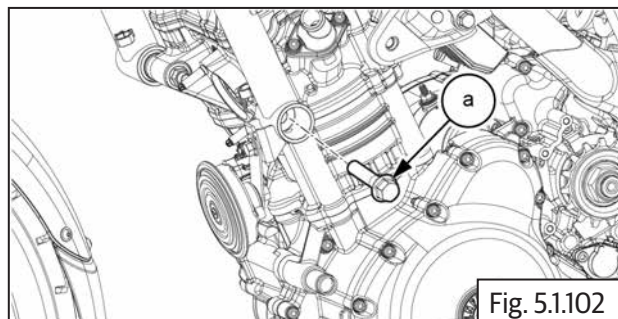


- Loosen and Remove Hex head bolt **(M10) (a)** from LHS and RHS engine .



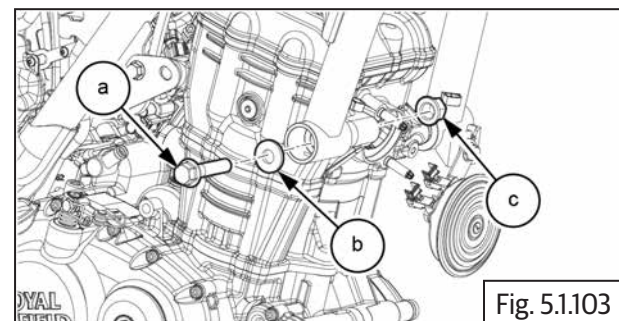
14mm Socket with Ratchet

- Loosen and Remove Hex head bolt **(M10) (a)** from Rear LHS engine .



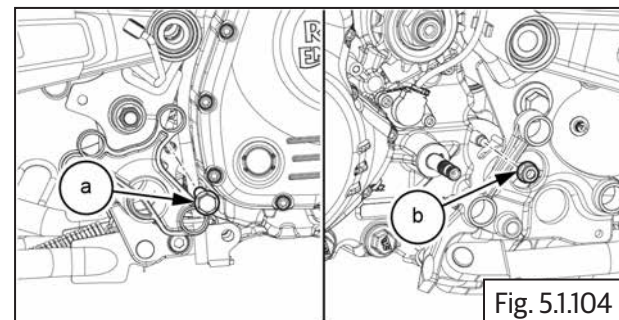
14mm Socket with Ratchet

- Loosen and Remove Hex head bolt **(a)** and washers 2Nos **(b)** with nut **(M10) (c)** from Front RHS main frame.



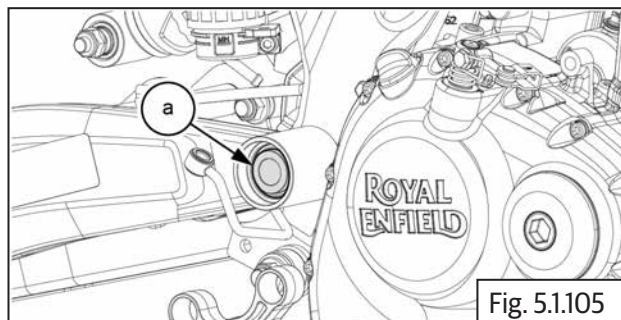
14mm Socket with Ratchet

- Loosen and Remove Hex head bolt **(a)** with nut **(M10) (b)** from Front LHS main frame .



14mm Socket with Ratchet

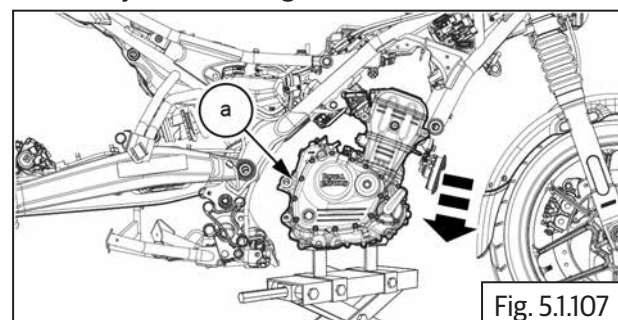
- Locate special tool **(a)** on main frame to loosen the rear mounting adjuster from frame RHS on rear side of engine.



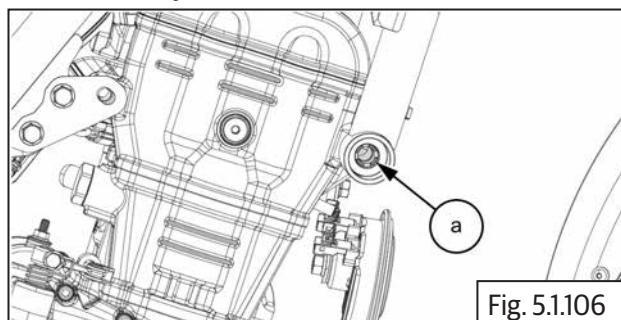
	Part No: ST32159/A
	Part Name: Frame Adjuster K Engine

	Part No: ST32159/A
	Part Name: Frame Adjuster K Engine

- Ensure bottom of engine **(a)** is supported suitably. Gently lower the engine from main frame.



- Locate special tool **(a)** on front RHS engine to remove adjuster from frame RH.



ENGINE INSTALL TO MAIN FRAME

CONTENTS

PAGE

5.2 Engine Install To Main Frame.....68

5.2.1. Swing Arm.....70

5.2.2. Clutch Cable71

5.2.3 Clutch Cable Free Play Adjustment72

5.2.4. Rear Chain To FD Sprocket73

5.2.5. Drive Chain Free Play Adjustment74

5.2.6. FD Sprocket Cover75

5.2.7. RR Unit76

5.2.8. Engine Coolant Temperature Sensor76

5.2.9. Oil pressure switch connector76

5.2.10. Fuel Injector connector76

5.2.11. EMS Throttle Body76

5.2.12. Canister77

5.2.13 Wiring harness bracket78

5.2.14. Exhaust Pipe78

5.2.15. O2 Sensor / Oxygen Sensor Connectors(Front)79

5.2.16 Radiator79

5.2.17. Air Filter Box Assembly81

5.2.18 . Gear Pedal82

5.2.19 . Drain Plug83

5.2.20 Radiator coolant filling84

5.2.21 Air Bleeding86

5.2.22. Sump Guard.....88

5.2.23. Side Panel LH.....89

5.2.24. Fuel Tank.....90

5.2.25 Connect Battery Terminal91

5.2.26. Rider Seat91

5.2.27. Pillion Seat92

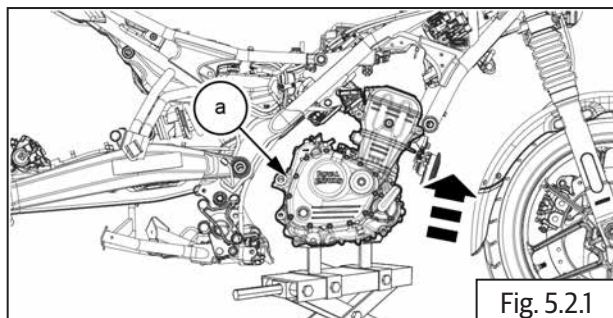
5.2 Engine Install To Main Frame

⚠ WARNING

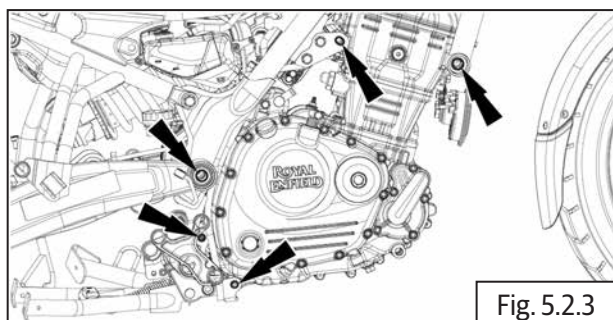
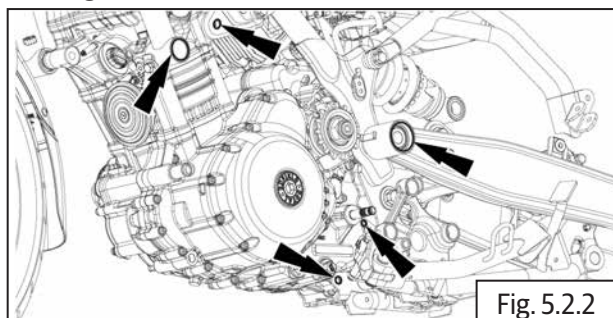
DO NOT tighten bolts during initial installation.

NOTE

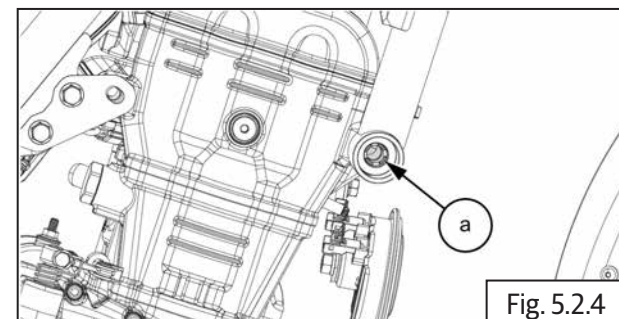
- Ensure motorcycle is upright on a firm and flat surface.
 - Ensure the front and rear wheels are clamped firmly to motorcycle ramp.
 - Slide engine into main frame only from the LH side and with rear end of engine into mainframe first.
 - Ensure frame adjusters at rear end of mainframe and all other mounting holes are aligned correctly with frames for ease of assembly.
 - Lift engine into mainframe by suitable supporting from the bottom of engine.
-
- Support engine suitably and firmly on a flat jack and ensure it is stable.
 - Gently raise the engine to the main frame, ensuring the bottom of engine **(a)** is supported suitably.

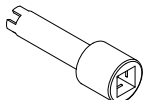


- Lift the jack slowly and align mounting holes of engine and main frame.

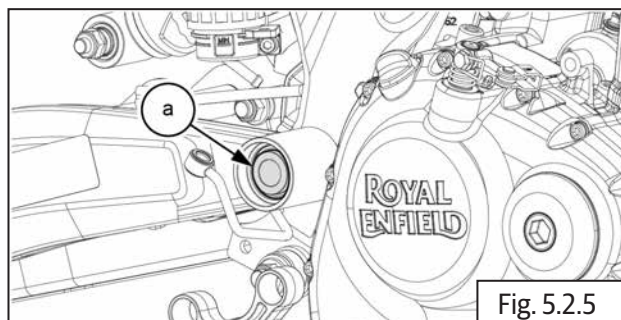


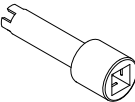
- Place special tool on adjuster **(a)** and gently adjust till frame holds engine properly.



	SPL	Part No: ST32159/A
		Part Name: Frame Adjuster K Engine
		3Nm / 0.3kgf-m

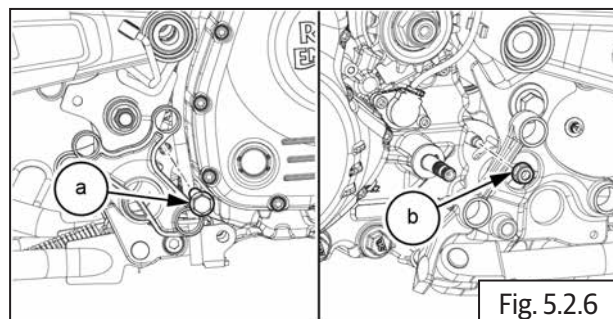
- Lift the jack slowly and align mounting holes of frame with mounting holes on engine.
- Place special tool on adjuster **(a)** and gently adjust till frame holds engine properly.



SPL 	Part No: ST32160/A
	Part Name: Frame Adjuster Swing arm

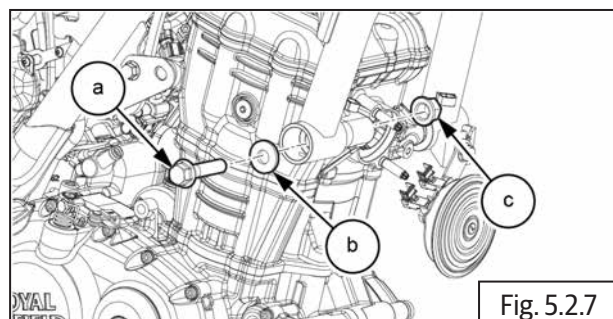
	3Nm / 0.3kgf-m
--	----------------

- Insert Hex head bolt **(a)** with nut **(M10) (b)** into Front LHS main frame. **DO NOT TIGHTEN FULLY.**



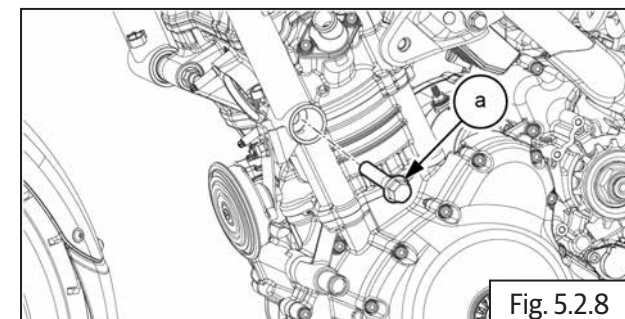
	14mm Socket with Ratchet
---	--------------------------

- Insert Hex head bolt **(a)** and washers **2Nos (b)** with nut **(M10) (c)** into Front RHS main frame. **DO NOT TIGHTEN FULLY.**



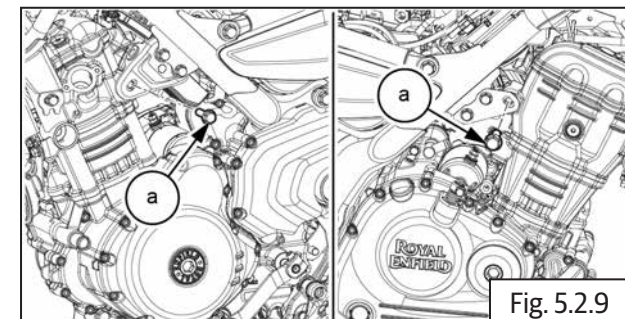
	14mm Socket with Ratchet
---	--------------------------

- Insert Hex head bolt **(M10) (a)** into Rear LHS engine. **DO NOT TIGHTEN FULLY.**



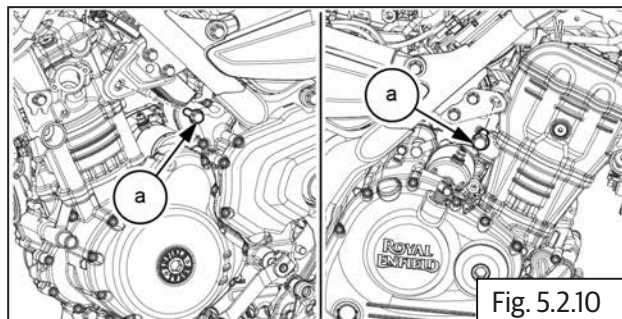
	14mm Socket with Ratchet
---	--------------------------

- Insert Hex head bolt **(M10) (a)** to LHS and RHS engine. **DO NOT TIGHTEN FULLY**



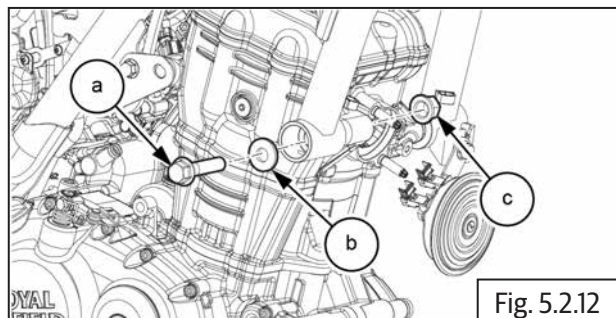
	14mm Socket with Ratchet
---	--------------------------

- Tighten the Hex head bolt **(M10) (a)** to LHS and RHS engine.



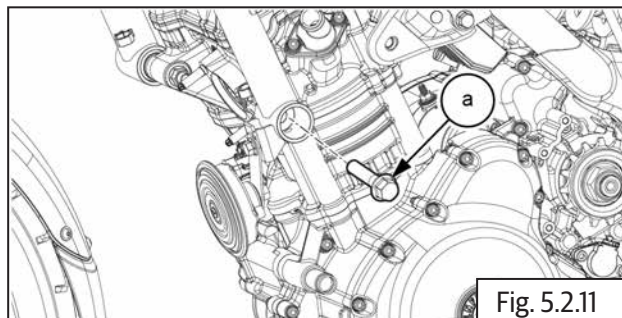
	14mm Socket with Ratchet
	45Nm / 4.5kgf-m

- Tighten the Hex head bolt **(a)** and washers 2Nos **(b)** with nut **(M10) (c)** into Front RHS main frame.

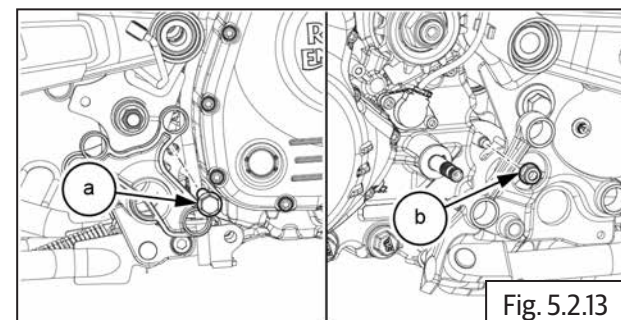


	14mm Socket with Ratchet
	45Nm / 4.5kgf-m

- Tighten the Hex head bolt **(M10) (a)** into Rear LHS engine.

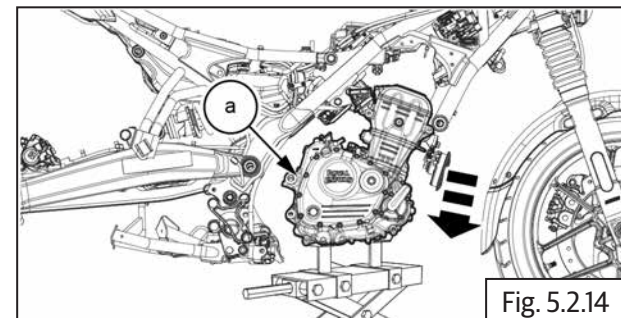


- Tighten the Hex head bolt **(a)** with nut **(M10) (b)** into Front LHS main frame. **DO NOT TIGHTEN FULLY**



	14mm Socket with Ratchet
	45Nm / 4.5kgf-m

- Remove support from engine **(a)**.

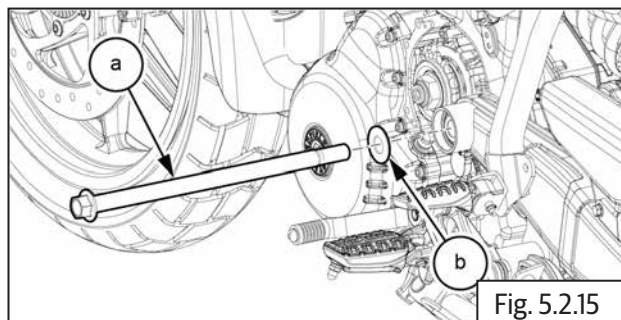


5.2.1 Swing Arm

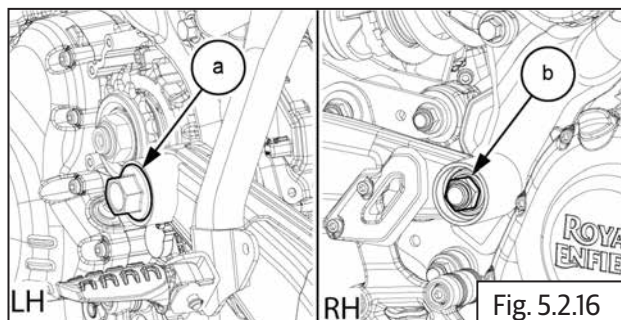
⚠ CAUTION

- Avoid resting the swing arm onto the CAT box as it will naturally tend to move down during this process..

- Insert the spindle **(a)** along with the thrust washer **(b)** into the left-hand side.

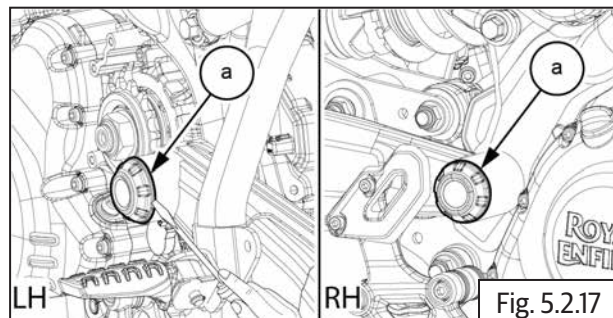


- Locate the spindle bolt **(M16) (a)** into the LH side and Tighten the hex nut **(b)** into the RH side.



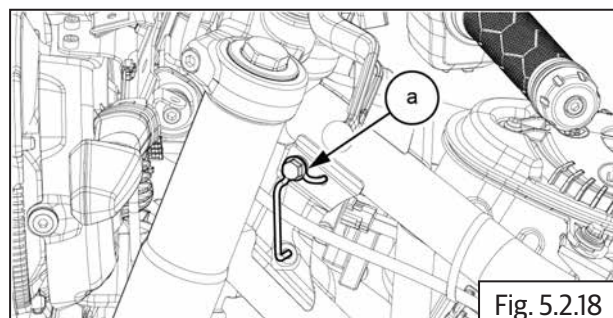
	22mm Socket with Ratchet 24mm Socket with Ratchet
	100Nm / 10.0kgf-m

- Remove pivot cap **(a)** from LHS & RHS swing arm spindle.
- Attach pivot cap to both the LHS and RHS swing arm.



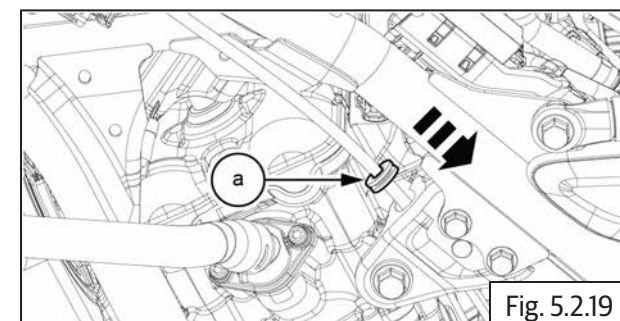
5.2.2. Clutch Cable

- Locate and tighten harness clip bolt **(M6) (a)** on LHS chassis frame.

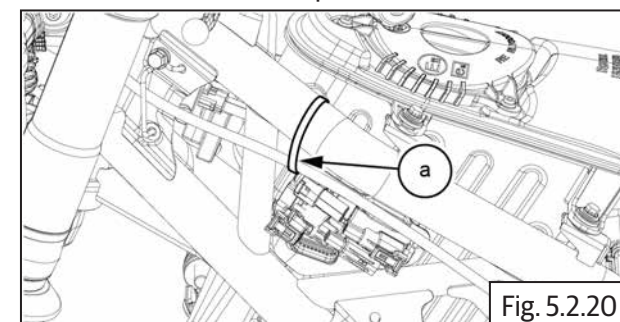


	10mm Socket with Ratchet
	10±1.5 Nm / 1.0±0.15 Kgf - m

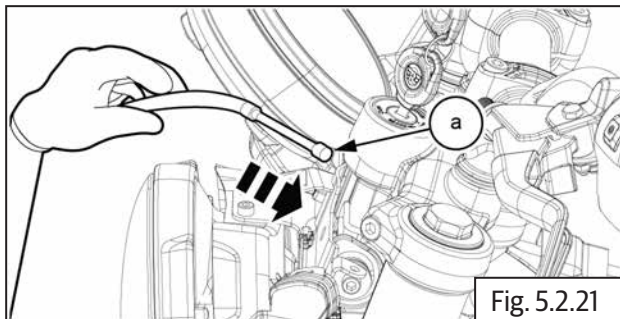
- Locate the cable on the LHS cylinder head rear bracket.



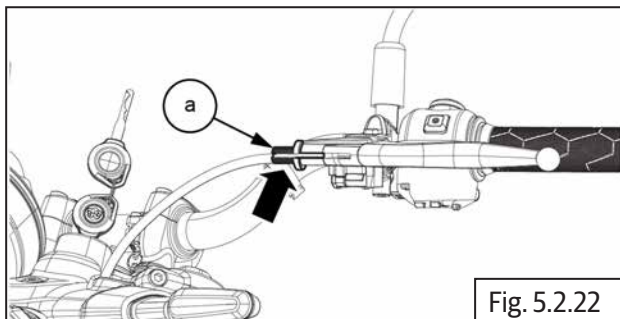
- Locate the rubber strap **(a)** from frame.



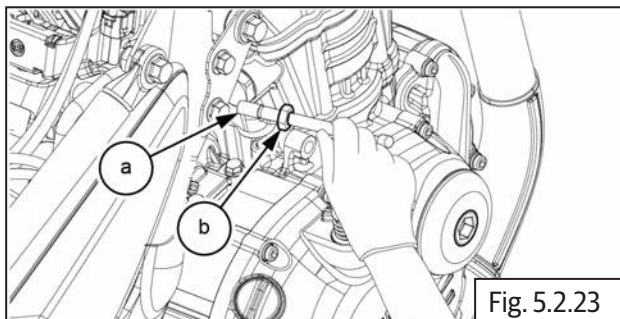
- Insert the clutch cable **(a)** into clutch lever.



- Locate and tighten lock nut and ensure adjuster **(a)** at the handlebar end is fully turned into the bracket LH to increase cable play.

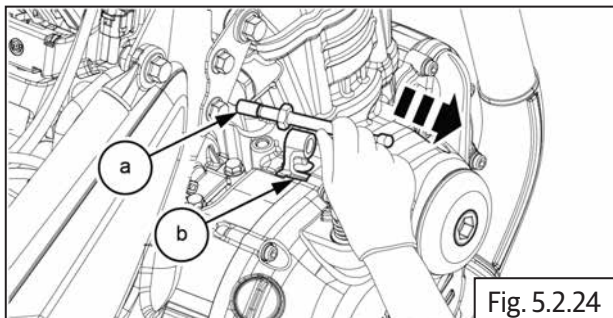


- Attach the outer lock nut **(a)** into the clutch cable.

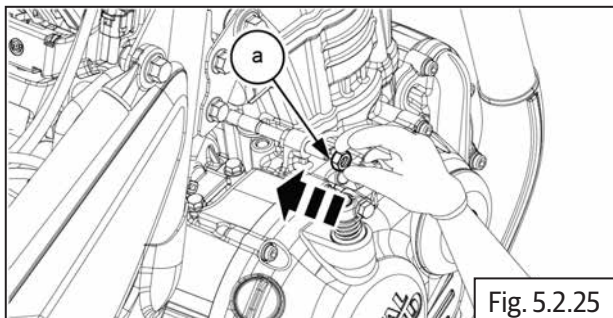


12mm Socket with Ratchet

- Insert the clutch cable **(a)** into the cable guide **(b)**.

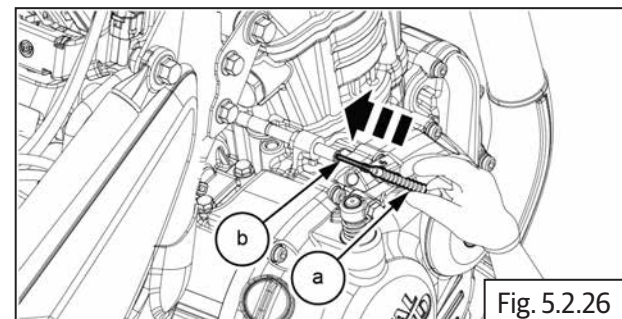


- Insert the adjuster into the housing cable guide and tighten the inner locknut **(M8) (a)** fully.

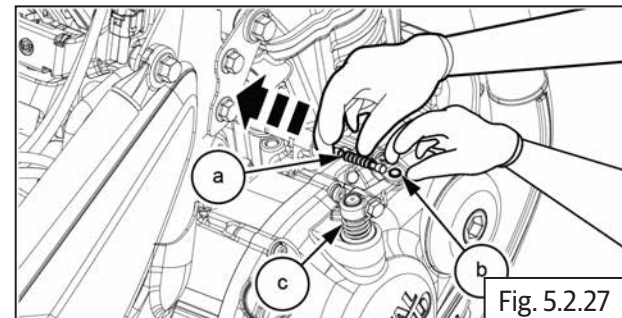


12mm Socket with Ratchet

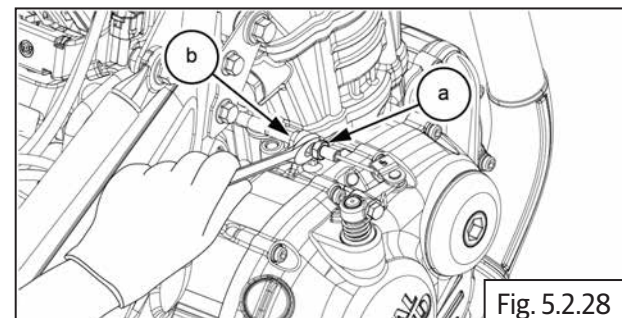
- Insert the rubber grommet **(a)** into the clutch cable **(b)**.



- Attach the inner cable **(a)** to the clevis **(b)** on the clutch actuating assembly **(c)**.



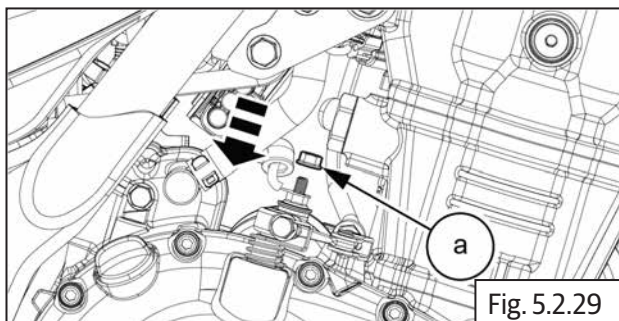
- Tighten the outer lock nut **(M8) (a)** at the rear of the cable adjuster **(b)**.





12mm Double end spanner

- Locate and tighten the nut to self motor main cable **(a)**.

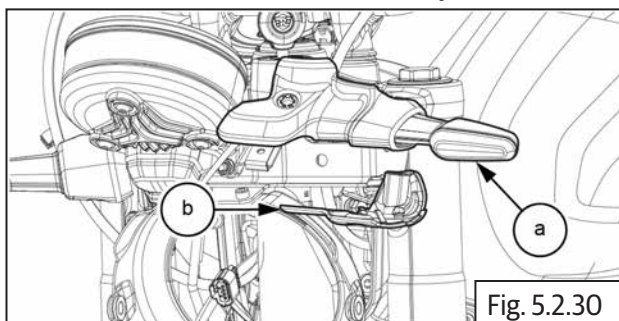


10mm Socket with Ratchet

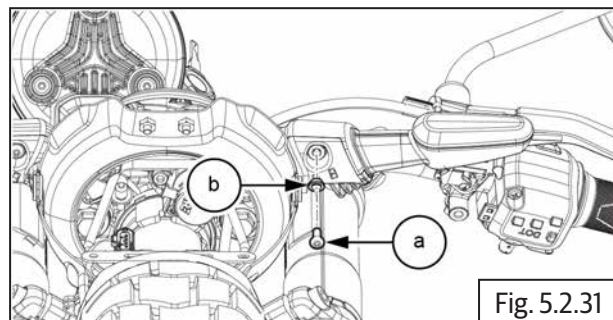


3.5 - 4Nm / 0.35 - 0.4kgf-m

- Attach the top **(a)** and bottom **(b)** trafficator mount covers on the front frame assembly.



- Locate and tighten the button head bolt **(M5) (a)** with top hat washer **(b)** on the Trafficator lower mount cover.

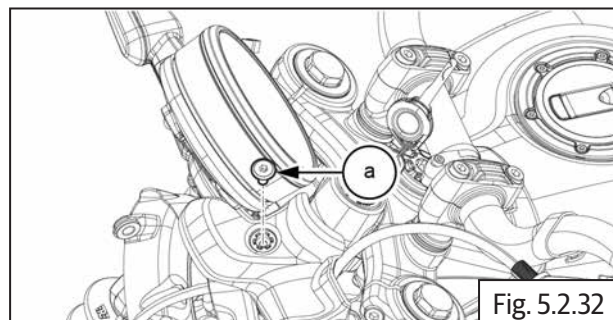


3mm Allen Socket with Ratchet



$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

- Locate and tighten the shoulder head bolt **M6 (a)** on trafficator upper cover.

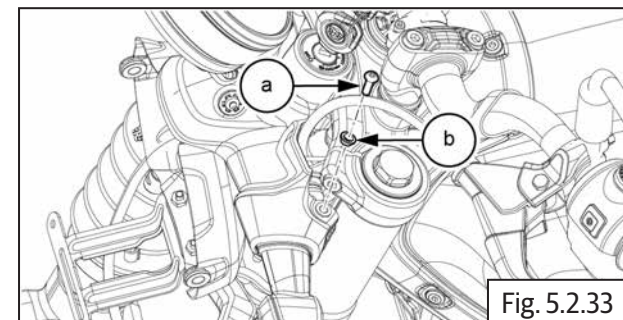


5mm Allen Socket with Ratchet



$10 \pm 1.5 \text{ Nm} / 1.0 \pm 0.15 \text{ Kgf} \cdot \text{m}$

- Locate and tighten the button head bolt **(M5) (a)** and top hat washer **(b)** on trafficator upper mount cover.



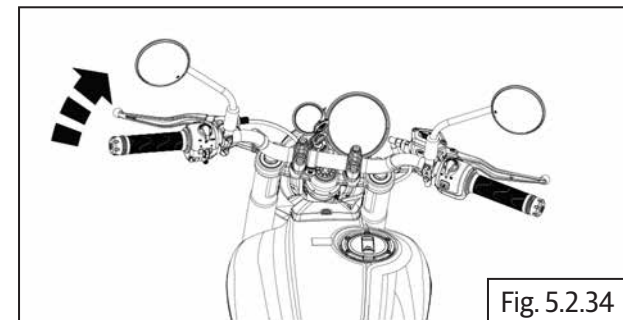
3mm Allen Socket with Ratchet



$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

5.2.3 Clutch Cable Free Play Adjustment

- Steer handlebar to right hand lock position.



- Loosen adjuster nuts **(a)** completely in clutch cable **(b)**.

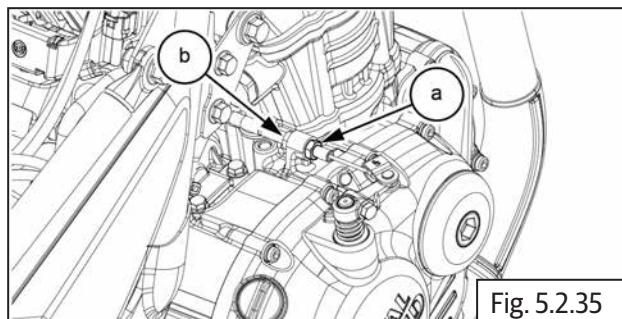


Fig. 5.2.35



12mm Double end spanner

- The clutch lever ball end (from its furthest position) before engine engagement.

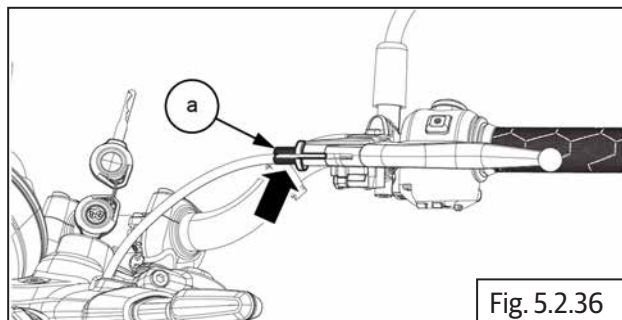


Fig. 5.2.36

- Actuate lever 3 times, check free play of **9-11mm**.

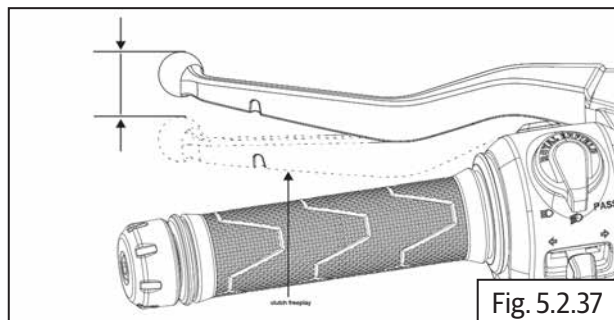


Fig. 5.2.37

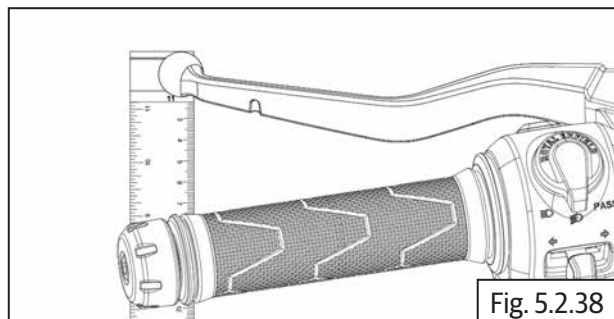


Fig. 5.2.38

- Tighten the nut closest **(a)** to the lifter arm without moving the inner nut.

- Rotate the handlebar **5 or more times**, returning to a **straight position** and re-check the free play in the lever **9-11mm**. Refer image sequence.

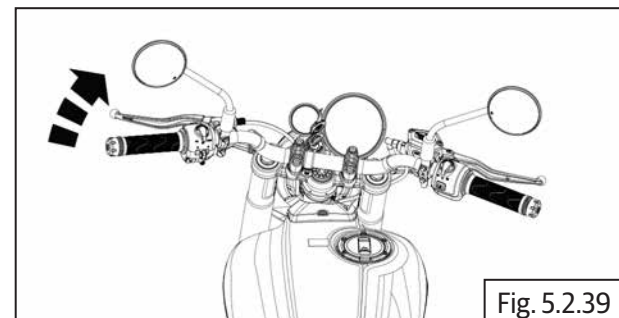


Fig. 5.2.39

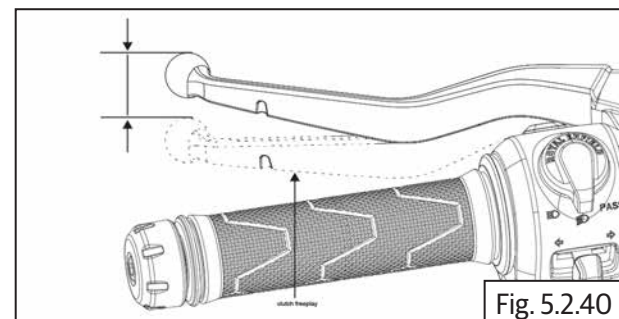


Fig. 5.2.40

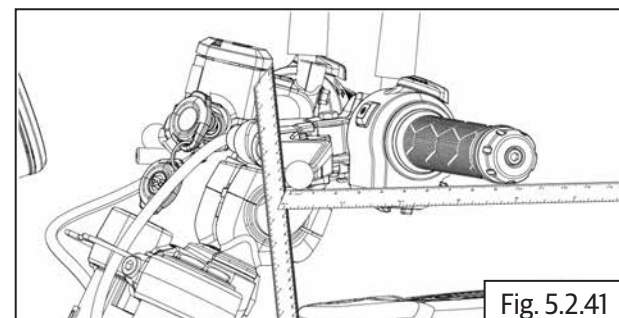


Fig. 5.2.41

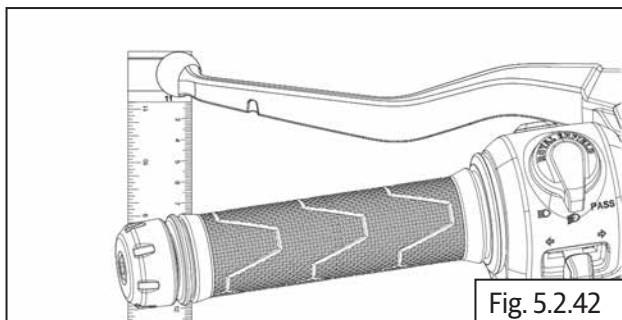


Fig. 5.2.42

- Tighten adjuster nuts **(a)** in clutch cable **(b)** at cover RH to recommended torque.

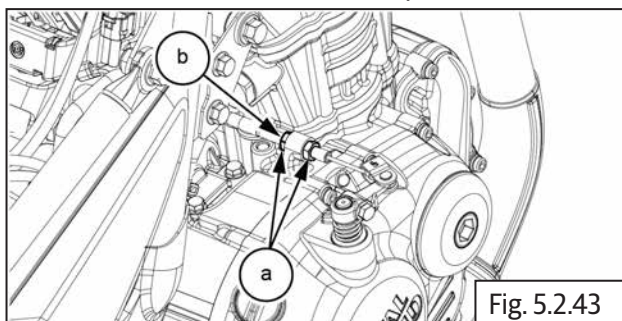


Fig. 5.2.43

	12mm Double end spanner
	8Nm / 0.8kgf-m

5.2.4. Rear Chain To FD Sprocket

- Install the drive chain **(a)** on the sprocket.

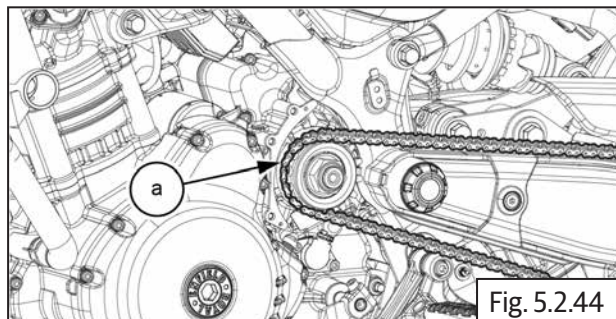


Fig. 5.2.44

5.2.5. Drive Chain Free Play Adjustment

- Vehicle will be placed on the center stand and in neutral gear, ensuring the rear wheel is clear of the ground.

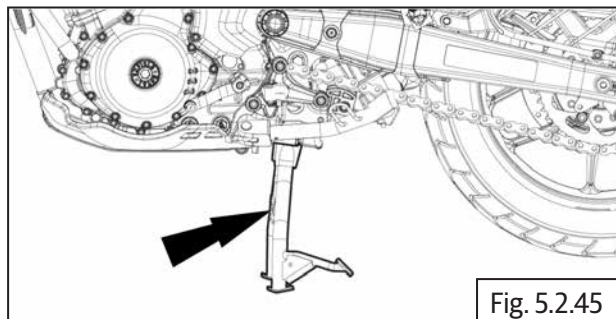


Fig. 5.2.45

- Rotate the wheel until find a position, where the chain slackness is at its lowest / tightest.
- Push the chain upward and downward at the measurement location.

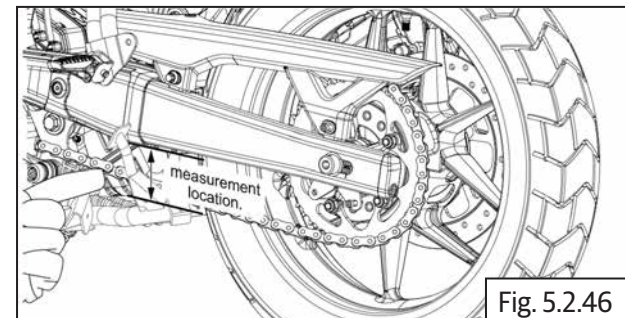


Fig. 5.2.46

- Measure how far the chain moves from the swingarm.

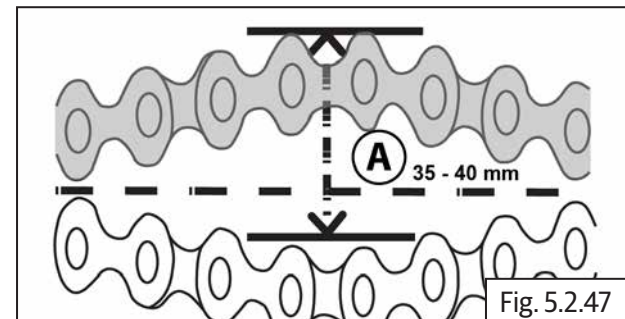
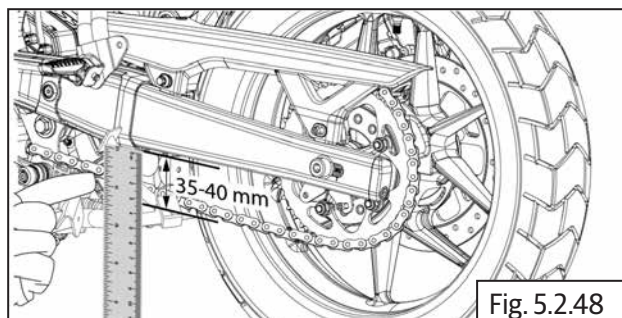
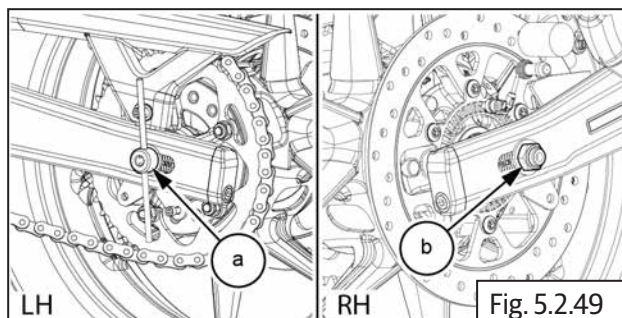


Fig. 5.2.47

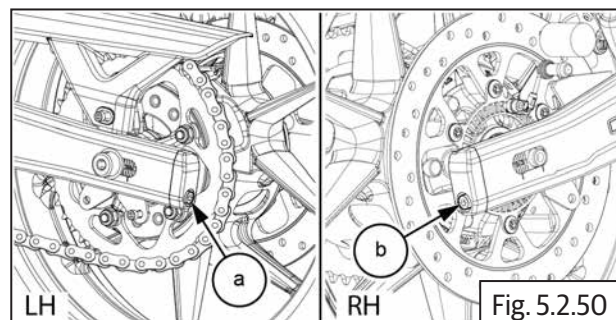
- Inspect chain free play at locations using a ruler. Free play for drive chain should be 35mm to 40mm.



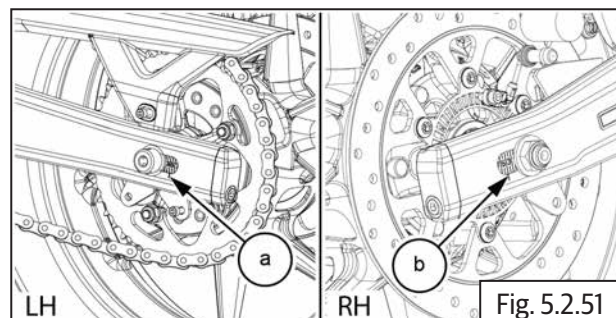
- If the free play of the drive chain is not between 35mm to 40mm then hold spindle **(a)** on LH using a tommy bar and loosen **(M16) (b)** nut on RH.



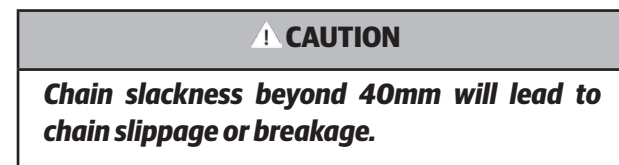
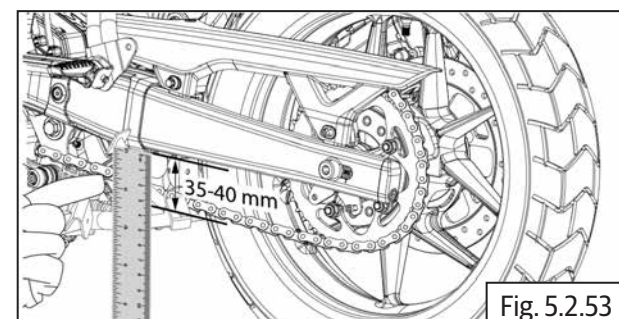
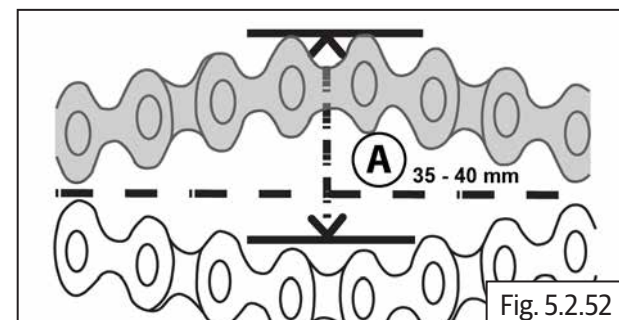
- Push the rear wheel to the extreme front in the swingarm slot.
- To reduce free play tighten the adjuster bolt **(M8) (a)** and **(b)** in both LHS and RHS.



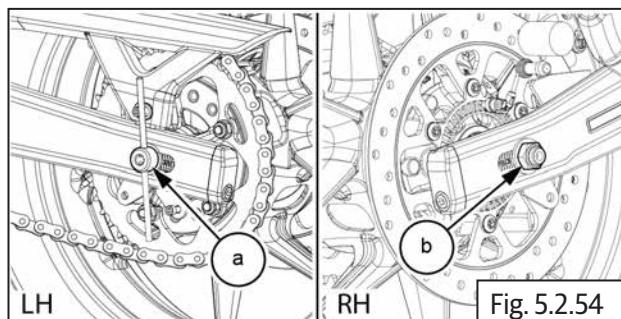
- Ensure the lines are matched with the lines punched in swing arm on both LH **(a)** & RH **(B)** side for proper wheel alignment.



- Now measure the drive chain free play using ruler and it should be 35mm to 40mm.

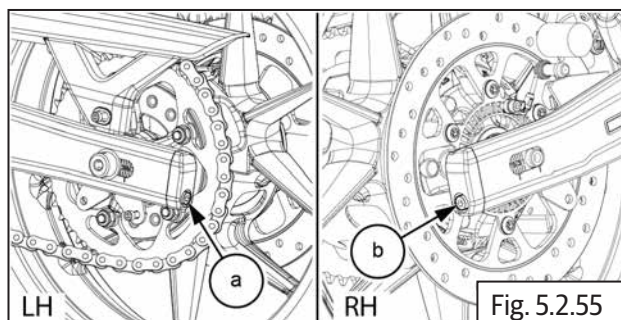


- Once chain free play is verified, hold spindle LH with tommy bar **(a)** and tighten the wheel axle nut **(M16) (b)**.



	24mm Ring spanner and Tommy bar
	70Nm/7.0kgf-m

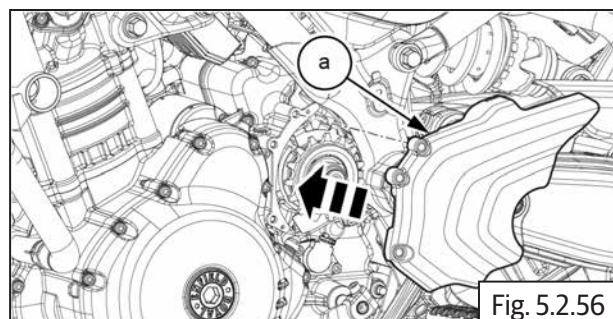
- Tighten the adjuster bolt **(M8) (a)** and **(b)** to both LHS and RHS.



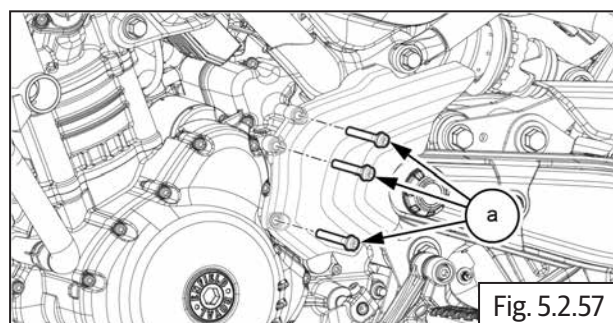
	6mm Allen Key
	25Nm / 2.5kgf-m

5.2.6. FD Sprocket Cover

- Assemble FD sprocket cover **(a)** on crankcase LH.



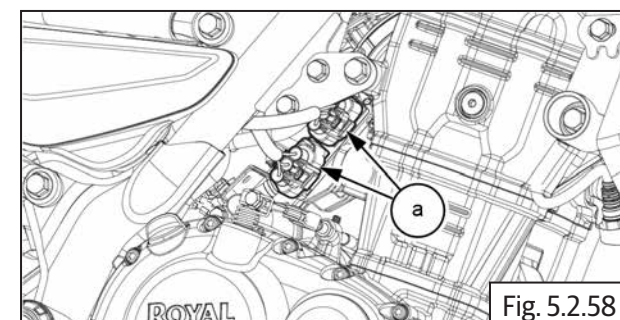
- Locate 3 Nos. Hex socket head bolts **(M6) (a)** on FD sprocket cover and tighten in a crisscross pattern to specified torque.



	5mm Allen Socket with Ratchet
	10 - 12Nm / 1.0 - 1.2kgf-m

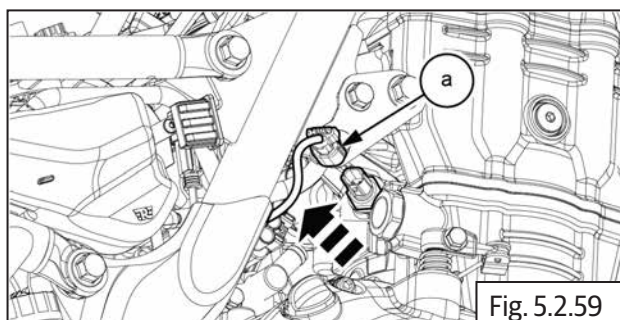
5.2.7. RR Unit

- Connect 2Nos electrical connectors **(a)** on RR unit.



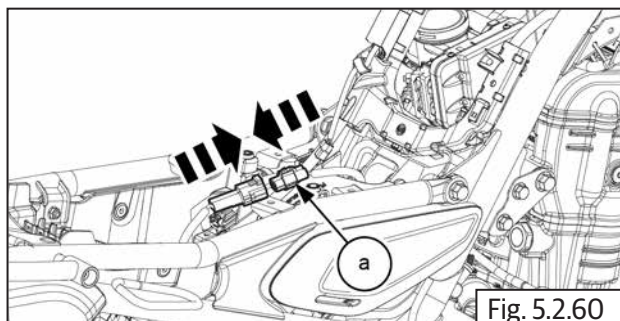
5.2.8. Engine Coolant Temperature Sensor

- Coolant temperature sensor located on rear side of cylinder head.
- Connect coolant temperature sensor coupler **(a)**.



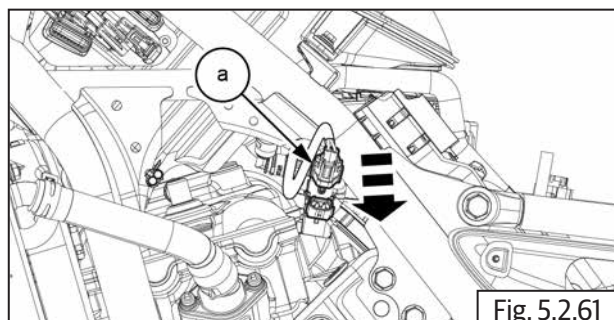
5.2.9. Oil pressure switch connector.

- Connect the oil pressure switch coupler **(a)**.



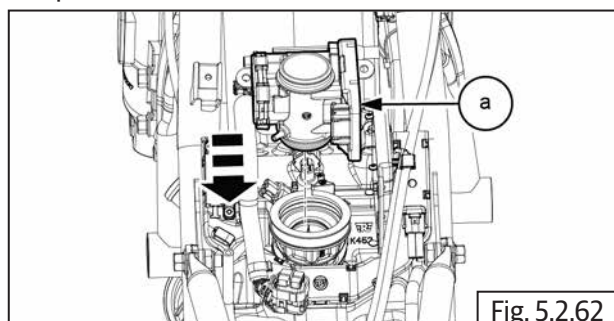
5.2.10. Fuel Injector connector.

- Connect the fuel injector coupler **(a)**.

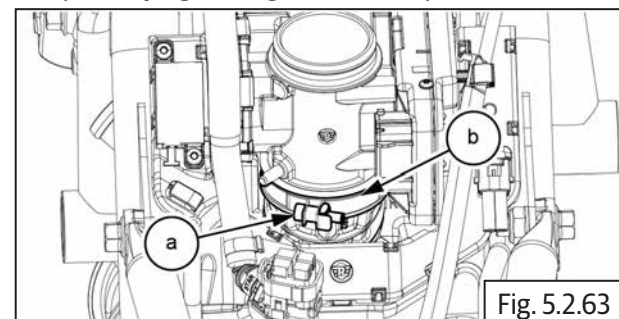


5.2.11. EMS Throttle Body

- Attach the EMS throttle body **(a)** to the transition piece.

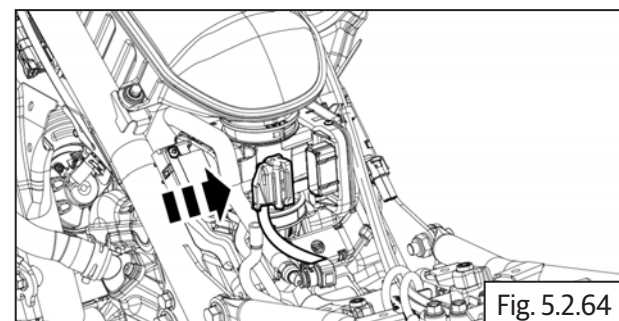


- Connect the EMS throttle body **(b)** to the transition piece by tightening the worm clip screws **(M5) (a)**.



	4mm Allen socket with ratchet
	$2.5 \pm 0.5 \text{ Nm}$ / $0.2 \pm 0.05 \text{ kgf m}$

- Connect the coupler to the ECU.



- Connect the EVAP hose **(a)** to the throttle body.

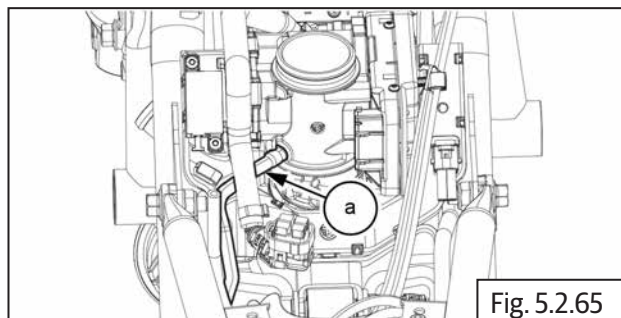


Fig. 5.2.65

5.2.12. Canister

- Locate the canister bracket **(a)** on chassis frame.

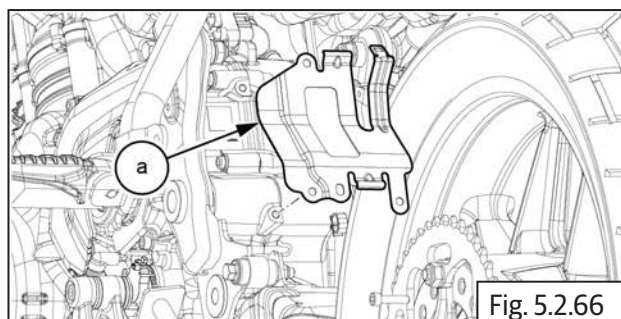


Fig. 5.2.66

- Fix the coupler clip **(a)** on canister bracket.

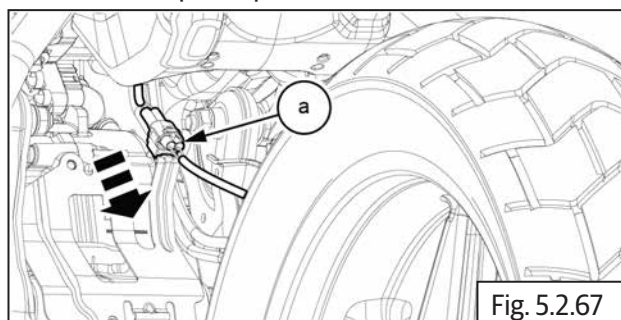


Fig. 5.2.67

- Locate and tighten the flange head bolts **2Nos (M6) (a)** on canister bracket.

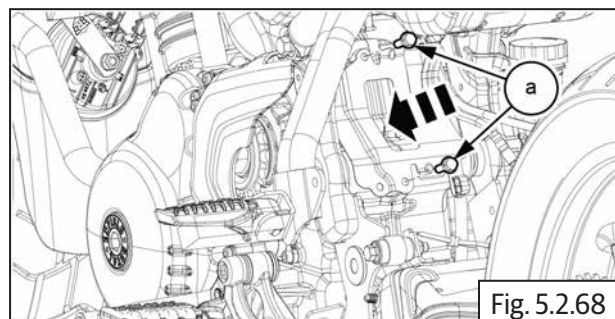


Fig. 5.2.68

	10mm Socket with Ratchet
	10Nm / 1.0kgf m

- Locate and place the canister with hose assembly **(a)** on chassis frame.

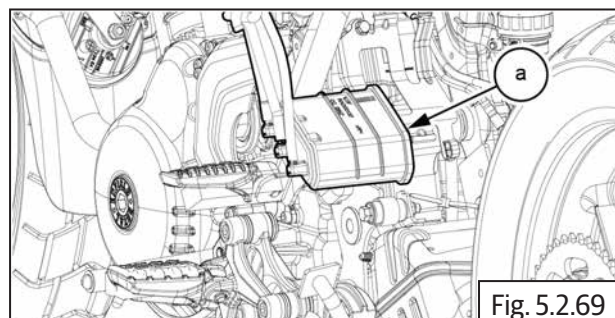


Fig. 5.2.69

NOTE

- Please ensure the EVAP hoses are routed properly and ensure they DO NOT get pinched or damaged.

- Fix the strap **(a)** on canister.

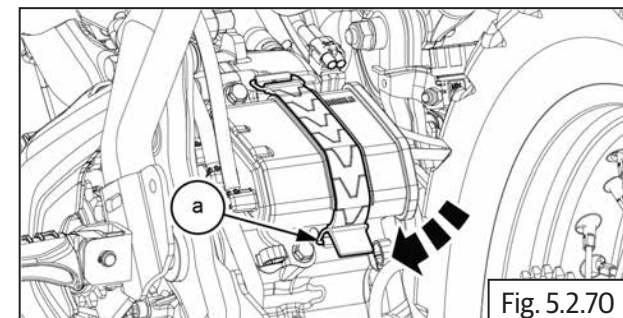


Fig. 5.2.70

- Locate the wire guide **(c)** on chassis frame .
- Locate and tighten the screw **(T40) (a)** with washer **(b)** on wire guide.

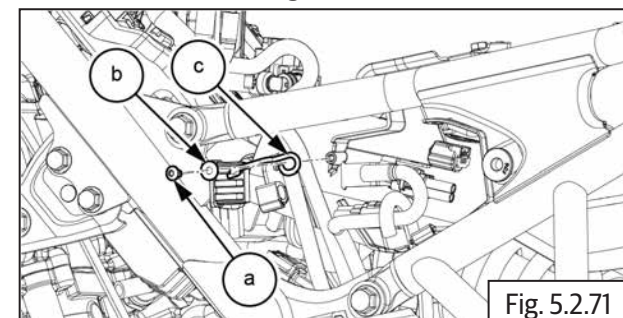
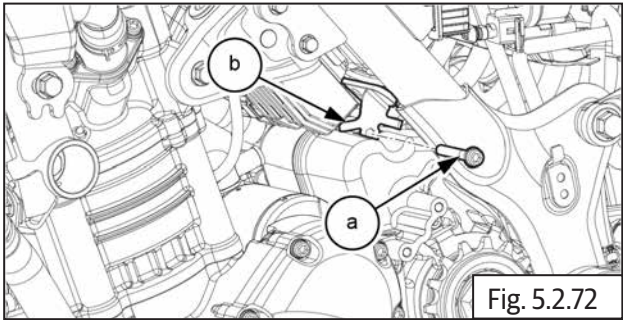


Fig. 5.2.71

	3mm Allen key
	1.5 Nm / 0.15kgf m

5.2.13 Wiring harness bracket

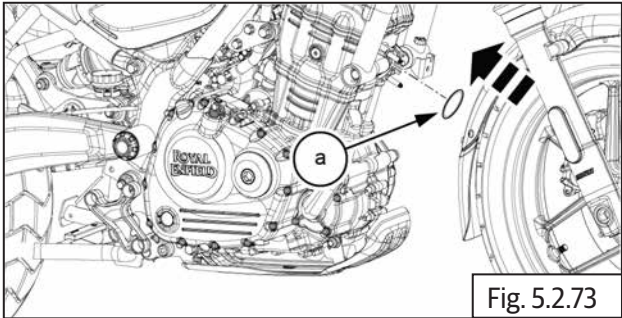
- Locate the clip bracket **(b)** to the engine.
- Tighten 1Nos. Hex socket head bolts **(M6) (a)** onto the clip bracket **(b)**.



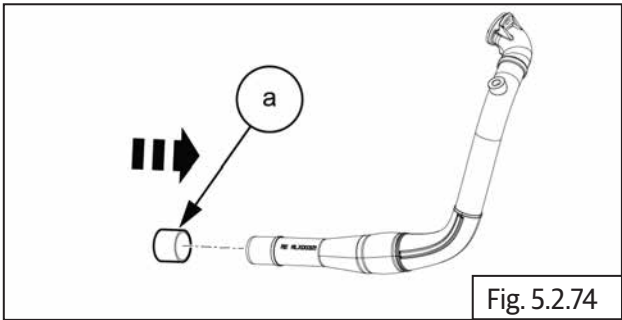
	5mm Allen key with Ratchet
	10-12N·m / 1.0 - 1.2kgf m

5.2.14. Exhaust Pipe

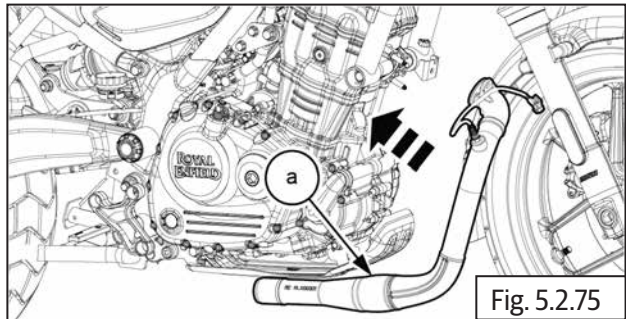
- Locate exhaust Copper Gasket **(a)** into cylinder head.



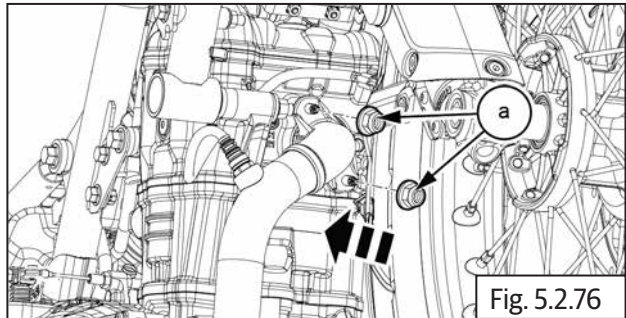
- Locate the gasket **(a)** into exhaust pipe .



- Locate exhaust pipe **(a)** into cylinder head and ensure the exhaust pipe flange is properly located on the studs.



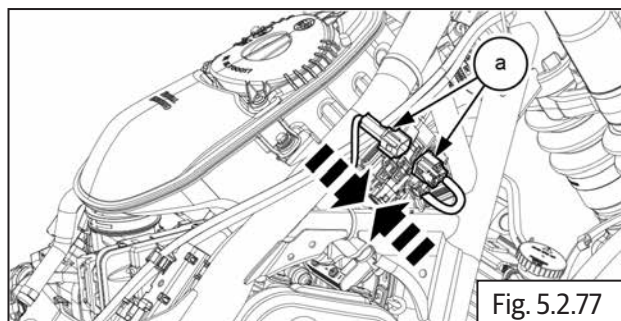
- Assemble 2Nos flange nuts **(M8) (a)** on the studs and hand tight it to align the rear end mounting.



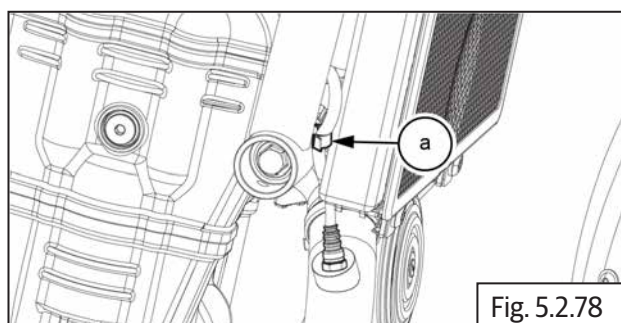
	12mm socket with ratchet
	25Nm / 2.5kgf-m

5.2.15. O2 Sensor / Oxygen Sensor Connectors (Front)

- Connect oxygen sensor connector **(a)**

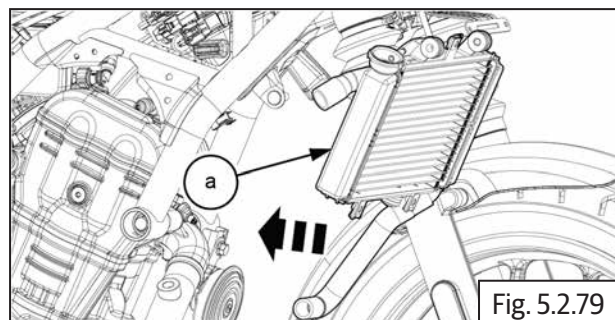


- Fix the 1Nos omega clips **(a)** on Oxygen Sensor wiring harness.

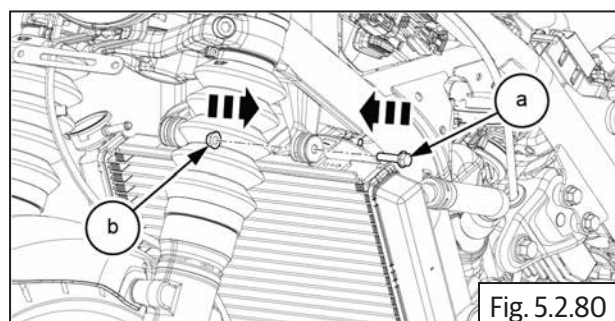


5.2.16 Radiator

- Install the radiator with hoses **(a)** on engine.

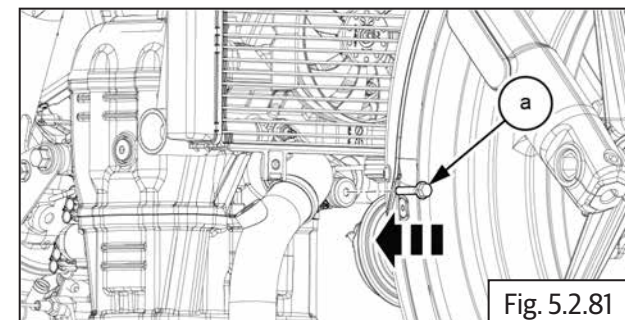


- Locate and tighten the 1Nos bolts **(M6) (a)** on top of the radiator.



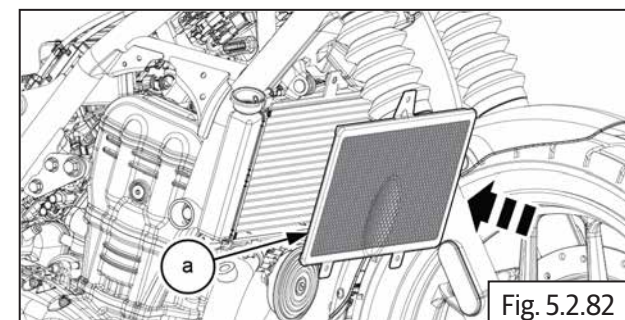
	10mm Socket with Ratchet
	8-10N-m / 0.8-1.0kgf-m

- Locate and tighten 1Nos bolts **(M6) (a)** on bottom of the radiator.

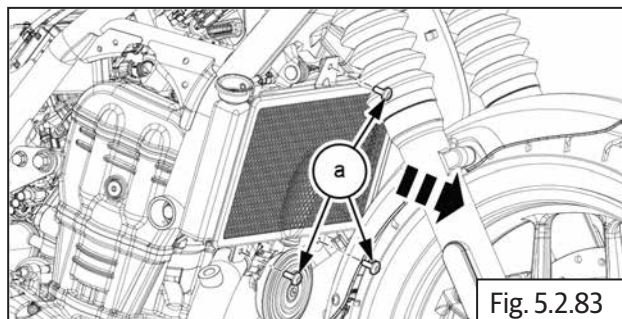


	10mm Socket with Ratchet
	8-10Nm / 0.8-1.0kgf-m

- Locate the guard **(a)** on radiator.

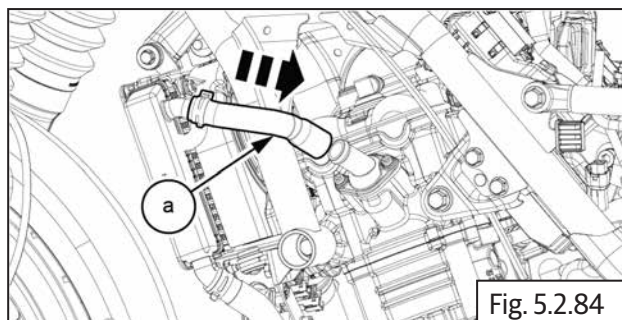


- Locate and tighten the 3Nos bolts **(M6) (a)** from radiator guard.

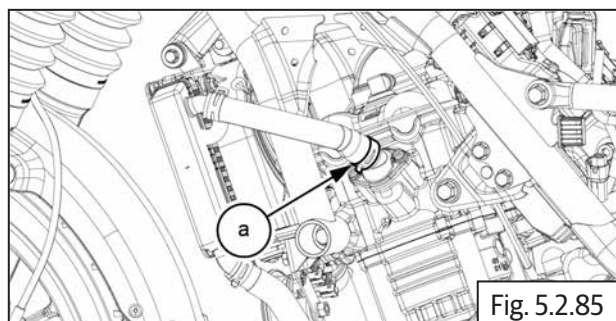


	10mm Socket with Ratchet
	2-4N-m / 0.2-0.4kgf-m

- Install the hose **(a)** on thermostat housing.

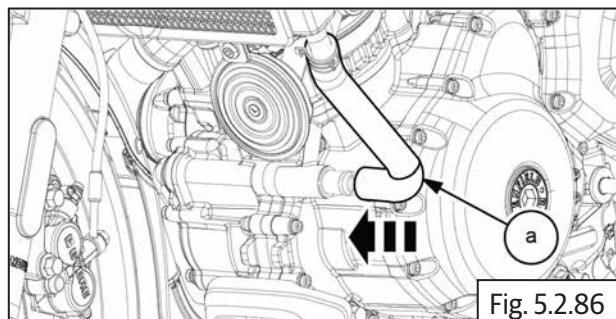


- Fix the clamp **(a)** on engine outlet hose.

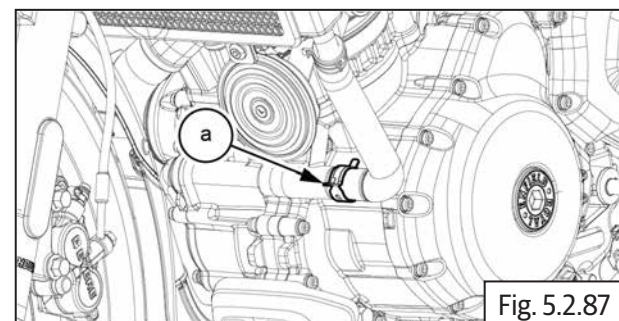


	Plier
--	-------

- Install the hose **(a)** on engine.

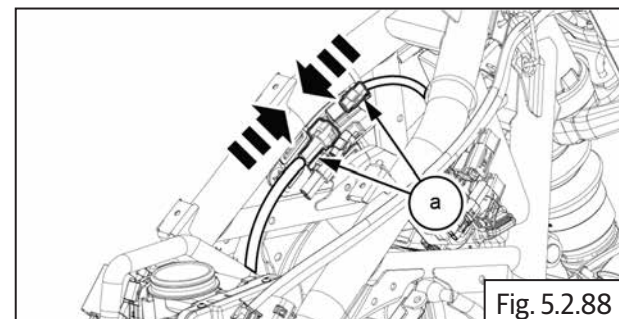


- Fix the clamp **(a)** on engine inlet hose.



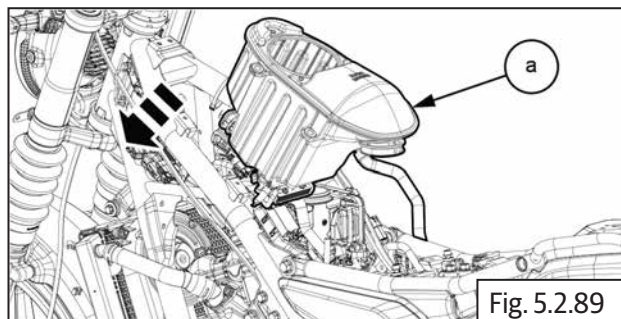
	Plier
--	-------

- Connect the cooling fan coupler **(a)**.

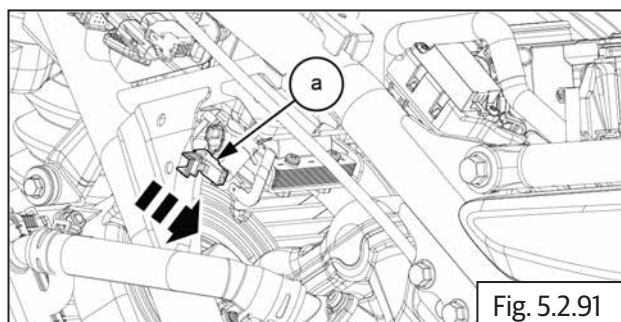
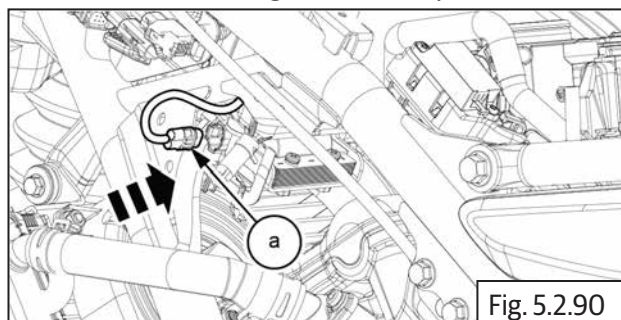


5.2.17. Air Filter Box Assembly

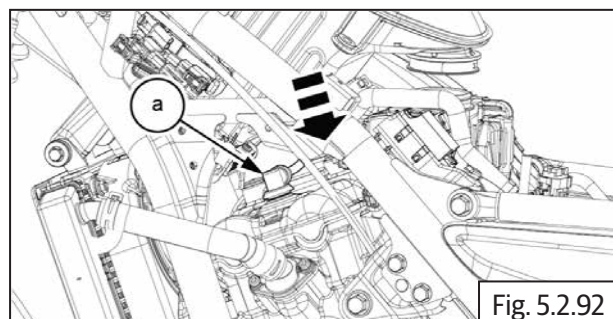
- Locate the air filter box **(a)** with ignition coil on front chassis frame.



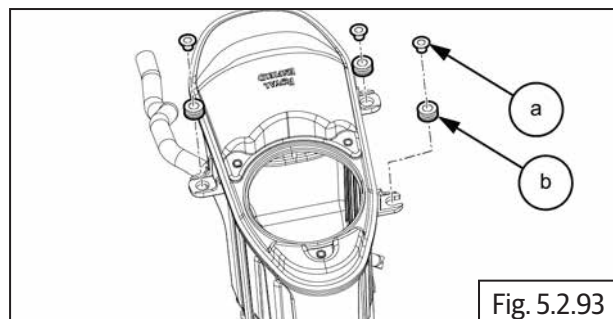
- Connect the **2Nos** ignition coil couplers **(a)**.



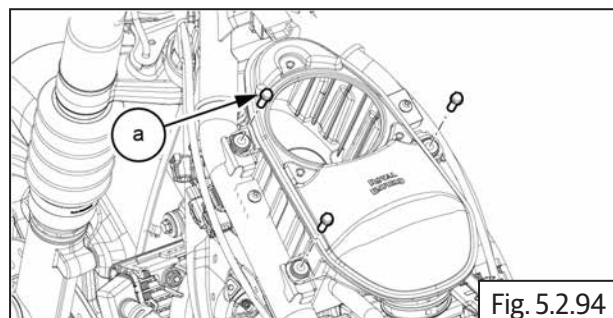
- Connect spark plug cap **(a)** on engine.



- Fix **3Nos** sleeves **(a)** with grommets **(b)** on air filter box.

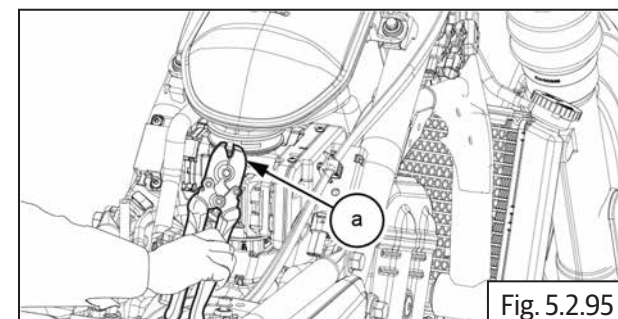


- Locate and tighten **3Nos** Hex flange bolts **(a)** **(M6)** on air filter box.



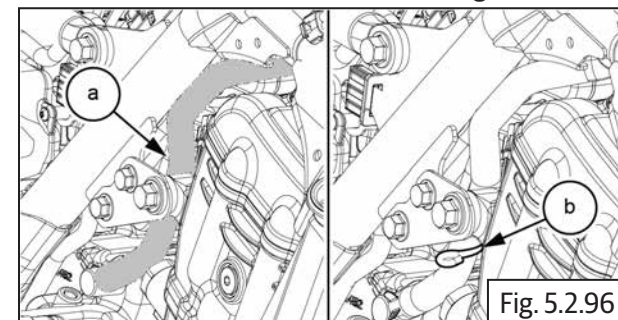
	8mm socket with ratchet
	3 to 4Nm / 0.3 to 0.4kgf-m

- Fix the clamp **(a)** on air filter bellow hose.

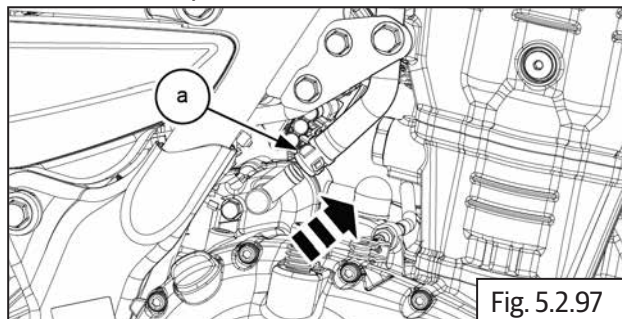


	Clamp Removal and install tool
--	--------------------------------

- Connect the breather hose **(a)** to engine.



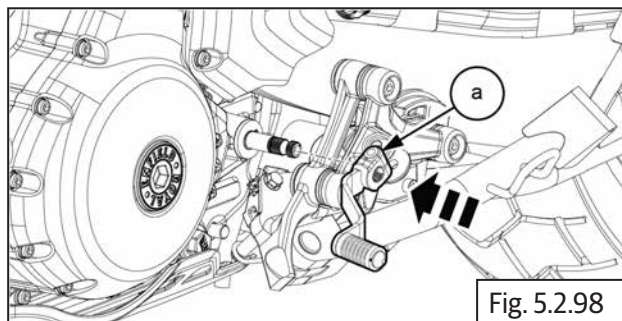
- Fix the clamp **(a)** to bottom breather hose.



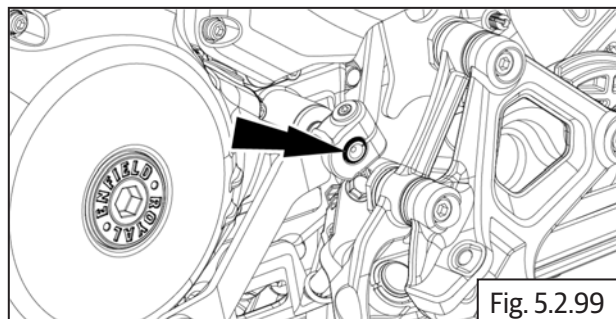
	Plier
---	-------

5.2.18 . Gear Pedal.

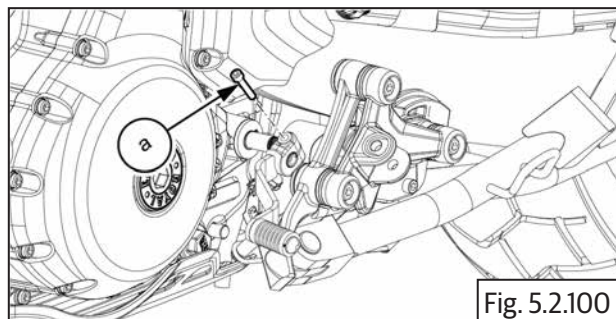
- Attach the gear pedal **(a)** to the gear shift shaft.



- Gear pedal slot should be match to dot punch mark.



- Tighten the cap bolt **M6 (a)** onto the gear pedal.



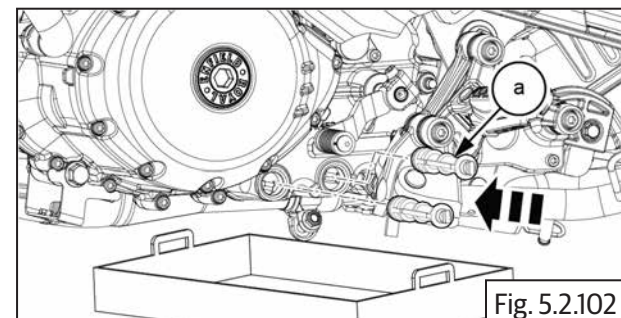
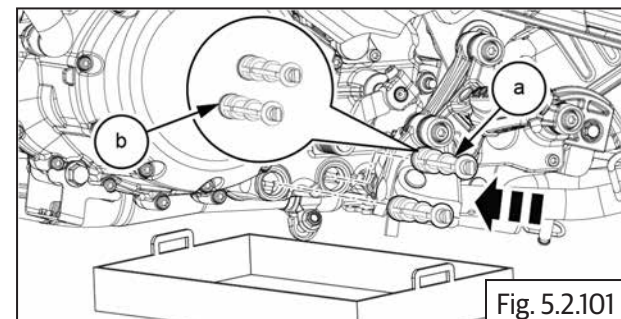
	5mm Allen socket with ratchet
	15Nm / 1.5kgf-m

5.2.19 . Drain Plug

NOTE

- Ensure the motorcycle is upright on a firm and flat surface.

- Install the 2Nos strainers **(a)** with "O" Rings **(b)** into the LHS oil sump.



NOTE

- Do not reuse the "O" Rings, Renew all "O" Rings.
- Lubricate "O"-Rings with engine oil.

CAUTION

- Strainers should be pushed by hand to fully engage "O"rings in bores before assembling drain plugs.
- Drain plugs **SHOULD NOT** be used to assemble strainers.



Engine oil

- Install and Tighten 2Nos drain plugs **(a)** along with "O" Rings **(b)** into the LHS oil sump.

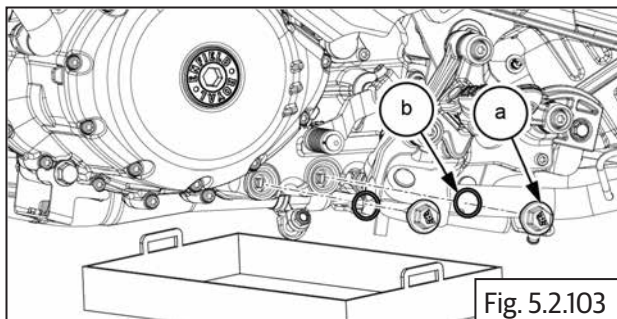


Fig. 5.2.103

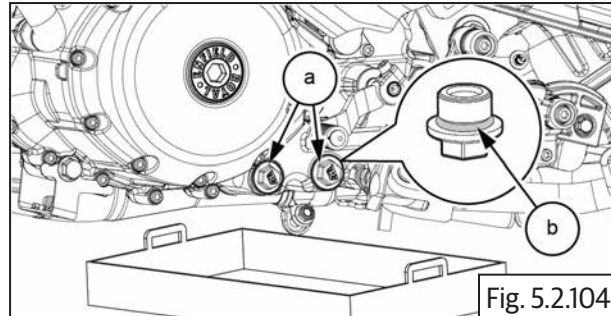


Fig. 5.2.104

NOTE

- Do not reuse the "O" Rings, Renew all "O" Rings.
- Lubricate "O"-Rings with tyre lube or P-80 emulsion



Tyre lube or P-80 emulsion



17mm Socket with Ratchet



12 to 14Nm -/1.2 to 1.4kgf-m

- Refill engine oil with recommended quantity.

Dry Fill	2.4 Liter
Refill	2.1 Liter (Approx.) for oil service (Including filter change)
Grade	10W40 API SN, JASO MA2, Semi Synthetic

- Tighten and install oil filler cap **(a)** onto the crankcase top on the RH side.

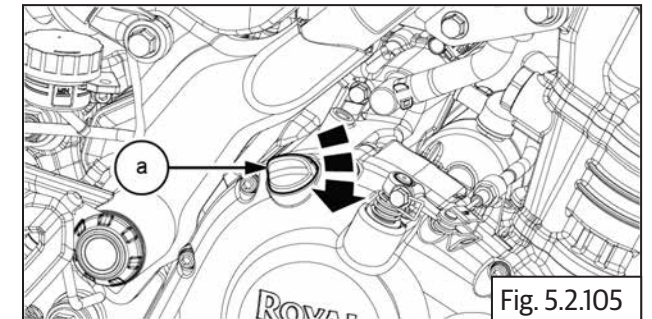
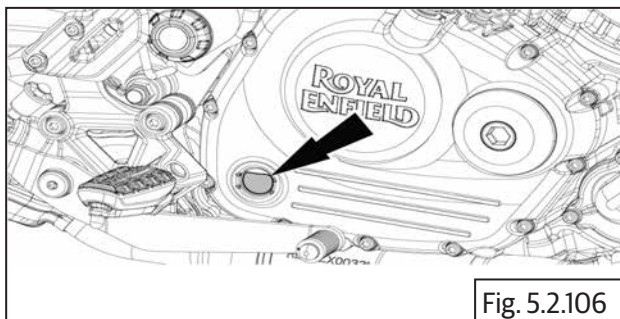


Fig. 5.2.105



Adjustable plier with soft jaws

- Check oil level through oil level window
- Engine oil level should be close to "MAX" condition.



5.2.20 Radiator coolant filling

⚠ WARNING

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

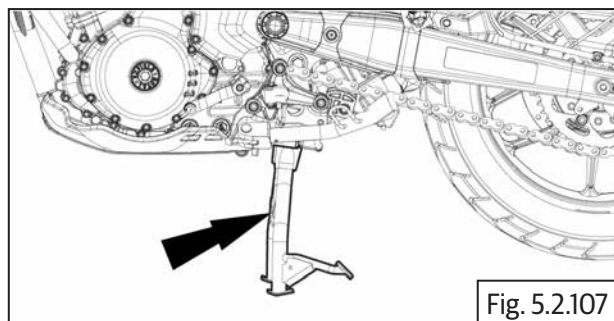
Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.

⚠ WARNING

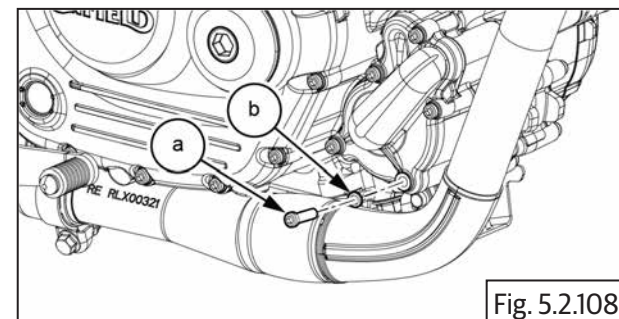
Danger of poisoning

Coolant is poisonous and a health hazard. Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If coolant is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

- Ensure motorcycle engine is cold.
- Place the motorcycle in an upright position on a flat level surface.

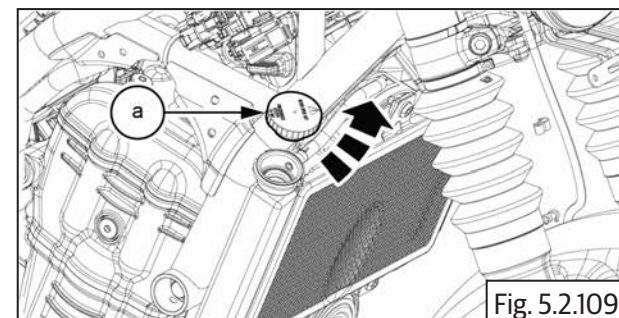


- Once drained, replace copper washer **(b)** with a new part and tighten bolt **(M6) (a)** on RHS water pump cover.

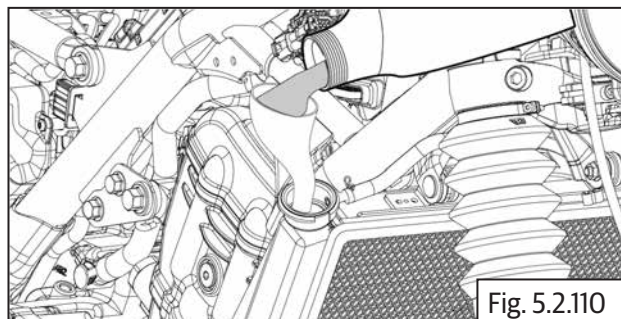


	5mm Allen Socket with Ratchet
	8-12Nm / 0.8-1.2kgf-m

- Remove the radiator pressure cap **(a)**.

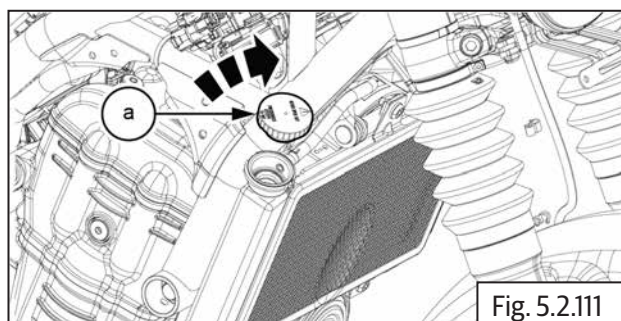


- Fill the system with recommended coolant up to the filler neck.

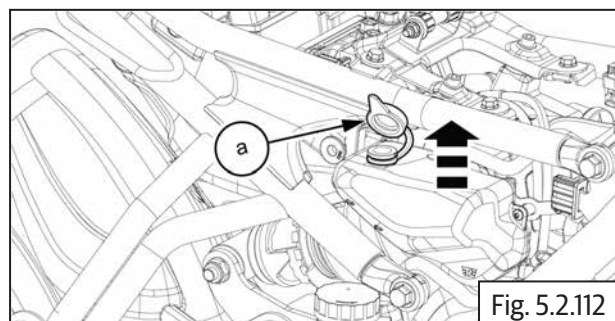


Grade	TOTAL COOLELF AUTO SUPRA -37°C
QTY	930ml±15ml

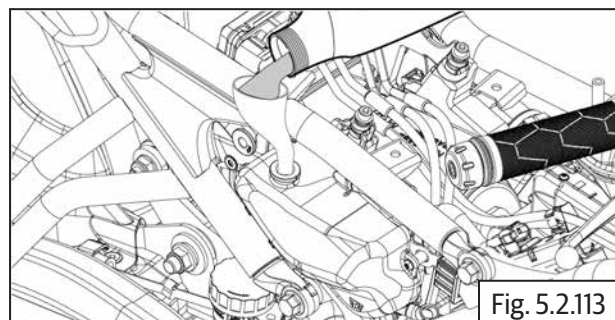
- Close the radiator pressure cap (a) ensuring it is correctly fitted & fully tightened clockwise.



- Remove the radiator expansion tank cap (a).

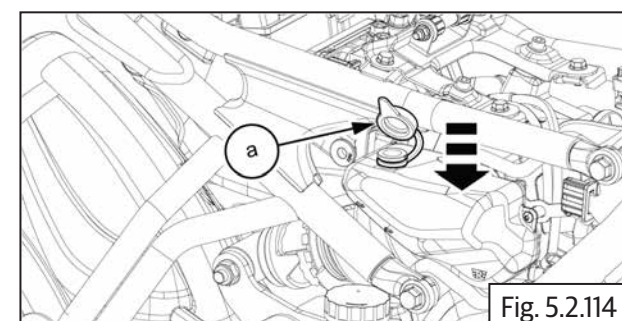


- Fill the recommended coolant to the upper level line.



Grade	TOTAL COOLELF AUTO SUPRA -37°C
QTY	190ml to 210ml

- Close the radiator expansion tank cap (a).

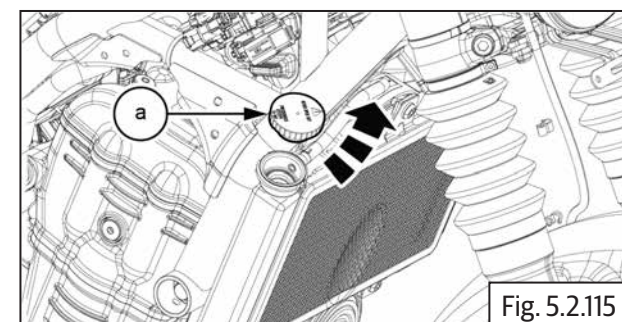


5.2.21 Air Bleeding

⚠ CAUTION

Do not run the engine without completing the filling procedure above.

- Remove the radiator pressure cap (a).



- Fill the system with recommended coolant up to the filler neck.

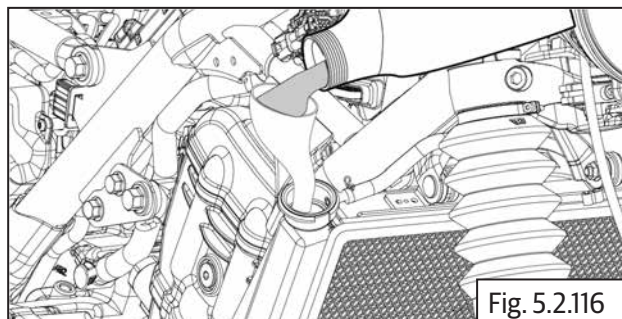


Fig. 5.2.116

- Gently tap and squeeze both engine to radiator top hose **(a)**.

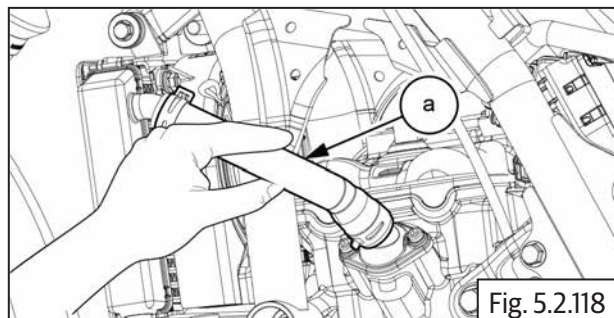


Fig. 5.2.118

- **(C)** If coolant level has dropped, top back up to filler neck level.

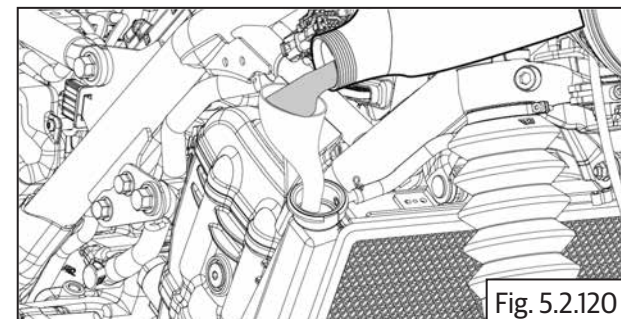


Fig. 5.2.120

Grade	TOTAL COOL ELF AUTO SUPRA -37°C
-------	---------------------------------

- **(A)** Gently tap and squeeze both engine to radiator bottom hose **(a)**.

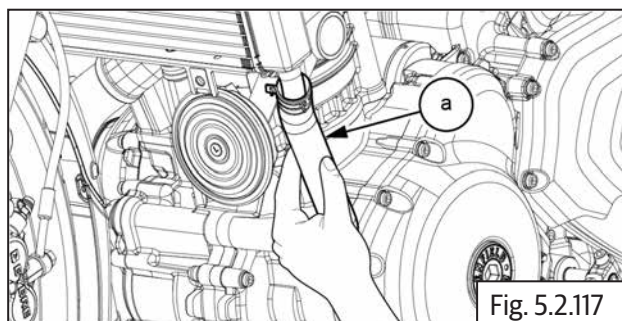


Fig. 5.2.117

- **(B)** Tip the bike to approx 45-60 degree angle on the left and then the right side.

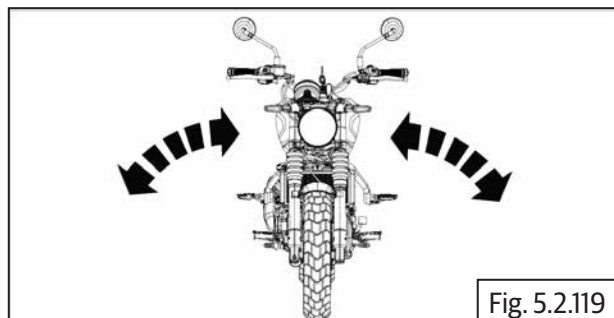


Fig. 5.2.119

- Repeat above procedure **(steps A to C)** until the level in the filler neck no longer drops
- Close the radiator pressure cap **(a)** ensuring it is correctly fitted & fully tightened clockwise.

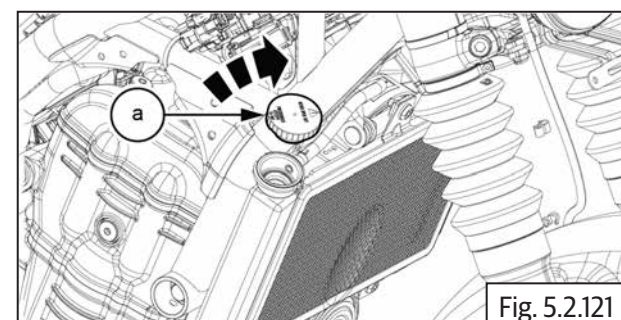
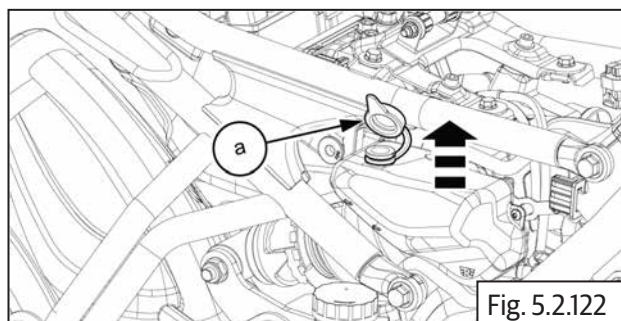
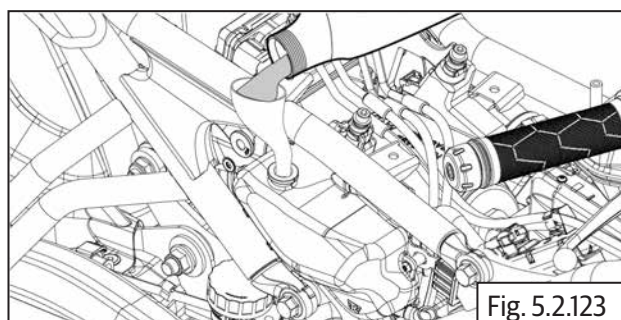


Fig. 5.2.121

- Remove the radiator expansion tank cap **(a)**.

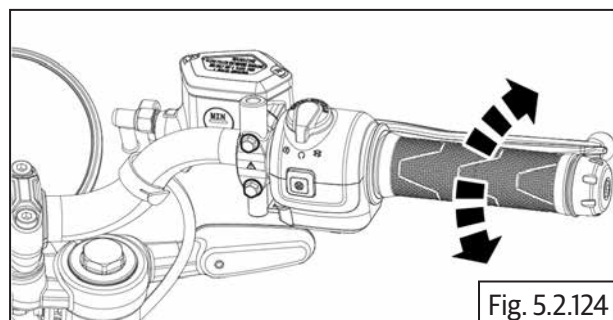


- Fill the recommended coolant to the upper level line.



Grade	TOTAL COOL ELF AUTO SUPRA -37°C
-------	---------------------------------

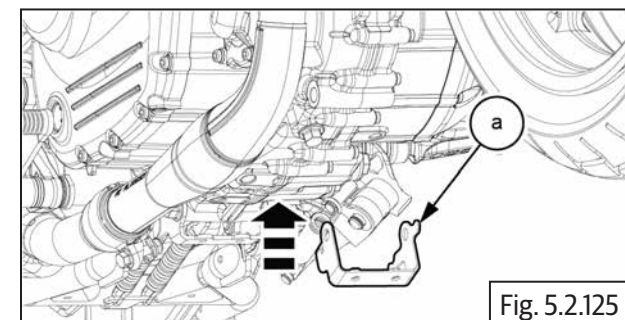
- Start the engine in neutral.
- Run the engine at idle for 5 minutes.
- Blip the throttle 3 or 4 times.



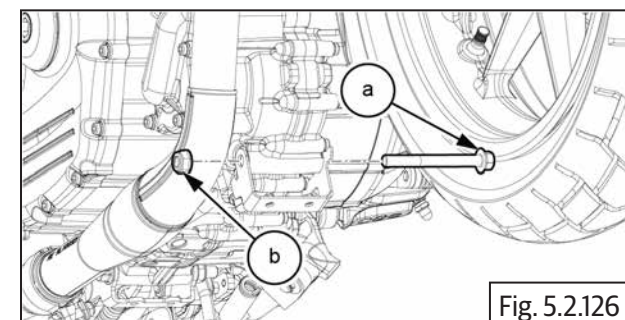
- Stop the engine and allow it to cool.
- Top up the coolant at the radiator pressure cap if required.
- Check for coolant leaks.
- Install the LHS and RHS side panels.

5.2.22. Sump Guard

- Locate the sump guard bracket rear **(a)** into engine.

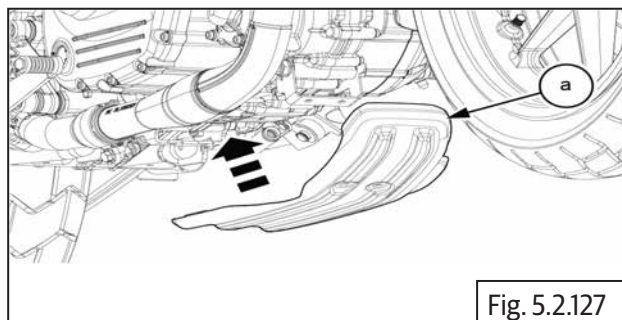


- Locate and tighten flange head bolt **(M10) (a)** with nut **(b)** into engine.

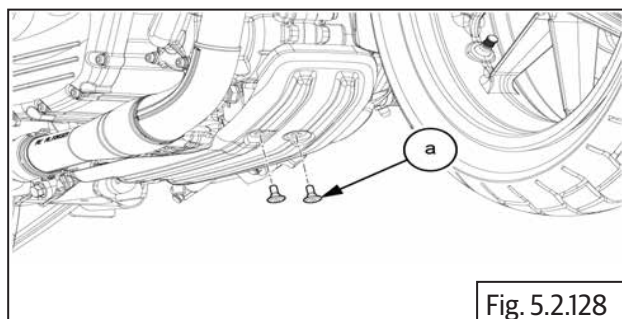


	14mm Socket with Ratchet
	17mm Double end Spanner
	45Nm / 4.5kgf-m

- Gently locate the sump guard **(a)** inside into rear bracket.



- Locate and tighten button head bolts 2nos **(M6) (a)** into sump guard bottom.

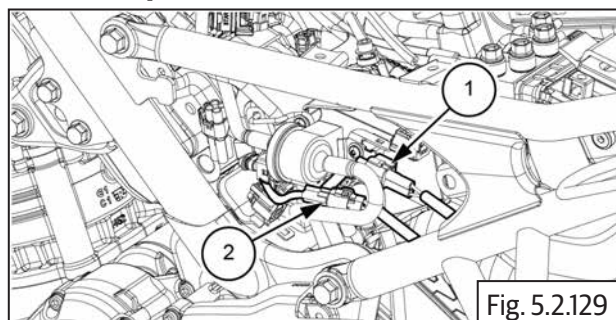


	5mm Allen Socket with Ratchet
	10Nm / 1.0kgf-m

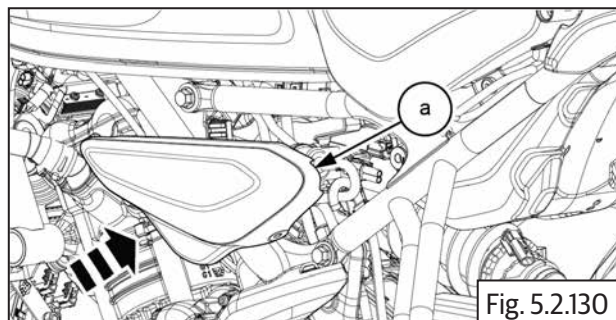
5.2.23. Side Panel LH

- Connect below listed couplers from LH bottom battery tray.

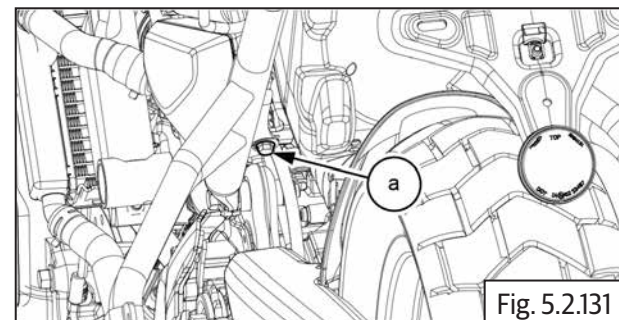
- 1. Crank position sensor**
- 2. Gear position sensor**



- Gently locate the side panel LH **(a)** on rear subframe LH.



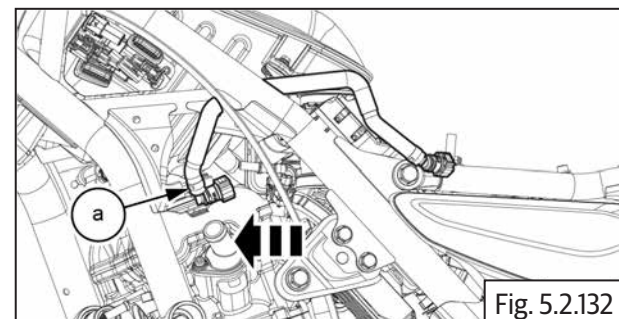
- Locate and tighten button head bolt 1no **(M6) (a)** along with washer **(b)** into LH side panel.



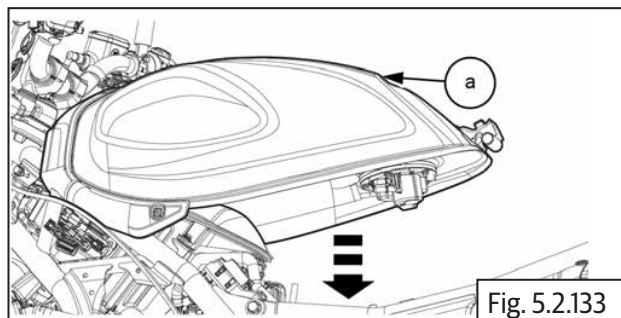
	4mm Allen Socket with Ratchet
	10Nm / 1.0kgf-m

5.2.24. Fuel Tank

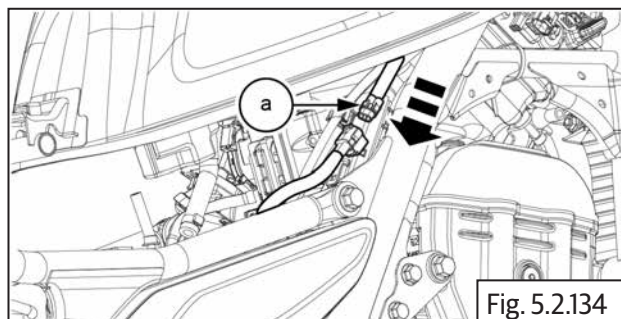
- Connect fuel hose **(a)** into injector cap.



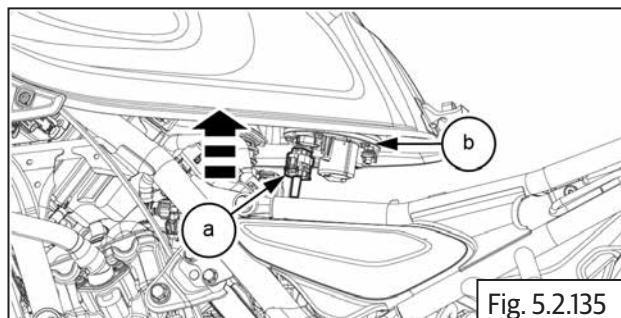
- Gently locate the fuel tank **(a)** on frame.



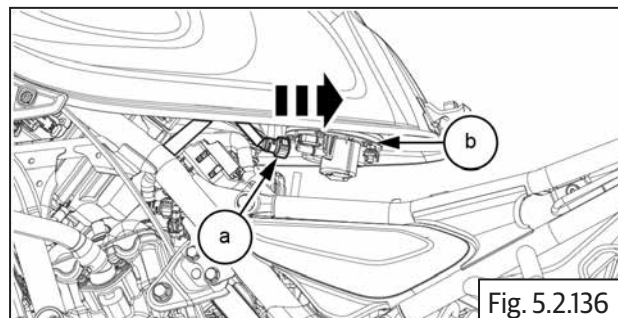
- Connect fuel gauge connector **(a)** on fuel tank .



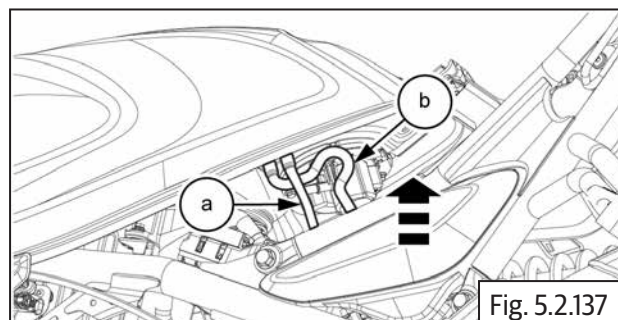
- Connect fuel pump connector **(a)** on fuel tank **(b)**.



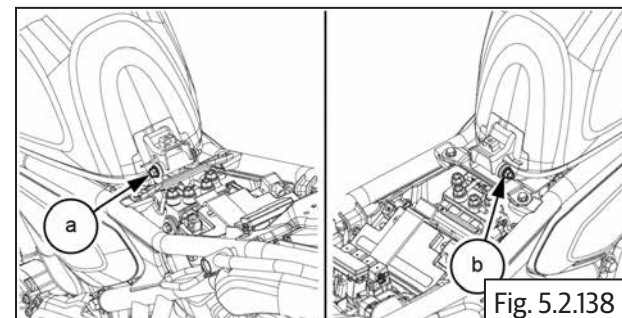
- Clean quick fix adapter area and connect by pressing lock button **(a)** on fuel pump **(b)**.



- Connect EVAP connection hose **(b)** from bottom of fuel tank.
- Connect drain hose connection **(a)** from bottom of fuel tank

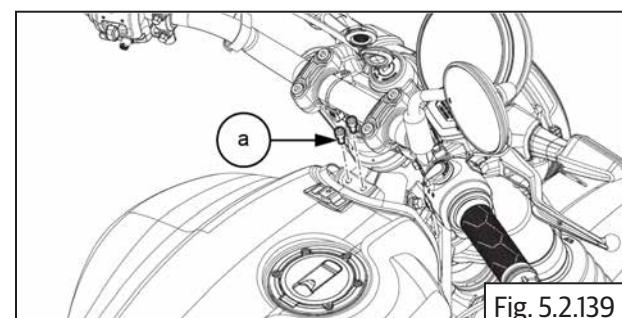


- Locate and tighten 3Nos cap bolts with washers **(a)** on tank mount bracket.



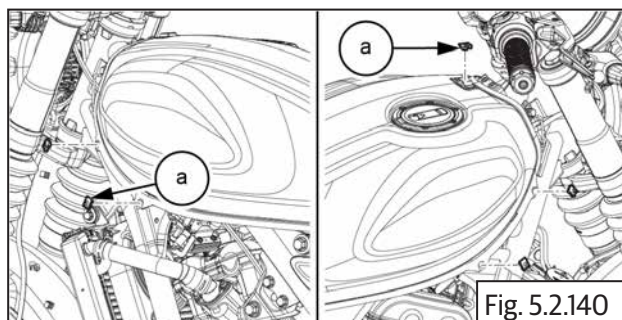
	5mm Allen key with Ratchet
	10Nm / 1.0kgf-m

- Locate and tighten 2Nos. cap bolts **(M6) (a)** on fuel tank front bracket.

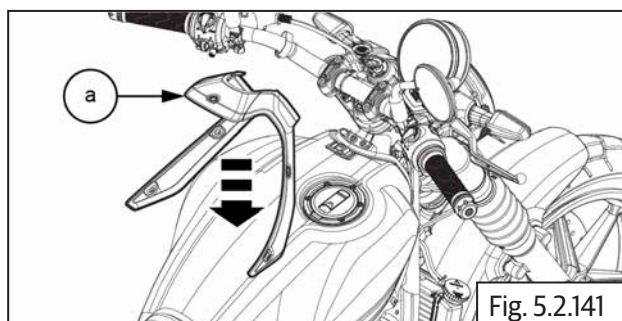


	5mm Allen key with Ratchet
	8.5 - 11.5Nm / 0.86 - 1.1kgf-m

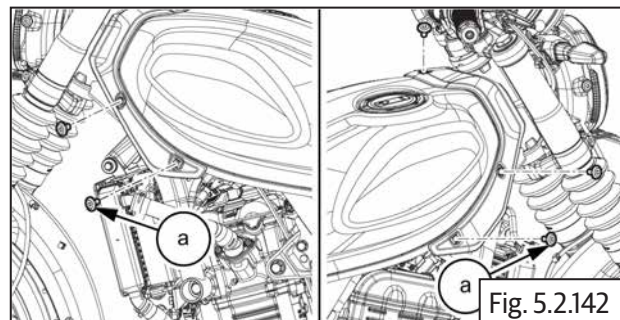
- Fix the 5Nos clip nuts **(a)** on fuel tank.



- Locate the cover **(a)** on the fuel tank.



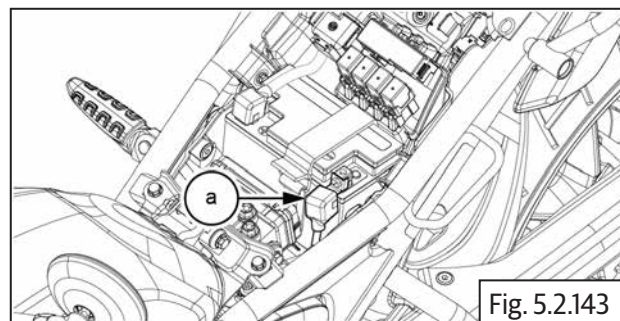
- Locate and tighten 5Nos. Button bolts **(M5) (a)** on LHS and RHS of the fuel tank cover.



	4mm Socket with Ratchet
	4.3 - 5.7Nm / 0.43 - 0.57kgf-m

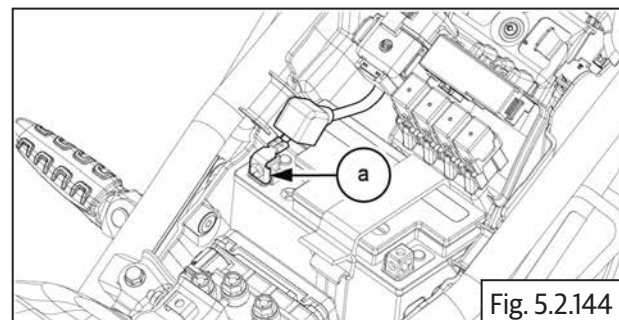
5.2.25 Connect Battery Terminal

- Connect battery negative (-ve) terminal bolt **(a)**.



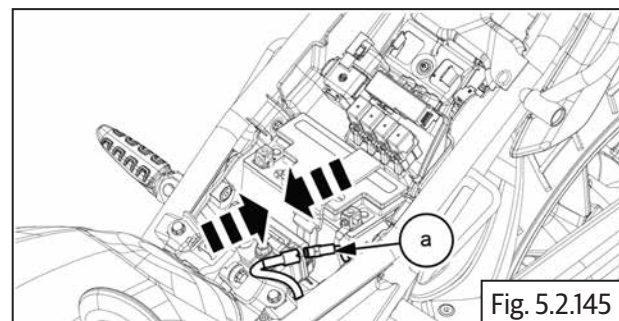
	10mm Socket with Ratchet
	3-4Nm / 0.3 - 0.4kgf-m

- Connect battery positive (+ve) terminal bolt **(a)**.



	10mm Socket with Ratchet
	3-4Nm / 0.3 - 0.4kgf-m

- Connect the negative (-ve) coupler **(a)**.



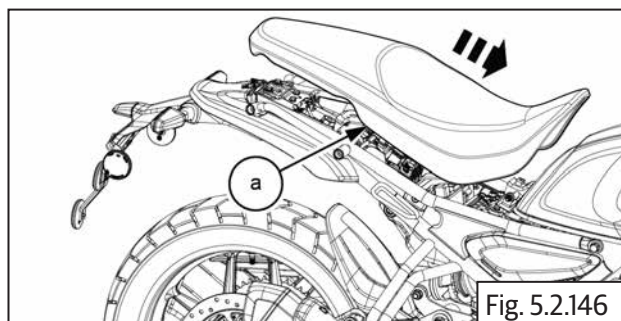
- Insert ignition key into the key barrel and switch "ON" the engine.
- Make sure the cluster, front trafficators, and head lamps work properly.

5.2.26. Seat Assembly

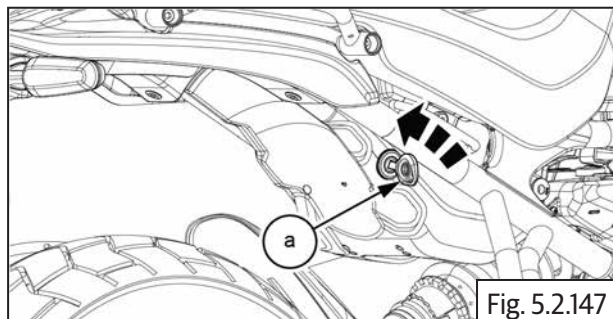
NOTE

- The rider seat height adjustment option is available in the bottom side of the rider seat.
- If increase or decrease in the rider seat height just change the front and rear end seat rod slot.

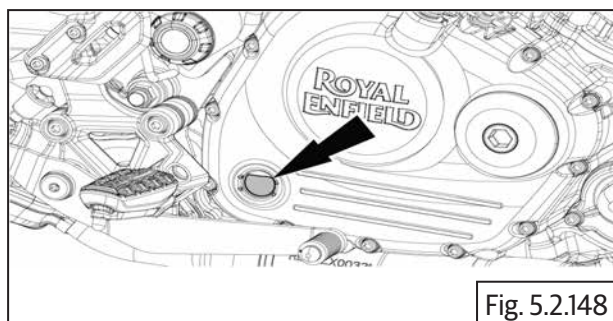
- Locate the seat assembly (a).



- Ensure the seat aligned with frame and press seat to lock with key (a) in position.



- Start and warm up engine for 2 to 3 minutes and then turn it off.
- Check oil level through oil level window
- Engine oil level should be close to "MAX" condition.



NOTE

- Switch ON and OFF the ignition twice and visually check for any fuel leakage or wet on the tank and components. If anything found, inspect and rectify the issue.

ENGINE DISMANTLING PROCEDURE

CONTENTS

PAGE

5.3. ENGINE DISMANTLING PROCEDURE

5.3.1 Components Removal from Engine	97
5.3.2 Manifold clamp Removal	97
5.3.3 Injector Removal	97
5.3.4 Spark Plug Removal	97
5.3.5 Coolant Temperature Sensor Removal	98
5.3.6 Oil Pressure Switch Removal	98
5.3.7 Thermostat Removal	98
5.3.8 Starter Motor Removal	99
5.3.9 Gear Position Sensor (GPS) Removal	99
5.3.10 FD Sprocket Removal	100
5.3.11 Oil Drain Plug And Strainer Removal	101
5.3.12 Cylinder Head Cam Cover Removal	102
5.3.13 ACG Cover (LH Side) Removal	102
5.3.14 Magneto Stator Removal	103
5.3.15 Oil Filter Removal	104
5.3.16 RH Side clutch Cover Removal	104
5.3.17 Oil Inspection Window Removal	105
5.3.18 Clutch Shifter Shaft Removal	105
5.3.19 Cam Ladder & Camshaft Sprocket Removal	107
5.3.20 Cylinder Head Removal	110

5.3.21 Cylinder Head Valve Removal	111
5.3.22 Piston Barrel Removal	112
5.3.23 Piston Removal	112
5.3.24 Piston Ring Removal	113
5.3.25 Clutch & Drive Sprocket Removal	113
5.3.26 Primary Drive Gear Removal	115
5.3.27 Oil Pump Removal	117
5.3.28 Crankcase Oil Jet Removal	118
5.3.29 Water Pump Removal	119
5.3.30 Magneto Assembly Removal	120
5.3.31 Gear shifter shaft Removal	121
5.3.32 RH Crankcase Removal	123
5.3.33 Crankshaft And Mass Balancer Removal	124
5.3.34 Gear Assembly Removal	125
5.3.35 Gear Assembly Removal	126
5.3.36 Countershaft Removal	126
5.3.37 Drive Shaft Removal	127

5.3.1 Components Removal from Engine

⚠ WARNING

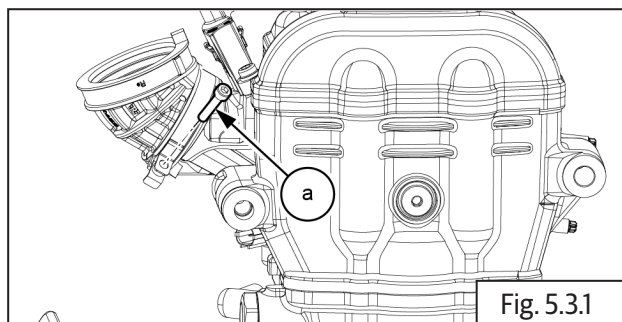
The engine and exhaust system get extremely hot during normal operation and direct contact with skin can cause serious burns. Make sure engine is in normal temperature (OR) cooled before starting operation.

NOTE

- Ensure the engine is properly clamped on the holding fixture on a worktable.
- Ensure the engine is clean and free of any oil residue/dirt. Clean engine with recommended degreasing agents/solvents to remove oil residue/dirt.
- Ensure worktable is clean and atmosphere is dust free.

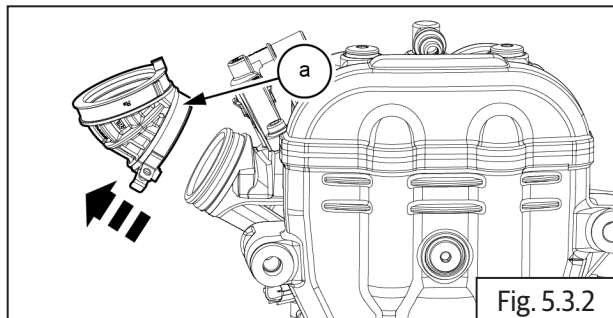
5.3.2 Manifold clamp Removal:

- Loosen worm clip screws (M5) (a) to a disconnect the adaptor from the cylinder head.



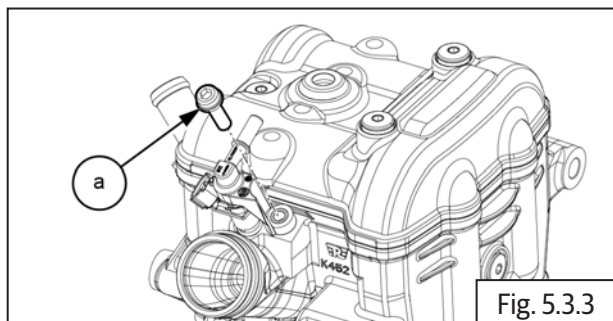
4mm allen key with Ratchet

- Gently pull out the adaptor (a) from inlet manifold.



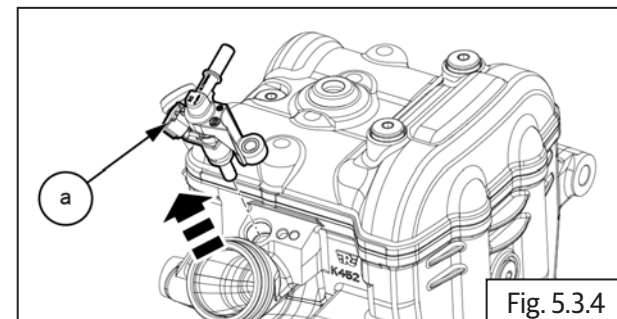
5.3.3 Injector Removal:

- Remove 1 No (M6) injector mounting bolt (a).



5mm allen key with Ratchet

- Gently pull out the injector assembly (a).



⚠ CAUTION

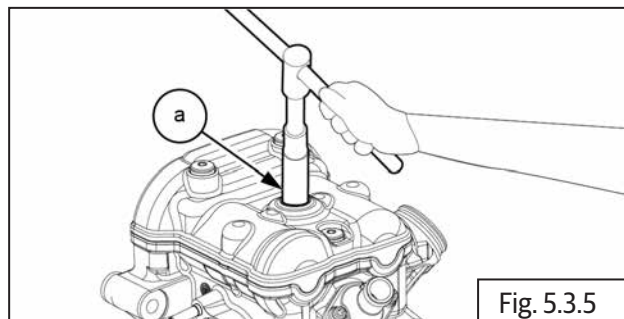
- Store the injector in a clean and dry place. Make sure that the injector is not damaged.
- Place the injector in a plastic bag to avoid dust entry.

5.3.4 Spark Plug Removal:

⚠ CAUTION

Before removing the spark plug, blow away any dirt accumulated in the spark plug area with compressed air to prevent it from dust falling into cylinder head.

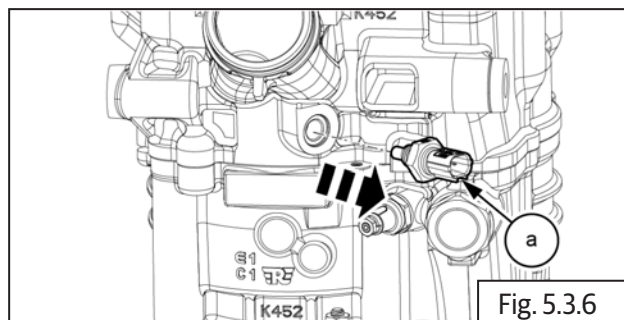
- Loosen and remove spark plug **(a)** from cylinder head.



14mm Long Socket with Ratchet

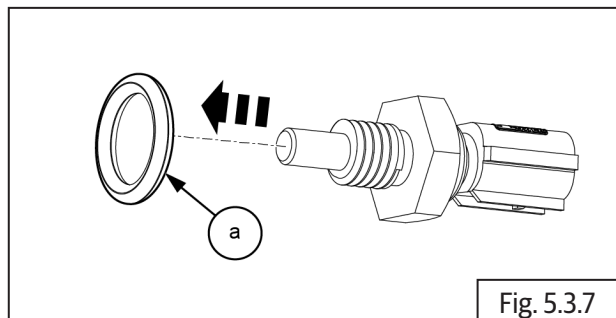
5.3.5 Coolant Temperature Sensor Removal:

- Loosen and remove the coolant Temperature sensor **(a)** along with O-ring.



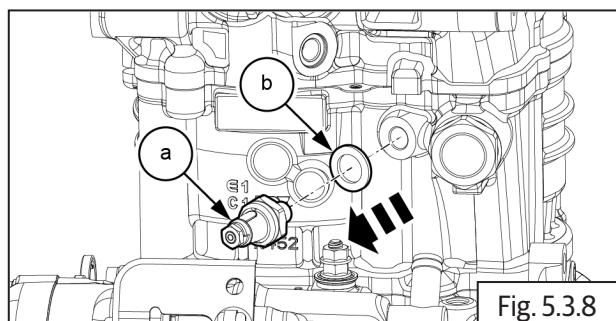
18mm Long Socket with Ratchet

- Remove the O-ring **(a)** from coolant Temperature sensor **(a)**.



5.3.6 Oil Pressure Switch Removal:

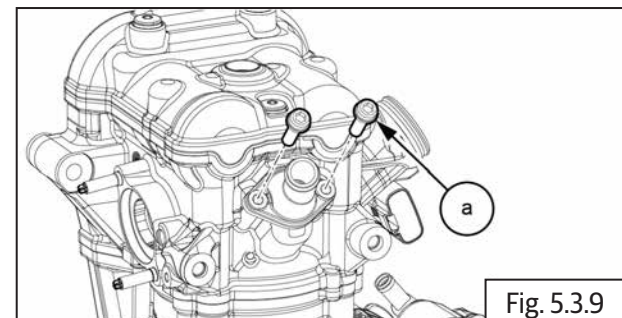
- Loosen and remove the Oil pressure switch **(a)** along with washer **(b)**.



21mm Long Socket with Ratchet

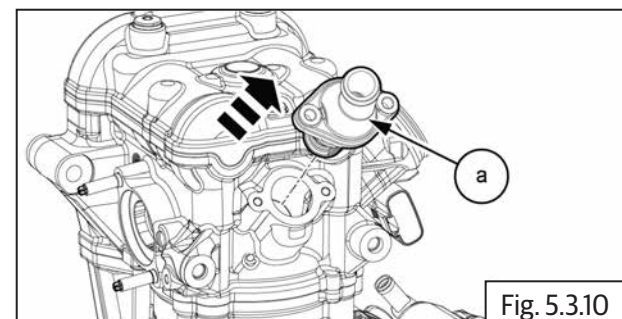
5.3.7 Thermostat Removal:

- Loosen and remove 2Nos. **(M6)** Thermostat mounting bolts **(a)**.

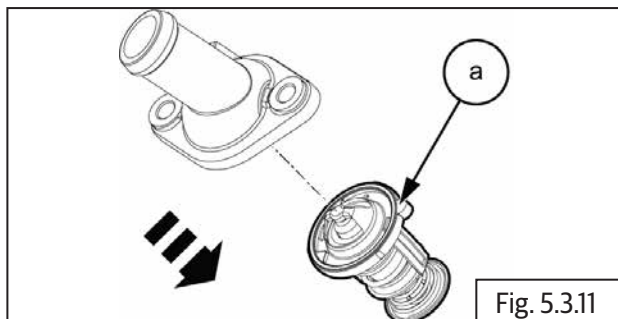


5mm allen key with Ratchet

- Remove the Thermostat **(a)** from the engine.

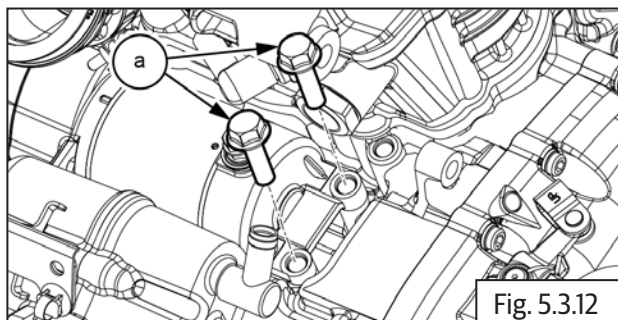


- Separate the thermostat **(a)** from housing.



5.3.8 Starter Motor Removal:

- Loosen and remove 2Nos. **(M6)** Starter Motor mounting bolts **(a)**.



10mm Socket with Ratchet

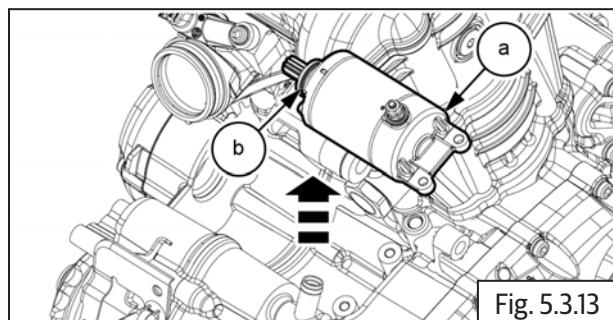
⚠ CAUTION

Remove the Bolts equally to avoid thread damage

NOTE

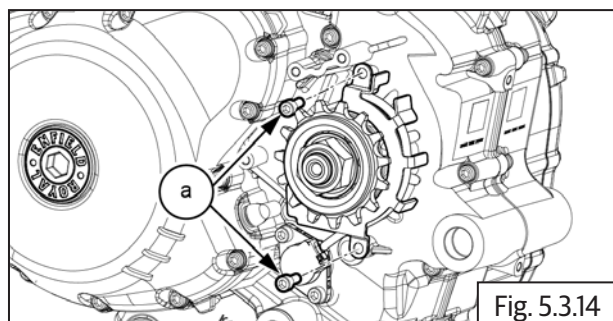
• **DO NOT** tap on the starter motor while removing it. Tapping may damage the internal components.

- Gently Pull out the Starter motor **(a)** with O - ring **(b)** from the Crankcase.



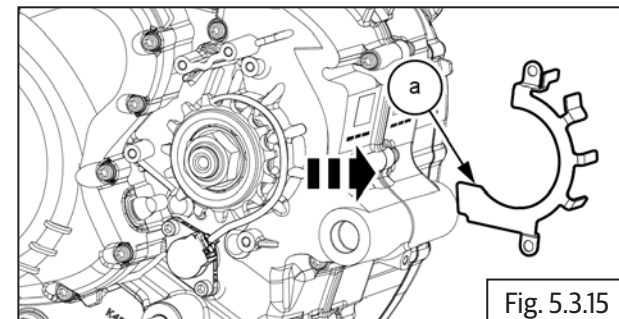
5.3.9 Gear Position Sensor (GPS) Removal:

- Loosen and remove 2 Nos. cap bolts **(M6)** **(a)** from gear position sensor cable guide bracket.

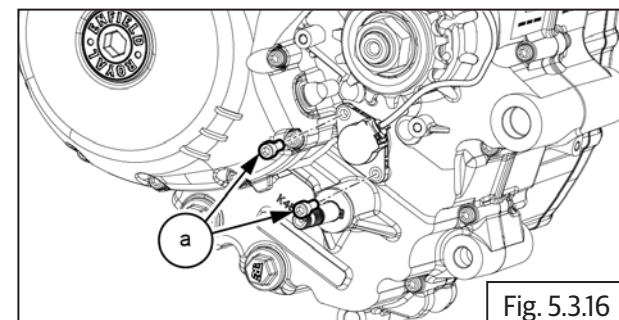


5mm allen key with Ratchet

- Remove the cable guide bracket **(a)**.

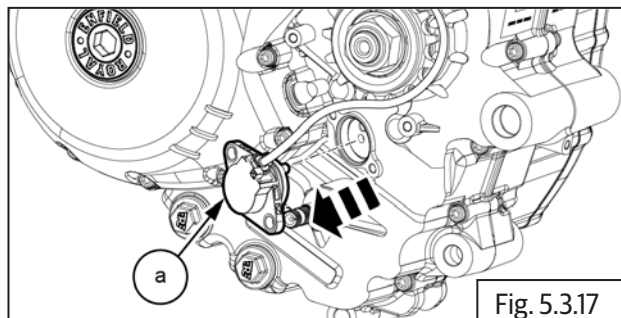


- Loosen and remove 2Nos. Gear position sensor mounting bolts **(M6)** **(a)**.

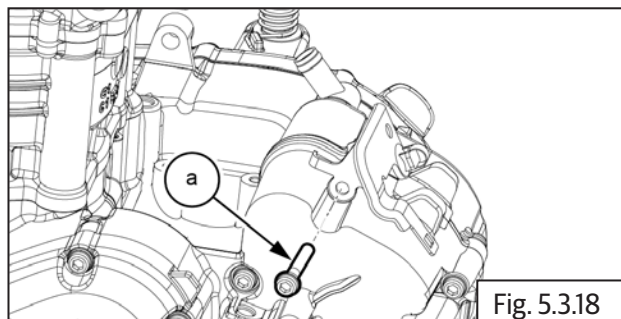


5mm allen key with Ratchet

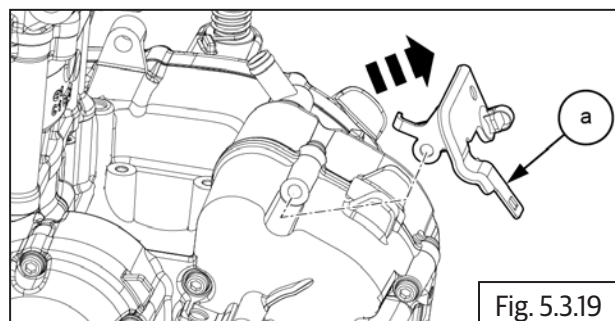
- Remove Gear position sensor with "O" ring **(a)** from engine.



- Loosen and remove 1Nos. cap head bolt **(M6) (a)** from clip bracket.

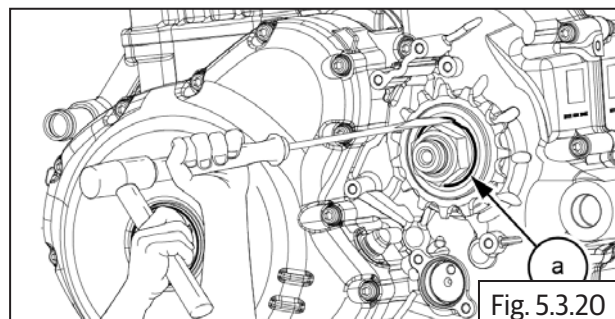


- Remove clip bracket **(a)** from engine.

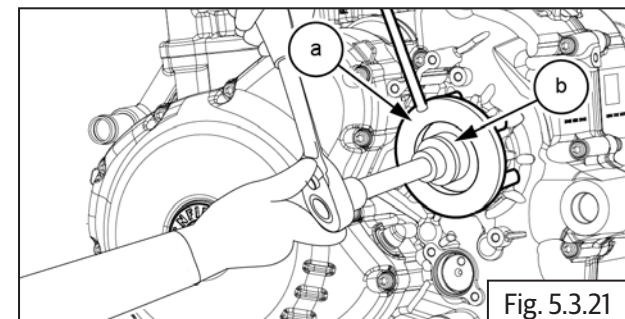


5.3.10 FD Sprocket Removal:

- Straighten lock tab washer **(a)** located over FD sprocket.



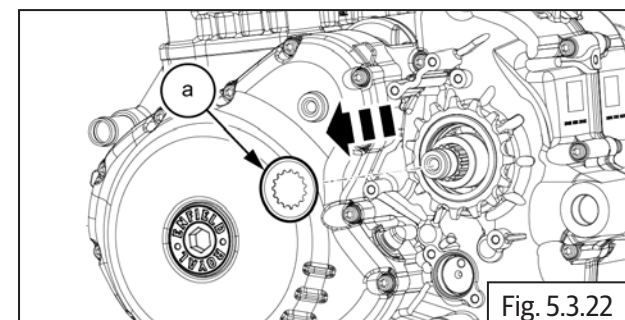
- Locate special tool over FD sprocket **(a)** and loosen hex nut **(M20) (b)**.



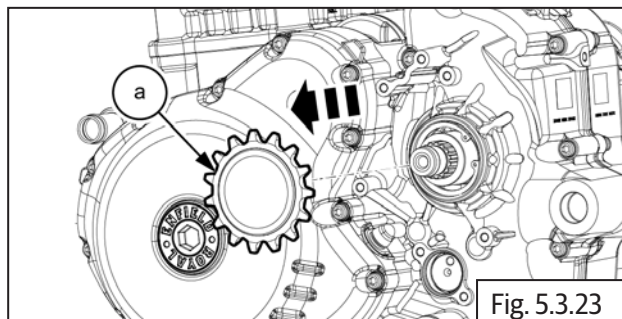
	SPL
	Part No: ST32069/A
Part Name: FD Sprocket holder	

	32mm Socket with Ratchet
--	--------------------------

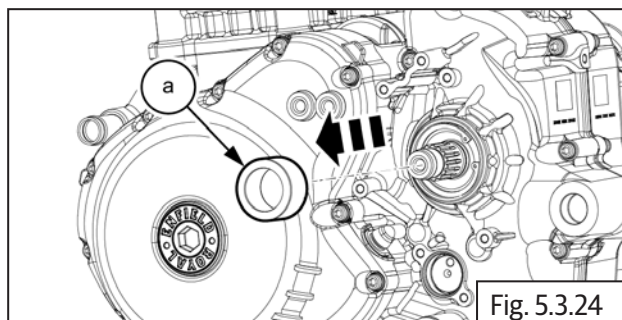
- Remove the lock top washer **(M20) (a)** from drive shaft.



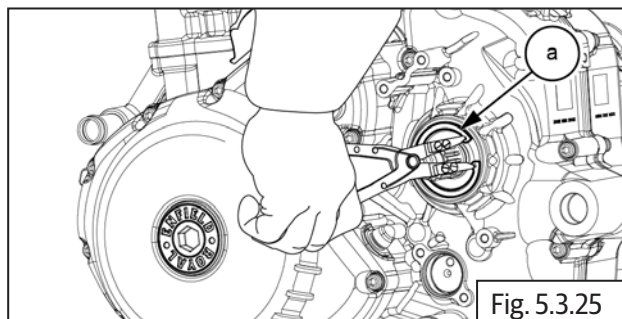
- Remove the FD Sprocket **(a)** from drive shaft.



- Gently Remove the Spacer **(a)** from drive shaft.

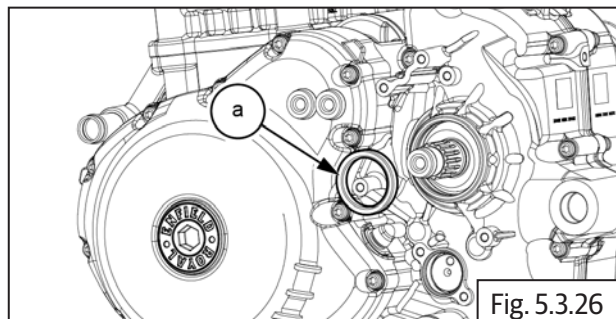


- Remove circlip **(a)** from drive shaft.



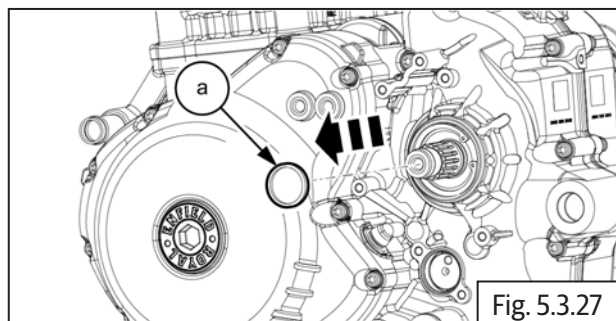
External Circlip Plier

- Remove the Oil seal **(a)** from drive shaft.



Connector

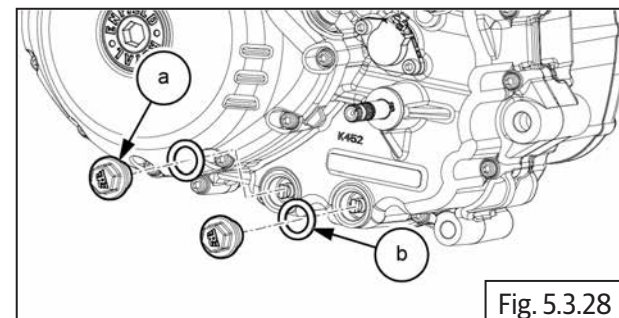
- Remove O-ring **(a)** from drive shaft.



Connector

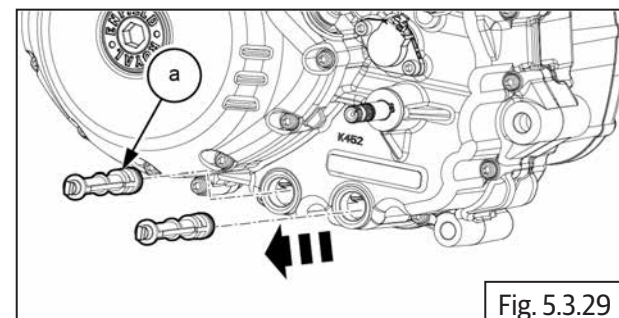
5.3.11 Oil Drain Plug And Strainer Removal:

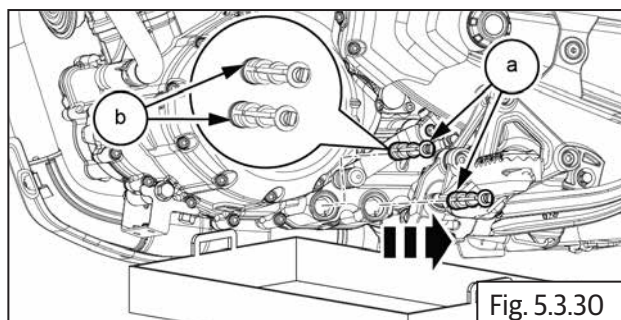
- Loosen and remove 2Nos drain plugs **(a)** along with "O" Rings **(b)** from LHS oil sump.



17mm Socket with Ratchet

- Remove the 2Nos strainers **(a)** with "O" Rings **(b)** from LHS oil sump





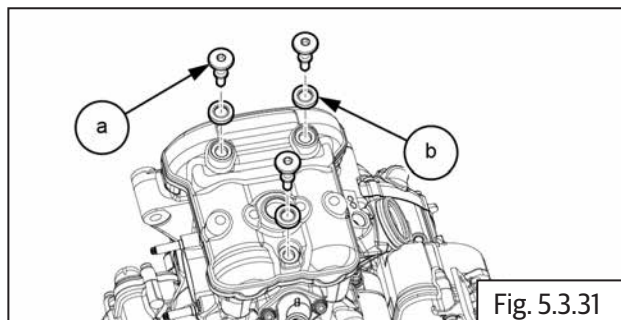
Nose Plier

5.3.12 Cylinder Head Cam Cover Removal:

- Loosen and remove the 3 Nos. Hex Socket head screws (M6) (a) along with washer (b).

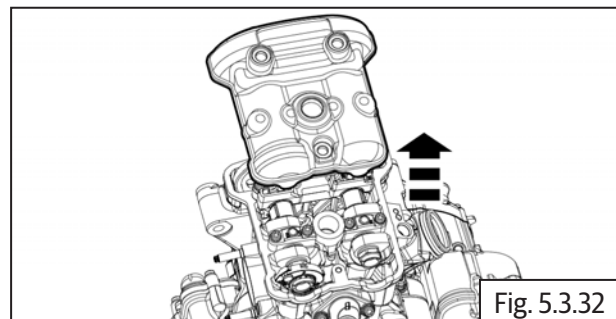
⚠ CAUTION

Remove the bolts equally to avoid thread damage.

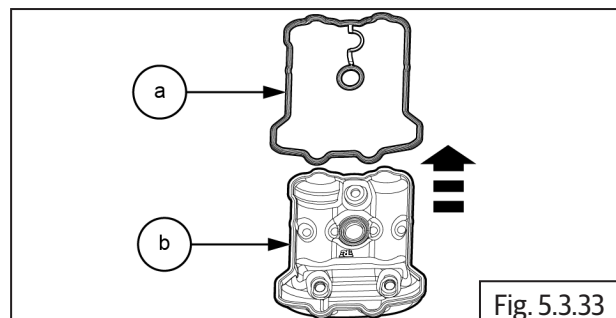


5mm allen key with Ratchet

- Gently remove the cam cover (a) from cylinder head.

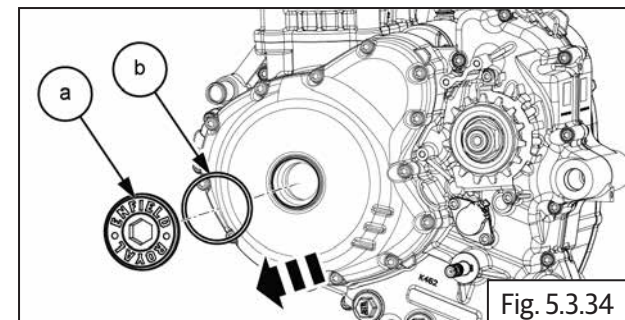


- Gently remove the gasket (a) without damage from cam cover (b).



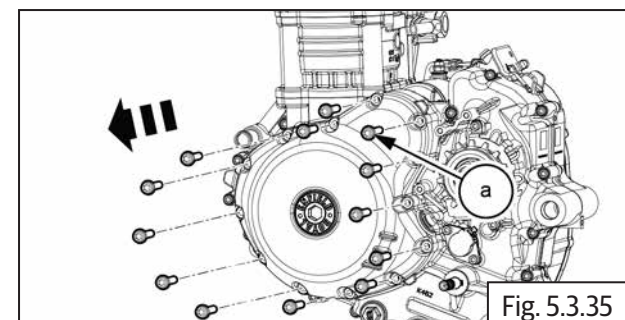
5.3.13 ACG Cover (LH Side) Removal:

- Remove crankshaft hole plug (M34) (a) along with 'O' Ring (b) from center of magneto cover.



14mm allen key with Ratchet

- Loosen and remove 13Nos. cap flange bolts (M6) (a) in crisscross pattern from LH side cover.



5mm allen key with Ratchet

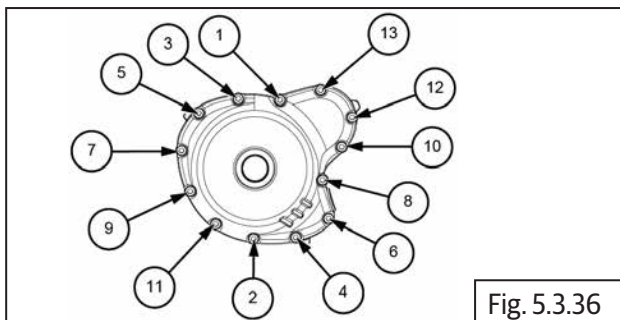


Fig. 5.3.36

- Gently tap on the tabs with a plastic / rubber mallet, on the inside edges of the magneto cover **(a)**, to remove.
- Remove magneto cover **(a)** from crankcase on LH side.

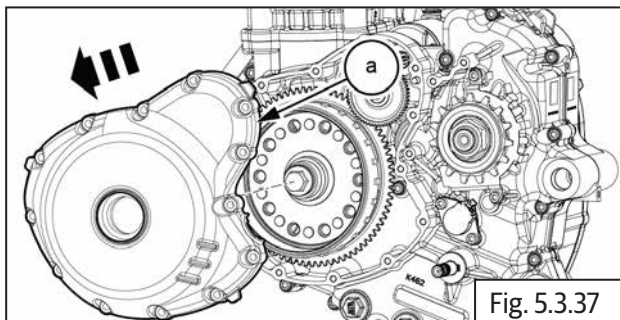


Fig. 5.3.37



Plastic/Rubber mallet

- The magneto cover may be hard to remove from crankcase, due to the magnetic force from the magneto acting on the stator coil.
- Remove the dowel pins 2Nos. **(a)** from LH side Crankcase.

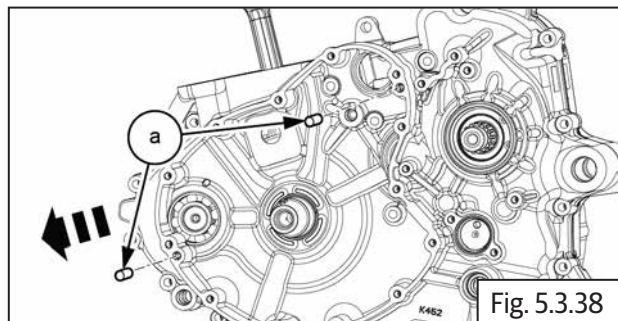


Fig. 5.3.38

- Gently Remove the ACG cover gasket **(a)**.

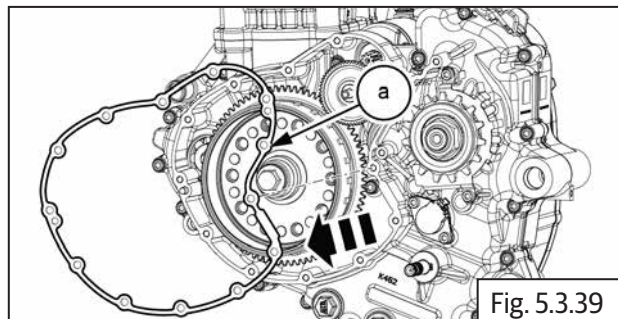


Fig. 5.3.39

⚠ CAUTION

- Do not use a sharp tool to scrap the gasket material from the joint faces.
- If required scrap only with a soft and blunt tool.

5.3.14 Magneto Stator Removal:

- Loosen and remove 2Nos. cap flange bolts **(M5)** **(a)** from Crank position sensor.

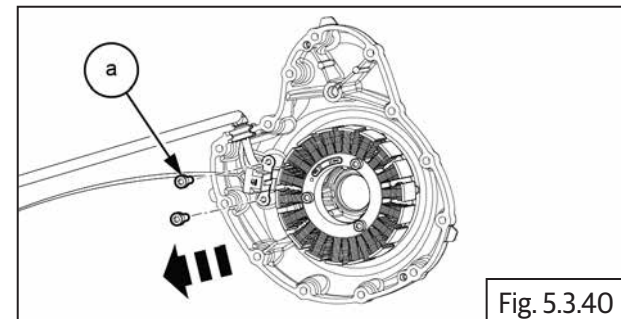


Fig. 5.3.40



4mm allen key with Ratchet

- Gently release wiring grommet **(a)** from ACG cover.

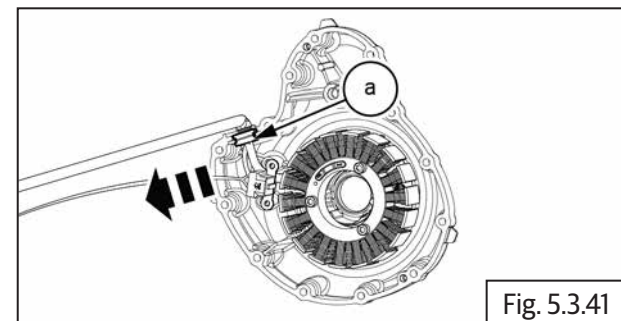
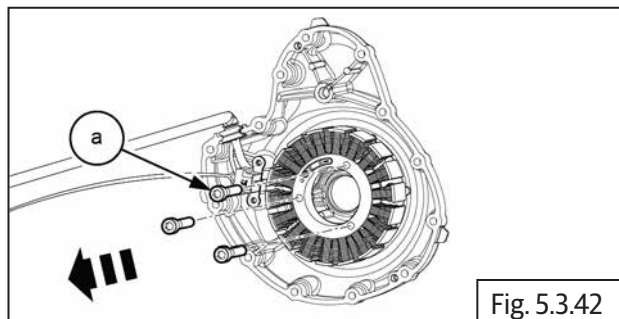


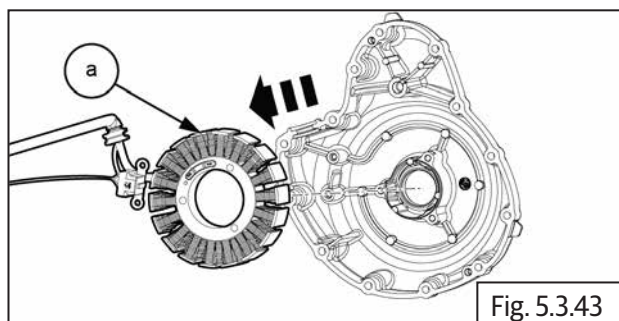
Fig. 5.3.41

- Loosen and remove 3Nos. cap flange bolts **(M6)** **(a)** from magneto starter mounting.



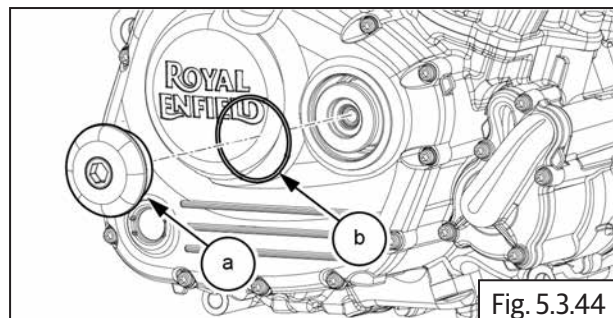
5mm allen key with Ratchet

- Gently remove the magneto starter **(a)** from LH ACG cover.



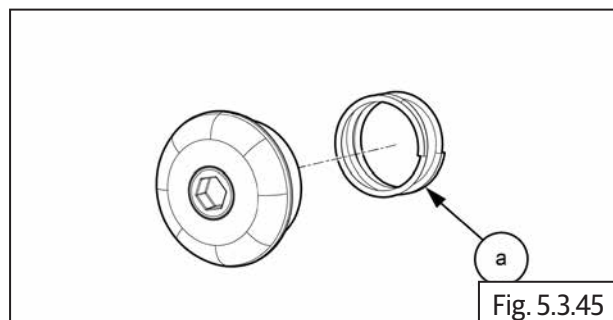
5.3.15 Oil Filter Removal:

- Loosen and remove the oil filter cap **(a)** along with O-ring **(b)**.

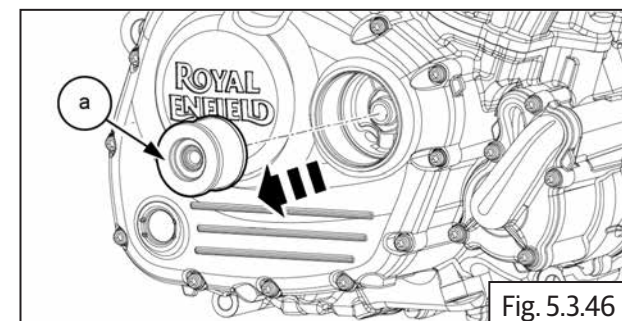


14mm allen key with Ratchet

- Remove the spring **(a)** from oil filter cap.

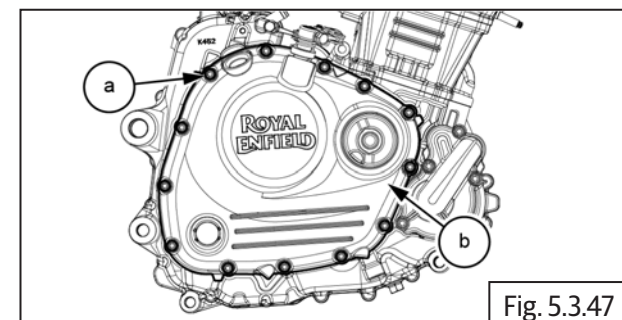


- Remove the oil filter **(a)** from RH clutch cover.



5.3.16 RH Side clutch Cover Removal:

- Loosen and remove 13Nos. cap flange bolts **(M6)** **(a)** in crisscross pattern from RH side cover **(b)**.



5mm allen key with Ratchet

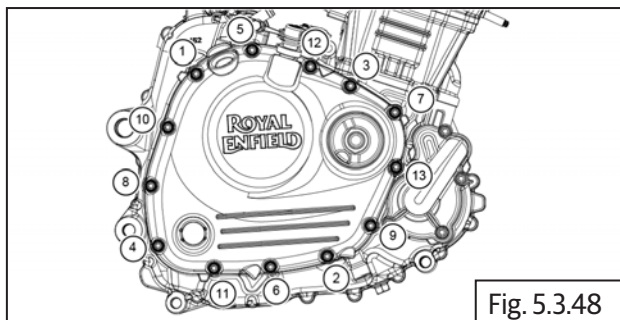


Fig. 5.3.48

- Gently remove the RH side cover **(a)**.
- Gently tap on the tabs with a plastic / rubber mallet, on the inside edges of the clutch cover **(a)**, to remove.

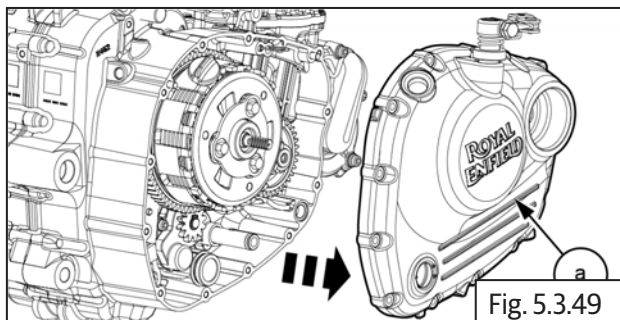


Fig. 5.3.49



Plastic/Rubber mallet

- Remove the oil transfer pipe with O rings **(a)**.

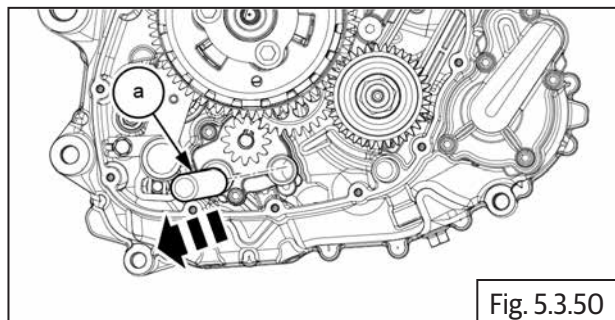


Fig. 5.3.50

- Remove the clutch cover gasket **(a)** from RH side cover.

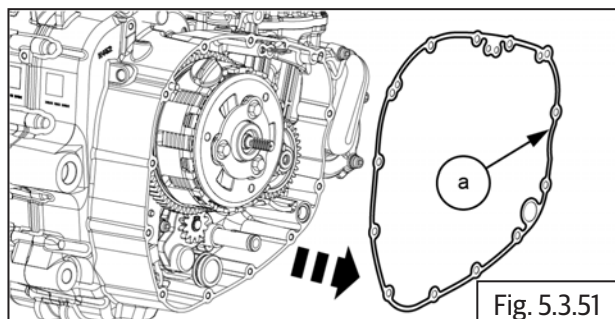


Fig. 5.3.51

⚠ CAUTION

- Do not use a sharp tool to scrap the gasket material from the joint faces.
- If required scrap only with a soft and blunt tool.

5.3.17 Oil Inspection Window Removal:

- Remove the circlip **(a)** on the oil level window inside clutch cover

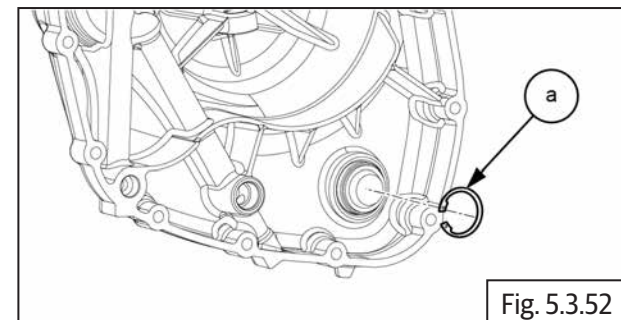


Fig. 5.3.52



Circlip plier

- Gently remove oil inspection window **(a)** from RH side clutch cover.

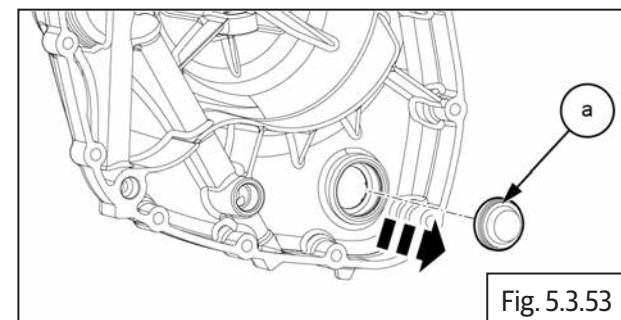


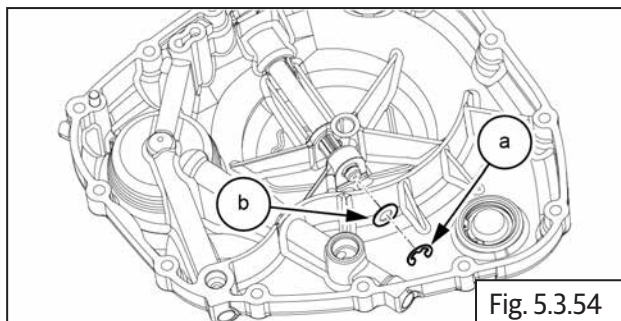
Fig. 5.3.53



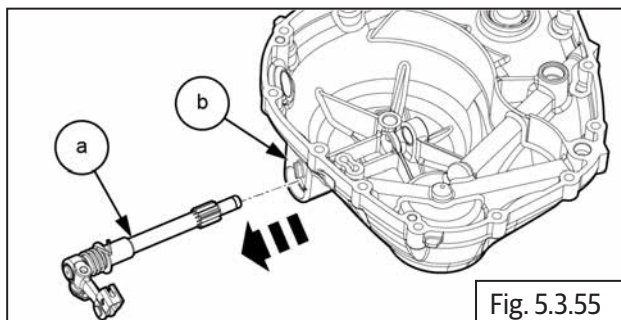
Screwdriver

5.3.18 Clutch Shifter Shaft Removal:

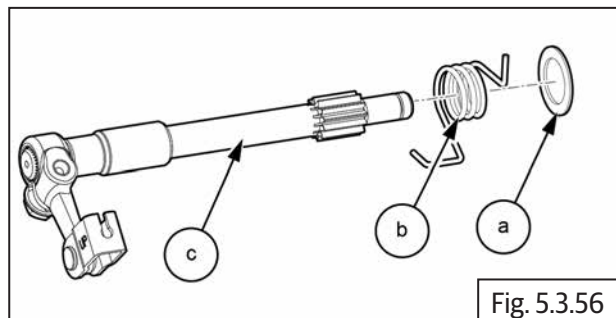
- Gently remove the E clip **(a)** and washer **(b)** from the bottom of the clutch actuating shaft inside clutch cover.



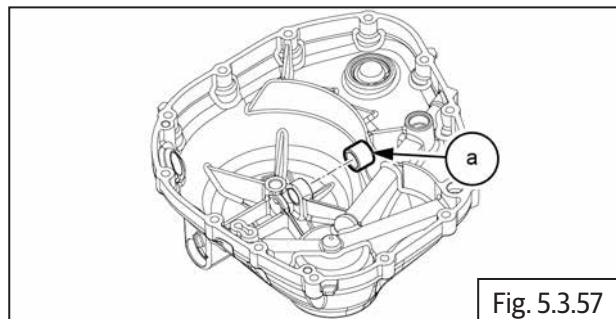
- Gently pull out clutch actuating shaft **(a)** from clutch cover **(b)**.



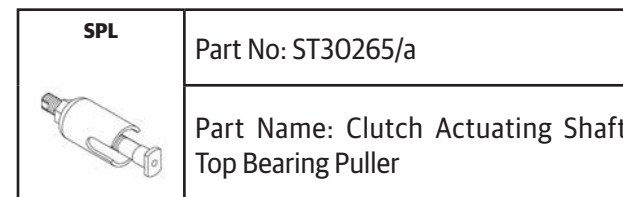
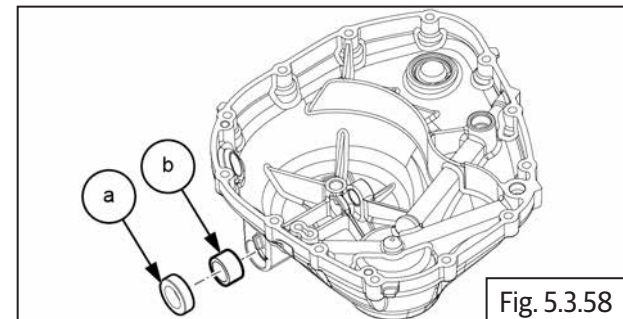
- Remove the washer **(a)** and spring **(b)** from clutch actuating shaft **(c)**.



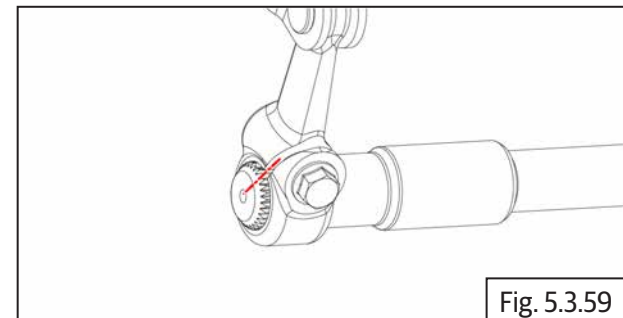
- Remove the bottom needle roller bearing **(a)** from clutch cover with special tool.



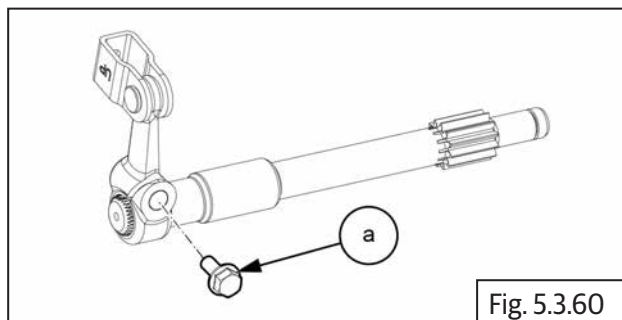
- Remove the Top needle roller bearing **(b)** and oil seal **(a)** from clutch cover with special tool.



- Before removal draw the identify mark on the clutch release arm slot.

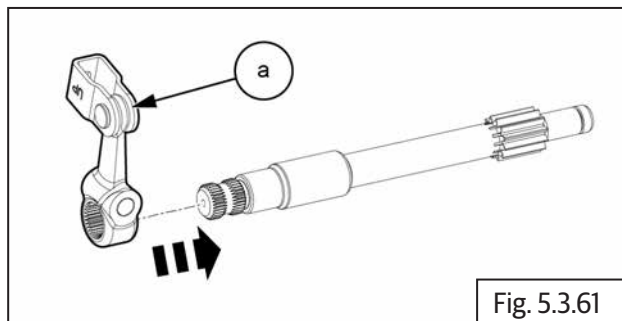


- Remove the hex head bolt **(M6) (a)** from clutch release arm.



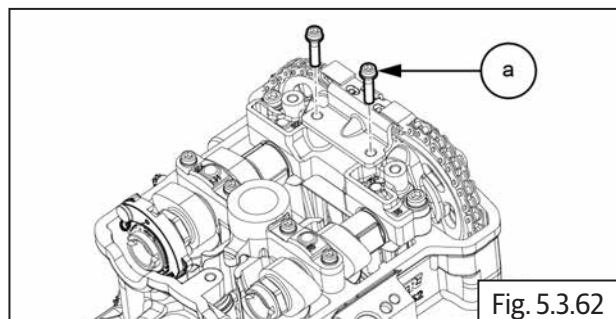
10mm Socket with Ratchet

- Remove the clutch release arm **(a)** from the shaft.



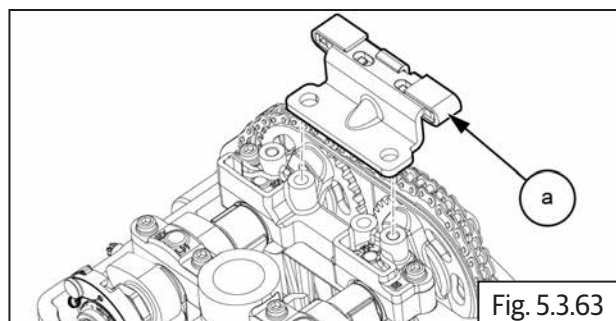
5.3.19 Cam Ladder & Camshaft Sprocket Removal :

- Loosen and remove 2Nos. Hex head bolts **(M6) (a)** from top mounting guide.

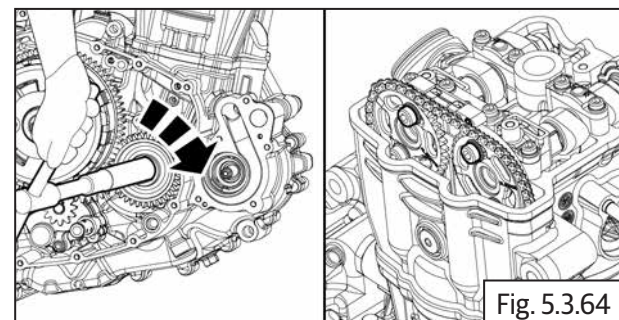


5mm allen key with Ratchet

- Remove the top guide plate **(a)** from cam ladder.

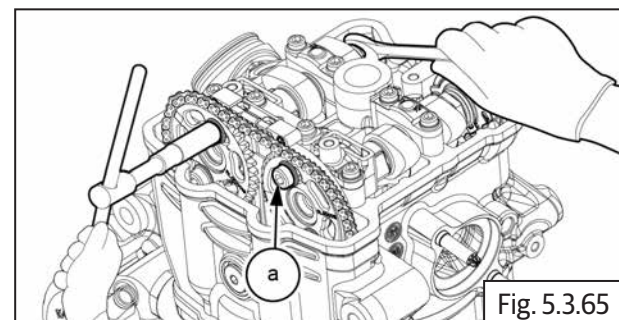


- Rotate the crankshaft to bring the piston in TDC.
- Bottom edge of slot in end of camshaft should be approximately lined up with top surface of cylinder head.



24mm Socket with Ratchet

- Loosen and remove 2Nos. 1st cap head bolt **(M8) (a)** from cam sprocket.



22mm Double End Spanner
6mm allen key with Ratchet

- Rotate the crankshaft 360° so that the 2nd cam sprocket bolt is visible above the top surface of the cylinder head.

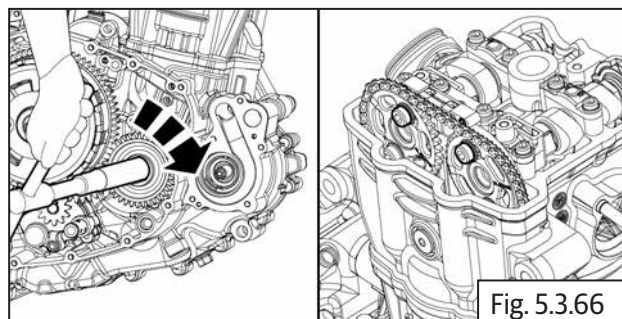


Fig. 5.3.66



24mm Socket with Ratchet

- Loosen and remove 2Nos. 2nd cap head bolt (**M8**) (**a**) from cam sprocket.

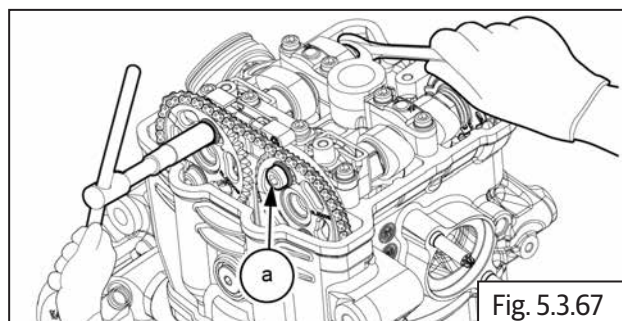


Fig. 5.3.67



22mm Double End Spanner
6mm allen key with Ratchet

- **HMT** - called as Hydro Mechanical Tensioner.
- Remove the HMT (**a**) with sealing washer (**b**) from engine RHS.

NOTE

- Take care may fall off cam sprockets.

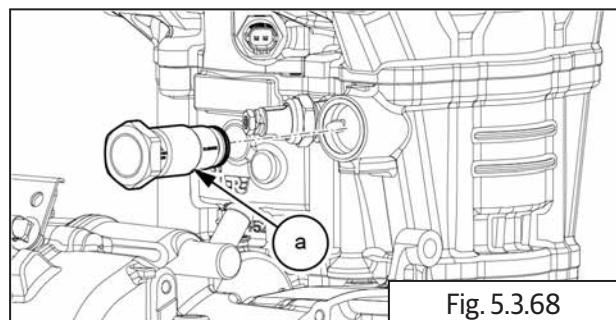


Fig. 5.3.68



27mm Socket with Ratchet

- Lift cam chain and remove cam sprockets from camshaft.

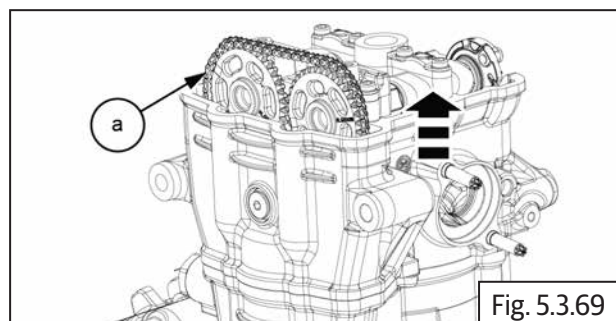


Fig. 5.3.69

- Gently release the cam chain and remove the inlet cam sprocket (**a**) and exhaust cam sprocket (**b**) from cam shafts.

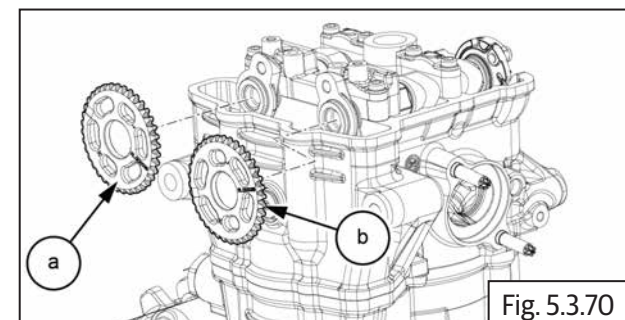


Fig. 5.3.70

- Loosen and remove the inlet and exhaust cam ladder cap bolts (**M6**) (**a**) 6 Nos from cylinder head.

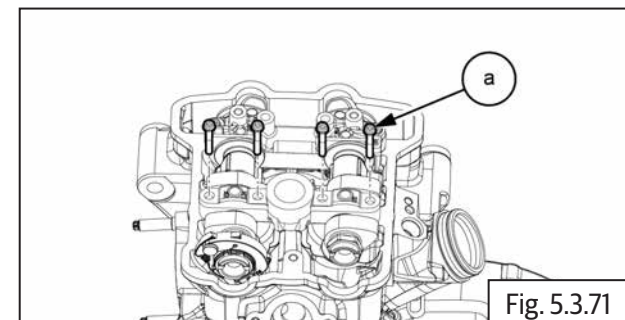


Fig. 5.3.71

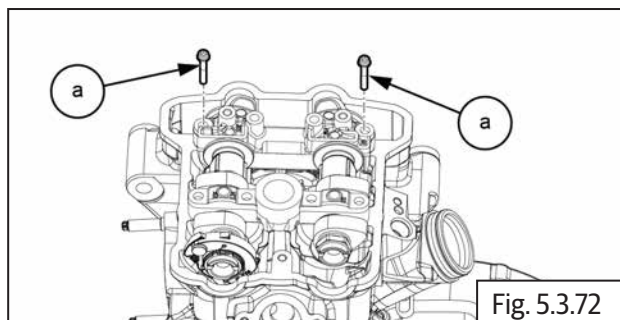


5mm allen key with Ratchet

⚠ CAUTION

Remove the bolts equally to avoid thread damage.

- Loosen and remove 2Nos. Hex head bolts **(M6) (a)** from cam ladder.

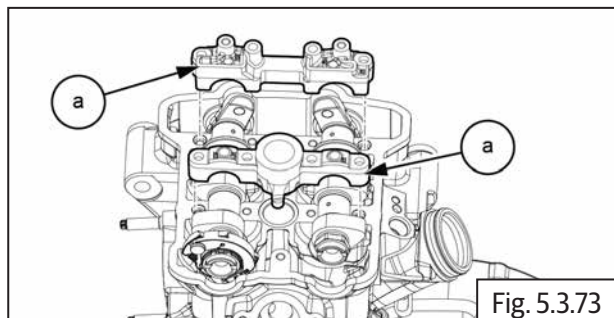


5mm allen key with Ratchet

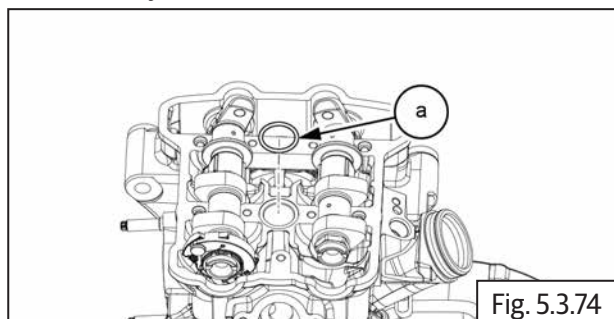
⚠ CAUTION

Remove the bolts equally to avoid thread damage.

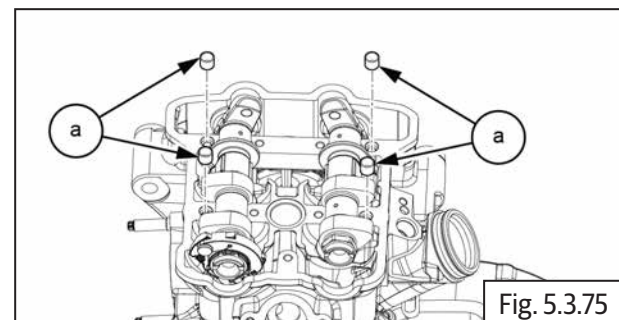
- Remove cam ladders **(a)** from cylinder head assembly.



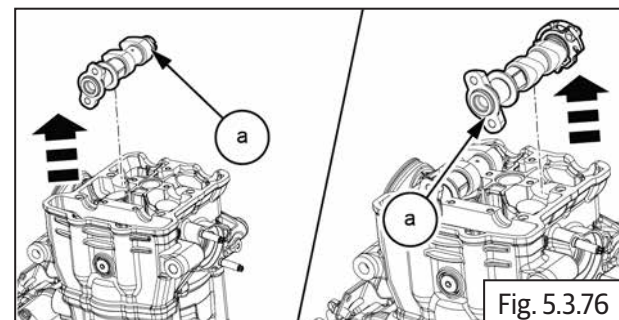
- Remove the O-ring **(a)** from cylinder head assembly.



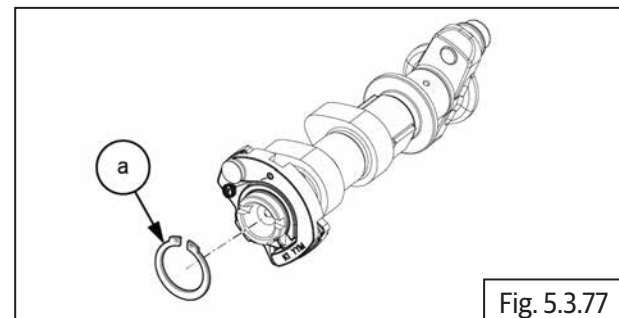
- Remove the dowel pins **(a)** 4Nos. from cylinder head.



- Remove the cam shaft **(a)** 2 Nos. from cylinder head.



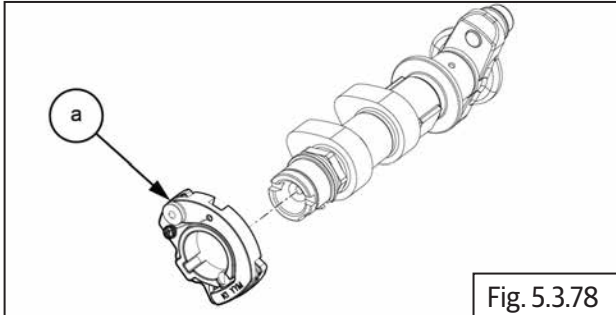
- Remove the circlip **(a)** from exhaust cam shaft.



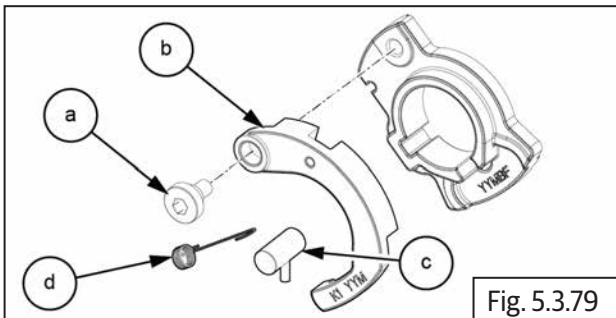


Circlip Plier

- Remove decompressor **(a)** from cam shaft.



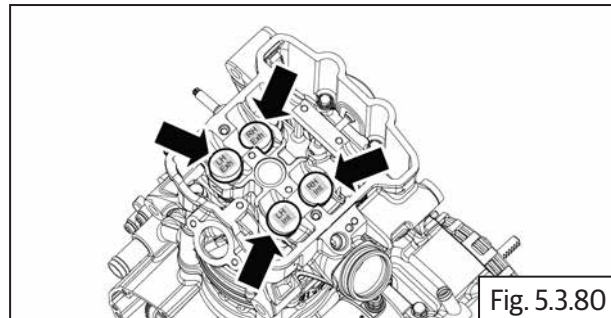
- Remove the pivot bolt from **(a)** from decompressor.
- Separate the below parts:
- b.** Decompressor weight.
- c.** Pin Assembly.
- d.** spring.



3mm Allen key

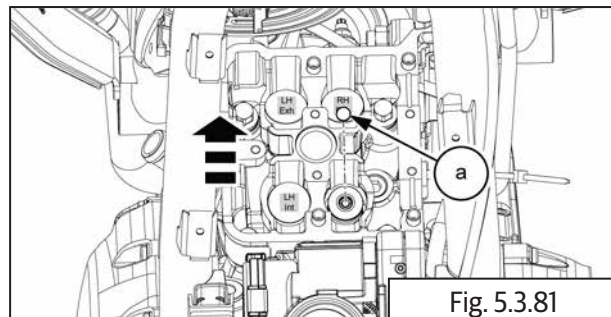
5.3.20 Cylinder Head Removal:

- Remove the inlet and exhaust tappet buckets **(a)** 4Nos. Using magnetic stick.



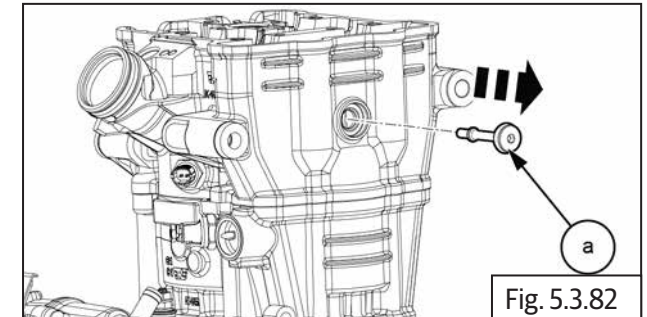
Magnetic stick

- Remove the shims **(a)** 4Nos. from retainer using magnetic stick.



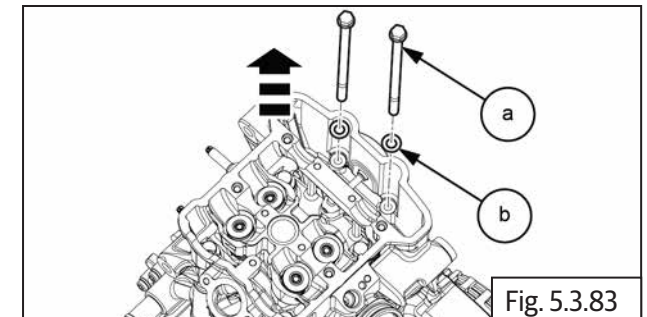
Magnetic stick

- Loosen and remove noise suppressor bolt and seal **(a)** from cylinder head.



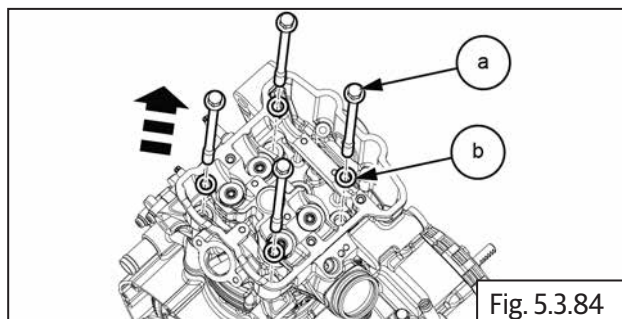
5mm allen key with Ratchet

- Loosen and remove 2Nos. Hex head long bolts **(M6) (a)** along with washer **(b)** on cylinder head.



8mm socket with Ratchet

- Loosen and remove 4Nos. Hex head long bolts **(M10) (a)** along with flat washer **(b)** in crisscross pattern on cylinder head.

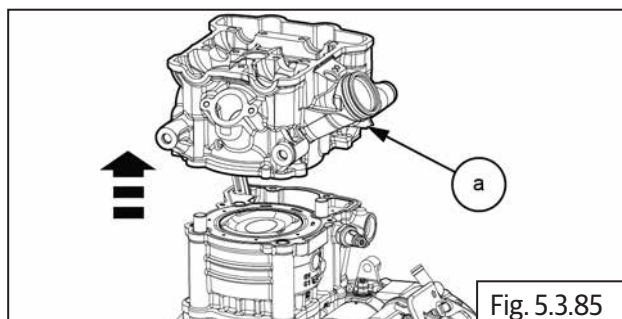


12mm socket with Ratchet

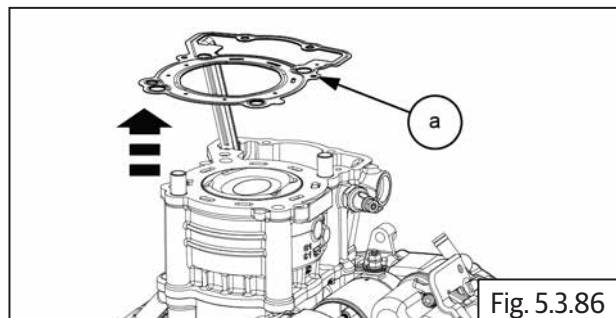
⚠ CAUTION

The cylinder head bolts are one time use, do not reuse the bolts.

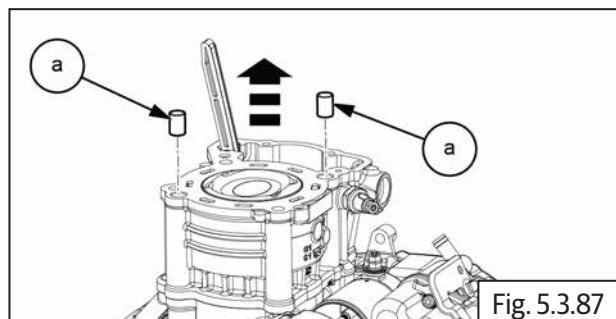
- Support cam chain suitably and gently remove cylinder head **(a)** from cylinder barrel.



- Remove the cylinder head gasket **(a)** from cylinder barrel.

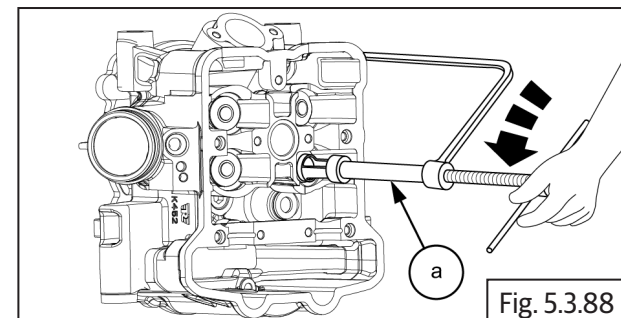


- Remove the dowel pins **(a)** 2Nos. from cylinder barrel.



5.3.21 Cylinder Head Valve Removal:

- Compress valve spring with special tool **(a)**.



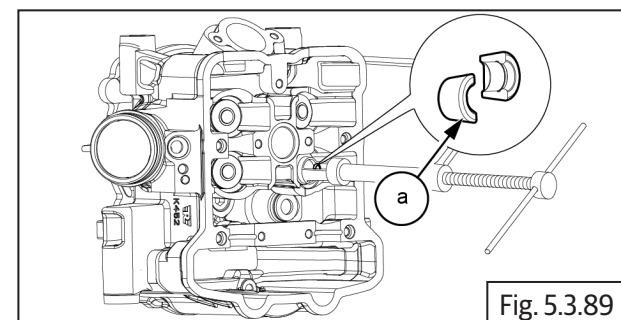
SPL

Part No: ST-27528-2



Part Name: Valve spring compressor

- Remove the cotters **(a)** on valve stem at the top using magnetic stick.



	Magnetic stick
---	----------------

SPL	Part No: ST-27528-2
	Part Name: Valve spring compressor

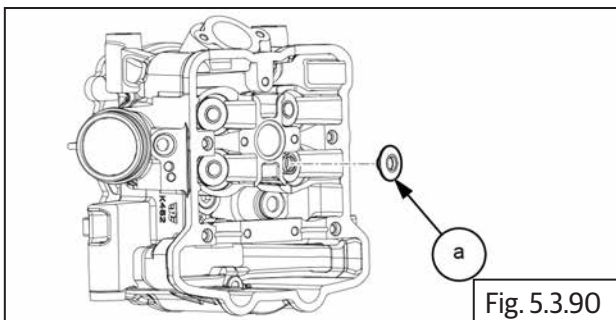
- Gently loosen the screw on valve spring compressor, till the valve spring tension is completely released and remove the special tool.

⚠ CAUTION

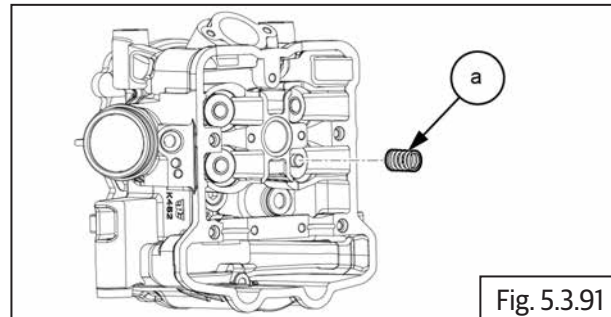
Valve spring under high tension when compressed.

Release valve spring compressor tool slowly and with care.

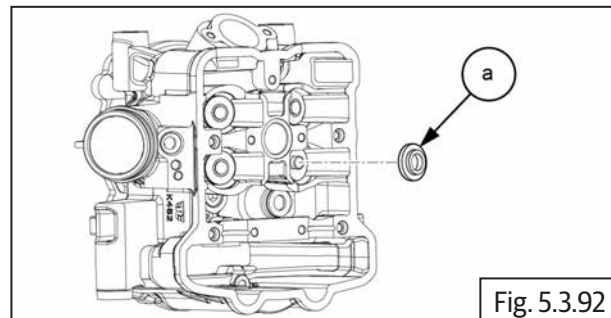
- Remove the retainer, valve spring (a) from the top of the valve spring.



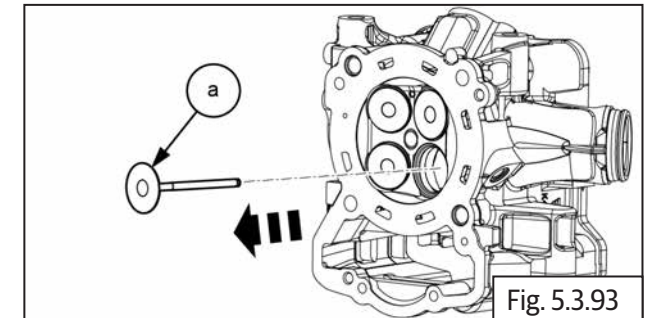
- Remove the valve spring (a) from valve stem.



- Remove the valve seat springs 4 Nos (a) from cylinder head.



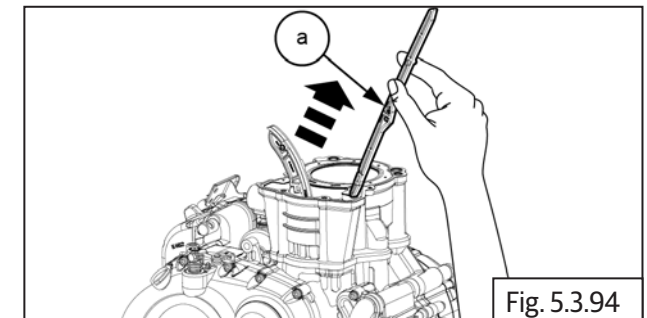
- Push valve (a) down from the top side of the cylinder head. Pull and remove valve (a) down from the bottom side of the cylinder head.



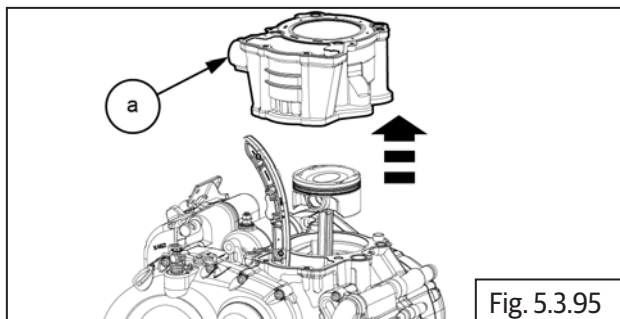
- Follow the same procedure to remove the other valves from the cylinder head.

5.3.22 Piston Barrel Removal:

- Remove the cam chain guide (a) from front end of the cylinder barrel.

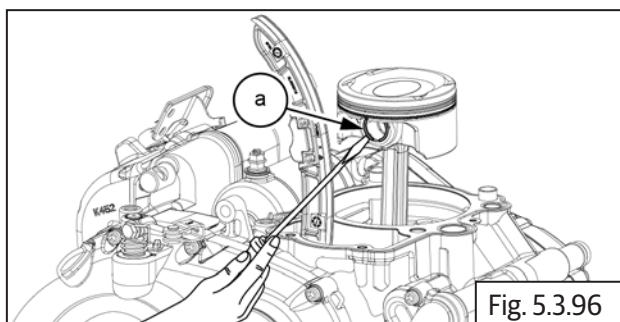


- Support cam chain suitably.
- Gently remove cylinder barrel **(a)** from crankcase.



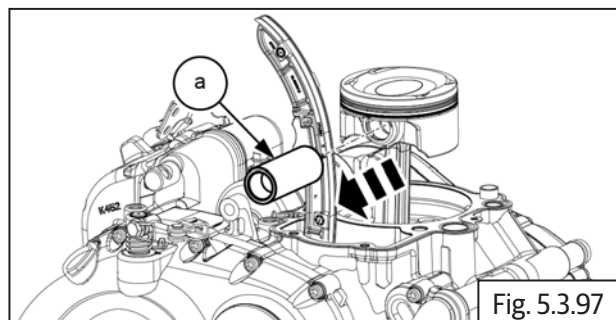
5.3.23 Piston Removal:

- Remove the circlip **(a)** from outer side of piston.

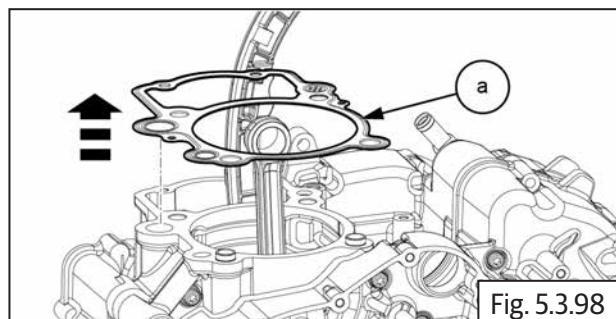


Screwdriver

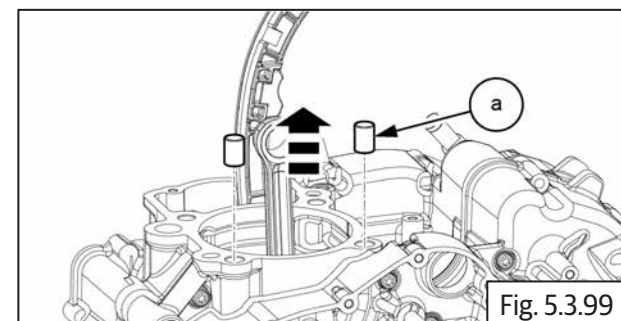
- Gently push out gudgeon pin **(a)** from inner side of piston and ensure it has completely come out of the connecting rod, to release piston from the connecting rod.



- Remove the gasket **(a)** from crankcase.

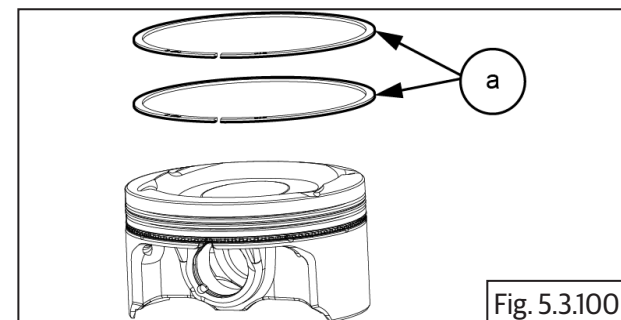


- Remove the dowel pins **(a)** 2Nos. from crankcase.

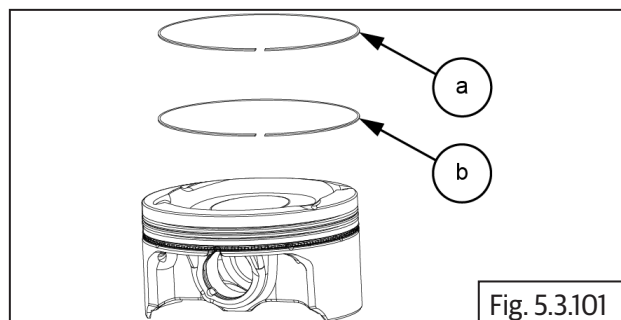


5.3.24 Piston Ring Removal:

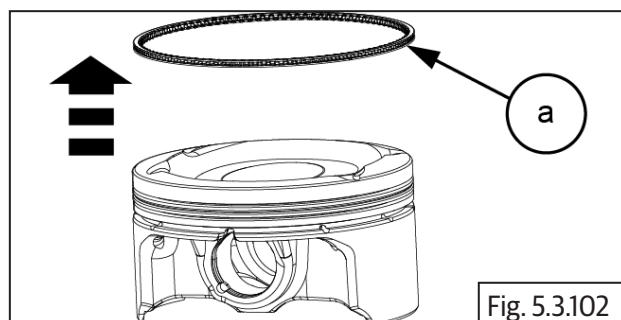
- Gently lift and remove piston ring top **(a)** 2Nos. from piston.



- Gently lift and remove top rail **(a)** & bottom rail fixing **(b)** from piston.

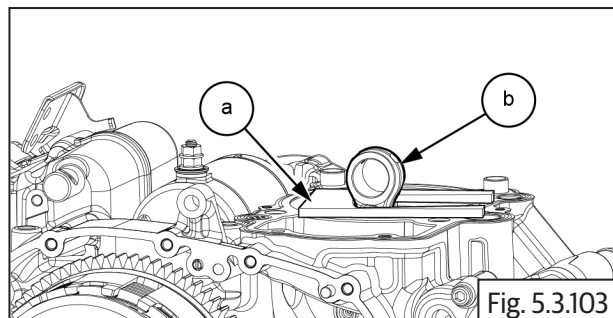


- Gently lift and remove oil ring **(a)** from piston.



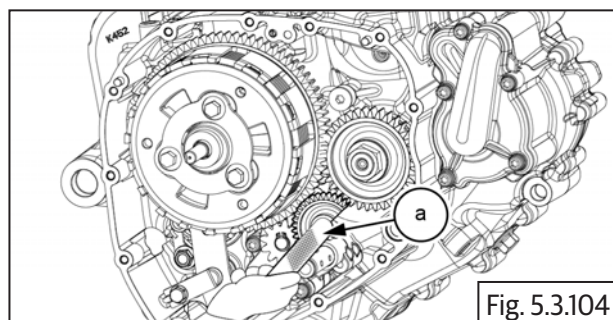
5.3.25 Clutch & Drive Sprocket Removal:

- Locate the special tool **(a)** to lock the connecting rod **(b)**.



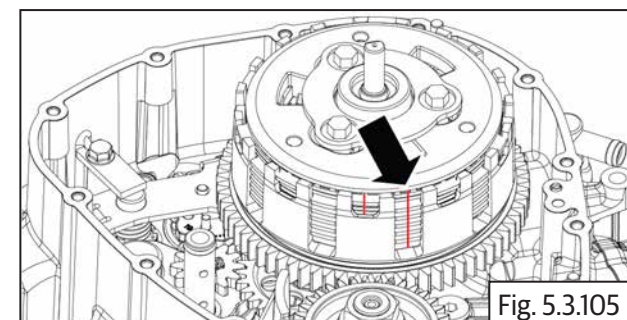
	Part No: ST-27529-2
	Part Name: Connecting rod holder

- Insert special tool **(a)** in crankcase RH to lock the crankshaft and prevent rotation.

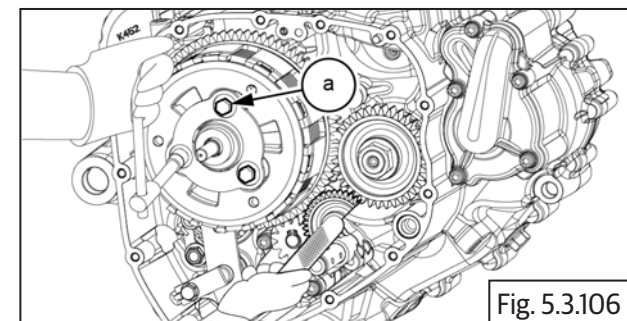


	Part No: ST275332
	Part Name: Crank gear locking tool

- Mark the position of clutch plates with a marker before dismantling.



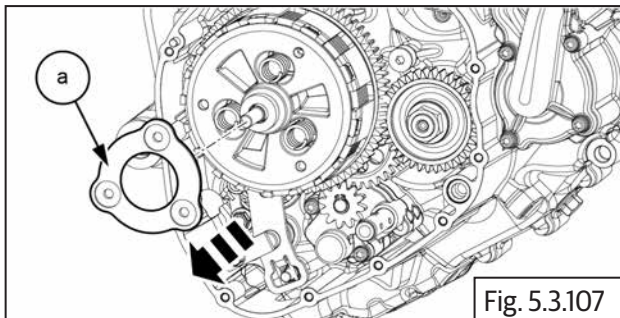
- Loosen and remove 3Nos. Hex flange head bolts **(M6) (a)** on the pressure plate evenly and slowly until tension is released completely.



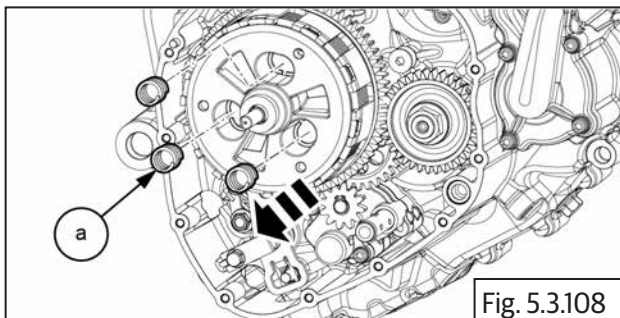


10mm Socket with Ratchet

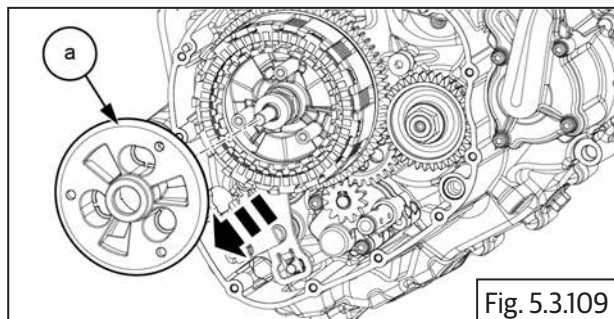
- Remove stopper plate **(a)** from clutch hub.



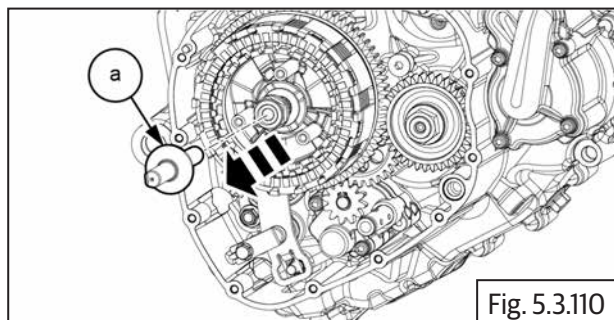
- Remove the spring **(a)** 3Nos. from clutch hub.



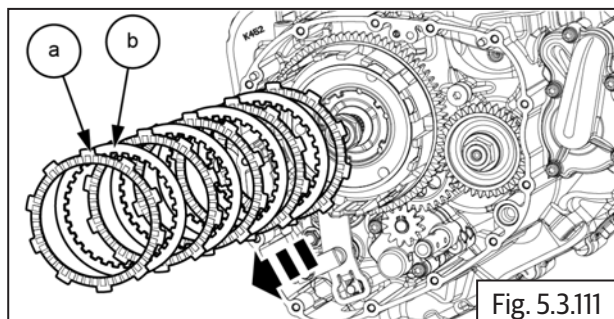
- Remove pressure plate **(a)** from clutch assembly.



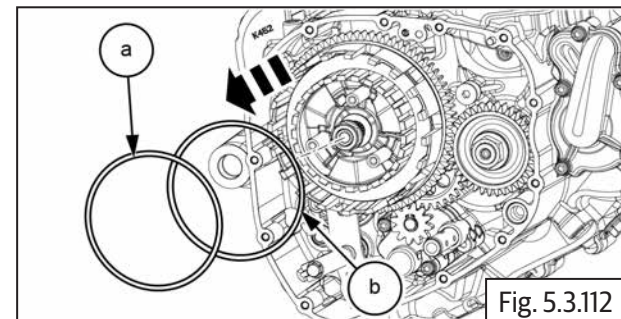
- Remove pull rod **(a)** from clutch assembly.



- Remove friction plate **(a)** and metal plate assembly **(b)** from clutch hub.



- Remove the washer **(a)** & spring **(b)** from clutch assembly.

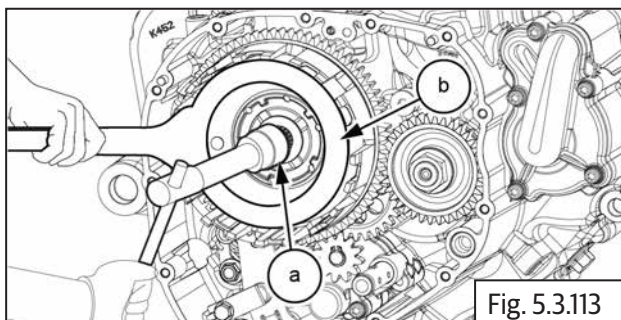


- Locate special tool **(a)** on clutch center **(b)** and ensure it is seated fully on the splines.
- Hold the clutch center firmly and remove Hex "U" nut **(M17)** **(b)** by rotating clockwise.

⚠ CAUTION

Hex "U" nut is a left hand thread. Wrong rotation may damage the threads.

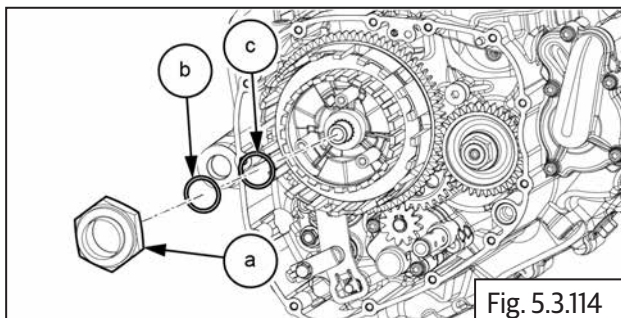
- Locate the special tool **(a)** to lock the connecting rod.



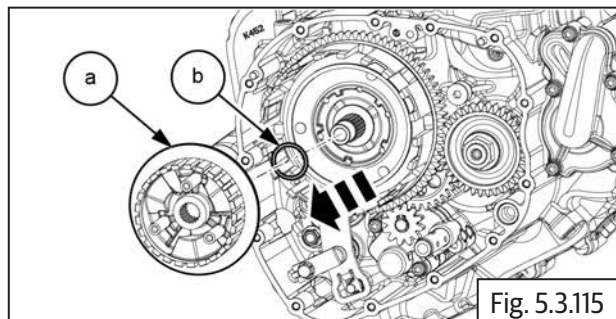
SPL	Part No: ST30266/a
	Part Name: Clutch holder

	27mm socket with Ratchet
--	--------------------------

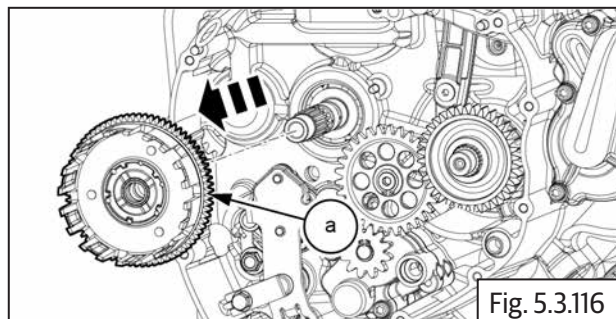
- Remove nut **(a)** conical washer **(b)** and flat washer **(c)**.



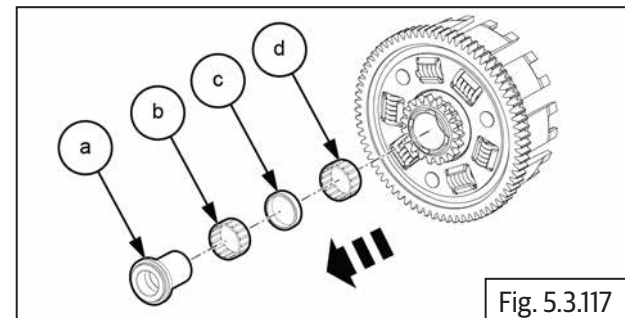
- Remove the center clutch **(a)** along with washer **(b)**.



- Remove the clutch outer drum assembly **(a)** from crankcase.

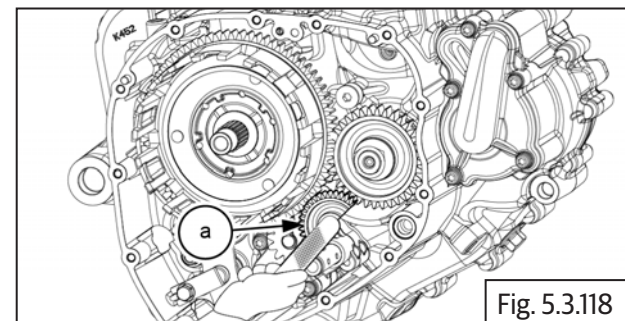


- Remove the spacer **(a)**, needle roller bearing **(b)**, spacer **(c)** & needle roller bearing **(d)** from clutch outer drum assembly.



5.3.26 Primary Drive Gear Removal:

- Insert special tool **(a)** in crankcase RH to lock the crankshaft and prevent rotation.

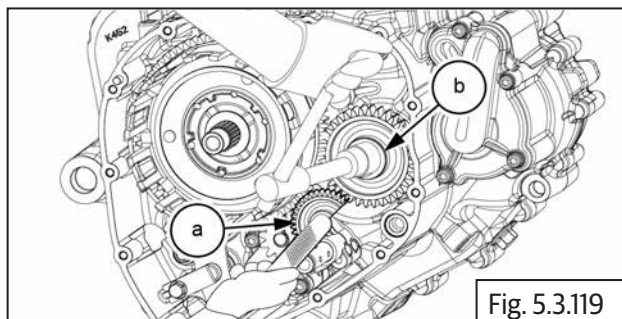


SPL	Part No: ST275332
	Part Name: Crank gear locking tool

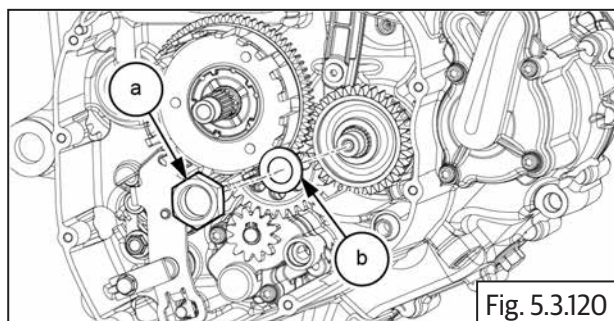
- Locate special tool **(a)** and remove Hex nut **(M18) (b)** by rotating clockwise

⚠ CAUTION

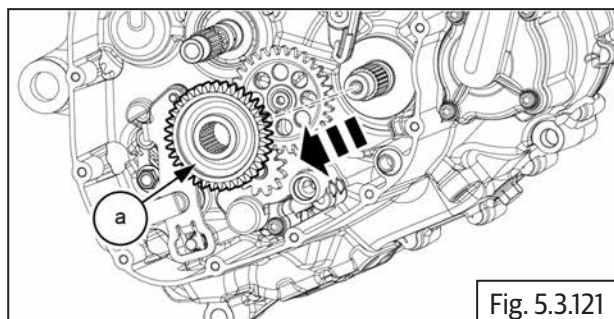
Crankshaft drive nut is a left hand thread. Rotate clockwise to loosen the nut.



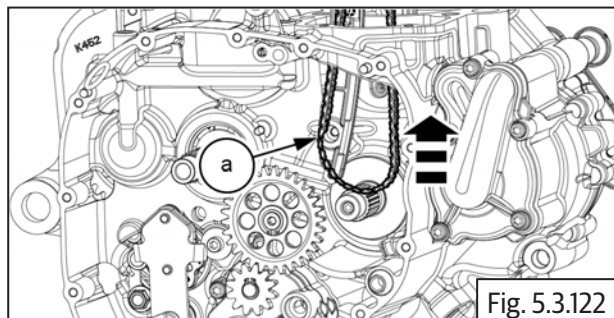
- Remove the crank nut **(a)** along with washer **(b)**.



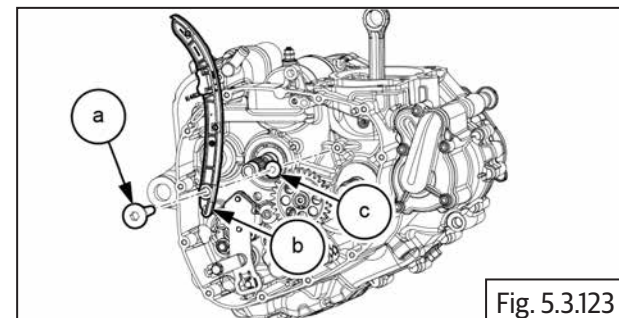
- Remove the primary drive gear **(a)** from crankshaft



- Remove the timing chain **(a)**.

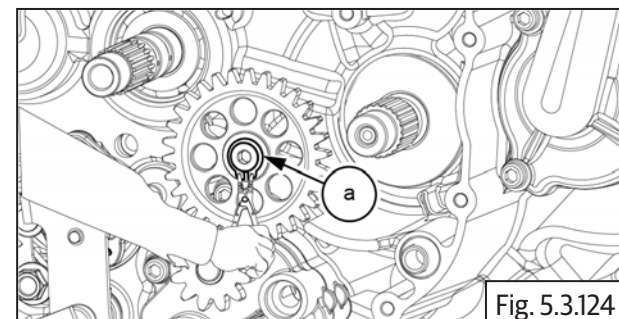


- Loosen and remove the cam chain tensioner blade **(b)** bolt **(a)** and washer **(c)**.



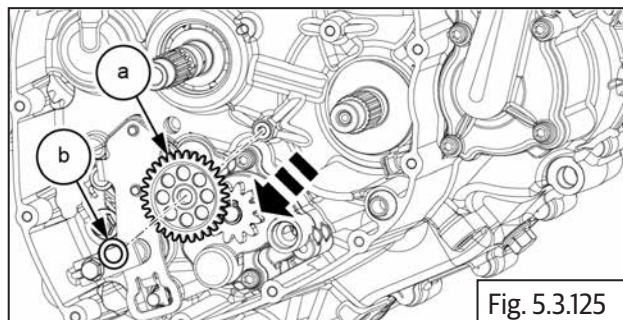
6mm allen key with Ratchet

- Remove circlip **(a)** from idler gear.

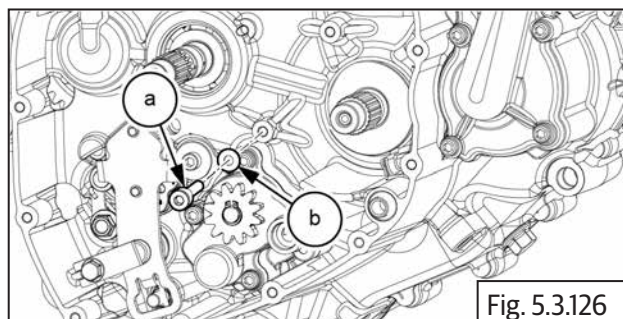


External Circlip Plier

- Remove idler gear **(a)** and washer **(b)**.

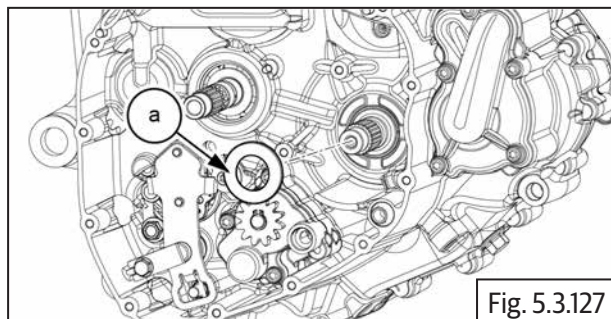


- Loosen and remove 1No. Hex head bolt **(M6) (a)** for idler gear screw with washer **(b)**.



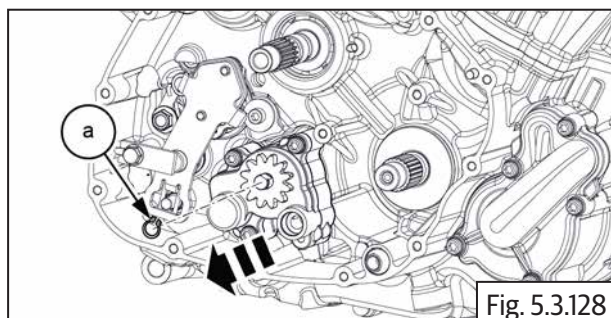
5mm allen key with Ratchet

- Remove the thrust washer **(a)** from crankshaft



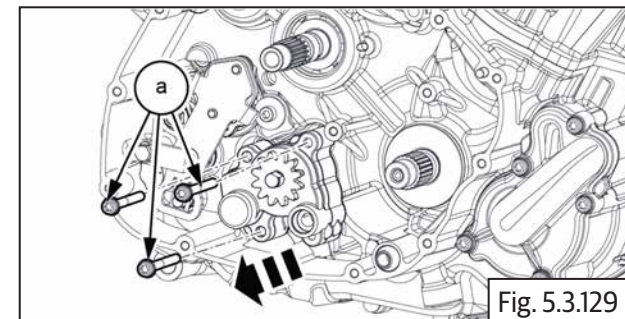
5.3.27 Oil Pump Removal:

- Remove circlip **(a)** from oil pump.



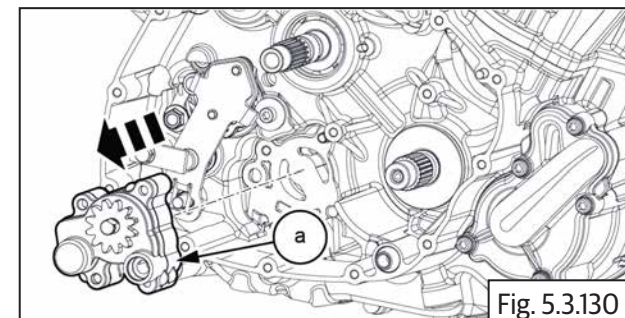
External Circlip Plier

- Loosen and remove 3Nos. Hex head screws **(M6) (a)** from oil pump assembly.



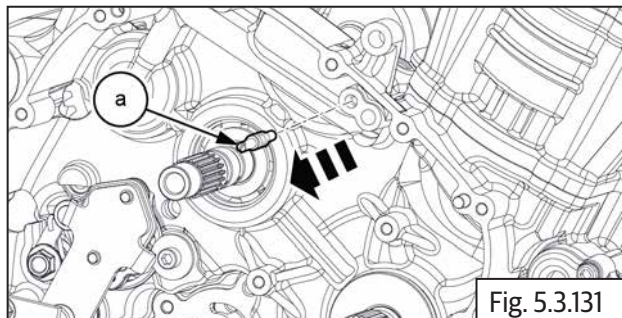
5mm allen key with Ratchet

- Remove the oil pump assembly **(a)**.



5.3.28 Crankcase Oil Jet Removal:

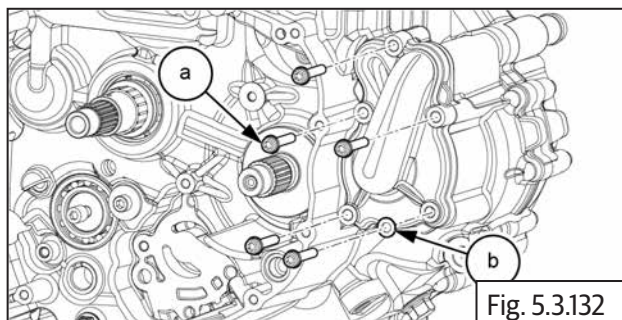
- Using screwdriver to remove crankcase oil jet **(a)** from crankcase.



Screwdriver

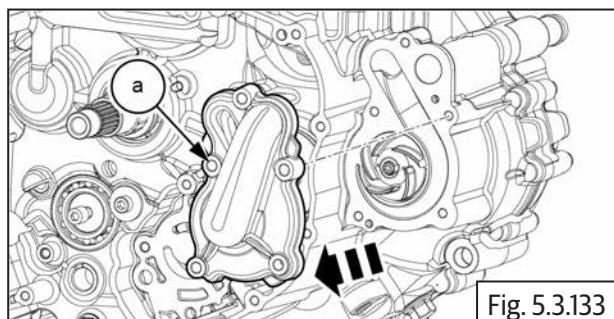
5.3.29 Water Pump Removal:

- Loosen and remove 5Nos. Hex head bolts **(M6)** **(a)** along with 1No. copper washer **(b)** from water pump cover.

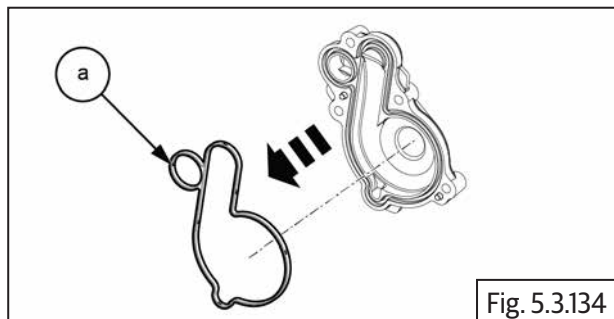


5mm allen key with Ratchet

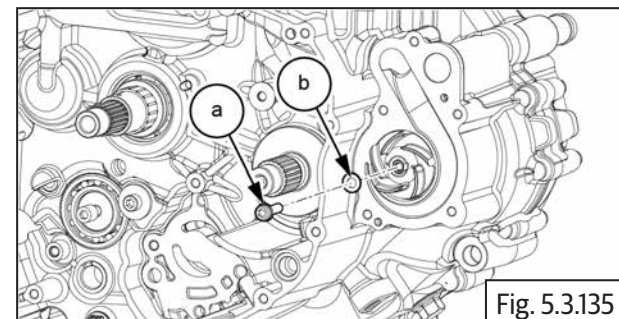
- Remove water pump cover **(a)** along with seal from RH crankcase.



- Remove water pump cover seal **(a)**.

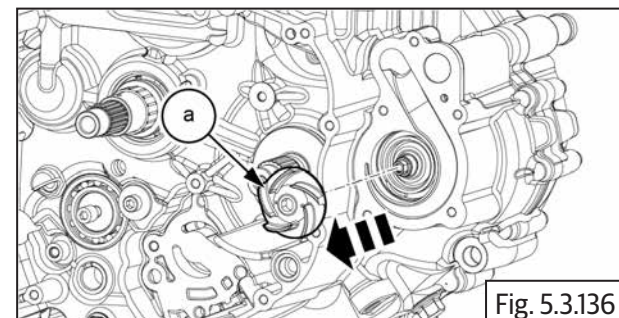


- Loosen and Remove 1No. Hex head bolt **(M5)** **(a)** along with washer **(b)** from impeller.

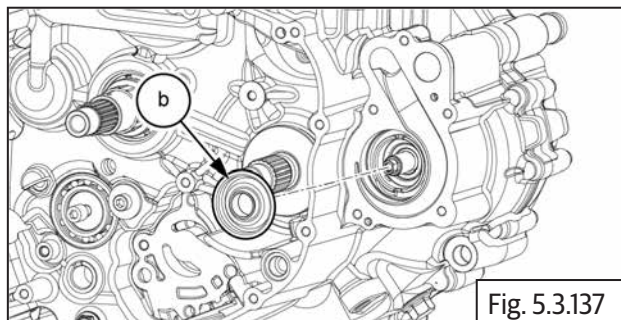


4mm allen key with Ratchet

- Remove impeller **(a)** from RH crankcase.

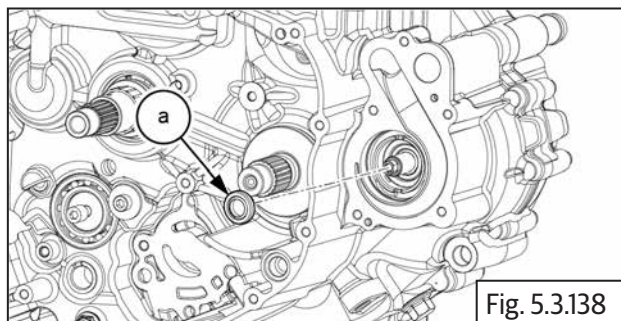


- Remove the lip seal **(b)** using screw drive.

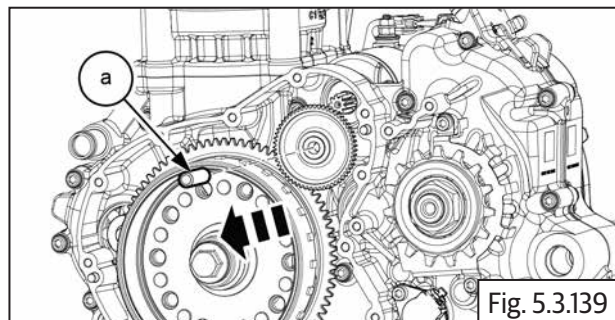


5.3.30 Magneto Assembly Removal:

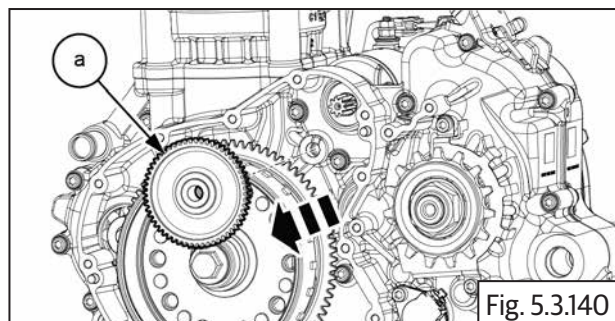
- Remove the oil seal **(a)** using screw drive.



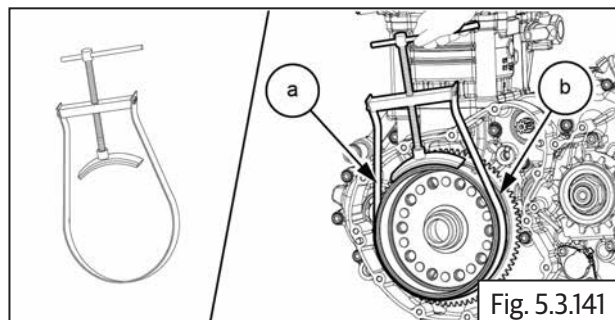
- Remove the idler shaft **(a)** from crankcase.



- Remove the idler gear **(a)** from crankcase.

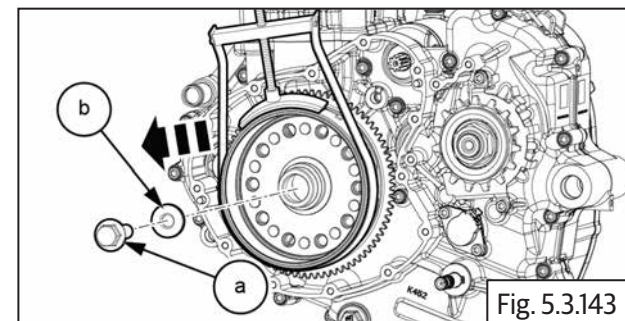
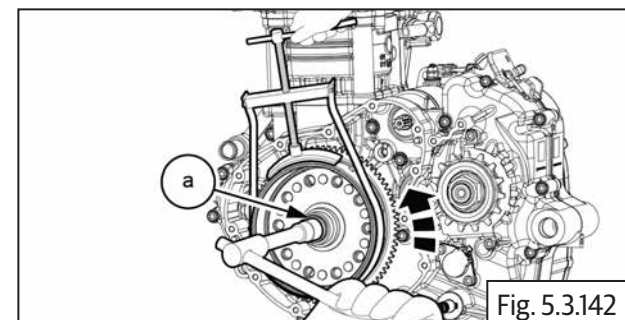


- Locate the special tool **(a)** to tighten the magneto rotor **(b)**.

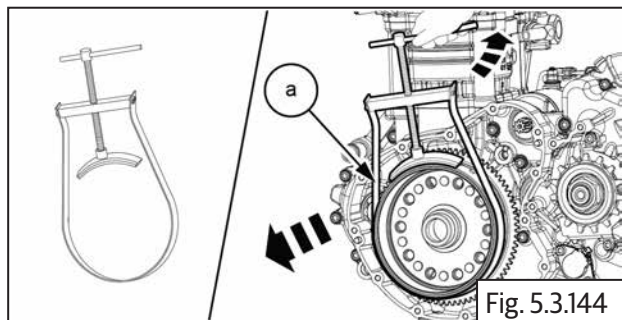


	Part No: ST32065/A
	Part Name: Magneto holder

- Loosen and remove 1No. Hex flange head bolt **(M12)** **(a)** along with tappet washer **(b)**.

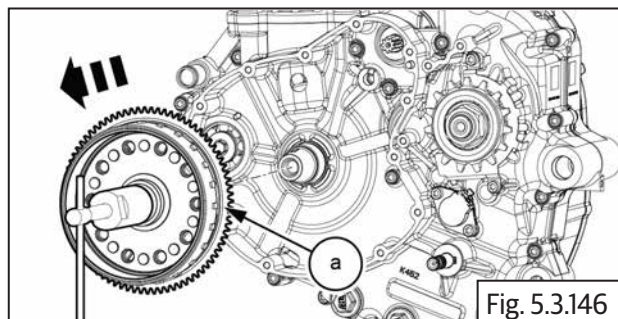


- Remove the special tool **(a)** from magneto rotor.

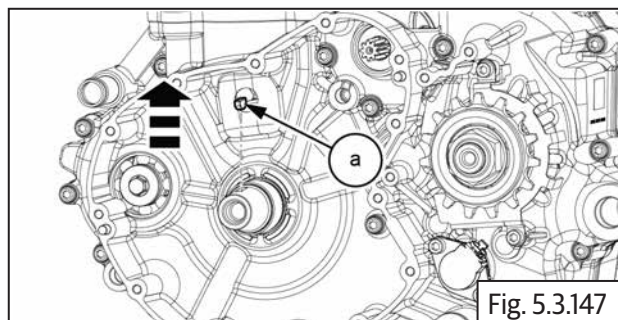


	SPL Part No: ST30274/a
	Part Name: Magneto puller assembly

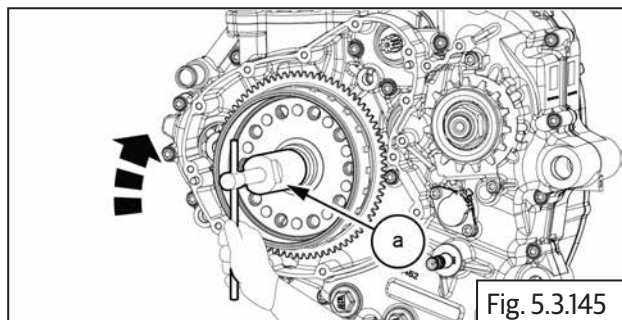
- Gently pull out magneto rotor assembly **(a)** with starter clutch.



- Remove woodruff key **(a)** from crankshaft.

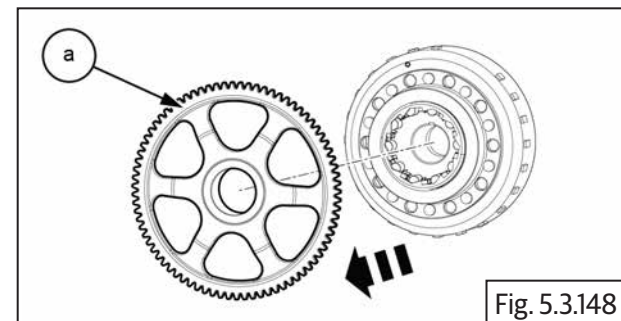


- Assemble puller **(a)** on magneto rotor and thread it in fully.
- Tighten center bolt onto puller till magneto rotor gets released from crankshaft.



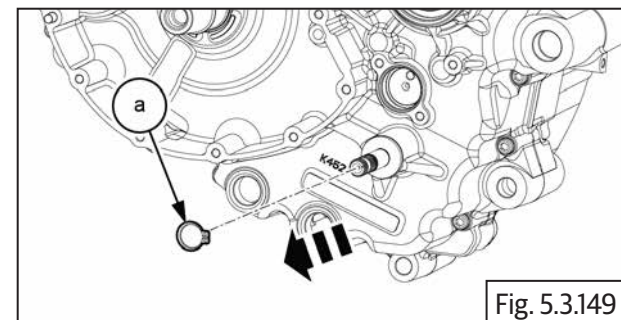
- Slightly rotate the starter gear in an anticlockwise direction and Gently lift and remove gear from rotor roller clutch bearing.

CAUTION
Be careful during this process as the roller clutch bearing may fall down or collapse..



5.3.31 Gear shifter shaft Removal:

- Remove circlip **(a)** from the shaft.



	External Circlip Plier
---	------------------------

- Remove washer **(a)** from the shifter shaft.

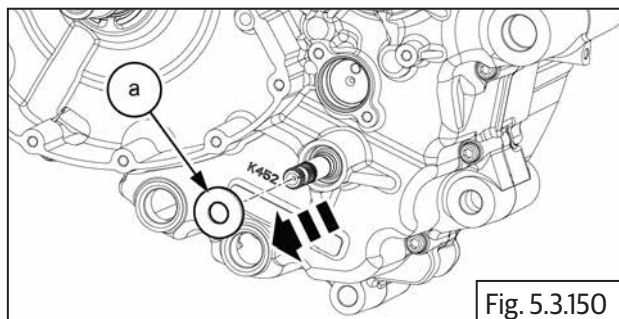


Fig. 5.3.150

- Loosen and remove 1No. Hex flange head bolt **(M6)** **(a)** and stopper bracket **(b)**.

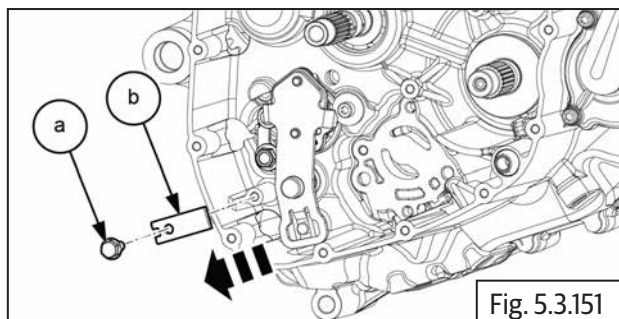


Fig. 5.3.151



10mm Socket with Ratchet

- Gently pull out shifter shaft assembly **(a)** from engine RH side.

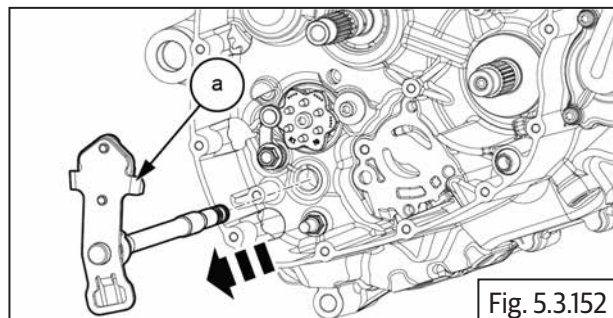


Fig. 5.3.152

- Remove circlip **(a)** washer **(b)** and expand spring legs and pull out spring **(c)** from longer end of shifter shaft.

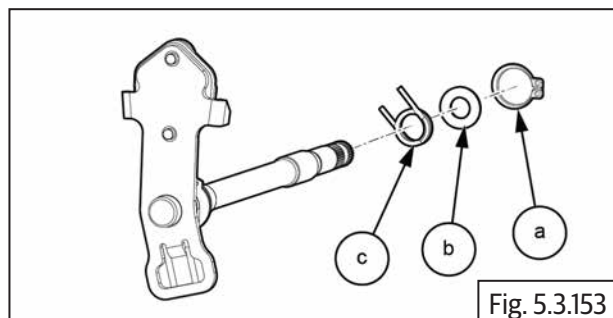


Fig. 5.3.153

- Remove the oil seal **(a)** from RH crankcase.

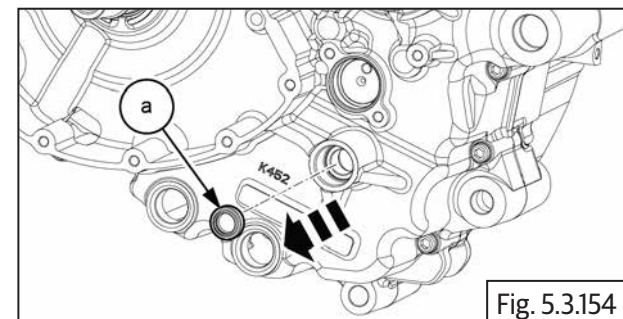


Fig. 5.3.154



Screwdriver

- Loosen and remove 1No. Hex flange head bolt **(M6)** **(a)** from gear stopper bracket.

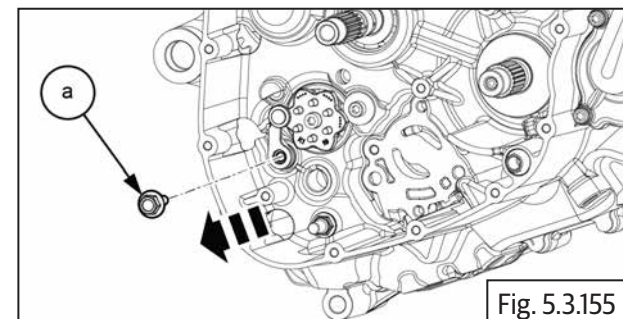
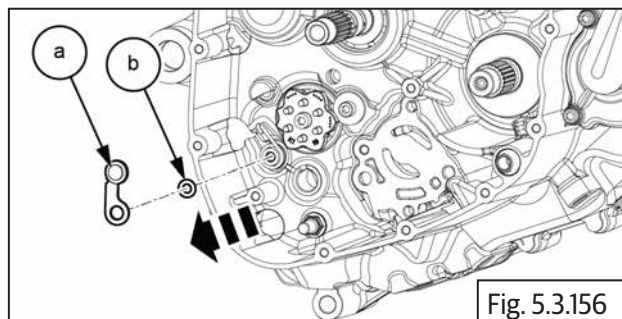


Fig. 5.3.155

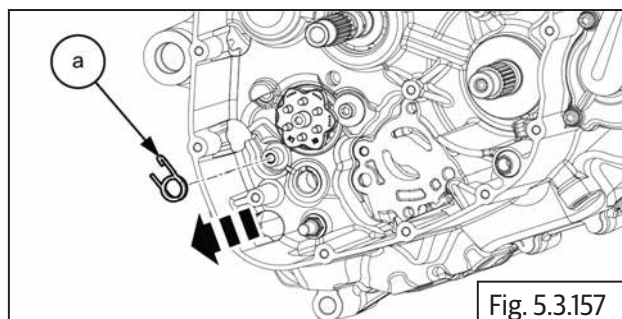


10mm Socket with Ratchet

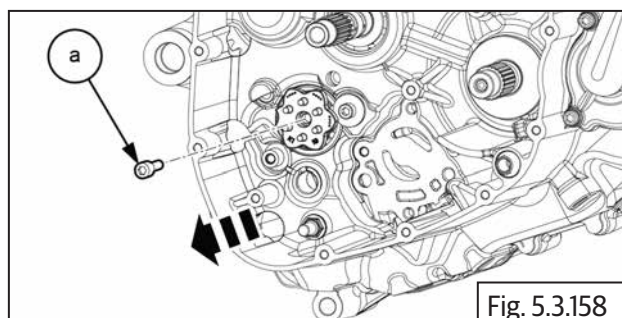
- Remove the gear stopper bracket **(a)** along with washer **(b)** from RH crankcase.



- Remove the spring **(a)** from RH crankcase.

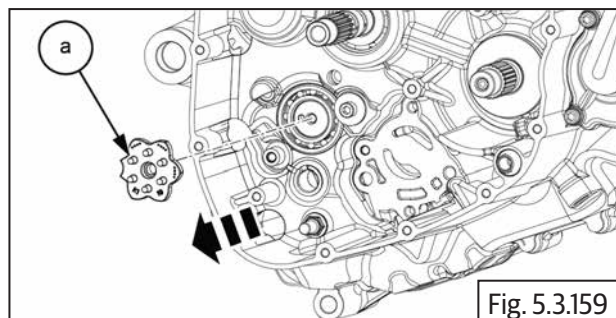


- Loosen and remove 1No. Hex flange head bolt **(M6)** **(a)** from star index.



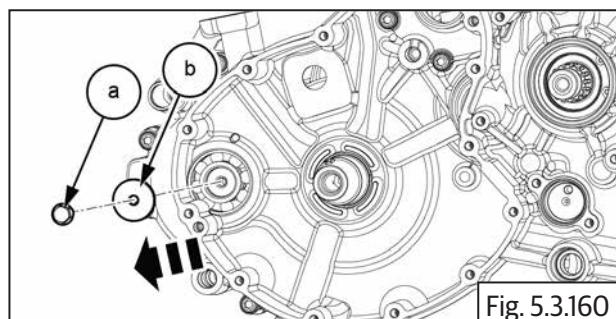
5mm Allen key with Ratchet

- Remove the star index **(a)** from RH crankcase.



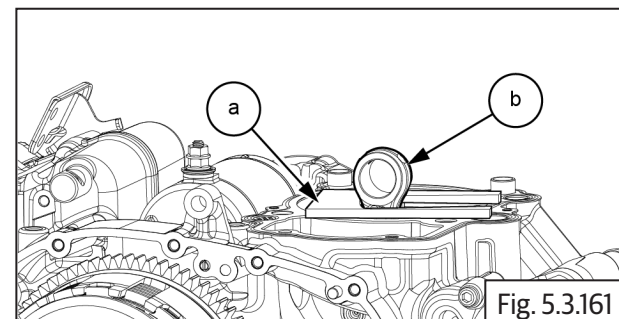
5.3.32 RH Crankcase Removal:

- Loosen and remove 1No. Hex flange head bolt **(M6)** **(a)** along with washer **(b)** from balancer shaft assembly.



10mm socket with Ratchet

- Remove the special tool **(a)** from connecting rod **(b)**.



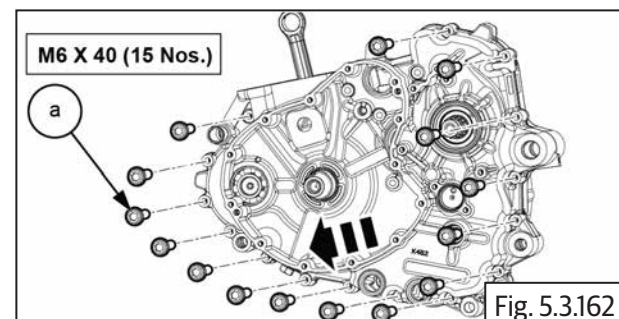
SPL

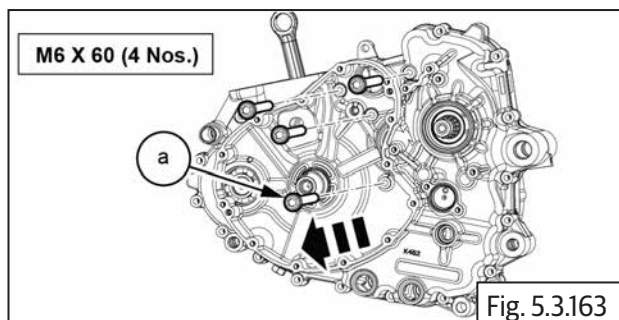
Part No: ST-27529-2



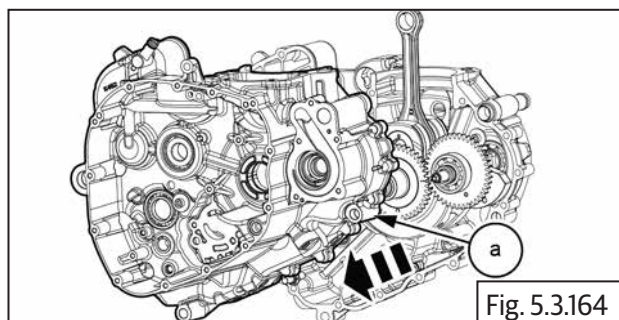
Part Name: Connecting rod holder

- Loosen and remove 19Nos. Hex socket screws **(M6)** **(a)** in a crisscross pattern RH crankcase cover.



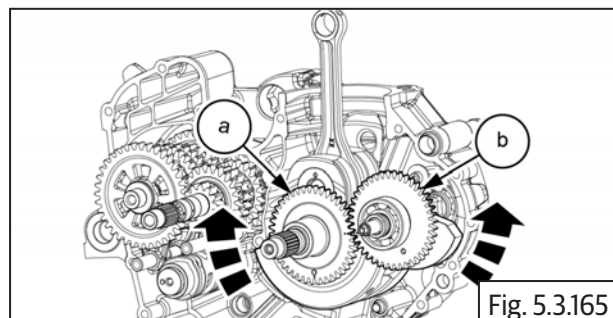


- Gently remove the RH crankcase **(a)**.

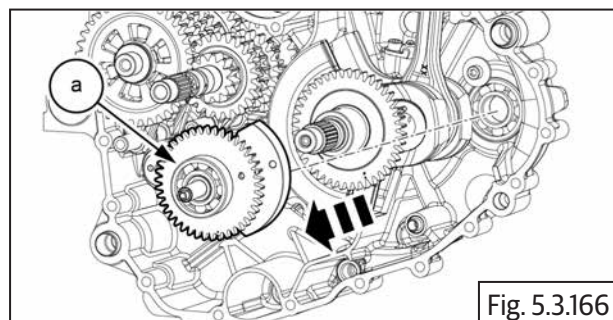


5.3.33 Crankshaft And Mass Balancer Removal:

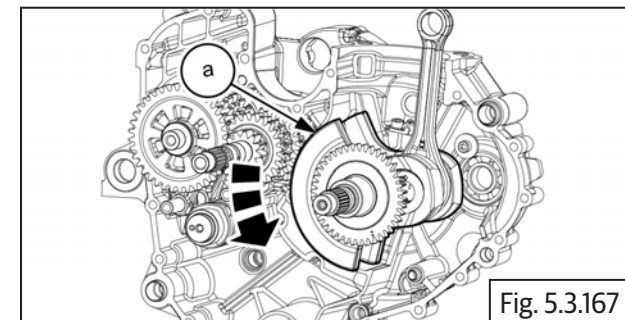
- Rotate the crankshaft assembly **(a)** and mass balancer **(b)**.



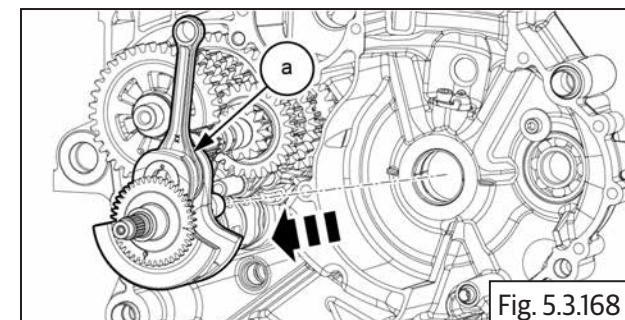
- Remove the mass balancer assembly **(a)** from the crankcase.



- Rotate the crankshaft assembly.

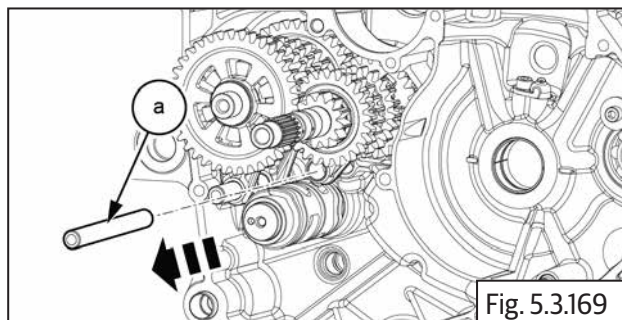


- Remove the crankshaft assembly **(a)** from the crankcase.

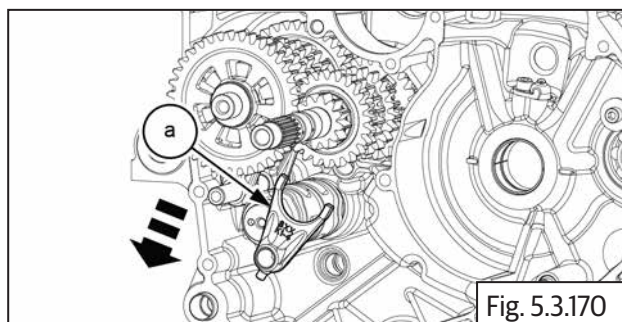


5.3.34 Gear Assembly Removal:

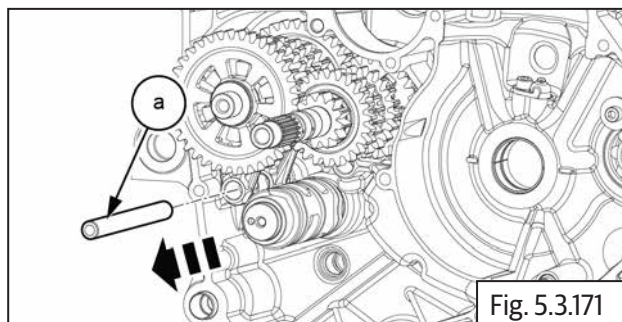
- Remove the shaft, gear shift fork (input) **(a)**.



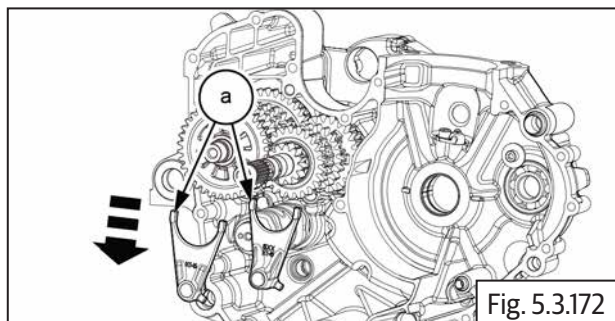
- Remove the gear shifter fork **(a)** 1No. from counter shaft.



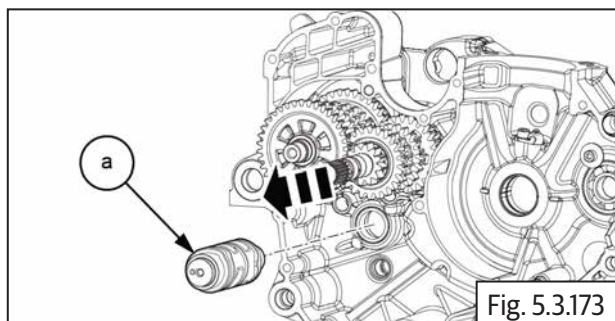
- Remove the shaft, gear shift fork (input) **(a)**.



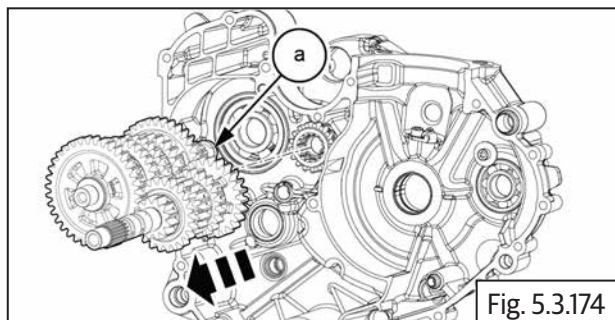
- Remove the gear shifter fork **(a)** 2Nos. from drive shaft.



- Remove the shifter drum **(a)** from crankcase LH.

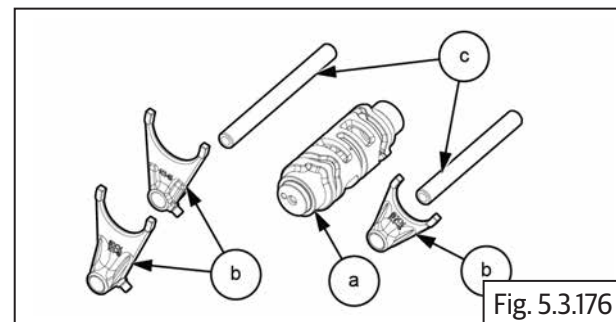
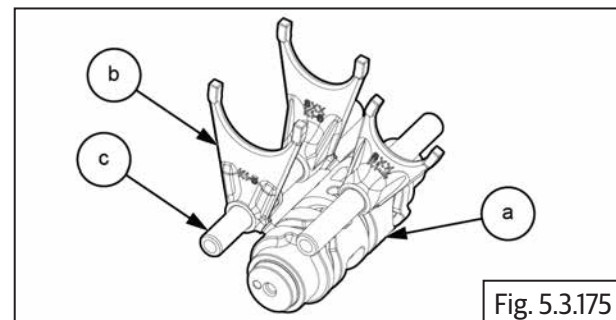


- Remove the gear box assembly **(a)** from crankcase LH.



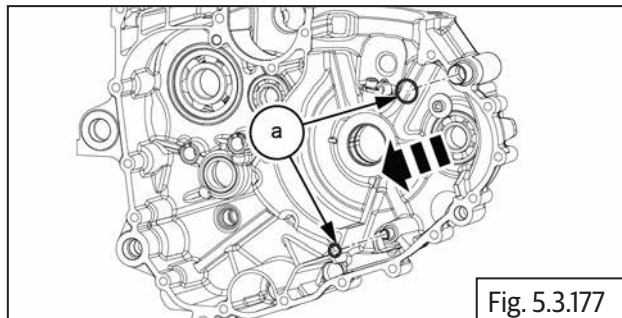
- Gear selector Exploded View.

- a. Selector Drum
- b. Selector Forks
- c. Spindles

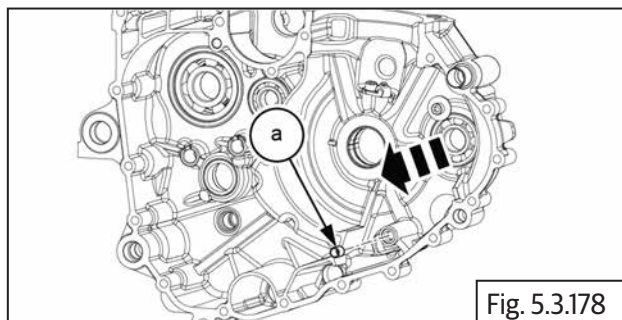


5.3.35 LH Crankcase Removal:

- Remove the 2Nos. O-rings **(a)** from crankcase LH.

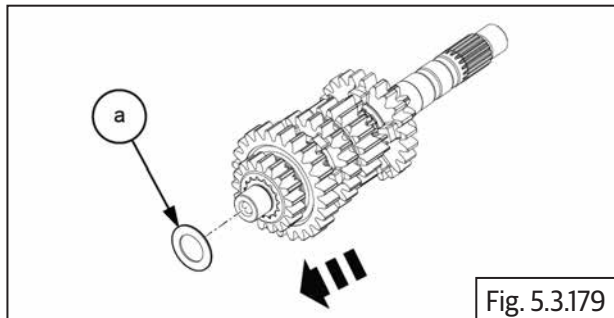


- Remove the dowel pin **(a)** from crankcase LH.

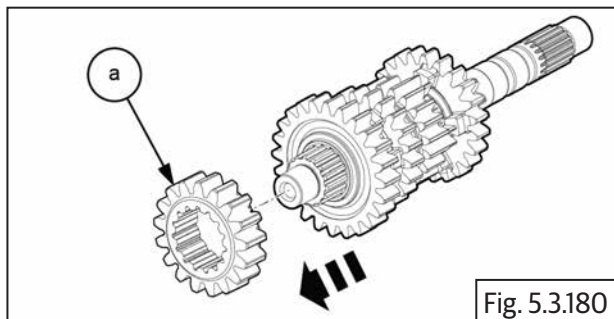


5.3.36 Countershaft Removal:

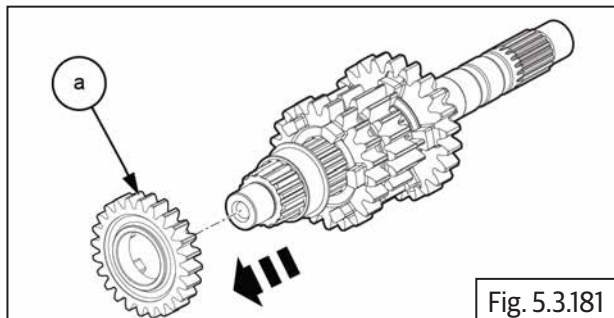
- Remove the thrust washer **(a)** from countershaft.



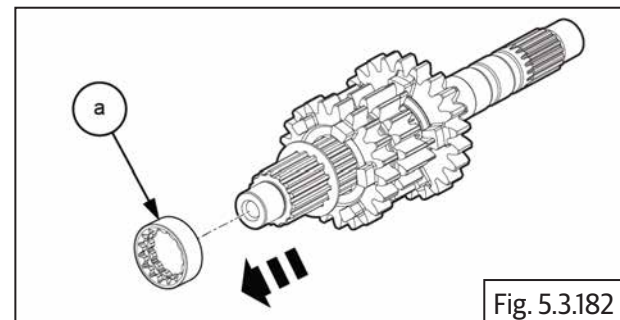
- Remove the 2nd drive gear **(a)** from countershaft.



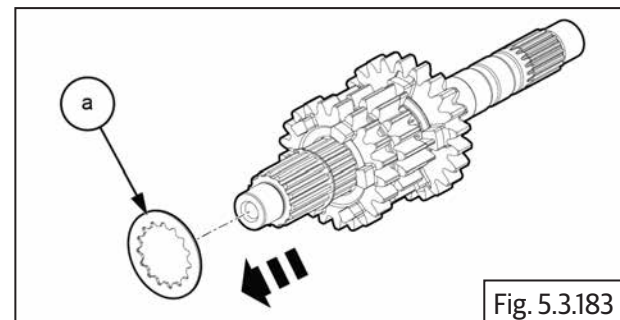
- Remove the 6th drive gear **(a)** from countershaft.



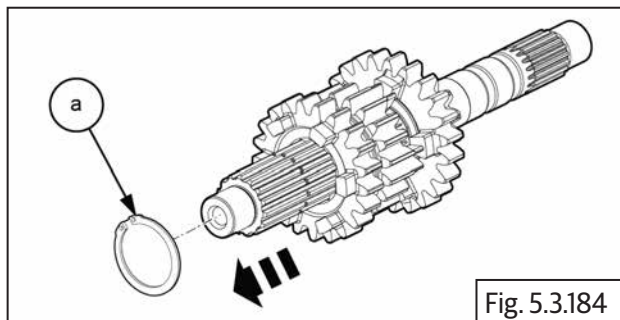
- Remove the plain bush **(a)** from countershaft.



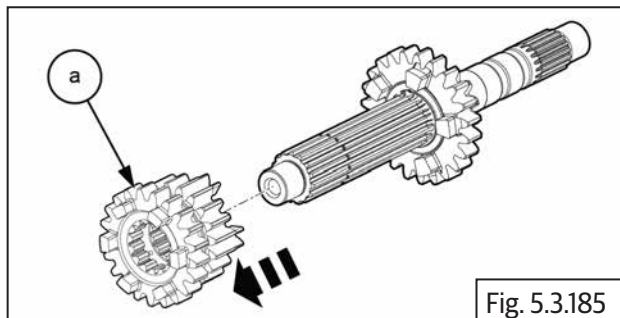
- Remove the washer **(a)** from countershaft.



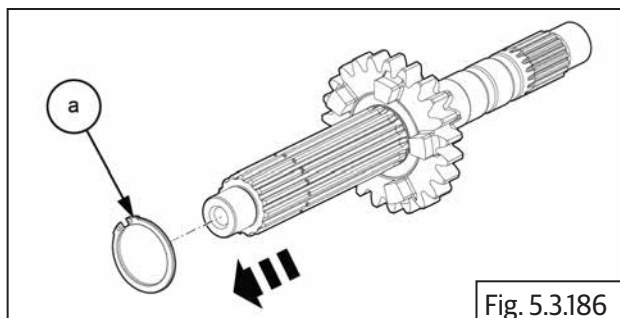
- Remove the circlip **(a)** from countershaft.



- Remove the 3rd drive gear **(a)** from countershaft.

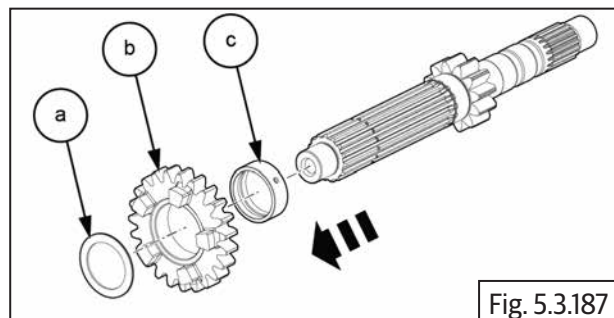


- Remove the circlip **(a)** from countershaft.



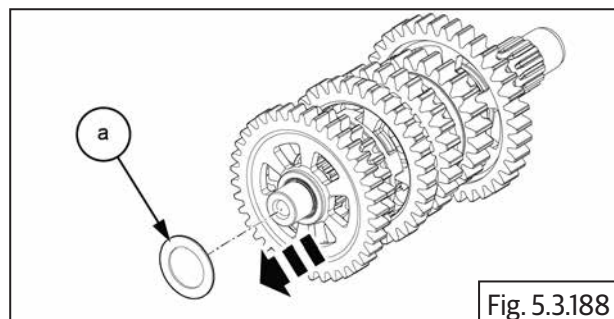
Circlip plier

- Remove the thrust washer **(a)** 5th drive gear **(b)** and bush **(c)** from countershaft.

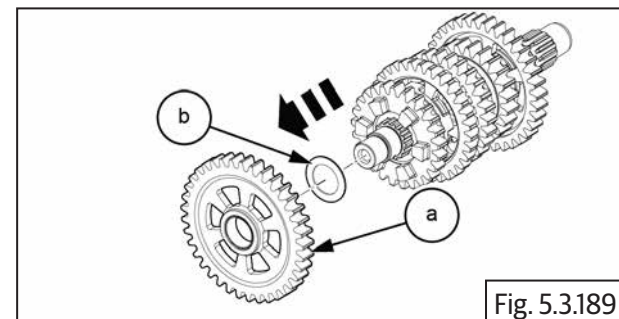


5.3.37 Drive Shaft Removal:

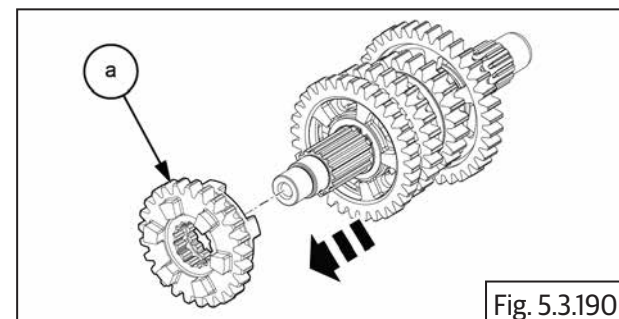
- Remove the thrust washer **(a)** from drive shaft.



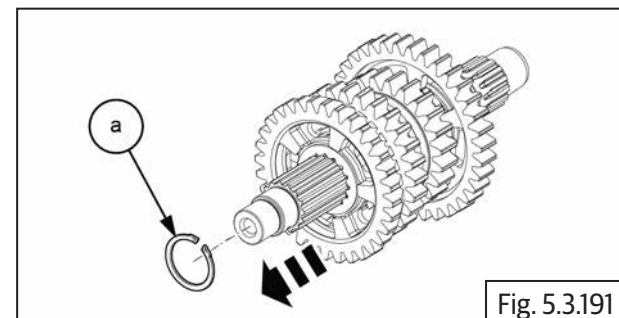
- Remove the 1st gear **(a)** along with thrust washer **(b)** from drive shaft.



- Remove the 5th driven gear **(a)** from drive shaft.



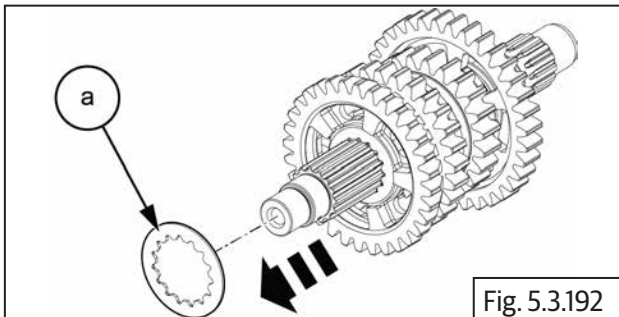
- Remove the circlip **(a)** from drive shaft 3rd gear side.



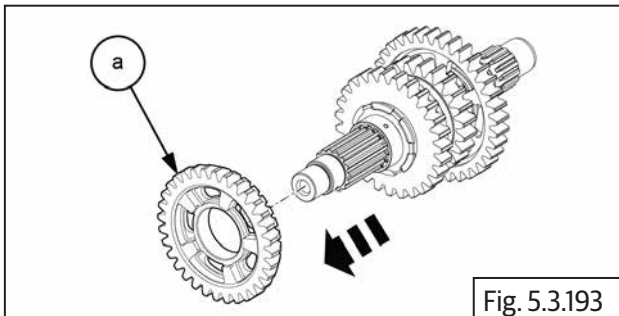


Circlip plier

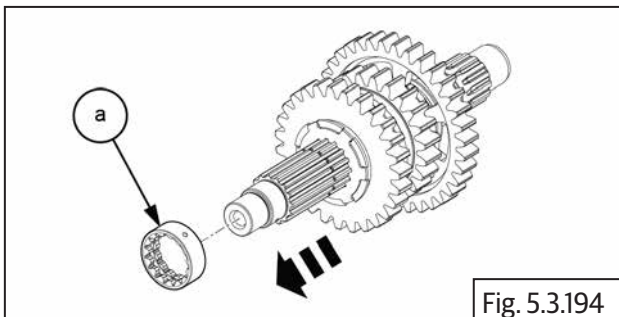
- Remove the thrust washer **(a)** from drive shaft.



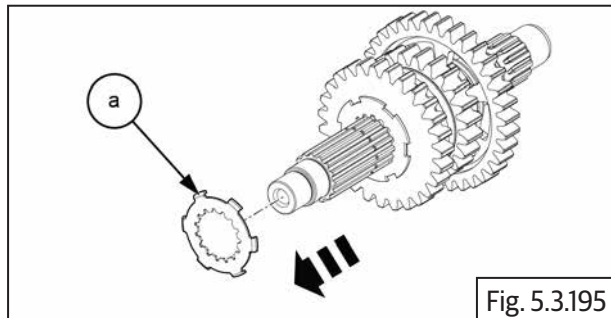
- Remove the 3rd driven gear **(a)** from drive shaft.



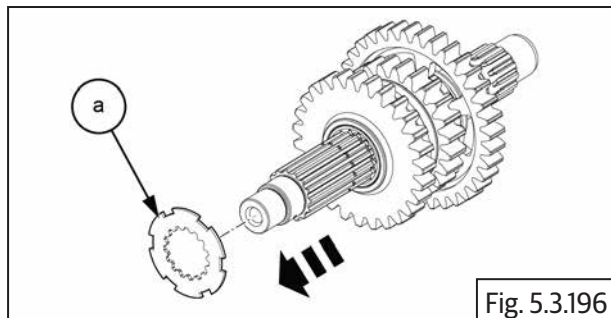
- Remove the plain bush **(a)** from drive shaft.



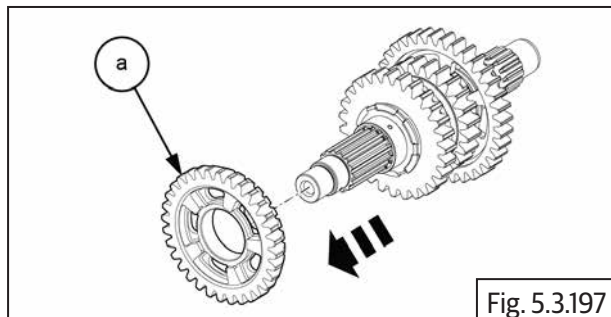
- Remove the thrust washer lock **(a)** from drive shaft.



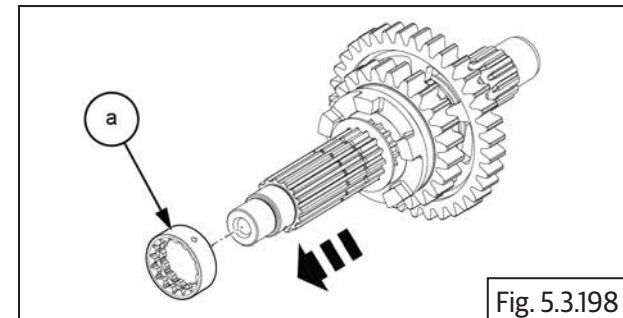
- Remove the thrust washer **(a)** from drive shaft.



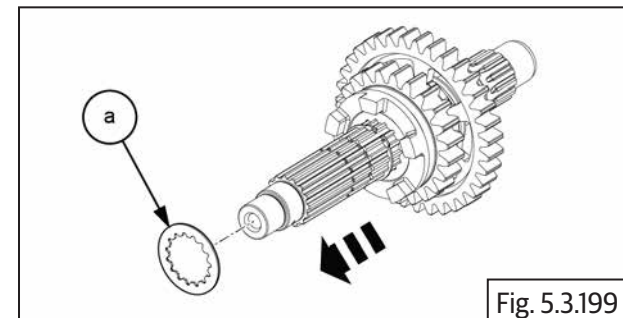
- Remove the 4th driven gear **(a)** from drive shaft.



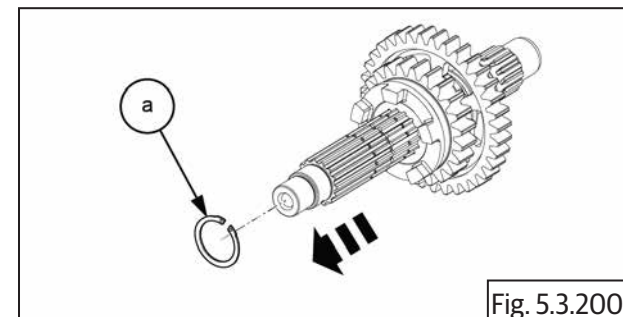
- Remove the plain bush **(a)** from drive shaft.



- Remove the washer **(a)** from drive shaft.



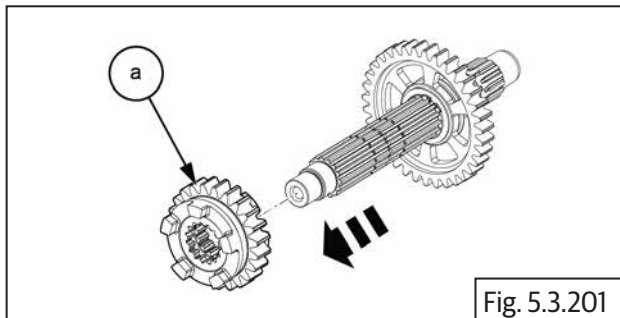
- Remove the circlip **(a)** from drive shaft 5th driven gear.



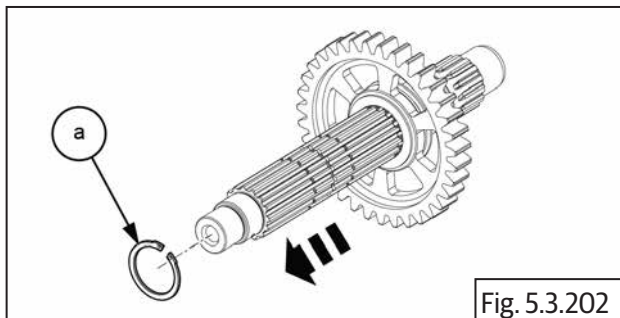


Circlip plier

- Remove the 6th driven gear **(a)** from drive shaft.

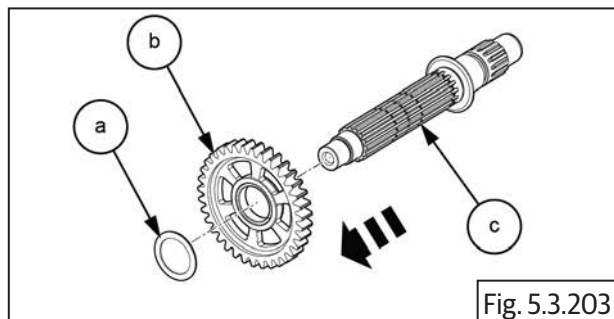


- Remove the circlip **(a)** from drive shaft.



Circlip plier

- Remove the bush **(a)** and 2nd driven gear **(b)** from drive shaft **(c)**.



ENGINE INSPECTION

CONTENTS

PAGE

5.4 Engine Inspection.....132

5.4.1 Cylinder Head..... 132

5.4.2 Cylinder Barrel..... 134

5.4.3 Crankcase..... 136

5.4.4 Clutch Components..... 137

5.4.5 Shifter Forks..... 138

5.4.6 Selector Drum..... 138

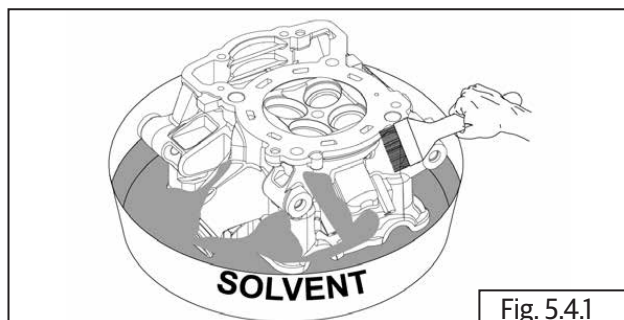
5.4.7 Magneto Cover..... 138

5.4.8 Clutch Cover..... 139

Engine Inspection

NOTE

- Remove off carbon deposits by scraping gently.
- Use soft blunt objects to clean.
- Wash components with recommended solvents.
- Ensure area is clean and dry before inspection.

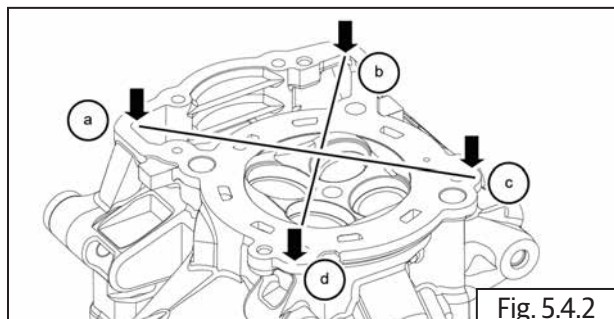


5.4.1 Cylinder Head

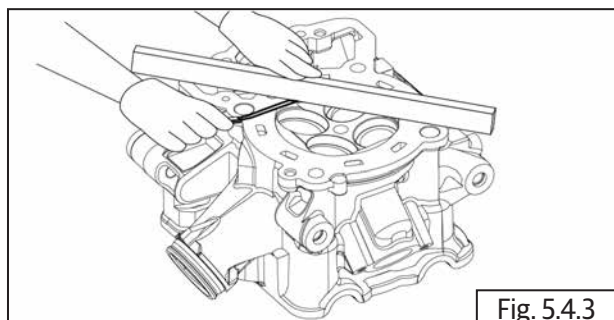
Cylinder Head Inspection

- Inspect cylinder head carefully for any cracks, blow holes or damages – especially in the inlet and exhaust ports.
- Place thick straight edge across cylinder head gasket seating surface.
- Insert pointed feeler gauge of 0.01 mm thickness between straight edge and cylinder head.

- Inspect and ensure 4 locations **(a, b, c, d)** on cylinder head are at same level.



- Ensure feeler enters properly at marked places.

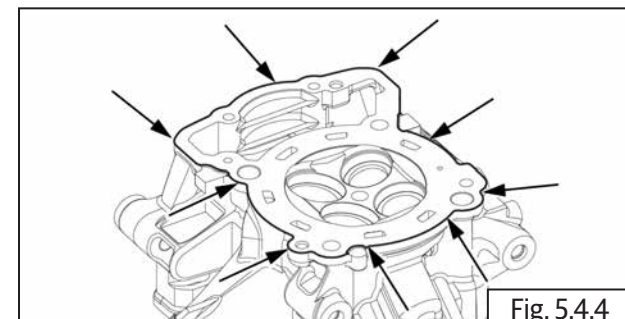


Thick straight edge and Feeler gauge

Service limit:	0.01 mm
----------------	---------

Rocker Cover to Cylinder Head Seating Surface

- Place the thick straight edge across the rocker cover gasket seating surface.
- Insert pointed feeler gauge of 0.01 mm thickness between straight edge and cylinder head at the marked places.



Camshaft Run-out

- Inspect camshaft lobes for pitting, score marks, uneven wear or damage.
- Support the camshaft on the 2 V-blocks **(a)**.
- Rotate the camshaft slowly and measure run-out with a dial gauge **(b)** at the machined place.

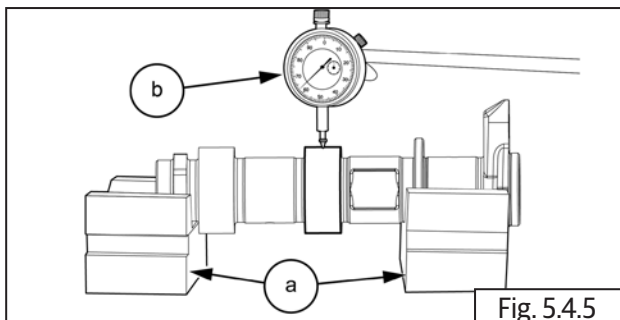


Fig. 5.4.5



V-Blocks and Dial gauge

Service limit:

0.05 mm

Camshaft Journal OD

- Measure camshaft journal OD **(a)**.

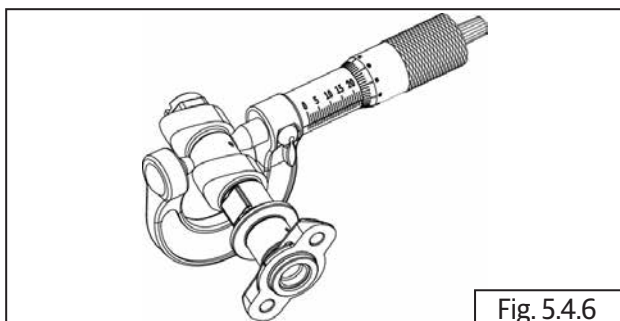


Fig. 5.4.6



Micrometer

Service Limit:

21.930 mm

Camshaft Lobe

- Inspect cam lobes for scoring, wear-out and scratches.
- Measure height of each cam lobe **(a)**.

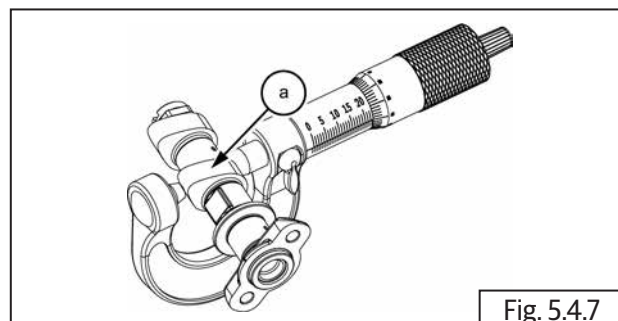


Fig. 5.4.7



Micrometer

Service limit (Intake):

37.83 mm

Service limit (Exhaust):

36.80 mm

Valve Inspection.

- Check each valve for wear, burn or distortion at its face and stem end. Replace valve, if necessary.
- Check valve stem end face for pitting and wear.
- When it is worn out, replace the valve.

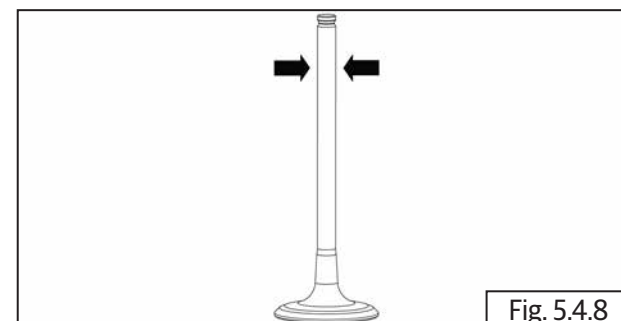


Fig. 5.4.8

Valve Guide ID (Inlet and Exhaust)

- Using micrometer and bore gauge, measure the ID of the valve guides at the top and bottom working area inside the guides.

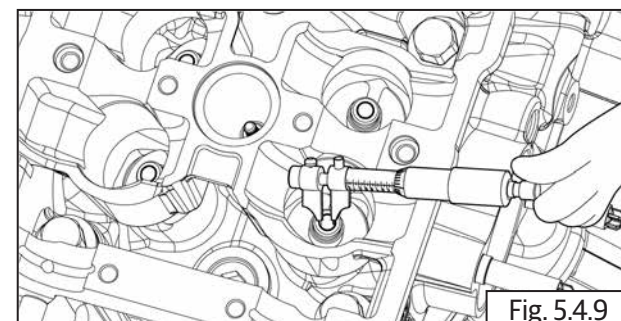


Fig. 5.4.9

	Micrometer and Bore gauge
---	---------------------------

Service Limit Intake	5.065 mm
Service Limit Exhaust:	5.100 mm

Valve Spring (Inlet and Exhaust)

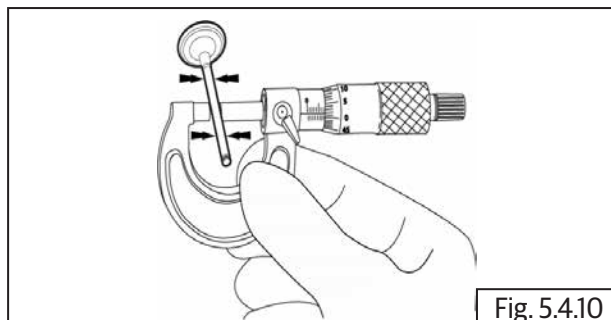
- Measure load on installed and working condition.

Installed Load	
Minimum:	151 N
Maximum:	171 N

Working Load	
Minimum:	432.8 N
Maximum:	392 N

Valve Stem OD (Inlet and Exhaust Valve)

- Measure diameter at marked places along the length of each stem.



	Micrometer
---	------------

Inlet Valve Stem	
Measuring Point	Service Limit
Stem OD Top	4.960mm
Stem OD middle	4.960mm
Stem OD bottom	4.960mm
Bend	5.050 mm

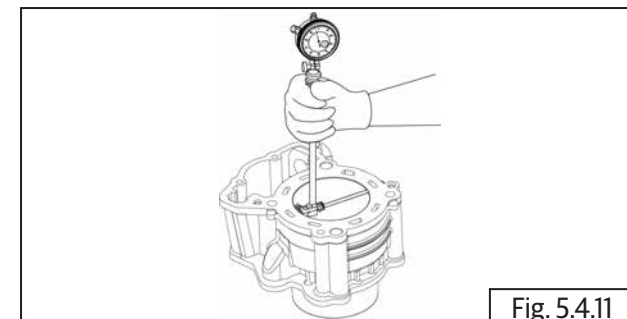
Exhaust Valve Stem	
Measuring Point	Service Limit
Stem OD Top	4.940mm
Stem OD middle	4.940mm
Stem OD bottom	4.940mm

Bend	0.050mm
------	---------

5.4.2 Cylinder Barrel

Cylinder Barrel Bore ID

- Check cylinder bore to piston working area for scoring, seizure marks and/or excessive wear.
- Measure the cylinder bore at the DTC (Top Dead Center) to BDC (Bottom Dead Center) at the rings working area using a bore gauge.
- Measure at both across and along the gudgeon pin axis.

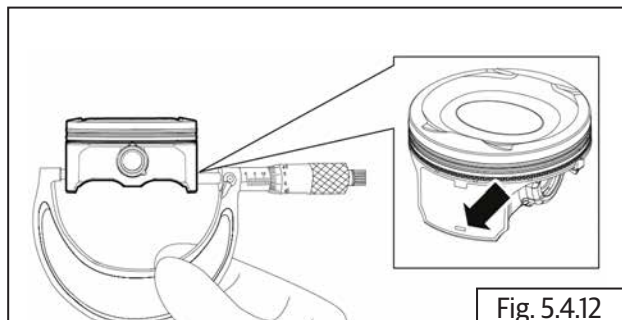


	Bore gauge
---	------------

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Barrel	Barrel ID (Top 0°)	A: 83.985	A: 83.995	A Grade: Ø84.065
	Barrel ID (Top 90°)	B: 83.996	B: 84.006	B Grade: Ø84.076
		C: 84.007	C: 84.017	C Grade: Ø84.087

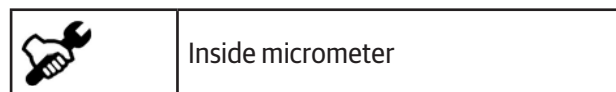
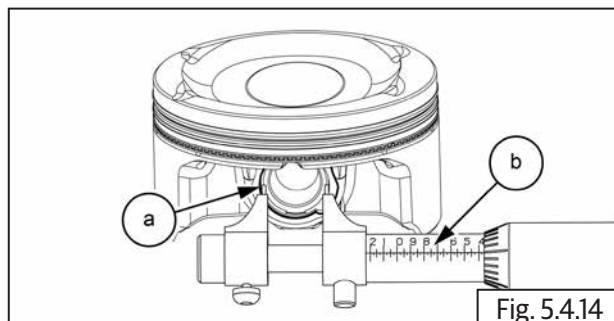
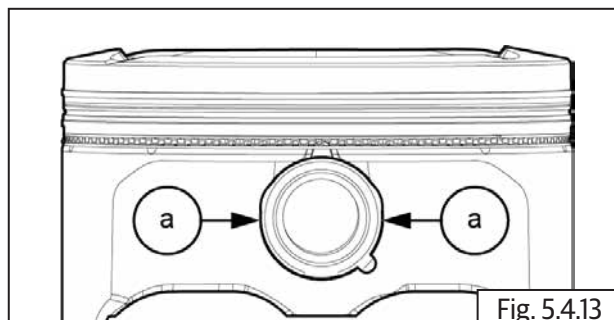
Piston OD

- Measure cylinder piston OD at the bottom window (8mm) where no coating area.



Piston Pin Bore ID

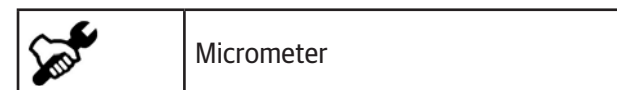
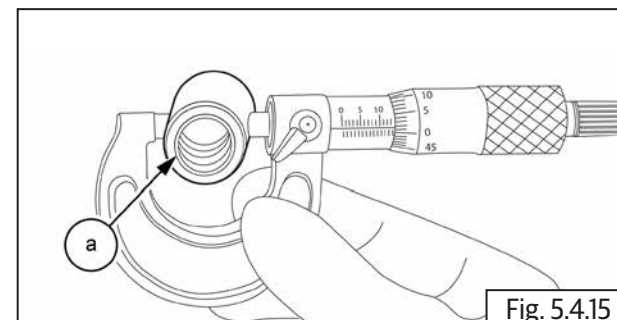
- Measure both LH and RH cylinder piston pin bore (a) inner diameter using inside micrometer (b).



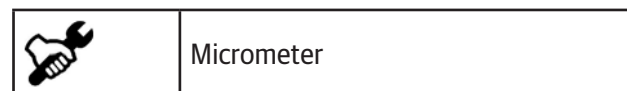
Part Name	Parameters	Spec(mm)		Proposed Service Limit(mm)
		Min	Max	
Piston	Pin Bore ID	20.007	20.013	20.026

Piston Pin

- Measure the diameter of the piston pin (a).



Part Name	Parameters	Spec(mm)		Proposed Service Limit(mm)
		Min	Max	
Piston Pin	Piston Pin OD	19.994	20	19.979



Part Name	Parameters	Spec(mm)		Proposed Service Limit(mm)
		Min	Max	
Piston	Piston OD @8mm	A: Ø83.960	A: Ø83.970	A Grade: Ø83.890
		B: Ø83.971	B: Ø83.981	B Grade: Ø83.901
		C: Ø83.982	C: Ø83.992	C Grade: Ø83.912

Piston Ring End Gap

- Position the piston rings at their respective locations at the top of the cylinder barrel (TDC) and ensure they are seated "squarely" inside the cylinder barrel.

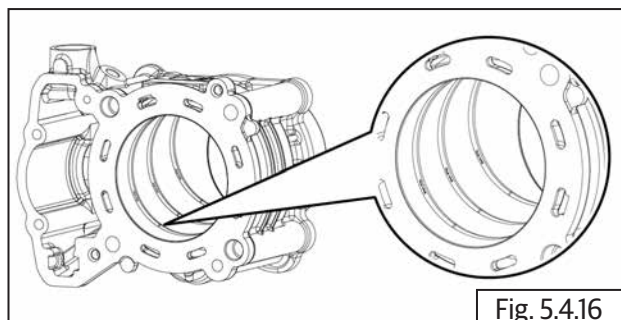


Fig. 5.4.16

- Measure piston rings end gap **(a)** using feeler gauge **(b)**.

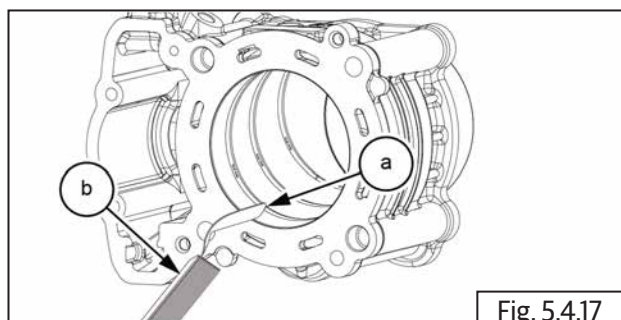


Fig. 5.4.17



Feeler gauge

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Top Ring	End Gap	0.15	0.25	0.55
Mid Ring		0.5	0.7	1

5.4.3 Crankcase

Connecting Rod Small End ID

- Measure the connecting rod small end inner diameter **(a)**.

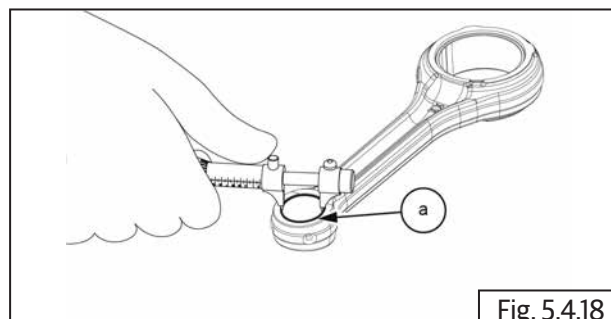


Fig. 5.4.18



Inside Micrometer

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Connecting Rod	Small End Bore	20.026	20.034	20.064

Water pump shaft Runout

- Place the balancer with water pump shaft on V-blocks.
- Rotate the balancer **(a)** and measure water pump shaft run-out with a dial gauge at the machined surface.

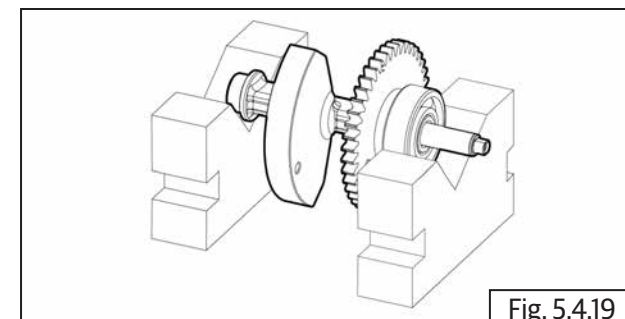


Fig. 5.4.19

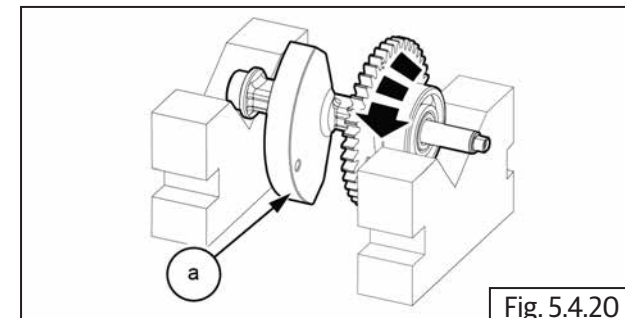


Fig. 5.4.20



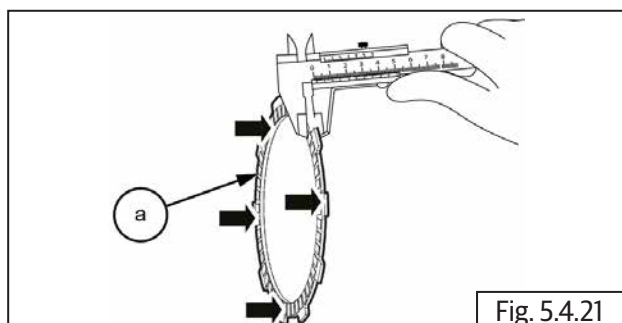
V-Blocks and Dial gauge.

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Balancer shaft	Water pump shaft Runout	0	0.1	0.15

5.4.4 Clutch Components

Friction plate

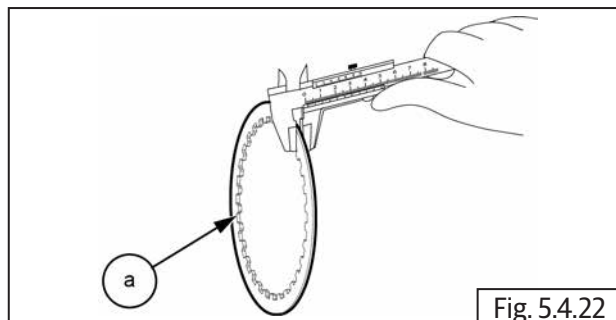
- Inspect the clutch plates visually for uneven wear, seizure and discoloration.
- Measure the thickness of the friction plate **(a)** at 4 locations marked by arrows.



Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Clutch	Friction Plate thickness	2.9	3.1	2.8

Steel Plate

- Measure the thickness of the steel plates **(a)** at different locations.

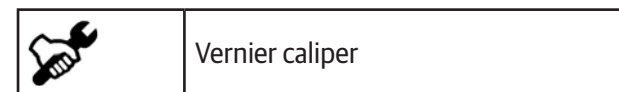
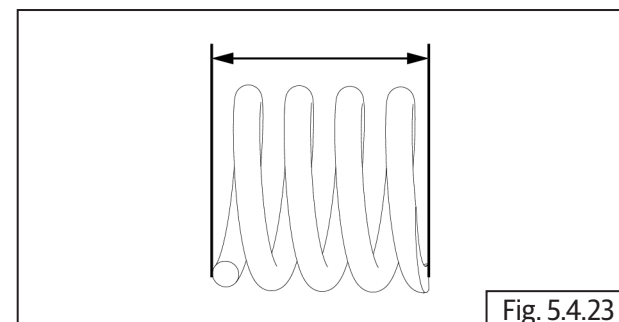


Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Clutch	Steel plate thickness	1.85	2.15	1.8



Clutch Spring

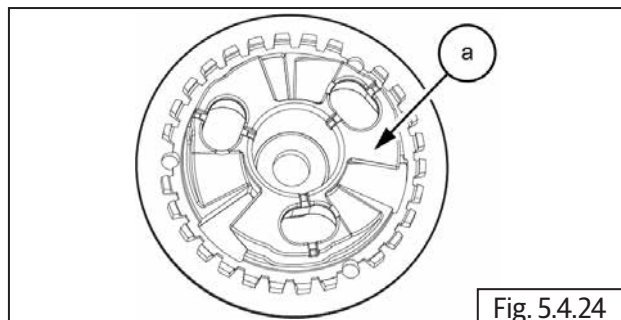
- Check free length of clutch spring.



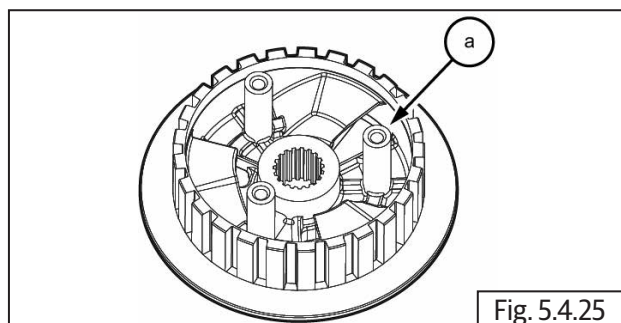
Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Clutch	Spring free height	44.86	44.86	42.9

Clutch Hub (Outer and Inner)

- Inspect the clutch hub **(a)** for any scratches, wear or damage of the lugs.

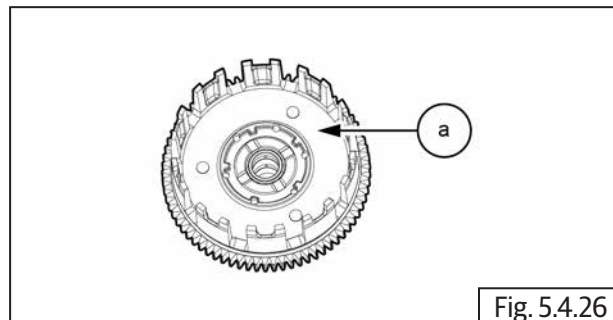


- Visually inspect clutch center **(a)** for any scratches, wear or damage.



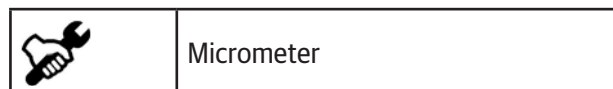
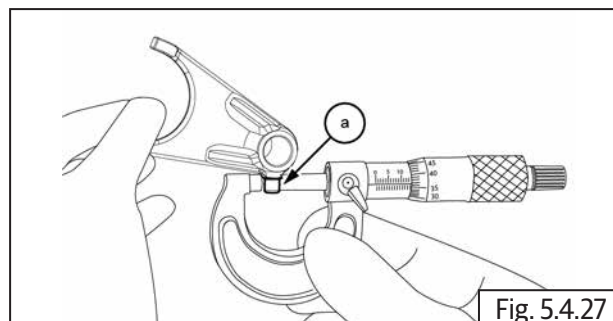
Clutch Housing

- Visually inspect clutch housing and lugs for any, wear, bends, lug breakage, heat marks or damages.



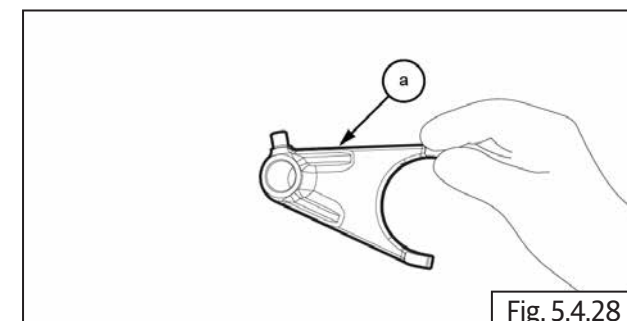
5.4.5 Shifter Forks

- Measure the pegs on shifter forks **(a)** using micrometer for wear.



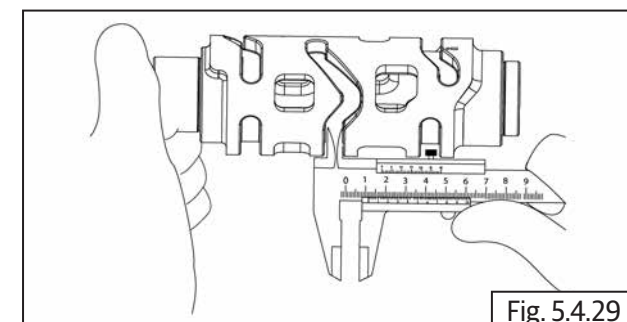
Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Fork	Pin OD	5.9	5.95	5.8

- Visually inspect the shifter fork machined lugs **(a)** for damage, excessive wear out scoring and replace if damaged.



5.4.6 Selector Drum

- Inspect the shifter fork working grooves in the selector drum for any damages, chipped ends etc. Measure the grooves in their working area for excessive wear out.

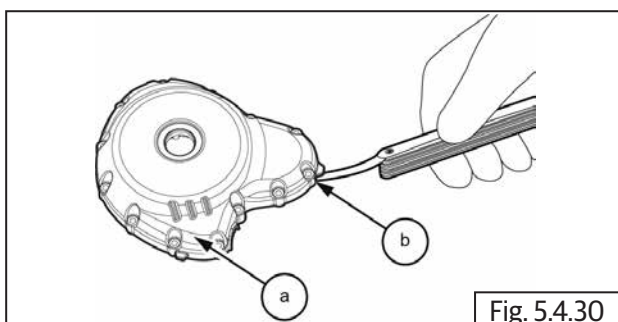


	Vernier caliper
--	-----------------

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Cam Drum	Groove Width	6.05	6.2	6.35

5.4.7 Magneto Cover

- Visually inspect the magneto cover for any outer damages, cracks etc.
- Inspect the cover seating area for any damages pitting etc.
- Place the magneto cover **(a)** on a surface plate and measure for any surface warpage using feeler strip **(b)** of 0.01 mm.
- Replace cover if warpage is beyond service limit.

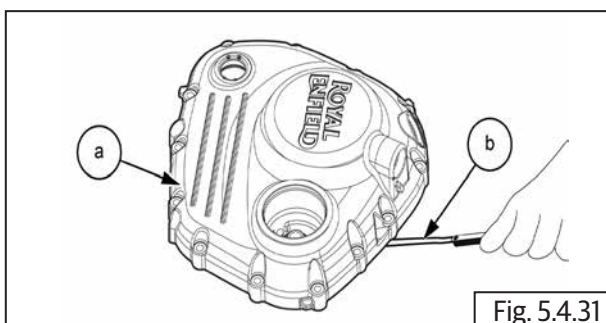


	Feeler gauge and Surface plate
--	--------------------------------

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
ACG Cover	Flatness	0	0.05	0.06

5.4.8 Clutch Cover

- Visually inspect the clutch cover for any outer damages, cracks etc.
- Inspect the cover seating area for any damages pitting etc.
- Place the clutch cover **(a)** on a surface plate and measure for any surface warpage using feeler strip **(b)** of 0.01 mm.
- Replace cover if warpage is beyond service limit.



	Feeler gauge and Surface plate
---	--------------------------------

Part Name	Parameters	Spec (mm)		Proposed Service Limit (mm)
		Min	Max	
Clutch Cover	Flatness	0	0.05	0.06

Engine Assembly Procedure

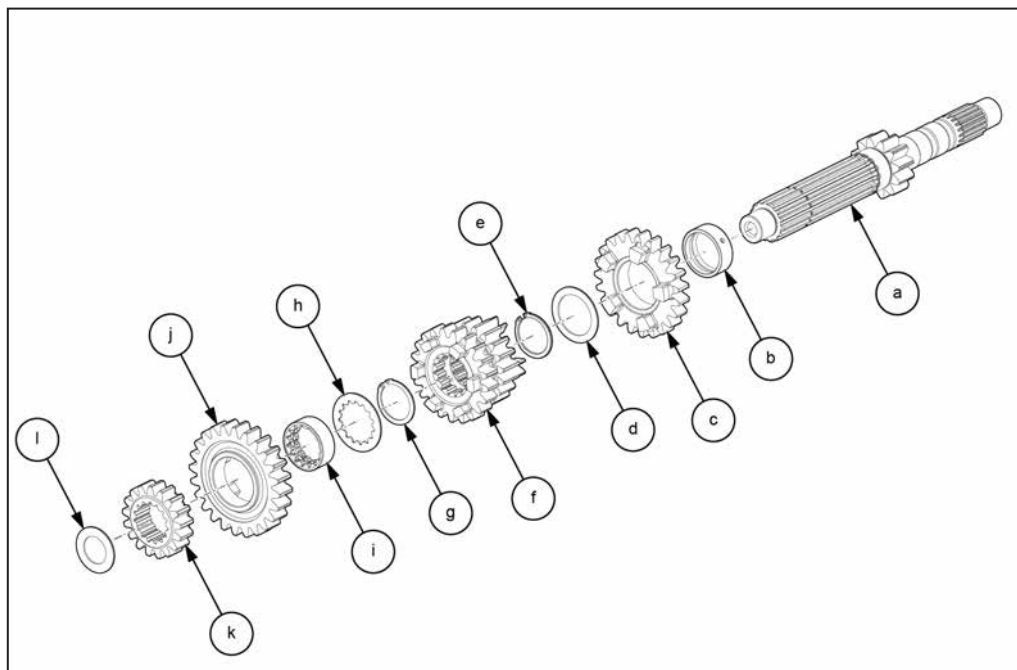
CONTENTS

PAGE

5.5.1 Countershaft Assembly Sequence	170
5.5.2 Countershaft Components	170
5.5.3 Drive shaft Assembly Sequence	173
5.5.4 Drive shaft Components	173
5.5.5 LH Crankcase	176
5.5.6 Gear Assembly	177
5.5.7 Crankshaft And Mass Balancer	178
5.5.8 RH Crankcase	179
5.5.9 Gear Shifter Shaft Installation	180
5.5.10 oil Pump assembly	182
5.5.11 Primary Drive Gear assembly	184
5.5.12 Clutch assembly	184
5.5.13 Pistons Rings	188
5.5.14 Piston Assembly	189
5.5.14.a Piston pin first circlip assembly	189
5.5.14.b Piston pin second circlip assembly	191
5.5.15 Cylinder Head Valve Assembling	192
5.5.16 Cylinder Head & Noise Suppressor Assembling	193
5.5.17 Cam Ladder And Camshaft Assembling	196
5.5.18 Cam Timing Procedure	196
5.5.19 Water Pump assembly	203

5.5.20 Cylinder Head Cam Cover Assembling	203
5.5.21 Magneto Assembly & Idler Gear installation	205
5.5.22 Magneto Stator Assembly	207
5.5.23 LH Cover Assembly	207
5.5.24 Oil Inspection Window Assembling	209
5.5.25 Clutch Shifter shaft Assembling	209
5.5.26 RH Side Cover Assembling	210
5.5.27 Oil Filter Assembling	211
5.5.28 Starter Motor Assembling	212
5.5.29 Gear Position Sensor (GPS) Assembling	212
5.5.30 Injector Assembling	213
5.5.31 Oil Pressure Switch Assembling	214
5.5.32 Coolant Temperature Sensor Assembling	214
5.5.33 Thermostat Assembling	214
5.5.34 Manifold clamp Assembling	215
5.5.35 Oil Strainer Assembling	215
5.5.36 Spark Plug Assembling	216

5.5.1 Countershaft Assembly Sequence



Item No.	Description	Quantity	Item No.	Description	Quantity
a	Shaft,counter (input) 1 st gear	1	g	Circlip	1
b	Bush,5th drive gear	1	h	Washer-3rd & 4th driven gear	1
c	Gear,5th drive	1	i	Splined bush - 6th drive gear	1
d	Thrust washer	1	j	6 th drive gear	1
e	Circlip	1	k	2 nd drive gear	1
f	Gear,3rd & 4th drive	1	l	Thrust washer	1

5.5.2 Countershaft Components:

NOTE

- Bush inner surface should freely slide on the shaft.
- Gear inner surface should freely rotate on bush outer surface.
- Gear inner spline should freely enter onto the shaft.
- Ensure proper seating of circlips after assembly.

- Assembly the bush **(a)** 5th drive gear **(b)** and thrust washer **(c)** on counter shaft.

NOTE

- Lubricate 5th drive gear and bush inner diameter.

	GL80W90
--	---------

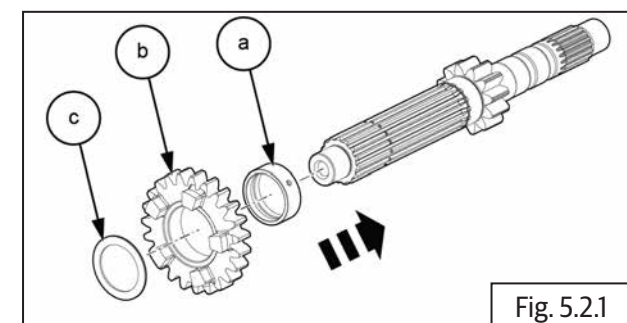


Fig. 5.2.1

NOTE

- Ensure bush is fully seated against in counter shaft.
- Ensure gear is fully seated on splined bush.

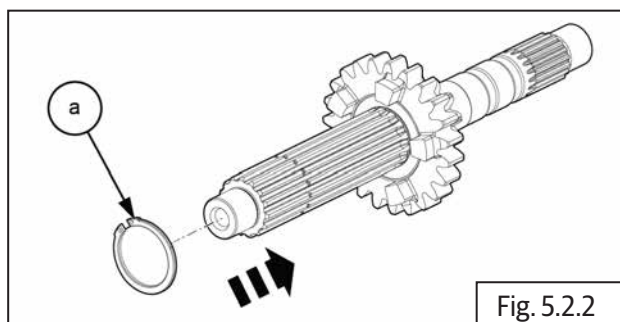
- Assembly the circlip **(a)** on groove on countershaft and ensure it is seated properly in the groove near 5th drive gear.

NOTE

- Gently rotate circlip without expanding to ensure it is properly seated in groove in countershaft.

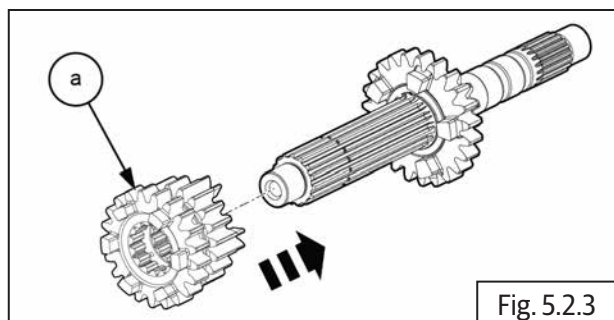
NOTE

- Do not reuse the circlip, Renew all circlips.



Circlip plier

- Assembly the 3rd & 4th Drive gear **(a)** on countershaft.



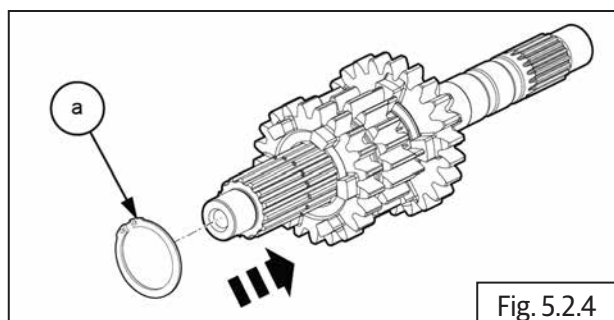
- Assembly the 2nd circlip **(a)** on countershaft and ensure it is seated properly in the groove.

NOTE

- Gently rotate circlip without expanding to ensure it is properly seated in groove in countershaft.

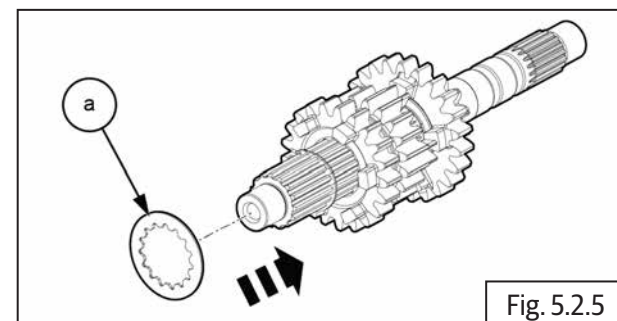
NOTE

- Do not reuse the circlip, Renew all circlips.



Circlip plier

- Assembly thrust washer **(a)** on countershaft and ensure it is seated properly against circlip.



- Ensure oil hole in splined bush **(a)** is aligned with oil hole in counter shaft and assemble splined bush.

NOTE

- Lubricate the splined bush Outer diameter.



GL80W90

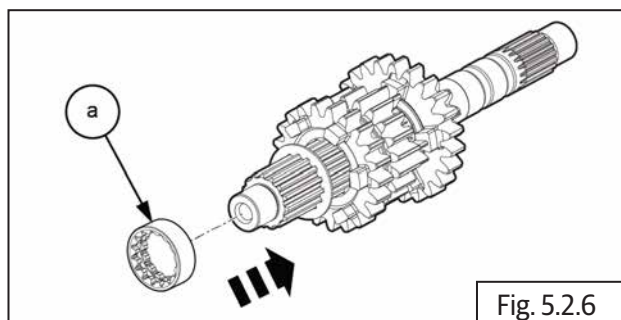


Fig. 5.2.6

NOTE

- Ensure bush is fully seated against thrust washer in countershaft.

- Assembly the 6th drive gear **(a)** on countershaft.

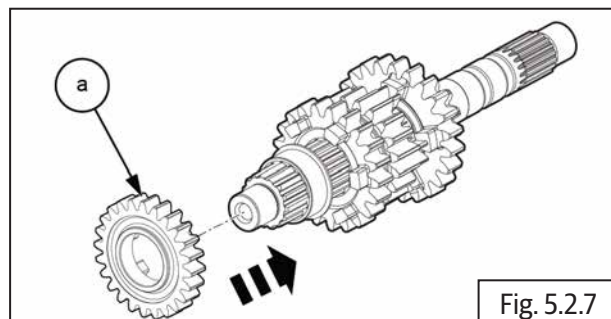


Fig. 5.2.7

NOTE

- Lubricate the 6th drive gear inner diameter.



GL80W90

NOTE

- Ensure gear is fully seated on splined bush.

- Assembly the 2nd drive gear **(a)** on countershaft.

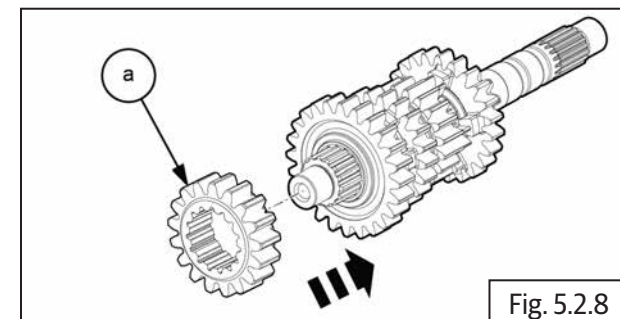


Fig. 5.2.8

- Assembly the 2nd drive gear thrust Washer **(a)** on counter shaft and ensure it is seated properly against 2nd drive gear.

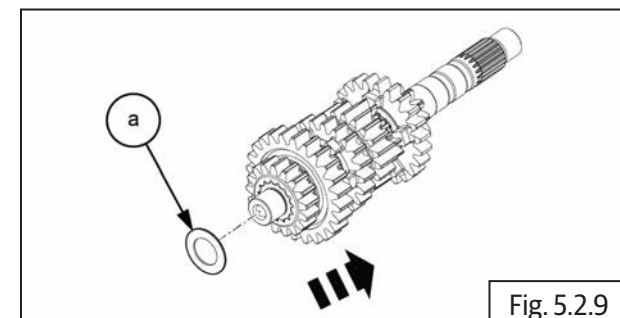
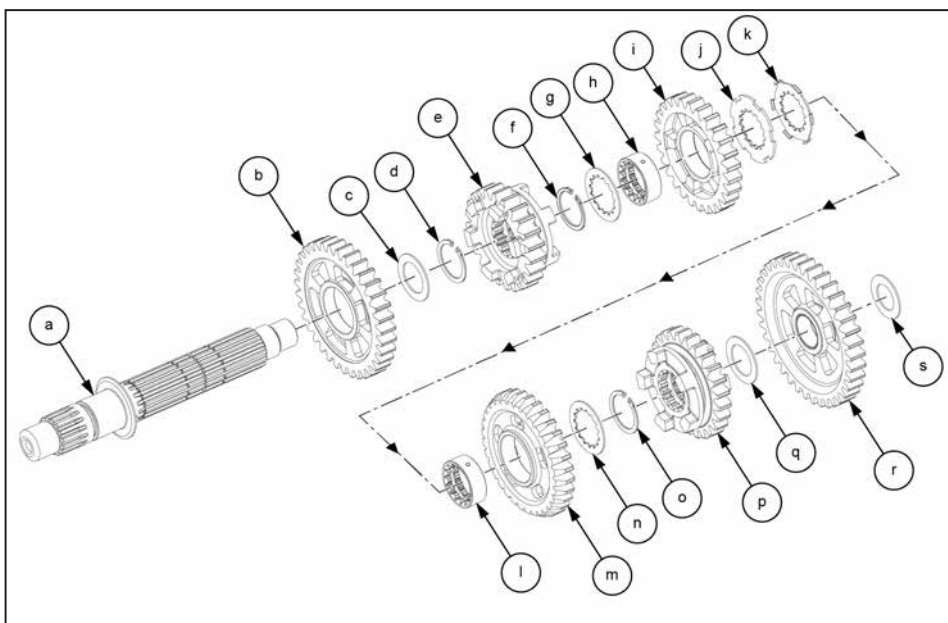


Fig. 5.2.9

5.5.3 Drive shaft Assembly Sequence



Item No.	Description	Quantity	Item No.	Description	Quantity
a	Drive shaft (out put)	1	k	Thrust Washer Lock	1
b	2 nd Driven Gear Comp	1	l	Splined bush	1
c	Washer	1	m	3 rd Driven Gear	1
d	Circlip	1	n	Washer 3 rd & 4 th Driven Gear	1
e	6 th Driven Gear	1	o	Circlip	1
f	Circlip	1	p	5 th Driven Gear	1
g	Washer 3 rd & 4 th Driven Gear	2	q	Washer	1
h	Splined bush	2	r	1 st Driven Gear	1
i	4 th Driven Gear	1	s	Washer	1
j	Thrust Washer	1			

5.5.4 Drive shaft Components:

NOTE

- **Do not** reuse thrust washers, circlips, collar bush. Always replace with new parts.
 - Ensure all components are cleaned and lubricated with recommended lubricants before assembly.
 - The drive shaft gears can be recognized by size: the gear with the smallest diameter is 6th gear, and the one with largest is 1st gear. Ensure that all parts are put back in correct sequence and all circlips and washers are incorporated in correct places.
- Assembly the washer (a) and 2nd driven gear comp (b) on drive shaft (c).

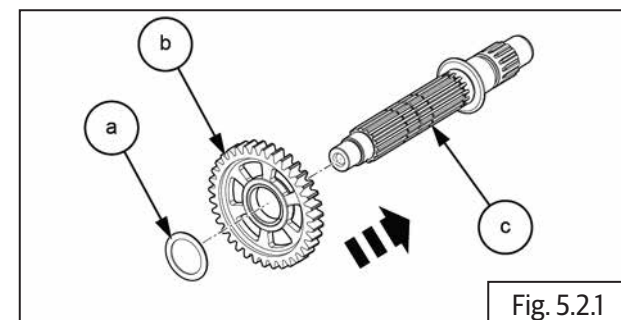
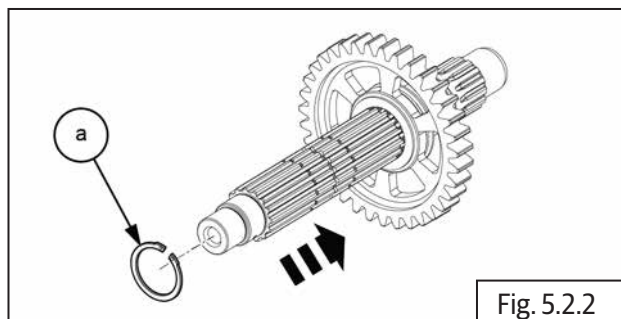


Fig. 5.2.1

- Assembly the circlip **(a)** on groove in drive shaft and ensure it is seated properly in the groove near 2nd driven gear.
- Gently rotate circlip without expanding to ensure it is properly seated.



NOTE

- Do not reuse the circlip, Renew all circlips.

NOTE

- Do not reuse the circlip, Renew all circlips.

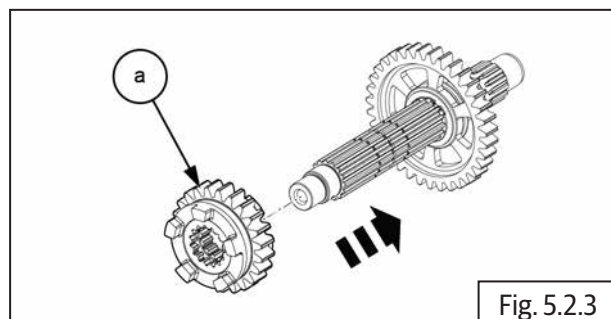


Circlip plier

NOTE

- Ensure proper seating of circlip after assembly.

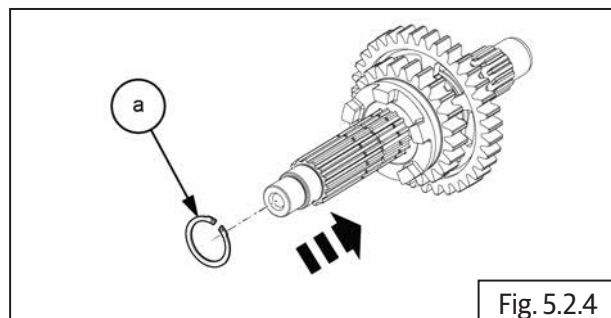
- Assembly the 6th driven gear **(a)** on drive shaft.



NOTE

- Spline should enter freely onto the shaft.

- Install the circlip **(a)** on the 6th gear.



NOTE

- Do not reuse the circlip, Renew all circlips.

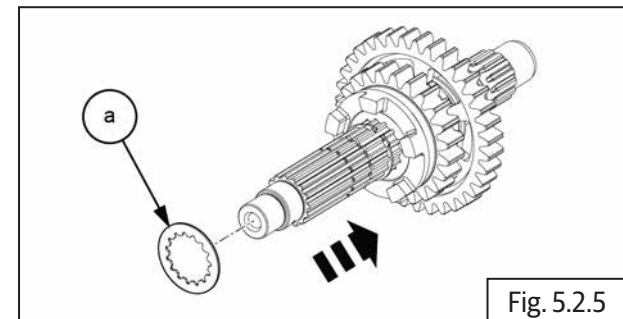


Circlip plier

NOTE

- Ensure proper seating of circlip after assembly.

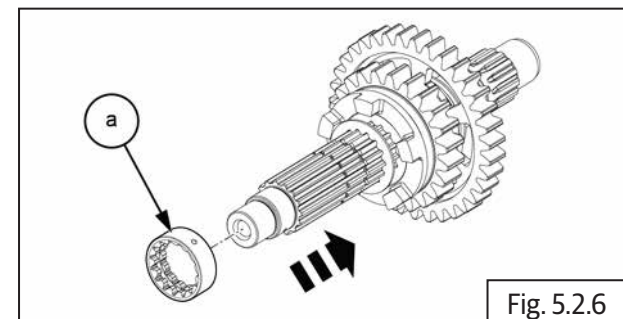
- Assembly thrust washer **(a)** on drive shaft and ensure it is seated properly against circlip.



NOTE

- Spline should enter freely onto the shaft.

- Ensure oil hole in 1st splined bush **(a)** is aligned with oil hole in drive shaft and assemble splined bush on drive shaft.



NOTE

- Spline should enter freely onto the shaft
- Ensure bush is fully seated against thrust washer in drive shaft.

- Assembly the 4th driven gear **(a)** on drive shaft.

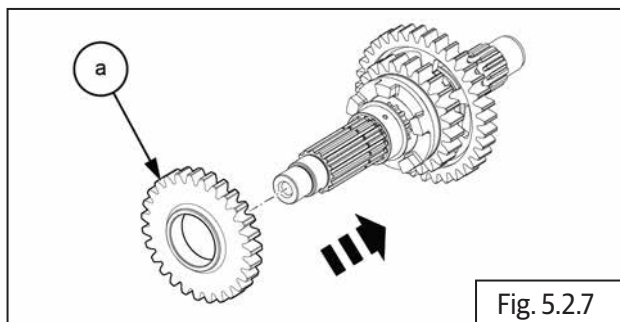


Fig. 5.2.7

- Assembly thrust washer **(a)** on drive shaft and ensure it is seated properly against 3rd driven gear.

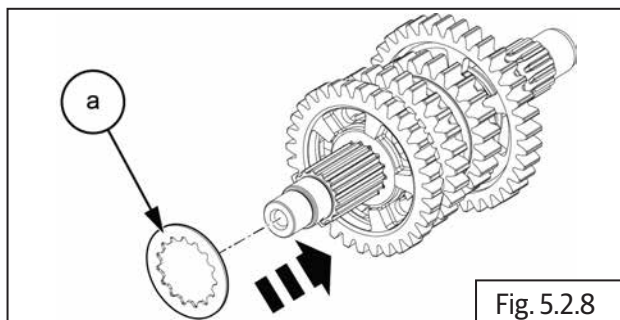


Fig. 5.2.8

NOTE

- Gently rotate circlip without expanding to ensure it is properly seated in groove in drive shaft.
- Gear inner surface should freely rotate on bush outer surface

- Assembly the 3rd circlip **(a)** on drive shaft and ensure it is seated properly in the groove.

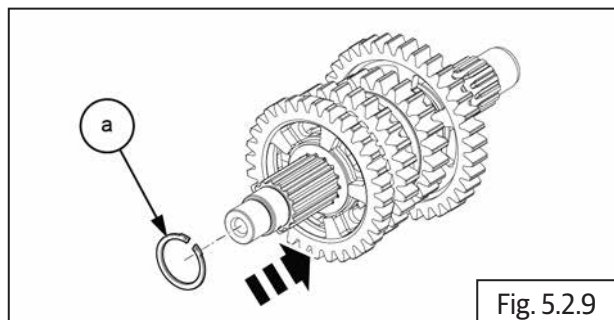


Fig. 5.2.9

NOTE

- Do not reuse the circlip, Renew all circlips.

NOTE

- Ensure proper seating of circlip after assembly.



Circlip plier

- Assembly the 5th driven gear **(a)** on drive shaft.

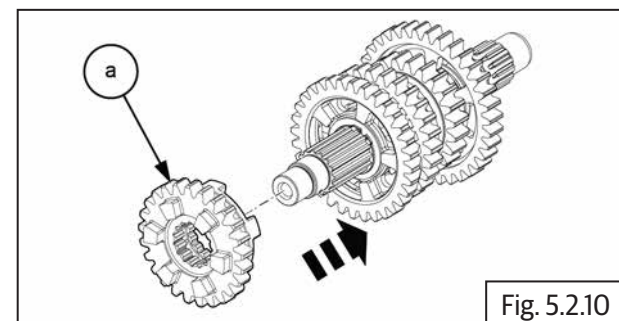


Fig. 5.2.10

NOTE

- Spline should enter freely onto the shaft.

- Assembly the 1st driven gear **(b)** along with thrust washer **(a)** on drive shaft.

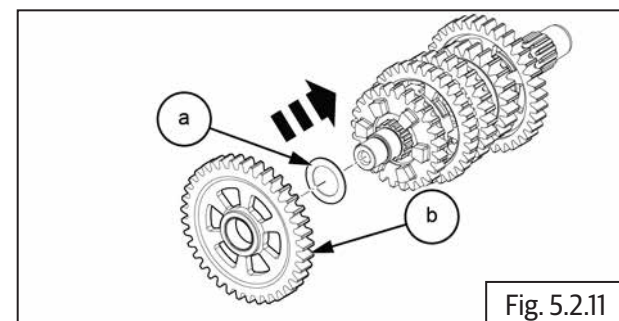
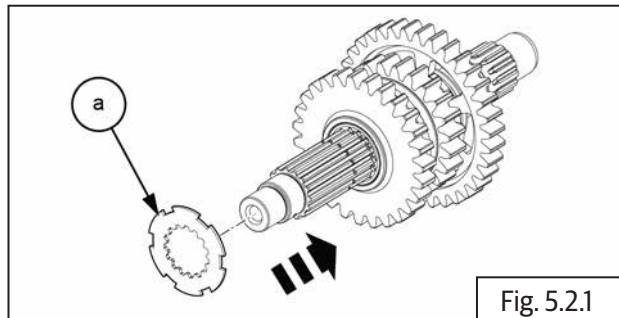


Fig. 5.2.11

NOTE

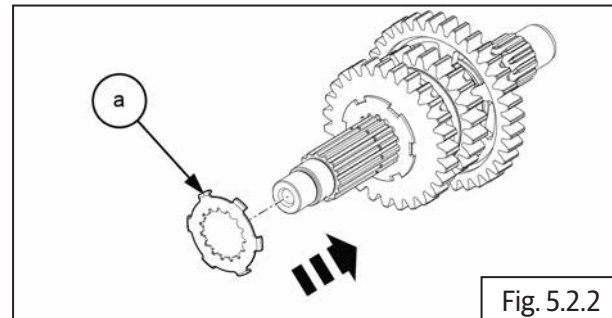
- Ensure gear is fully seated on splined bush.
- Bush inner surface should freely slide on the shaft.
- Gear inner surface should freely rotate on bush outer surface

- Insert thrust lock washer **(a)** with internal and external splines on drive shaft and align internal splines with groove in drive shaft.
- Rotate lock washer such that the washer locks in place on drive shaft and cannot come out.

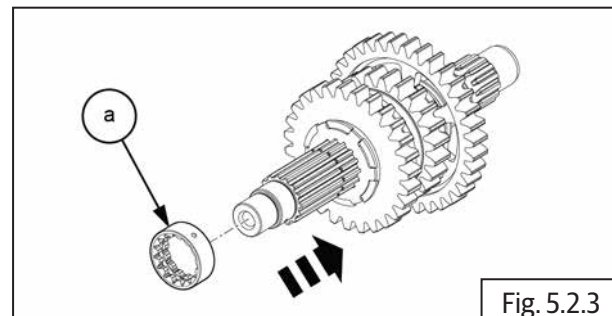
**NOTE**

- Thrust washer spline should enter freely onto shaft.
- Ensure bush is fully seated against splined lock washer in drive shaft.

- Assemble splined lock washer **(a)** on drive shaft such that the outside tabs are facing the lock washer on drive shaft.
- Ensure outer tabs of lock washer are aligned and fully seated in outer splines of lock washer

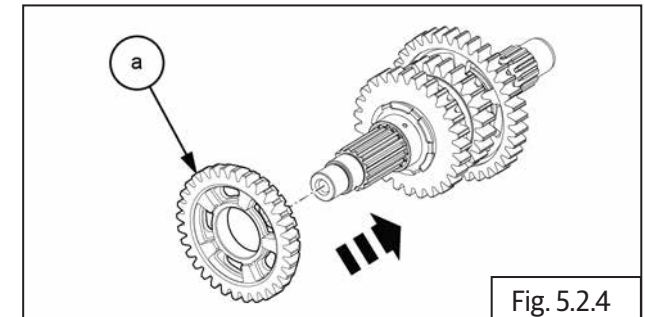
**NOTE**

- Thrust washer lock spline should enter freely onto shaft and lug to be matched with washer groove.
- Ensure oil hole in 2nd splined bush **(a)** is aligned with oil hole in drive shaft and assemble splined bush on drive shaft.

**NOTE**

- Spline should enter freely onto the shaft.
- Ensure bush is fully seated against splined lock washer in drive shaft.

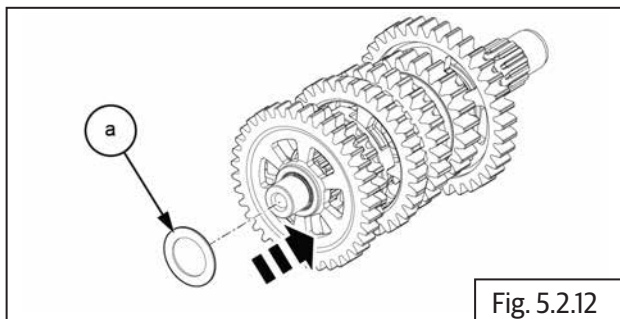
- Assembly the 3rd driven gear **(a)** on drive shaft.

**NOTE**

- Ensure gear is fully seated on splined bush.
- Gear inner surface should freely rotate on bush outer surface

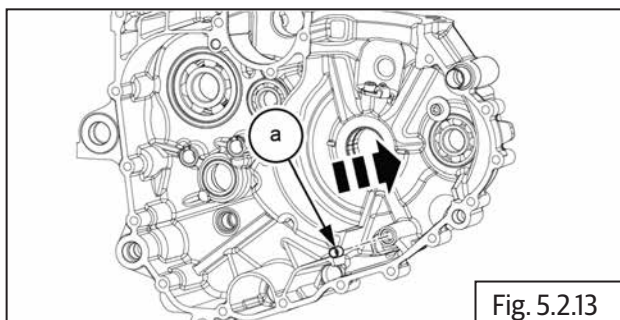
NOTE

- Bush inner surface should freely slide on the shaft.
- Assembly thrust washer (a) on drive shaft and ensure it is seated properly against 1st driven gear.

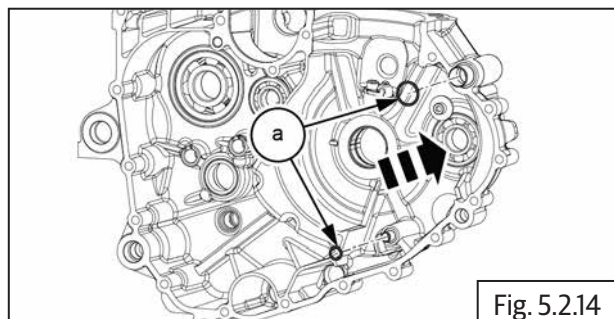


5.5.5 LH Crankcase:

- Insert the 1 No dowel pin (a) into crankcase LH.



- Install the 2 Nos. O-rings (a) into crankcase LH.

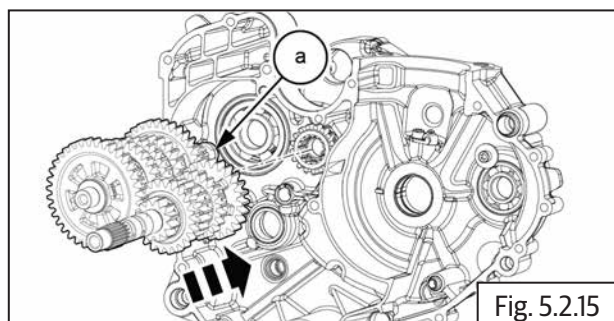


NOTE

- Do not reuse the "O" Rings, Renew all "O" Rings.

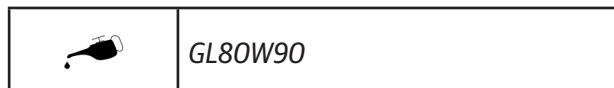
5.5.6 Gear Assembly

- Install the gear box assembly (a) into crankcase LH.

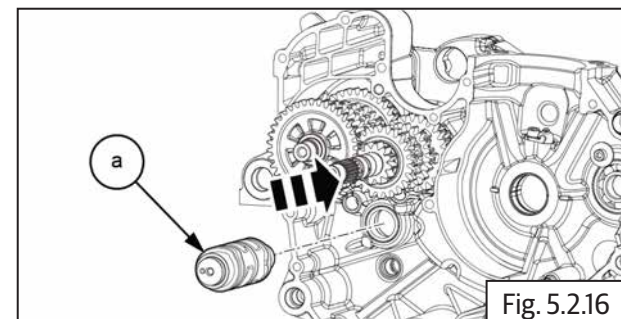


NOTE

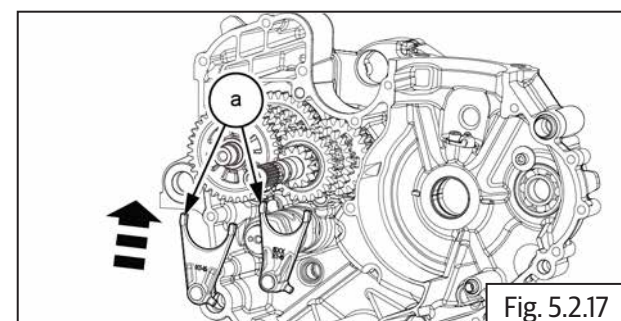
- Lubricate the all gears.



- Install the shifter drum (a) into crankcase LH.



- Install the gear shifter fork (a) 2 Nos. into drive shaft.

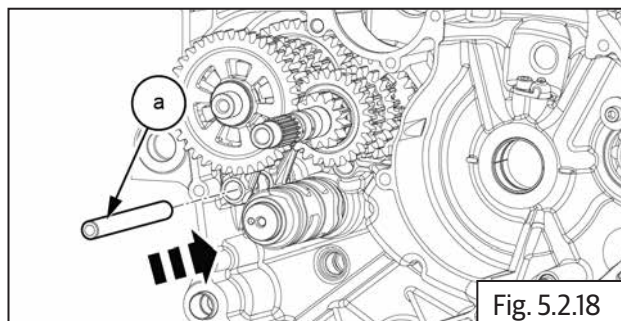


NOTE

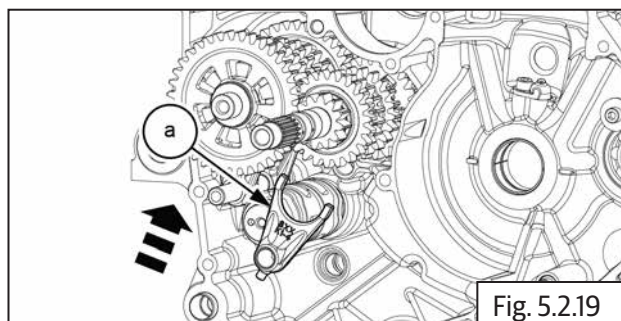
- Lubricate the selected fork and shaft before assemble.



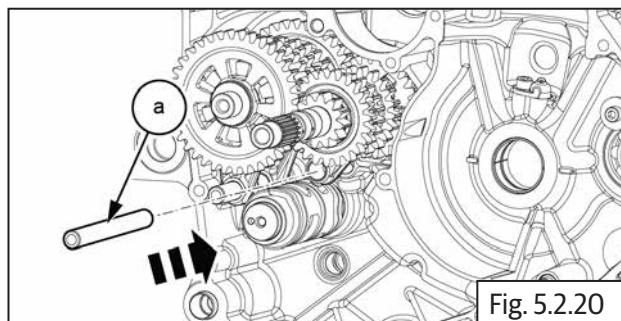
- Install the gear shifter shaft **(a)** into drive shaft.



- Install the gear shifter fork **(a)** 1 No. into counter shaft.



- Install the gear shifter shaft **(a)** into counter shaft.



5.5.7 Crankshaft And Mass Balancer

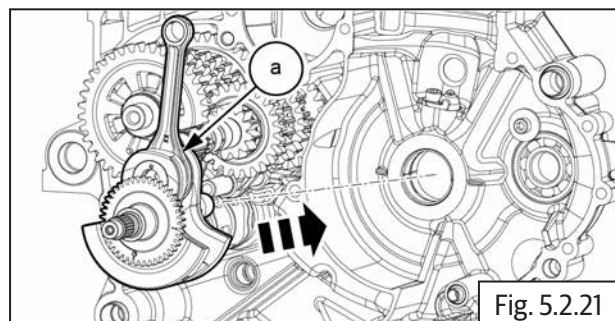
NOTE

- Lubricate the crankshaft and balancer before assemble..

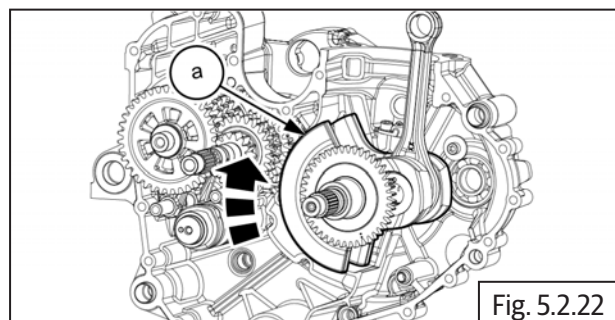


GL80W90

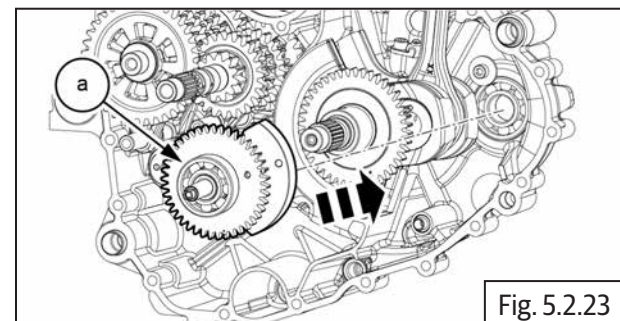
- Locate the crankshaft assembly **(a)** into crankcase.



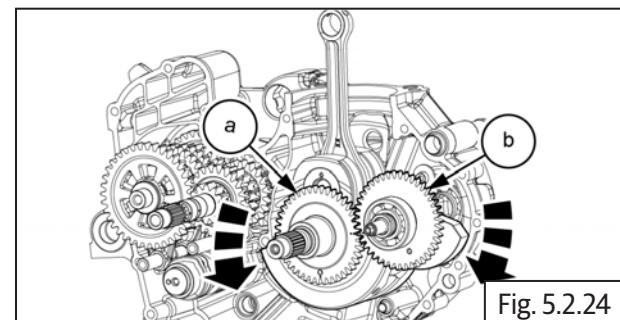
- Rotate the crankshaft assembly anticlockwise.



- Locate the mass balancer **(a)** into crankcase.



- Rotate and ensure the crankshaft assembly **(a)** and mass balancer **(b)** it is seated properly in crankcase.



NOTE

- Make sure the three punch marks on the crankshaft and balancer shaft line up during assembly.

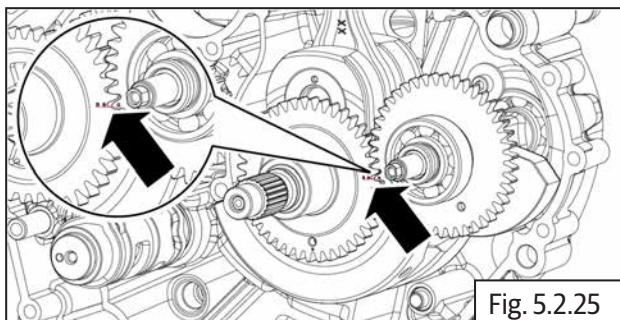


Fig. 5.2.25

5.5.8 RH Crankcase

- Apply Threebond Super Cleaner on the crankcase surface and wipe it using a lint-free cloth.
- Use Threebond 1217H sealant with a bead diameter of 1.5 +0.5mm. Please refer to the image provided for more details.

NOTE

- Before closing the crankcase box, ensure there is no excess sealant on the crankcase surface..

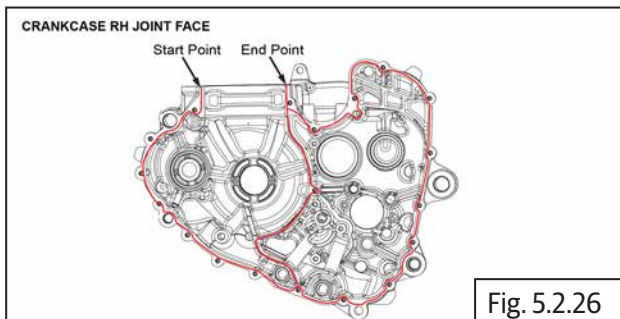


Fig. 5.2.26

- Apply recommended sealant on gasket evenly, on the upper crankcase mating surface (a).

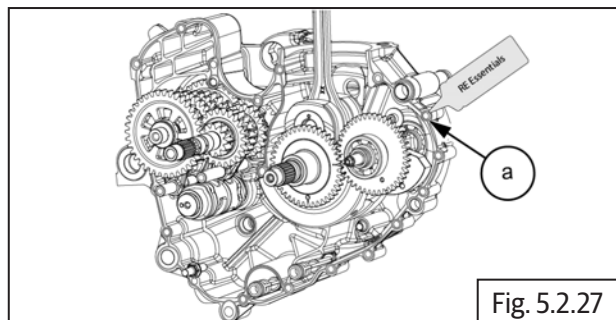


Fig. 5.2.27



Threebond 1217H 2.Sealant

- Assemble the RH crankcase (a) and ensure proper fitment.

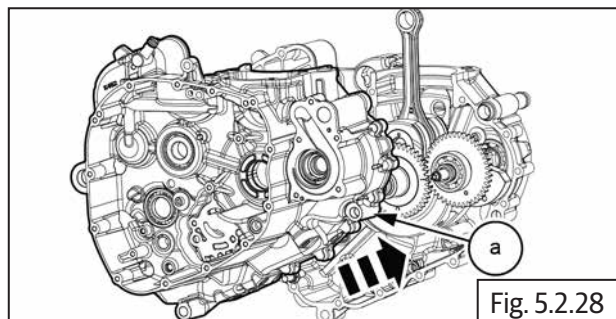


Fig. 5.2.28

- Locate 4 Nos. Hex socket screws (M6) (a) in RH crankcase cover and hand tighten just sufficiently **Do not TIGHTEN FULLY.**

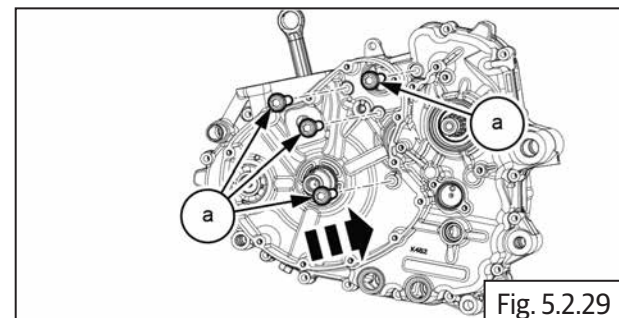


Fig. 5.2.29



5 mm Allen key with Ratchet

- Locate 15 Nos. Hex socket screws (M6) (a) in RH crankcase cover and hand tighten just sufficiently **Do not TIGHTEN FULLY.**

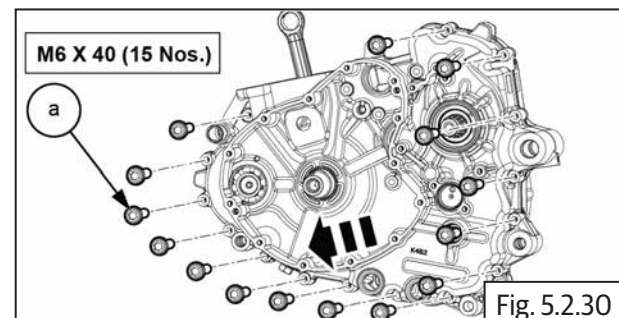
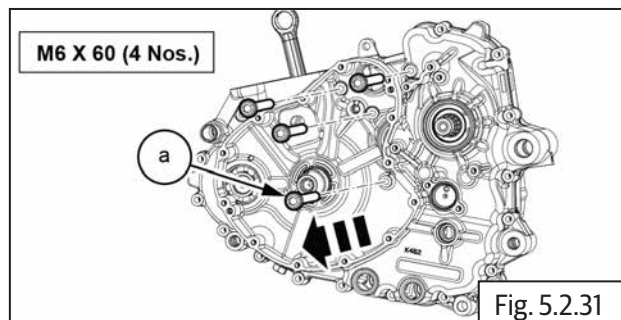


Fig. 5.2.30



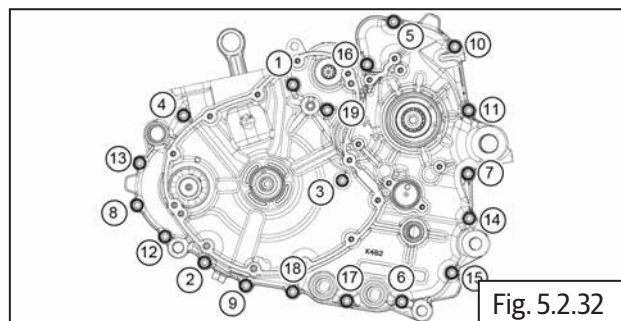
5 mm Allen key with Ratchet

- Locate 4 Nos. Hex socket screws **(M6) (a)** in RH crankcase cover and hand tighten just sufficiently **Do not TIGHTEN FULLY.**



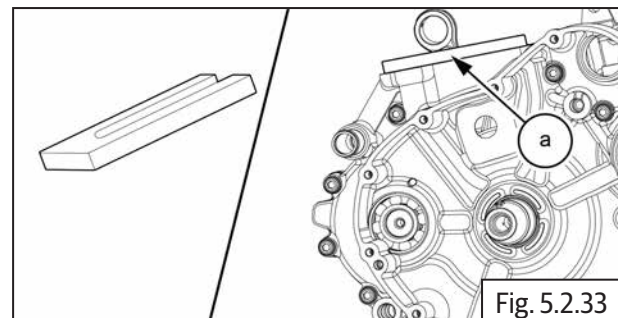
	5 mm Allen key with Ratchet
--	-----------------------------

- Tighten the 19 Nos. Hex flange bolts , as mentioned in the sequence below,



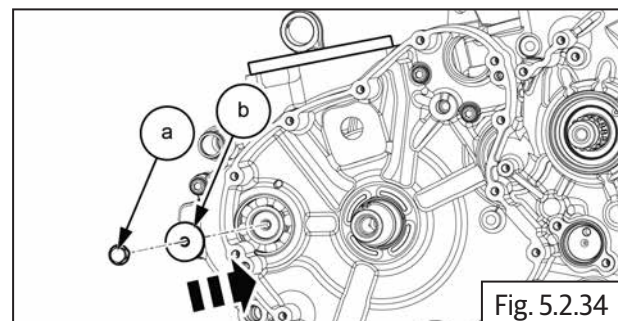
	5mm Allen key with ratchet
Torque	10 - 12 Nm / 1.0 - 1.2 kgf-m

- Connect the special tool **(a)** from connecting rod **(b).**



SPL	Part No: ST-27529-2
	Part Name: Connecting rod holder

- Locate and tighten 1 No. Hex flange head bolt **(M6) (a)** along with washer **(b)** on balancer shaft assembly.

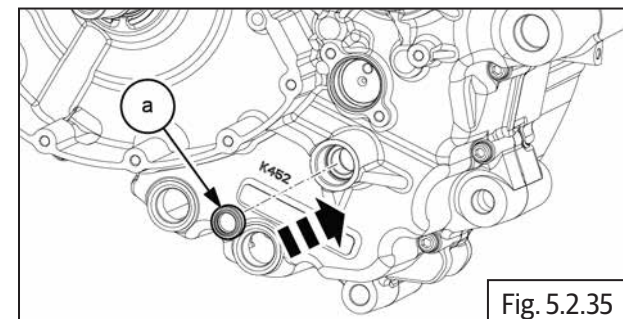


	Loctite 243
--	-------------

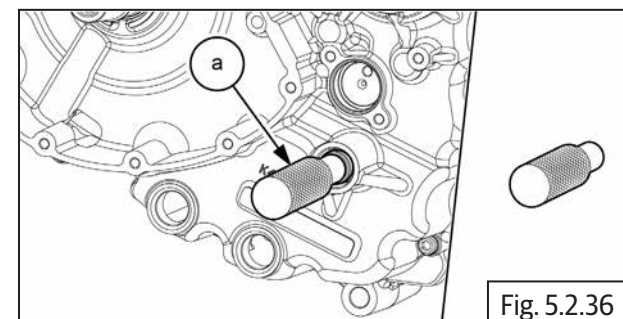
	10mm Socket with ratchet
Torque	11 N-m / 1.1kgf-m

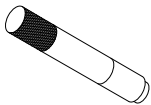
5.5.9 Gear Shifter Shaft Installation:

- Install the oil seal **(a)** into LH crankcase.



- Use special tool **(a)** to install the oil seal.



	Part No: ST30270/a
	Part Name: Gear Shifter seal installer

NOTE
• Oil seal should be used one time only. Do not reuse.

- Locate the star index **(a)** into shifter drum dowel pin.

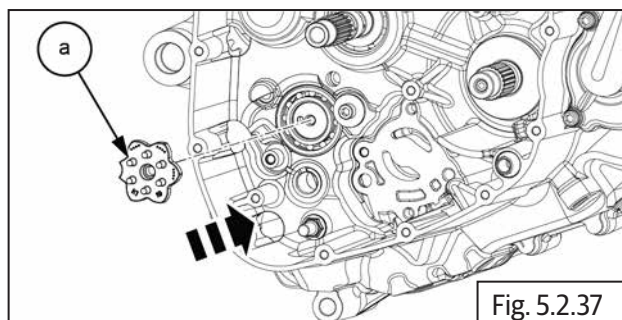


Fig. 5.2.37

- Locate and tighten 1 No Hex flange head bolt **(M6)** **(a)** into star index.

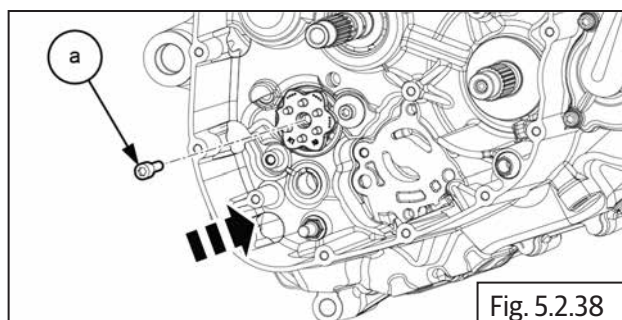


Fig. 5.2.38

NOTE
• Intex bolt should be used one time only. DO NOT reuse.

	5mm Allen Key with ratchet
Torque	11 N-m / 1.1kgf-m

- Locate the spring **(a)** in crankcase RH.

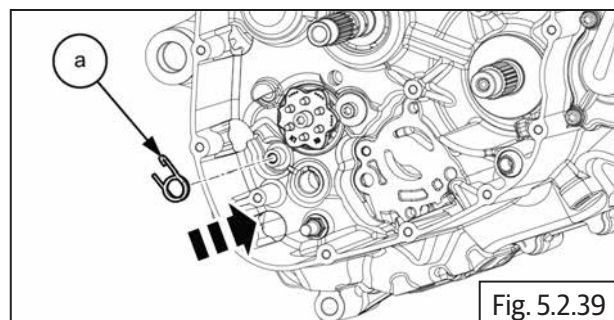


Fig. 5.2.39

- Locate the stopper arm **(a)** and washer **(b)** above spring.
- Ensure spring is seated on the groove provide in the stopper arm **(a)**.

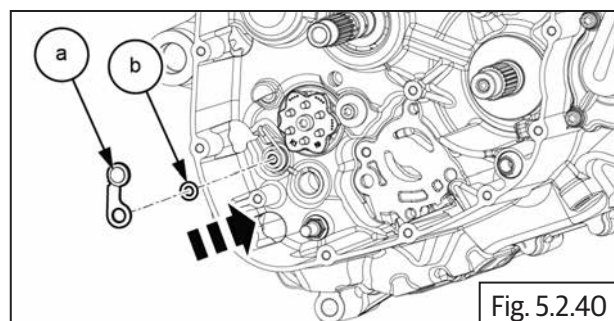


Fig. 5.2.40

CAUTION
Ensure the arm stopper is seated properly on the bolt step.

- Tighten 1 No Hex flange head bolt **(M6)** **(a)** into into cam stopper arm .

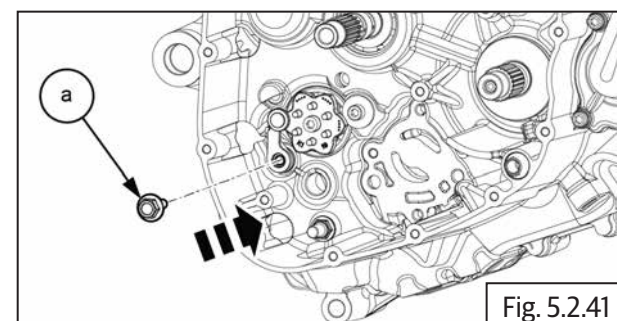
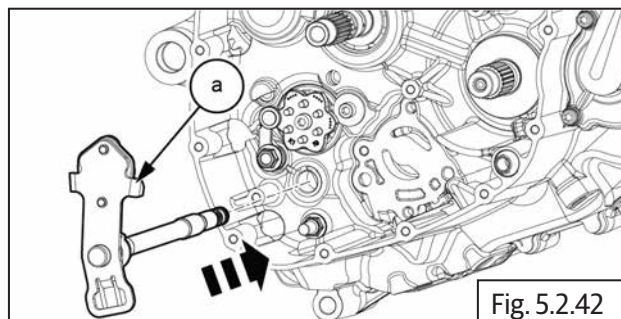


Fig. 5.2.41

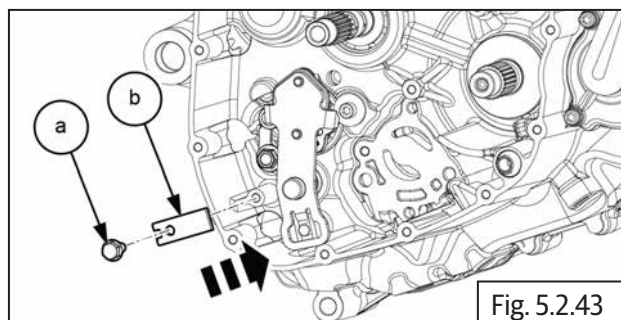
NOTE
• Stopper arm bolt should be used one time only. DO NOT reuse.

	10mm Socket with ratchet
Torque	11 N-m / 1.1kgf-m

- Insert gear shifter **(a)** from RH side of the engine.



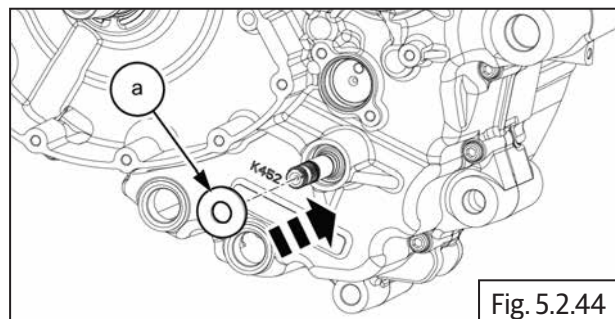
- Assemble the stopper bracket **(b)** on crankcase RH locating on gear shifter shaft and tighten **(M6) (a)**.



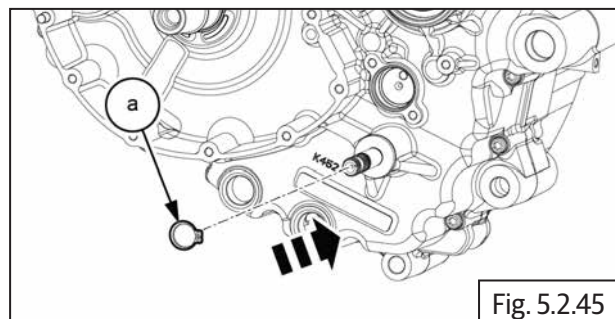
	Loctite 243
--	-------------

	10mm Socket with ratchet
Torque	9 N-m / 0.9 kgf-m

- Insert the flat washer **(a)** on gear shifter shaft.



- Insert the circlip **(a)** into the shaft.



NOTE

- Do not reuse the circlip, Renew all circlips.

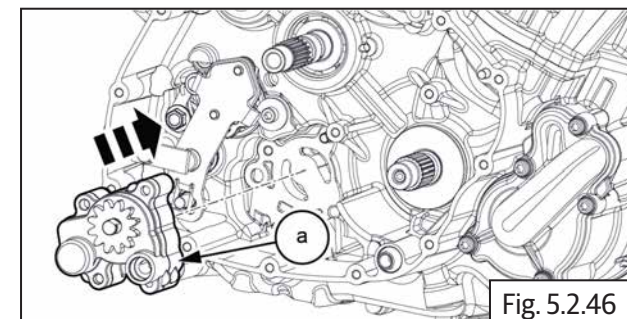
	External Circlip Plier
--	------------------------

5.6.10 oil Pump assembly:

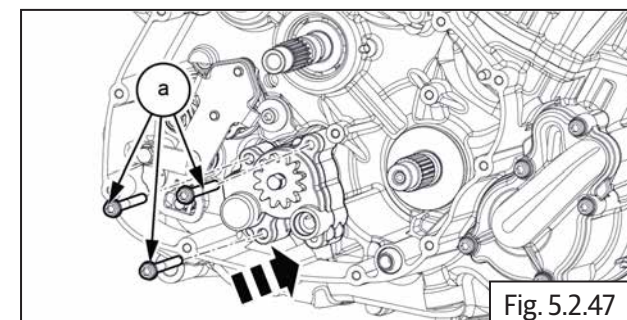
NOTE

- Check oil pump rotates freely before assembly.
- Check both pump and idler rotate freely after assembly.

- Install the oil pump assembly **(a)** into crankcase LH.

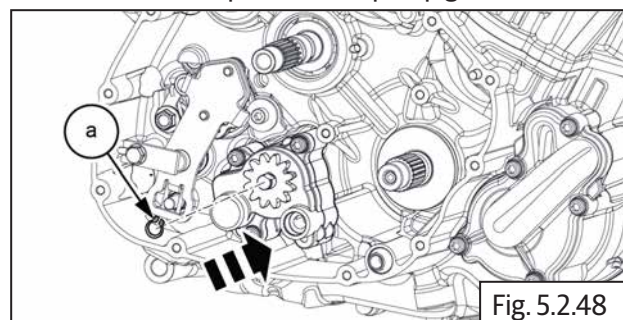


- Locate and tighten 3 Nos **(M6) (a)** into oil pump assembly.



	5mm Allen Key with ratchet
Torque	10 N-m / 1.0 kgf-m

- Install the circlip **(a)** into oil pump gear.

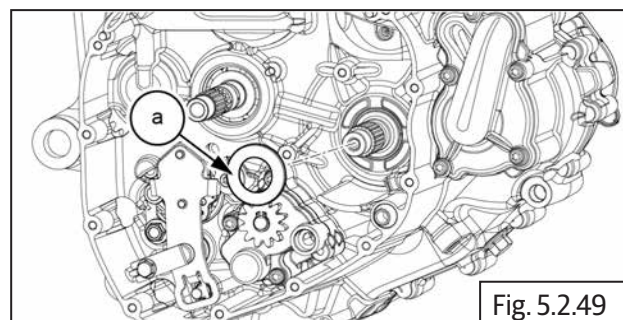


NOTE

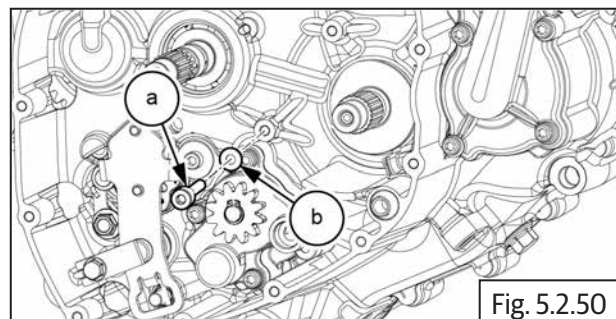
- Do not reuse the circlip, Renew all circlips.

	External Circlip Plier
---	------------------------

- Install the thrust washer **(a)** into crankshaft.



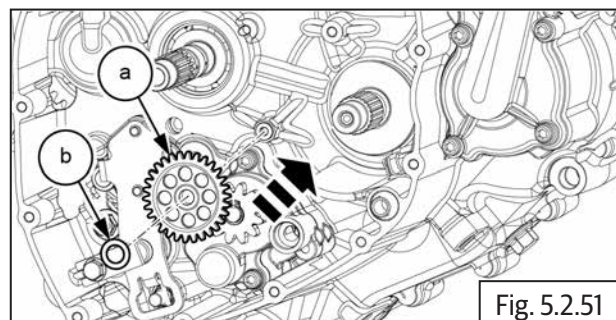
- Locate and tighten 1 No stepped bolt **(M6) (a)** with washer **(b)** on ideal gear.



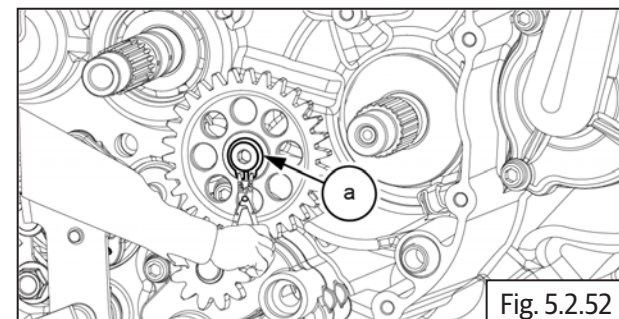
	Loctite 243
---	-------------

	5mm Allen Key with ratchet
Torque	9 N-m / 0.9 kgf-m

- Install the ideal gear **(a)** along with washer **(b)**.



- Install the circlip **(a)** into ideal gear.



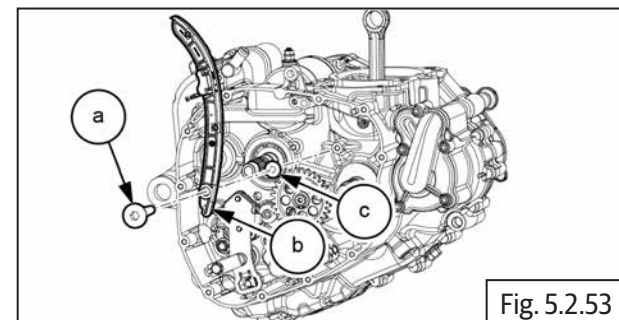
NOTE

- Do not reuse the circlip, Renew all circlips.

	External Circlip Plier
---	------------------------

5.5.11 Primary Drive Gear assembly:

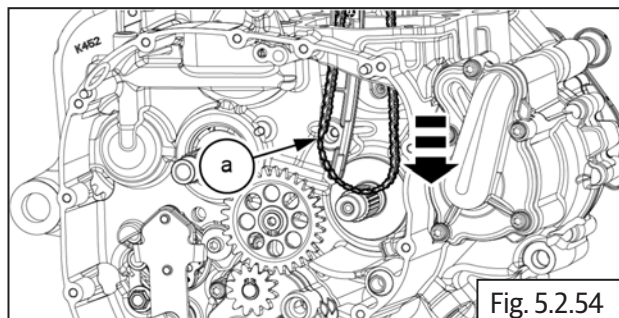
- Locate and tighten the chain tensioner pad **(a)** shoulder bolt **(b)** and washer **(c)**.



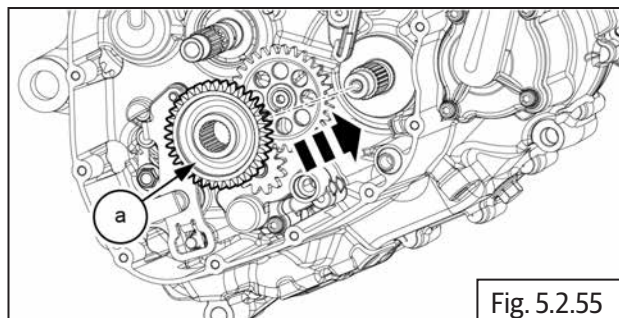
	Loctite 243
---	-------------

	6mm Allen Key with ratchet
Torque	11 N-m / 1.1 kgf-m

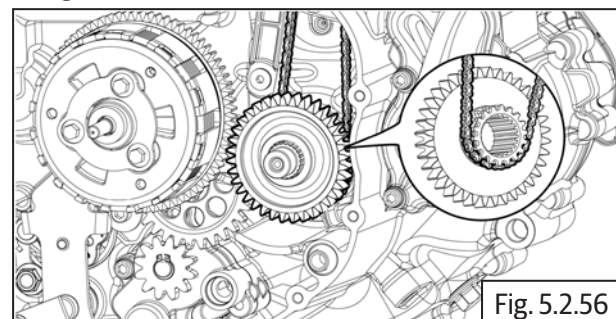
- Locate and fix the cam chain **(a)**.



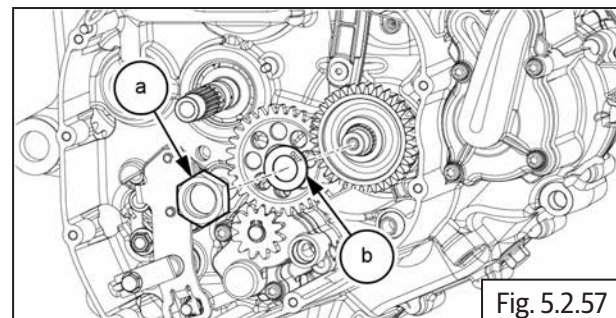
- Locate and install the primary drive gear **(a)**.



- Ensure cam chain properly guide on primary drive gear.



- Install the crank nut **(a)** along with washer **(b)**.
- Ensure washer OUT facing to be on nut side
- Apply hand tight on nut.



	Loctite 243
---	-------------

NOTE

- **Crank Nut should be used one time only. DO NOT reuse.**

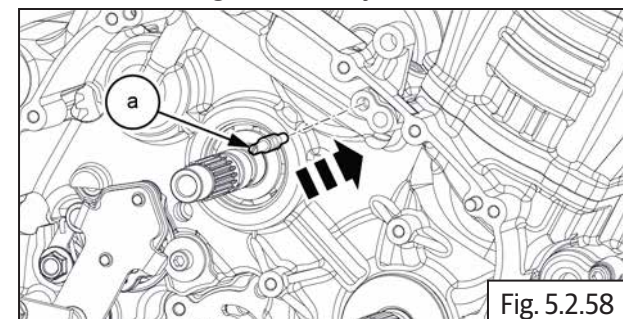
NOTE

- **Crank Nut** is left hand thread. Turn anticlockwise to tighten nut on shaft.

	24 mm socket with ratchet
Torque	118-122 N-m / 11.8 - 12.2 kgf-m

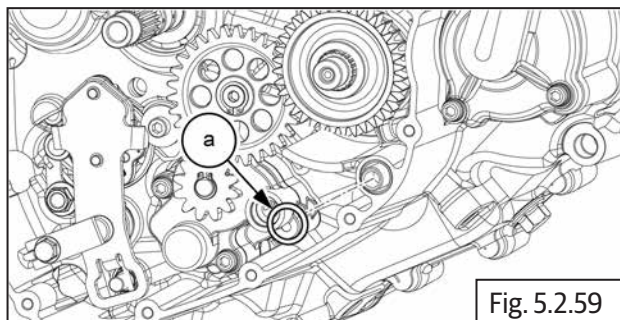
5.5.12 Clutch assembly:

- Locate and tighten the oil jet **(a)** into crankcase.



	Screw Driver
Torque	1.5 N-m / 0.15 kgf-m

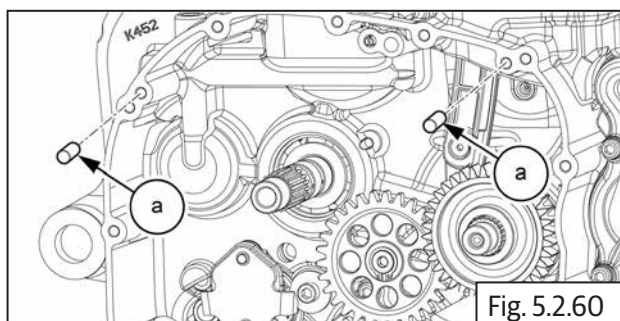
- Install the O-ring **(a)** into crankcase.



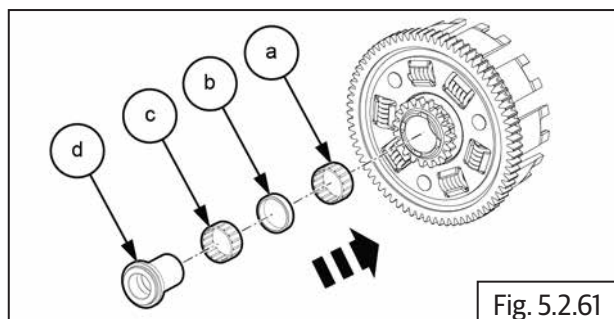
NOTE

- **Do not reuse the "O" Rings, Renew all "O" Rings.**

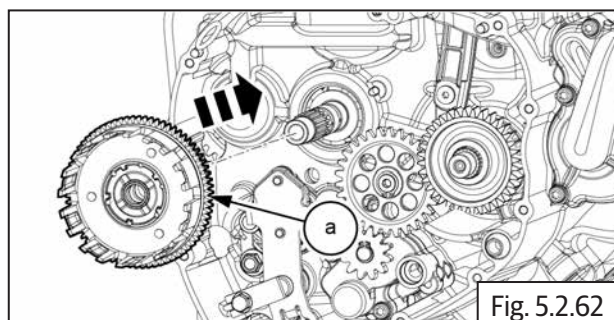
- Install the 2 Nos. Hollow dowel pins **(a)** into crankcase.



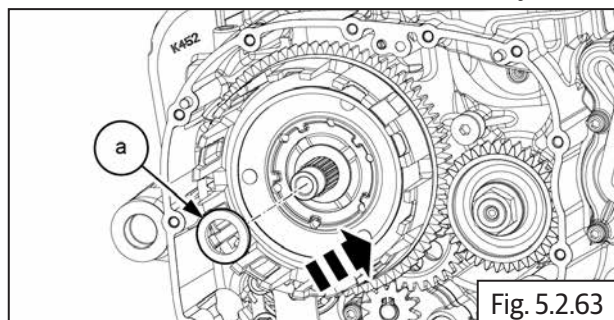
- Install the needle bearing **(a)**, spacer **(b)**, needle roller bearing **(c)** spacer **(d)** & into clutch housing.



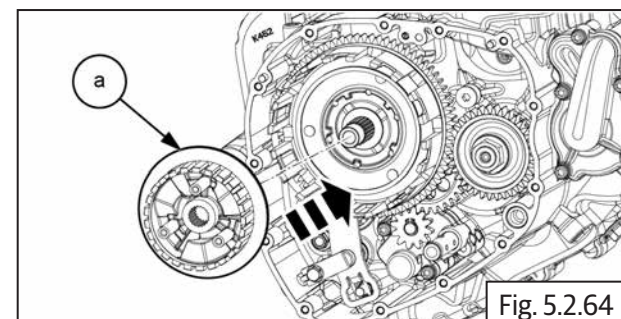
- Install the clutch housing **(a)** into counter shaft.



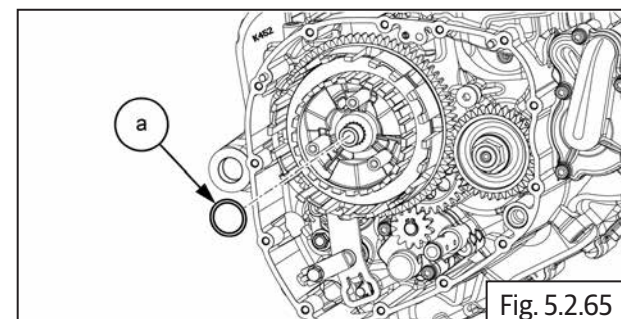
- Install the washer **(a)** into clutch assembly.



- Install the clutch hub **(a)** into clutch housing.



- Install the washer **(a)** into clutch hub.



- Locate and tighten the nut **(M17) (a)** along with Belleville washer **(b)** into clutch hub.

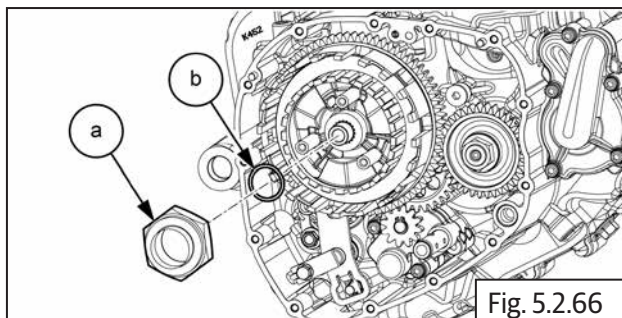


Fig. 5.2.66

NOTE

- **Clutch Nut** is left hand thread. Turn anticlockwise to tighten nut.

CAUTION

Hex "U" nut is a left hand thread. Wrong rotation may damage the threads.

- Insert special tool **(b)** in clutch center and ensure it is seated fully on the splines.
- Hold the clutch center firmly and tighten nut **(M17) (a)** by rotating anti-clockwise.

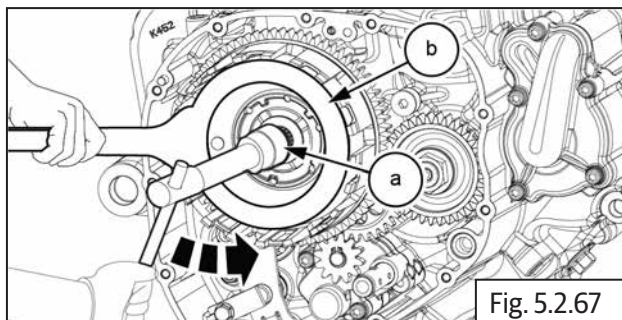


Fig. 5.2.67

SPL 	Part No: ST30266/a
	Part Name: Clutch holder

	27mm Socket with ratchet
Torque	120 -130 N-m / 12 - 13 kgf-m

- Insert special tool **(a)** in crankcase RH to lock the crankshaft and prevent rotation.

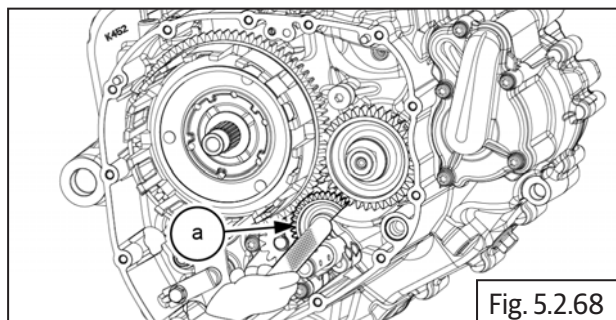


Fig. 5.2.68

SPL 	Part No: ST275332
	Part Name: Crank gear locking tool

CAUTION	
Crank Nut is left hand thread. Turn anticlockwise to tighten nut on shaft.	

- Hold the special tool **(b)** and tighten the Hex "U" nut **(M18) (a)** by rotating Anti-clockwise.

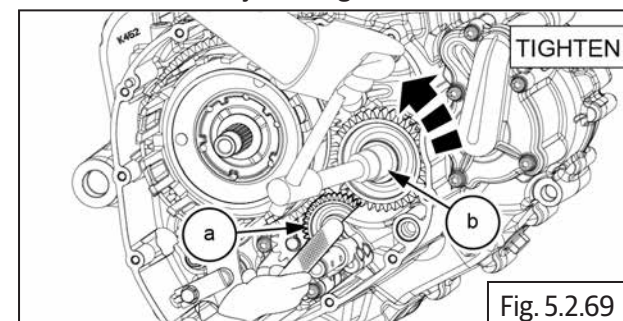


Fig. 5.2.69

	Loctite 243
---	-------------

NOTE

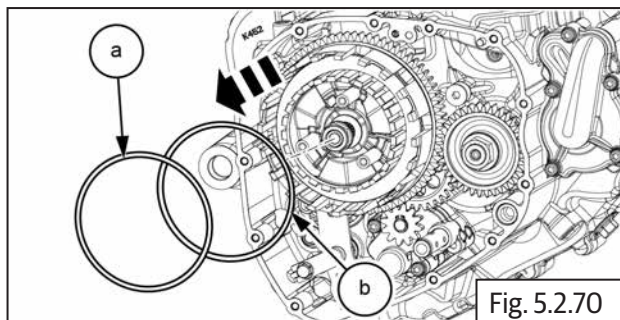
- **Crank Nut should be used one time only. DO NOT reuse.**

NOTE

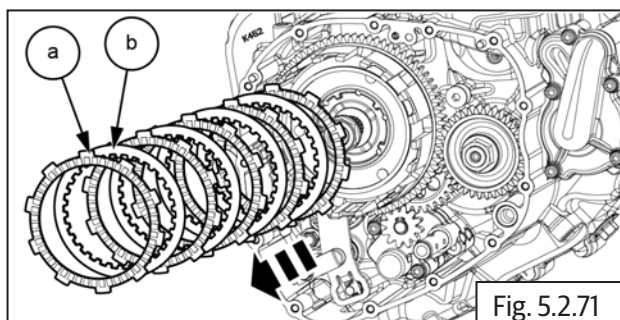
- **Crank Nut** is left hand thread. Turn anticlockwise to tighten nut on shaft.

	24 mm socket with ratchet
Torque	118-122 N-m /11.8 - 12.2 kgf-m

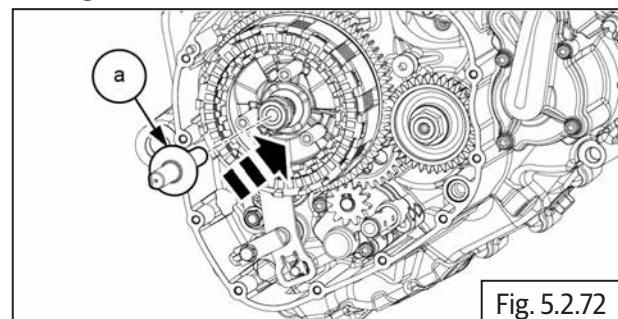
- Install washer **(a)** & spring **(b)** from clutch assembly.



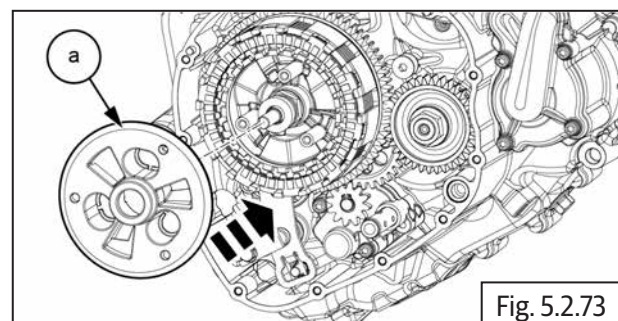
- Install friction plate **(a)** and metal plate assembly **(b)** from clutch hub.
- Ensure the splines of the plates are correctly positioned and located on the clutch housing.



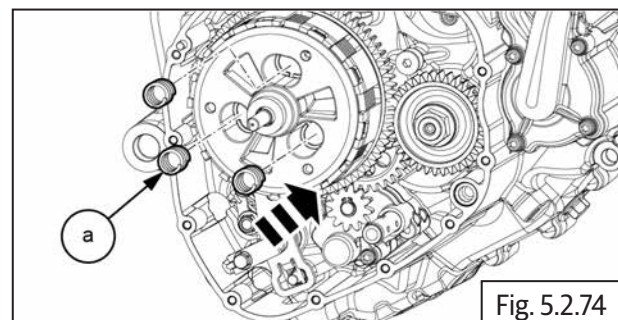
- Install the clutch release pin **(a)** into clutch housing.



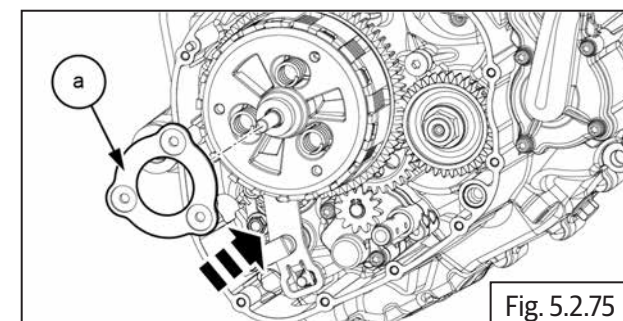
- Install pressure plate **(a)** on clutch hub.



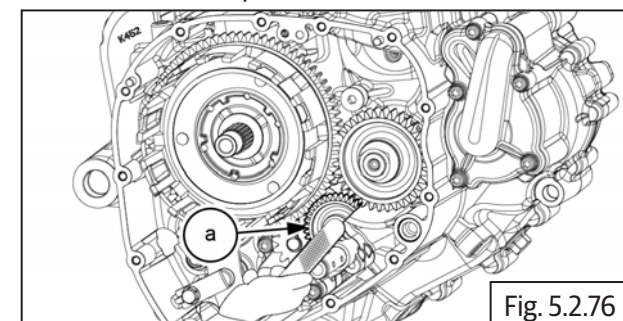
- Install the spring **(a)** 3 Nos. into clutch hub.



- Install mounting bracket **(a)** on clutch hub.

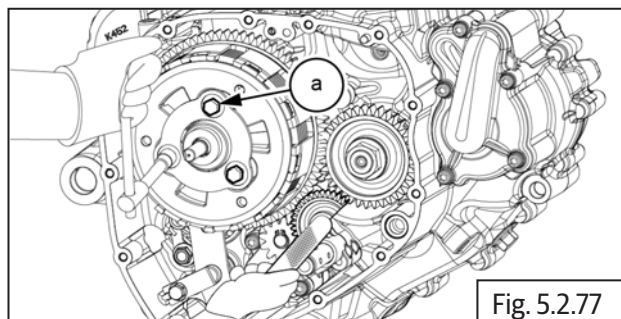


- Insert special tool **(a)** in crankcase RH to lock the crankshaft and prevent rotation.



SPL	Part No: ST275332
	Part Name: Crank gear locking tool

- Locate and tighten 3 Nos. Hex flange head bolts **(M6) (a)** into the pressure plate evenly to avoid thread damage.



	10mm Socket with ratchet
Torque	11 N-m / 1.1 kgf-m

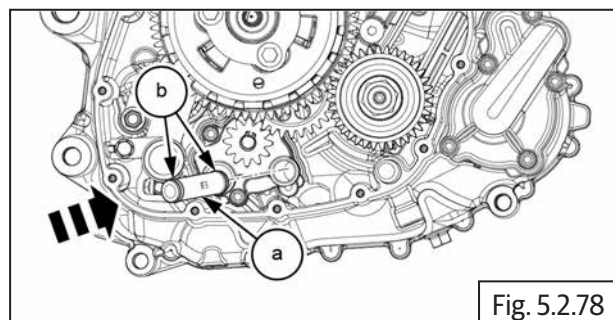
- Install the oil transfer pipe **(a)** along with O-rings 2 Nos **(b)**.

NOTE

- Lubricate the transfer pipe o-rings before assemble.



GL80W90

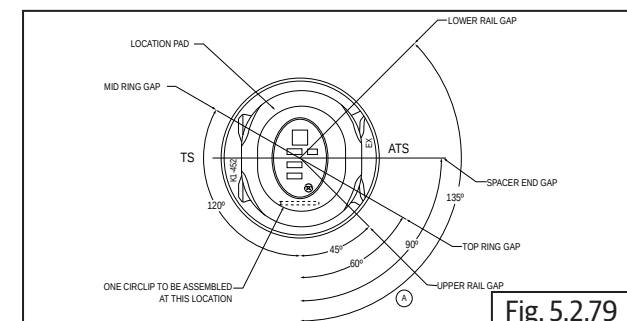


5.5.13 Pistons Rings

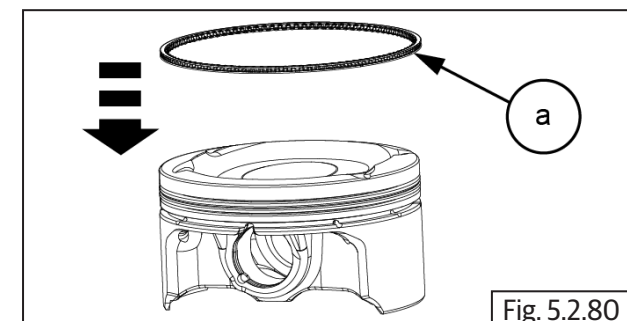
• Orientation Pattern

NOTE

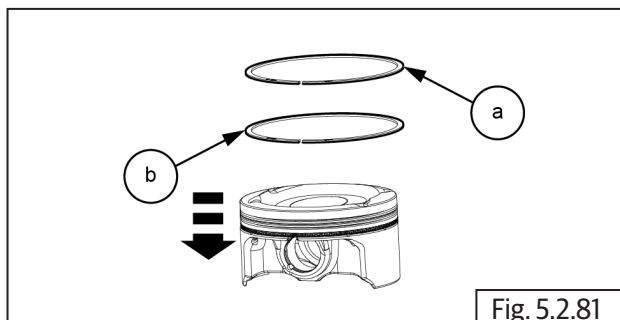
- Rings should be assembled with proper orientation Refer below image.



- Position and install the Oil control ring with stiffener ring **(a)** into piston bottom groove.

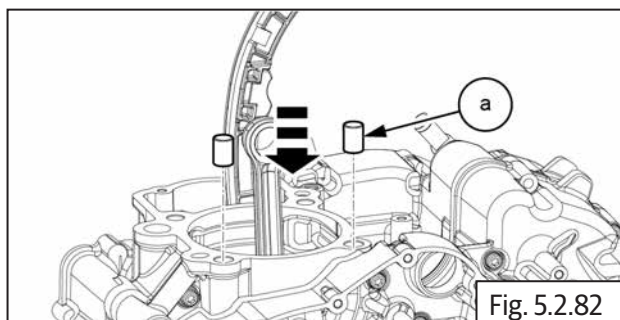


- Position and install the Second compression ring **(b)** into piston middle groove.
- Position and install the first compression ring **(a)** into piston Top groove

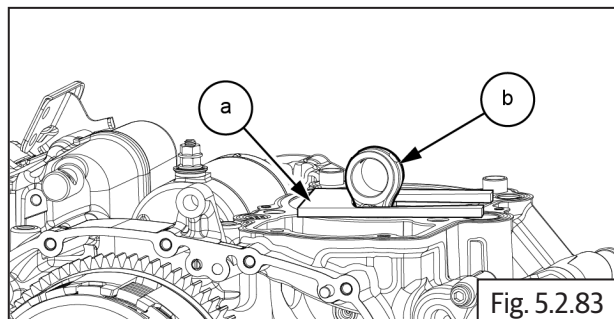


5.5.14 Piston Assembly

- Install 2 Nos. dowel pins **(a)** on upper crankcase.



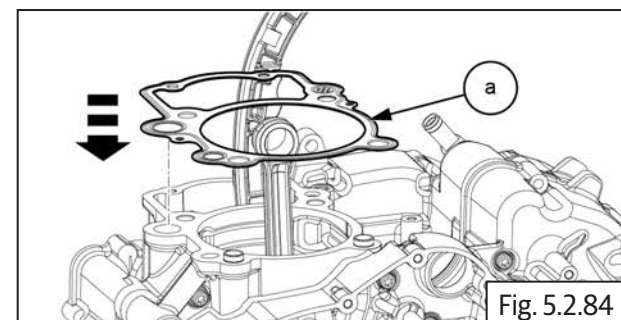
- Remove the special tool **(a)** from connecting rod **(b)**.



SPL	Part No: ST-27529-2
	Part Name: Connecting rod holder

- Ensure the gasket seating area in crankcase is clean.
- Ensure proper seating of the gasket on the dowels on the crankcase.

NOTE	
• Apply Threebond 1217H at the LH & RH crankcase joints before assembling the gasket and push the gasket to fill the joint split line after applying the sealant"	

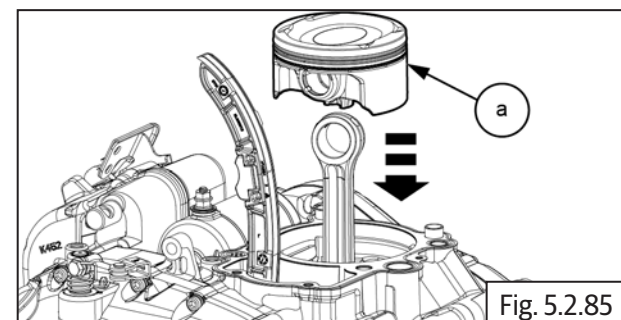


- Position and hold the piston **(a)**.

CAUTION	
Assemble the piston Ex facing the exhaust side of the engine.	

NOTE	
• Lubricate the piston.	

	GL80W90
--	---------



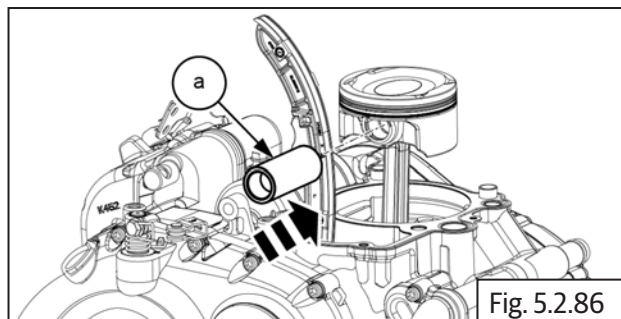
- Gently install gudgeon pin **(a)** into the inner side of piston RH and ensure it has completely seated of the connecting rod.

NOTE

- Lubricate the gudgeon pin.

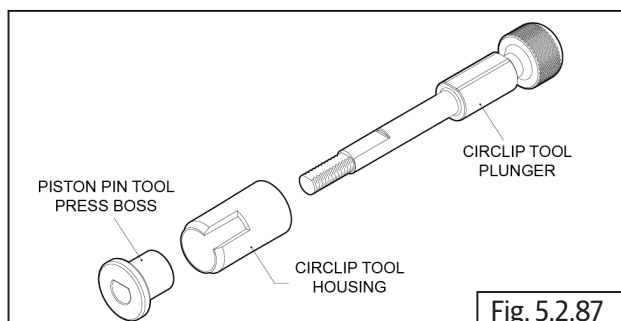


GL80W90

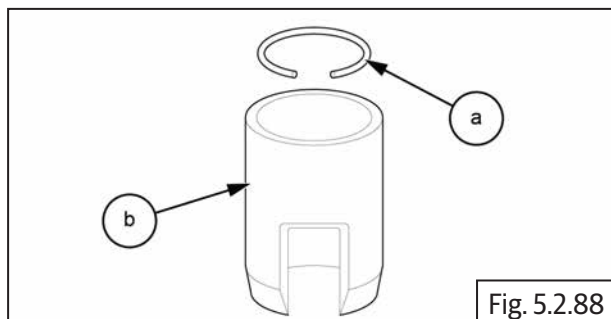


5.5.14.b Piston pin second circlip assembly

- circlip fixing special tool.



- Lubricate the inner surface of tool housing **(b)**.
- Press and insert the circlip **(a)** into tool housing **(b)**.

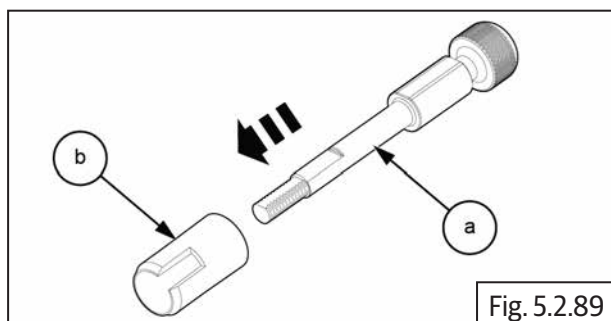


GL80W90

NOTE

- Do not reuse the circlip, Renew all circlips.

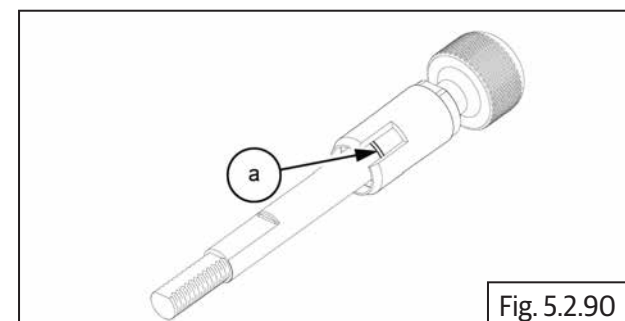
- Install the circlip tool plunger **(a)** into tool housing **(b)**.



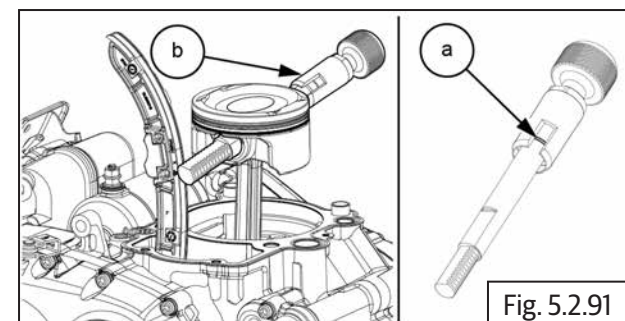
NOTE

- Do not reuse the circlip, Renew all circlips.

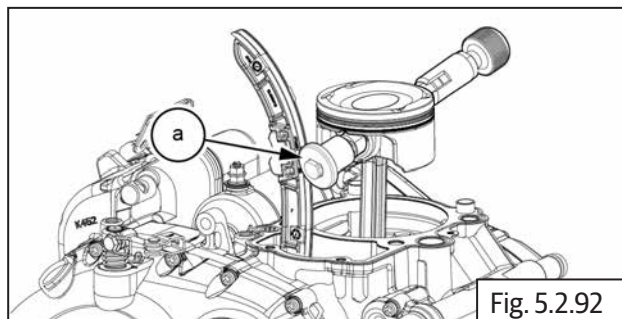
- Press the plunger and check circlip **(a)** moved to middle of tool housing.



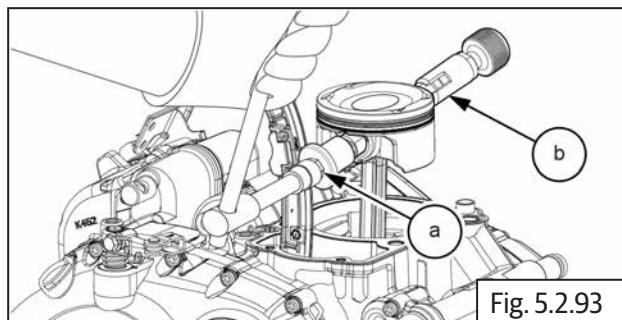
- Locate and position the circlip **(a)** with special tool **(b)** to piston gudgeon hole.



- Locate the piston pin tool **(a)** on another side of the piston.

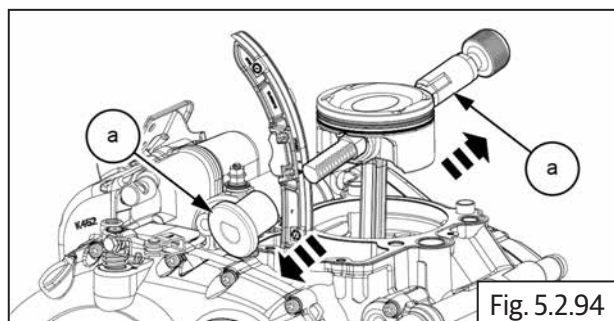


- Tighten the nut **(a)** on the special tool **(b)**, until circlip seated on piston gudgeon groove.



19 mm Socket with ratchet

- Disassemble the special tool **(a)** from the piston.



NOTE

- Ensure gudgeon pin circlip end gap to face bottom.

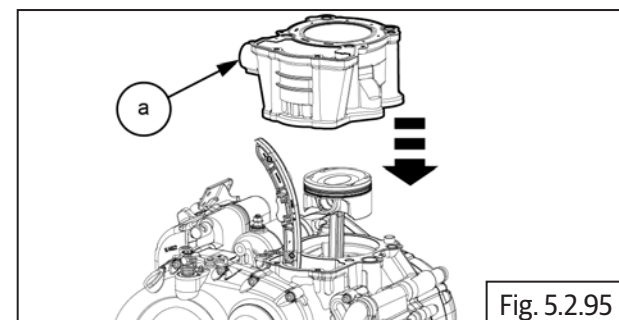
- Support the piston vertically and install the cylinder barrel **(a)** into piston.
- Insert the piston rings with your thumbs.

NOTE

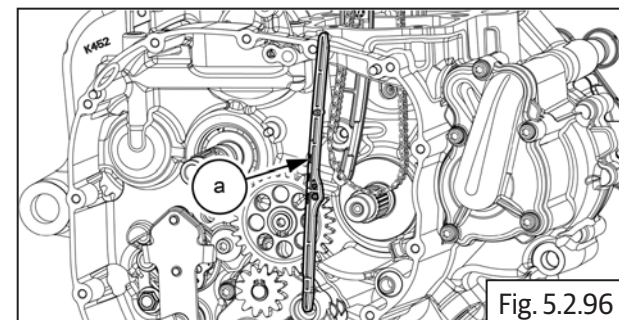
- *Lubricate the inner cylinder bore.*



GL80W90



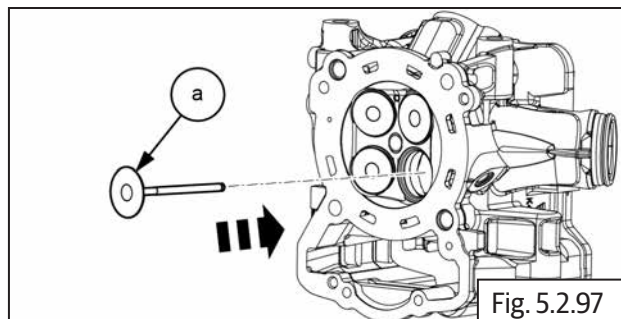
- Locate and install the cam chain guide RH **(a)**.



5.5.15 Cylinder Head Valve Assembling:

NOTE

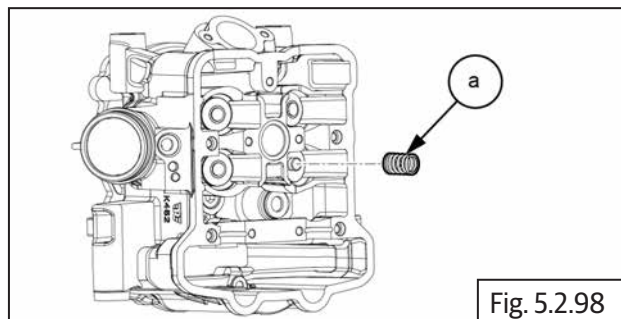
- Check the valve spring seat and valve stem seal have been assembled before the valve are inserted.
- Assemble inlet valve **(a)** into cylinder head.



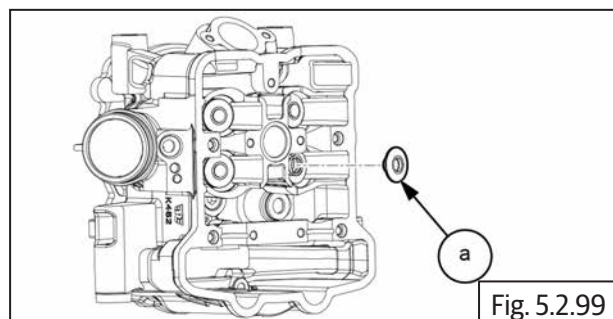
- Support the valve from bottom and Insert the valve spring **(a)** into valve stem.

NOTE

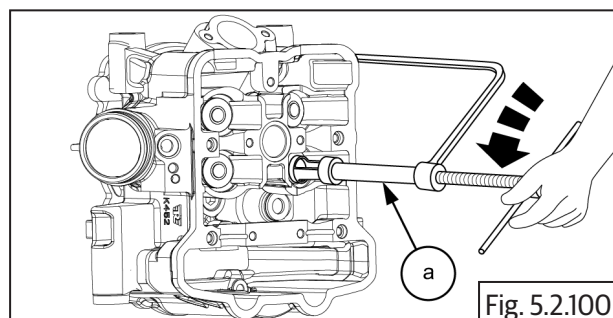
- Ensure the painted surface is facing the cylinder head.

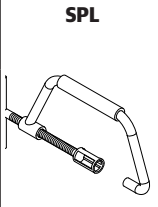


- Insert the retainer collect on valve spring **(a)**.

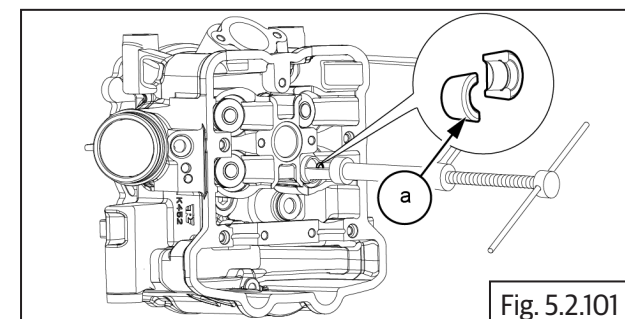


Insert a special tool **(a)** and compress valve spring and "hand tighten" the threaded screw.

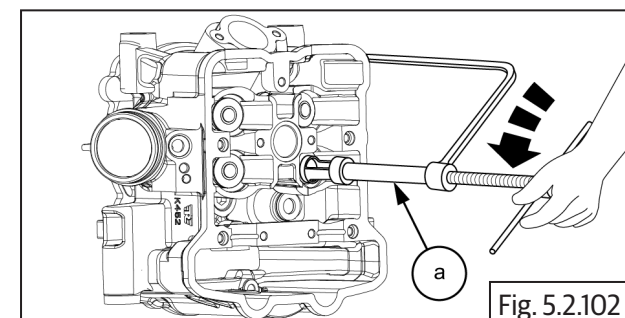


	Part No: ST-27528-2
	Part Name: Valve Spring
	Compressor

- Insert collet **(a)** on the valve stem top portion.



Gently unscrew special tool **(a)** screw and remove from the valve spring.



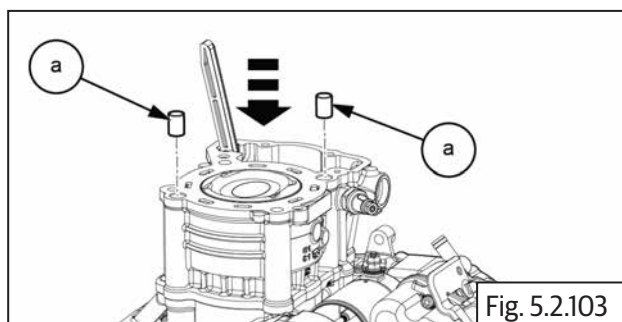
- Follow the same procedure to install the other valves into the cylinder head.

5.5.16 Cylinder Head & Noise Suppressor Assembling:

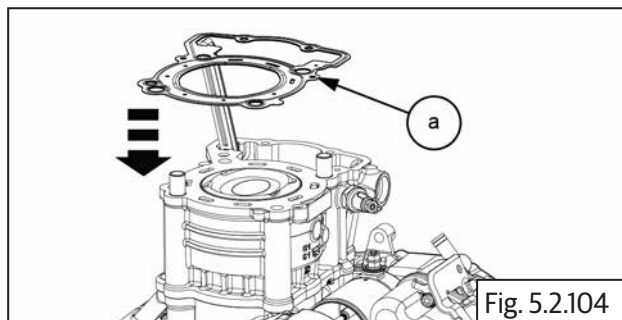
NOTE

- Guide and cam chain should be installed before fitted the cylinder head gasket.

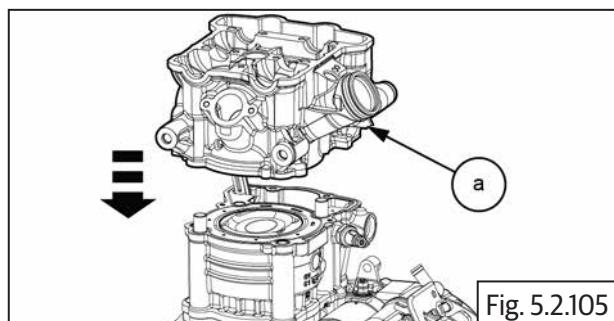
- Install 2 Nos. dowel pins **(a)** on top cylinder barrel.



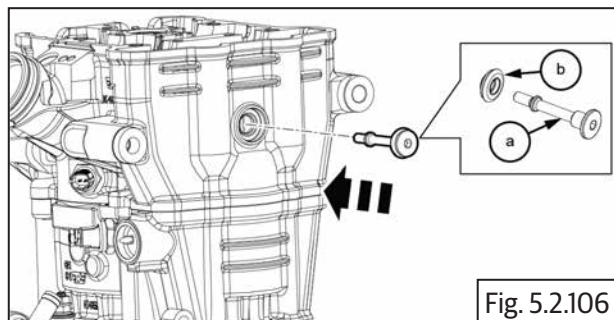
- Locate the cylinder head gasket (a) over the cylinder barrel.
- Ensure head gasket orientation to be matching the oil hole position.



- Install the cylinder head (a) over cylinder barrel.



- Lift the cam chain. Locate and tighten the noise suppressor bolt **(a)** with seal **(b)** on the cylinder head.



NOTE

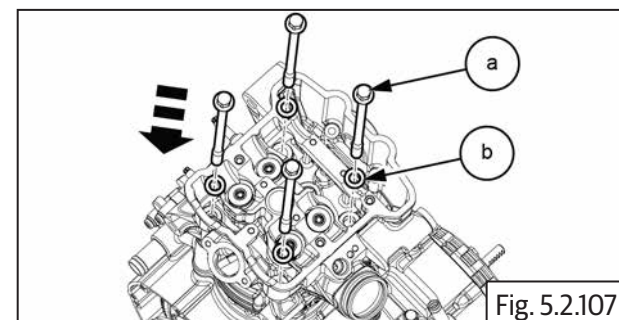
- Seal should be used one time only. DO NOT reuse.

	5mm Allen Key with ratchet
Torque	9N-m / 0.9kgf-m

- Locate new 4 Nos. Hex flange head bolts **(M10) (a)** along with washers **(b)** on the cylinder head.

CAUTION

Cylinders head bolts (M10) (a) should be used one time only. DO NOT reuse.



12mm Socket with ratchet

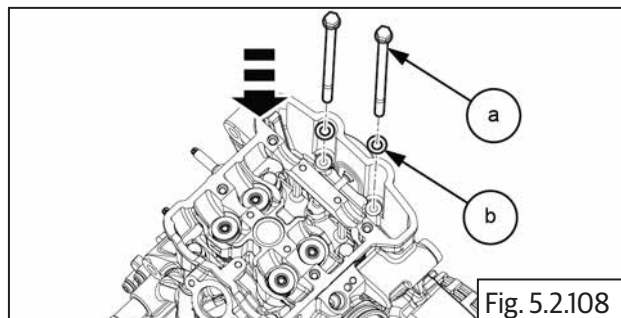
NOTE

- Lubricate the bolts and washers to avoid friction during tightening.



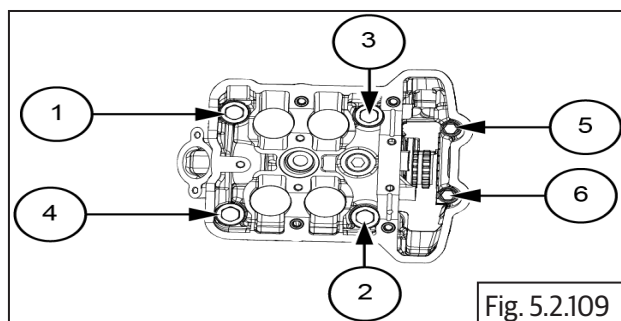
GL80W90

- Locate the 2 Nos. Hex head long bolts **(M6) (a)** along with washer **(b)** on the cylinder head LH.



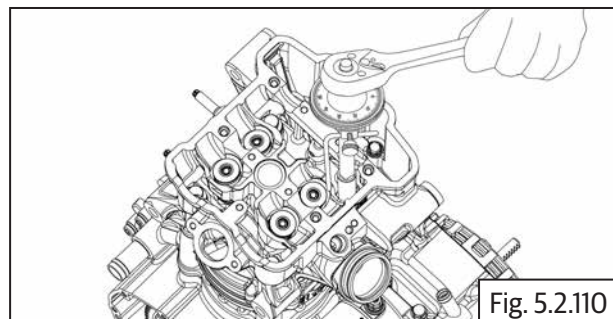
	8mm Socket with ratchet
Torque	11 N-m / 1.1 kgf-m

- Tighten the cylinder head bolts below sequence.



- Finally tighten each of the cylinder head bolts using an angular torque wrench, to the specified angular torque value given below and in the same crisscross pattern detailed above.

- Step 1: Fasteners 1-4 to 15Nm
- Step 2: Fasteners 1-4 to 35Nm
- Step 3: Fasteners 1-4 to $180^\circ \pm 1^\circ$
- Step 4: Fasteners 5&6 to 11 ± 1 Nm

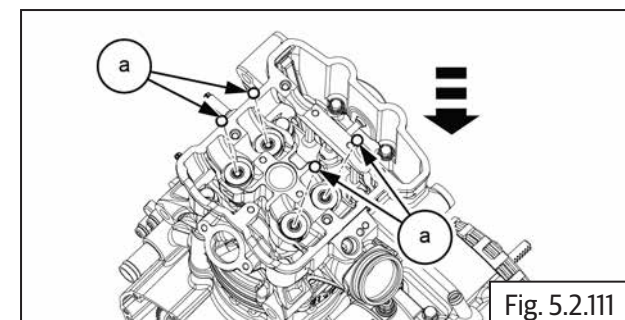


	12mm Socket with ratchet
	8mm Socket with ratchet

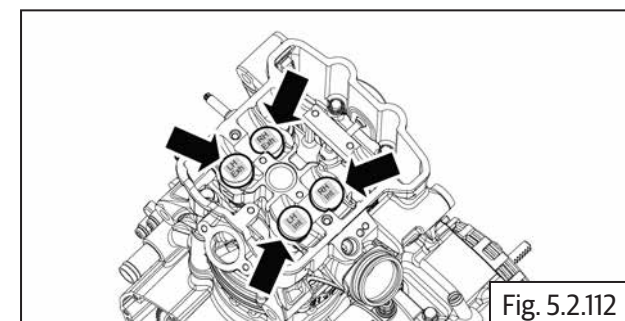
SPL	Part No: ST-27562-1
	Part Name: Angular Torque Wrench

5.5.17 Cam Ladder And Camshaft Assembling:

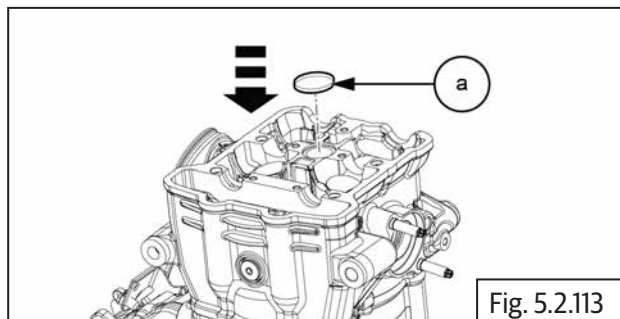
- Locate the 4 Nos. shims **(a)** on valve stem top portion.



- Locate the tappet bucket 4 Nos. on valve stem top portion.

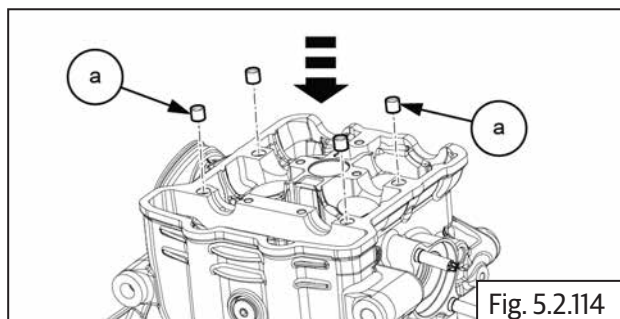


- Install the O-ring **(a)** into cylinder head assembly.



NOTE

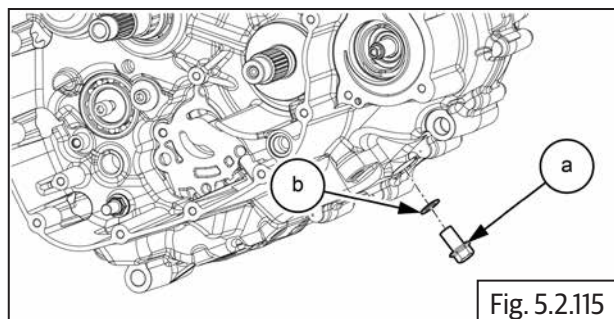
- Do not reuse the "O" Rings, Renew all "O" Rings.
- Install 4 Nos. dowel pins **(a)** into cylinder head assembly.



5.5.18 Cam Timing Procedure:

Stage 1 - Camshaft Fitment

- Loosen and remove 1Nos. Hex head bolt **(M10)** **(a)**.

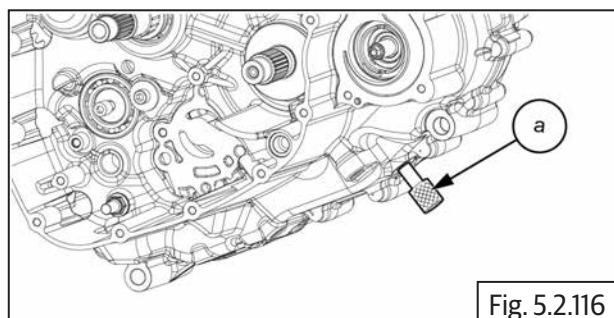


14 mm Socket with Ratchet

- Insert the special tool **(a)** to lock the crank shaft

NOTE

- Once Crank TDC Locking Tool is located in hole in crank, ensure crank cannot rotate in either direction.



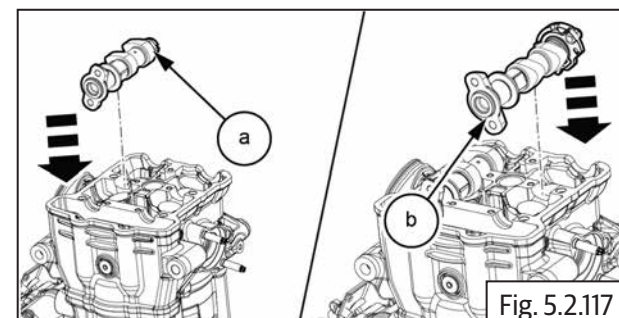
SPL

Part No: ST32062/A

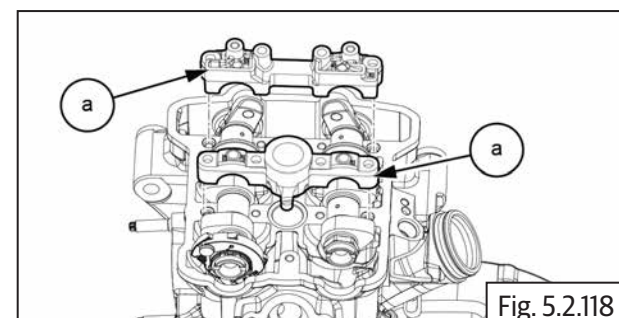


Part Name: Crankshaft TDC Locking Tool

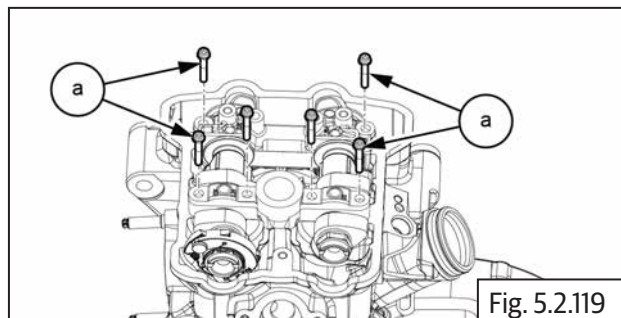
- Locate and install the Camshaft **(a)** & **(b)** 2 Nos. on cylinder head.



- Install 2 Nos. cam ladder **(a)** & **(b)** on Camshafts.



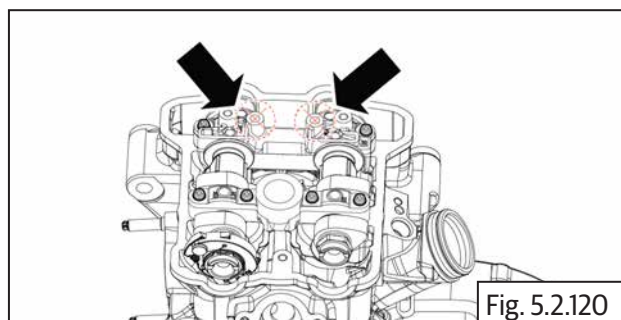
- Locate and tighten 6 Nos. Hex head bolts **(M6) (a)** on cam ladder.



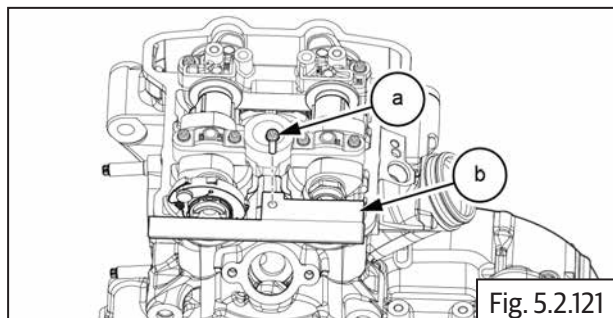
	5mm Allen Socket with ratchet
Torque	9-11 N-m / 0.9 - 1.1 kgf-m

NOTE

- Do not fit 2No cap bolts **(M6) on** top guide bolts in position.



- Locate and tighten cap bolts **(M6) (a)** on special tool **(b)** to lock the cam TDC.

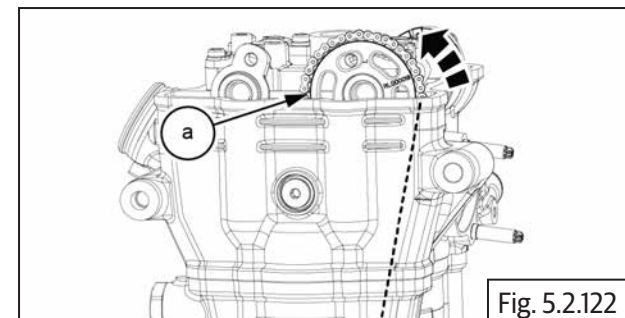


	5mm Allen Socket with ratchet
--	-------------------------------

SPL	Part No: ST32061/A
	Part Name: Cam TDC Locking Tool

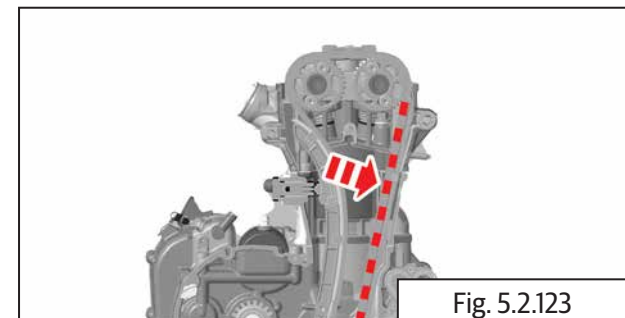
Stage 2 - Cam Sprocket Fitment

- Loop cam chain **(a)** over exhaust cam sprocket and fit sprocket onto exhaust camshaft.



NOTE

- Ensure no chain slackness between crank sprocket and exhaust cam sprocket. Refer below image.



- Check to see if the threaded hole **(a)** in the camshaft is fully visible in the slot of the cam sprocket

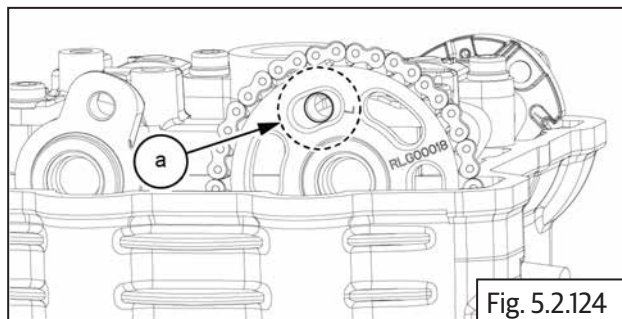


Fig. 5.2.124

NOTE

- If the threaded hole **(a)** is fully visible fix the bolt..

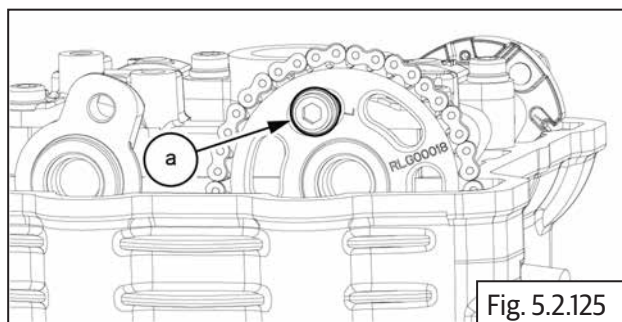


Fig. 5.2.125



6 mm Allen Key with Ratchet

NOTE

- Cam sprocket bolt should be used one time only. DO NOT reuse.
- Do not tighten bolt fully - sprocket must be free to rotate the full length of the slot.
- If the threaded hole **(a)** is **not fully visible**, remove the sprocket from the camshaft, lift the chain off the sprocket and rotate the sprocket by one tooth.
- Re-fit sprocket and check again. Repeat until threaded hole **(a)** is fully visible and fit bolt.

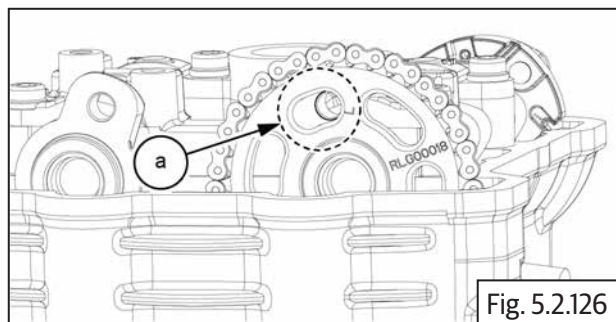


Fig. 5.2.126

- Loop cam chain over intake cam sprocket and fit sprocket onto intake camshaft
- Rotate sprocket anti clockwise to ensure there is no slack in the chain between the exhaust cam sprocket and the intake cam sprocket.

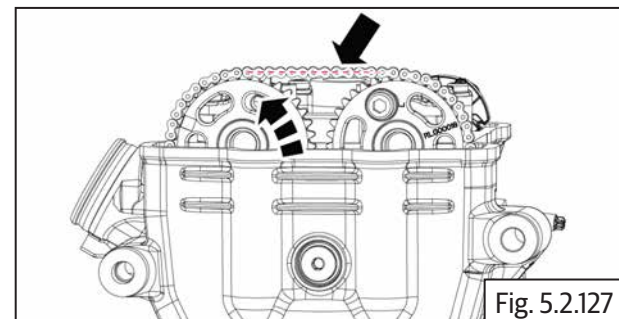


Fig. 5.2.127

- Repeat steps above to ensure threaded hole is fully visible and fit bolt on inlet cam sprocket.

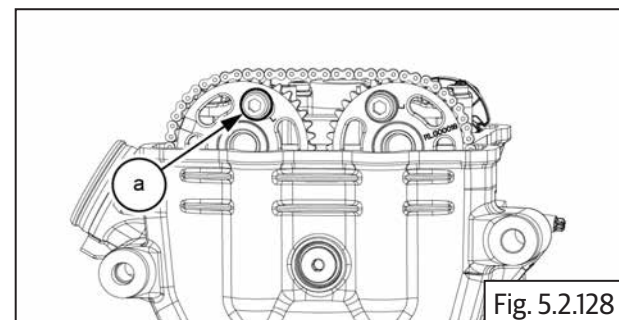


Fig. 5.2.128



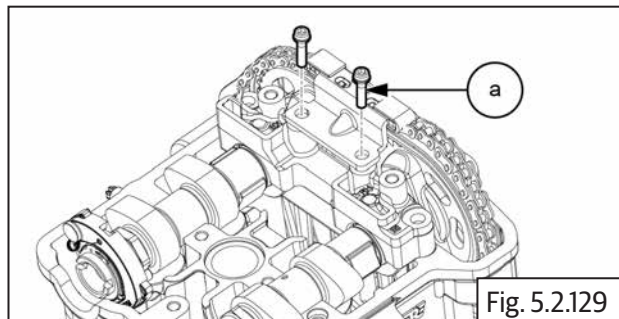
6 mm Allen Key with Ratchet

NOTE

- Cam sprocket bolt should be used one time only. DO NOT reuse.
- Do not tighten bolt fully - sprocket must be free to rotate the full length of the slot.

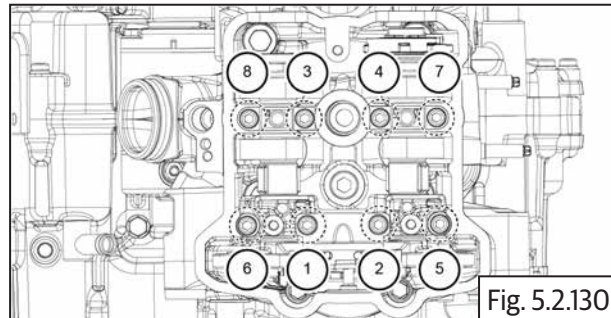
Stage 3 - Top Guide and Hydro-Mechanical Tensioner Fitment

- Locate and tighten the cap bolts **(M6)** **(a)** 2 Nos on top guide plate.



5 mm Allen Key with ratchet

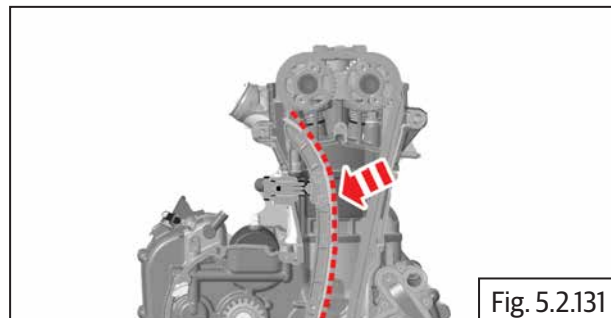
- Tighten cam cap bolts 8Nos **(M6)** to specified torque according to tightening sequence.



5 mm Allen Key with ratchet

Torque 10 N-m / 1.0 kgf-m

- Check for chain slack between intake cam sprocket and crank sprocket.

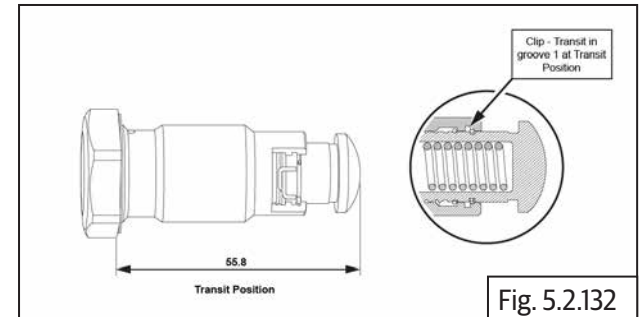


NOTE

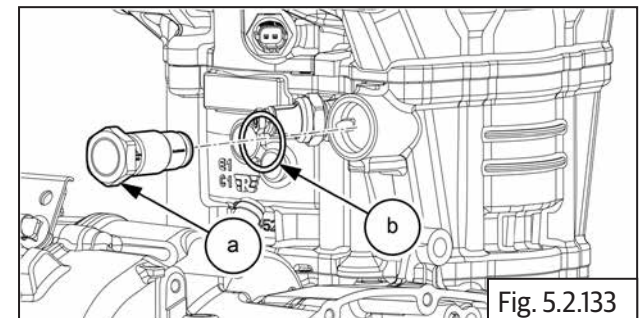
- If chain is tight here it may not be seated correctly on the crank sprocket.

NOTE

- HMT should be in Transit position before install refer below image.



- Install the HMT **(a)** with new sealing washer **(b)** on engine RHS barrel.

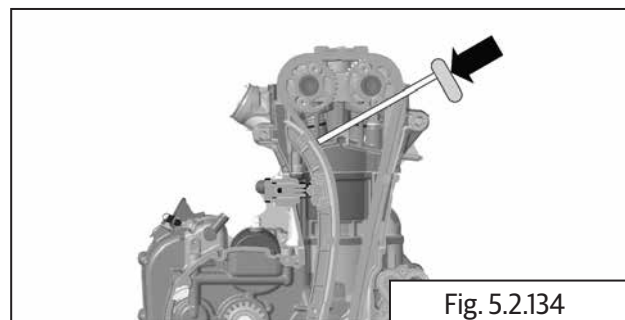


27mm Allen Key with ratchet

Torque 40 N-m/4.0 kgf-m

- Using a special tool push cam chain against tensioner arm. Refer below image.

NOTE	
- Listen for “click” as HMT releases from transit position and ratchet is disengaged. “click” will only be heard if background noise level is low.	

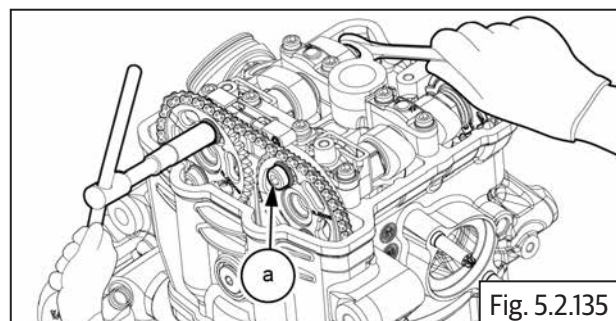


SPL 	Part No: ST32070/A
	Part Name: Nylon rod

- Chain should now feel tight between cam sprockets
- If chain feels slack between sprockets, repeat steps above to release HMT from transit position.

Stage 4 - Cam Sprocket Bolt Tightening

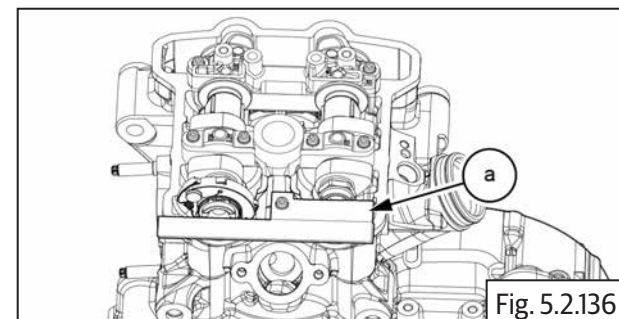
- Cam TDC Locking Tool still bolted to the head to prevent the camshafts from rotating.
- Hold the Camshaft and Tighten cam sprocket bolt 2 Nos **(M8) (a)**.



	6mm Allen Key with ratchet 22mm Double End Spanner
	Torque 35 N-m / 3.5 kgf-m

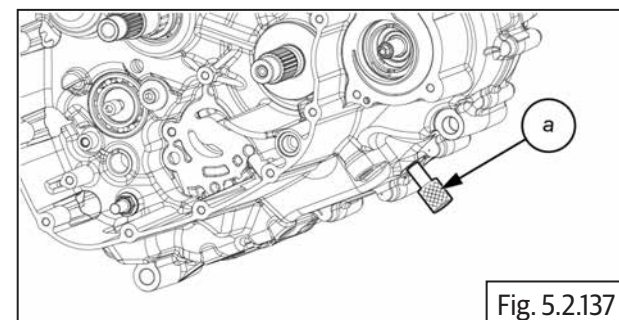
NOTE	
- Bolts must be tightened to full torque within 10 minutes of first insertion. - If they are left longer than this the bolts must be replaced with new ones.	

- Remove the special tool **(a)** from Camshaft.



SPL 	Part No: ST32061/A
	Part Name: Cam TDC Locking Tool

- Remove the Crankshaft TDC locking tool **(a)** from the crankcase.



SPL 	Part No: ST32062/A
	Part Name: Crankshaft TDC locking tool

- Rotate the crank shaft **360 degree** on clock wise for another slotted hole on cam chain sprocket is at top most position.

NOTE

- Bolts must be tightened to full torque within 10 minutes of first insertion.
- If they are left longer than this the bolts must be replaced with new ones.

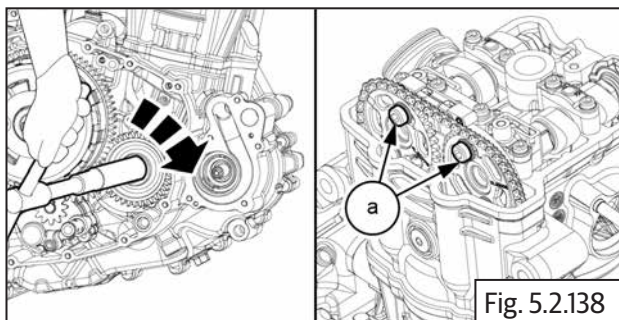


Fig. 5.2.138

- Hold the Camshaft and Tighten cam sprocket bolt 2 Nos **(M8) (a)**.

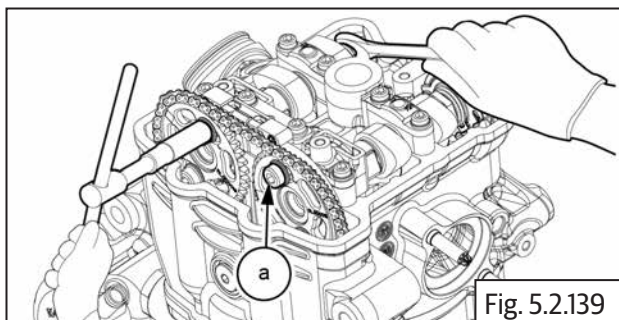


Fig. 5.2.139

	6mm Allen Key with ratchet 22mm Double End Spanner
Torque	35 N-m / 3.5 kgf-m

Stage 5 - Camshaft Timing Verification

- Rotate the crank shaft **720 degree** on clock wise
- Watch for correct actuation of intake and exhaust valve train.

NOTE

- During engine rotation, chain run between the sprockets may become slack when intake valves are closing..
- Chain may drop by up to 3mm between sprockets and will become tight again as the engine is rotated further and intake valves close
- This is normal operation
- After two revolutions align the bottom edge of both camshaft slots with top surface of head.

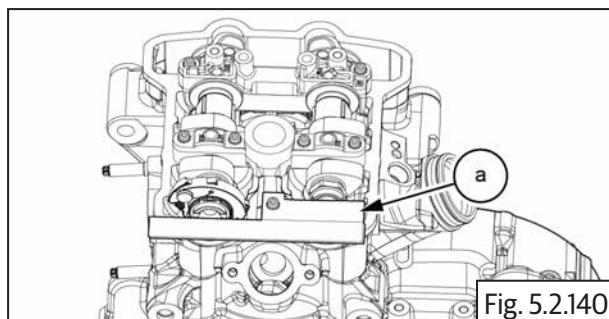


Fig. 5.2.140

SPL	Part No: ST32061/A
	Part Name: Cam TDC Locking Tool

- Fix crank at TDC position using Crank TDC Locking tool - Tighten by hand only.
- Once pin is located in hole in crank, ensure crank cannot rotate in either direction

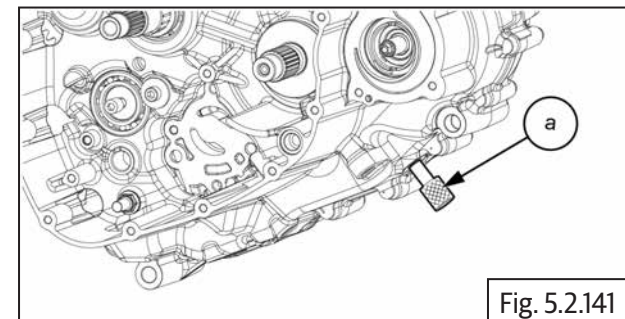
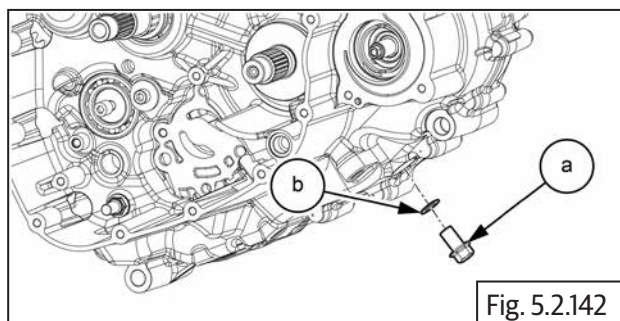


Fig. 5.2.141

SPL	Part No: ST32062/A
	Part Name: Crankshaft TDC locking tool

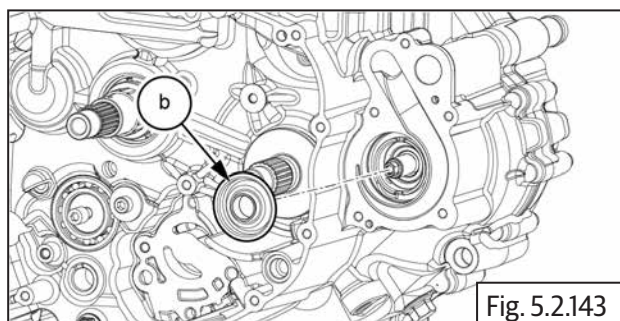
- Remove Crank TDC Locking Tool
- Remove Cam TDC Locking Tool
- Locate and tighten the crank lock plug bolt **(M10)** **(a)** with new copper washer **(b)**.



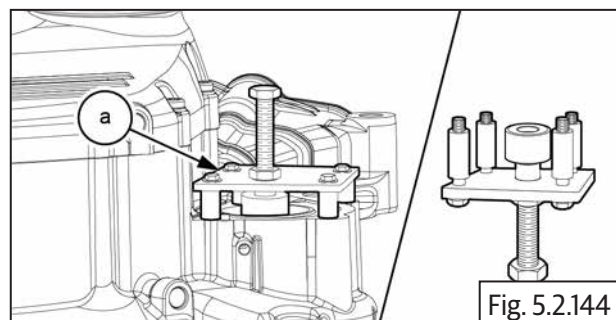
	14 mm Socket with Ratchet
Torque	30 -34 N-m / 3.0 - 3.4 kgf-m

5.5.19 Water Pump assembly:

- Locate the mechanical seal **(b)** on the water pump shaft.



- Locate and tighten 4 Nos hex bolts **(M6)** on special tool **(a)**.

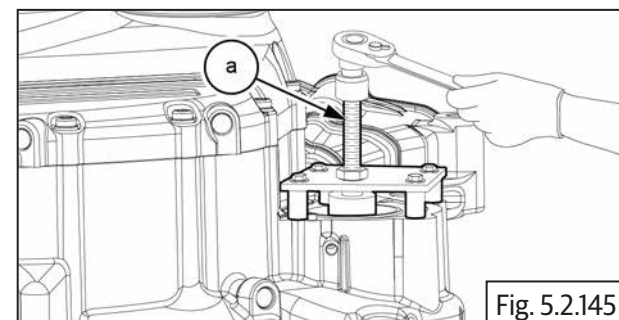


SPL	Part No:ST32068/A
	Part Name: Coolant Pump Oil Seal Assembly Tool

	10mm Socket With Ratchet
---	--------------------------

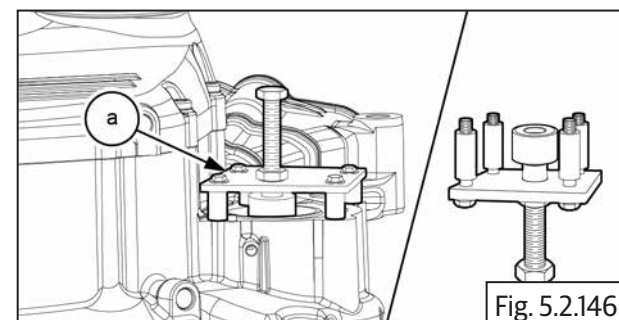
⚠ CAUTION	
• Do not damage the water pump seating surface while install the seal.	

- Tighten the special tool top bolt **(a)** until lip seal to proper seat.



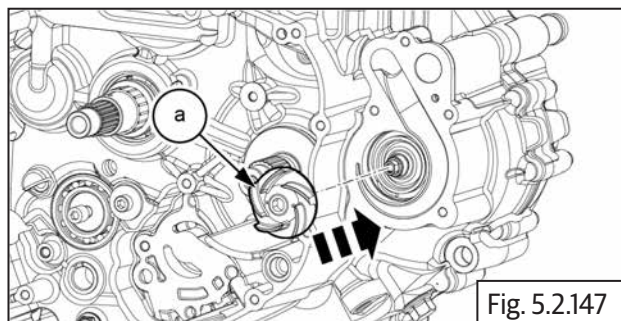
	27 mm Socket With Ratchet.
---	----------------------------

- Remove the special tool **(a)** from water pump drive shaft.

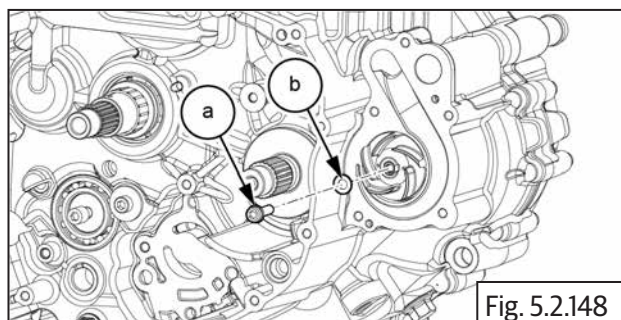


	10mm Socket With Ratchet
---	--------------------------

- Install impeller **(a)** into RH crankcase.



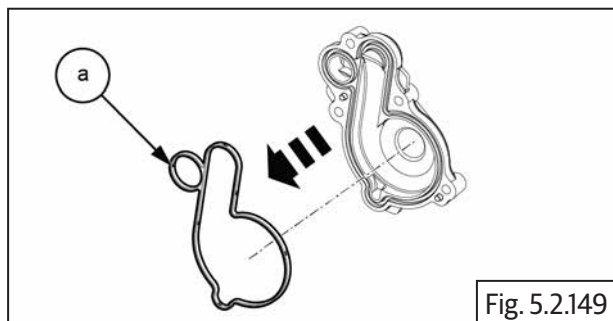
- Locate and tighten 1 No. Hex head bolt **(M5) (a)** along with washer **(b)** into impeller.



	3 mm Allen Key with ratchet
Torque	4.5 N-m / 0.45 kgf-m

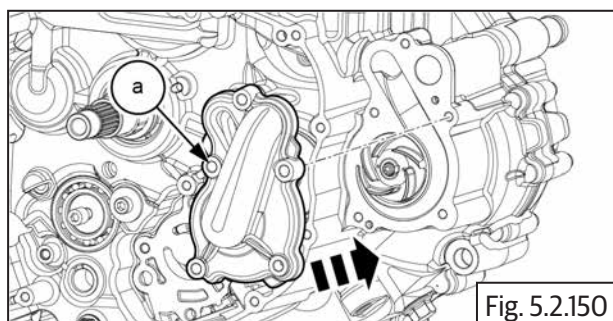
	3 mm allen key with Ratchet
--	-----------------------------

- Install water pump cover seal **(a)**.

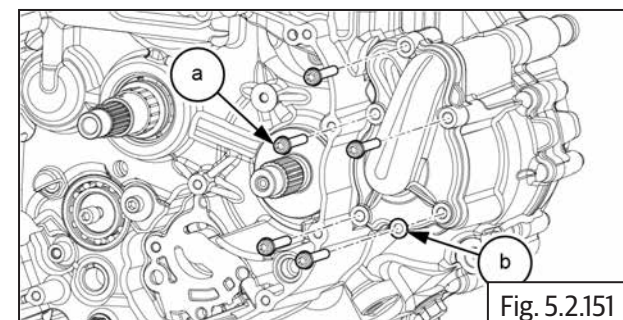


NOTE

- *Cover Seal should be used one time only. DO NOT reuse.*
- Install water pump cover **(a)** along with seal into RH crankcase.



- Locate and tighten 5 Nos. Hex head bolts **(M6) (a)** along with 1 No. new copper washer **(b)** on water pump cover.



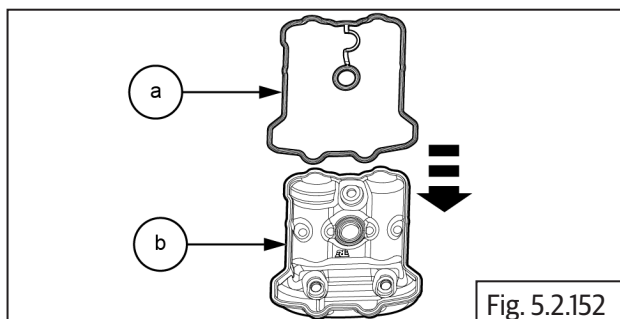
	5mm Allen Key with ratchet
Torque	10 N-m / 1.0 kgf-m

5.5.20 Cylinder Head Cam Cover Assembling:

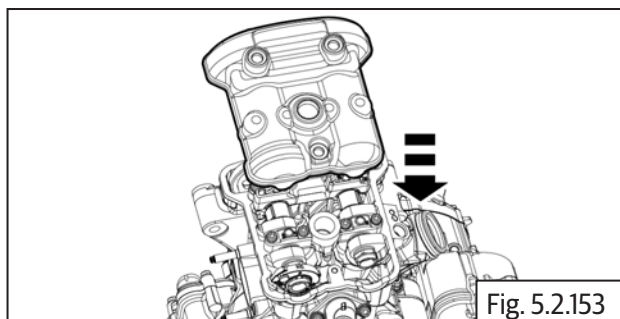
NOTE

- Ensure the cover cylinder head seating surface and gasket seating groove are clean.
- Gasket is **one time use only**.

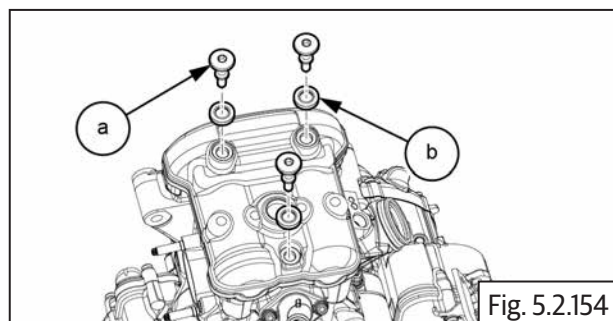
- Locate the new gasket **(a)** in the groove in cylinder head **(b)** and ensure its is properly and evenly seated.



- Locate the cylinder head cam cover carefully.



- Assemble new seals washers **(a)** on the 3 Nos. Hex socket head bolts **(M6) (b)**.
- Locate the bolts **(M6) (b)** on cylinder head cover tighten bolts to cylinder head evenly to specified torque.



	5mm Allen Key with ratchet
Torque	11 N-m / 1.1 kgf-m

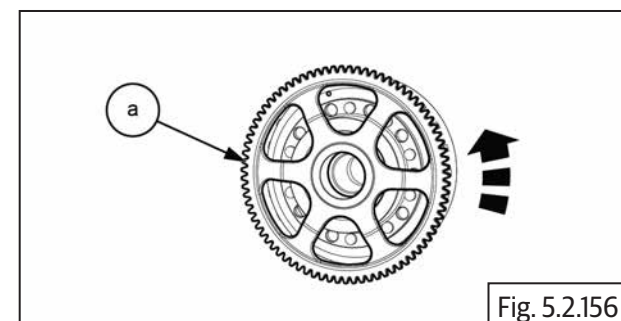
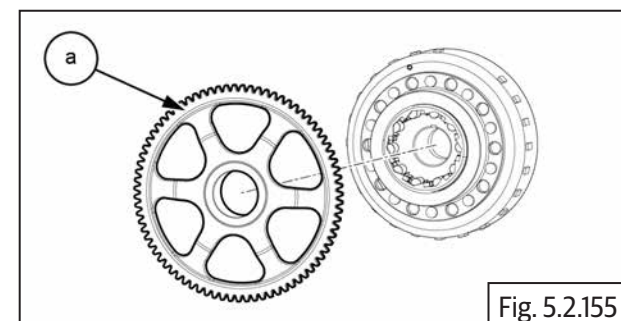
5.5.21 Magneto Assembly & Idler Gear installation:

- Slightly rotate the starter gear **(a)** in an anticlockwise direction. Gently locate the gear **(a)** into the rotor roller clutch bearing.

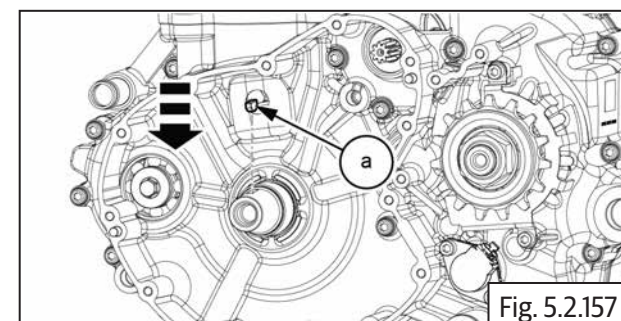
! CAUTION

- Be careful during this process as the roller clutch bearing may fall down or collapse.

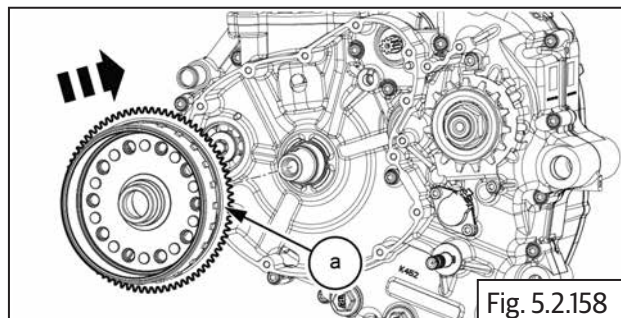
- Install starter clutch **(a)** on magneto rotor assembly.



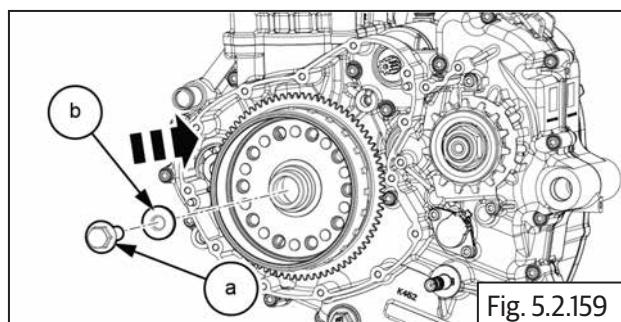
- Install woodruff key **(a)** into crankshaft.



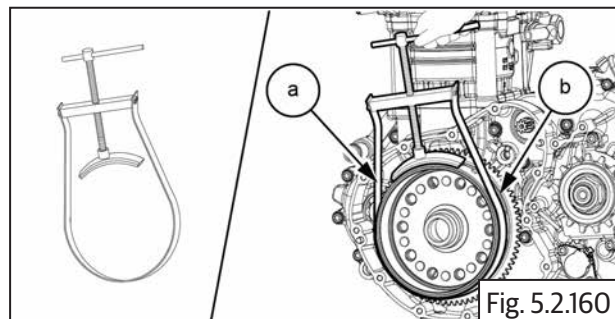
- Locate magneto rotor (a) on crankshaft duly ensuring the slot in the rotor is positioned correctly on woodruff key.



- Locate the 1 No. Hex flange head bolt (M12) (a) along with tappet washer (b) on magneto rotor.

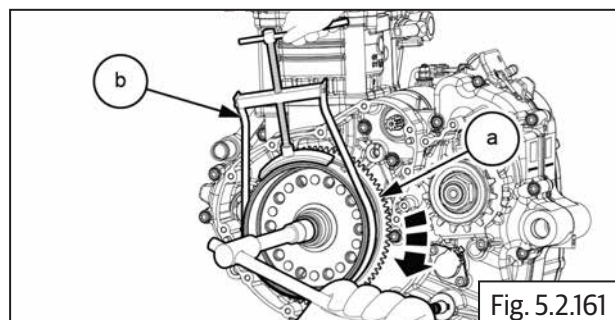


- Locate the special tool (a) to tighten the magneto rotor (b).



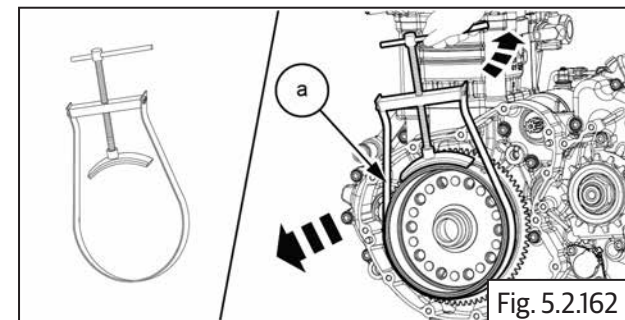
	SPL
	Part No: ST32065/A
	Part Name: Magneto holder

- Hold the special tool (b) and tighten the magneto assembly (a) to be specify torque.



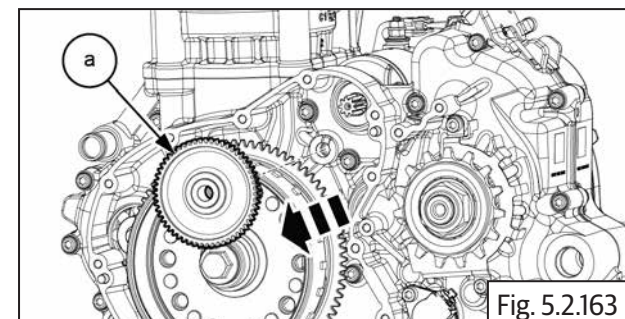
	17mm Socket with ratchet
Torque	128 - 132 N-m/ 12.8 - 13.2 kgf-m

- Remove the special tool (a) from magneto rotor.



	SPL
	Part No: ST32065/A
	Part Name: Magneto holder

- Insert the idler gear (a) on crankcase.



- Install the idler shaft **(a)** into gear.

NOTE

- Lubricate the idler shaft before assemble.



GL80W90

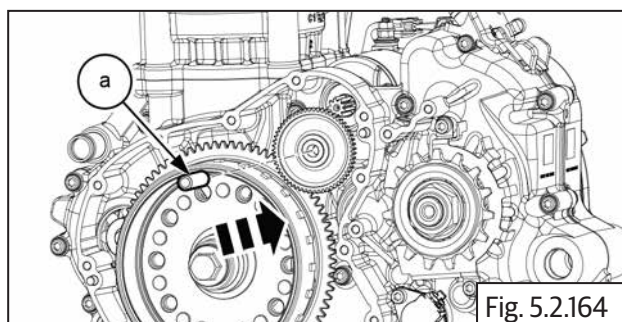


Fig. 5.2.164

5.5.22 Magneto Stator Assembly:

- Gently Install the magneto starter **(a)** into LH side cover assembly.

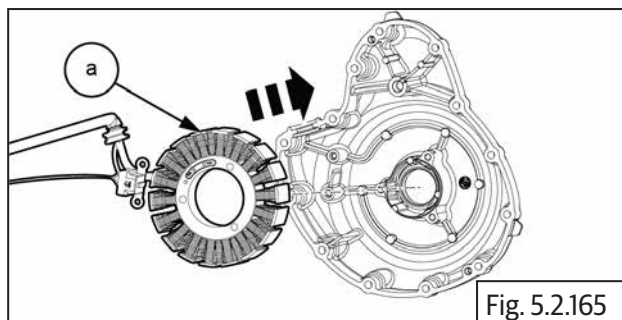


Fig. 5.2.165

- Locate and tighten 3 Nos. Hex socket head screws **(M6) (a)** on magneto starter mounting.

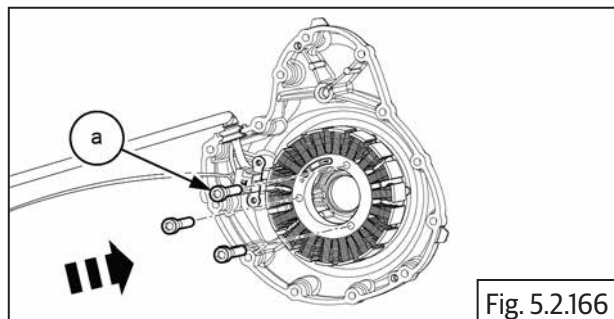


Fig. 5.2.166



5 mm Allen Key with ratchet

Torque

11 N-m / 1.1 kgf-m

- Gently insert wiring grommet **(a)** into magneto cover.

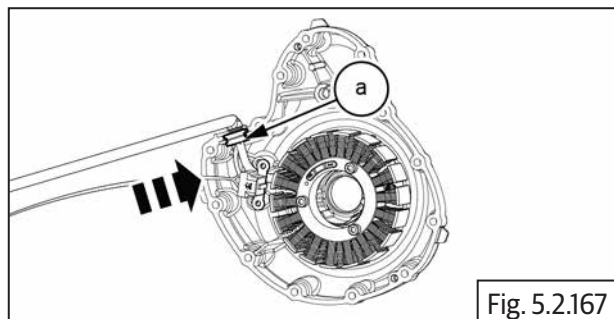


Fig. 5.2.167



Loctite Superflex 24

NOTE

- Apply the Loctite Superflex 24 to on cable grommet.

- Locate and tighten 2 Nos. Hex socket head screws **(M5) (a)** on crank position sensor (CPS).

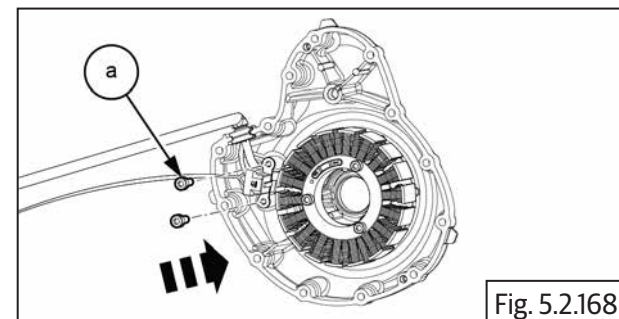


Fig. 5.2.168



4 mm Allen Key with ratchet

Torque

9 N-m / 0.9 kgf-m



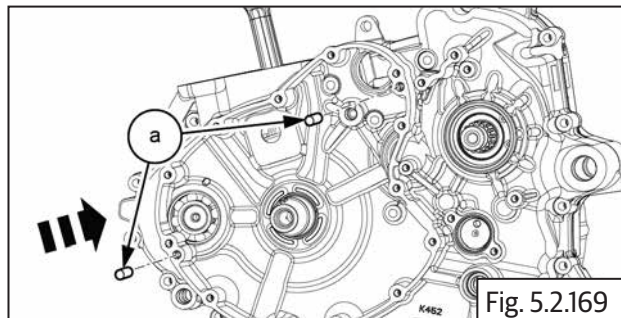
Loctite 243

NOTE

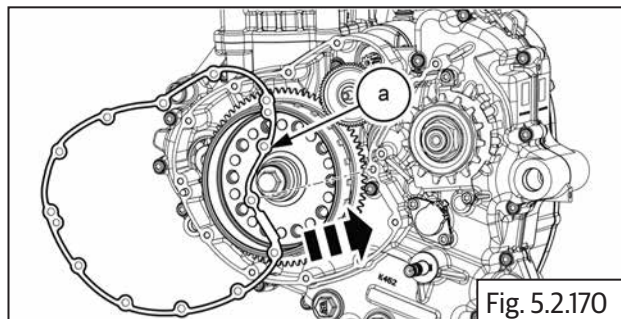
- Apply the Loctite 243 on bolts.

5.5.23 LH Cover Assembly:

- Install the dowel pins 2 Nos. **(a)** into LH side crankcase.



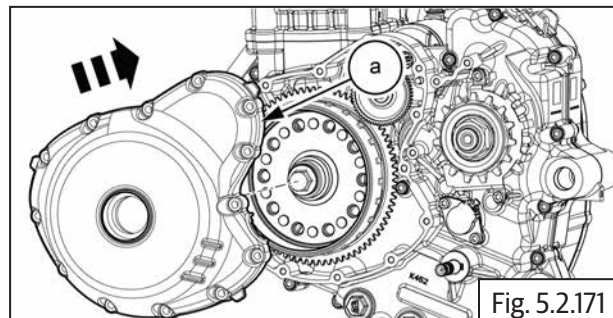
- Gently install the LH side cover gasket **(a)**.



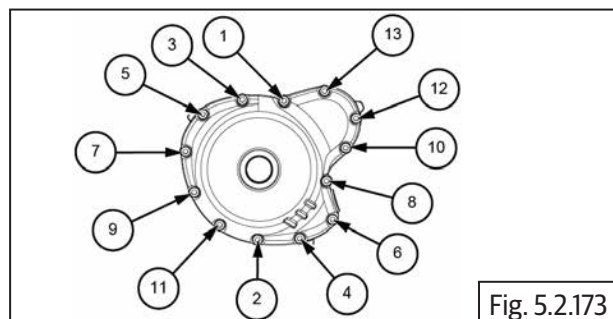
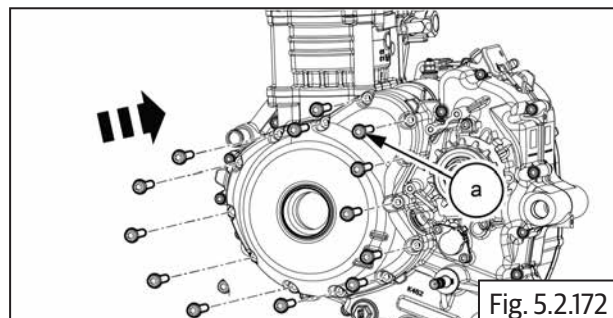
NOTE

- Cover gasket should be used one time only. DO NOT reuse.

- Install LH side cover assembly **(a)** on crankcase LH side.



- Locate and tighten 13 Nos. Hex socket head bolts **(M6) (a)** in crisscross pattern from LH side cover.



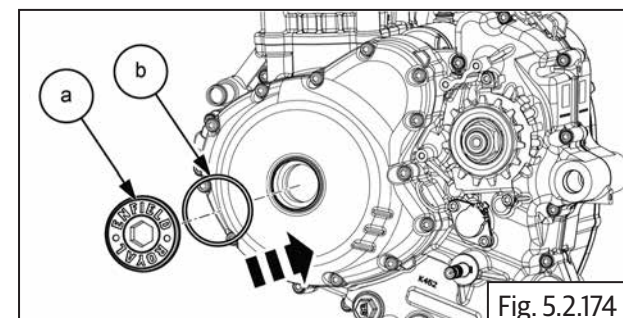
	5 mm Allen Key with ratchet
Torque	11 N-m / 1.1 kgf-m

	Loctite Superflex 24
--	----------------------

NOTE

- Apply the Loctite Superflex 24 to on bolts.

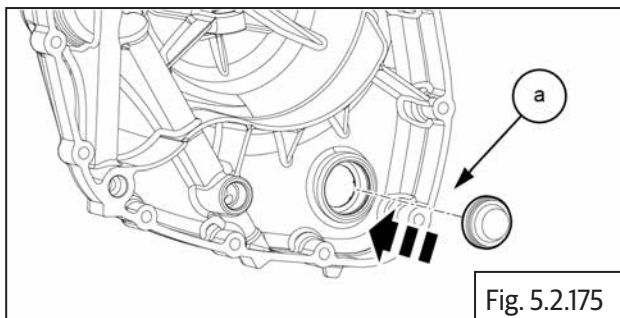
- Locate and tighten crankshaft timing plug **(M34) (a)** along with O ring **(b)** into LH side cover.



	14 mm Allen Key with ratchet
Torque	20 N-m / 2.0 kgf-m

5.5.24 Oil Inspection Window Assembling:

- Gently install oil inspection window **(a)** into crankcase RH side cover.

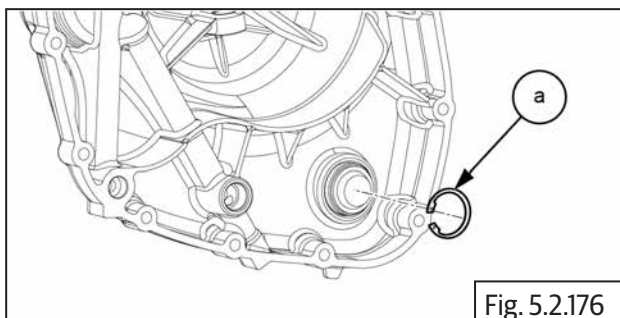


	Loctite 243
--	-------------

NOTE

- Apply the Loctite 243 on oil window seating surface..

- Install the circlip **(a)** on the oil level window inside clutch cover.



NOTE

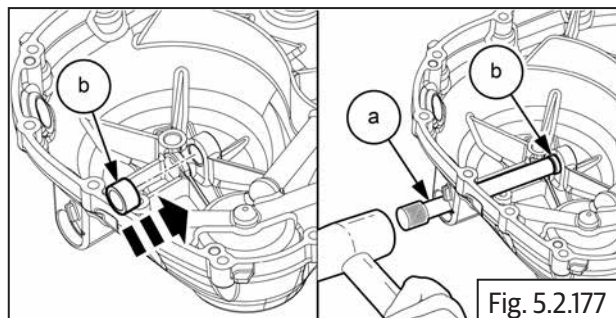
- Do not reuse the circlip, Renew all circlips.



Circlip plier

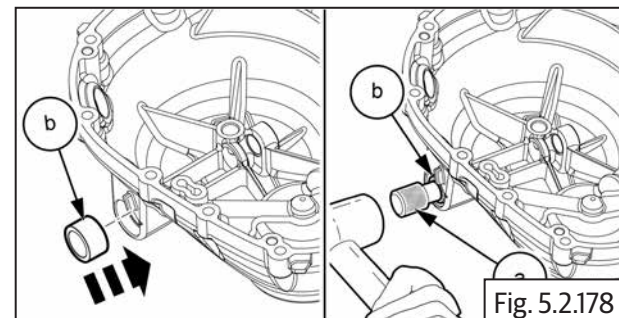
5.5.25 Clutch Shifter shaft Assembling:

- Install the secondary needle roller bearing **(b)** in the clutch cover with using special tool **(a)**.
- Gently tap the bearing draft **(a)** using mallet to fix the bearing.



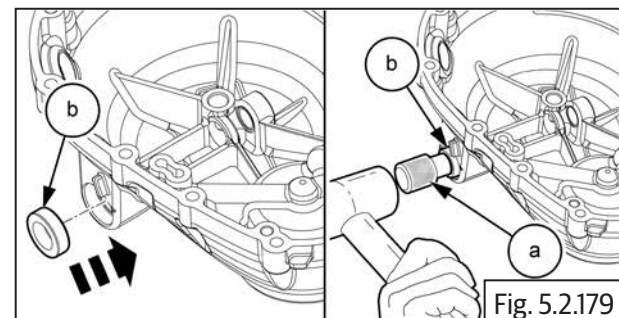
SPL	Part No: ST30261/a
	Part Name: Clutch Activating Lever Bottom Bearing Installer

- Install the Primary needle roller bearing **(a)** on the clutch cover with using special tool **(b)**.
- Gently tap the special tool **(b)** using mallet to fix the bearing.



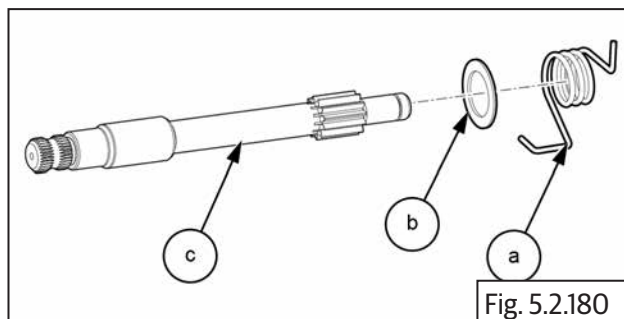
SPL	Part No:ST30262/a
	Part Name: Clutch Activating Lever Top Bearing Installer

- Install the oil seal **(b)** clutch cover with using special tool **(a)**.
- Gently tap the special tool **(a)** using mallet to fix the seal.

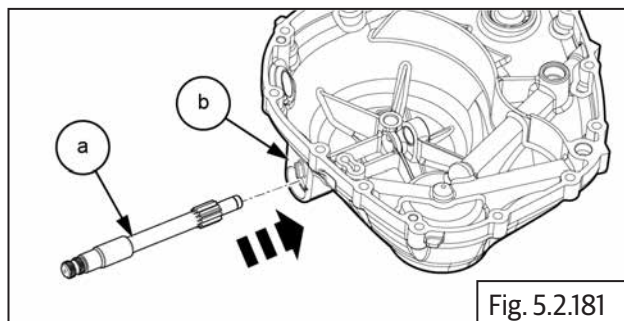


SPL	Part No: ST30264/a
	Part Name: Clutch Activating Shaft Oil Seal Installer

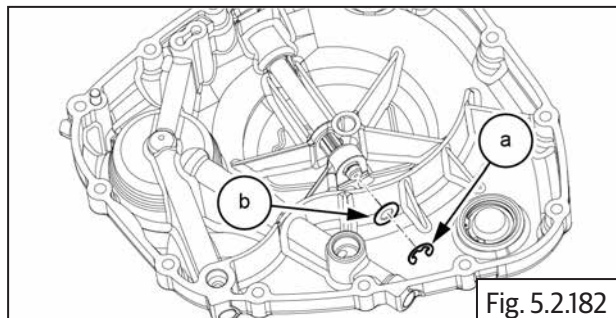
- Install the washer **(a)** and spring **(b)** into clutch actuating shaft **(c)**.



- Gently insert clutch actuating shaft **(a)** into the clutch cover **(b)**.

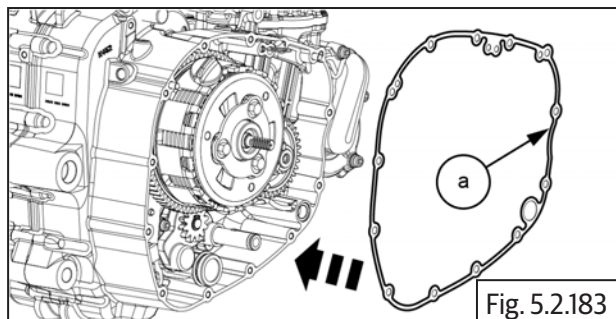


- Gently install the washer **(b)** and E clip **(a)** into the bottom of the clutch actuating shaft inside clutch cover.



5.5.26 RH Side Cover Assembling:

- Locate the gasket **(a)** into the dowel pin.



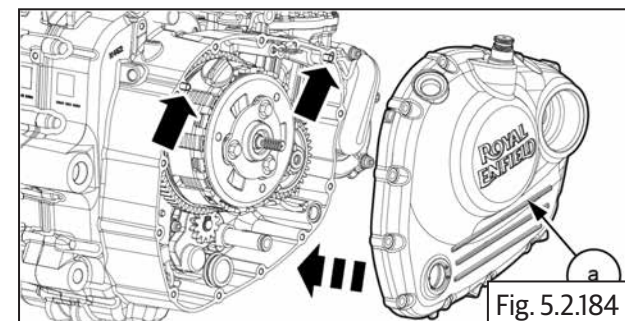
NOTE

- Cover gasket *should be used one time only. DO NOT reuse.*

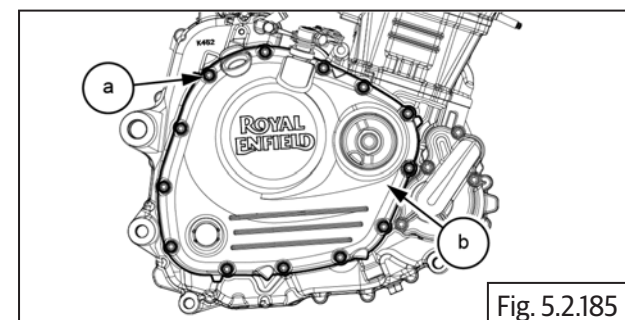
CAUTION

Keep pin clutch sleeve orientation as shown for ease of RH cover assembly.

- Gently locate the RH side cover **(a)** to with respective 2 dowel pins and ensure the proper fit ment.



- Locate and tighten 13 Nos. Hex socket head bolts **(M6)** **(a)** in crisscross pattern on RH side cover **(b)**.



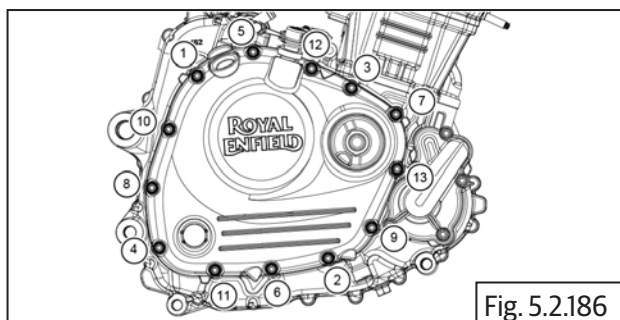


Fig. 5.2.186

	5 mm Allen Key with ratchet
Torque	11 N-m /1.1 kgf-m

5.5.27 Oil Filter Assembling:

- Install the oil filter **(a)** into RH side cover.

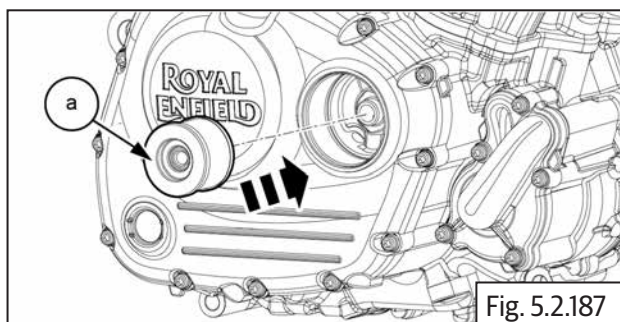


Fig. 5.2.187

NOTE	
• Lubricate O ring with tyre lube or P-80 emulsion.	

- Locate the spring **(a)** on the oil filter cap.

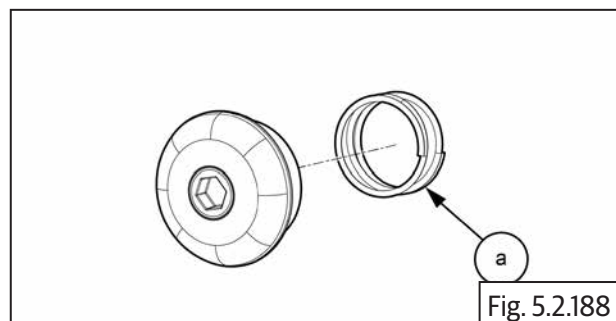


Fig. 5.2.188

- Locate and tighten the oil filter mounting cap **(a)** along with O-ring **(b)** into RH side cover.

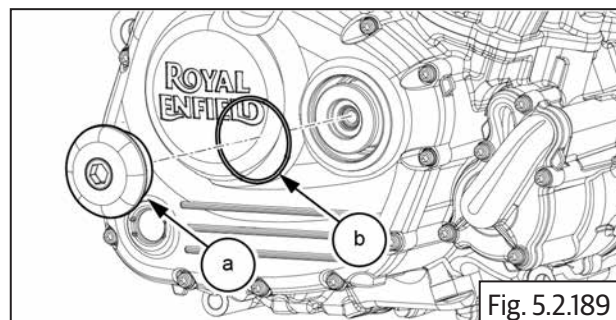


Fig. 5.2.189

	14 mm Allen Key with ratchet
Torque	22 N-m /2.2 kgf-m

5.5.28 Starter Motor Assembling:

- Gently locate the Starter motor **(a)** along with "O" ring into the LH crankcase.

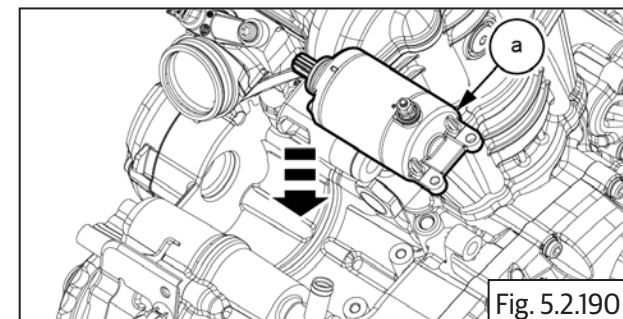


Fig. 5.2.190

- Locate and tighten 2 Nos. **(M6)** Starter Motor mounting bolts **(a)**.

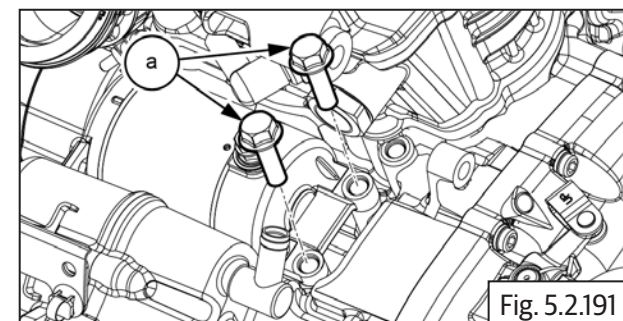


Fig. 5.2.191

	10 mm Socket with ratchet
Torque	9 N-m /0.9 kgf-m

5.5.29 Gear Position Sensor (GPS) Assembling:

NOTE

- O ring to checked and replace if required.
- Apply tire lube or silicone lube on O ring (all around 360).

- Install Gear position sensor **(a)** from engine.

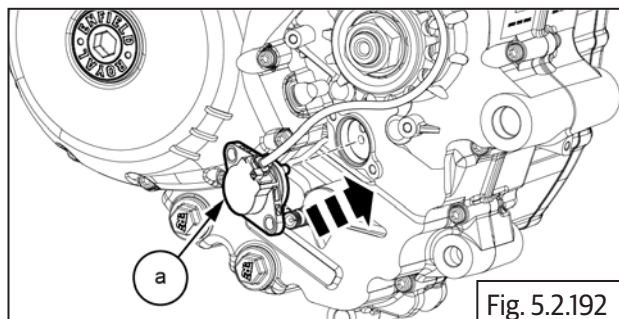


Fig. 5.2.192

- Locate and tighten 2 Nos. **(M6)** Gear position sensor mounting bolts **(a)**.
- Apply Loctite 243 around the bolt thread before the assembly.

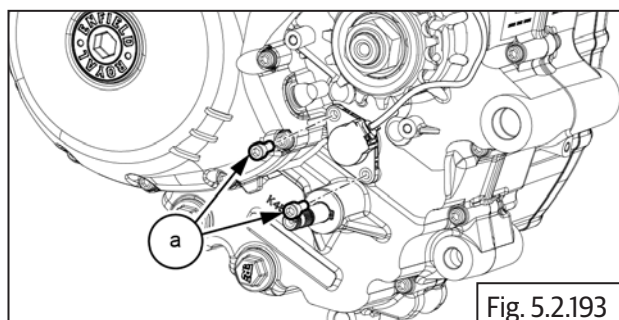


Fig. 5.2.193

	Loctite 243
--	-------------

	5 mm Allen Key with ratchet
Torque	9 N-m /0.9 kgf-m

- Install the cable guide bracket **(a)**.

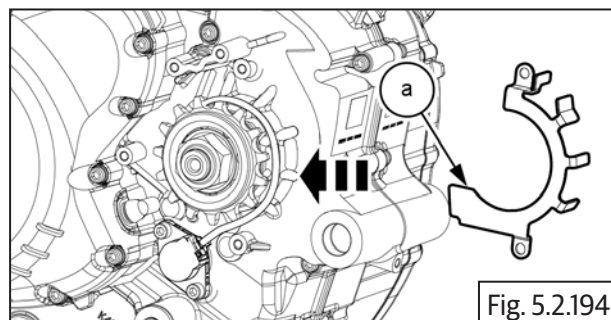


Fig. 5.2.194

- Locate and tighten 2 Nos. Hex socket head bolts **(M6)** **(a)** gear position sensor cable mounting.

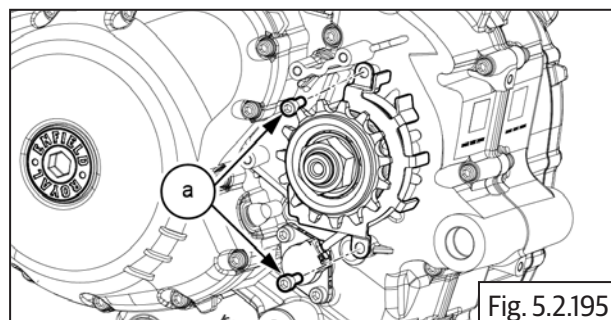


Fig. 5.2.195

	5 mm Allen Key with ratchet
Torque	9 N-m /0.9 kgf-m

- Install Cable mounting bracket **(a)** on the engine.

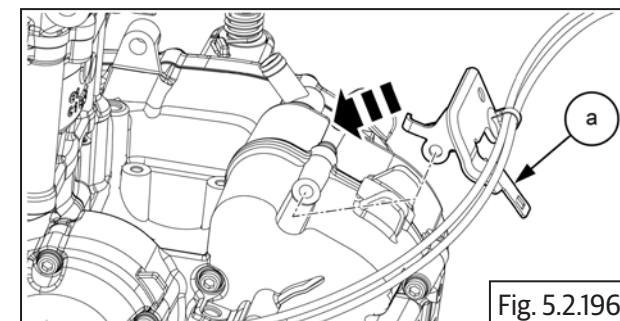


Fig. 5.2.196

- Locate and tighten 1 No **(M6)** Cable mounting bolt **(a)**.

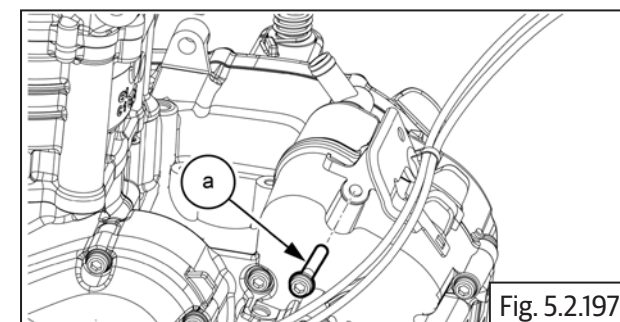


Fig. 5.2.197

	5 mm Allen Key with ratchet
Torque	11 N-m /1.1 kgf-m

5.5.30 Injector Assembling:

NOTE

- Lubricate the Injector 'O' ring **(a)** before assemble.



GL80W90

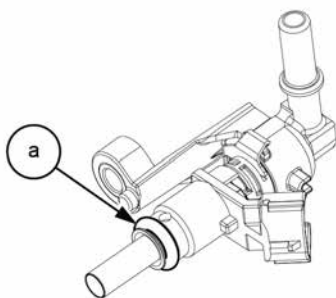


Fig. 5.2.198

- Gently locate the injector assembly **(a)**.

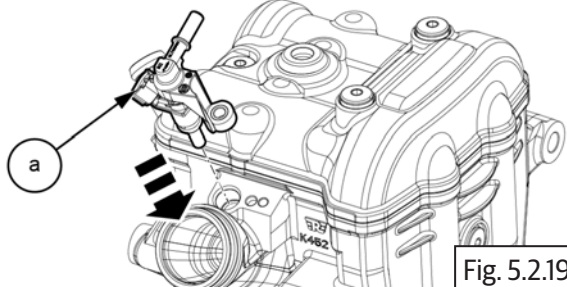


Fig. 5.2.199

- Locate and tighten 1 No **(M6)** injector mounting bolt **(a)**.

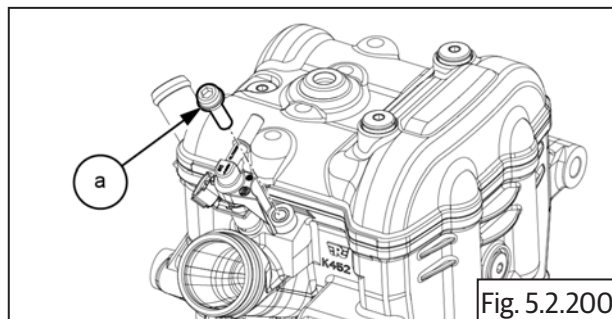


Fig. 5.2.200



5 mm Allen Key with ratchet

Torque

11 N-m /1.1 kgf-m

5.5.31 Oil Pressure Switch Assembling:

- Locate and tighten the Oil pressure switch **(a)** along with washer **(b)**.
- Apply the Loctite 542 around the thread before assembling.

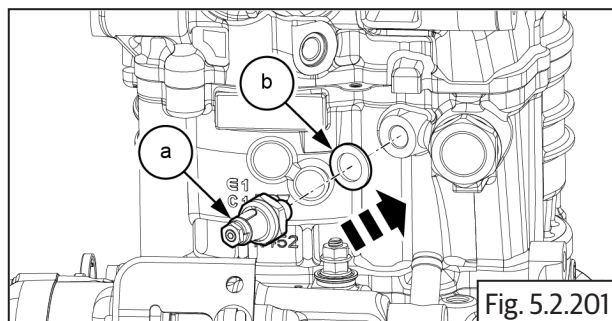


Fig. 5.2.201



Loctite 542



21 mm Socket with ratchet

Torque

9 N-m /0.9 kgf-m

5.5.32 Coolant Temperature Sensor Assembling:

- Install the O-ring **(a)** into coolant Temperature sensor.

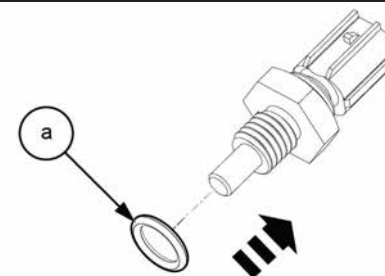


Fig. 5.2.202

- Locate and tighten the coolant Temperature sensor **(a)** along with o ring **(b)**.

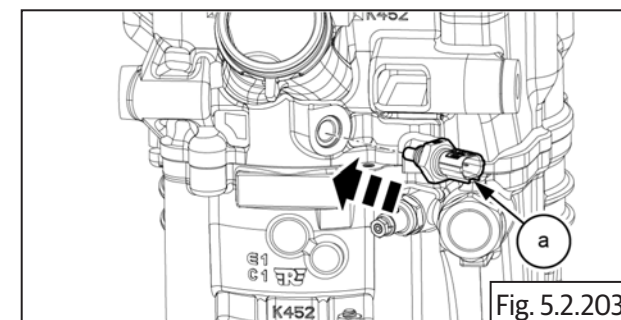
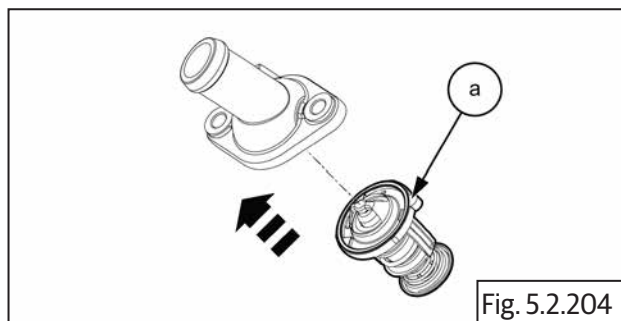


Fig. 5.2.203

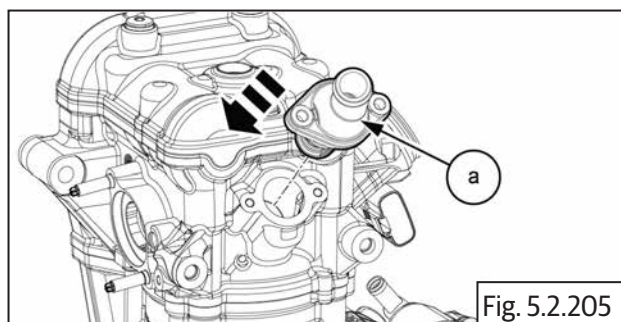
	18 mm Long Socket with Ratchet
Torque	7.5 N-m / 0.75 kgf-m

5.5.33 Thermostat Assembling:

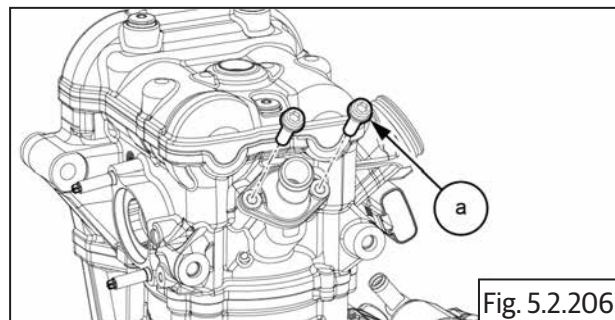
- Install the Thermostat valve **(a)** into housing.



- Install the Thermostat **(a)** into the engine.



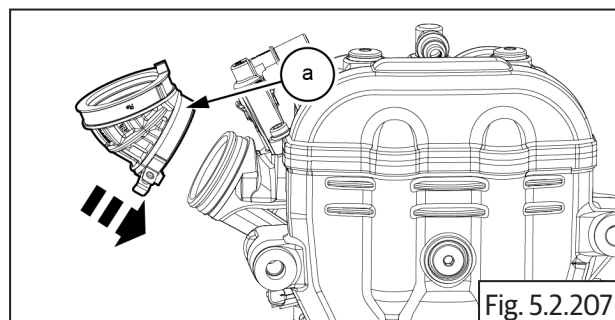
- Locate and tighten 2 Nos. **(M6)** Thermostat mounting bolts **(a)**.



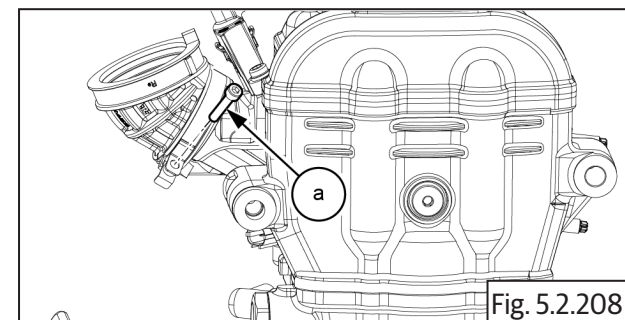
	5 mm Allen Key with ratchet
Torque	11 N-m / 1.1 kgf-m

5.5.34 Manifold clamp Assembling:

- Gently install the inlet manifold **(a)** into cylinder head.



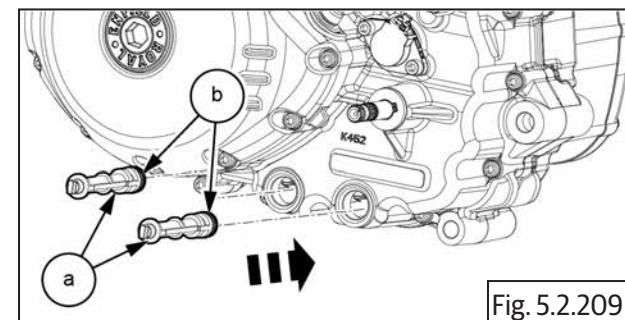
- Locate and tighten the 4mm Allen bolt **(a)** into inlet manifold clamp.



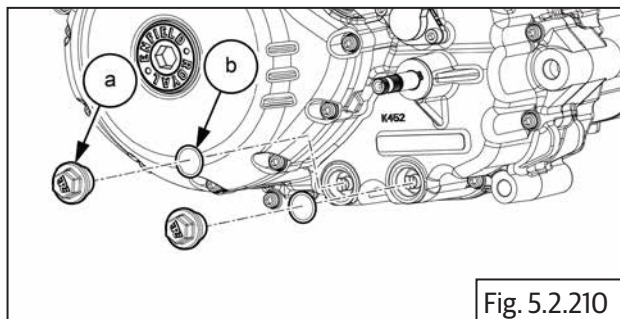
	4 mm Allen Key with ratchet
Torque	2.5 N-m / 0.25 kgf-m

5.5.35 Oil Strainer Assembling:

- Gently install the 2 Nos. oil strainer **(a)** along with "O" ring **(b)** into engine.



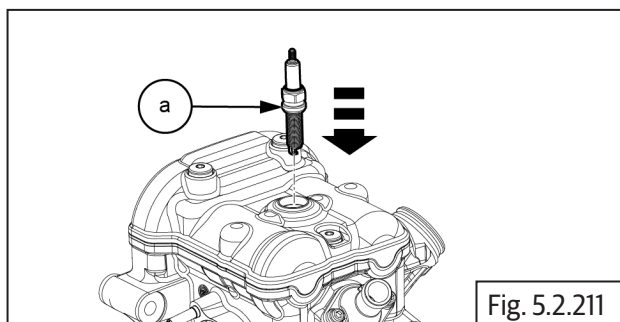
- locate and tighten the 2 Nos. oil drain bolts **(a)** along with o rings **(b)** into engine.



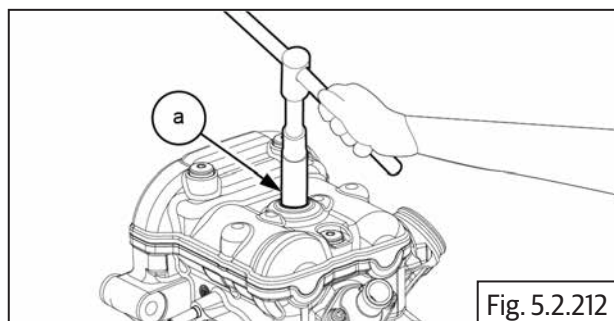
	17 mm Socket with ratchet
Torque	13 N-m /1.3 kgf-m

5.5.36 Spark Plug Assembling:

- Install spark plug **(a)** into cylinder head.



- Tighten the spark plug **(a)** into cylinder head.



	14 mm Long Socket with ratchet
Torque	11 N-m /1.1 kgf-m

ENGINE COOLING SYSTEM

CONTENTS

PAGE

5.6 Engine Cooling System 140

5.6.1 Coolant Drain..... 143

Dismantling..... 144

5.6.2 Expansion tank..... 144

5.6.3 Radiator..... 145

5.6.4 Cooling fan..... 147

5.6.5 Radiator child pats..... 148

5.6.6 Thermostat..... 150

5.6.7 Water Pump..... 150

5.6.8 Engine Coolant Temperature Sensor..... 152

Inspection..... 152

Assembly..... 153

5.6.9 Engine Coolant Temperature Sensor..... 153

5.6.10 Water Pump..... 153

5.6.11 Thermostat..... 155

5.6.12 Radiator child part..... 156

5.6.13 Cooling fan..... 157

5.6.14 Radiator..... 159

5.5815 Expansion tank..... 160

5.5.16 Radiator coolant filling..... 161

5.6.17 Air Bleeding..... 163

5.6 Engine Cooling System

⚠ WARNING

Never open a radiator cap when the engine is hot.

The pressure released can make the coolant begin to boil and expand.

Boiling coolant could spurt out of the filler neck or reservoir, causing severe burns.

⚠ CAUTION

DO NOT perform any operation on cooling system soon after the motorcycle is OFF.

They can extremely hot and will cause serious injuries.

Wait until the engine temperature is the same as the outdoor temperature.

NOTE

- *Ensure the motorcycle is upright on a firm and flat surface.*

5.6.1 Coolant Drain

Prior Removal:

- Remove the fuel tank.
- Remove the LHS and RHS side panels.
- Open the radiator pressure cap (a).

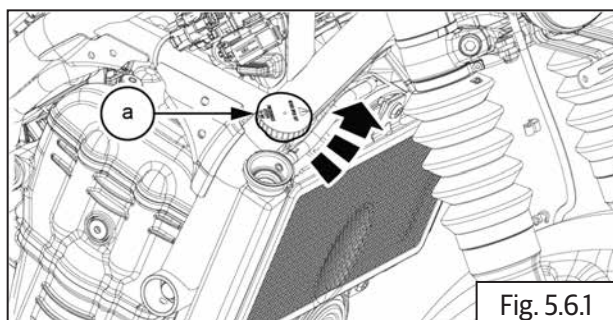


Fig. 5.6.1

- Open the expansion cap (a).

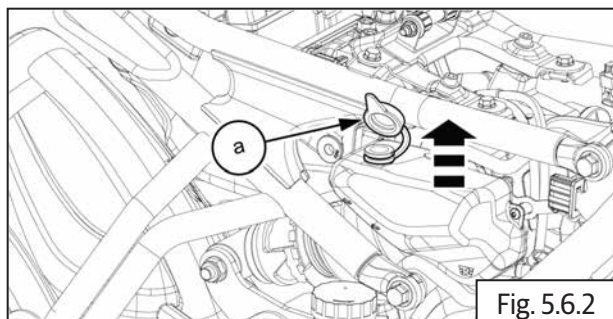


Fig. 5.6.2

- Place a tray under the engine, loosen and remove coolant drain bolt (M6) (a) along with copper washer (b) from the RHS water pump cover.

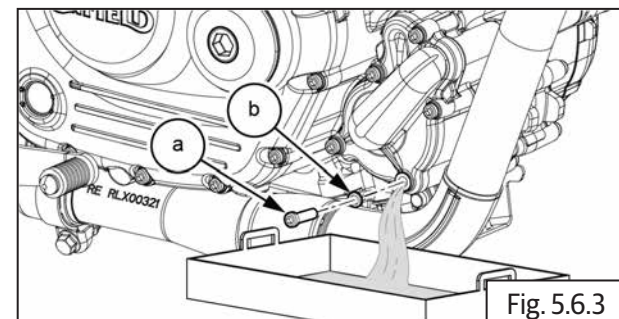


Fig. 5.6.3



5mm Allen key

- Remove the clip (a) from radiator top.

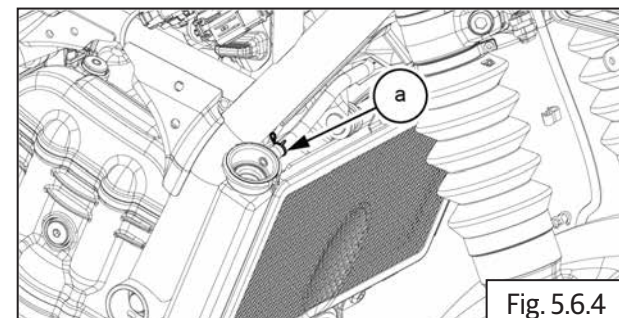
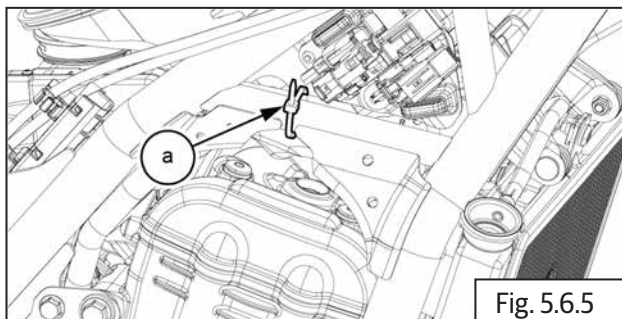


Fig. 5.6.4



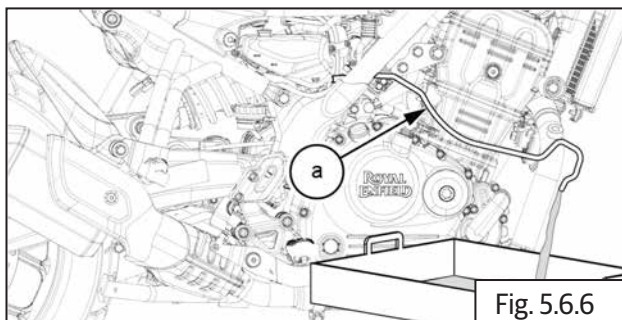
Plier

- Detach the 1 Nos tag **(a)** from hose.



Cutter

- Place a tray under the expansion tank hose **(a)** and drain the coolant from expansion tank.



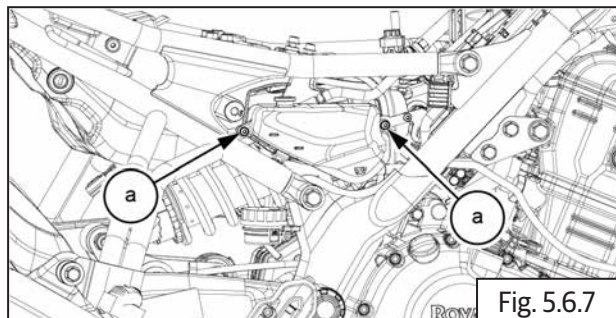
⚠ WARNING

DO NOT spill coolant. Collect coolant in a separate container and dispose it through authorized disposal agencies in your locality. Avoid skin or body contact with the coolant. Promptly wash affected area with soap and water.

Dismantling

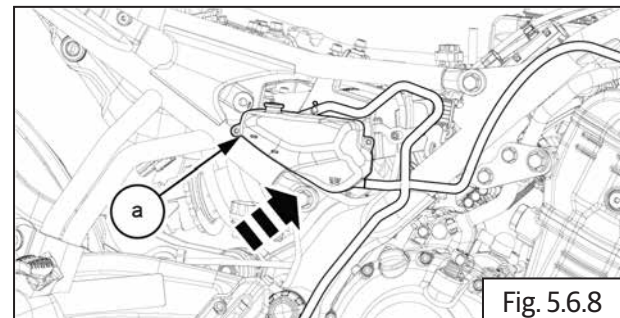
5.6.2 Expansion tank

- Loosen and remove 2Nos screws **(a)** from expansion tank.

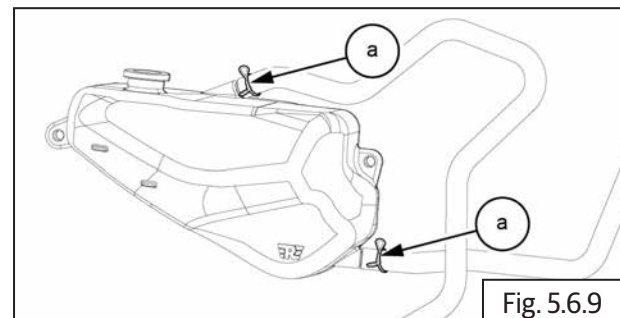


T 20 Torx

- Remove expansion tank with hoses **(a)** from chassis frame.

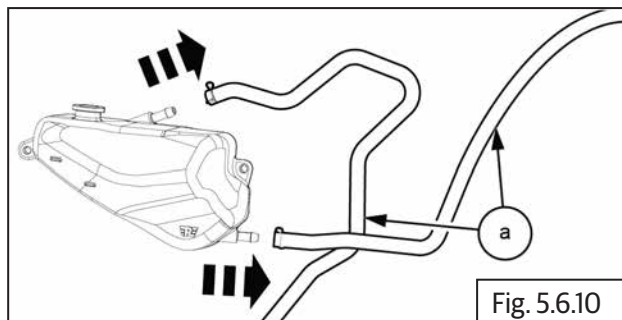


- Remove the 2Nos clips **(a)** from over flow hose and main hose.



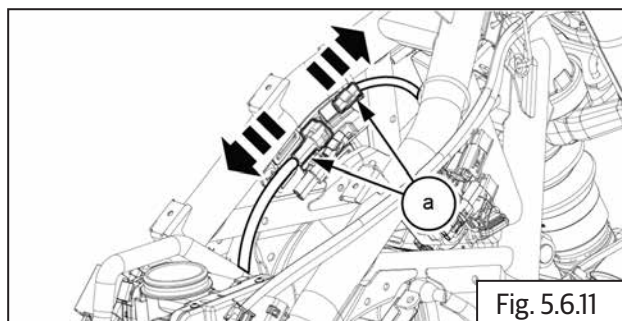
Plier

- Pull and remove the over flow hose **(a)** and main hose **(a)** from expansion tank.

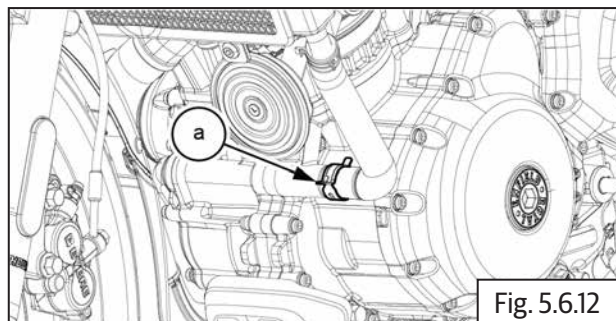


5.6.3 Radiator

- Disconnect the cooling fan coupler **(a)**.

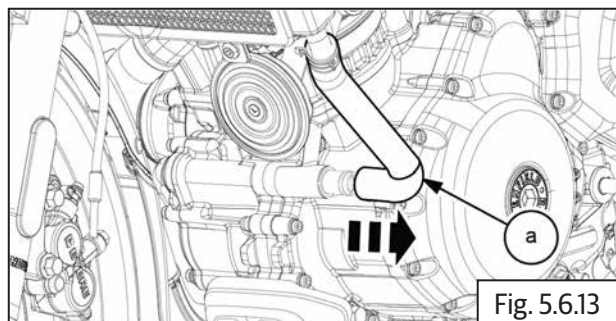


- Remove the clamp **(a)** from engine inlet hose.

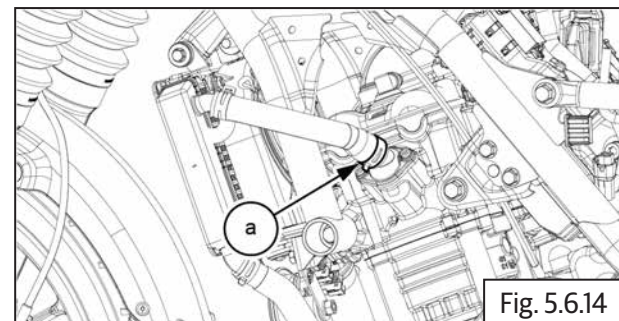


Plier

- Pull and remove the hose **(a)** from engine.

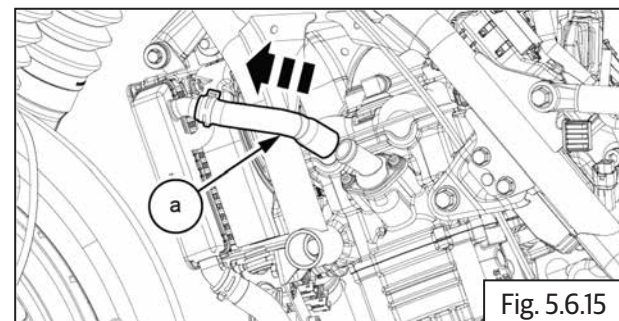


- Remove the clamp **(a)** from engine outlet hose.

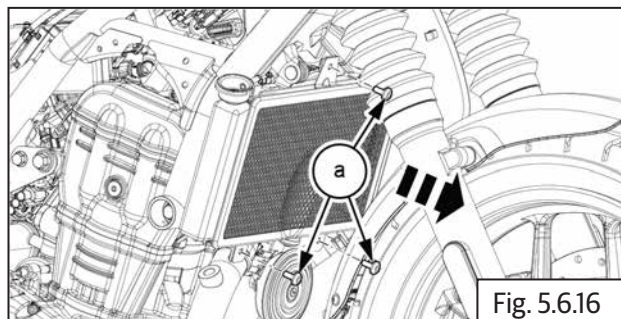


Plier

- Pull and remove the hose **(a)** from thermostat housing.

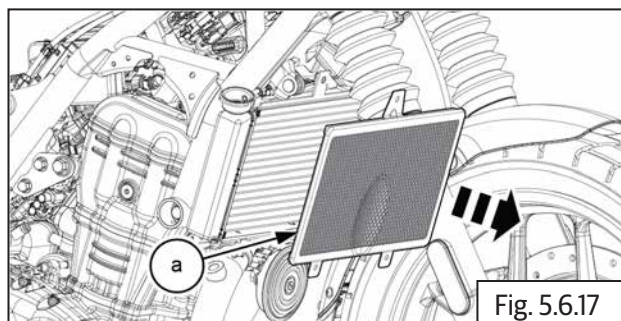


- Remove the 3Nos allen bolts **(M6) (a)** from radiator guard.

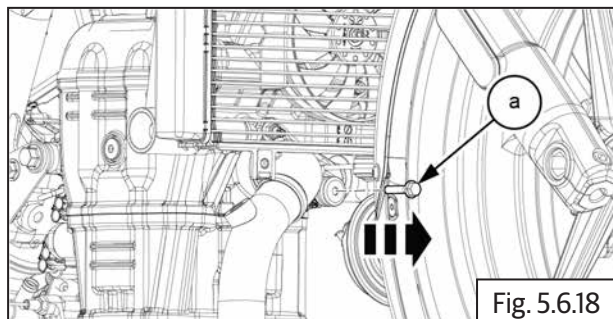


5mm allen key with Ratchet

- Remove the guard **(a)** from radiator.

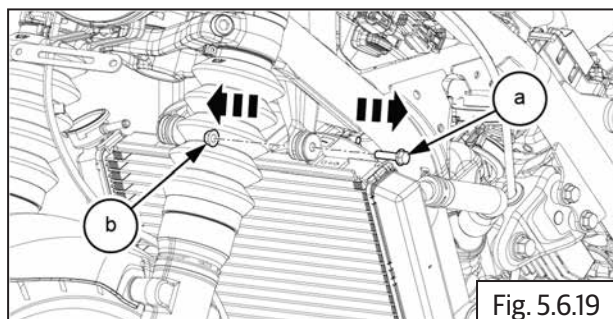


- Remove the 1 Nos bolts **(M6) (a)** from bottom of the radiator.



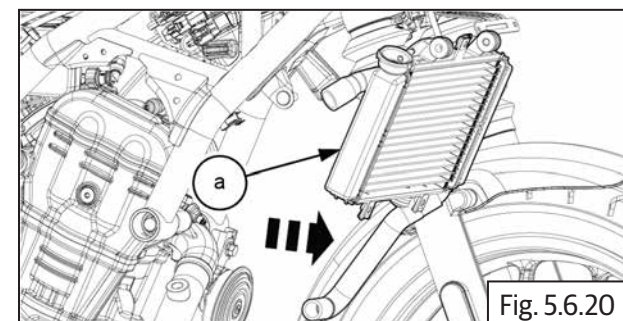
10mm Socket with Ratchet

- Remove the 1Nos bolts **(M6) (a)** 1Nos nut **(b)** from top of the radiator.



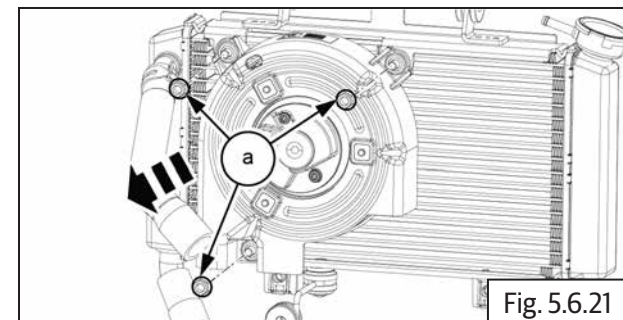
10mm Socket with Ratchet

- Remove the radiator with hoses **(a)** from engine.



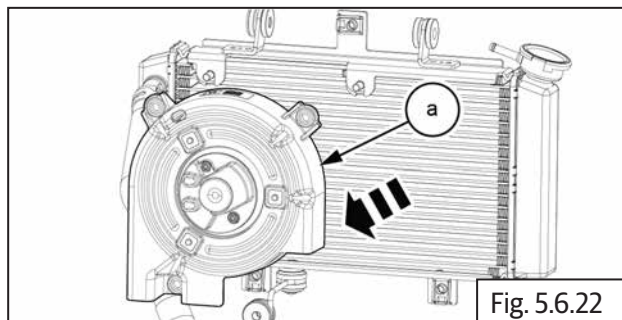
5.6.4 Cooling fan

- Remove the 3Nos nuts **(M6) (a)** from cooling fan.

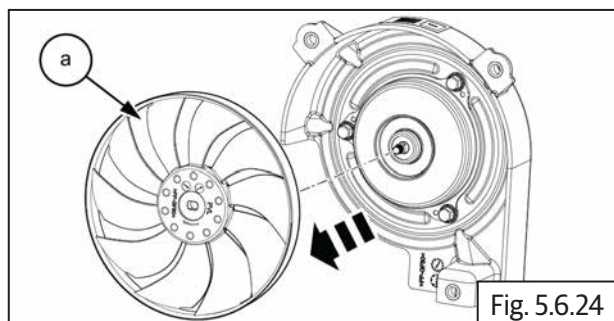


10mm Socket with Ratchet

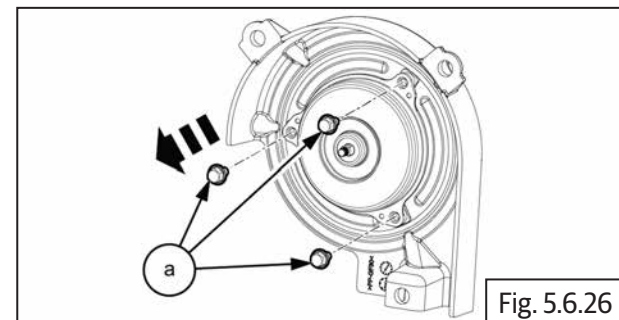
- Remove cooling fan **(a)** from radiator.



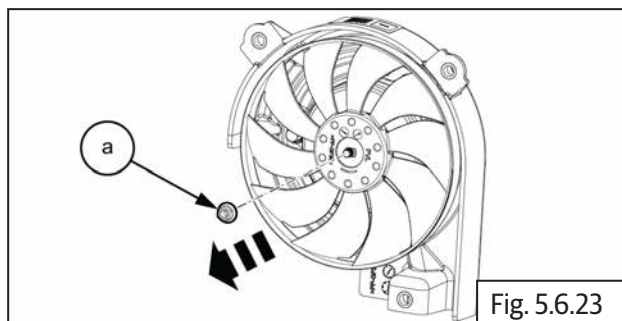
- Remove fan **(a)** from motor.



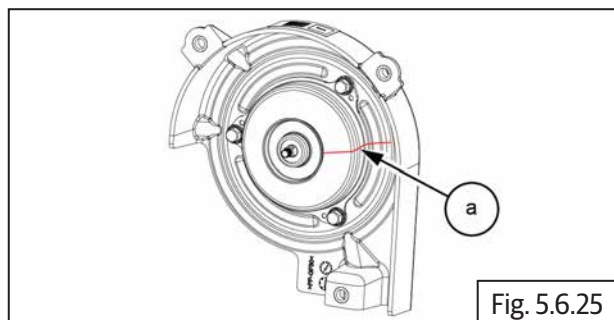
- Remove the 3Nos bolts **(M4) (a)** from motor.



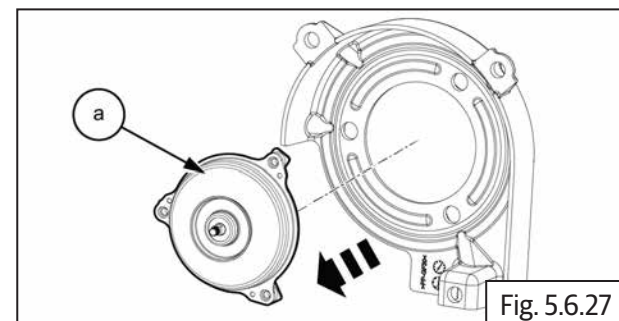
- Remove the 1Nos nuts **(M4) (a)** from fan.



- Mark the motor position **(a)** before removal.

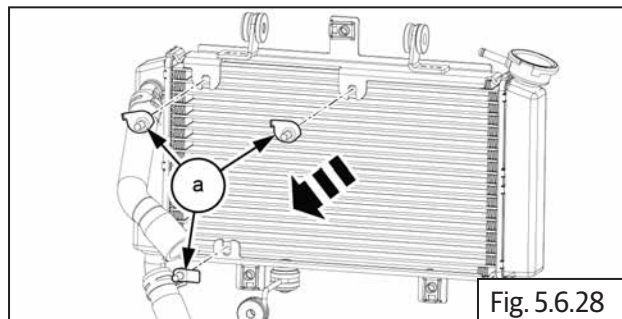


- Remove motor **(a)** from cowl.

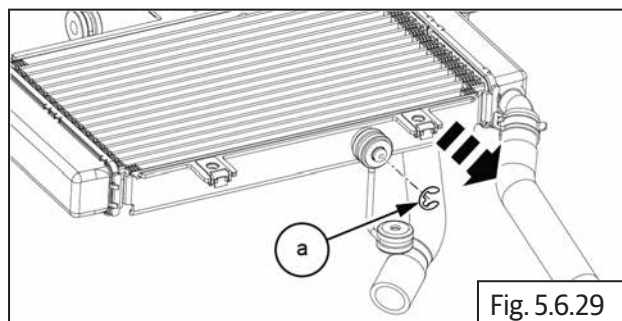


5.6.5 Radiator child parts

- Remove the 3Nos nut clips **(a)** from radiator.

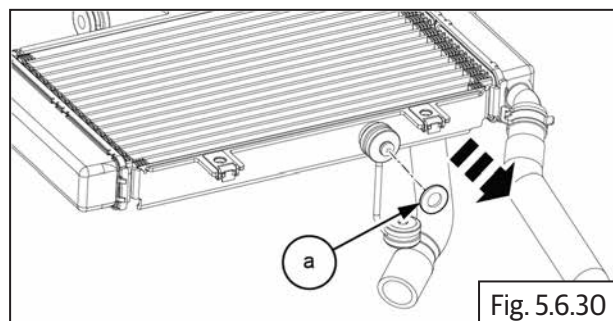


- Remove the "E" clip **(a)** from bottom radiator.

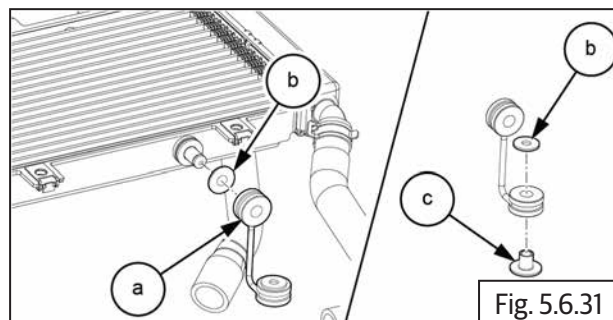


Nose plier

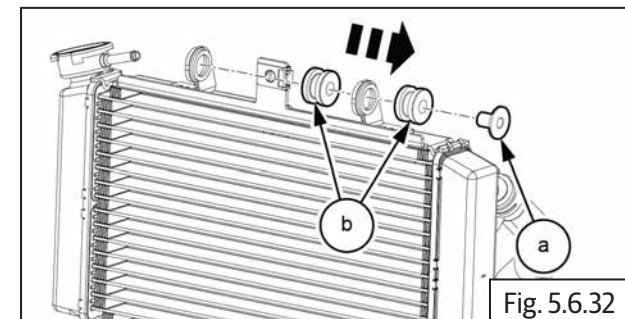
- Remove washer **(a)** from bottom radiator .



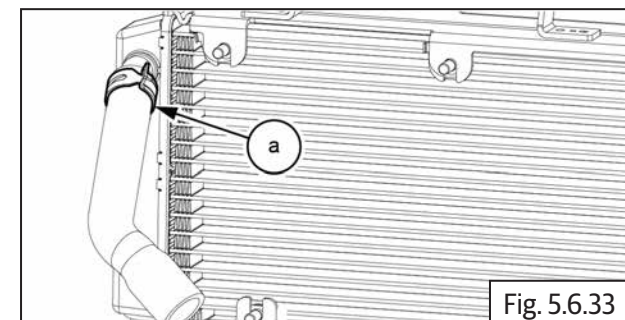
- Remove bracket with grommet **(a)** from bottom radiator.



- Remove 1Nos hat washer **(a)** and 2Nos grommets **(b)** from top radiator.

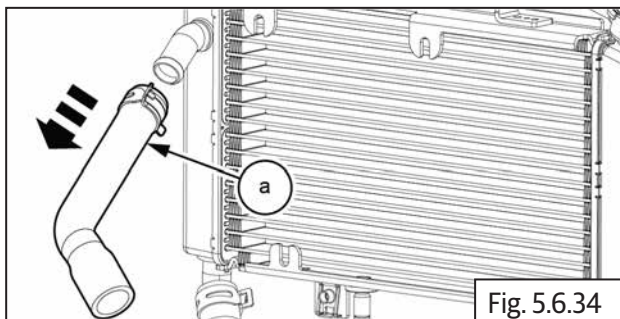


- Remove the clamp **(a)** from top hose.

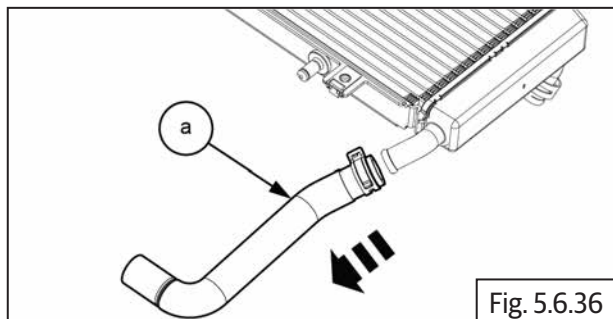


Plier

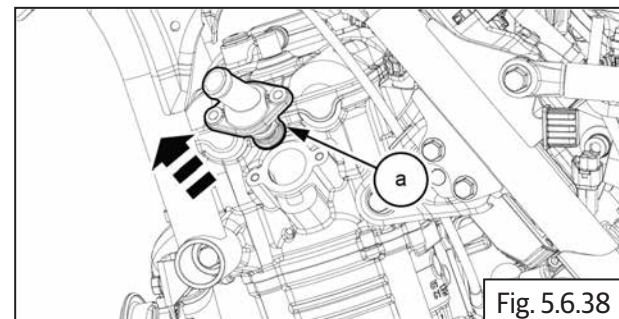
- Pull and remove the top hose **(a)** from radiator.



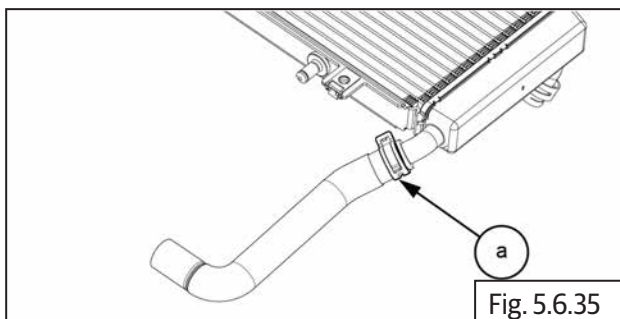
- Pull and remove the bottom hose **(a)** from radiator.



- Remove thermostat with housing **(a)** from engine.

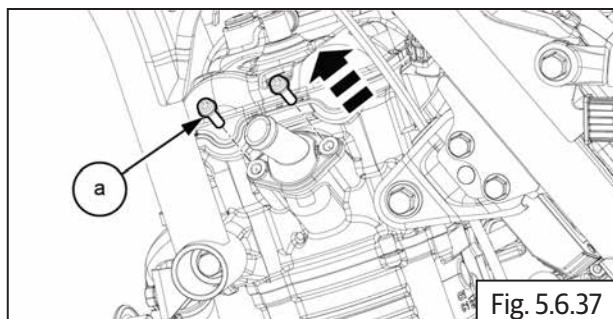


- Remove the clamp **(a)** from bottom hose.

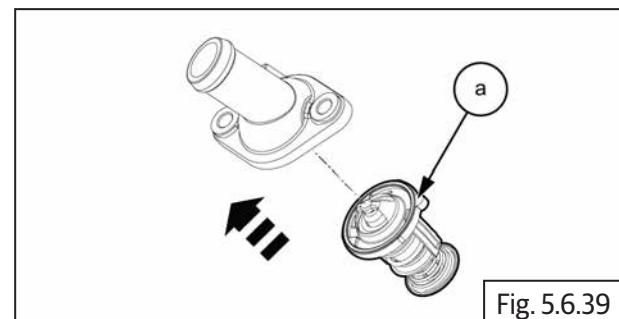


5.6.6 THERMOSTAT

- Remove the 2 Nos cap bolts **(a)** from thermostat housing.



- Separate the thermostat **(a)** from housing.



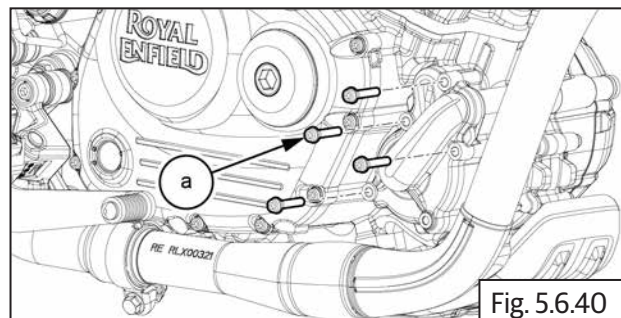
Plier



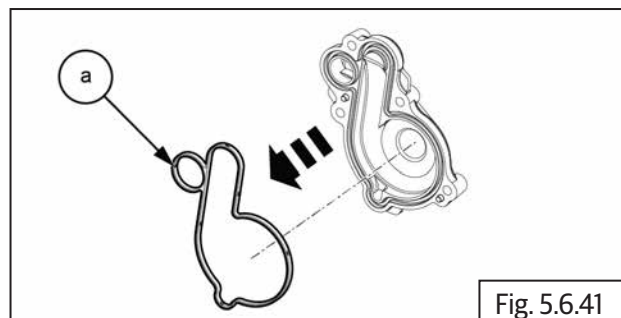
5mm Allen key

5.6.7 Water Pump

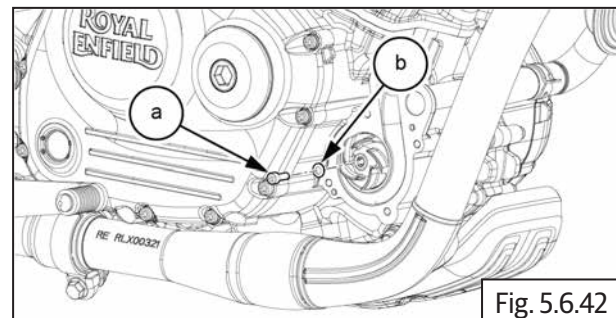
- Loosen and remove 5Nos cap bolts **(M6) (a)** from water pump.



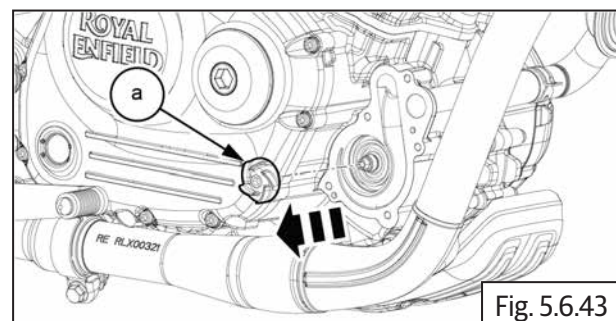
- Remove water pump cover with gasket **(a)**.



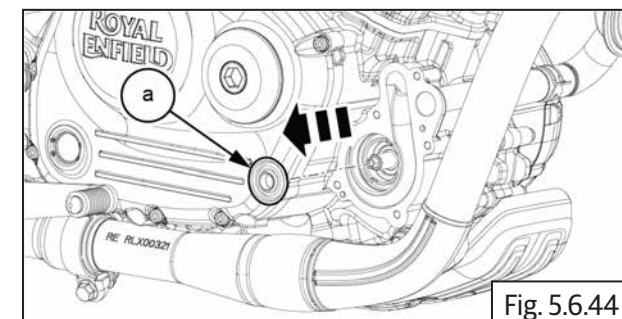
- Loosen and remove 1 Nos cap bolt **(M5) (a)** with washer **(b)** from impeller.



- Remove impeller **(a)** from water pump drive shaft.



- Remove the lip seal **(a)** using screw driver.

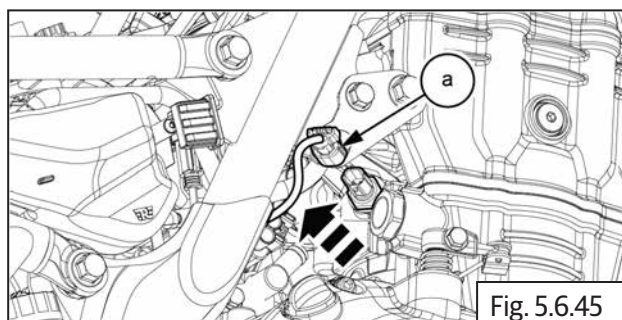


NOTE

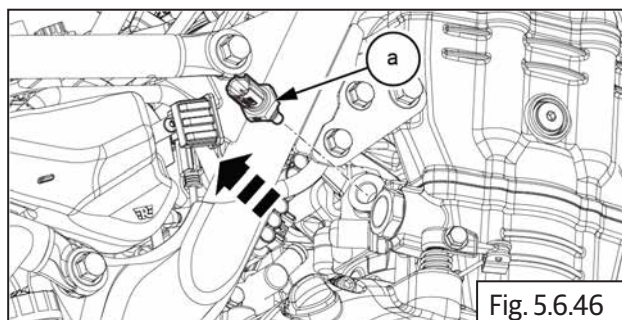
- Should not be reuse the lip seal.*

5.6.8 Engine Coolant Temperature Sensor

- Coolant temperature sensor located on rear side of cylinder head.
- Remove coolant temperature sensor coupler (a).

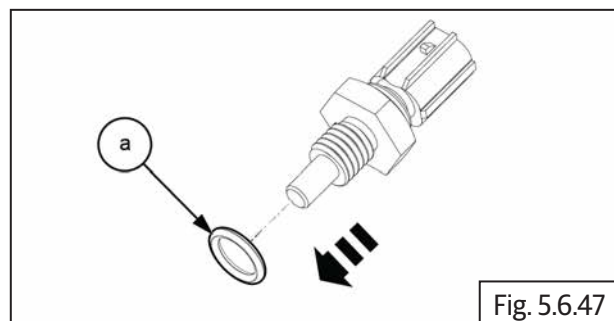


- Remove coolant temperature sensor (a).



18mm Long Socket With Ratchet

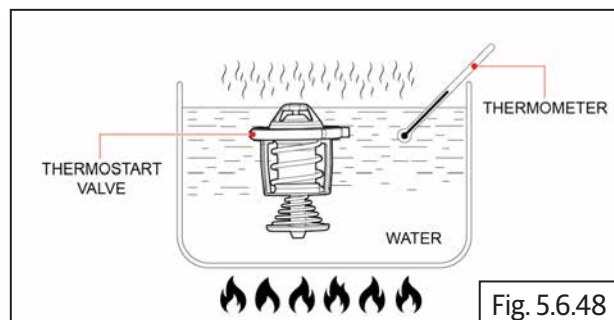
- Remove "O" ring (a) from temperature sensor.



Inspection

Thermostat

- Place the thermostat in a container of water and raise the temperature to **95°C**. If the thermostat fails to open when hot, or close properly when cooled, it must be replaced.

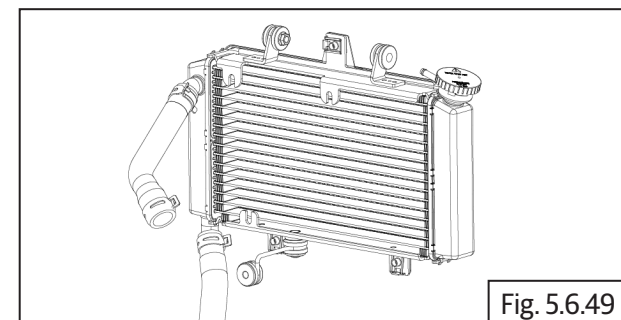


Fan and thermostat valve operating stage

- The thermostat valve opens partially when the engine temperature reaches **82°C ± 2°C**.
- The thermostat valve opens fully when the engine temperature reaches **95°C**.
- The fan motor starts when the engine temperature reaches **103°C**.
- The fan motor stops when the engine temperature drops to **97°C**.

Radiator Hoses

- Hoses should be replaced at any time if found in less than perfect condition, regardless of age. Hoses should be replaced if a visual inspection reveals any hardness, leaks, cracks, swelling, chafing, or other damage.



Lip seal

- If there is a leakage of water or oil in the bottom of the hole, the water pump lip seal or the water pump drive shaft oil seal should be replace.

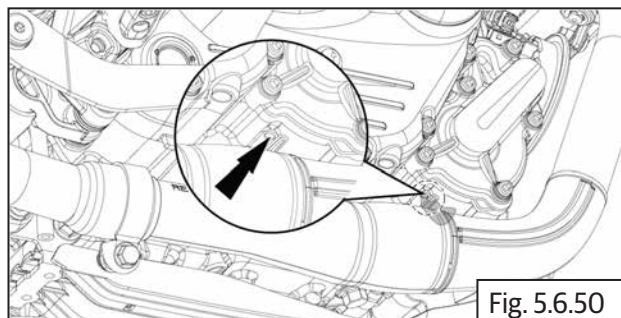


Fig. 5.6.50

Assembly

5.6.9 Engine Coolant Temperature Sensor

NOTE

- Should not be reuse the "O" ring .

- Install "O" ring (a) on the temperature sensor.

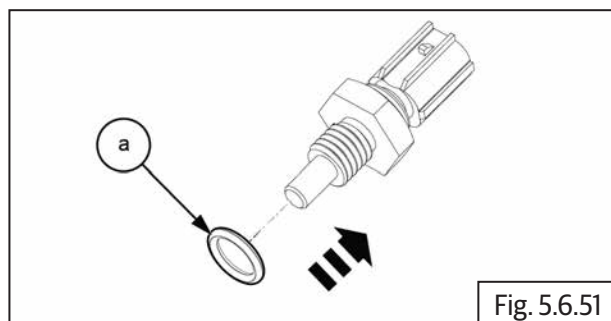


Fig. 5.6.51

- Locate and tighten the temperature sensor (a).

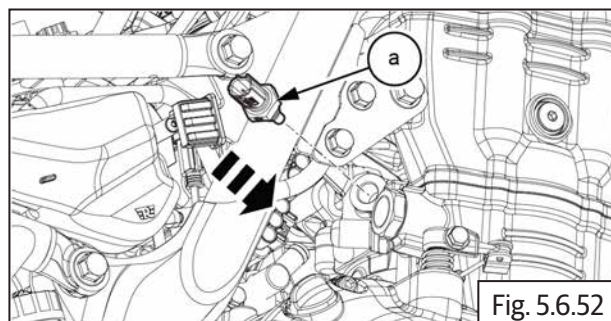


Fig. 5.6.52

	18mm Long Socket With Ratchet
Torque	6.5-8.5 N-m / 0.6-8.6 kgf-m

- Connect coolant temperature sensor coupler (a).

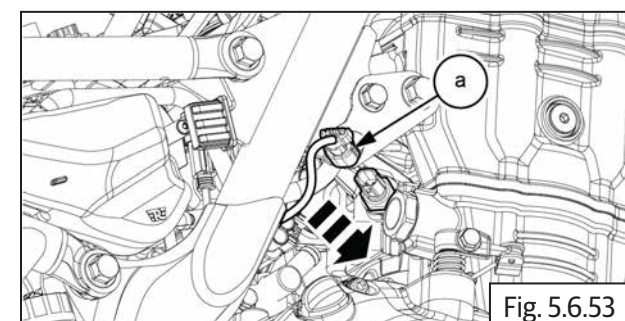


Fig. 5.6.53

5.6.10 Water Pump

NOTE

- Should not be reuse the lip seal.

- Locate the lip seal (a) on water pump drive shaft.

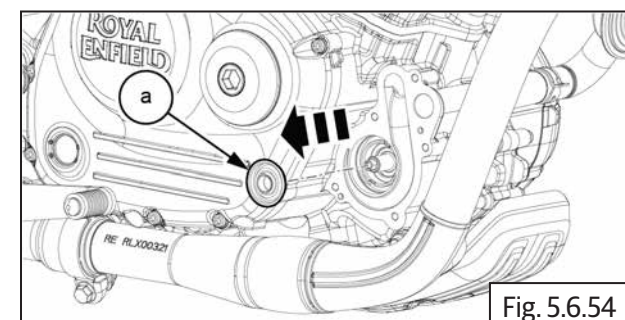
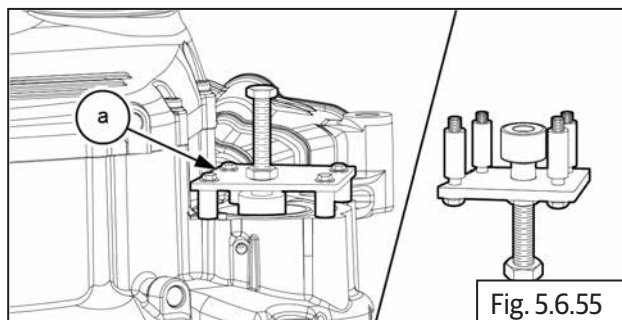
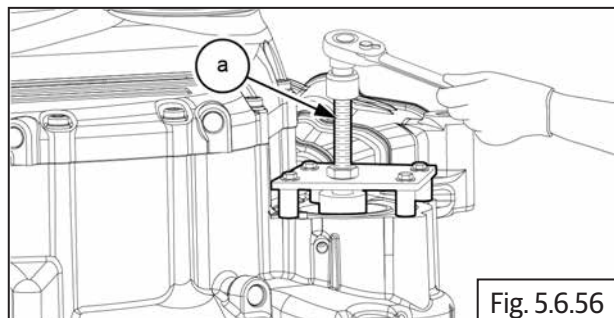


Fig. 5.6.54

- Locate and tighten 4Nos hex bolts **(M6)** on special tool **(a)**.



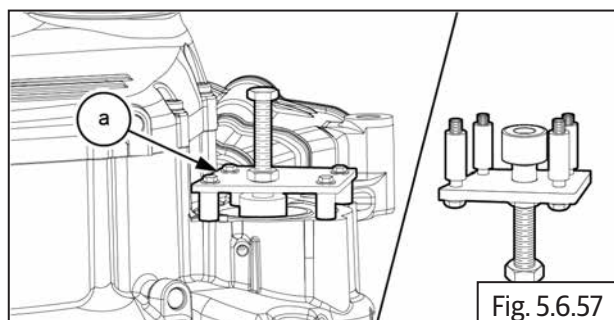
- Tighten the special tool top bolt **(a)** until lip seal to proper seat.



SPL	Part No: ST-32068-a
	Part Name: Coolant Pump Oil Seal Assembly Tool

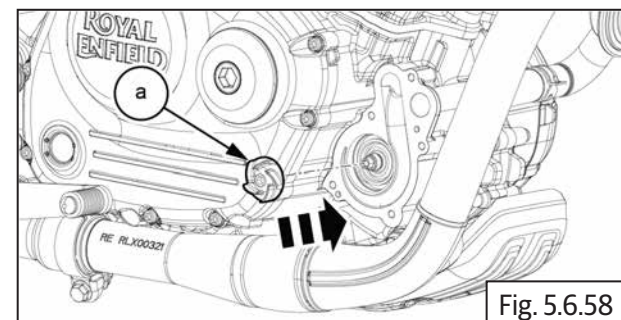
	27mm Socket With Ratchet.
---	---------------------------

- Remove the special tool **(a)** from water pump drive shaft.



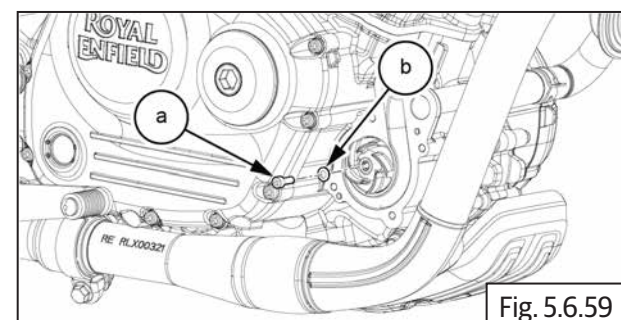
	10mm Socket With Ratchet
---	--------------------------

- Locate the impeller **(a)** into water pump drive shaft.



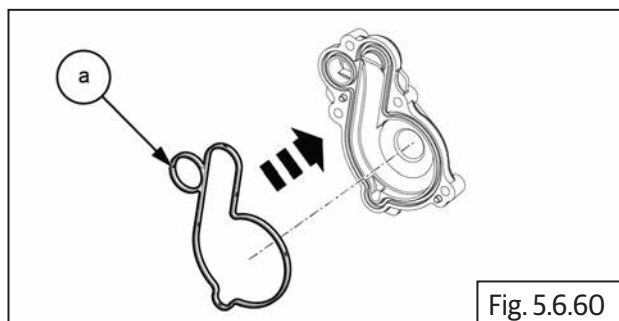
- Locate and tighten 1Nos cap bolt **(M5)** **(a)** with washer **(b)** into impeller.

NOTE	
• Apply LOCTITE 243 on the threads of the bolt before installing.	



	4mm Allen Socket With Ratchet
	4-5Nm / 0.4-0.5kgf-m

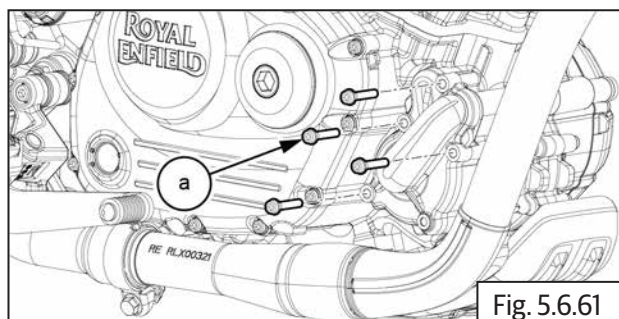
- Install the gasket **(a)** on water pump cover.



NOTE

- Should not be reuse the old gasket.

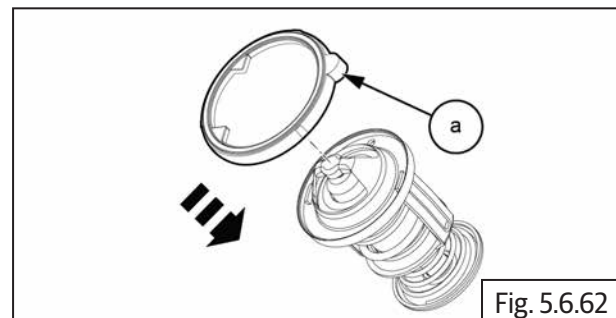
- Locate and tighten 5 Nos cap bolts **(M6) (a)** on water pump.



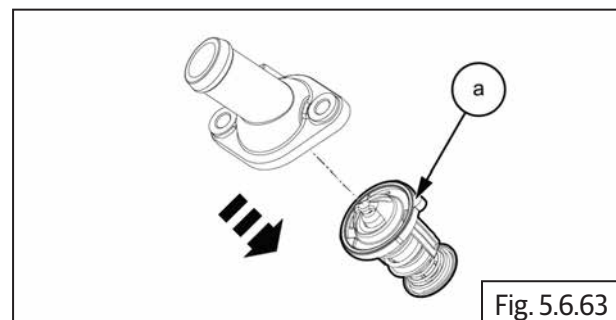
	5mm Allen Socket With Ratchet
Torque	10-12Nm / 1.0-1.2kgf-m

5.6.11 THERMOSTAT

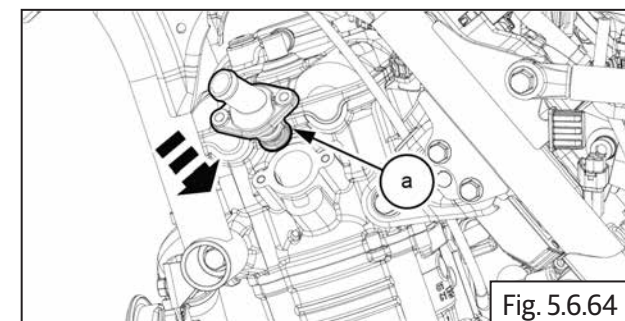
- Install the "O" ring **(a)** into thermostat.



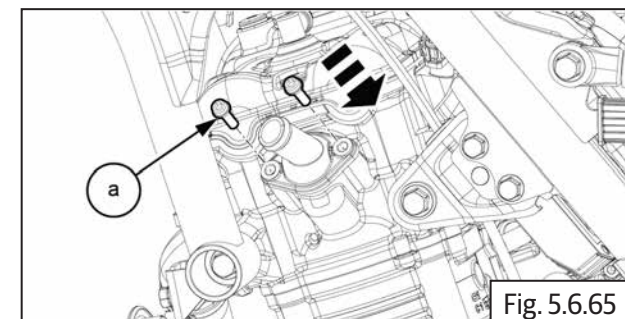
- Locate the thermostat **(a)** into housing.



- Locate thermostat with housing **(a)** on engine.



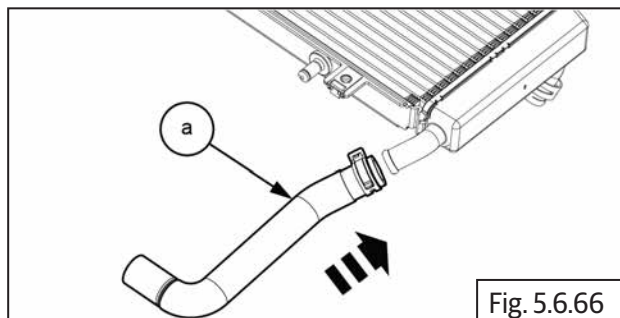
- Locate and tighten 2 Nos cap bolts **(a)** on thermostat housing.



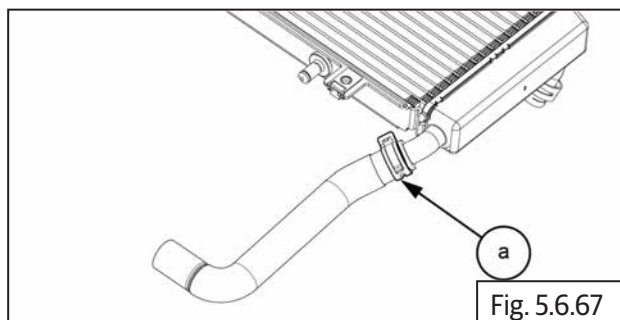
	5mm Allen Socket With Ratchet
Torque	10-12Nm / 1.0-1.2kgf-m

5.6.12 Radiator child part

- Install the bottom hose **(a)** into radiator.

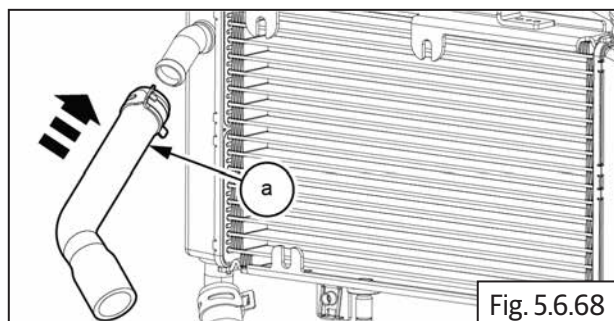


- Install the clamp **(a)** on bottom hose.

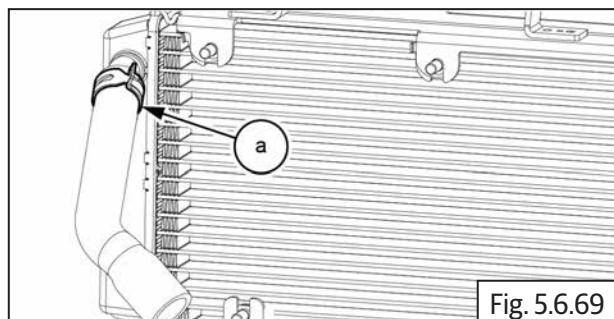


Plier

- Install the top hose **(a)** into radiator.

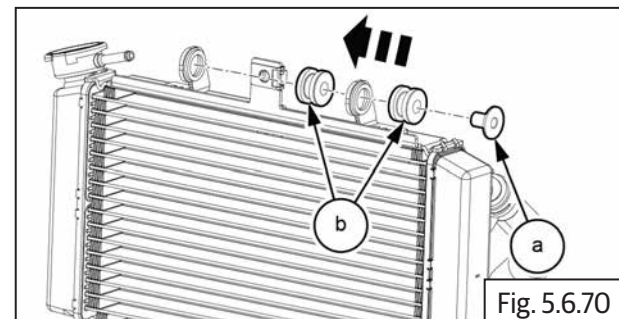


- Install the clamp **(a)** from top hose.

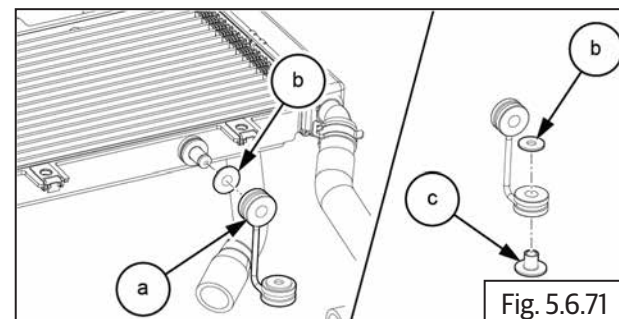


Plier

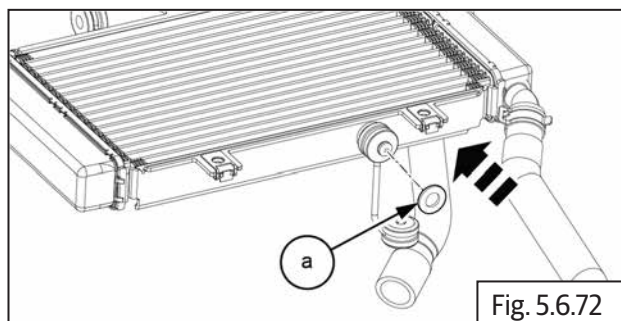
- Install 1 Nos hat washer **(a)** and 2 Nos grommets **(b)** on top radiator.



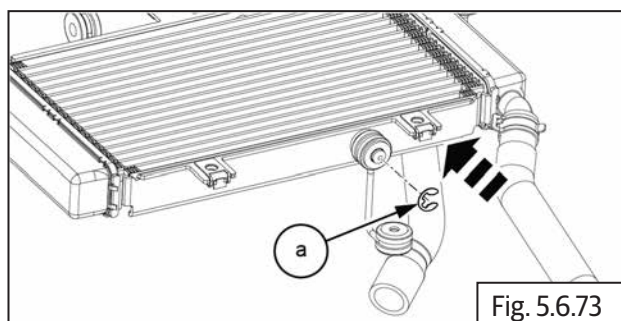
- Install the bracket with grommet **(a)** 1Nos washer **(b)** 1 Nos hat washer **(c)** on bottom radiator.



- Install washer **(a)** on bottom radiator .

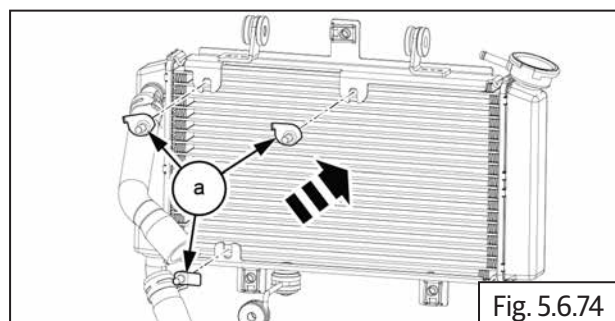


- Install the “E” clip **(a)** on bottom radiator.



Nose plier

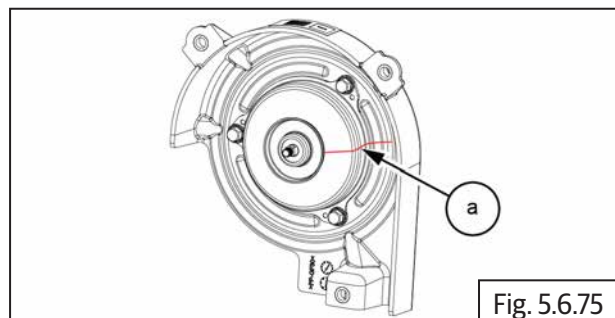
- Install the 3Nos nut clips **(a)** on radiator.



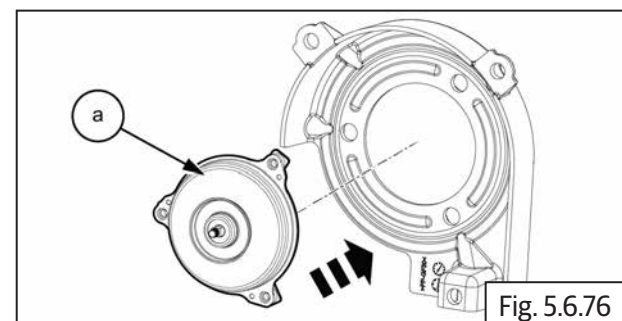
5.6.13 Cooling fan

NOTE

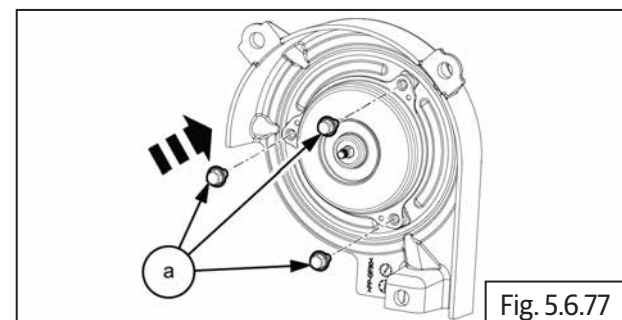
- Ensure fan motor is orientated correctly with wires facing towards closed side of cowl.
- Refer the paint mark **(a)** before assemble.



- Locate the motor **(a)** on cowl.



- Locate and tighten the 3Nos bolts **(M4) (a)** on motor.

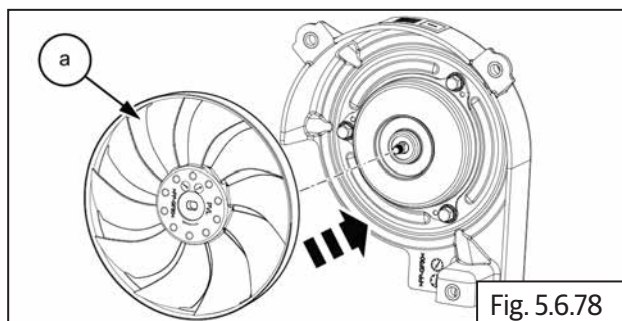


8mm Socket with Ratchet

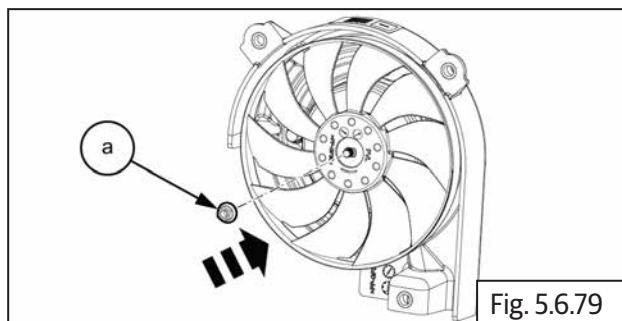
Torque

2.45 - 3.92Nm / 0.25-0.39kgf-m

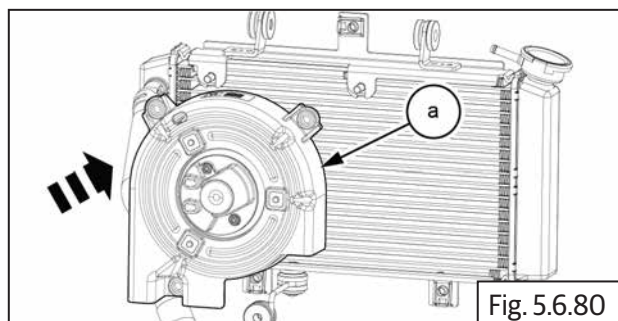
- Install the fan **(a)** into motor.



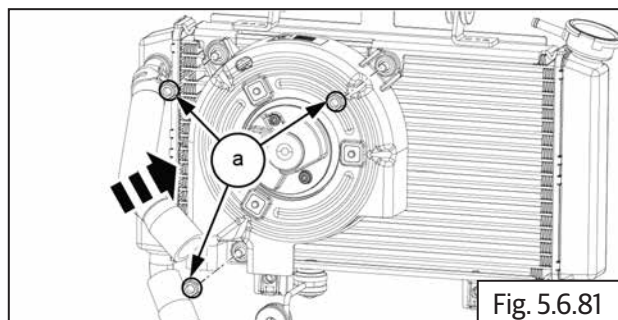
- Locate and tighten the 1Nos nuts **(M4) (a)** into fan.



- Locate the cooling fan **(a)** into radiator.



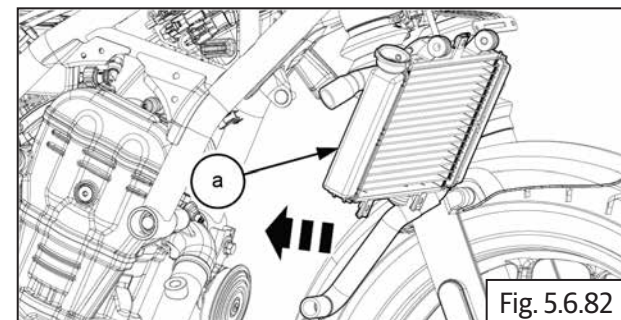
- Locate and tighten the 3Nos nuts **(M6) (a)** into cooling fan.



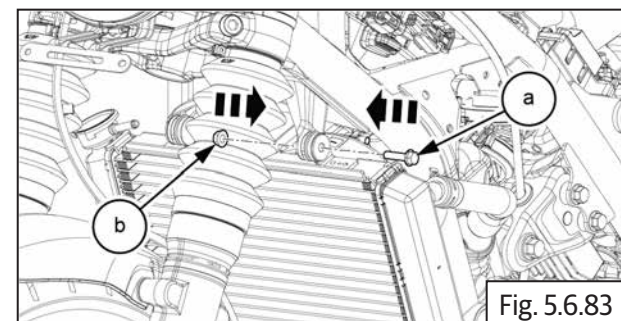
	10mm Socket with Ratchet
	2-2.5 Nm / 0.2-0.25kgf-m

5.6.14 Radiator

- Install the radiator with hoses **(a)** on engine.

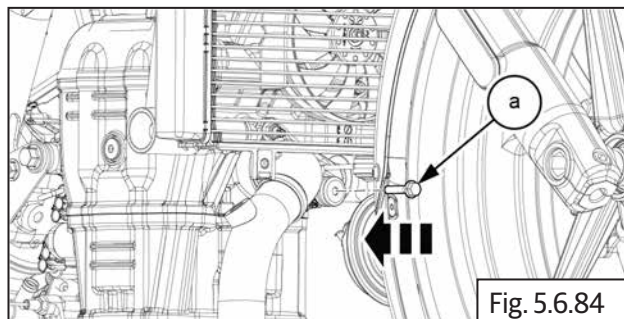


- Locate and tighten the 1Nos bolts **(M6) (a)** 1Nos nut **(b)** on top of the radiator.



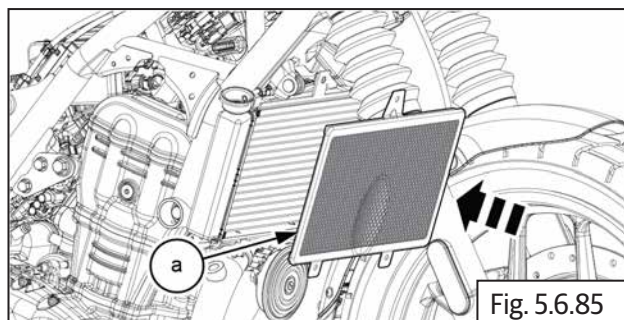
	10mm Socket with Ratchet
	8-10Nm / 0.8-1.0kgf-m

- Locate and tighten 1 Nos bolts **(M6) (a)** on bottom of the radiator.

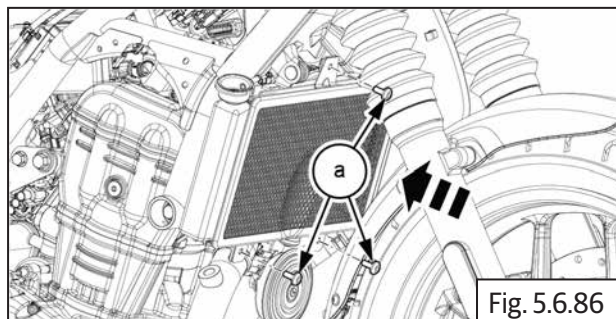


	10mm Socket with Ratchet
	8-10Nm / 0.8-1.0kgf-m

- Locate the guard **(a)** on radiator.

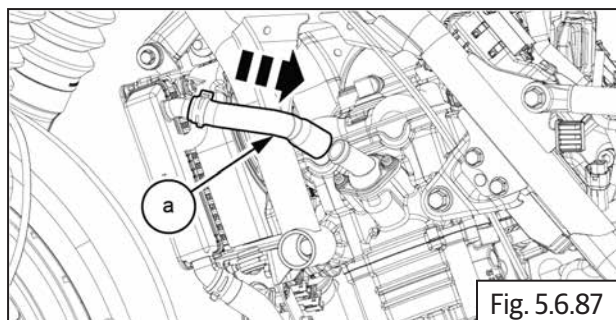


- Locate and tighten the 3 Nos bolts **(M6) (a)** from radiator guard.

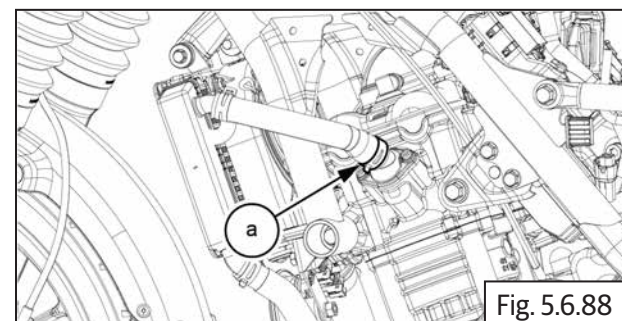


	5mm Socket with Ratchet
	2-4Nm / 0.2-0.4kgf-m

- Install the hose **(a)** on thermostat housing.

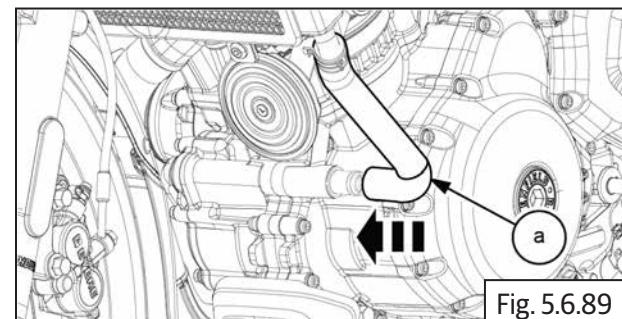


- Fix the clamp **(a)** on engine outlet hose.

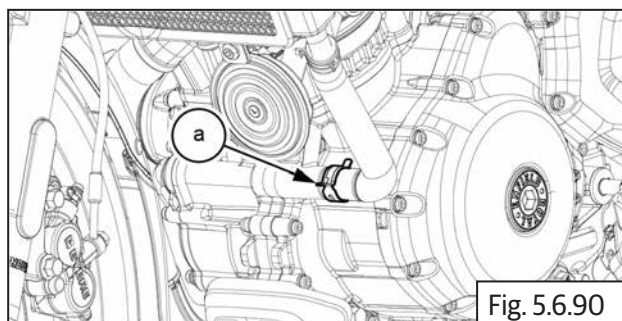


	Plier
--	-------

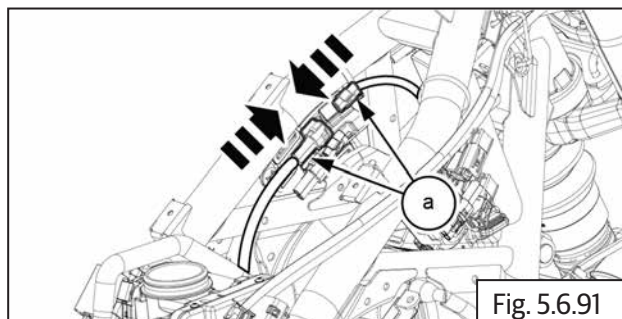
- Install the hose **(a)** on engine.



- Fix the clamp **(a)** on engine inlet hose.

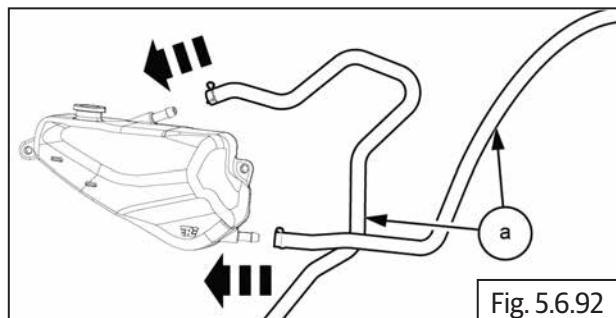


- Connect the cooling fan coupler **(a)**.

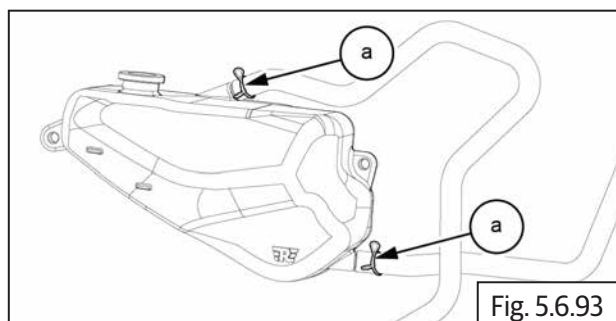


5.6.15 Expansion tank

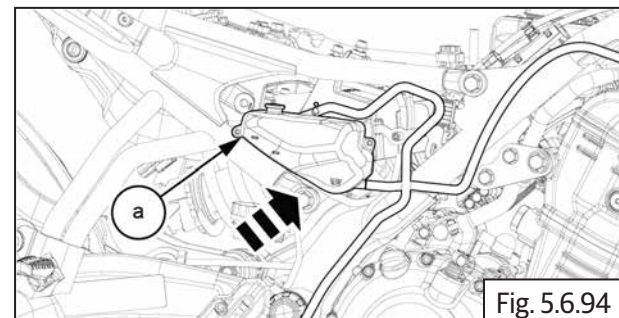
- Install the over flow hose **(a)** and main hose **(a)** on expansion tank.



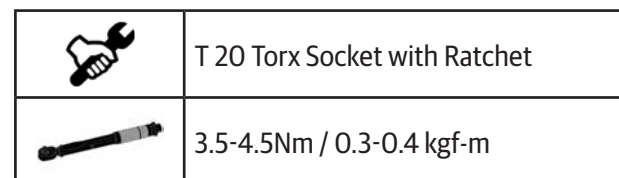
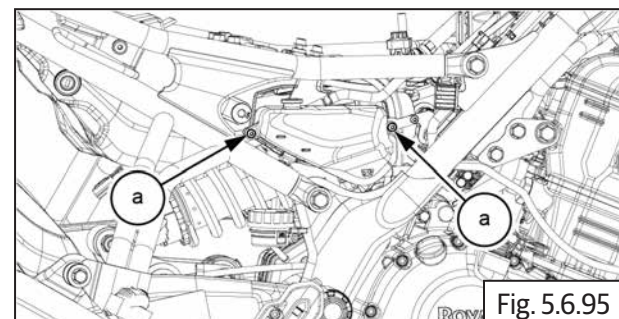
- Fix the 2Nos clips **(a)** on over flow hose and main hose.



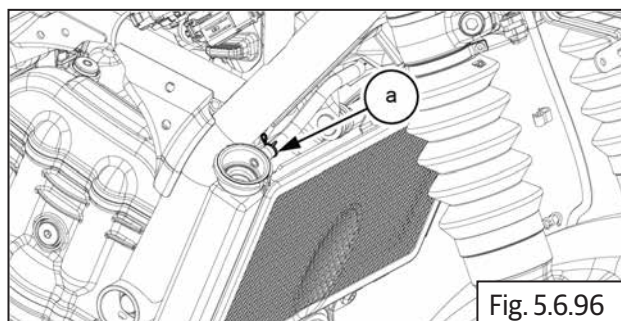
- Locate expansion tank with hoses **(a)** on chassis frame.



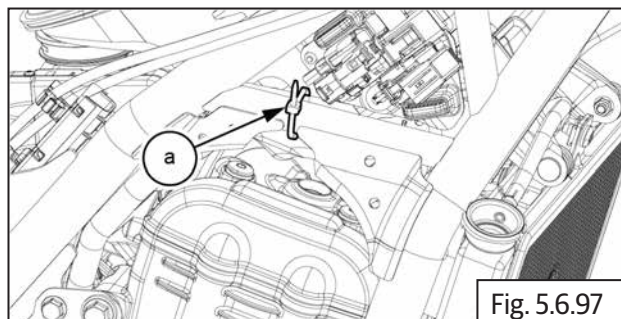
- Locate and tighten 2Nos screws **(a)** on expansion tank.



- Fix the clip **(a)** on radiator top.



- Fix the 1 Nos tag **(a)** on hose.



- Install the fuel tank.

5.6.16 Radiator coolant filling

⚠ WARNING

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.

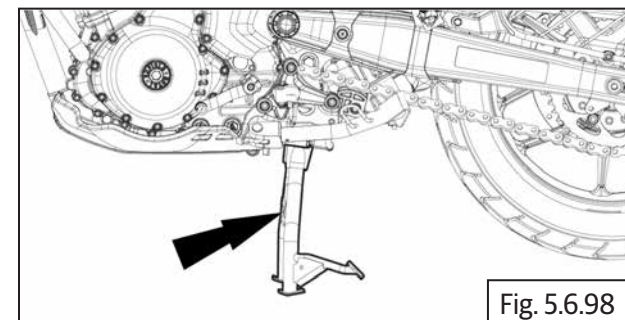
⚠ WARNING

Danger of poisoning

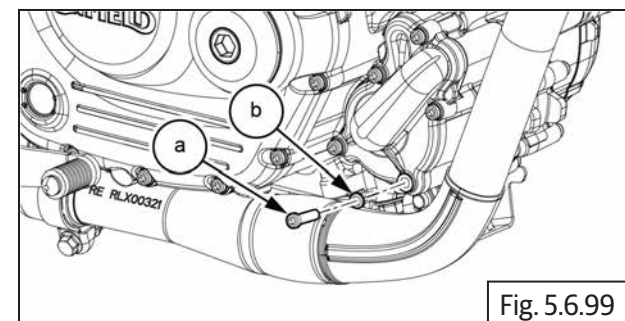
Coolant is poisonous and a health hazard. Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If coolant is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

- Ensure motorcycle engine is cold.

- Place the motorcycle in an upright position on a flat level surface.

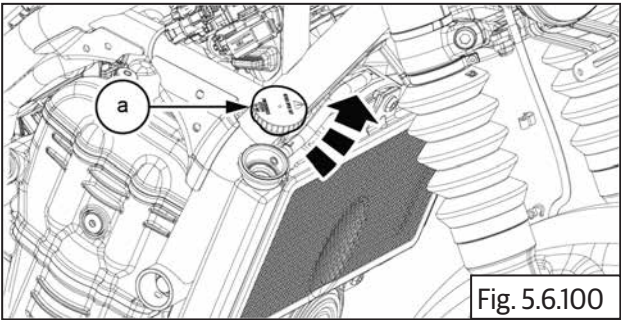


- Once drained, replace copper washer **(b)** with a new part and tighten bolt **(M6) (a)** on RHS water pump cover.

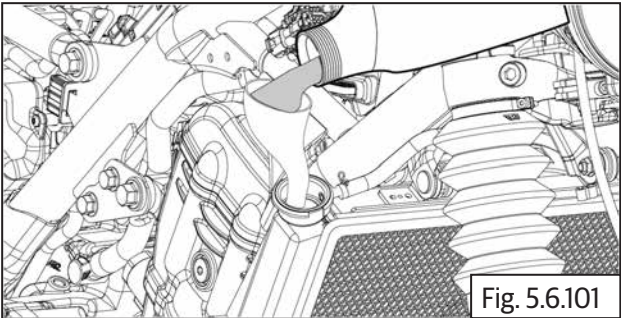


	5mm Allen Socket with Ratchet
	10-12Nm / 1.0-1.2kgf-m

- Remove the radiator pressure cap **(a)**.

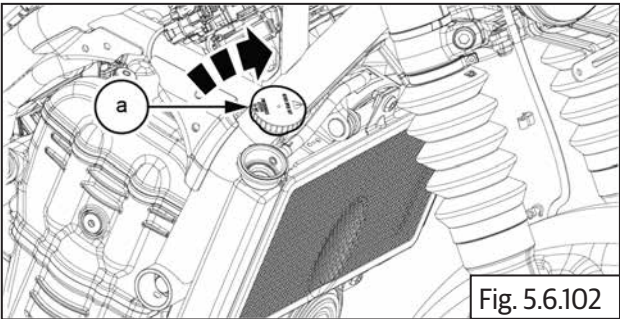


- Fill the system with recommended coolant up to the filler neck.

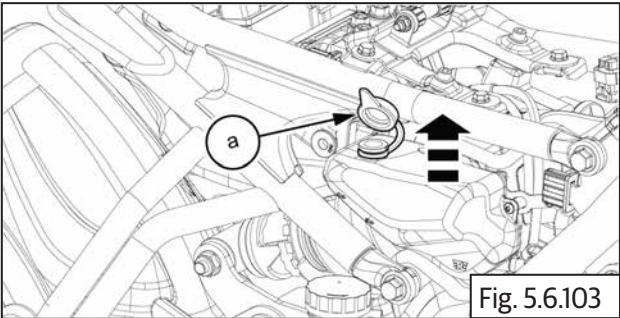


Grade	TOTAL COOLELF AUTO SUPRA -37°C
QTY	970ml

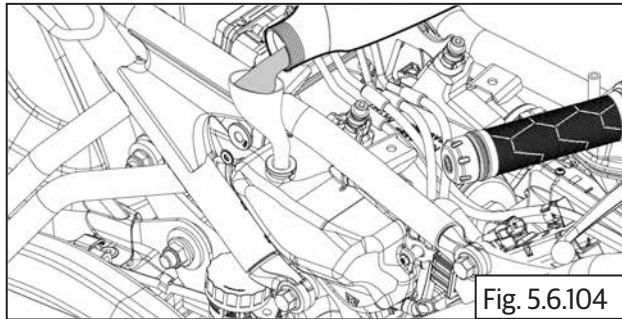
- Close the radiator pressure cap **(a)** ensuring it is correctly fitted & fully tightened clockwise.



- Remove the radiator expansion tank cap **(a)**.

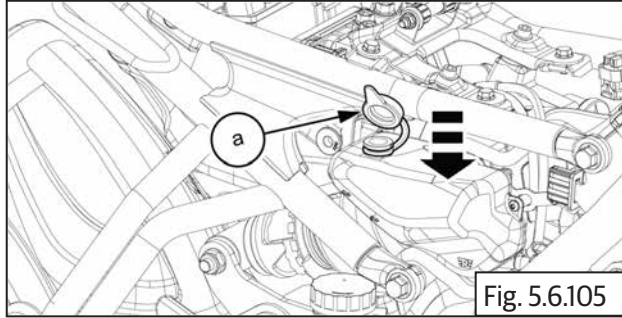


- Fill the recommended coolant to the upper level line.



Grade	TOTAL COOLELF AUTO SUPRA -37°C
QTY	200ml

- Close the radiator expansion tank cap **(a)**.

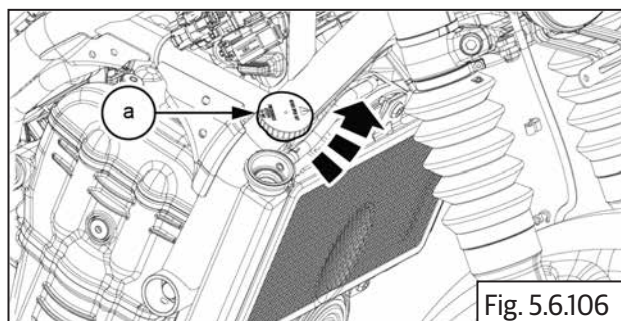


5.6.17 Air Bleeding

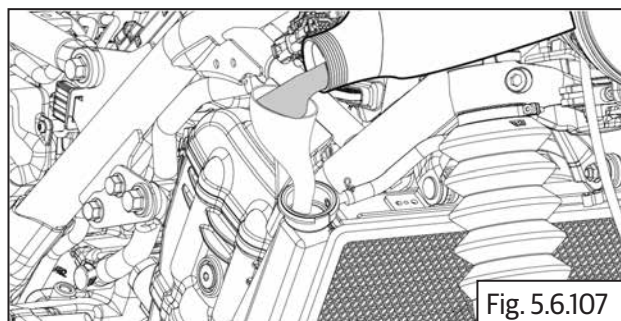
⚠ CAUTION

Do not run the engine without completing the filling procedure above.

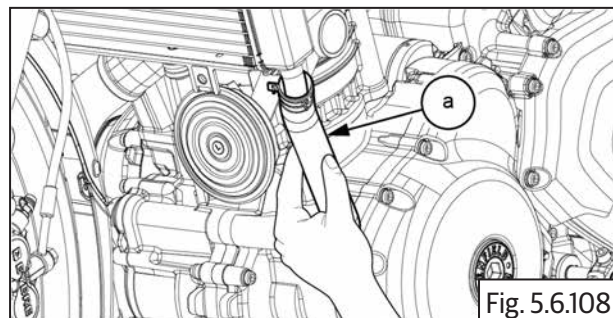
- Remove the radiator pressure cap **(a)**.



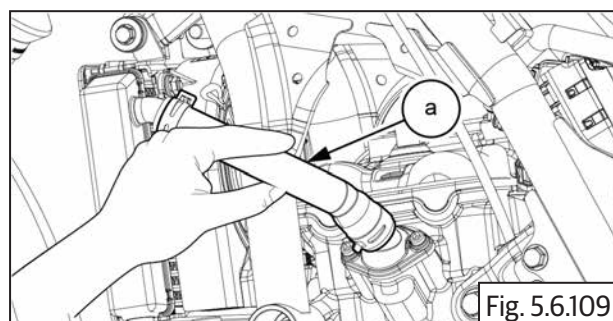
- Fill the system with recommended coolant up to the filler neck.



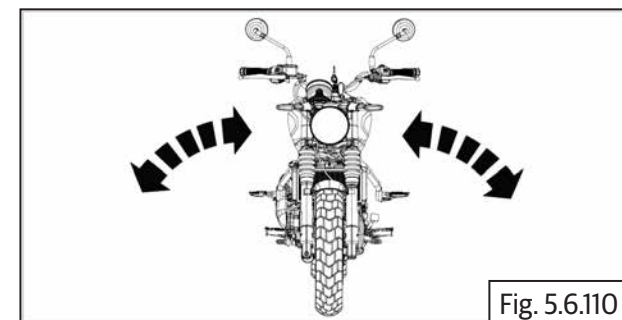
- (A)** Gently tap and squeeze both engine to radiator bottom hose **(a)**.



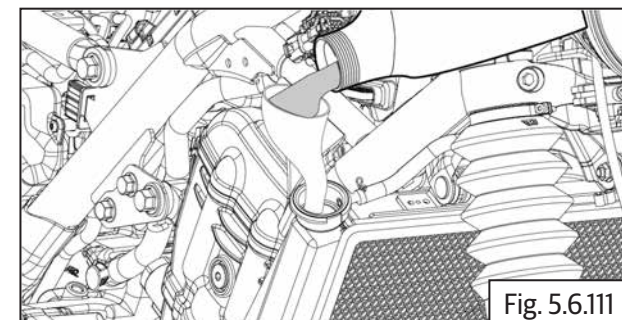
- Gently tap and squeeze both engine to radiator top hose **(a)**.



- (B)** Tip the bike to approx 45-60 degree angle on the left and then the right side.



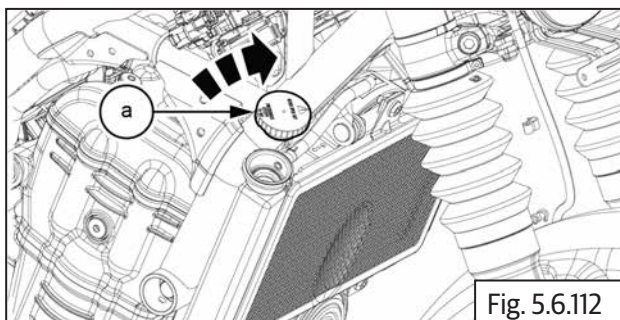
- (C)** If coolant level has dropped, top back up to filler neck level.



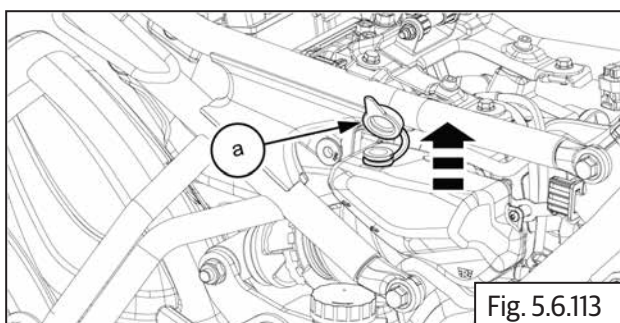
Grade	TOTAL COOLELF AUTO SUPRA -37°C
-------	--------------------------------

Grade	TOTAL COOLELF AUTO SUPRA -37°C
-------	--------------------------------

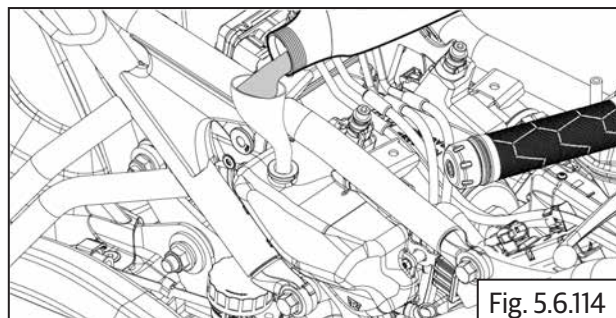
- Repeat above procedure (**steps A to C**) until the level in the filler neck no longer drops
- Close the radiator pressure cap (**a**) ensuring it is correctly fitted & fully tightened clockwise.



- Remove the radiator expansion tank cap (**a**).

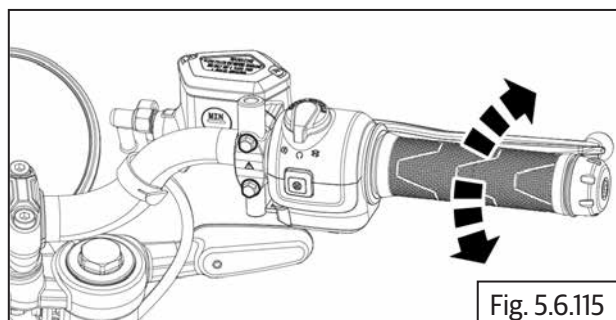


- Fill the recommended coolant to the upper level line.



Grade	TOTAL COOLELF AUTO SUPRA -37°C
-------	--------------------------------

- Start the engine in neutral.
- Run the engine at idle for 5 minutes.
- Blip the throttle 3 or 4 times.



- Stop the engine and allow it to cool.
- Top up the coolant at the expansion tank if required.
- Check for coolant leaks.
- Install the LHS and RHS side panels.

5.6.18 Troubleshooting

Symptom	Possible Cause	Diagnosis
Engine Overheating	Too little coolant in cooling system	Check the cooling system for leakage. Check the coolant level
	Radiator fins very dirty	Clean the radiator fins
	Foam formation in cooling system	Drain the coolant, fill / bleed the cooling system
	Thermostat defective	Check the thermo start
	Fan fuse blown	Change the fault fuse
	Defect in radiator fan system	Check radiator fan system

Valve Clearance Adjusting Procedure

CONTENTS

PAGE

6.1 Valve Clearance checking Procedure.....36

6.2 Valve Clearance Adjusting Procedure.....38

6.3 Shim Calculation.....42

6.1 Valve Clearance checking Procedure

⚠ WARNING

The engine and exhaust system get extremely hot during normal operation and direct contact with skin can cause serious burns. Make sure engine is in normal temperature (OR) cooled before starting operation.

⚠ CAUTION

DO NOT perform any operation on engine system soon after the motorcycle is OFF. They can extremely hot and will cause serious injuries. Wait until the engine temperature is the same as the outdoor temperature.

NOTE

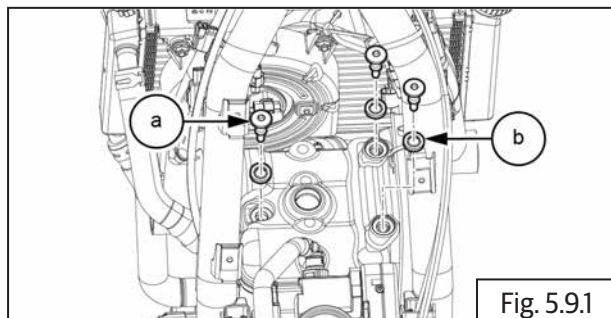
- Ensure the motorcycle is upright on a firm and flat surface.

Prior Removal:

- Remove the both seats.
- Remove the fuel tank.
- Remove the air filter box.
- Loosen and remove **3 Nos** head cover bolts (**M6**) (**a**) with seal washers (**b**) from cam cover.

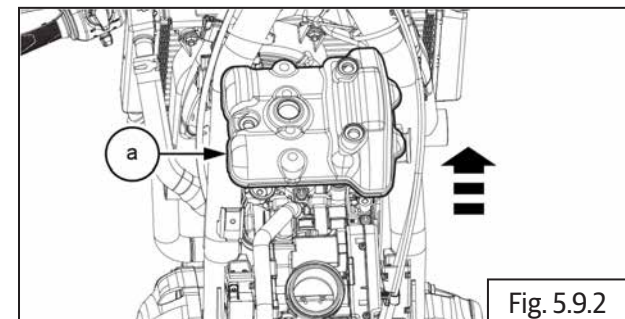
⚠ CAUTION

Remove the bolts equally to avoid thread damage.

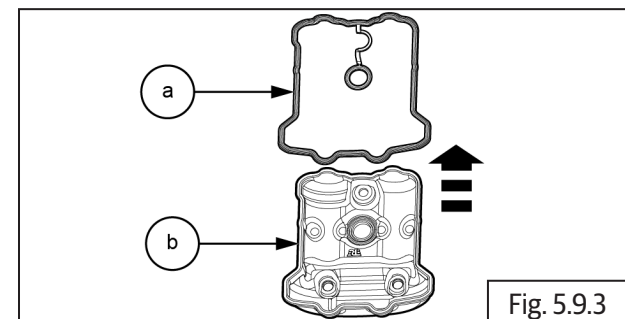


5 mm allen key with Ratchet

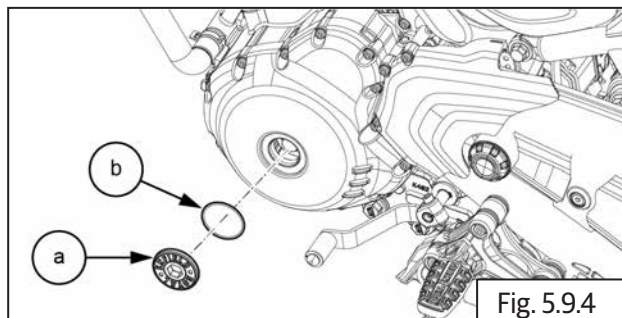
- Gently remove cam cover (**a**) from cylinder head.



- Remove gasket (**a**) from cam cover.

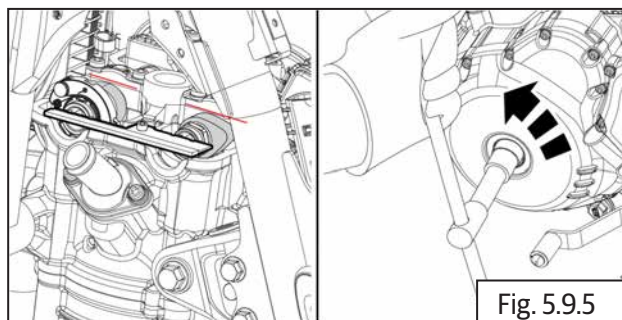


- Remove the plug-crankshaft hole **(M34) (a)** with "O" ring **(b)** from middle of the cover LH.



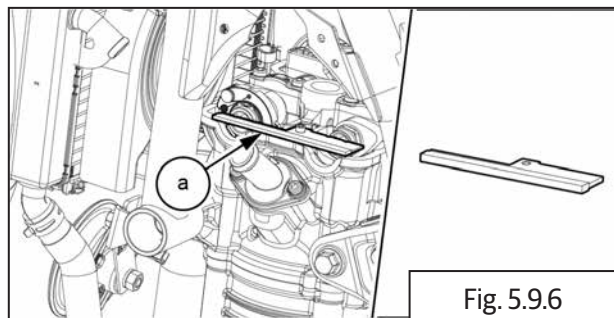
14 mm allen key with Ratchet

- Rotate the magneto rotor slowly until both cam slots are aligned on deck surface.
- Check that inlet and exhaust cam lobes point outwards. See the picture below



17 mm Socket with Ratchet

- Insert the special tool **(a)** on inlet and exhaust cam shaft slot.

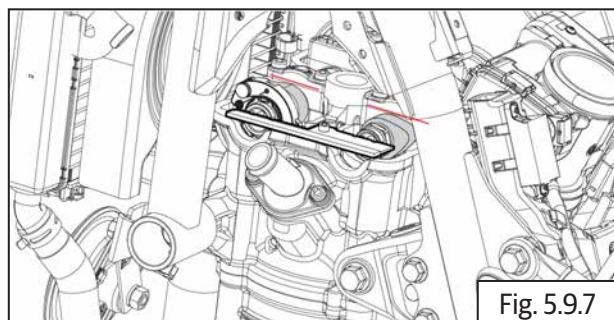


Part No: ST-32061-a



Part Name: Cam TDC Locking Tool

- Check that inlet and exhaust cam lobes point outwards. See the picture below.



NOTE

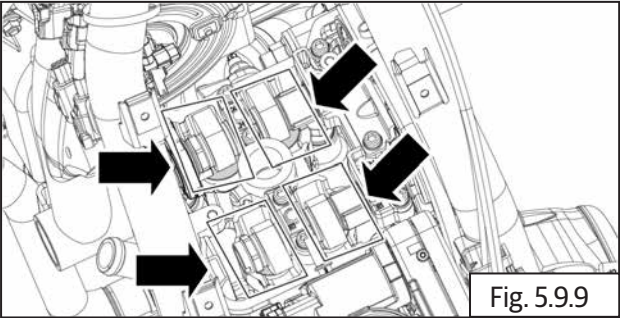
- Maximum single feeler gauge thickness to use is 0.15mm. For clearances greater than 0.15mm use combinations of feeler gauges.
- e.g. $0.12 + 0.13 = 0.25\text{mm}$

- Insert the feeler gauge between cam shaft and tappet bucket.



Feeler Gauge

- Check the valve clearance at all valves between the camshaft and tappet bucket.



- Record clearance values in a table. Refer below table.

Valve Position	Measured Clearance (A)	Measured Fitted Shim (B)	Calculated New Shim (D)	Fitted New Shim (E)	Calculated New Clearance (F))	Measured New Clearance
Int LH						
Int RH						
Exh LH						
Exh RH						

$$\text{Calculated new shim (D)} = A + B - C$$

$$\text{Calculated new clearance (F)} = A + B - E$$

- Measured value should be below spec.

Valve Clearances (mm) Cold condition	
Intake valve clearance	0.12mm to 0.18mm
Exhaust valve clearance	0.22mm to 0.28mm

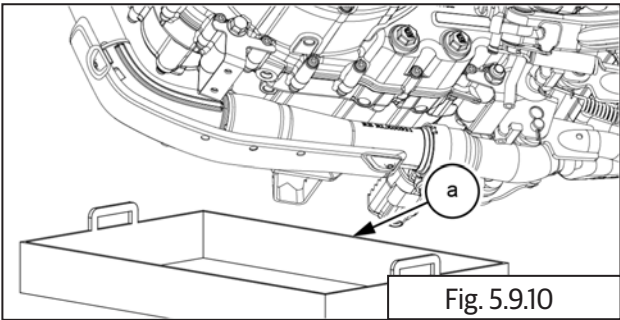
- If valve clearance does not meet specification, adjust the valve clearance.

All Valve measured value		Status
Intake valve (LH)	0.15mm	ok
Intake valve (RH)	0.10mm	Not ok
Exhaust valve (LH)	0.25mm	ok
Exhaust valve (RH)	0.30mm	Not ok

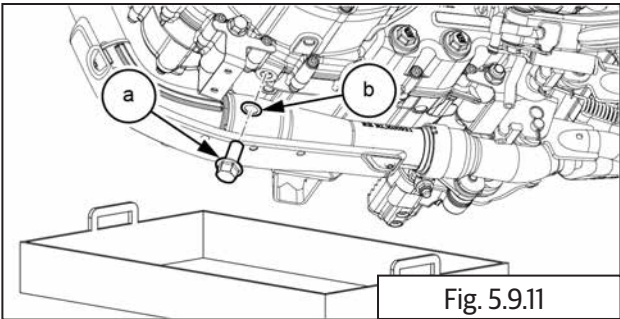
6.2 Valve Clearance Adjusting Procedure

Prior Removal:

- Remove the sump guard.
- Place the tray to underneath the engine.

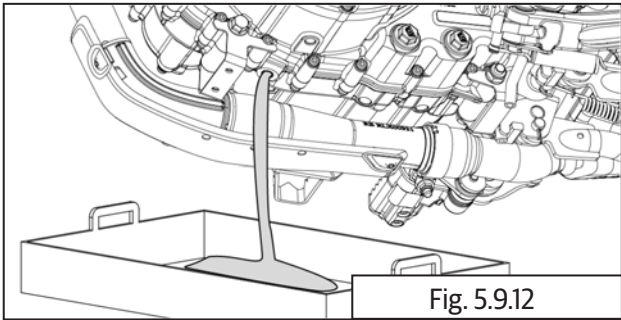


- Loosen and remove crank lock plug bolt **(M10) (a)** with copper washer **(b)** .

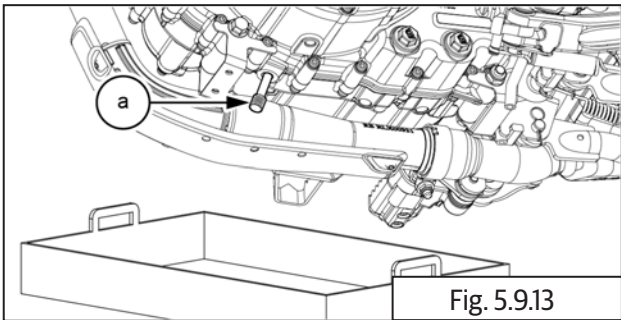


	14 mm Socket with Ratchet
--	---------------------------

- Allow the oil to drain from plug hole.



- Insert the crank TDC locking tool **(a)** and tighten by hand.



	Part No: ST-32062-a
	Part Name: Crankshaft TDC Locking Tool

- Once pin is located, ensure crank cannot rotate in either direction.

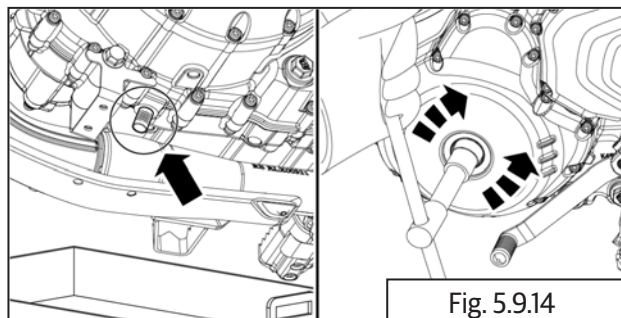


Fig. 5.9.14

- Mark the both cam sprocket and cam chain position using paint marker. See below image.

NOTE

- Clean the surface of the cam sprocket. If oil is on the surface, the paint marker cannot mark on it.

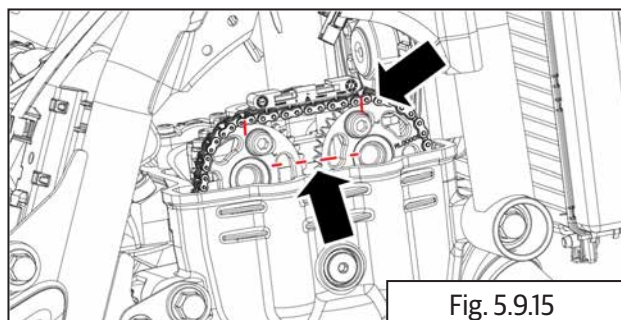


Fig. 5.9.15



Paint marker

- HMT** - called as Hydro Mechanical Tensioner.
- Remove the HMT **(a)** with sealing washer **(b)** from engine RHS.

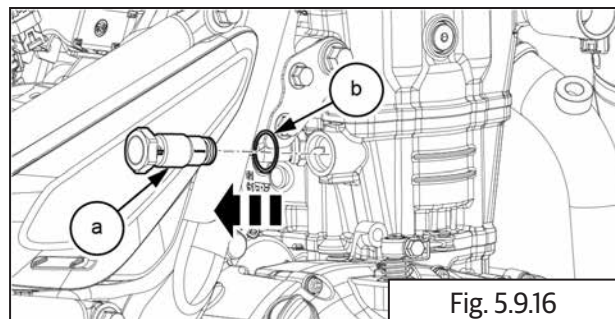


Fig. 5.9.16



27 mm Socket with Ratchet

- Loosen and remove the **6 Nos** inlet and exhaust cam ladder cap bolts **(M6) (a)** from cylinder head.

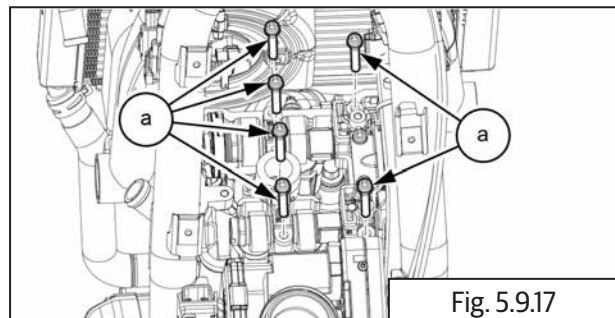


Fig. 5.9.17



5 mm Allen Socket with Ratchet

⚠ CAUTION

Remove the bolts equally to avoid thread damage.

- Loosen and remove the **2 Nos** cap bolts **(M6) (a)** from top guide plate.

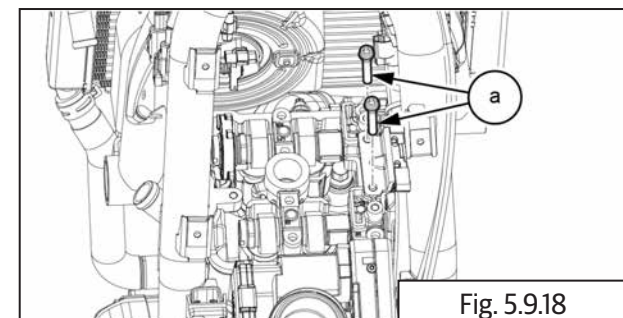


Fig. 5.9.18



5 mm Allen Socket with Ratchet

- Remove the top guide plate **(a)**.

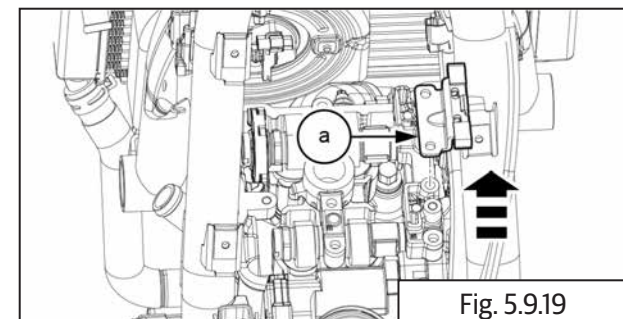
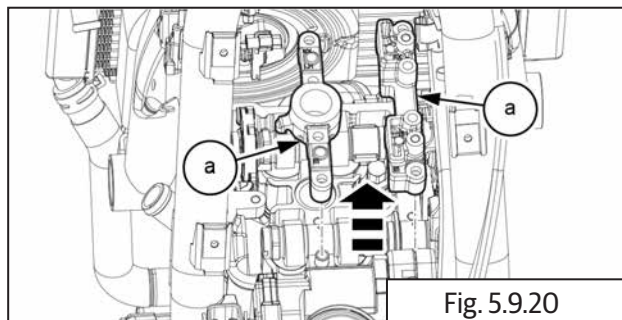
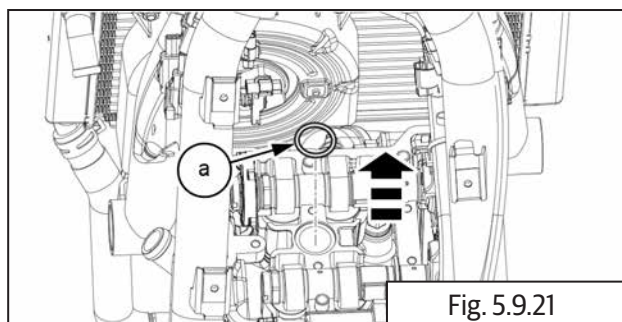


Fig. 5.9.19

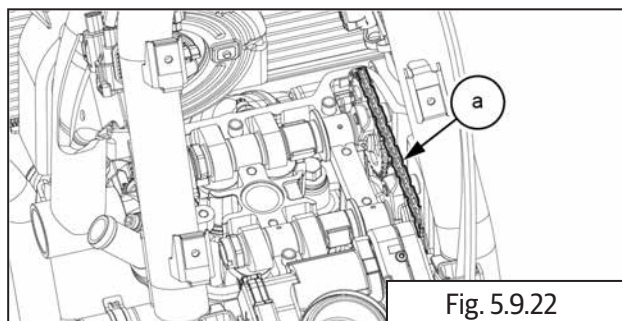
- Remove the **2 Nos** cam caps **(a)** from cam shaft.



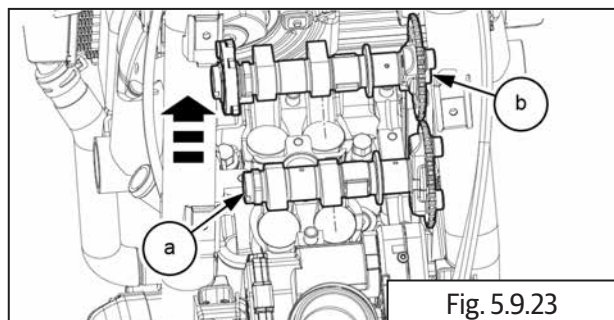
- Remove the "O" ring **(a)** from cylinder head.



- Detach the cam chain **(a)** from inlet and exhaust cam sprocket.



- If only inlet clearances require adjustment remove only inlet cam shaft **(a)**.
- If only exhaust clearance require adjustment remove only exhaust cam shaft **(b)**.



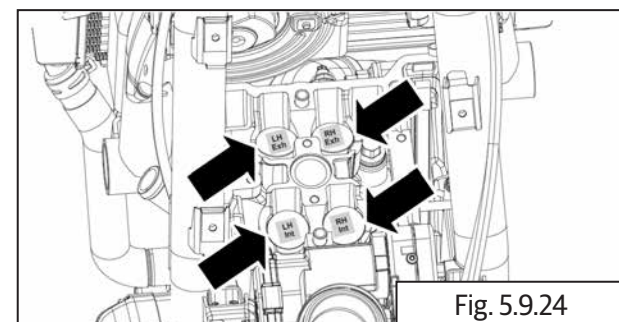
NOTE

- Do not use paint marker.

- Mark the position of each bucket using marker before removal. It will help to avoid mixed up. Refer below image.

NOTE

- Clean the top surface of the tappet bucket. If oil is on the surface, the marker cannot mark on it.



Sharpie permanent marker

- Work in this below order:**

- Inlet LH
- Inlet RH
- Exhaust LH
- Exhaust RH

- Adjust clearances only where required to bring them within range.

- Remove the inlet tappet bucket (RH) **(a)** using magnetic stick.

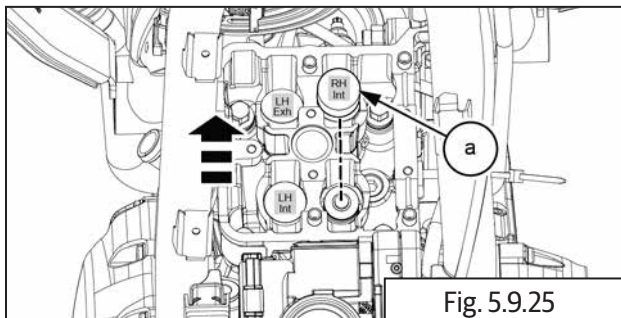


Fig. 5.9.25

	Part No:
	Part Name: Magnetic stick

- Measure the thickness of the shim using a micrometer.

NOTE
Micrometer MUST be calibrated.

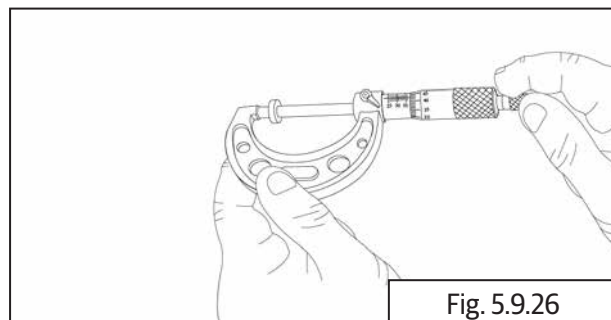


Fig. 5.9.26

- Remove the shim **(a)** from retainer using magnetic stick.

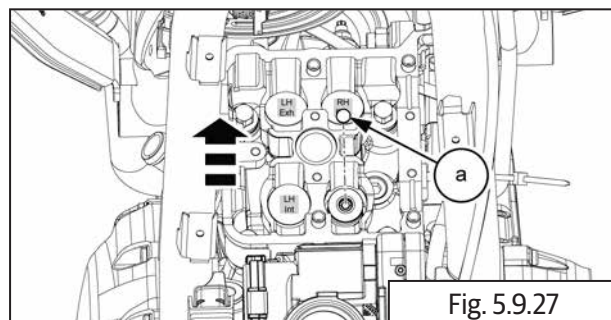
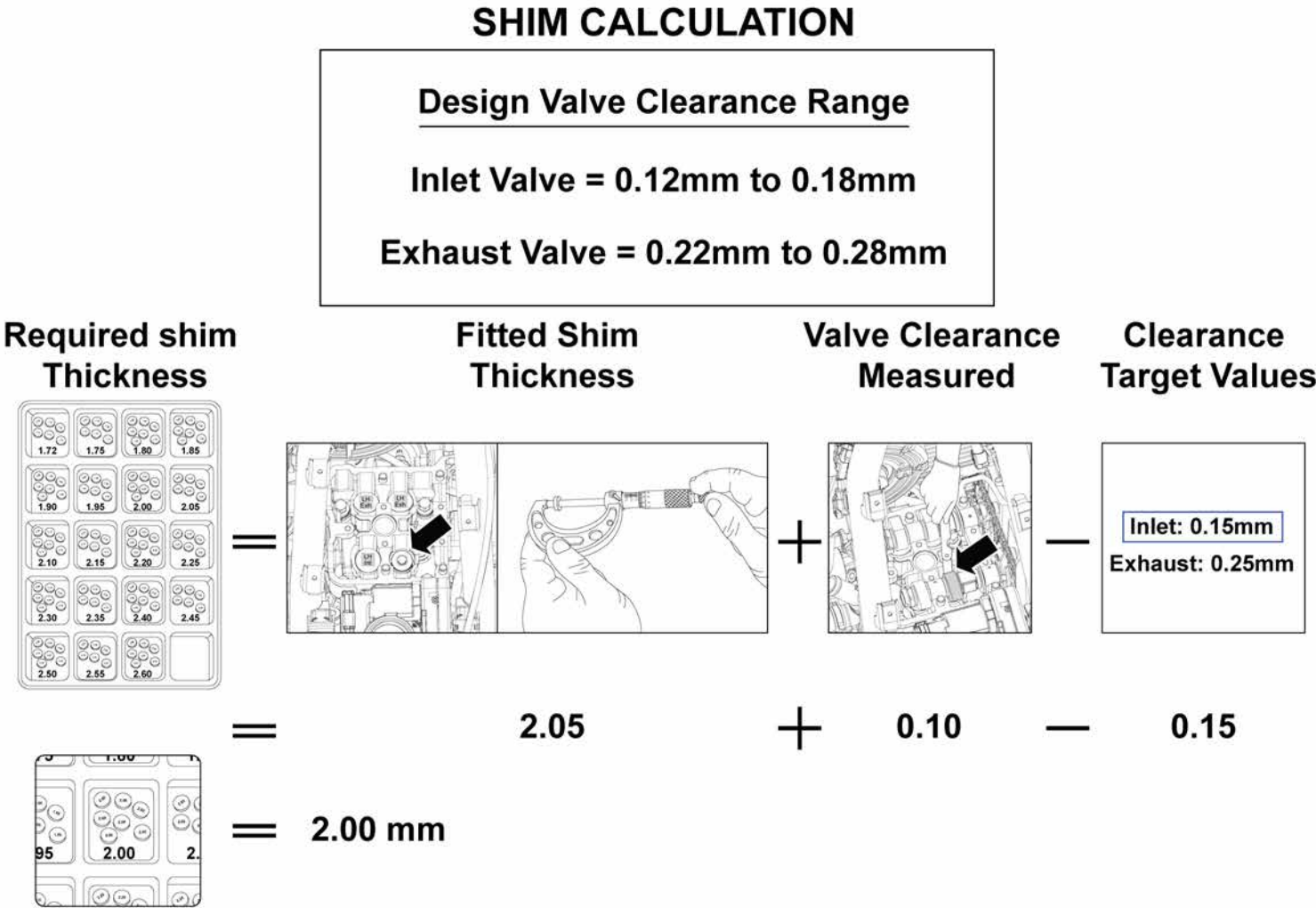


Fig. 5.9.27

	Part No:
	Part Name: Magnetic stick

- Record clearance values in a table. Refer 6.3A

6.3. Shim Calculation



6.3.A Table

	Manual Data Entry here		Google Sheet Calculated Values Here			Manual Data Entry Here
Valve Position	Measured Clearance (A)	Measured Fitted Shim (B)	Calculated New Shim (D)	Fitted New Shim (E)	Calculated New Clearance (F)	Measured New Clearance
Int LH	0.10	2.05	2.00	2.00	0.15	
Int RH	0.15	2.20	2.20	2.20	0.15	
Exh LH	0.19	1.95	1.89	1.90	0.24	
Exh RH	0.29	2.00	2.04	2.05	0.24	

Target Clearance (C)

Intake = 0.15

Exhaust = 0.25

Calculated new shim (D) = A + B - C

Calculated new clearance (F) = A + B - E

NOTE

- If the shims or tappet buckets misplaced, the adjustment will not be accurate.
- When adjusting the clearances you should complete the process for one valve before you start the adjustment for another valve. It is important to make sure that the shims and tappet buckets are not mixed up.

- Install the new calculated thickness shim **(a)** on the retainer and reassemble the tappet bucket.

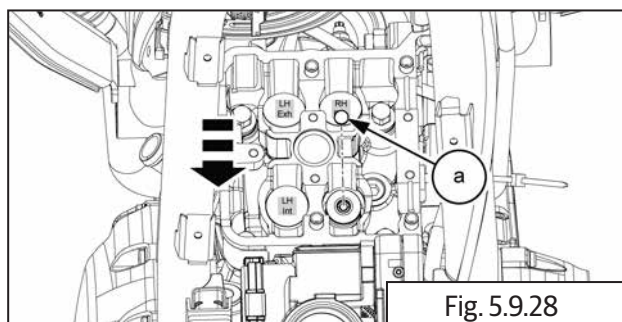


Fig. 5.9.28

- Repeat the above process for each of the valves where the clearance needs to be adjusted.

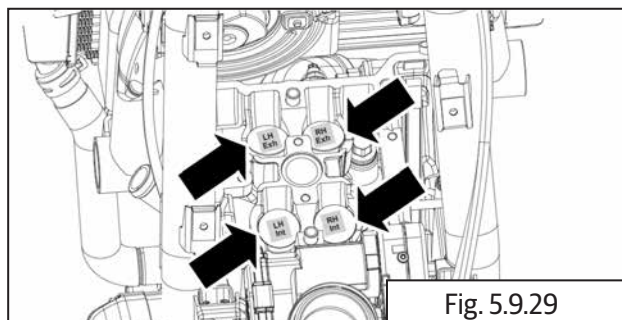


Fig. 5.9.29

- Exhaust cam shaft **(b)** should be installed before inlet cam shaft **(a)** if both cam shafts have been removed.

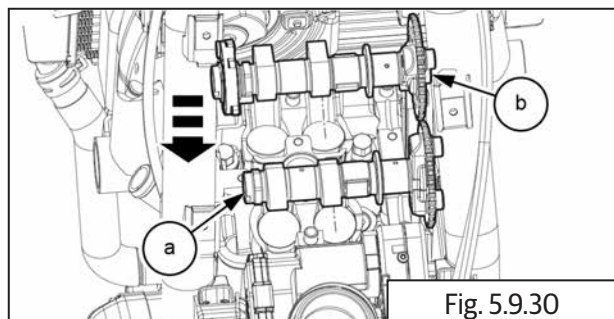


Fig. 5.9.30

- Chain should be fitted over cam sprockets and paint marks should be lined up at this stage before the **2Nos** cam caps are re-fitted.

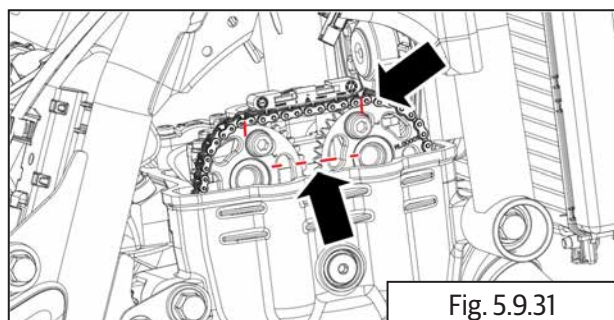


Fig. 5.9.31

- Install the timing chain **(a)** on the both cam sprocket.

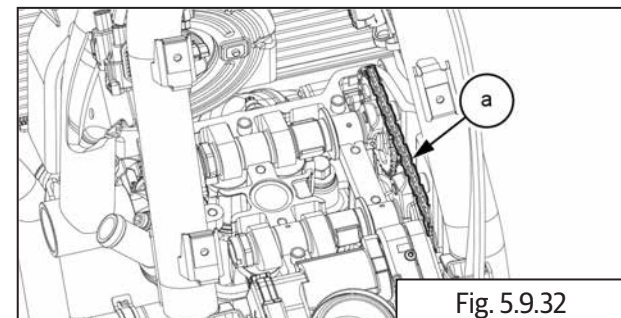


Fig. 5.9.32

- Match the sprockets and chain on as per the paint mark.

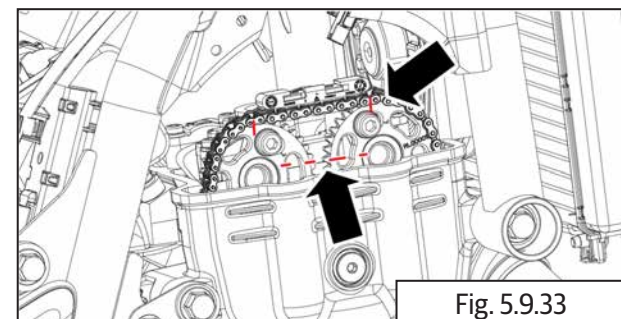
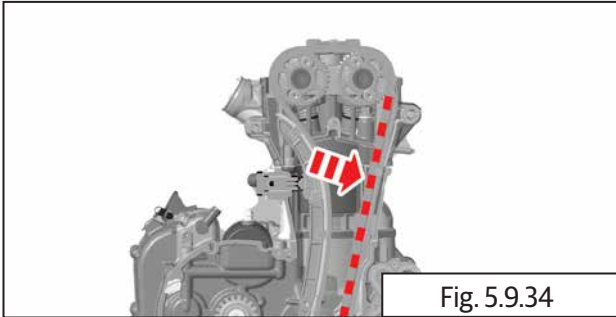


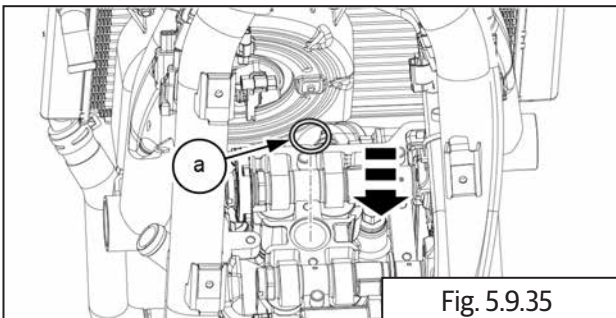
Fig. 5.9.33

NOTE

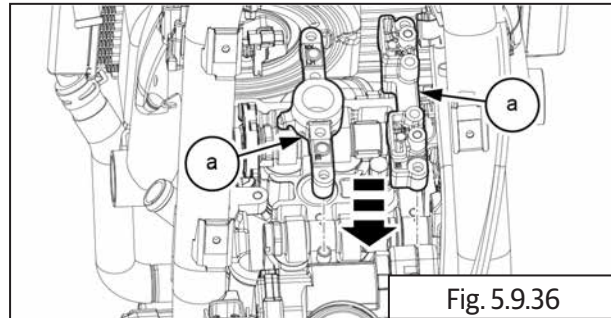
- Ensure no chain slackness between crank sprocket and exhaust cam sprocket. Refer below image.



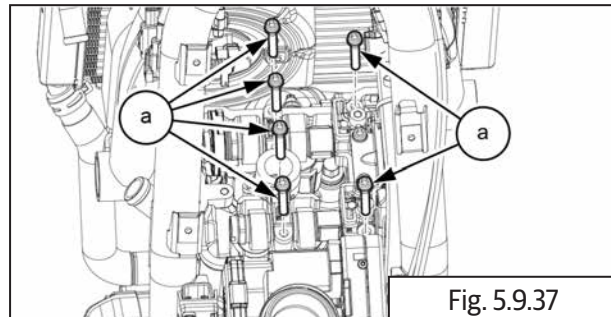
- Install the new "O" ring (a) on the cylinder head.



- Install the inlet and exhaust cam caps (a).

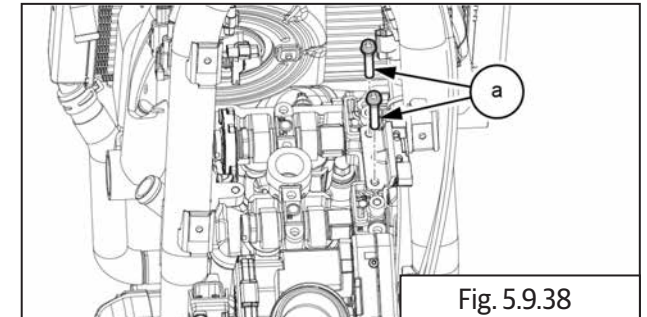


- Locate and tighten the **6 Nos** inlet and exhaust cam cap bolts (M6) (a) on cylinder head.



	5mm Allen Socket With Ratchet
	10 N-m / 1.0 kgf-m

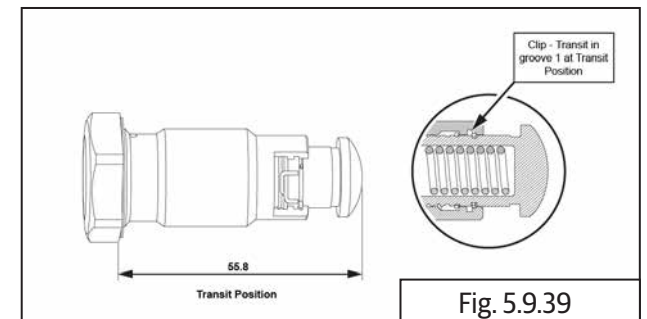
- Locate and tighten the **2 Nos** cap bolts (M6) (a) on top guide plate.



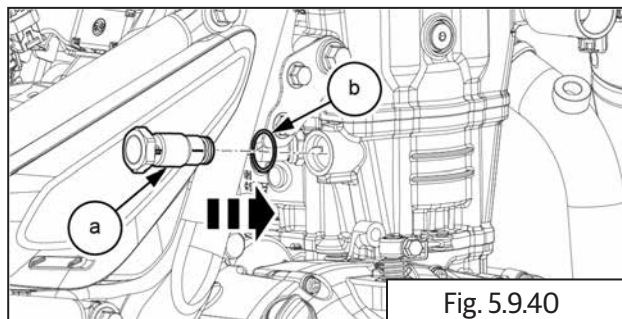
	5mm Allen Socket With Ratchet
	10 N-m / 1.0 kgf-m

NOTE

- HMT should be in Transit position before install refer below image.



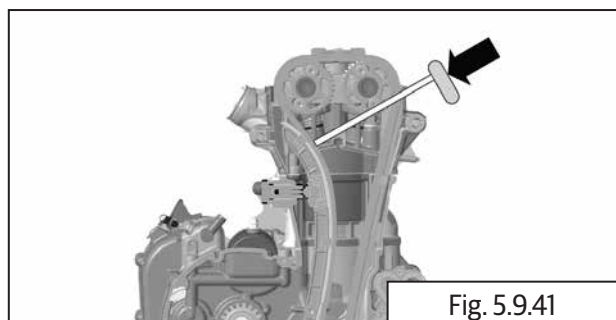
- Install the HMT **(a)** with new sealing washer **(b)** on engine RHS.



	27 mm Socket with Ratchet
	38 -42 N-m / 3.8 - 4.2 kgf-m

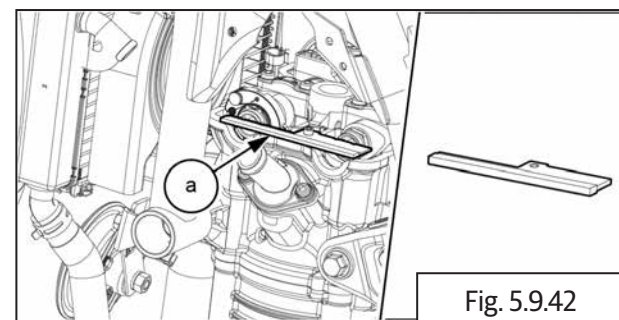
- Using a special tool push cam chain against tensioner arm. Refer below image.

NOTE	
•	Listen for “click” as HMT releases from transit position and ratchet is disengaged.
•	“click” will only be heard if background noise level is low.



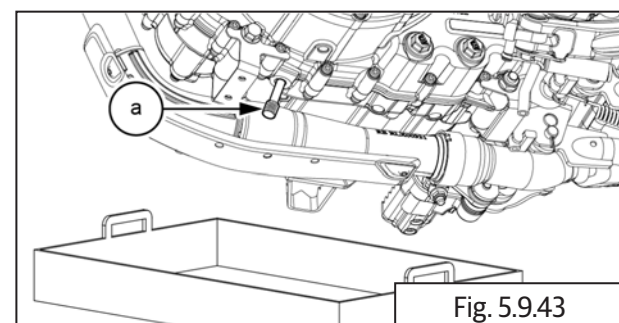
	Part No: ST-32070-a
	Part Name: Nylon rod

- Insert the special tool **(a)** on inlet and exhaust cam shaft to confirm the timing is correct.
- At this stage the clearances should be checked again to ensure that the valve clearance adjustment has been done correctly.
- If the clearances are not correct the adjustment process MUST be repeated.



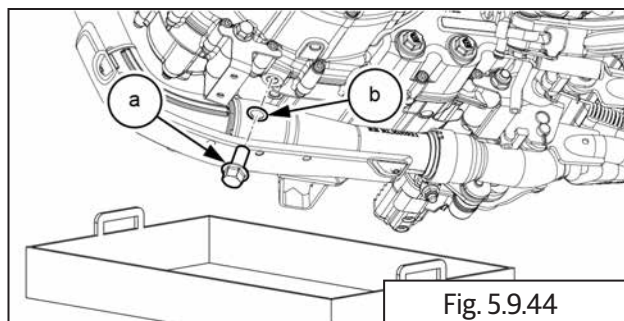
	Part No: ST-32061-a
	Part Name: Cam TDC locking tool

- Remove the Crank TDC locking tool **(a)**.



	Part No: ST-32062-a
	Part Name: Crank TDC locking tool

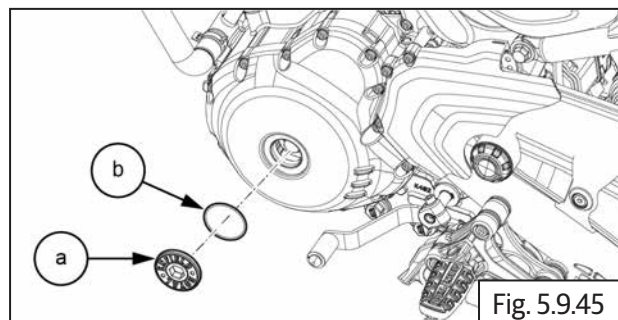
- Locate and tighten the crank lock plug bolt **(M10)** **(a)** with new copper washer **(b)**.



	14 mm Socket with Ratchet
	30 -34 N-m / 3.0 - 3.4 kgf-m

- Apply lubricant on the "O" ring before assembly process.

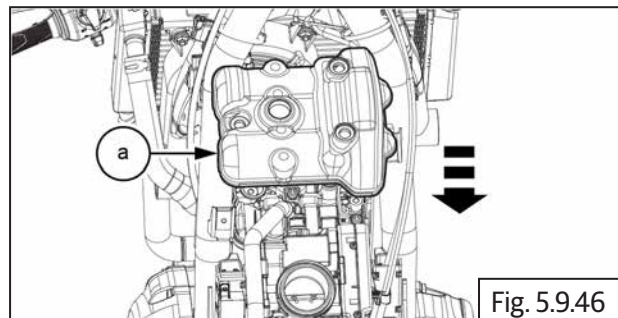
- Locate and tighten the plug crankshaft hole **(M34)** **(a)** with new "O" ring **(b)** on middle of the cover LH.



	Tyre lube or P-80 emulsion
---	----------------------------

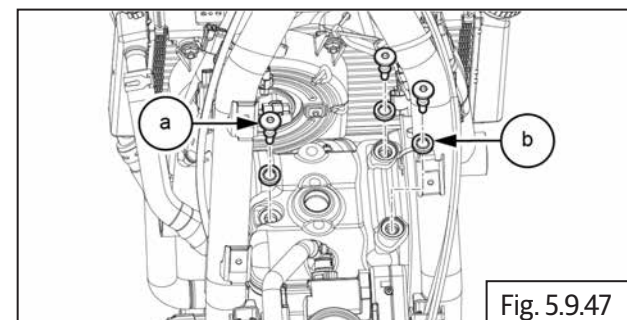
	14 mm allen key with Ratchet
	18 -22 N-m / 1.8 - 2.2 kgf-m

- Install the cam cover with new gasket **(a)**.



- Install and tighten the **3 Nos** head cover bolts **(M6)** **(a)** with new seal washers on cam cover.

! CAUTION	
Tighten the bolts equally to avoid thread damage.	



	5 mm allen key with Ratchet
	11 N-m / 1.1 kgf-m

- Fill recommended engine oil till the level is between the “Max and Min” marks on the oil level window on clutch cover.

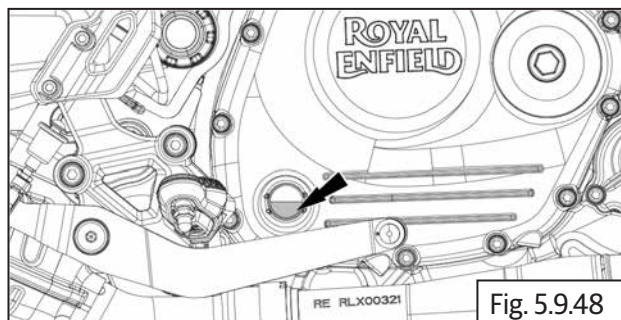


Fig. 5.9.48

Grade	ELF Moto 4 Roadstar 10W-40 (API SN/JASO MA2)
-------	--

Assemble the following parts:

- Install the sump guard
- Install the fuel tank
- Install the both seats.

ENGINE TROUBLESHOOTING

5.8 Engine Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix
Poor/Weak Compression	Spark plug is loose	Spark plug is not tightened to torque	Check and tighten spark plug to specified torque.
		Threads are stripped OR damaged on spark plug OR cylinder head	Inspect spark plug tightening threads in cylinder head for wear-out/damage. Replace cylinder head assembly. Inspect spark plug threads for any damages OR wear-out. Replace spark plug.
	No clearance between rocker arm and valve stem	Tappet is adjusted too tight (Causing valves to be partially open in TDC compression stroke)	Refer tappet bucket setting procedure. Check and Adjust valve clearance as per specifications.
	Valve(s) movement sticky in valve guide(s)	Valve stem is partially seized in valve guide	Check valve(s) for free movement in valve guide(s). Replace as required.
		Valve stem(s) bent	

Symptom	Possible Cause	Diagnosis	How to Fix
Poor/Weak Compression	Valve(s) stuck open after compression stroke (Valve timing)	Sprocket is incorrectly aligned to cam shaft	Check and align sprocket correctly on cam shaft.
		Cam shaft rotation is partially seized (sticky) in cylinder head	Check cam shaft for free movement in cylinder head. Replace as required.
	Cylinder head gasket leakage	Uneven head bolt torque	Remove and inspect cylinder head/ cylinder barrel seating surfaces for warpage, damage, unevenness, etc. Replace cylinder head gasket and tighten cylinder head bolts to specified torque.
		Uneven/damaged seating surface on cylinder head/cylinder barrel	
	Piston rings are worn out	Excessive gap in piston rings at the end in cylinder barrel	Inspect piston rings and cylinder barrel for excessive wear out. Replace piston rings/piston with rings.
			Replace cylinder barrel assembly if cylinder barrel is worn out.

Symptom	Possible Cause	Diagnosis	How to Fix
Poor/Weak Compression	Piston scuffed/partially seized in cylinder barrel	Piston scuffed/damaged/partially seized in cylinder barrel	Inspect cylinder barrel for damages/ heavy scoring and replace piston assembly AND/OR cylinder barrel as required.
Engine Overheating	Oil level is low	External oil leakage	Inspect all joints carefully for oil leaks and rectify.
		Excess oil consumption	Check for smoke through exhaust in hot condition, inspect valve stem seals, valve stem to guide excess clearance, piston rings wear-out, and piston/ cylinder barrel wear-out/damage. Repair/replace accordingly.
	Engine oil is contaminated	Non recommend engine oil is used Metal particles found in oil	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Overheating	Engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Engine oil looks too black/highly viscous	Engine oil is not changed as per recommended maintenance schedule	
	Low engine oil pressure	Strainer is blocked	Remove oil sump cover and strainer, Clean/replace oil strainer. Replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
		Poor delivery by oil pump	Check oil pressure, inspect oil pump for internal blocks OR wear out. Clean & replace oil pump as required. Replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	No clearance between tappet bucket and cam shaft	Tappet(s) adjusted is too tight (Causing valves to be partially open in TDC compression stroke)	Check and adjust tappet clearances to specifications.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Overheating	Partial seizure of Engine internals	Rocker arm(s) is partially seized (sticky) in spindle(s)	Check rocker arm(s) for free movement in spindle(s).
		Cam shaft rotation is partially seized (sticky) in cylinder head	Check cam shaft for free movement in cylinder head.
		Valve stem is partially seized (sticky) in valve guide	Check valve(s) for free movement in valve guide(s).
		Piston is scuffed/damaged/partially seized in cylinder barrel	Inspect cylinder barrel for damages/heavy scoring and replace piston assembly AND/OR cylinder barrel as required.
		Connecting rod is partially seized in crank shaft assembly	Dismantle engine, inspect all internal parts, replace as required and reassemble engine.
		Journal bearings/crankshaft/balancer shafts are seized	
	Transmission drag	Bearings/Gear/Bushes in the shaft are seized	Dismantle engine, inspect all internal parts, replace as required and reassemble engine.
	Too little coolant in cooling system	Check the cooling system for leakage. Check the coolant level	
	Radiator fins very dirty	Clean the radiator fins	
	Foam formation in cooling system	Drain the coolant, fill / bleed the cooling system	
	Thermostat defective	Check the thermo start	
	Fan fuse blown	Change the fault fuse	
	Defect in radiator fan system	Check radiator fan system	

Symptom	Possible Cause	Diagnosis	How to Fix
Excessive Engine Oil Consumption/Smoke (Bluish White)	Excess oil in Engine	Engine oil is filled excessively	Drain and refill oil to correct specifications. Replace oil filter. Inspect and clean air box and breather hoses for excess oil.
	Engine oil is contaminated	Engine oil is NOT as per Royal Enfield recommendation	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Engine oil looks too black/highly viscous	Engine oil is not changed as per recommended maintenance schedule	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Relief valve in oil pump malfunction	Remove and inspect oil pump relief valve	Remove oil pump and clean OR replace the relief valve.
	Valve stem seal failure	Valve stem seal(s) is cracked OR loose in valve guide	Inspect Stem seals; if defective replace full set.
	Valve stem to valve guide clearance is excess	Valve guides worn out excessively	Inspect valve stem guide. If the clearance is out of specification; replace head assembly.

Symptom	Possible Cause	Diagnosis	How to Fix
Excessive Engine Oil Consumption/ Smoke (Bluish White)	Valve stem is scuffed/scored	Valve stem seal(s) is cracked OR worked loose from valve guide	Inspect Stem seals; if defective replace full set.
	Piston rings are stuck in piston ring grooves	Wet/excessive carbon build up in ring grooves in piston/on rings	Release piston ring(s) carefully from piston ring groove(s), clean and replace with new rings. Inspect cylinder for damages.
	Piston rings are worn out	Excessive gap in piston rings at the end in cylinder barrel	Inspect piston rings and cylinder barrel for excessive wear out. Replace piston rings/piston with rings. Replace cylinder barrel assembly if cylinder barrel is worn out.
	Piston is seized in cylinder barrel	Piston is scuffed, damaged OR partially seized in cylinder barrel	Inspect cylinder barrel for damages/heavy scoring and replace piston assembly AND/OR cylinder barrel if required.

Symptom	Possible Cause	Diagnosis	How to Fix
Excessive Engine Oil Consumption/ Smoke (Bluish White)	Partial seizure of engine internals	Connecting rod is partially seized in crank shaft assembly	Dismantle engine, inspect all internal parts, replace as required and reassemble engine.
		Journal bearings/crankshaft/balancer shafts are seized	
Engine Noise Top End	Exhaust gas leak between cylinder head and exhaust pipe	Exhaust pipe(s) flange mounting nuts are loose AND/OR seal is deformed OR damaged	Dismantle exhaust pipe(s) from cylinder head; replace gasket and tighten flange mounting to specified torque.
	Excessive wear-out of Camshaft journals	Camshaft journal is partially seized OR scored	Inspect and replace cylinder head.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Middle	Cam chain tensioner is defective	Cam chain tensioner spring/cam chain pad are worn-out OR broken	Replace cam chain tensioner pad assembly.
	Piston rings are stuck in piston groove	Wet/excessive carbon is build up in the ring grooves in piston/on rings	Release piston ring(s) carefully from piston ring groove(s), clean and replace with new rings.
	Piston rings are worn out	Excessive gap in piston rings at the end in cylinder barrel	Inspect piston rings and cylinder barrel for excessive wear out. Replace piston rings/piston with rings. Replace cylinder barrel assembly if cylinder barrel is worn out.
	Excessive clearance between Piston and barrel	Inspect Piston to Barrel clearance for given specs	Replace entire set of cylinder piston and barrel assembly.
	Connecting rod small end to piston pin clearance is excess	Remove and inspect if the piston pin is loose OR scored OR seized	Replace the piston pin AND/OR connecting rod as required.
	Connecting rod is bent	Remove and inspect valve timing; check if valve is stuck OR damaged and if the connecting rod is bent OR twisted	Replace the connecting rod AND/OR stem valve and affected parts.
Engine Noise Bottom	Crankshaft journal bearing is worn-out/partially seized	Remove and inspect the bearing code and crankshaft. Check for scores OR seizures	Check the oil gallery. Replace the journal bearings and crankshaft if required.
	Connecting rod big end journal bearing is worn-out/partially seized	Remove and inspect oil circulation and the connecting rod bigger end bearing	Check and replace the connecting rod big end bearing.
	Balancer shaft journal bearing is worn-out/partially seized	Remove and inspect the balancer shaft and journal bearing	Check and replace the balancer shaft bearing and replace if defective.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Bottom	Clutch slipper spring is deformed OR broken	Remove and inspect clutch slipper spring for breakage	Replace the clutch slipper spring if worn-out.
	Clutch outer hub collar bush/needle bearing is defective	Remove and inspect if the clutch outer hub collar bush/needle bearing is worn out	Replace the affected parts.
	Clutch friction plate lugs/clutch outer hub slots are defective	Remove and inspect if clutch friction plate lugs/clutch outer hub slots are worn-out OR damaged	Check and replace the friction plates and affected parts.
	Drive shaft bearing is worn out	Remove and inspect for noisy drive shaft bearing OR excess play	Check and replace the bearing/drive shaft assembly.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Bottom	Drive shaft bush is worn out	Remove and inspect for drive shaft bush wear-out OR excess play	Check and replace the bush and shaft if worn out.
	Counter shaft bearing is worn out	Remove and inspect for the noisy counter shaft bearing	Check and replace the counter shaft bearing and shaft if worn out.
	Counter shaft bush is worn out	Remove and inspect counter shaft bush for any wear-out OR excess play	Check and replace the counter shaft bush and shaft if worn out.
	Excessive clearance between splines and gears	Remove and inspect splines and gears for any wear-out OR excess play	Check and replace the gear splines and gears.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Vibration	Engine mounting fasteners to main/cradle frame are loose	Check all mounting fasteners for looseness/ stripped OR washed out threads/broken mountings/fasteners	Ensure engine mounting fasteners are tightened at specified torque to the main/cradle frame. Check the mounting for any cracks OR damages. Check if the adjuster and bush are as per specifications.
	Engine steady bracket is loose	Check fasteners for looseness/stripped/washed out threads/broken mountings/fasteners	Ensure engine steady bracket mounting is free of cracks. Ensure that fasteners are tightened to main frame to the specified torque.
	Silencer mounting is loose	Inspect silencer (LH/RH) mountings, mounting cub washers and brackets for cracks OR loose ends. Inspect if tightening torque with cylinder head and silencer pipe brackets to frame torque is as per specs	Ensure silencer (LH/RH) mountings points, mounting cub washers and brackets are free of cracks OR loose ends. Tighten all mounting fasteners to specified torque. Ensure exhaust pipe mounting flange nuts are correctly tightened to cylinder head.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Vibration	Foot pegs are loose	Check foot peg mounting fasteners for looseness/stripping/washed out threads/broken fasteners	Tighten foot pegs to specified torque and replace defective parts.
	Balancer shaft/crankshaft run-out	Dismantle engine and check balancer shaft for any run out/bearings damage	Replace affected bearings/balancer shaft.
Clutch is Spongy/Soft	Clutch inner cable is partially damaged	Inspect clutch cable top & bottom ends for damaged inner cable	Replace Clutch cable.
	Clutch has excess free play	Clutch cable free play is more than specs at handle bar end	Adjust clutch free play to 2-3mm.
	Engine oil has lost viscosity	Check if engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch is Spongy/Soft	Clutch activating lever assembly is loose on clutch shaft	Check if clutch lever clamping bolts are loose	Tighten clamping bolt on clutch lever as per specs.
		Inspect splines on clutch shaft and lever for splines damage/worn out	Replace clutch lever and shaft.
	Clutch springs are weak	Inspect clutch release springs for pre-setting/length reduction	Inspect clutch springs for correct free length and replace if out of specs.
	Clutch springs are broken	Inspect clutch springs for any damages	Replace clutch springs.
	Clutch friction plates have become soggy	Inspect clutch friction plate material for softness/damages/puffed up condition	Replace clutch friction plate/steel plates.
	Clutch center/hub is worn out	Inspect clutch center and hub splines area for damages/wear out	Replace clutch assembly.
	Clutch assembly center nut is loose	Inspect if clutch center fixing nut is loose/threads are washed out	Replace nut/main shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch is Hard	Clutch inner cable is stuck/has hard movement in outer cable	Inspect inner clutch cable for free movement in outer cable	Lubricate clutch cable and inspect for free movement. If problem still exists, replace clutch cable.
	No free play in clutch lever at handle bar end	Clutch cable free play is less than specs	Adjust clutch free play to 2-3mm.
	Engine is contaminated	Engine oil is not changed as per recommended maintenance schedule OR Engine oil is NOT as per Royal Enfield recommendation	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Excess Oil in Engine	Engine oil is filled excessively	Drain and refill oil to correct specifications.
	Clutch lever movement is sticky in cover RH	Check free movement of clutch shaft in cover RH	Remove clutch shaft from cover RH, inspect, lubricate and reassemble.
		Check if clutch shaft is seized in cover RH	Replace clutch shaft in cover RH.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch Slip	Clutch has excess free play	Inspect clutch cable top & bottom ends for frayed strands of the inner cable	Replace clutch cable if damaged. Adjust clutch free play to 2-3mm.
	Clutch lever movement is sticky in cover RH	Check free movement of clutch shaft in cover RH	Remove clutch shaft from cover RH, inspect, lubricate and reassemble.
		Check if clutch shaft is seized in cover RH	Replace clutch shaft in cover RH.
	Clutch springs are weak	Inspect clutch release springs for presetting/length reduction	Replace if out of specs.
	Clutch springs are broken	Inspect clutch springs for any damages	Replace clutch springs.
	Clutch friction plates have become soggy	Inspect clutch friction plate material for softness/damages/puffed up condition	Replace clutch friction plate/steel plates.
	Clutch center/hub is worn out	Inspect clutch center and hub spline area for damages/wear out	Replace clutch assembly.
	Clutch assembly center nut is loose	Inspect if clutch center fixing nut is loose/threads are washed out	Replace nut/main shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch juddering	Clutch cable is brittle	Inspect clutch cable top & bottom ends for frayed strands of the inner cable	Replace clutch cable.
	Clutch lever movement is sticky in cover RH	Check free movement of clutch shaft in cover RH	Remove clutch shaft from cover RH, inspect, lubricate and reassemble.
		Check if clutch shaft is seized in cover RH	Replace clutch shaft in cover RH.
	Uneven wear of clutch friction plates	Friction plates OR steel plates are worn-out, warped OR dragging	Remove clutch friction and steel plates. Inspect, lubricate and reassemble. Replace if necessary.
	Clutch steel plate movement on clutch hub is abrupt		
	Clutch steel plate warped	Check if steel plate is warped OR worn-out	Remove clutch steel plates, inspect, lubricate and reassemble. Replace if necessary.
	Clutch release spring is sticky	Inspect if the clutch release spring is not releasing properly	Remove, inspect and replace.
Noise in Clutch	Clutch Spring is broken	Inspect if the clutch is also broken	Replace the spring and clutch if required.
	Clutch outer hub collar bush/needle bearing is worn-out	Inspect if Clutch outer hub collar bush/needle bearing for damages	Replace hub collar bush AND/OR needle bearing.
	Clutch friction plate lugs/clutch outer hub slots are worn out	Inspect clutch friction plate and outer hub for damages	Replace Clutch friction plate lugs AND/OR clutch outer hub.
Down-Shift/Up-Shift Travel Is Excessive	Gear link is defective	Inspect if the gear link is worn out	Remove, lubricate link and reassemble. Replace if necessary.

Symptom	Possible Cause	Diagnosis	How to Fix
Gear is Hard to Shift	Gear shift stopper is defective	Inspect gear shift stopper roller for wear-out/damage	Remove and lubricate shifter and reassemble. Replace if necessary.
	Gear shift stopper spring is defective	Inspect gear shift spring for preset/breakage	Replace the spring.
Gear is under engaged condition	Shifter fork movement is sticky	Inspect if shifter fork has sticky movement in spindle/selector drum	Replace the shifter fork.
Gear Engagement is Hard	Oil level is low/engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Excessive clutch free play	Clutch cable free play is more than specs at handle bar end	Adjust free play and replace clutch cable if necessary.
	Gear shaft is bent	Inspect if the gear shaft is sticky OR bent	Replace gear shaft.
	Shifter fork movement and selector drum are sticky	Inspect shifter fork free movement in selector drum	Replace the selector drum.
	Sliding gear movement on counter-shaft/drive shaft is sticky	Inspect if gear sliding is sticky	Replace sliding gears on counter shaft and drive shaft.
	Gear shift stopper movement is sticky	Inspect if shifter fork stopper is worn-out	Remove, lubricate and reassemble shifter fork. Replace if necessary.
	Gear shift shaft is bent/stuck	Remove and inspect shaft run-out	Replace gear shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Gear Engages and Slips	Gear shift stopper is worn-out	Inspect gear shift stopper	Remove, lubricate shifter and reassemble. Replace if necessary.
	Gear shift stopper spring is broken	Inspect gear shift spring for preset/breakage	Check and Replace the spring.
	Sliding gear dogs are worn-out	Inspect sliding gear dogs	Remove and replace if necessary.
Gear is not Engaging	Engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Gear teeth are broken	Inspect gear teeth	Remove, inspect and replace gear and affected parts.
	Gear shift stopper is jammed	Inspect the movement of the stopper	Remove, inspect and replace the stopper id necessary.
	Selector fork is jammed on spindle	Remove and check the fork in the drum	Check, lubricate and reassemble OR replace if required.
	Selector fork is jammed in selector drum	Check for free traveling of the fork in the selector drum	Replace the drum and affected parts.
	Gear shift shaft is bent/stuck	Dismantle and check the run-out	Replace the gear selector shaft.
Gear Lever is not Returning After Shifting	Gear shift shaft spring is broken	Check operation of gear selector shaft spring AND/OR lock	Remove and replace the spring.
	Gear shift shaft is bent/stuck	Inspect gear shift shaft guide movement	Replace gear shift shaft and affected parts.

Symptom	Possible Cause	Diagnosis	How to Fix
Noise in Gear Box	Engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Gear teeth are broken	Inspect gear teeth	Remove, inspect and replace gear and affected parts.
	Drive shaft bearing is worn-out	Check the bearing sound and wear-out	Dismantle, inspect the drive shaft bearing and replace.
	Drive shaft bush is worn out	Check the bush play and seating	Remove, inspect and replace drive shaft push.
	Counter shaft bearing is worn out	Check if the counter shaft bearing has excess play	Remove, inspect and replace counter shaft bearing and shaft if required.
	Counter shaft bush is worn out	Check if the counter shaft bush is worn-out OR has excess play	Remove, inspect and replace counter shaft bush and shaft if required.
	Excessive clearance between splines and gears	Check if clearance is as per specifications	Remove, inspect and replace the affected parts.

AIR FILTER BOX ASSEMBLY

CONTENTS	PAGE
6.1 Air Filter Box Assembly.....	246
Dismantling.....	246
6.1.1 Air Filter Element.....	246
6.1.2 Air Filter Box Assembly	246
Inspection	249
Assembly	250
6.1.3 Air Filter Box Assembly	250
6.1.4 Air Filter Element	252
Troubleshooting	254

6.1 Air Filter Box Assembly

Dismantling

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

⚠ CAUTION

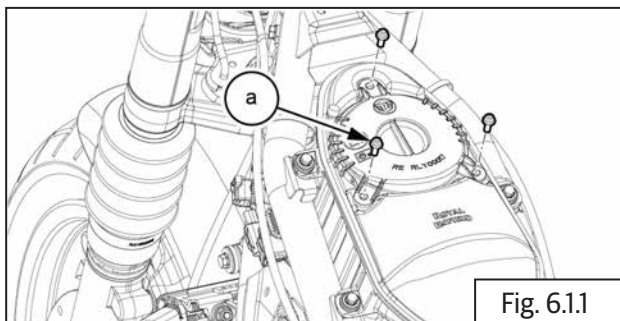
Be careful while connecting and disconnecting the electrical couplers. Do not damage pins of the couplers.

- Ensure ignition switch and engine stop switch are in OFF position.
- Disconnect battery negative (-) terminal.

6.1.1 Air Filter Element

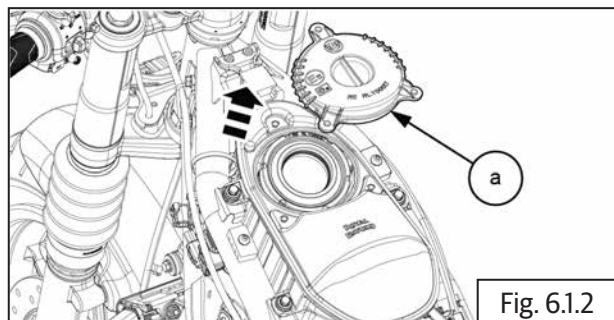
Prior Removal:

- Remove the fuel tank (Refer Fuel System Chapter).
- Remove the seat (Refer Side Panels and Seat Chapter).
- Loosen and remove **3 Nos** allen head screws (**M5**) (**a**) from air filter box cover.

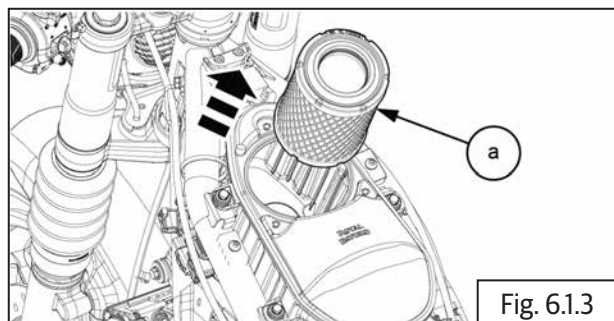


4mm Allen Socket With Ratchet

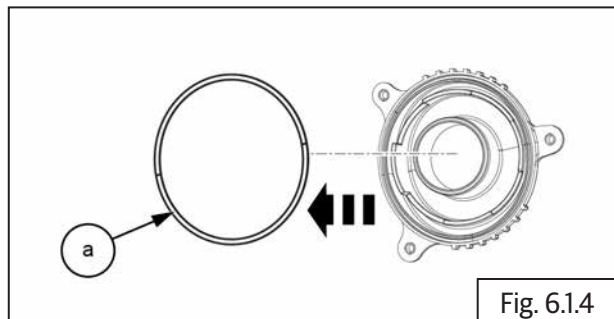
- Remove the cover (**a**) from air filter box.



- Gently pull out air filter element (**a**) from air filter box assembly.



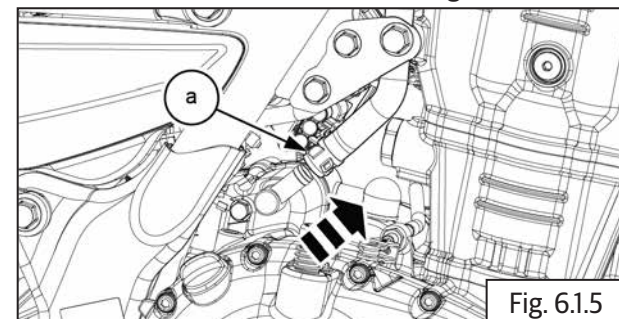
- Remove the "O" ring (**a**) from air filter box cover.



Flat Head Screw Driver

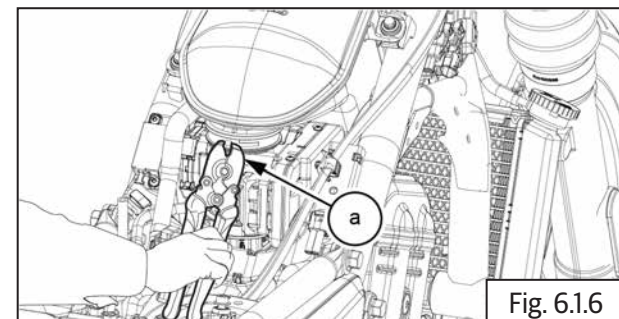
6.1.2 Air Filter Box Assembly

- Remove the clamp (**a**) from bottom breather hose.
- Detach the breather hose from engine.



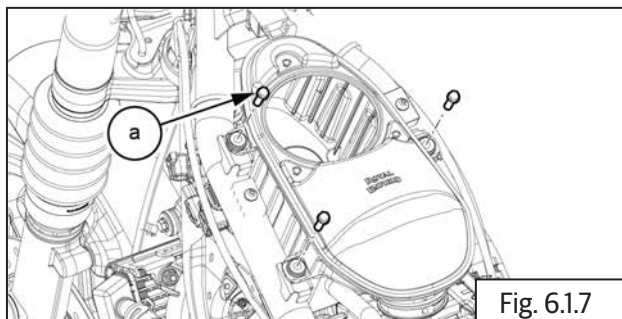
Plier

- Remove the clamp (**a**) from air filter bellow hose.



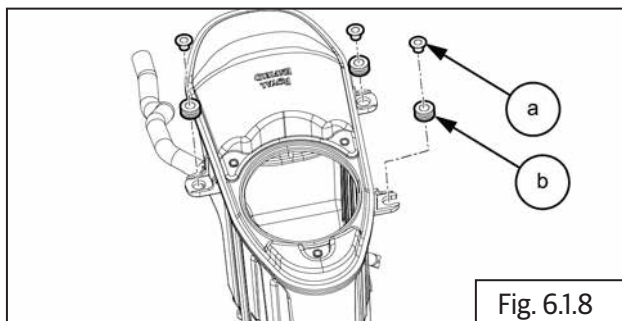
Clamp Removal And Install Tool

- Loosen and remove 3 Nos Hex flange bolts **(a)** **(M6)** from air filter box.

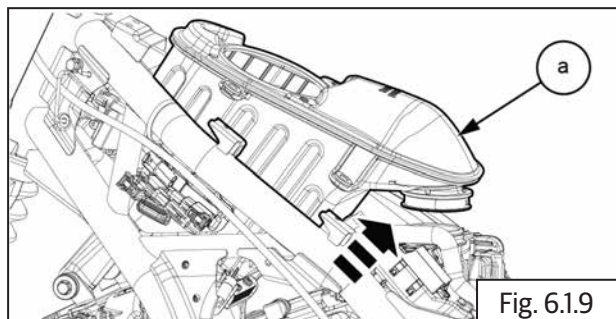


8 mm Socket With Ratchet

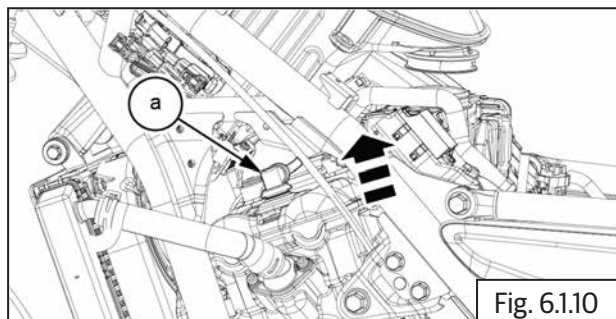
- Remove 3 Nos sleeves **(a)** with grommets **(b)** from air filter box.



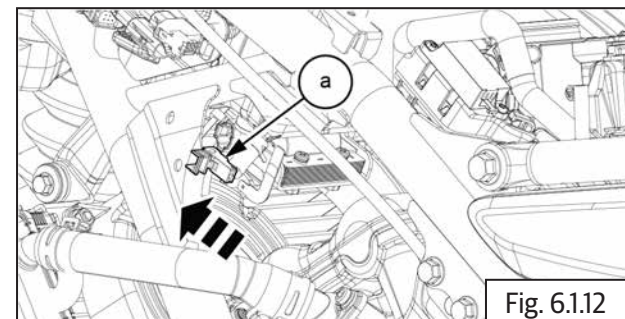
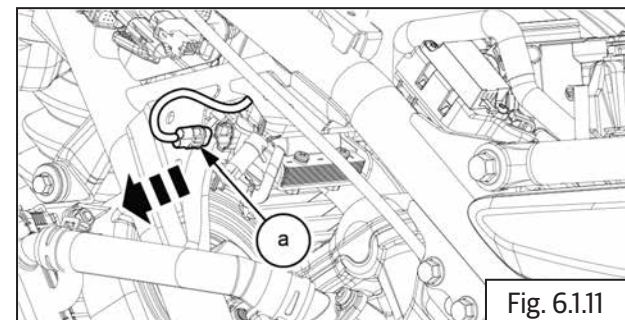
- Slightly lift the air filler box **(a)** to access the ignition coil connector.



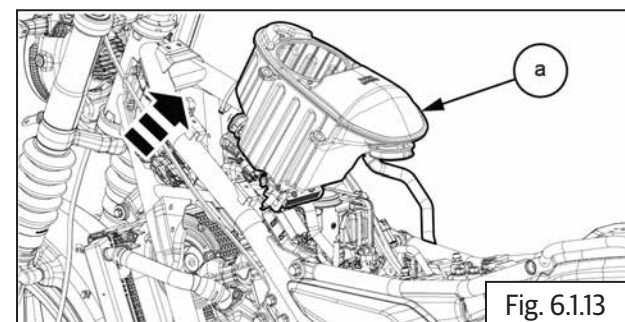
- Remove spark plug cap **(a)** from engine.



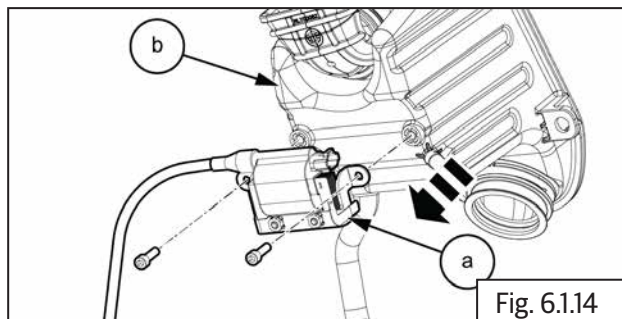
- Disconnect the **2 Nos** ignition coil couplers **(a)**.



- Remove air filter box **(a)** with ignition coil.

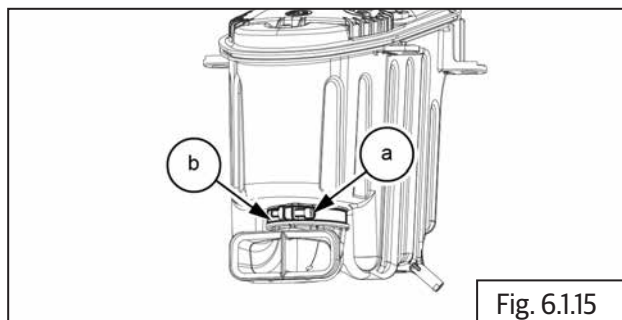


- Remove **2 Nos** cap head screws (**M6**) from ignition coil (**a**).
- Remove ignition coil with high tension cable from air filter box (**b**).



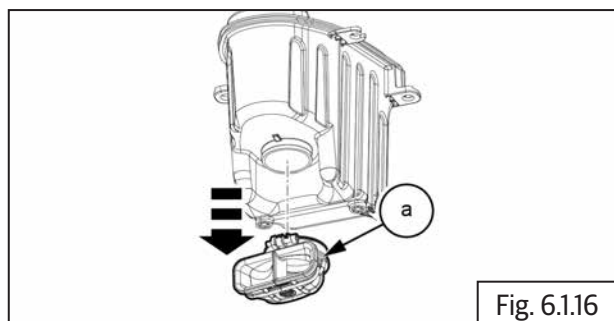
5mm Allen Socket With Ratchet

- Remove the clip (**a**) from inlet bellow hose (**b**).

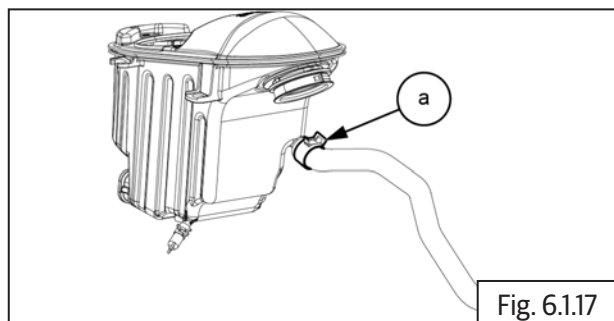


Screw Driver

- Remove the inlet bellow hose (**a**).

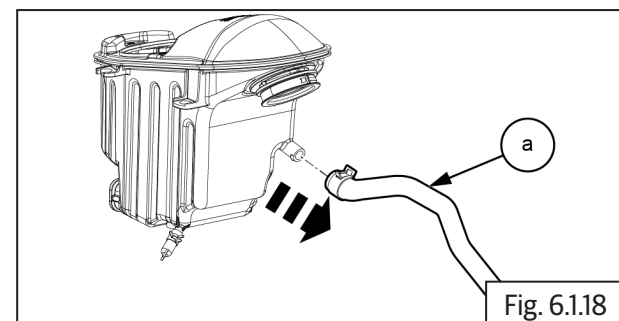


- Remove the clamp (**a**) from breather hose.

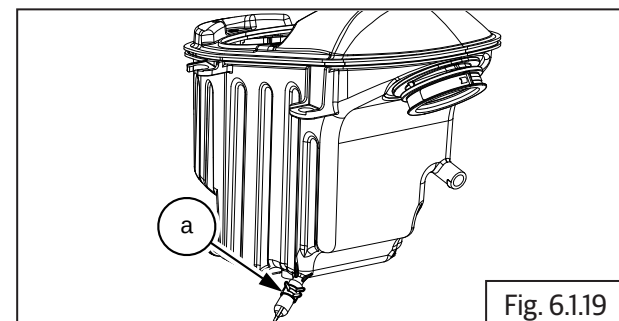


Plier

- Detach the breather hose (**a**) from air filter box.

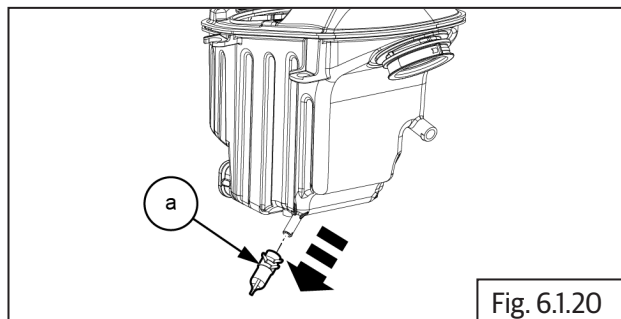


- Remove the clip (**a**) from drain hose.



Plier

- Detach the drain hose **(a)** from bottom air filter box.



Plier

Inspection

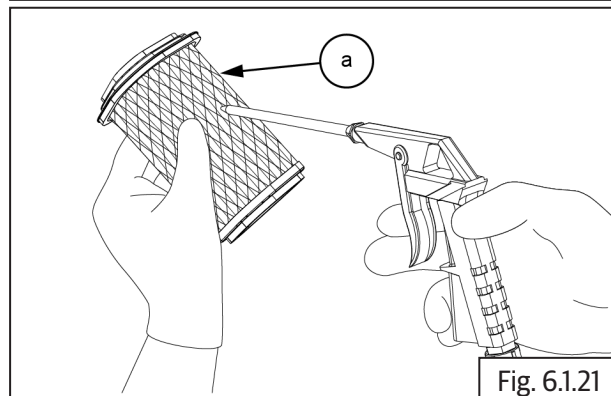
- Inspect air filter box assembly for any damages or cracks.
- Inspect air intake bellows for any damages, cracks and/or brittleness.
- Inspect rubber O rings, hoses for cuts, cracks or damages. Replace seals and rubber parts whenever they are removed.
- Inspect air filter element carefully for any deformation, damages, heavy clogging with dirt, soggy condition, and/or foreign particles embedded in the element. Replace if any of these conditions are observed.

Clean

- Clean air filter element **(a)** based on the periodic maintenance schedule OR more frequently if motor-cycle is used in dusty/off-road conditions.
- Gently tap filter element with minimum force to dislodge heavy/embedded dust particles.
- Using low pressure compressed air, blow air from out side to inner side to remove fine dust particles.

CAUTION

AVOID blowing air from the inner side to the outer surface of the filter element.

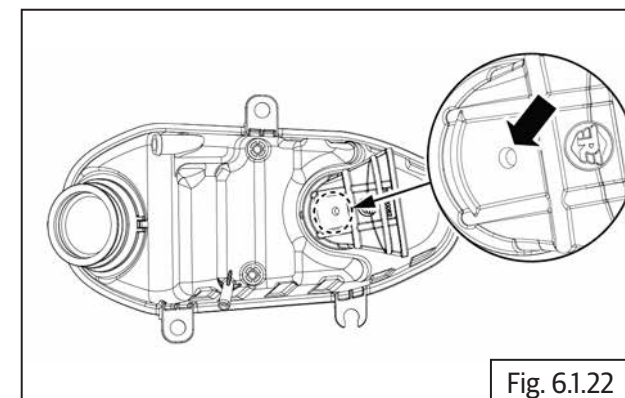


Air gun

CAUTION

DO NOT wash the element in water, gasoline or any solvents.

- Clean the air filter housing internals, with a soft damp cloth to remove dust.
- Check and Clean the inlet bellow hole if blocked.



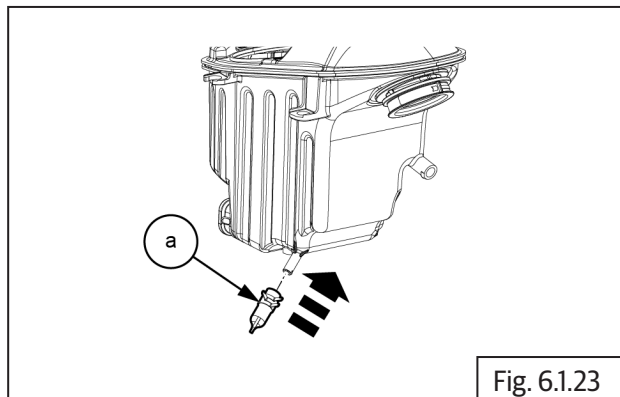
Replace

- If found damage in O-rings, rubber bellow hoses, clips parts please replace while servicing.
- Replace air filter element as per the periodic maintenance schedule.

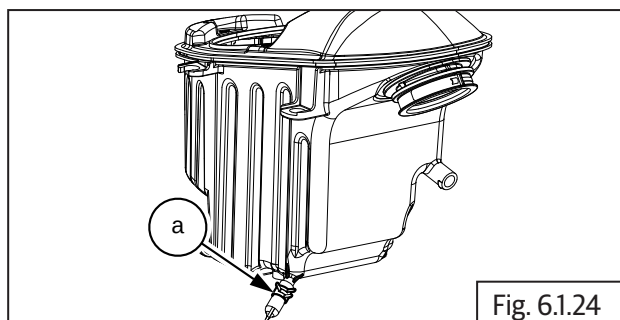
Assembly

6.1.3 Air Filter Box Assembly

- Fix the drain hose **(a)** on bottom air filter box.

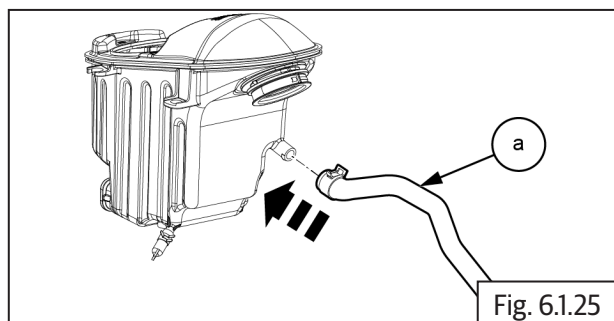


- Fix the clip **(a)** on drain hose.

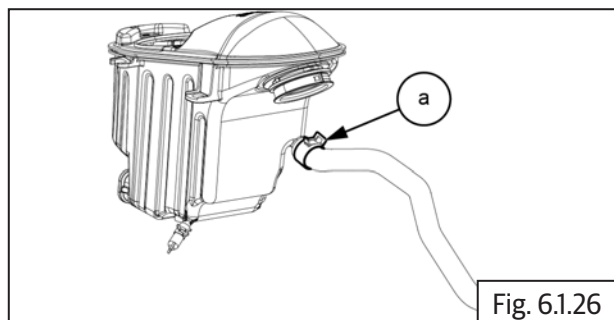


Plier

- Fix the breather hose **(a)** to air filter box.

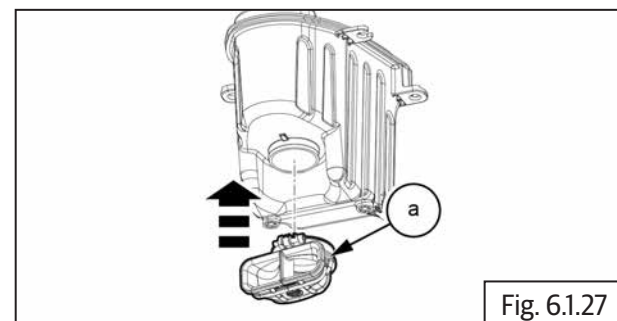


- Fix the clamp **(a)** to breather hose.



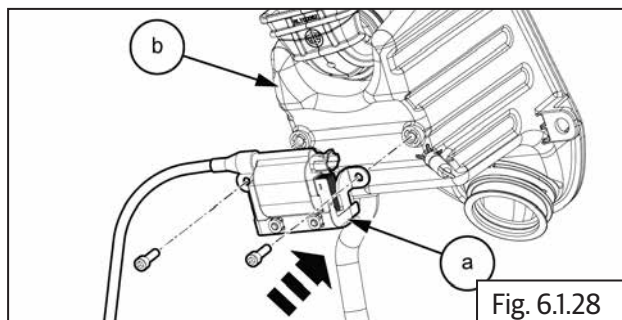
Plier

- Fix the inlet bellow hose with clip **(a)**.



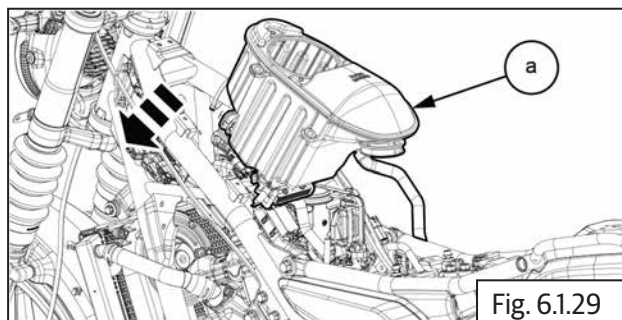
Screw Driver

- Locate the ignition coil with high tension cable on air filter box **(b)**.
- Locate and tighten **2 Nos** cap head screws **(M6)** on ignition coil **(a)**.

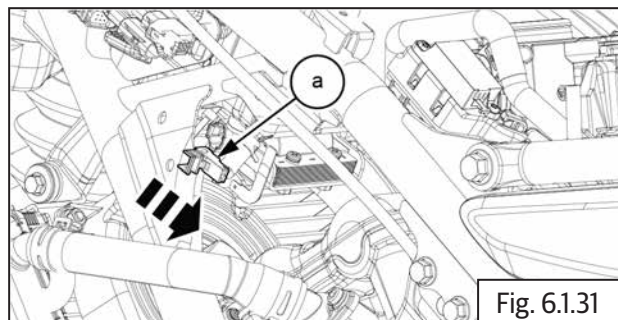
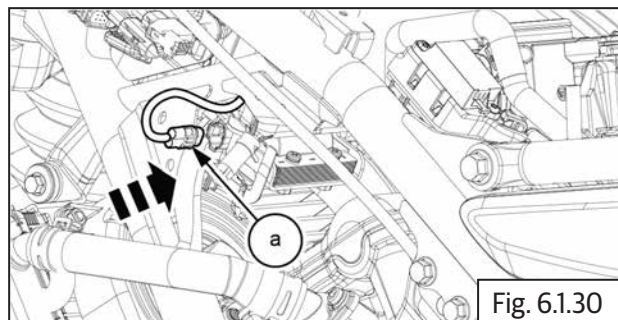


	5mm Allen Socket With Ratchet
	3 to 4 Nm / 0.3 to 0.4 kgf-m

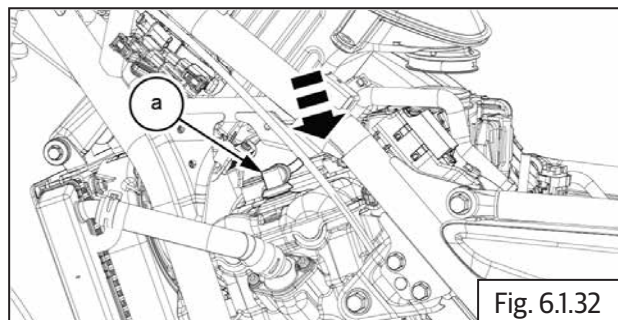
- Locate the air filter box **(a)** with ignition coil and HT cable on front chassis frame.



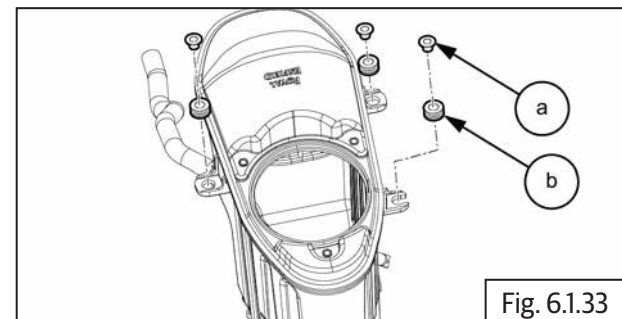
- Connect the **2 Nos** ignition coil couplers **(a)**.



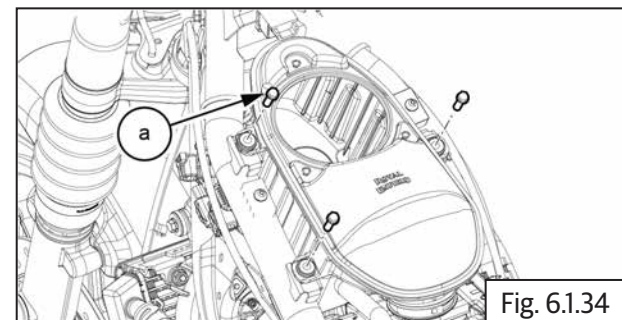
- Connect spark plug cap **(a)** on engine.



- Fix **3 Nos** sleeves **(a)** with grommets **(b)** on air filter box.



- Locate and tighten **3 Nos** Hex flange bolts **(a)** **(M6)** on air filter box.



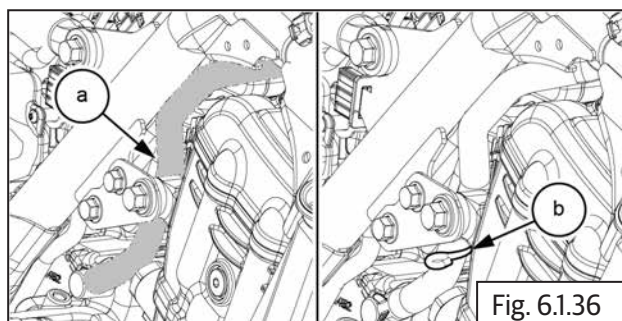
	8 mm Socket With Ratchet
	3 to 4 N·m / 0.3 to 0.4 kgf-m

- Fix the clamp **(a)** on air filter bellow hose.

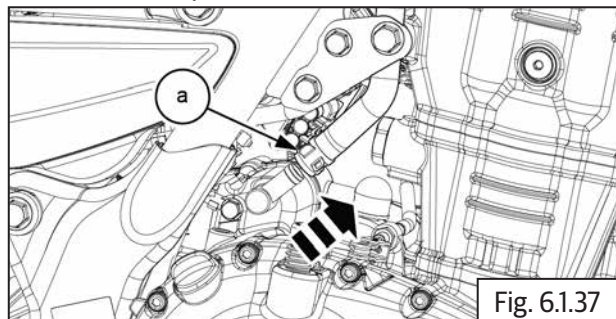


Clamp Removal And Install Tool

- Route the breather hose **(a)** to the engine breather, and ensure it passes through the wire clip **(b)** in the frame.



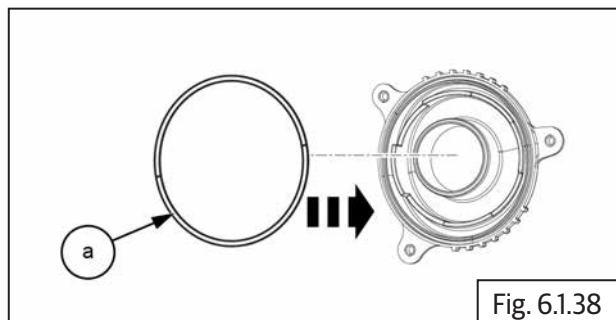
- Fix the clamp **(a)** to bottom breather hose.



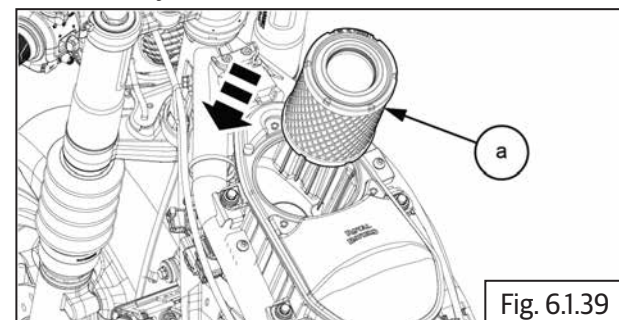
Plier

6.1.4 Air Filter Element

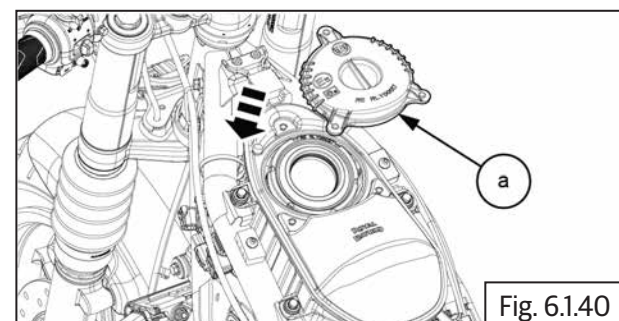
- Fix the "O" ring **(a)** on air filter box cover.



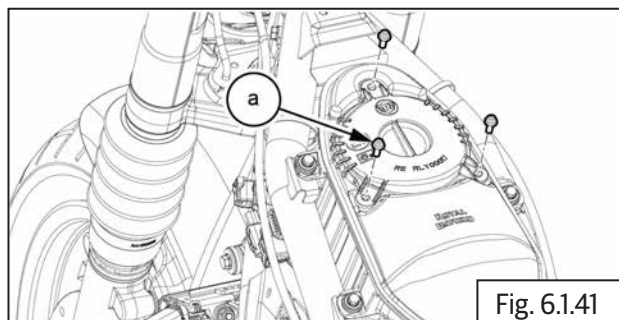
- Locate the air filter element **(a)** into air filter box assembly.



- Locate the cover **(a)** on air filter box.



- Locate and tighten the **3 Nos** allen head screws **(M5)(a)** on air filter box cover.



	4mm Allen Socket With Ratchet
	1.7 to 2.3 Nm / 0.17 to 0.23 kgf-m

⚠ CAUTION

Do not over tighten the screws or use excessive force as it will damage the cover and the air filter box assembly.

- Install the fuel tank (Refer Fuel System Chapter).
- Install the seats (Refer Side Panels and Seat Chapter).

Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Air induction noise from air filter box is high.	Air filter element cover not sealing properly on air filter box assembly.	Air filter element cover not seated properly on air filter box assembly/improperly tightened.	Check proper seating of the air filter element cover on air filter box assembly.	
	Air filter element cover cracked.	Air filter element cover cracked due to improper assembly/over tightened.	Replace air filter Element cover assembly.	
	Air filter box assembly cracked/damaged.	Air filter box assembly not aligned properly and tightened/damaged due to stone hit.	Replace air filter box assembly.	
	Hoses connecting to inlet manifold cracked.	Cracked due to age hardening/improper assembly.	Replace air filter box assembly.	
Engine running very sluggish and pick up poor.	Filter element choked.	Filter element choked with dirt/water/oil.	Check and replace filter element.	
Engine misfiring/running lean/idling improper.	Filter element damaged.	Damaged due to mishandling/heavy particles entering air filter box assembly.	Check and replace filter element.	
Engine oil accumulation inside air filter box assembly.	Excessive oil in sump.	Check and maintain correct engine oil level.	Clean breather chamber and hose leading to air filter box assembly.	

NOTE

- The troubleshooting given in this section is only related to issues with air filter system. For complaints related to poor pickup, improper idling, etc., please refer to the respective chapters.

HANDLEBAR

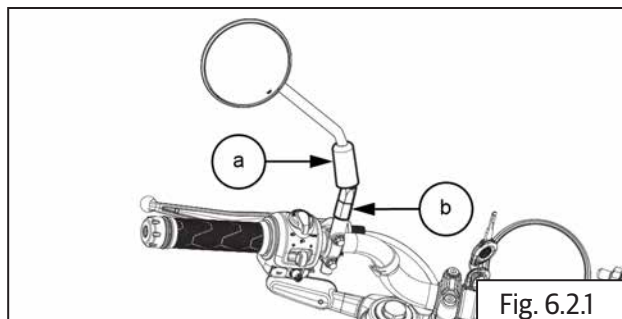
CONTENTS	PAGE
6.2 Handlebar.....	256
Dismantling.....	256
6.2.1.Aggregates of Handlebar.....	256
6.2.2. Handlebar	258
6.2.3. Upper Yoke	259
Inspection.....	260
Assembly.....	260
6.2.4. Upper Yoke	260
6.2.5. Handlebar.....	261
6.2.6.Aggregates of Handlebar.....	262
6.2.7.Handlebar Alignment.....	266
Troubleshooting.....	256

6.2 Handlebar

Dismantling

6.2.1. Aggregates of Handlebar

- Remove the following parts:
 - Clutch cable. Refer engine removal from frame chapter.
 - Brake master cylinder front. Refer Brake chapter chapter
 - Electrical connections on LH and RH handlebar. Refer Electrical chapter.
 - Cable routing straps. Refer Electrical chapter.
- Slightly lift rubber boot **(a)**, loosen Hex nut **(M10)** **(b)** clockwise direction.
- Rotate the LH mirror clockwise direction to remove from handlebar.



16 mm Combination Spanner

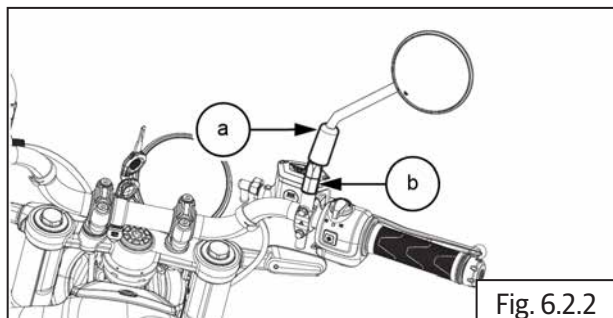
⚠ CAUTION

Left hand thread!

DO NOT rotate the mirror after it comes to stop on the bracket as it will cause the bracket to crack.

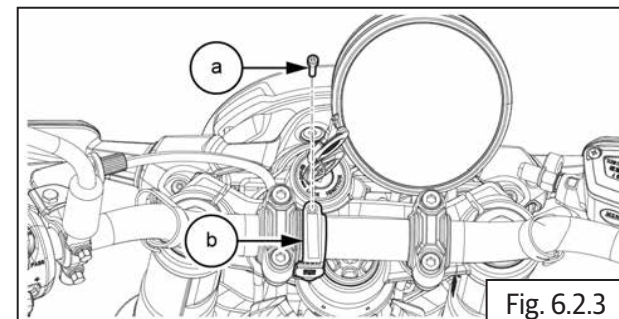
Always position mirror and lock in place with rider seated on the motorcycle.

- Slightly lift rubber boot **(a)**, loosen Hex nut **(M10)** **(b)** anti clockwise direction.
- Rotate the RH mirror anti clockwise direction to remove from handlebar.



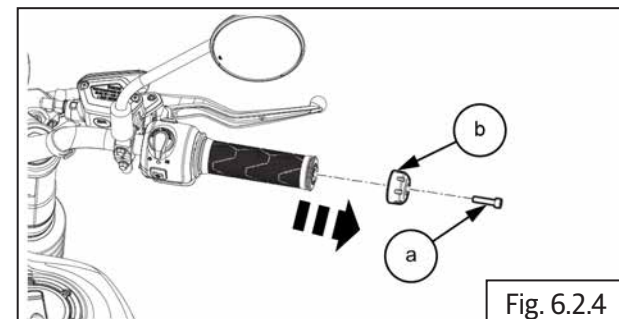
16 mm Combination Spanner

- Loosen and remove the cap bolt **(M4)** **(a)** along with usb mount **(b)** from handlebar.



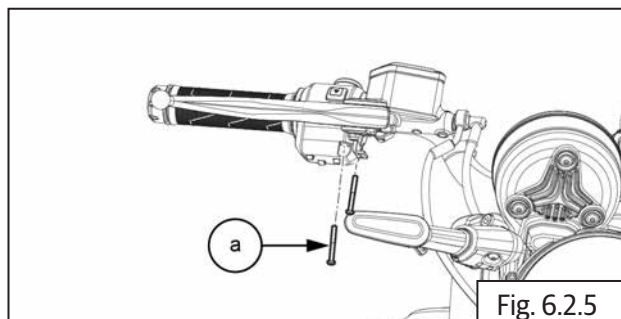
3mm Allen Socket with Ratchet

- Loosen and remove cap bolt **(M6)** **(a)** along with end weight **(b)** from handlebar RH.



5mm Allen Socket with Ratchet

- Loosen and remove **2 Nos** Switch module screws **(a)** from RH handlebar.

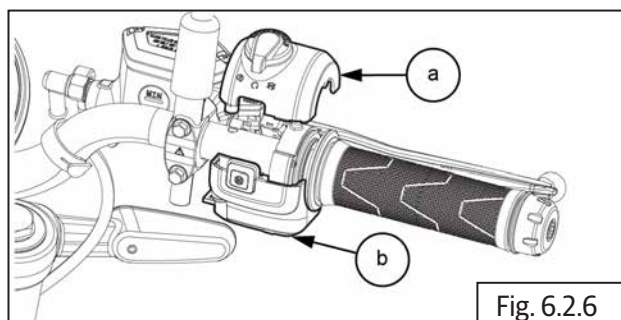


Phillips screw driver

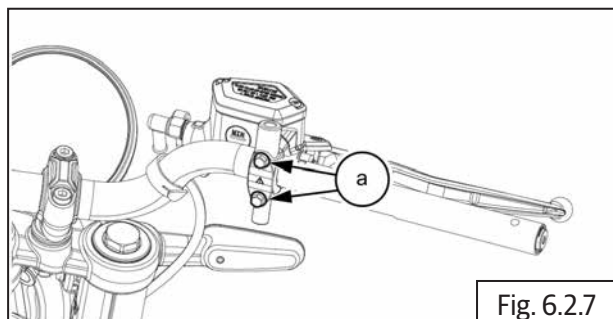
- Gently separate switch module top **(a)** and bottom **(b)** from handlebar RH.

! CAUTION

Support RH switch module carefully after removal.

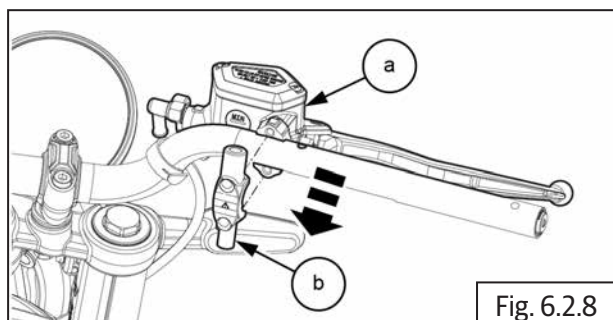


- Loosen and remove **2 Nos** Hex flange head bolt **(M5) (a)** from front master cylinder.



8mm Socket with Ratchet

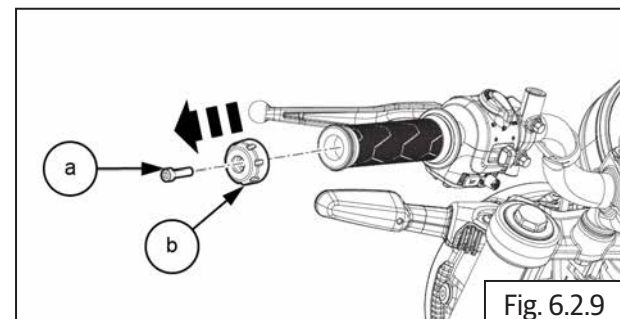
- Remove master cylinder assembly **(a)** along with cap **(b)** from RH handlebar.



! CAUTION

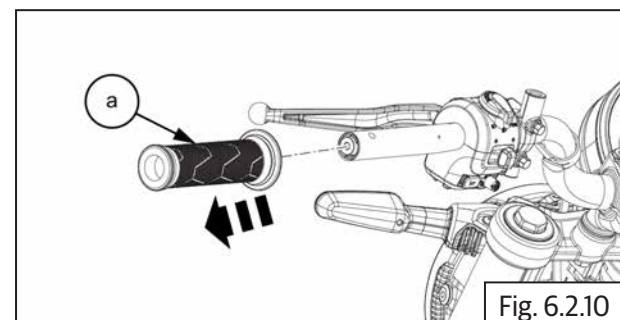
Ensure master cylinder assembly is supported after removing.

- Loosen and remove Hex socket head bolt **(M6) (a)** along with end weight **(b)** from handlebar LH.

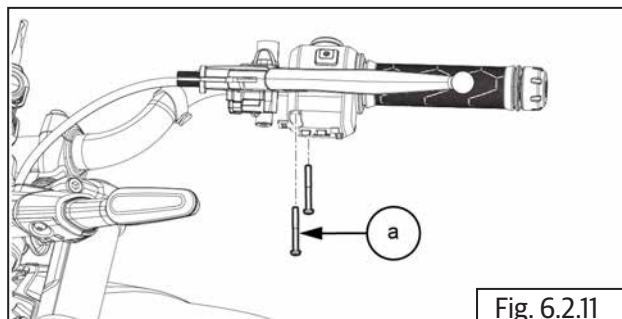


5mm Allen Socket with Ratchet

- Gently remove grip **(a)** from handlebar.

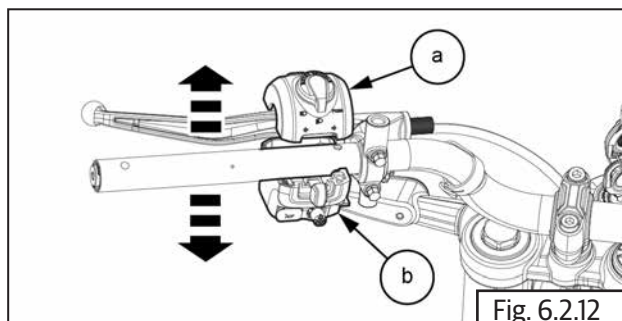


- Loosen and remove **2 Nos** screws **(a)** from switch module on handlebar LH.

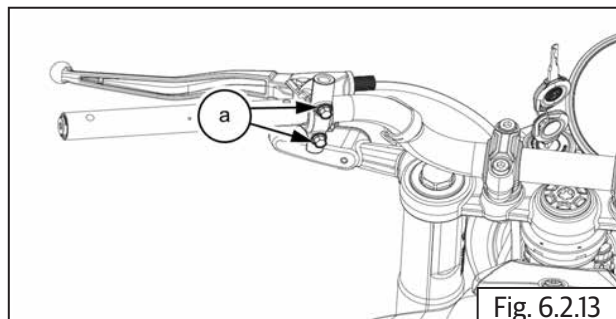


Phillips screw driver

- Gently separate top **(a)** and bottom **(b)** switch module and remove from handlebar LH.

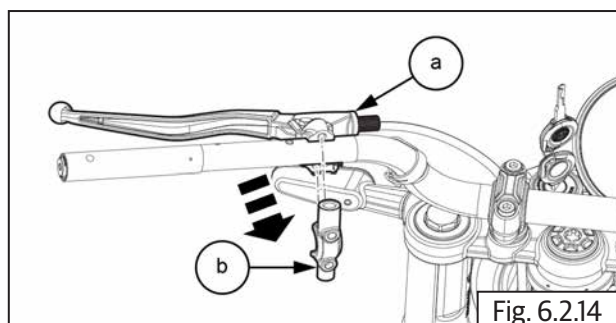


- Loosen and remove **2 Nos** Hex flanged head bolts **(M6) (a)** from clutch lever bracket LH.

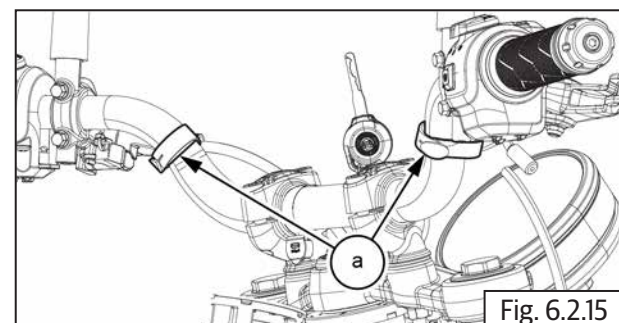


8mm Socket with Ratchet

- Remove the clutch lever bracket LH **(a)** along with cap **(b)** from handlebar LH.

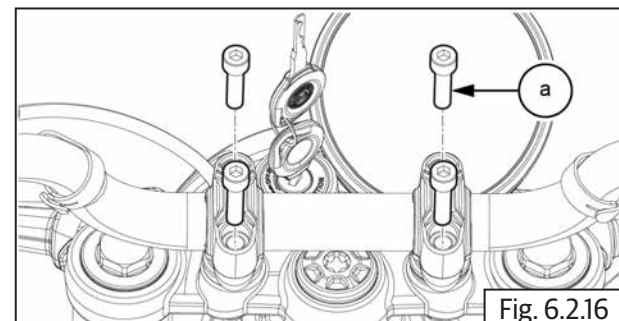


- Remove the all rubber straps **(a)** from handlebar.



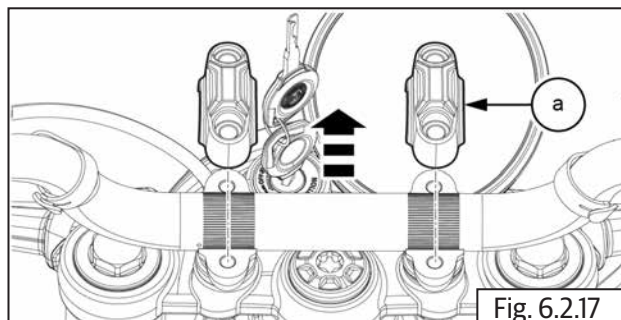
6.2.2. Handlebar

- Loosen and remove **4 Nos** cap bolts **(M8) (a)** from upper clamps on handlebar.

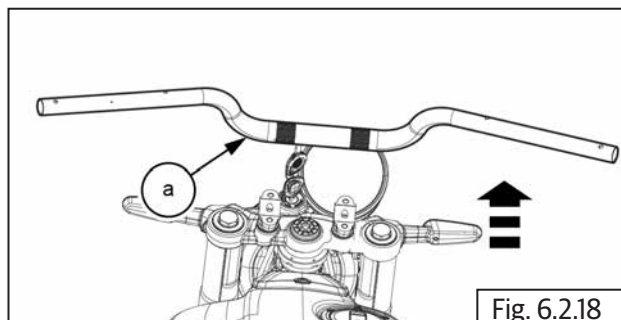


6mm Allen socket with Ratchet

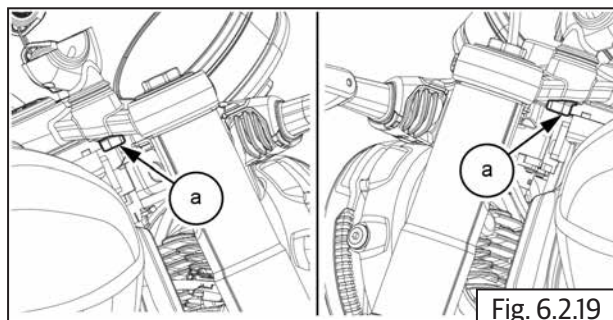
- Remove **2 Nos** upper clamps **(a)** from raiser handlebar.



- Remove handlebar **(a)** from raiser.

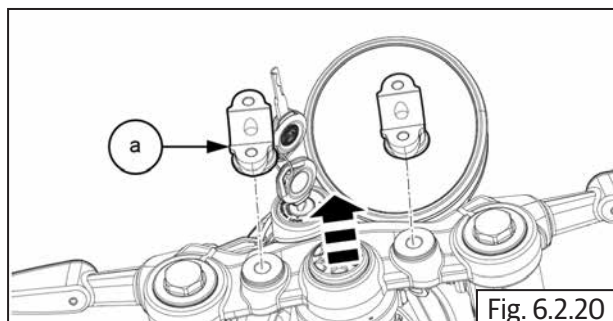


- Loosen and remove **2 Nos** Hex head flanged bolts **(M10) (a)** from raiser handlebar.

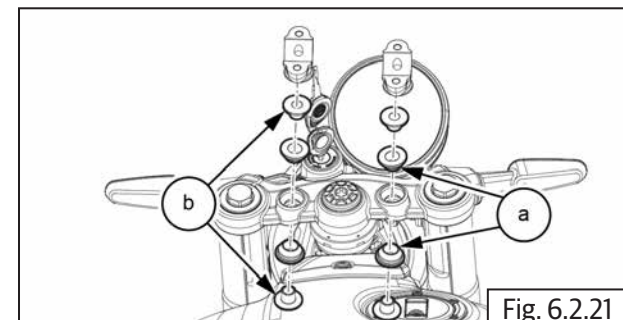


14mm Socket with Ratchet

- Remove **2 Nos** handlebar raiser **(a)** from upper yoke.

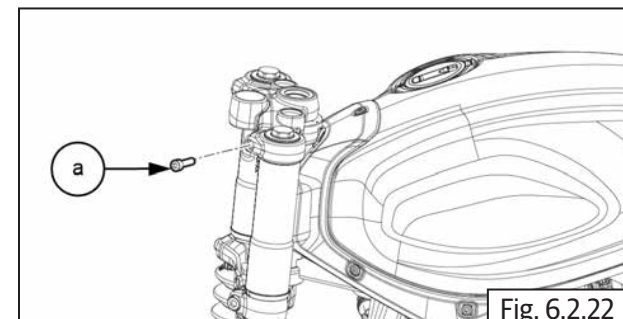


- Remove the **4 Nos** flange sleeves **(b)** and rubber bushes **(a)** from upper yoke.



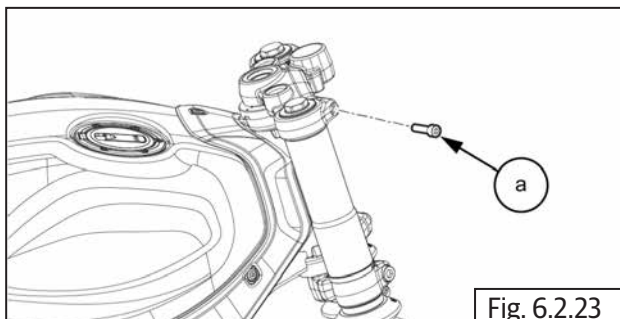
6.2.3. Upper Yoke

- Remove the following parts:
 - Remove Front frame. **Refer front frame chapter**
 - Remove ignition switch **Refer electrical chapter**.
- Loosen and remove cap bolt **(M8) (a)** from LHS upper yoke.



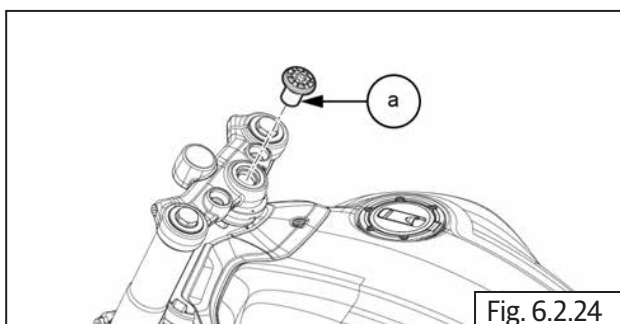
6mm Allen socket with Ratchet

- Loosen and remove cap bolt **(M8) (a)** from RHS upper yoke.



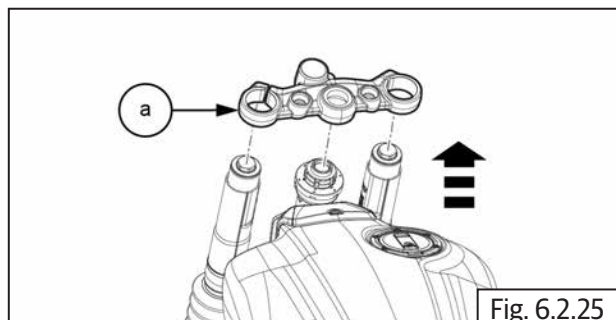
6mm Allen socket with Ratchet

- Loosen and remove the steering stem lock bolt **(a)** from upper yoke.



T60 Torx socket with Ratchet

- Gently tap and pull out upper yoke **(a)** from LH and RH fork assembly.



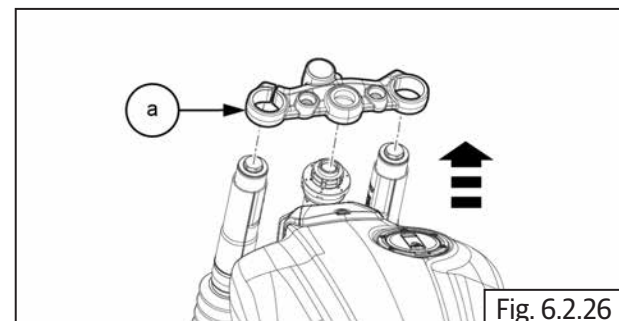
Inspection

- Inspect handlebar for any bends, cracks or damages. Replace if necessary.
- Inspect rubber grip tightness and replace if it has lost grip.

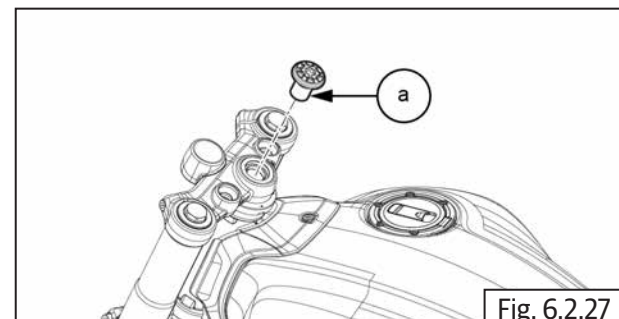
Assembly

6.2.4. Upper Yoke

- Locate upper yoke **(a)** on the LH and RH fork assembly and ensure both forks seated properly in the upper yoke



- Locate and tighten cap bolts **(M8) (a)** on upper yoke.

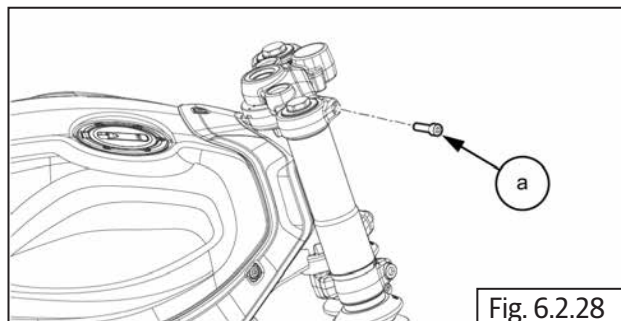


T60 Torx socket with Ratchet



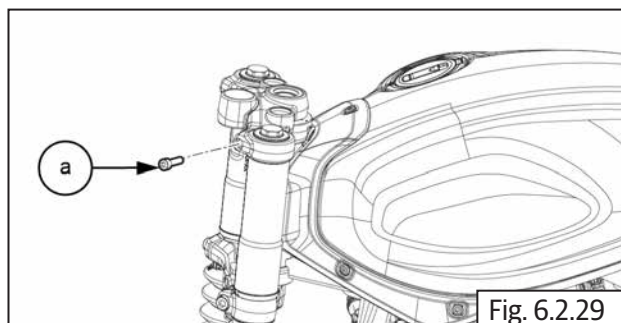
90Nm / 9.0kgfm

- Insert and tighten cap bolts **(M8) (a)** on RHS upper yoke.



	6mm Allen socket with Ratchet
	20Nm / 2.0kgfm

- Insert and tighten cap bolt **(M8) (a)** on LHS upper yoke.

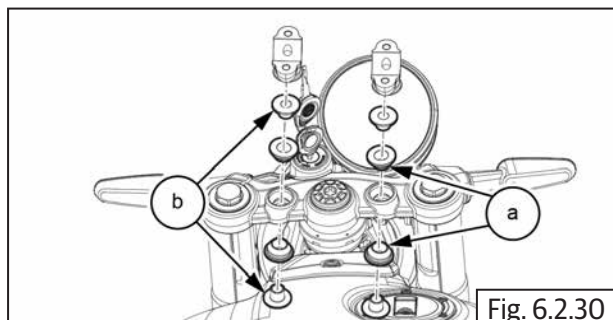


	6mm Allen socket with Ratchet
	20Nm / 2.0kgfm

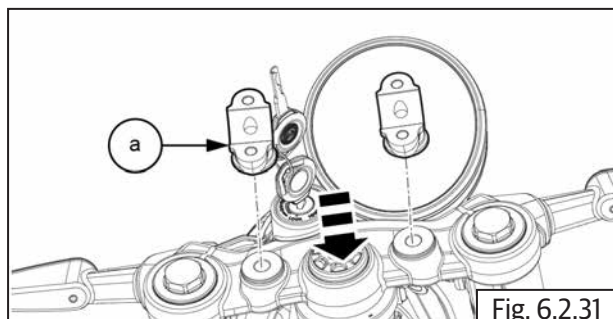
- Assemble the following parts:
 - Install Front frame [Refer front frame chapter.](#)
 - Install ignition switch [Refer electrical chapter.](#)

6.2.5. Handlebar

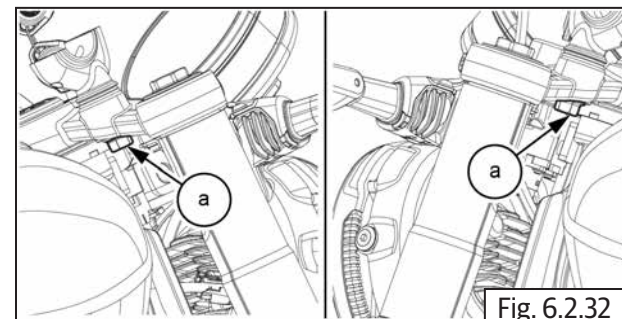
- Locate the flange sleeves **4 Nos (b)** and rubber bushes **(a)** on upper yoke.



- Locate raiser **(a)** on upper yoke .

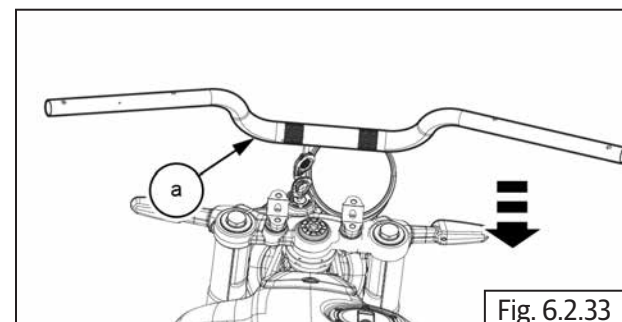


- Locate and tighten **2 Nos** Hex flange head bolts **(M10) (a)** into bottom of upper yoke.

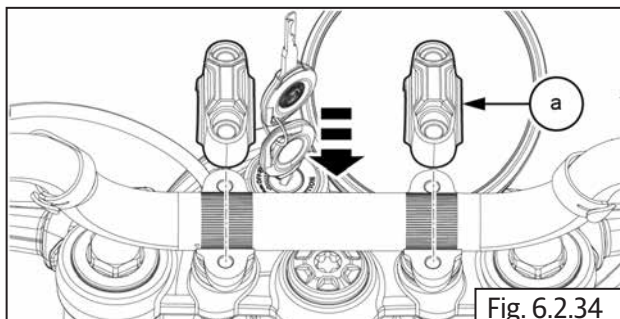


	14mm Socket with Ratchet
	45Nm /4.5kgfm

- Assemble handlebar **(a)** into raiser handlebar.

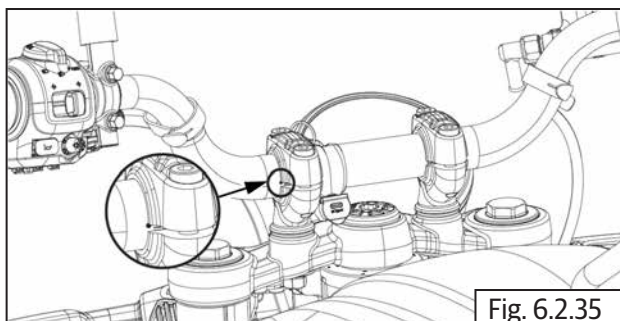


- Install clamp handlebar **(a)** into handlebar.

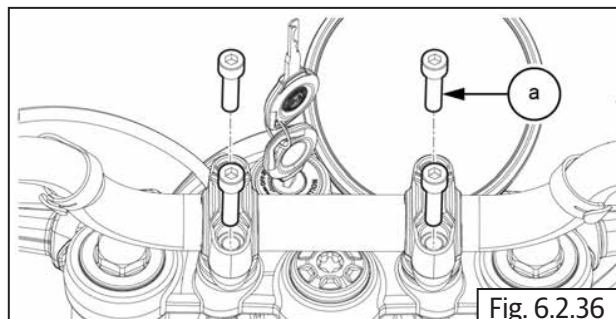


NOTE

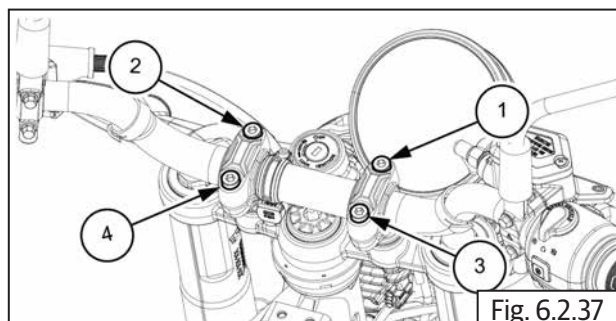
- Ensure the steering handlebar align marks/dots are matched with clamp handlebar parallel.



- Locate the **4 Nos** cap bolts **(M8) (a)** into clamp upper handlebar.



- All bolts are to be tightened below sequence.



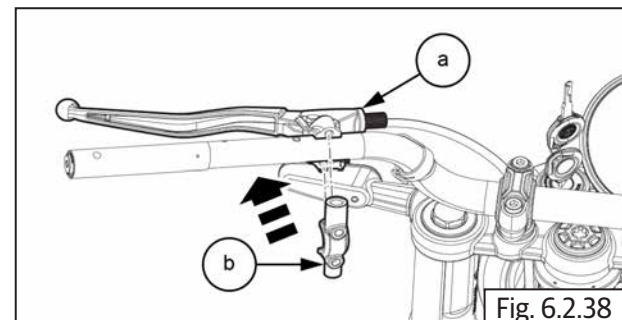
	6mm Allen socket with Ratchet
	20Nm/2.0kgfm

⚠ CAUTION

If the risers are not assembled correctly, the handlebar will not be clamped correctly and difficulty will be found in the alignment of the handlebar. Damages may also be incurred on the riser clamps and/or the threads in the parts.

6.2.6. Aggregates of Handlebar

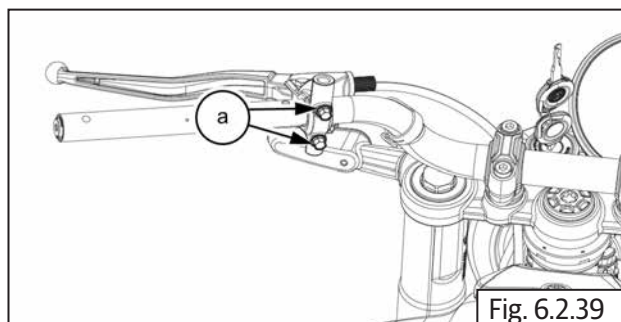
- Insert clutch lever bracket **(a)** and cap **(b)** on LH handlebar.



- Locate and tighten **2 Nos** Hex flanged head bolt (**M6**) (**a**) on clutch lever bracket LH.

NOTE

- Top bolt to be tightened first, then the bottom one.

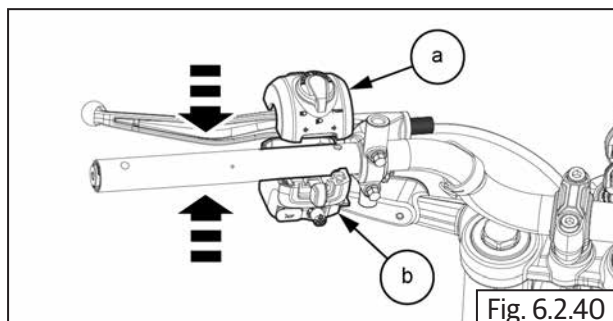


	8mm Socket with Ratchet
	10Nm / 1.0kgfm

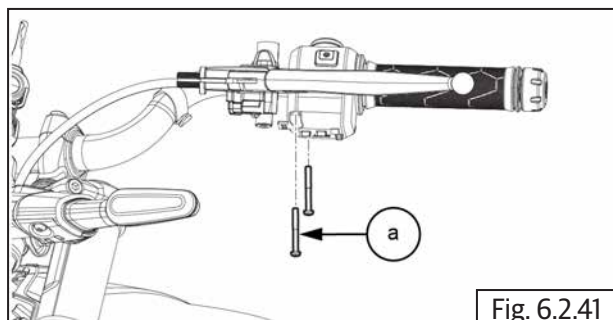
CAUTION

DO NOT over tighten bolt as it will cause bracket to crack.

- Assemble switch module top (**a**) and bottom (**b**) on handlebar LH. Ensure peg on LH switch module top half is correctly located in the hole in handlebar.



- Insert the long screw (**a**) into front mounting hole of switch module LH from bottom and tighten just sufficiently.

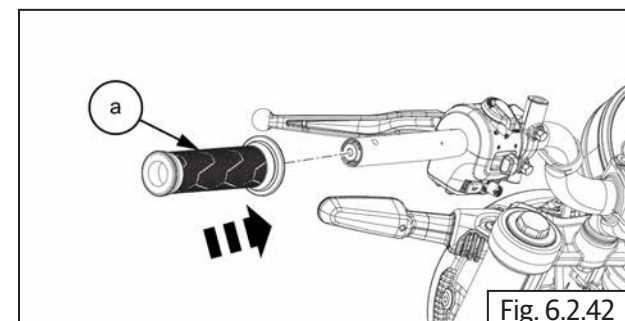


CAUTION

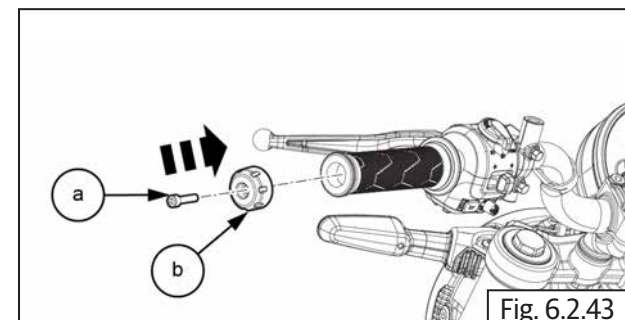
DO NOT over tighten.

	Phillips Screw Driver
	1.5 - 2Nm / 0.15 - 0.2kgfm

- Locate and insert grip (**a**) into handlebar.

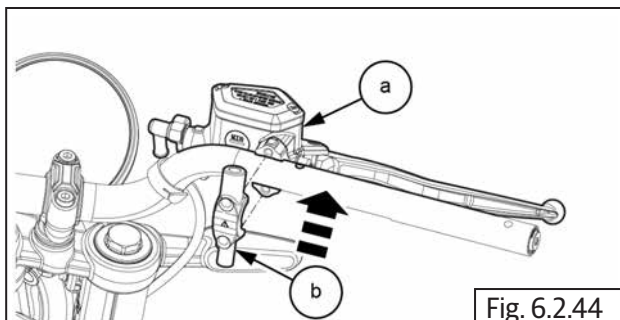


- Insert and tighten Hex socket head bolt (**M6**) (**a**) along with end weight (**b**) into handlebar LH.

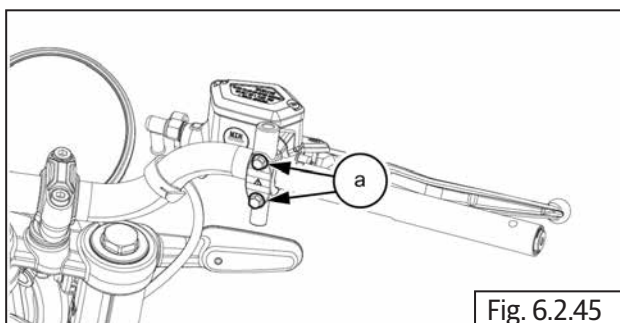


	5 mm Allen Socket with Ratchet
	10 ± 2 Nm / 1.0 - 0.2 kgfm

- Assemble clutch cable.
- Locate the master cylinder assembly **(a)** along with cap **(b)** on RH handlebar.

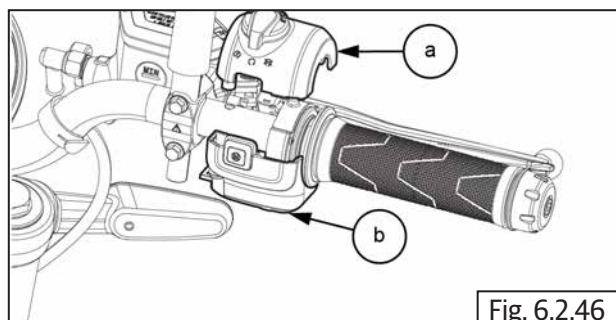


- Insert and tighten **2 Nos** Hex flange head bolt **(M5)** **(a)** on master cylinder.

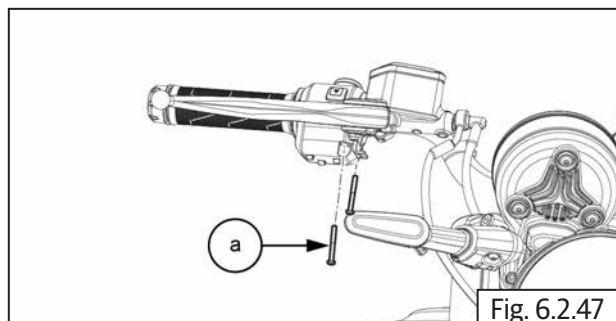


	8mm Socket with Ratchet
	10Nm / 1.0kgfm

- Assemble switch module top **(a)** and bottom **(b)** on handlebar RH. Ensure peg on RH switch module top half is correctly located in the hole in handlebar.



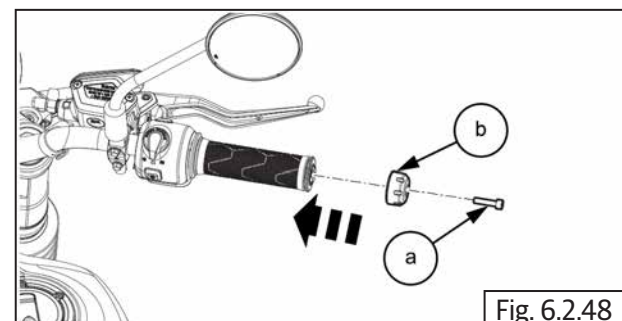
- Insert **2 Nos** long screws **(a)** into the front mounting hole of switch module RH from the bottom and tighten just sufficiently.



⚠ CAUTION
DO NOT over tighten

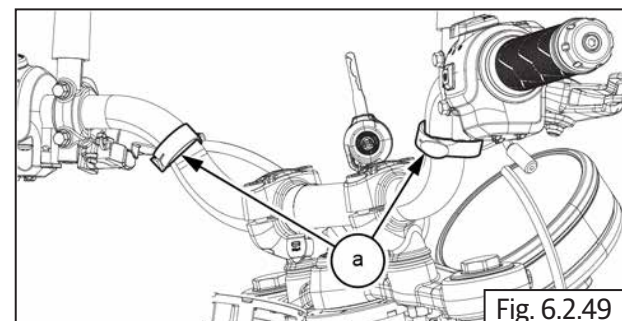
	Phillips Screw Driver
	1.5 - 2Nm / 0.15 - 0.2kgfm

- Insert and tighten Hex socket head bolt **(M6)** **(a)** along with end weight **(b)** into handlebar RH

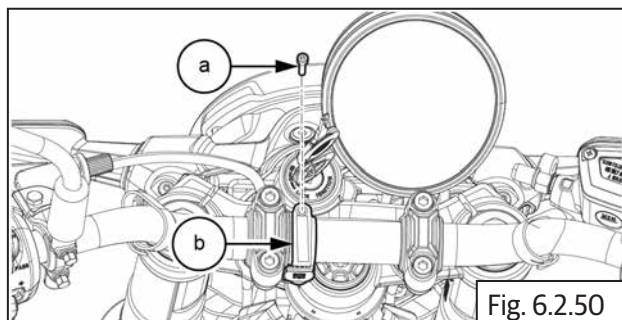


	5 mm Allen Socket with Ratchet
	10 ± 2 Nm / 1.0 - 0.2 kgfm

- Fix the all rubber straps **(a)** on handlebar.

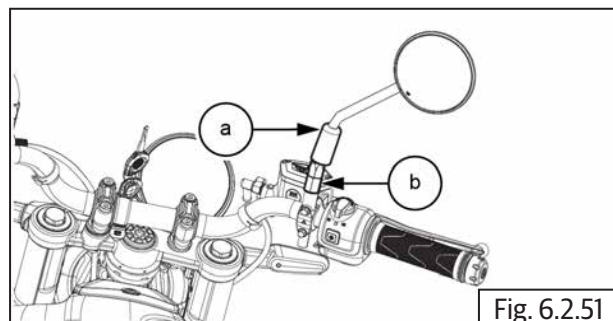


- Insert and tighten the cap bolt **(M4) (a)** along with usb mount **(b)** into handlebar.



	3mm Allen Socket with Ratchet
	2Nm / 0.2kgfm

- Rotate the RH mirror clockwise direction to attach to handlebar.
- Tighten Hex nut **(M10) (b)** clockwise direction.
- Lower the rubber boot **(a)** on mirror.



	16 mm Combination Spanner
--	---------------------------

⚠ CAUTION

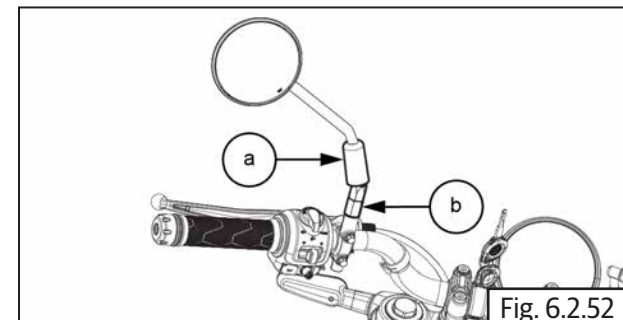
DO NOT rotate the mirror after it comes to stop on the bracket as it will cause the bracket to crack.

Always position mirror and lock in place with rider seated on the motorcycle.

NOTE

Ensure correct adapters and nuts are assembled to LH/RH mirrors to eliminate the chances of cross threading.

- Rotate the LH mirror counterclockwise to attach to handlebar.
- Tighten Hex nut **(M10) (b)** anticlockwise direction.
- Lower the rubber boot **(a)** on mirror.



	16 mm Combination Spanner
--	---------------------------

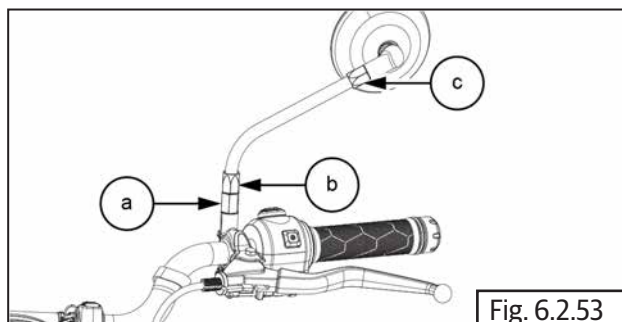
⚠ CAUTION

Left hand thread

DO NOT rotate the mirror after it comes to stop on the bracket as it will cause the bracket to crack.

Always position mirror and lock in place with rider seated on the motorcycle.

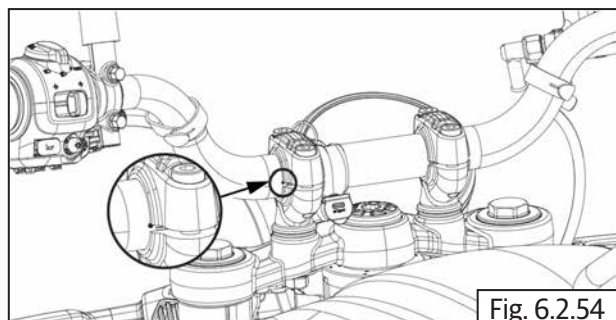
- Once mirror alignment is set, nuts to the below mentioned torque.



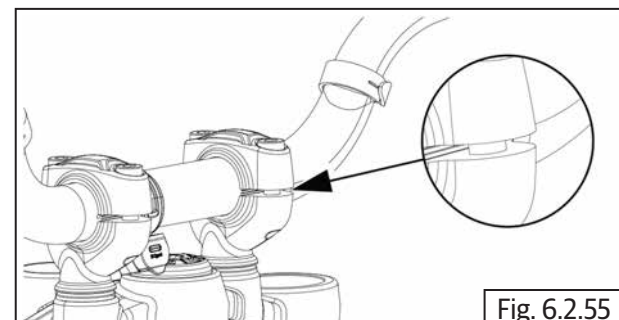
	16 mm Combination Spanner with Ratchet
	(a) - 20Nm/2.0kgfm (b) & (c) - 24Nm/2.4kgfm

6.2.7. Handlebar Alignment

- Ensure that the handlebar is positioned correctly with respect to the **punch mark** on the left-hand side (LH) of the handlebar.
- Refer below image:

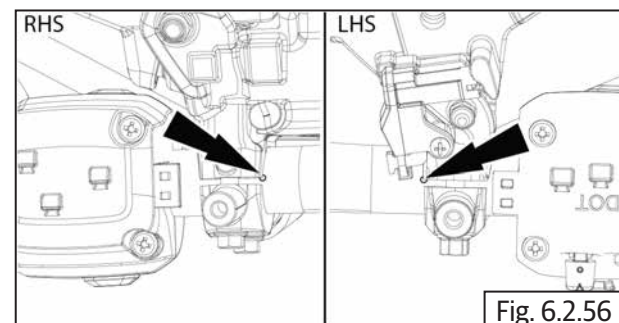


- After correct assembly of the riser, a gap between **0.9 - 2.9mm** will appear at the rear of the handlebar.
- Refer below image:

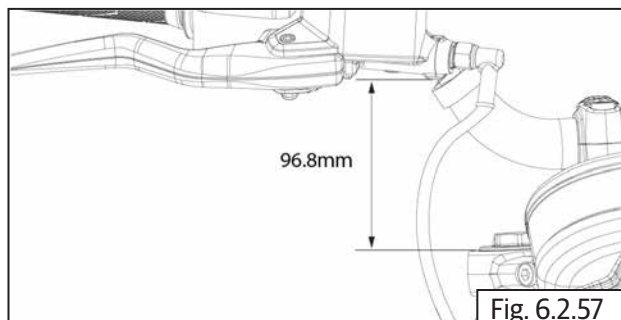


	Steel Ruler
--	-------------

- Ensure the **punch mark** is inline with the machined face of the LHS and RHS of lever holders.
- Refer below image:

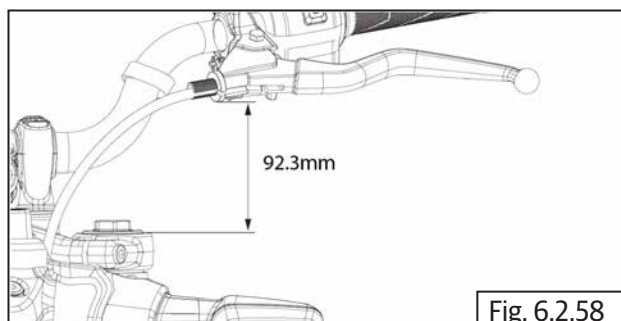


- Align the brake lever distance **96.8mm** from top yoke.
- Refer below image:



Steel Ruler

- Align the clutch lever distance **92.3mm** from top yoke.
- Refer below image:



Steel Ruler

- Install the following parts:
 - Clutch cable Refer engine install on frame chapter..
 - Brake master cylinder front Refer Brake chapter chapter.
 - Electrical connections on LH and RH handlebars. Refer Electrical chapter.
 - Cable routing straps. Refer Electrical chapter
- After assembly, check proper functioning of electrical components.

Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Vibrations transmitted to rider while riding	Tyre pressures are more than recommended.	Improper front and rear tyre pressures.	Ensure correct tyre pressures.	Solo: Front tyre: 32 psi/ 2.24 kg/cm ² . Rear tyre: 36 psi/ 2.53 kg/cm ² . With Pillion: Front tyre: 32 psi/ 2.24 kg/cm ² . Rear tyre: 36 psi/ 2.53 kg/cm ² ..
	Handlebar balancers are loose.	Balancer mountings are loose/ threads are worn-out.	Tighten balancer mountings/replace balancers.	
	Clip-on pinch bolts are loose on fork main tubes. Handlebar clamp fasteners are loose on top yoke.	Fasteners loose/threads worn-out	Check and tighten fasteners/replace fasteners/ handlebar clip-ons/top yoke	Torque: 10 ± 2 Nm / 1.0 - 0.2 kgfm Torque: 20 Nm / 2.0 kgfm
	Handlebar is cracked at mounting location.	Clip-on/handlebar clamping locations has minor cracks.	Replace clip-ons/handlebar	
Uneasiness/pain felt on one shoulder	Handlebar is bent/misaligned.	One or the other clip-on is bent/handlebar is bent.	Replace clip-ons/handlebar.	
		Handlebar alignment dots are not correct.	Ensure correct positioning of the handlebar alignment dots with respect to top yoke.	

NOTE

- The troubleshooting given in this section is only related to issues with Handlebar. For complaints like unstable riding, wobbling, etc., it will be necessary to check other aggregates like wheel, front/rear suspension and so on.

SILENCER, CATBOX AND EXHAUST PIPE

CONTENTS	PAGE
6.3 Silencer, Catbox And Exhaust Pipe	269
Dismantling.....	269
6.3.1. O2 Sensor / Oxygen Sensor (Front).....	269
6.3.2. Silencer.....	269
6.3.3. Catbox.....	271
6.3.4. Exhaust Pipe.....	272
6.3.5. O2/Oxygen Sensor (Front & Rear).....	273
Assembly.....	273
6.3.6. O2/Oxygen Sensor (Front & Rear).....	273
6.3.7. Exhaust Pipe.....	274
6.3.8. Catbox.....	275
6.3.9. Silencer.....	276
6.3.10. O2 Sensor / Oxygen Sensor (Front).....	278
Troubleshooting.....	279

6.3 Silencer, Catbox And Exhaust Pipe

⚠ CAUTION

- **DO NOT** perform any operation on exhaust pipes and silencers soon after the motorcycle is OFF.
- They can extremely hot and will cause serious injuries.
- Always wait until the silencer is completely cooled down.

Dismantling

⚠ CAUTION

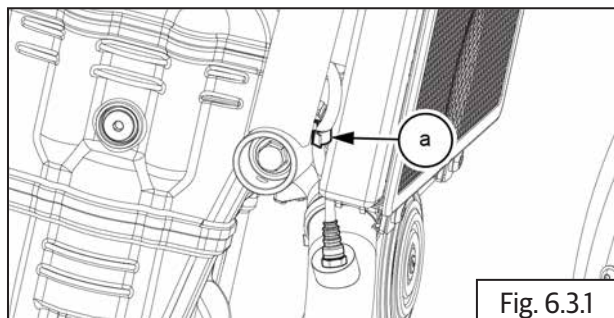
- **Be careful while connect and disconnect the electrical couplers. Do not damage pins of the couplers.**

6.3.1. O2 Sensor / Oxygen Sensor (Front)

Prior Removal:

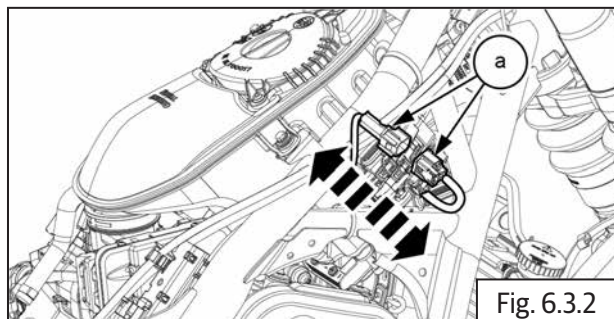
- Ensure ignition and stop switch are in off position.
- Disconnect the battery terminals.
- Remove the fuel tank (Refer Fuel System Chapter).

- Detach the omega clips (a) from Oxygen Sensor wiring harness.



Flat Head Screw Driver

- Oxygen sensor coupler located on RHS chassis frame.
- Disconnect oxygen sensor connector (a).



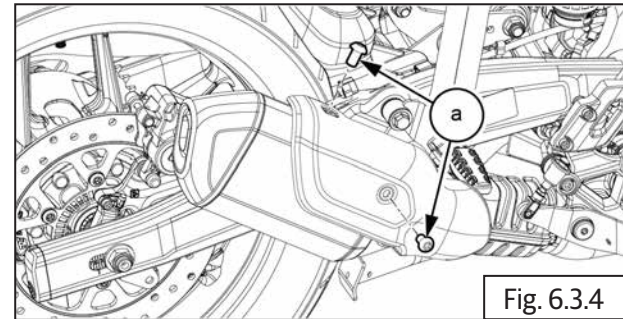
- Loosen and remove Oxygen Sensor (a) from the Exhaust pipe.



17 mm Combination Spanner

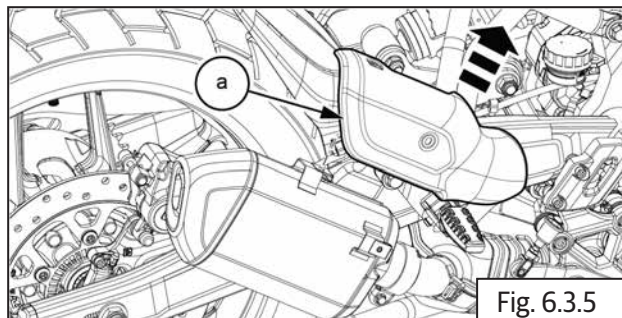
6.3.2. Silencer

- Remove 2 Nos button head bolts (M6) (a) from rear silencer heat shield.

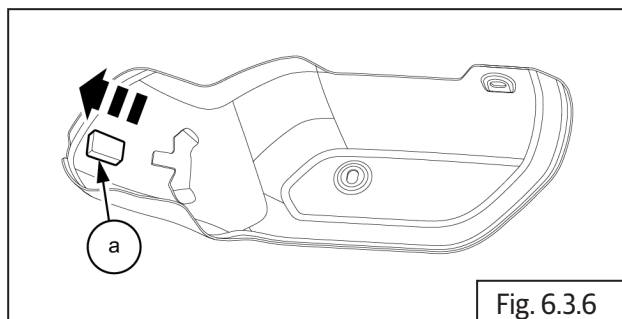


4mm Allen key

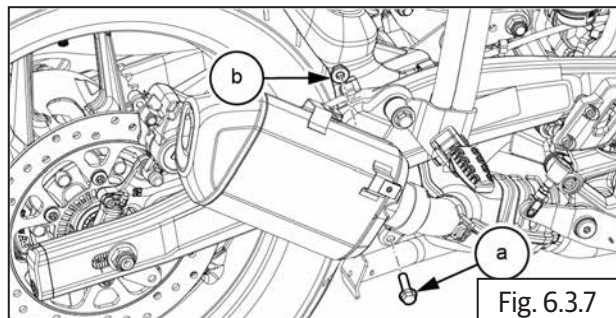
- Slightly slide backward and remove heat shield **(a)** from rear silencer.



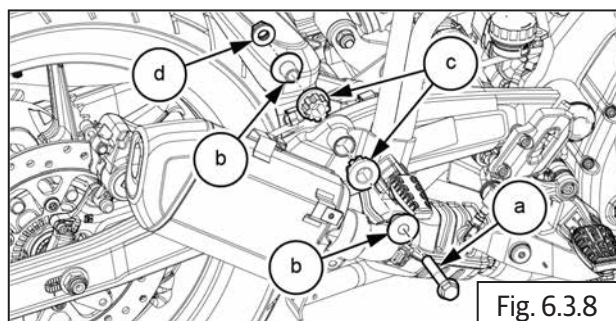
- Remove guard stopper cap **(a)** from inner of the heat shield.



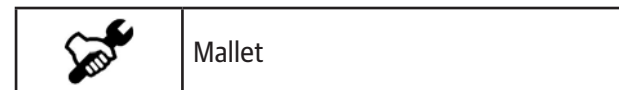
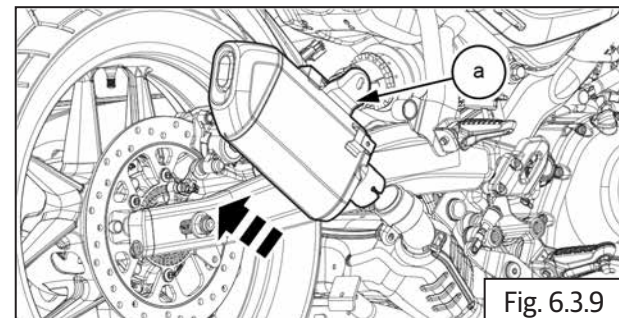
- Loosen and remove hex flange bolt **(M8) (a)** and flanged U nut **(M8) (b)** from mounting clamp.



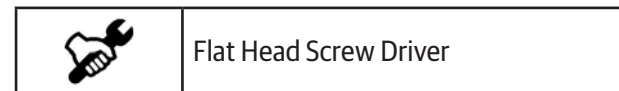
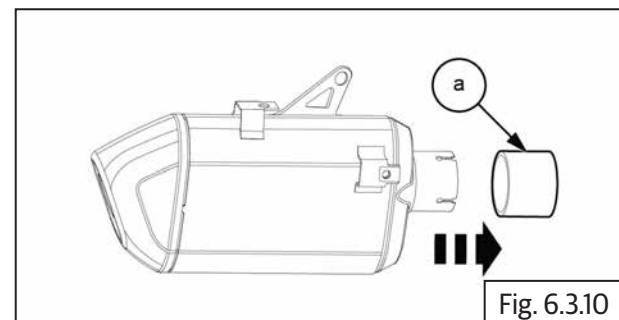
- Remove the silencer mounting bolt **(a) (M8)** with nut **(d) (M8)** along with **2 Nos pins (b)** and **2 Nos dampers (c)** from silencer.



- Gently tap and pull the silencer **(a)** outwards to remove.

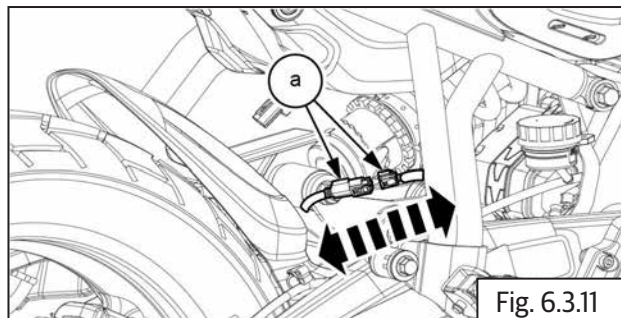


- Remove the gasket **(a)** from Silencer and Discard it.

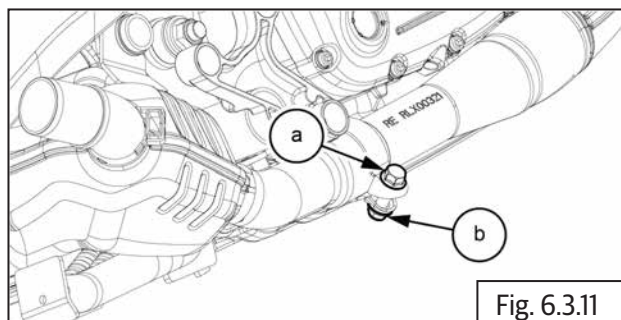


6.3.3. Catbox

- Disconnect rear oxygen sensor connector (a).

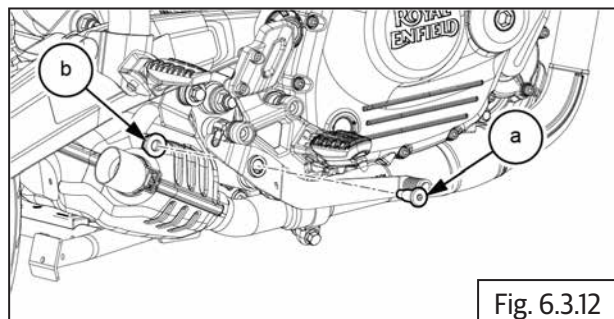


- Loosen hex flange bolt (M8) (a) and flanged U nut (M8) (b) from mounting clamp.



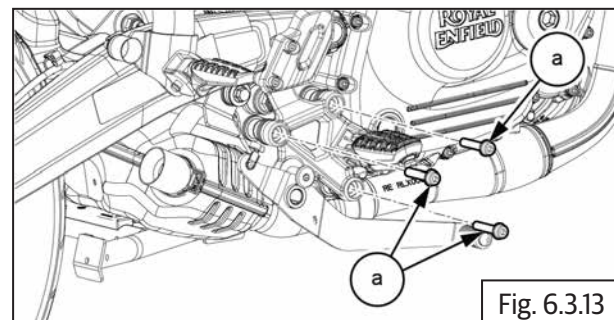
12 mm Socket with Ratchet

- Loosen and remove the pedal screw (a) and hex flanged nut (M8) (b) from the break pedal.



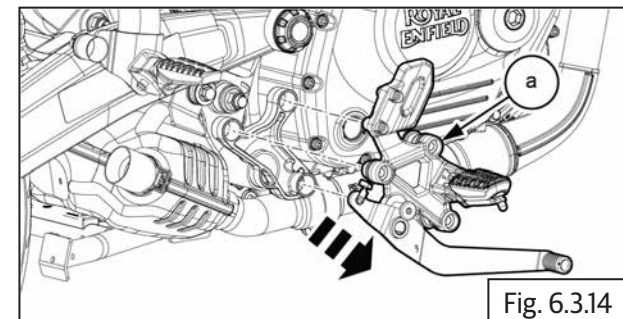
6 mm Allen Socket with Ratchet, 12 mm Combination Spanner

- Remove the 3 Nos cap flange bolts (M8) (a) from the RH control plate.

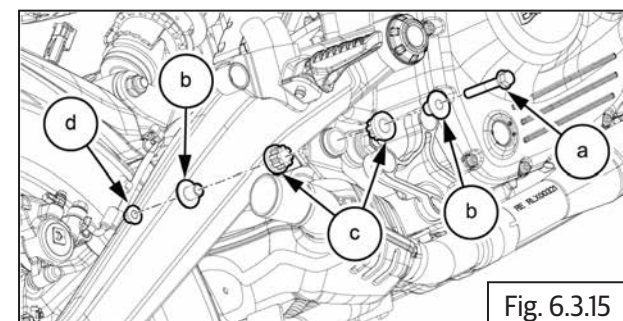


5 mm Allen Socket with Ratchet

- Slightly move the control plate (a) with master cylinder from vehicle.



- Remove the mounting bolt (M8) (a) along with 2 Nos pins (b) and 2 Nos dampers (c) and hex flanged nut (d) from RHS catbox.



12 mm Socket with Ratchet

- Remove the mounting bolt **(M8) (a)** and nut **(d)** along with **2 Nos** pins **(b)** and damper bush **(c)** from LHS catbox.

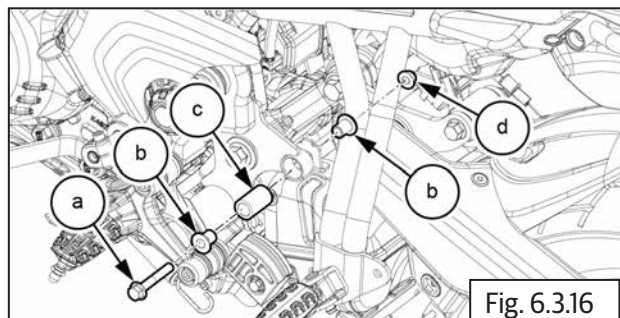


Fig. 6.3.16



12 mm Socket with Ratchet

- Gently tap and pull out the catbox **(a)** outwards to remove.

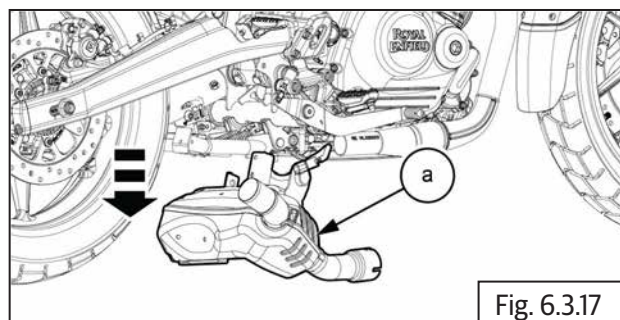


Fig. 6.3.17



Mallet

6.3.4. Exhaust Pipe

- Remove the bolt **(M6) (a)** and nut **(b)** from top of the radiator.

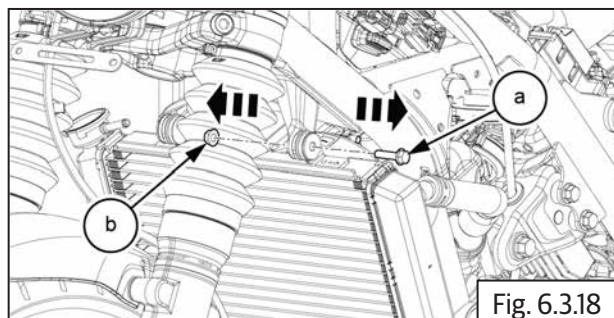


Fig. 6.3.18



10 mm Socket with Ratchet

- Remove the bolt **(M6) (a)** from bottom of the radiator.

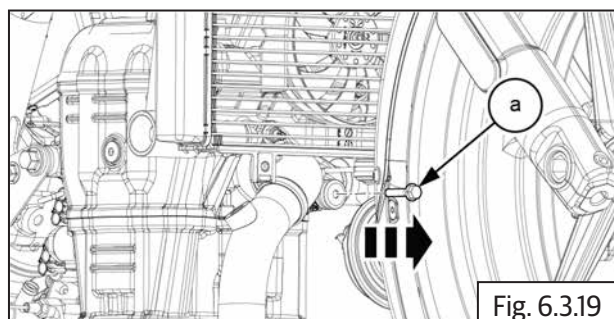


Fig. 6.3.19



10 mm socket with ratchet

- Slightly move the radiator **(a)** from the front frame.

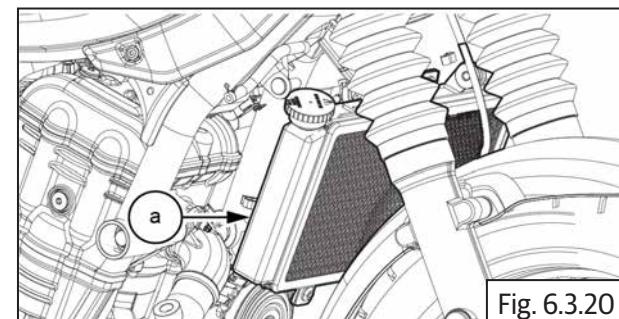


Fig. 6.3.20

⚠ CAUTION

- Take care of the radiator when removing the exhaust pipe, the radiator fins should not be damaged when removing the exhaust pipe.

- Loosen and remove **2 Nos** U flange nuts **(M8) (a)** from the cylinder head assembly.

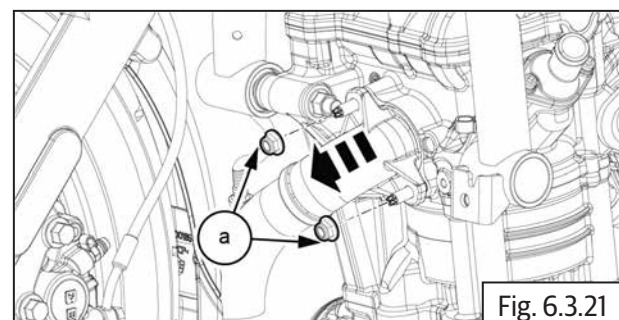
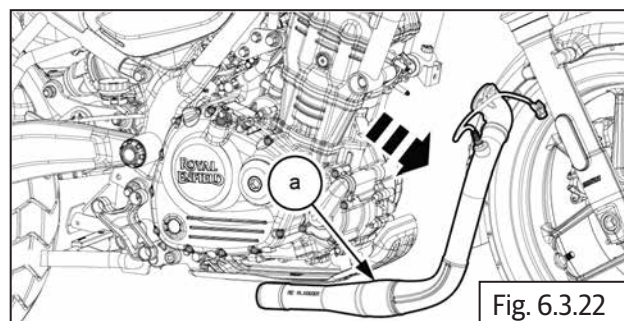


Fig. 6.3.21

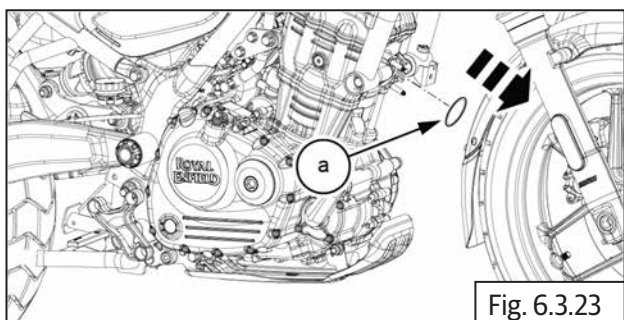


12 mm Socket with Ratchet

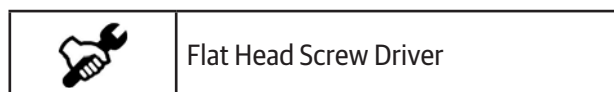
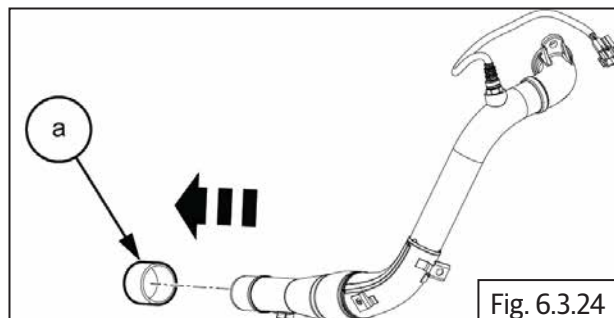
- Remove the exhaust pipe **(a)** from the vehicle.



- Remove header gasket **(a)** from cylinder head.

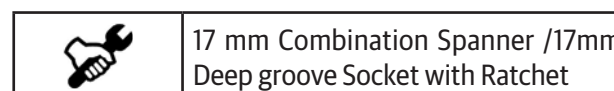
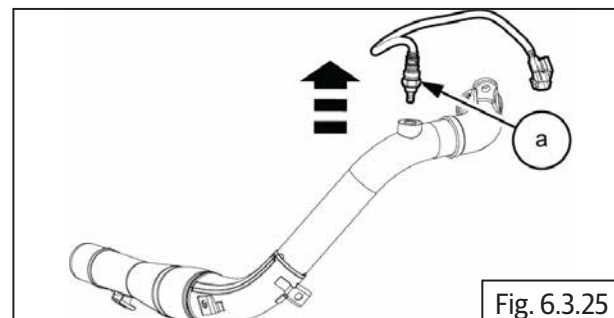


- Remove the Gasket **(a)** from the exhaust pipe rear end and discard the Gasket.

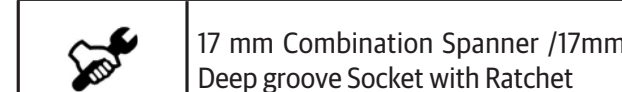
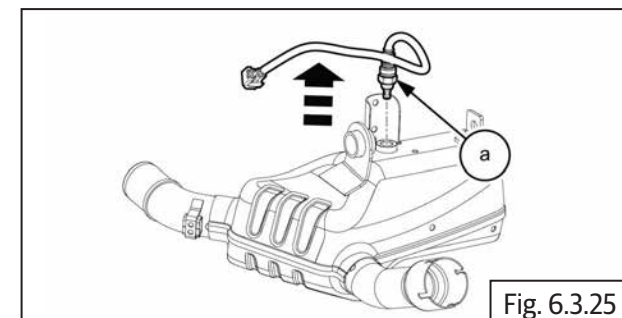


6.3.5. O2/Oxygen Sensor (Front & Rear)

- Gently loosen and remove the Oxygen sensor **(a)** from the exhaust pipe.



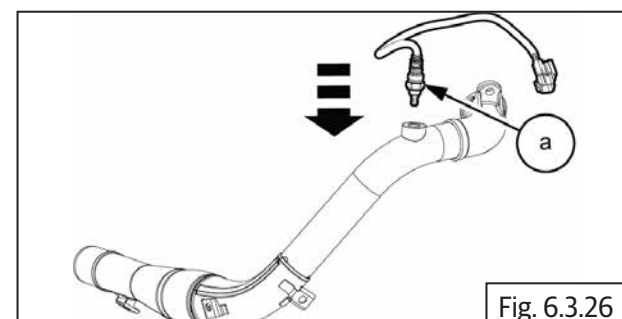
- Gently loosen and remove the Oxygen sensor **(a)** from the Catbox.



Assembly

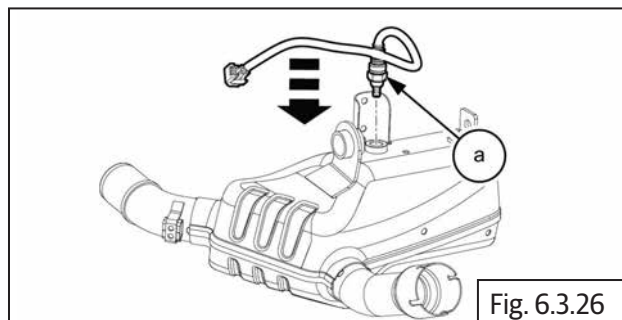
6.3.6. O2/Oxygen Sensor (Front & Rear)

- Locate and tighten Oxygen sensor **(a)** on the exhaust pipe.



	17 mm Combination Spanner / Deep groove Socket with Ratchet
Torque	17 Nm / 1.7 kgf-m

- Locate and tighten Oxygen sensor **(a)** on the Catbox.



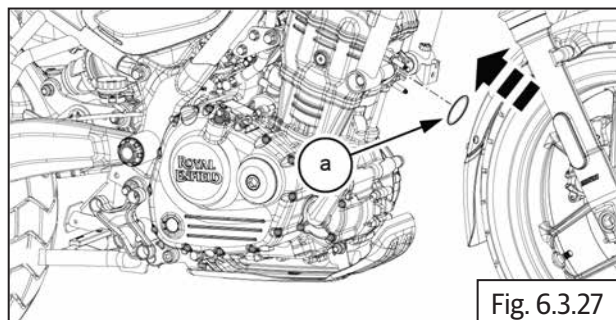
	17 mm Combination Spanner / Deep groove Socket with Ratchet
Torque	17 Nm / 1.7 kgf-m

⚠ CAUTION

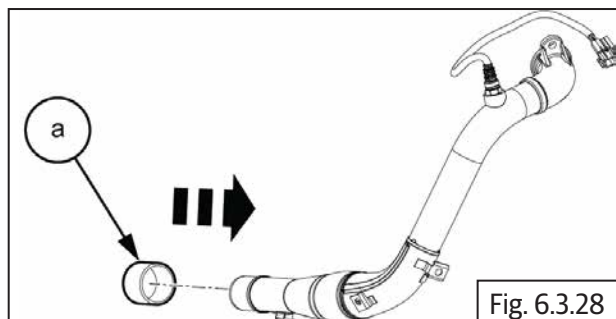
- DO NOT** over tighten as it damage the sensor.

6.3.7. Exhaust Pipe

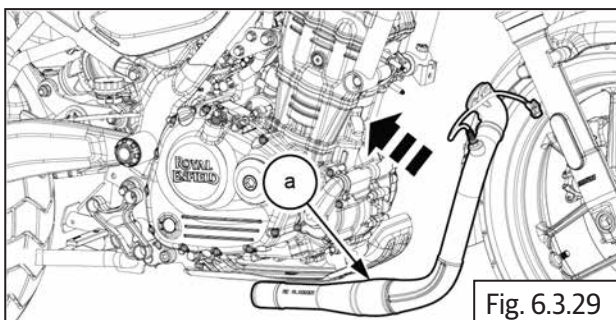
- Locate header gasket **(a)** into cylinder head.



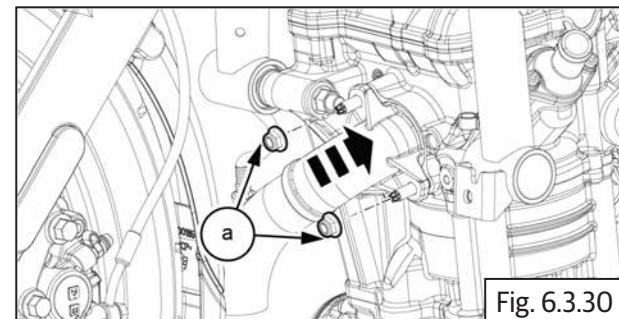
- Locate the new gasket **(a)** into exhaust pipe .



- Locate exhaust pipe **(a)** into cylinder head and ensure the exhaust pipe flange is properly located on the studs.

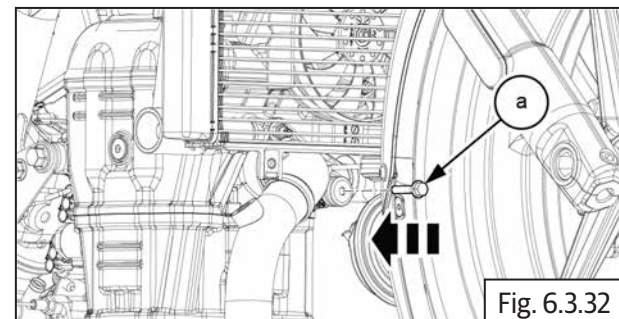


- Assemble **2 Nos** U flange nuts **(M8) (a)** on the studs and hand tight it to align the rear end mounting.



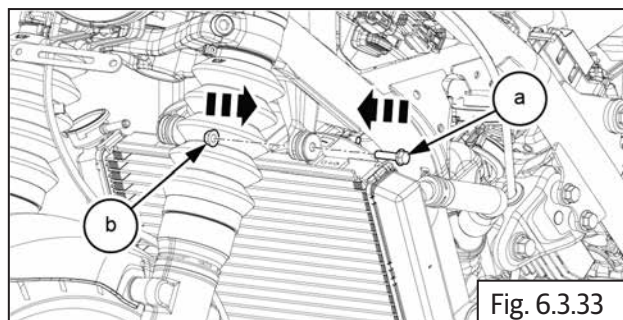
	12 mm Socket with Ratchet
Torque	25 Nm / 2.5 kgf-m

- Locate and tighten the bolt **(M6) (a)** on bottom of the radiator.



	10 mm Socket with Ratchet
Torque	8-10 Nm / 0.8-1.0 kgf-m

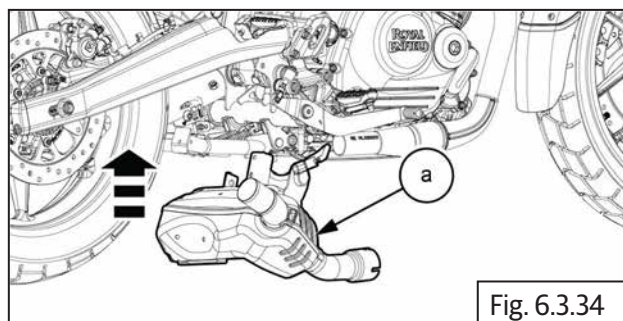
- Locate and tighten the bolt **(M6) (a)** and nut **(b)** on top of the radiator.



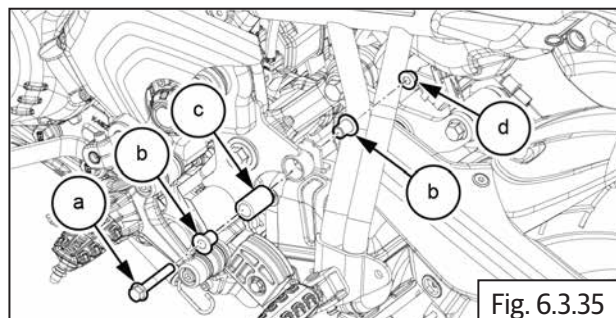
	10 mm Socket with Ratchet
Torque	8-10 Nm / 0.8-1.0 kgf-m

6.3.8. Catbox

- Insert the catbox **(a)** into header pipe.

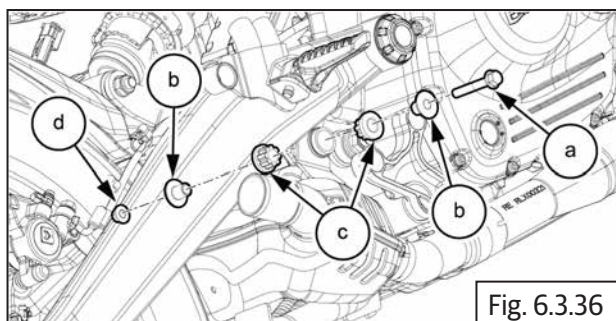


- Locate and tighten the catbox mounting bolt **(M8) (a)** and nut **(d)** along with **2 Nos** pins **(b)** and damper bushes **(c)** on LHS catbox.



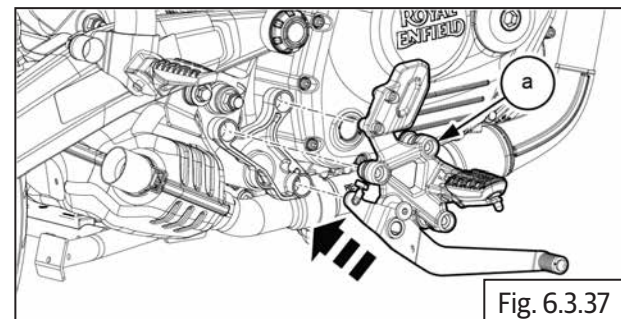
	12 mm Socket with Ratchet
Torque	25 Nm / 2.5 kgf-m

- Locate and tighten catbox mounting bolt **(M8) (a)** and nut **(d)** along with **2 Nos** pins **(b)** and **2 Nos** dampers **(c)** on RHS catbox.

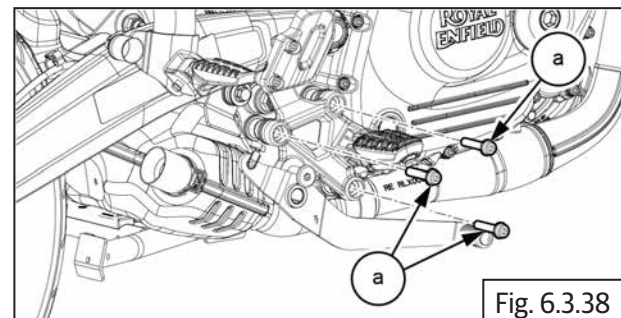


	12 mm socket with ratchet
Torque	25 Nm/2.5 kgf-m

- Locate the control plate RHS **(a)** on vehicle.

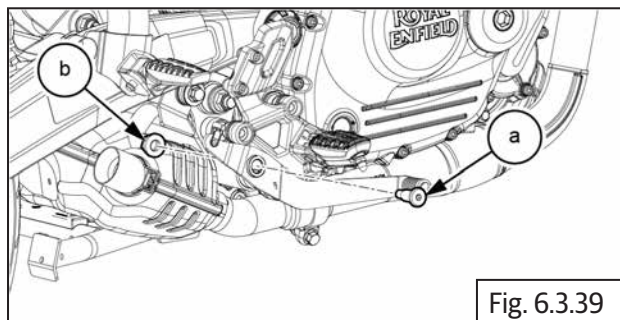


- Locate the **3 Nos** cap flange bolts **(M8) (a)** on RH control plate.



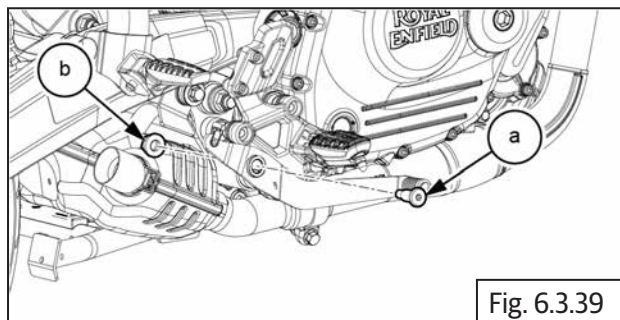
	5mm Allen Socket with Ratchet
Torque	20 ± 3Nm / 2 ± 0.3kgf-m

- Locate and tighten the pedal screw **(a)** and hex flange nut **(M8) (b)** on the break pedal.



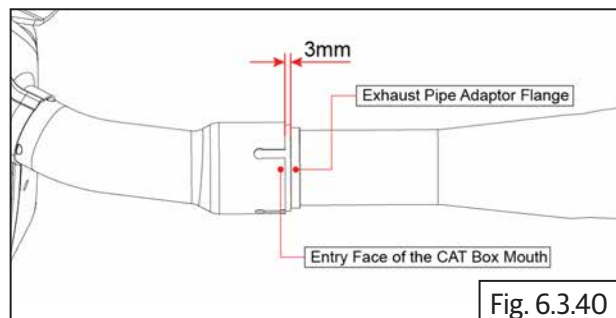
	6 mm Allen Socket with Ratchet, 12 mm Combination Spanner
Torque	25 ± 3Nm / 2.5 ± 0.3kgf-m

- Locate and tighten the pedal screw **(a)** and hex flange nut **(M8) (b)** on the break pedal.

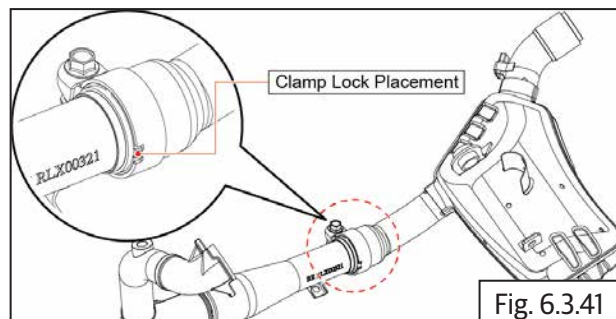


	6 mm Allen Socket with Ratchet, 12 mm Combination Spanner
Torque	25 ± 3Nm / 2.5 ± 0.3kgf-m

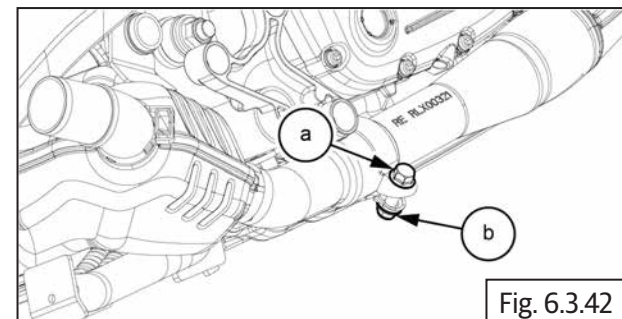
- The entry face of the catbox mouth and Exhaust pipe adaptor flange face should be as close as possible, **Max. 3mm gap** allowed.



- Position the clamp orientation refer below image.



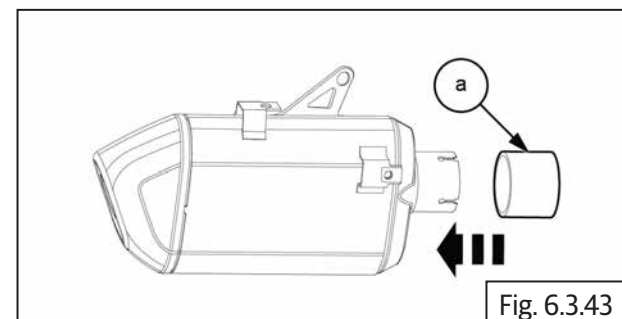
- Tighten hex flange bolt **(M8) (a)** and flanged U nut **(M8) (b)** on mounting clamp.



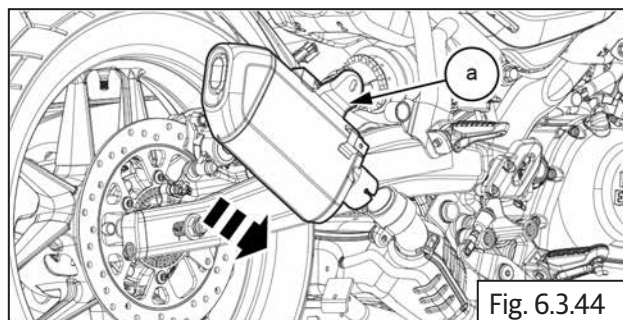
	12 mm Socket with Ratchet
Torque	32 Nm / 3.2 kgf-m

6.3.9. Silencer

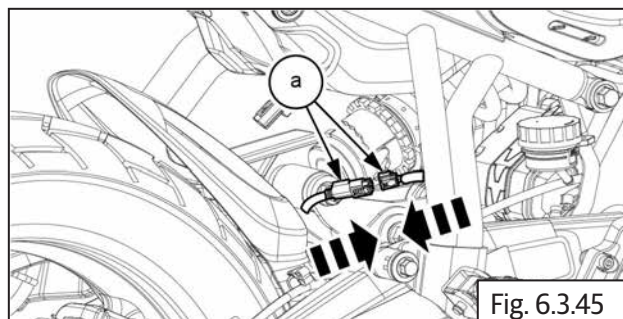
- Install the new gasket **(a)** into the silencer.



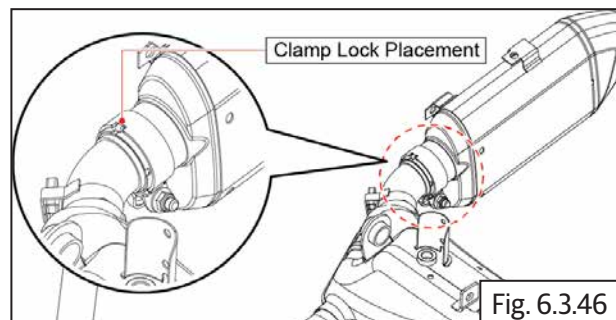
- Locate the silencer **(a)** into catbox outlet pipe.



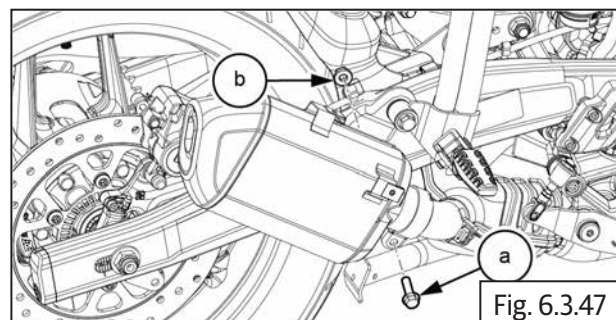
- Connect the rear oxygen sensor connector (a).



- Position the clamp orientation refer below image.

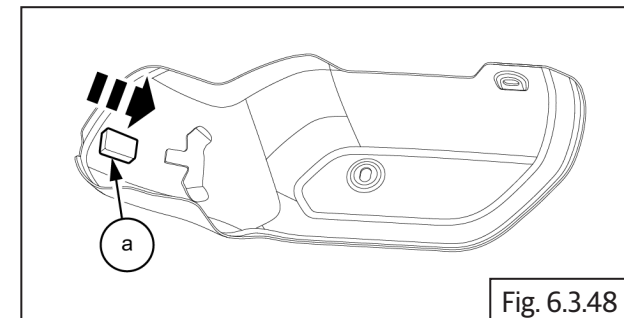


- Tighten hex flange bolt **(M8) (a)** and flanged U nut **(M8) (b)** on mounting clamp.

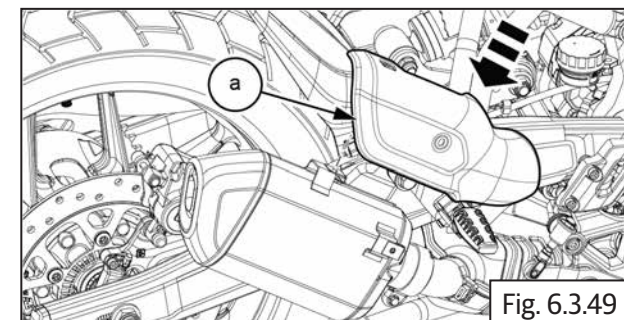


	12 mm Socket with Ratchet
Torque	32 Nm / 3.2 kgf-m

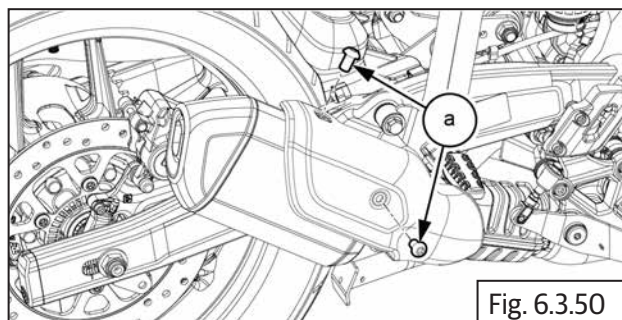
- Install the guard stopper cap **(a)** into inner of the heat shield.



- Locate the rear heat shield **(a)** on the silencer.
- Ensure the Clip nut is placed on the mountings.



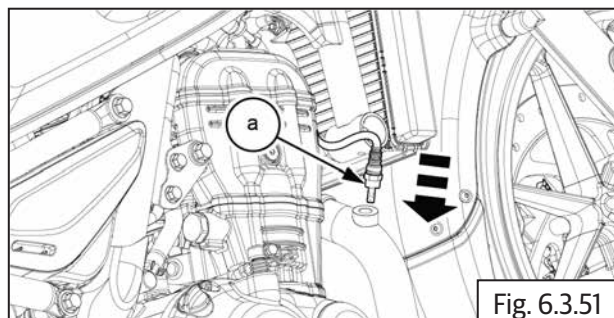
- Locate and tighten the **2 Nos** button head bolts **(M6) (a)** on rear silencer heat shield.



	4 mm Allen Socket with Ratchet
Torque	5 Nm / 0.5 kgf-m

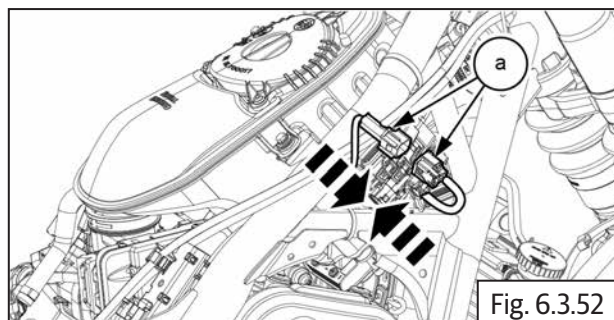
6.3.10. O2 Sensor / Oxygen Sensor Connectors (Front)

- Locate the O2 sensor **(a)** on the Exhaust pipe.

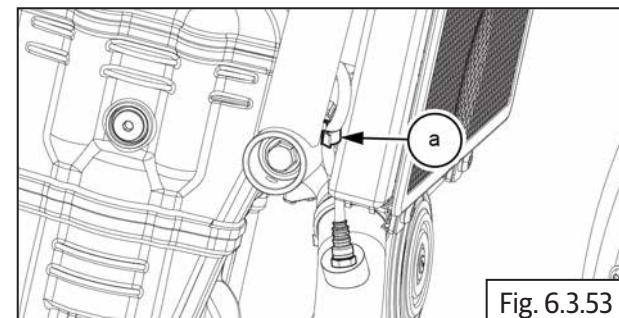


	17mm Combination Spanner
Torque	17 Nm / 1.7 kgf-m

- Connect oxygen sensor connector **(a)**.



- Fix the omega clips **(a)** on Oxygen Sensor wiring harness.



- Assemble the fuel tank (Refer Fuel System Chapter).

Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Vibration/rattling noise from exhaust pipe and cat box.	Exhaust pipe mounting to cylinder head bolt loose.	Exhaust pipe flange mounting to cylinder head is loose/flange is cracked.	Check and tighten flange mounting bolts. Replace exhaust pipe if flange is cracked.	Torque: 25 Nm/2.5 kgf-m
	Exhaust pipe with cat box mounting to frame is loose.	Fasteners are loose/mounting clamps are cracked.	Check and tighten fasteners. Replace clamps if they are cracked. Replace Exhaust pipe with CAT box.	Torque: 32 Nm/3.2 kgf-m
Vibration/rattling noise from silencer.	Silencer mounting to frame is loose.	Fasteners are loose/mounting clamps are cracked.	Check and tighten fasteners. Replace clamps/silencer if they are cracked.	Torque: 25 Nm/2.5 kgf-m
	Internal baffles in silencer are broken.	Remove silencer and shake to check if internal baffles are cracked.	Replace silencer assembly.	
Exhaust gas leak from cylinder head joint/silencer joint.	Gaskets are burnt/missing.	Gaskets are burnt-out due to loose clamping of exhaust pipe/silencer.	Replace exhaust pipe/silencer gaskets.	

NOTE

- The troubleshooting given in this section is only related to issues with noise/leak in the exhaust system. For complaints related to poor pickup, misfiring, etc., please refer to the respective chapters.

FOOTREST/CONTROL PLATE/STANDS

CONTENTS

PAGE

6.4 Footrest / Control Plate/Stands 3

Dismantling..... 3

6.4.1. Rider Footrest..... 3

6.4.2. Pillion Footrest..... 4

6.4.3. Gear Pedal..... 5

6.4.4. Control Plate (LHS)..... 5

6.4.5. Control Plate (RHS)..... 6

6.4.6. Side Stand..... 7

6.4.7. Center Stand..... 9

Inspection..... 11

Assembly..... 11

6.4.8. Center Stand..... 12

6.4.9. Side Stand..... 13

6.4.10. Control Plate (RHS)..... 14

6.4.11. Control Plate (LHS)..... 16

6.4.12. Gear Pedal..... 17

6.4.13. Pillion Footrest (LHS)..... 17

6.4.14. Rider Footrest (LHS)..... 18

6.4. Footrests/ Contol Plate/ Stands

Dismantling

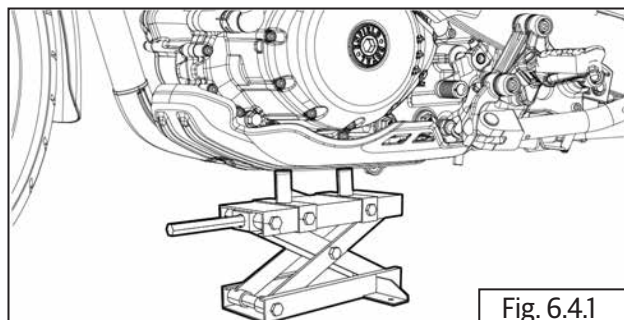
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

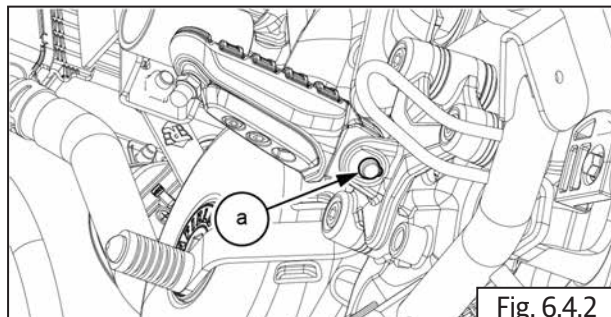
Ensure ignition and stop switch are in off position.

6.4.1. Rider Footrest

- Locate a scissor jack under the cradle frame and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).

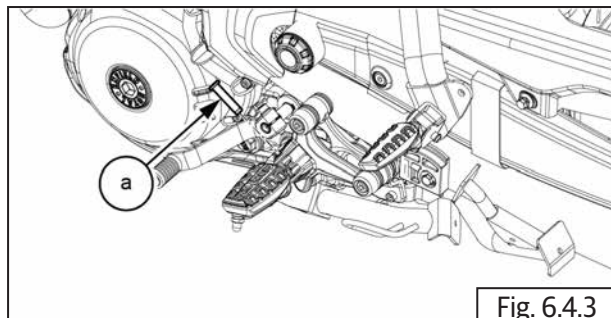


- Remove the circlip (a) at the bottom of the LH footrest.



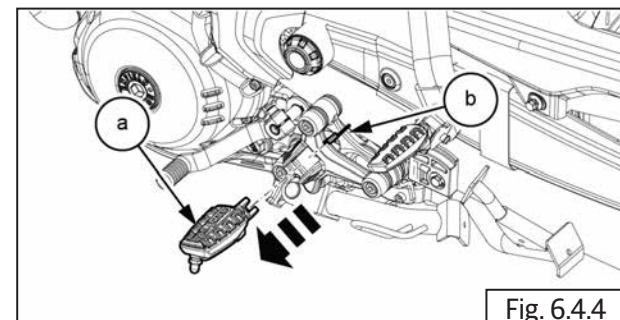
Circlip Expander

- Remove the pin (a) from rider footrest. .

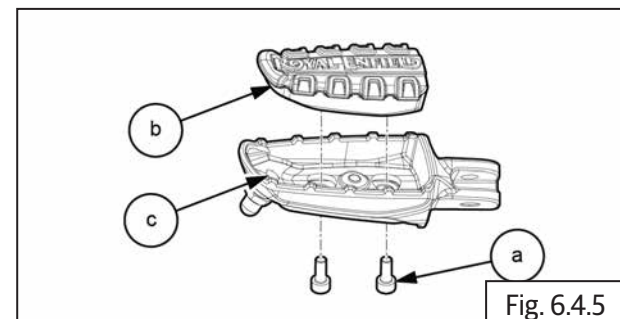


Flat Head Screw Driver

- Remove the footrest (a) along with spring (b).

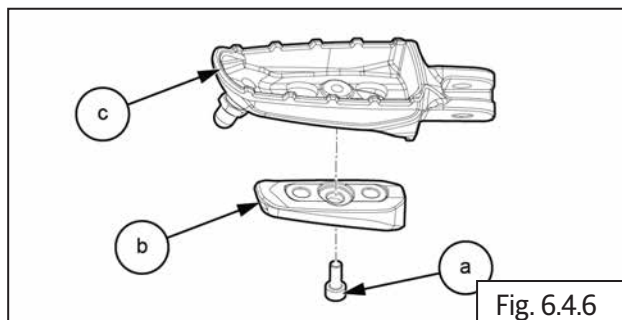


- Loosen 2 Nos cap bolt (M5) (a) and remove rubber (b) from rider footrest (c).



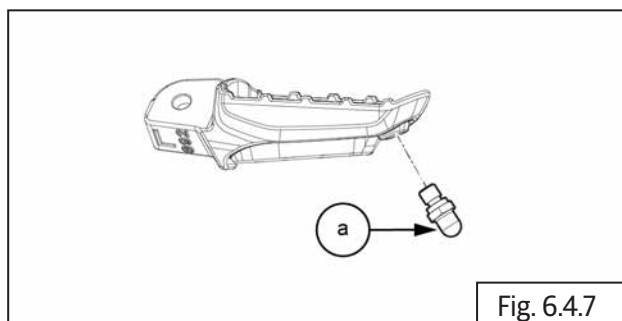
4 mm Allen socket With Ratchet

- Loosen cap bolt **(M5) (a)** and foot peg **(b)** from rider footrest **(c)**.



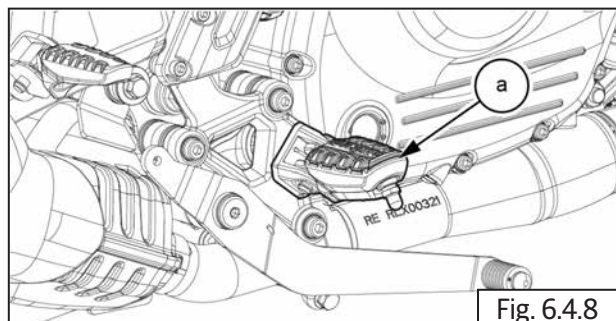
5 mm Allen socket With Ratchet

- Loosen and remove feeler peg **(a)** from rider footrest.



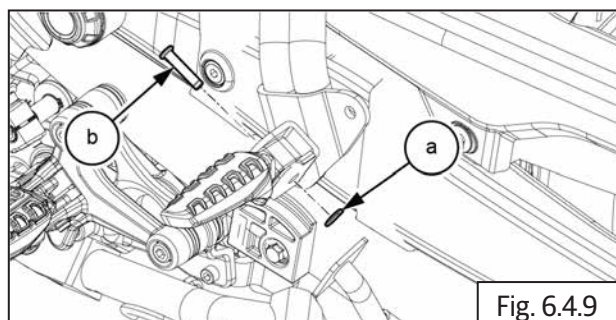
12 mm socket With Ratchet

- Repeat the same rider footrest removal procedure to RHS footrest **(a)**.



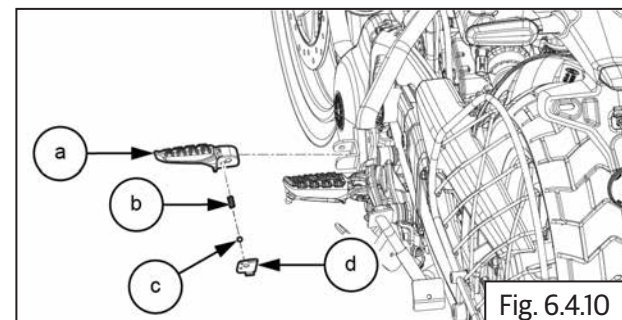
6.4.2. Pillion Footrest

- Remove circlip **(a)** from the bottom of the LH pillion footrest.
- Gently pull out pin **(b)** from the top supporting the LH pillion footrest.

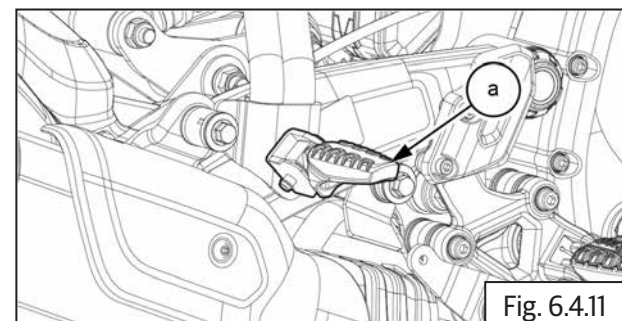


Circlip Expander
Flat Head Screw Driver

- Remove LH footrest **(a)** from mounting bracket.
- Carefully remove ball **(c)** with spring **(b)** and retainer plate **(d)**.

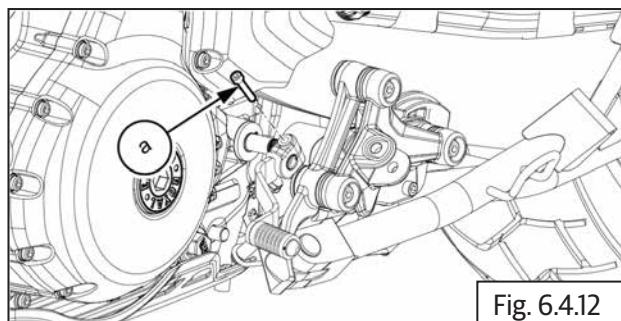


- Repeat the same pillion footrest removal procedure to RHS pillion footrest **(a)**.



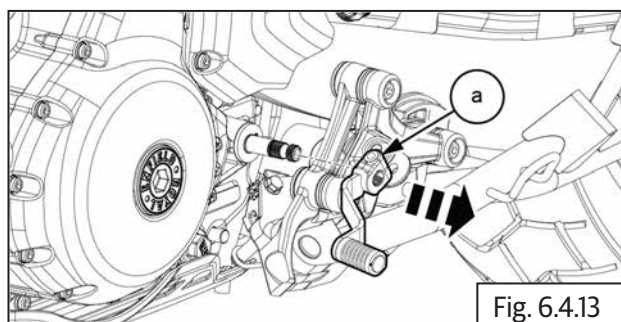
6.4.3. Gear Pedal

- Loosen and remove cap bolt **(M6) (a)** from gear pedal.



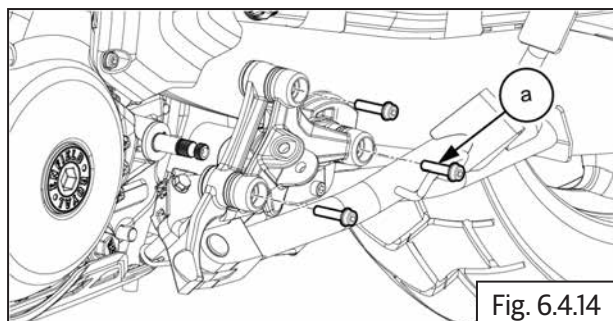
5 mm Allen socket With Ratchet

- Gently pull out gear pedal **(a)** from shifter.



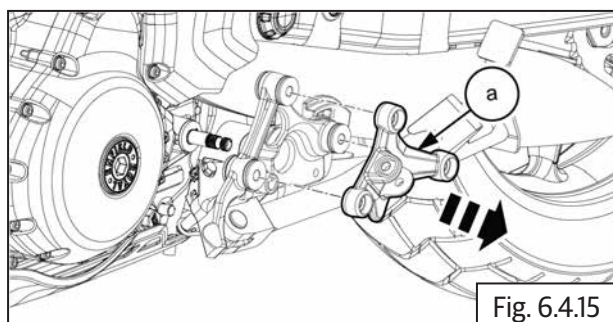
6.4.4. Control Plate (LHS)

- Loosen and remove **3 Nos** cap bolts **(M8) (a)** from control plate.

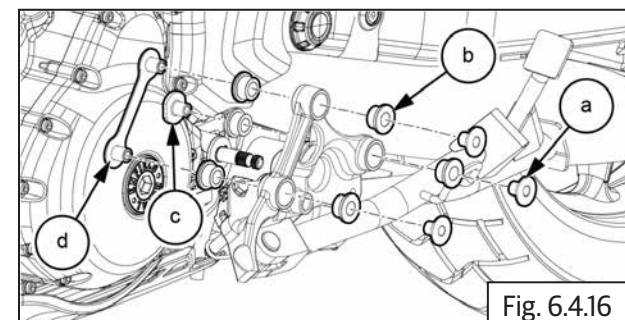


6 mm Allen socket With Ratchet
27 Combination spanner

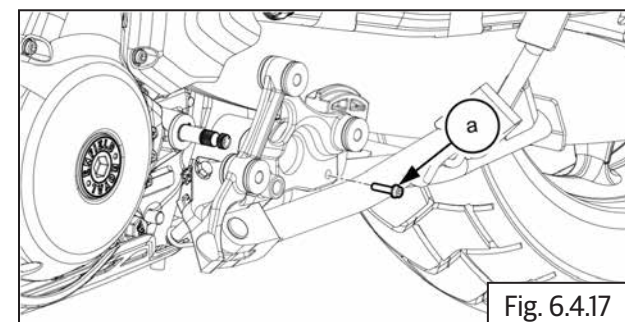
- Remove control plate **(a)** from frame.



- Remove **3 sets** of top hat **(a)**, rubber bush **(b)** and top hat threaded **(c)**, Nut plate **(d)** from control plate.

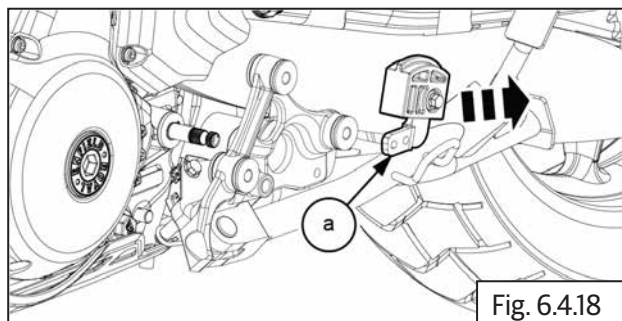


- Loosen and remove hex flange bolt **(M6) (a)** bolt & hex nut from the frame.

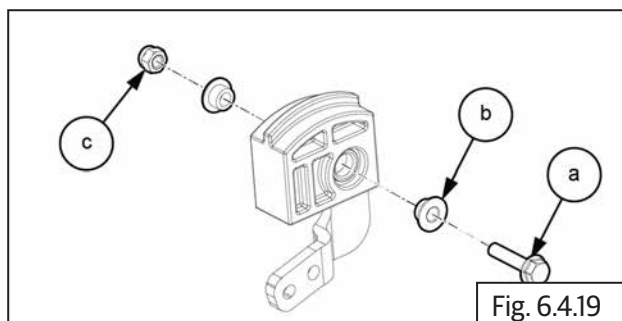


5 mm Allen Socket With Ratchet
10 mm Combination spanner

- Remove the rubbing block **(a)** from the frame.

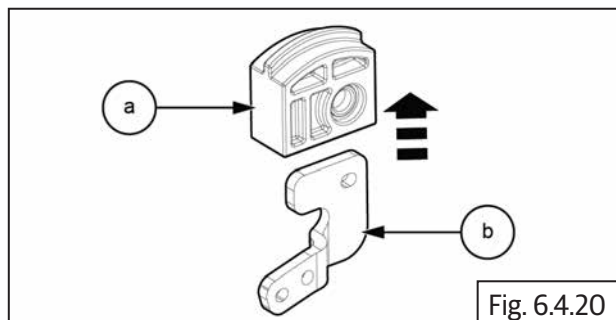


- Loosen and remove hex flange bolt **(M6) (a)** Top hat **(b)** and Hex nut **(c)** from rubbing block.



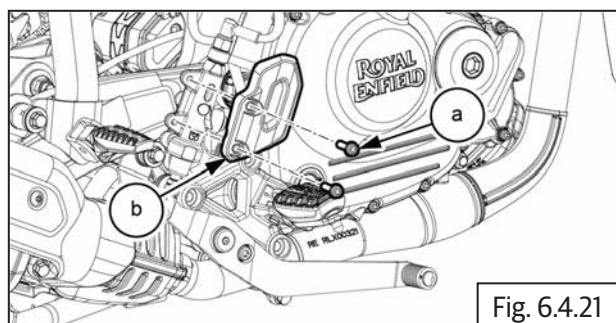
10 mm Socket With Ratchet
10 mm Combination spanner

- Remove the rubbing block **(a)** from the rubbing bracket **(b)**.



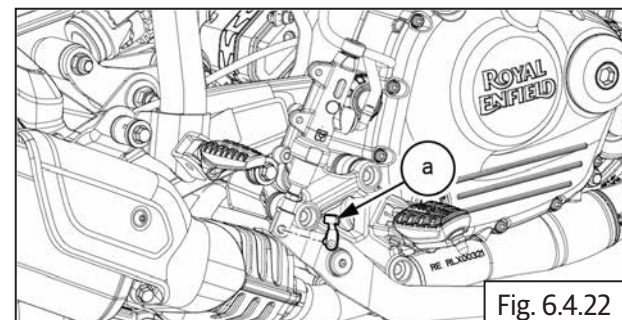
6.4.5. Control Plate (RHS)

- Loosen **2 Nos** cap bolts **(M6) (a)** and remove heel guard **(b)** from control plate RHS.



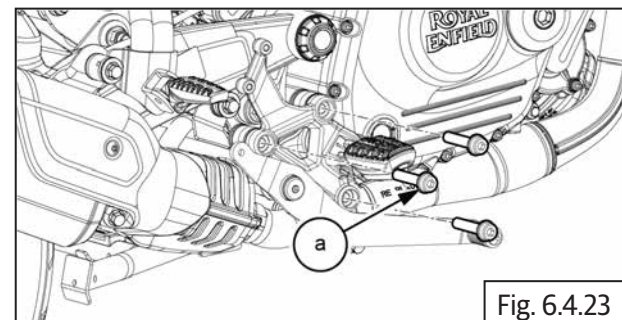
5 mm Allen socket With Ratchet

- Remove the clevis spring pin **(a)** from master cylinder.



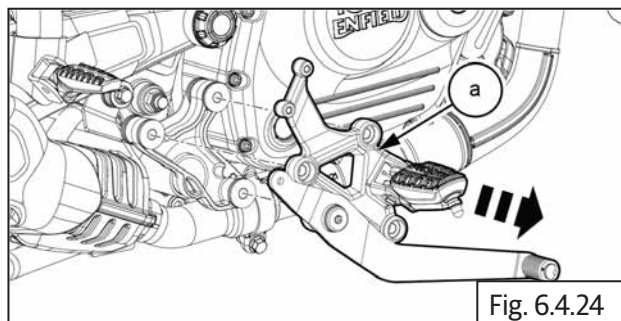
Nose plier

- Loosen and remove **3 Nos** cap bolts **(M8) (a)** from control plate RHS.

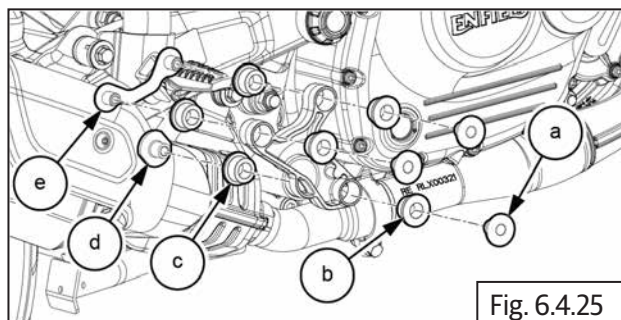


6 mm Allen socket With Ratchet
27 Combination spanner

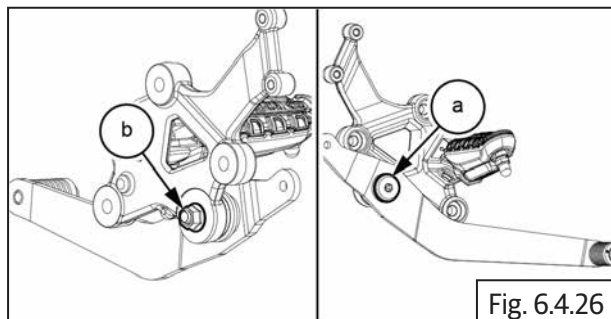
- Remove control plate RHS **(a)** from frame.



- Remove **3 sets** of top hats **(a)**, rubber bushes **(b)**, top hat threaded **(c)** **(d)** & nut plate **(e)** from control plate RHS.

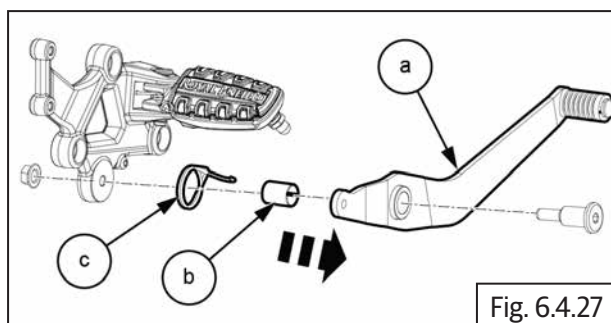


- Loosen and remove screw **(a)** & hex flange nut **(M8)** **(b)** from control plate RHS.



6 mm Allen Key With Ratchet
12 mm Combination Spanner

- Remove brake pedal **(a)** along with bush **(b)** and spring **(c)** from RH control plate.



6.4.6. Side Stand

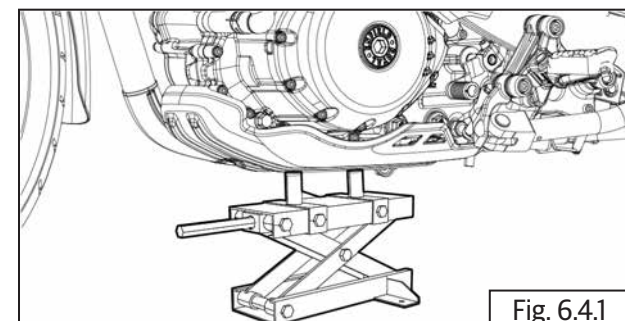
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.
Ensure ignition and stop switch are in off position.

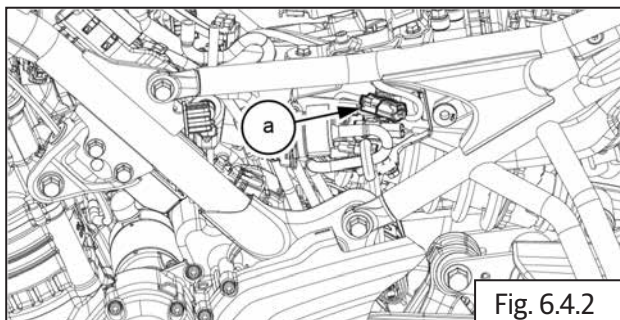
⚠ CAUTION

Be extremely careful when removing and installing the springs as the combined tension of the springs is very strong.
Keep the motorcycle on its side stand when removal and installing the center stand.
The spring removal and installation shall be performed by two people. While one person holds the motorcycle, another person installs the spring.

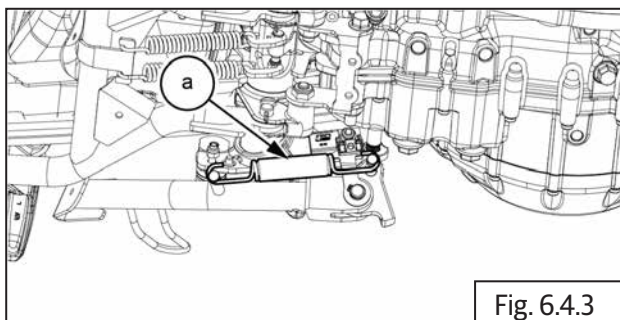
- Locate a scissor jack under the cradle frame and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).



- Disconnect the side stand switch coupler **(a)**.

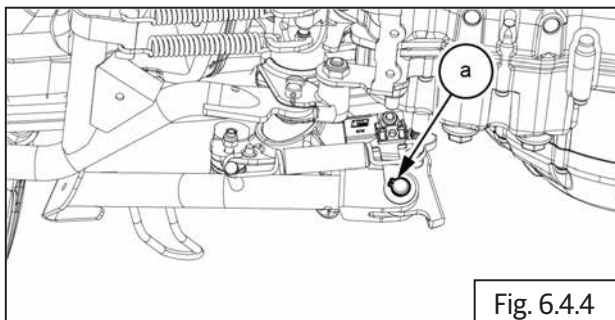


- Remove spring **(a)** from the side stand.



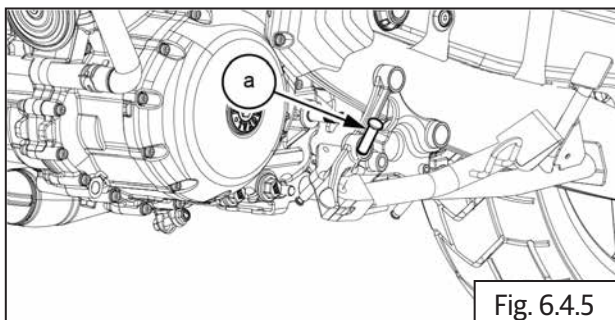
Screw driver

- Remove the circlip **(a)** from clevis pin.

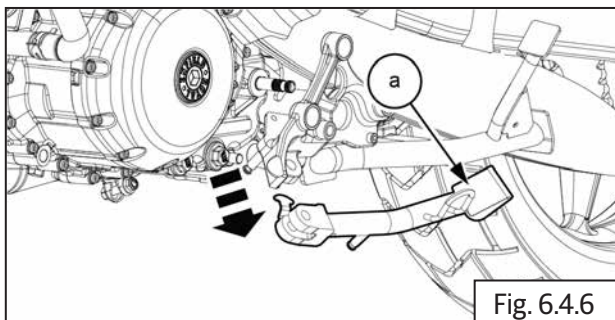


Circlip Expander

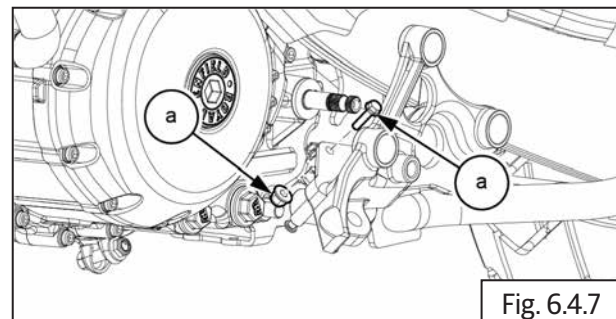
- Remove clevis pin **(a)** from side stand.



- Remove side stand **(a)** from frame.

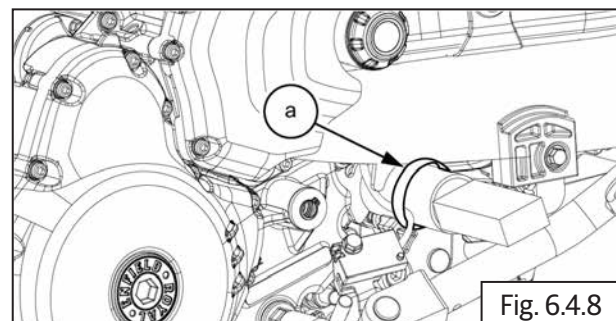


- Loosen and remove hex flange bolt **(M6) (a)** and hex nut **(b)** from side stand switch .



10 mm Socket With Ratchet
10 mm Combination Spanner

- Detach the wire tag **(a)** from side stand switch wiring harness.



Nose plier

- Detach the omega clips **2 Nos (a)** from side stand switch wiring harness.

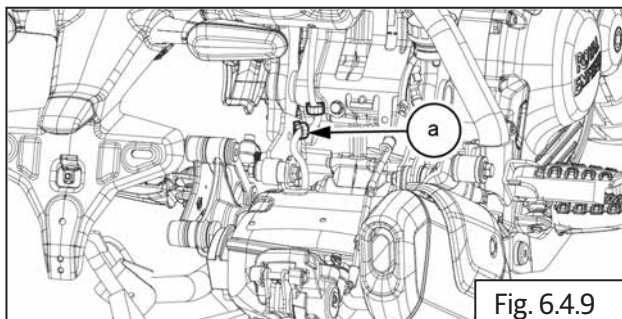


Fig. 6.4.9



Nose plier

- Remove the side stand switch with harness **(a)** from frame .

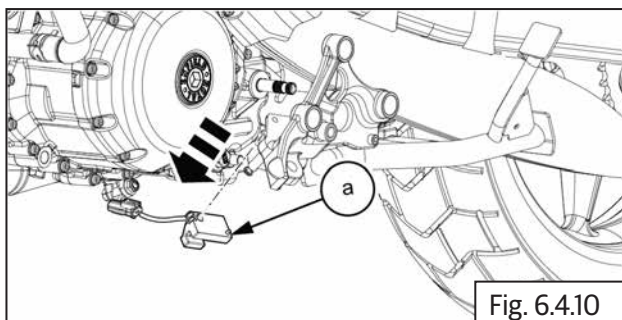


Fig. 6.4.10

6.4.7. Center Stand

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

⚠ CAUTION

Be extremely careful when removing and installing the springs as the combined tension of the springs is very strong.

Keep the motorcycle on its side stand when removal and installing the center stand. The spring removal and installation shall be performed by two people. While one person holds the motorcycle, another person installs the spring.

- Locate a scissor jack under the cradle frame and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).

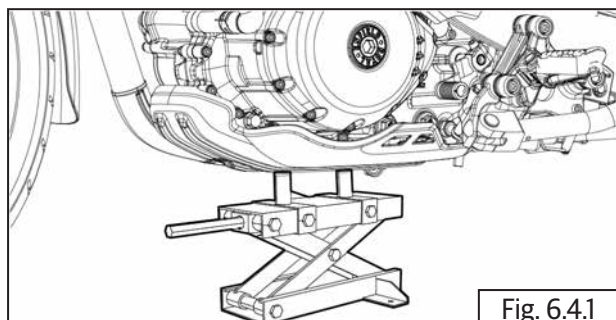


Fig. 6.4.1

- Remove **2 Nos** springs and mount plate **(a)** from the center stand.

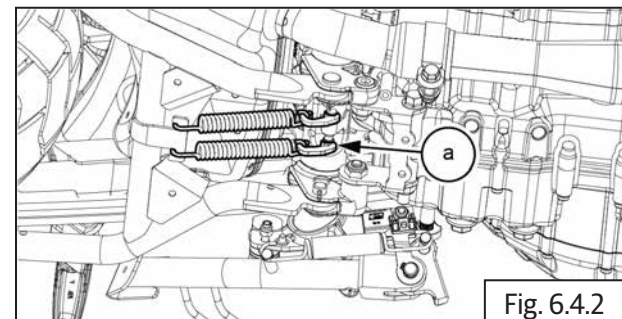


Fig. 6.4.2



Screw driver

- Detach the **2 Nos** mount plates **(a)** from center stand springs.

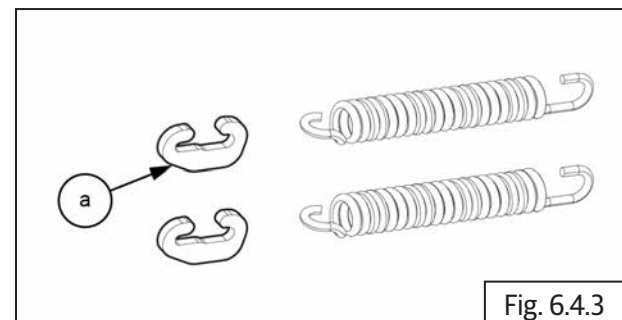
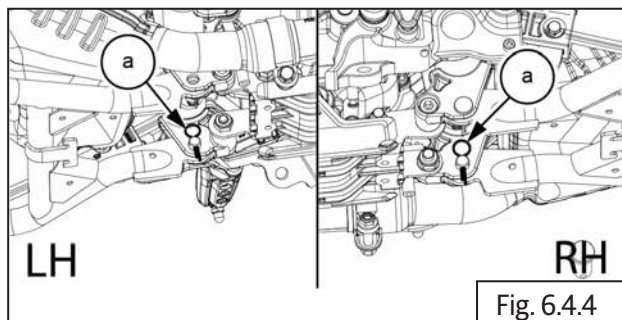
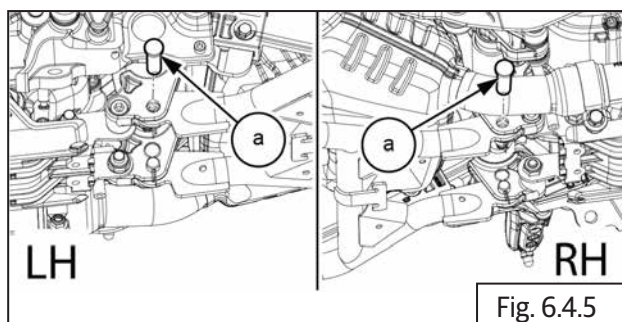


Fig. 6.4.3

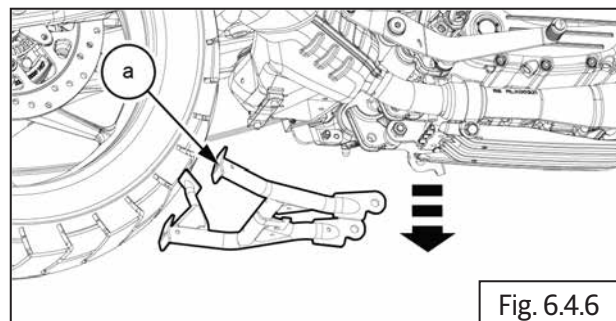
- Straighten and remove split pin **(a)** from spindle pin located on center stand.



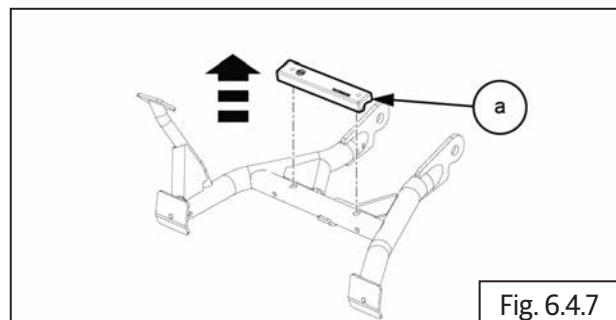
- Remove spindle pin **(a)** from both side to separate center stand from frame.



- Remove center stand **(a)** from frame.



- Remove rubber stopper **(a)** from center stand.



Inspection

- Inspect footrests for any wear out, cracks, damages at the mounting area.
- Inspect clevis pin for any wear-out.
- Inspect springs for loss of tension and breakage.
- Inspect ball (only for pillion footrest) for uneven wear.
- Inspect rider footrest housing on frame for any cracks and damages.
- Inspect pillion footrest brackets for any cracks and damages.
- Inspect the center stand for rust formation, any bend or damage.
- Inspect side stand for any wear out, cracks, damages at the mounting area.
- Inspect rubber bush for any cracks, cut or tear and wear.

Assembly

6.4.8 Center Stand

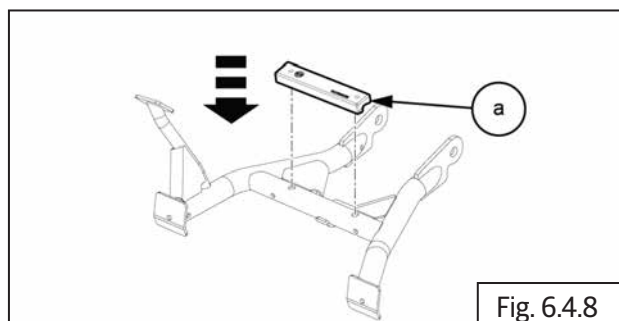
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

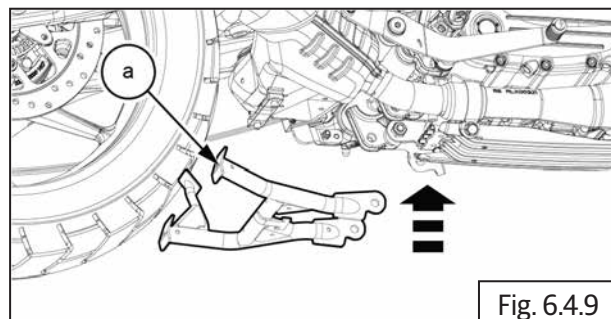
⚠ CAUTION

Be extremely careful when removing and installing the springs as the combined tension of the springs is very strong. Keep the motorcycle on its side stand when removal and installing the center stand. The spring removal and installation shall be performed by two people. While one person holds the motorcycle, another person installs the spring.

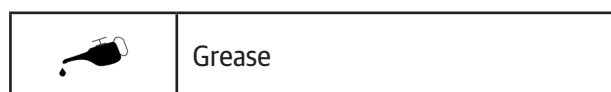
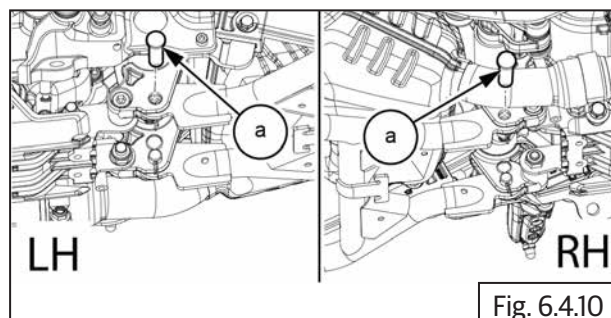
- Fix the rubber stopper (a) on center stand.



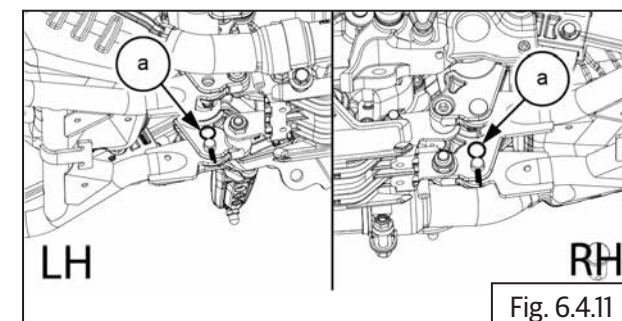
- Align the center stand (a) into the frame.



- Apply grease to pin before stand assembly.
- Insert the spindle pin (a) on both edges of the center stand.



- Straighten and fix the split pin (a) on both edges of the center stand.

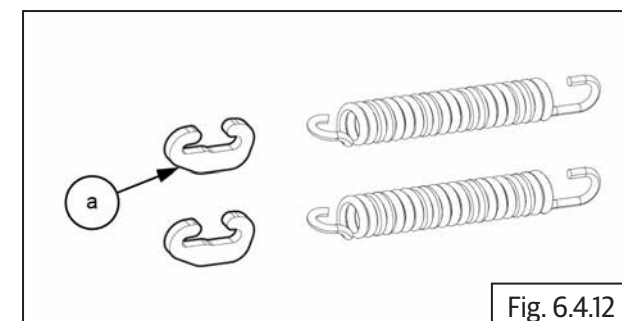


Nose plier

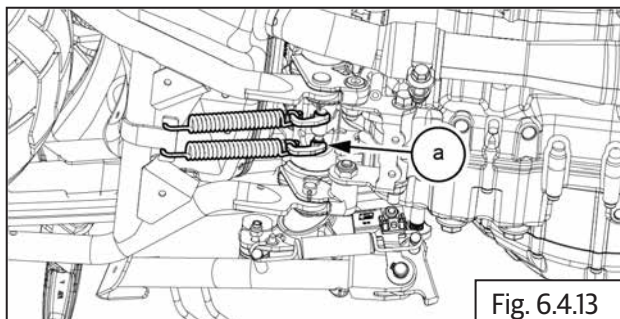
NOTE

- Spindle pin must be orientated as per below image.

- Fix the 2 Nos mount plates (a) to center stand springs.



- Fix the **2 Nos** springs with mount plates **(a)** on center stand.



Screw driver

6.4.9. Side Stand

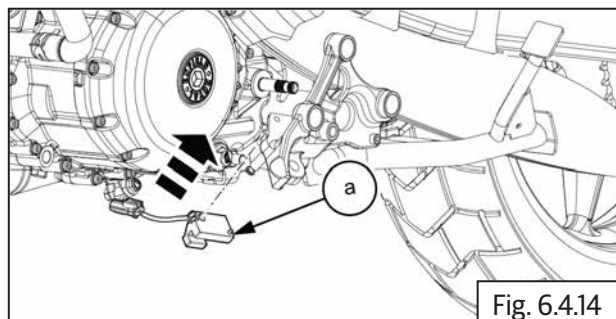
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

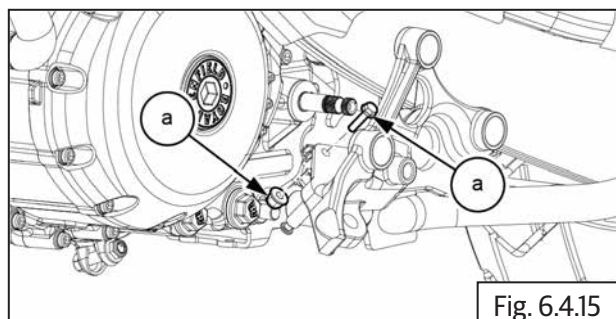
⚠ CAUTION

Be extremely careful when removing and installing the springs as the combined tension of the springs is very strong. Keep the motorcycle on its side stand when removal and installing the center stand. The spring removal and installation shall be performed by two people. While one person holds the motorcycle, another person installs the spring.

- Locate the side stand switch **(a)** into frame .



- Locate and tighten hex flange bolt **(M6) (a)** & hex nut **(b)** into side stand switch plate.

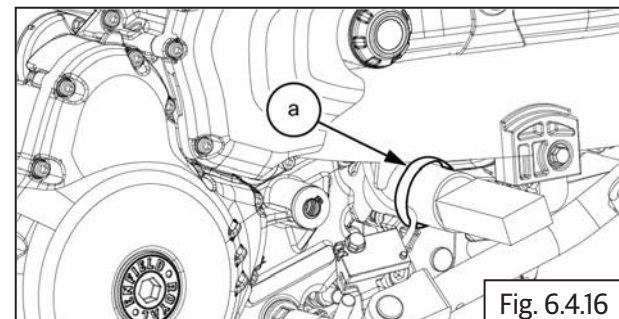


10 mm Allen Socket with Ratchet

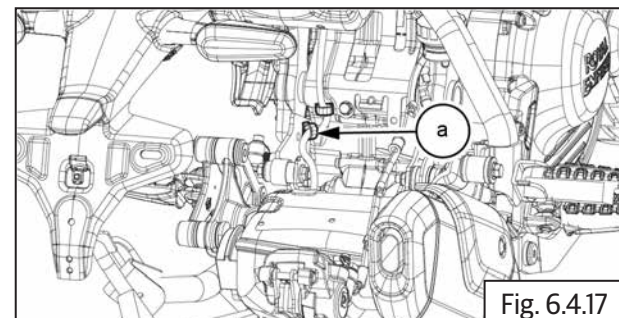


10 Nm / 1.0 kgf-m

- Fix the wire tag **(a)** on side stand switch wiring harness.



- Fix the **2 Nos** omega clips **(a)** on side stand switch wiring harness.



- Apply grease on the inner surface of the stand.
- Locate side stand (a) into the frame.

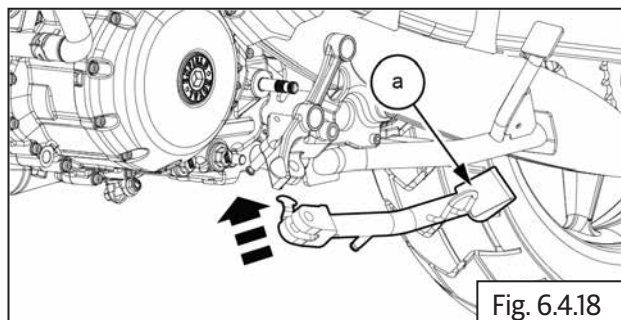
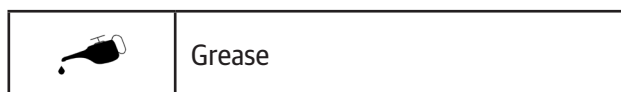


Fig. 6.4.18



Grease

- Locate clevis pin (a) into side stand.

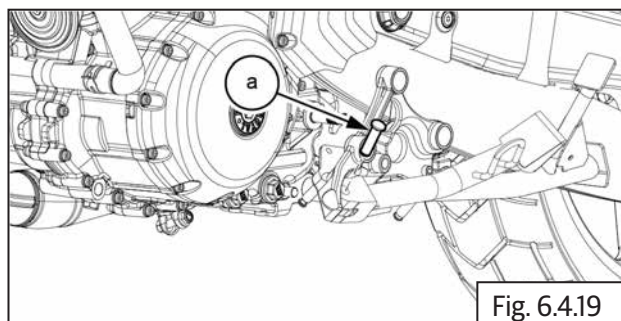


Fig. 6.4.19

- Fix the circlip (a) into the clevis pin.

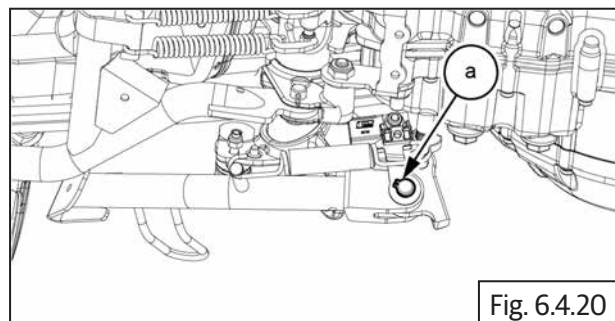


Fig. 6.4.20



Circlip Expander

- Install spring (a) into the side stand.

NOTE

- Spring must be orientated as per below image.

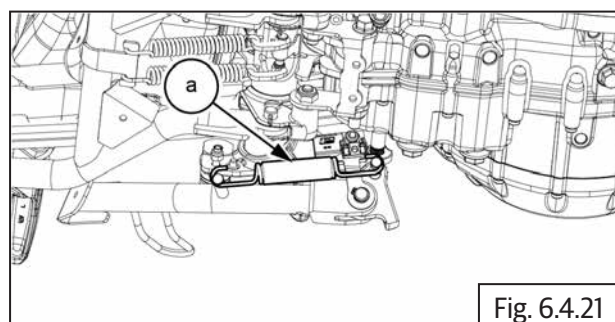


Fig. 6.4.21



Screw driver

6.4.10. Control Plate (RHS)

- Apply grease on brake pedal screw.
- Locate brake pedal (a) along with bush (b) and spring (c) into RH control plate.

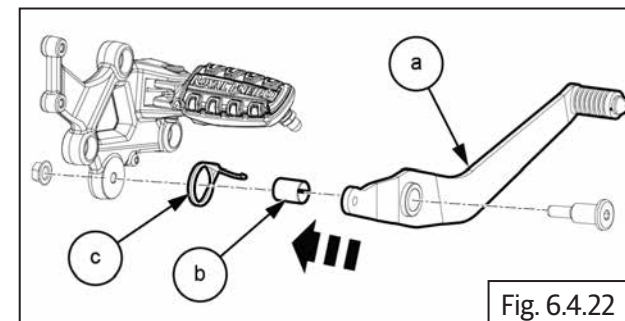
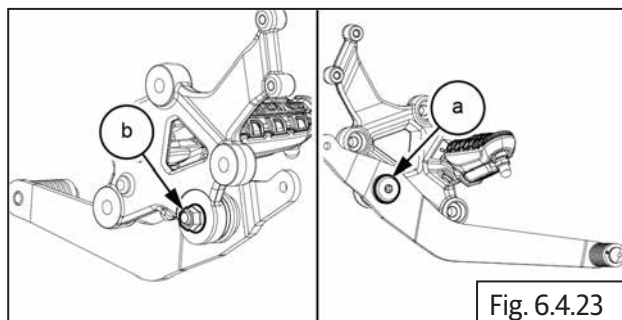


Fig. 6.4.22



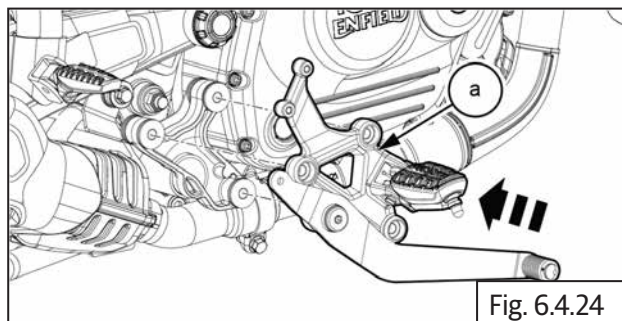
Grease

- Locate and tighten screw **(a)** into control plate RHS.
- Locate and tighten hex flange nut **(M8) (b)** into control plate RHS.

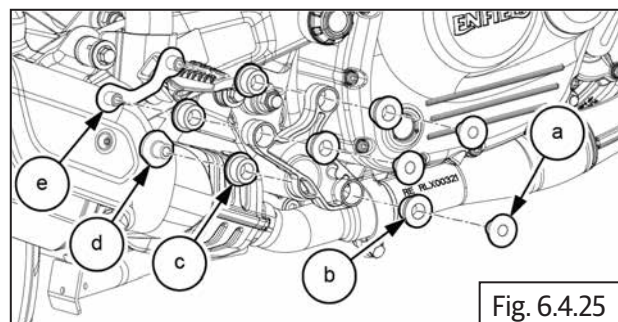


	6 mm Allen Socket with Ratchet 12 mm Combination Spanner
	25 Nm / 2.5 kgf-m

- Install control plate RHS **(a)** into the frame.

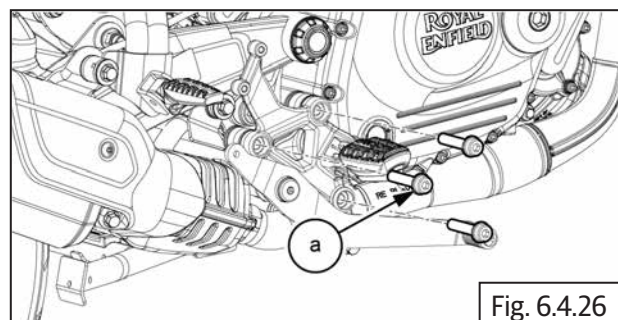


- Apply lubricant on rubber bushes before install.
- Install **3 sets** of top hat **(a)**, rubber bush **(b) (c)**, top hat threaded **(d)** & nut plate **(e)** into control plate RHS.



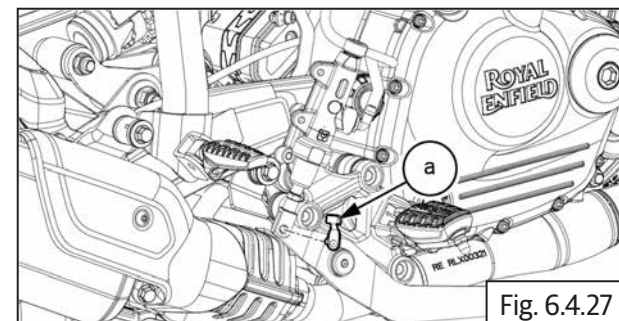
	P 80 emulsion
--	---------------

- Locate and tighten **3 Nos** cap bolts **(M8) (a)** into control plate RHS.



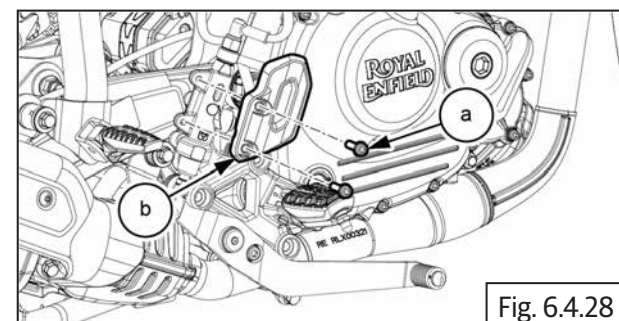
	6 mm Allen socket With Ratchet 27 Combination spanner
	20 ± 3 Nm / 2 ± 0.3 kgf-m

- Fix the clevis spring pin **(a)** on master cylinder.



	Nose plier
--	------------

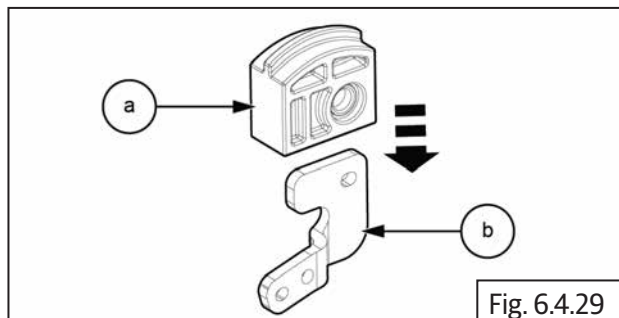
- Locate and tighten **2 Nos** cap bolts **(M6) (a)** by fix heel guard **(b)** on control plate RHS.



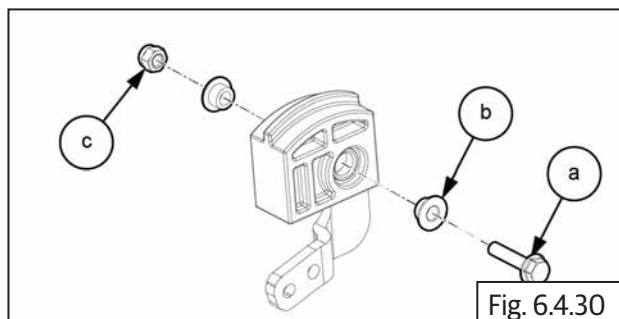
	5 mm Allen socket with Ratchet
	10 Nm / 1.0 kgf-m

6.4.11.. Control Plate (LHS)

- Locate rubbing block **(a)** into rubbing bracket **(b)**.

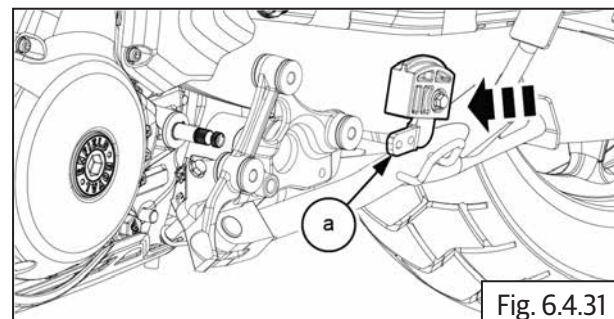


- Locate and tighten hex flange bolt **(M6) (a)** Top hat **(b)** and Hex nut **(c)** into rubbing block.

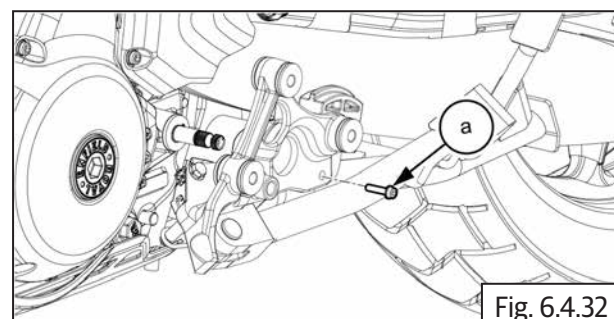


	10 mm Allen Socket with Ratchet 10 mm Double end Spanner
	10 Nm / 1.0 kgf-m

- Locate rubbing block **(a)** into frame.

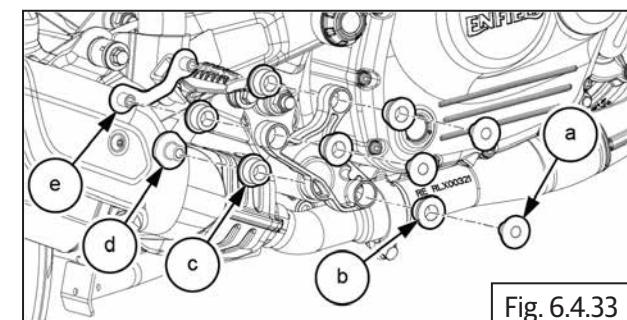


- Locate and tighten hex flange bolt **(M6) (a)** bolt and hex nut into frame.



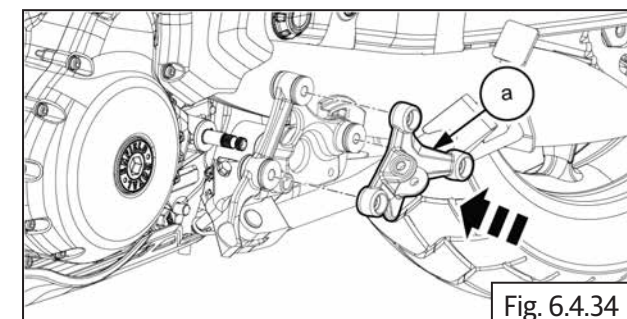
	5 mm Allen Socket With Ratchet 10 mm Combination spanner
	10 Nm / 1.0 kgf-m

- Apply lubricant on rubber bushes before install.
- Install **3 sets** of top hats **(a)**, rubber bushes **(b)**, top hat threaded **(c) (d)** & nut plate **(e)** on control plate RHS.

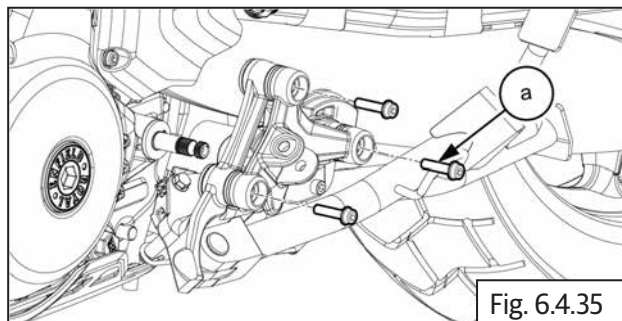


	P 80 emulsion
--	---------------

- Locate control plate LHS **(a)** into frame.



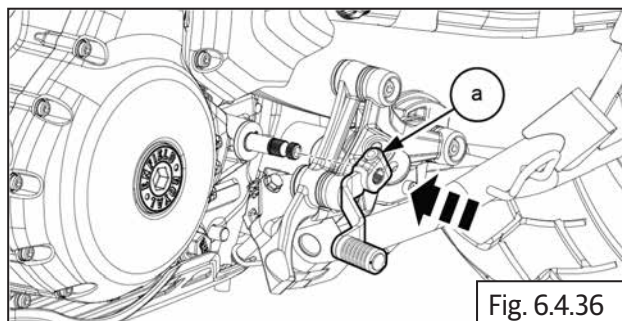
- Locate and tighten **3 Nos** cap bolts **(M8) (a)** into control plate LHS.



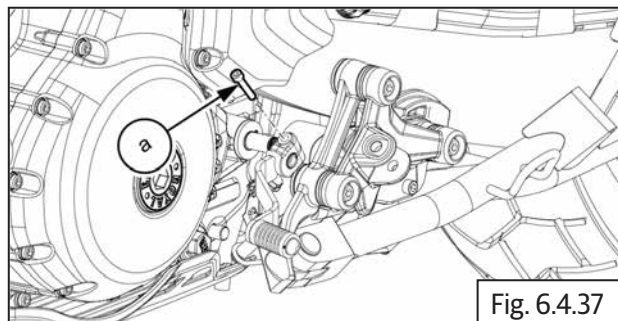
	6 mm Allen socket With Ratchet 27 Combination spanner
	20 Nm / 2.0 kgf-m

6.4.12. Gear Pedal

- Gently install the gear pedal **(a)** into shifter.



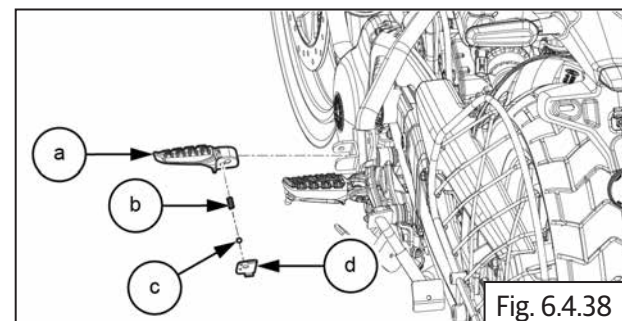
- Locate and tighten cap bolt **(M6) (a)** on gear pedal.



	5 mm Allen socket with Ratchet
	15 Nm / 1.0 kgf-m

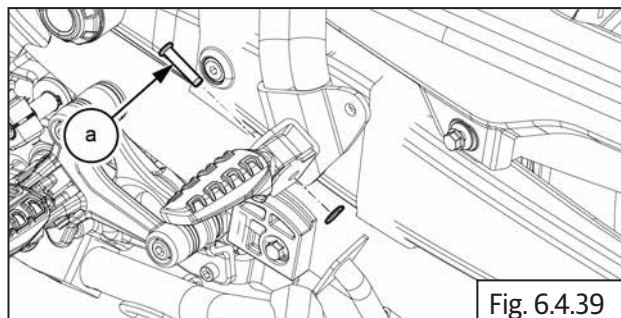
6.4.13. Pillion Footrest LHS

- Install retainer plate **(d)** into mounting bracket.
- Install spring **(b)** into the footrest **(a)**.
- Apply grease on the ball **(c)** slightly and locate it on the hole in the footrest **(a)**.
- Locate the footrest **(a)** carefully on the mounting bracket without disturbing the ball **(c)**.



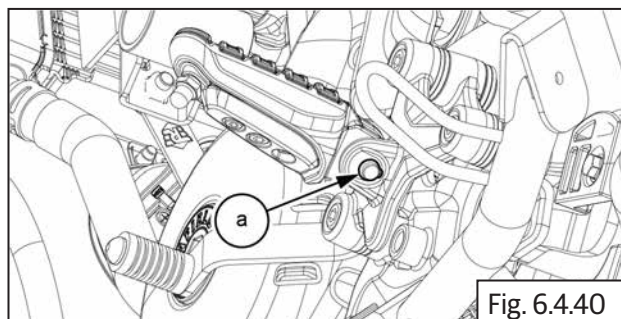
	Grease
--	--------

- Apply grease on pin before install.
- Gently install the pin **(a)** on top supporting the LH footrest.



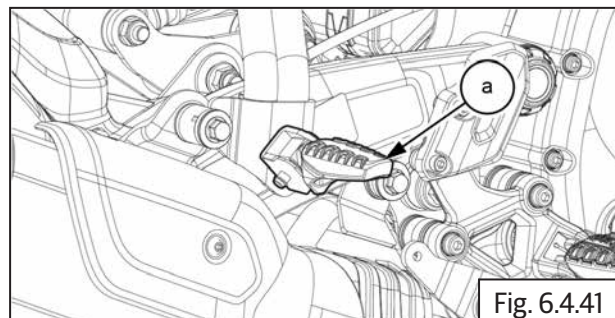
	Grease
---	--------

- Locate and fix circlip **(a)** on bottom of the LH footrest.



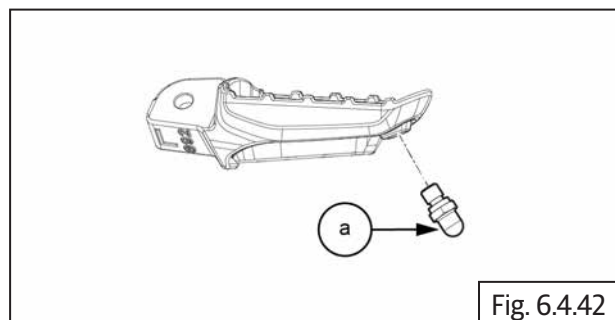
	Circlip Expander
---	------------------

- Repeat the same pillion footrest install procedure to RHS footrest (a).



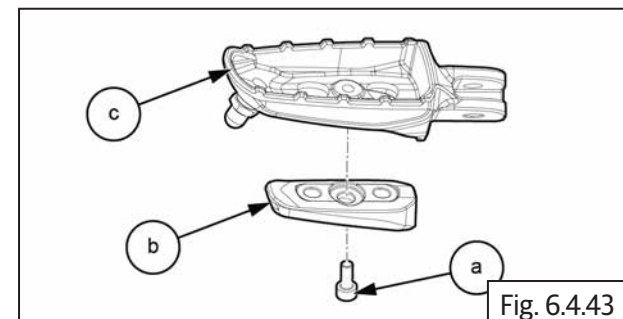
6.4.14. Rider Footrest LHS

- Locate and tighten feeler peg **(a)** on rider footrest.



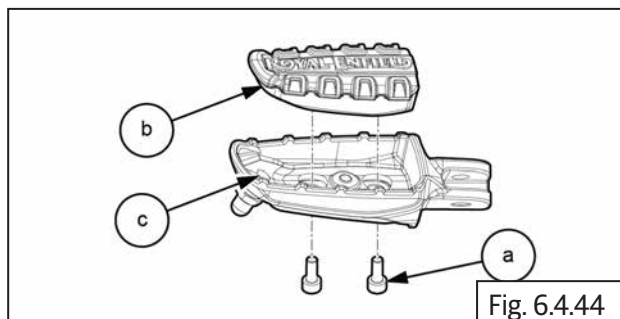
	12 mm socket With Ratchet
	20 Nm / 2.0 kgf-m

- Locate and tighten cap bolt **(M5) (a)** and foot peg **(b)** on rider footrest **(c)**.



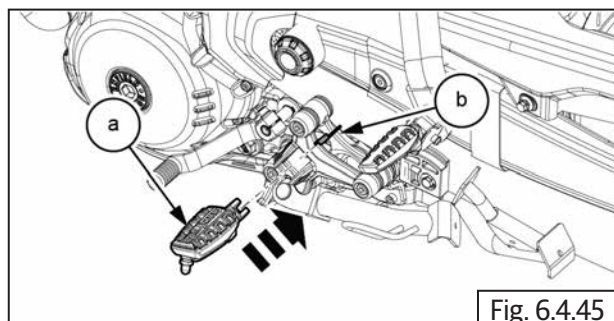
	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate rubber **(b)** on rider footrest **(c)**.
- Locate and tighten **2 Nos** cap bolts **(M5) (a)** on rider footrest **(c)**



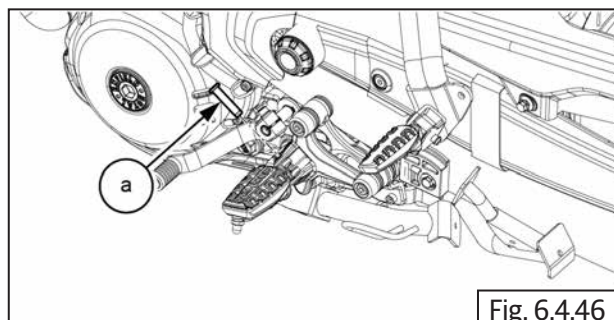
	4 mm Allen Socket with Ratchet
	5 Nm / 0.5 kgf-m

- Locate the spring **(b)** between the footrest **(a)**.



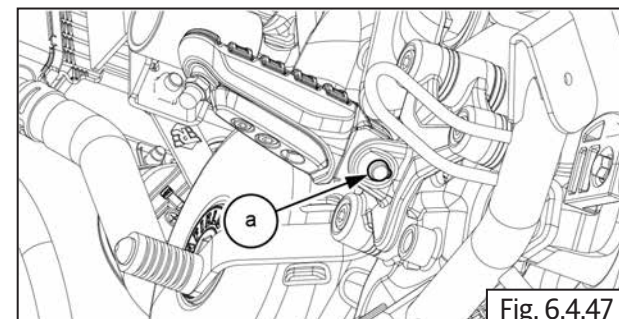
	Grease
--	--------

- Apply grease on pin before install.
- Insert the pin **(a)** into the footrest .



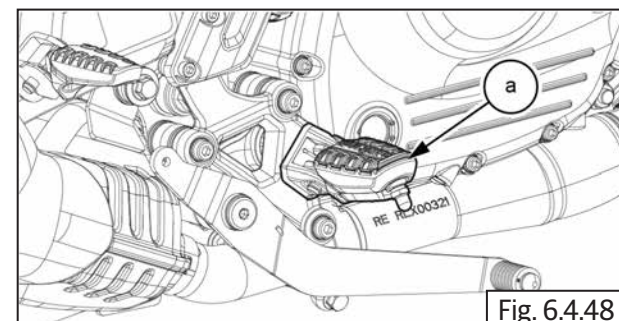
	Grease
--	--------

- Install the circlip **(a)** at the bottom of the LH footrest.



	Circlip Expander
--	------------------

- Repeat the same rider footrest install procedure to RHS footrest **(a)**.



Mudguards/Number Plates

CONTENTS

PAGE

6.5 Front And Rear Mudguard..... 3

Dismantling..... 3

6.5.1 Front and Rear Number Plate.....3

6.5.2 Front Mudguard..... 3

6.5.3 Extension Mudguard..... 4

6.5.4. Rear Mudguard..... 4

6.5.5 License plate illuminator..... 7

6.5.6 Trafficator..... 7

6.5.7 Ambient temperature sensor..... 7

6.5.8 Rear wiring harness..... 8

6.5.9 Bottom Battery Tray..... 8

Assembly 10

6.5.10 Bottom Battery Tray..... 10

6.5.11 Rear wiring harness..... 13

6.5.12 Ambient temperature sensor..... 14

6.5.13 Trafficator..... 14

6.5.14 License plate illuminator.....14

6.5.15 Rear Mudguard..... 15

6.5.16 Extension Mudguard..... 17

6.5.17 Front Mudguard..... 17

6.5. Front And Rear Mudguard

Dismantling

6.5.1 Front and Rear Number Plate

- As per Government norms high security number plates will be provided which are riveted with the vehicle and cannot be removed.

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

6.5.2 Front Mudguard

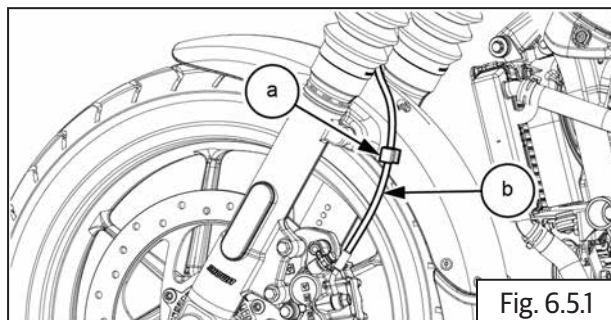
Prior removal

⚠ CAUTION

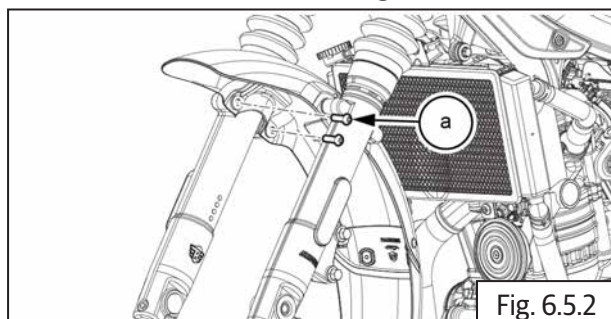
Ensure ignition and stop switch are in off position.

- Ensure ignition and stop switch are in off position.
- Disconnect the battery terminal (Refer Electrical Chapter).
- Remove the front wheel assembly (Refer Wheels Chapter).

- Detach the c clip (a) from brake fluid pipe.

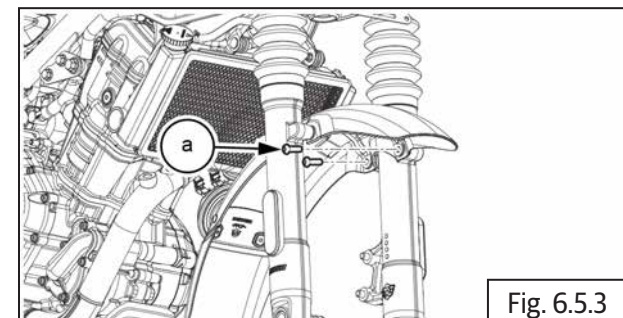


- Loosen and remove 2 Nos Button head bolts (M8) (a) from RH front mudguard.



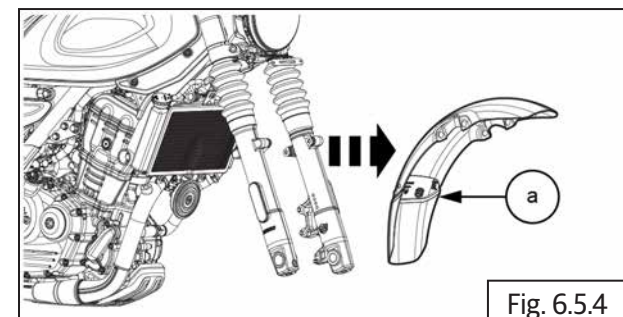
5 mm Allen socket with Ratchet

- Loosen and remove 2 Nos Button head bolts (M8) (a) from LH front mudguard.

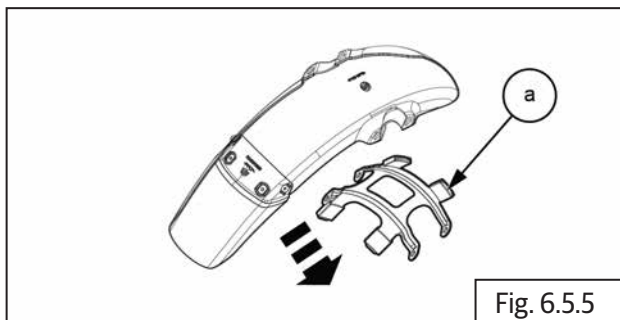


5 mm Allen socket with Ratchet

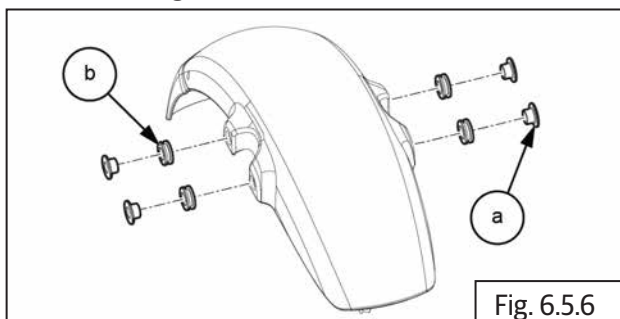
- Remove mudguard with brace (a) from front fork ends.



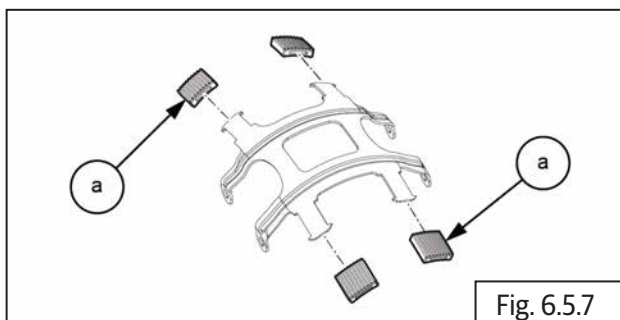
- Remove the brace **(a)** from bottom mudguard.



- Remove the **4Nos** sleeves **(a)** and grommets **(b)** from mudguard.

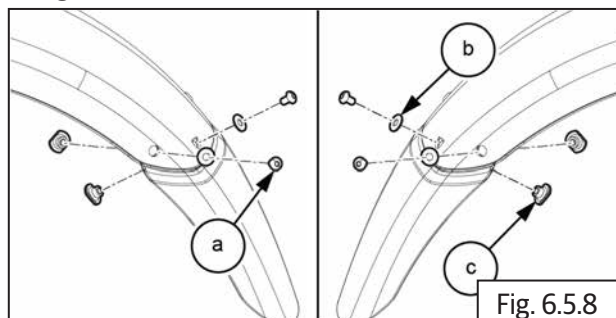


- Remove the **4Nos** support rubbers **(a)** from brace.



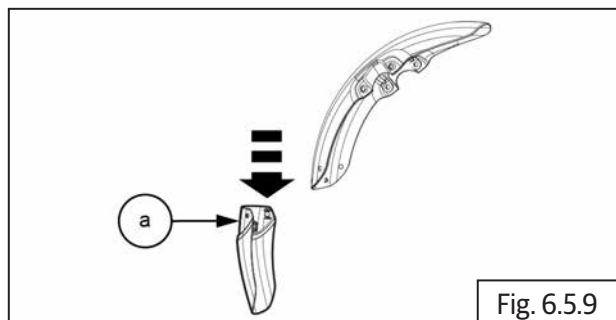
6.5.3 Extension Mudguard

- Loosen and remove **3 Nos** screws **(a)** with washers **(b)** and top hats **(c)** from extension mudguard.



3 mm Allen socket with Ratchet

- Remove the extension mudguard **(a)**.



6.5.4. Rear Mudguard

Dismantling

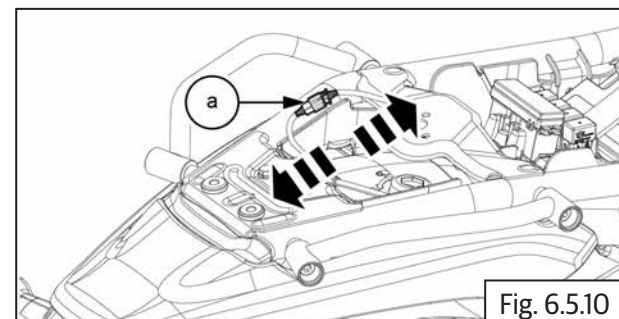
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

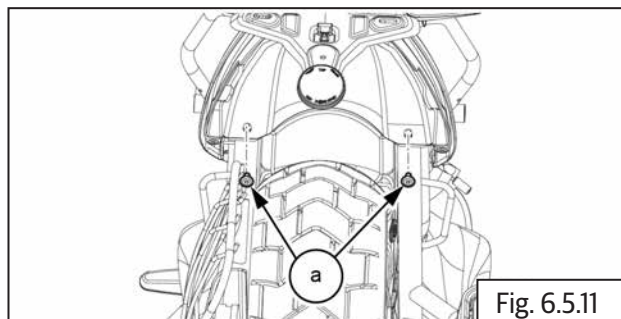
⚠ CAUTION

Ensure ignition and stop switch are in off position.

- Disconnect the battery terminal (Refer [Electrical Chapter](#)).
- Remove the seat (Refer [Side Panels and Seat Chapter](#)).
- Disconnect rear electrical connector **(a)**.

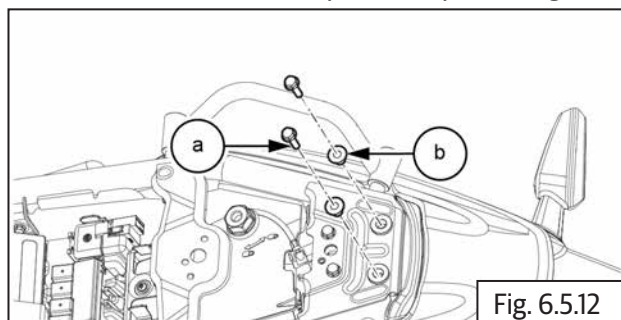


- Loosen and remove **2 Nos** button head bolts (**M6**) (**a**) from bottom number plate hanger.



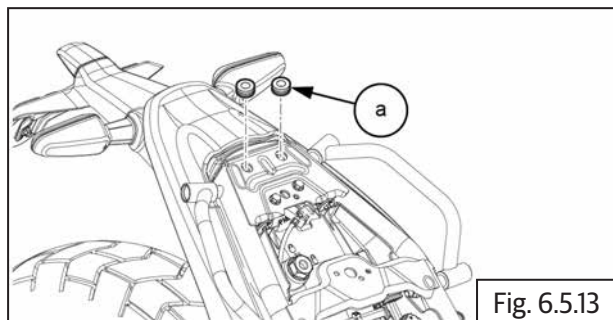
5 mm Allen socket with Ratchet

- Loosen and remove **2 Nos** hex head bolts (**M6**) (**a**) with sleeves (**b**) from top number plate hanger.

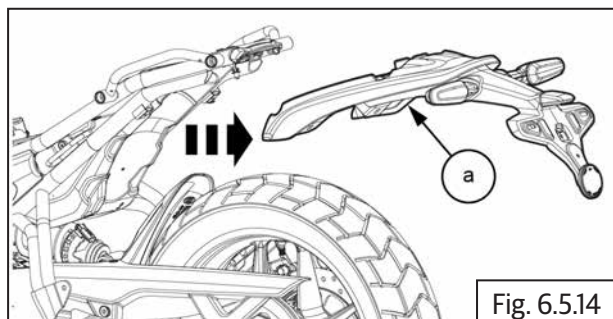


10 mm socket with Ratchet

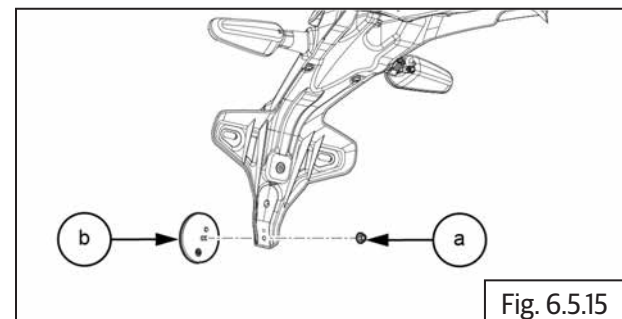
- Remove **2Nos** grommets (**a**) from rear mudguard.



- Remove rear mudguard (**a**) from frame.

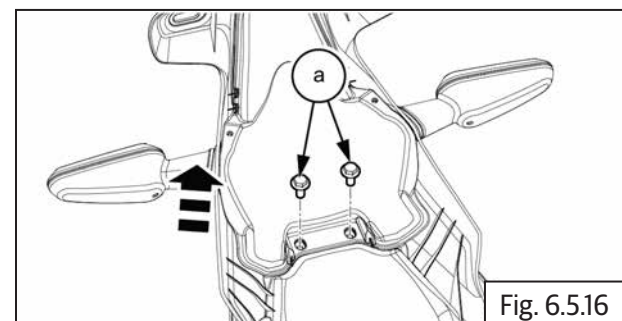


- Loosen and remove Hex nut (**M6**) (**a**) from rear reflector (**b**).
- Remove the rear reflector (**b**) from rear mudguard.



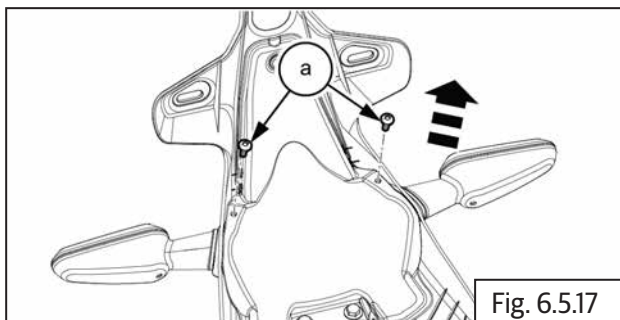
8 mm socket with Ratchet

- Loosen and remove **2 Nos** hex head bolts (**M6**) (**a**) from cover.



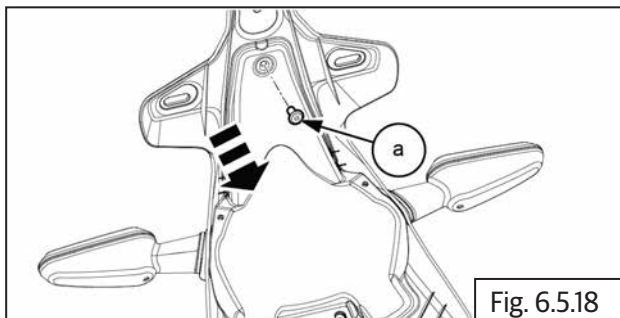
10 mm socket with Ratchet

- Loosen and remove **2 Nos** screws **(a)** from cover.



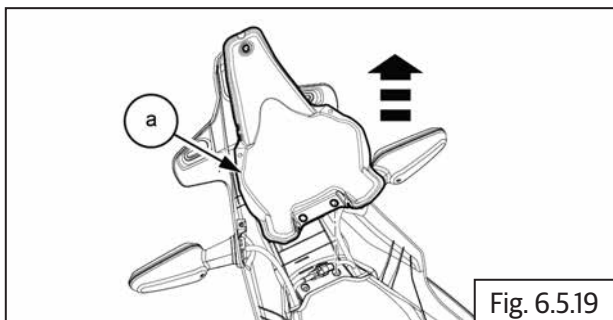
T20 Torx socket with Ratchet

- Loosen and remove button head bolt **(M5) (a)** from cover.

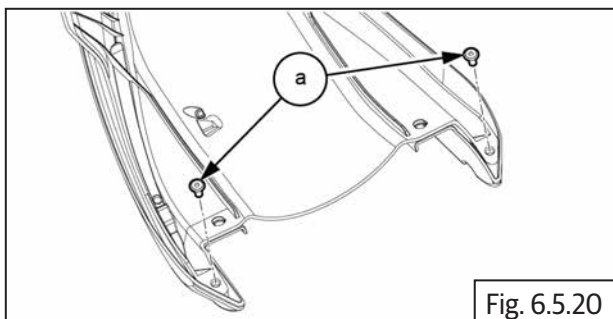


4 mm Allen socket with Ratchet

- Remove the cover **(a)** from rear mudguard .

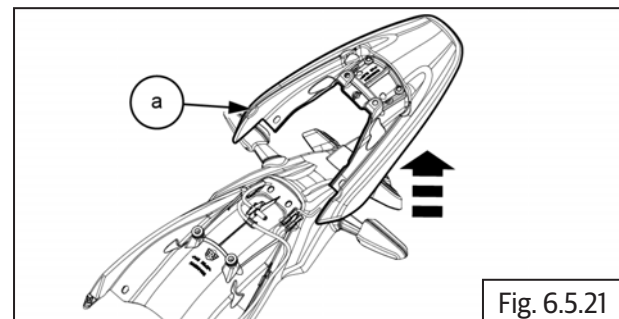


- Loosen and remove **2 Nos** button head bolts **(M5) (a)** from rear mudguard.

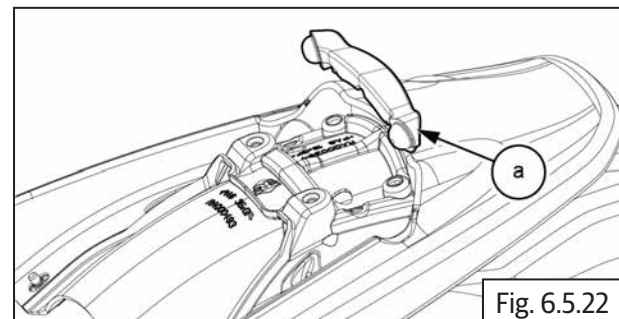


4 mm Allen socket with Ratchet

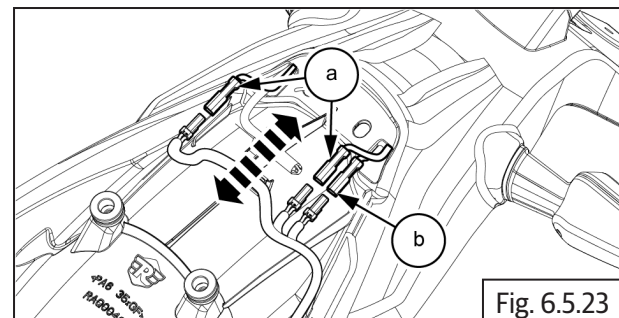
- Remove rear mudguard **(a)** from number plate hanger.



- Remove rubber **(a)** from rear mudguard.

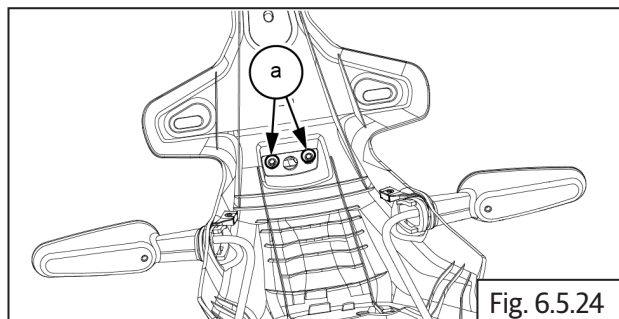


- Disconnect LHS and RHS trafficator connector **(a)**.
- Disconnect license plate illuminator connector **(b)**.



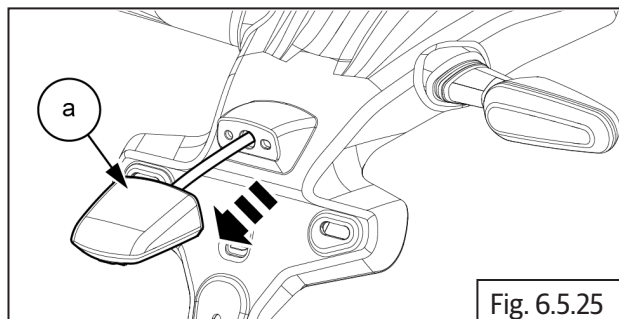
6.5.5 License plate illuminator

- Loosen and remove **2 Nos** button head screws **(M5) (a)** from license plate illuminator.



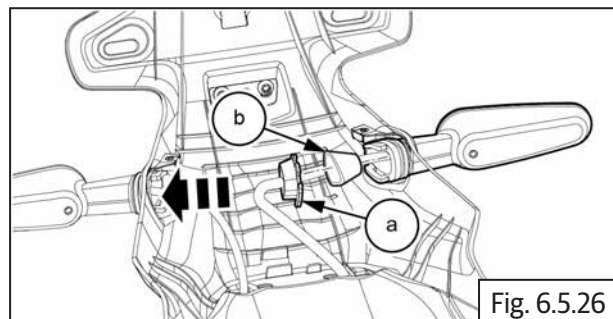
4 mm Allen socket with Ratchet

- Remove the license plate illuminator **(a)** from rear mudguard.



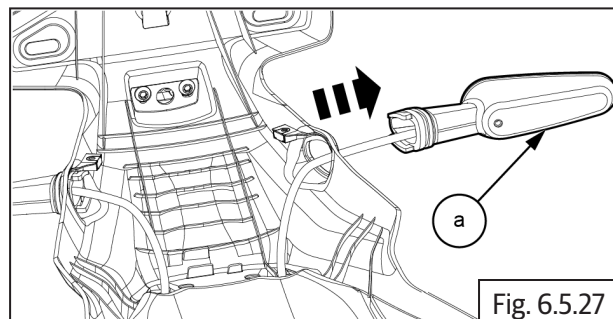
6.5.6 Trafficator

- Remove the retainer clip **(a)** and sleeve **(b)** from RH trafficator.



Flat Head Screw Driver

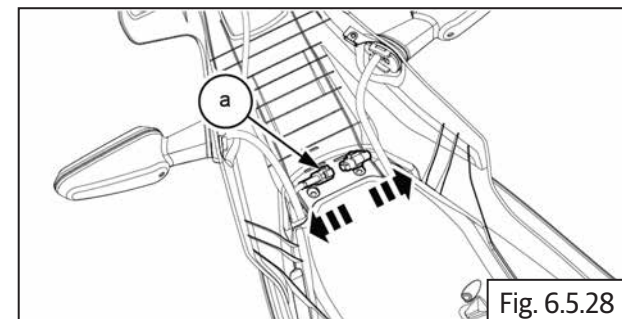
- Gently Pull out and remove the rear RH trafficator **(a)**.



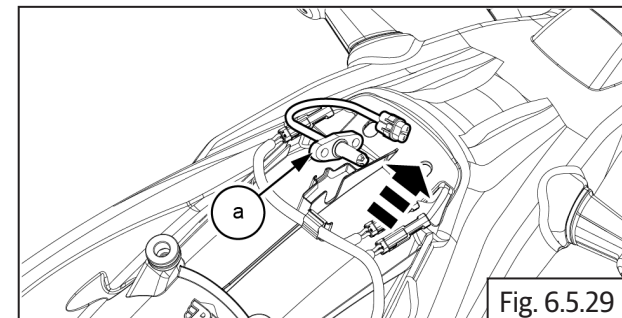
- Repeat the same procedure to LHS trafficator.

6.5.7 Ambient temperature sensor

- Disconnect ambient temperature sensor coupler **(a)**.

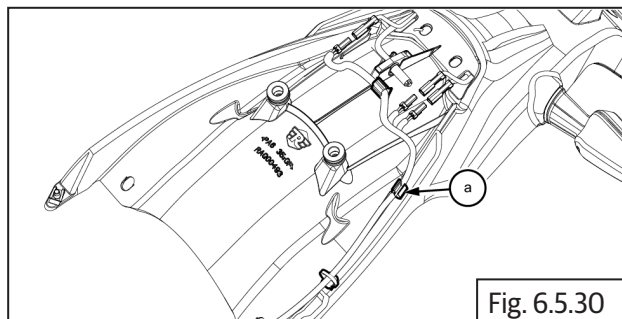


- Remove ambient temperature sensor **(a)** from rear mudguard.

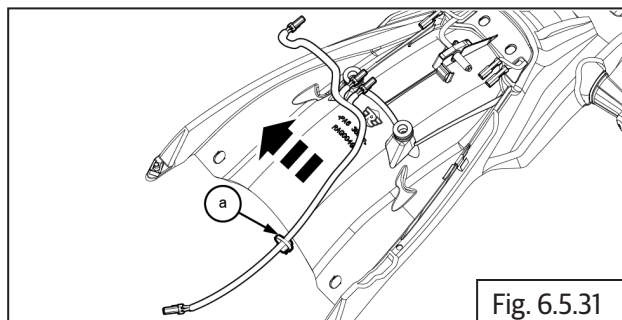


6.5.8 Rear wiring harness

- Remove **2 Nos** cable holder clips **(a)** from wiring harness.
- Detach the wire tag from wiring harness.



- Remove wiring harness **(a)** from rear mudguard.



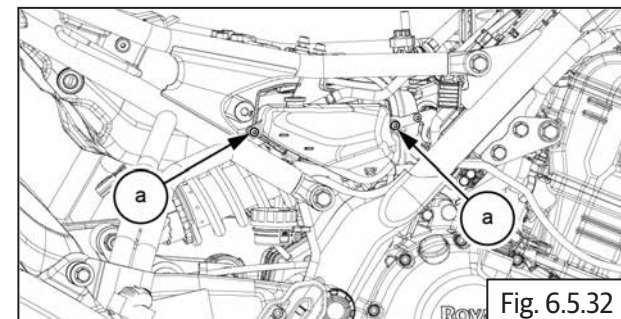
6.5.9 Bottom Battery Tray

⚠ CAUTION

Ensure ignition and stop switch are in off position.

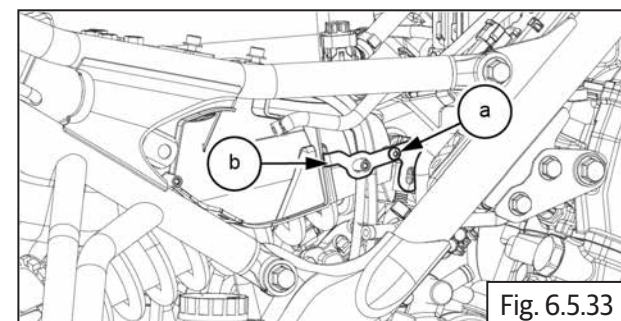
- Disconnect the battery terminal (Refer Electrical Chapter).
- Remove the seat (Refer Side Panels and Seat Chapter).
- Remove the fuel tank (Refer Fuel system Chapter).
- Remove the battery assembly (Refer Electrical Chapter).
- Remove LHS and RHS side panel (Refer Side Panels and Seat Chapter).
- Remove rear mudguard assembly (Refer mudguard Chapter).

- Loosen and remove **2 Nos** screws **(a)** from expansion tank.



T20 Torx Socket with Ratchet

- Loosen and remove screw **(a)** from retainer bracket.
- Remove retainer bracket **(b)** from chassis frame.



T20 Torx socket with Ratchet

- Loosen and remove **2Nos** cap bolts **(a)** from modulator bracket.

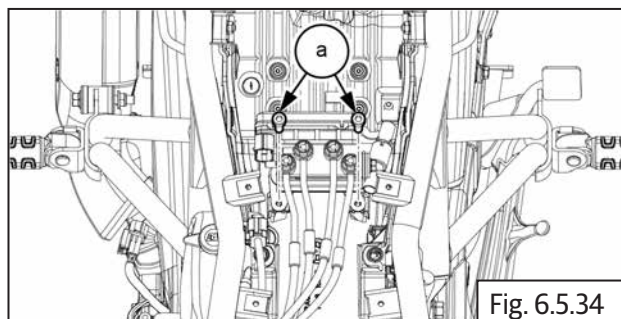


Fig. 6.5.34



5 mm Allen Socket with Ratchet

- Remove the below listed couplers from LH side of the battery tray.
- 1. Side stand switch
- 2. Gear position sensor
- 3. Crank position sensor
- 4. Purge valve

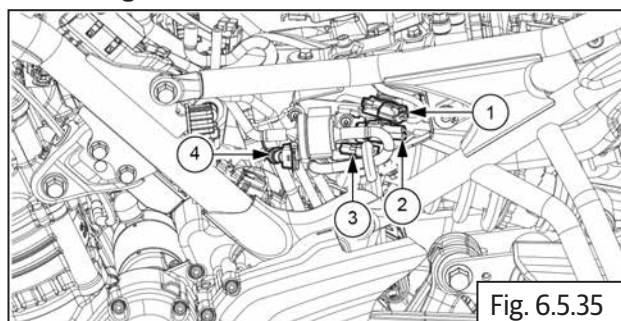


Fig. 6.5.35

- Slide and remove the purge valve with rubber boot **(a)** from bracket.

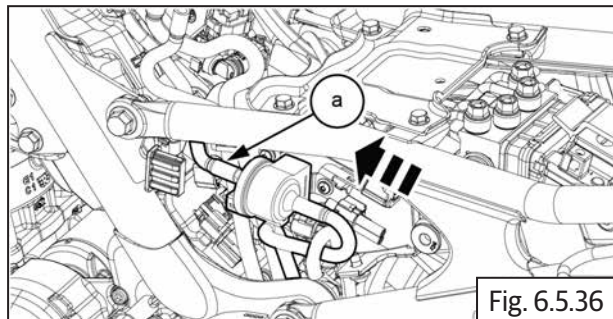


Fig. 6.5.36

- Remove the screw **(T40)** **(a)** with washer **(b)** from the wire guide.
- Remove the wire guide **(c)** from chassis frame .

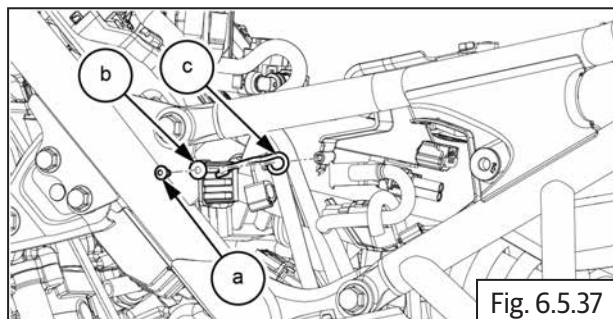


Fig. 6.5.37



3mm Allen socket with Ratchet

- Loosen and Remove **7Nos** screws **(a)** with washers **(b)** from battery tray.

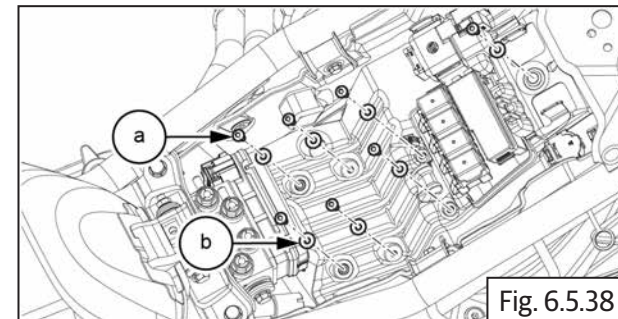


Fig. 6.5.38



T20 Torx socket with Ratchet

- Slide and move the battery tray with relay holders **(a)**

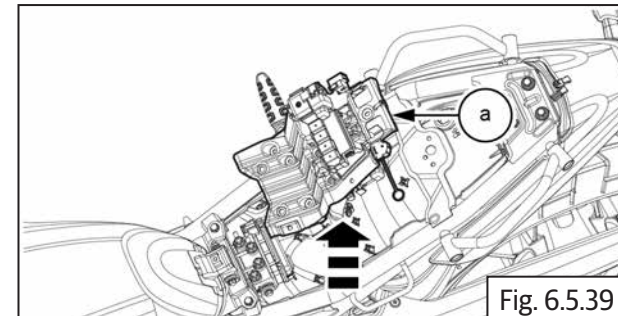
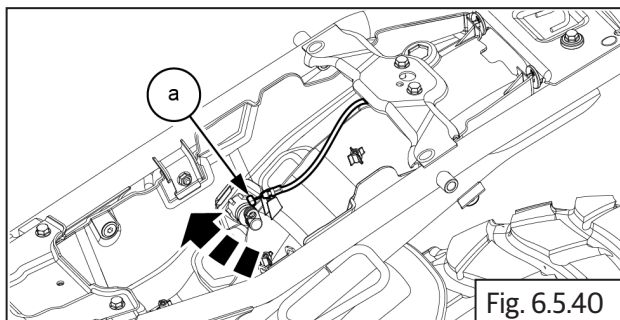
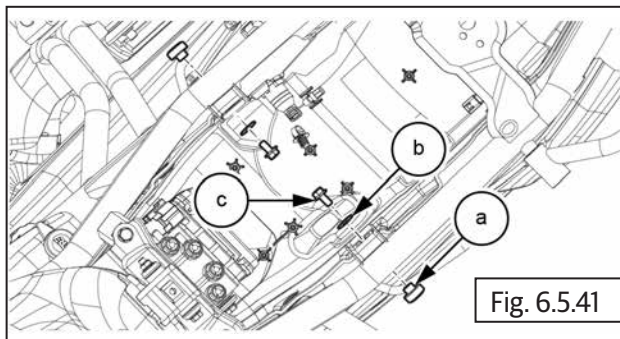


Fig. 6.5.39

- Detach the rear seat lock cable **(a)**.

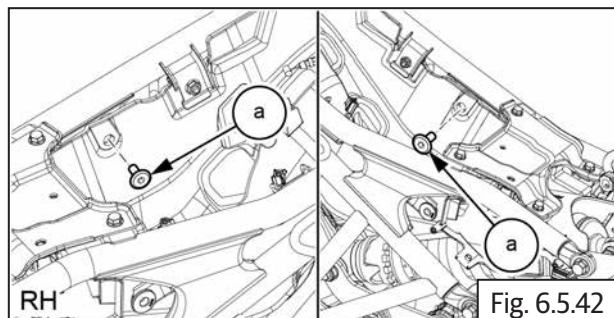


- Loosen and remove **2 Nos** Hex head bolts **(c)** with washers **(b)** and nuts **(M5) (a)** from bottom battery tray.



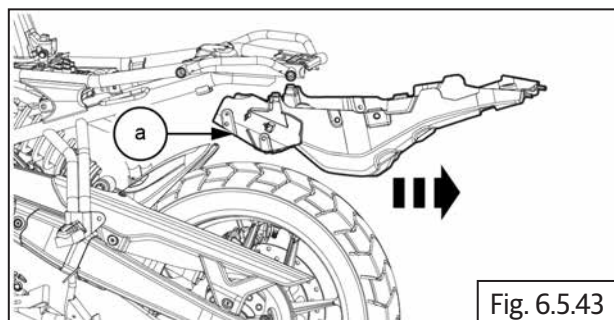
5 mm Allen socket with Ratchet
10mm Socket with Ratchet

- Loosen and remove 2 Nos. button head bolts **(M6) (a)** from bottom battery tray.

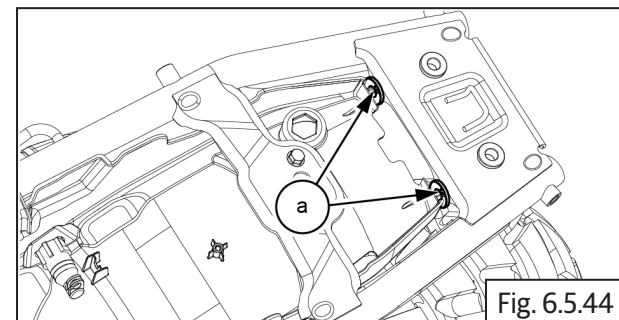


5 mm Allen socket with Ratchet

- Remove bottom battery tray **(a)** from rear subframe.



- Remove **2 Nos** grommets **(a)** from rear subframe.



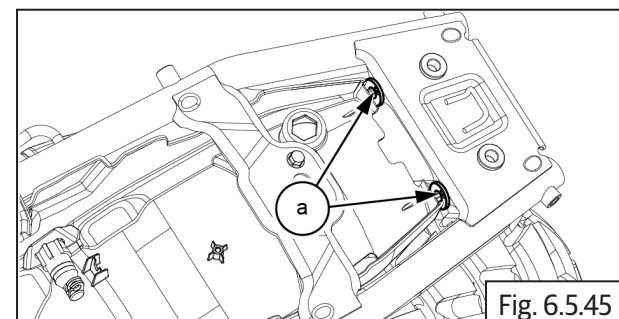
Assembly

6.5.10 Bottom Battery Tray

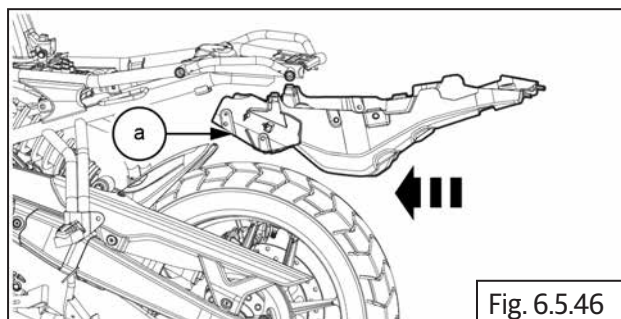
⚠ CAUTION

DO NOT over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

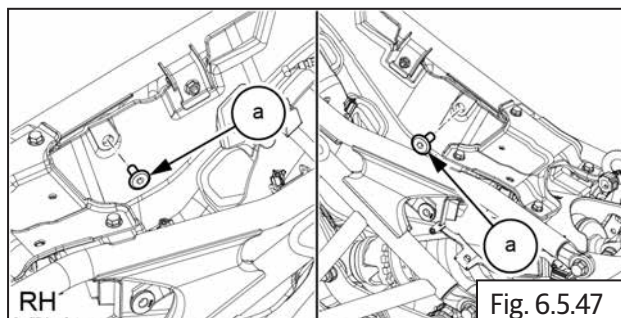
- Locate and fix **2 Nos** grommets **(a)** on rear subframe.



- Locate and align the bottom battery tray **(a)** on rear subframe.

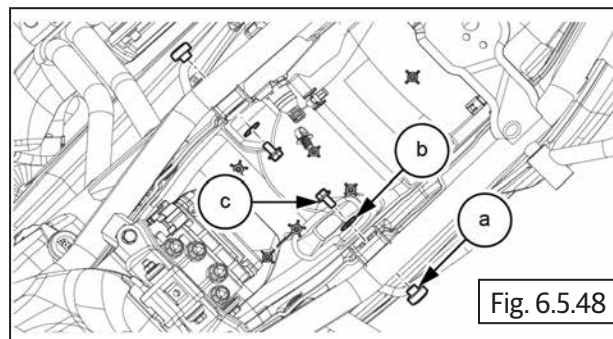


- Locate and tighten **2 Nos** button head bolts **(M6)** **(a)** to bottom battery tray.



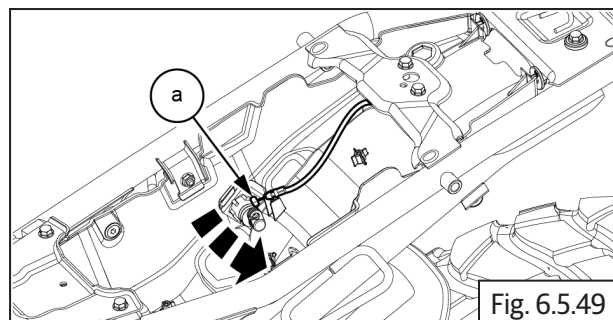
	5 mm Allen socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate and tighten **2 Nos.** Hex head bolts **(c)** with washers **(b)** and nuts **(M5)** **(a)** to bottom battery tray.

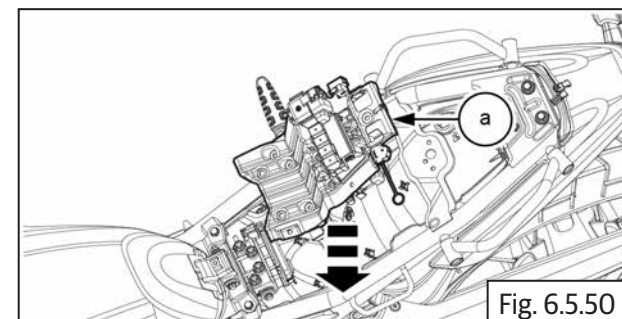


	5 mm Allen socket with Ratchet
	10mm Socket with Ratchet
	$5 \pm 1 \text{ Nm} / 0.5 \pm 0.1 \text{ kgf-m}$

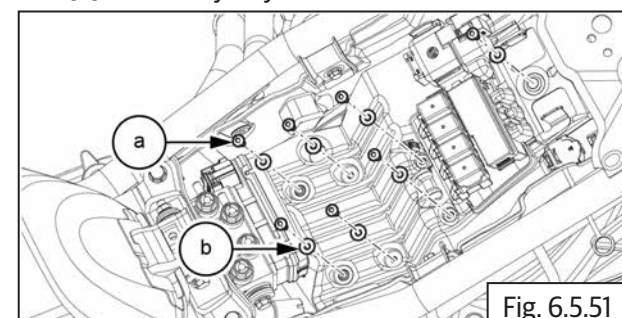
- Fix the rear seat lock cable **(a)**.



- Slide and move the battery tray with relay holders **(a)**.

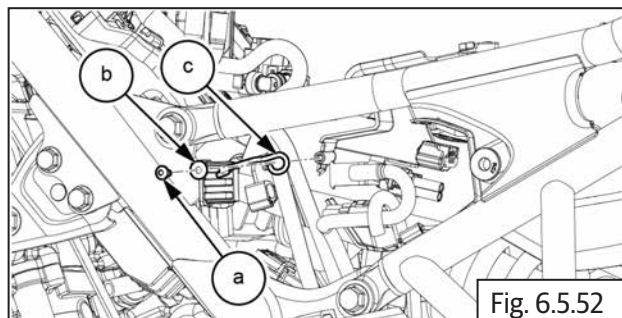


- Locate and tighten **7Nos** screws **(a)** with washers **(b)** on battery tray.



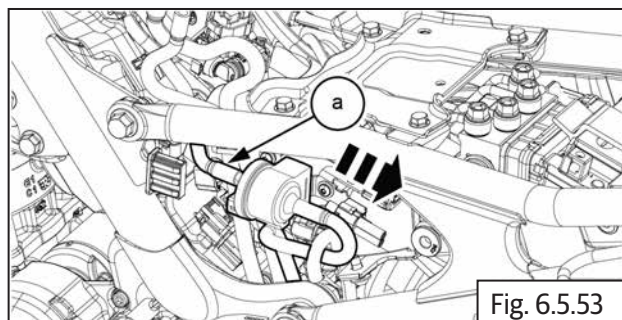
	T20 Torx socket with Ratchet
	1.5 Nm / 0.15 kgf-m

- Locate the wire guide **(c)** on chassis frame .
- Locate and tighten the screw **(T40)** **(a)** with washer **(b)** on wire guide.

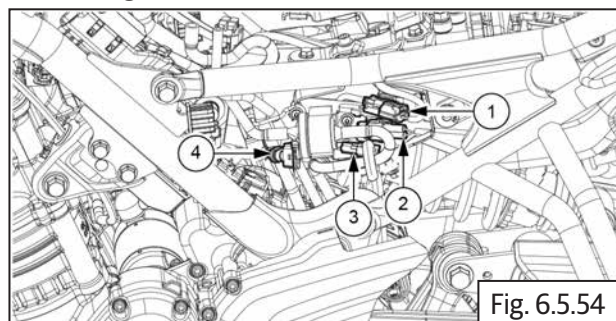


	3mm Allen socket with Ratchet
	1.5Nm/0.15 kgf-m

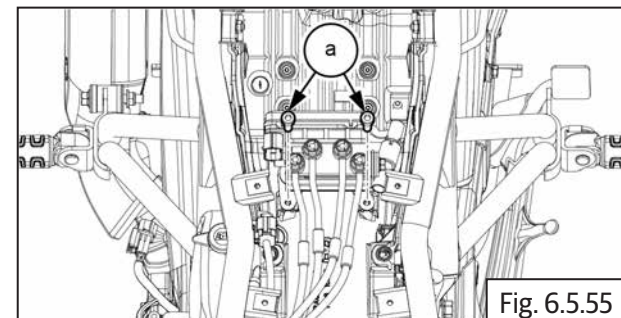
- Slide and fix the purge valve with rubber boot **(a)** to the bracket.



- Connect the below listed couplers on bottom battery tray.
- 1. Side stand switch
- 2. Gear position sensor
- 3. Crank position sensor
- 4. Purge valve

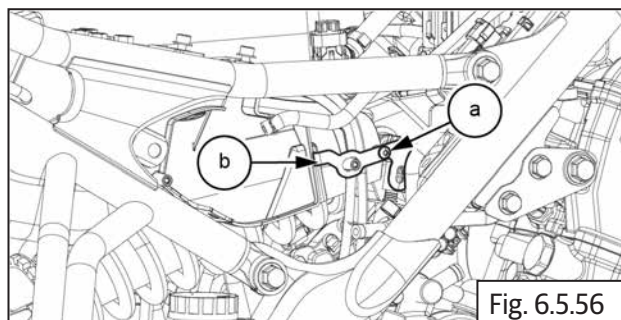


- Locate and tighten **2Nos** cap bolts **(a)(M5)** on modulator bracket.



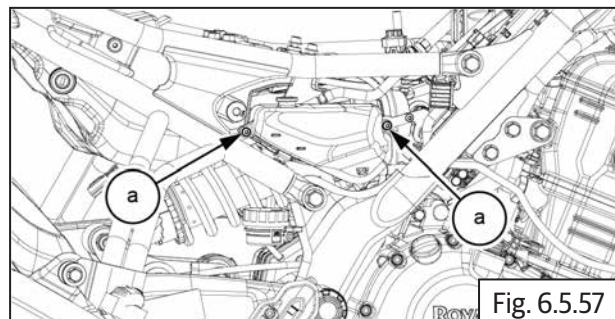
	5 mm Allen Socket with Ratchet
	3 Nm / 0.3 kgf-m

- Locate retainer bracket **(b)** on chassis frame.
- Locate and tighten screw **(a)** on retainer bracket.



	T20 Torx socket with Ratchet
	1.5Nm/0.15 kgf-m

- Locate and tighten **2 Nos** screws **(a)** on expansion tank.

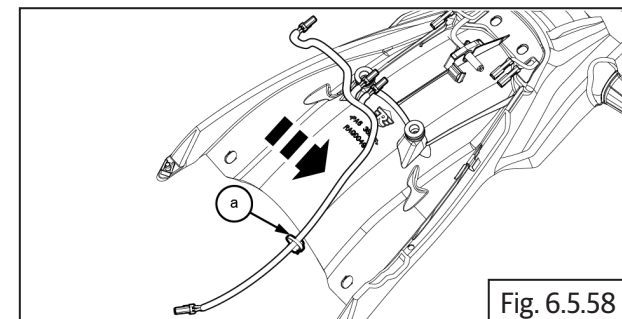


	T 20 Torx Socket with Ratchet
	3.5-4.5 Nm / 0.3-0.4 kgf-m

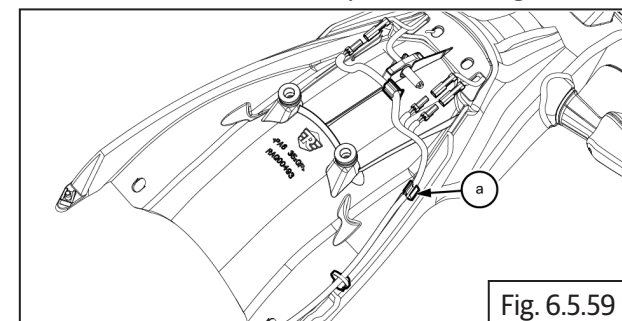
- Install rear mudguard assembly (Refer Mudguard chapter).
- Install LHS and RHS side panel (Refer Side Panels and Seat Chapter).
- Install the battery assembly (Refer Electrical Chapter).
- Install the fuel tank (Refer Fuel system Chapter)
- Install the seat (Refer Side Panels and Seat Chapter).
- Connect the battery terminal. (Refer Electrical Chapter).

6.5.11 Rear wiring harness

- Locate and align wiring harness **(a)** on rear mudguard.

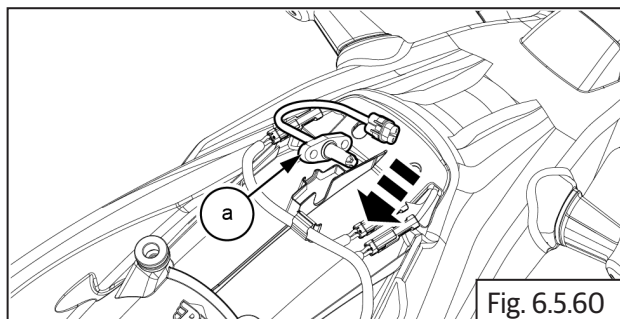


- Fix the wire tag on wiring harness.
- Fix **2 Nos** cable holder clips **(a)** on wiring harness.

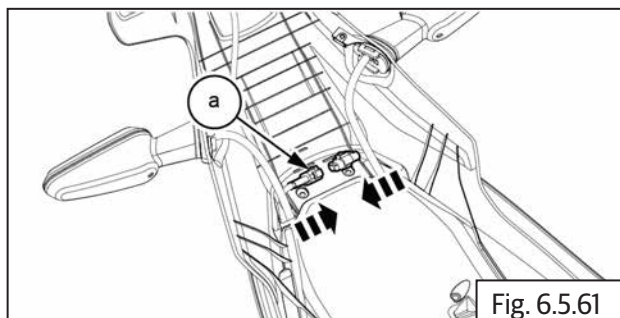


6.5.12 Ambient temperature sensor

- Locate and align ambient temperature sensor **(a)** on rear mudguard.

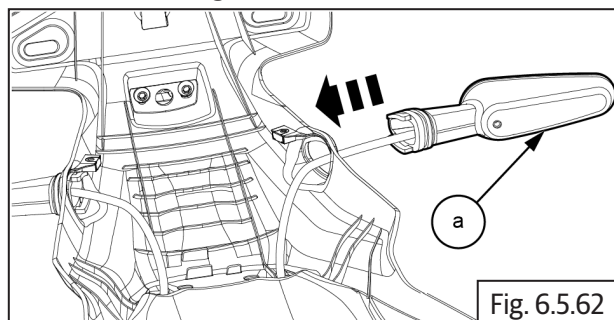


- Connect ambient temperature sensor coupler **(a)**.

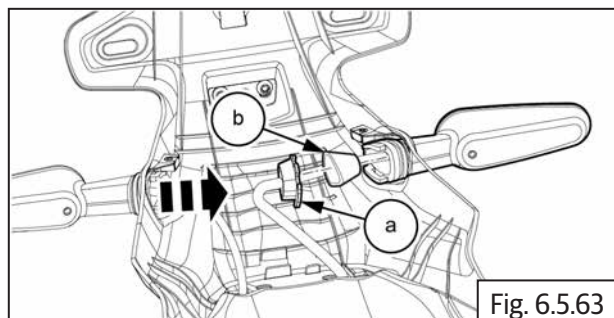


6.5.13 Trafficator

- Locate and align the RH rear trafficator **(a)**.



- Locate and fix retainer clip **(a)** and sleeve **(b)** on RH trafficator.

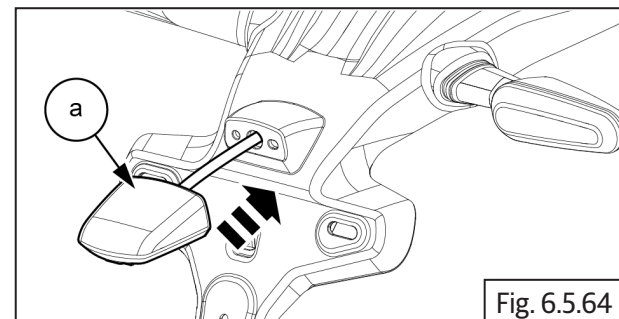


Flat Head Screw Driver

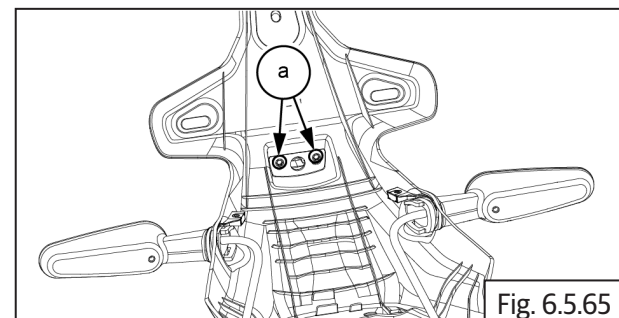
- Repeat the same procedure to LHS trafficator.

6.5.14 License plate illuminator

- Locate and align the license plate illuminator **(a)** on rear mudguard.



- Locate and tighten **2 Nos** button head screws **(M5)** **(a)** on license plate illuminator.



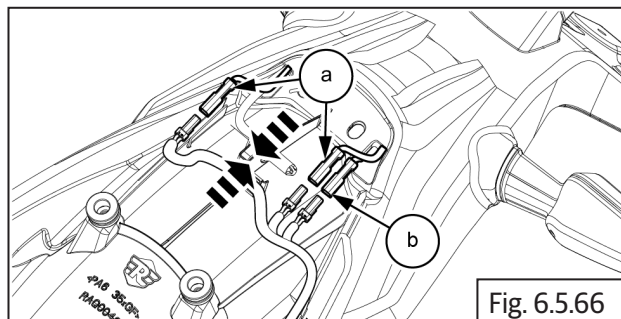
4 mm Allen socket with Ratchet



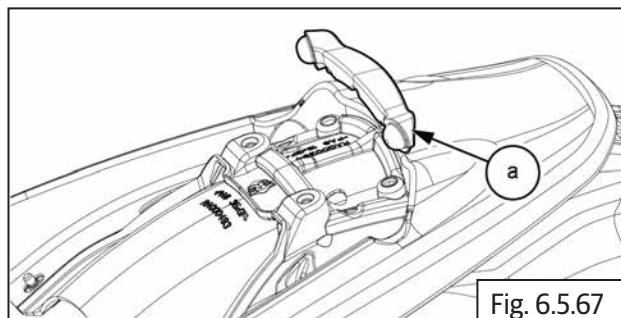
5 N-m / 0.5 kgf-m

6.5.15 Rear Mudguard

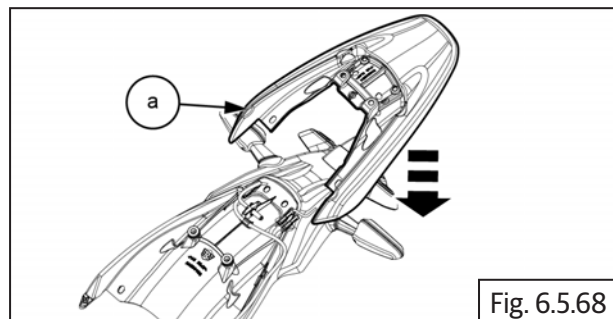
- Connect LHS and RHS trafficator connector **(a)**.
- Connect license plate illuminator connector **(b)**.



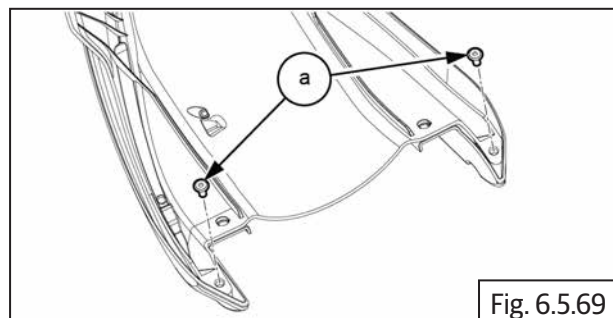
- Locate and fix rubber **(a)** on rear mudguard.



- Locate the rear mudguard **(a)** on number plate hanger.

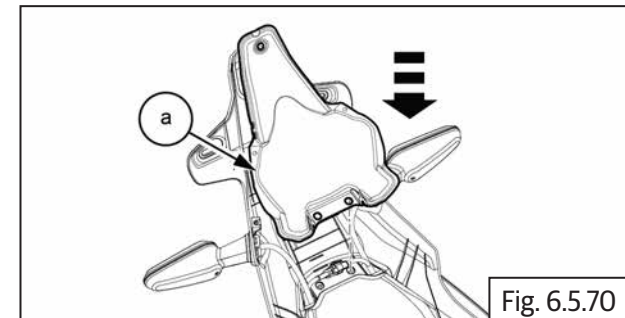


- Locate and tighten **2 Nos** button head bolts **(M5) (a)** on rear mudguard.

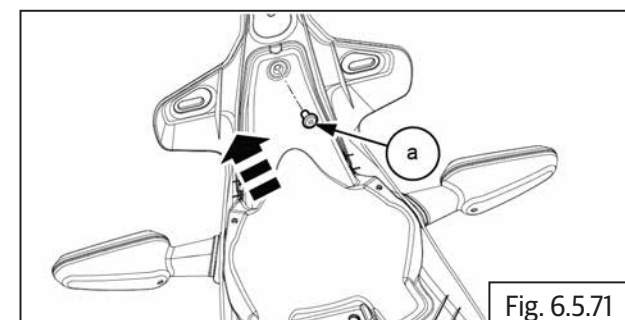


	4 mm Allen socket with Ratchet
	5 Nm / 0.5 kgf-m

- Locate and align the cover **(a)** from rear mudguard.

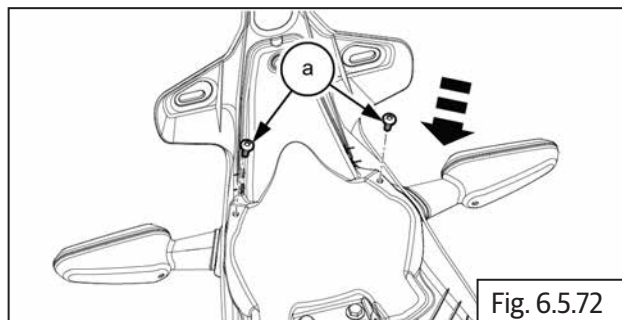


- Locate and tighten the button head bolt **(M5) (a)** on cover.



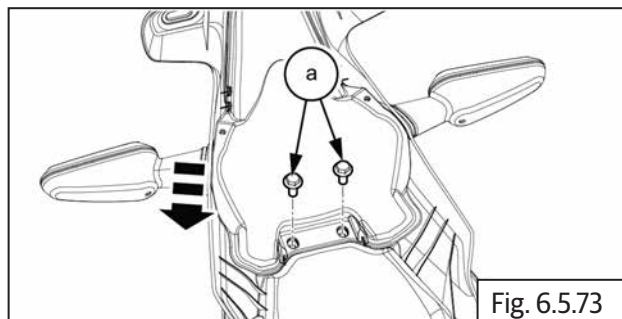
	4 mm Allen socket with Ratchet
	5 Nm / 0.5 kgf-m

- Locate and tighten **2 Nos** screws **(a)** on cover.



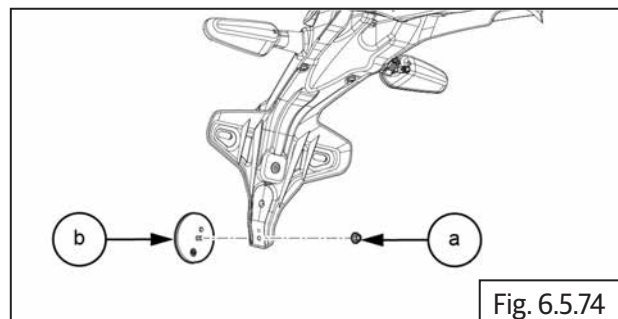
	T20 Torx socket with Ratchet
	1.5 Nm / 0.15 kgf-m

- Locate and tighten **2 Nos** hex head bolts **(M6) (a)** from cover.



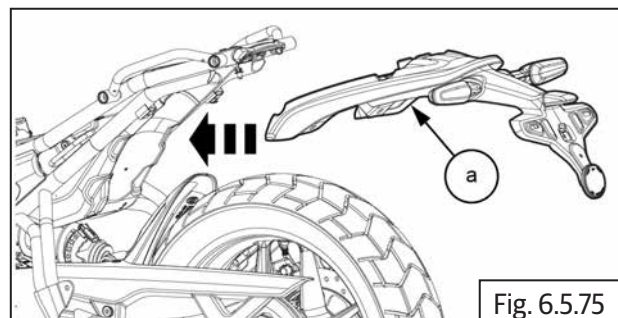
	10 mm socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate the rear reflector **(b)** on rear mudguard.
- Locate and tighten Hex nut **(M6) (a)** on rear reflector **(b)**.

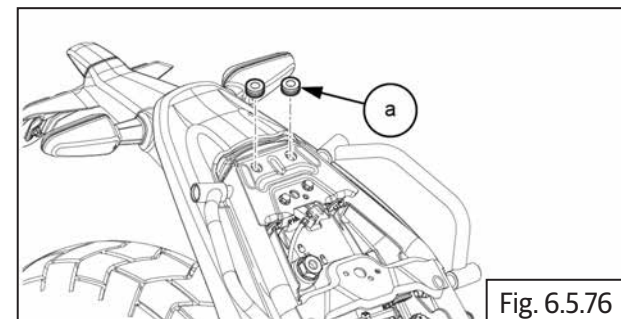


	8 mm socket with Ratchet
	5 Nm / 0.5 kgf-m

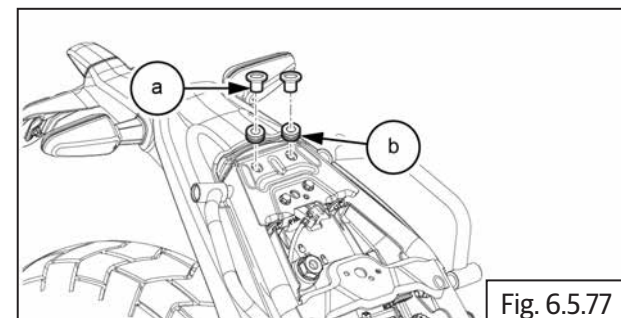
- Locate the rear mudguard **(a)** on frame.



- Locate and tighten **2Nos** grommets **(a)** on rear mudguard.

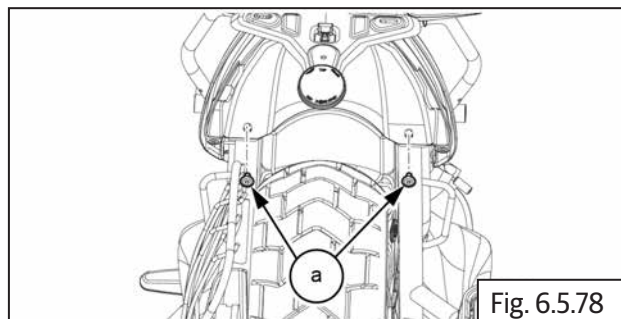


- Locate and tighten **2 Nos** hex head bolts **(M6) (a)** with sleeves **(b)** on top number plate hanger.



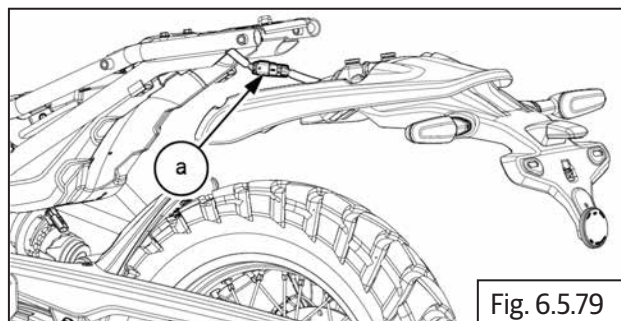
	10 mm socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate and tighten **2 Nos** button head bolts (**M6**) (**a**) on bottom number plate hanger.



	5 mm Allen socket with Ratchet
	10 Nm / 1.0 kgf-m

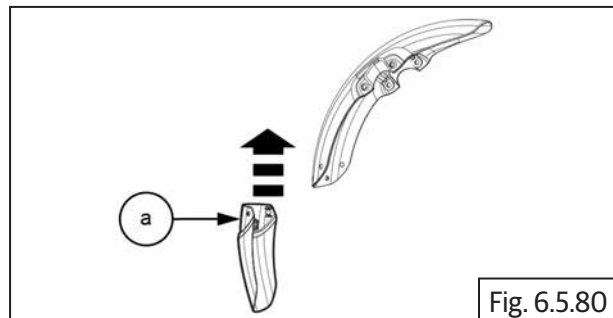
- Connect rear electrical connector (**a**).



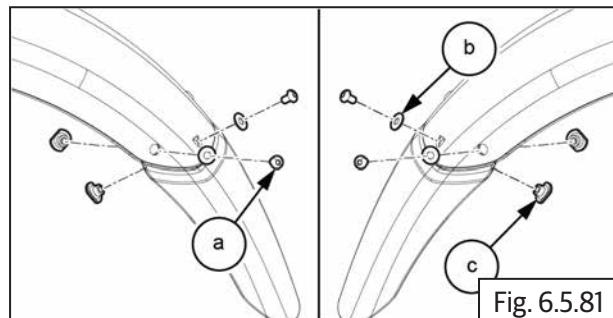
- Install the seat (Refer Side Panels and Seat Chapter).
- Connect the battery terminal (Refer Electrical Chapter).

6.5.16 Extension Mudguard

- Locate and align the extension mudguard (**a**).



- Locate and tighten **3 Nos.** screws (**a**) with washers (**b**) and top hats (**c**) on extension mudguard.



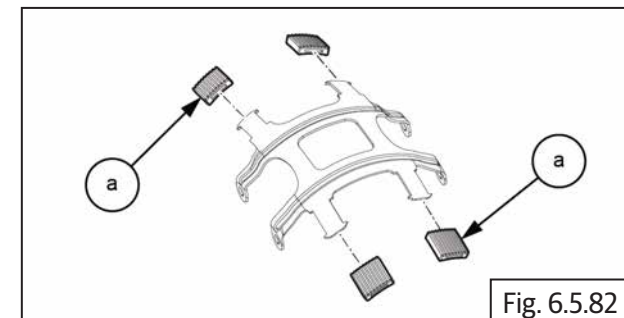
	3 mm Allen Socket with Ratchet
	$3 \pm 1 \text{ Nm} / 0.3 \pm 0.1 \text{ kgf-m}$

⚠ CAUTION

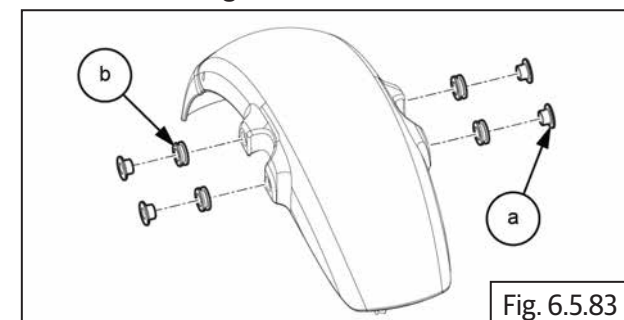
DO NOT over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

6.5.17 Front Mudguard

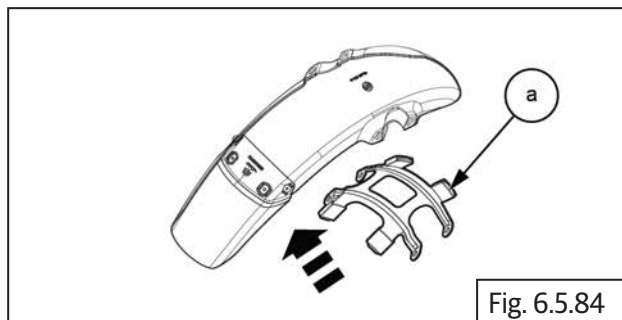
- Fix the **4Nos** support rubbers (**a**) into brace.



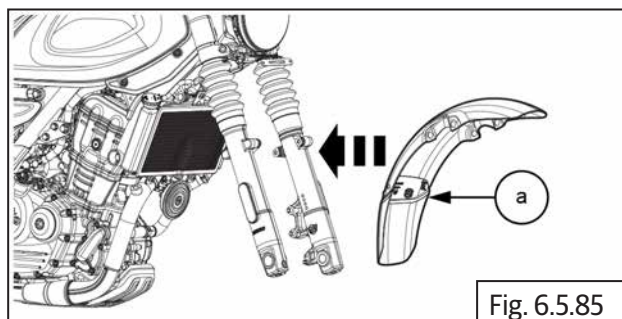
- Install the **4Nos** sleeves (**a**) and grommets (**b**) onto the mudguard.



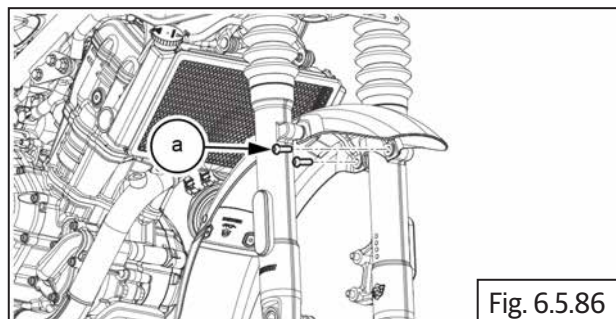
- Fix the brace **(a)** to the bottom mudguard.



- Locate and fix mudguard with brace **(a)** to the front fork ends.

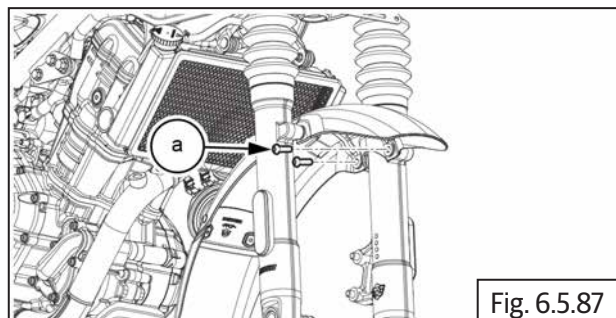


- Locate and tighten **2 Nos.** button head bolts **(M8) (a)** on the LH front mudguard.



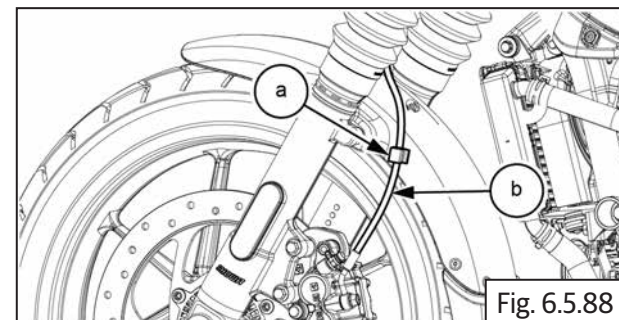
	5 mm Allen socket with Ratchet
	$15 \pm 2 \text{ Nm} / 1.5 \pm 0.2 \text{ kgf-m}$

- Locate and tighten **2 Nos.** button head bolts **(M8) (a)** on the RH front mudguard.



	5 mm Allen socket with Ratchet
	$15 \pm 2 \text{ Nm} / 1.5 \pm 0.2 \text{ kgf-m}$

- Fix the c clip **(a)** on brake fluid pipe.



- Fix front wheel assembly (Refer [Wheels Chapter](#)).
- connect the battery terminal (Refer [Electrical Chapter](#)).

SIDE PANELS / SEAT / SUMP GUARD

CONTENTS

PAGE

6.6 Side Panels / Seat / Sump guard..... 314

Dismantling..... 314

6.6.1. Side Panel RH..... 314

6.6.2. Side Panel LH..... 315

6.6.3. Seat Assembly..... 316

6.6.4. Grab Rail..... 316

6.6.5. Seat Latch Lock..... 318

6.6.6. Sump Guard..... 319

Assembly..... 320

6.6.7. Sump Guard..... 320

6.6.8. Seat Latch Lock..... 320

6.6.9. Grab Rail..... 322

6.6.10. Seat Assembly.....323

6.6.11. Side Panel LH..... 323

6.6.12. Side Panel RH..... 324

6.6 Side Panels / Seat / Sump guard

Dismantling

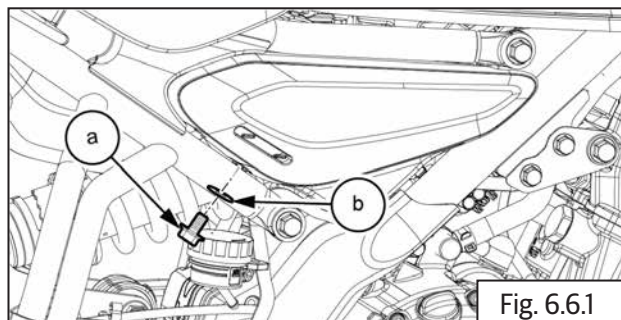
6.6.1. Side Panel RH

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

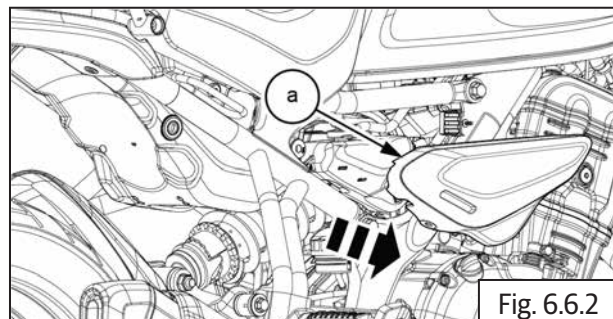
Ensure ignition and stop switch are in off position.

- Disconnect the battery terminal (Refer Electrical Chapter).
- Loosen and remove hex head flange bolt (M6) (a) along with washer (b) from side panel.

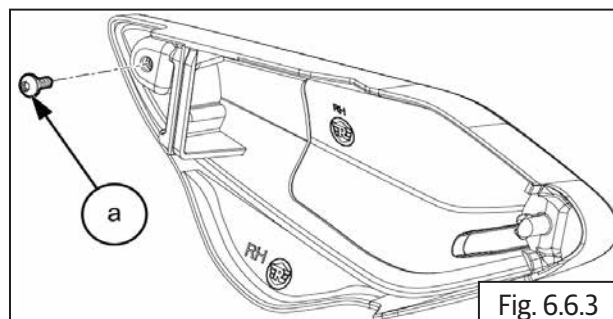


10mm Socket With Ratchet

- Gently Pull the side panel (a) outside for opening the same.

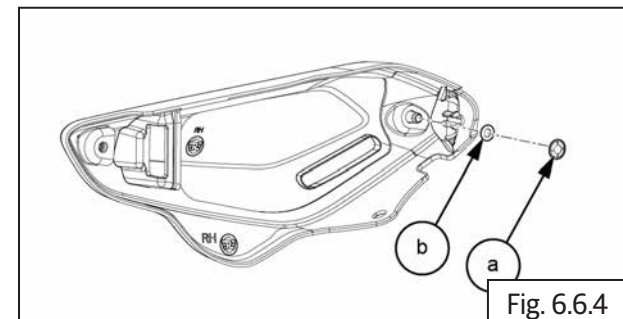


- Loosen and remove screw (M6) (a) from side panel.



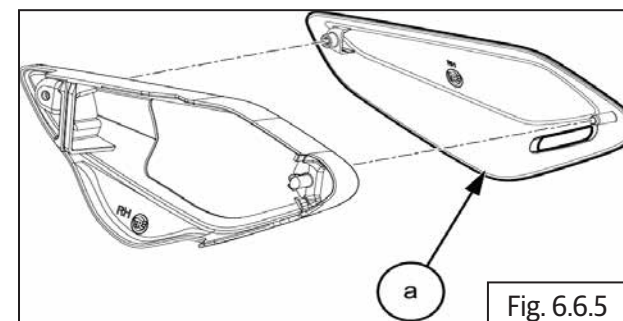
T20 Torx Socket With Ratchet

- Gently Pull and remove the spring nut (a) with "O"ring (b) from side panel.

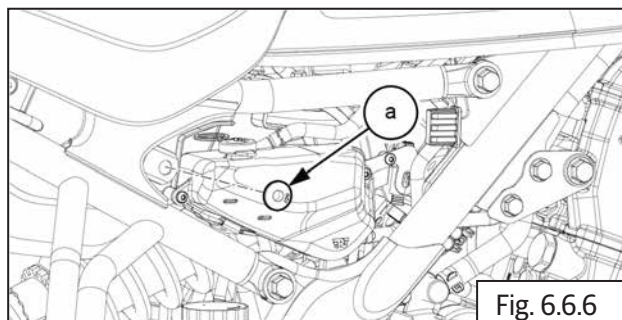


Flat Head Screw Driver

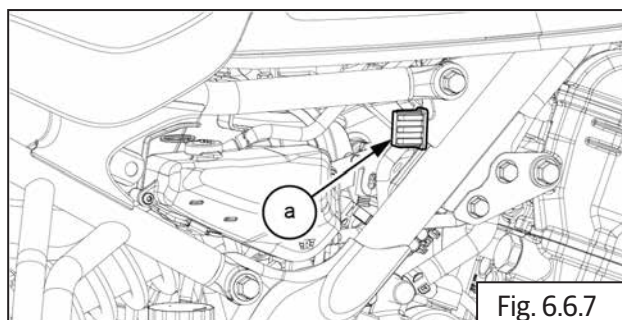
- Gently Pull the side panel cover (a) outside for opening the same.



- Gently Pull and remove the rubber grommet **(a)** from rear sub frame assembly.

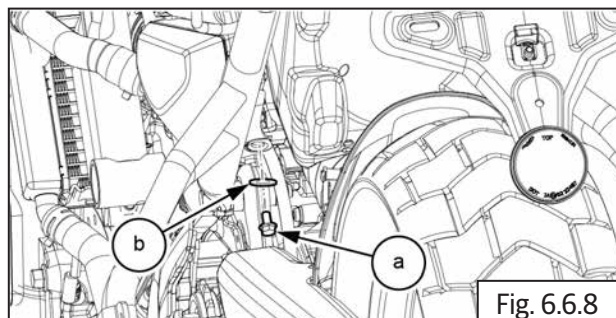


- Gently Pull and remove the rubber grommet **(a)** from main frame assembly.

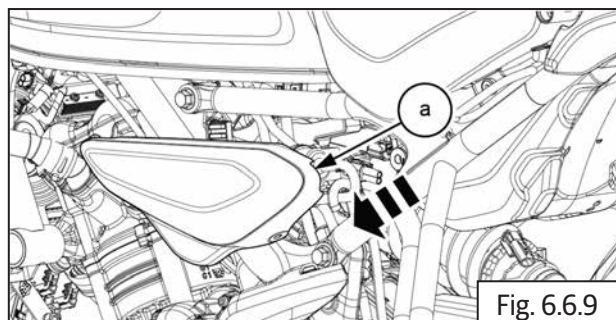


6.6.2. Side Panel LH

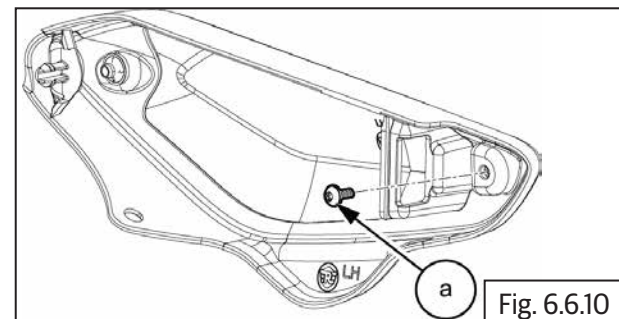
- Loosen and remove button head bolt **(M6) (a)** along with washer **(b)** from side panel.



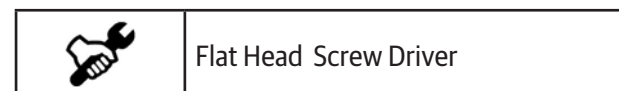
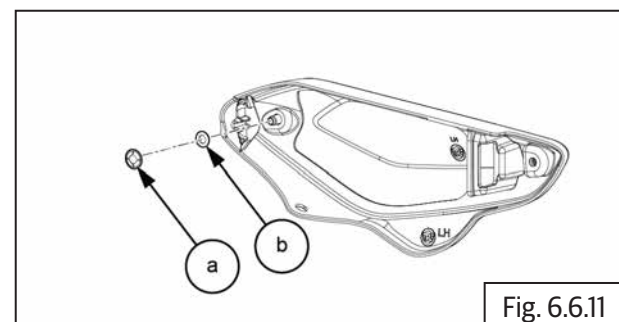
- Gently Pull the side panel **(a)** outside for opening the same.



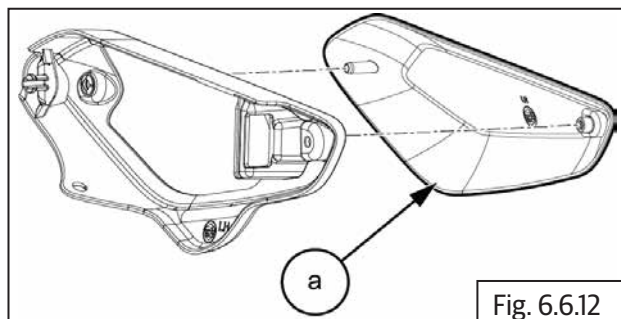
- Loosen and remove screw **(M6) (a)** from side panel.



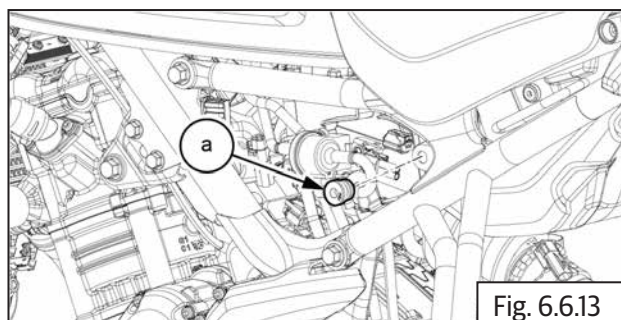
- Gently Pull and remove the spring nut **(a)** with "O"ring **(b)** from side panel.



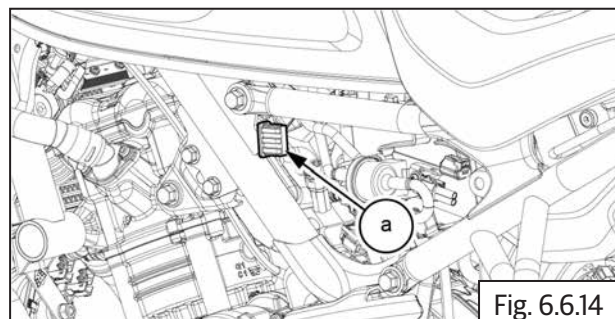
- Gently Pull and remove the side panel cover **(a)** outside for opening the same.



- Gently Pull and remove the rubber grommet **(a)** from rear sub frame assembly.



- Gently Pull and remove the rubber grommet **(a)** from main frame assembly.

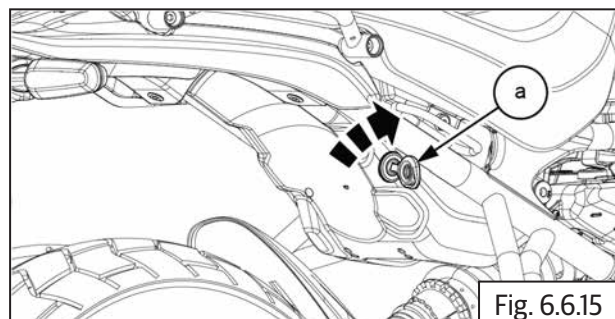


6.6.3. Seat Assembly

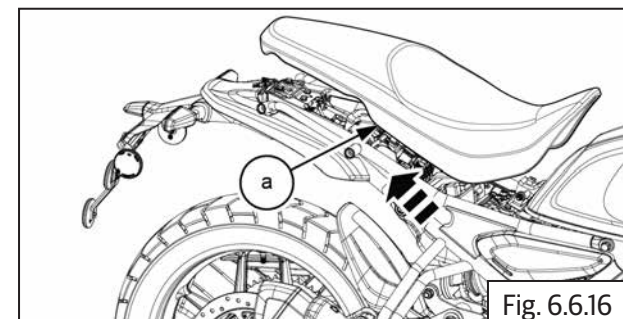
⚠ CAUTION

Please Take care while disassembling and assembling the seats, and sheet metal parts, as any sharp edges will lead to injuries.

- Insert the key **(a)** on the seat key slot and turn clockwise direction.

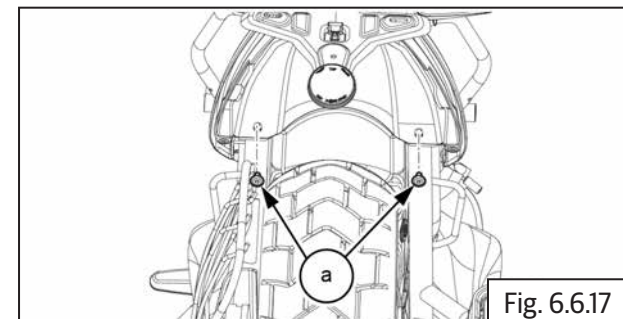


- Slide the seat **(a)** backward direction to detach the seat from frame.



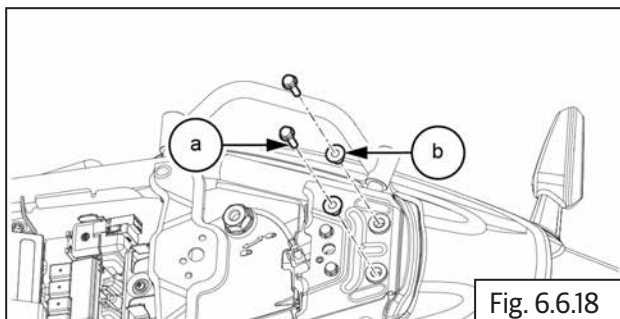
6.6.4. Grab Rail

- Disconnect the battery terminal (Refer **Electrical Chapter**).
- Loosen and remove **2 Nos** button head bolts **(M6)** **(a)** from bottom number plate hanger.



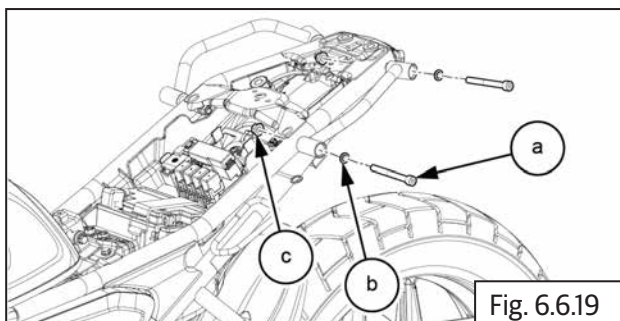
5 mm Allen Socket With Ratchet

- Loosen and remove **2 Nos** hex head bolts **(M6)** **(a)** with sleeves **(b)** from top number plate hanger.



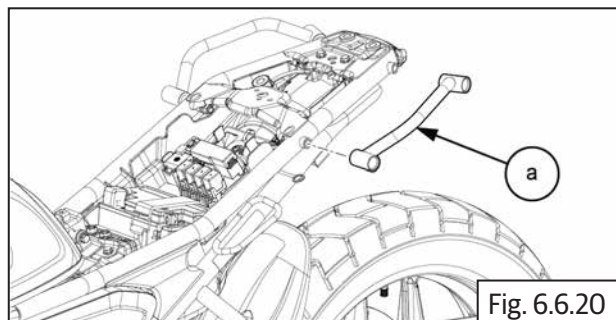
10 mm Socket With Ratchet

- Loosen and remove cap head bolts **2 Nos (M8)** **(a)** along with washer **(b)** and nut **(c)** grab rail mounting LH side .

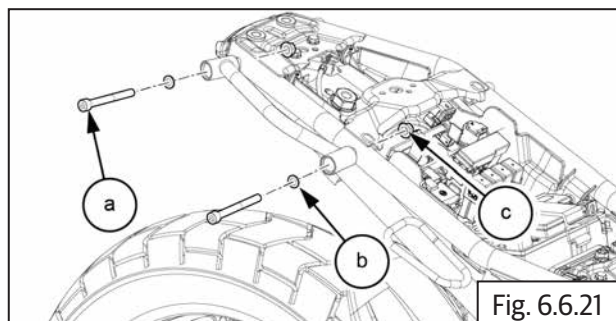


6 mm Allen Socket with Ratchet
10 mm Combination Spanner

- Remove LH side grab rail assembly **(a)** from rear sub frame assembly.

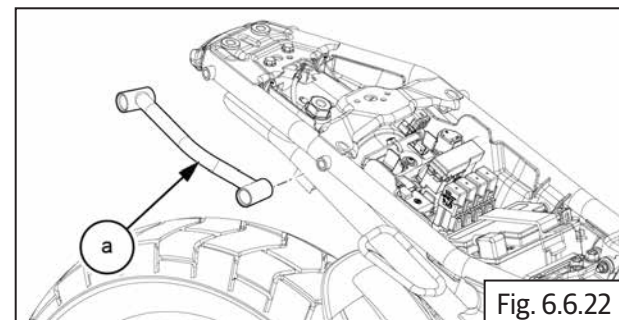


- Loosen and remove cap head bolts **2 Nos (M8)** **(a)** along with washer **(b)** and nut **(c)** grab rail mounting RH side .



6 mm Allen Socket with Ratchet
10 mm Combination Spanner

- Remove RH side grab rail assembly **(a)** from rear sub frame assembly.



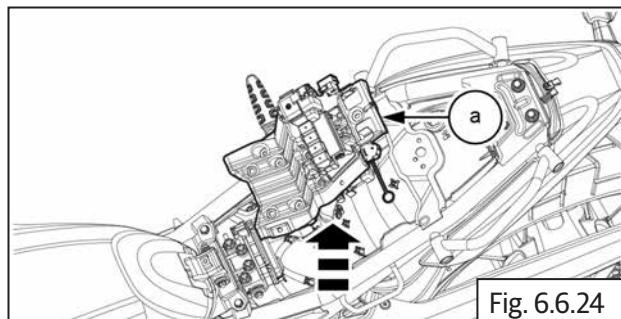
6.6.5 Seat latch lock

- Loosen and Remove **7Nos** screws **(a)** with washers **(b)** from battery tray.

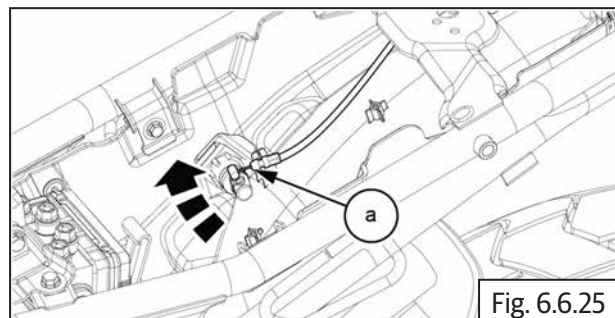


T20 Torx Socket With Ratchet

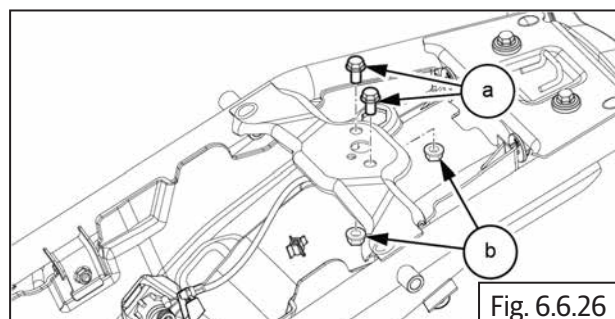
- Slide and move the battery tray with relay holders **(a)**



- Detach the rear seat lock cable **(a)**.

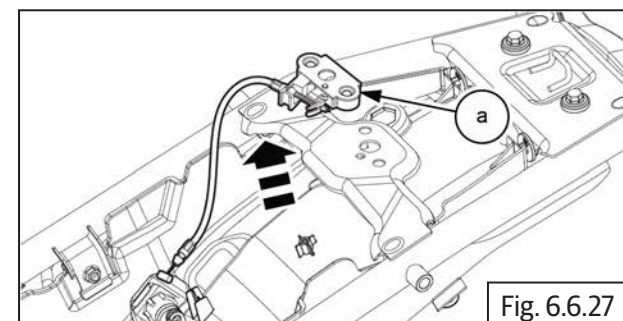


- Loosen and remove **2 Nos** hex head bolts **(a)** with nuts **(b)** **(M6)** from seat latch lock.

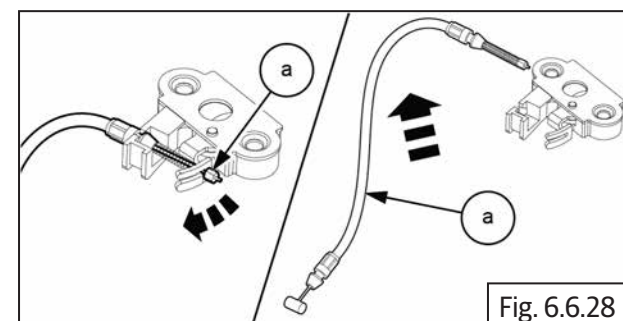


10mm Socket With Ratchet

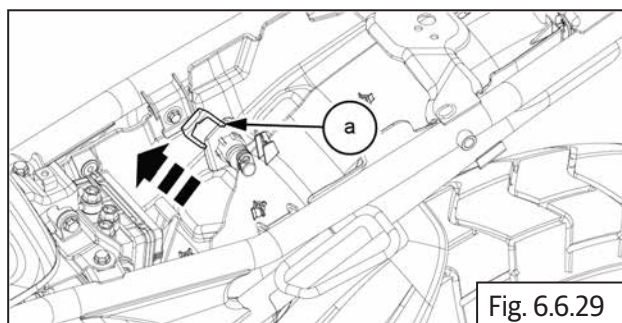
- Detach the seat latch **(a)** from vehicle.



- Detach the cable **(a)** from seat latch.

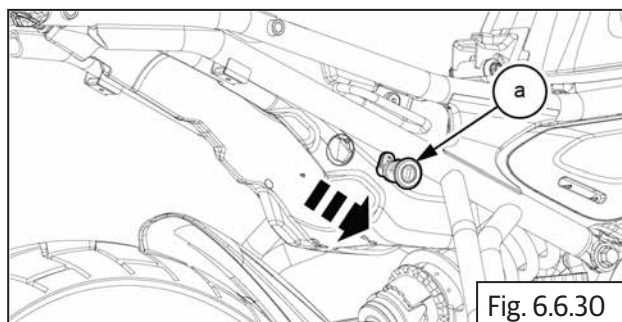


- Slide and remove seat lock clip **(a)**.



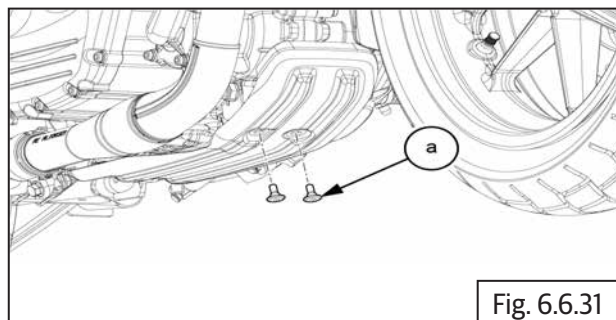
Flat Head Screw Driver

- Remove the seat key lock set **(a)** from bottom battery tray.



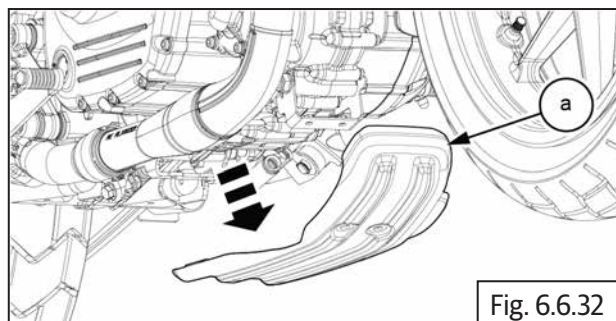
6.6.6. Sump Guard

- Loosen and remove **2 Nos** button head bolts **(M6) (a)** from sump guard bottom.

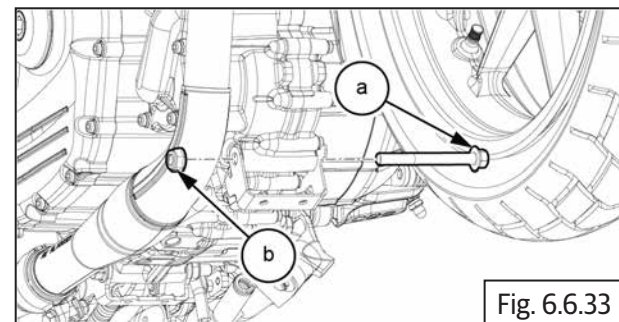


5 mm Allen Socket with Ratchet

- Remove the sump guard **(a)** from bracket.



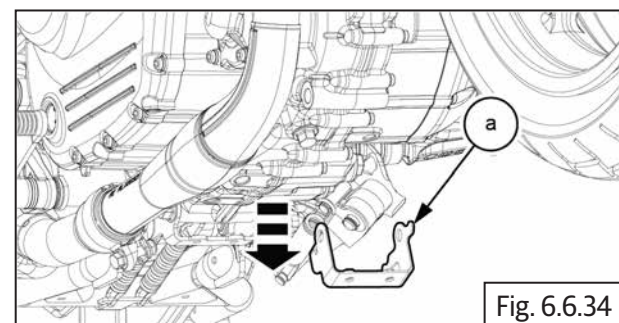
- Loosen and remove flange head bolt **(M10) (a)** with nut **(b)** from engine.



14 mm Socket with Ratchet

17 mm Combination Spanner

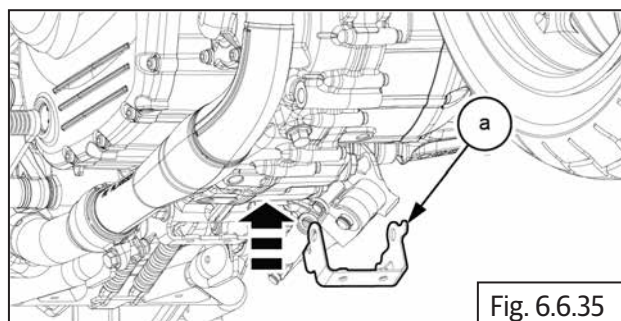
- Remove the front sump guard bracket **(a)** from bottom engine.



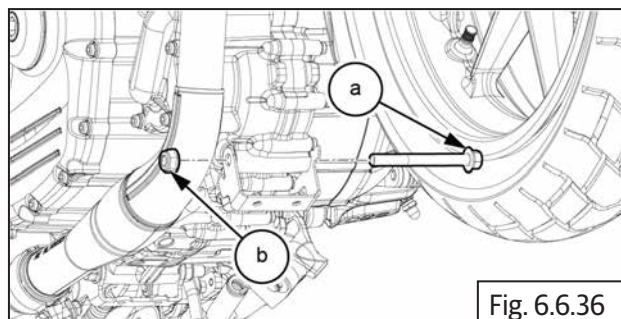
Assembly

6.6.7. Sump Guard

- Locate the front sump guard bracket **(a)** into bottom engine.

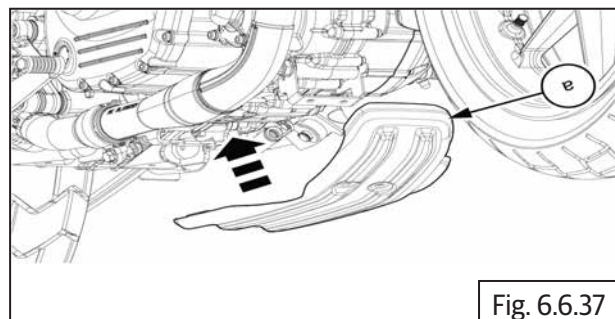


- Locate and tighten flange head bolt **(M10) (a)** with nut **(b)** into engine.

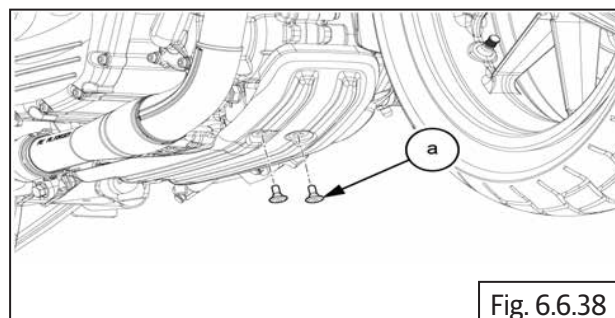


	14 mm Socket with Ratchet
	17 mm Combination Spanner
	45 Nm / 4.5 kgf-m

- Gently locate the sump guard **(a)** inside into rear bracket.



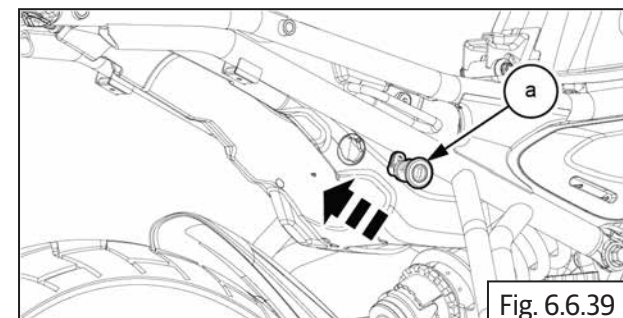
- Locate and tighten **2 Nos** button head bolts **(M6) (a)** into sump guard bottom.



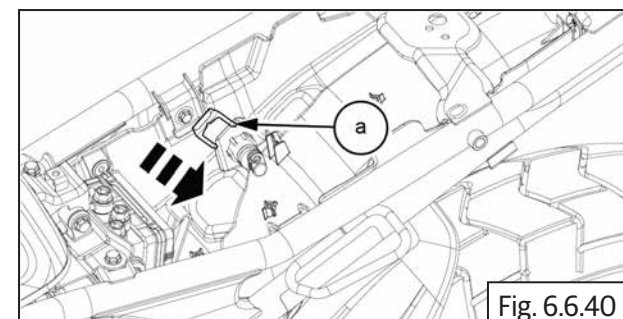
	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

6.6.8 Seat latch lock

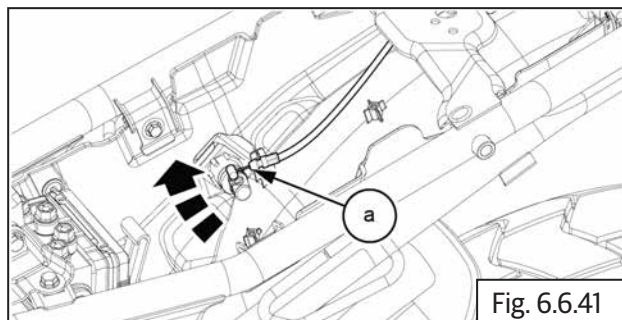
- Attach the seat key lock set **(a)** to the bottom battery tray.



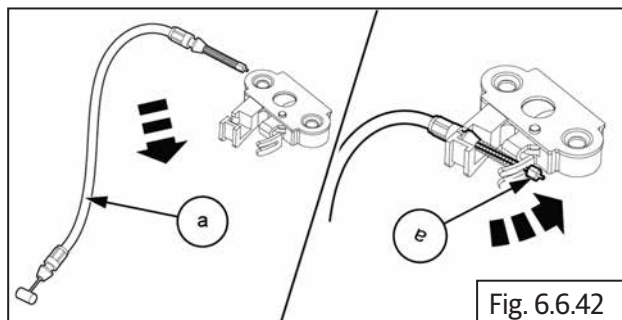
- Slide and attach seat lock clip **(a)**.



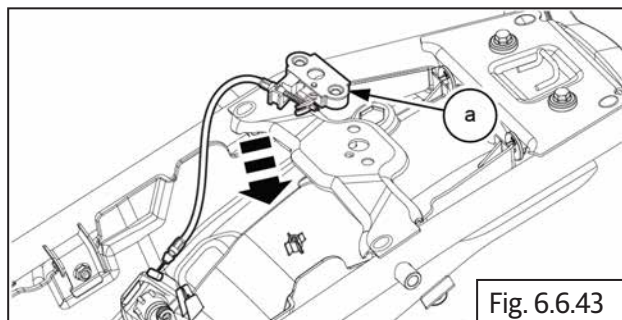
- Attach the seat latch lock with cable **(a)**



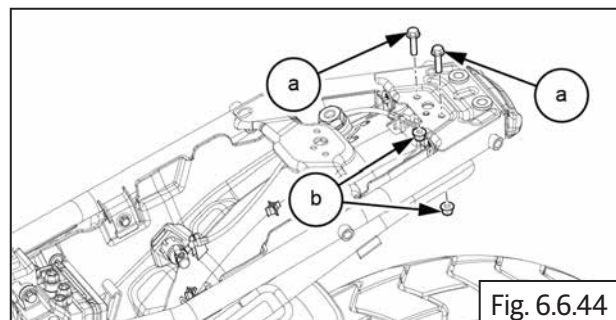
- Place and align the cable **(a)** to seat latch.



- Attach the seat latch lock with cable **(a)**

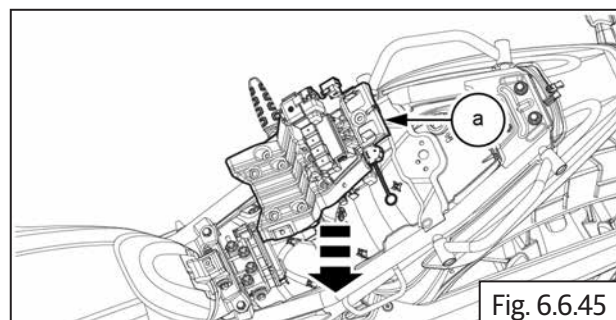


- Locate and tighten the **2 Nos** hex head bolts **(a)** **(M6)** with nuts **(b)** on seat latch lock.

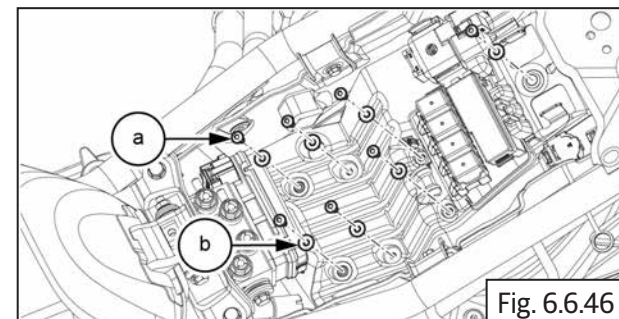


	10 mm socket with Ratchet
	10 Nm / 1.0 kgf-m

- Slide and move the battery tray with relay holders **(a)**.



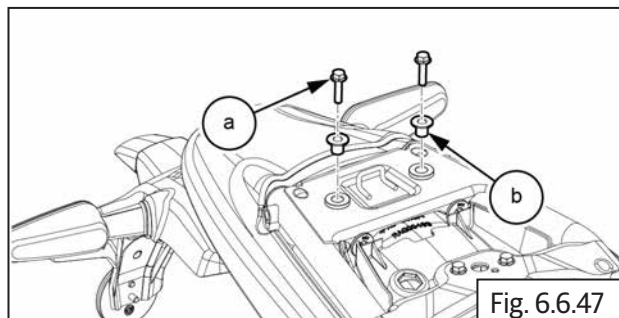
- Locate and tighten **7Nos** screws **(a)** with washers **(b)** on battery tray.



	T20 Torx socket with Ratchet
	1.5Nm / 0.15 kgf-m

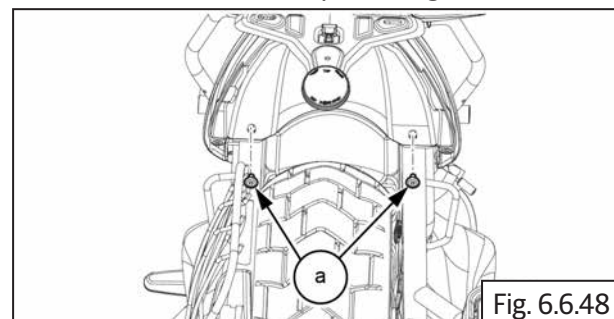
6.6.9. Grab Rail

- Locate and tighten **2 Nos** hex head bolts **(M6)** **(a)** with sleeves **(b)** on top number plate hanger.



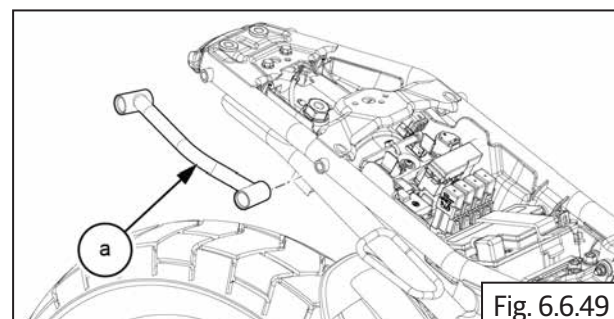
	10 mm socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate and tighten **2 Nos** button head bolts **(M6)** **(a)** on bottom number plate hanger.

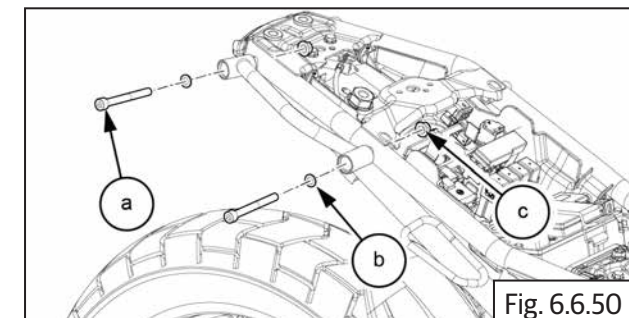


	5 mm Allen socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate RH side grab rail assembly **(a)** on rear sub frame assembly.

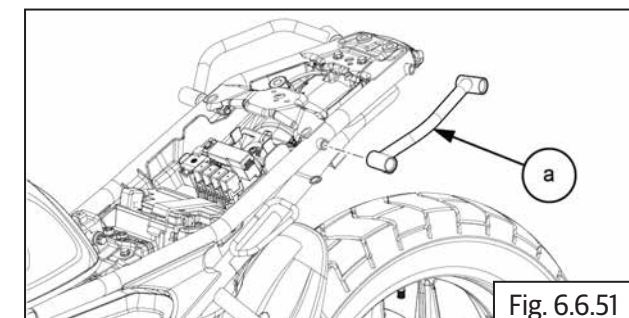


- Locate and tighten cap head bolts **2 Nos (M8)** **(a)** along with washer **(B)** and nut **(C)** into grab rail mounting RH side.

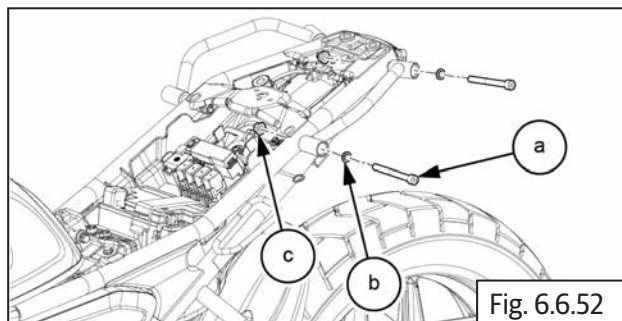


	6 mm Allen Socket with Ratchet
	10 mm Combination Spanner
	34 Nm / 3.4 kgf-m

- Locate LH side grab rail assembly **(a)** into rear sub frame assembly.



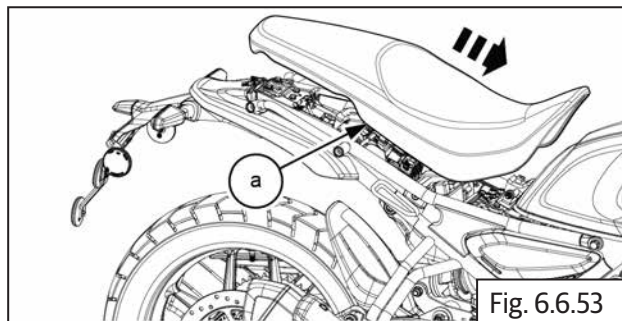
- Locate and tighten cap head bolts **2 Nos (M8) (a)** along with washer **(B)** and nut **(C)** into grab rail mounting LH side.



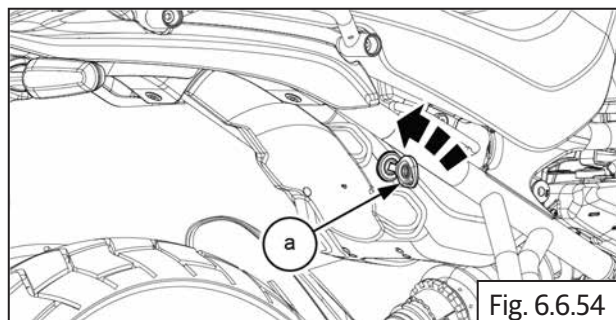
	6 mm Allen Socket with Ratchet
	10 mm Combination Spanner
	34 Nm / 3.4 kgf-m

6.6.10. Seat Assembly

- Locate the seat assembly **(a)**.



- Insert the key **(a)** on the seat key slot and turn anti-clockwise direction.

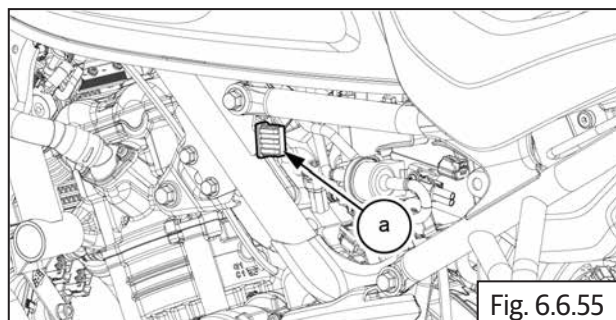


6.6.11. Side Panel LH

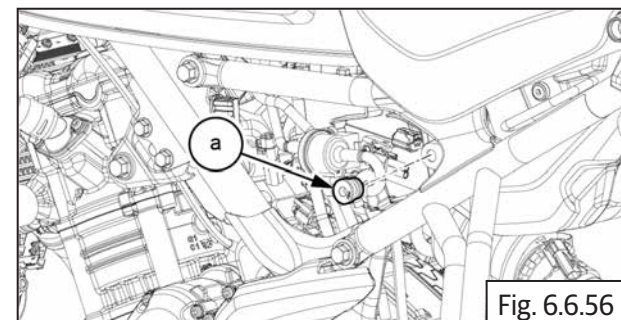
⚠ CAUTION

DO NOT over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

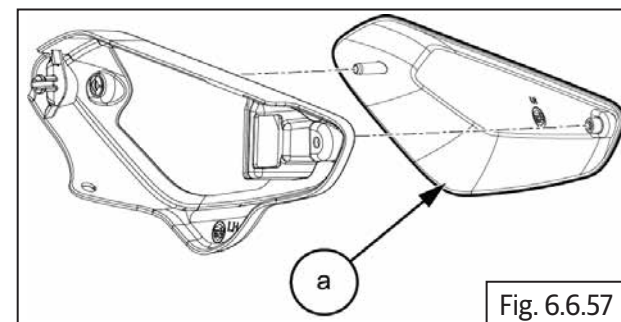
- Gently Press and fix rubber grommet **(a)** into main frame assembly.



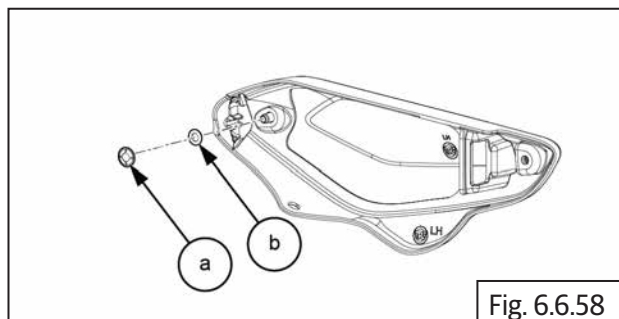
- Gently press and fix rubber grommet **(a)** into rear sub frame assembly.



- Gently press and fix side panel cover **(a)** outside into side panel.

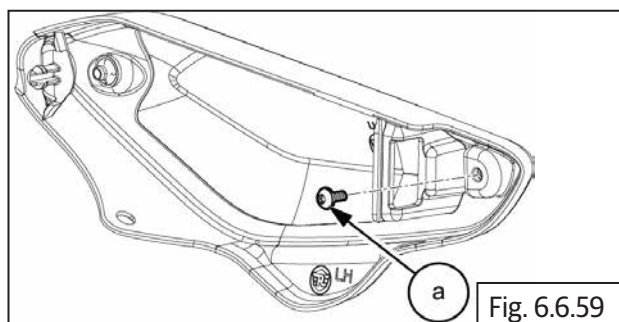


- Secure and locate the spring nut **(a)** with "O"ring **(b)** to side panel.



Flat Head Screw Driver

- Locate and tighten screw **(M6)** **(a)** into side panel.

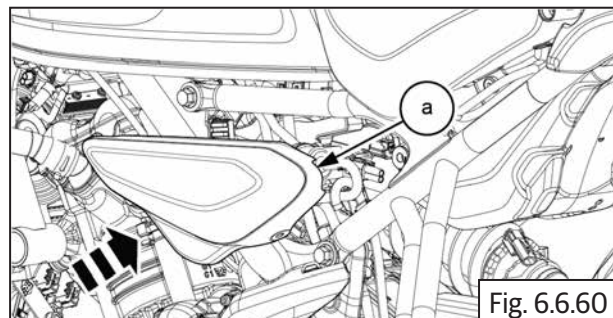


T20 Trox Socket With Ratchet

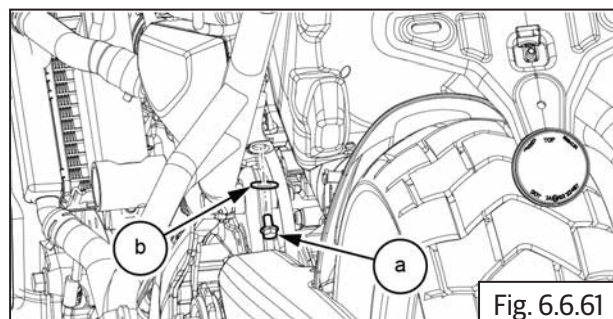


3 Nm / 0.3 kgf-m

- Gently locate the side panel **(a)** on rear subframe .



- Locate and tighten button head bolt 1 no **(M6)** **(a)** along with washer **(b)** into side panel.



10mm Socket With Ratchet



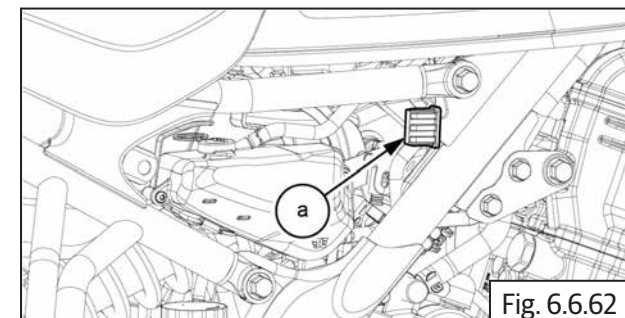
3 Nm / 0.3 kgf-m

6.6.12. Side Panel RH

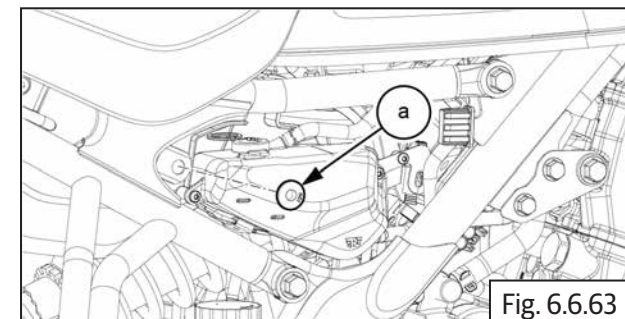
⚠ CAUTION

DO NOT over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

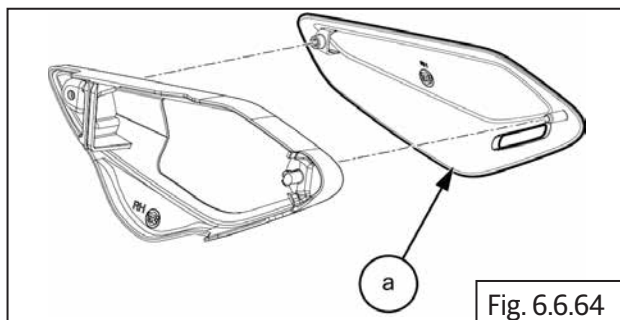
- Gently Press and fix rubber grommet **(a)** into main frame assembly.



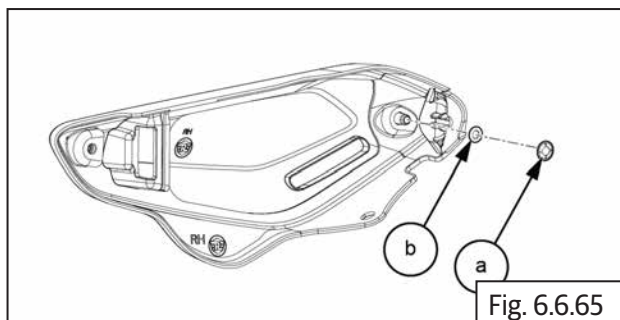
- Gently press and fix rubber grommet **(a)** into rear sub frame assembly.



- Gently press and fix side panel cover **(a)** outside into LH side panel.

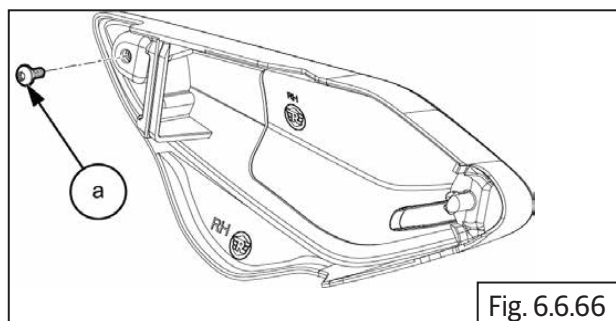


- Secure and locate the spring nut **(a)** with "O"ring **(b)** to side panel.



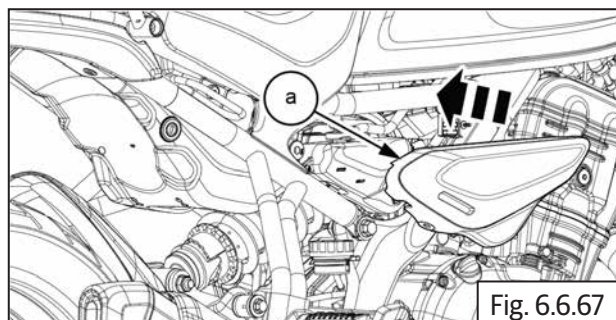
	Flat Head Screw driver
--	------------------------

- Locate and tighten screw **(M6) (a)** into side panel.

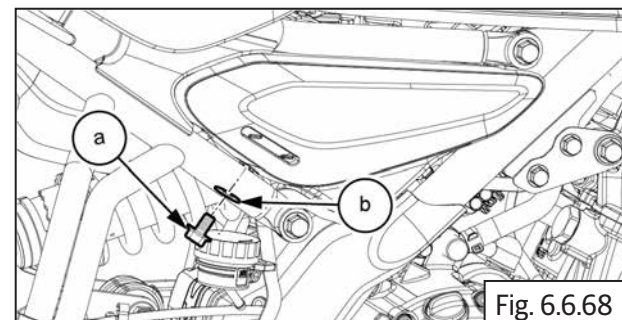


	T20 Trox socket with ratchet
	3 Nm / 0.3 kgf-m

- Gently locate the side panel **(a)** on rear sub frame .



- Locate and tighten button head bolt **(M6) (a)** along with washer **(b)** into side panel.



	10mm Socket with Ratchet
	3 Nm / 0.3 kgf-m

WHEELS

CONTENTS	PAGE
6.7 Wheels	330
Dismantling.....	330
6.7.1 Front Wheel	330
6.7.2. Front Brake Disc.....	331
6.7.3 Rear Wheel from Swing Arm.....	332
6.7.4 Rear Brake Disc.....	334
Inspection.....	337
6.7.5. Front Wheel and Brake Disc.....	337
6.7.6. Rear Wheel and Brake Disc.....	339
Assembly.....	341
6.7.7 Front And Rear Tyre Assembly On Wheel Rim.....	341
6.7.8 Rear Brake Disc.....	341
6.7.9 Rear Wheel into Swing Arm.....	343
6.7.10 Drive Chain Free Play Adjustment.....	347
6.7.11 Front Brake Disc.....	347
6.7.12 Front Wheel into Front Fork Assembly.....	348
Troubleshooting.....	351

6.7 Wheels

Dismantling

6.7.1. Front Wheel

NOTE

- Ensure the motorcycle is upright on a firm and flat surface.

- Locate a scissor jack under the engine and lift motorcycle such that the front wheel is off the ground.

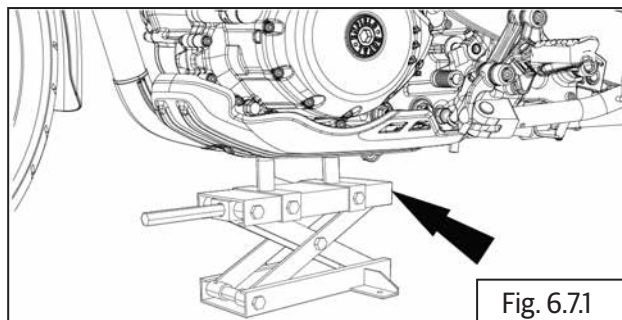


Fig. 6.7.1

- Loosen and remove cap bolt **1 Nos (M8) (a)** from RHS front fork assembly.

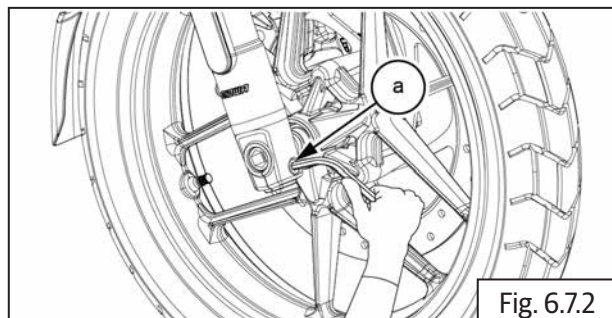


Fig. 6.7.2

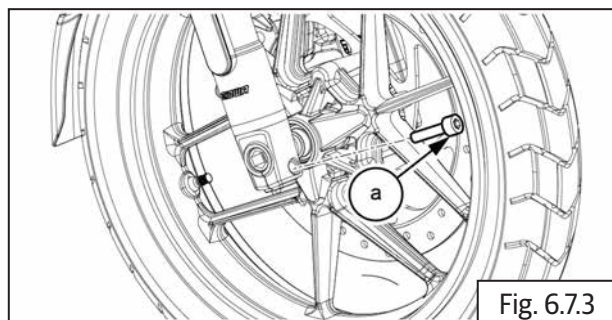


Fig. 6.7.3



8 mm Allen key

- Loosen and remove spindle bolt **(a)** from RHS front fork assembly.

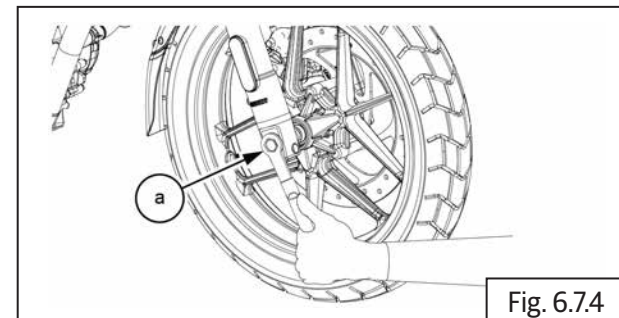


Fig. 6.7.4

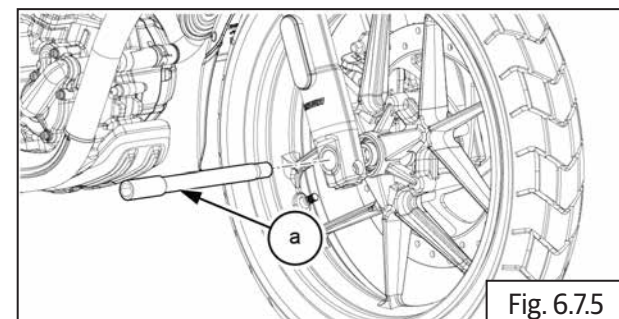


Fig. 6.7.5

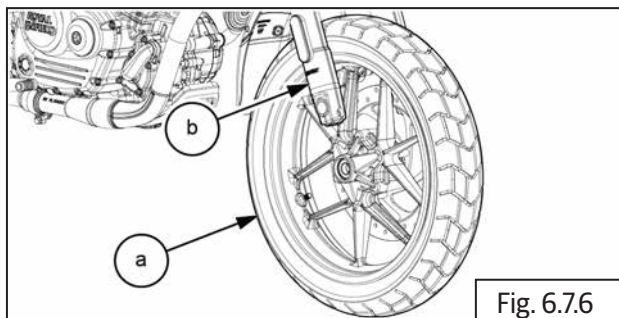


17 mm Front Spindle Adapter

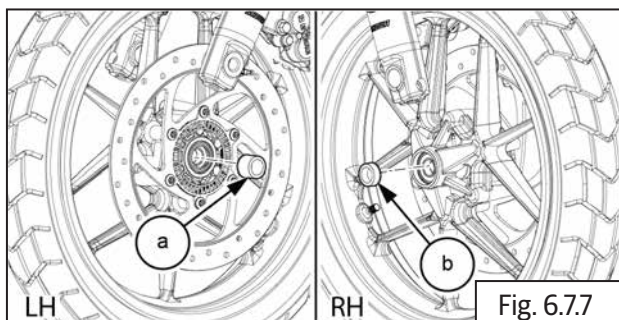
- Gently lower the wheel **(a)** such that it comes out of the fork legs **(b)**.

⚠ CAUTION

Locate a limiter pad in the middle of the brake pads, It can help prevent the brake caliper from jamming.



- Remove **LHS (a)** and **RHS (b)** spacers from front wheel hub.



6.7.2 Front Brake Disc

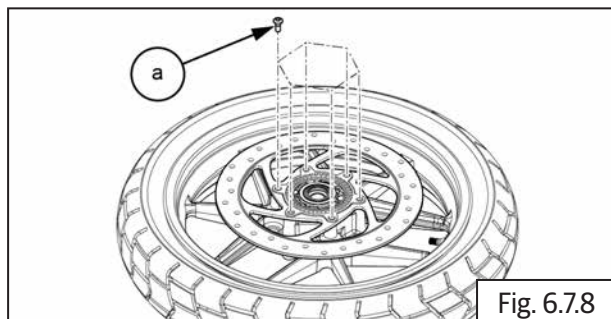
⚠ WARNING

DO NOT place/store the wheel with disc facing downward. It will damage and cause disc warpage.

⚠ CAUTION

Place a soft cloth under the wheel hub center mounting hole area to prevent damage.

- Loosen and remove **6 Nos** button head bolts **(M8)** **(a)** holding disc plate to hub, in crisscross pattern.

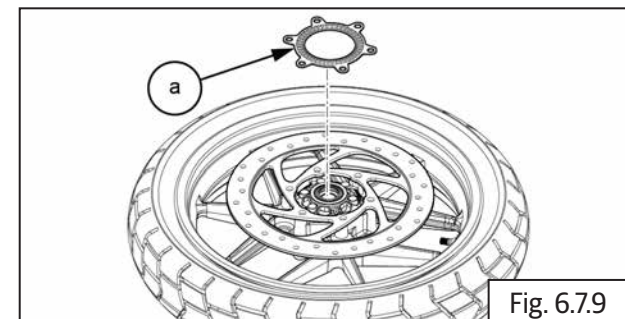


6 mm Allen socket with Ratchet

⚠ CAUTION

Avoid any bends or damages to the toner wheel as it will affect the functioning of ABS.

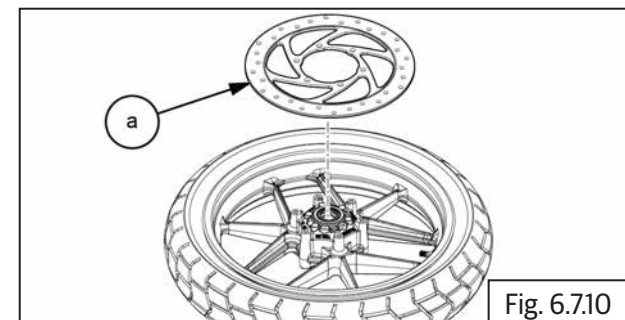
- Remove toner wheel **(a)** from hub.



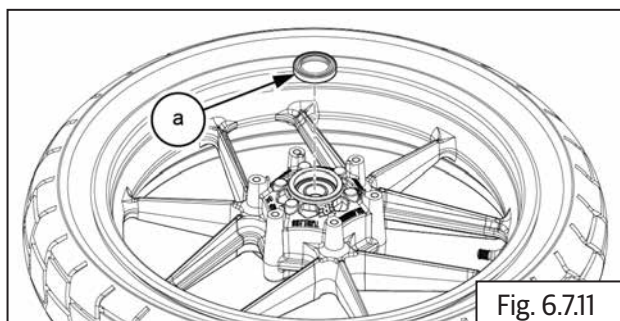
- Remove brake disc **(a)** from hub.

⚠ CAUTION

Ensure the brake disc does not get damaged, as it will affect the brake efficiency.

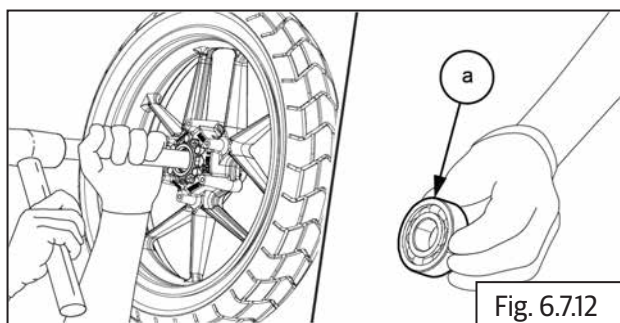


- Remove grease seals **(a)** from LHS and RHS hub.



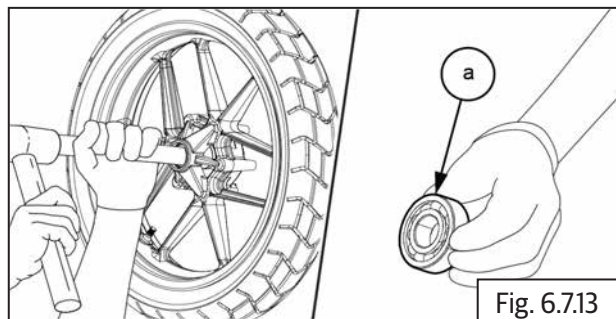
Screw driver

- Locate a suitable pointed punch on hole in spacer from RH of hub to remove bearing LH **(a)**.



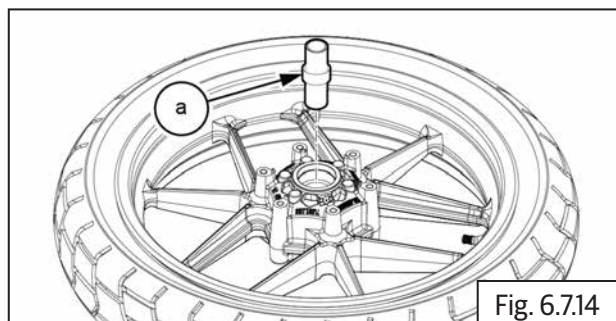
Bearing removal tool and Mallet

- Insert a punch into hub from LH side and drive out bearing RH **(a)**.



Punch and Mallet

- Remove the internal spacer **(a)**.

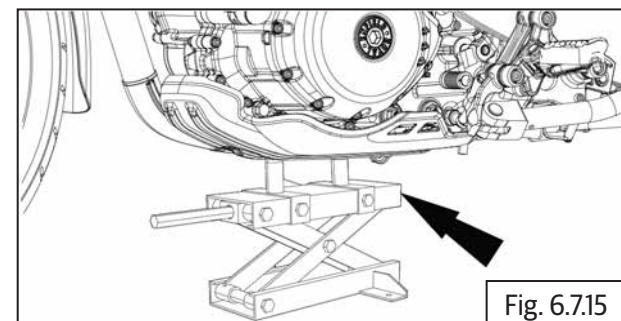


6.7.3. Rear Wheel from Swing Arm

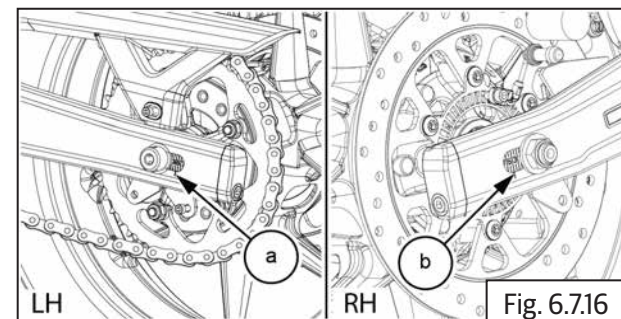
NOTE

- Ensure the motorcycle is upright on a firm and flat surface.

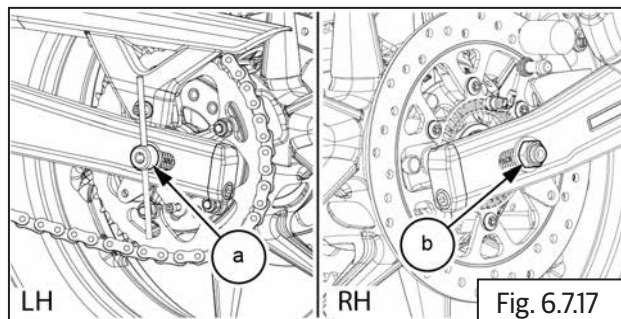
- Locate a scissor jack under the cradle frame and lift motorcycle such that the front wheel is off the ground.



- Before remove the rear wheel, observe the alignment index marks on both left **(a)** and right **(b)** chain adjusters.

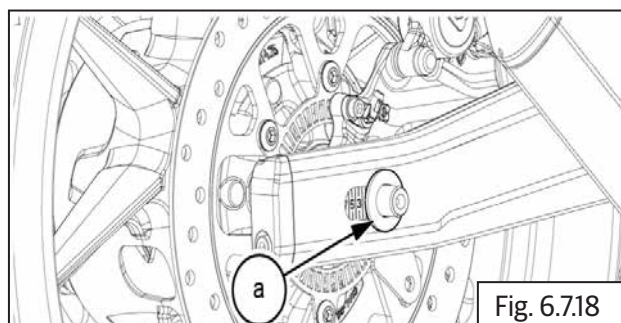


- Loosen and remove nut **(M16) (b)** from RH and hold other side LH spindle **(a)** with tommy bar.

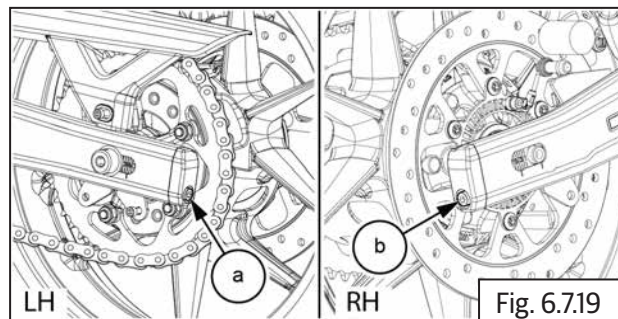


24 mm Ring spanner and Tommy bar

- Remove washer **(a)** from spindle on swing arm RH.

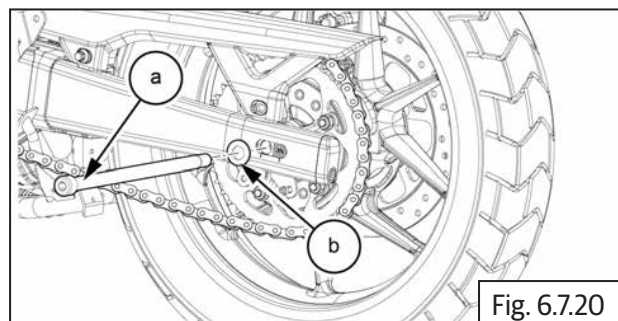


- Loosen the adjuster cap bolts **(M8) (a)** and **(b)** on both LH and RH swing arm.



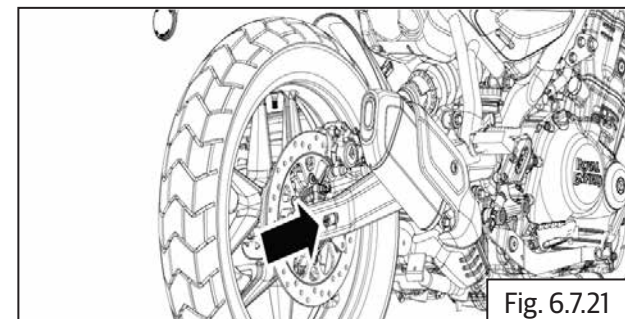
6 mm Allen Key

- Gently tap spindle **(a)** from RH to pull out from LHS.
- Remove spindle **(a)** from swing arm LH along with washer **(b)**.

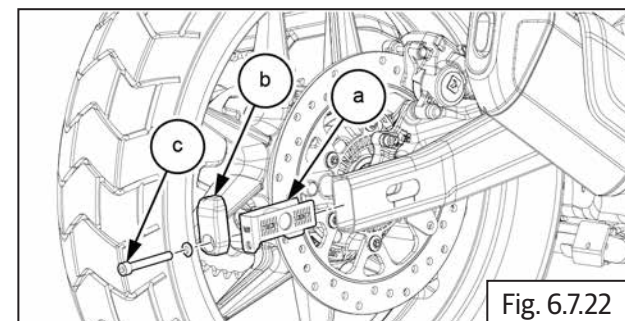


Mallet & Tommy bar

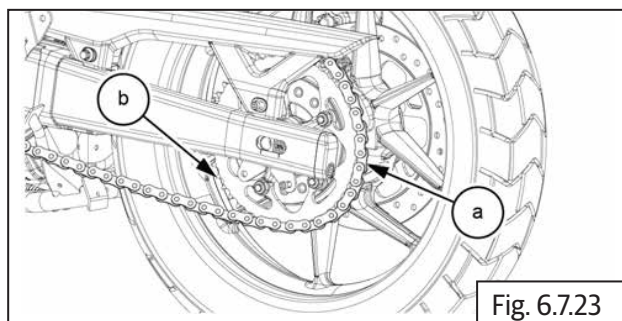
- Push rear wheel forward to increase chain slack on rear sprocket.



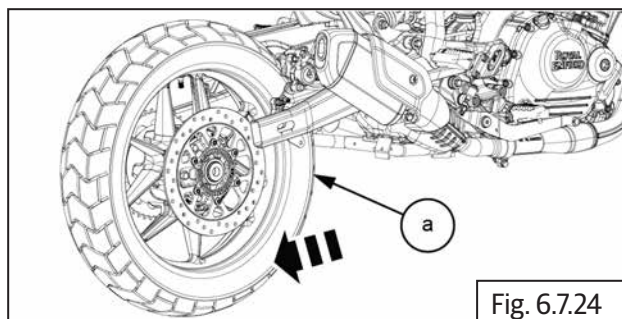
- Remove chain adjuster assembly **(a)** cap **(b)** with cap bolt **(c)** from swing arm RHS.
- Proceed the same step to LHS side.



- Gently release drive chain **(a)** from sprocket **(b)**.



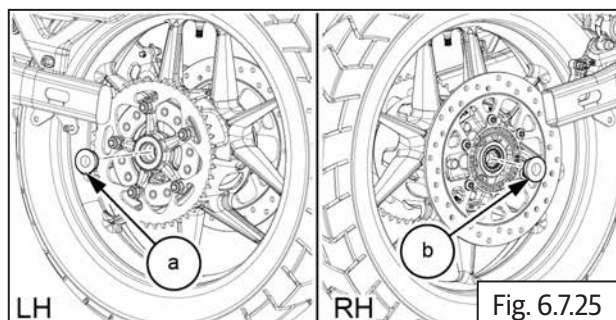
- Gently remove rear wheel **(a)** from swing arm.
- Ensure limiter pad is placed between brake pads in caliper assembly.



! CAUTION

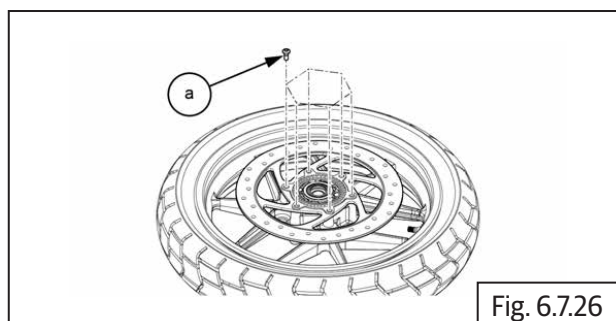
Locate a limiter pad in the middle of the brake pads, It can help prevent the brake caliper from jamming.

- Gently remove spacer LHS **(a)** and RHS **(b)** from the rear wheel hub.



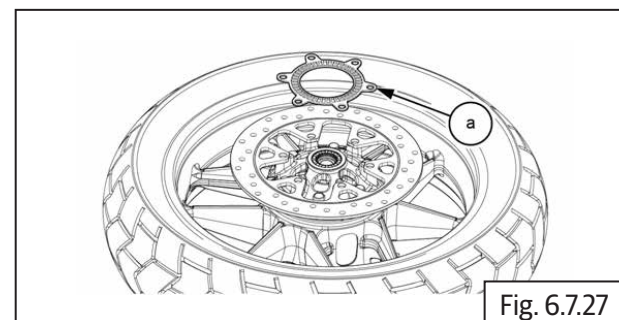
6.7.4. Rear Brake Disc

- Loosen and remove 6 Nos **(M8) (a)** bolts to remove ABS toner wheel.

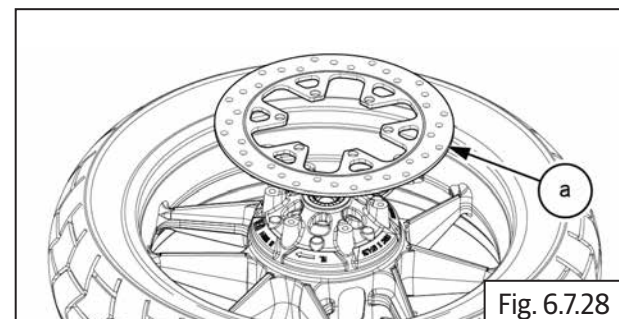


6 mm Allen socket with Ratchet

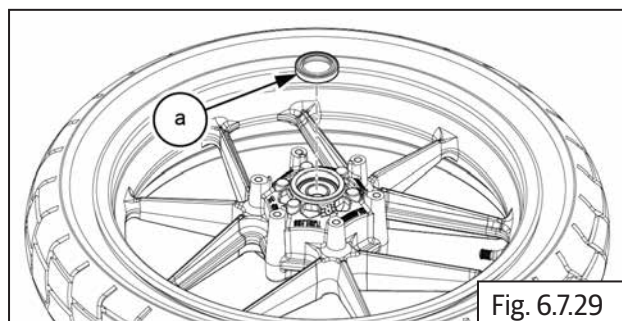
- Remove ABS toner wheel **(a)** from rear wheel hub RH.



- Remove rear brake disc **(a)** from the rear wheel hub RH.

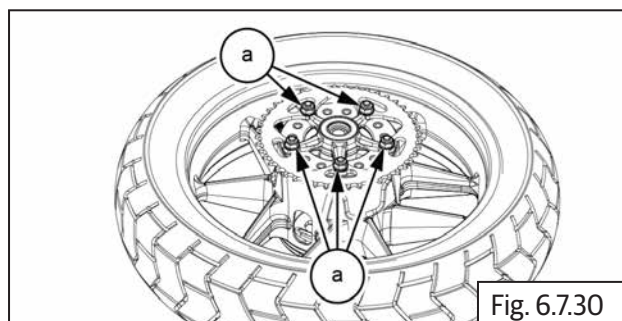


- Remove grease seal **(a)** from RHS hub.



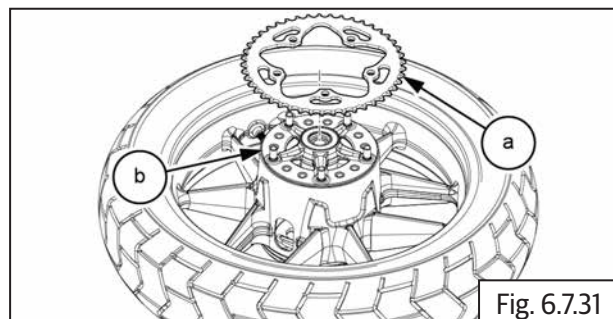
Screw driver

- Loosen and remove 5 Nos **(M10)** **(a)** Hex flanged nut to remove chain sprocket .

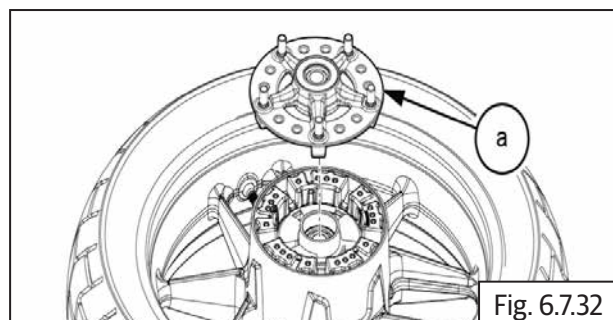


17 mm Socket with Ratchet

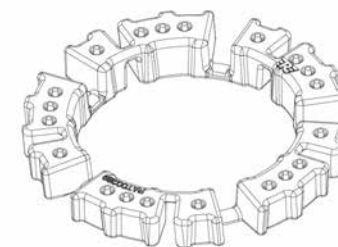
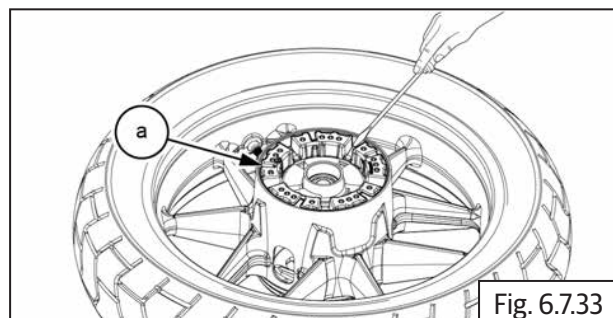
- Remove chain drive sprocket **(a)** from sprocket carrier **(b)**.



- Remove sprocket carrier **(a)** from the rear wheel hub .

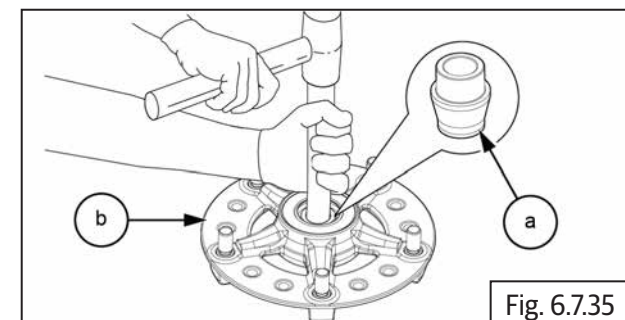


- Remove cush rubber **(a)** from rear wheel hub LH.



Minus screwdriver

- Gently tap to remove cush spacer **(a)** from sprocket carrier **(b)**.

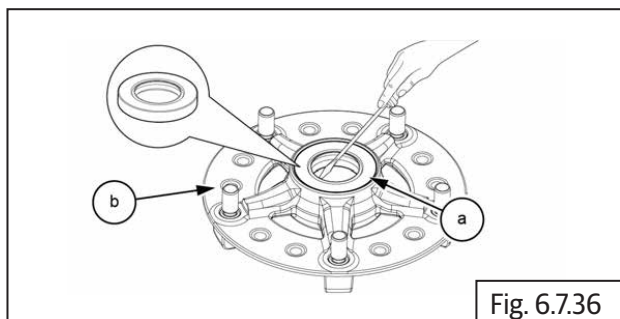


Punch and Mallet

⚠ CAUTION

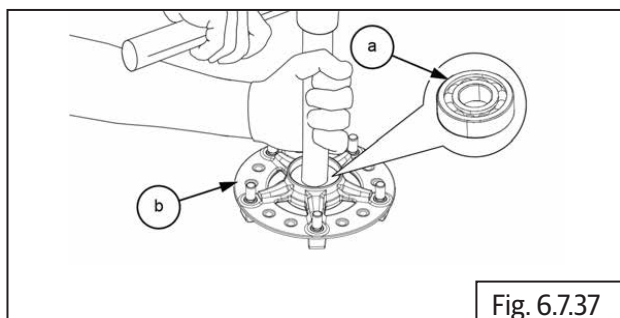
DO NOT apply excessive force to remove the bearing, spacer as it may cause damage.

- Gently remove grease seal **(a)** from the sprocket carrier **(b)**.



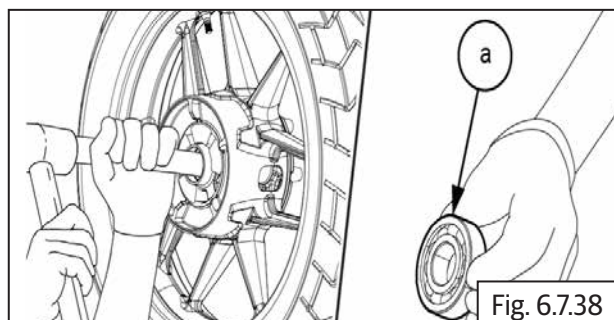
Minus screwdriver

- Gently remove bearing **(a)** from the sprocket carrier **(b)**.



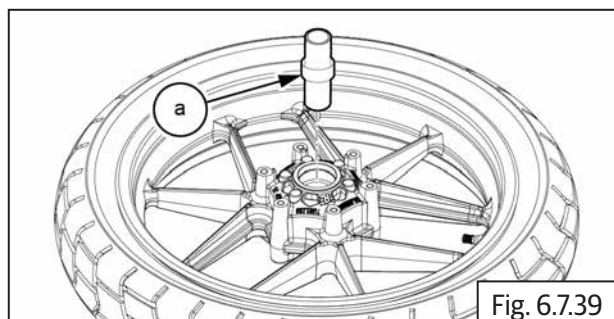
Bearing removal tool and Mallet

- Insert a punch into hub from LH side and drive out bearing RH **(a)**.

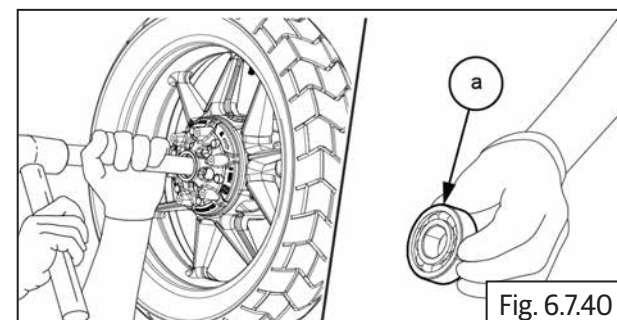


Punch and Mallet

- Remove internal spacer **(a)** from the rear wheel hub.



- Locate a suitable punch on hole in spacer from RH of hub to remove bearing RH **(a)**.

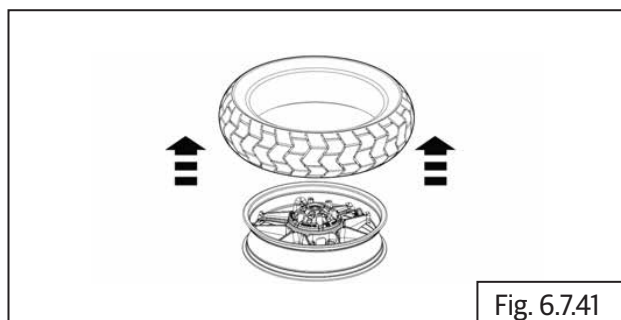


Punch and Mallet

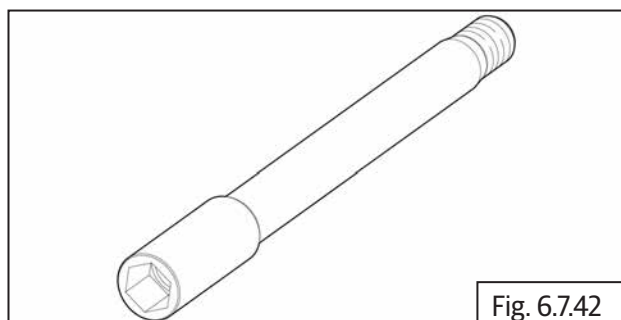
Inspection

6.7.5. Front Wheel and Brake Disc

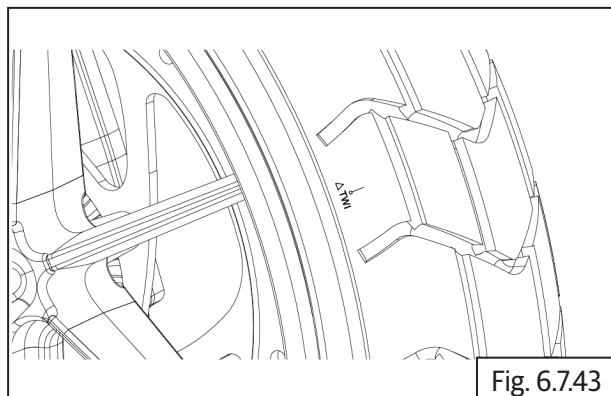
- Remove the tyre from wheel rim.
- Inspect tyre condition and wheel rim for any damages or bends and replace if out of specifications.



- Inspect and replace spindle if it has excess wear, rust or bends.

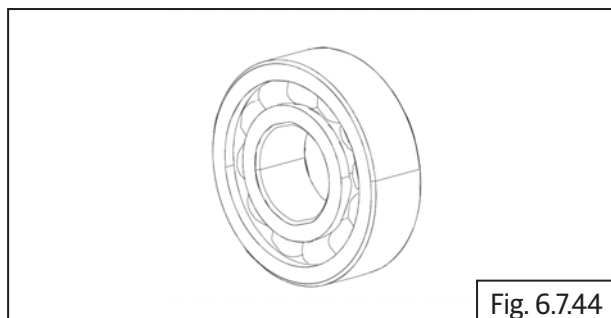


- Check tyres for any uneven wear out and the spikes on the center of the tyre is above the TWI index.

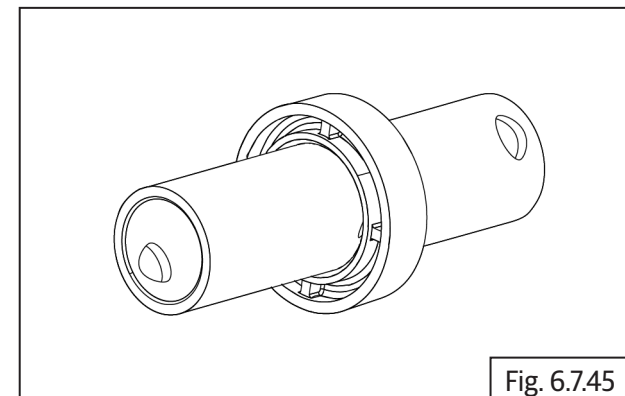


Tyre depth gauge

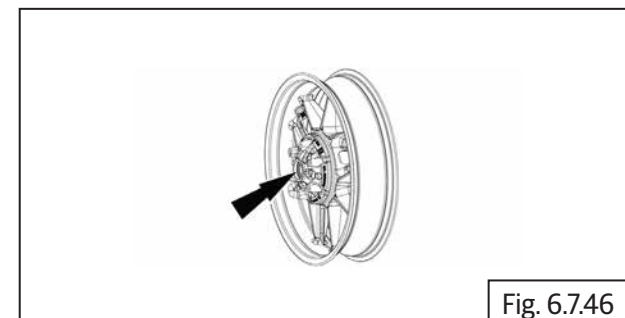
- Check noise and play on bearing LH and RH.



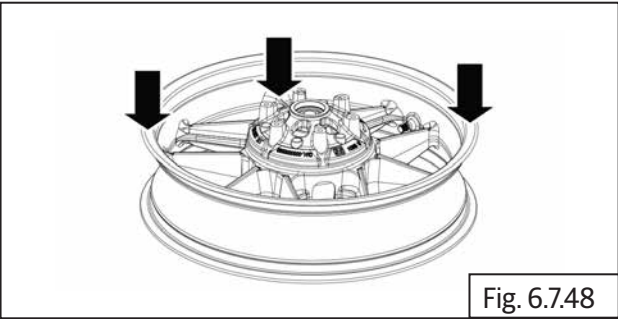
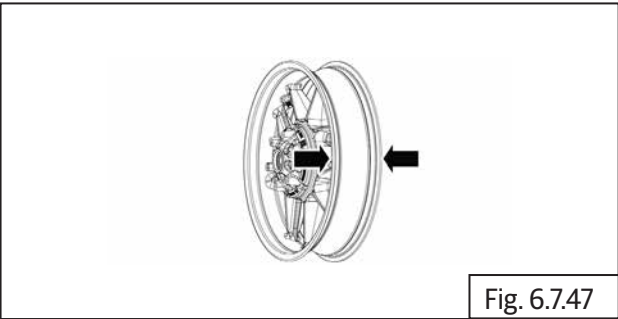
- Check and replace wheel spacer if it has excess wear-out.



- Check if wheel hub assembly is cracked or damaged and replace.
- Check and replace wheel hub bearing seated portion if there is any scoring.

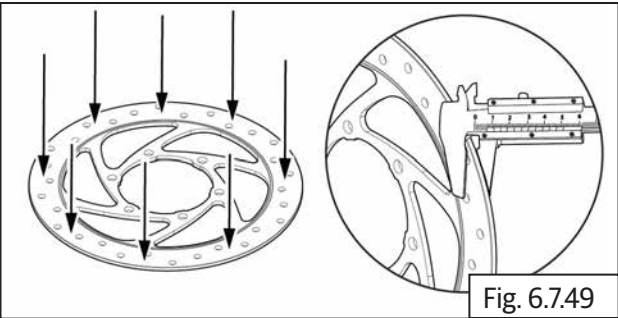


- Inspect wheel rim run out and face out and replace if out of specifications.



Service limit	1 mm
---------------	------

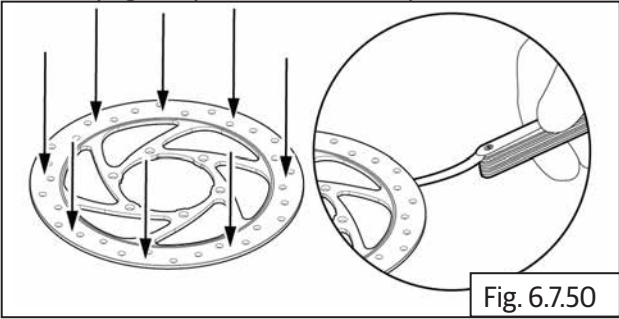
- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of brake disc.
- Inspect brake disc thickness. Measure depth at points where scoring is found on the discs and replace if there is excess wear.
- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.



	Vernier caliper
--	-----------------

Service limit	4.5 mm
---------------	--------

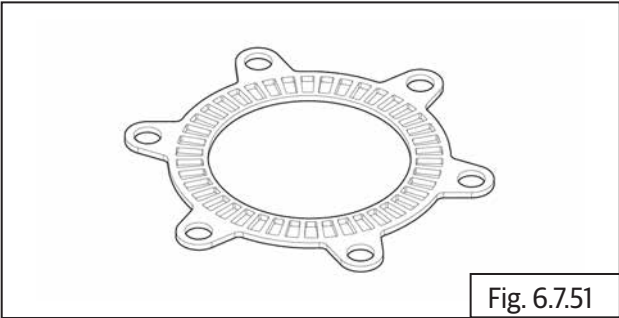
- Place brake disc rotor on a flat surface and inspect war page. Replace if it is out of specifications.



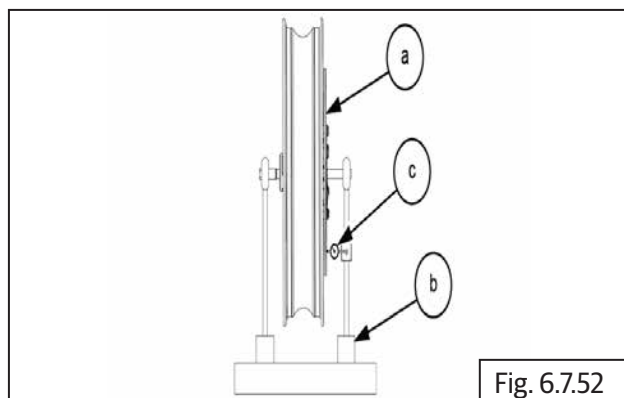
	Feeler gauge
--	--------------

Standard	0.00 mm
Service limit	0.3 mm

- Inspect and replace toner wheel plate if there are any damages or bends.



- After assembly of brake disc **(a)** into front wheel, insert spindle into rim, fix on wheel balance frame **(c)** and rotate rim to check the disc run-out with dial gauge **(b)**. Ensure run-out is within specified service limits.
- Similarly check run out of front and rear wheel.

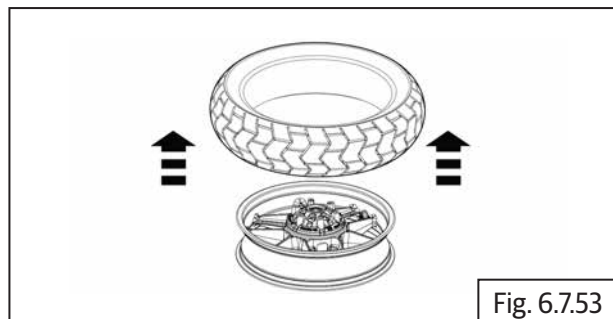


Service limit	0.3 mm
---------------	--------

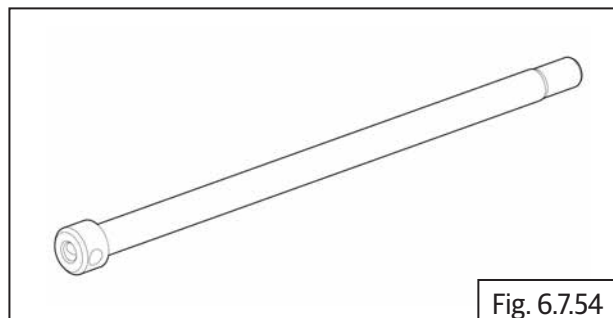
NOTE	
Run-out of brake disc should be checked only when brake disc is assembled on wheel hub.	

6.7.6 Rear Wheel and Brake Disc

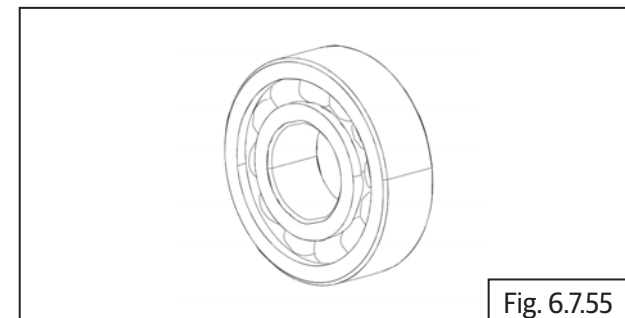
- Remove the tyre from wheel rim.
- Inspect tyre condition and wheel rim for any damages or bends and replace if out of specification.



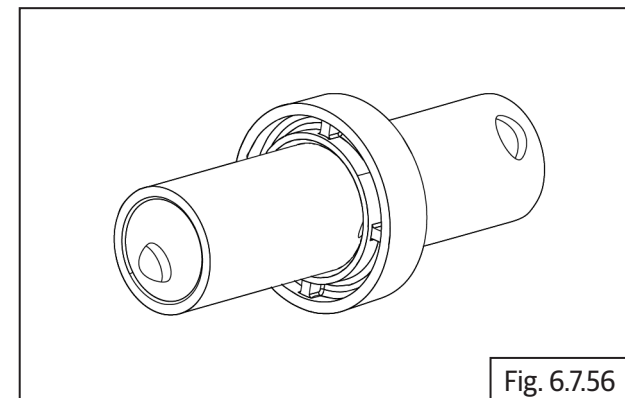
- Inspect and replace spindle (a) if it has excess wear, rust or bends.



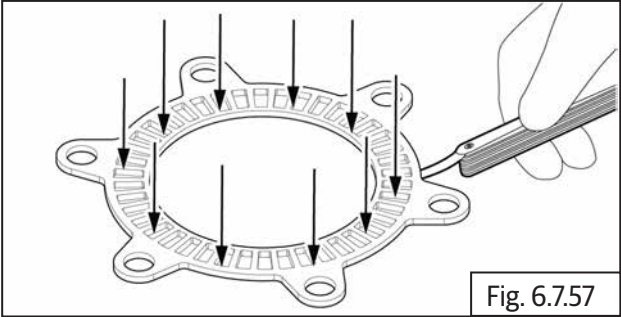
- Check noise and play on bearing LH and RH. Replace if necessary.



- Check and replace spacer if it has excess wear-out.



- Inspect ABS toner wheel for any bends or damages.
- Place ABS toner wheel on a flat surface and check war page. Replace if out of specifications.

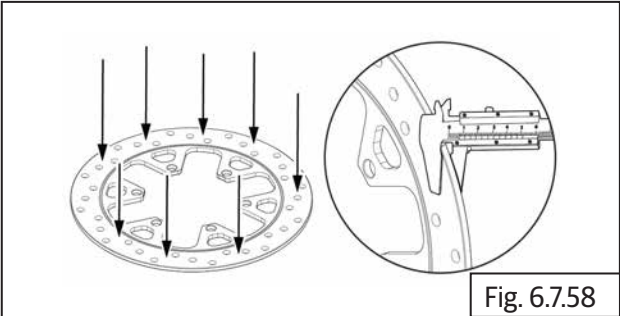


	Feeler gauge
--	--------------

Standard	0.00 mm
Service limit	0.3 mm

- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of brake disc.
- Inspect brake disc thickness and run-out. Measure depth at points where scoring is found on the discs and replace if there is excess wear.

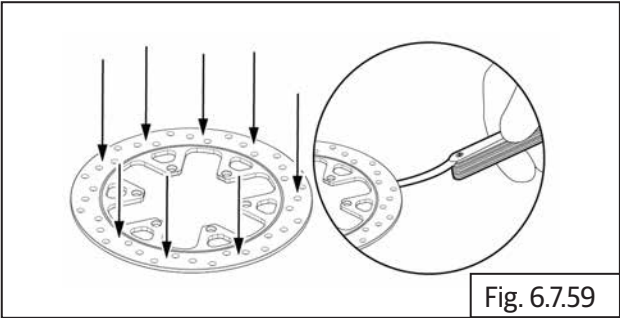
- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.



	Vernier caliper
--	-----------------

Service limit	4.5 mm MIN
---------------	------------

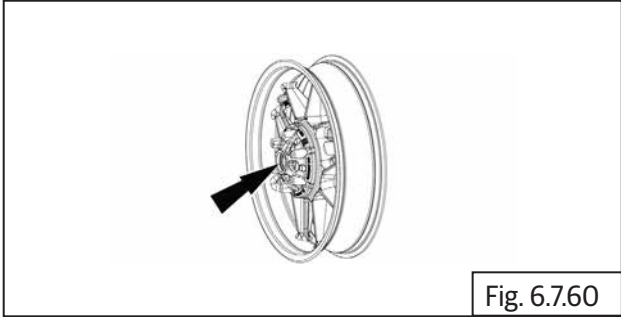
- Place brake disc rear on a flat surface and check war page. Replace if out of specifications.



	Feeler gauge
--	--------------

Standard	0.00 mm
Service limit	0.05 mm

- Inspect wheel hub assembly for any cracks or damages. Replace if out of specifications.
- Inspect if hub bearing seating portion has scoring. Replace if out of specifications.



- Check rear wheel hub cushion rubbers for any wear-out or damages.

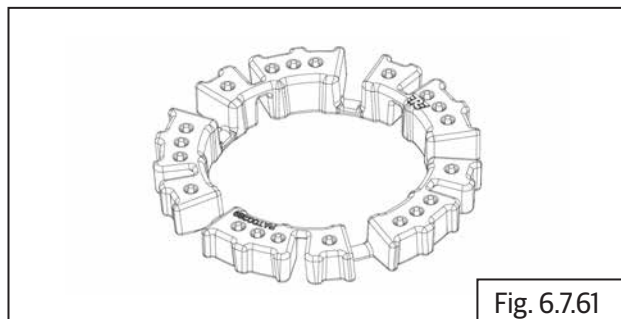


Fig. 6.7.61

- Check tyres for any uneven wear out and the sipes on the center of the tyre is above the TWI index.

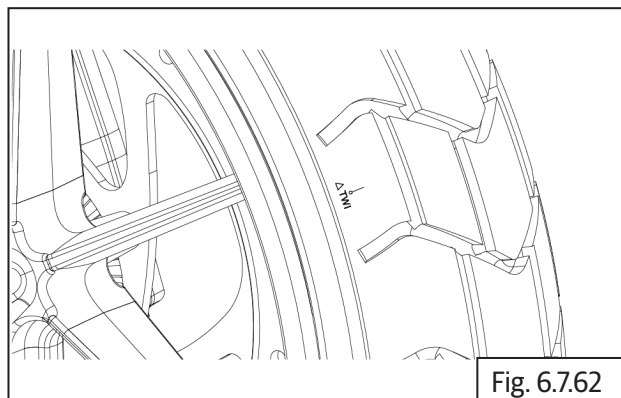


Fig. 6.7.62



Tyre depth gauge

Assembly

6.7.7. Front And Rear Tyre Assembly On Wheel Rim

- Ensure the tyre is assembled on the wheel rim with the arrow on the tyre side wall is facing towards the front.
- Inflate tyre to the recommended pressure and ensure the tyre is evenly seated in the rim on both LH and RH sides.

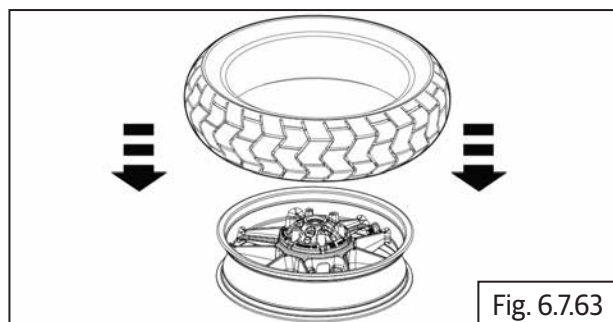


Fig. 6.7.63

6.7.8. Rear Brake Disc

- Locate bearing LH **(a)** into rear wheel hub LH. Gently tap on the bearing and ensure it is seated properly on the hub.

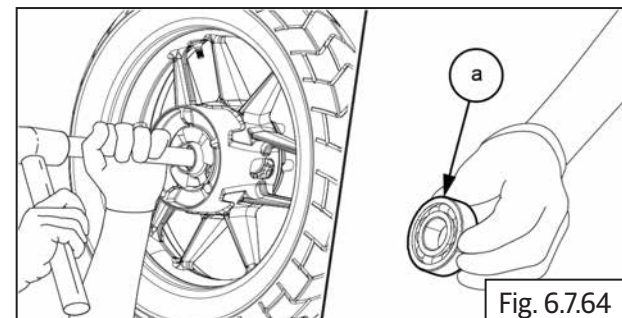


Fig. 6.7.64



Punch and Mallet

- Assemble spacer **(a)** into rear wheel hub RH. Ensure it is properly seated on the bearing surface.

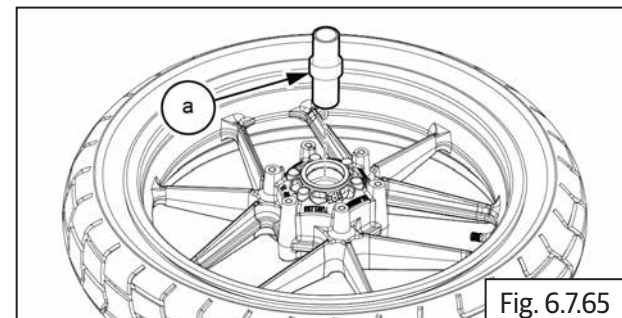
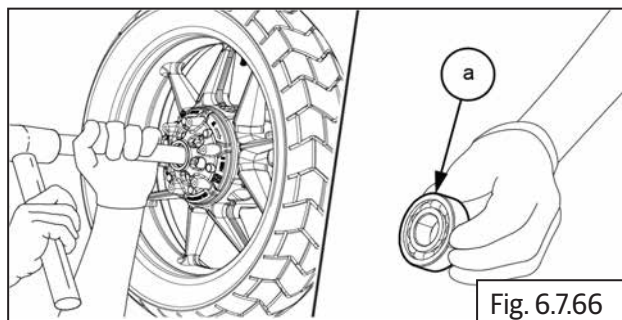


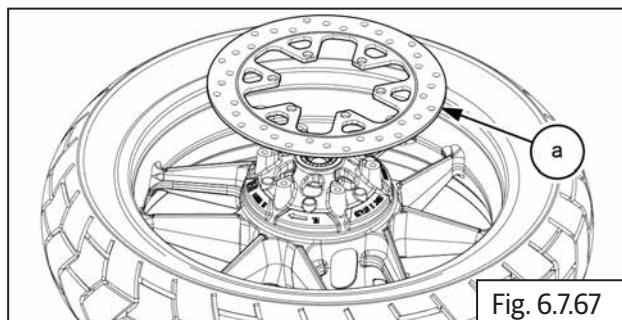
Fig. 6.7.65

- Locate bearing RH **(a)** into rear wheel hub RH. Gently tap on the bearing and ensure it is seated properly on the hub.

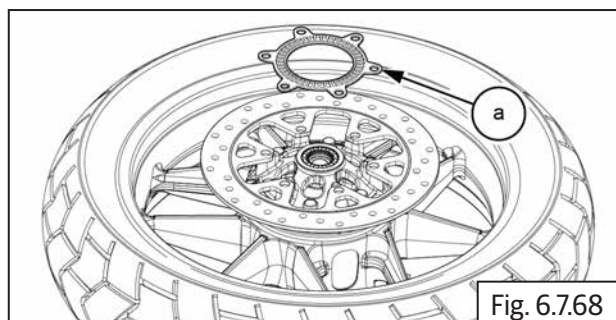


Punch and Mallet

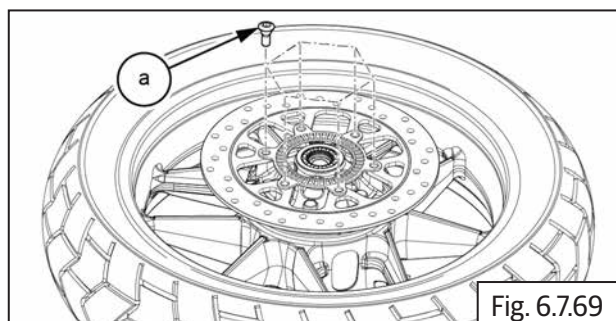
- Assemble rear brake disc **(a)** into rear wheel hub RH.



- Assemble ABS toner wheel **(a)** into rear brake disc on rear wheel hub RH.



- Apply recommended sealant on the **6 Nos** button head bolts **(M8) (a)** and allow it to dry for a few minutes.
- Locate the bolts on the mounting holes and tighten toner ring and brake disc to the wheel hub in crisscross pattern to specified torque.



6 mm Allen socket with Ratchet

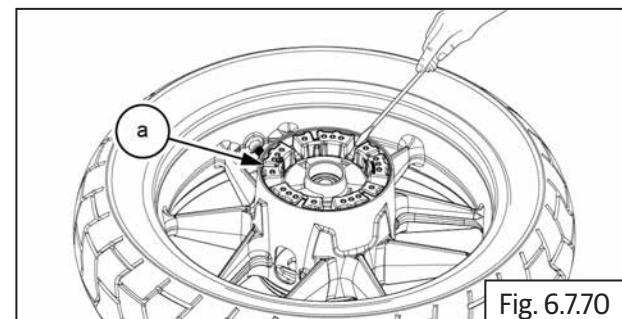
Torque

25 N-m/2.5 kgf-m



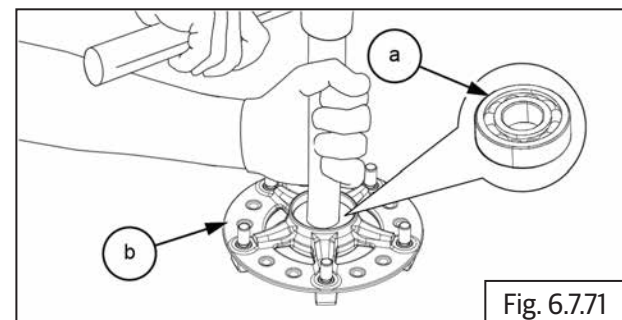
Loctite 243

- Clean cush rubber seating area and insert cush rubber **(a)** into rear wheel hub LH and gently tap with mallet.

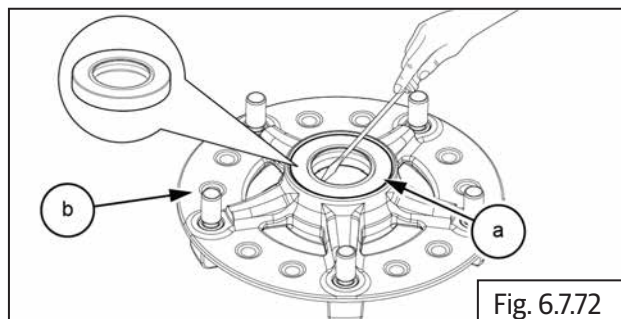


Mallet

- Locate bearing **(a)** into sprocket carrier **(b)**. Ensure it is properly seated on the slot.



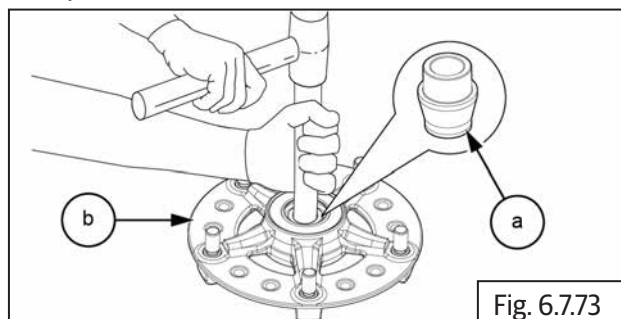
- Apply grease as required on seal to inner and outer diameter surface.
- Assemble grease seal **(a)** into sprocket carrier **(b)**.



	NLGI 2 / Mobil XHP 222
---	------------------------

	Seal installer
---	----------------

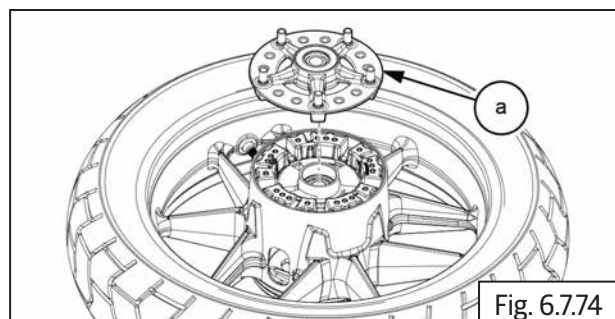
- Apply grease as required on cush spacer outer surface.
- Locate and gently tap the cush spacer **(a)** into sprocket carrier **(b)**.



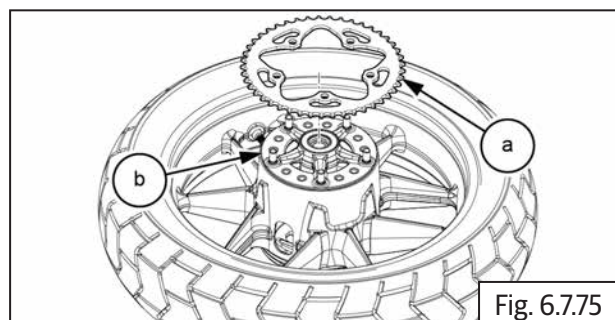
	NLGI 2 / Mobil XHP 222
---	------------------------

	Mallet
---	--------

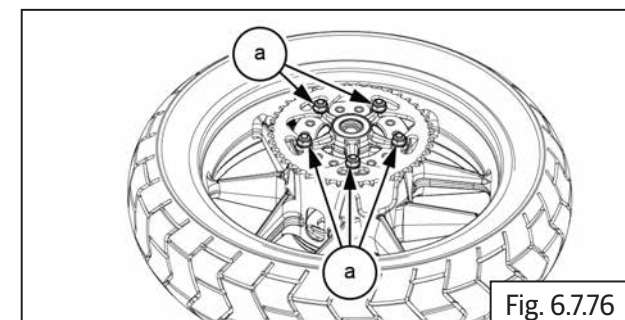
- Assemble rear sprocket carrier **(a)** over cushion rubbers into rear wheel hub LH.



- Locate chain drive sprocket **(a)** into sprocket carrier **(b)** on rear wheel hub LH.



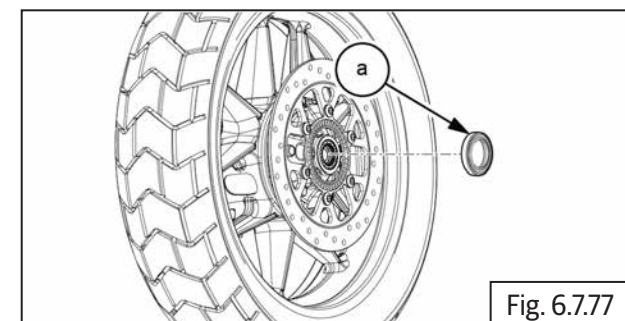
- Locate and tighten **5 Nos (M10) (a)** Hex flanged nut into carrier on rear wheel hub LH.



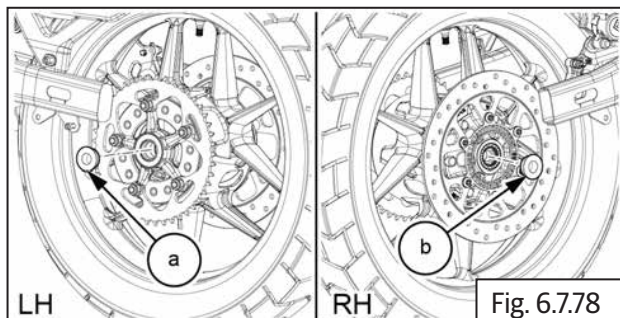
	17 mm Socket with Ratchet
Torque	45 N-m / 4.5kgf-m

6.7.9. Rear Wheel into Swing Arm

- Place the flanged side of the spacers **(a)** towards the both side of the grease seal.



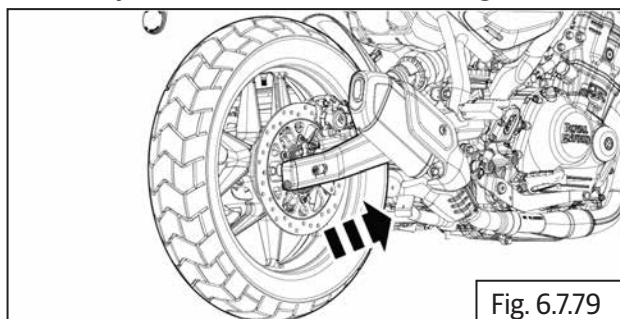
- Apply grease as required on both spacer outer surface.
- Insert spacers into rear wheel hub RHS **(b)** and LHS **(a)**.



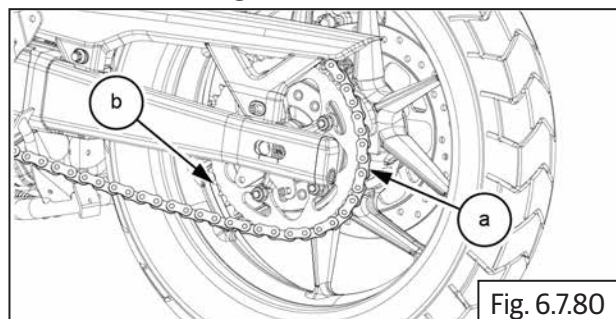
NOTE

- Take out the limiter pad from the brake caliper before install the wheel.

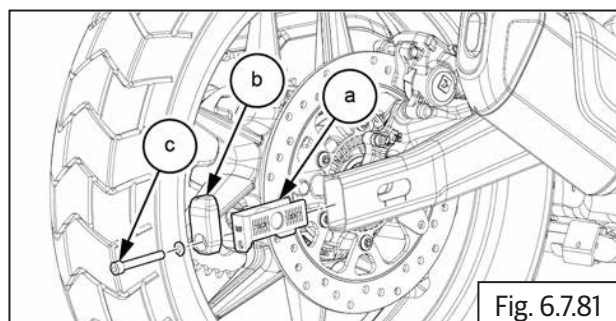
- Gently locate rear wheel **(a)** into swing arm .



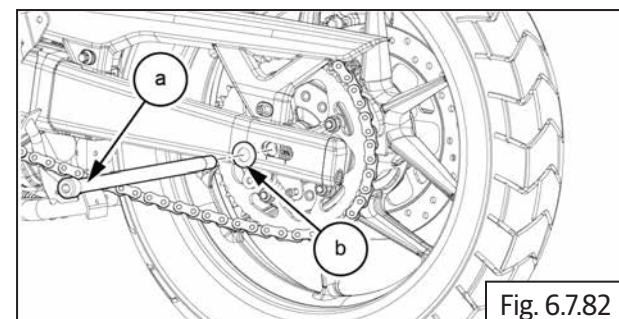
- Locate drive chain **(a)** onto sprocket **(b)** and align wheel into swing arm.



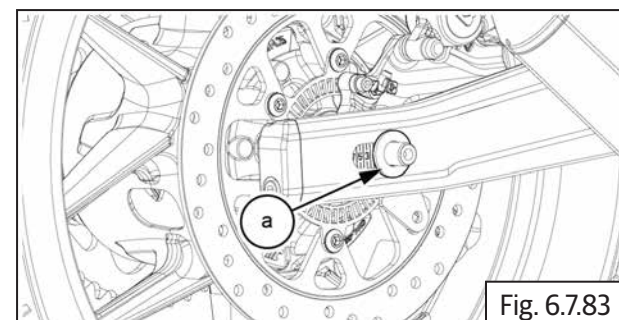
- Remove limiter pad and slide brake caliper on to brake disc.
- Assemble chain adjuster assembly **(a)** cap **(b)** with bolt **(c)** into swing arm RHS and LHS.



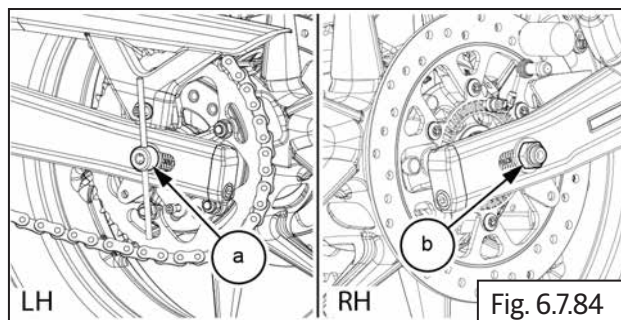
- Apply grease as required on spindle outer surface.
- Insert spindle **(a)** with tommy bar into rear wheel hub LH along with washer **(b)**.



- Install washer **(a)** into spindle RH.

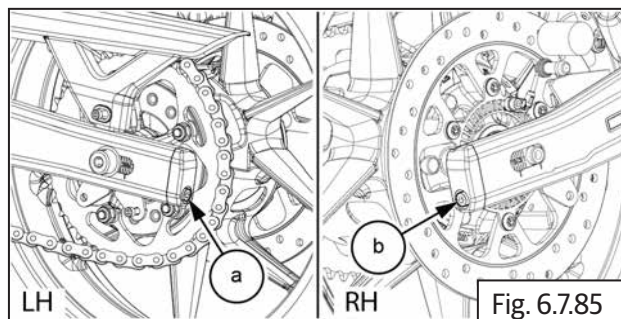


- Hold spindle LH with tommy bar **(a)** and tighten the nut **(M16) (b)**.
- Before tighten the spindle refer drive chain free play adjustment.



	24 mm Ring spanner and Tommy bar
Torque	60-80 N-m / 6.0-8.0 kgf-m

- Tighten the adjuster bolt **(M8) (a)** and **(b)** to both LHS and RHS .

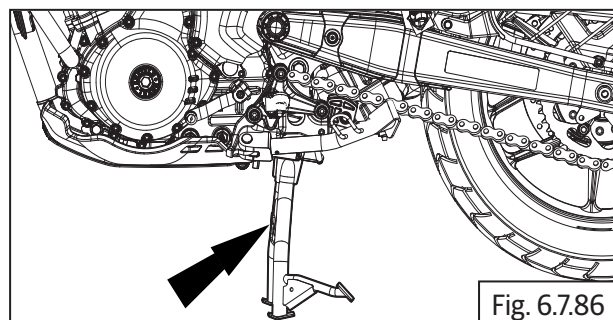


	6 mm Allen Key
Torque	10 N-m / 1.0 kgf-m

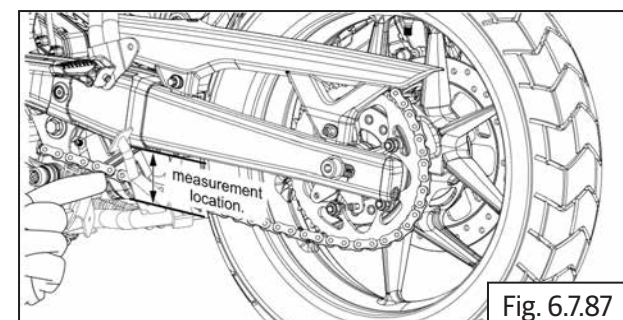
- After completing rear wheel assembly into motorcycle, ensure chain slack is as per specifications.

6.7.10. Drive Chain Free Play Adjustment

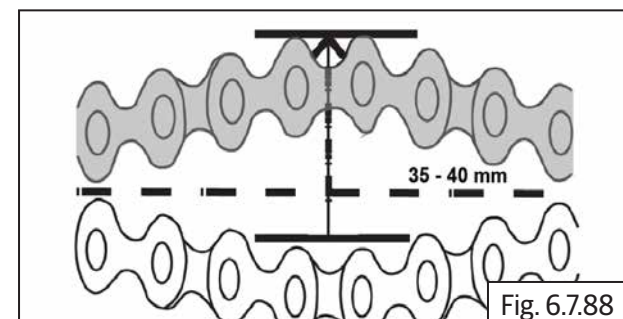
- Vehicle will be placed on the center stand and in neutral gear, ensuring the rear wheel is clear of the ground.



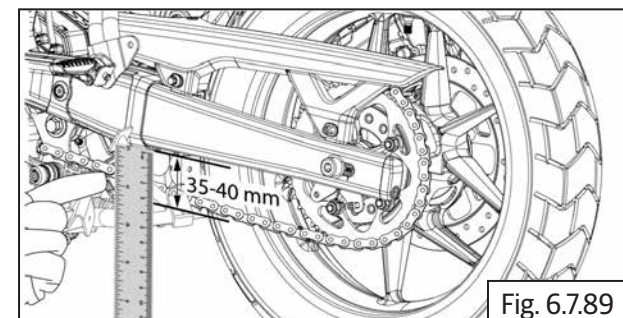
- Rotate the wheel until find a position, where the chain slackness is at its lowest / tightest.
- Push the chain upward and downward at the measurement location.



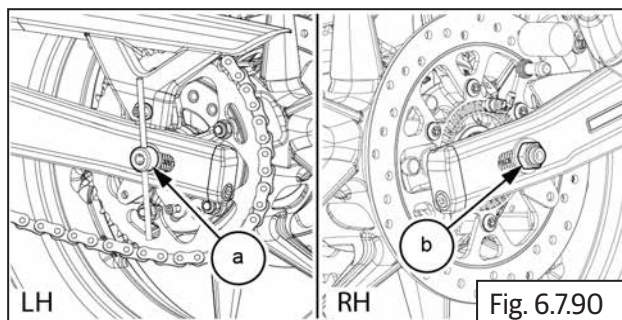
- Measure how far the chain moves from the swingarm.



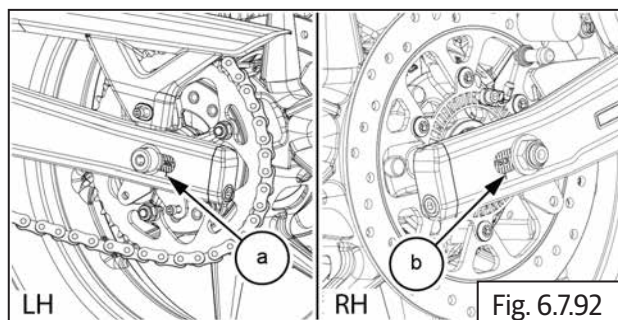
- Inspect chain free play at locations using a ruler. Free play for drive chain should be 35 mm to 40 mm.



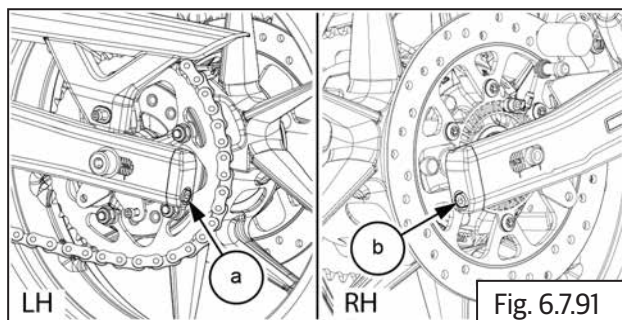
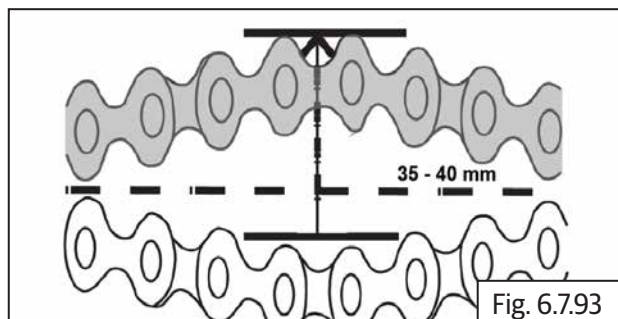
- If the free play of the drive chain is not between 35 mm to 40 mm then hold spindle **(a)** on LH using a tommy bar and loosen **(M16) (b)** nut on RH.



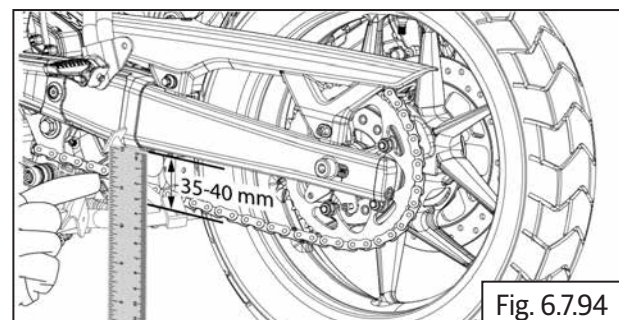
- Ensure the lines are matched with the lines punched in swing arm on both LH **(a)** & RH **(b)** side for proper wheel alignment.



- Now measure the drive chain free play using ruler and it should be 35 mm to 40 mm.



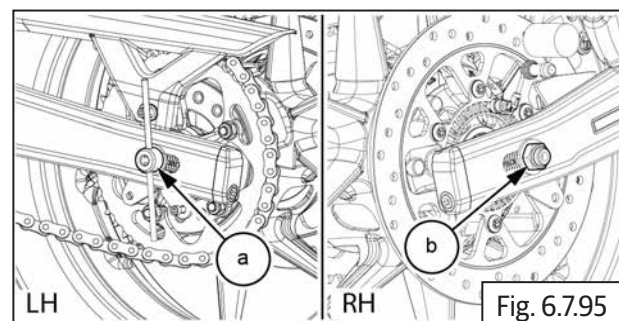
6 mm Allen Key



! CAUTION

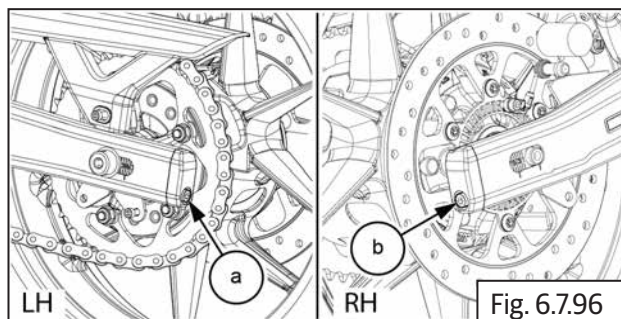
Chain slackness beyond 40 mm will lead to chain slippage or breakage.

- Once chain free play is verified, hold spindle LH with tommy bar **(a)** and tighten the nut **(M16) (b)**.



	24 mm Ring spanner and Tommy bar
Torque	60-80 N-m / 6.0-8.0 kgf-m

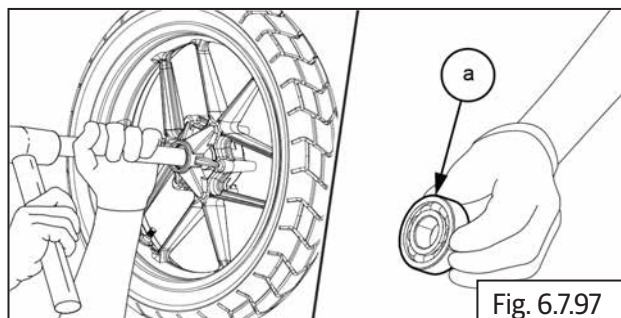
- Tighten the adjuster bolt **(M8) (a)** and **(b)** to both LHS and RHS.



	6 mm Allen Key
Torque	10 N-m / 1.0 kgf-m

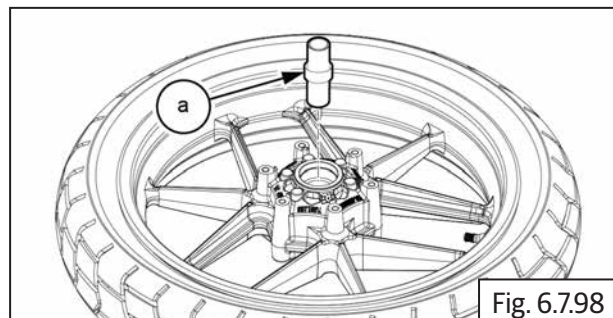
6.7.11. Front Brake Disc

- Insert bearing **(a)** into front wheel hub RH.

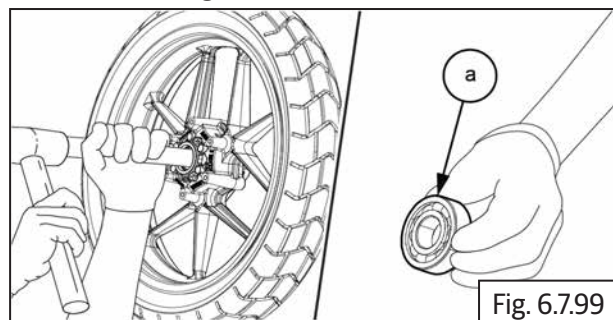


	Punch and Mallet
--	------------------

- Insert bearing spacer **(a)** from LH side of front hub **(b)**.

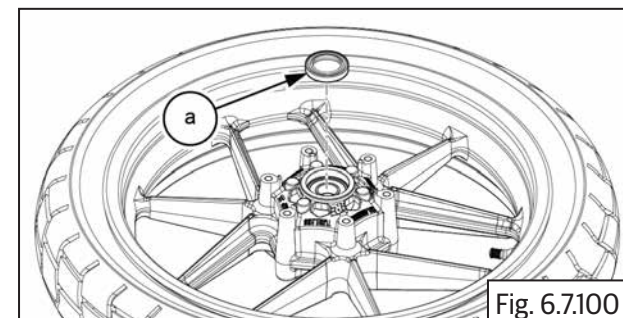


- Insert bearing into wheel hub LH **(a)**.



	Punch and Mallet
--	------------------

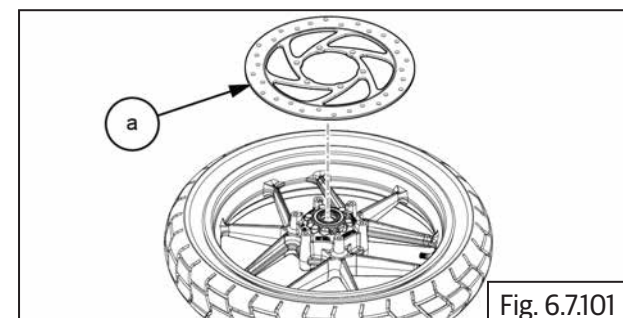
- Apply grease as required on seal to inner and outer diameter surface.
- Install grease seal **(a)** into wheel hub LH and RH with seal installer.



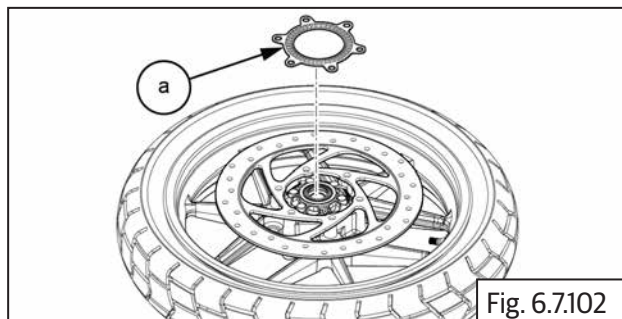
	NLGI 2 / Mobil XHP 222
--	------------------------

	Seal installer
--	----------------

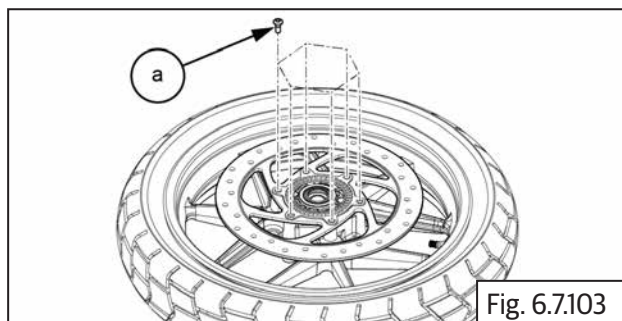
- Locate front brake disc **(a)** on wheel hub with the disc facing up. Ensure mounting holes are correctly aligned.



- Position toner wheel **(a)** on front disc and ensure mounting holes are correctly aligned.



- Apply recommended sealant on the **6 Nos** button head bolts **(M8) (a)** and allow it to dry for a few minutes.
- Locate the bolts on the mounting holes and tighten toner ring and brake disc to the wheel hub in crisscross pattern to specified torque.



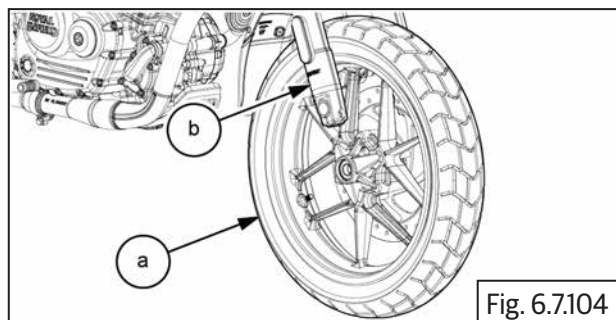
	6 mm Allen socket with Ratchet
Torque	25 N-m/2.5 kgf-m

	Loctite 243
--	-------------

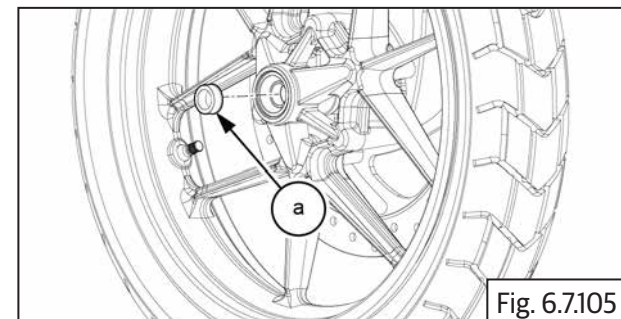
6.7.12. Front Wheel into Front Fork Assembly

NOTE

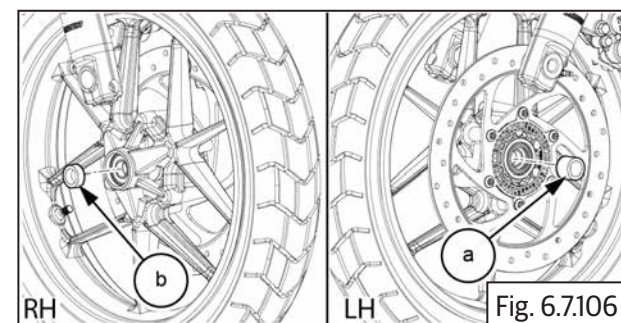
- Take out the limiter pad from the brake caliper before install the wheel.*
- Carefully align front wheel **(a)** into front fork assembly **(b)**.



- Place the flanged side of the spacers **(a)** towards the both side of the grease seal.

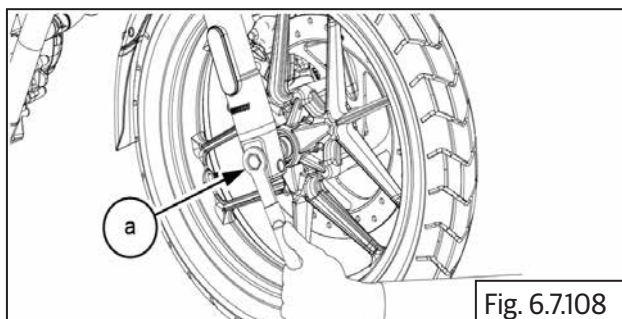
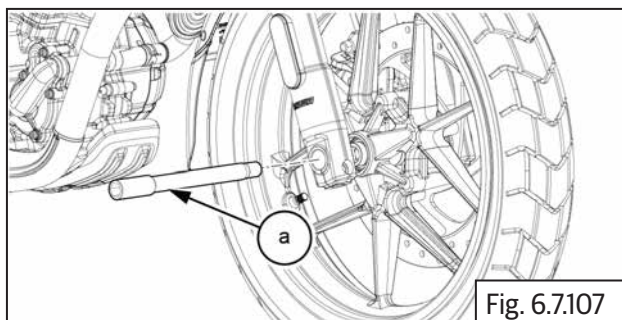


- Apply grease as required on both side spacer outer surface.
- Insert spacer **(a)** and **(b)** into wheel hub on LH and RH.



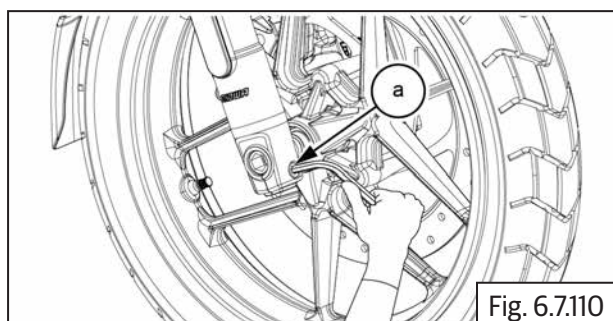
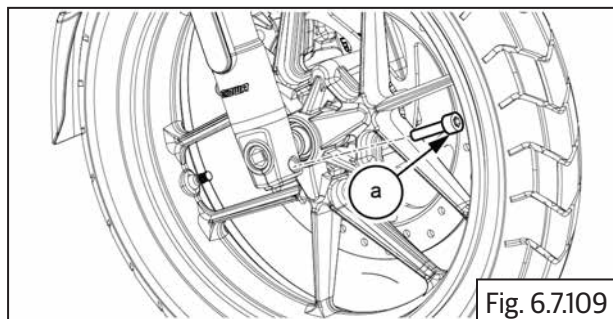
	NLGI 2 / Mobil XHP 222
--	------------------------

- Insert spindle **(a)** into front RH fork assembly and wheel hub.
- Gently tighten spindle **(a)** into front RH fork assembly and wheel hub.



	17 mm Front Spindle Adapter
Torque	60-80 N-m / 6.0-8.0 kgf-m

- Tighten cap bolts **1 Nos (M6) (a)** into front fork assembly RH.



	8 mm Allen key
Torque	45N-m / 4.5 kgf-m

Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
1. Tyres Related				
Centre Threads Wear-Out Is High/ Poor Traction/ Unstable Riding.	Tyre pressure is more than recommended.	Front and rear tyre pressure is over inflated.	Ensure correct tyre pressures.	Solo - Front tyre: 32 psi/2.24 kg/cm2. Rear tyre: 36 psi/2.53 kg/cm2 With Pillion - Front tyre: 32 psi/2.24 kg/cm2. Rear tyre: 40 psi/2.81 kg/cm2
Side Threads Wear- Out Is High/ Side Wall Has Cracks/ Motorcycle Has Dragging/Unstable Riding.	Tyre pressures is less than recommended.	Front and rear tyre pressure is over inflated.	Check inner tubes for any puncture/ leaky valve pins ensure correct tyre pressures.	Solo - Front tyre: 32 psi/2.24 kg/cm2. Rear tyre: 36 psi/2.53 kg/cm2 With Pillion - Front tyre: 32 psi/2.24 kg/cm2. Rear tyre: 40 psi/2.81 kg/cm2
Rear Tyre Wear-Out On One Side.	Improper wheel alignment.	Rear wheel misaligned with respect to front wheel.	Check and correct wheel alignment.	
Tyre/S Wearing Out Is Uneven/ Motorcycle Is Unstable/Wobbling.	Internal defect/poor quality tyre.	Tyres found to have bulges/ cracks in side wall. Threads are separated from the tyre.	Replace with Royal Enfield recommended tyres.	Front tyre (Alloy wheel) : 120/70R17 58H (Tubeless tyre) Rear tyre (Alloy wheel): 160/60R17 69H (Tubeless tyre)
	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reset correctly.	
	Wheel rims have a defect.	Wheel rims are bent/ have excessive run out.	Remove tyre and carry out proper wheel truing.	
	Rims have excessive side play.	Wheel bearings worn-out/ excessive play.	Remove and replace wheel bearings.	

2. Wheel Rims Related				
Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Motorcycle Is Unstable/Wobbling.	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reset correctly.	
	Wheel rims are out of trueness.	Wheel rims are bent/ have excessive run out.	Remove tyre and true the wheel rim correctly.	
	Wheel rims have a crack/ heavy damage.	Wheel rims are cracked/ damaged due to impact.	Replace with royal enfield genuine wheel rims.	
3. Others				
	Wheels have excessive axial/side play.	Wheel bearings are worn-out.	Remove bearing and replace.	
	Hubs Front/rear are cracked/damaged.	Wheel Hubs are damaged due to impact.	Replace with Royal Enfield genuine hubs.	

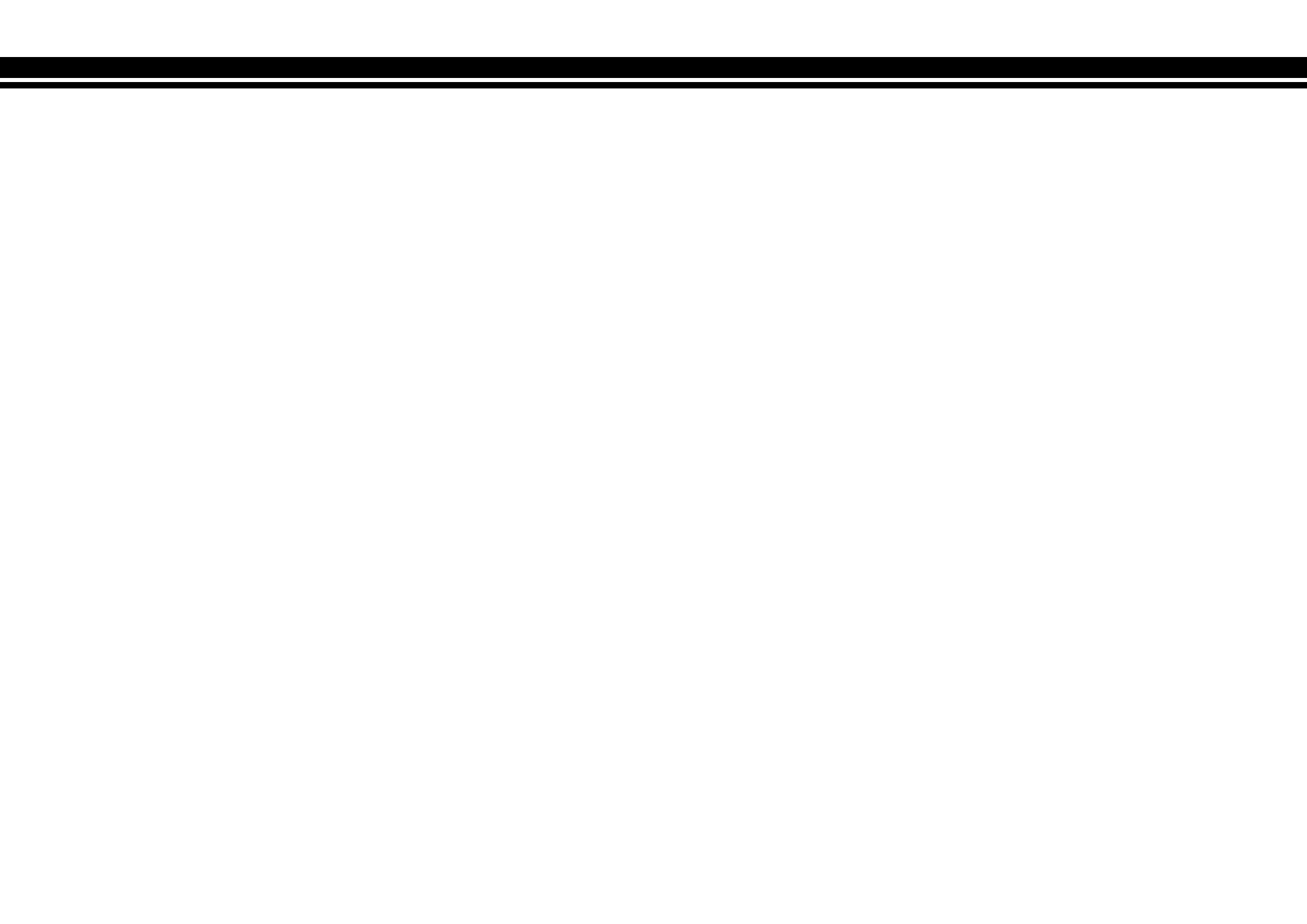
NOTE

- The trouble shooting given in this section is only related to the issues with wheels. For complaints related to other issues such as poor suspension action/handling/unstable ride please refer to suspension .

6.8. Suspension

CONTENTS

	PAGE	
6.8.Suspension.....	353	6.8.4.11. Chain Rubbing strip.....369
Dismantling.....	353	6.8.4.12. Swing Arm Assembly..... 370
6.8.1. Steering Stem Assembly from Frame Head Tube.....	353	6.8.4.13. Hugger assembly..... 373
6.8.2 Ball outer racer from top and bottom Head Tube.....	357	6.8.4.14. Chain Guard Upper..... 373
6.8.3. Bottom Roller Bearing from Steering Stem.....	357	Suspension Assembly.....
6.8.4. Swing arm.....	359	375
Dismantling.....	359	6.8.5. Bottom Roller Bearing into Steering Stem..... 375
6.8.4.1 Chain Guard Removal.....	359	6.8.6. Ball Bearing into Frame top an bottom Head Tube..... 375
6.8.4.2. Hugger assembly Removal.....	360	6.8.7. Steering Stem Assembly into Frame Head Tube..... 376
6.8.4.3. Swing Arm Assembly Removal.....	360	
6.8.4.4. Chain Rubbing strip Removal.....	362	
6.8.4.5. Rocker Removal.....	363	
6.8.4.6. Shock Absorber Removal.....	364	
6.8.4.7. Link Rod Removal.....	365	
Assembly.....	366	
6.8.4.8. Link Rod.....	366	
6.8.4.9. Shock Absorber.....	367	
6.8.4.10. Rocker.....	368	



6.8.Suspension

Dismantling

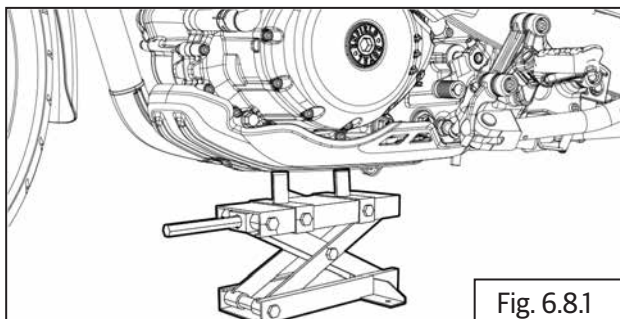
6.8.1. Steering Stem Assembly from Frame Head Tube

⚠ CAUTION

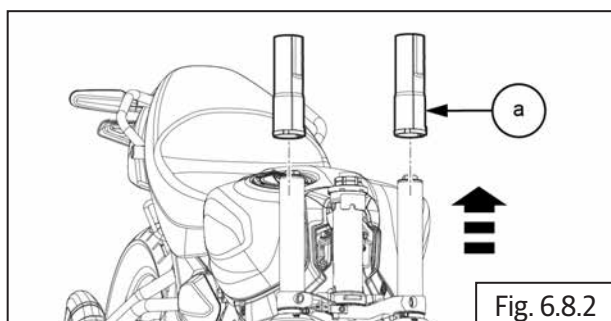
Ensure the motorcycle is upright on a firm and flat surface.

Ensure ignition and stop switch are in off position.

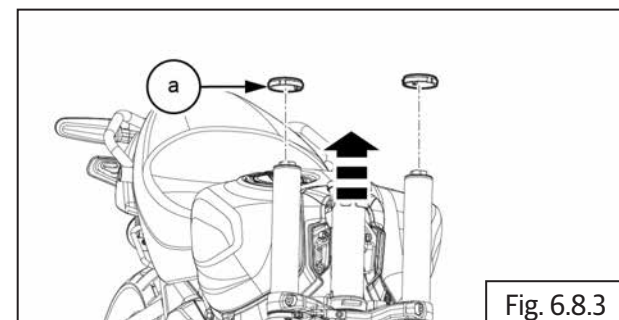
- Locate a scissor jack under the engine and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm)



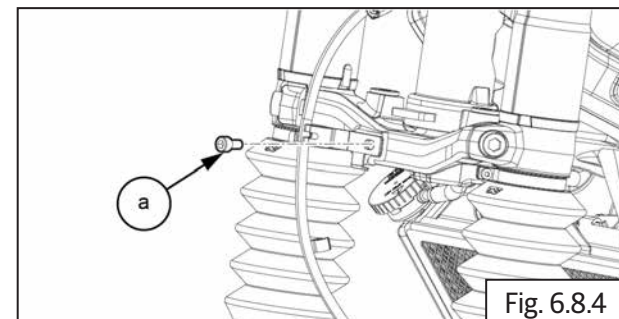
- Ensure ignition and stop switch are in off position
- Remove the following parts:
 - Front wheel . Refer wheel chapter.
 - Release brake hose and wheel speed sensor wires from the clips. Refer wheel chapter.
 - Wheel caliper from fork end LH. Support caliper suitably Refer wheel chapter .
 - Wheel speed sensor from the fork end LH. Support wheel speed sensor suitably. Refer wheel chapter.
 - Front Frame Refer Front Frame chapter.
 - Front mudguard Refer mudguard chapter.
- Aggregates of Handlebar:
 - Handlebar Refer handlebar chapter.
 - Upper Yoke. Refer handlebar chapter
- Loosen and remove the shroud fork (a) from fork assembly.



- Loosen and remove cushion shroud (a) from fork assembly.

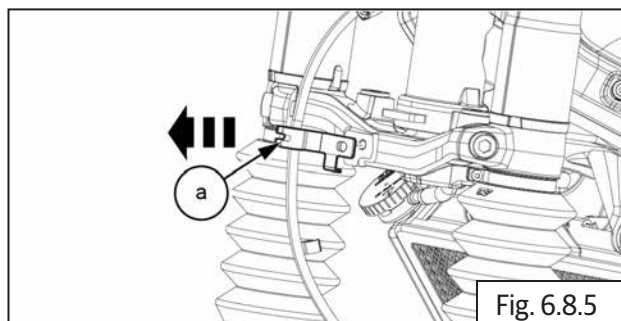


- Loosen and remove cap screw (M6) (a) from cable strap.

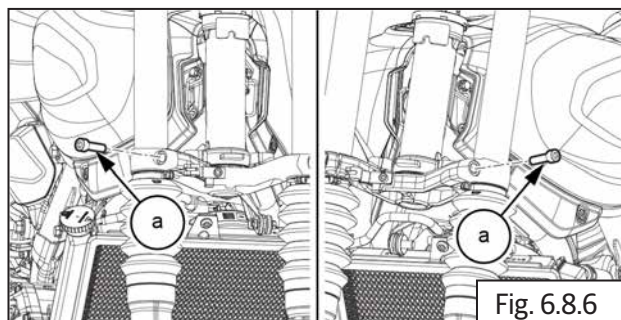


5 mm Allen socket with Ratchet

- Remove cable strap **(a)** from lower yoke.

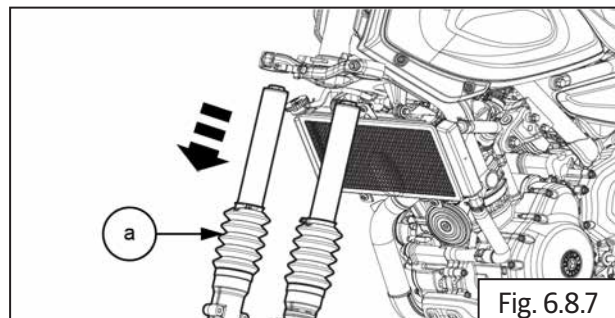


- Loosen and remove **2 Nos** cap bolts **(M10)** **(a)** from lower yoke.

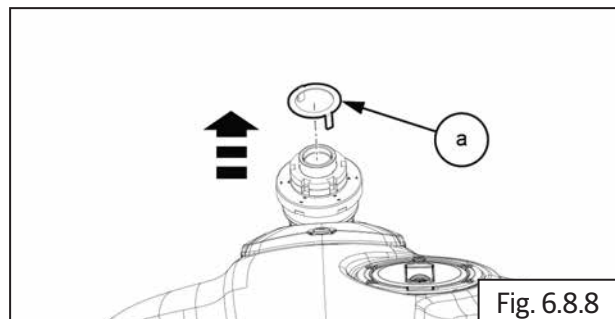


8 mm Allen socket with Ratchet

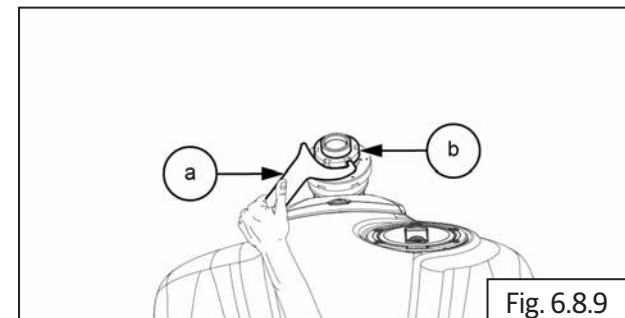
- Remove both fork assembly **(a)** from steering stem.



- Loosen and remove tabbed washer **(a)** from steering stem.



- Using special tool **(a)** loosen and remove 1st lock nut **(M30)** **(b)** from steering stem.

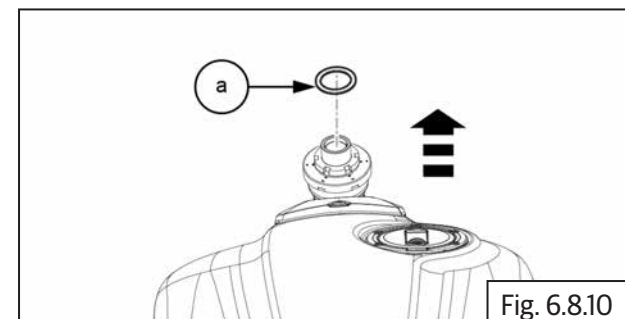


Part No: ST 30969-a

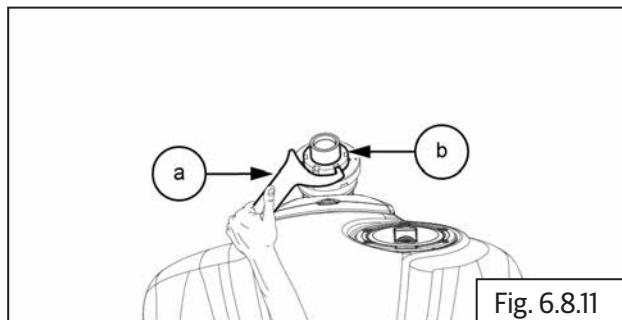


Part Name: Steering stem nut adjuster

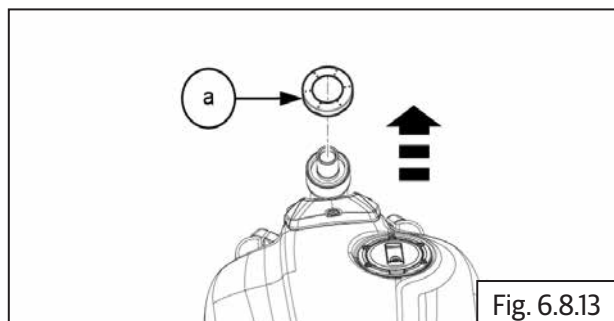
- Remove rubber spacer **(a)** from steering stem.



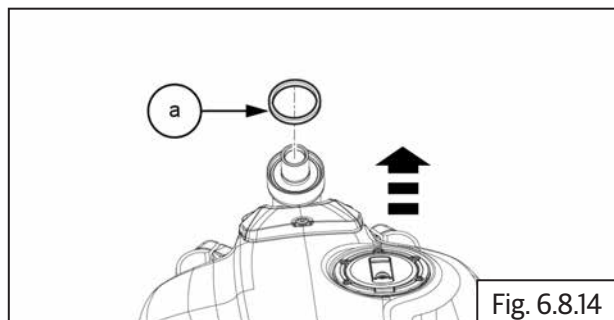
- Using special tool **(a)** loosen and remove 2nd lock nut **(M30) (b)** from steering stem.



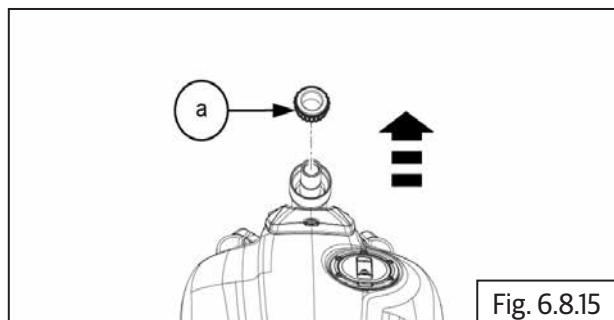
- Remove seal **(a)** from steering stem.



- Remove internal headstock spacer **(a)** from steering stem.



- Gently pull out bearing **(a)** from steering stem.



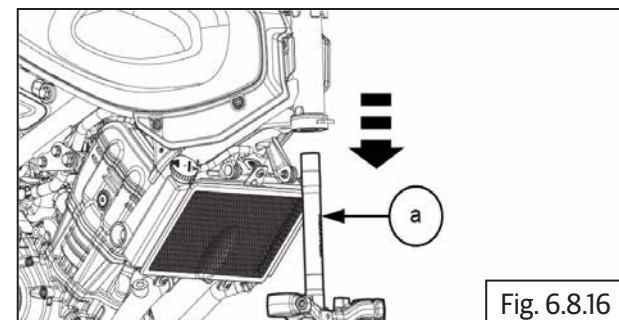
- Gently pull out steering stem **(a)** from frame head tube bottom.

⚠ CAUTION

Support steering stem from bottom. DO NOT allow the steering stem to drop out of frame head tube.

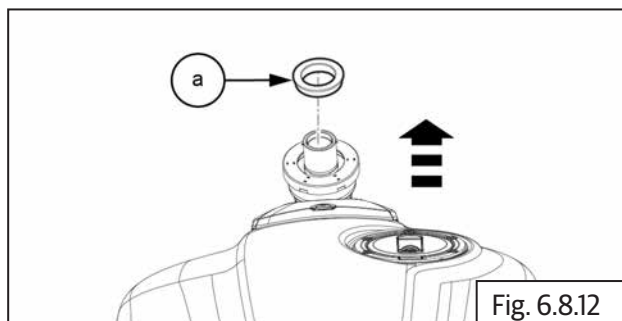
⚠ CAUTION

DO NOT tap or use force to remove steering stem from frame head tube.



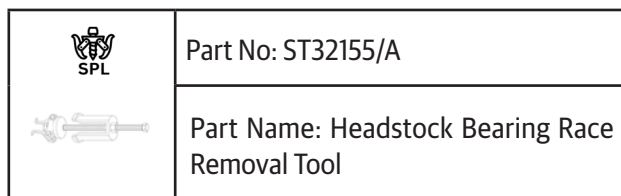
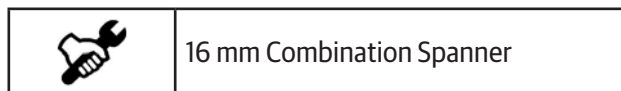
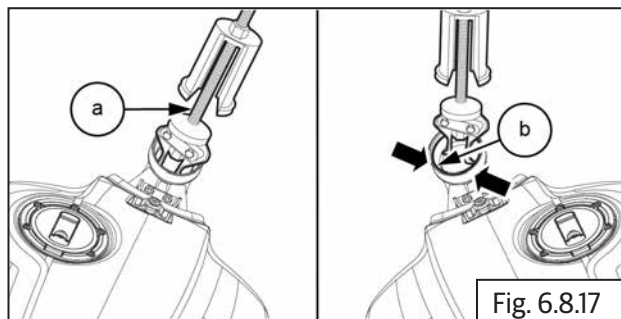
	Part No: ST 30969-a
	Part Name: Steering stem nut adjuster

- Remove headstock spacer **(a)** from steering stem.

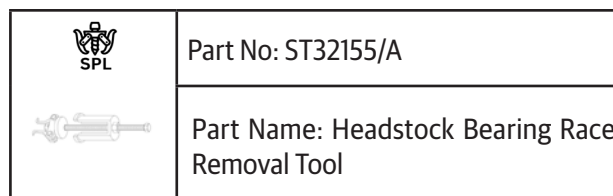
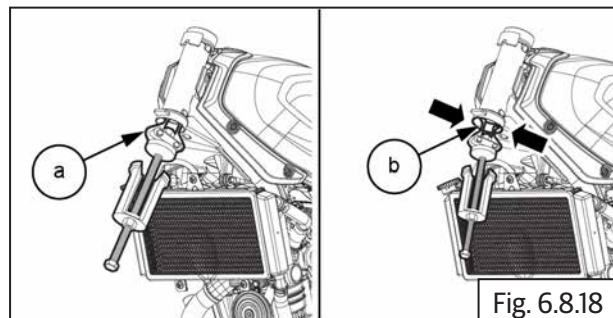


6.8.2 Ball Outer Racer From Top And Bottom Head Tube

- Use special tool **(a)** and remove upper racer **(b)** from head tube top.

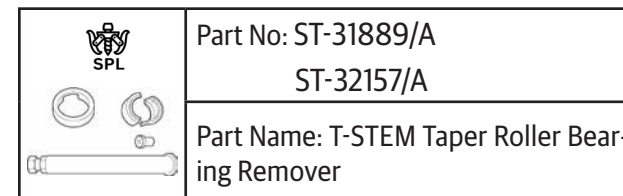
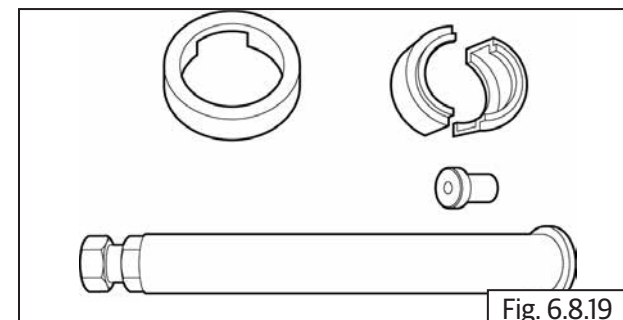


- Use special tool **(a)** and remove bottom racer **(b)** from head tube top.

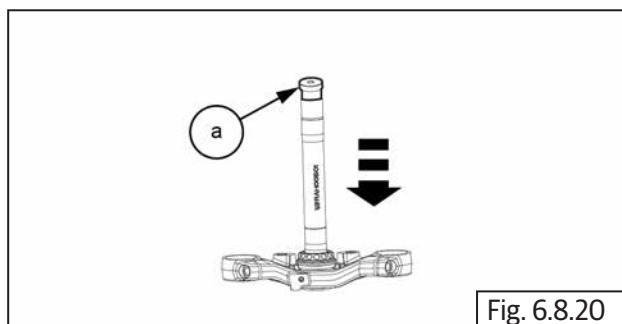


6.8.3. Bottom Roller Bearing from Steering Stem

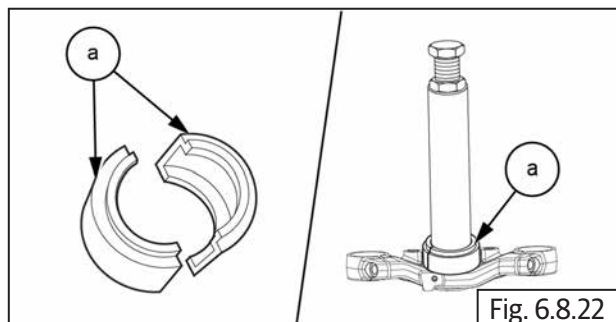
- Use bearing puller T-stem to remove the bearing from T-stem.



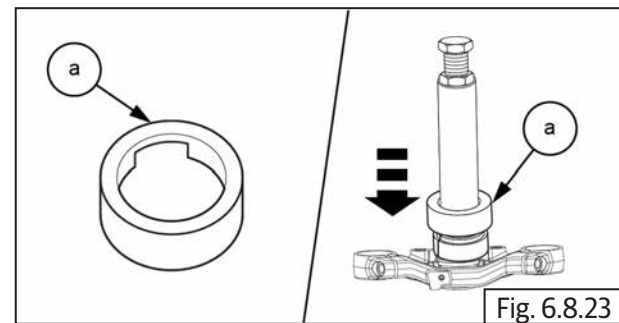
- Locate and place the bunk **(a)** on stem top.



- Locate and place two half plate **(a)** on the bottom sleeve.



- Locate and position the sleeve **(a)** into steering stem.

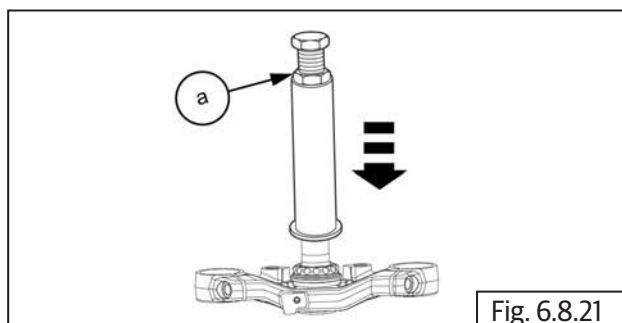


	Part No: ST-31889/A ST-32157/A
	Part Name: T-STEM Taper Roller Bearing Remover

	Part No: ST-31889/A ST-32157/A
	Part Name: T-STEM Taper Roller Bearing Remover

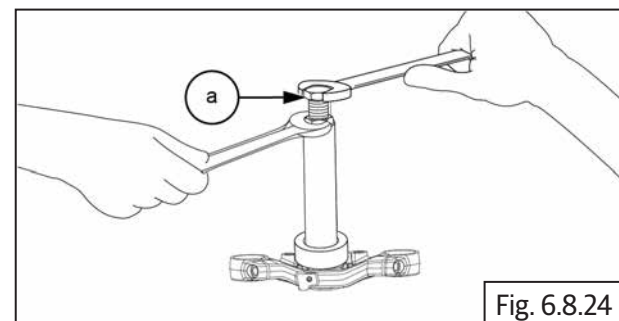
	Part No: ST-31889-a
	Part Name: T-STEM Taper Roller Bearing Remover

- Locate and place the sleeve **(a)** into steering stem.



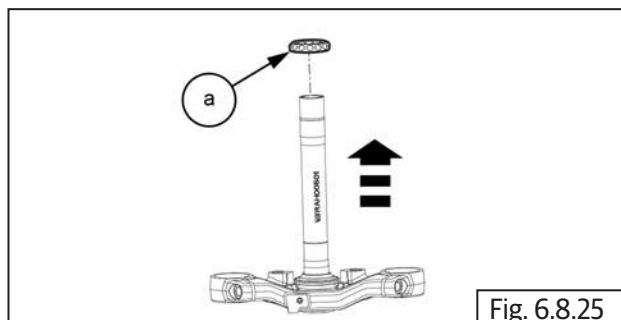
	Part No: ST-31889/A ST-32157/A
	Part Name: T-STEM Taper Roller Bearing Remover

- Tighten hex nut **(a)** in clockwise direction till bearing tool assembly comes out of frame head tube and hex nut rotates free.



	24 mm and 27 mm Combination Spanner
--	-------------------------------------

- Remove the bearing **(a)** from the bottom of the stem.



6.8.4. Swing arm

Dismantling

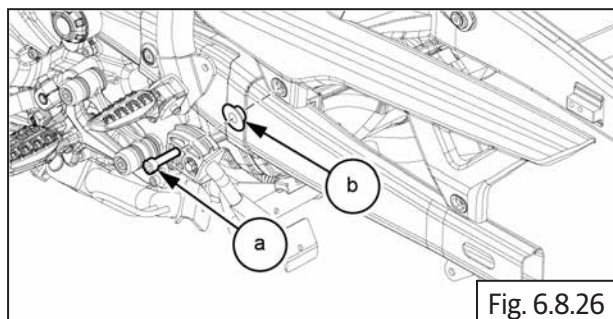
- Remove the following parts:
 - Rear wheel [Refer Wheel chapter.](#)

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface. Support the motorcycle firmly while removing the Swing arm.

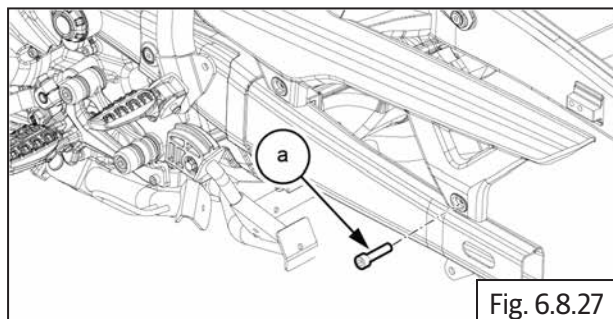
6.8.4.1 Chain Guard Removal:

- Loosen and remove the **(M6)** button head bolt **(a)** along with washer **(b)** from chain guard upper.



10 mm Socket with Ratchet

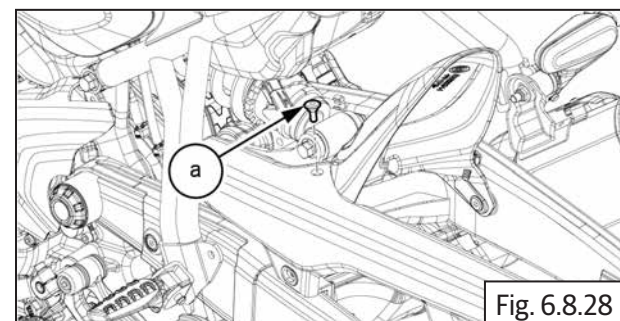
- Loosen and remove the cap bolt **(M6)** **(a)** from chain guard upper.



5 mm Allen socket with Ratchet

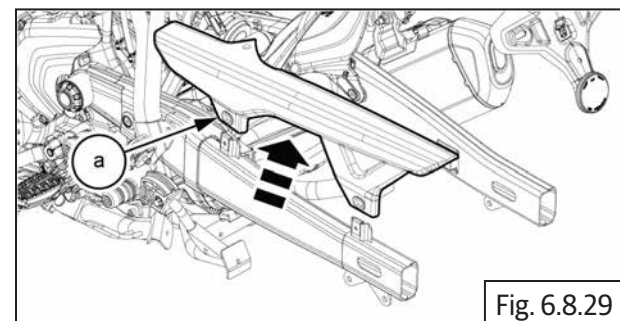
- Loosen and remove button head bolt **(M6)** **(a)**

from chain guard top.



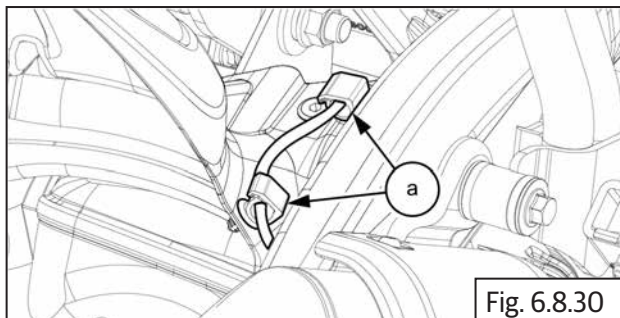
5 mm Allen socket with Ratchet

- Gently remove the chain guard upper **(a)** from swing arm assembly.

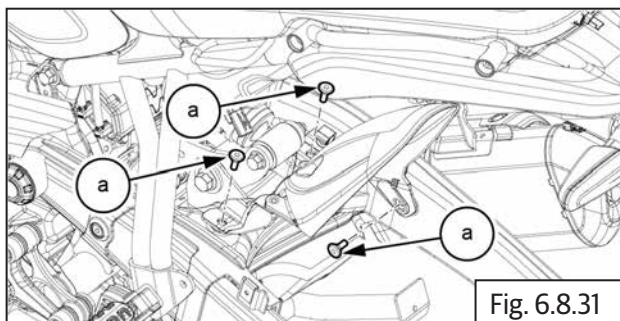


6.8.4.2. Hugger assembly Removal:

- Remove the corrugated conduit clips **2Nos (a)** from hugger assembly.

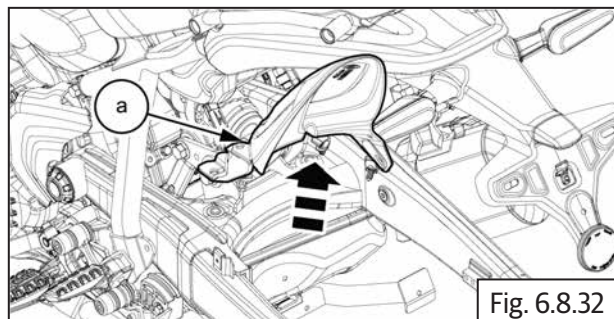


- Loosen and remove the **3Nos** button head bolts (**M6**) (**a**) from hugger assembly.



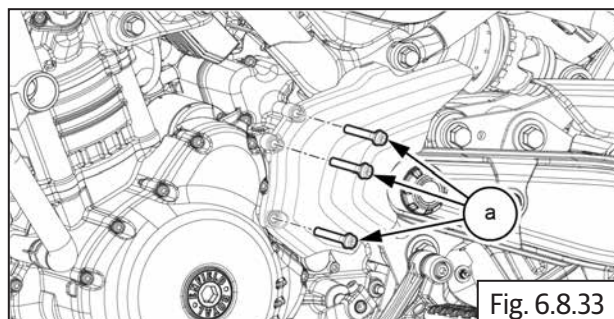
5 mm Allen socket with Ratchet

- Remove the hugger assembly (**a**) from swing arm.



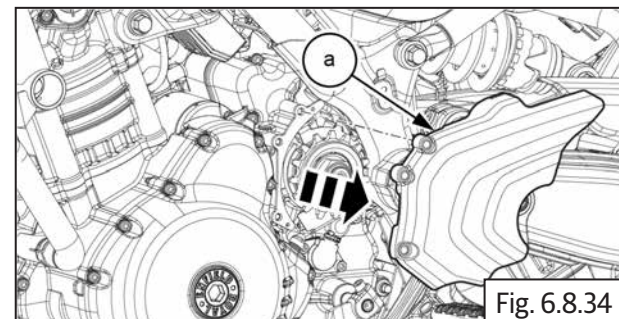
6.8.4.3. Swing Arm Assembly Removal:

- Loosen and remove **3Nos** Hex socket head bolts (**a**) from chain sprocket cover.

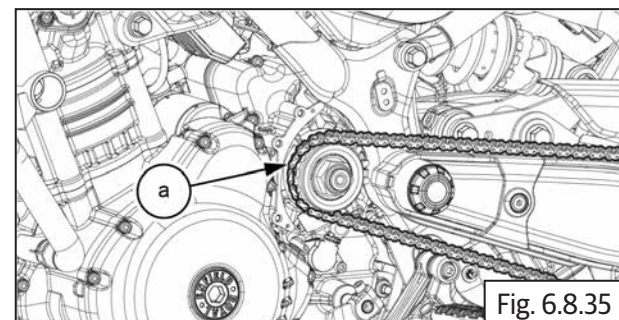


5 mm Allen socket with Ratchet

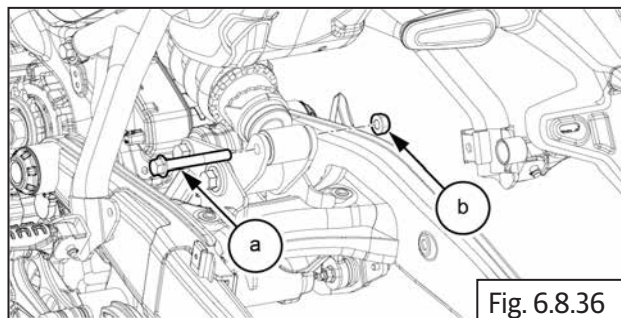
- Remove the chain sprocket cover (**a**) from engine.



- Remove the drive chain (**a**) from the sprocket.

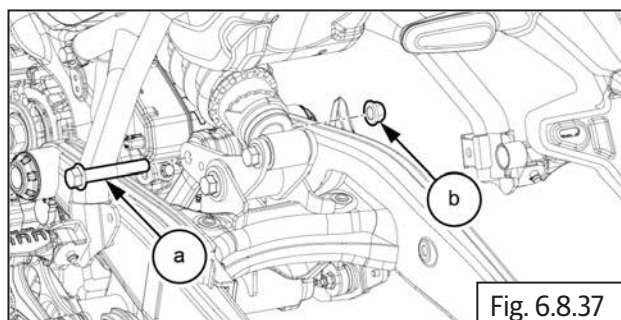


- Loosen and remove the Hex head bolt **(M10) (a)** with flange nut **(b)** from drag arm.



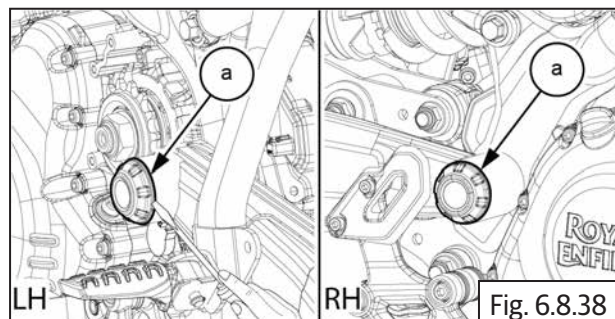
	14 mm Socket with Ratchet 17 mm Combination Spanner
--	--

- Loosen and remove the Hex head bolt **(M10) (a)** with flange nut **(b)** from link rod.



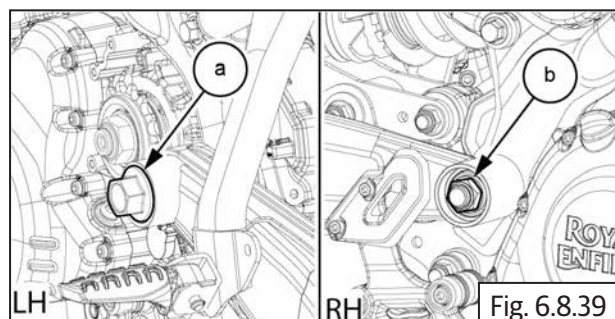
	14 mm Socket with Ratchet 17 mm Combination Spanner
--	--

- Remove pivot cap **(a)** from LHS & RHS swing arm spindle.



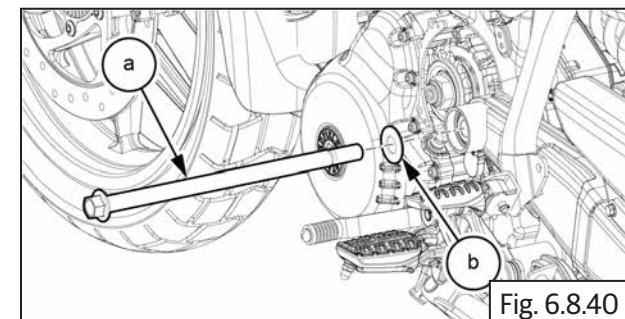
	Flat Screw driver
--	-------------------

- Hold spindle bolt **(M16) (a)** in frame RH side and loosen and remove hex nut **(M16) (b)** from LH side.

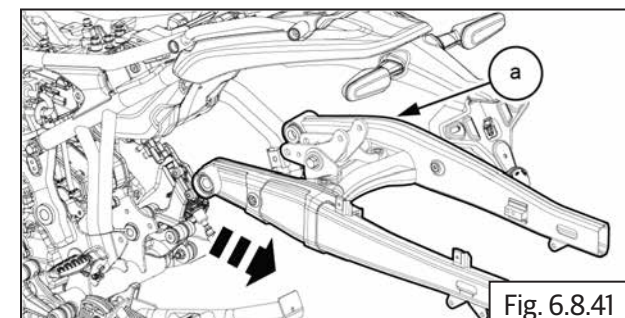


	21 mm Socket with Ratchet 24 mm Socket with Ratchet
--	--

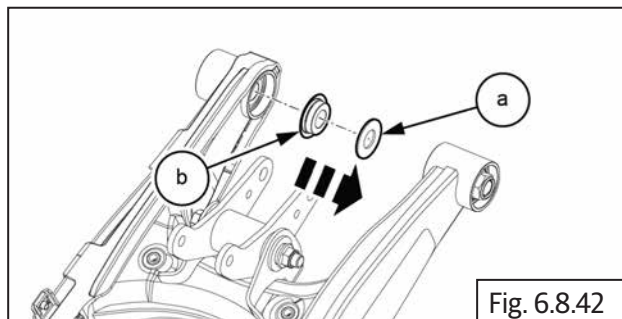
- Remove the spindle **(a)** along with thrust washer **(b)** from LH side.



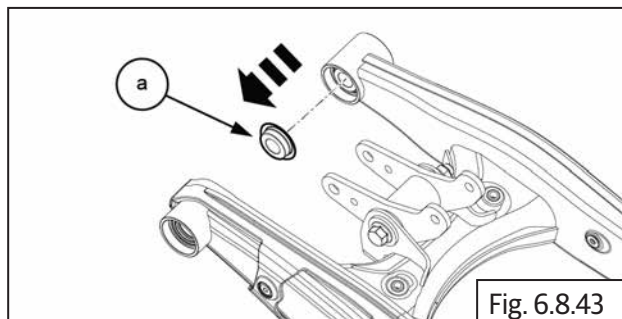
- Provide suitable support below chassis frame and remove swing arm **(a)** from chassis frame.



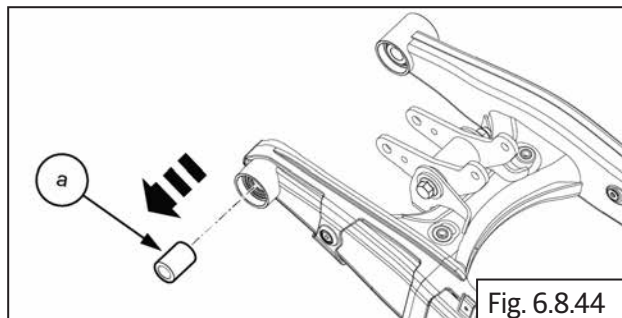
- Remove the seal spacer **(b)** and thrust washer **(a)** from swing arm LH.



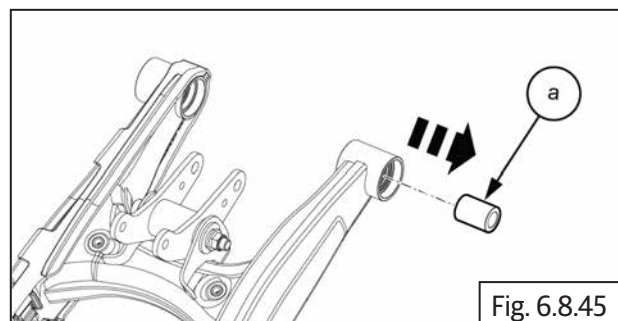
- Remove the seal spacer **(a)** from swing arm RH.



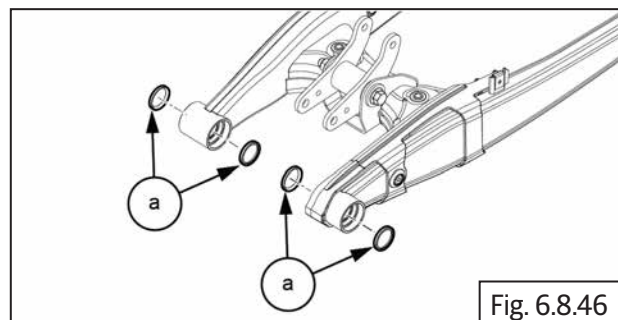
- Remove the ground sleeve **(a)** from swing arm LH.



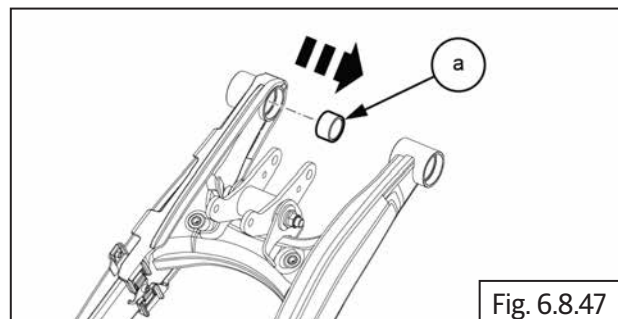
- Remove the ground sleeve **(a)** from swing arm RH.



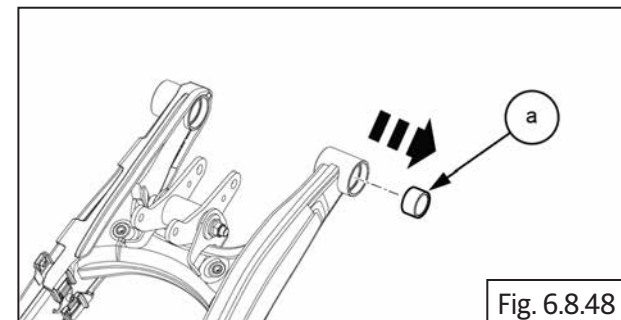
- Remove the seal spacer **4 Nos (a)** from swing arm assembly.



- Remove the bearing **(a)** from swing arm LH.

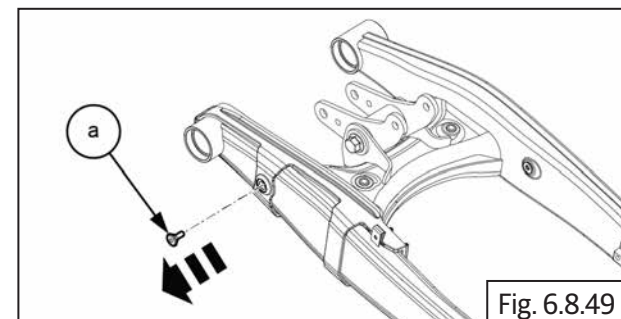


- Remove the bearing **(a)** from swing arm RH.



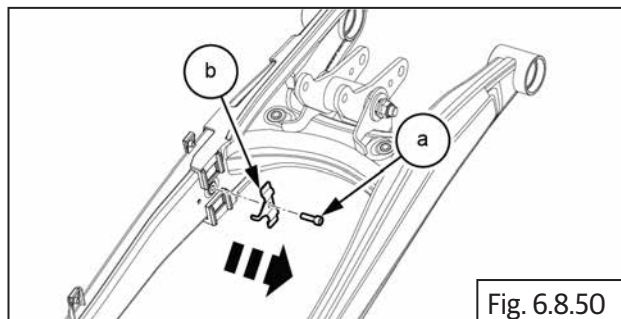
6.8.4.4. Chain Rubbing strip Removal:

- Loosen and remove button head bolt **(M6) (a)** from Swing arm LH outer side.



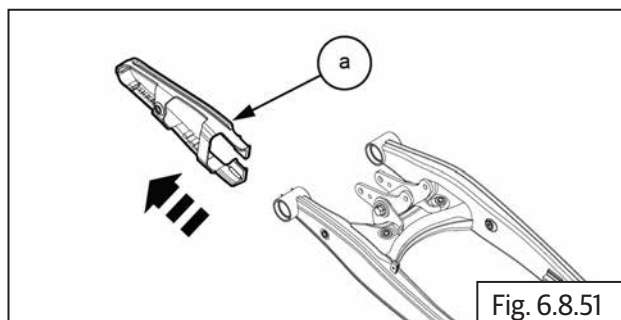
5 mm Allen socket with Ratchet

- Loosen and remove cap bolt **(M6) (a)** along with bracket **(b)** from Swing arm LH inner side.



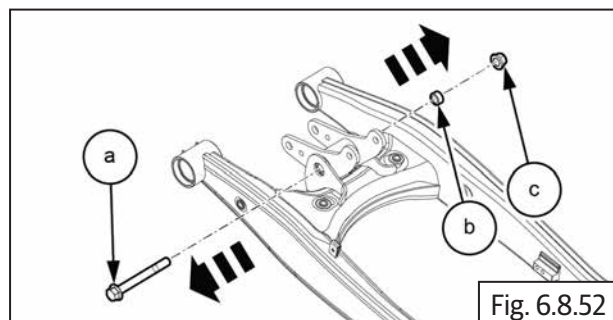
5 mm Allen socket with Ratchet

- Separate chain rubbing strip **(a)** from Swing arm LH.



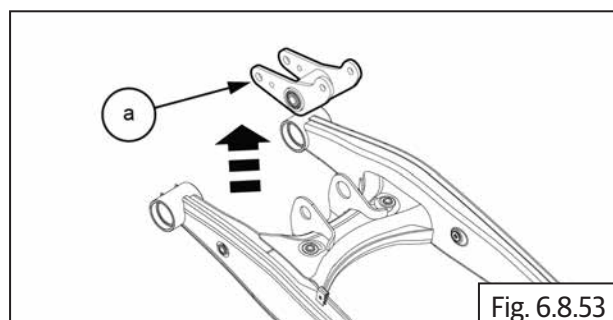
6.8.4.5. Rocker Removal

- Loosen and remove the Hex head bolt **(M12) (a)** with flange nut **(M12) (c)** and rocker mount **(b)** from rocker assembly.

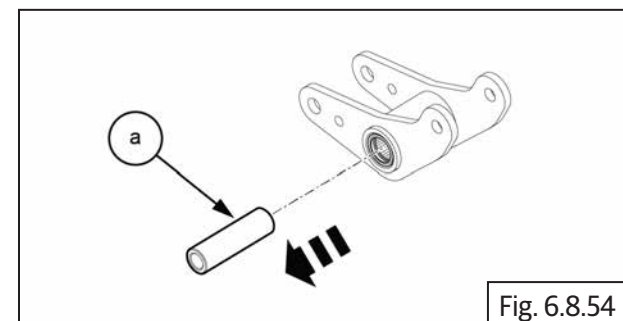


17mm socket with Ratchet
19mm Combination Spanner

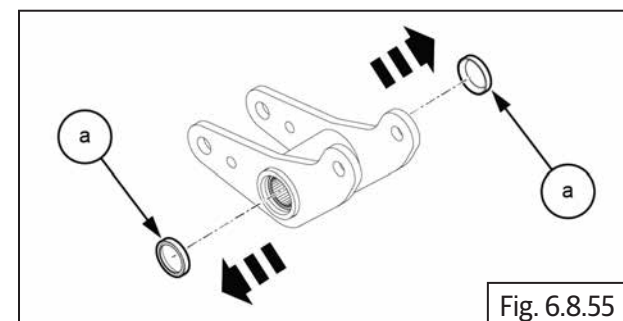
- Remove the rocker assembly **(a)** from swing arm assembly.



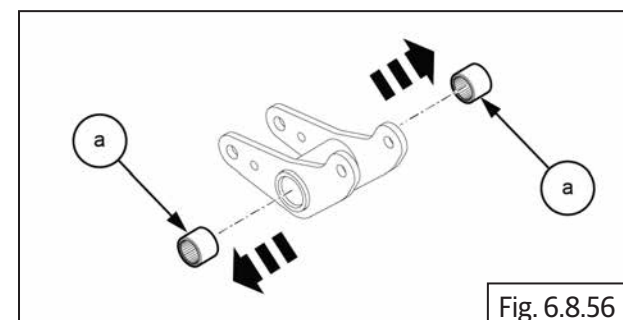
- Remove the rocker sleeve **(a)** from rocker assembly.



- Remove the **2Nos** seals **(a)** from rocker assembly.

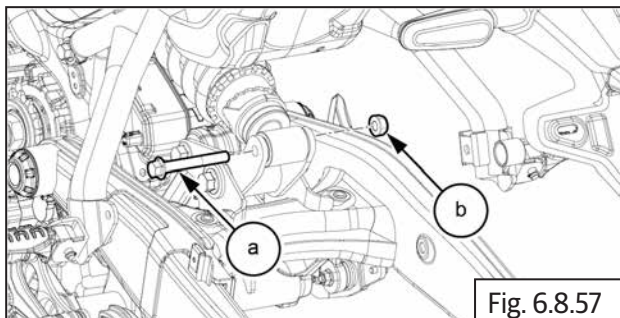


- Remove the **2Nos** bearings **(a)** from rocker assembly.



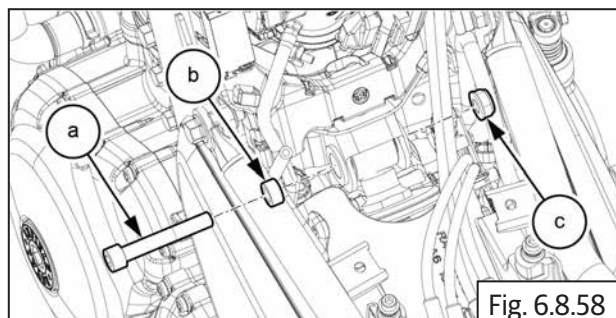
6.8.4.6. Shock Absorber Removal:

- Loosen and remove the Hex head bolt **(M10)** **(a)** with flange U nut **(M10)** **(b)** from the shock absorber bottom.



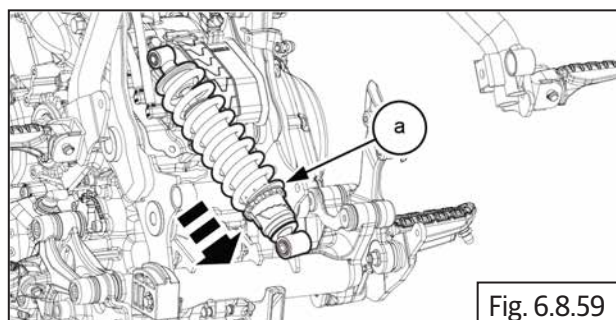
	14 mm Socket with Ratchet
	17 mm Combination Spanner

- Loosen and remove the Hex head bolt **(M10)** **(a)** with flange U nut **(c)** and boss mount **(b)** from the shock absorber top.

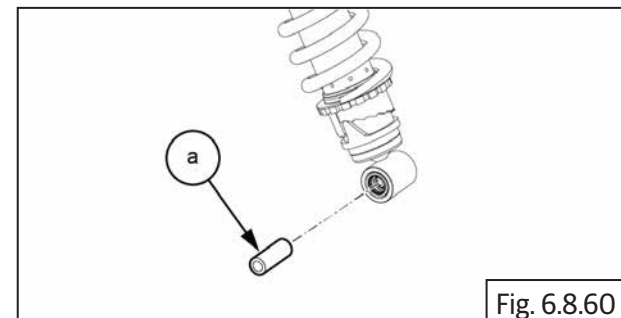


	8mm Allen Socket with Ratchet
	17 mm Combination Spanner

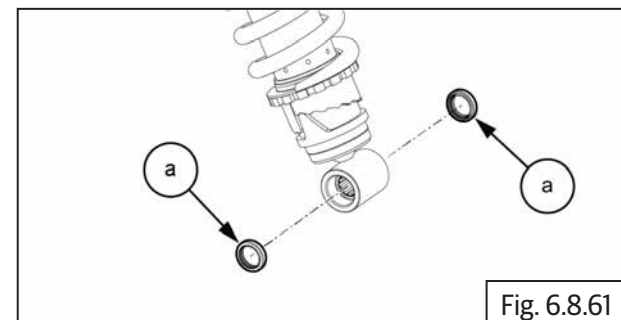
- Gently remove rear shock absorber **(a)** from the main frame.



- Gently remove spacer **(a)** from rear shock absorber bottom end.

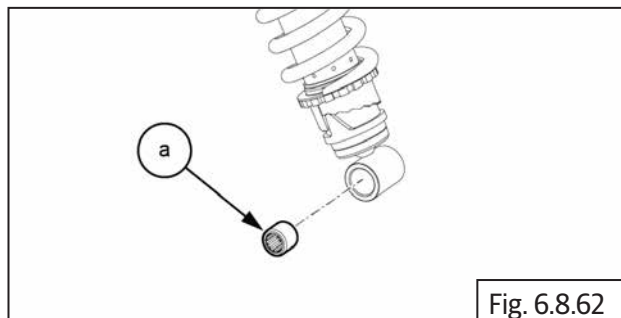


- Gently remove the **2Nos** plastic washer **(a)** from rear shock absorber bottom end.



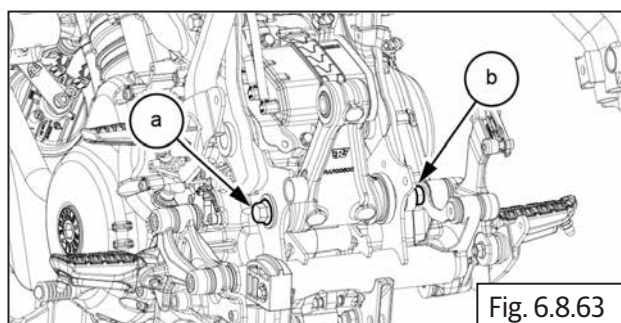
	Screw driver
--	--------------

- Gently remove the bearing **(a)** from rear shock absorber bottom end.



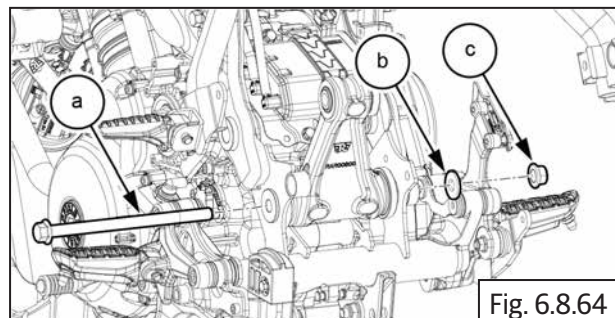
6.8.4.7. Link Rod Removal

- Loosen the cap bolt **(M12) (a)** with flange U nut **(M12) (b)** from link rod.

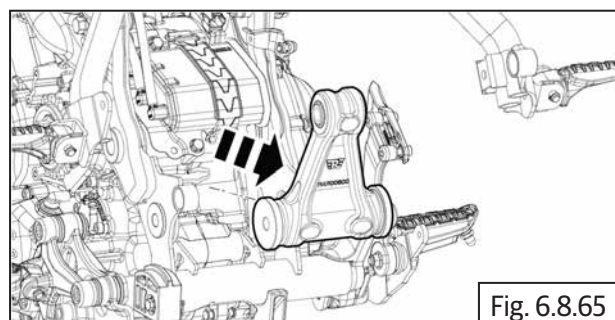


17mm Socket With Ratchet

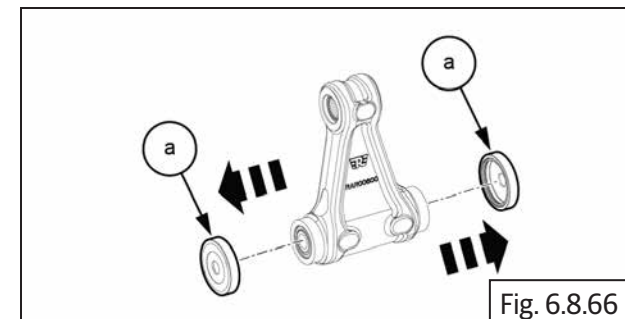
- Remove the cap bolt **(M12) (a)** along with washer **(b)** and nut **(M12) (c)** from link rod.



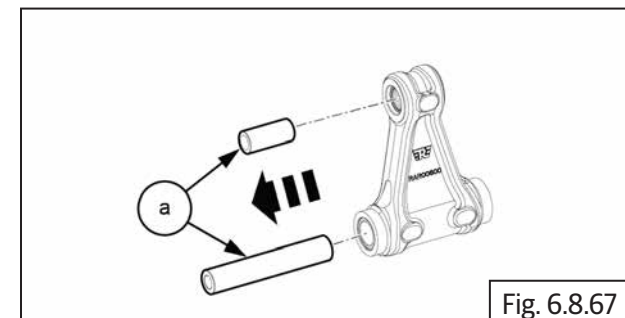
- Remove the link rod **(a)** from main frame.



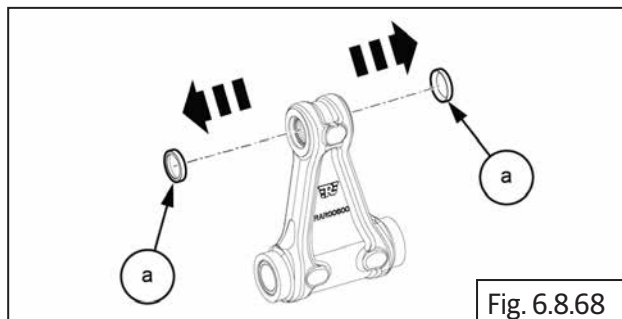
- Gently remove the **2 Nos** cup seals **(a)** from link rod.



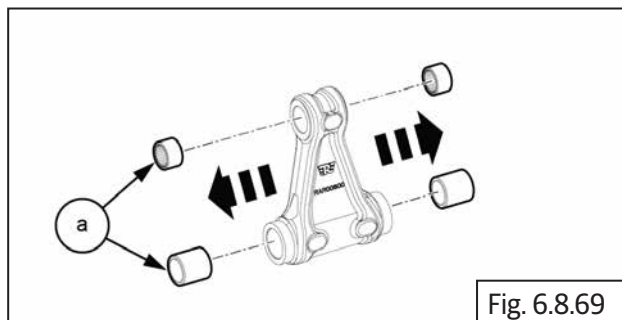
- Gently remove the **2 Nos** Sleeves **(a)** from link rod.



- Gently remove the **2 Nos** plastic washers (**a**) from link rod.



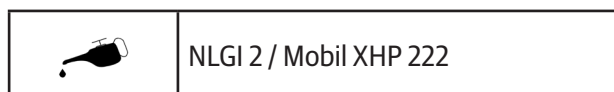
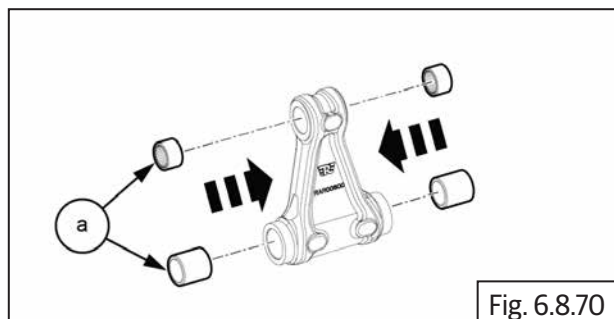
- Gently remove the **4 Nos** Bearings (**a**) from link rod.



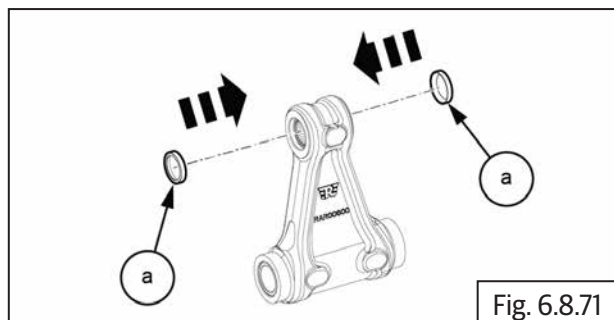
Assembly

6.8.4.8. Link Rod:

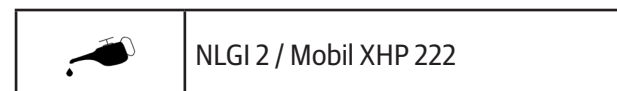
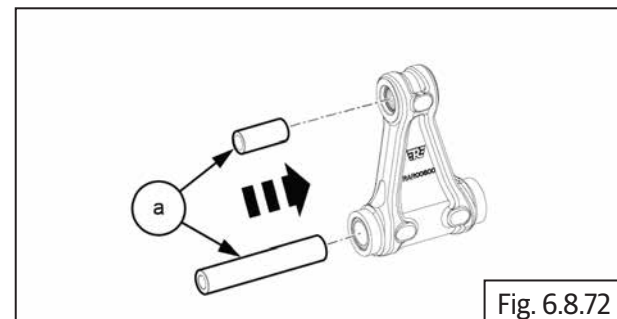
- Apply grease on the needle roller bearing (**a**) before installing.
- Install the **4 Nos** Bearings (**a**) into the link rod.



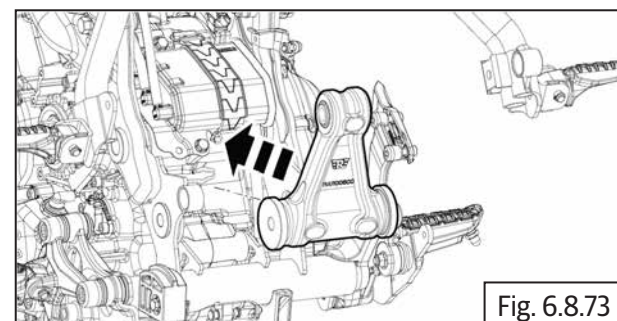
- Install the **2Nos** seals (**a**) into the link rod.



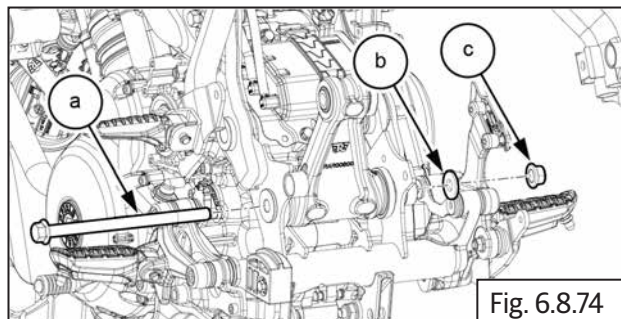
- Apply grease on the sleeve before installing.
- Install the **2Nos** sleeves (**a**) into the link rod.



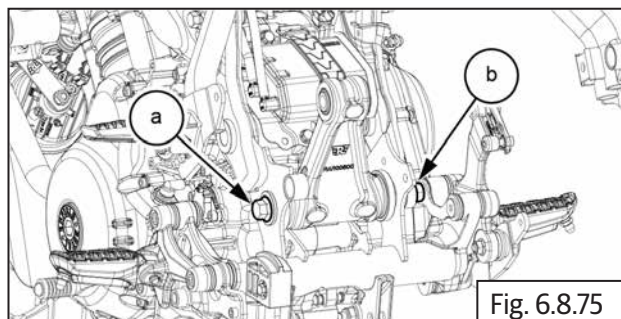
- Locate link rod (**a**) into main frame.



- Install cap bolt **(M12) (a)** along with washer **(b)** and flange U nut **(M12) (c)** into link rod.



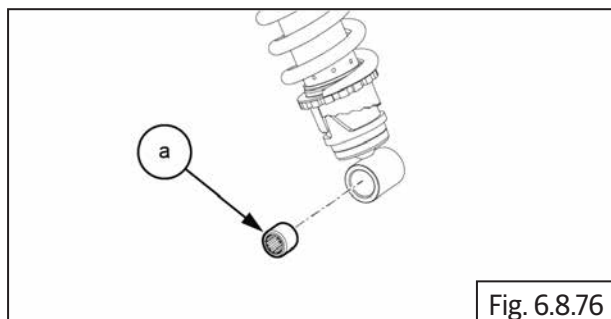
- Tighten the cap bolt **(M12) (a)** with U nut **(M12) (b)** into link rod.



	17mm Socket with Ratchet
Torque	70 Nm / 7.0 kgf-m

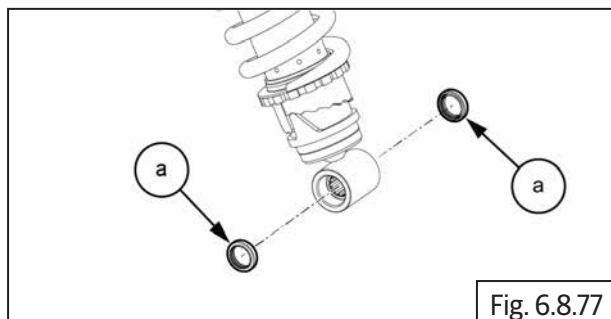
6.8.4.9. Shock Absorber

- Apply grease on the needle roller bearing **(a)** before installing.
- Install the roller bearing **(a)** into rear shock absorber bottom end.

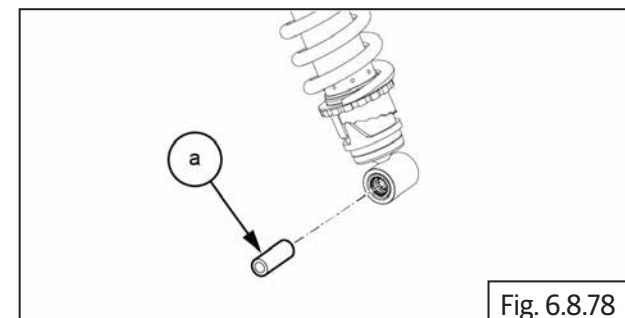


	NLGI 2 / Mobil XHP 222
--	------------------------

- Install the **2Nos** plastic washer **(a)** into rear shock absorber bottom end.

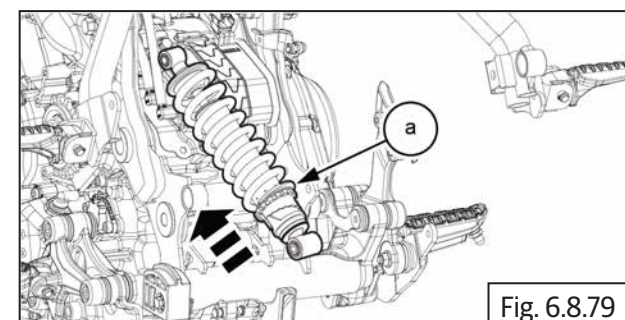


- Apply grease on the ground sleeve before installing
- Install spacer **(a)** into rear shock absorber bottom end.



	NLGI 2 / Mobil XHP 222
--	------------------------

- Gently install rear shock absorber **(a)** into main frame.



- Locate and tighten the Hex head bolt **(M12)** **(a)** with U nut **(b)** into the shock absorber bottom.

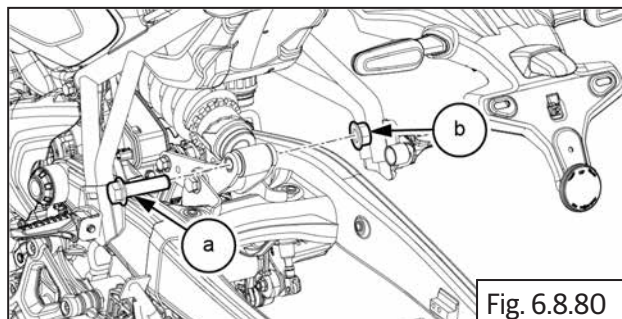


Fig. 6.8.80

- Locate and tighten the Hex head bolt **(M10)** **(a)** with U nut **(c)** and boss mount **(b)** on shock absorber top.

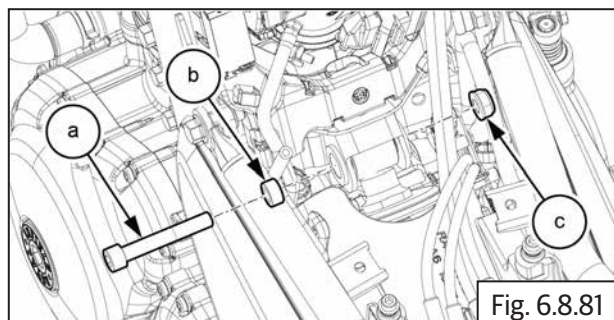


Fig. 6.8.81

	14 mm Socket with Ratchet
	17 mm Combination Spanner
	60 N-m / 6.0 kgf-m

	8 mm Allen socket with Ratchet
	17 mm Combination Spanner
	45 Nm / 4.5 kgf-m

6.8.4.10. Rocker

- Apply grease on the needle roller bearing **(a)** before installing.
- Locate and install the **2 Nos** bearing **(a)** into rocker assembly.

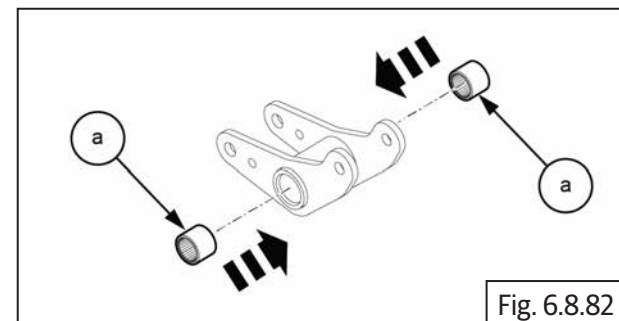


Fig. 6.8.82

	NLGI 2 / Mobil XHP 222
--	------------------------

- Locate and install the **2 Nos** plastic washer **(a)** into rocker assembly.

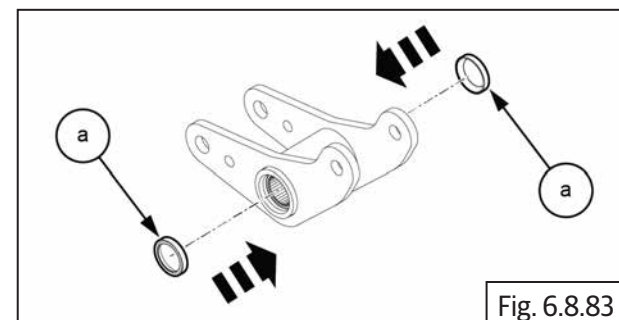
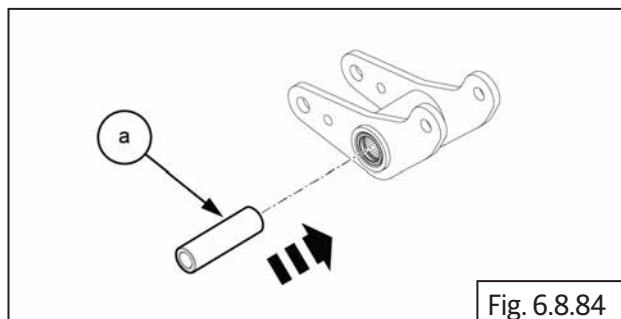


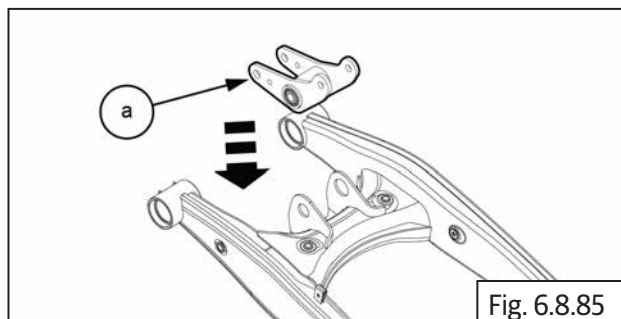
Fig. 6.8.83

- Apply grease on the ground sleeve before installing.
- Locate and install the sleeve **(a)** into rocker assembly.

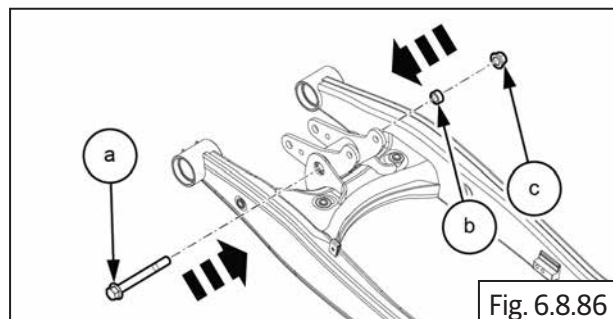


	NLGI 2 / Mobil XHP 222
---	------------------------

- Locate the rocker assembly **(a)** into swing arm assembly.



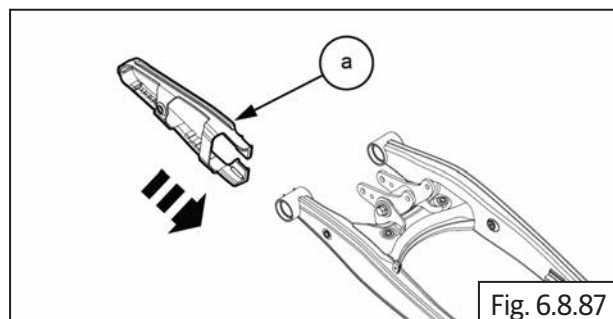
- Locate and install the Hex head bolt **(M12) (a)** with U nut **(b)** into rocker assembly.



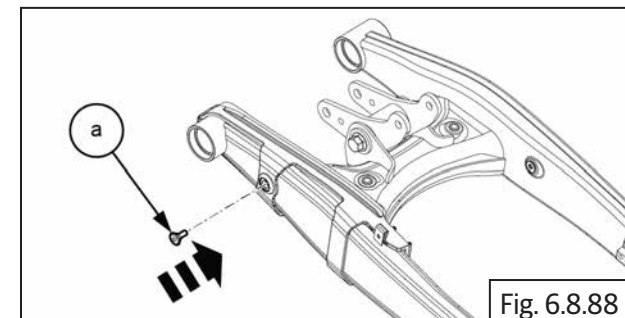
	17 mm Socket with Ratchet 19 mm Combination Spanner
	70 Nm / 7.0 kgf-m

6.8.4.11. Chain Rubbing strip

- Locate chain rubbing strip **(a)** on the LH side and align mounting holes.

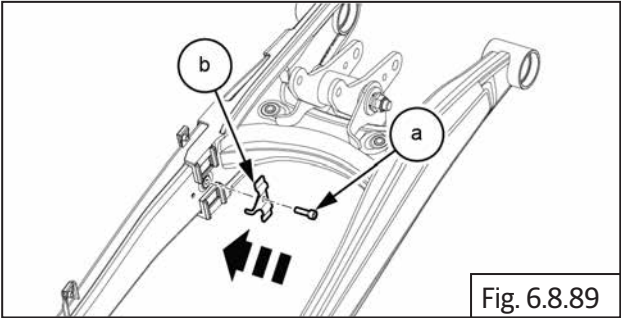


- Locate and tighten button head bolt **(M6) (a)** into Swing arm LH outer side.



	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

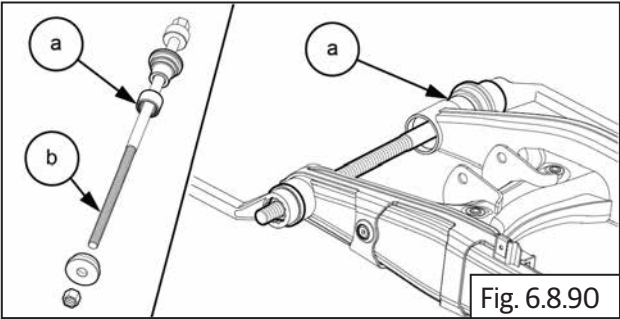
- Locate and tighten cap bolt **(M6) (a)** along with bracket **(b)** into Swing arm LH inner side.



	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

6.8.4.12. Swing Arm Assembly

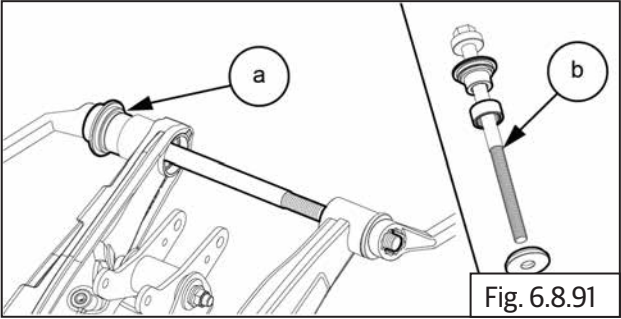
- Apply **0.2g** of grease on the needle roller bearing **(a)** before installing.
- Using special tool **(b)** locate and install needle roller bearing **(a)** into swing arm RH.



	Part No:ST-32158/A
	Part Name: Swingarm NRB Installer Tool

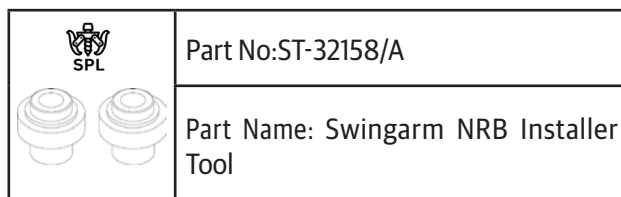
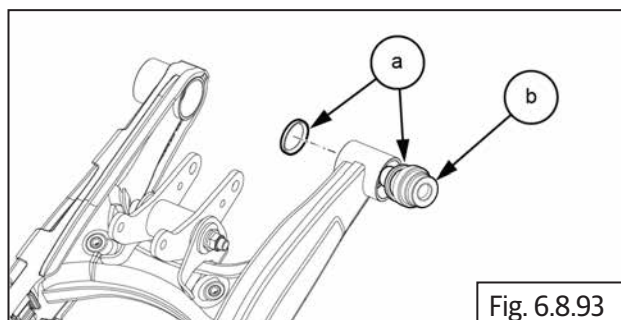
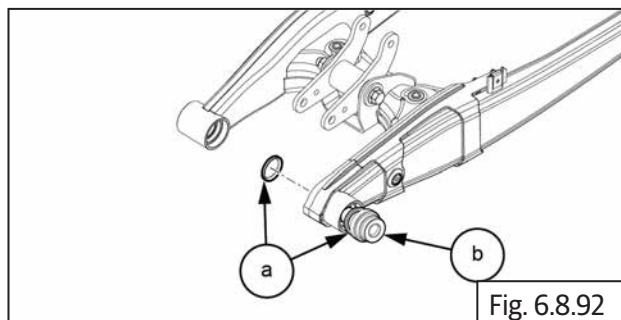
	NLGI 2 / Mobil XHP 222
---	------------------------

- Using special tool **(b)** locate and install needle roller bearing **(a)** into swing arm LH.

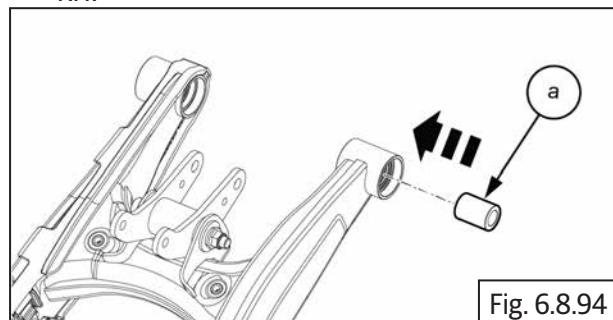


	Part No:ST-32158/A
	Part Name: Swingarm NRB Installer Tool

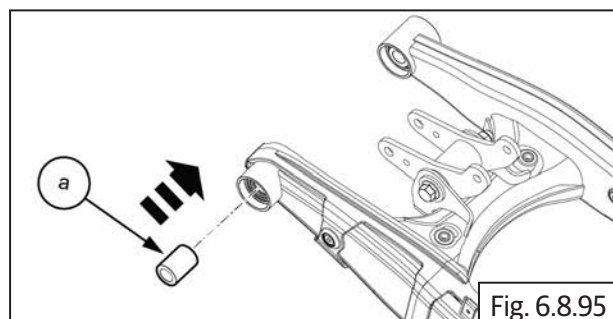
- Apply **0.1g** of grease to the outside of the seal. **(a)** before installing.
- Using special tool **(b)** locate the seal spacer 4 Nos **(a)** into swing arm assembly.



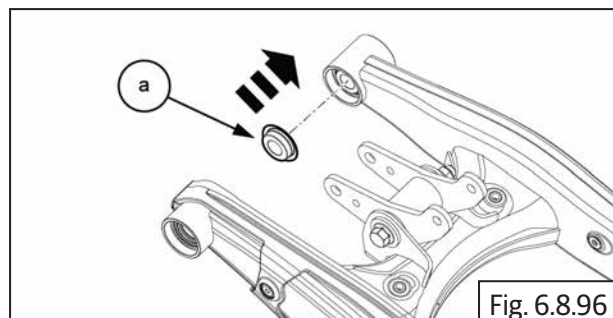
- Apply grease on the ground sleeve before installing
- Locate and install ground sleeve **(a)** into swing arm RH.



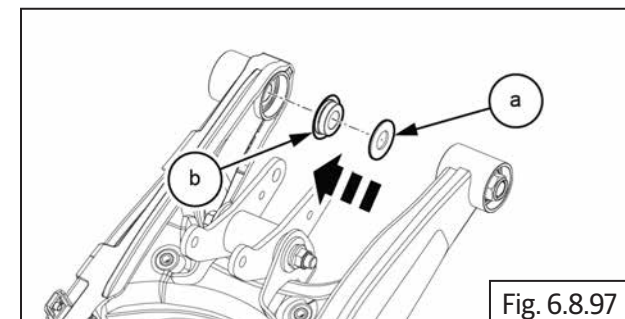
- Locate and install ground sleeve **(a)** into swing arm LH.



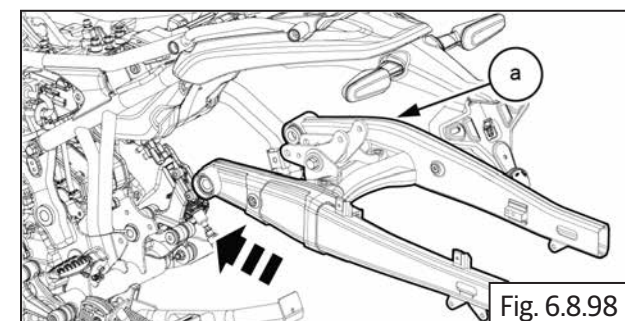
- Locate and install seal spacer **(a)** into swing arm RH.



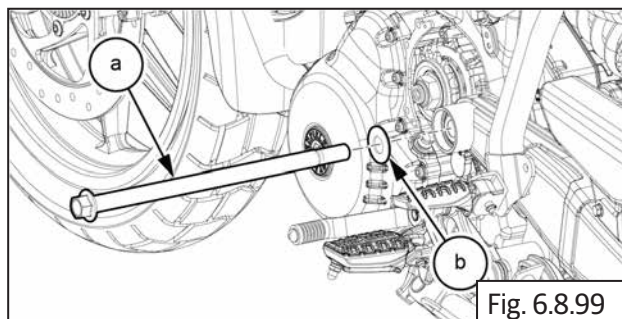
- Locate and install thrust washer **(b)** and seal **(a)** from swing arm LH.
- Apply small amount of grease on thrust washer.



- Provide suitable support below chassis frame and install swing arm **(a)** from chassis frame.
- Position Swing arm **(a)** assembly into frame and ensure mounting holes are aligned properly.

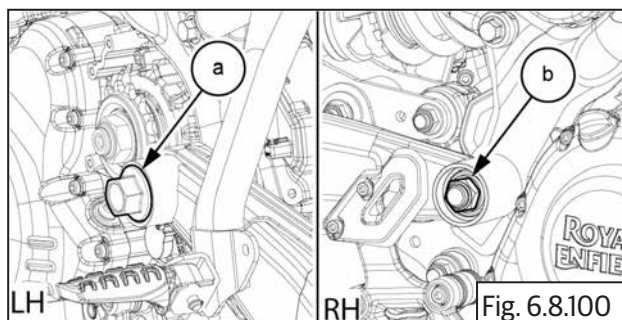


- Install the spindle **(a)** along with thrust washer **(b)** into LH side.
- Apply small amount of grease on thrust washer.



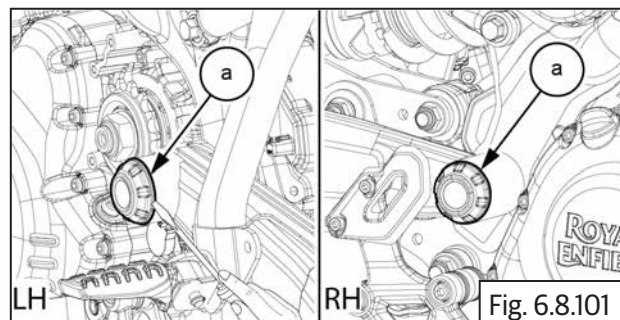
	NLGI 2 / Mobil XHP 222
---	------------------------

- Locate spindle bolt **(M16) (a)** into frame LH side and tighten hex U nut **(M6) (b)** into RH side frame.

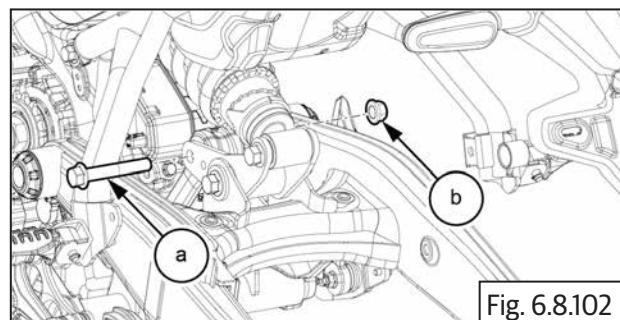


	21 mm Socket with Ratchet 24 mm Socket with Ratchet
	100 Nm / 10.0 kgf-m

- Locate cap cover **(a)** over LHS & RHS swing arm. Gently press to install.

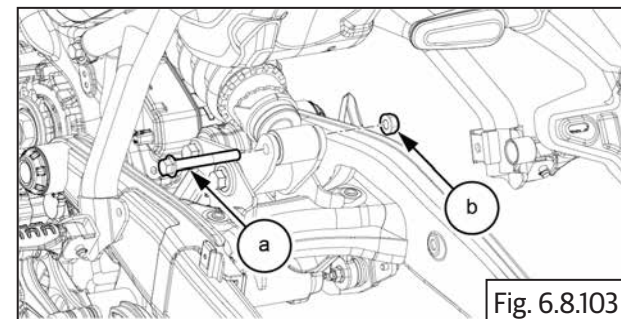


- Locate and tighten hex head bolt **(M10) (a)** with U nut **(b)** into link rod.



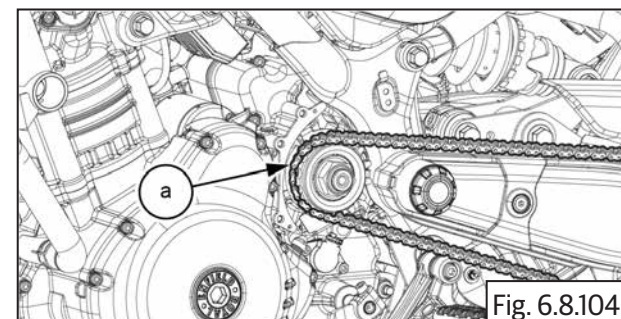
	14 mm Socket with Ratchet 17 mm Combination Spanner
	70 Nm / 7.0 kgf-m

- Locate and tighten hex head bolt **(M10) (a)** with U nut **(b)** into rocker assembly.

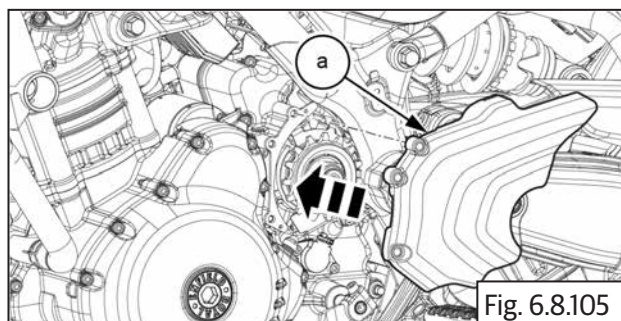


	14 mm Socket with Ratchet 17 mm Combination Spanner
	60 Nm / 6.0 kgf-m

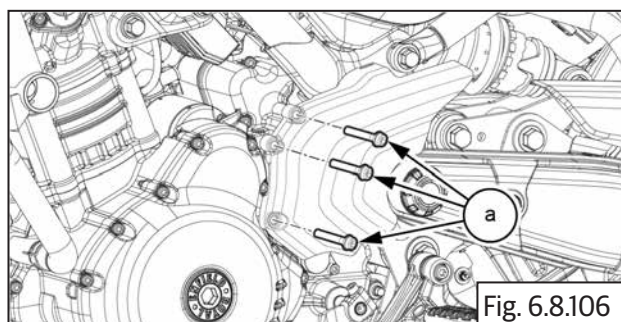
- Install drive chain **(a)** into the sprocket.



- Install the chain sprocket cover **(a)** into engine.



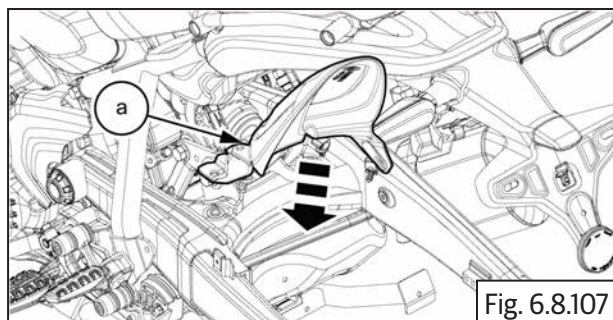
- Locate and tighten **3 Nos** cap bolts **(a)** on chain sprocket cover.



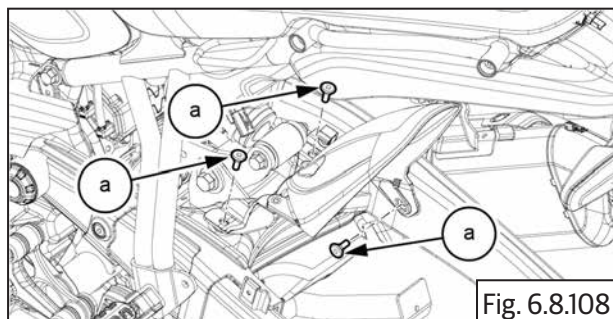
	5mm Allen Socket with Ratchet
	10Nm to 12 Nm / 1.0 to 1.2 kgf-m

6.8.4.13. Hugger assembly

- Install the hugger assembly **(a)** on swing arm.

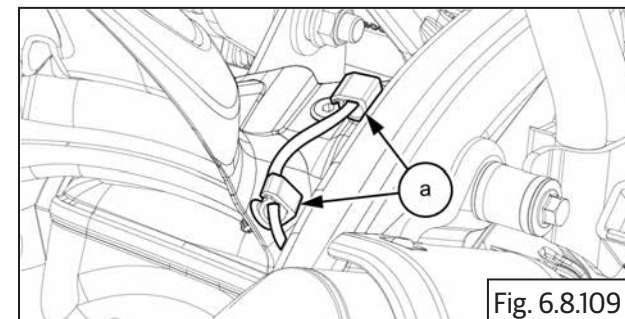


- Locate and tighten the **3 Nos** button head bolts **(M6) (a)** on hugger assembly.



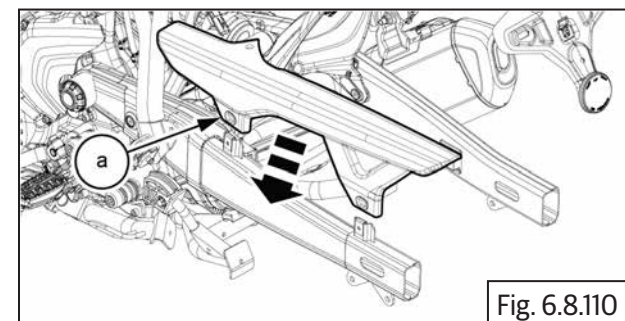
	5mm Allen Socket with Ratchet
	10Nm / 1.0 kgf-m

- Press and fix corrugated conduit clip **(a)** on hugger assembly.

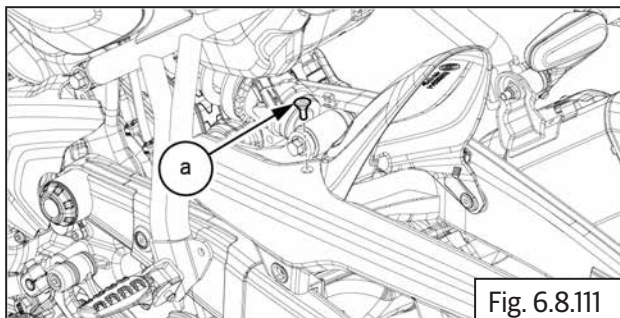


6.8.4.14. Chain Guard Upper

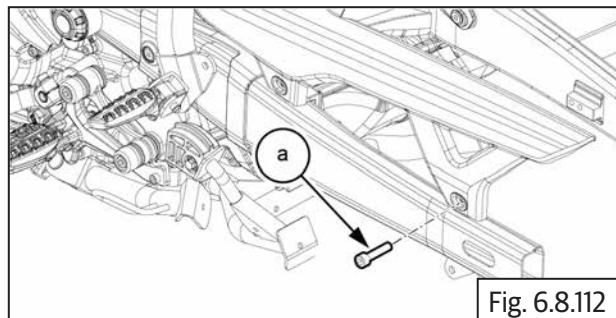
- Locate chain guard upper **(a)** on the LH side and align mounting holes.



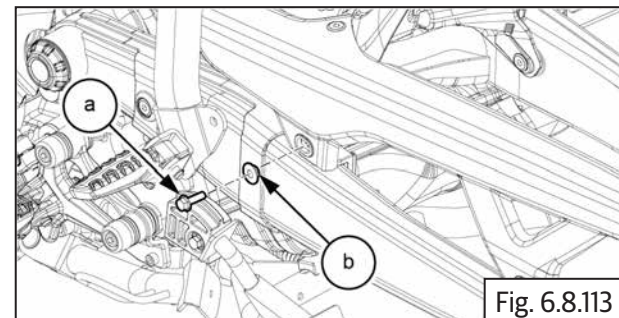
- Locate and tighten button head bolt **(M6) (a)** from chain guard top.



- Locate and tighten cap bolt **(M6) (a)** on chain guard upper.



- Locate and tighten hex bolt **(M6) (a)** along with washer **(b)** on chain guard upper.



	5 mm Allen Socket with Ratchet
	10 Nm /1.0 kgf-m

	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

	10 mm Socket with Ratchet
	10 Nm /1.0 kgf-m

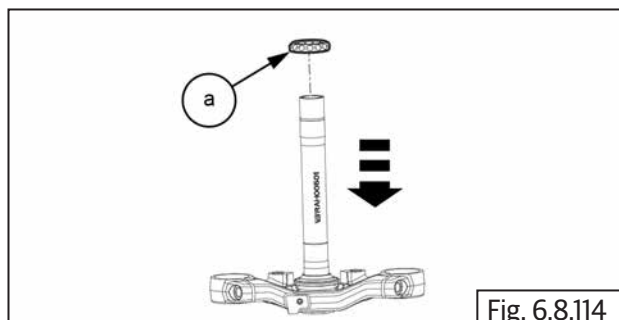
Assemble the following parts:

- Rear wheel [Refer Wheel chapter.](#)

Suspension Assembly

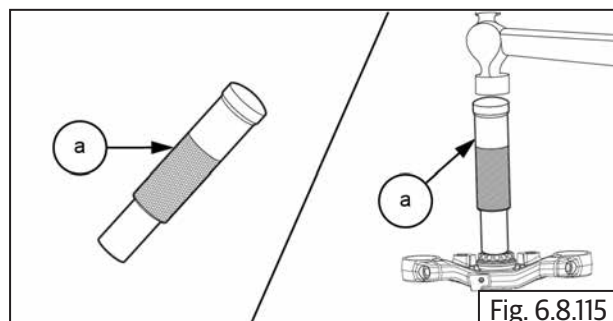
6.8.5. Bottom Roller Bearing into Steering Stem

- Apply **0.5g** of grease to the lower headstock bearing.
- Insert the dust seal and roller bearing **(a)**.



NLGI 2 / Mobil XHP 222

- Assemble bearing with special tool **(a)**.

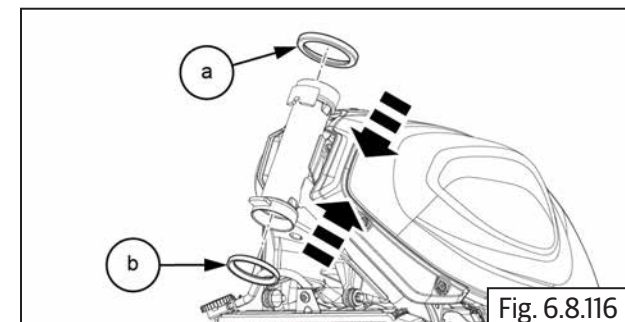


Part No: ST-31893/A

Part Name: T STEM Taper Roller Bearing Installer

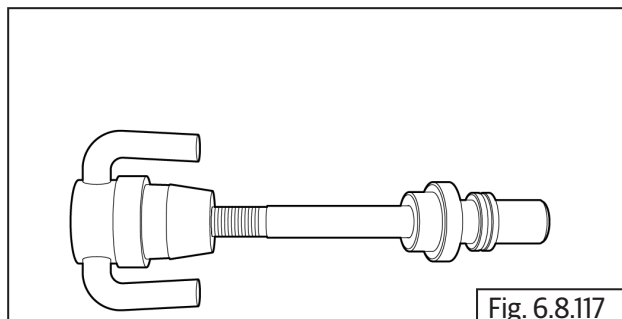
6.8.6. Ball Bearing into Frame top and bottom Head Tube

- Apply **0.2g** of grease to the outer surface of the outer bearing race before install.
- Locate bottom bearing outer race **(b)** and top bearing outer race **(a)** into frame headstock tube.



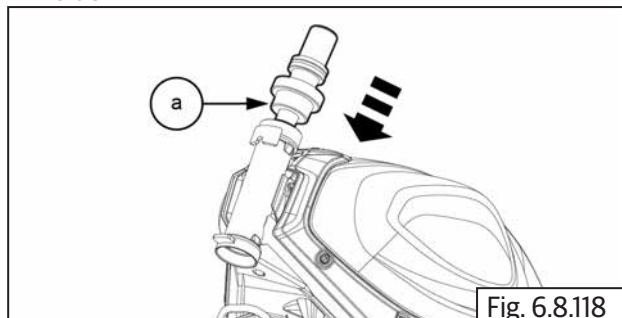
NLGI 2 / Mobil XHP 222

- Use bearing race installer tool to install top and bottom bearing races into headstock.



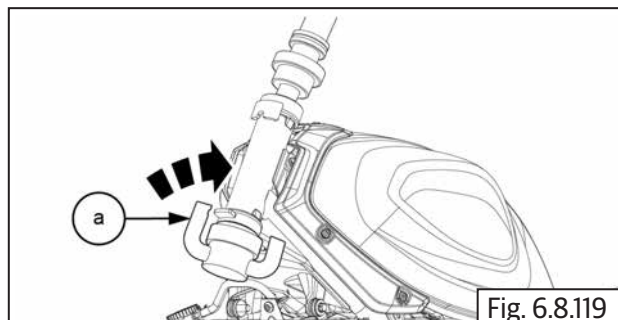
	Part No: ST-31894/A
	Part No: ST-32156/A
	Part Name: Headstock bearing race installer

- Locate the race installer tool **(a)** into headstock top side.



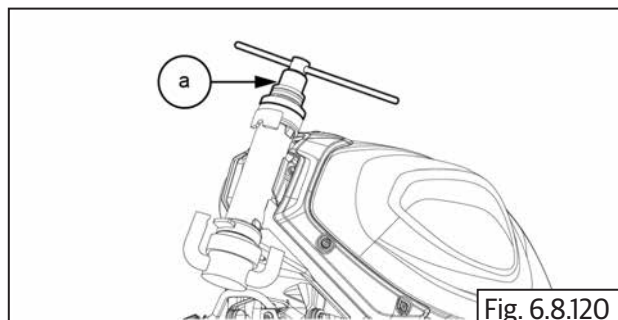
	Part No: ST-31894/A
	Part No: ST-32156/A
	Part Name: Headstock bearing race installer

- Tighten the bottom nut **(a)** to clockwise direction.



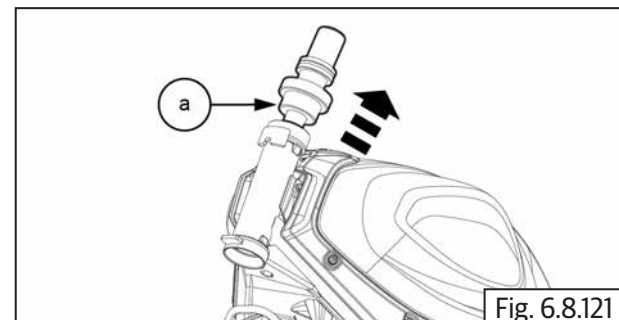
	Part No: ST-31894/A
	Part No: ST-32156/A
	Part Name: Headstock bearing race installer

- Tighten tool head **(a)** using T rod till bearing race perfectly seat.



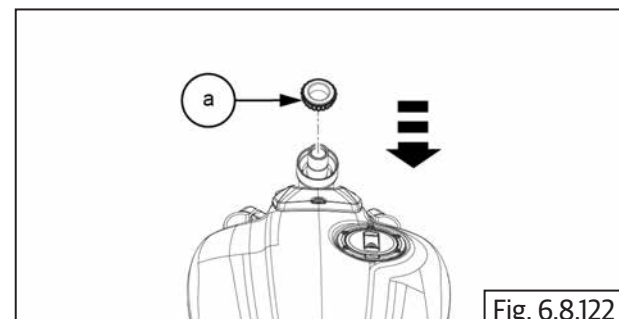
	Part No: ST-31894/A
	Part No: ST-32156/A
	Part Name: Headstock bearing race installer

- Remove the installer tool (a) from the headstock.



	Part No: ST-31894/A
	Part No: ST-32156/A
	Part Name: Headstock bearing race installer

- Apply **0.5g** of grease to the upper headstock bearing.
- Install bearing **(a)** into frame top head tube top **(b)**.



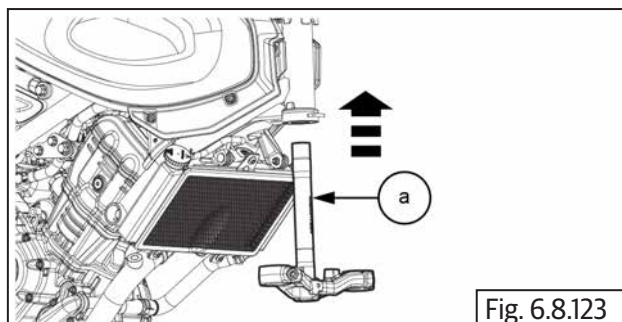
	NLGI 2 / Mobil XHP 222
---	------------------------

6.8.7. Steering Stem Assembly into Frame Head Tube

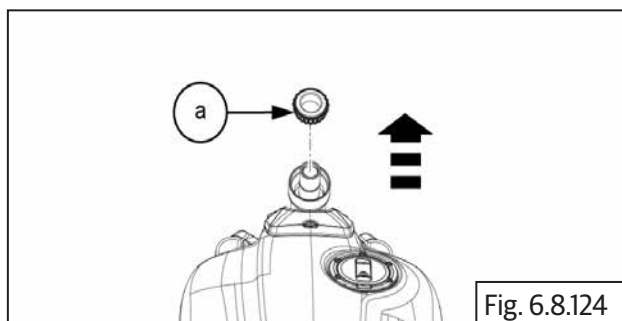
- Gently insert steering stem (a) into frame head tube bottom.

⚠ CAUTION

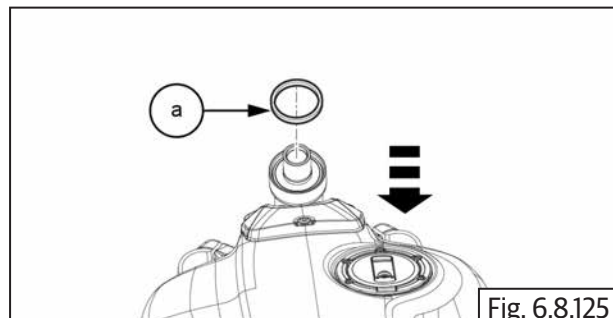
DO NOT tap or use force to assembly the steering stem into frame head tube.



- Gently insert bearing (a) on steering stem.



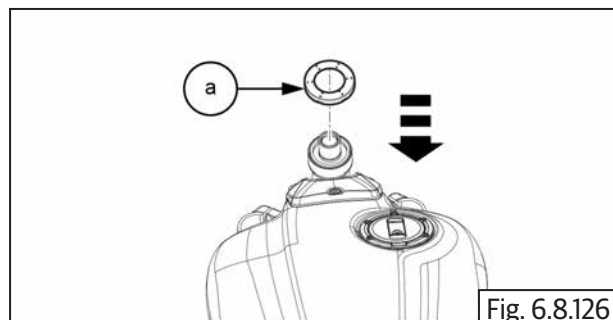
- Locate internal headstock spacer (a) on steering stem.



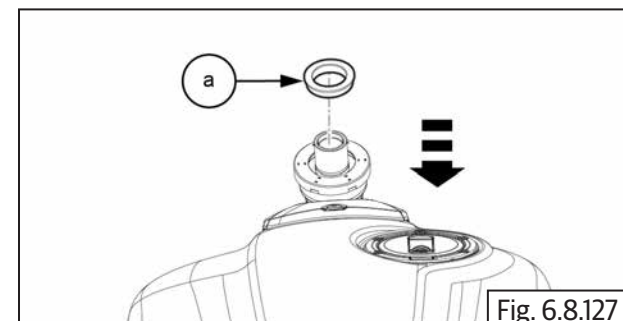
- Locate seal (a) on steering stem.
- Apply **0.1g** of grease to the outside of the seal. (a) before installing.



NLGI 2 / Mobil XHP 222



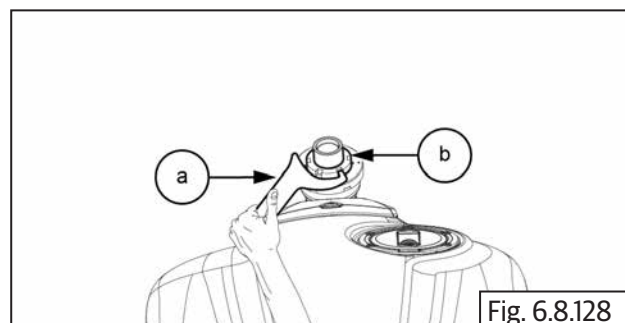
- Locate headstock spacer (a) on steering stem.



⚠ CAUTION

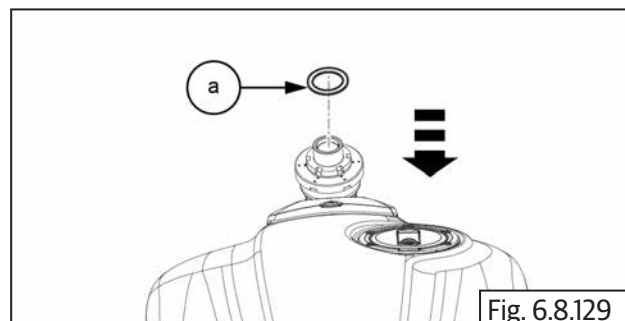
Support steering stem from bottom. DO NOT allow the steering stem to drop out of frame head tube.

- Pre-fit the lower lock nut **(b)** over the steering stem, do not tighten the lock nut fully.
- Apply **35Nm** torque then immediately loosen the lower lock nut **(b)**.
- Apply **15Nm** torque on lower lock nut **(b)** using special tool **(a)**.

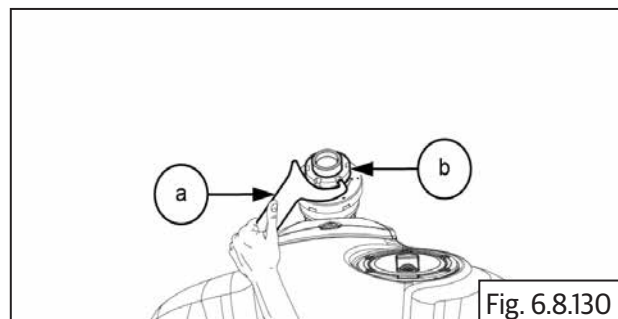


 	Part No ST-30969/A
	Part Name: Steering stem nut adjuster

- Locate rubber spacer **(a)** on steering stem.



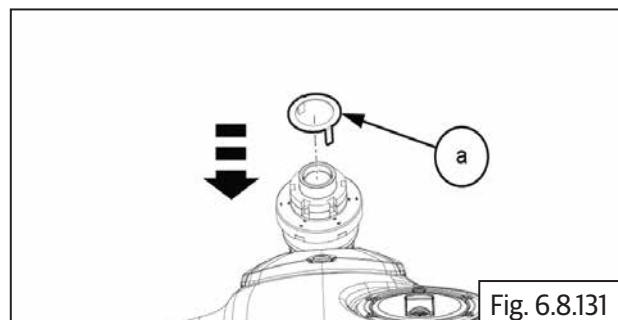
- Using special tool **(a)** tighten and locate 1st lock nut **(b)** on steering stem.



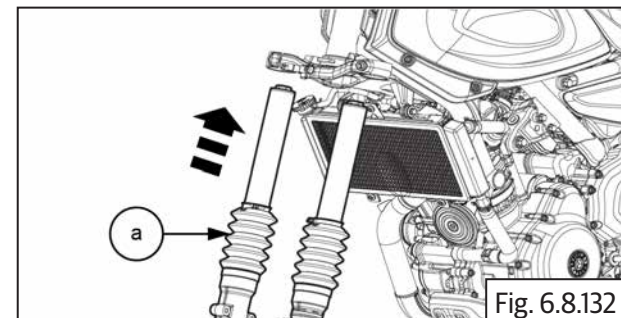
 	Part No ST-30969/A
	Part Name: Steering stem nut adjuster

	1 Nm / 0.1 Kgf-m
---	------------------

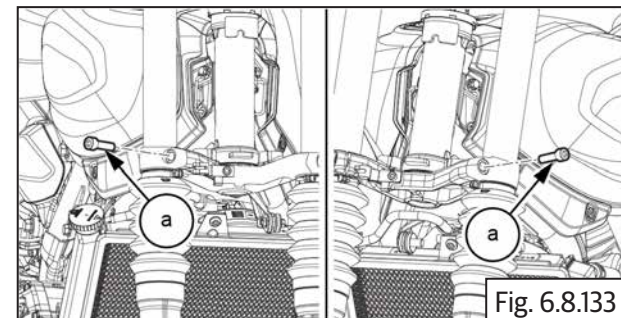
- Locate tabbed washer **(a)** on steering stem.



- Locate and fix both fork assembly **(a)** into steering stem.

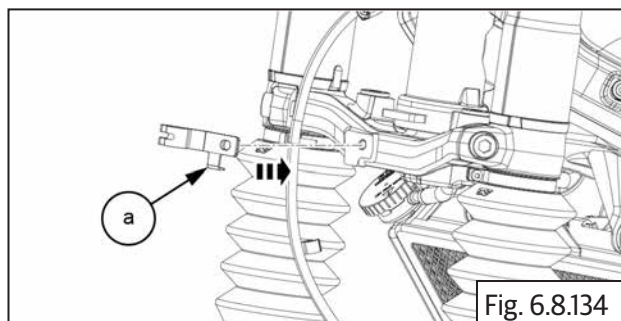


- Locate and tighten **2 Nos** cap bolts **(M10)** **(a)** into lower yoke.

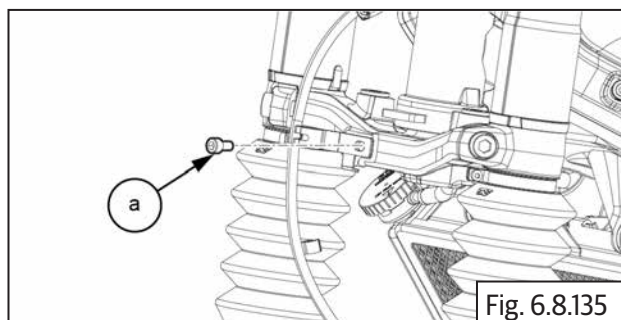


	8mm Allen Socket with Ratchet
	45 Nm / 4.5 kgf-m

- Locate the cable strap **(a)** from lower yoke.

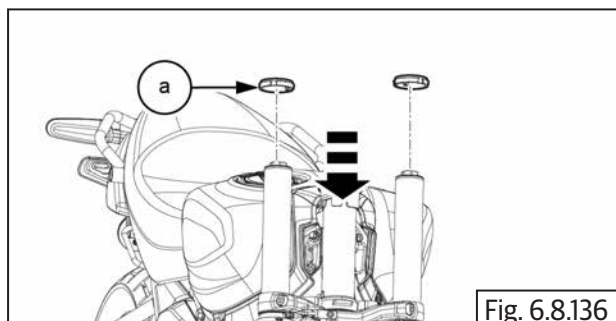


- Locate and tighten the cap screw **(M6) (a)** on cable strap.

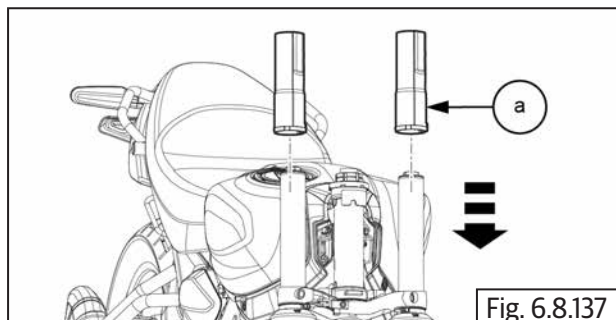


	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate the cushion shroud **(a)** onto fork assembly.

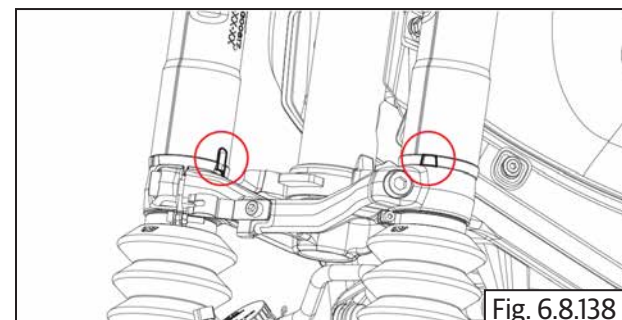


- Locate the shroud fork **(a)** onto fork assembly.



NOTE

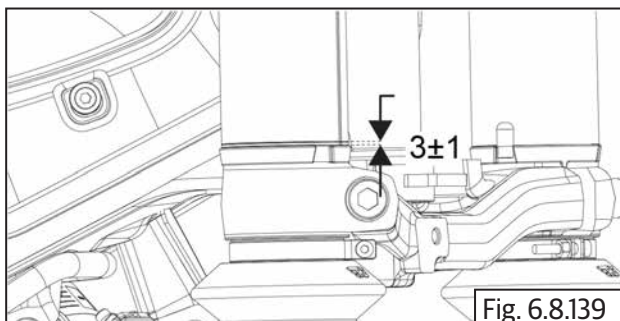
- The cushion boss **SHOULD NOT** be visible when the bike is viewed from Left or Right sides. Refer below image.



	Steel Ruler
--	-------------

NOTE

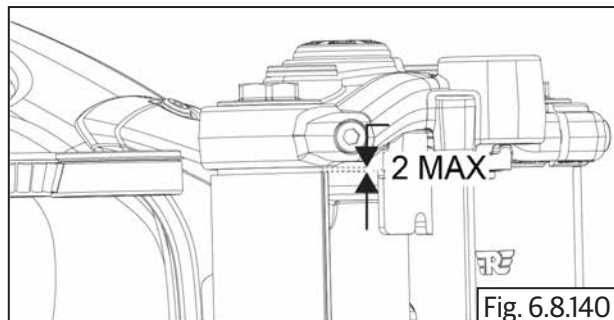
- When fitting the shrouds onto the Cushions it is not necessary to push the Shroud fully.
- The gap should be **3mm ± 1** , Refer below image.



Steel Ruler

NOTE

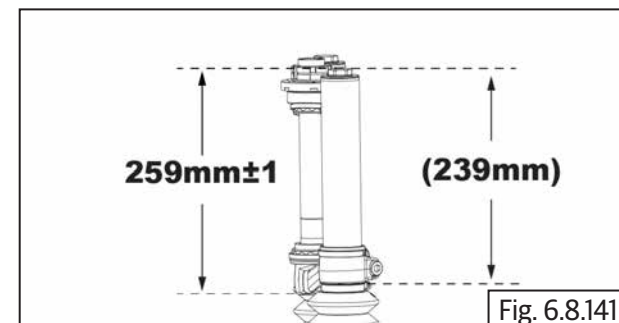
- Up to a **2mm (Max.)** gap at the top of the shroud between the upper yoke is permissible. Refer below image.



Steel Ruler

NOTE

- **259mm ±1 "Pull-Through"** is measured from the yoke lower center face to the top of the fork bolt, this is equal to **239mm** when measured from the base of the fork clamps.



Steel Ruler

- Install the following parts:
 - Front wheel. [Refer wheel chapter.](#)
 - Fix brake hose and wheel speed sensor wires from the clips. [Refer wheel chapter.](#)
 - Wheel caliper on fork end LH. Support caliper suitably. [Refer wheel chapter.](#)
 - Wheel speed sensor on the fork end LH. Support wheel speed sensor suitably. [Refer brake chapter](#)
 - Front mudguard. [Refer mudguard chapter.](#)
 - Aggregates of Handlebar. [Refer handle bar chapter](#)
 - Handlebar. [Refer handle bar chapter](#)
 - Upper Yoke. [Refer handle bar chapter](#)

6.9 FRONT FRAME

CONTENTS	PAGE
6.9. Front Frame.....	379
Dismantling.....	379
6.9.1 Headlamp.....	379
6.9.2 Trafficator LH.....	380
6.9.3 Trafficator RH.....	381
6.9.4 Cluster.....	382
6.9.5 Headlamp frame.....	384
Assembly	385
6.9.6 Headlamp frame	385
6.9.7 Cluster.....	387
6.9.8 Trafficator RH.....	388
6.9.9 Trafficator LH.....	390
6.9.10 Headlamp.....	391

6.9. Front Frame

Dismantling

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Note

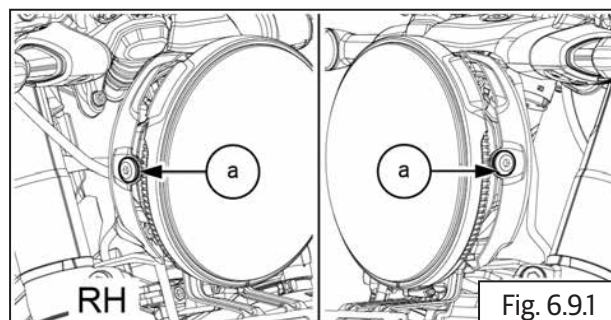
- Ensure ignition and stop switch are in off position.
- Disconnect the battery terminal.

6.9.1 Headlamp

⚠ CAUTION

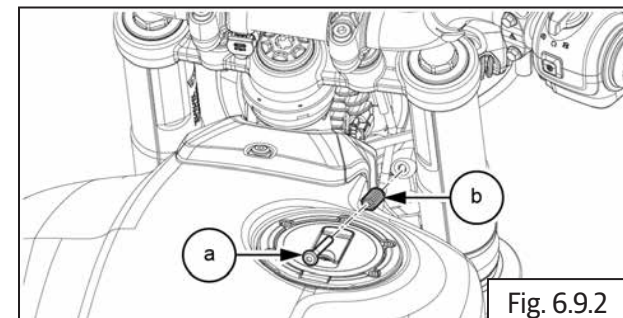
Support the Headlamp assembly carefully.

- Gently loosen and remove the shoulder head bolts (a) from LH & RH side of head lamp holder.



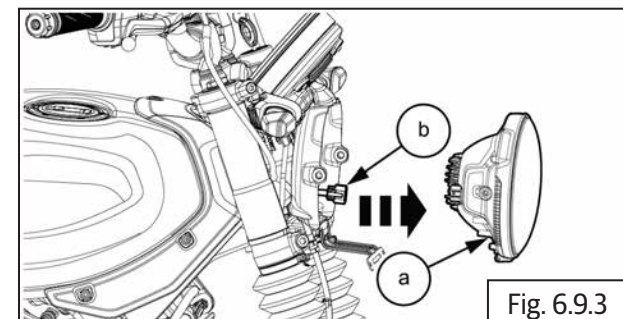
4 mm Allen Socket with Ratchet

- Gently loosen and remove the head lamp adjuster screw (a) and spring (b).



4 mm Allen Socket with Ratchet

- Disconnect the headlamp coupler (b).
- Remove the head lamp assembly (a).

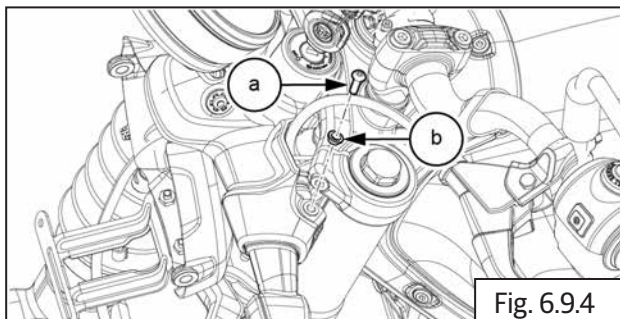


Note

- The headlamp has a LED lighting system. In the event of failure, the headlamp LED assembly should be replaced.

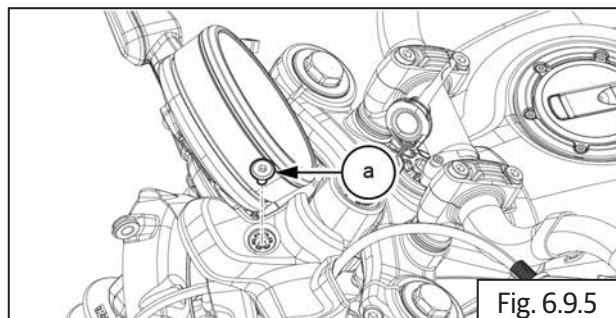
6.9.2 Trafficator LH

- Loosen and remove the button head bolt **(M5) (a)** with top hat washer **(b)** from the Trafficator upper mount cover.



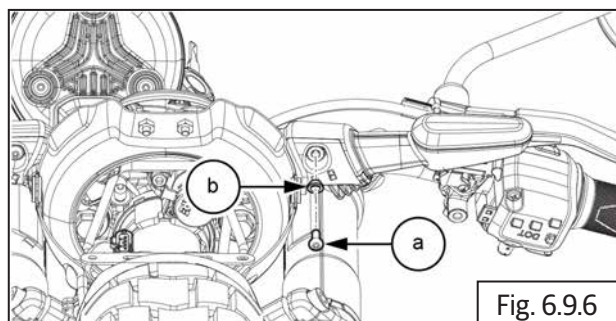
3mm Allen Socket with Ratchet

- Loosen and remove the shoulder button head bolt **M6 (a)** from the Trafficator upper mount cover.



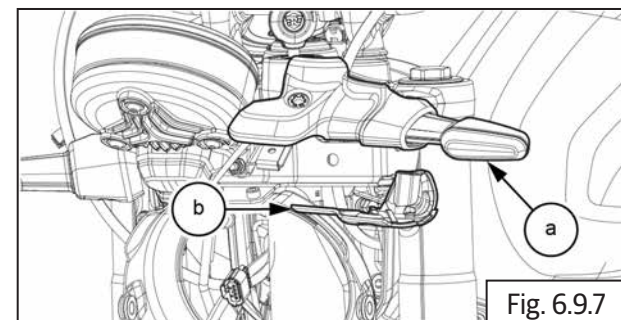
5mm Allen Socket with Ratchet

- Loosen and remove the button head bolt **(M5) (a)** with top hat washer **(b)** from the Trafficator lower mount cover.

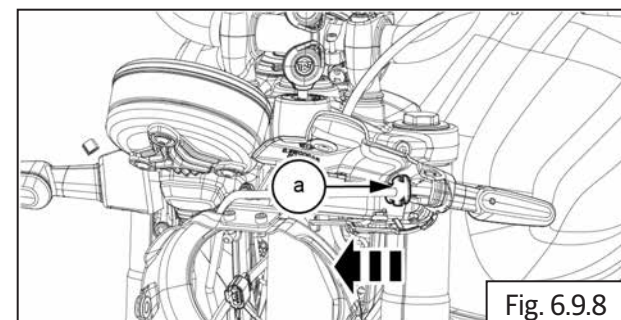


3mm Allen Socket with Ratchet

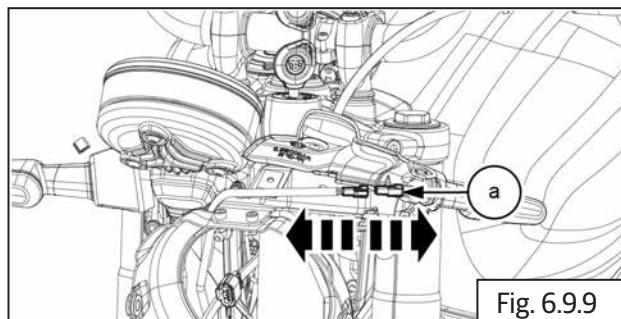
- Separate the top **(a)** and bottom **(b)** trafficator mount covers from the front frame assembly.



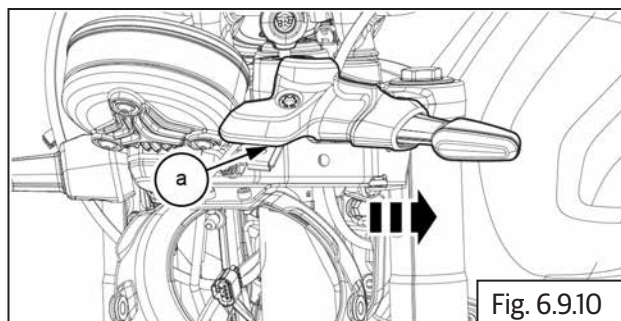
- Remove the retainer clip **(a)** from the trafficator.



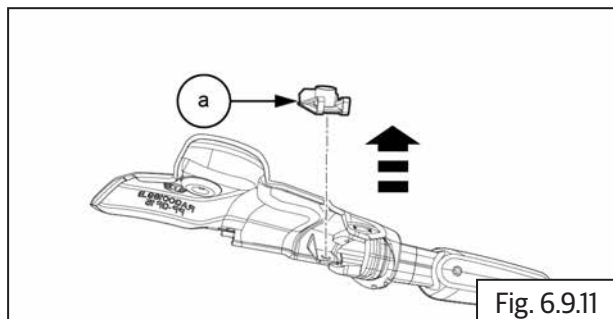
- Disconnect the trafficator coupler **(a)**.



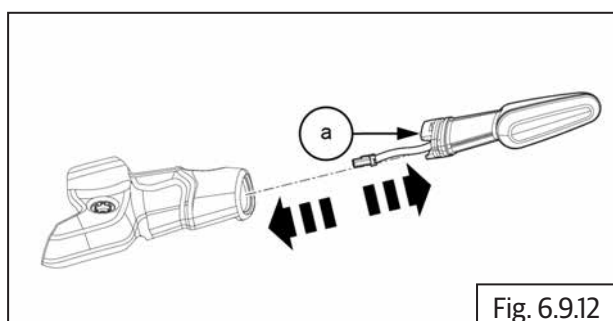
- Remove the trafficator assembly **(a)** from the front frame assembly.



- Remove the clip nut **(a)** from the top mount cover.

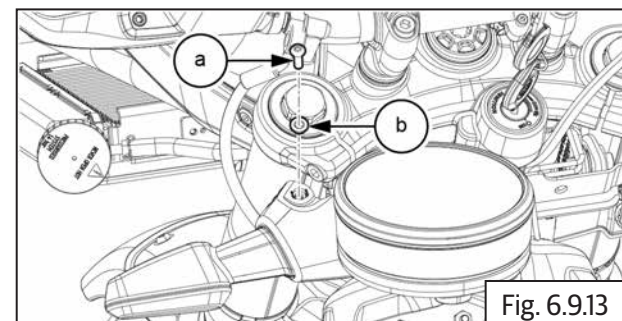


- Remove the indicator **(a)** from the top mount cover.



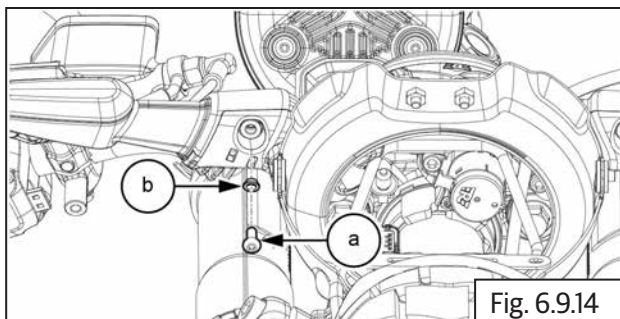
6.9.3 Trafficator RH

- Loosen and remove the button head bolt **(M5) (a)** with top hat washer **(b)** from the Trafficator upper mount cover.



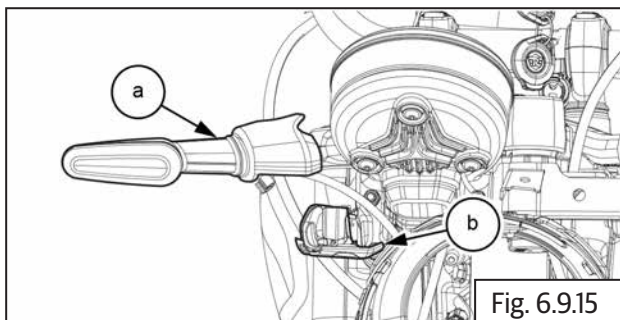
	3mm Allen Socket with Ratchet
--	-------------------------------

- Loosen and remove the button head bolt **M5 (a)** with top hat washer **(b)** from the trafficator lower mount cover.

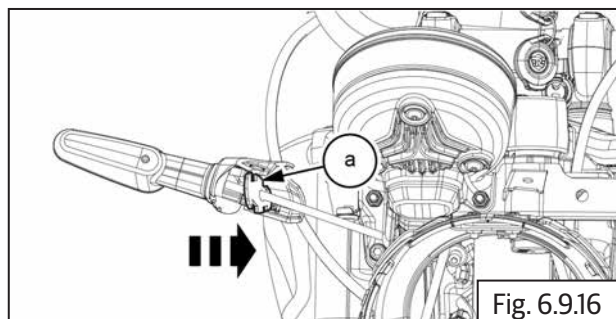


3mm Allen Socket with Ratchet

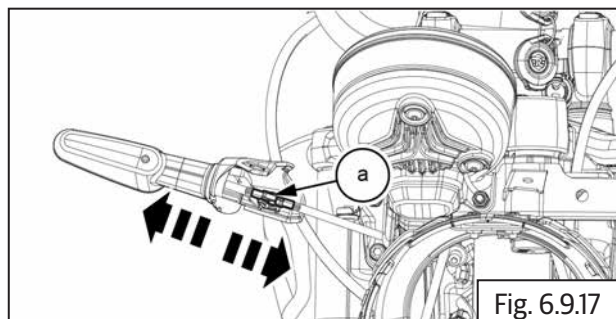
- Separate the top **(a)** and bottom **(b)** trafficator mount covers from the front frame assembly.



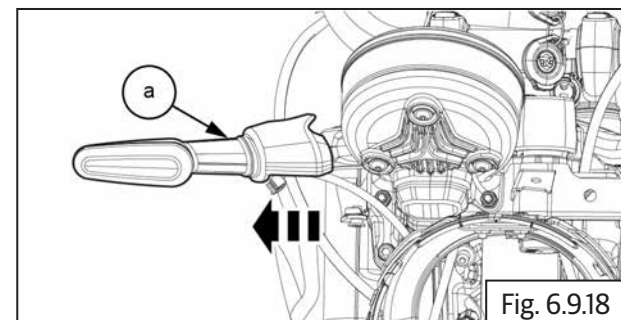
- Remove the retainer clip (a) from the trafficator.



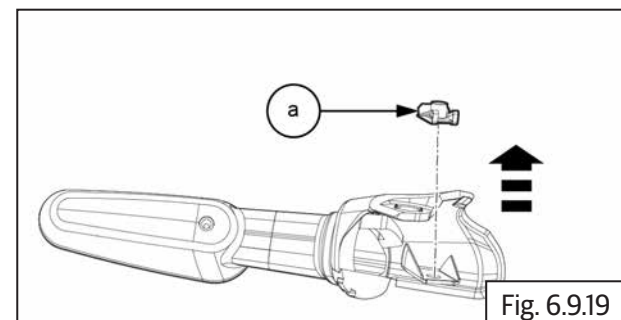
- Disconnect the trafficator coupler **(a)**.



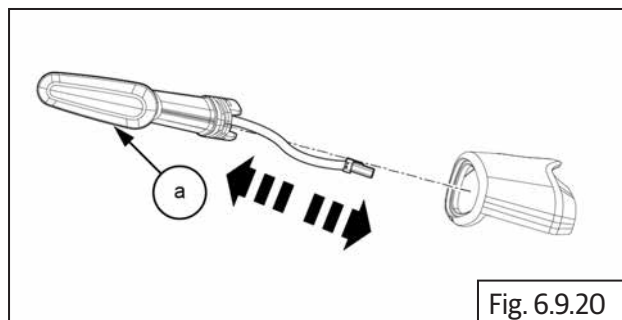
- Remove the trafficator assembly **(a)** from the front frame assembly.



- Remove the clip nut **(a)** from the top cover.

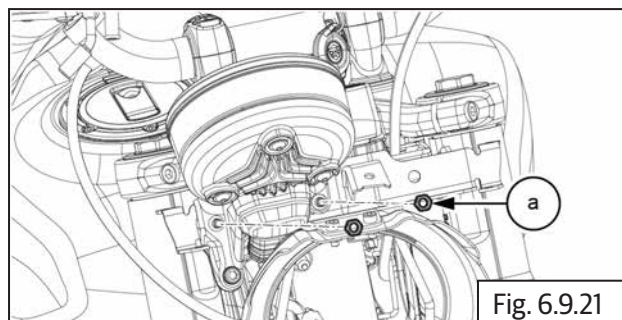


- Remove the trafficator **(a)** from the upper mount cover.

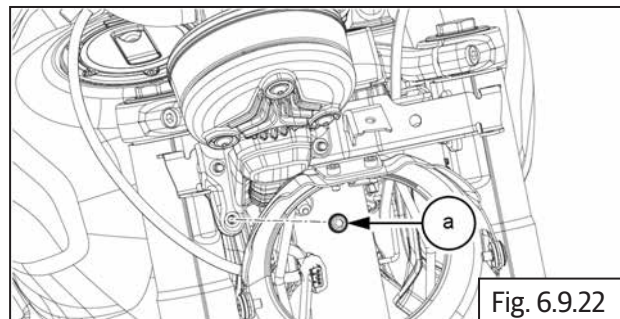


6.9.4 Cluster

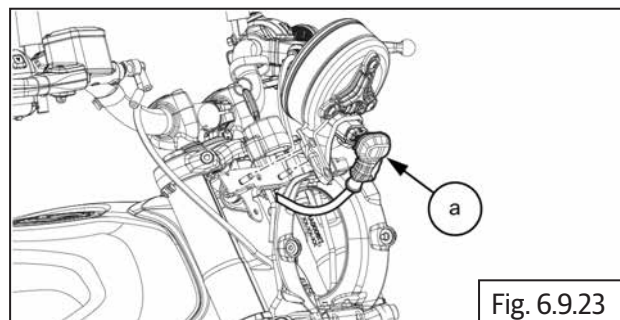
- Loosen and remove the **2 Nos** nuts **M6 (a)** from mounting bracket.



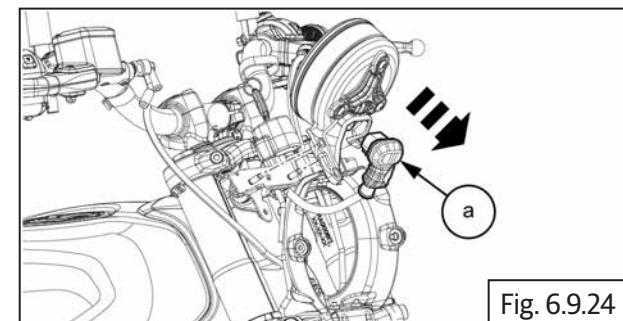
- Loosen and remove the button head bolt **M6 (a)** from mounting bracket.



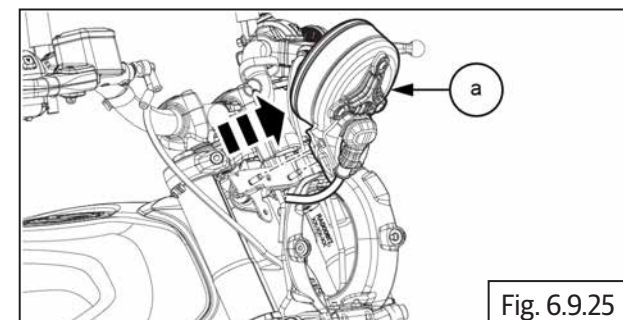
- Detach the cover **(a)** from the instrument cluster coupler.



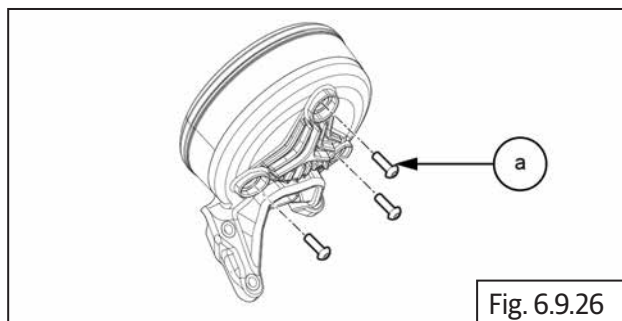
- Disconnect the instrument cluster coupler **(a)**.



- Remove the instrument cluster with mount **(a)** from front frame assembly.

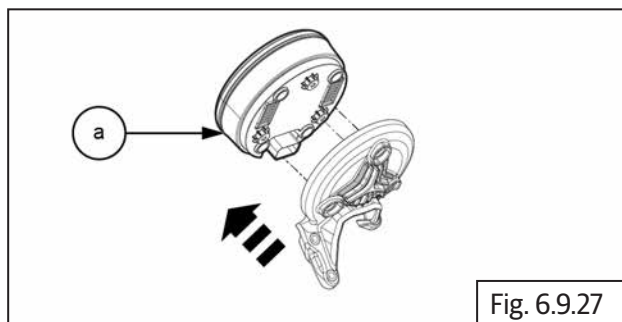


- Loosen and remove the **3 Nos** button head bolts **(M5) (a)** from instrument cluster.

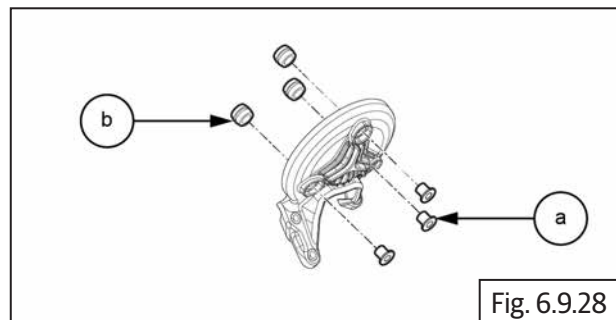


3mm Allen Socket with Ratchet

- Remove the cluster **(a)** from the cluster bracket.

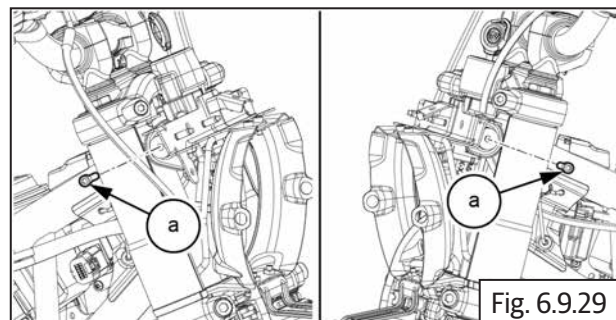


- Remove the **3 Nos** top hats **(a)** and grommets **(b)** from cluster bracket.



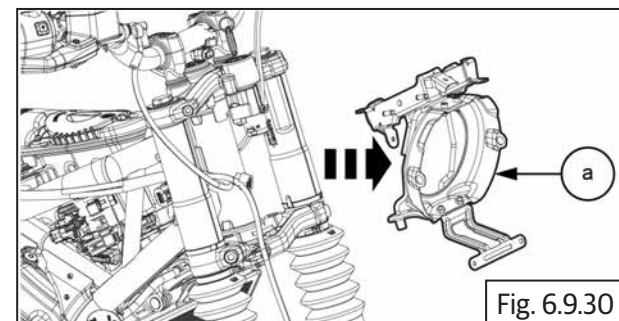
6.9.5 Headlamp Frame

- Loosen and remove the **2 Nos** cap bolts **(M6) (a)** from LH and RH head lamp frame.

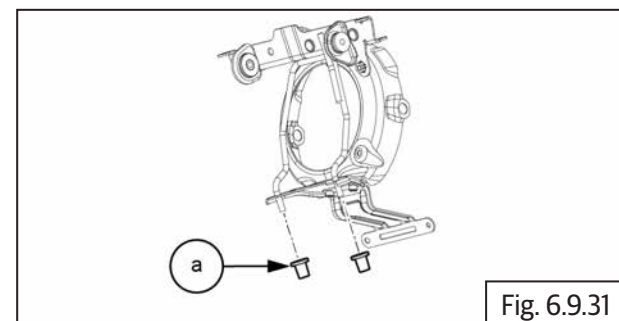


5mm Allen Socket with Ratchet

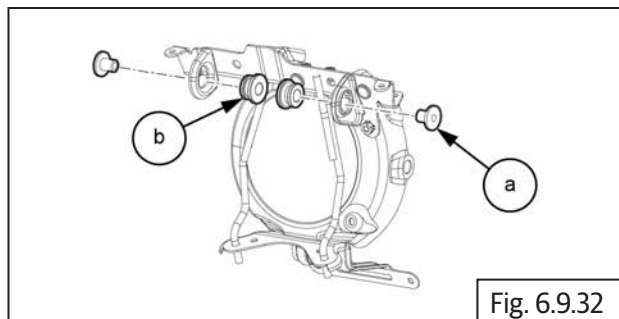
- Remove the headlamp frame **(a)** from the vehicle.



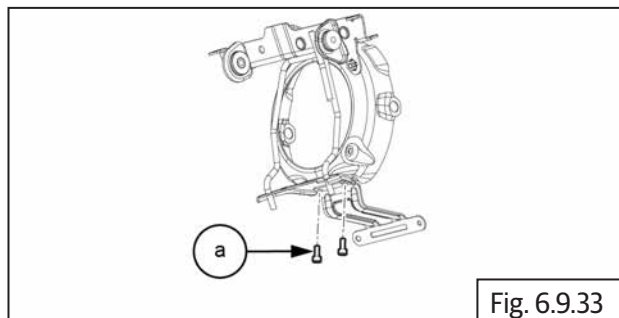
- Remove the grommet **(a)** from headlamp frame.



- Remove the **2 Nos** top hats **(a)** and grommets **(b)** from LHS and RHS of headlamp frame.

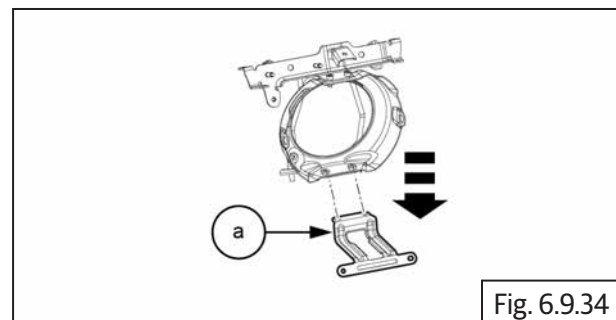


- Loosen and remove the **2 Nos** cap bolts **(M5)(a)** from the bottom side of the headlamp frame.

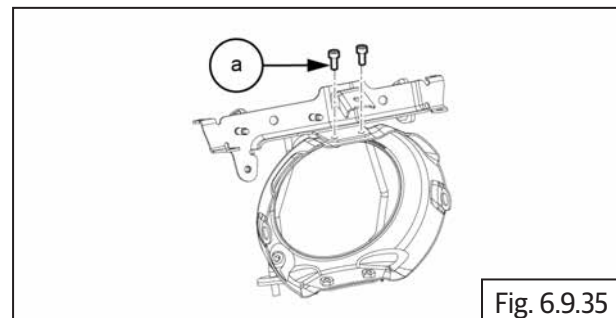


4mm Allen Socket with Ratchet

- Remove the number plate **(a)** from the bottom headlamp frame.

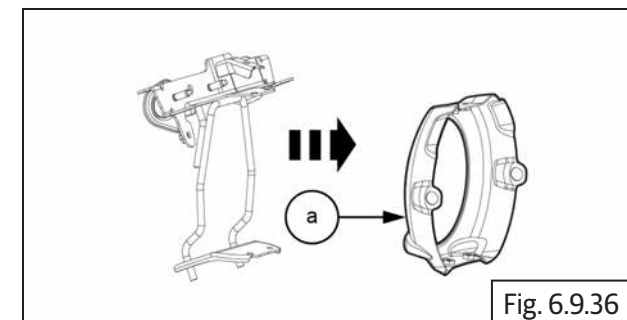


- Loosen and remove the **2 Nos** cap bolts **(M5)(a)** from the top side of the headlamp frame.

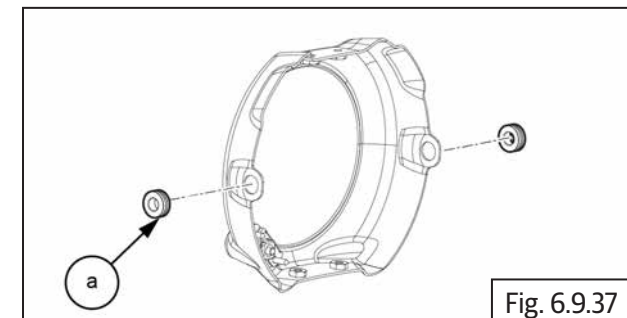


4mm Allen Socket with Ratchet

- Remove the headlamp mounting ring **(a)** from headlamp frame.



- Remove the **2 Nos** grommets **(a)** from headlamp mounting ring.



Assembly

⚠ CAUTION

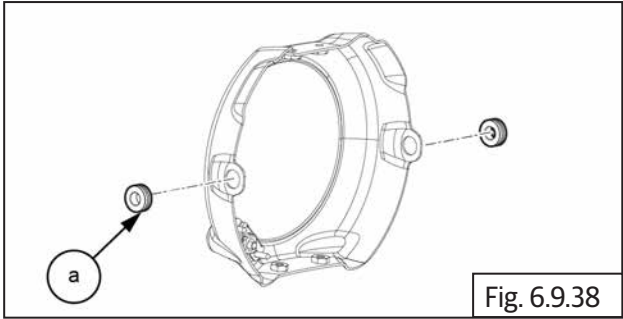
Do not over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

6.9.6 Headlamp Frame

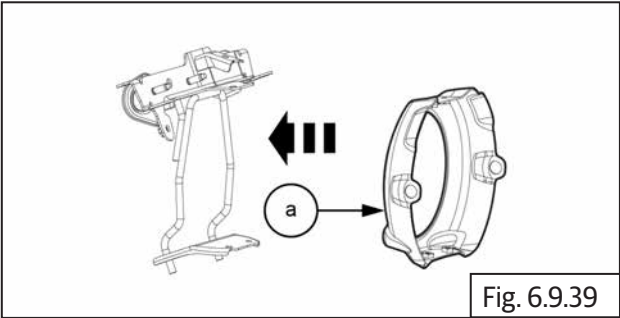
⚠ CAUTION

Support the Headlamp assembly carefully.

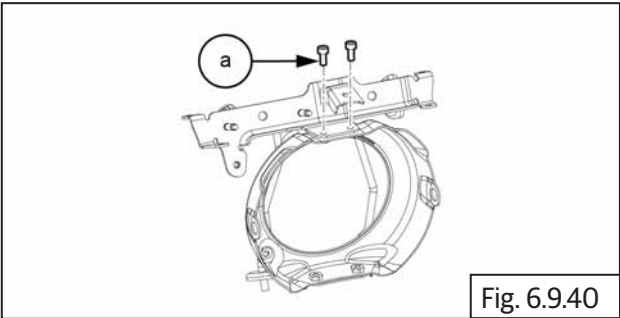
- Locate and install the **2 Nos** grommets **(a)** on headlamp mounting ring.



- Locate the headlamp mounting ring **(a)** to the headlamp frame.

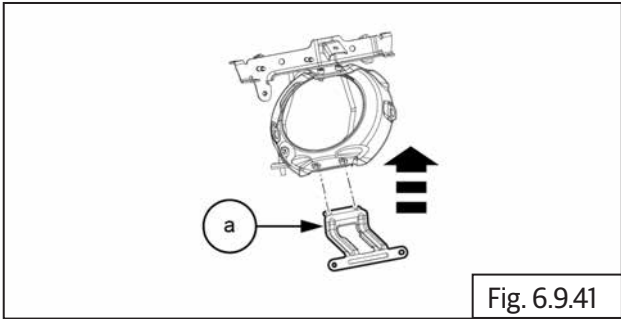


- Tighten the **2 Nos** cap bolts **(M5) (a)** on the top side of the headlamp frame.

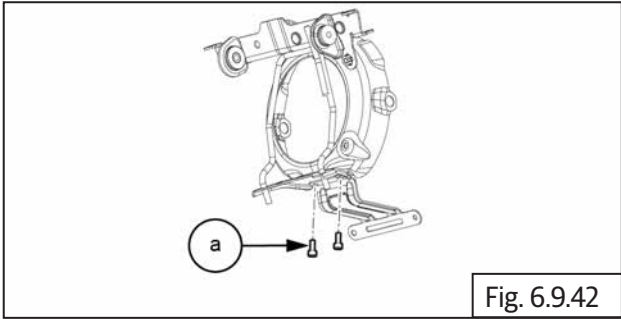


	4mm Allen Socket with Ratchet
	$5 \pm 0.7 \text{ Nm} / 0.5 \pm 0.07 \text{Kgf} \cdot \text{m}$

- Locate the number plate **(a)** to the bottom of the headlamp frame.

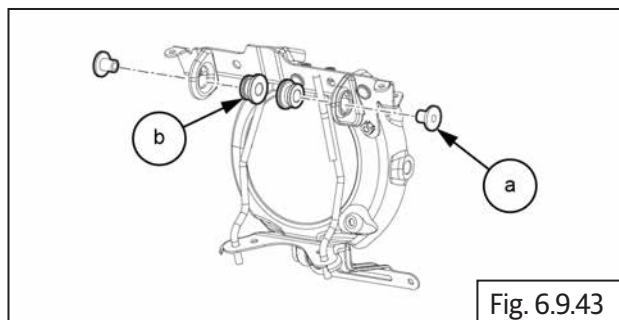


- Locate and tighten the **2 Nos** cap bolts **(M5)(a)** on the bottom side of the headlamp frame.

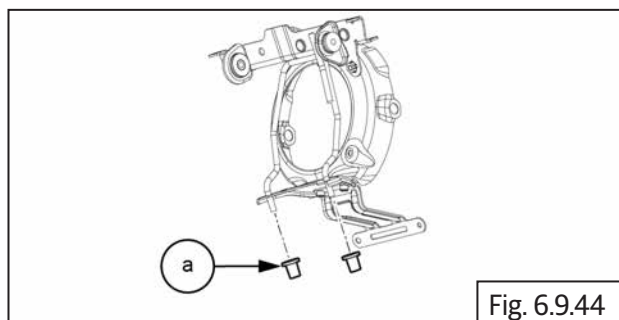


	4mm Allen Socket with Ratchet
	$5 \pm 0.7 \text{ Nm} / 0.5 \pm 0.07 \text{Kgf} \cdot \text{m}$

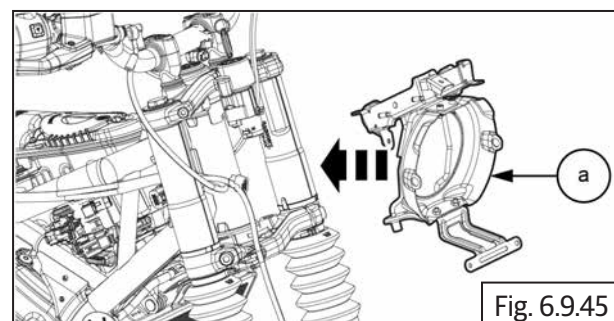
- Insert the **2 Nos** top hats **(a)** and grommets **(b)** to the LHS and RHS of the headlamp frame.



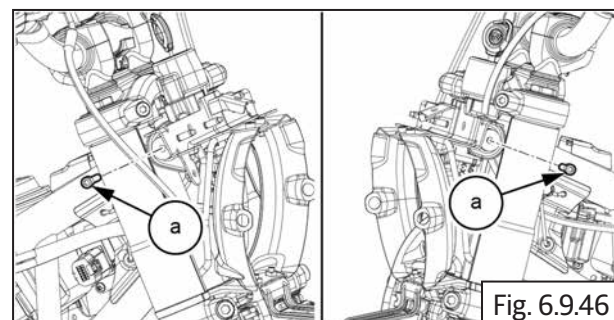
- Insert the grommet **(a)** into the bottom headlamp frame.



- Locate the headlamp frame **(a)** on the vehicle.



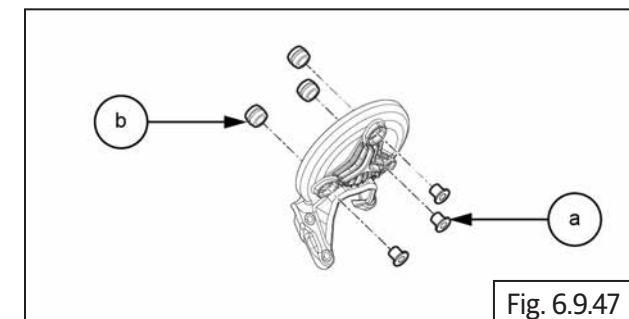
- Tighten the **2 Nos** cap bolts **(M6) (a)** on the LH and RH headlamp frame.



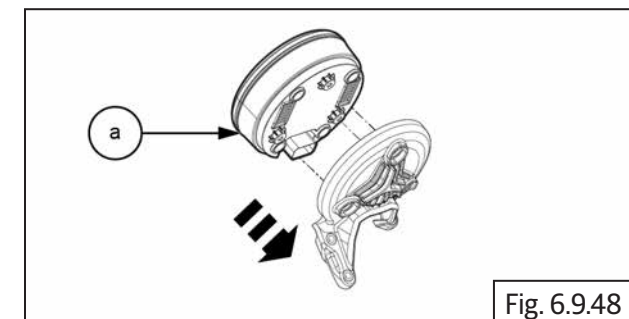
	5mm Allen Socket with Ratchet
	$10 \pm 1.5 \text{ Nm} / 1.0 \pm 0.15 \text{ Kg} \cdot \text{m}$

6.9.7 Cluster

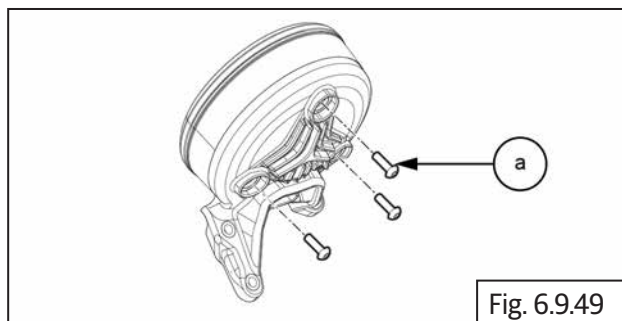
- Locate the **3 Nos** top hats **(a)** and grommets **(b)** into the cluster bracket.



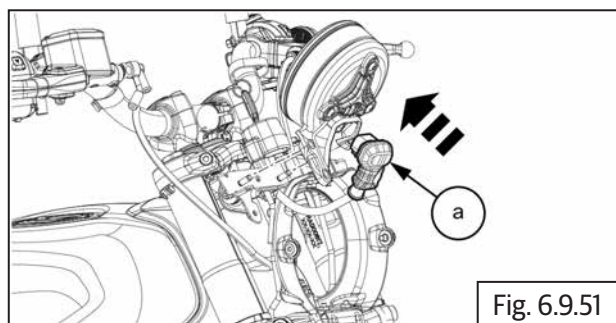
- Locate the cluster **(a)** on cluster bracket.



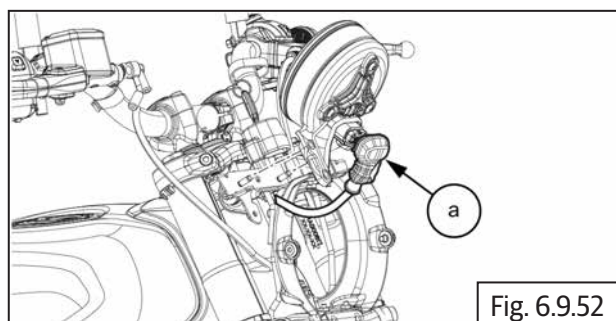
- Locate and tighten the **3 Nos** button head bolts **(M5) (a)** on the instrument cluster.



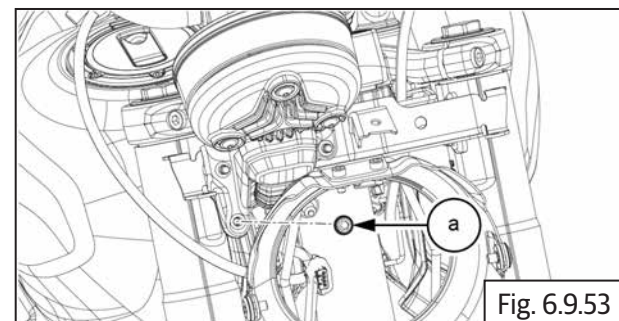
- Connect the instrument cluster coupler **(a)**.



- Fix the cover **(a)** to the instrument cluster coupler.

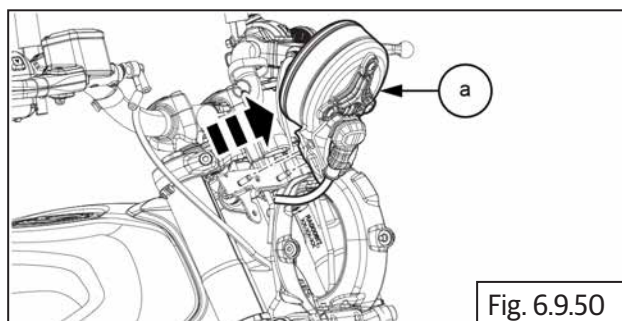


- Locate and tighten the button head bolt **M6 (a)** on the mounting bracket.



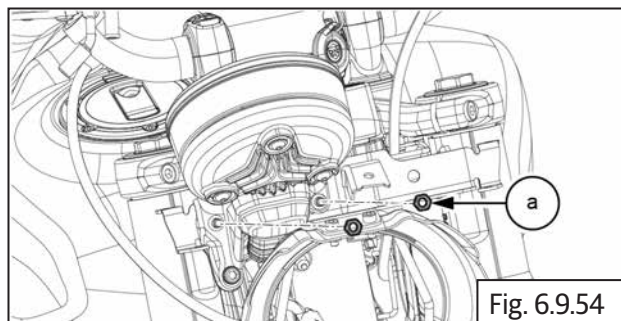
	3mm Allen Socket with Ratchet
	$5 \pm 0.7 \text{ Nm} / 0.5 \pm 0.07 \text{ Kgf} \cdot \text{m}$

- Locate the instrument cluster with mount **(a)** to the front frame assembly.



	5mm Allen Socket with Ratchet
	$10 \pm 1 \text{ Nm} / 1.0 \pm 0.1 \text{ Kgf} \cdot \text{m}$

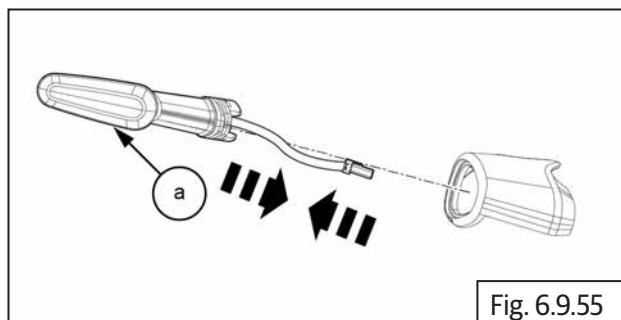
- Locate and tighten the **2 Nos** nuts **M6 (a)** on the mounting bracket.



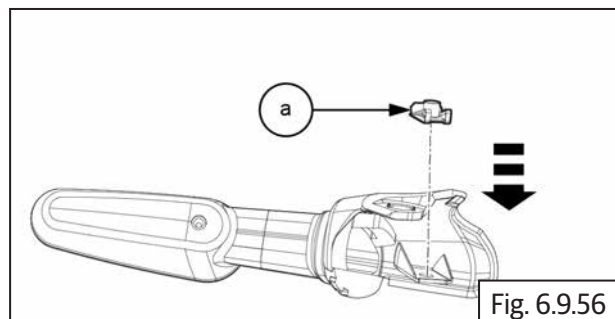
	10mm Socket with Ratchet
	$10 \pm 1\text{Nm}$ / $1.0 \pm 0.1\text{Kgf} \cdot \text{m}$

6.9.8 Trafficator RH

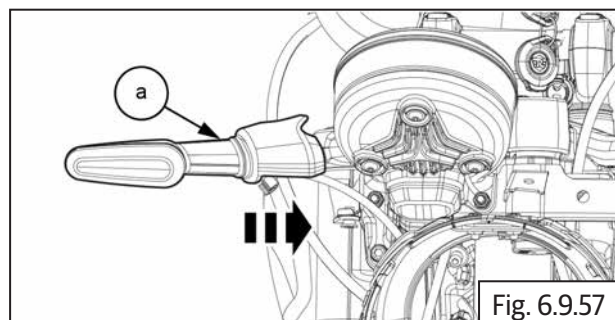
- Install the trafficator **(a)** to the upper mount cover.



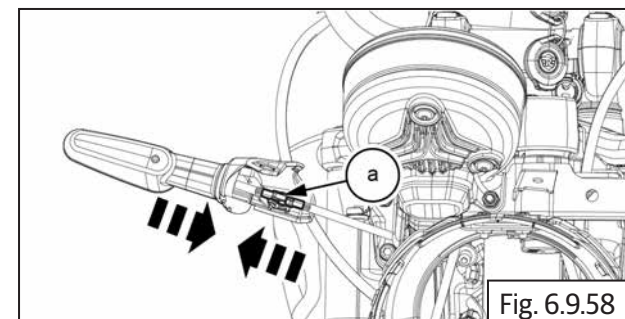
- Fix the clip nut **(a)** to the top cover.



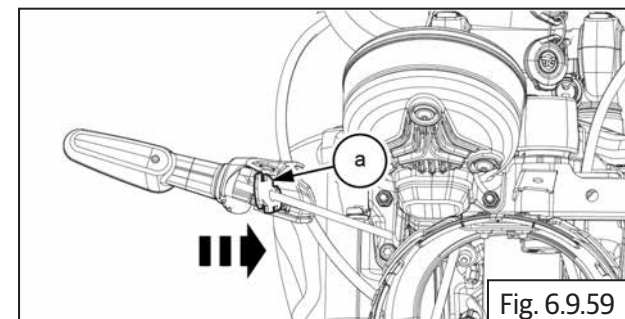
- Locate the trafficator assembly **(a)** to the front frame assembly.



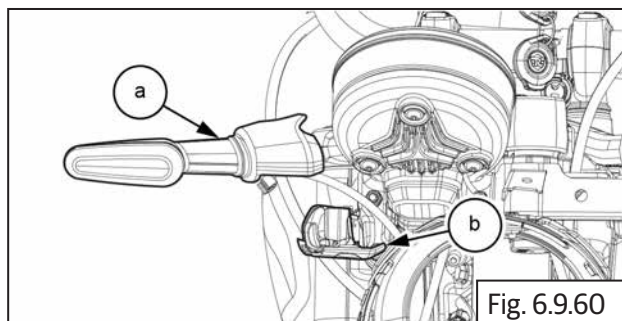
- Connect the trafficator coupler **(a)**.



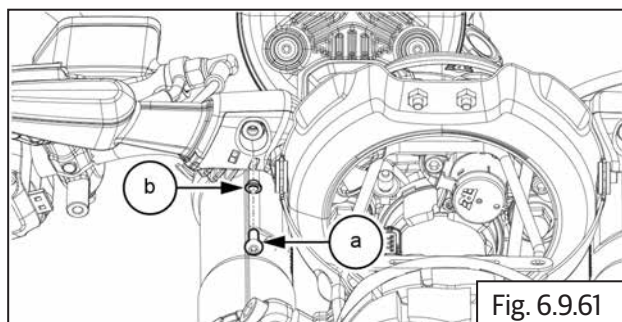
- Fix the retainer clip **(a)** to the trafficator.



- Locate the top **(a)** and bottom **(b)** trafficator cover on front frame assembly.

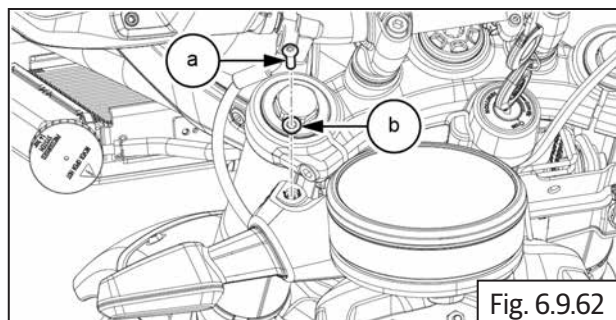


- Locate and tighten the button bolt **M5 (a)** with top hat washer **(b)** on trafficator bottom cover.



	3mm Allen Socket with Ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

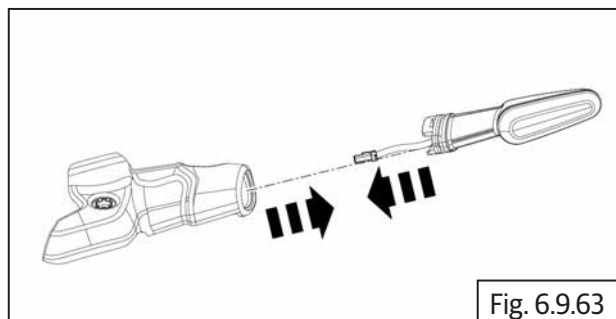
- Locate and tighten the button head bolt **(M5) (a)** and top hat washer **(b)** on trafficator upper cover.



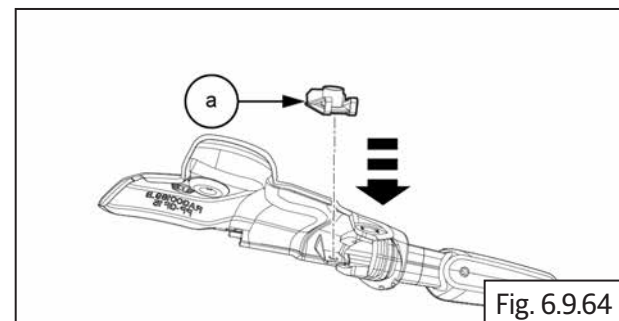
	3mm Allen Socket with Ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

6.9.9 Trafficator LH

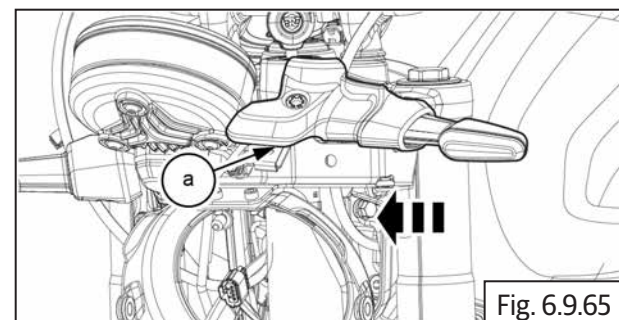
- Install the indicator **(a)** on upper mount cover.



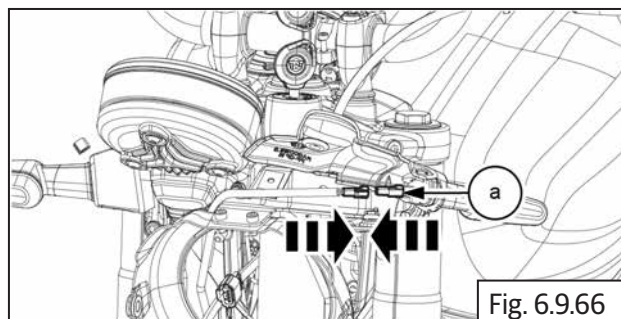
- Fix the clip nut **(a)** on upper mount cover.



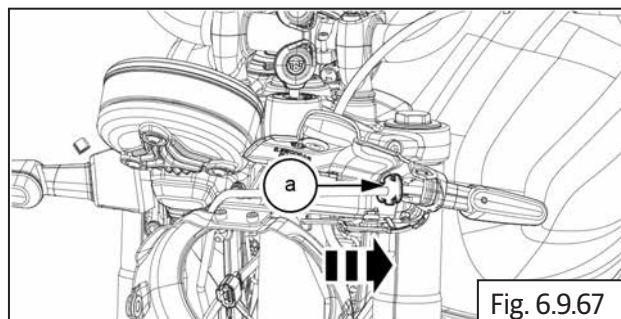
- Locate the trafficator assembly **(a)** on front frame assembly.



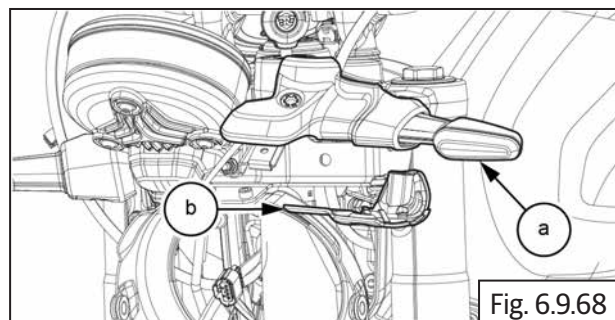
- Connect the trafficator coupler **(a)**.



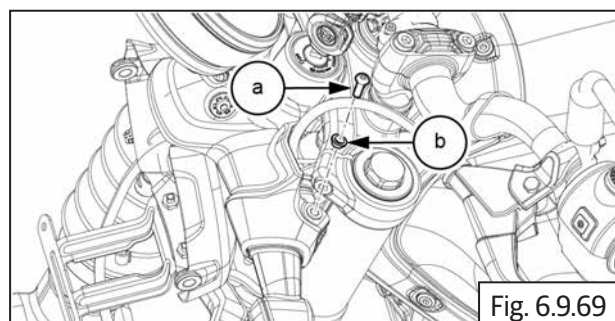
- Fix the retainer clip **(a)** on trafficator.



- Locate the upper **(a)** and lower **(b)** mount cover on front frame assembly.

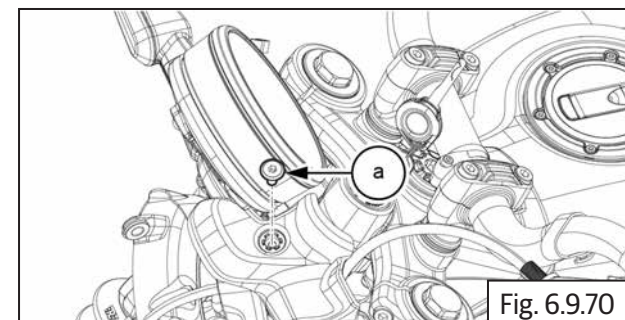


- Locate and tighten the button head bolt **(M5) (a)** and top hat washer **(b)** on trafficator upper mount cover.



	3mm Allen Socket with Ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

- Locate and tighten the shoulder head bolt **M6 (a)** on trafficator upper cover.



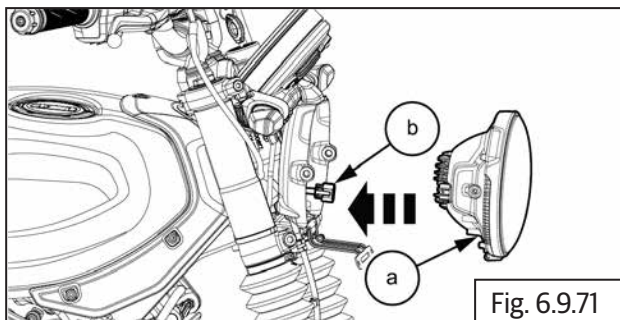
	5mm Allen Socket with Ratchet
	$10 \pm 1.5 \text{ Nm} / 1.0 \pm 0.15 \text{ Kgf} \cdot \text{m}$

6.9.10 Headlamp

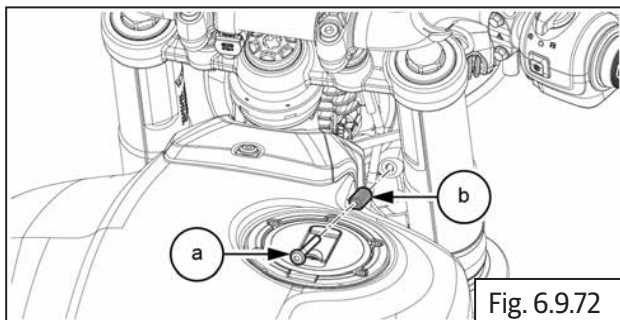
Note

- The headlamp has a LED lighting system. In the event of failure, the headlamp LED assembly should be replaced.

- Locate the head lamp assembly **(a)**.
- Connect the headlamp coupler **(b)**.

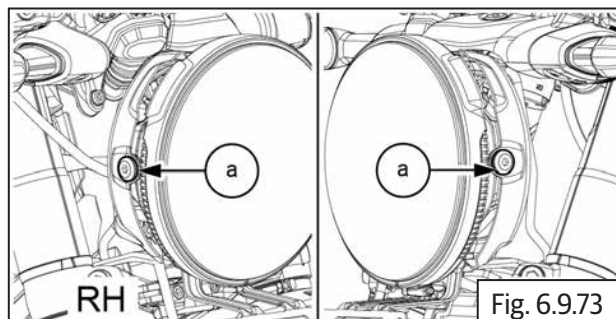


- Gently locate and tighten the head light beam adjustment screw **(a)** with spring **(b)**.



	4 mm Allen Socket with Ratchet
--	--------------------------------

- Locate and tighten the shoulder head bolts **(a)** on the LH and RH side of the head lamp holder.



	4mm Allen Socket with Ratchet
	3 - 4 N-m / 0.3 - 0.4 kgf-m

- Connect the battery terminals.
- Make sure the cluster, front trafficators, and head-lamp are working properly.

FUEL SYSTEM

CONTENTS	PAGE
7. Fuel System	397
Dismantling	397
7.1. Fuel Tank	397
7.2. Fuel Tank Cap	400
7.3. Fuel Tank Rear Mount Bracket	400
7.4. Fuel Pump with fuel level sensor	401
7.5. Strainer	402
Inspection	403
7.6. Fuel Float	403
7.7. Fuel Pump	404
Assembly	405
7.8. Strainer	405
7.9. Fuel Pump with fuel level sensor	406
7.10 Fuel Tank Rear Mount Bracket	407
7.11. Fuel Tank Cap.....	407
7.12. Fuel Tank	408

7. Fuel System

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Please handle with care. Improper handling can lead to fatal accident or serious injury. Always drain/fill fuel only in a well ventilated area.

Ensure there is no scope for flames or sparks near by while draining/filling fuel.

⚠ CAUTION

Make sure the fuel pressure is relieved before disconnecting the fuel connection.

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

FUEL DELIVERY MODULE (FDM) - Don'ts during serviceability

- Avoid handling / holding FDM using Strainer, Cover supply port, Electrical connector and Harness.
- Hands must be free from dust, oil & water during part handling.
- No liquid-based testing allowed.
- Dust cap must not be removed until mating hoses are assembled (Confirmation required for dust cap removal during leak testing).

- Fuel Supply Port and Electrical connector shall be completely covered during leak testing.
- No Compression/Pressure applied on FDM Strainer.
- Harness & all electrical connections must not be pulled/disturbed.
- All sealing surfaces, Strainer must not be touched by any gauge/ fixture or tool.
- Old seal should not be reused.
- Bar code label on cover must not be removed.
- Once if FDM is dropped should not be used and it must go to rejection.
- Polybags must be removed just before assembly to tank if any.

Dismantling

7.1. Fuel Tank

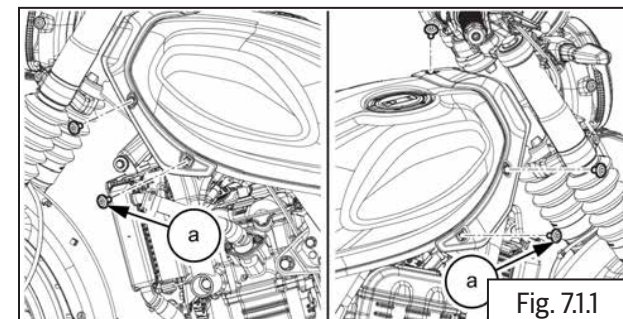
Prior Removal:

- Ensure ignition key and engine stop switch are in OFF position.
- Remove the seats (Refer Side Panels and Seat Chapter).
- Disconnect battery negative (-) terminal.

⚠ CAUTION

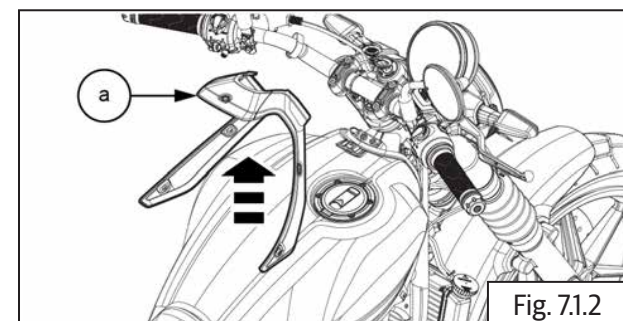
Be careful while connecting and disconnecting the electrical couplers. Do not damage pins of the couplers.

- Loosen and remove **5 Nos. Button bolts (M5) (a)** from LHS and RHS of the fuel tank cover.

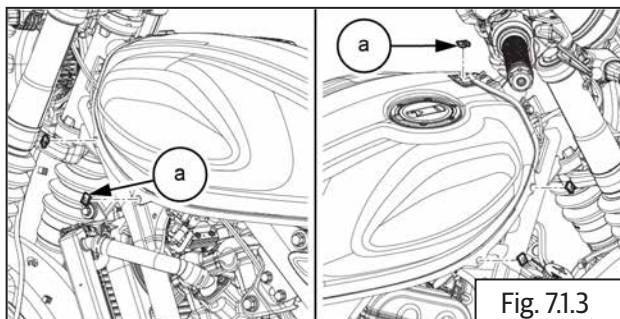


4mm Allen Socket with Ratchet

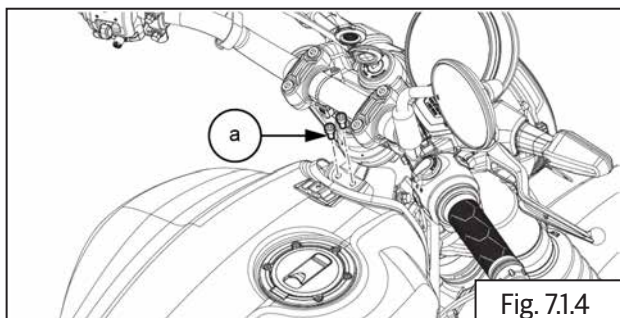
- Remove the cover **(a)** from the fuel tank.



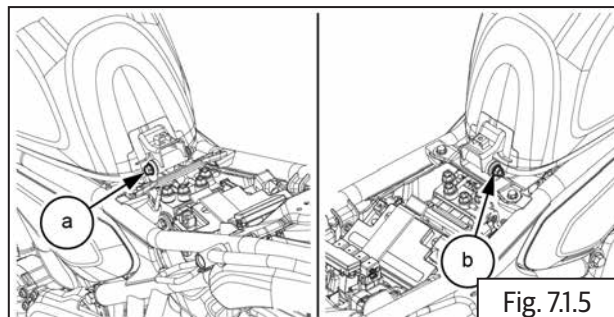
- Remove the **5 Nos** clip nuts **(a)** from fuel tank.



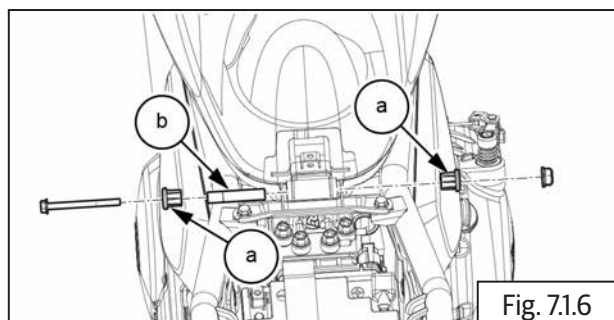
- Loosen and remove **2 Nos.** cap bolts **(M6) (a)** from fuel tank front bracket.



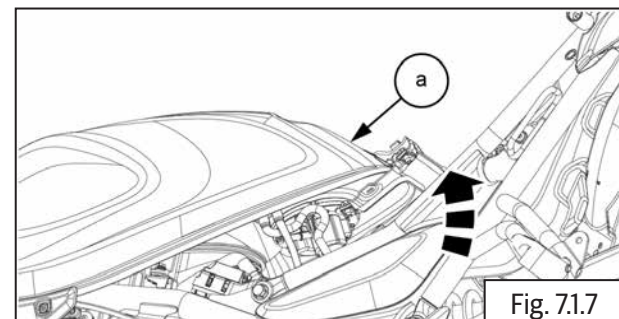
- Loosen and remove Hex head flange bolt **(a)** and nut **(M6) (b)** from rear end of fuel tank on frame.



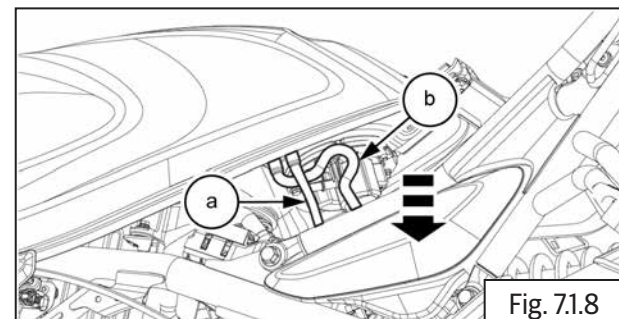
- Remove **2 Nos** dampers **(a)** and spacer **(b)** from fuel tank.



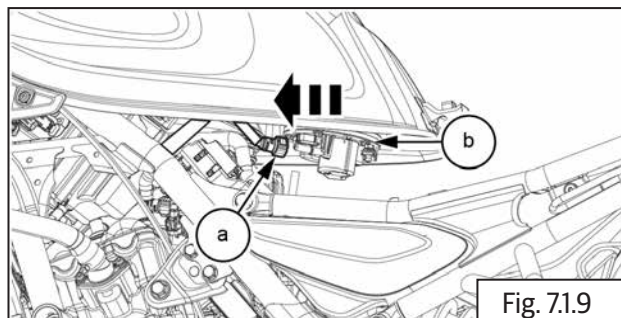
- Gently lift fuel tank **(a)** upwards and pull backwards slightly.



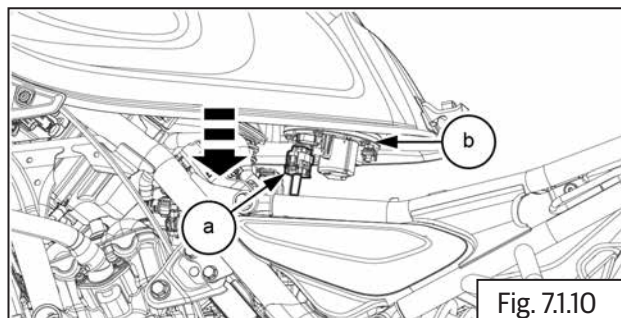
- Disconnect EVAP connection hose **(a)** from bottom of fuel tank.
- Disconnect drain hose connection **(b)** from bottom of fuel tank



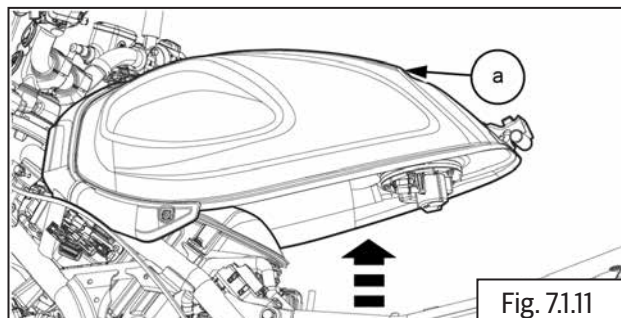
- Clean quick fix adapter area and disconnect by pressing lock button **(a)** from fuel pump **(b)**.



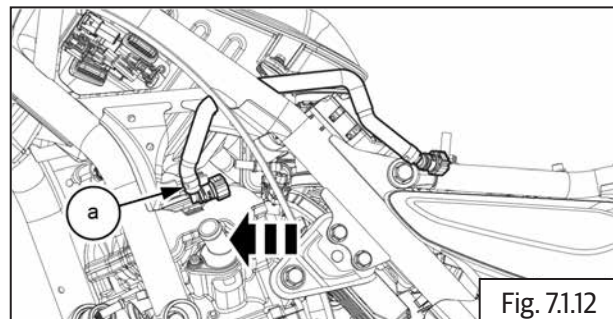
- Disconnect fuel pump connector **(a)** from fuel pump **(b)**.



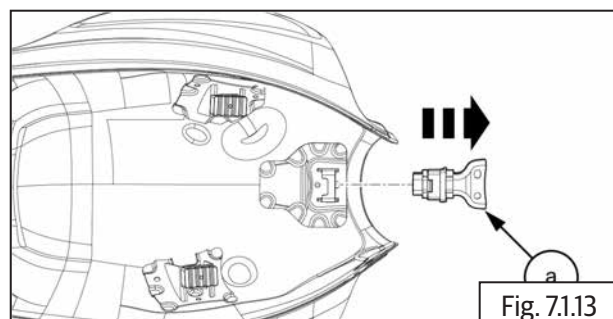
- Gently remove fuel tank **(a)** from frame.



- Remove fuel hose **(a)** from injector cap.

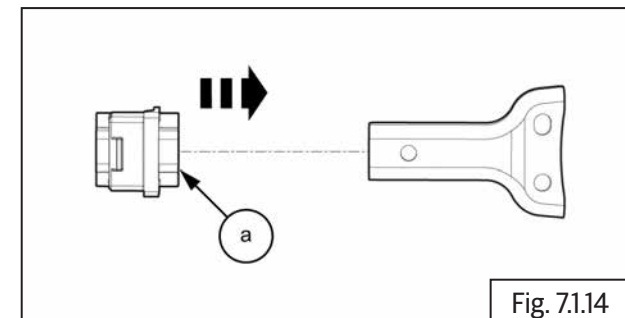


- Remove the front rubber mount and front bracket **(a)** from fuel tank.



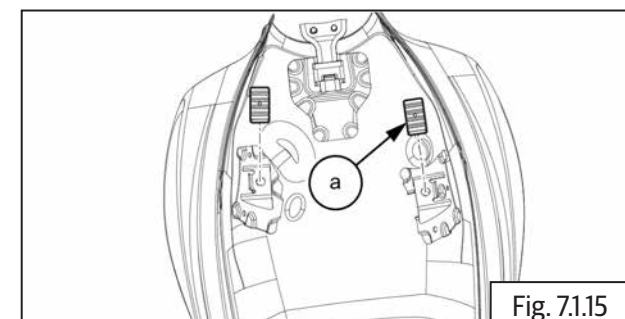
Flat Head Screwdriver

- Separate the front rubber mount **(a)** and front bracket.



Flat Head Screwdriver

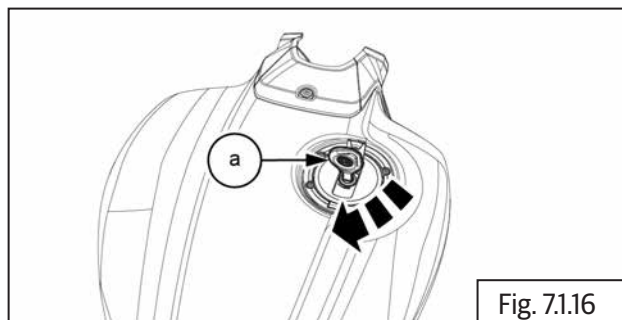
- Remove the **2 Nos.** rubber mount **(a)** from fuel tank.



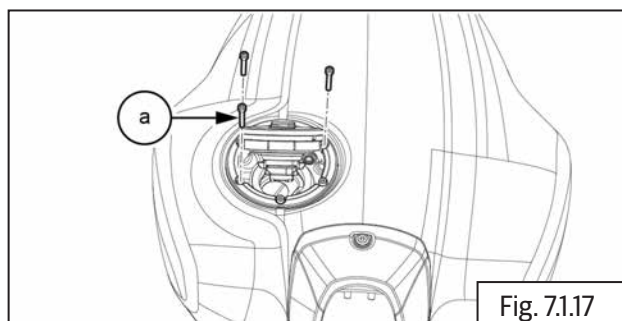
Flat Head Screwdriver

7.2 Fuel Tank Cap

- Lift key flap on fuel tank and insert key **(a)** turn clock wise to open.

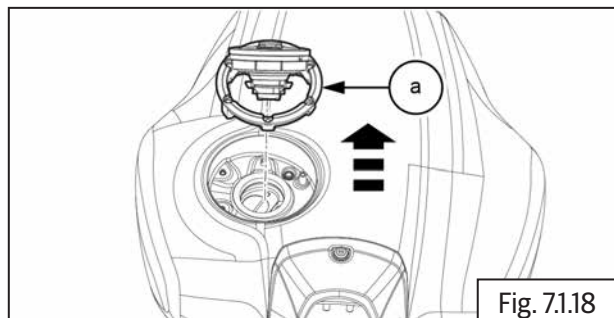


- Loosen and remove **3 Nos.** cap bolts **(M4) (a)** from fuel tank outer ring.

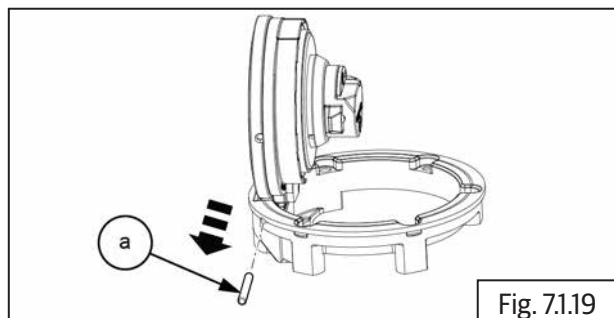


3mm Allen Socket with Ratchet

- Remove the outer ring with tank cap **(a)** from fuel tank.

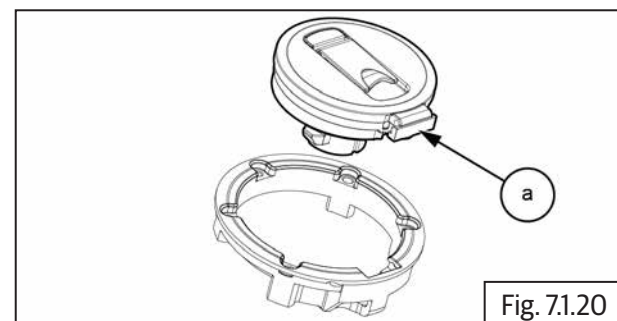


- Gently tap to remove spring dowel **(a)** from tank cap.



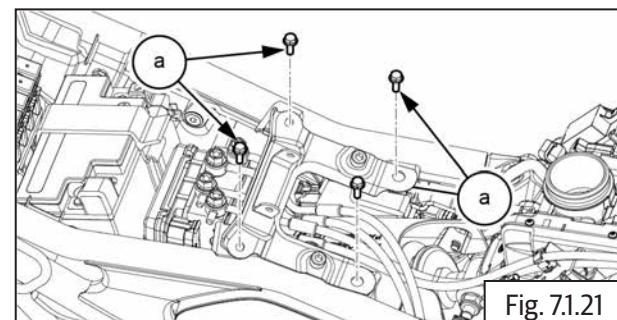
Punch and Mallet

- Remove the tank cap **(a)** from outer ring.



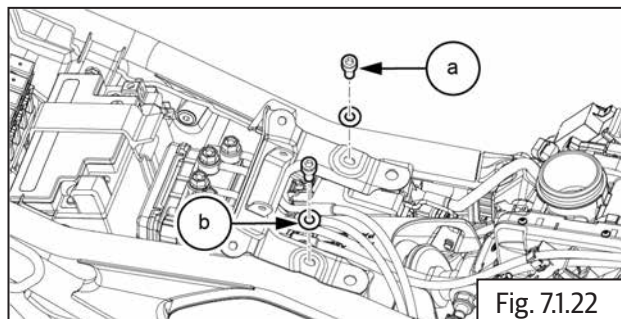
7.3. Fuel Tank Rear Mount Bracket

- Loosen and remove **4 Nos.** Flange Heads bolts **(M6) (a)** from rear mount bracket.



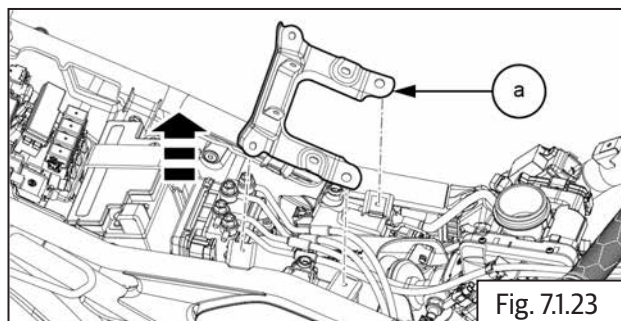
10mm Socket with Ratchet

- Loosen and remove **2 Nos.** cap bolts **(M6) (a)** with washers **(b)** from rear mount bracket.

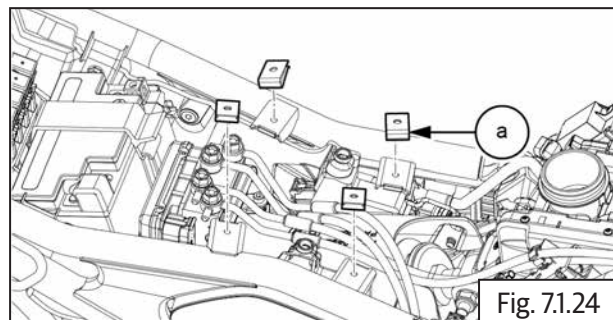


5 mm Allen Socket with Ratchet

- Remove the tank rear mount bracket **(a)**.



- Remove the **4 Nos** clip nuts **(a)** from frame.



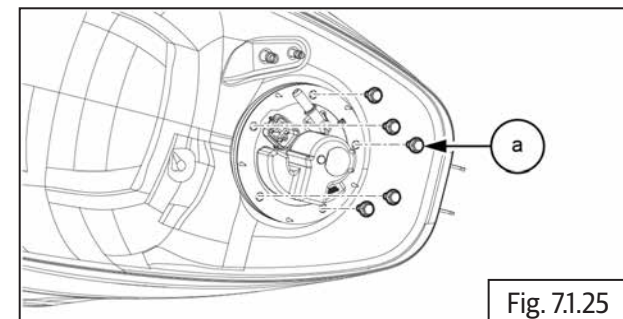
7.4. Fuel Pump with fuel level sensor

- Invert fuel tank to access fuel pump with float.

⚠ CAUTION

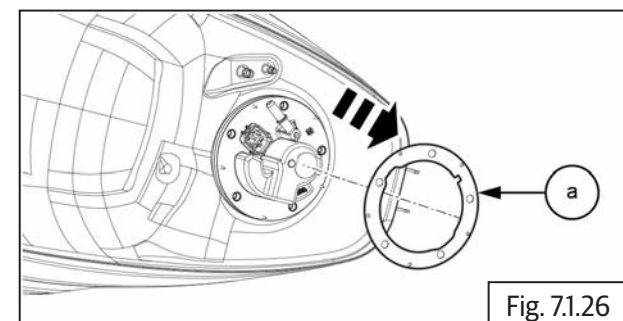
- Ensure the tank top/side surfaces DO NOT get damaged or scratched while removing fuel pump/float. Provide adequate protection to fuel tank.**

- Loosen and remove **5 Nos.** Hex flange collar bolts **(M5) (a)** from fuel pump.

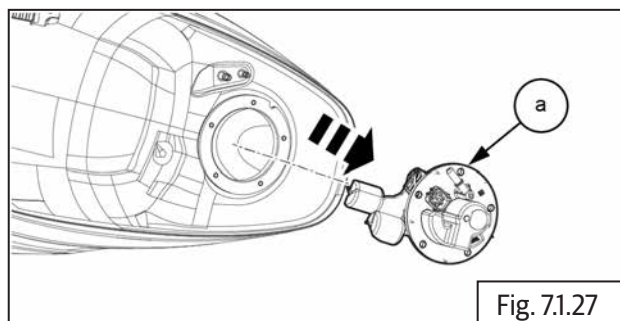


8 mm Socket with Ratchet

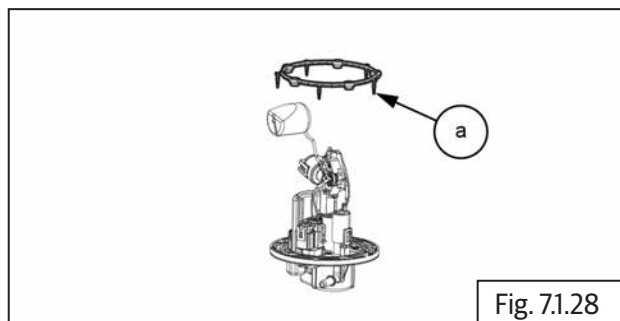
- Remove lock plate **(a)** from fuel pump.



- Gently pull out the fuel pump **(a)** from fuel tank.



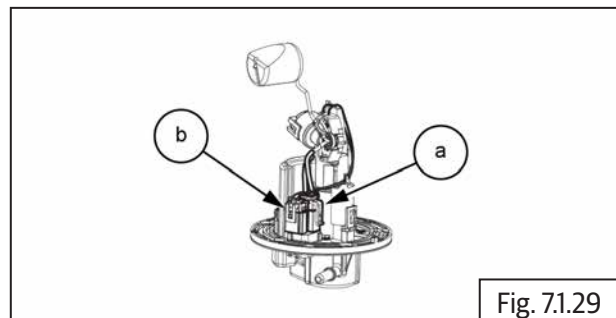
- Remove seal **(a)** from fuel pump.



7.5. Strainer

- Ensure clean work area prior to the replacement process.
- To ensure there is no damage to the wiring harness during the strainer serviceability. we suggest to remove the coupler from fuel pump **(a)** and fuel level sensor **(b)**.

- Then without damaging/deforming locks provided in the connector take out the coupler carefully.



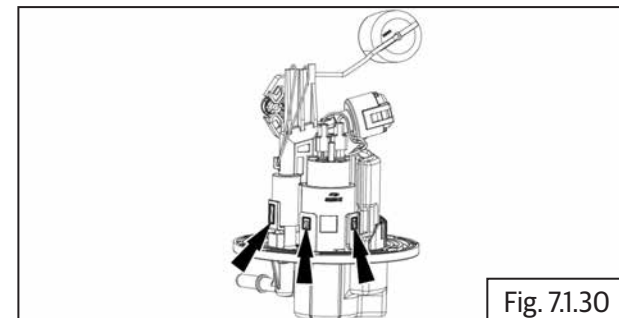
NOTE

- This operation requires 2 persons.*

- Pull the snap window gently with the help of 2nd person.
- To remove snap 2 and 3, Either flat screw driver or fingers can be used.
- Once all the 3 snaps are unsnapped, Then pull the pump with float upwards carefully.

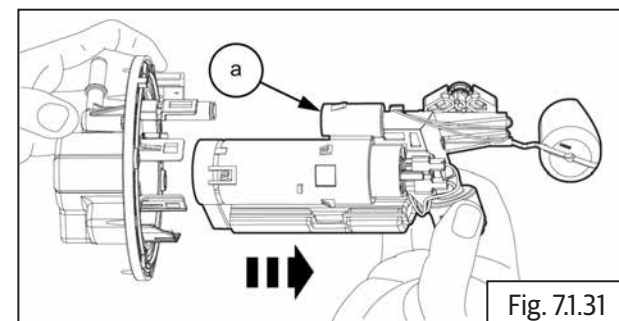
NOTE

- Please ensure that there is no deformation of snap windows.*



Flat Heat Screw Driver

- Hold the cover at bottom and then Pull the pump with float **(a)** in upward direction, till the complete pump with float is taken out.



- Lift the strainer snap window by screw driver from the snap (2 snaps) **(a)** provide in the pump retainer carefully.

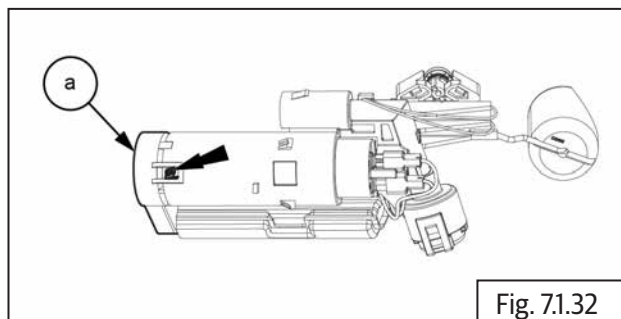


Fig. 7.1.32



Flat Heat Screw Driver

- Hold the pump with float **(a)** and then pull the strainer **(b)** carefully.
- Remove the strainer **(b)** carefully without damaging the pump.
- During strainer removal **(b)**, The pump with float **(a)** must be held firmly.

NOTE

- Please ensure pump inlet plate must not be damaged during removing strainer **(b)**.

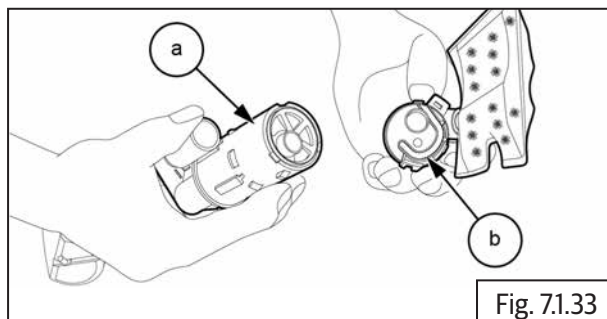


Fig. 7.1.33

NOTE

- While removing strainer, Ensure that no contaminations enters the pump spout until assembling the new strainer.

- Remove the "O" ring **(a)** from pump cover.

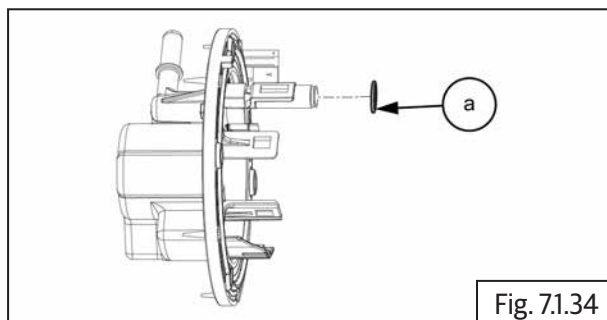


Fig. 7.1.34

⚠ CAUTION

Ensure the float unit does not gets damaged or bent while removing from fuel tank. Store fuel pump with float unit carefully. Do not disturb the level of the float unit as it will seriously affect fuel level indication.

Inspection

7.6. Fuel Float

- Keep the multimeter in resistance mode **200 Ω**.

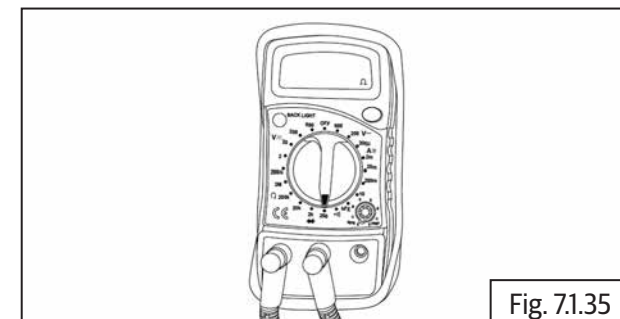


Fig. 7.1.35

- Connect the multimeter positive probe to **pin C** and negative probe to **pin D**.

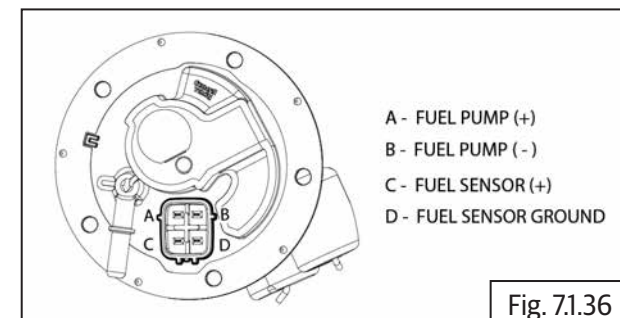
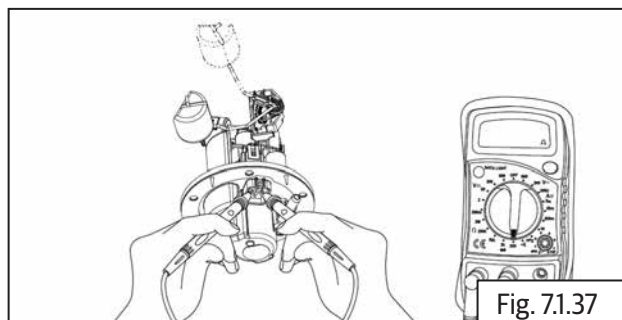


Fig. 7.1.36

- It is recommended to check float unit resistance @Empty, Half & Full conditions by multimeter as shown. (Ref. Resistance spec.).



Resistance Specification

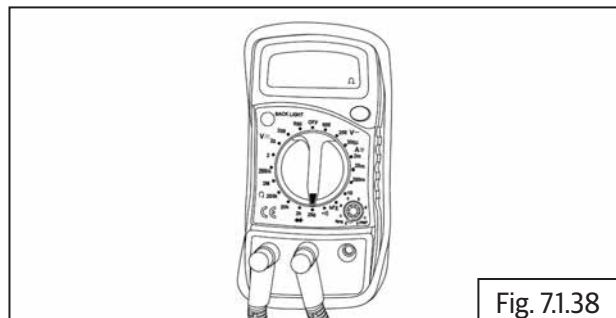
Float Position	"Resistance Value (OHM)"	"Tank Level"
1	110 ±2	Full
2	96 ±4	
3	70 ± 4	
4	48 ± 4	Half
5	28 ± 4	
6	10 ±2	Empty

- If the resistance is not meeting the specified limit and if fuel float assembly is punctured please replace the fuel float.

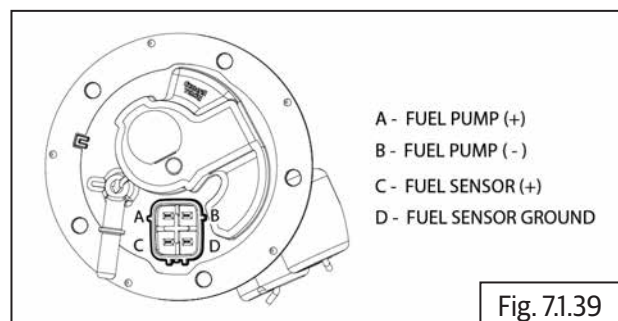
- Replace if fuel float assembly is punctured.

7.7. Fuel Pump

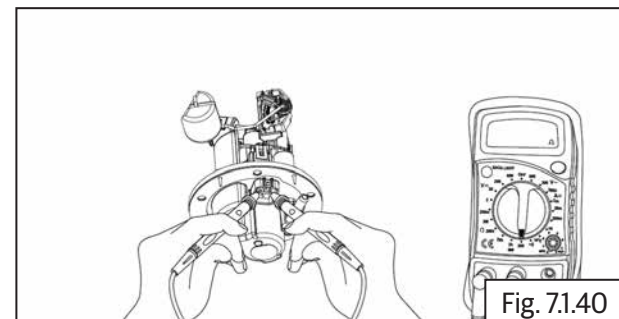
- Keep the multimeter in resistance mode **200 Ω**.



- Connect the multimeter positive probe to **pin A** and negative probe to **pin B**.
- Check the resistance value.



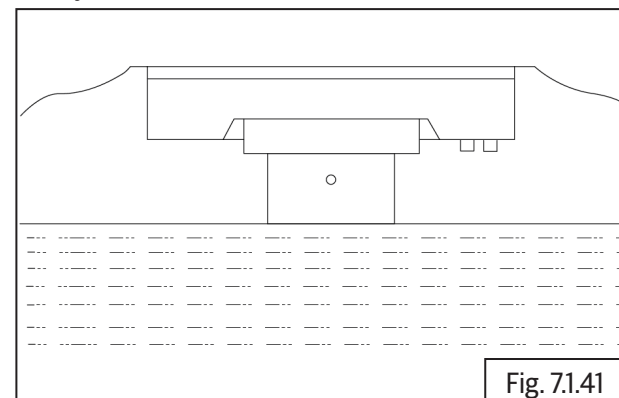
- Replace the fuel pump if resistances are out of specifications.



- Replace following whenever fuel system is dismantled:
 - Seals
 - Strainer
 - O Rings

Do's & Don'ts

- Do not fill fuel tank above anti-splash plate inside fuel tank as it will cause fuel to get into EVAP system.



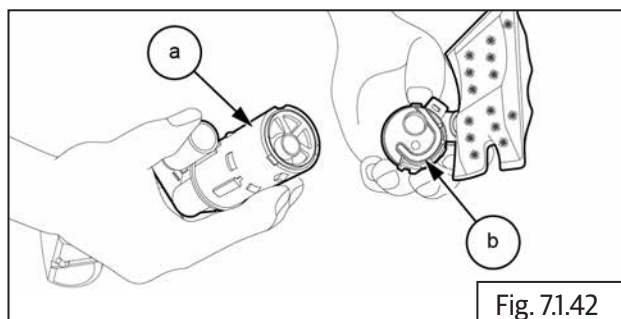
Assembly

7.8. Strainer

- Take new strainer **(b)** and remove the dust cap on the strainer.

NOTE

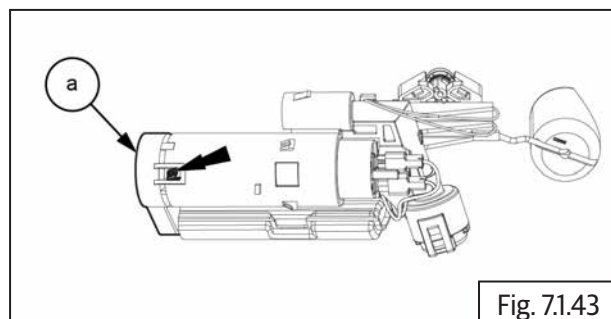
- The strainer assembly for the pump and pump retainer **(a)** it can be assembled in one direction.



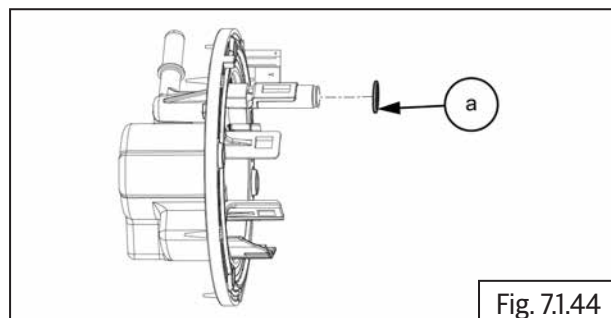
NOTE

- Ensure the Pump flow path and the Strainer spout is in the same line during assembly.

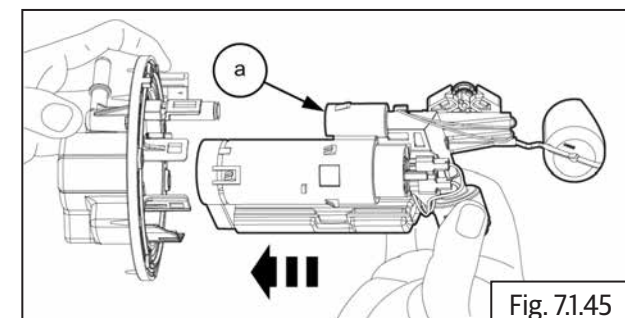
- Hold the pump retainer and push the strainer **(a)** until it get snapped.
- Press and Snap fit Make sure the locks in the strainer locked properly to the snaps provided in the module.



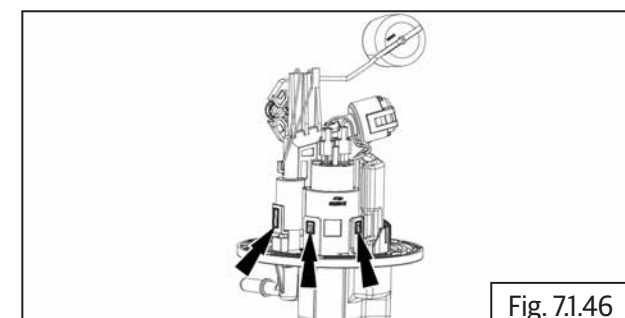
- Ensure the O ring **(a)** is present and no damages to the O ring during assembly.



- After completing the strainer assembly with the pump retainer. Assemble the pump retainer assembly **(a)** to the cover.
- Align pump retainer assembly **(a)** to the cover, and check the slot position in cover during alignment.
- Hold the module and lift the cover upwards carefully until the complete snap.

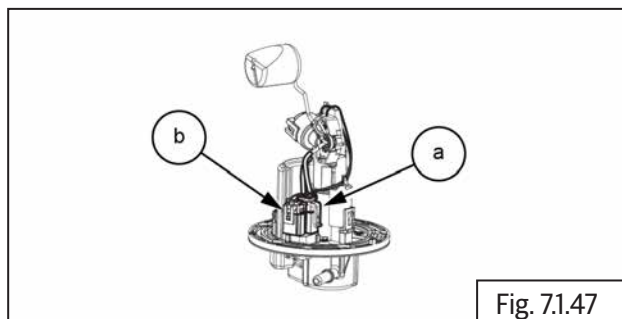


- Once assembled, Check all the 3 snaps are locked properly.



Flat Head Screw Driver

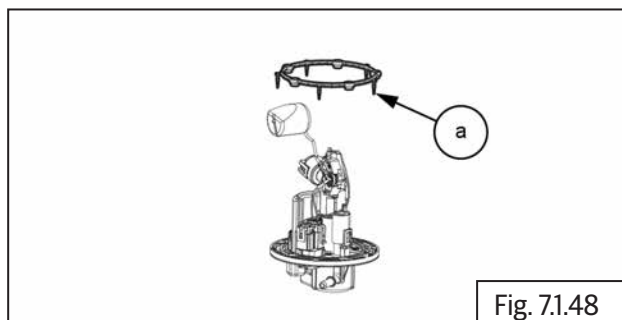
- Then realign the module to back side and then push the electrical couplers **(a)** and **(b)**. without damaging locks provided in the couplers.



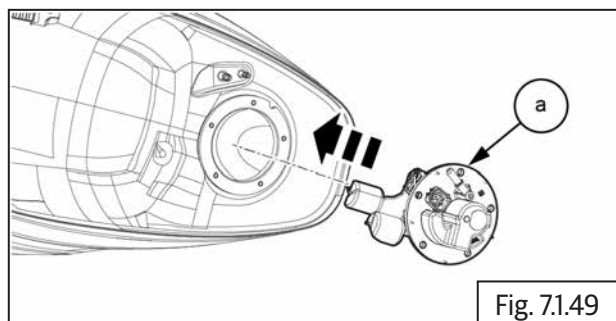
- Confirm the snap lock is properly fitted.

7.9. Fuel Pump with fuel level sensor

- Locate new seal **(a)** into fuel pump.

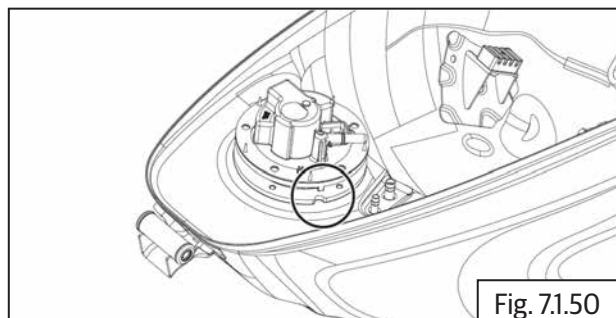


- Locate and place the fuel pump **(a)** into fuel tank.



NOTE

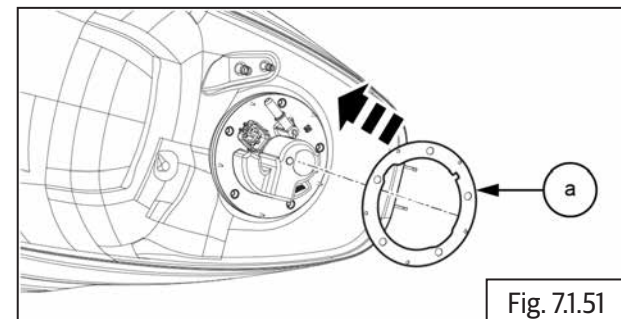
- Ensure the pump cover slot should be match to fuel tank slot.



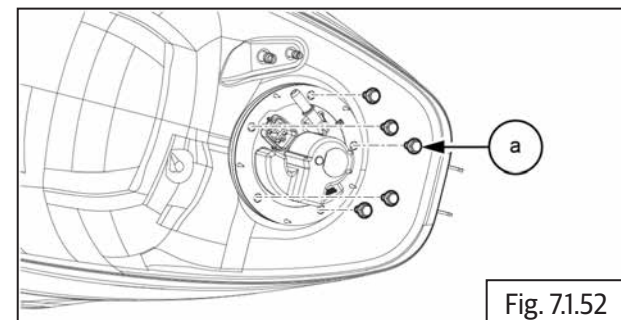
NOTE

- Fuel pump assembly to the tank it can be assembled in only one direction.

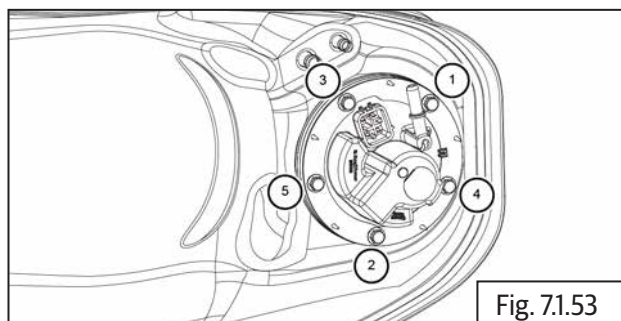
- Locate and position the lock plate **(a)** on the fuel pump.



- Locate the **5 Nos.** Hex head flange bolts **(M5) (a)** on the fuel pump.



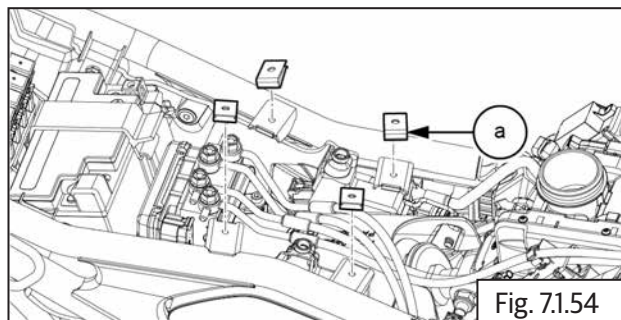
- Tighten the bolts below sequence.



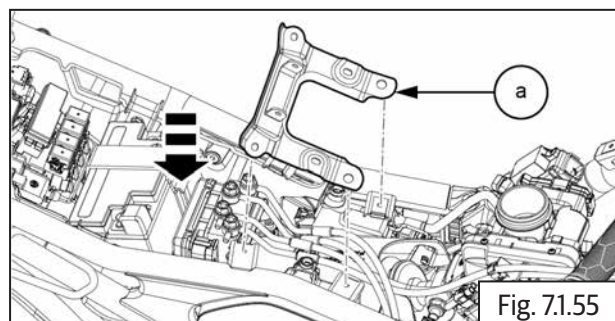
	8 mm Socket with Ratchet
	4.3 - 5.7 Nm / 0.43 - 0.57 - kgf-m

7.10. Fuel Tank Rear Mount Bracket

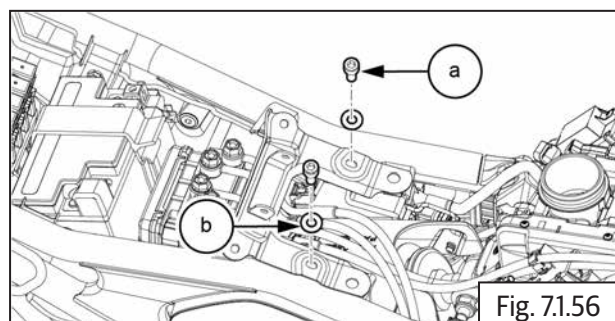
- Locate the 4 Nos clip nuts **(a)** on frame.



- Locate the tank rear mount bracket **(a)**.

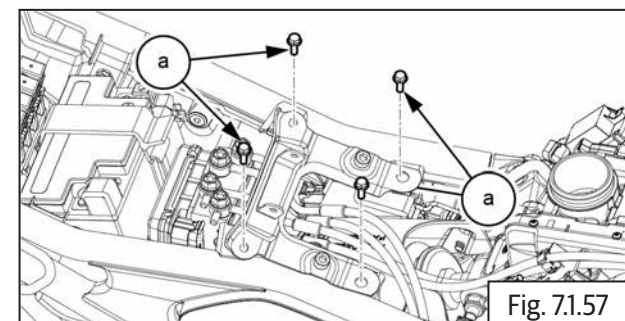


- Locate and tighten the **2 Nos.** cap bolts **(M6) (a)** with washers **(b)** on rear mount bracket.



	5 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

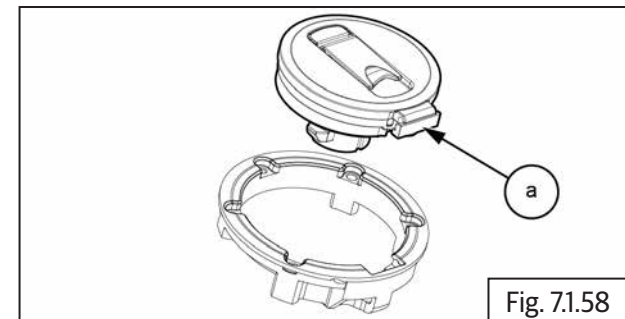
- Locate and tighten the **4 Nos.** Flange Heads bolts **(M6) (a)** from rear mount bracket.



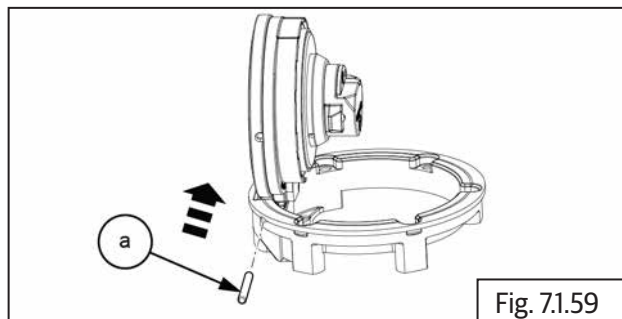
	10mm Socket with Ratchet
	8.5 - 11.5 Nm / 0.86 - 1.1 kgf-m

7.11. Fuel Tank Cap

- Locate and align the tank cap **(a)** into outer ring.

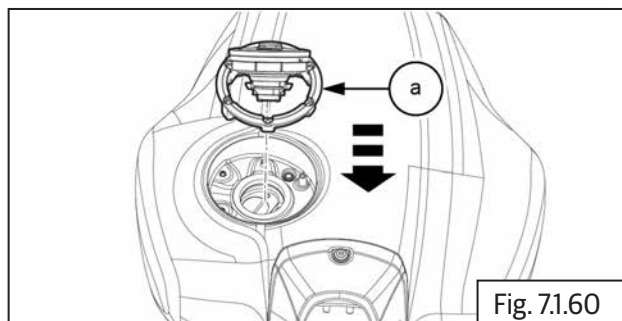


- Gently tap to install the spring dowel **(a)** into tank cap.

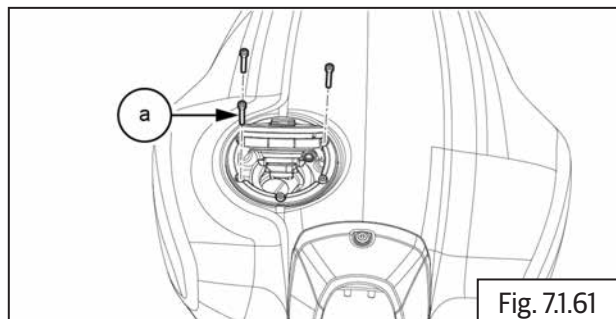


Punch and Mallet

- Locate and align the outer ring with tank cap **(a)** on fuel tank.



- Locate and tighten the **3 Nos.** cap bolts **(M4) (a)** on fuel tank outer ring.



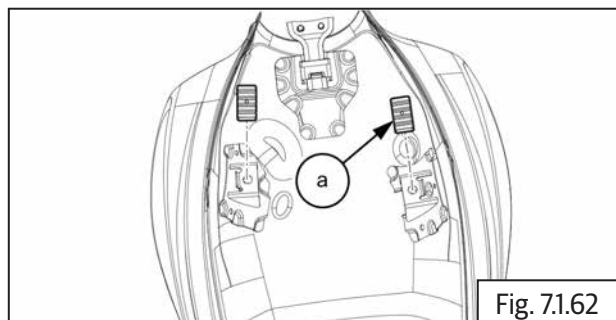
3mm Allen key with Ratchet



4 Nm / 0.4 kgf-m

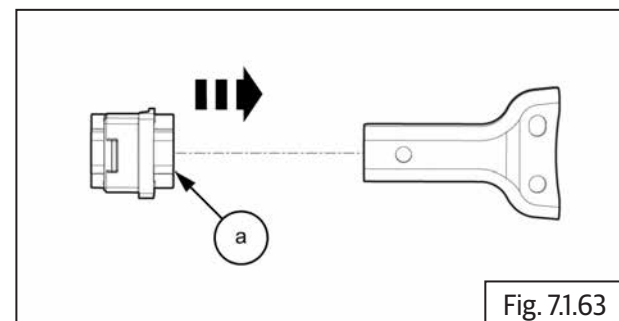
7.12. Fuel Tank

- Locate and fix **2 Nos.** rubber mount **(a)** on fuel tank.



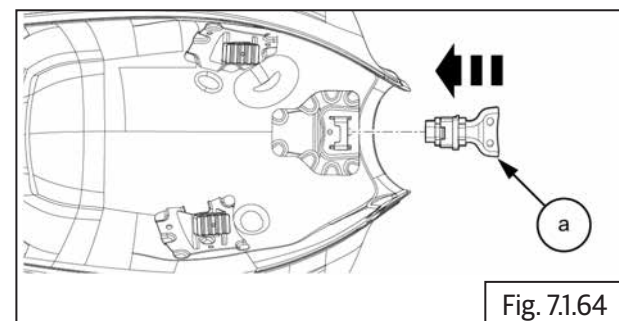
Flat Head Screwdriver

- Fix the front rubber mount **(a)** into front bracket.



Flat Head Screwdriver

- Locate the front rubber mount and front bracket **(a)** into fuel tank.



Flat Head Screwdriver

- Connect fuel hose **(a)** on injector cap.

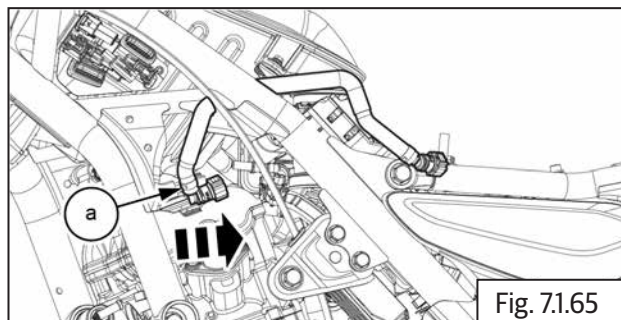


Fig. 7.1.65

- Gently locate the fuel tank **(a)** on frame.

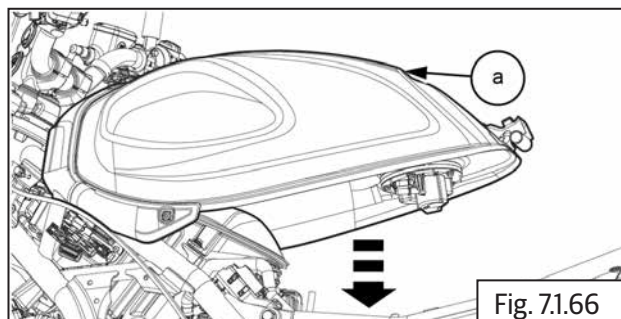


Fig. 7.1.66

- Connect the fuel pump coupler **(a)** to fuel pump **(b)**.

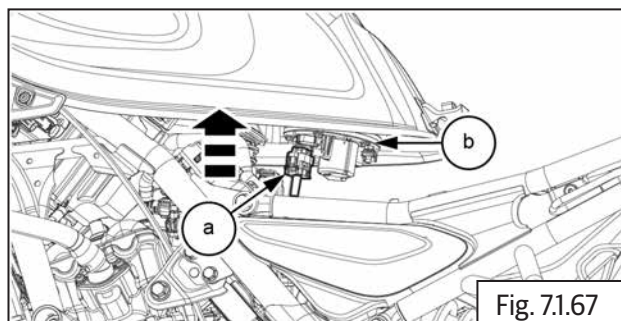


Fig. 7.1.67

- Clean quick fix adapter area and connect by pressing lock button **(a)** on fuel pump **(b)**.

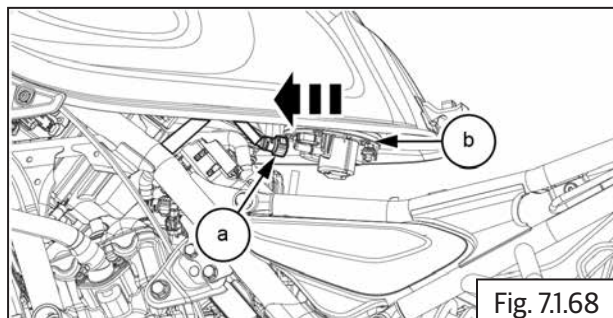


Fig. 7.1.68

- Connect EVAP connection hose **(a)** to bottom of fuel tank.
- Connect drain hose connection **(b)** to bottom of fuel tank.

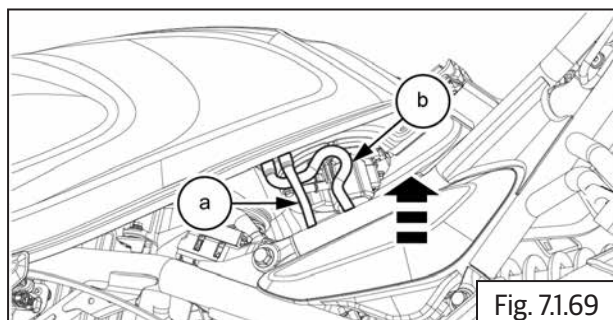


Fig. 7.1.69

- Install the **2 Nos** dampers **(a)** and spacer **(b)** to fuel tank.

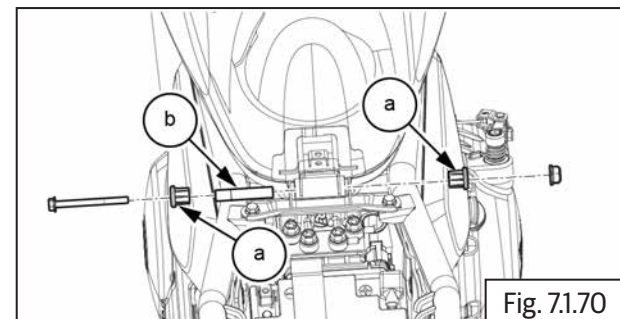


Fig. 7.1.70

- Locate and tighten Hex head flange bolt **(a)** and nut **(M6) (b)** on rear end of fuel tank.

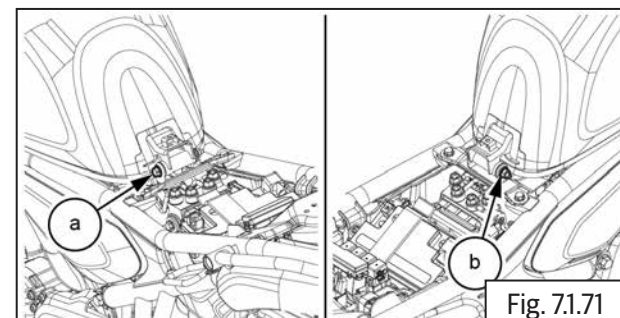
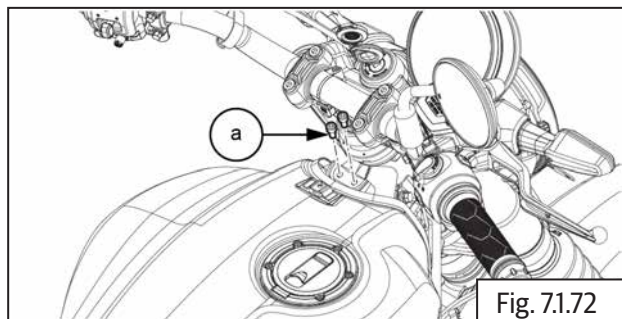


Fig. 7.1.71

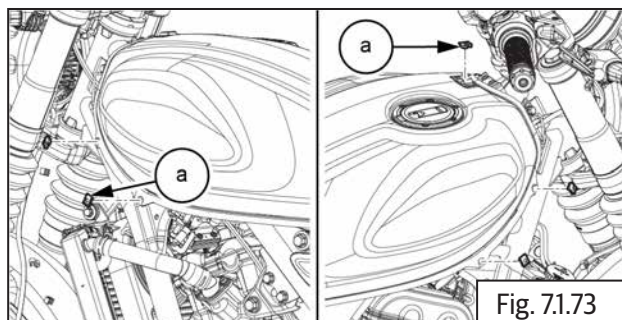
	10mm Socket with Ratchet
	8.5 - 11.5 Nm / 0.86 - 1.1 kgf-m

- Locate and tighten **2 Nos.** cap bolts **(M6) (a)** on-fuel tank front bracket.

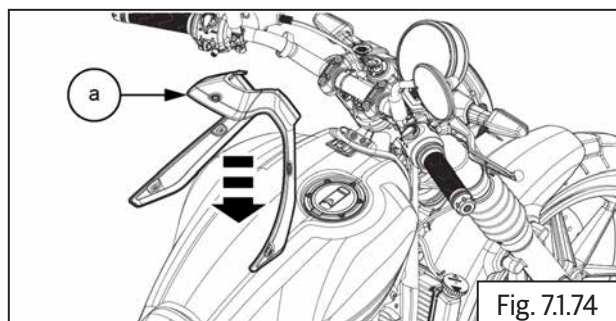


	5mm Allen Socket with Ratchet
	8.5 - 11.5 Nm / 0.86 - 1.1 kgf-m

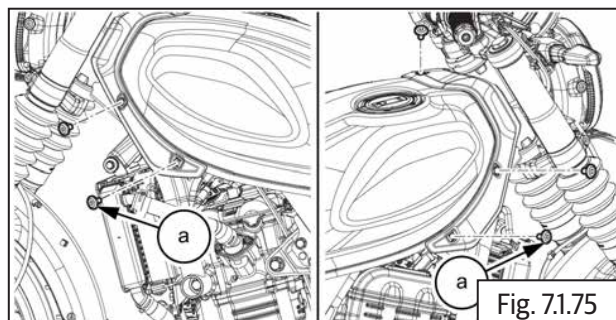
- Fix the **5 Nos** clip nuts **(a)** on fuel tank.



- Locate the cover **(a)** on the fuel tank.



- Locate and tighten **5 Nos.** Button bolts **(M5) (a)** on LHS and RHS of the fuel tank cover.



	4mm Allen Socket with Ratchet
	4.3 - 5.7 Nm / 0.43 - 0.57 - kgf-m

Install the following parts:

- Connect battery negative (-) terminal.
- Install the seats ([Refer Side Panels and Seat Chapter](#)).

NOTE

- Switch ON and OFF the ignition twice and visually check for any fuel leakage or wet on the tank and components, If anything found, inspect and rectify the issue.

EVAPORATIVE (EVAP) EMISSION CONTROL SYSTEM

CONTENTS	PAGE
8. Evaporative (EVAP) Emission Control System.....	412
General Description	412
8.1. Evaporative (EVAP) Emission Control System.....	413
Dismantling.....	413
8.1.1 EVAP Purge Valve.....	413
8.1.2. Canister	414
8.1.3. Hoses.....	415
Inspection	415
Assembly	416
8.1.4. Hoses	416
8.1.5. Canister	416
8.1.6 EVAP Purge Valve	417
8.1.7. EVAP Hose Routing Procedure	418

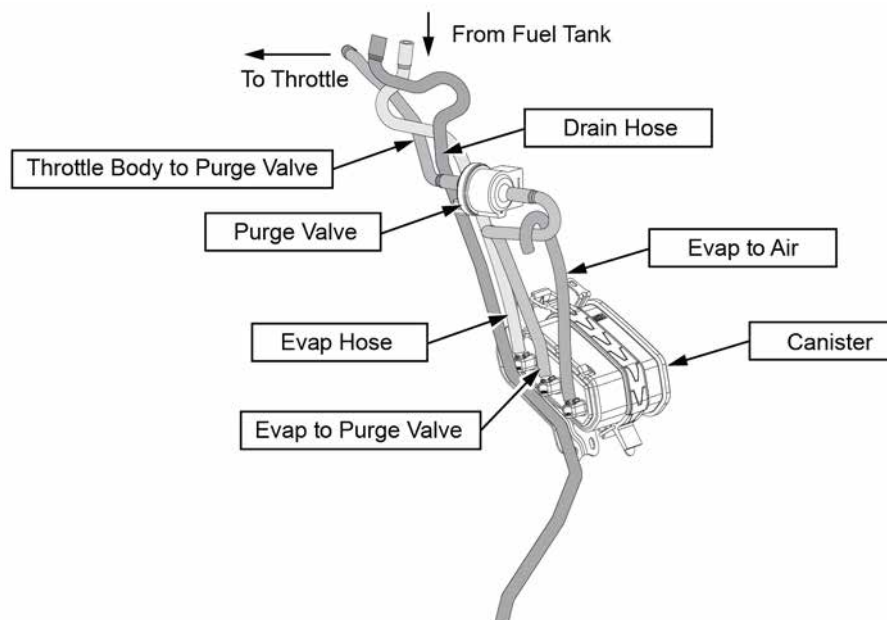
8. Evaporative (EVAP) Emission Control System

General Description

Royal Enfield motorcycles are equipped with Evaporative (EVAP) Emission Control System.

Whenever the motorcycle is parked after a ride or in hot summer, in high day time temperatures, fuel vapors with hydrocarbons tend to escape into the atmosphere through the vent hole of the fuel tank cap.

The evaporative emission control system traps these fuel vapors and purges it into a charcoal canister. When the engine is running, the vapors from the charcoal canister is routed through a purge valve into the combustion chamber. These vapors are also monitored by the engine management system (EMS) so as to ensure the exhaust emissions are within the specifications.



8.1. Evaporative (EVAP) Emission Control System

Dismantling

⚠ WARNING

Before dismantling any part of the EVAP system, ensure the engine and exhaust systems are at ambient temperature. Evaporative fuel vapors are highly inflammable and explosive, which can result in serious injury and or fatal accidents.

⚠ WARNING

DO NOT damage or puncture any part of the EVAP system like canister, purge valve etc. DO NOT blow high compressed air into the canister or purge valve as it can result in an explosion.

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

NOTE

- Before removing any part of the EVAP system, open fuel tank cap to release the pressure inside.

Prior Removal:

- Ensure ignition key and engine stop switch are in OFF position.
- Disconnect battery negative (-) terminal.
- Remove the seats (Refer Side Panels and Seat Chapter).
- Remove the fuel tank (Refer Fuel System Chapter).
- Remove the LHS side panel (Refer Side Panels and Seat Chapter).

8.1.1 EVAP Purge Valve

- Disconnect electrical coupler (a) from purge valve.

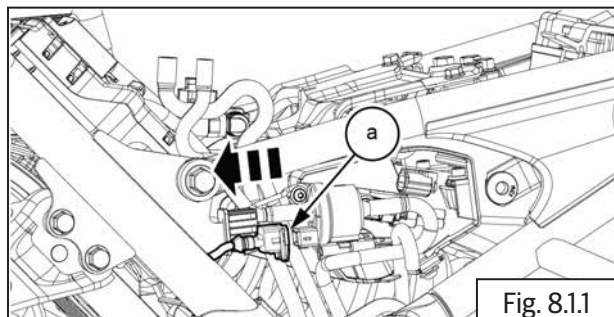


Fig. 8.1.1

- Disconnect hose (a) from throttle body.

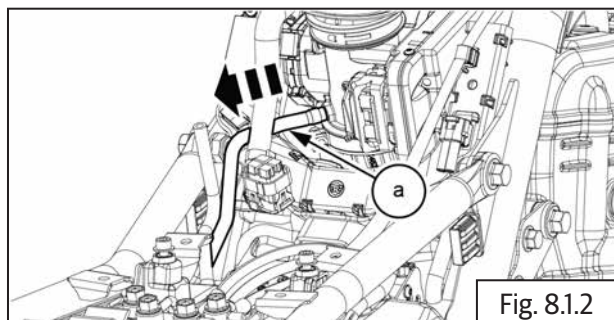


Fig. 8.1.2

- Slide and remove the purge valve with rubber boot (a) from bracket.

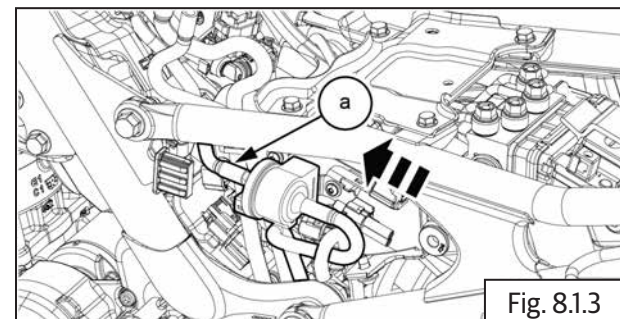


Fig. 8.1.3

- Disconnect input hose (a) from purge valve.

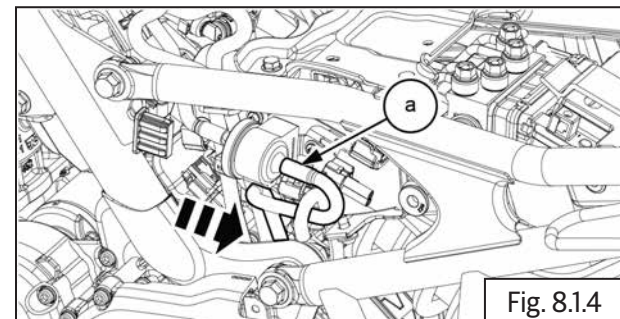


Fig. 8.1.4

- Remove the purge valve with hose assembly (a).

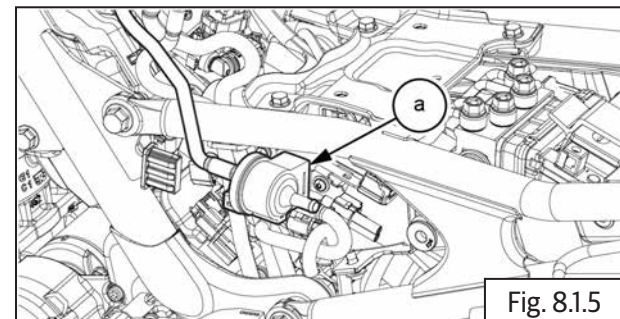
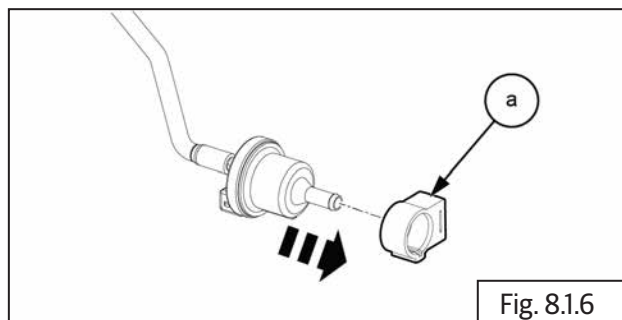
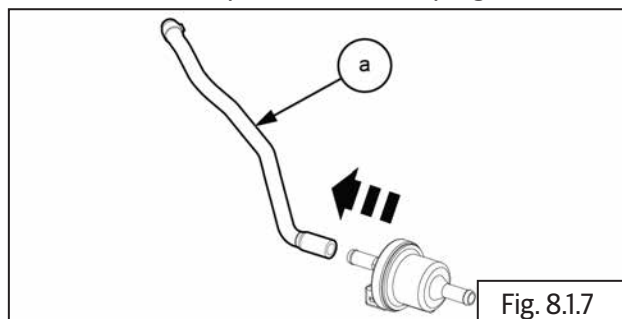


Fig. 8.1.5

- Slide and remove the rubber boot **(a)** from purge valve.

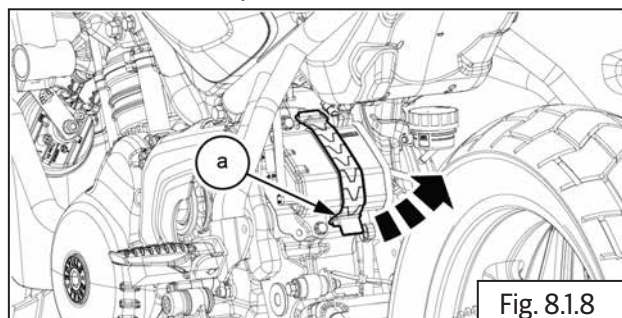


- Disconnect output hose **(a)** from purge valve.

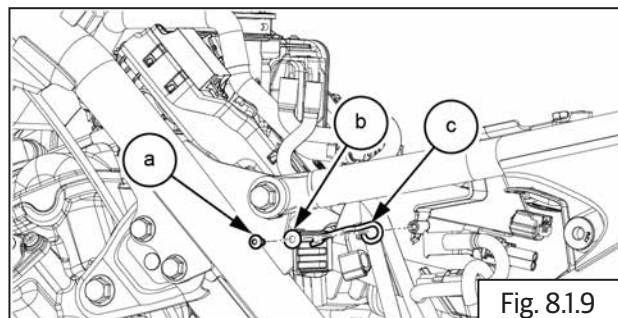


8.1.2. Canister

- Remove the strap **(a)** from canister.



- Remove the screw **(T40) (a)** with washer **(b)** from the wire guide **(c)**.
- Remove the wire guide **(c)** from chassis frame .

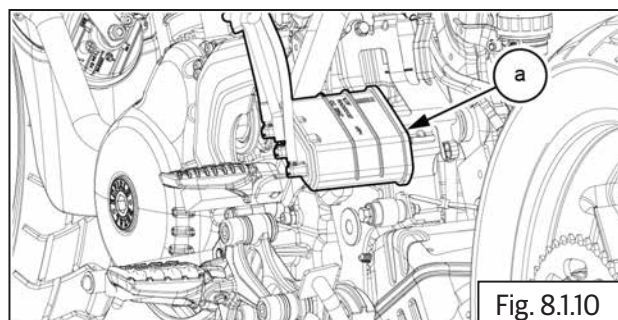


T20 Torx Socket with Ratchet

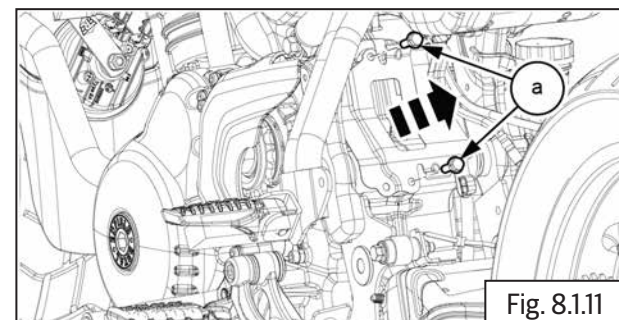
- Remove the canister with pipe assembly **(a)** from chassis frame.

⚠ CAUTION

Do not apply excessive force to pull out canister with hoses as it will damage the canister and the hose pipes.

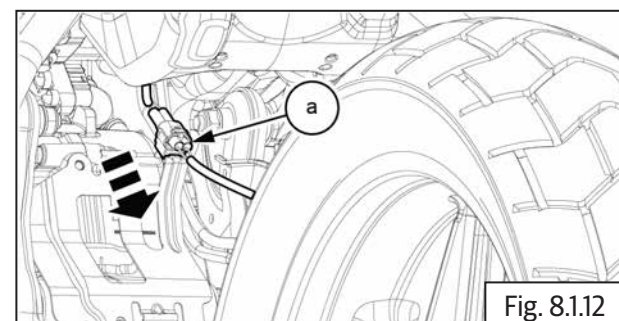


- Loosen and remove the flange head bolts **2 Nos (M6) (a)** from canister bracket.



10mm Socket with Ratchet

- Detach the Rear brake switch coupler clip **(a)** from canister bracket.



Flat Head Screwdriver

- Remove the canister bracket **(a)** from chassis frame.

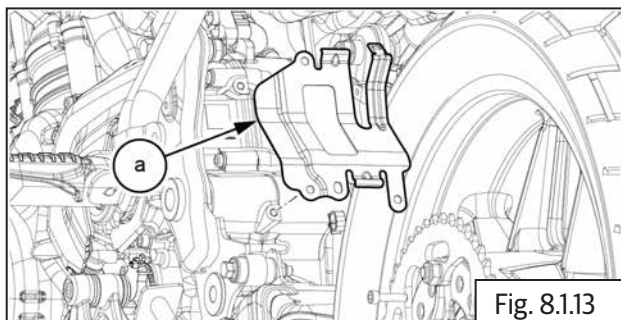


Fig. 8.1.13

8.1.3. Hoses

- Disconnect all hoses from the canister.
- EVAP to tank **(a)**
- EVAP to purge valve **(b)**
- EVAP to air **(c)**

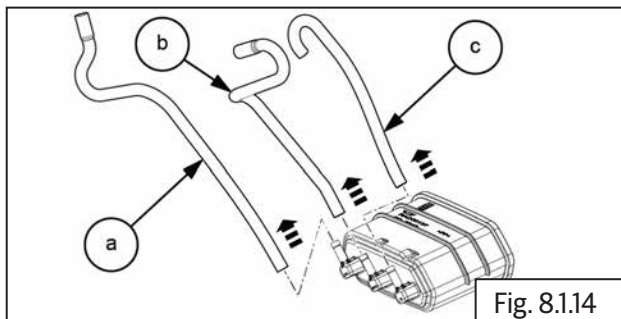


Fig. 8.1.14

Inspection

Charcoal Canister

- Clean and inspect for any damage or crack on canister. Replace if necessary.
- Gently shake canister to feel if there is wet fuel inside. If suspected replace canister.
- Blow low pressure air (12 kPa) through the inlet port and check for the free flow of outlet side. If restricted or no air, replace the canister.

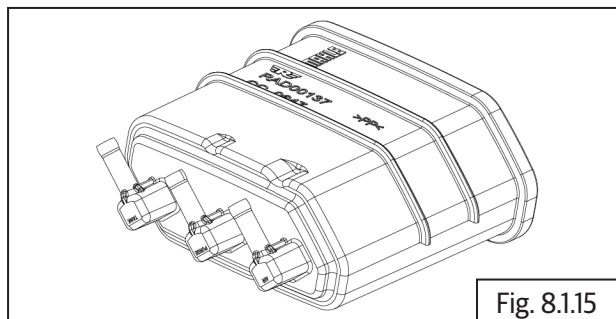


Fig. 8.1.15

Purge Valve

- Clean and visually inspect the EVAP purge valve for any damage or crack.
- Check purge valve in EMS section, replace if found defective.
- Blow low pressure air (12 kPa) through hose connecting to throttle body and check for pressure release through hose connecting to canister. If air releases, purge valve is defective and replace.

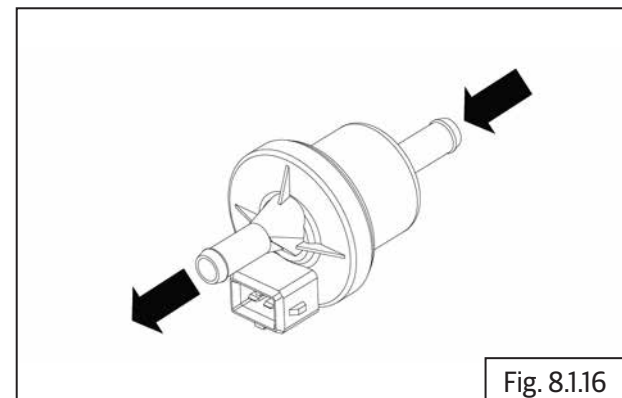


Fig. 8.1.16

Hoses

- Check hose for any crack, pinch, wear out or hardening. Replace if defective.
- Replace hoses as mentioned in Periodic Maintenance Schedule.

Do's & Don'ts

- Do not fill fuel tank above anti-splash plate inside fuel tank as it will cause fuel to get into EVAP system.

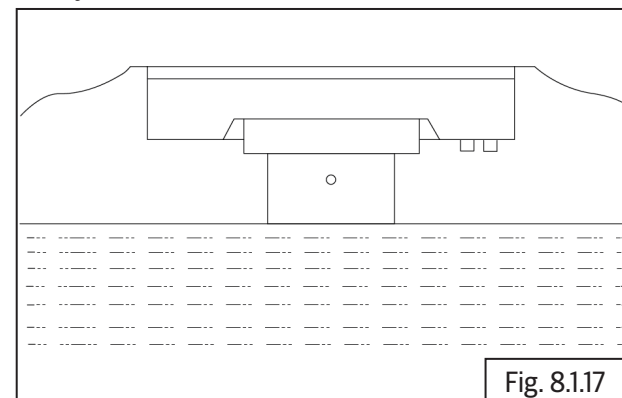


Fig. 8.1.17

- Do not use motorcycle if any part of EVAP system is damaged.
- Do check the EVAP system periodically for damages and leakages.

Assembly

8.1.4. Hoses

- Connect all hoses on canister.
- EVAP to air **(c)**
- EVAP to purge valve **(b)**
- EVAP to tank **(a)**

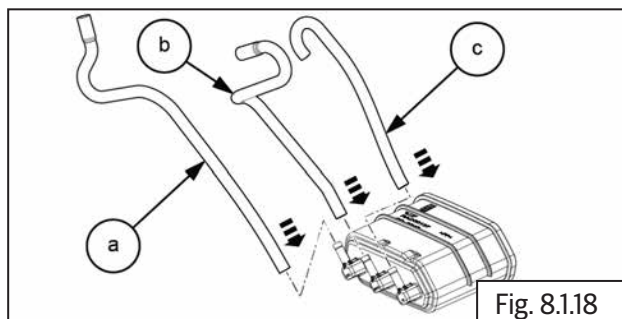


Fig. 8.1.18

8.1.5. Canister

- Locate the canister bracket **(a)** on chassis frame.

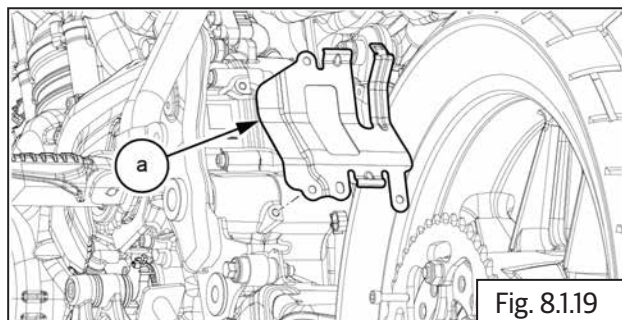


Fig. 8.1.19

- Fix the rear brake switch coupler clip **(a)** on canister bracket.

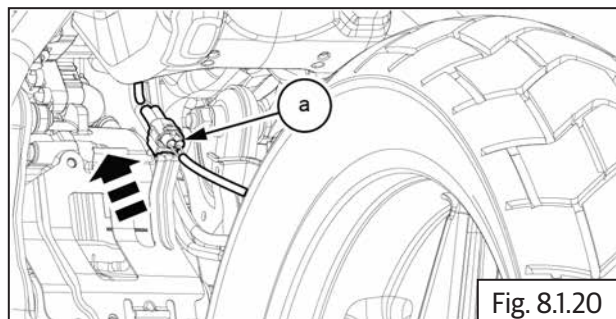


Fig. 8.1.20

- Locate and tighten the flange head bolts **2 Nos (M6) (a)** on canister bracket.

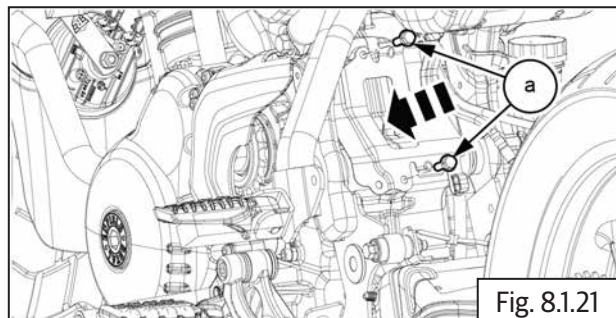


Fig. 8.1.21

	10 mm Socket with Ratchet
	9 - 11 Nm / 0.9 - 1.1 kgf m

- Locate and place the canister with hose assembly **(a)** on chassis frame.

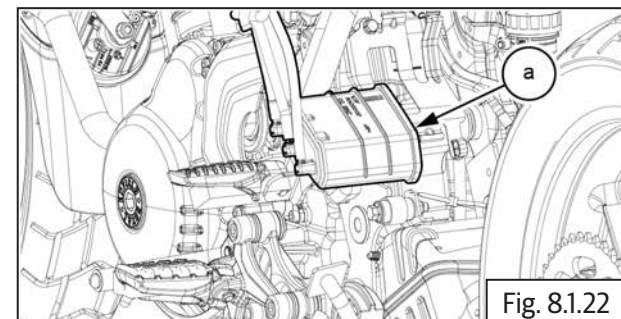


Fig. 8.1.22

NOTE

- Please ensure the EVAP hoses are routed properly and ensure they DO NOT get pinched or damaged.

- Fix the strap **(a)** on canister.

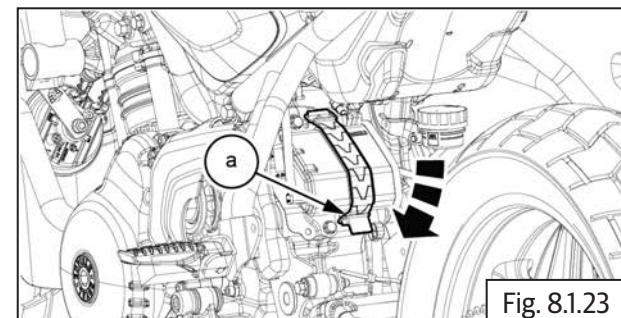
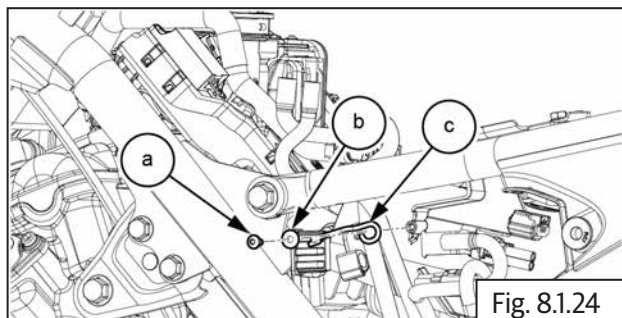


Fig. 8.1.23

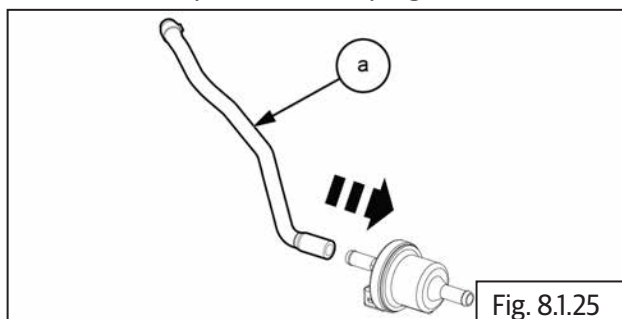
- Locate the wire guide **(c)** on chassis frame .
- Locate and tighten the screw **(T40) (a)** with washer **(b)** on wire guide.



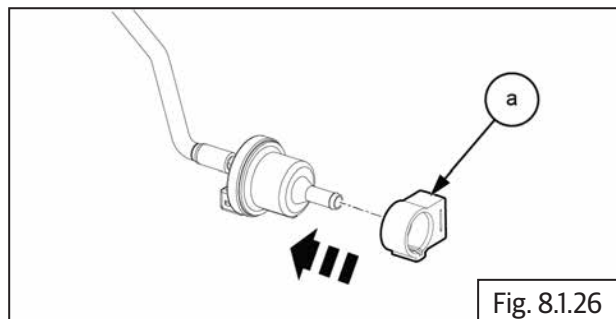
	T20 Torx Socket with Ratchet
	1.5 Nm / 0.15 kgf m

8.1.6 EVAP Purge Valve

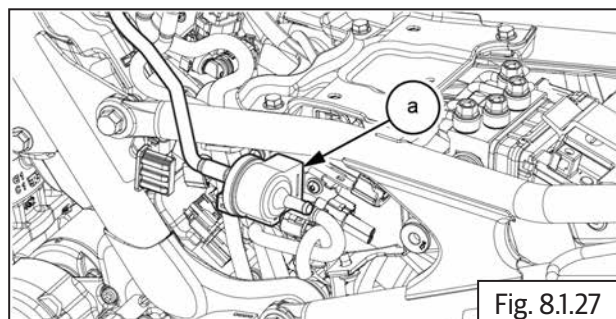
- Connect output hose **(a)** to purge valve.



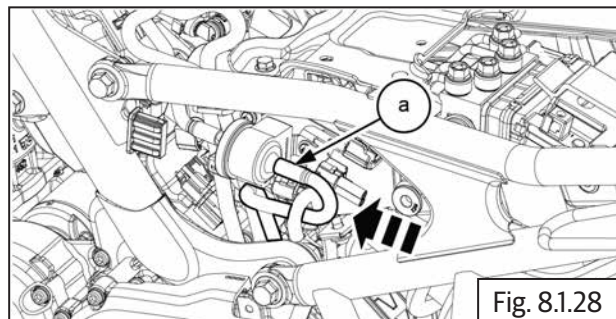
- Fix purge valve into the rubber boot **(a)**.



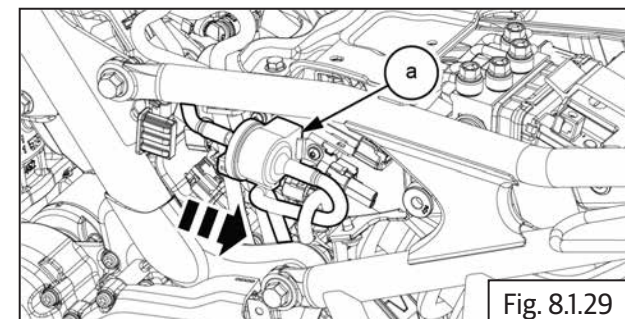
- Locate the purge valve with hose assembly **(a)** on LHS chassis fame.



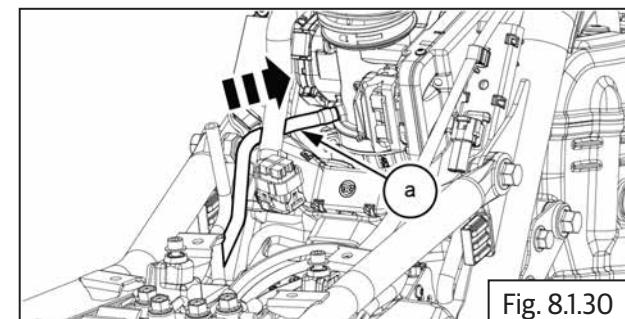
- Connect input hose **(a)** to purge valve.



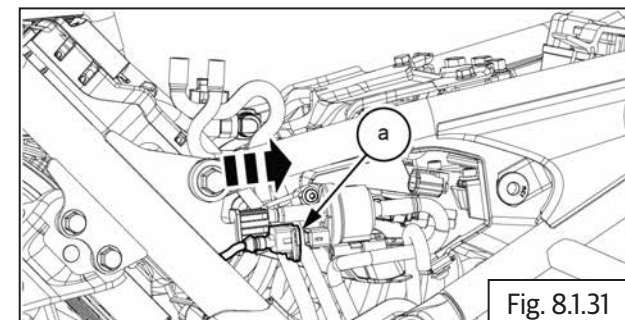
- Slide and fix the purge valve with rubber boot **(a)** to the bracket.



- Connect hose **(a)** to throttle body.



- Connect electrical coupler **(a)** to purge valve.

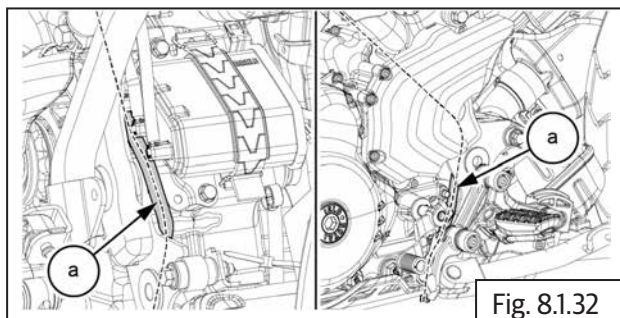


8.1.7. EVAP Hose Routing Procedure

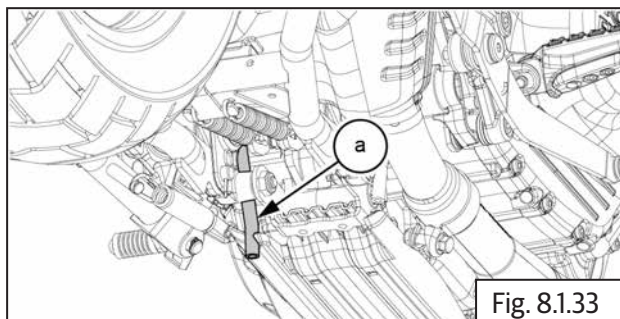
NOTE

- Please ensure the EVAP hoses are routed properly and ensure they DO NOT get pinched or damaged.

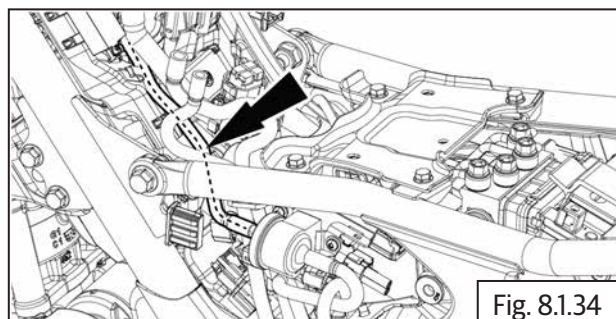
- The drain hose **(a)** runs on top of the EVAP bracket and down behind the frame:



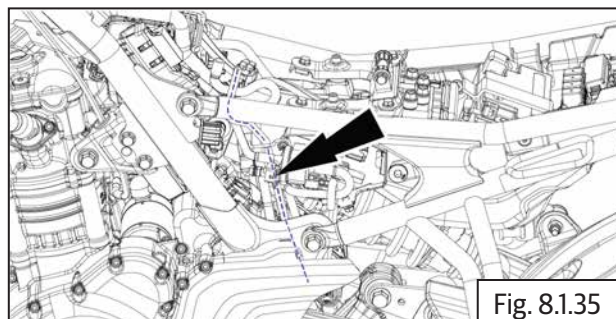
- The drain pipe **(a)** is located in the hole in the sump guard:



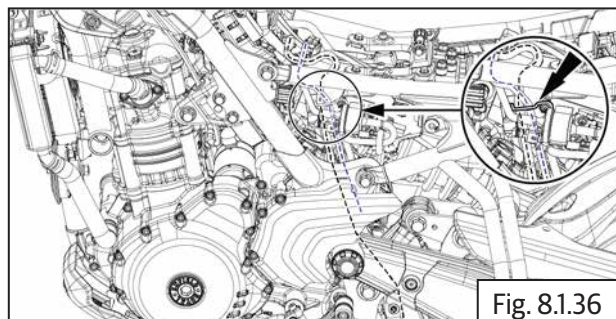
- The hose from the throttle body to the purge valve is routed as follows.



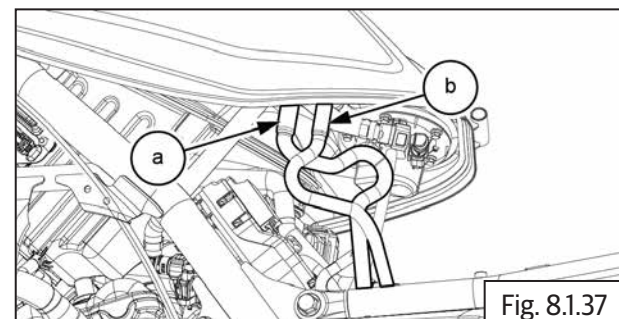
- The EVAP hose continues straight down its connects to the canister.



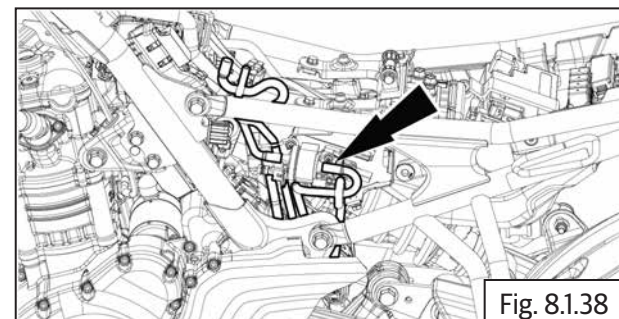
- The drain and EVAP hoses from the tank should both be held by the wire retainer.



- The drain **(a)** and EVAP **(b)** hoses come out from the fuel tank channel in the area indicated.



- All hoses should be inside (protected by) the frame.



- Reassemble the LHS side panel (Refer Side Panels and Seat Chapter).
- Reassemble the fuel tank (Refer Fuel System Chapter).
- Reassemble the seats (Refer Side Panels and Seat Chapter).
- Connect battery negative (-) terminal.

BRAKES AND ABS

CONTENTS	PAGE
9. Brakes and ABS	413
Dismantling.....	416
9.1. Brake - Front.....	422
9.1.1. Master Cylinder - Front.....	416
9.1.2. Brake Caliper - Front.....	418
9.1.3. Brake Disc - Front.....	421
9.2. Brake - Rear	422
9.2.1. Master Cylinder Assembly - Rear.....	422
9.2.2. Rear Brake Pedal.....	424
9.2.3. Rear Fluid Reservoir.....	425
9.2.4. Brake Caliper Assembly - Rear.....	425
9.2.5. Brake Disc - Rear.....	428
Inspection.....	428
Assembly.....	431
9.3.Brake - Rear.....	4
9.3.1. Brake Disc - Rear.....	431
9.3.2. Brake Caliper Assembly - Rear.....	431
9.3.3. Rear Fluid Reservoir.....	434
9.3.4. Rear Brake Pedal.....	435
9.3.5. Master Cylinder Assembly - Rear.....	436

9.4. Brake - Front.....	4
9.4.1. Brake Disc - Front.....	438
9.4.2. Brake Caliper - Front.....	438
9.4.3. Master cylinder - Front.....	440
9.5 Anti-lock Braking System (ABS).....	443
9.5.1 Functions and Specifications.....	444
Dismantling.....	448
9.6.1. Modulator.....	448
9.6.2. Wheel Speed Sensor - Front	454
9.6.3. Wheel Speed Sensor - Rear.....	454
Assembly.....	455
9.6.4. Wheel Speed Sensor - Rear.....	455
9.6.5. Wheel Speed Sensor - Front.....	455
9.6.6. Modulator.....	456
9.6.7 ABS DTC Codes.....	462
9.7. Bleeding the Hydraulic Brake System With DOL	
Tool (Front & Rear).....	462
9.7.1 Preparation (Front Disc Brake).....	464
9.7.2 Reassembly.....	467
9.7.3 Preparation (Rear Disc Brake).....	467

9.7.4 Reassembly.....	468
-----------------------	-----

9.8. Brake Bleeding..... 470

9.8.1. Front Brake Bleeding.....	471
----------------------------------	-----

9.8.2. Front Brake Fluid Leakage	475
--	-----

9.8.3. Front Brake Fluid Top up.....	475
--------------------------------------	-----

9.8.4. Rear Brake Bleeding.....	476
---------------------------------	-----

9.8.5. Rear Brake Fluid Leakage.....	478
--------------------------------------	-----

9.8.6. Rear Brake Fluid Top Up.....	479
-------------------------------------	-----

9. Brakes and ABS

Dismantling

9.1. Brake - Front

NOTE

- Ensure the motorcycle is upright on a firm and flat surface.
- Before dismantling brake assembly, bleed out brake fluid. Refer brake bleeding chapter.

⚠ WARNING

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint.

⚠ CAUTION

Ensure ignition key and engine stop switch are in OFF position.

NOTE

- If brake pads are being replaced, then it is not necessary to perform system bleeding.
- Wheel should be dismantled only for brake disc plate removal.

⚠ CAUTION

Whenever front brake caliper assembly is dismantled from front wheel, DO NOT depress brake lever as the piston in the caliper will move out/get misaligned.
DO NOT remove or disturb the wheel speed sensor on fork end LH.

9.1.1 Master Cylinder - Front

⚠ WARNING

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint.

⚠ WARNING

Skin Irritation - Brake fluid can cause skin irritation on contact.

Avoid contact with skin and eyes, and keep out of the reach of children.

Wear suitable protective clothing and goggles.

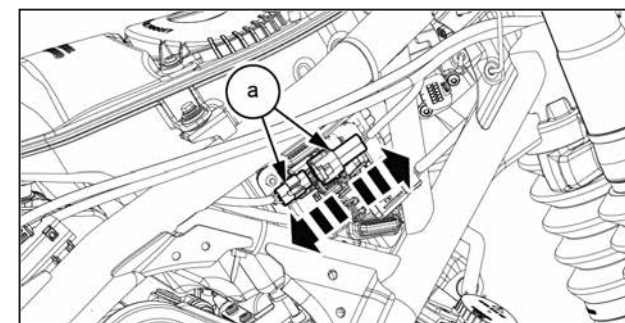
If brake fluid comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

⚠ CAUTION

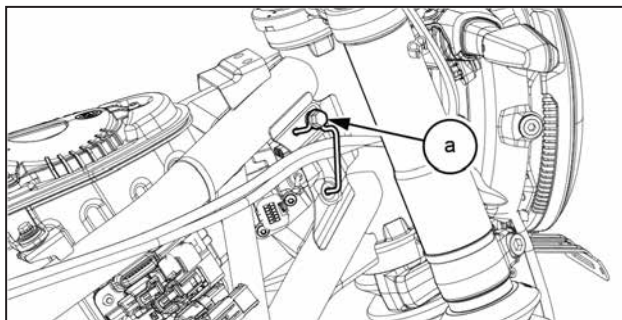
Brake fluid quickly ruins painted plastic surfaces; any spilled fluid should be completely washed away immediately.

Prior Removal:

- Remove the rider and pillion seats. Refer [Seat chapter](#).
- Disconnect battery negative (-) terminal. Refer [Electrical chapter](#).
- Remove the fuel tank. Refer [Fuel system chapter](#)
- Rear view mirror from handlebar RH.. Refer [Handlebar chapter](#)
- Brake pressure switch connector **(a)** located on front RHS connector holder.
- Disconnect the front brake pressure switch connector **(a)**.

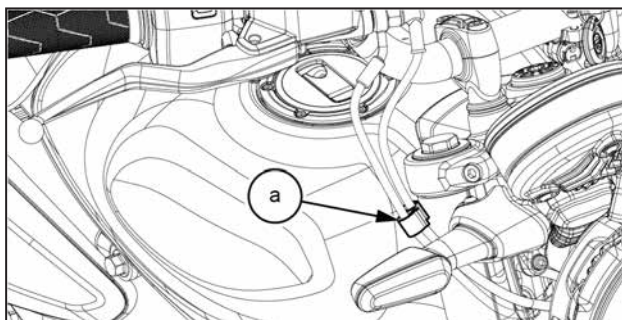


- Loosen and remove hex head flange bolt **(M6) (a)**.
- Remove harness clip from RHS chassis frame.



10 mm Socket with Ratchet

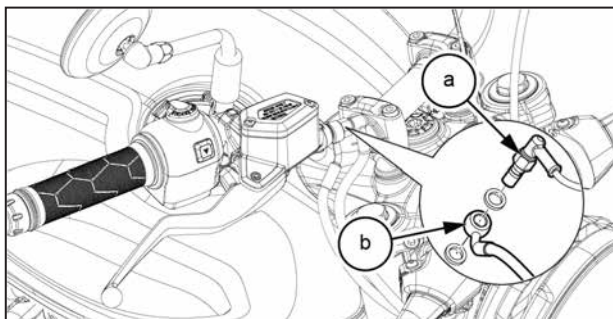
- Detach the double cable clips **(a)** on front brake pressure switch wiring harness.



- Loosen and remove the brake switch with harness **(a)**.
- Remove copper washers and brake hose **(b)** from front master cylinder.

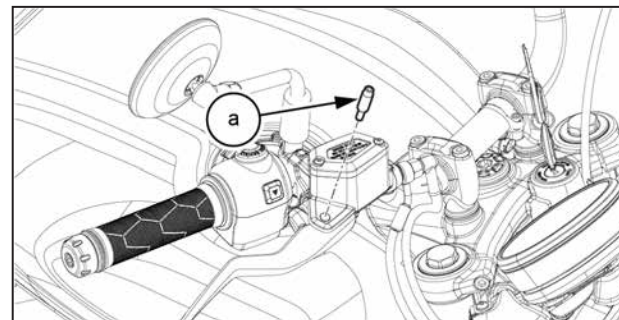
NOTE

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.



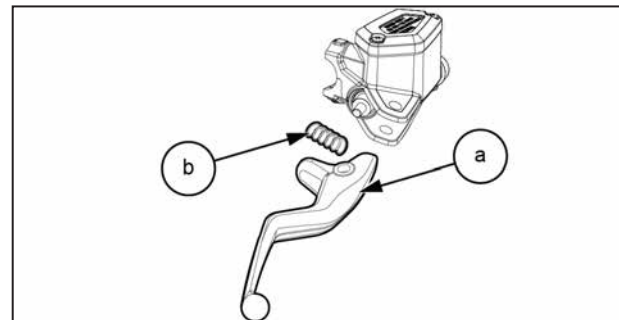
14 mm Spanner

- Hold screw **(M6) (a)** at the top of brake lever, loosen and remove hex nut at the bottom.

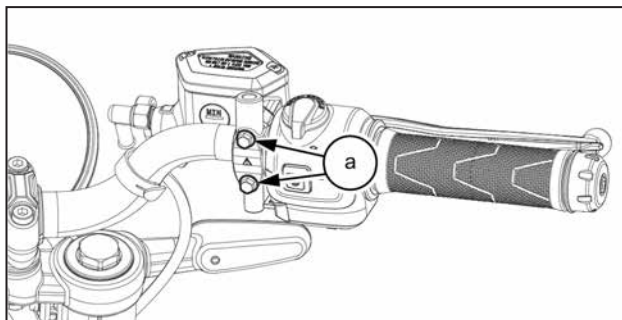


4 mm allen key and 10 mm double end spanner

- Remove brake lever **(a)** with spring **(b)** from front master cylinder.



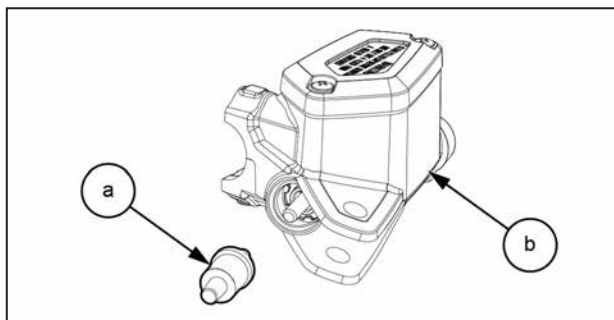
- Loosen and remove **2 Nos** screws from master cylinder clamp.
- Remove master cylinder and clamp from RHS handle bar.



8 mm Socket with Ratchet

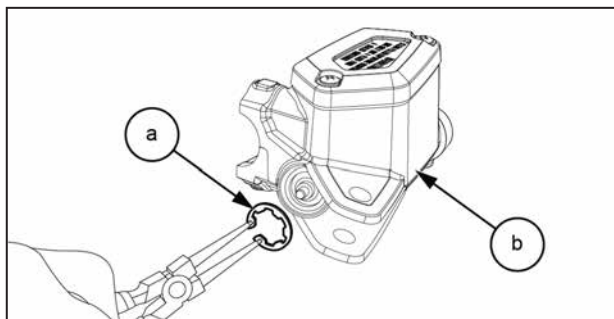
Dismantling Master Cylinder Front

- Remove boot **(a)** from the master cylinder assembly **(b)**.



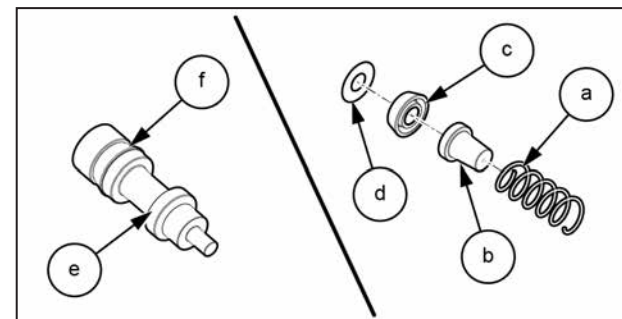
Screw driver

- Remove circlip **(a)** from the master cylinder assembly **(b)**.



Circlip plier

- Remove piston **(e)** with secondary seal **(f)**.
- Remove primary washer **(d)** and primary seal **(c)**.
- Remove spring **(a)** and spring retainer **(b)**.



! CAUTION

Do not use any sharp tool to pull out the piston from the master cylinder. Pull out gently with minimum force.

! CAUTION

Do not remove the secondary seal from the piston since removal will damage it.

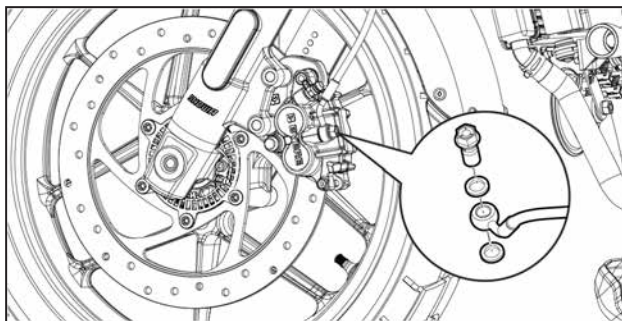
! CAUTION

Immediately wash away any brake fluid that spills.

9.1.2 Brake Caliper - Front

NOTE

- If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed.
- Loosen and remove the banjo bolt with copper washers from front brake caliper.

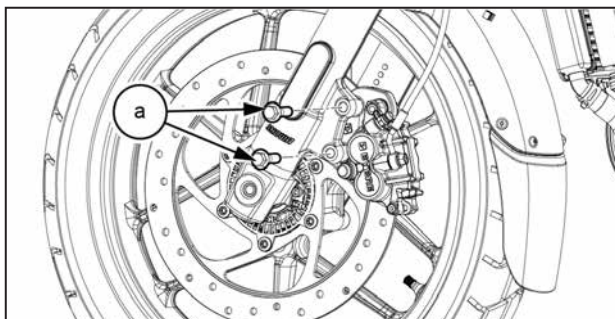


12 mm Socket with Ratchet

NOTE

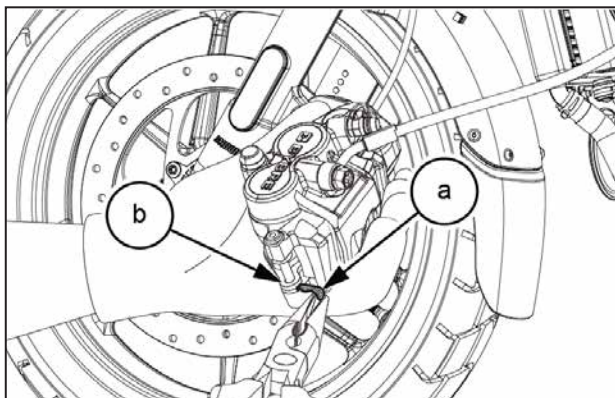
- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.

- Loosen and remove the **2 Nos (M10) (a)** bolts from front caliper.



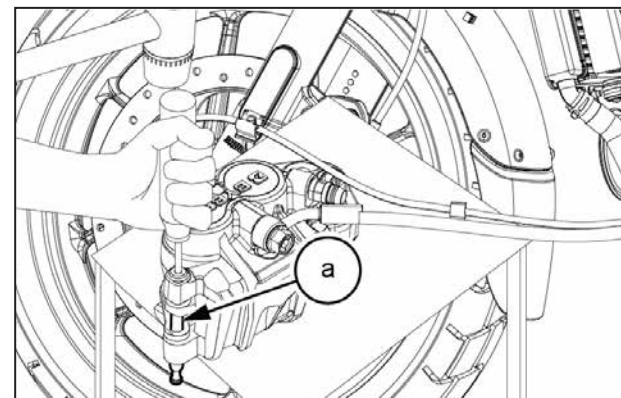
14 mm Socket with Ratchet

- Gently slide out front brake caliper assembly from front LH fork.
- Remove brake pad lock clip **(a)** from brake caliper assembly **(b)**.

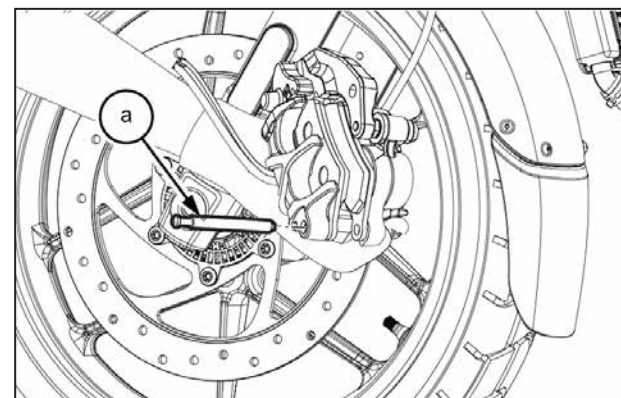


Nose plier

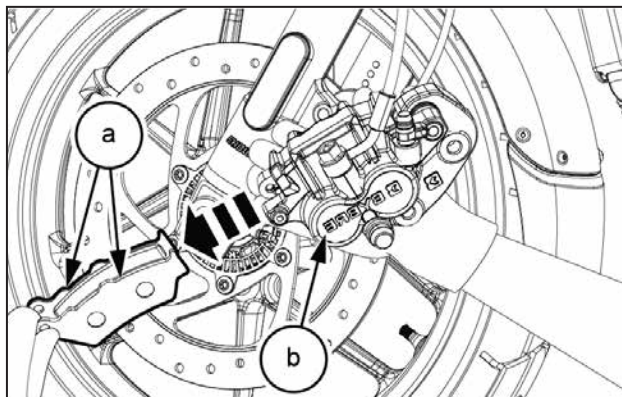
- Suitably support caliper and correctly tap brake pad pin **(a)** from inner side to outside.



- Once pin **(a)** is free, gently pull out pin from brake caliper.

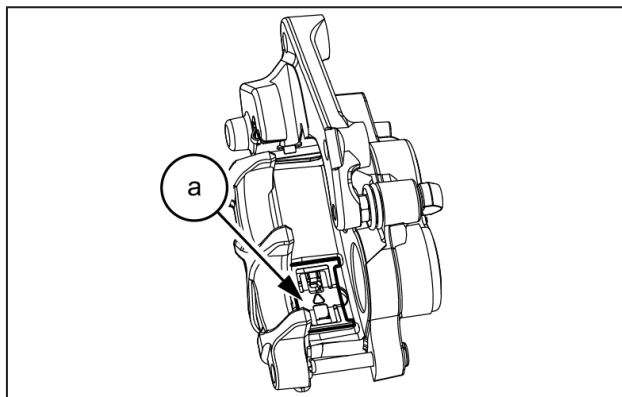


- Slide out and remove brake pads **(a)** from brake caliper front **(b)**.

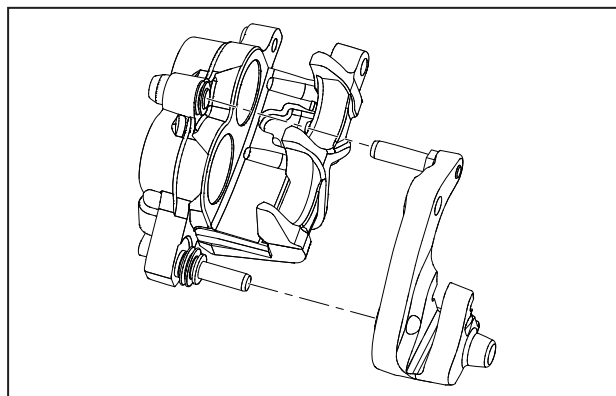


Dismantling Front Brake Caliper

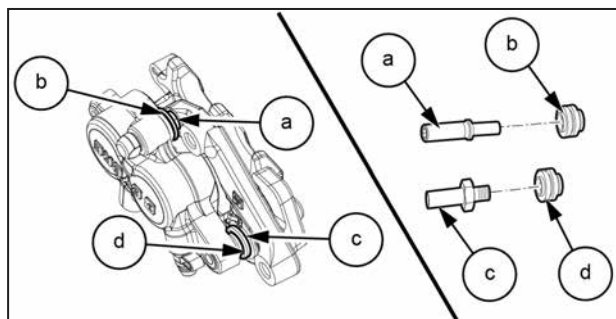
- Remove the pad tensioner spring plate **(a)**.



- Remove mounting bracket from caliper assembly.

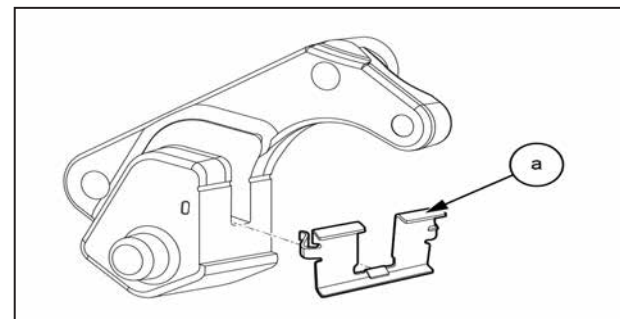


- Remove the dust boots **(b)** and **(d)** from caliper assembly.
- Remove caliper slide pins **(a)** and **(c)**.

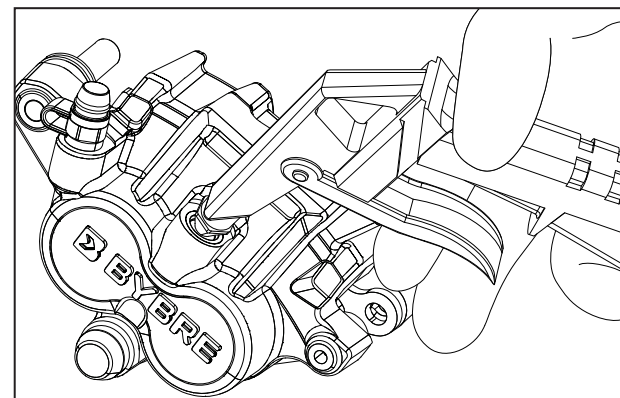


11mm Combination Spanner
5mm Allen socket Ratchet

- Remove rattle clip **(a)** from caliper.



- Position caliper body with the pistons down and apply small squirts of air pressure to fluid inlet hole to remove pistons.



⚠ WARNING

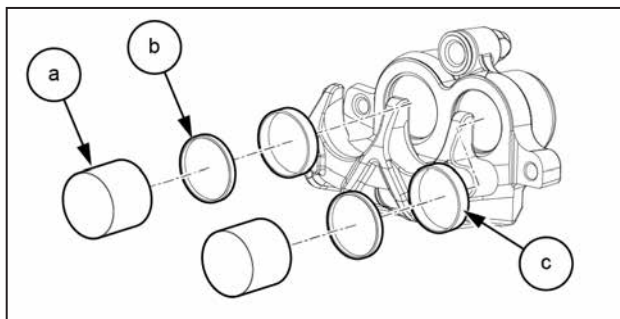
To avoid serious injury, never place your fingers or palm in front of the piston. If you apply compressed air into the caliper, the piston may crush your hand or fingers.

⚠ CAUTION

Do not use high pressure air or bring the nozzle too close to the inlet. Place a shop towel over the pistons to prevent the pistons from becoming projectiles. Push the dust seals and piston seals in and lift them out using a blunt tool. Care should be taken to avoid any damages on the bore of the sliding surface.

Enough care should be taken to avoid damages of the piston OD while servicing/handling. Remove the bleed screw.

- Remove the pistons **2Nos (a)** from caliber.
- Remove dust seals **2Nos (b)** from caliber.
- Remove fluid seals **2Nos (c)** from caliber.



9.1.3. Brake Disc - Front

- Remove front wheel assembly. **Refer wheel chapter**
- Ensure wheel assembly is placed on a flat surface with disc plate facing upwards.

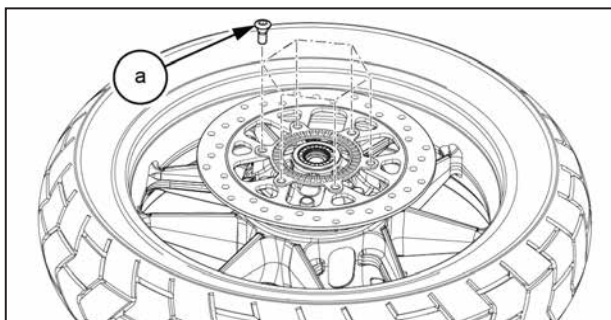
⚠ WARNING

DO NOT place/store the wheel with disc facing downward. It will damage the disc warpage.

⚠ CAUTION

Place a soft cloth under the wheel hub center mounting hole area to prevent damage.

- Loosen and remove **6 Nos button head bolts (M8) (a)** holding disc plate to hub, in crisscross pattern.

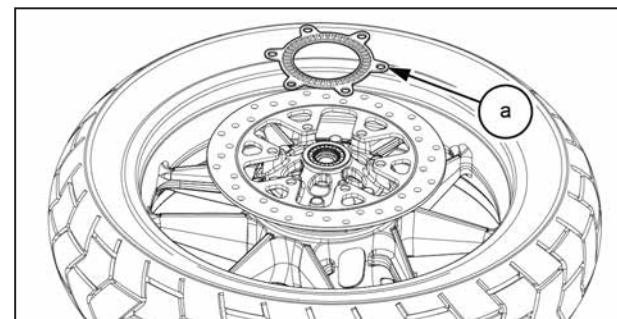


6 mm Allen socket with Ratchet

⚠ CAUTION

Avoid any bends or damages to the toner wheel as it will affect the functioning of ABS.

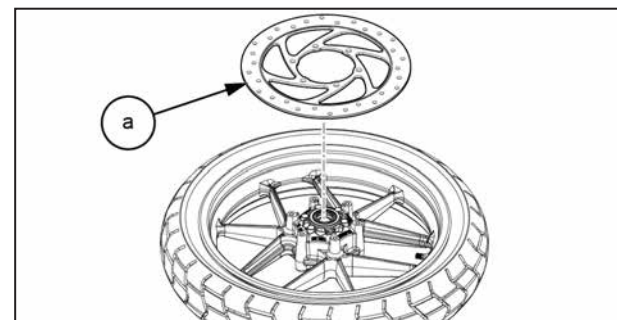
- Remove toner wheel **(a)** from hub.



- Remove brake disc **(a)** from hub.

⚠ CAUTION

Ensure the brake disc does not get damaged as it will affect the brake efficiency.



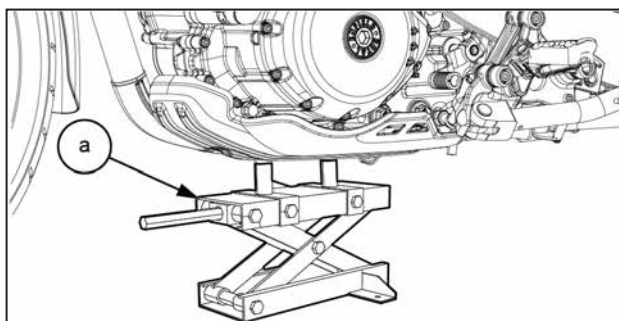
CAUTION

Avoid any bends or damages to the brake disc as it will have serious effects on braking efficiency and will lead to juddering.

9.2. Brake - Rear

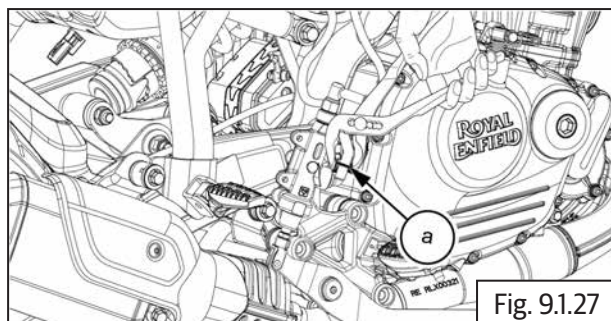
NOTE

- Ensure the motorcycle is upright on a firm and flat surface.
- Locate a scissor jack under the engine and lift motorcycle such that the front wheel is off the ground.



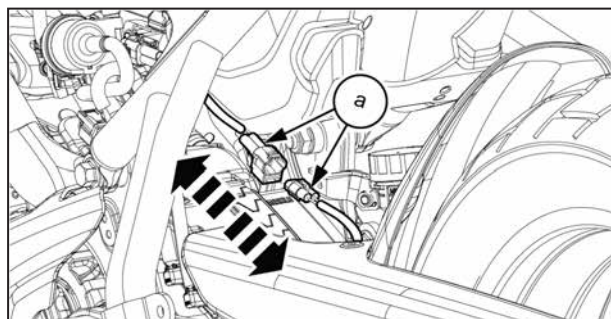
9.2.1. Master Cylinder Assembly - Rear

- Slide the reservoir hose clamp (a).
- Pull off the reservoir hose lower end, and drain the brake fluid into a container.

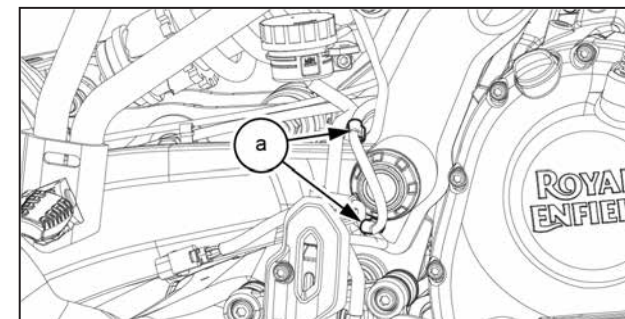


Plier

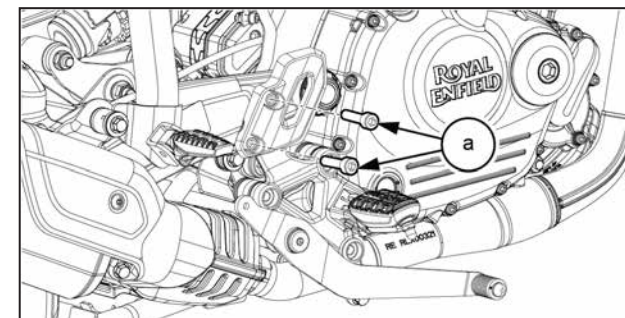
- Disconnect rear brake pressure switch coupler (a).



- Detach the double cable clips **2Nos (a)** from pressure switch harness.

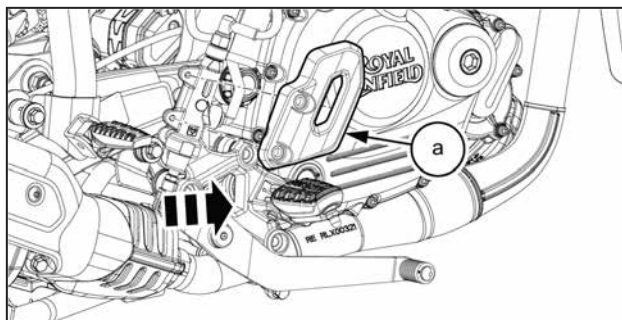


- Remove the **2Nos** cap bolts (M6) (a) from heel guard.

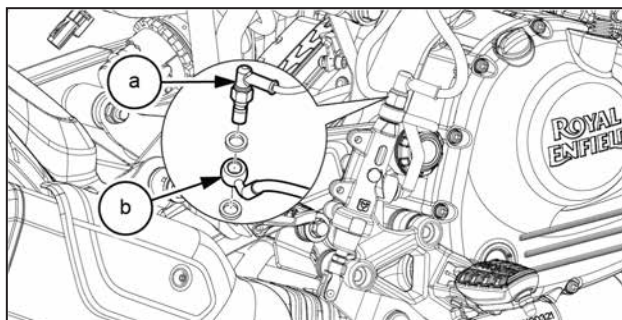


5mm Allen Socket with Ratchet

- Remove the heel guard **(a)**.

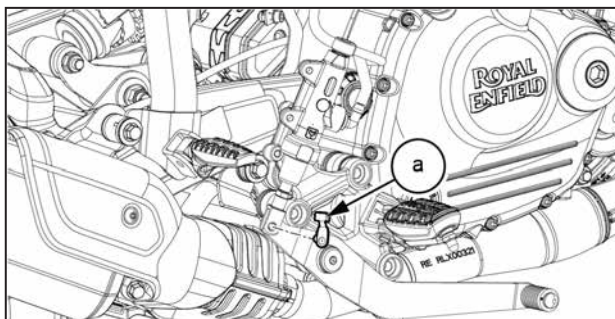


- Just remount the head screw on master cylinder.
- Loosen and remove the rear brake pressure switch **(a)** and ABS hose **(b)**.



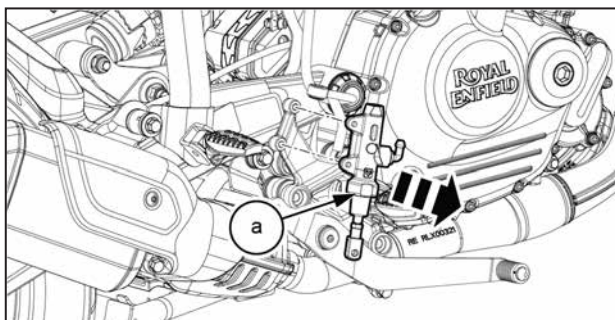
14mm Combination Spanner

- Remove the clevis spring pin **(a)** from master cylinder.



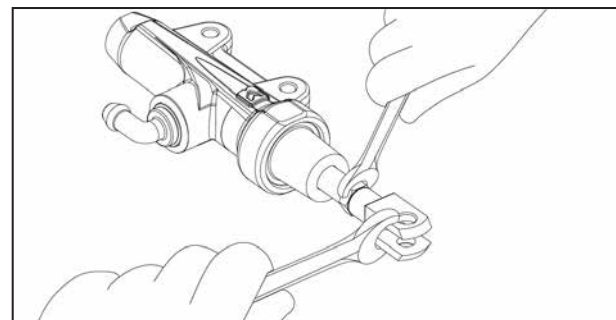
Nose plier

- Loosen and remove **2 Nos** Hex socket head bolts to detach master cylinder assembly **(a)**.



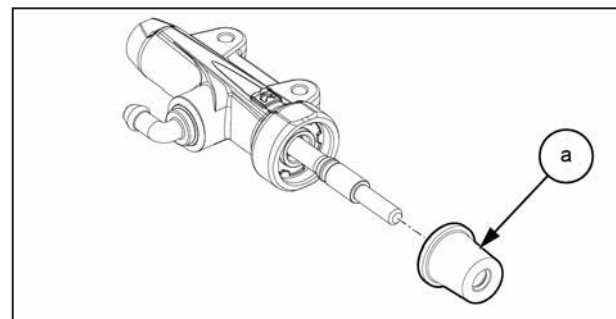
Dismantling Rear Brake Master Cylinder

- Loosen and remove the push rod nut.



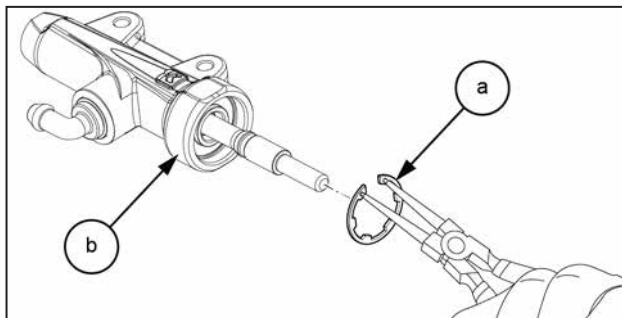
10mm and 12mm Combination Spanner

- Remove protective rubber boot **(a)** from master cylinder.



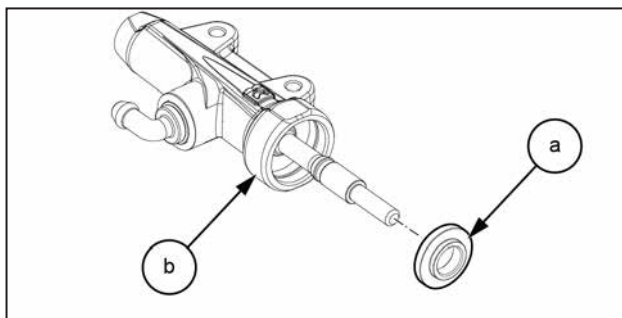
Screw driver

- Remove **(a)** circlip from the master cylinder body **(b)**.

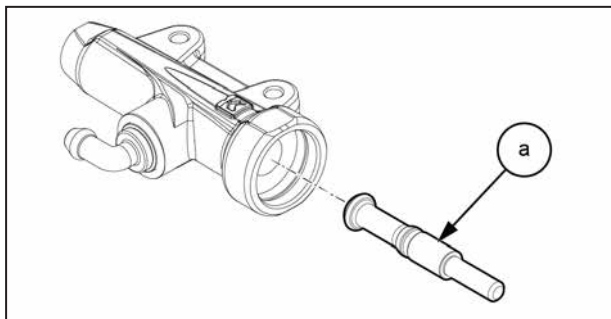


Circlip plier

- Remove stopper washer **(a)** from master cylinder **(b)**.



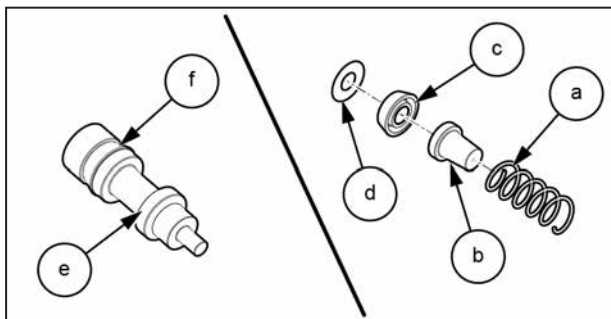
- Remove push rod **(a)** from master cylinder.



- Remove piston **(e)** with secondary seal **(f)**.
- Remove primary washer **(d)** and primary seal **(c)**.
- Remove spring **(a)** and spring retainer **(b)**.

⚠ CAUTION

Do not use any sharp tool to pull out the piston from the master cylinder. Pull out gently with minimum force.



⚠ CAUTION

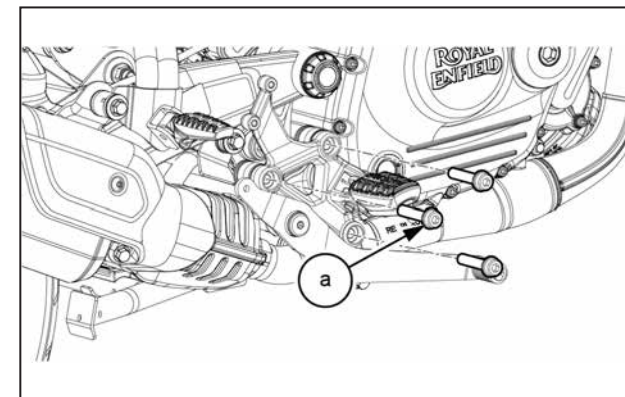
Do not remove the secondary seal from the piston since removal will damage it.

⚠ CAUTION

Immediately wash away any brake fluid that spills.

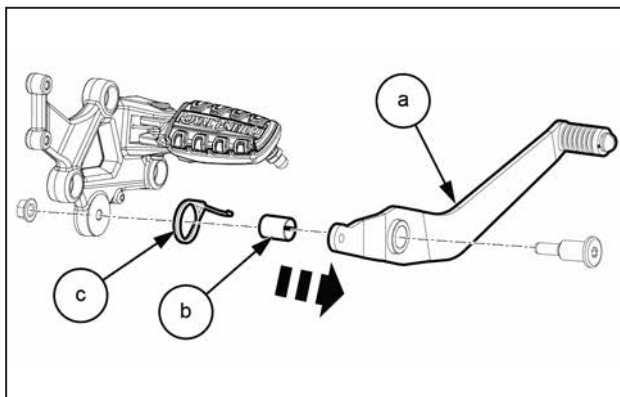
9.2.2. Rear Brake Pedal

- Loosen and remove Hex socket bolt with nut **(M8)** **(a)** to detach brake pedal.



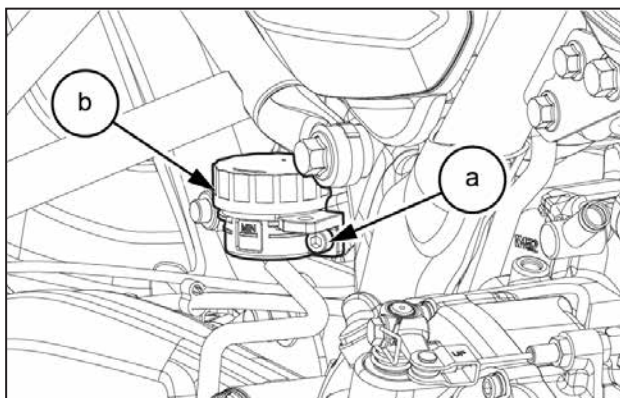
6 mm Allen socket and 12 mm Combination Spanner.

- Remove pedal **(a)** from LHS control plate
- Remove spring **(b)** and bush **(c)** from brake pedal.



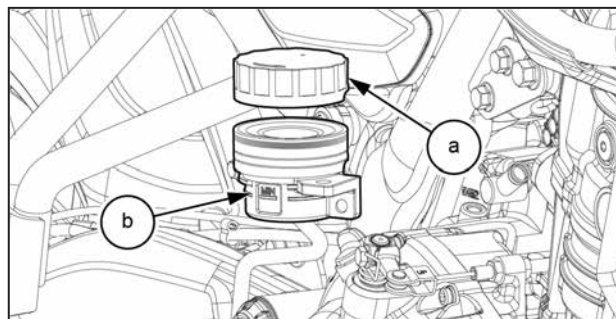
9.2.3. Rear Fluid Reservoir

- Loosen and remove Hex socket bolt **M6 (a)** to remove fluid reservoir **(b)**.



4 mm Allen socket with Ratchet

- Open the cap **(a)** from reservoir **(b)**.



- Take out plate diaphragm **(a)** and diaphragm **(b)** from reservoir.

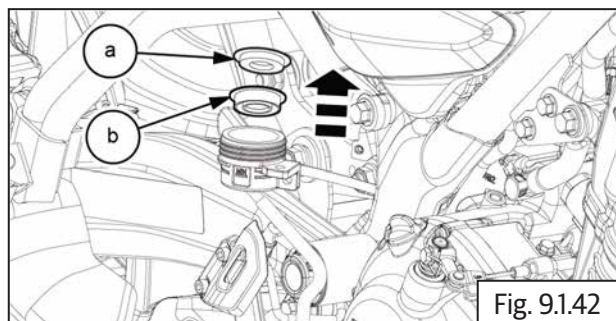
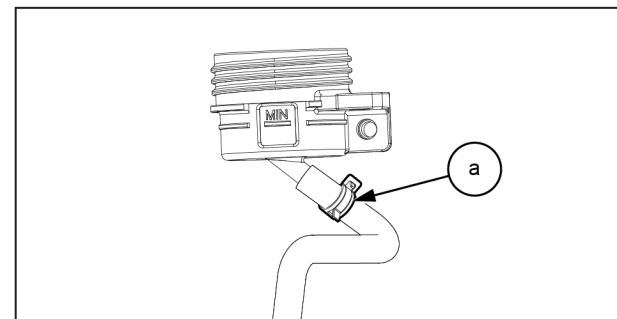


Fig. 9.1.42

- Slide the clip **(a)** and detach hose from reservoir.



Nose Plier

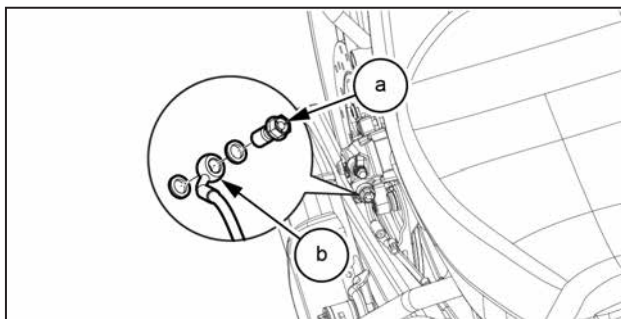
9.2.4. Brake Caliper Assembly - Rear

- Remove the following:
- Remove spindle bolt from rear wheel. Refer Wheel chapter.

NOTE

- If brake pads are being replaced, then it is not necessary to perform system bleeding.
- Wheel should be dismantled only for brake disc plate removal.

- Loosen and remove the banjo bolt **(a)** with copper and ABS hose **(b)** from rear brake caliper.

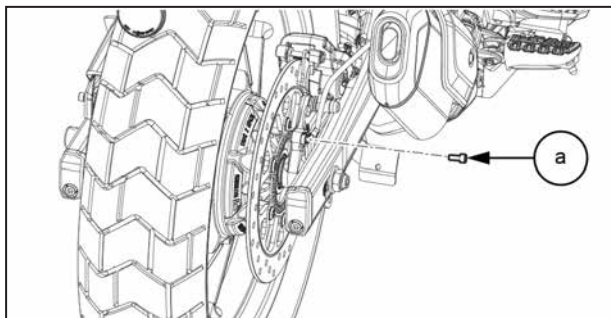


12 mm Socket with Ratchet

NOTE

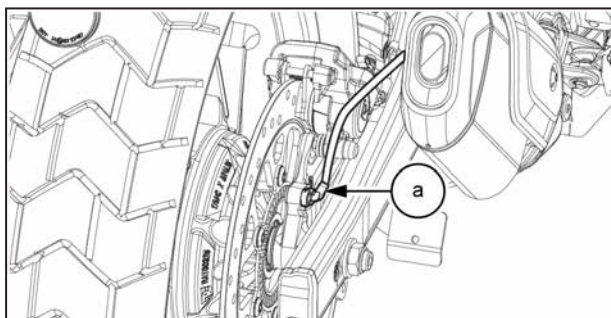
- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.

- Loosen and remove Hex socket head screw **(M6)** **(a)** located below brake caliper on RH rear wheel.

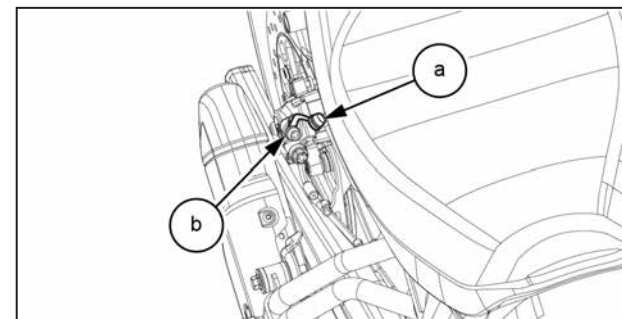


5 mm Allen socket with Ratchet

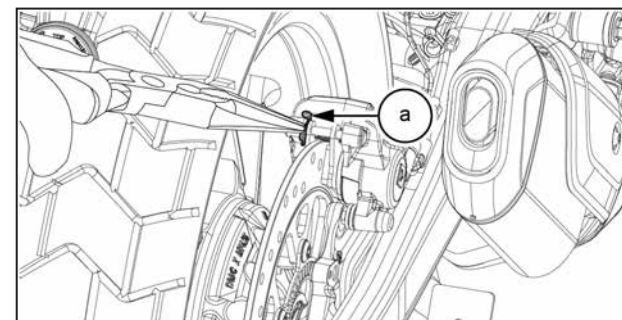
- Gently remove rear wheel speed sensor ABS **(a)** from caliper.



- Open the bleeder cap **(a)** from caliper **(b)**.

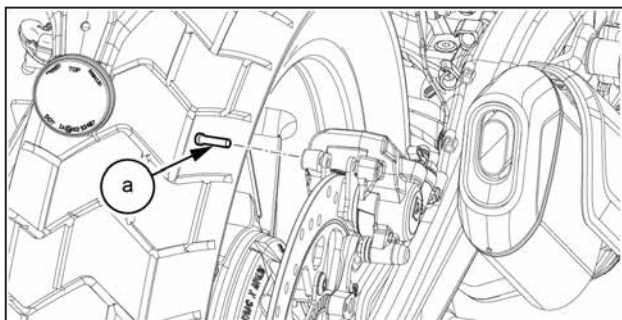


- Remove clip **(a)** from brake caliper.



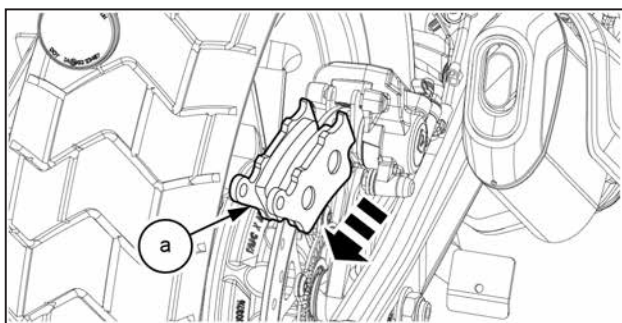
Nose plier

- Remove pin **(a)** from brake caliper.



Nose plier

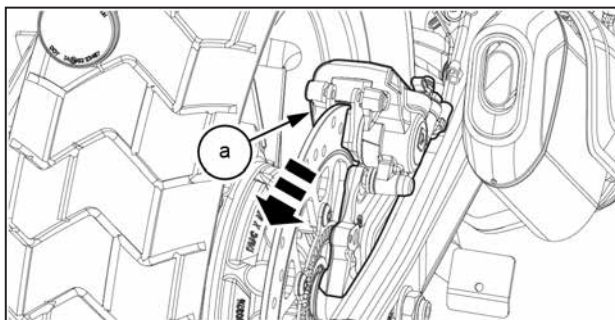
- Slide out and remove brake pads **(a)** from brake caliper.



NOTE

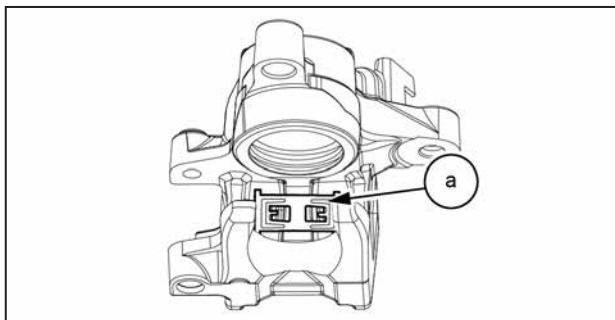
- If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed.

- Slide out and remove brake caliper **(a)** with holder.

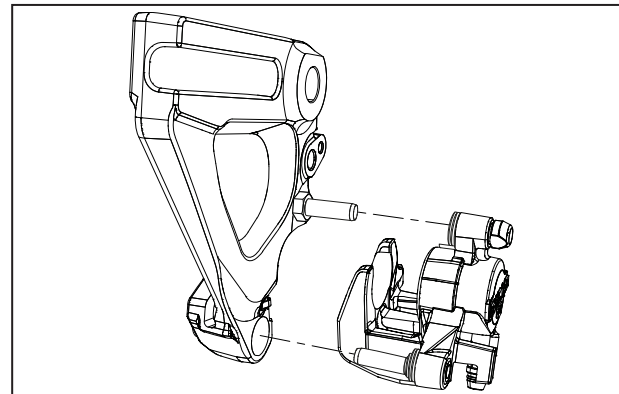


Dismantling Rear Brake Caliper

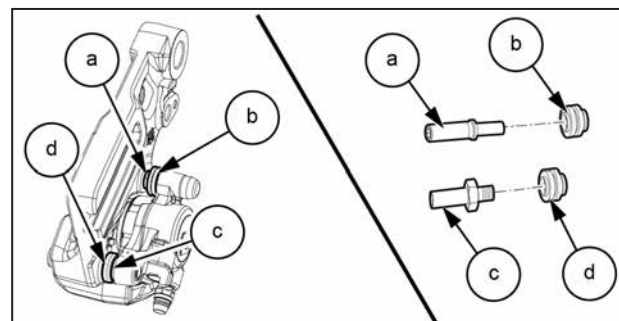
- Remove the brake pad spring **(a)**.



- Separate the mounting bracket from the caliper assembly by gently pull.

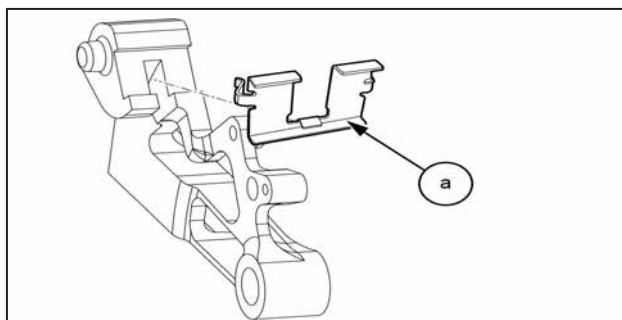


- Remove the dust boots **(b) and (d)** from caliper assembly.
- Remove caliper slide pins **(a) and (c)**.

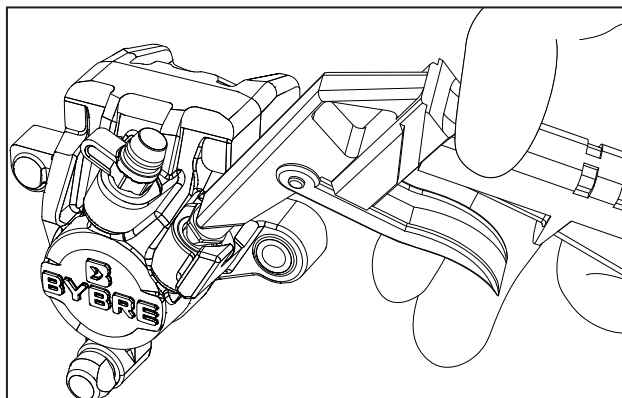


11mm ring spanner
5mm Allen Key

- Remove rattle clip **(a)** from caliber.



- Position caliper body with the pistons down and apply small squirts of air pressure to fluid inlet hole to remove pistons.



⚠ WARNING

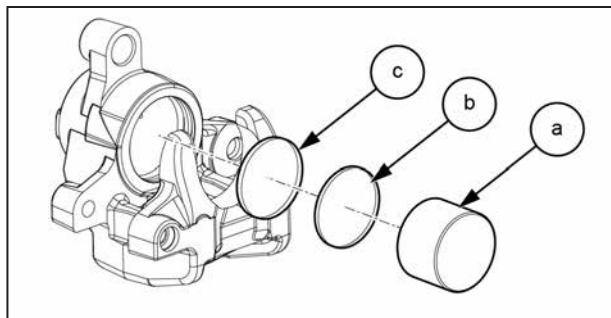
To avoid serious injury, never place your fingers or palm in front of the piston. If you apply compressed air into the caliper, the piston may crush your hand or fingers.

⚠ CAUTION

Do not use high pressure air or bring the nozzle too close to the inlet. Place a shop towel over the pistons to prevent the pistons from becoming projectiles. Push the dust seals and piston seals in and lift them out using a blunt tool. Care should be taken to avoid any damages on the bore of the sliding surface.

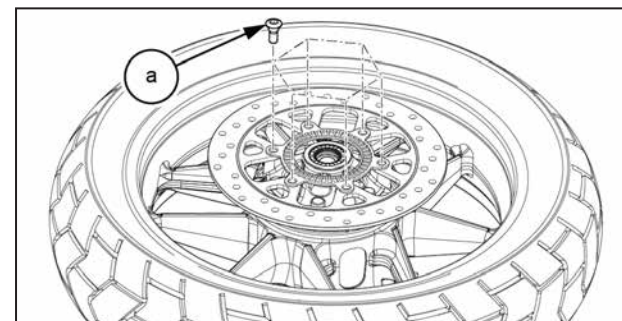
Enough care should be taken to avoid damages of the piston OD while servicing/handling. Remove the bleed screw.

- Remove the pistons **(a)** from caliber.
- Remove dust seals **(b)** from the caliber.
- Remove fluid seals **(c)** from the caliber.



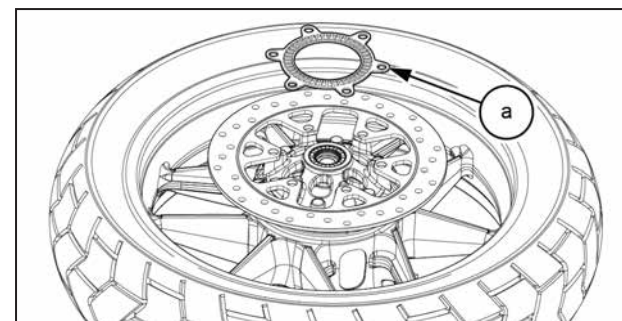
9.2.5. Rear Wheel and Brake Disc

- Remove the rear wheel.
- Loosen and remove **6Nos (M8) (a)** bolts to remove ABS toner wheel.

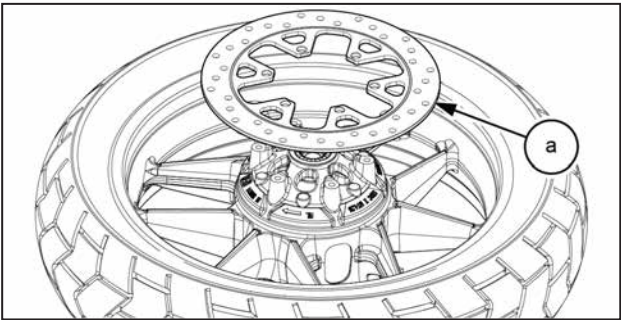


6 mm Allen socket with Ratchet

- Remove ABS toner wheel **(a)** from rear wheel hub RH.



- Remove rear brake disc **(a)** from the rear wheel hub RH.

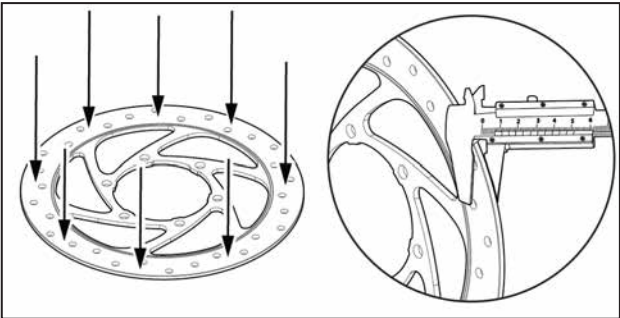


Inspection

Front Wheel and Brake Disc

- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of brake disc.
- Inspect brake disc thickness and run-out. Measure depth at points where scoring is found on the discs and replace if there is excess wear.

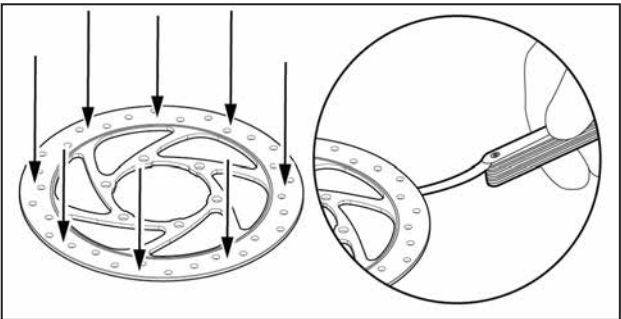
- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.



	Vernier caliper
---	-----------------

Service limit	4.5 mm
---------------	--------

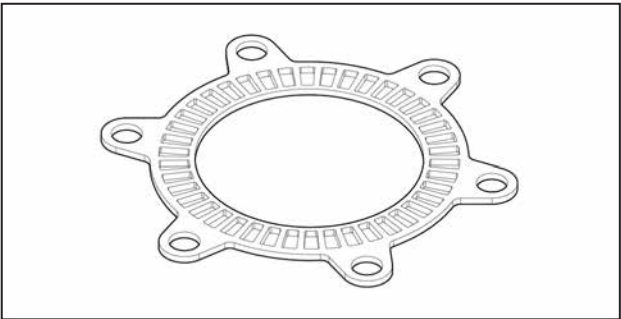
- Place brake disc rotor on a flat surface and inspect war page. Replace if it is out of specifications.



	Feeler gauge
---	--------------

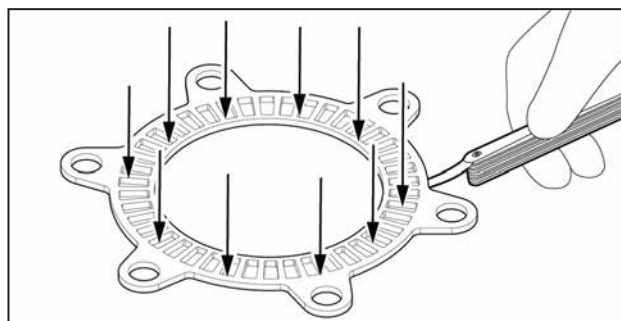
Standard	0.00 mm
Service limit	0.3 mm

- Inspect and replace toner wheel plate if there are any damages or bends.



Rear Wheel and Brake Disc

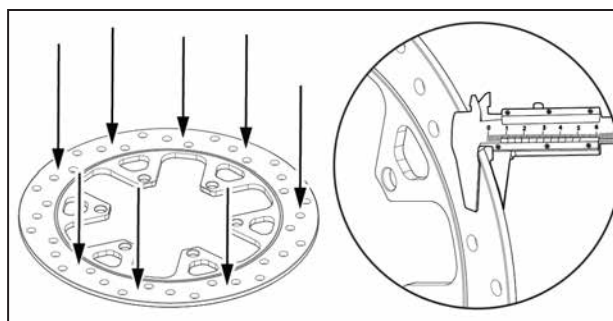
- Inspect ABS toner wheel for any bends or damages.
- Place ABS toner wheel on a flat surface and check war page. Replace if out of specifications.



	Feeler gauge
---	--------------

Standard	0.00 mm
Service limit	0.3 mm

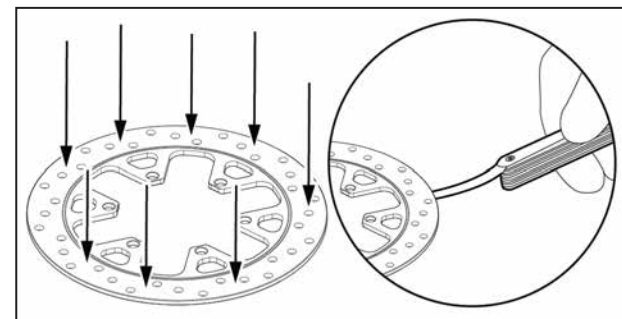
- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of brake disc.
- Inspect brake disc thickness and run-out. Measure depth at points where scoring is found on the discs and replace if there is excess wear.
- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.



	Vernier caliper
---	-----------------

Service limit	4.5 mm (Minimum)
---------------	------------------

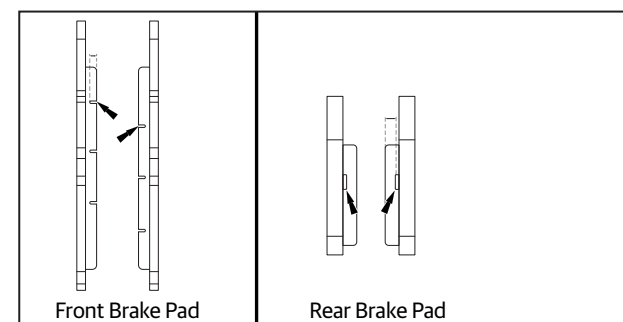
- Place brake disc rear on a flat surface and check war page. Replace if out of specifications.



	Feeler gauge
---	--------------

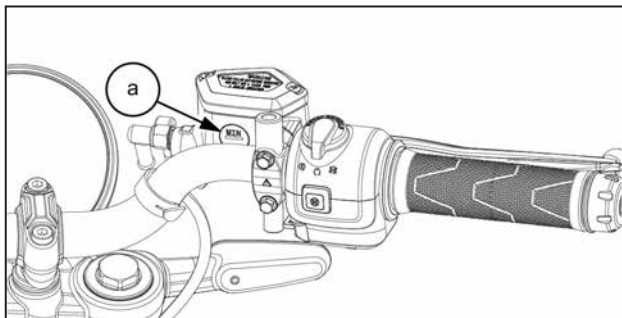
Standard	0.00 mm
Service limit	0.05 mm

- The pads need to be replaced if a brake pad is worn to the indicator.



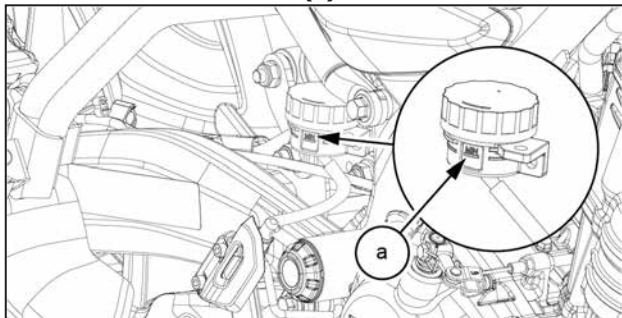
Front

- Check that the brake fluid reservoir is horizontal and that the fluid level is center of the window **(a)** consider as a minimum level.



Rear

- Check that the brake fluid reservoir is horizontal and that the fluid level is between the "MAX" level and "Min" level marks **(a)**.

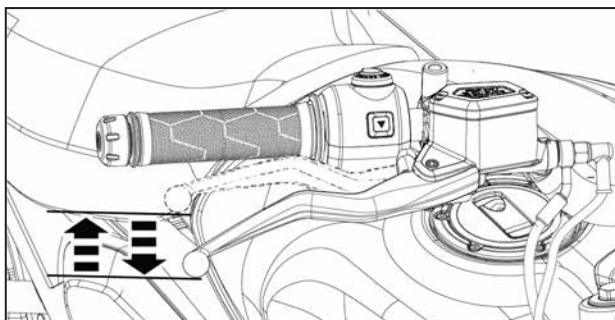


⚠ CAUTION

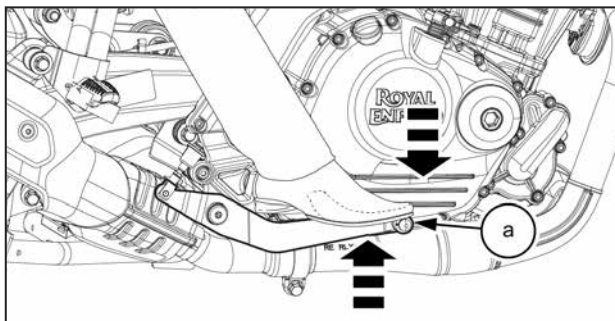
DO NOT mix DOT 4 and other brake fluids together.

- Inspect brake lever front free play and brake pedal rear **(a)** free play. If free play is spongy, check brake pads for wear or tear and replace and follow brake bleeding procedure.

Front

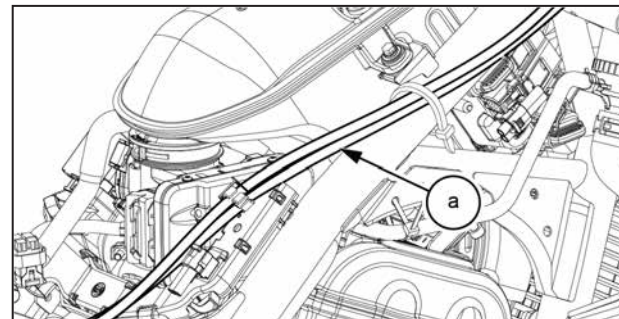


Rear

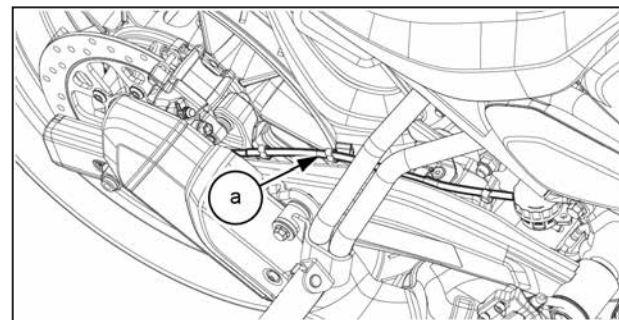


- Inspect and replace front and rear brake hoses **(a)** if they have any cracks, leakages or damages.

Front



Rear



NOTE

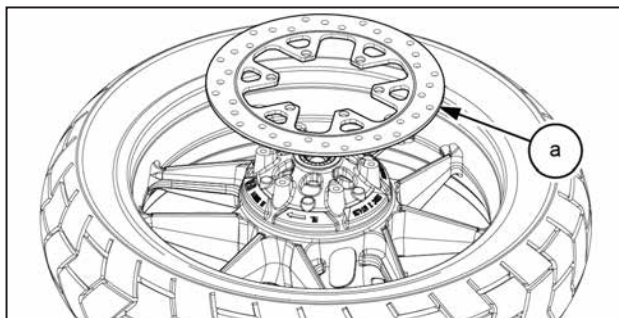
- Ensure the motorcycle is upright on a firm and flat surface.

Assembly

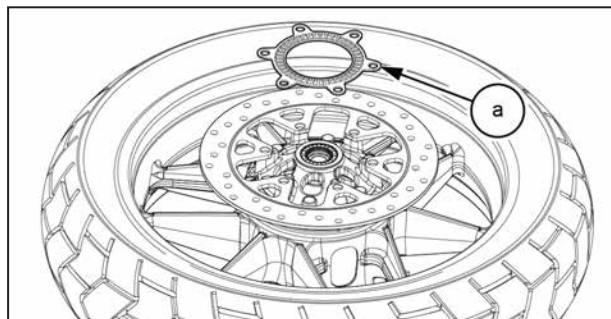
9.3. Brake - Rear

9.3.1 Brake Disc - Rear

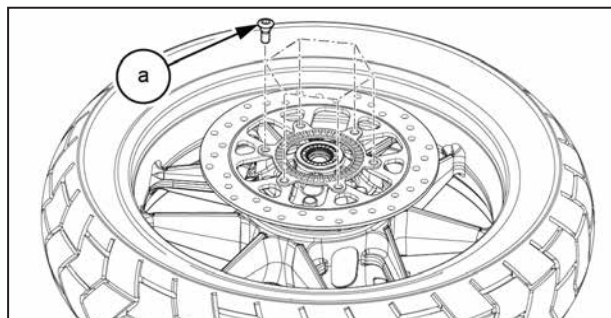
- Assemble rear brake disc **(a)** into rear wheel hub RH.



- Assemble ABS toner wheel **(a)** into rear brake disc on rear wheel hub RH.



- locate and tighten **6 Nos (M8) (a)** bolts into rear wheel disc hub RH.



NOTE

- Disc bolts are should be used one time only. DO NOT reuse.



6 mm Allen socket with Ratchet

Torque

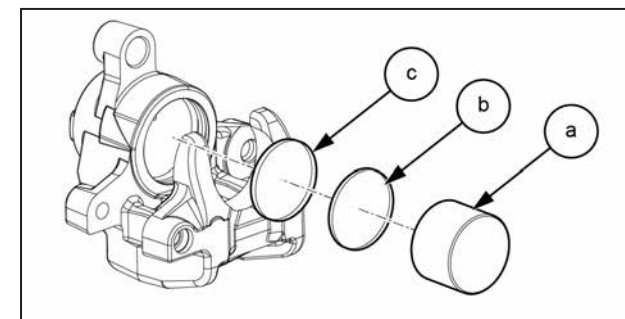
25 Nm/ 2.5 kgf-m

- Assemble drive chain and rear wheel into swing arms.

9.3.2 Brake Caliper Assembly - Rear

Assembling Rear Brake Caliper

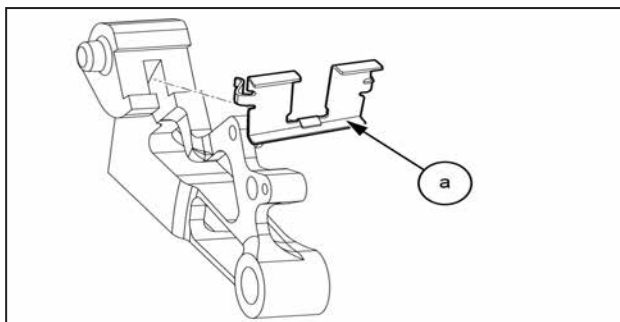
- Coat fresh brake fluid on new dust seals and piston seals.
- Install piston seals in the inner groove **(c)** and dust seals in the outer groove **(b)** in the bore in caliper assembly.
- Coat the caliper cylinder and piston **(a)** with fresh brake fluid.
- Insert the closed end of the piston **(a)** into the caliper bore and gently press it into caliper fully till the open ends of the piston are flush with the caliper bore outer edge



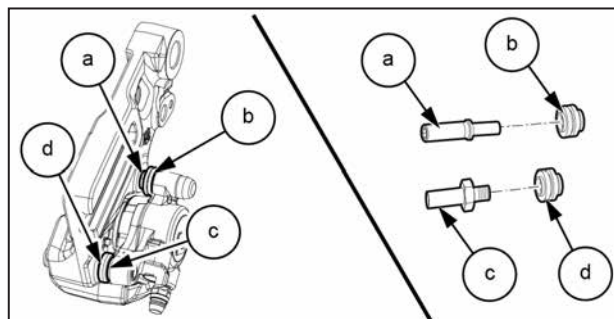
⚠ CAUTION

DO NOT apply force while assembling the piston into the caliper. Press only with minimal hand pressure.

- Locate the rattle clip **(a)** on caliper.

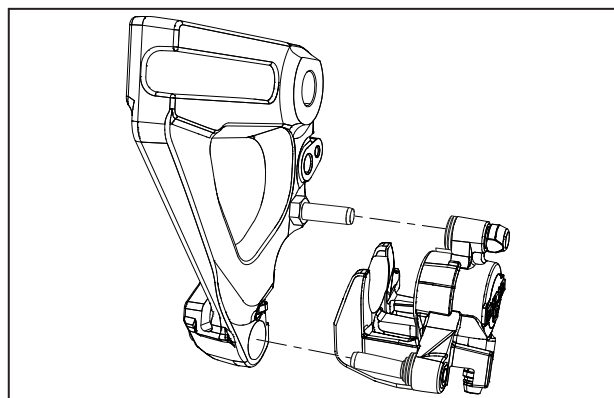


- Locate and tighten the caliber slide pins **(a)** and **(c)**.
- Install the dust boots **(b)** and **(d)** on caliper assembly.

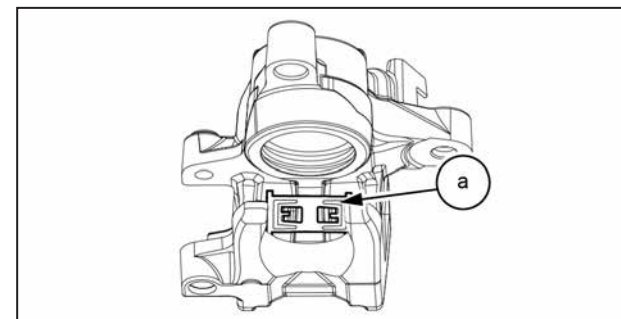


	11mm Deep Socket 5mm Allen Socket
	Torque 20-25 Nm / 2.0 - 2.5 kgf-m

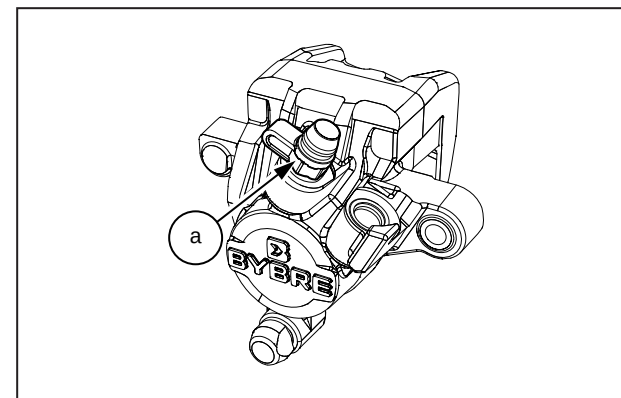
- Locate bracket on the caliper and gently press caliper into bracket fully.



- Install the pad tension spring plate **(a)** in the Caliper body.



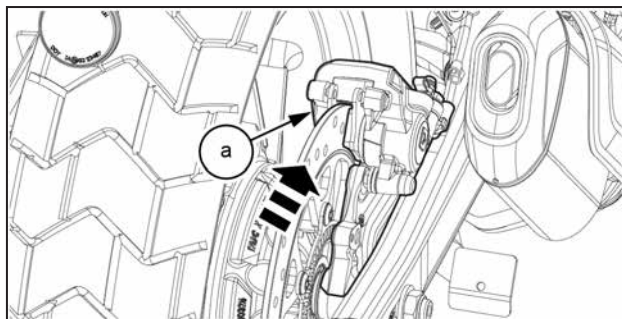
- Assemble Bleeder screw **(a)** with the dust cap on the caliper body.



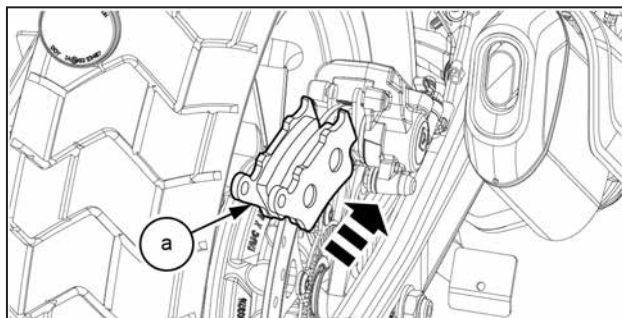
	11mm Socket with Ratchet / Combination Spanner
	Torque 12-16 Nm / 1.2 - 1.6 kgf-m

Rear Brake Pads in Wheel Caliper

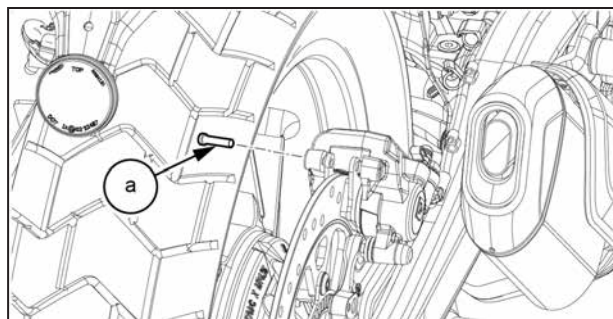
- Gently locate brake caliper **(a)** with holder onto brake disc.



- Gently locate brake pads **(a)** into brake caliper.

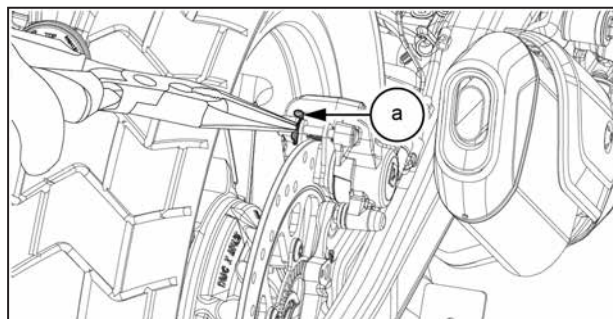


- Locate brake pad lock pin **(a)** into brake caliper.



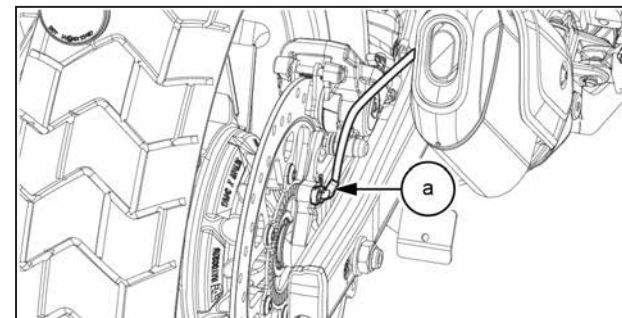
Nose plier

- Install clip **(a)** into brake pad lock pin.

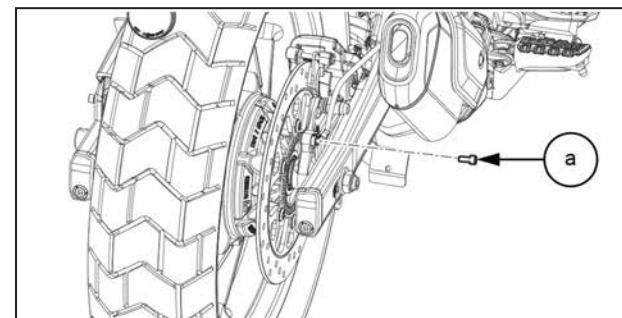


Nose plier

- Gently locate the rear wheel speed sensor ABS **(a)** onto caliper.



- Tighten Hex socket head screw **(M6) (a)** on brake caliper RH rear wheel.

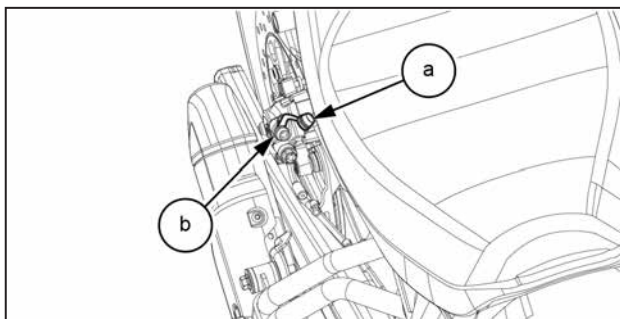


5 mm Allen socket with Ratchet

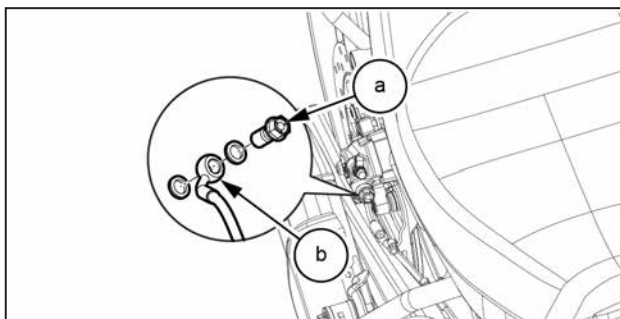
Torque

10 Nm/ 1.0 kgf-m

- Close the bleeder cap **(a)** on caliper **(b)**.



- Tighten the banjo bolt **(a)** with new copper washer and ABS hose **(b)** on rear brake caliper.

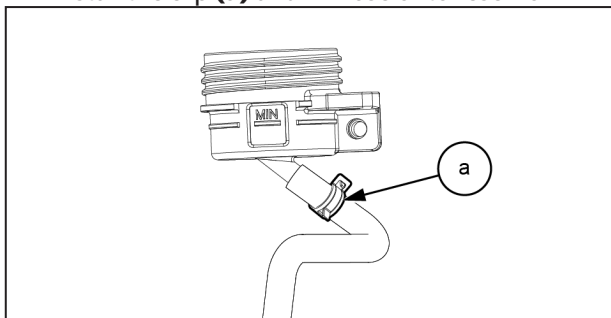


	12 mm Socket with Ratchet
Torque	24 -28 Nm/ 2.4 - 2.8 kgf-m

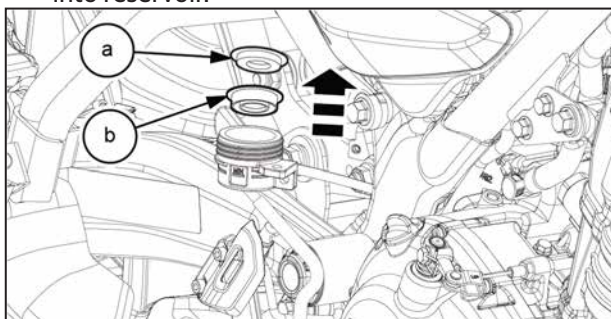
- Assemble swing arm bolt, spindle and chain adjuster assembly into rear wheel.

9.3.3 . Fluid reservoir

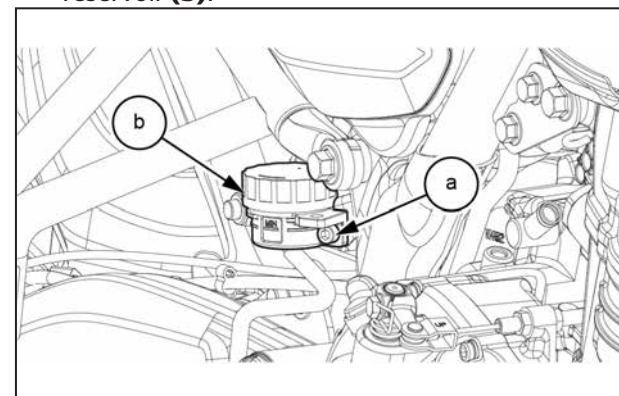
- Install the clip **(a)** and fix hose onto reservoir.



- Install the plate diaphragm **(a)** and diaphragm **(b)** into reservoir.



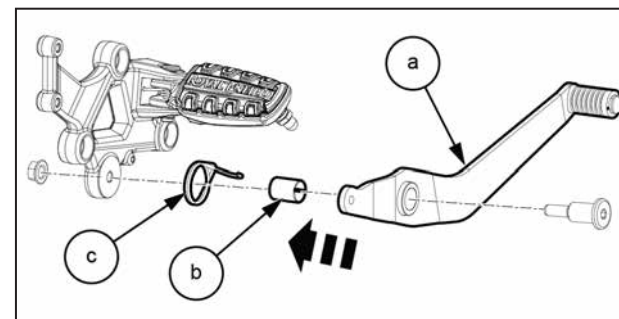
- Locate and tighten Hex socket bolt **M6 (a)** on fluid reservoir **(b)**.



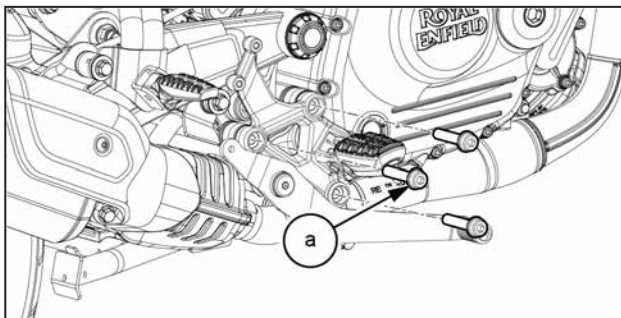
	4 mm Allen socket with Ratchet
Torque	3 Nm/ 0.3 kgf-m

9.3.4. Rear Brake Pedal

- Install spring **(b)** and bush **(c)** into brake pedal.
- Install the pedal **(a)** on LHS control plate.



- Locate and tighten 3 **Nos** cap bolts (M8) (a) into control plate RHS..



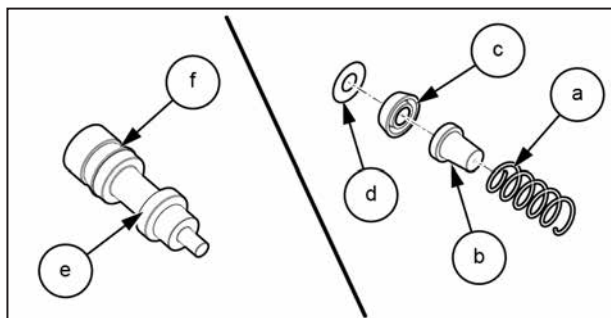
	6 mm Allen socket With Ratchet/27 Combination spanner.
Torque	20 ± 3 Nm / 2 ± 0.3 kgf-m

Assemble Rear Brake Master Cylinder

- Install the spring (a) and spring retainer (b) into master cylinder bore.
- Install the primary washer (d) and primary seal (c) on piston.
- Install piston (e) with secondary seal (f) into master cylinder bore.

⚠ CAUTION

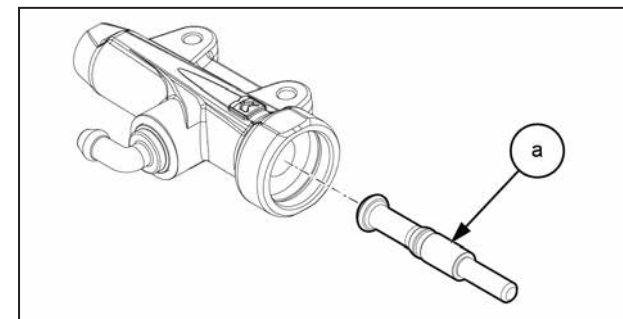
DO NOT use any sharp tool to assemble the O ring or piston in the master cylinder.



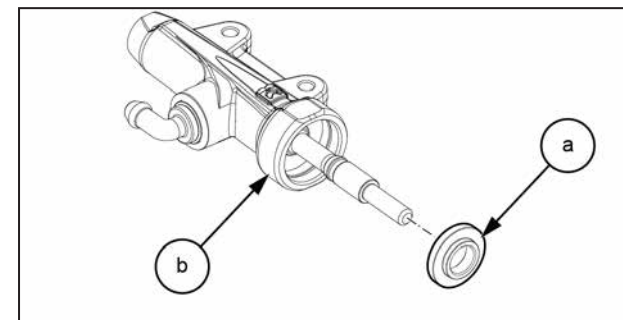
⚠ CAUTION

Immediately wash away any brake fluid that spills.

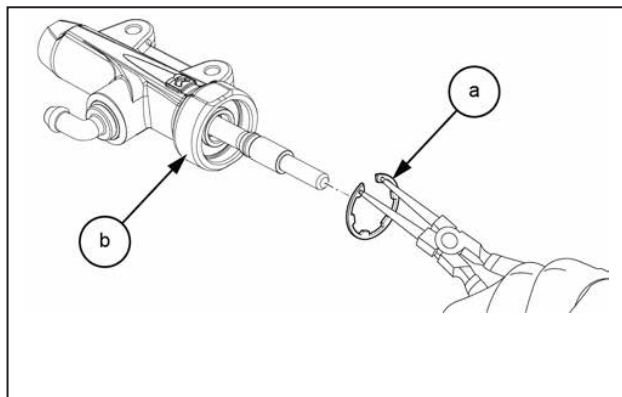
- Locate push rod (a) into master cylinder.



- Locate stopper washer (a) into master cylinder (b).

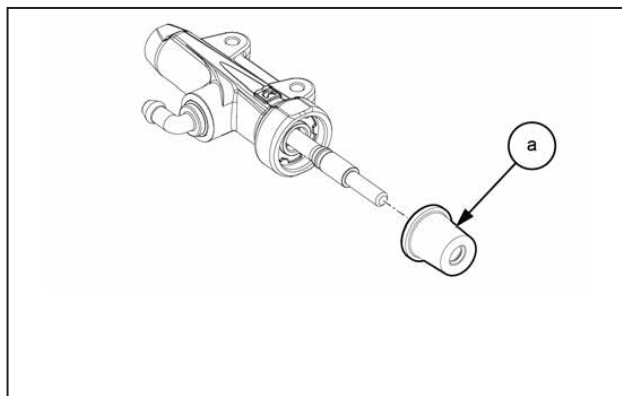


- Assemble Circlip **(a)** in the master cylinder body **(b)** and ensure it is locked properly in the groove.



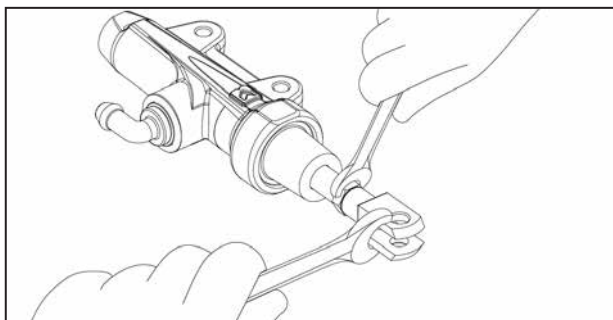
Circlip plier

- Install protective rubber boot **(a)** on master cylinder.



Screw driver

- Tighten the push rod nut.



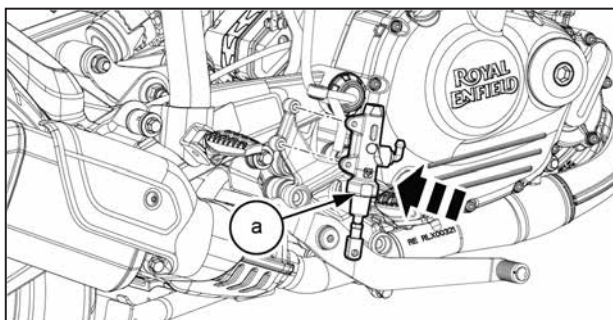
10mm and 12mm Combination Spanner

Torque

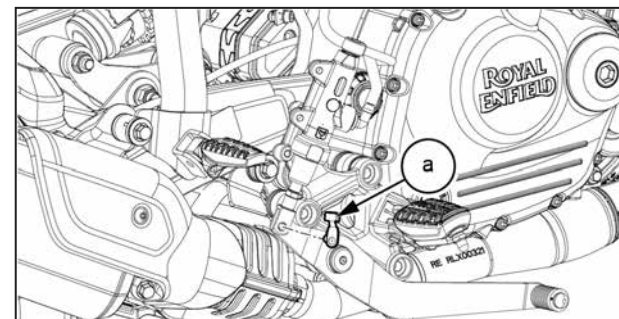
5.5 - 7.5 Nm/0.56 - 0.76 kgf-m

9.3.5. Master Cylinder Assembly - Rear

- Locate master cylinder assembly **(a)** on RH control plate.

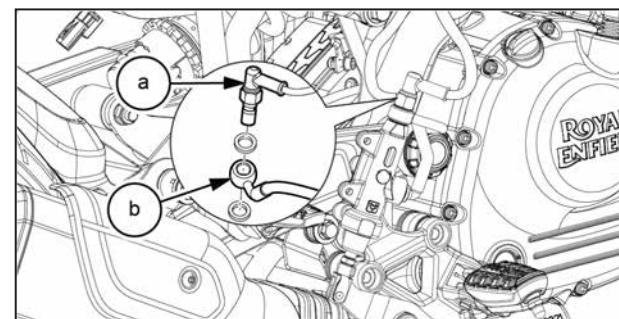


- Install the clevis spring pin **(a)** on master cylinder push rod.



Nose plier

- Locate and tighten the rear brake pressure switch **(a)** with new copper washers and ABS hose **(b)**.

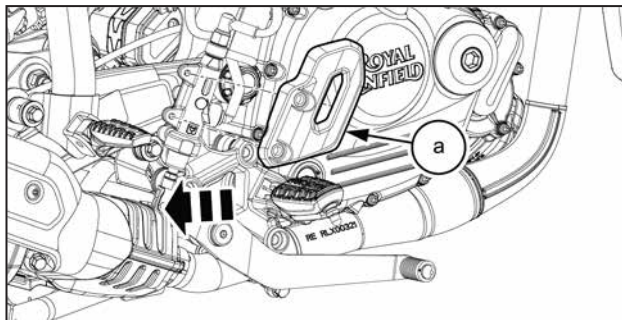


14mm Double End spanner

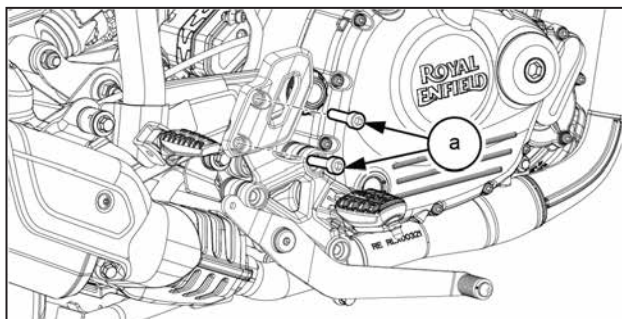
Torque

26 Nm/2.6 kgf-m

- Locate the heel guard **(a)**.

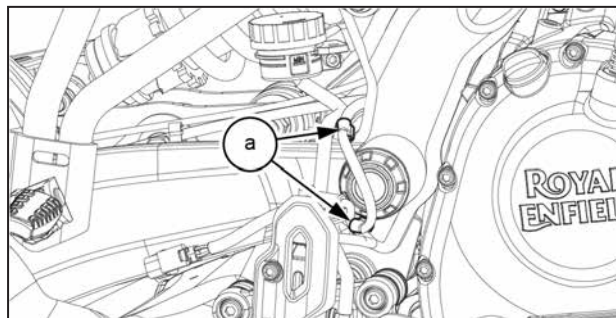


- Locate and tighten the **2Nos** cap bolts **(M6)** **(a)** on heel guard.

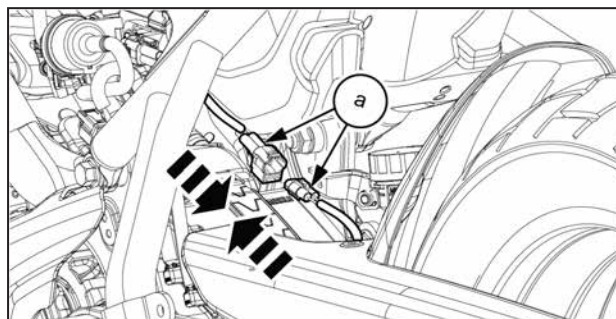


	5 mm Allen socket with Ratchet
Torque	10Nm/1.0 kgf-m

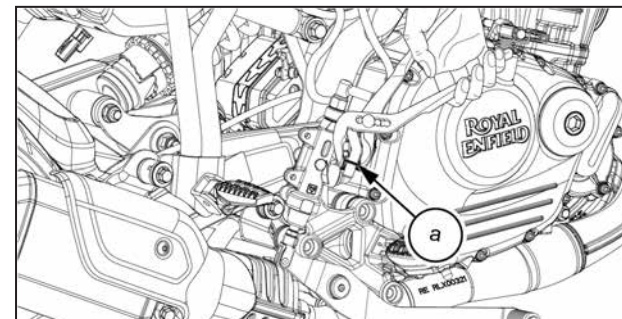
- Fix the double cable clips **2Nos** **(a)** on pressure switch harness.



- Connect rear brake pressure switch coupler **(a)**.



- Fix the clamp **(a)** and hose on reservoir

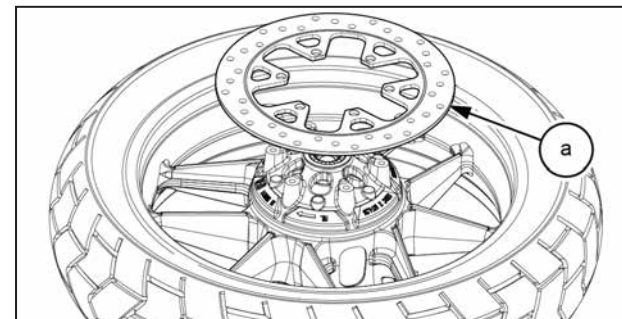


Plier

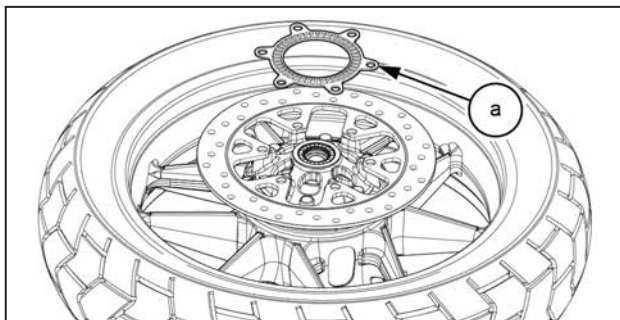
9.4. Brake - Front

9.4.1. Brake Disc - Front

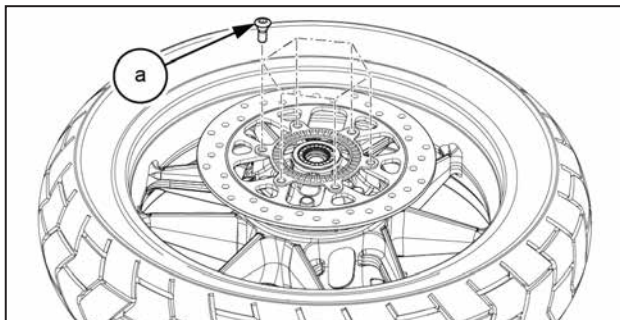
- Locate front brake disc **(a)** on wheel hub with the disc facing up. Ensure mounting holes are correctly aligned.



- Position toner wheel **(a)** on front disc and ensure mounting holes are correctly aligned.



- Locate the bolts 5 Nos **(M8)** **(a)** on the mounting holes and tighten toner ring and brake disc to the wheel hub in crisscross pattern to specified torque.



NOTE

- Disc bolts are should be used one time only. DO NOT reuse.



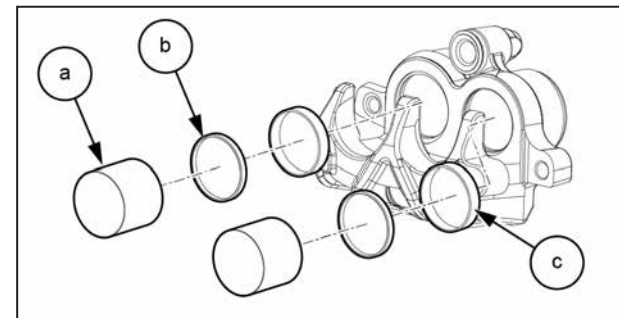
6 mm Allen socket with Ratchet

Torque 25 Nm/2.5 kgf-m

- Assemble front wheel into front fork assembly.
Refer Wheel chapter.

9.4.2. Brake Caliper - Front

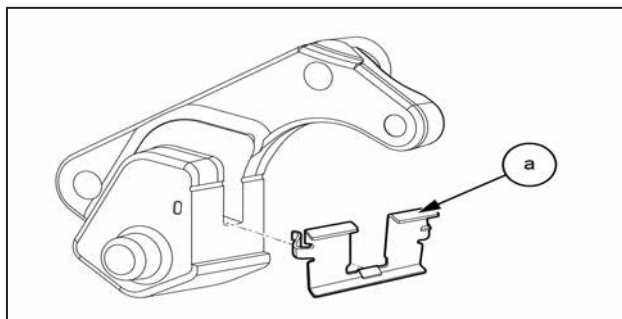
- Coat fresh brake fluid on new dust seals and piston seals.
- Install piston seals in inner groove **(c)** and dust seals in outer groove **(b)** in the bore in caliper assembly.
- Coat the caliper cylinders and pistons **(a)** with fresh brake fluid.
- Insert closed end of the pistons into caliper bores and gently press it into caliper fully till open ends of the piston **(a)** are flush with caliper bore outer edge.



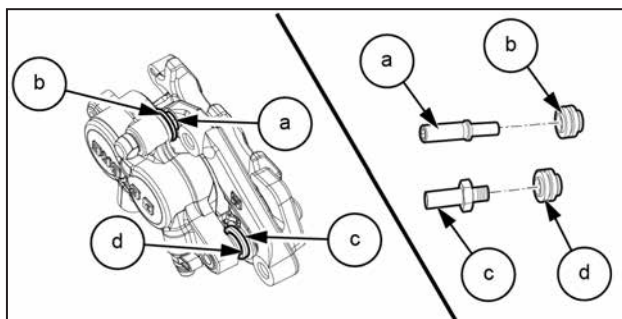
NOTE

- Do not apply force while assembling the pistons into the caliper. Press only with minimal hand pressure. Assemble pistons one at a time into the caliper.

- Install the rattle clip **(a)** on caliber.

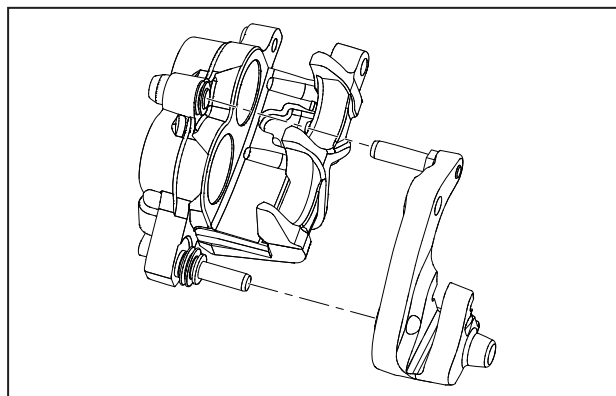


- Locate and tighten the caliber slide pins **(a)** and **(c)**.
- Fix the dust boots **(b)** and **(d)** on caliper assembly.

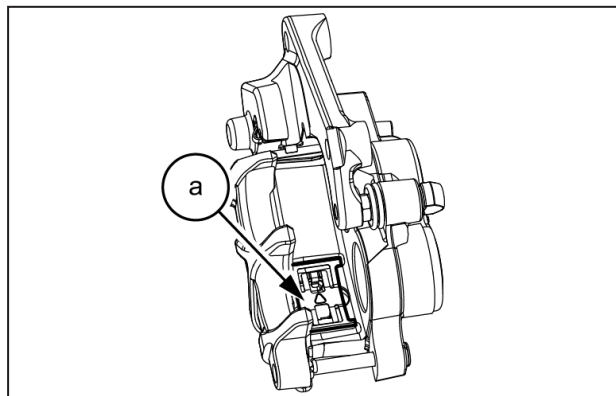


	11mm Deep Socket and 5mm Allen socket with Ratchet
Torque	20 to 25 Nm/2.0 to 2.5 kgf-m

- Install the mounting bracket on caliper assembly.

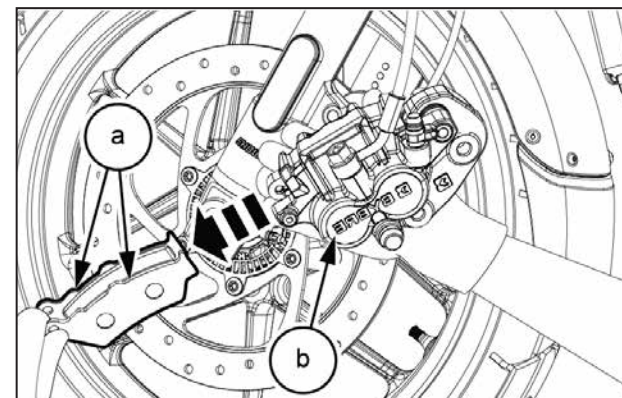


- Install the pad tensioner spring plate **(a)**.

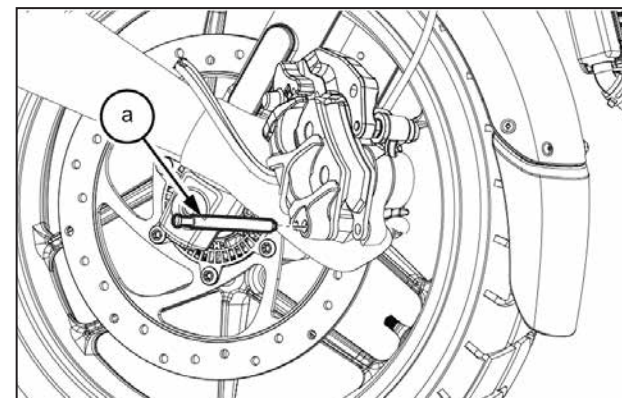


Brake Caliper - Front

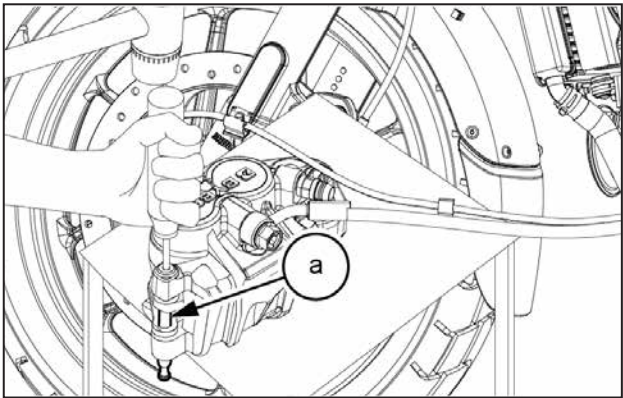
- Slide in and assemble brake pads **(a)** into brake caliper **(b)**.



- Lubricate and insert brake pad pin **(a)** into caliper.



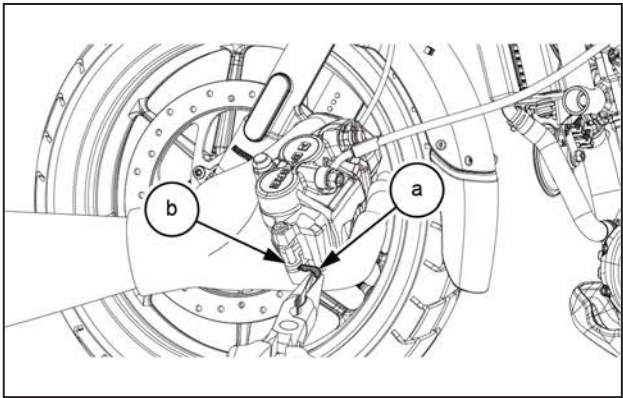
- Suitably support caliper and correctly tap brake pad pin **(a)** from outside to inside.





Pin punch and Mallet

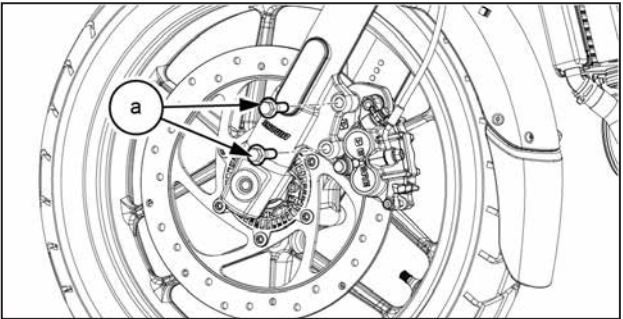
- Assemble brake pad lock clip **(a)** into the brake pad pin **(b)**.





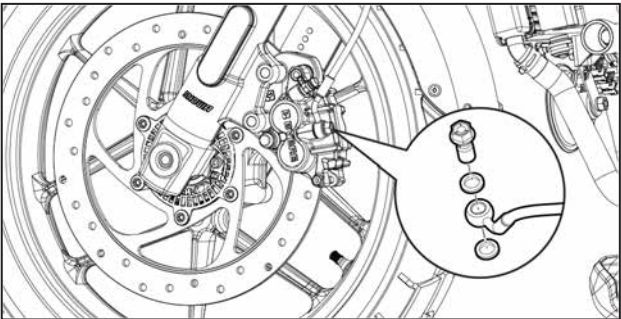
Nose plier

- Support and hold the front brake caliper assembly suitably onto the front LH fork.
- Locate and tighten upper and lower Hex flange head bolts **(M10) (a)** to fix front brake caliper assembly to LH fork.



	14 mm Socket with Ratchet
Torque	45± 6Nm / 4.5 ±0.6kgf-m

- Tighten the banjo bolt with new copper washer and ABS hose on front brake caliper.



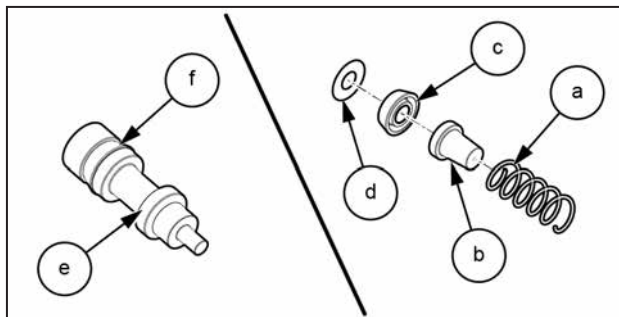
	12 mm Socket with Ratchet
Torque	24-28Nm / 2.4 to 2.8 kgf-m

9.4.3. Master Cylinder Front

- Install the spring **(a)** and spring retainer **(b)** into master cylinder bore.
- Install the primary washer **(d)** and primary seal **(c)** on piston.
- Install piston **(e)** with secondary seal **(f)** into master cylinder bore.

⚠ CAUTION

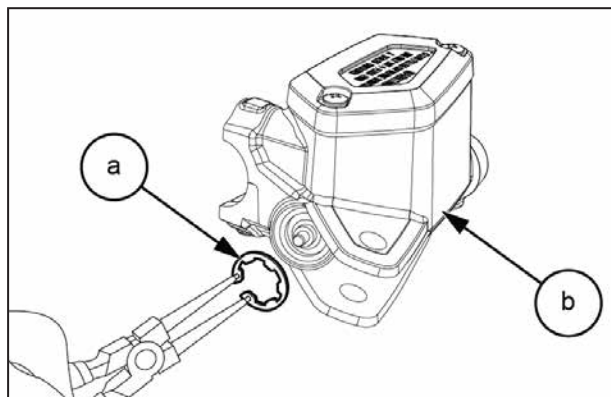
DO NOT use any sharp tool to assemble the O ring or piston in the master cylinder.



⚠ CAUTION

Immediately wash away any brake fluid that spills.

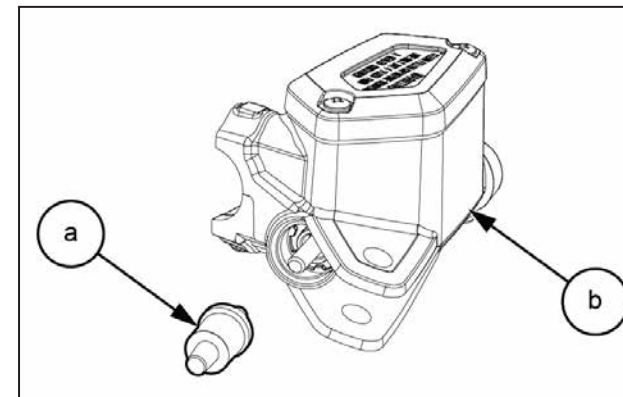
- Compress and assemble circlip **(a)** into groove of master cylinder **(b)**.



⚠ CAUTION

**DO NOT use tools with sharp ends.
Ensure circlip is locked properly after assemble.**

- Install the boot **(a)** on master cylinder assembly **(b)**.

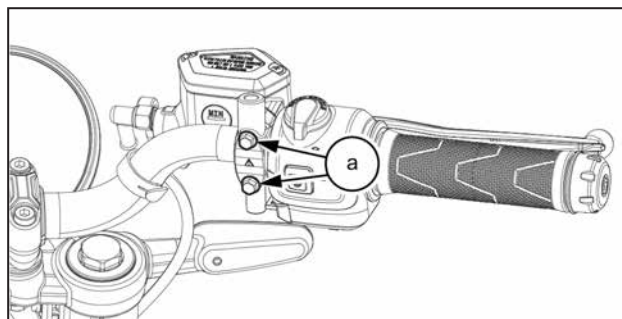


Screw driver

- Locate master cylinder assembly on handlebar RH and locate clamp over cylinder.
- Locate and tighten **2 Nos** Hex flange head bolt **(M5) (a)** into clamp and fix the master cylinder assembly.
- Tighten the top bolt first and then tighten the bottom bolt

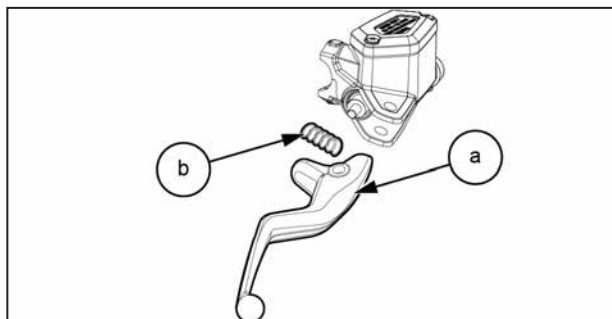
NOTE

- Tighten the top bolt first and then tighten the bottom bolt.

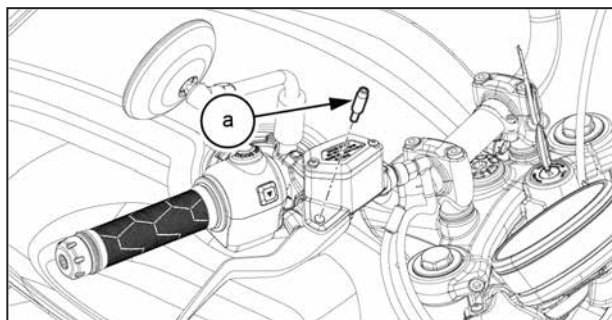


	8 mm Socket with Ratchet
Torque	10 Nm / 1.0 kgf-m

- Install brake lever **(a)** with spring **(b)** on front master cylinder.

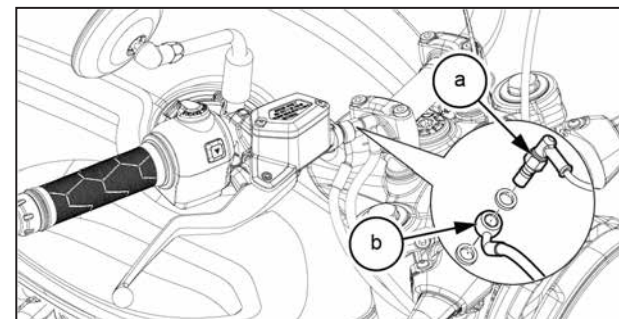


- Hold screw **(M6) (a)** at the top of brake lever, and tighten hex nut at the bottom.



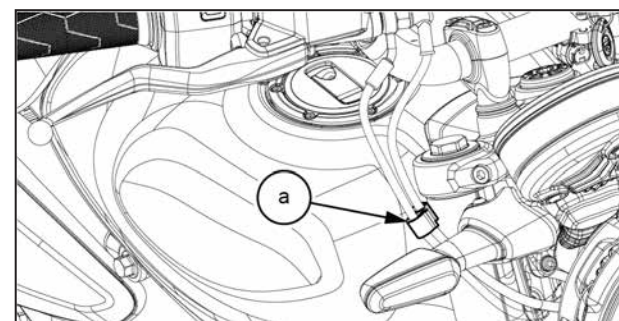
	4 mm allen socket and 10 mm Socket with Ratchet
Torque	3 - 5 Nm/0.3 to 0.5 kgf-m

- Tighten the brake switch **(a)** with new copper washer and ABS hose **(b)** on front master cylinder..

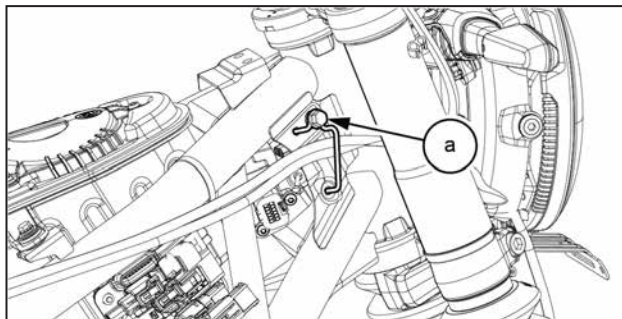


	14 mm socket
Torque	24 - 28 Nm / 2.4 to 2.8 kgf-m

- Fix the double cable clips **(a)** on front brake pressure switch wiring harness.

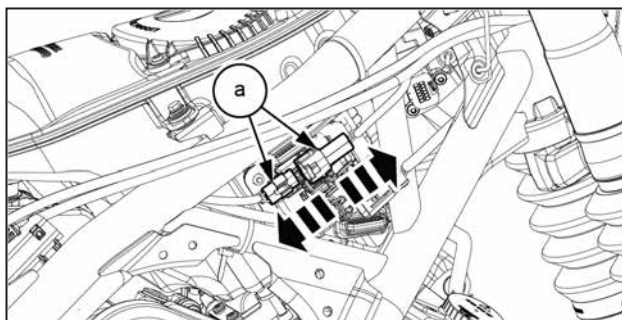


- Locate harness clip **(a)** on RHS chassis frame.
- Tighten the hex head flange bolt **(M6)**.



	10 mm Socket with Ratchet
Torque	10 N-m / 1.0 kgf-m

- connect the front brake pressure switch connector **(a)**.



After install refer brake oil bleeding procedure. Refer [Brake chapter](#).

Install the following parts:

- Rear view mirror on handlebar RH. Refer [Handle chapter](#).
- Install the fuel tank . Refer [Fuel system chapter](#).
- Connect battery negative (-) terminal. Refer [electrical system chapter](#).
- Install the rider and pillion seats. Refer [Side panel and seat chapter](#).

CAUTION

Immediately wash away any brake fluid that spills.

9.5. Anti-lock Braking System (ABS)

9.5.1. Working Principle

The Royal Enfield Himalayan motorcycles are equipped with the state of the art Anti-Lock Braking System (ABS).

The ABS is a safety system which constantly receives inputs about the speed of rotation of the front and rear wheels on a real time basis and modulates the braking force for each wheel when brakes are applied by the rider. This helps prevent the brakes from locking the wheels, especially when brakes are applied suddenly, the wheels have a better traction with the road surface.

The benefits of ABS:

- Increased braking efficiency and riding confidence when braking.
- Prevent wheel lock up when brakes are applied suddenly with great force thereby ensuring good traction of the front and rear wheels with the road surface.

The ABS consists of an Electronic Control Unit (ECU), modulator, toner rings and wheel speed sensors.

The ECU constantly receives inputs on the speed of rotation of the front and rear wheels through the wheel speed sensors. When the rider applies either the front or rear brakes or both brakes, the speed sensors provide data on the rate of deceleration of the wheels to the ECU which then commands the valves in the modulator to progressively regulate the hydraulic fluid pressure on a real time basis so that the brake pads do not "lock" on the brake disc which can potentially cause the wheels to lock.

Whenever front and/or rear brakes are applied with great force/suddenly, the braking management system gets input of the wheels speed through a wheel speed sensor and commands the modulator in the braking system to modulate

the hydraulic fluid force such that the brake pads do not lock on the brake disc which effectively from locking and provide better traction to prevent the motor cycle from shifting and/or loss of control.

In the ABS, during application of brakes, a pulsating sensation will be felt on the brake lever/pedal indicating that the ABS is working correctly.

WARNING

The ABS will by no means prevent an accident and/or loss of control. It is the responsibility of the rider to anticipate and judge the braking distances required, depending on the speed at which the motorcycle is traveling and apply brakes sufficiently in advance to prevent an accident and/or loss of control.

While ABS assists in improved motorcycle control during braking, decreased stopping distances on dry and good road conditions, it cannot be assumed that it will be effective in wet, rainy, snow covered, off road conditions, loose gravel surfaces or hilly roads etc, as the traction of the wheel itself will be very minimal in these conditions.

As far as possible, whenever applying sudden brakes in emergency in wet conditions, please ensure the motorcycle is upright in steady riding position and the handlebars are straight. Avoid hard braking when banking heavily at great speeds.

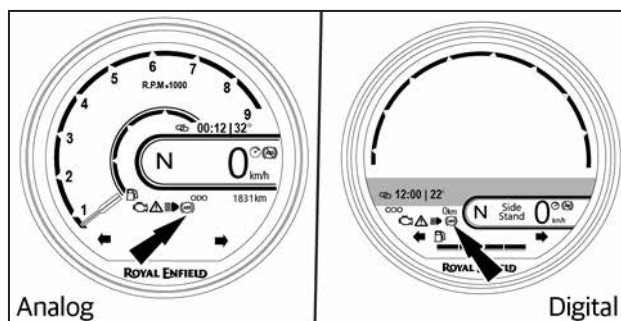
Whenever brakes are applied, a pulsating sensation will be felt on the brake lever/pedal. This is characteristic to the ABS and quite normal, as the modulator in the ABS constantly modulates the hydraulic pressure in the braking system in relation to the force applied on the brake lever/pedal and the speed of the motorcycle.

Whenever bleeding the hydraulic system, it is highly recommended to bleed both the front and rear brakes for proper functioning of the ABS. Do not restrict to bleeding any one brake system as it may render the ABS non-functional, in case the other brake has air bubbles in its system.

9.5.2. Functions and Specifications of the ABS Aggregates

As soon as the ignition and engine stop switch are switched ON, the ABS sign will light up. The lamp will remain ON till the motorcycle attains a speed of Km/h (MPH) and then switches OFF. This indicates that the ABS is working properly.

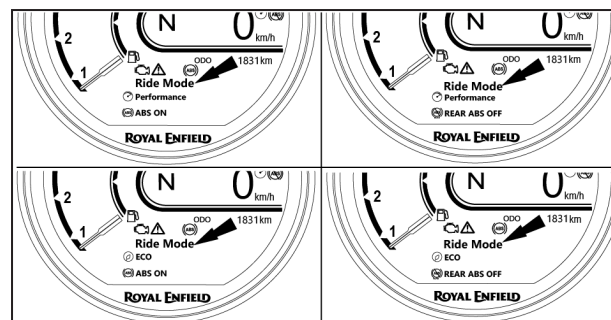
In the event the lamp does not switch OFF and remains continuously ON at higher speeds, it is recommended not to drive the motorcycle and get the brake system inspected and corrected through a nearest authorized Royal Enfield Dealer / Distributor.



The ride mode can be viewed and changed by pressing the mode button on the RH switch cube.

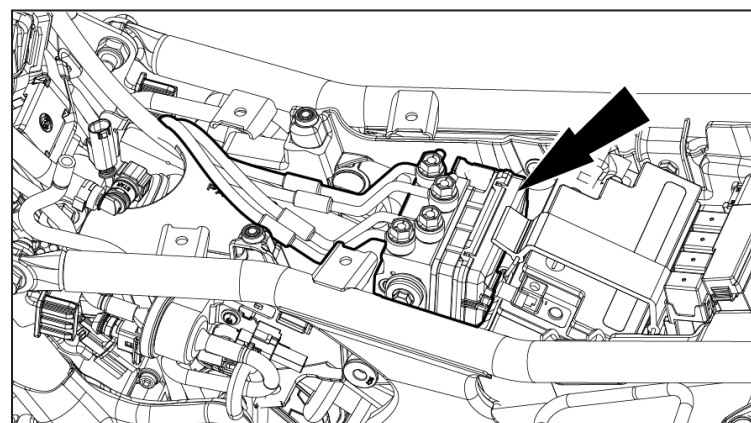
The ride mode appears on the home screen and following modes are available.

- Performance + ABS ON
- Performance + Rear ABS OFF
- ECO + ABS ON
- ECO + Rear ABS OFF



1. Electronic Control Unit (ECU) with Modulator

The ECU is located in the bracket alongside of the modulator, on the frame, behind the battery. It consists of a microprocessor, which receives inputs from the wheel speed sensors, interprets the data, determines the safe hydraulic pressure in relation to the speed of the wheels and commands the valves in the modulator to progressively regulate the hydraulic fluid pressure on a real time basis for efficient and safe braking.

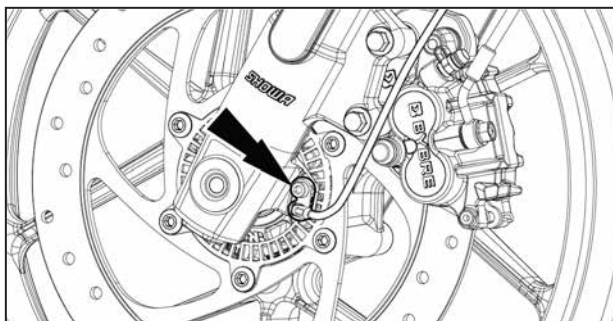
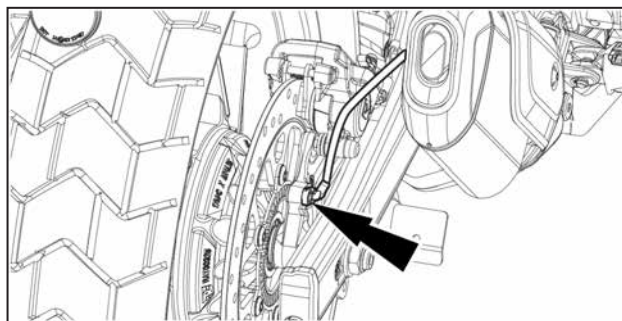


The ECU also records and stores data on the performance of the ABS on a real-time basis. This will help in diagnosing any braking related disorders, whenever the Royal Enfield NACS II diagnostic tool is connected to the socket in the wiring harness of the motorcycle. The history stored in the ECU can also be saved to an external computer for future reference and also erased from the ECU, using the Royal Enfield NACS II diagnostic tool.

The modulator is located on the frame below the fuel tank. The brake hoses from the master cylinders and brake calipers are connected to the modulator. Whenever brakes are applied, the valves inside the modulator are progressively activated by the ECU to regulate the hydraulic fluid pressure in the brake system. This in turn will modulate the movement of the pistons inside the brake calipers to prevent the brake pads from locking on the brake discs.

3. Wheel Speed Sensors, Front and Rear

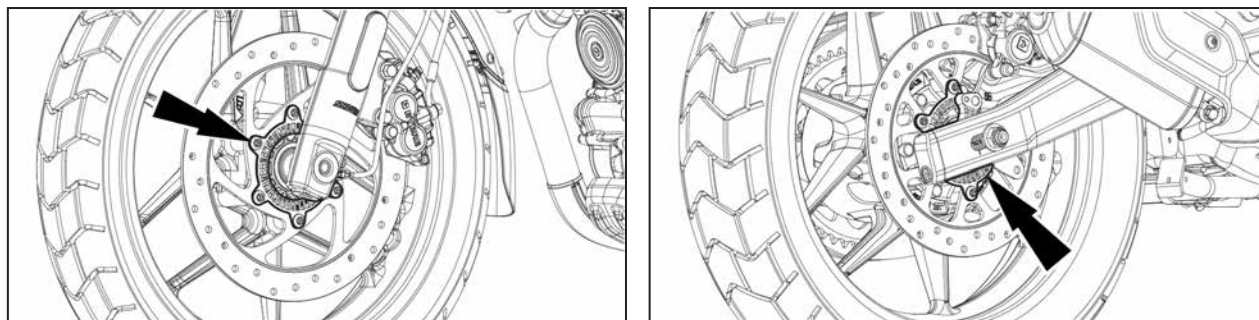
There are 2 wheel speed sensors provided in the motorcycle. The front speed sensor is assembled on the fork end LH and the rear speed sensor is assembled on the rear wheel caliper bracket.



These sensors provide the inputs to the ECU about the speed of rotation of the wheels.

4. Toner Rings, Front and Rear

The toner rings are assembled on the front and rear brake hubs inside the brake discs.

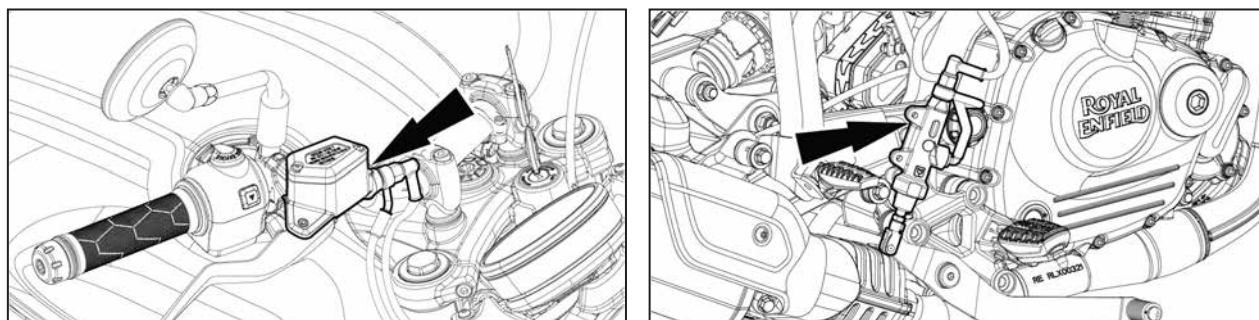


The toner rings assist the wheel speed sensors to assess the speed of rotation of the wheels.

5. Master Cylinders, Front and Rear

The front brake master cylinder **(a)** is assembled on the handlebar RH and activated by the front brake lever.

The rear brake master cylinder is assembled on the frame RH side and activated by the brake pedal.



Whenever the front brake lever/rear brake pedal are activated, the piston inside the master cylinder applies force on the brake fluid to activate the brakes.

The master cylinders are connected to the modulator through brake hoses to transmit the applied hydraulic fluid pressure from the master cylinders.

6. Wheel Calipers - Front and Rear

The front wheel caliper is assembled on the fork end LH and the rear wheel caliper is located on the rear swing arm RH. The wheel calipers consist of pistons and brake pads.



When brakes are applied, the hydraulic fluid force in the braking system causes the pistons to move, and pushes the brake pads against the brake discs on the wheels for braking. The wheel calipers are connected to the modulator which modulate the hydraulic fluid force to be applied against the pistons.

Do's and Don'ts for ABS

- **Use only approved Brake fluid recommended by Royal Enfield. (DOT4)**
- **Whenever the modulator is removed from the motorcycle, please ensure it is stored upright with the ports facing upwards.**
- **Whenever the modulator is removed from the motorcycle for any reason, please ensure the front and rear brake system bleeding is carefully done and no air is trapped in the brake system.**
- **DO NOT interchange ABS unit/ECU from one motorcycle to another.**
- **DO NOT interchange the brake hose connections between master cylinders and wheel cylinders and also front and rear circuit, at the modulator end.**
- **The shelf life of a wet modulator unit is 5 years from the date of manufacture.**

Dismantling

9.6.1.Modulator

⚠ CAUTION

Before dismantling the modulator, ensure ignition switch and engine stop switch are in OFF position.

Ensure the hydraulic brake fluid from the front and rear brakes is drained completely.

⚠ CAUTION

- Ensure ignition key and engine stop switch are in OFF position.

- Remove the rider and pillion seats. Refer Side panel seat chapter.
- Disconnect battery negative (-) terminal. Refer Electrical chapter.
- Remove the fuel tank. Refer Fuel system chapter
- Remove RHS side panel. Refer Side panel seat chapter.

⚠ CAUTION

Ensure the following:

Fuel is drained completely from fuel tank.

Fuel feed and return hoses are disconnected from the fuel rail.

Wiring couplers to fuel pump and low fuel sensors are disconnected.

EVAP hose pipes are disconnected.

- Bleed out the brake fluid from the front and rear brake system. Refer Brake bleeding chapter.

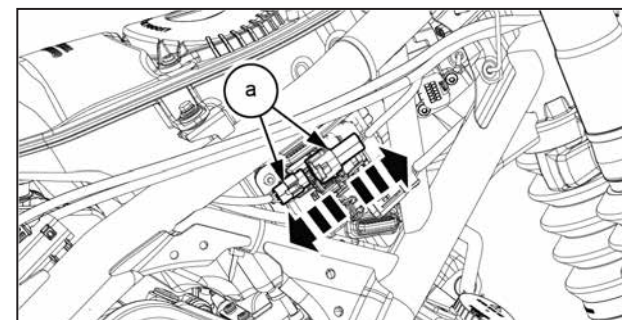
⚠ WARNING

Ensure brake fluid does not get in contact with eyes and skin. In-case of exposure wash affected area thoroughly with water. Seek medical attention immediately if any irritation persists.

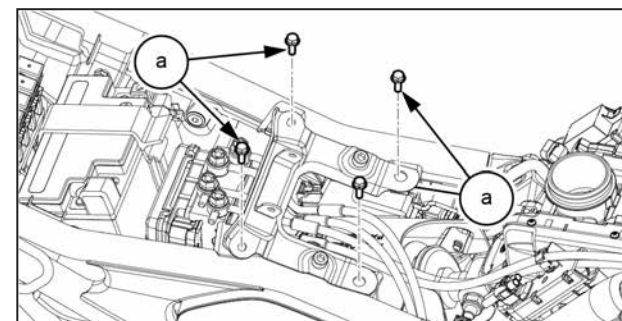
Keep out of reach of children.

Dispose drained brake fluid carefully and responsibly.

- Front brake pressure switch connector located on Front RHS connector holder.
- Disconnect the front brake pressure switch connector (a).

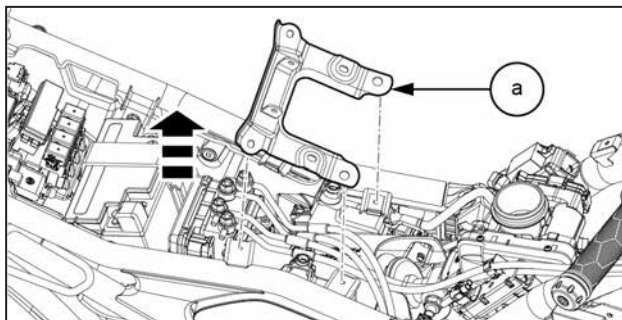


- Loosen and remove the top seat mounting bracket bolts 4 Nos (M6) (a) .

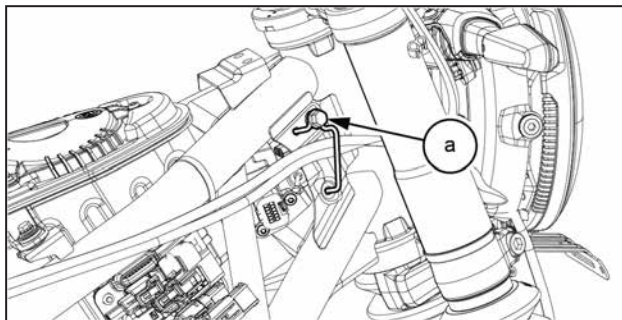


10 mm Socket and ratchet

- Remove the top seat mounting bracket **(a)** from chassis frame.

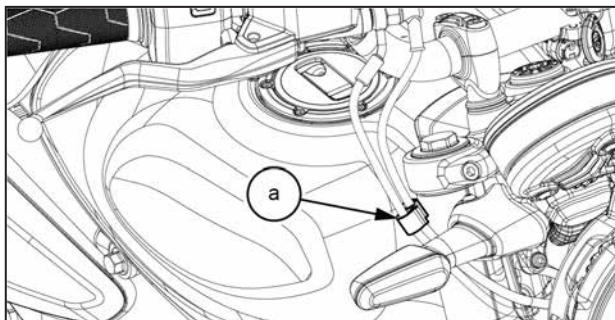


- Loosen and remove hex head flange bolt **(M6) (a)**.
- Remove harness clip from RHS chassis frame.



10 mm Socket with Ratchet

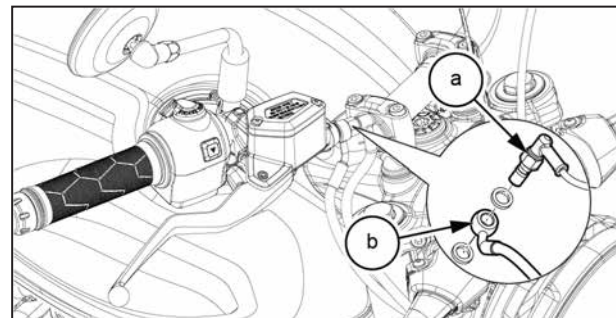
- Detach the double cable clips **(a)** on front brake pressure switch wiring harness.



- Loosen and remove the brake switch with harness **(a)**.
- Remove copper washers from front brake hose.
- Remove the brake hose **(b)** from front master cylinder.

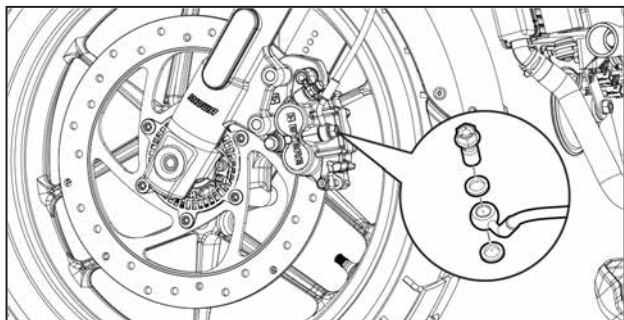
NOTE

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.



14 mm Combination Spanner

- Loosen and remove the banjo bolts with copper washers from front brake caliper.

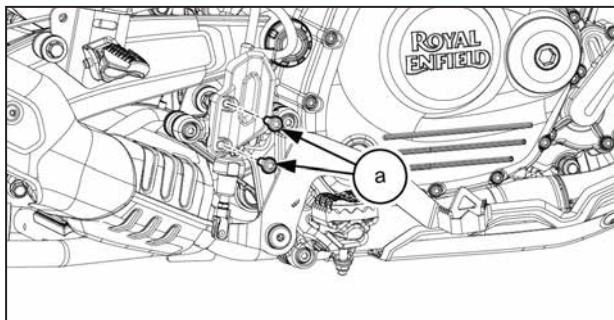


12 mm Socket with Ratchet

NOTE

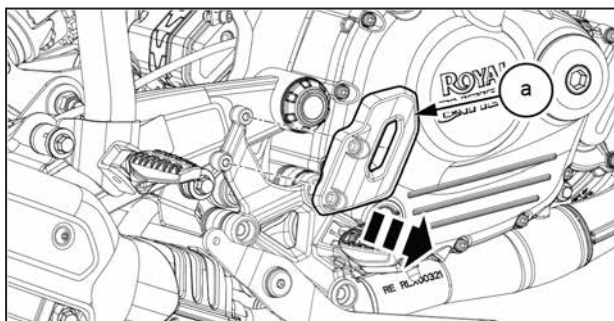
- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.

- Remove the **2Nos** cap bolts **(M6) (a)** from heel guard.

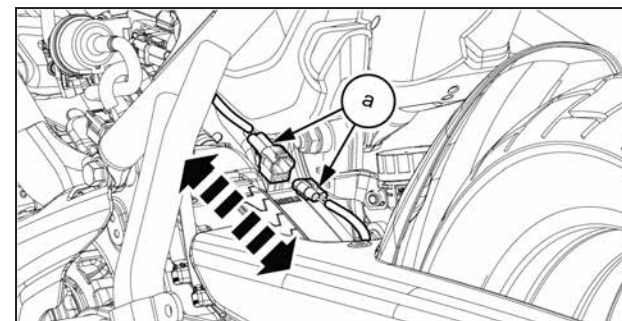


5 mm Allen socket With Ratchet

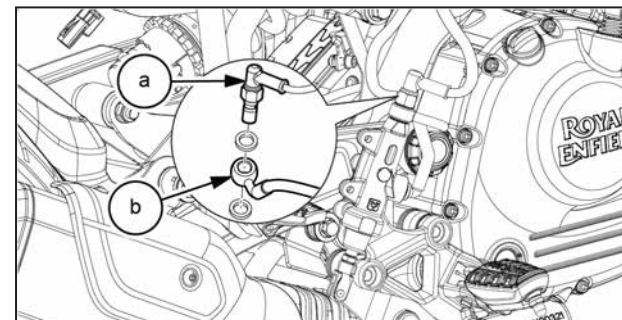
- Remove the heel guard **(a)**.



- Disconnect rear brake pressure switch coupler **(a)**.

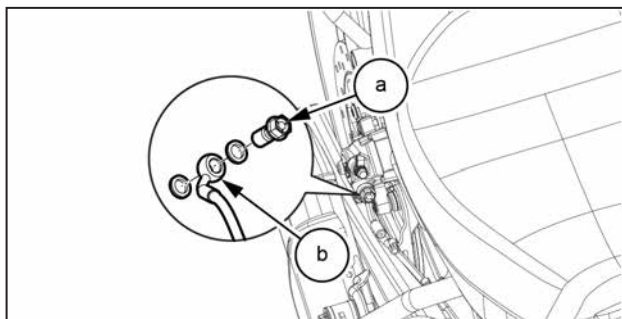


- Just remount the head screw on master cylinder.
- Loosen and remove the rear brake pressure switch **(a)** and ABS hose.



14mm Combination Spanner

- Loosen and remove the banjo bolt **(a)** with copper and ABS hose **(b)** from rear brake caliper.

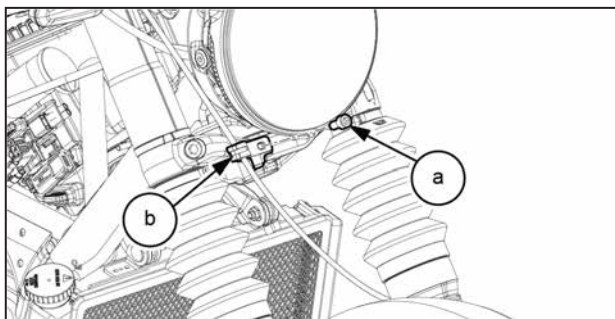


12 mm Socket with Ratchet

NOTE

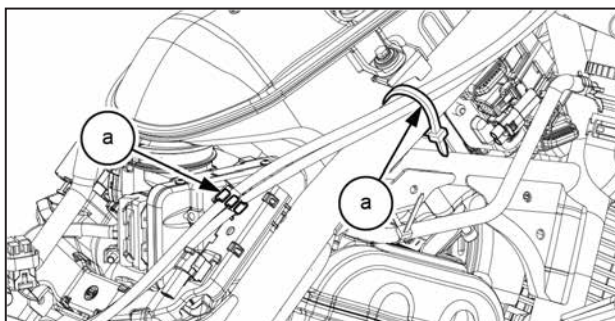
- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.

- Loosen and remove the cap bolt **(M6) (a)** from brake line clip **(b)**.

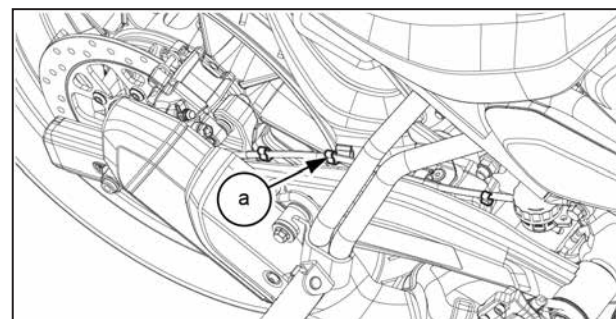


5mm Allen socket Ratchet

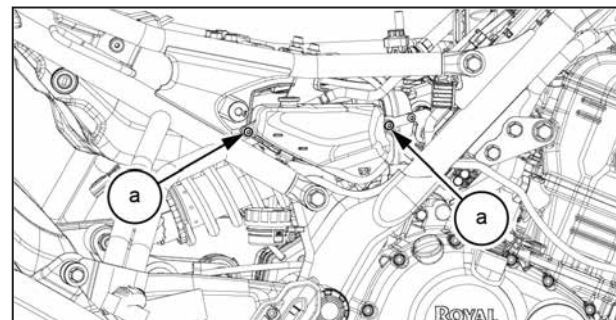
- Remove the cable strap **(a)** from ABS hose.
- Detach the hose from double cable clip **(a)**.



- Detach the rear ABS hose from double cable clip **(a)**.

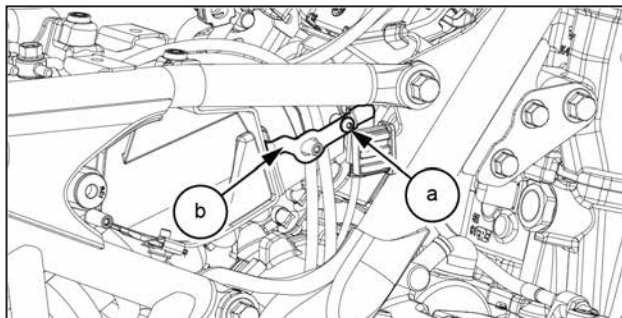


- Loosen and remove **2Nos** screw **(a)** from expansion tank.

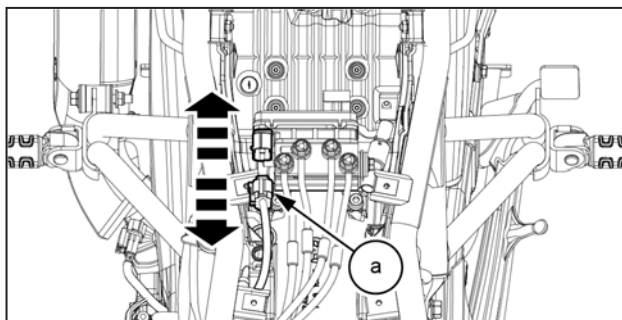


T20 Torx socket

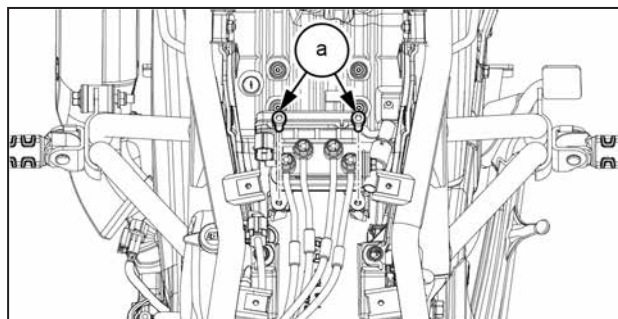
- Loosen and remove screw **(a)** from retainer bracket.
- Remove retainer bracket **(b)** from chassis frame.



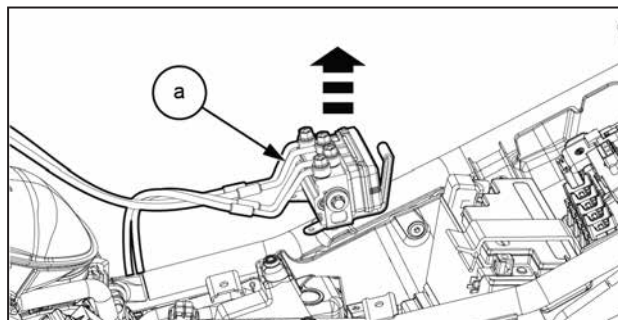
- Disconnect the ABS modulator coupler **(a)**.



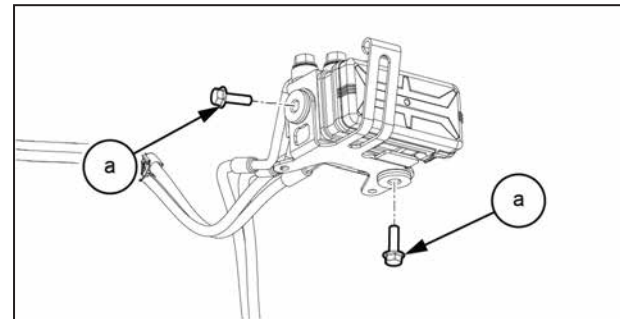
- Loosen and remove **2Nos** cap bolts **(a)** from modulator bracket.



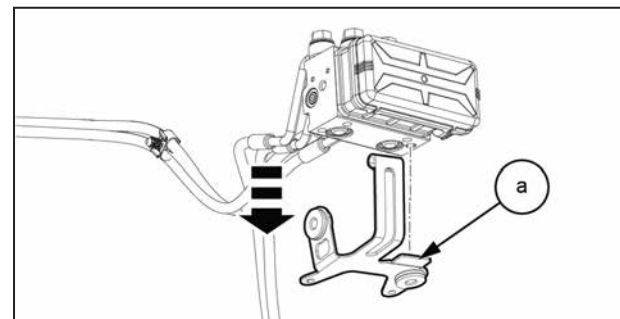
- Gently pull out modulator **(a)** along with bracket and 4 Nos. hoses from frame to remove.



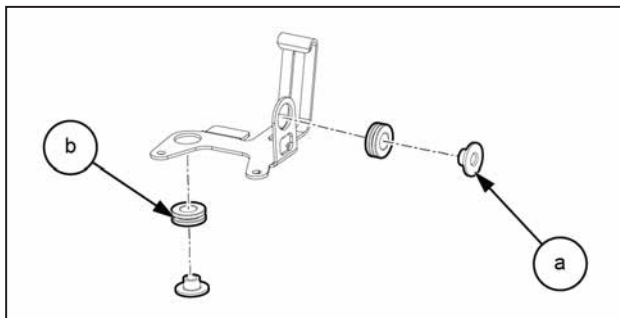
- Loosen and remove hex bolt **2Nos (M6) (a)** from modulator bracket.



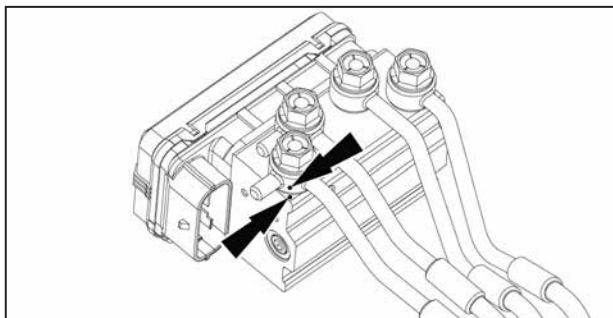
- Remove the bracket **(a)** from modulator.



- Remove the **2Nos** spacer top hats **(a)** and grommets **(b)** from bracket.

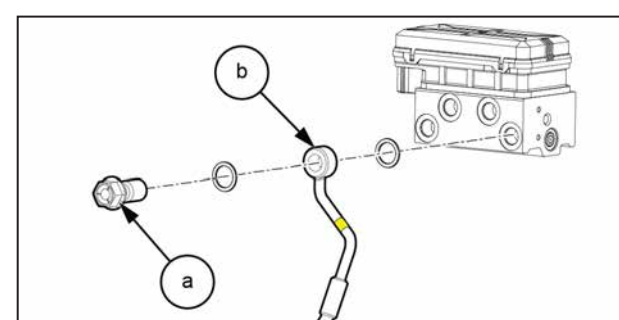
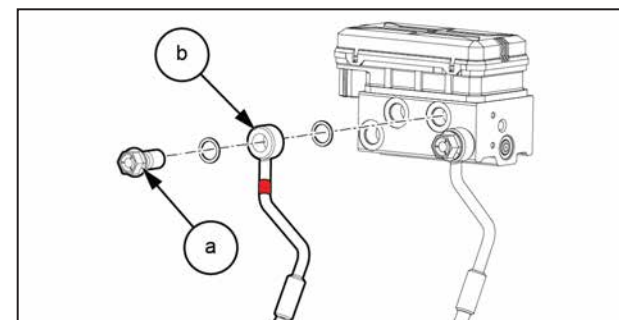
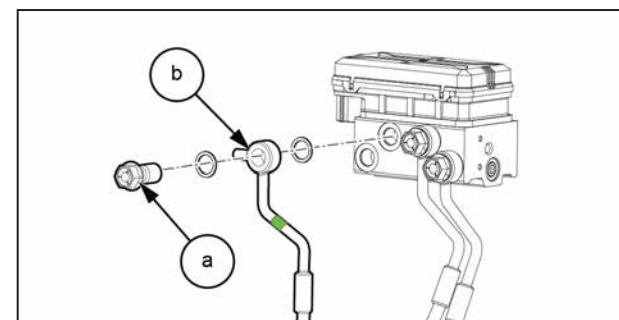
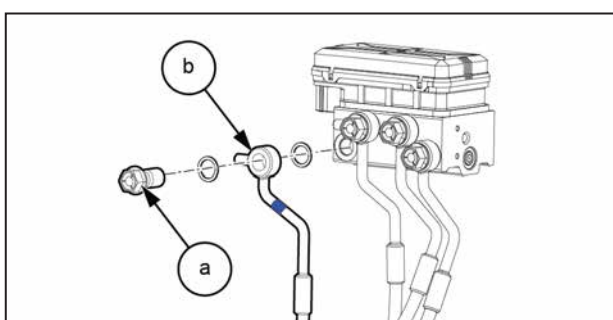
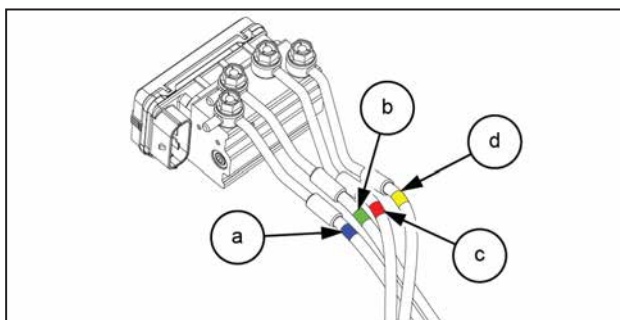


- Reference mark to be created during dismantling for ease of assembly.



- Brake hose color tags:
 - a) BLUE - Front Master Cylinder Assembly
 - b) GREEN - Front Brake Caliper
 - c) RED - Rear Brake Caliper
 - d) YELLOW - Rear Master Cylinder Assembly

- Repeat the above process to other brake hoses.
- Support modulator suitably on a work table, loosen and remove **4 Nos** banjo bolts **(a)** along with washers from modulator to remove brake hoses **(b)**.
- Remove **4 Nos** brake hoses from modulator.

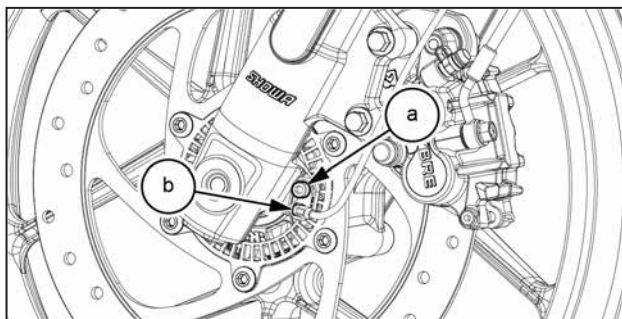


Do's & Don'ts

- **DO NOT interchange ABS Modulator/ECU from one motorcycle to another.**
- **Whenever the modulator is removed from the motorcycle, please ensure it is stored upright with the ports facing upwards.**

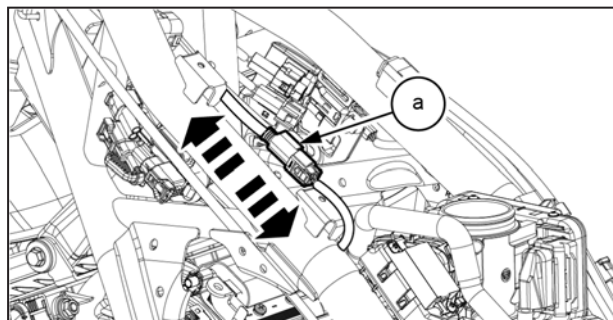
9.6.2. Wheel Speed Sensor - Front

- Remove the **2 Nos** bolts from LHS front mud-guard.
- Slightly lift to access the ABS sensor mounting screw.
- Loosen and remove hex socket head bolt **(M6) (a)** holding sensor **(b)** to fork end LH.
- Gently pull out sensor from fork end LH.



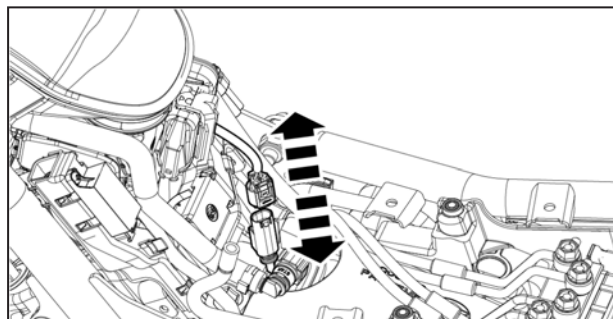
5 mm Allen socket with Ratchet

- Disconnect the Front ABS sensor coupler **(a)** from near RHS air filter.
- Remove the sensor from the vehicle.

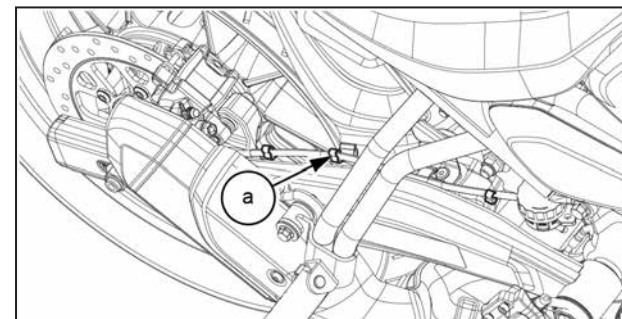


9.6.3. Wheel Speed Sensor - Rear

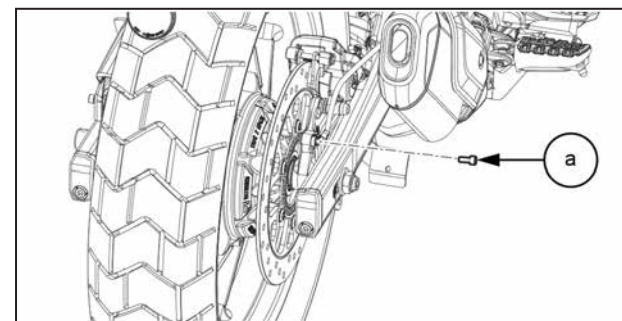
- Remove ABS sensor coupler from rear RHS frame.



- Detach the rear rear ABS sensor harness from double cable clips **(a)**.



- Loosen and remove hex flange head bolt **(M6) (a)** holding sensor to rear wheel caliper bracket top.
- Gently pull out sensor from rear wheel caliper bracket top.

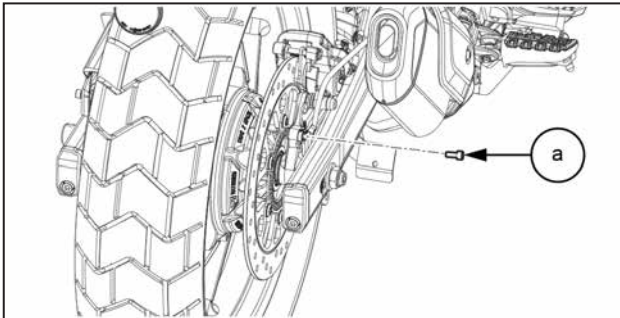


5 mm Allen socket with Ratchet

Assembly

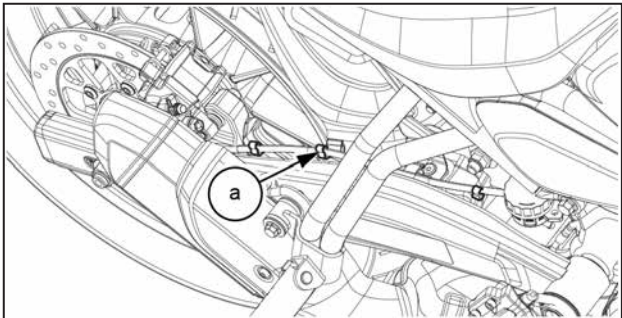
9.6.4. Wheel Speed Sensor - Rear

- Gently locate sensor into rear wheel caliper.
- Locate and tighten hex flange head bolt **(M6) (a)** holding sensor to rear wheel caliper bracket top.

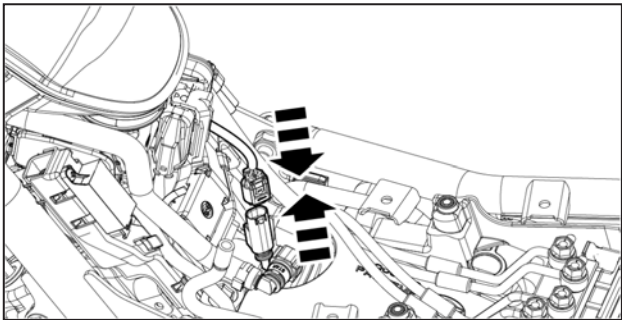


	5 mm Allen socket with Ratchet
Torque	10 Nm/ 1.0 kgf-m

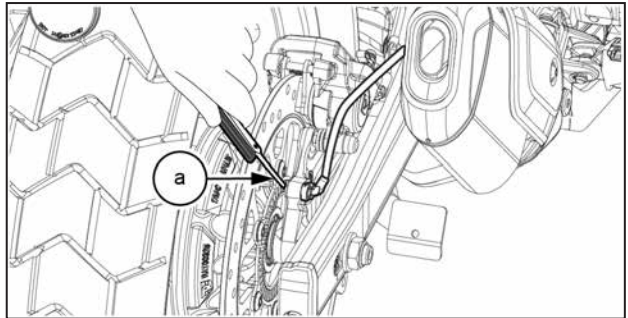
- Fix the double cable clips **(a)** to rear ABS sensor harness.



- Disconnect ABS sensor coupler from rear RHS frame.



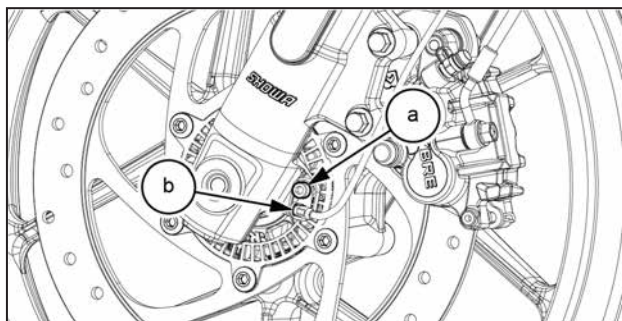
- After assembling wheel speed sensor, Check the clearance between the wheel speed sensor and the pulsar ring, the Gap approximately **0.28 to 1.85 mm.**



	Feeler Gauge
--	--------------

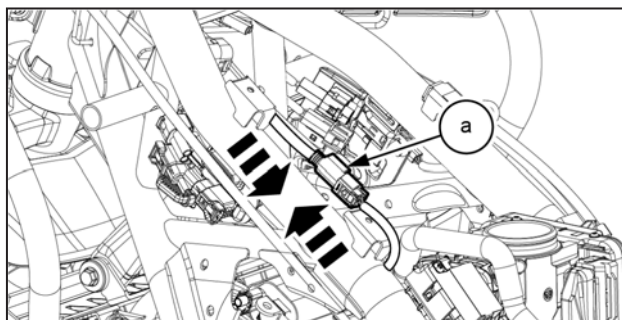
9.6.5. Wheel Speed Sensor - Front

- Gently locate sensor into fork end LH.
- Locate and tighten hex flange bolt **(M6) (a)** holding sensor **(b)** to fork end LHS.
- Tighten the 2 Nos bolts on LHS front mudguard.

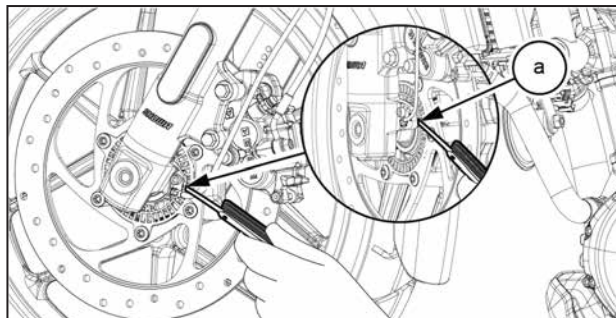


	5 mm Allen socket with Ratchet
Torque	10 Nm/ 1.0 kgf-m

- Connect the Front ABS sensor coupler **(a)** on near RHS air filter.



- After assembling wheel speed sensor, Check the clearance between the wheel speed sensor and the pulsar ring, the Gap approximately **0.13 to 1.90mm**.

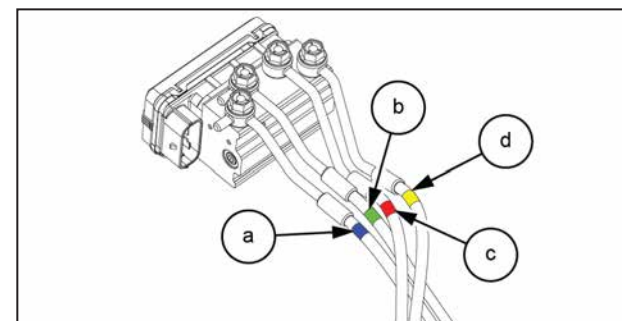


	Feeler Gauge
--	--------------

⚠ WARNING
DO NOT interchange ABS unit/ECU from one motorcycle to another.

9.6.6 Modulator

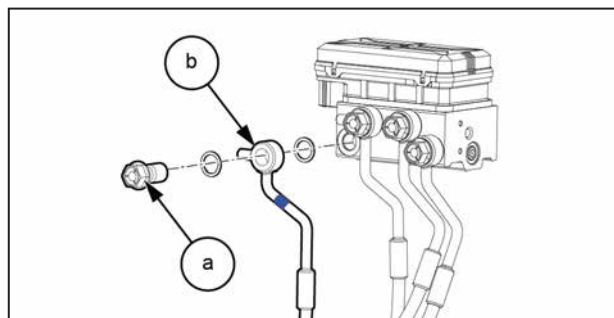
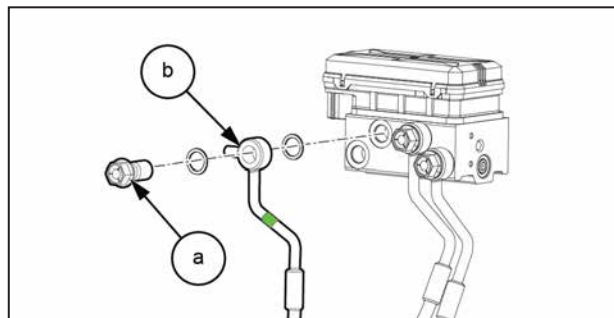
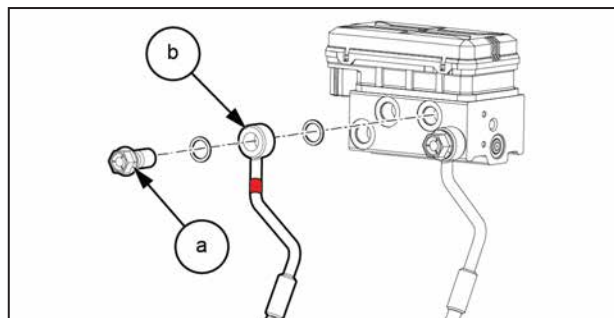
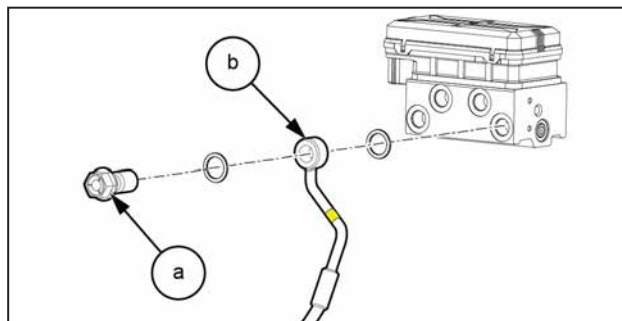
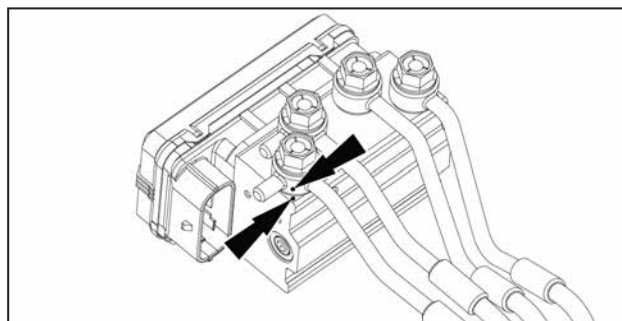
- Brake hose color tags:
 - a) BLUE - Front Master Cylinder Assembly
 - b) GREEN - Front Brake Caliper
 - c) RED - Rear Brake Caliper
 - d) YELLOW - Rear Master Cylinder Assembly
- Ensure the sequence of the hoses is as per the color tags shown below.



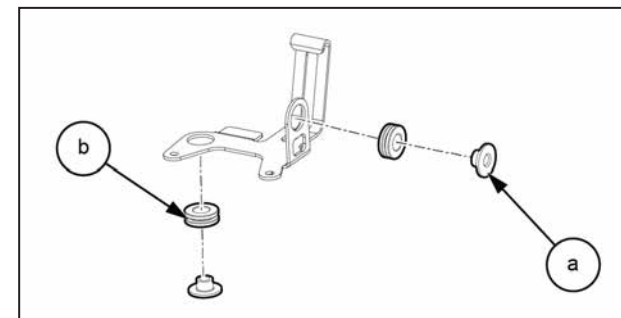
- Locate **4 Nos** brake hoses into modulator.
- Support modulator suitably on a work table, keeping the color tags in mind, locate and tighten **4 Nos** banjo bolts **(a)** along with washers into modulator to fix brake hoses **(b)**.

	12 mm socket with Ratchet
Torque	27-31 Nm / 2.7 -3.1 kgf-m

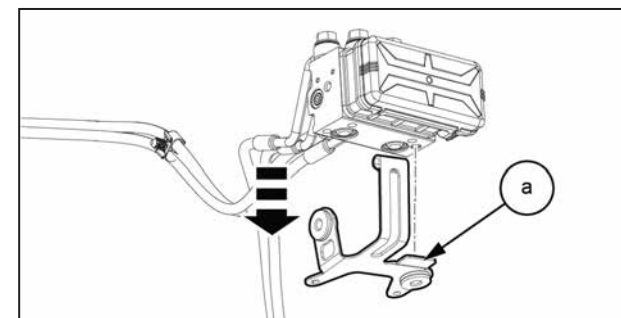
- Ensure the reference marks to align properly.



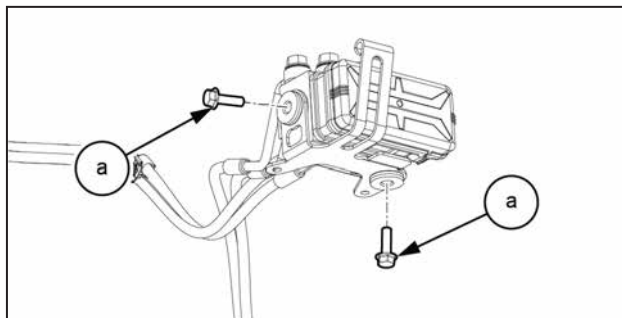
- Install the **2Nos** spacer top hats **(a)** and grommets **(b)** on bracket.



- Install the bracket **(a)** on modulator.

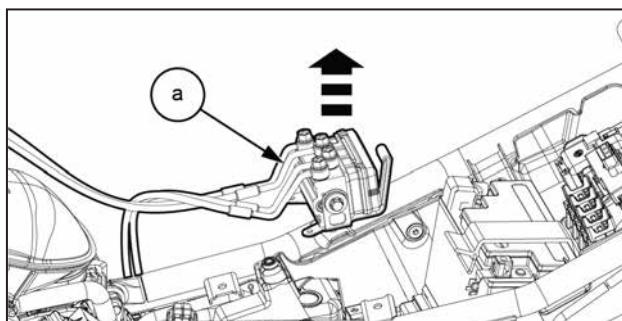


- Locate and tighten the hex bolt **2Nos (M6) (a)** on modulator bracket .

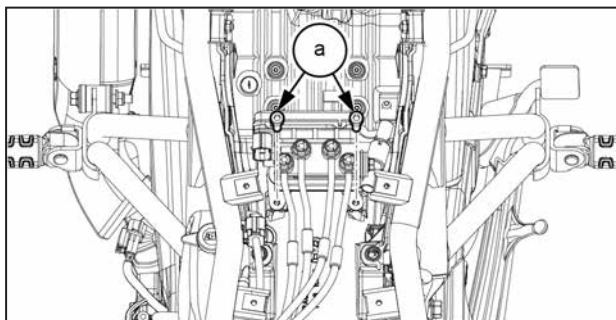


	10 mm Socket with Ratchet
Torque	10 Nm/1.0 kgf-m

- Locate the modulator **(a)** along with bracket and **4 Nos** hoses on frame to install .

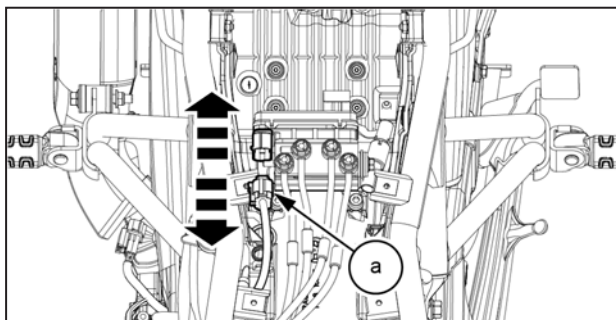


- Locate and tighten **2Nos** cap bolts **(a)** on modulator bracket.

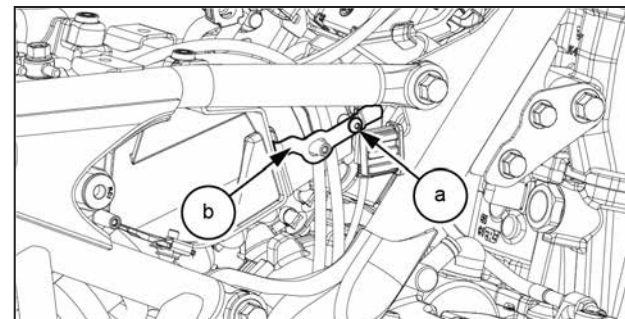


	5 mm Allen Socket with Ratchet
Torque	5 Nm / 0.5 kgf-m

- Connect the ABS modulator coupler **(a)**

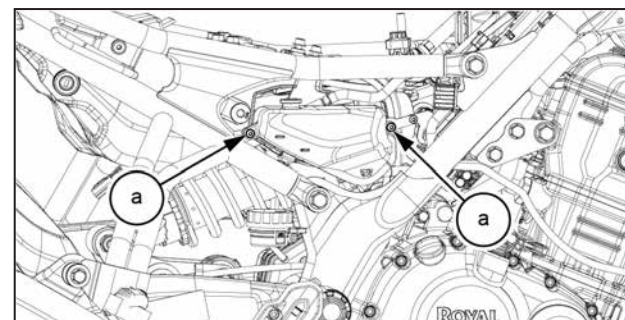


- Locate retainer bracket **(b)** on chassis frame.
- Locate and tighten screw **(a)** on retainer bracket.



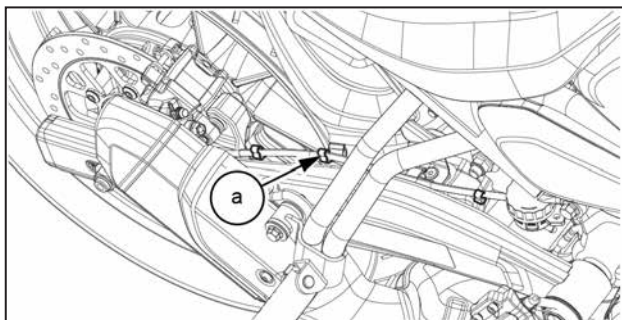
	3 mm Allen Socket with Ratchet
Torque	1.5 Nm/0.15 kgf-m

- Locate and tighten 2Nos screw **(a)** on expansion tank.



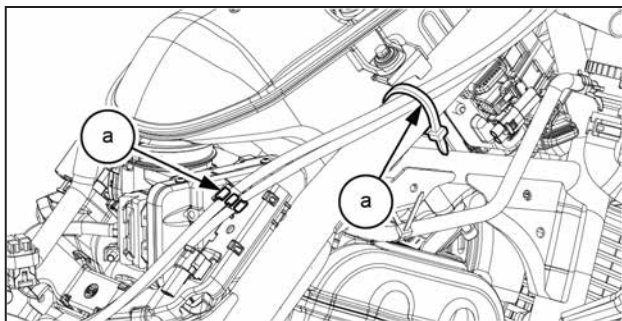
	T20 Torx socket
Torque	4 Nm / 0.4 kgf-m

- Fix the double cable clips **(a)** on rear ABS hose.

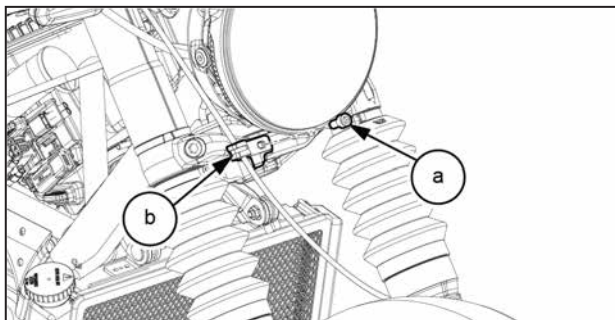


- Fix the double cable clip **(a)** on ABS hose.

- Fix the cable strap **(a)** on ABS hose.

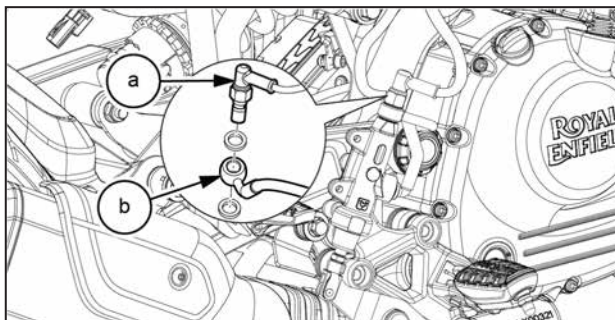


- Locate and tighten the cap bolt **(M6) (a)** on brake line clip **(b)**.



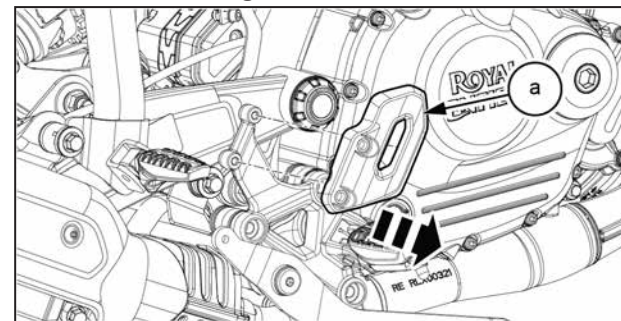
	5 mm Allen Socket with Ratchet
Torque	10 Nm / 1.0kgf-m

- Locate and tighten the rear brake pressure switch with new copper washers **(a)** and ABS hose **(b)**.

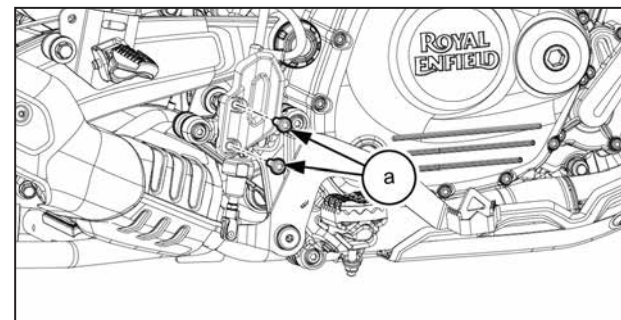


	14mm Combination Spanner
Torque	26 Nm/ 2.6 kgf-m

- Locate the heel guard **(a)**.

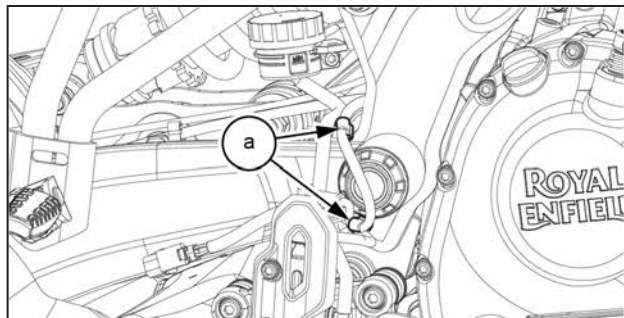


- Locate and tighten the **2Nos** cap bolts **(M6) (a)** on heel guard.

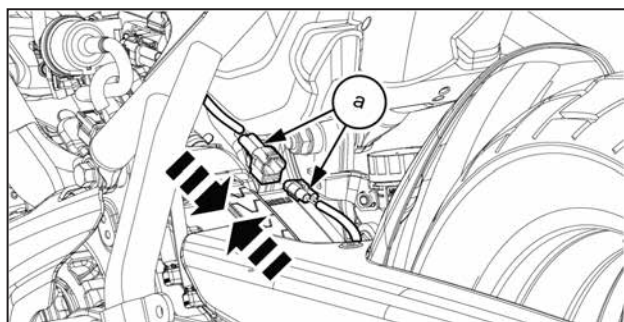


	5 mm Allen socket with Ratchet
Torque	10Nm/ 1.0 kgf-m

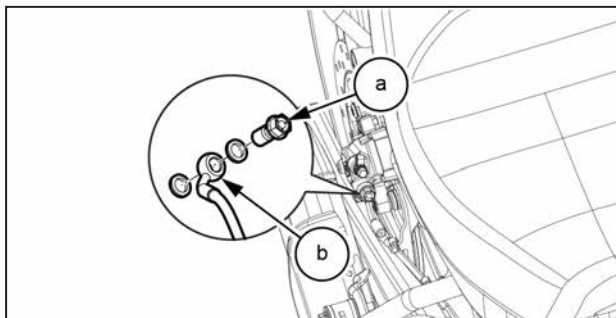
- Fix the double cable clips **2 Nos (a)** on pressure switch harness.



- Connect rear brake pressure switch coupler **(a)**.

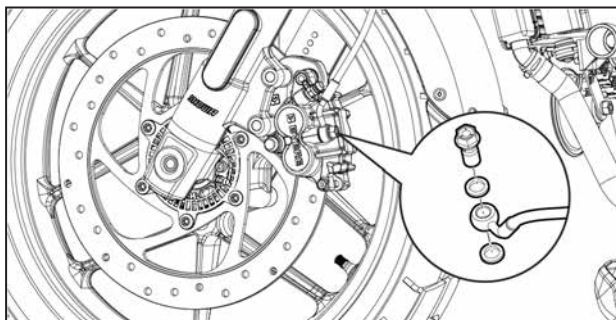


- Tighten the banjo bolt **(a)** with new copper washer and ABS hose **(b)** on rear brake caliper.



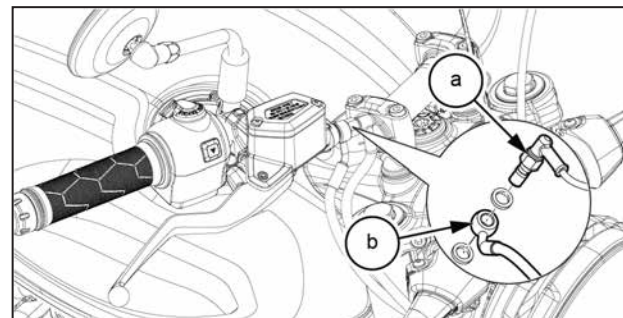
	12 mm Socket with Ratchet
Torque	24 - 28 Nm / 2.4 -2.8 kgf-m

- Tighten the banjo bolt with new copper washer and ABS hose on front brake caliper.



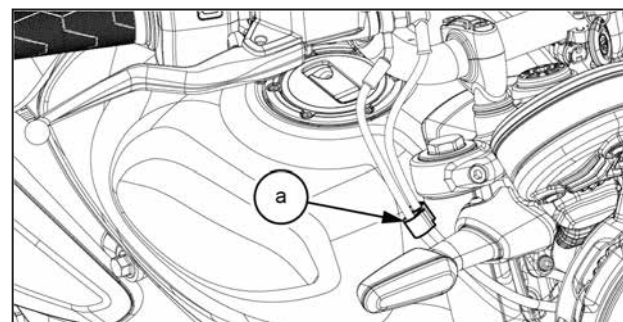
	12 mm Socket with Ratchet
Torque	24 - 28 Nm / 2.4 -2.8 kgf-m

- Tighten the brake switch **(a)** with new copper washer and ABS hose **(b)** on front master cylinder..

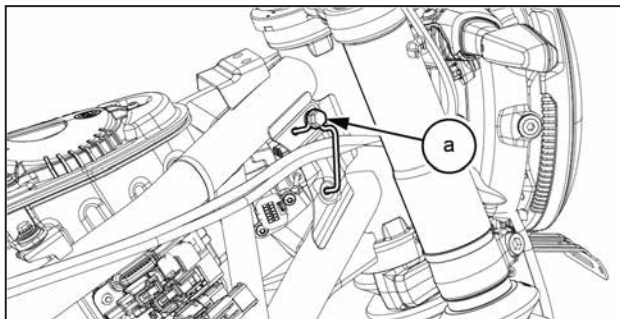


	14 mm socket with Ratchet
Torque	24 - 28 Nm / 2.4 -2.8 kgf-m

- Fix the double cable clips **(a)** on front brake pressure switch wiring harness.

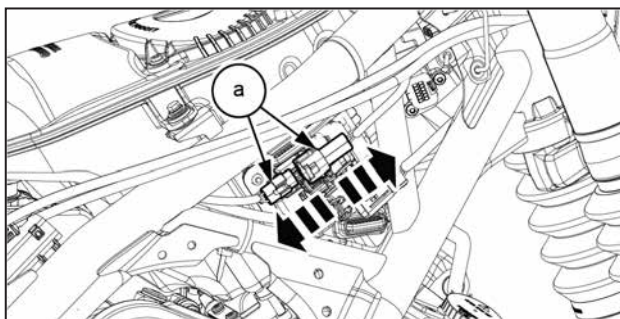


- Locate harness clip on RHS chassis frame.
- Tighten the hex head flange bolt **(M6) (a)**.



	10 mm Socket with Ratchet
Torque	10 Nm / 1.0 kgf-m

- Connect the front brake pressure switch connector **(a)**.



- **Assemble the following parts:**
 - Fuel tank assembly. [Refer fuel system chapter.](#)
 - Install the rider and pillion seat. [Refer seat chapter.](#)

- Side panel RH [Refer side panel chapter.](#)

⚠ CAUTION

After assembly of all aggregates, ensure the following:

- Fuel is refilled/top up into fuel tank.
- Fuel feed and return hoses are properly connected into the fuel rail.
- Wiring couplers to fuel pump and low fuel sensors are properly connected.
- EVAP hose pipes are properly connected.

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

9.6.7 ABS DTC Codes

S.No	DTC (P code)	Component	Failure Description
1	C1015	ABS pump	ABS pump/Motor Failure
2	C1019	ABS ECU	ABS ECU Relay Fault
3	C1021	ABS ECU	ABS ECU Internal Fault
4	C1024	ABS WSS	(GENERIC) ABS Wheel Speed Difference too high
5	C1031	ABS WSS	ABS Wheel Speed Circuit Open or Shorted (Rear)
6	C1032	ABS WSS	ABS Wheel Speed Intermittent (Rear)
7	C1033	ABS WSS	ABS Wheel Speed Circuit Open or Shorted (Front)
8	C1034	ABS WSS	ABS Wheel Speed Intermittent (Front)

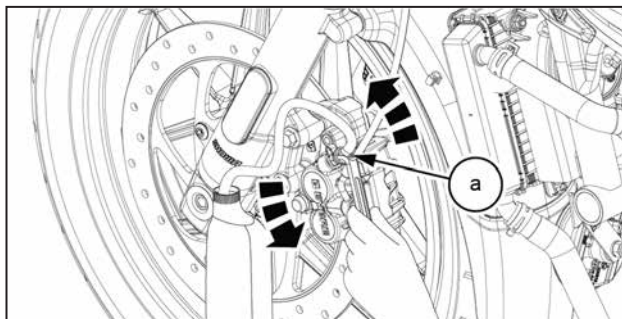
9	C1048	Outlet valve	(AV) ABS Release Solenoid Circuit Open or high Resistance (Rear)
10	C1049	Outlet valve	(AV) ABS Release Solenoid Circuit Open or high Resistance (Front)
11	C1052	Inlet valve	(EV) ABS Apply Solenoid Circuit Open or high Resistance (Rear)
12	C1054	Inlet valve	(EV) ABS Apply Solenoid Circuit Open or high Resistance (Front)
13	C1058	ABS ECU	ABS Voltage Low
14	C1059	ABS ECU	ABS Voltage High
15	U2921	CAN communication	CAN Generic monitoring
16	U2922	CAN communication	High Speed CAN Communications Bus Fault
17	U2926	CAN communication	Cluster DLC / Timeout Failure

BLEEDING THE HYDRAULIC BRAKE SYSTEM WITH DOL TOOL (FRONT & REAR)

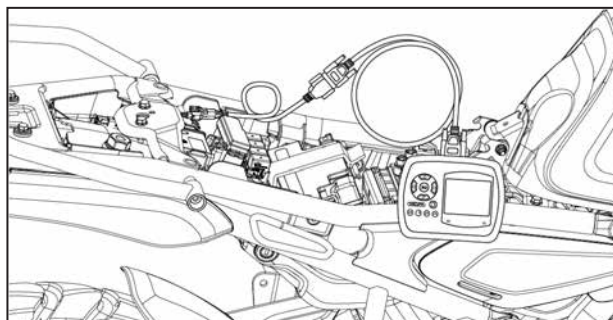
9.7. Bleeding the Hydraulic Brake System With DOL Tool (Front & Rear)

9.7.1. Preparation (Front Disc Brake)

- Use a Philips screwdriver to loosen and remove the screws of the front disc brake master cylinder.
- Remove the dust cap and place the suitable ring spanner on the bleeding nipple **(a)** and attach a Vinyl Pipe (transparent).
- Thereafter, take a Clean glass / Plastic container (transparent) with fresh brake fluid, and dip the other end of the vinyl pipe (transparent) in it (make sure that the vinyl pipe is always submerged in the fluid during the bleeding process).

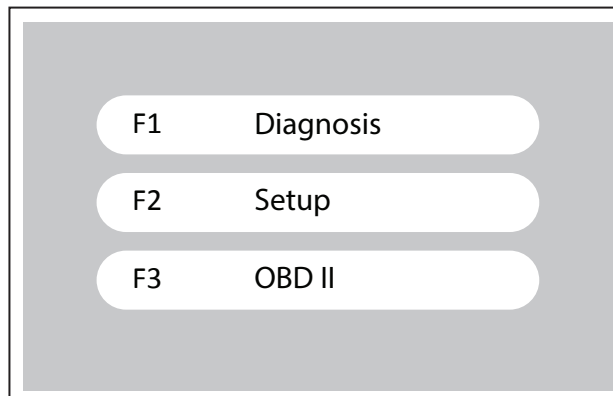


- Connect the DOL tool switch "ON" the ignition.

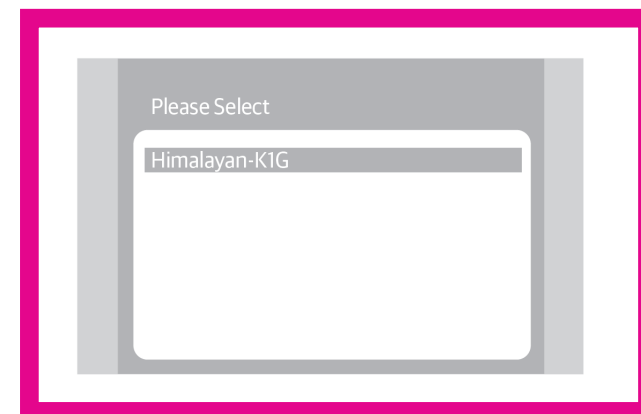


Procedure

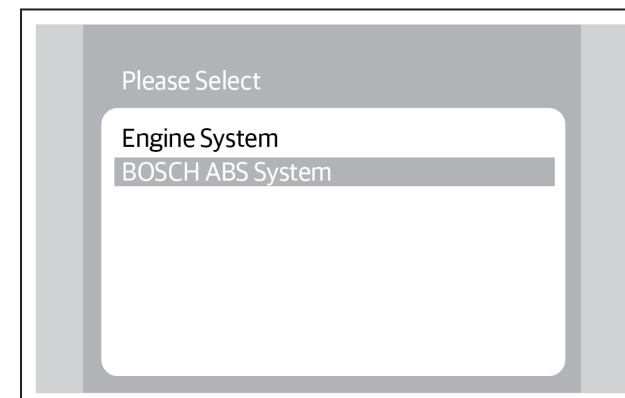
- Select - F1 Diagnosis.



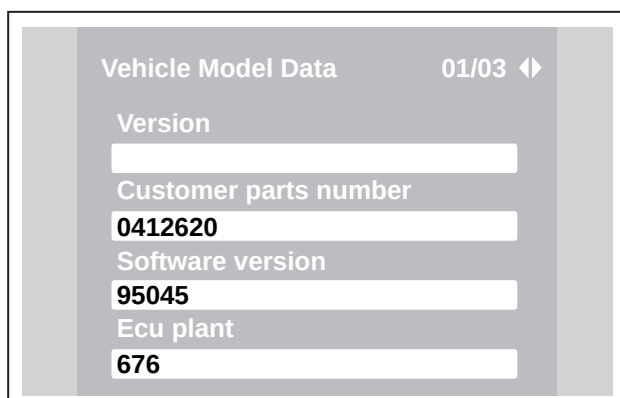
- Select - Himalayan - K1G.



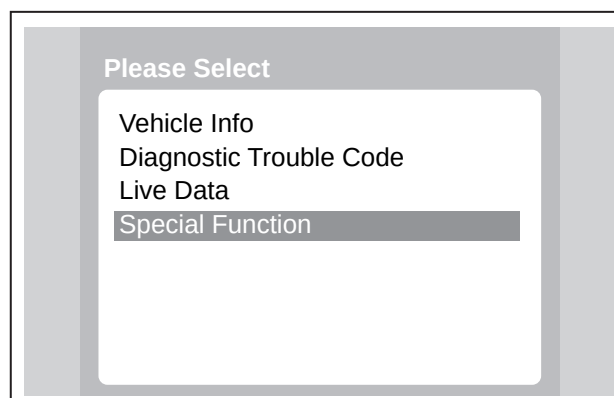
- Select - Bosch ABS.



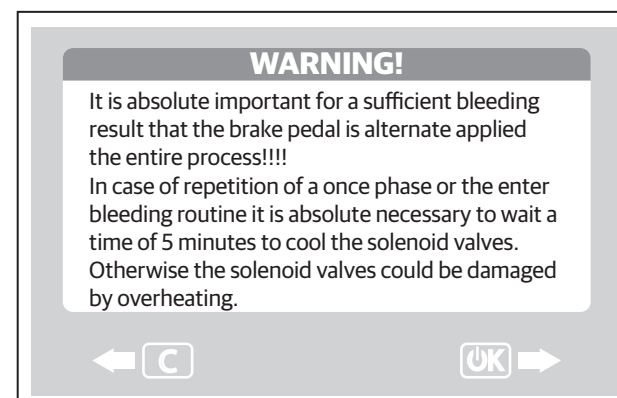
- Default Screen.



- Select - Spl Function.



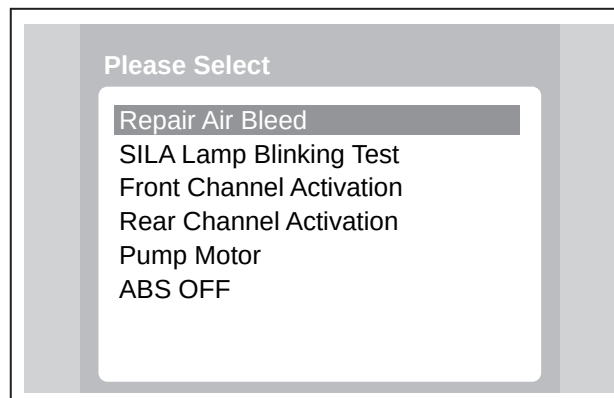
- Default Screen.



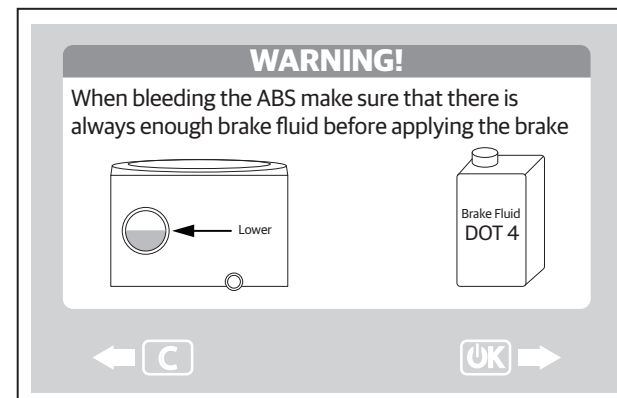
- Press C.



- Select - Repair Air Bleed.



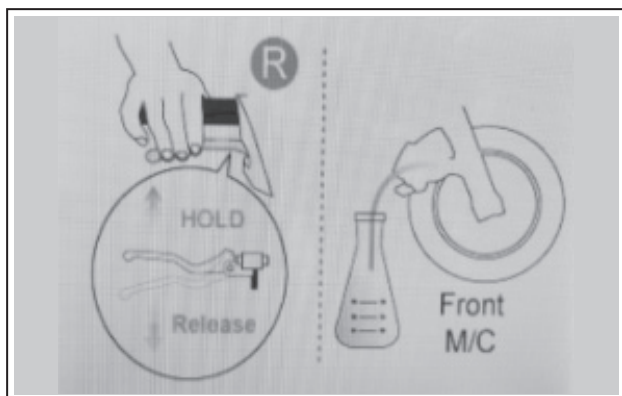
- Default Screen.



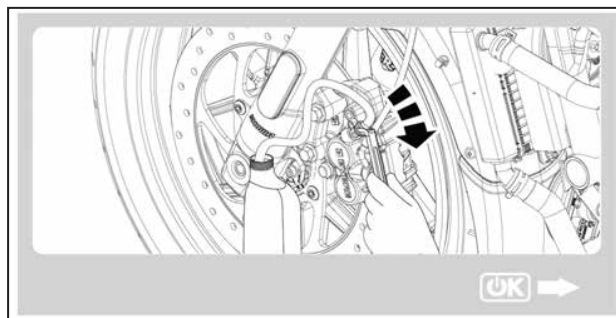
- Loosen the bleeder nipple.



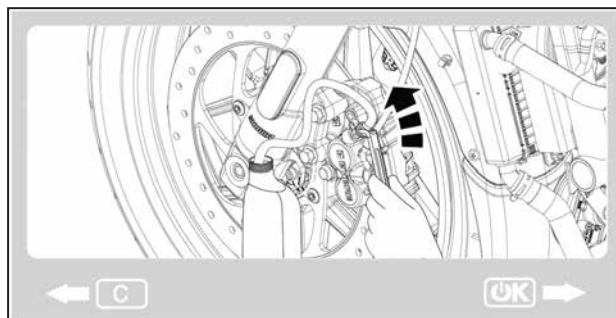
- Operate the brake lever.



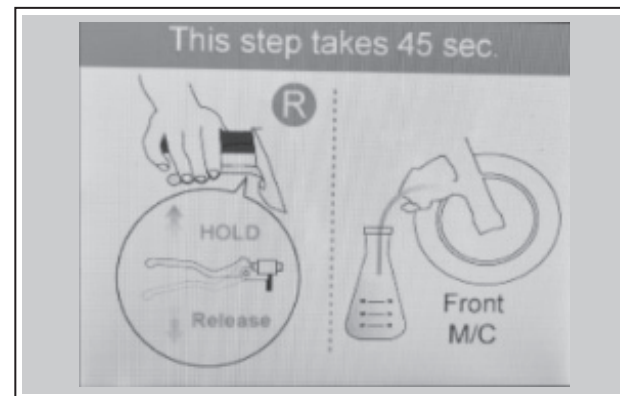
- Hold the lever in pressed condition and tighten the bleeder nipple.



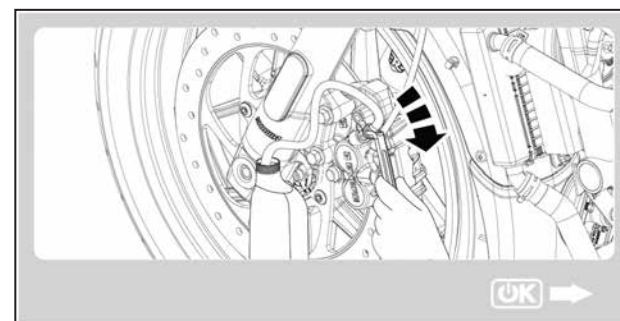
- Loosen the bleeder nipple - (Brake lever in released condition).



- Operate the brake lever till the next window open in DOL.



- Hold the brake lever in pressed condition and tighten the bleeding nipple.



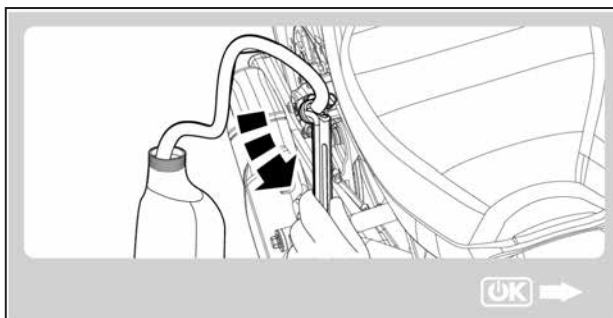
- During this operation pump will run and expel the air trapped in the system through bleeder nipple.

9.7.2. Reassembly

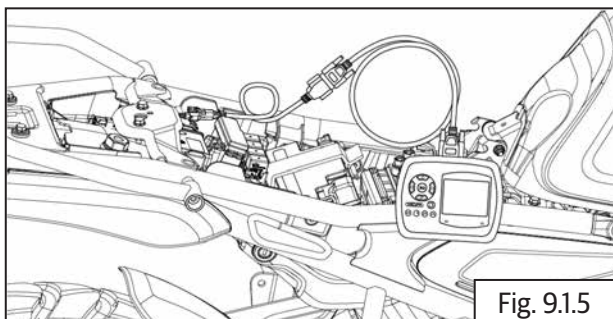
- Switch OFF the ignition.
- Disconnect the DOL Tool.
- Remove the vinyl pipe and remove the ring spanner.
- Refit the dust cap (make sure that there is no leak from the bleeder nipple).
- Refit the diaphragm with diaphragm plate of the master cylinder.
- Refit the master cylinder cap taking care that the vent slot in the cap is facing rider.

9.7.3. Preparation (Rear Disc Brake)

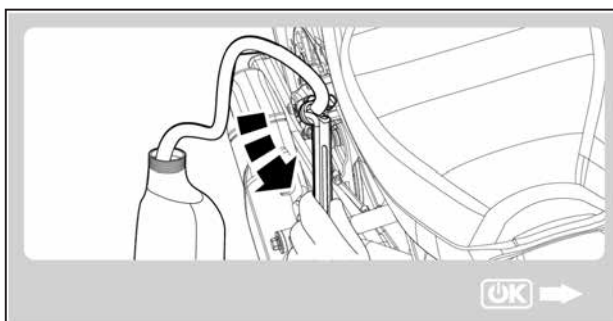
- Remove the reservoir cap of the rear disc brake.
- Remove the Diaphragm Plate with diaphragm.
- Remove the dust cap and place the suitable ring spanner on the bleeding nipple.
- Attach a Vinyl Pipe (transparent).
- Thereafter, take a Clean glass / Plastic container (transparent) with fresh brake fluid, and dip the other end of the vinyl pipe (transparent) in it (make sure that the vinyl pipe is always submerged in the fluid during the bleeding process).



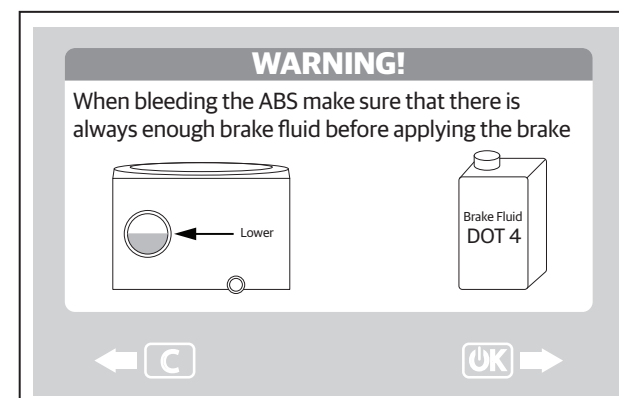
- Connect the DOL tool switch on the ignition



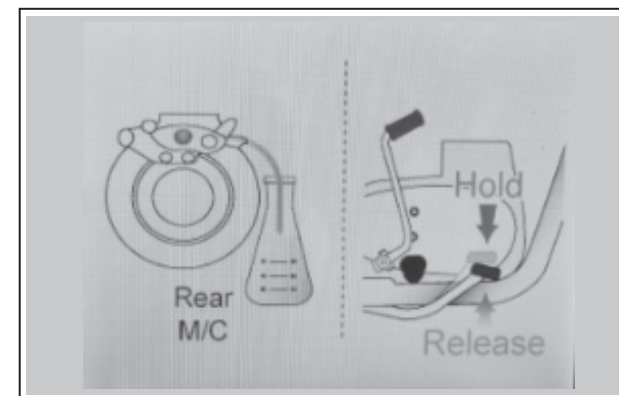
- Loosen the bleeder nipple.



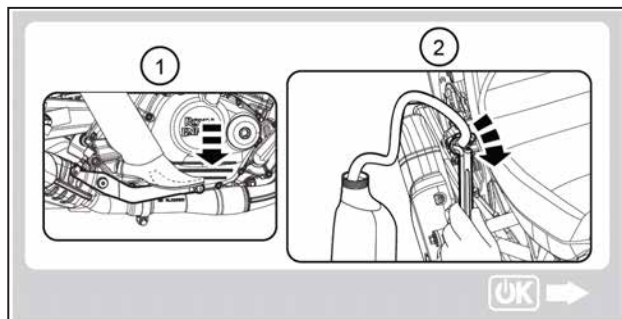
- Default Screen.



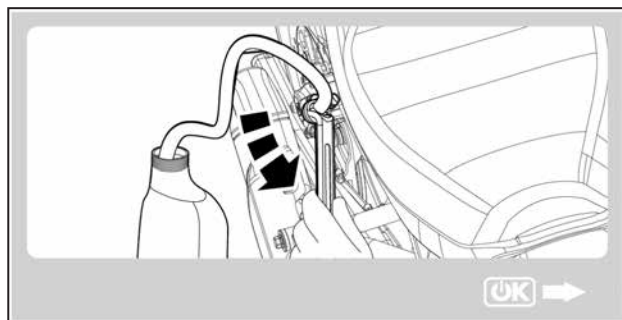
- Operate the brake lever.



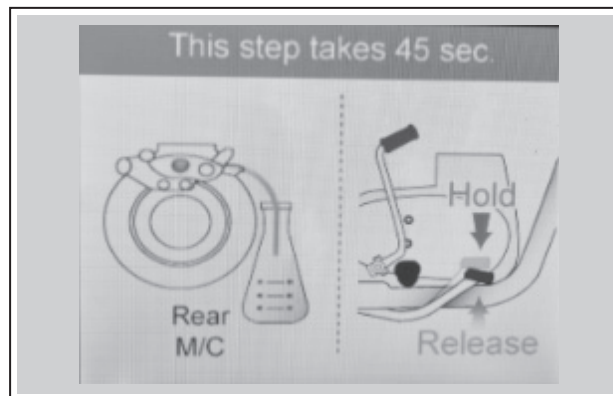
- Hold the brake Pedal in pressed condition and tighten the bleeding nipple.



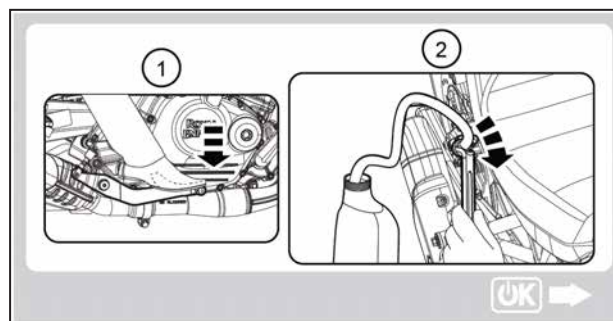
- Loosen the bleeder nipple - (Brake lever in released condition)



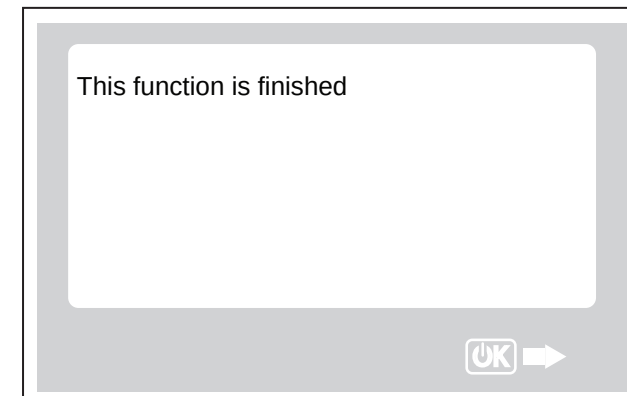
- Operate the brake lever until the next window opens in DOL.



- Hold the brake lever in pressed condition and tighten the bleeding nipple.



- During this operation pump will run and expel the air trapped in the system through bleeder nipple



9.7.4 Reassembly

- Switch OFF the ignition and disconnect and remove the DOL tool.
- Remove the vinyl pipe and remove the ring spanner.
- Refit the dust cap (make sure that there is no leak from the bleeder nipple).
- Refit the diaphragm with diaphragm plate of the reservoir.
- Refit the reservoir cap.

BRAKE BLEEDING (FRONT & REAR)

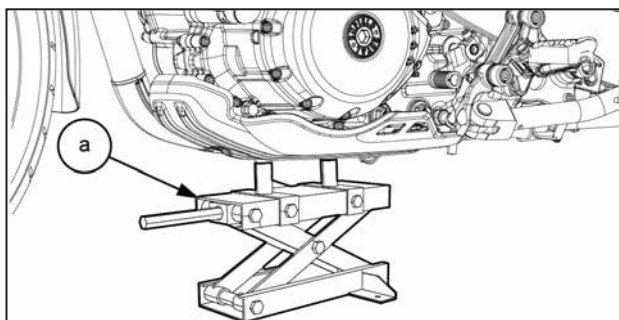
MANUAL METHOD

9.8. Brake Bleeding

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Support motorcycle with suitable equipment below cradle frame.



⚠ CAUTION

Do not spill brake fluid on any part of the motorcycle as it will damage the painted/plastic surfaces.

⚠ WARNING

Ensure brake fluid does not get in contact with eyes and skin. In-case of exposure wash affected area thoroughly with water. Seek medical attention immediately if any irritation persists.

Keep out of reach of children.

Dispose drained brake fluid carefully and responsibly.

⚠ WARNING

Brake fluid is Hygroscopic hence, absorbs moisture from air. Ensure fluid reservoirs caps are closed properly.

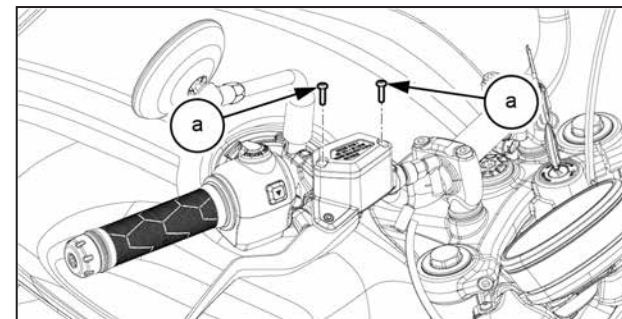
If moisture in the brake system may cause damage to brake parts and fluid, causing reduction in braking efficiency; which in turn may lead to fatal accidents.

NOTE

- Use brake fluid from sealed containers only.
- Use only DOT4 specification brake fluid listed in technical specifications .
- Ensure ignition switch and stop switch are in ON position.

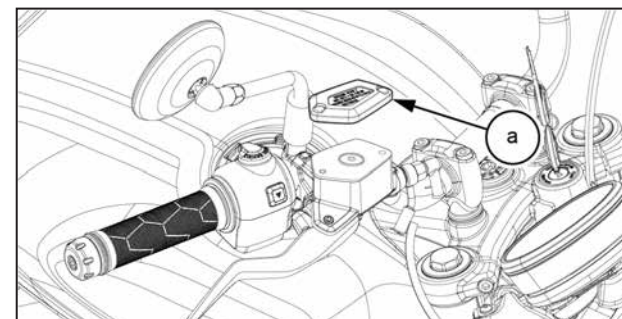
9.8.1. Front Brake Bleeding

- Loosen and remove **2 Nos** screws **(a)** from front brake reservoir tank.

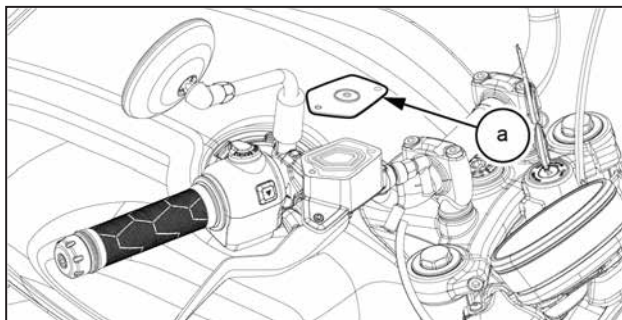


Screw driver phillips

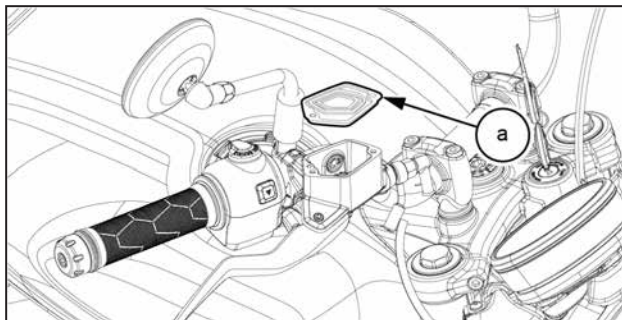
- Remove reservoir cap **(a)** from front brake reservoir tank.



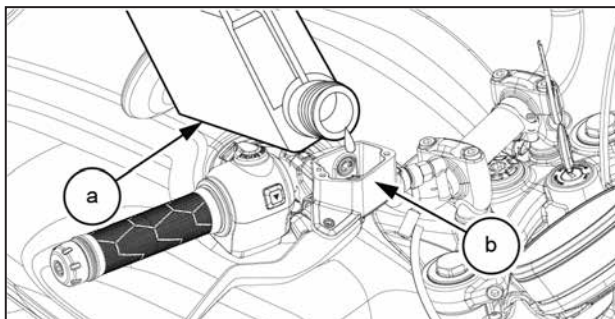
- Remove reservoir plate diaphragm **(a)** from front brake reservoir tank.



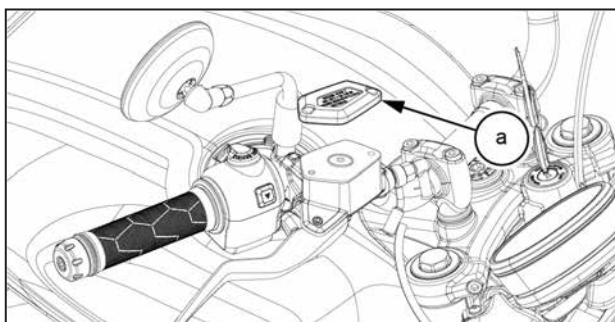
- Remove reservoir diaphragm **(a)** from front brake reservoir tank.



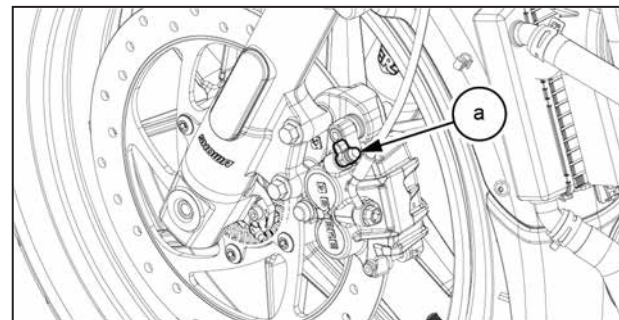
- Gently top up fresh brake fluid **(a)** into reservoir **(b)**.
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.



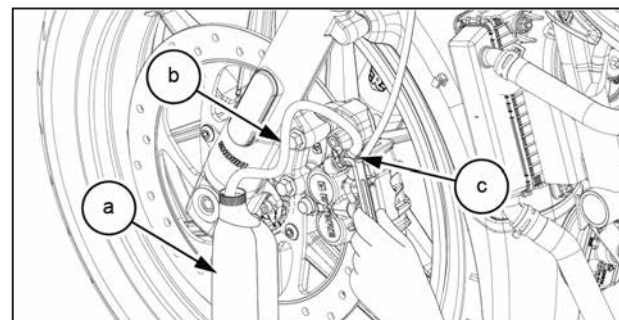
- Locate diaphragm and cap **(a)** on the reservoir and DO NOT fasten with screws.



- Remove rubber cap **(a)** from bleeder valve from front caliper on front wheel RH.



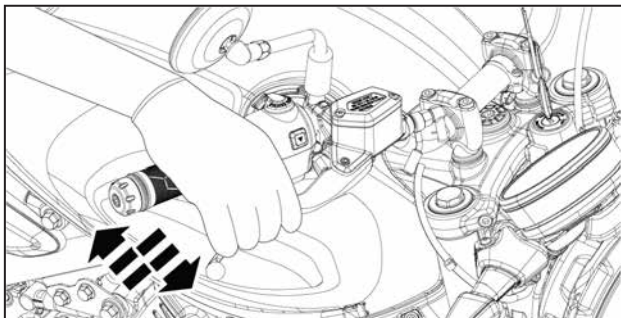
- Dip bleeder hose **(b)** one end into a container **(a)** with fresh brake fluid to avoid air passage into bleeder valve.
- Insert bleeder hose other end into bleeder valve **(c)** on front caliper to drain used oil.



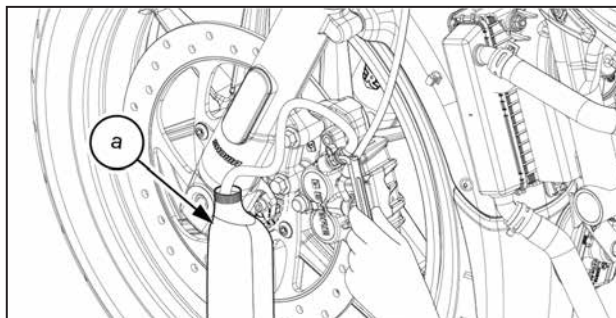
NOTE

- Use brake fluid from new, sealed containers only.
- Use only DOT4 specification brake fluid listed in technical specifications.

- Gently pump brake lever until brake is effective.
- Once brake lever is effective, hold it in place.

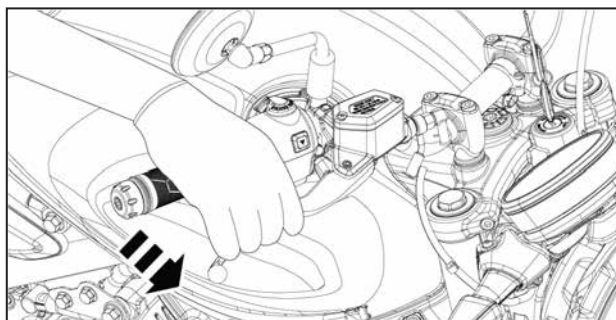


- While holding brake lever, quickly open and close bleeder valve **(M6) (a)**.

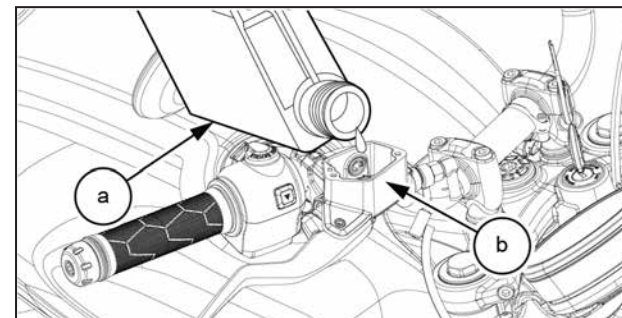


11 mm Ring spanner and air bleeder.

- Release the brake lever **(a)**.



- Gently top up fresh brake fluid **(a)** into reservoir **(b)**.
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.



- Repeat this operation until air from the system is released completely. Observe bleeder hose. As air in the system is cleared, bubbles stop appearing in hose.

! CAUTION

While bleeding the brake system always ensure brake fluid is above min level BUT below "Max" level. Never allow the brake fluid go below minimum level to avoid air entering brake system. Always fill the brake fluid from sealed container only.

Do not leave the master cylinder cap and or brake fluid container open for long as brake fluid is highly hygroscopic in nature and will lose its properties if exposed to atmospheric conditions.

- Inspect brake lever efficiency.

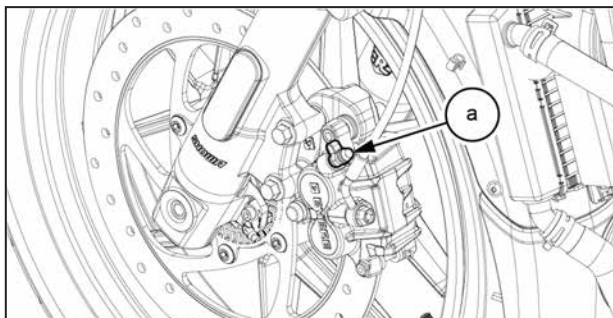
NOTE

- The fluid level must be checked often during the bleeding operation and top up with fresh brake fluid as necessary.*
- Gently tap brake hose for proper bleeding performance.*
- Check brake fluid level after completion of brake bleeding.*
- Whenever the modulator is removed or replaced the brake bleeding time will be longer as brake fluid will have to travel from master cylinder to modulator and then to wheel caliper*
- Whenever bleeding the brake system, it is always recommended to bleed both the front and rear brakes.*

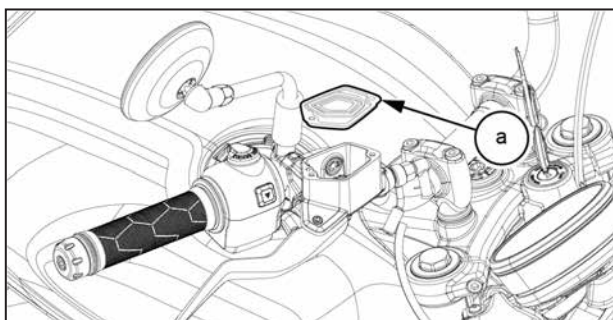
- Remove bleeder hose **(a)** from bleeder valve **(b)**.



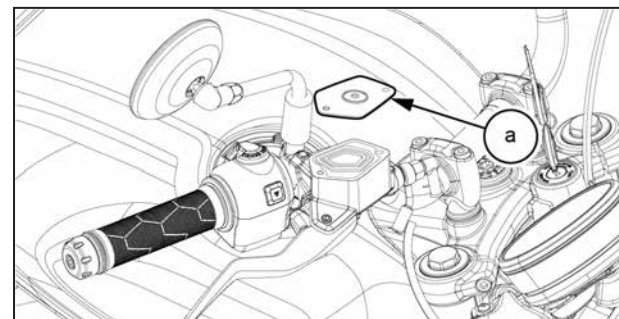
- Close rubber cap **(a)** on bleeder valve .
- Ensure cap is locked properly to avoid exposure to dust or mud.



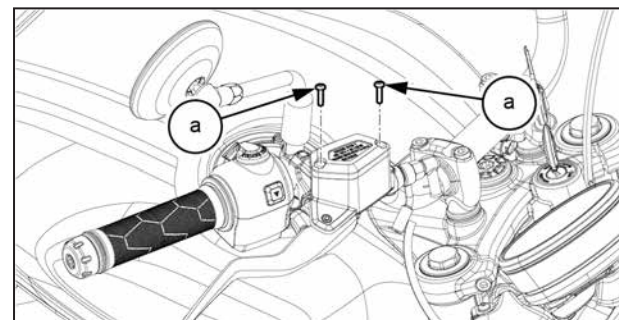
- Install reservoir diaphragm **(a)** into front brake reservoir tank.



- Install reservoir plate diaphragm **(a)** into front brake reservoir tank **(b)**.



- Close the reservoir cap and tighten **2 Nos** screws **(a)** into front brake reservoir tank.



Trox Socket with Ratchet

Torque

1.1 - 1.4 Nm / 0.11 - 0.14 kgf-m

9.8.2. Front Brake Fluid Leakage

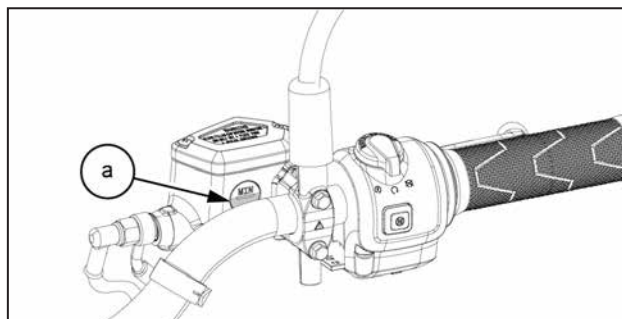
⚠ CAUTION

Ensure motorcycle is placed on a flat surface resting it on ramp/center stand.

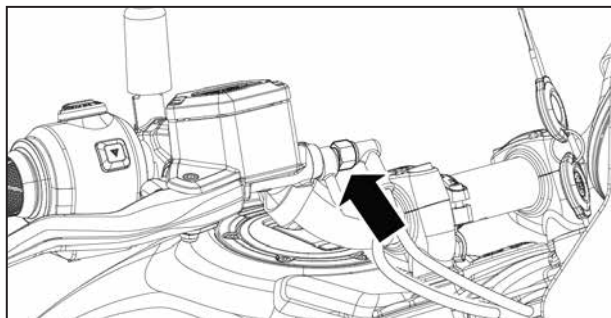
NOTE

- Inspect fluid level at every 5000 Km. Replace fluid after 20,000 Km.

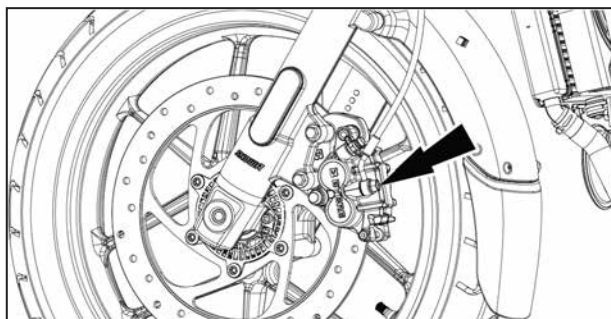
- Inspect fluid level, visible in window glass on front reservoir tank **(a)**.
- Ensure brake fluid level is always above middle of the window.



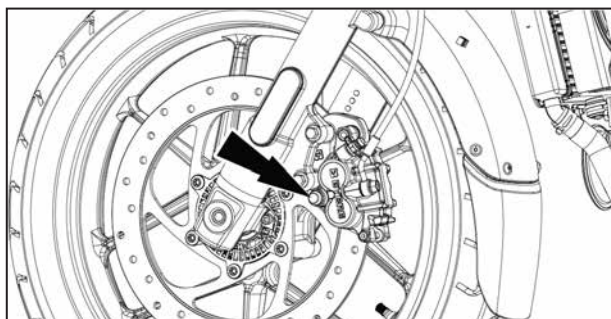
- If oil level is below 'MIN', inspect leakage at front brake hoses and front master cylinder banjo bolt.



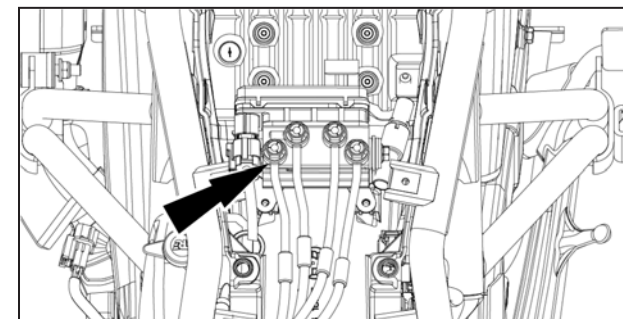
- Inspect leakage at caliper banjo bolt.



- Inspect leakage on brake disc from caliper piston.

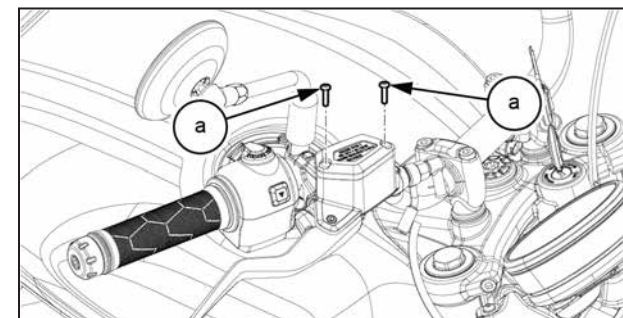


- Inspect fluid leakage at hoses at ABS modulator.



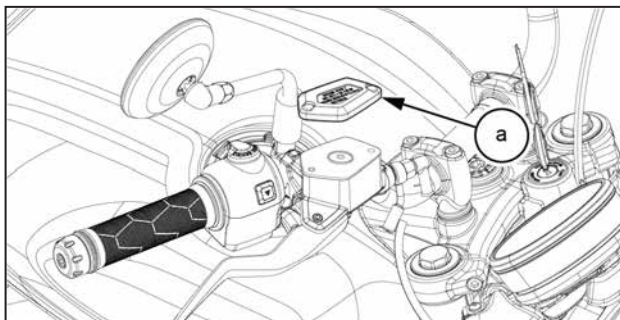
9.8.3. Front Brake Fluid Top up

- Loosen and remove **2 Nos.** screws **(a)** from front brake reservoir tank.

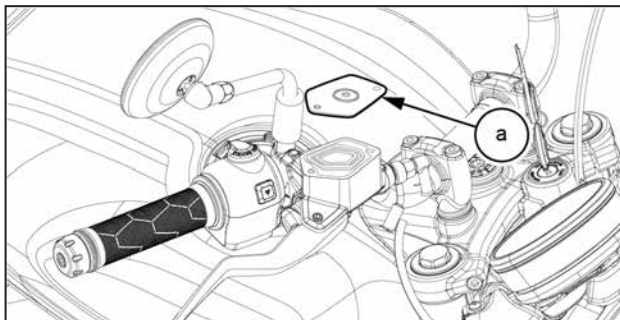


Screw driver

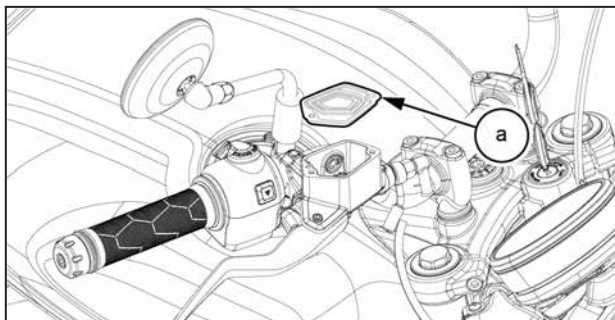
- Remove reservoir cap **(a)** from front brake reservoir tank.



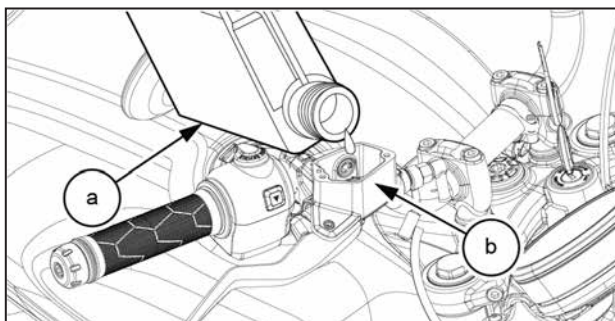
- Remove diaphragm plate **(a)** from front brake reservoir tank.



- Remove diaphragm **(a)** from front brake reservoir tank.



- Top up fresh fluid **(a)** into reservoir tank **(b)** up to 'top of the window'.
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.



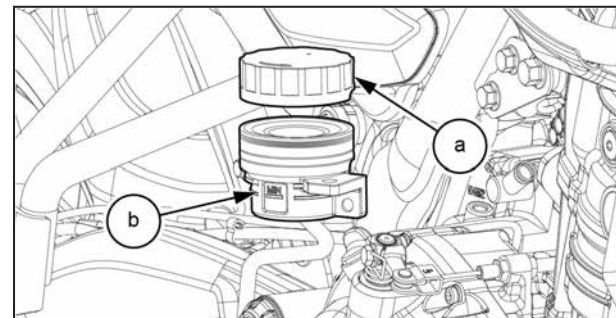
9.8.4. Rear Brake Bleeding

⚠ CAUTION

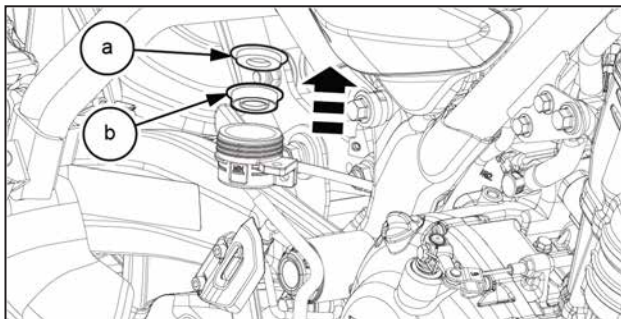
Ensure the motorcycle is upright on a firm and flat surface.

Support motorcycle with suitable equipment below cradle frame.

- Rear brake reservoir is located near rear wheel on cradle frame.
- Open rear brake reservoir cap **(a)** from reservoir **(b)**.

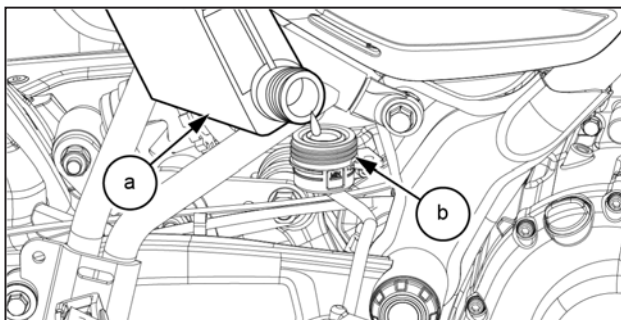


- Open the diaphragm plate **(a)** and diaphragm **(b)** from reservoir.

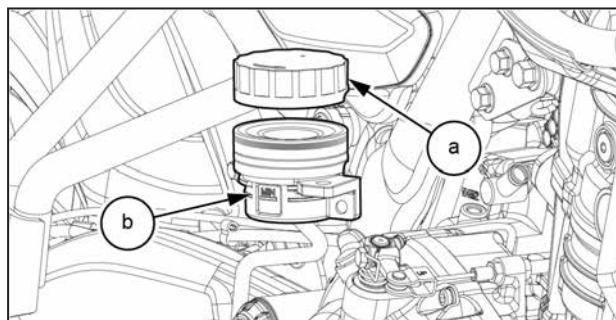


NOTE

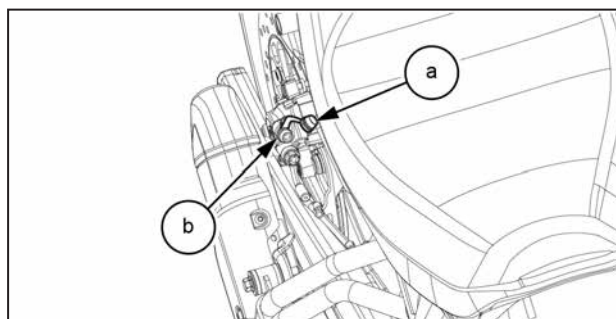
- Use brake fluid from sealed containers only.
- Use only DOT4 specification brake fluid listed in technical specification Information .
- Fill fresh brake fluid **(a)** into reservoir **(b)**.



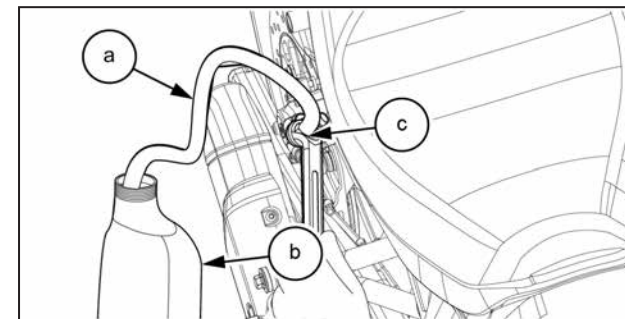
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.
- Locate the reservoir cap **(a)** on the tank **(b)** and ensure it is seated properly.



- Locate rear brake bleeder valve on rear wheel brake caliper, behind silencer.
- Open rubber cap **(a)** from rear brake bleeder valve **(b)**.

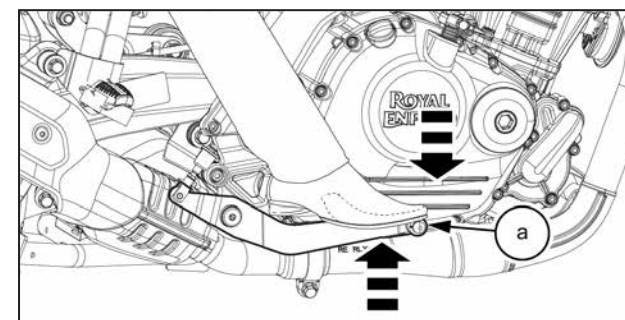


- Dip bleeder hose **(a)** one end into a container **(b)** with fresh brake fluid to avoid air passage into bleeder valve.
- Insert bleeder hose other end into bleeder valve **(M6) (c)** on front caliper to drain used oil.

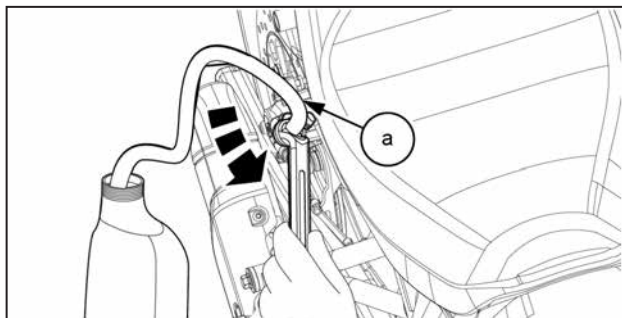


11 mm Ring spanner

- Gently pump rear brake pedal **(a)** until pumping becomes hard and then hold it in place.



- While holding brake, quickly open and close bleeder valve **(a)**.

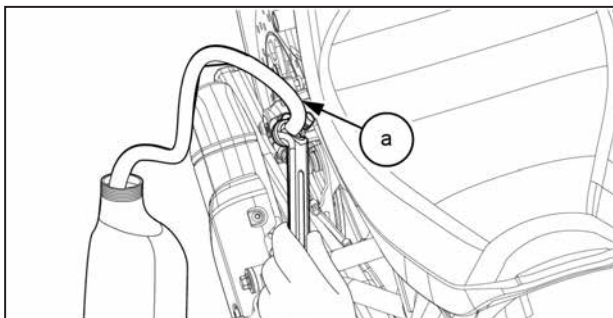


- Repeat this operation until air from system is released completely.
- Inspect brake lever efficiency.

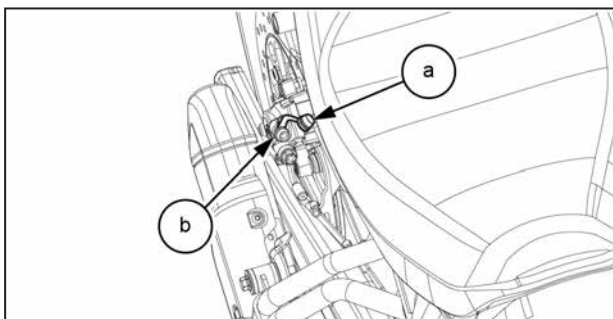
NOTE

- The fluid level must be checked often during the bleeding operation and top up with fresh brake fluid as necessary.
- Gently tap brake hose for proper bleeding performance.
- Check brake fluid level after completion of brake bleeding.

- Remove bleeder hose **(a)** from bleeder valve on rear caliper.



- Close bleeder valve **(b)** rubber cap **(a)**.
- Ensure cap is locked properly to avoid exposure to dust or mud.



9.8.5. Rear Brake Fluid Leakage

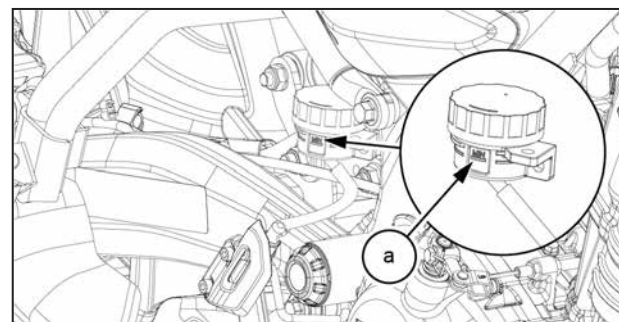
CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

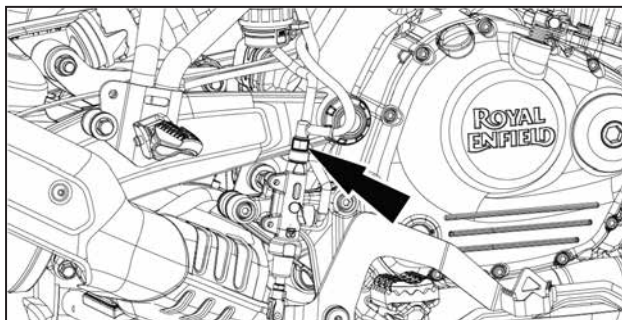
NOTE

- Inspect fluid level at every 5000Km Replace fluid after 20000Km.

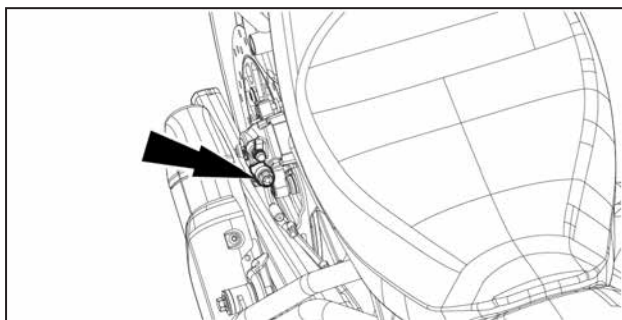
- Inspect fluid level visible on rear reservoir tank.
- Ensure brake fluid level in rear reservoir tank is always between 'MIN' and 'Max' marks **(a)**.



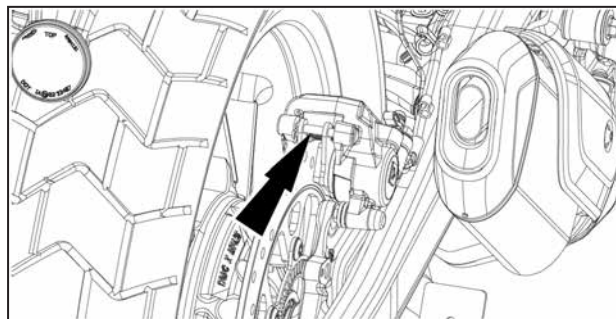
- If oil level is below 'MIN', inspect leakage at rear brake hoses and rear master cylinder banjo bolt.



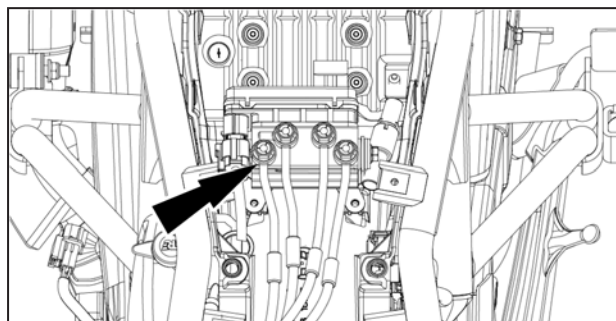
- Inspect leakage at rear caliper banjo bolt.



- Inspect leakage on brake disc from caliper piston.

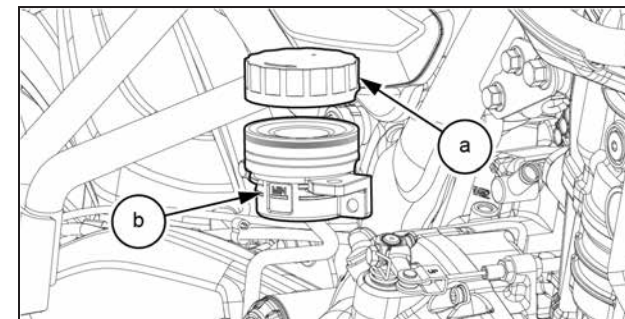


- Inspect fluid leakage at hoses on ABS modulator.

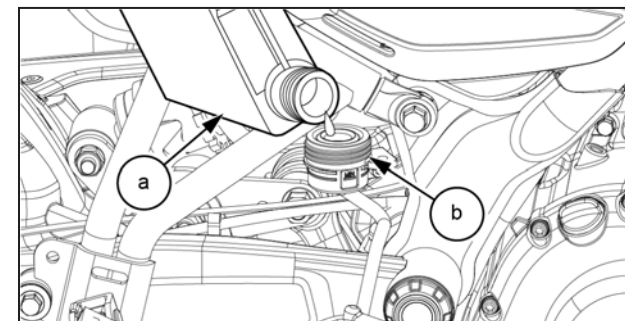


9.8.6.Rear Brake Fluid Top Up

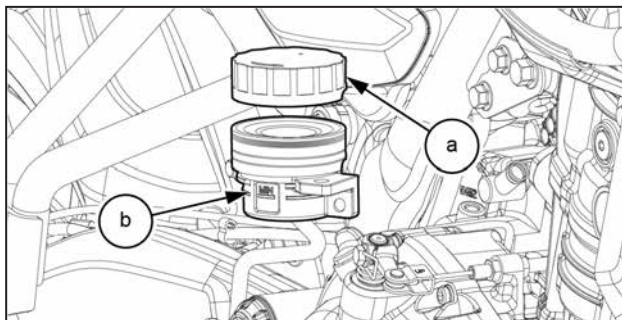
- Open rear brake reservoir cap **(a)** from reservoir **(b)**.



- Top up fresh brake fluid **(a)** into reservoir tank **(b)** only up to MAX level. Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.



- Locate the reservoir cap **(a)** on the tank **(b)** and ensure it is seated properly.



10. ENGINE MANAGEMENT SYSTEM (EMS)

CONTENTS	PAGE
10 Engine Management System (EMS).....	486
EMS Components.....	486
Functional Diagram.....	606
Functional Specifications.....	487
1. Electronic Control Unit (ECU).....	487
2. Fuel Injectors.....	488
3. Fuel Supply Module.....	488
4. Throttle Position Sensor.....	489
5. Manifold Absolute Pressure Sensor (MAP).....	489
6. Canister Purge Valve.....	489
7. HEGO Sensor (HEGO / O2).....	490
8. Idle Air Control Valve (IAC).....	490
9. Coolant Temperature Sensor.....	490
10. Intake Air Temperature Sensor (IAT).....	491
11. Clutch Switch.....	491
12. Side Stand Swicth.....	492
13. Gear Position Sensor (GPS).....	493
14. Roll Over Sensor.....	493
15. Crank Position Sensor (CPS).....	494

16. Starter Relay.....	494
10.1 Engine Management System (EMS).....	495
Dismantling.....	495
10.1.1. Engine Control Unit (ECU).....	495
10.1.2. Fuel Injector.....	496
10.1.3. Fuel Pump.....	496
10.1.4. Strainer.....	497
10.1.5 Coolant Temperature Sensor.....	499
10.1.6 Engine Oil Pressure Switch.....	499
10.1.7. HEGO (O2) Sensor.....	500
10.1.8. Purge Valve.....	500
10.1.9. Ignition Coil.....	501
10.1.10. Crank Position Sensor.....	502
10.1.11. Gear Position Sensor.....	503
10.1.12. Side Stand Switch.....	504
10.1.13. Starter Relay.....	506
10.1.14. Throttle Grip Assembly.....	507
10.1.15. Clutch Switch.....	509
Assembly	509
10.1.16. Engine Control Unit (ECU).....	509

10.1.17. Fuel injector.....	510
10.1.18. Fuel Pump	512
10.1.19. Coolant Temperature Sensor.....	5.14
10.1.20. Engine Oil Pressure Switch.....	515
10.1.21. HEGO (O2) Sensors.....	515
10.1.22. Purge Valve.....	516
10.1.23. Ignition Coil.....	517
10.1.24. Crank Position Sensor.....	518
10.1.25. Gear Position Sensor.....	519
10.1.26. Side Stand Switch.....	520
10.1.27. Starter Relay.....	522
10.1.28. Throttle Grip Assembly.....	523
10.1.29. Clutch Switch.....	524
10.1.31 Actuator.....	525

10. Engine Management System (EMS)

Engine Management System is responsible for controlling the amount of fuel being injected and for adjusting the ignition timing. Optimum functioning of EMS assures maximum engine power with the lowest amount of exhaust emissions and lowest fuel consumption.

EMS Components

- Electronic Control Unit (Integrated with Throttle Body)
- Fuel Injector
- Fuel Supply Module
- Throttle Position Sensor (In-built within ECU)
- Manifold Pressure Sensor (In-built within ECU)
- Canister Purge Valve
- HEGO (O2) Sensor
- Idle Air Control Valve (In-built within ECU)
- Engine Oil Temperature Sensor
- Intake Air Temperature Sensor (In-built within ECU)
- Clutch Switch
- Side Stand Switch
- Gear Position Sensor
- Roll Over Sensor (In-built within ECU)
- Crank Position Sensor
- Starter Motor Relay

Functional Specifications

1. Electronic Control Unit (ECU)

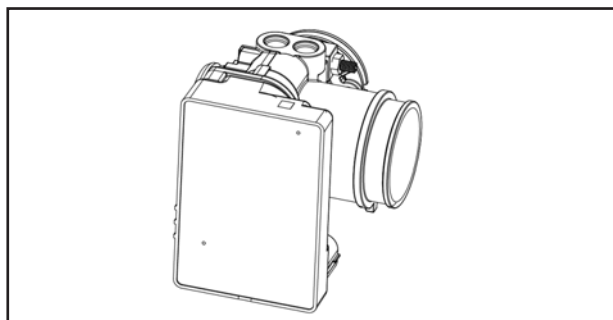
Electronic Control Unit is any embedded system that controls one or more electrical system or subsystems in a vehicle.

Engine Control Unit is a type of Electronic Control Unit that controls a series of actuators on an internal combustion engine to ensure optimal engine performance. It does this by reading values from a multitude of sensors within the engine bay, interpreting the data using multidimensional performance maps (called lookup tables), and adjusting the engine actuators accordingly.

Here ECU consists of a printed circuit board (PCB) assembly contained the plastic housing. The PCB assembly is electrically connected to the following hardware within the throttle body: air intake temperature sensor, air pressure sensor, throttle position sensor and idle flow actuator.

Key Elements:

1. Micro Controller
2. Memory
3. Inputs
4. Outputs
5. Communication Links
6. Throttle Body and In-built Sensors



Specification:

Operating Voltage: 8 to 16 V

Operating temperature: -20°C to 85°C

2. Fuel Injector

Fuel injector that use pintle valves are operated by electromagnetic components called solenoids. The solenoid is activated, or “pulses” by an ECU which causes it to undergo linear movement.

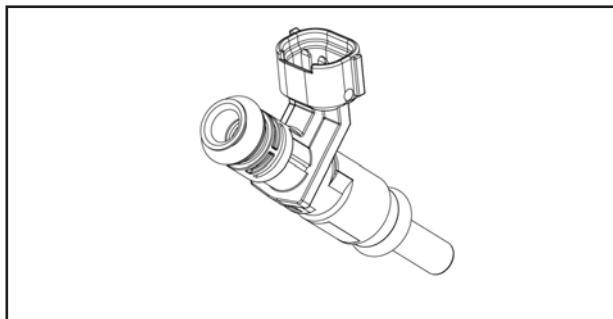
Since the solenoid is mechanically connected to a pintle valve within the fuel injector, the linear movement causes the pintle to move away from its seat. A small amount of highly pressurized fuel then sprays from the pintle nozzle.

Specification:

Resistance: $12\Omega \pm 0.6\Omega$ at $22 \pm 3^\circ\text{C}$

Operating Voltage : 6 to 16 V

Operating Pressure: 200-600 kPa



3. Fuel Supply Module

The inlet filter filters the minute dust particles and supplies fuel to the feed pump. The feed pump creates positive pressure in the fuel lines, pushing the gasoline to the injector. The benefit of placing the pump inside the tank is that it is less likely to start a fire. Though electrical components (such as a fuel pump) can spark and ignite fuel vapours, liquid fuel will not explode and therefore submerging the pump in the tank is one of the safest places to mount. The pressure regulator maintains a constant pressure of 350 kPa by returning the surplus fuel back into the tank.

Specification:

Operating Voltage: 8 to 16 V

Operating Fuel Pressure: 450 ± 14 kPa

Operating Temperature: -30°C TO 60°C



4. Throttle Position Sensor

A Throttle Position Sensor (TPS) is used to monitor the position of the throttle operation and is located on the butterfly spindle so that it can directly monitor the position of the throttle. The sensor is a potentiometer type and therefore provides a variable resistance depending upon the position of the butterfly valve and hence throttle position can be sensed by the ECU. The sensor signal is used by the ECU as an input to its control system. The ignition timing and fuel injection timing (and potentially other parameters) are altered depending upon the position of the throttle, and also depending on the rate of change of the position.

The ECU uses the throttle valve position to know:

- Engine mode: Idle, Part Throttle, Wide-Open Throttle.
- Air-fuel ratio correction.
- Acceleration/ Deceleration correction.

5. Manifold Absolute Pressure Sensor (MAP)

The Manifold Absolute Pressure sensor provides instantaneous manifold pressure information to the ECU. This is necessary to calculate air density to determine the required fuel metering for optimum combustion and influence the advance or retard of ignition timing. This sensor is built in the ECU.

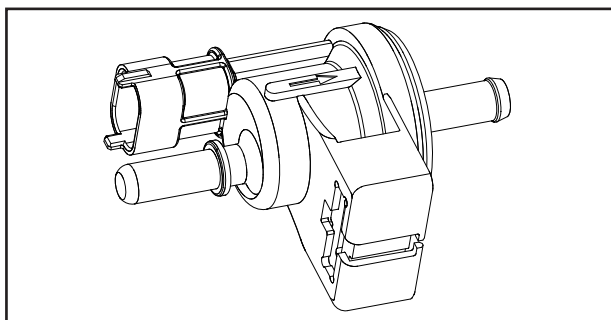
6. Canister Purge Valve

The purge valve is the part of the vehicle Evaporative Emission Control (EVAP) system. The EVAP system prevents fuel vapors in the fuel tank from escaping into the atmosphere. The EVAP system traps fuel vapors from the fuel tank and temporarily stores them in the charcoal canister, see the diagram. When the engine is running under certain conditions, the fuel vapors are purged from the canister and burned inside the engine. The purge valve precisely controls the amount of fuel vapor that is purged from the charcoal canister. It opens only when engine oil $>75^{\circ}\text{C}$ and HEGO sensor "Controller ON".

Specification:

Valve: Normally Closed

Resistance: $16 \pm 2\Omega$ @ $23 \pm 5^{\circ}\text{C}$



7. HEGO Sensor (HEGO / O2)

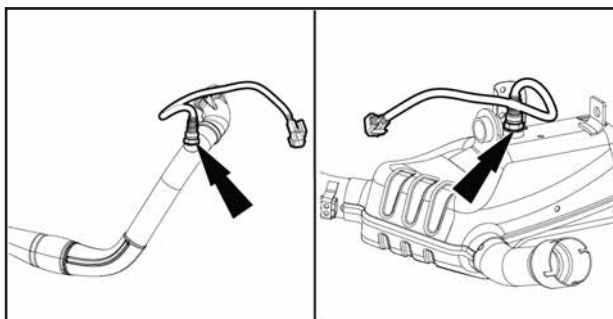
The Heated Exhaust Gas Oxygen sensor detects the presence of oxygen in the exhaust and produces a variable voltage according to the amount of oxygen detected. The O2 sensor provides feedback to the ECU indicating air/fuel ratio in order to achieve a near stoichiometric air/fuel ratio of 14.7 : 1 during closed loop engine operation. The ideal mixture is the amount of fuel needed to make an engine perform as commanded by the ECU.

The HEGO sensor is a voltage generator which is installed upstream from the exhaust pipe and catbox. The heated exhaust gas oxygen sensor will generate a voltage signal that is characteristic of this ideal stoichiometric ratio. The HEGO sensor operates as a reference-gas sensor, and compares the residual oxygen in the exhaust gas with the oxygen in the reference atmosphere (air circulating inside the sensor). The active sensor ceramic is heated by the internal heating element; thus sensor heating reduces the influence of the exhaust gas temperature on the sensor-ceramic temperature and therefore the temperature-dependent sensor. Reliable signals working temperature from 300°C to 900°C maximum.

Specification:

Operating Voltage: 16 V (Max)

Operating temperature: 600°C to 950°C



8. Idle Air Control Valve (IAC)

Idle Air Control Valve is basically a stepper motor controlling the bypass air to the engine and helps to idle and cold start the engine without difficulties. The ECU accordingly collects the data from the engine oil temperature and intake air temperature sensors and operates the stepper motor in regulating the engine RPM. This allows the engine's idle speed to be maintained constant. Idle Air Control Valve is built in the ECU.

9. Coolant Temperature Sensor

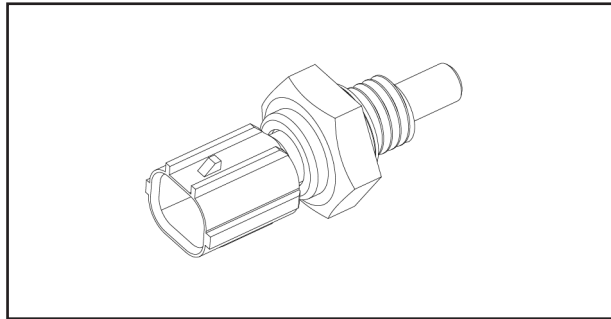
Engine oil temperature sensor is thermistor whose resistance is dependent on temperature. It has a Negative Temperature Coefficient where the resistance decreases with increase in temperature. It gives the average temperature of the engine oil to the ECU for making corrections in the injection quantity, ignition timing and for adjusting the stepper opening for better idle stability. It is mounted in LH of cylinder head.

Specification:

Operating Temperature: -55 to 250°C

Supply Voltage: 5 V

Pin Out Voltage: 3.79 V @ 40°C (Across Pins 19 & 22)

**10. Intake Air Temperature Sensor (IAT)**

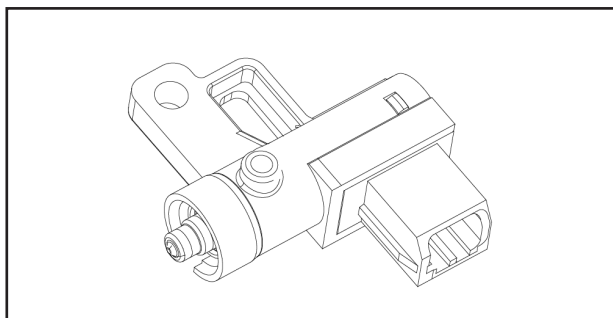
Intake air temperature sensor is also a Negative Temperature Coefficient sensor where the resistance decreases with increase in temperature. It gives the information about ambient air temperature to the ECU for making corrections in the injection quantity and ignition timing. This intake air temperature sensor is in-built in ECU.

NOTE: 1. To meet target emission
2. To meet evaporative emission.

11. Clutch Switch

Clutch switch gives information to the ECU about the clutch status (i.e) engaged or disengaged with the gearbox.

The clutch switch gives digital input to the ECU (i.e) 0 or 1 which will help in starting of the vehicle when the engine is not in neutral gear. It is mounted under the LH switch module at handle bar.



12. Side Stand Switch

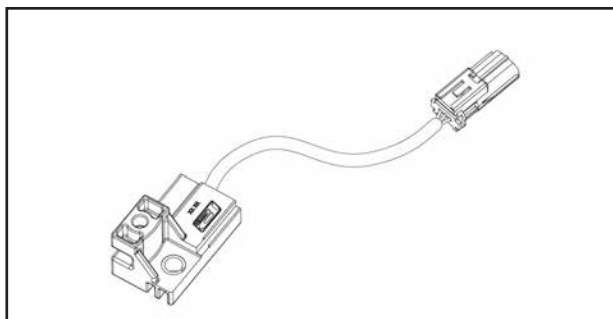
Side stand switch prevents the vehicle from starting when the side stand is down and not in neutral gear. It is HALL - IC type switch, which is directly connected to ECU.

Specification:

(Across Pins 226 & 208)

Side stand down: 2.80 to 4.05 V

Side stand up: 0.35 to 1.15 V



13. Gear Position Sensor (GPS)

Gear Position Sensor indicates the ECU, the gear in which the vehicle is operated at that instant. The input is also required for drive ability calculations in the ECU.

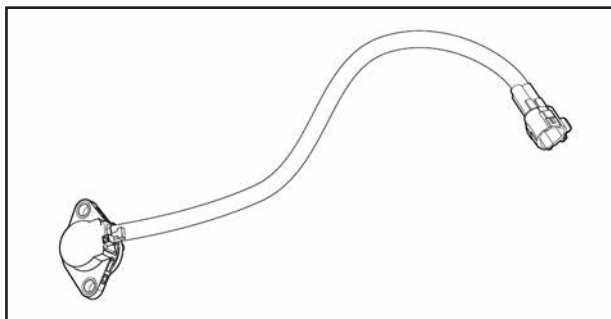
During neutral gear position a light will glow in instrument cluster.

Operating temperature: -25°C to +150°C

Specification:

(Across Pins 123 & 208)

Neutral gear: 0.37 to 1.16 V



14. Roll Over Sensor

Roll over sensor is also known as bank angle sensor. This sensor gives signal to the ECU if the vehicle rolls off during any mishap or accident. The ECU then cuts off the supply to the fuel injector and the spark plug thus stalling the vehicle, due to which further major mishap is avoided. This sensor is In-built in the ECU.

Specification:

Banking angle: 50 degrees

15. Crank Position Sensor (CPS)

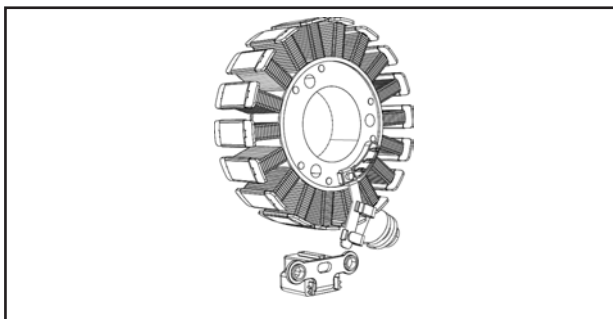
It provides an alternating electrical pulse to the ECU, to determine crankshaft speed and TDC position of the piston in compression stroke. This input will help the ECU to optimize both fuel injection as well as Ignition advance required to suit the crankshaft rotation speed (RPM).

In the event throttle is wide open, leading to crankshaft speed above 5500 RPM, the high frequency electrical pulses from the crank position sensor will prompt the ECU to restrict fuel supply so that the crank speed reduces to safe levels. This is a safety aspect to prevent damage to moving engine parts. CPS is located inside the engine cover LH, under the stator coil.

Specification:

Output Voltage: 3 - 5 V AC

Resistance : $215\Omega \pm 10\Omega$



16. Starter Relay

The starter motor is activated by a solenoid, whenever the starter button is depressed to start the engine.

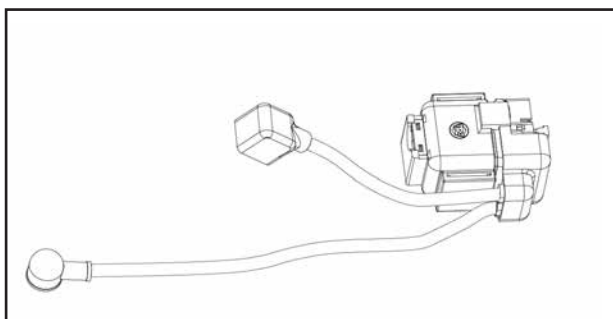
While cranking, when the crank speed attains 600 RPM the ECU commands the starter solenoid to disconnect the power supply to the starter motor so that it will stop spinning.

Also in case the engine does not start within 15 seconds of depressing the starter button, the solenoid will disconnect power supply to the starter motor and will reset to normal condition only after the starter switch is released and after a time delay of about 5 seconds and Crank is at Zero RPM

This is a safety feature to safeguard the starter motor, solenoid and the starter clutch.

Specification:

Operating Voltage: 8 to 16 V



10.1 Engine Management System (EMS)

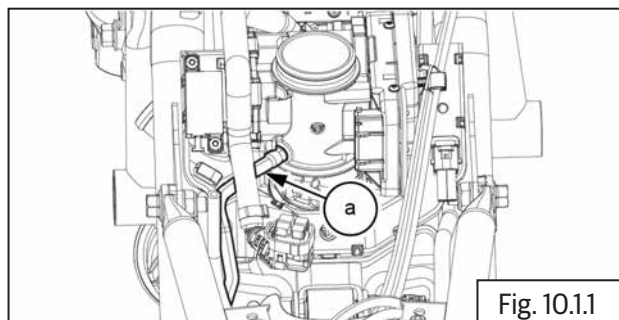
Dismantling

10.1.1 Engine Control Unit (ECU)

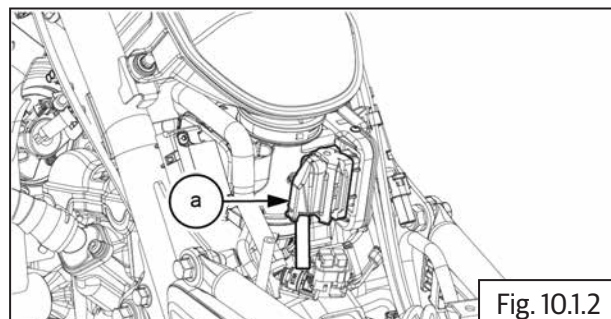
⚠ CAUTION

- Before disconnecting ECU from the wiring harness, the battery terminals must be disconnected from the battery.
- Ensure the ignition switch and stop switch are in OFF position.

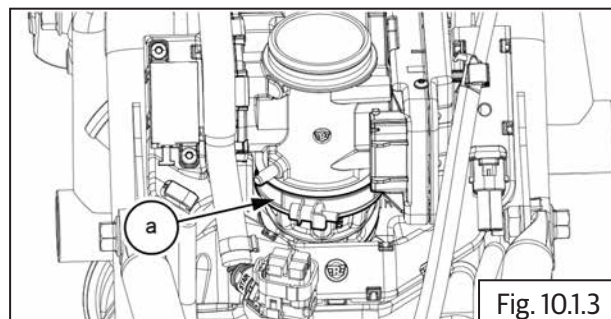
- Remove the Seat assembly. Refer side panel and seat chapter.
- Disconnect battery terminals. Refer electrical chapter.
- Remove the Fuel tank. Refer fuel system chapter.
- Remove Air filter Assembly. Refer air filter system chapter.
- Disconnect hose (a) from throttle body.



- Disconnect coupler (a) from ECU.

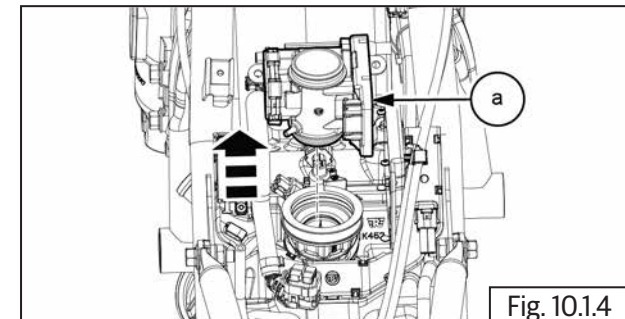


- Loosen worm clip screws (M5) (a) to a disconnect EMS throttle body from adaptor.



4 mm Allen socket with ratchet

- Remove EMS throttle body (a) from adaptor.



⚠ CAUTION

- Ensure locks are fully lifted up and released before disconnecting wiring connectors from ECU.
- Ensure locks are handled with care and do not get damaged or broken.
- Damaged or broken locks will result in loose connections and cause the ECU to fail.

Storage of ECU

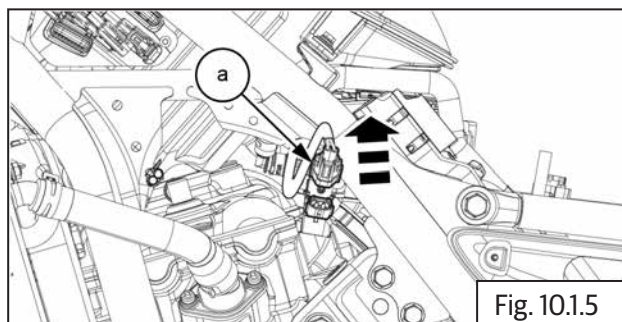
Do's & Don'ts

- Store ECU away from any magnetic forces as it will affect the ECU program software and damage ECU.
- Store ECU in a cool and dry place.
- DO NOT allow moisture to affect the ECU.
- DO NOT wash the ECU with water or any solvent.
- Prevent ECU from any external damages.

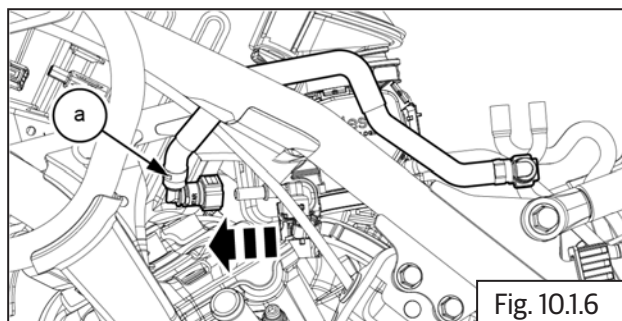
- DO NOT drop ECU or allow it to fall as internals will get damaged and render the ECU defective.
- DO NOT keep any heavy or sharp objects on ECU as it will damage internals and render the ECU defective.

10.1.2 Fuel Injector

- Disconnect coupler from injector assembly (a).



- Remove fuel hose (a) from injector cap.



- Remove 1 No (M6) injector mounting bolt (a).

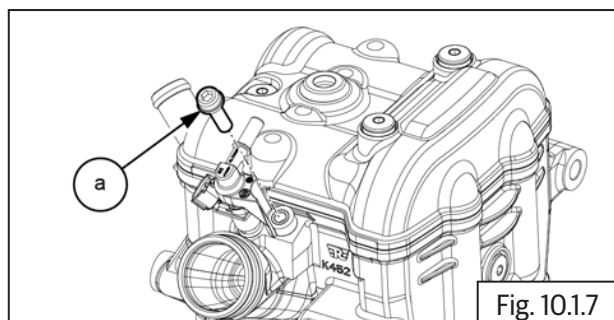


Fig. 10.1.7



5 mm Allen Socket With Ratchet

- Gently pull out the injector assembly (a).

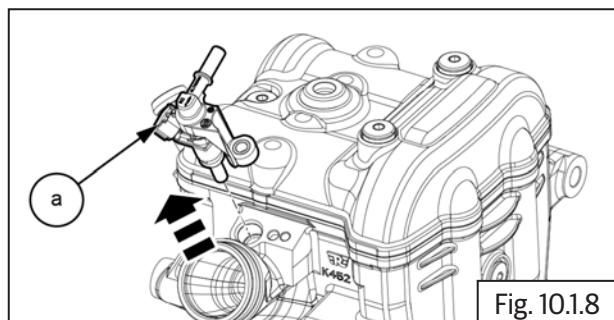


Fig. 10.1.8

⚠ CAUTION

- Store the injector in a clean and dry place. Make sure that the injector is not damaged.
- Place the injector in a plastic bag to avoid dust entry.

⚠ CAUTION

- Ensure Ignition switch and Engine stop switch are in OFF position.

- Remove the Seat assembly. Refer side panel and seat chapter .
- Remove the Fuel tank. Refer fuel system chapter.

⚠ CAUTION

- Ensure the following:
- Fuel is drained completely from fuel tank.
- Fuel feed and return hoses are disconnected from the fuel rail.
- Wiring couplers to fuel pump and low fuel sensor are disconnected.
- EVAP hose pipes are disconnected.

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

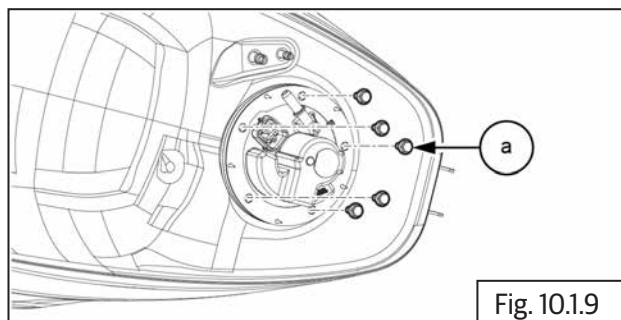
- Invert fuel tank to access fuel pump and fuel float.

10.1.3 Fuel Pump

⚠ CAUTION

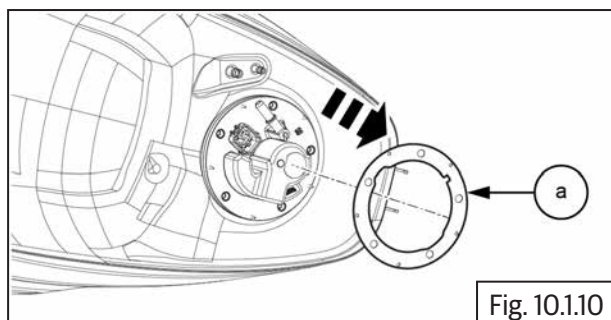
- **Ensure the tank top/side surfaces DO NOT get damaged or scratched while removing fuel pump/float. Provide adequate protection to fuel tank.**

- Loosen and remove **5 Nos** Hex flange collar bolts **(M5) (a)** from fuel pump.

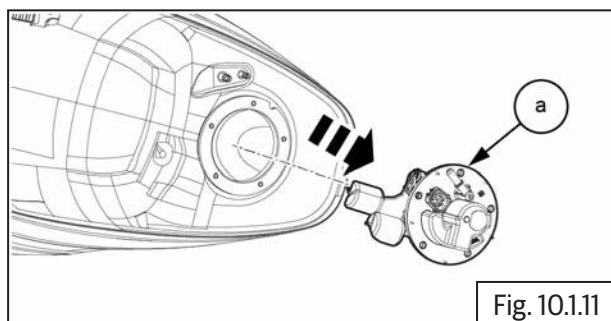


8 mm Socket with Ratchet

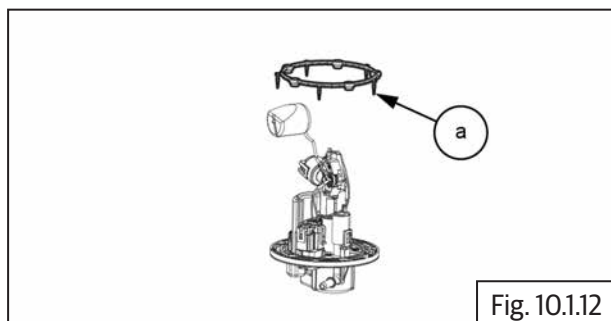
- Remove lock plate **(a)** from fuel pump.



- Gently pull out the fuel pump **(a)** from fuel tank.

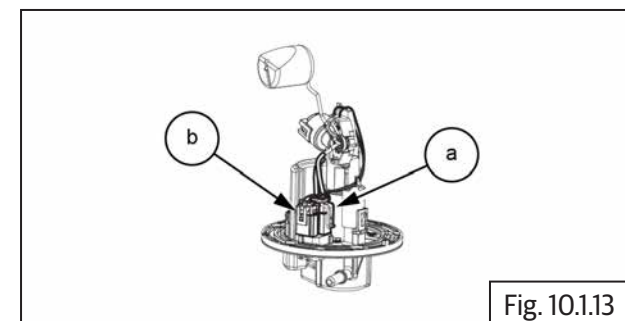


- Remove seal **(a)** from fuel pump.



10.1.4 Strainer

- Ensure clean work area prior to the replacement process.
- To ensure there is no damage to the wiring harness during the strainer serviceability. We suggest to remove the coupler from fuel pump **(a)** and fuel level sensor **(b)**.
- Then without damaging/deforming locks provided in the connector take out the coupler carefully.



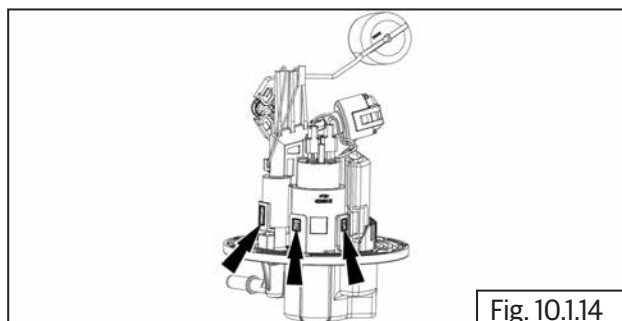
NOTE

- *This operation requires 2 persons.*
- Pull the snap window gently with the help of 2nd-person.

- To remove snap 2 and 3, Either flat screw driver or fingers can be used.
- Once all the 3 snaps are unsnapped, Then pull the pump with float upwards carefully.

NOTE

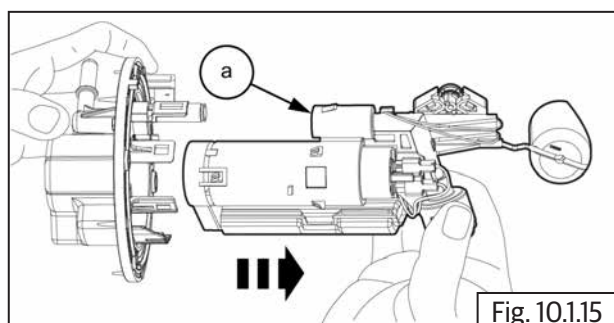
- Please ensure that there is no deformation of snap windows..



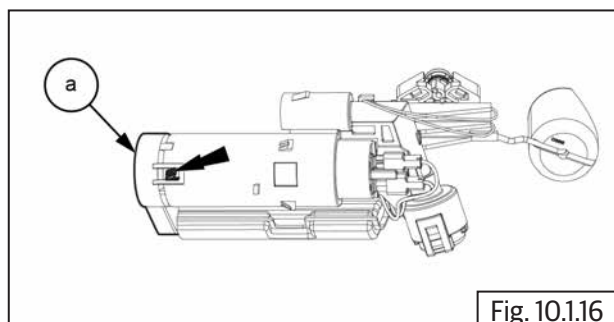
Flat Heat Screw Driver

- Hold the cover at bottom and then Pull the pump with float (a) in upward direction, till the com-

plete pump with float is taken out.



- Lift the strainer snap window by screw driver from the snap (2 snaps) (a) provide in the pump retainer carefully.



Flat Heat Screw Driver

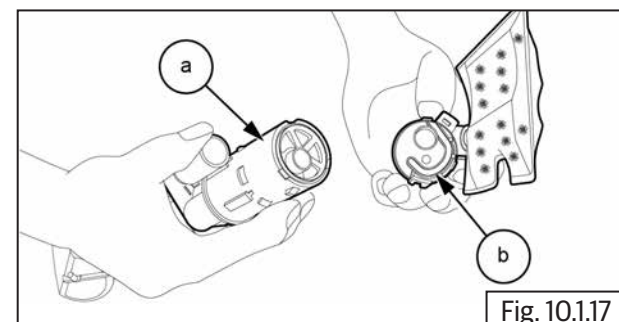
- Hold the pump with float (a) and then pull the

strainer (b) carefully.

- Remove the strainer (b) carefully without damaging the pump.
- During strainer removal (b), The pump with float (a) must be held firmly.

NOTE

- Please ensure pump inlet plate must not be damaged during removing strainer (b).



NOTE

- While removing strainer, Ensure that no contaminations enters the pump spout until assembling the new strainer.

- Remove the "O" ring (a) from pump cover.

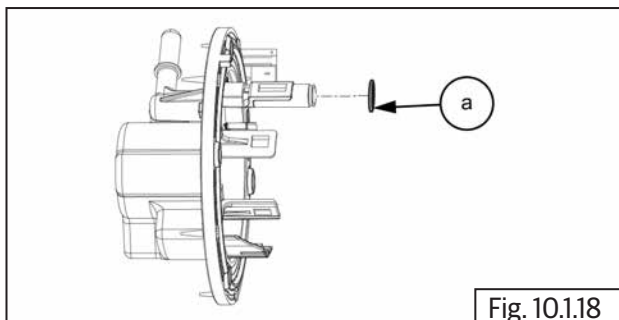


Fig. 10.1.18

⚠ CAUTION

Ensure the float unit does not get damaged or bent while removing from fuel tank. Store fuel pump with float unit carefully. Do not disturb the level of the float unit as it will seriously affect fuel level indication.

10.1.5. Coolant Temperature Sensor

- Drain the coolant. Refer engine cooling chapter
- Coolant temperature sensor located on rear side of cylinder head.
- Remove coolant temperature sensor coupler (a).

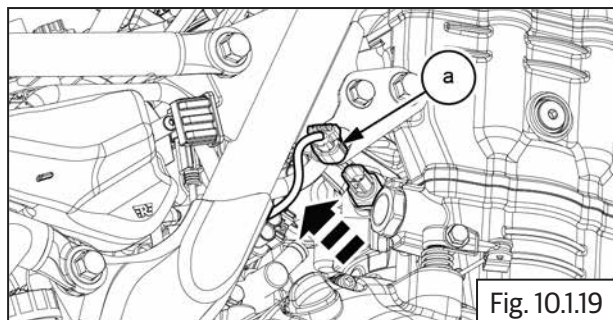


Fig. 10.1.19

- Remove coolant temperature sensor (a).

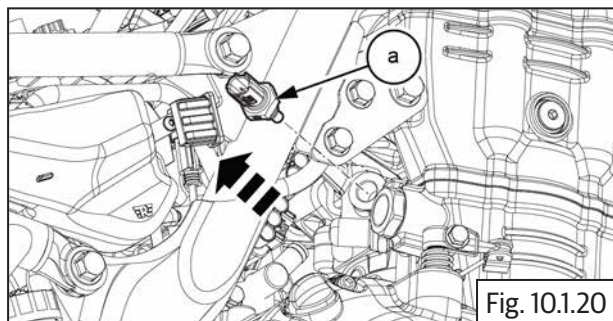


Fig. 10.1.20



18 mm Long Socket With Ratchet

10.1.6. Engine Oil Pressure Switch

NOTE

- Ensure the engine is cold before dismantling EOT.
- Ensure Ignition switch and Engine stop switch are in OFF position.

⚠ CAUTION

Do not remove EOT from cylinder head when the engine is hot.

- Disconnect the oil pressure switch coupler (a).

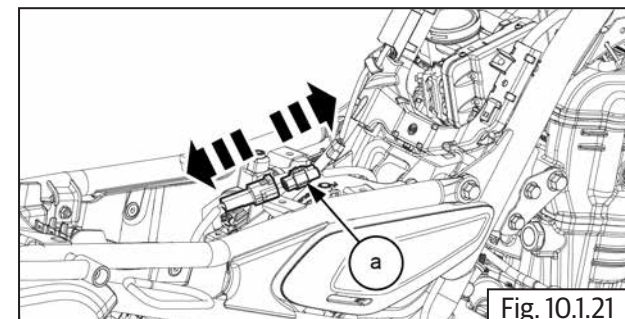


Fig. 10.1.21

- Drain engine oil. Refer engine removal chapter.
- Loosen and remove the Oil pressure switch (a) along with washer (b).

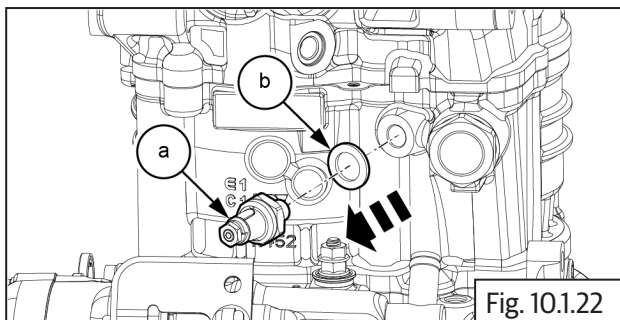


Fig. 10.1.22



21 mm Long Socket with Ratchet

10.1.7. HEGO (O2) Sensor

⚠ CAUTION

Do not loosen/remove HEGO (O2) sensors when the exhaust pipes are hot.

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and is at the same levels of ambient/surrounding temperature whenever working on the engine or exhaust systems.

- Remove the Fuel tank. *Refer fuel system chapter.*
- Remove Air filter Assembly. *Refer air filter system*

chapter.

- Detach the omega clips **(a)** from Oxygen Sensor wiring harness.

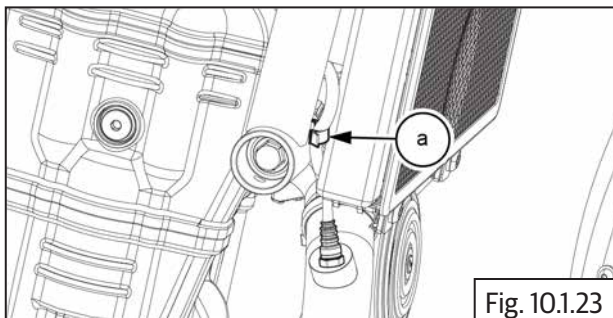


Fig. 10.1.23



Flat Head Screw driver

- Oxygen sensor coupler **(a)** located on RHS chassis frame.
- Disconnect oxygen sensor connector **(a)**.

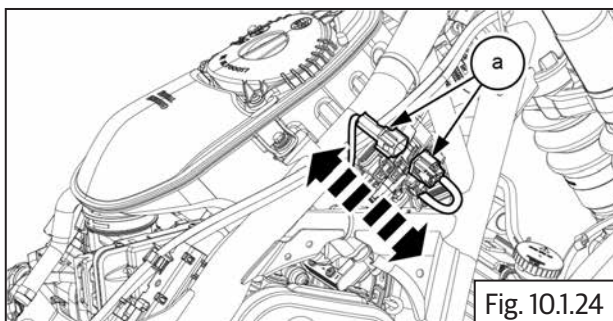


Fig. 10.1.24

- Gently loosen and remove the Oxygen sensor **(a)** from the exhaust pipe.

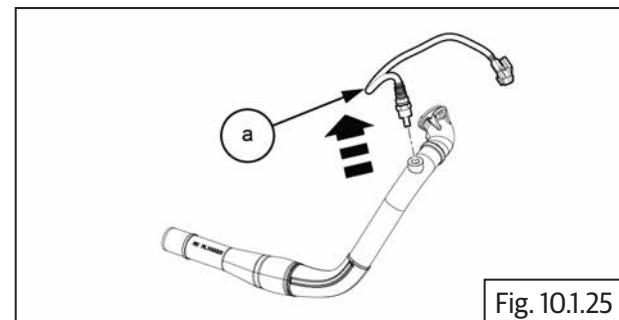


Fig. 10.1.25



17 mm Combination Spanner / Deep groove spanner

10.1.8. Purge Valve

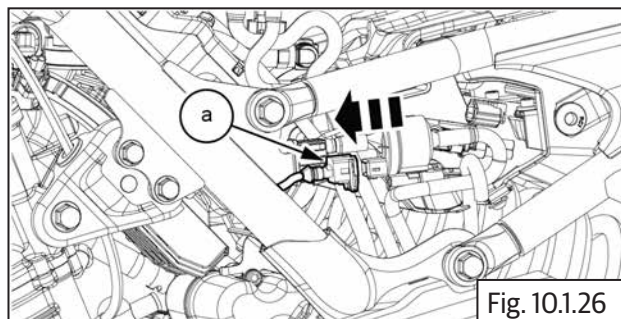
Prior Removal:

⚠ CAUTION

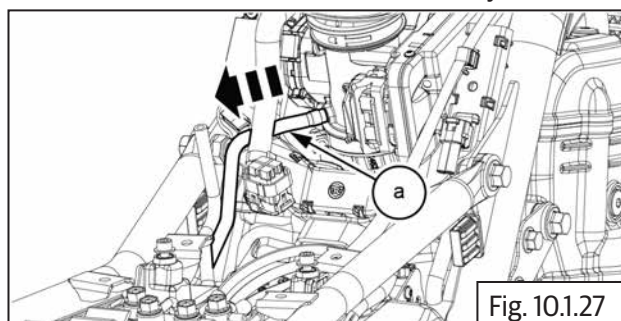
- **Ensure ignition key and engine stop switch are in OFF position.**
- **Before removing any part of the EVAP system, open fuel tank cap to release the pressure inside.**

- Remove the Seat assembly and side panel. *Refer side panel and seat chapter .*

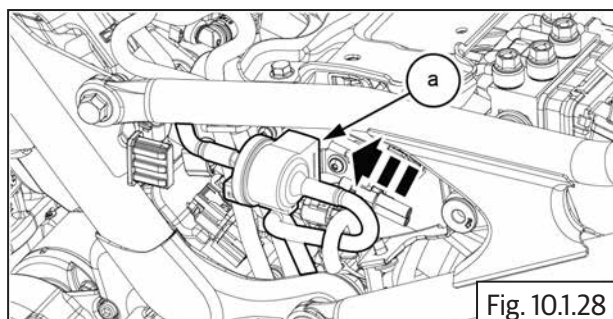
- Disconnect battery terminals. **Refer electrical chapter.**
- Remove the Fuel tank. **Refer fuel system chapter.**
- Remove Air filter Assembly. **Refer air filter system chapter.**
- Disconnect electrical coupler **(a)** from purge valve.



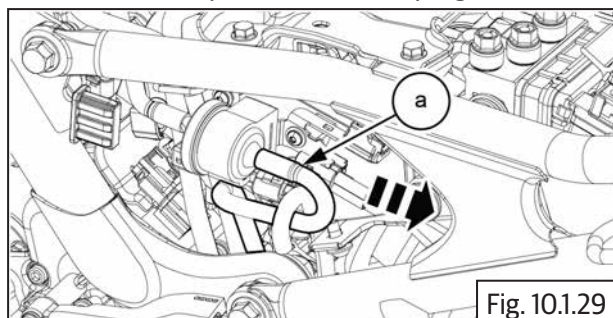
- Disconnect hose **(a)** from throttle body.



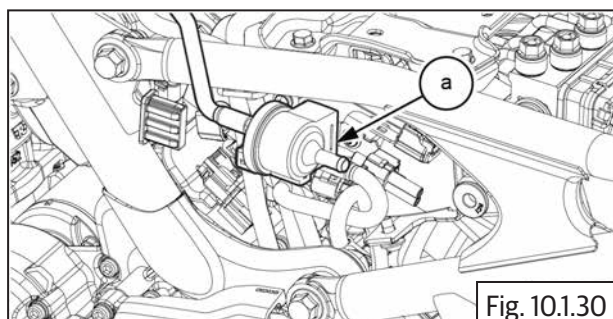
- Slide and remove the purge valve with rubber boot **(a)** from bracket.



- Disconnect input hose **(a)** from purge valve.



- Remove the purge valve with hose assembly **(a)**.



10.1.9. Ignition Coil

⚠ CAUTION

- **Ensure ignition key and engine stop switch are in OFF position.**

- Remove the Fuel tank. **Refer fuel system chapter.**
- Remove Air filter Assembly. **Refer air filter system chapter.**

⚠ CAUTION

- **Ensure the following:**
- **Fuel is drained completely from fuel tank.**
- **Fuel feed and return hoses are disconnected from the fuel rail.**
- **Wiring couplers to fuel pump and low fuel sensor are disconnected.**

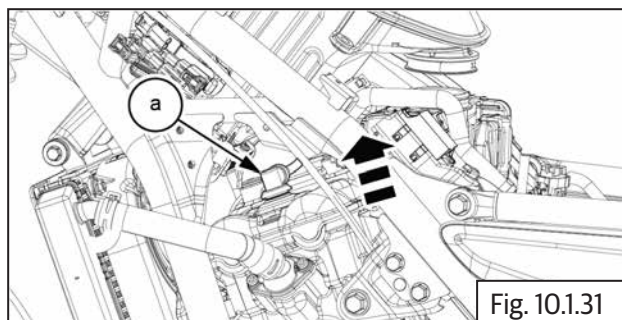
⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

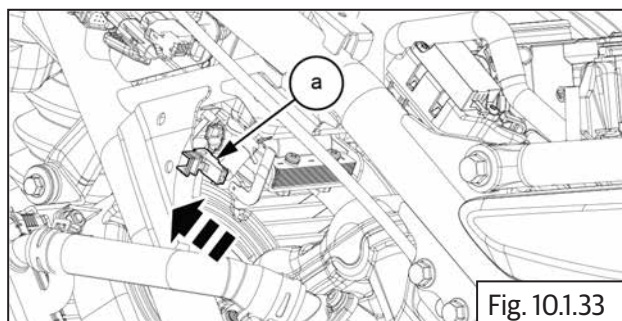
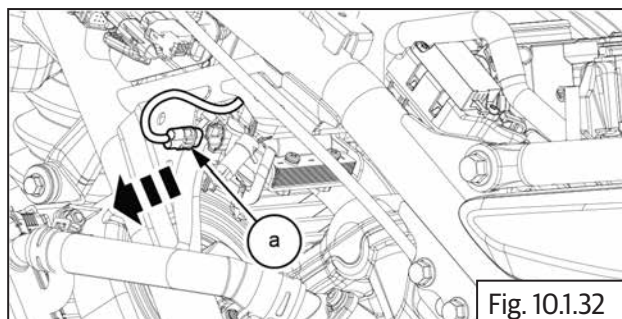
- The Ignition coil is located on the bottom of the air

filter.

- Remove spark plug cap **(a)** from engine.



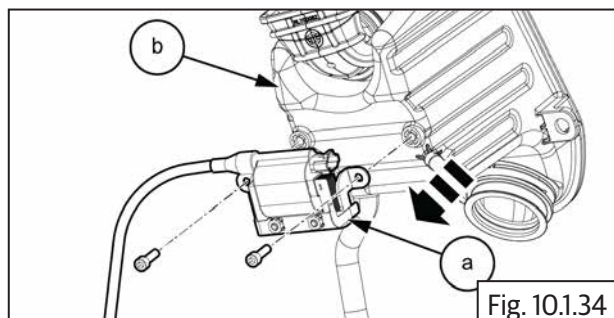
- Disconnect the **2 Nos** ignition coil couplers **(a)**.



- Remove **2 Nos** cap head screws **(M6)** from ignition

coil **(a)**.

- Remove ignition coil **(a)** with high tension cable from air filter box **(b)**.



5mm Allen Socket with Ratchet

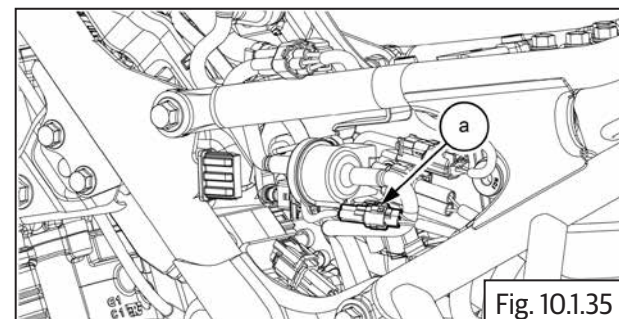
10.1.10 Crank Position Sensor

Prior Removal:

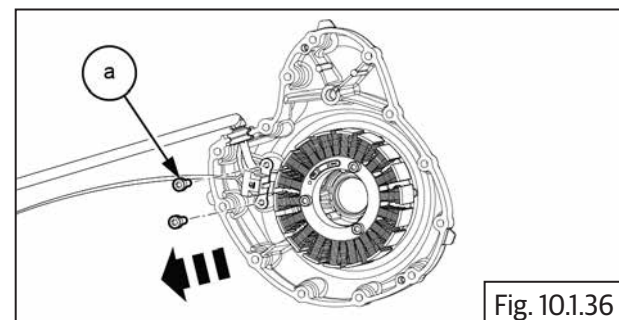
- Remove the Side panel LH **Refer side panel and seat chapter**.
- Remove the ACG Cover (LH Side). **Refer Engine Dismantling Chapter**.
- The crank position sensor is located inside the

engine cover LH and attached to the Magneto coil.

- Disconnect crank position sensor coupler **(A)** from LH bottom battery tray.

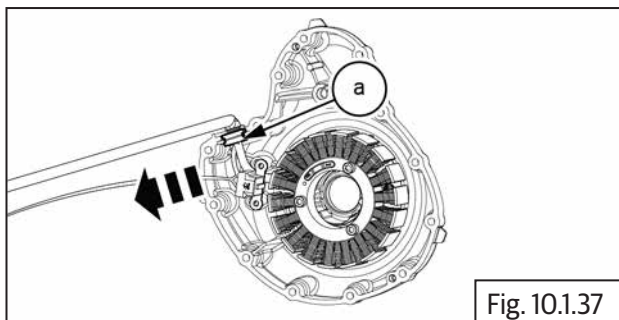


- Loosen and remove **2 Nos** cap flange bolts **(M5)** **(a)** from Crank position sensor.

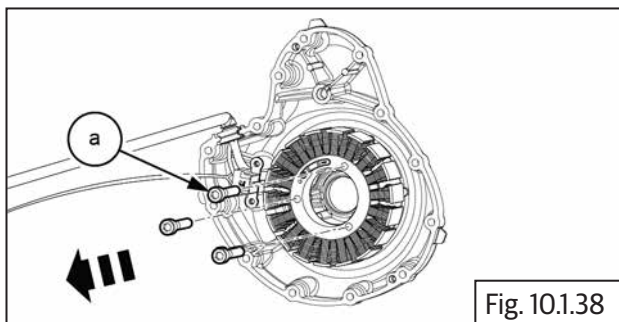


4 mm Allen Socket With Ratchet

- Gently release wiring grommet **(a)** from ACG cover.

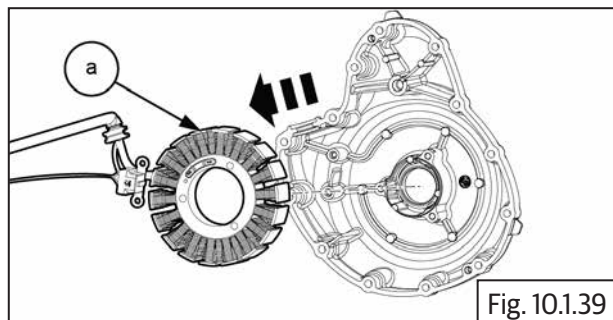


- Loosen and remove **3 Nos** cap flange bolts (**M6**) (**a**) from magneto starter mounting.



5 mm Allen Socket With Ratchet

- Gently remove the magneto starter (**a**) from LH ACG cover.

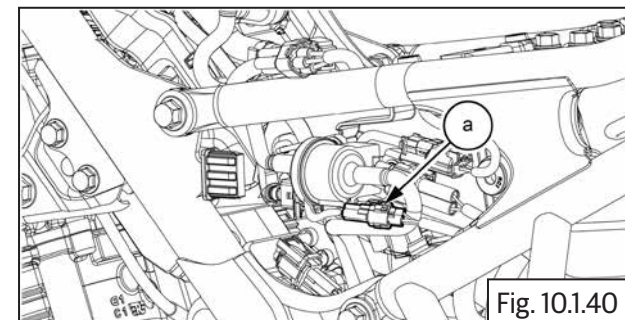


10.1.11. Gear Position Sensor

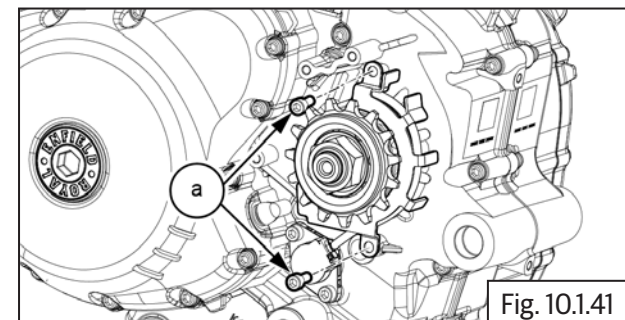
Prior Removal:

- Remove the Side panel LH **Refer side panel and seat chapter**.
- Remove the FD Sprocket cover. **Refer Engine Dismantling Chapter**.

- The crank position sensor (**a**) is located inside the engine cover LH and attached to the Magneto coil.
- Disconnect gear position sensor coupler (**a**) from LH bottom battery tray.

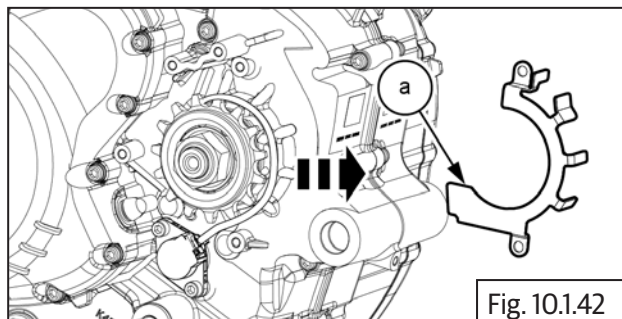


- Loosen and remove **2 Nos** cap bolts (**M6**) (**a**) from gear position sensor cable guide bracket.

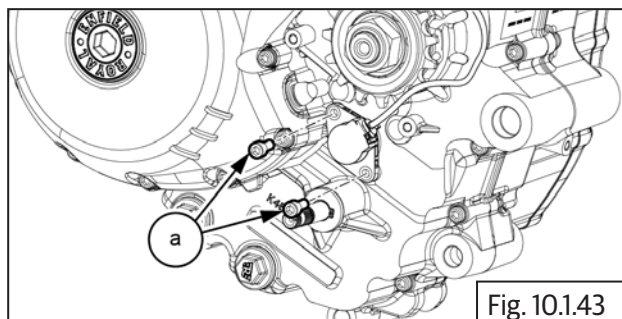


5 mm Allen Socket With Ratchet

- Remove the cable guide bracket **(a)**.

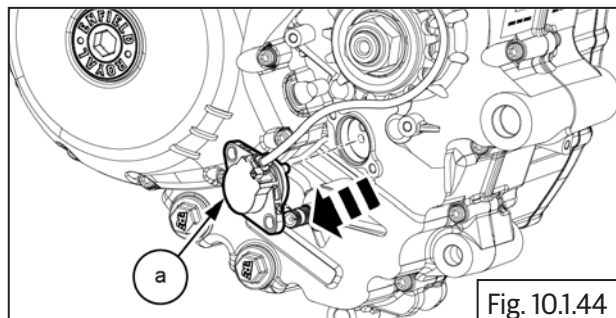


- Loosen and remove **2Nos** Gear position sensor mounting bolts **(M6) (a)**.



5 mm Allen Socket With Ratchet

- Remove Gear position sensor with "O" ring **(a)** from engine.



10.1.12. Side Stand Switch

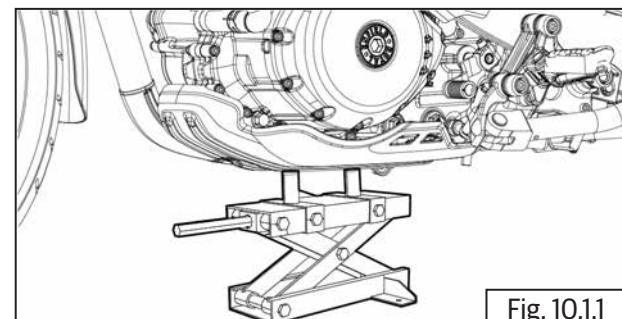
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

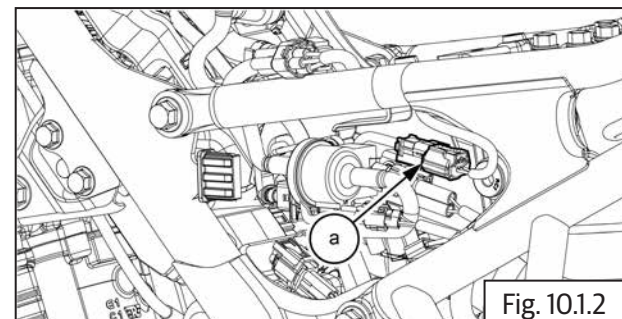
⚠ CAUTION

Be extremely careful when removing and installing the springs as the combined tension of the springs is very strong. Keep the motorcycle on its side stand when removal and installing the center stand. The spring removal and installation shall be performed by two people. While one person holds the motorcycle, another person installs the spring.

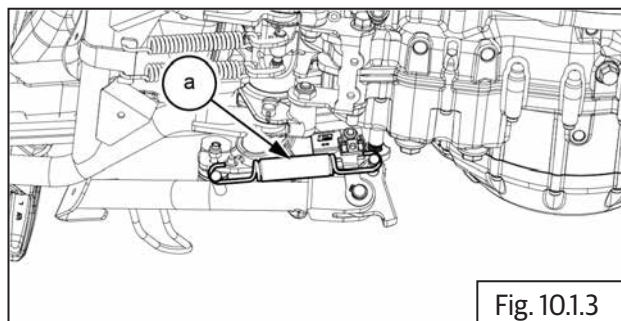
- Locate a scissor jack under the cradle frame and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).



- Remove the Side panel LH **Refer side panel and seat chapter ..**
- Disconnect the side stand switch coupler **(a)**.

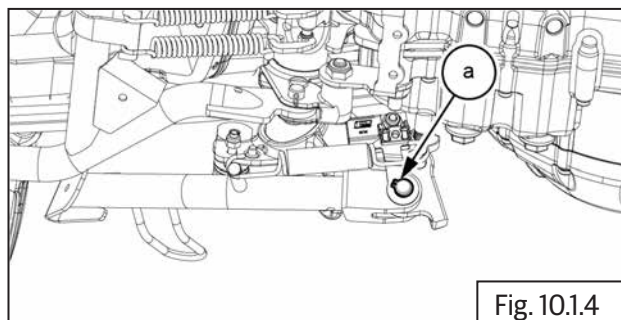


- Remove spring **(a)** from the side stand.



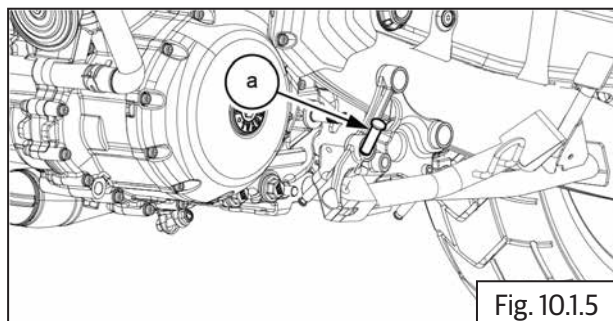
Screw driver

- Remove the circlip **(a)** from clevis pin.

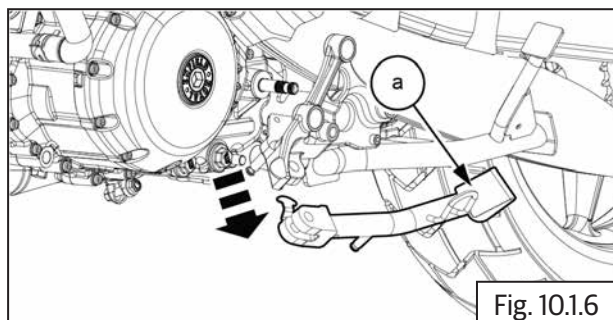


Circlip Expander

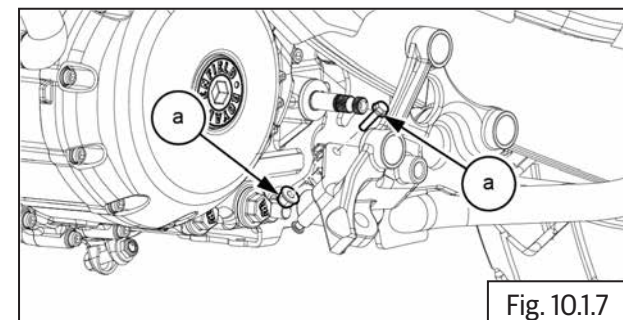
- Remove clevis pin **(a)** from side stand.



- Remove side stand **(a)** from frame.

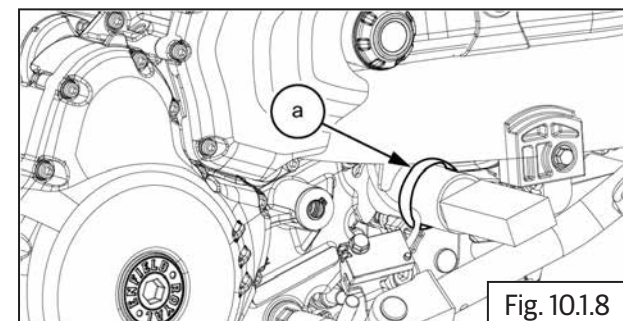


- Loosen and remove hex flange bolt **(M6) (a)** and hex nut **(b)** from side stand switch.



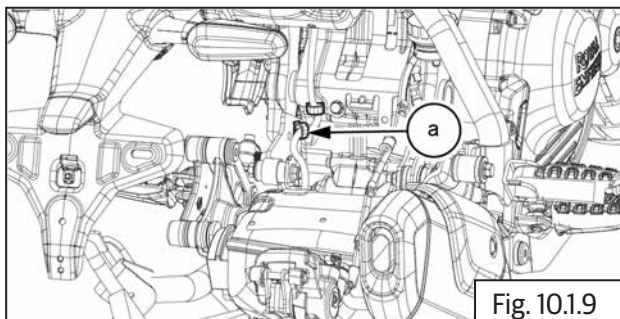
10 mm Socket With Ratchet
10 mm Combination Spanner

- Detach the wire tag **(a)** from side stand switch wiring harness.



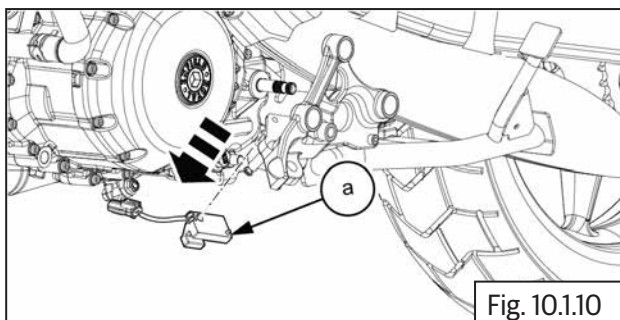
Nose plier

- Detach the omega clips **2 Nos (a)** from side stand switch wiring harness.



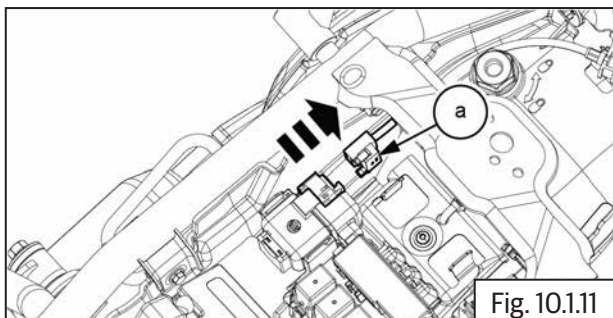
Nose plier

- Remove the side stand switch with harness **(a)** from frame .

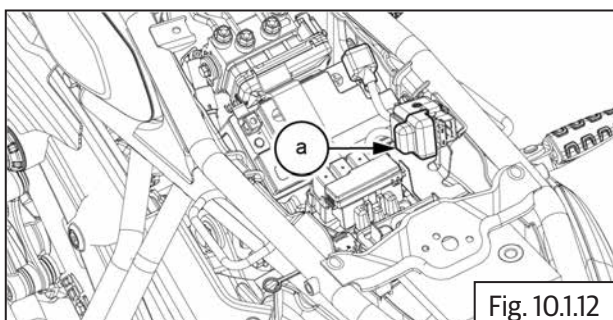


10.1.13 Starter relay

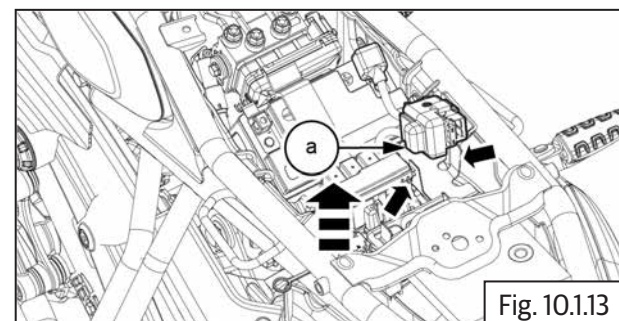
- Remove the Seat assembly and side panel. Refer side panel and seat chapter .
- Disconnect battery terminals. Refer electrical chapter.
- Disconnect the starter relay coupler **(a)**.



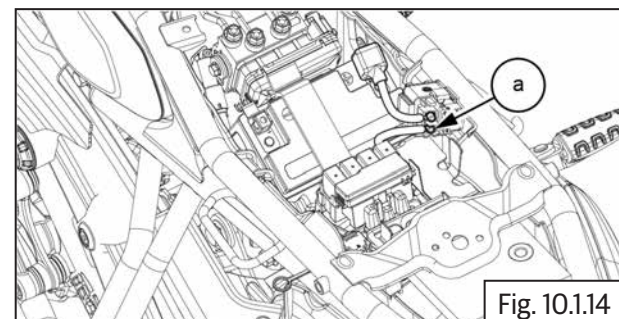
- Open the cap **(a)** from the relay.



- Remove the starter relay **(a)** from the slot.



- Remove the **2 Nos** screws **(a)** from the main cable.



4 mm Allen Socket With Ratchet

- Remove the battery main cables **(a)** from relay.

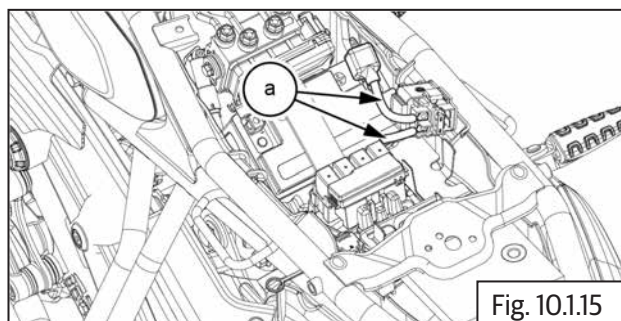


Fig. 10.1.15

- Remove the starter relay **(a)** from battery tray,

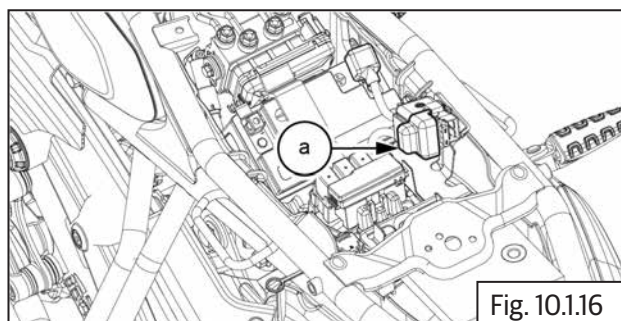


Fig. 10.1.16

- Loosen and remove the nut **(a)** from self motor and remove the main cable.

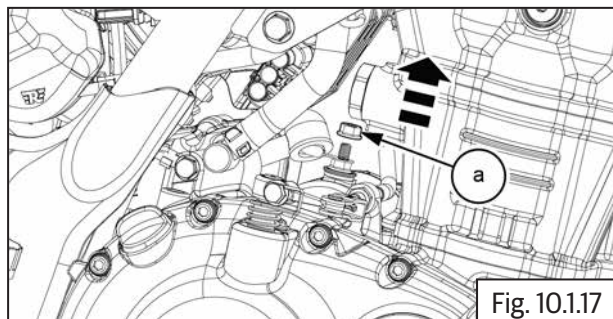


Fig. 10.1.17



10 mm Socket with Ratchet

10.1.14 Throttle Grip Assembly

- Remove the Seat assembly. **Refer side panel and seat chapter .**
- Remove the Fuel tank. **Refer fuel system chapter.**
- Disconnect Accelerator position sensor coupler **(a)**.

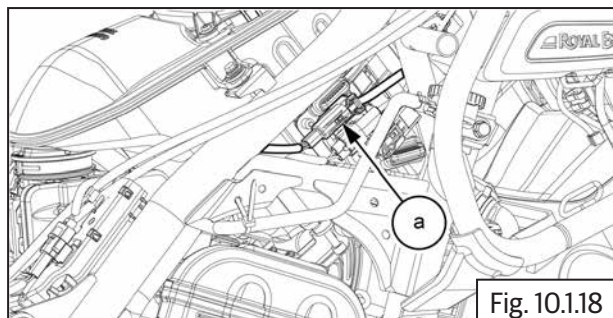


Fig. 10.1.18

- Loosen and remove **2Nos** philips head screws **(a)** from the RH switch cube along with throttle grip from handle bar.

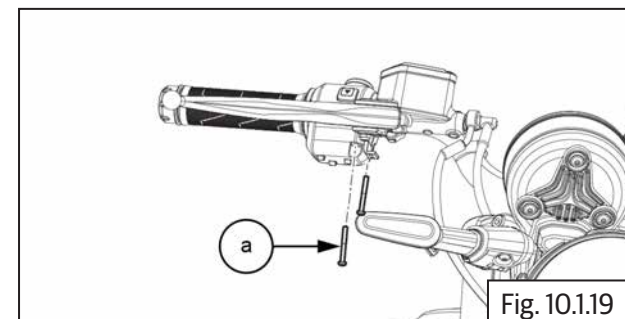


Fig. 10.1.19



Philips Screw Driver

- Gently separate the upper RH switch cube **(a)** and lower RH switch cube **(b)** and remove RH switch cube along with throttle grip from handle bar.

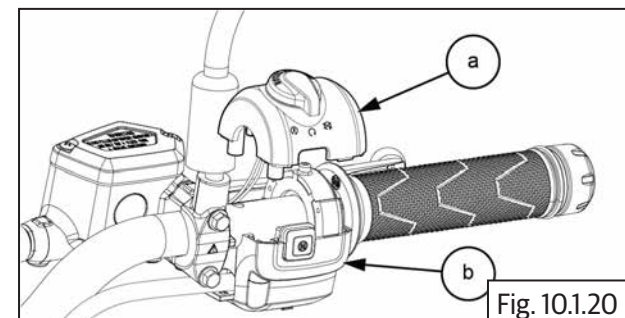
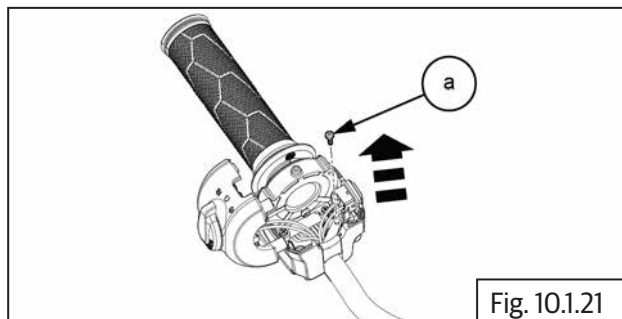


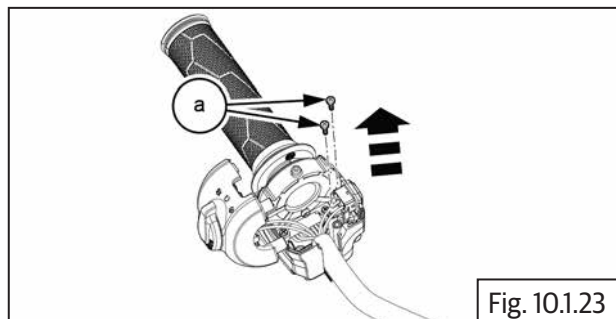
Fig. 10.1.20

- Loosen and remove philips head screw **(a)** from the wire stopper.



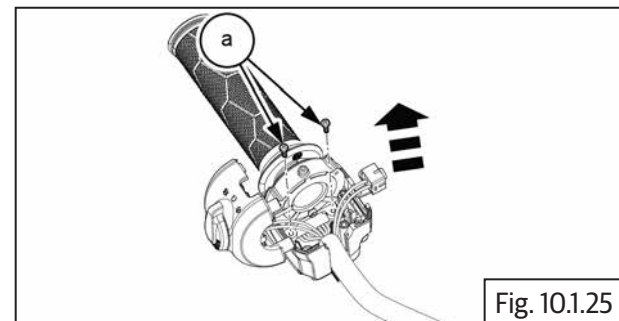
Philips Screw Driver

- Loosen and remove **2Nos** philips head screws **(a)** from the mode switch.



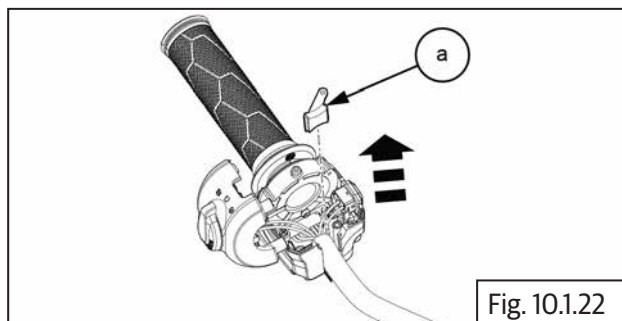
Philips Screw Driver

- Loosen and remove **2Nos** philips head screws **(a)** from throttle grip.

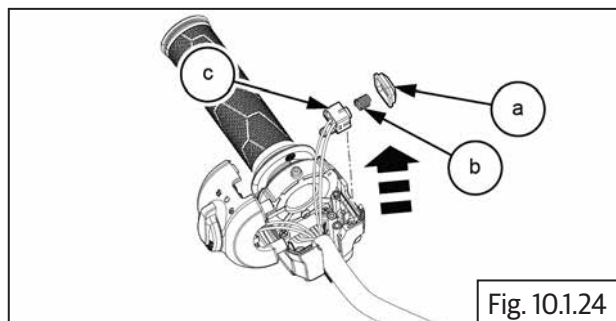


Philips Screw Driver

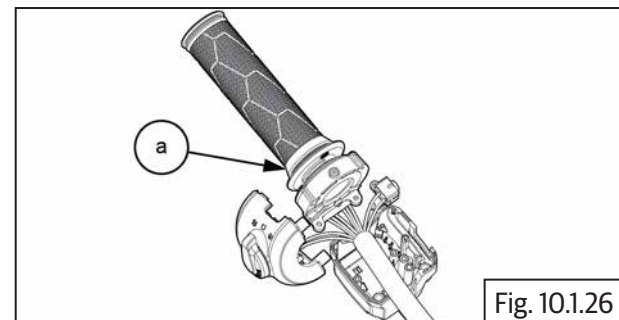
- Remove wire stopper **(a)** from lower RH switch cube **(b)**.



- Gently separate mode switch **(c)** along with button **(a)** & spring **(b)** from lower RH switch cube.

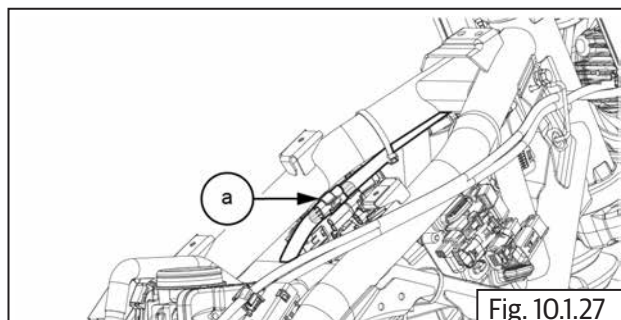


- Remove throttle grip **(a)** from RH switch cube.

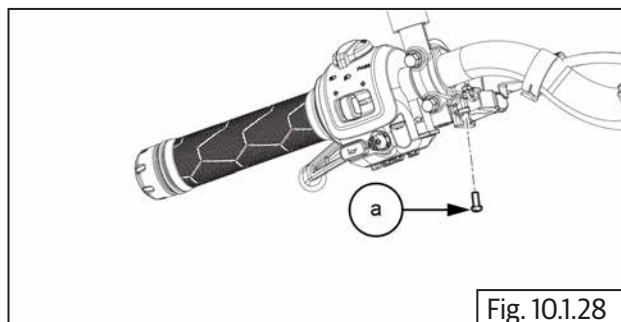


10.1.15. Clutch Switch

- Remove the Seat assembly. Refer side panel and seat chapter .
- Remove the Fuel tank. Refer fuel system chapter.
- Disconnect clutch switch coupler (a).

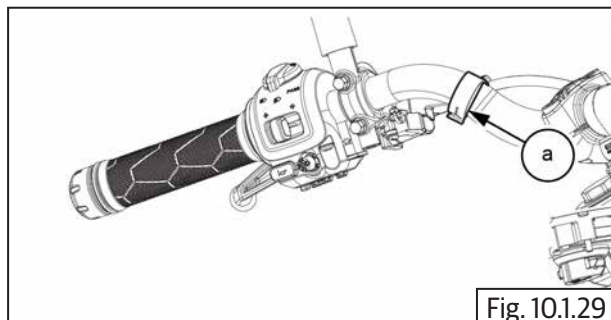


- Loosen and remove 1 Nos of screw (a) from clutch lever .

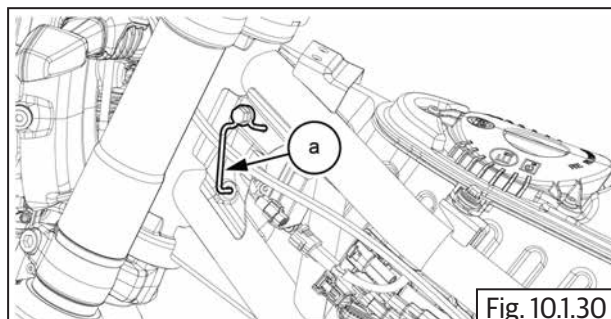


Philips Screw Driver

- Remove the cable strap (a).

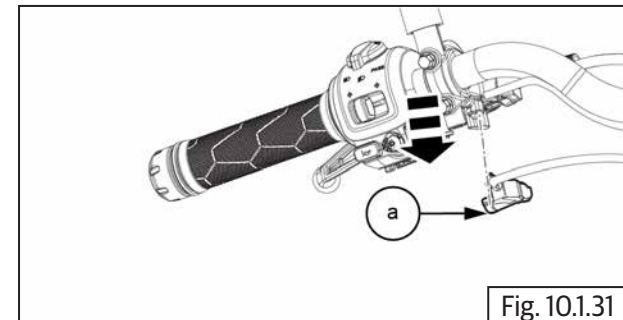


- Remove hex head bolt from harness clip (a) and remove clip (a) from frame.



10 mm Socket with Ratchet

- Remove the clutch switch (a) from clutch lever.



Assembly

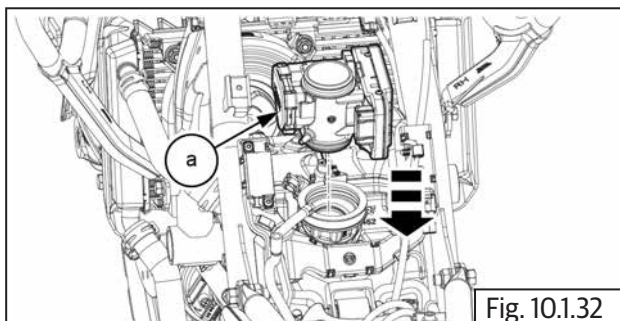
10.1.16. Engine Control Unit (ECU)

! CAUTION

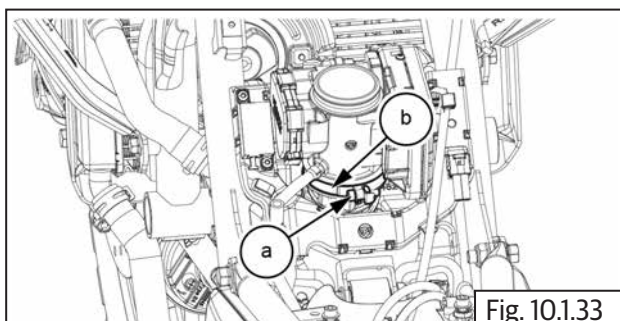
Before assembling any part of the EMS, the Ignition switch and Engine stop switch MUST be in OFF position

Before connecting ECU into wiring harness, the battery terminals must be disconnected from the battery.

- Attach the EMS throttle body **(a)** to the adaptor.

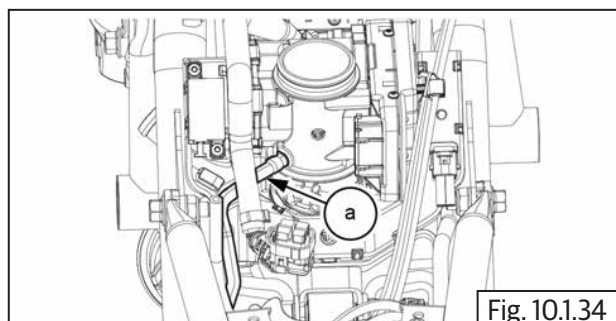


- Connect the EMS throttle body **(b)** to the adaptor by tightening the worm clip screws **(M5) (a)**.



	4 mm Allen Socket With Ratchet
	2.5±0.5 Nm / 0.2 ± 0.05 kgf m

- Connect the EVAP hose **(a)** to the throttle body.



- Install the following parts:
- Install the battery terminals. Refer fuel system chapter.
- Install the Fuel tank. Refer fuel system chapter.
- Install the Seat assembly. Refer side panel and seat chapter.

⚠ CAUTION

Ensure the locks are fully lifted up and released, before connecting wiring connectors into ECU.

Ensure the locks are handled with care and do not get damaged or broken

Damaged or broken locks will result in loose connections and cause the ECU to fail.

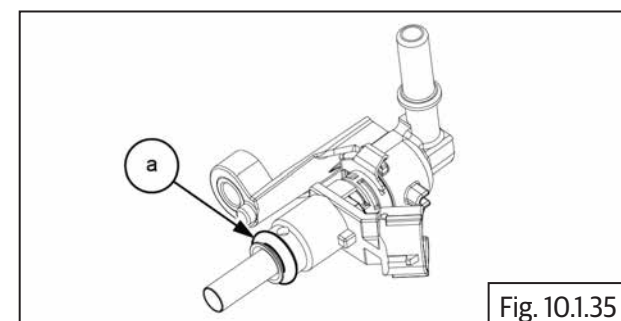
10.1.17. Fuel injector

- Fuel injector are located on the intake manifold.

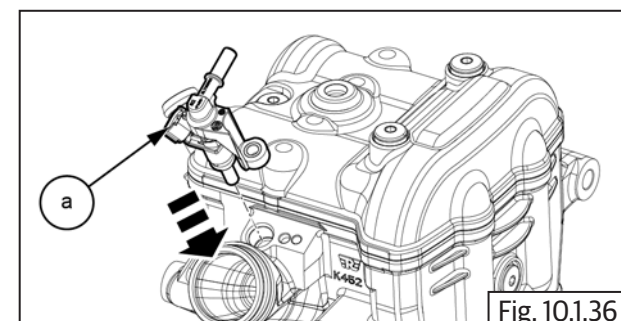
NOTE

- Lubricate the Injector 'O' ring **(a)** before assemble.

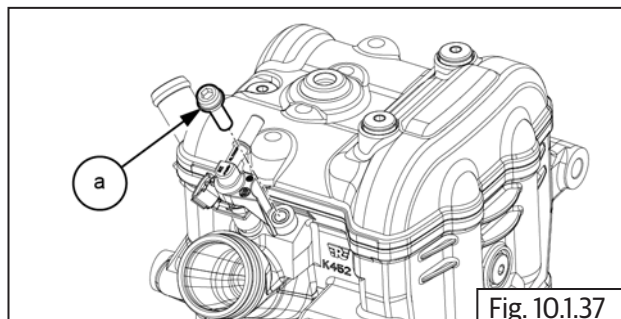
	GL80W90
--	---------



- Gently locate the injector assembly **(a)**.

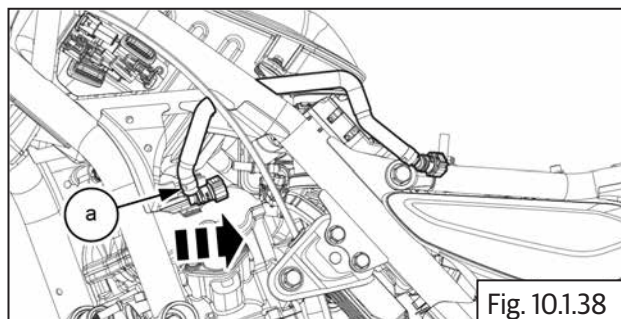


- Locate and tighten **(M6)** injector mounting bolt **(a)**.

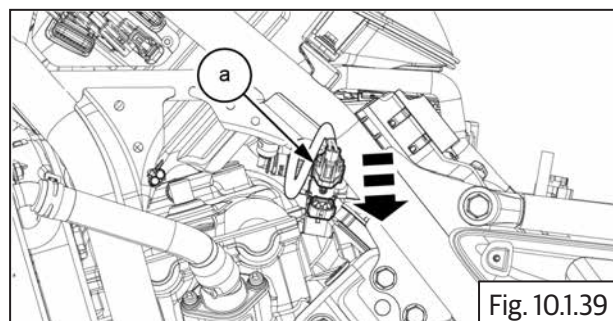


	5 mm Allen Key with ratchet
	11 N-m /1.1 kgf-m

- Connect fuel hose **(a)** into injector cap.



- Connect coupler into injector assembly **(a)**.



⚠ CAUTION

Ensure the following:

Fuel is refilled into fuel tank.

Fuel feed and return hoses are connected into fuel rail.

Wiring couplers to fuel pump and low fuel sensor are connected.

EVAP hose pipes are connected.

Water drain hose are connected.

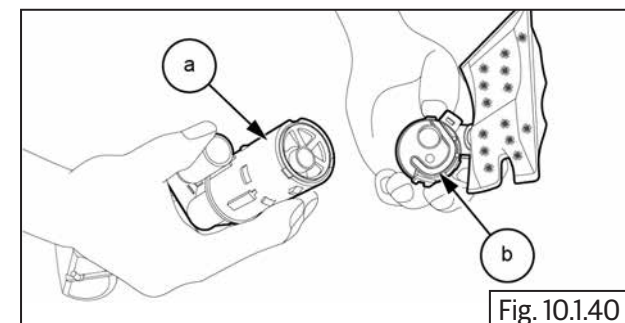
- Assemble the following parts:
 - Fuel tank. **Refer fuel system chapter.**
 - Rider seat. **Refer side panel and seat chapter.**

10.1.18 Strainer

- Take new strainer **(b)** and remove the dust cap on the strainer.

NOTE

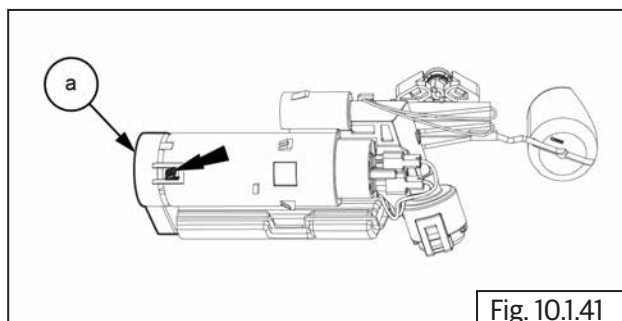
- The strainer assembly for the pump and pump retainer **(a)** it can be assembled in one direction.



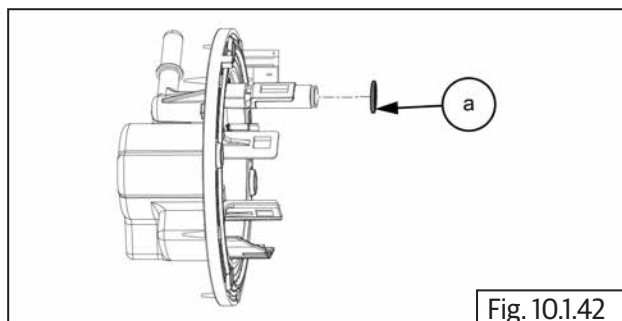
NOTE

- Ensure the Pump flow path and the Strainer spout is in the same line during assembly.

- Hold the pump retainer and push the strainer (a) until it get snapped.
- Press and Snap fit Make sure the locks in the strainer locked properly to the snaps provided in the module.

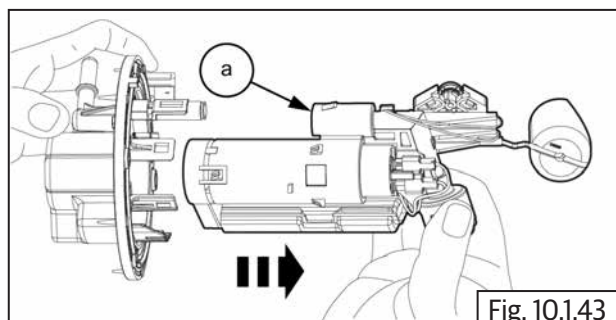


- Ensure the O ring (a) is present and no damages to the O ring during assembly.

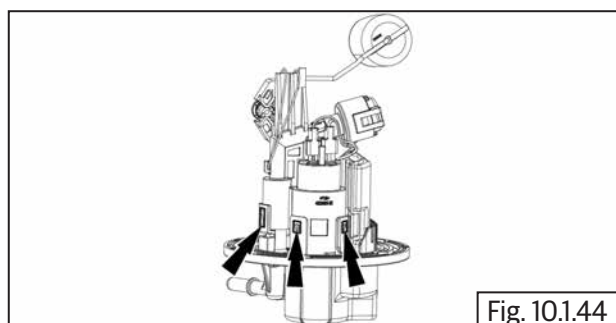


- After completing the strainer assembly with the pump retainer. Assemble the pump retainer assembly (a) to the cover.

- Align pump retainer assembly (a) to the cover, and check the slot position in cover during alignment.
- Hold the module and lift the cover upwards carefully until the complete snap.

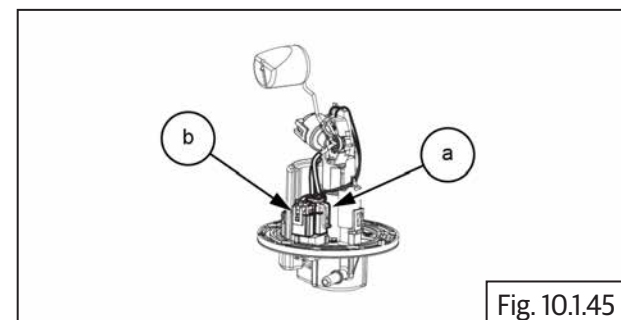


- Once assembled, Check all the **3 snaps** are locked properly.



Flat Head Screw Driver

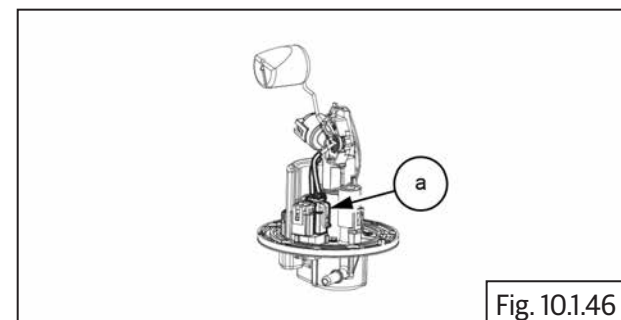
- Then realign the module to back side and then push the electrical couplers (a) and (b). without damaging locks provided in the couplers.



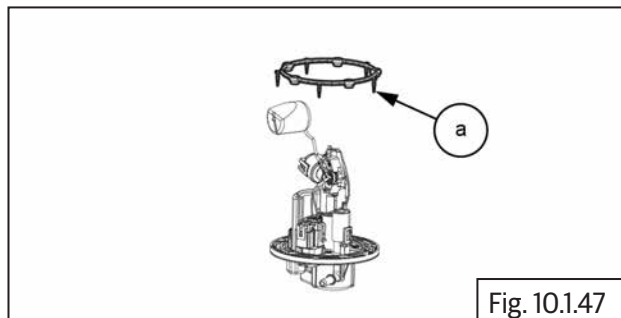
- Confirm the snap lock is properly fitted.

10.1.19. Fuel Pump

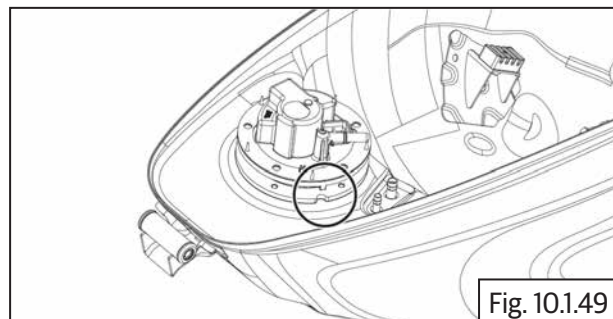
- Then realign the module to back side and then push the electrical connector (a). without damaging locks provided in the connector.



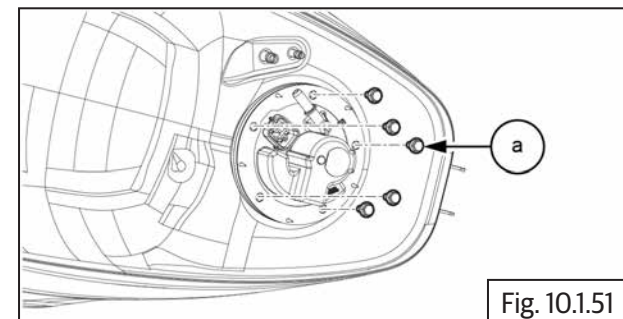
- Confirm the snap lock is properly fitted.
- Locate new seal **(a)** into fuel pump.



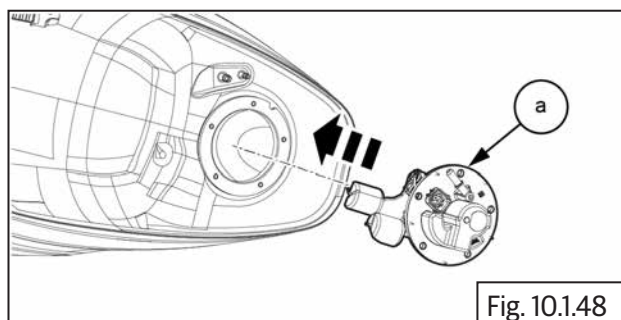
- Ensure the pump cover slot should be match to fuel tank slot.



- Locate the **5 Nos** Hex head flange bolts **(M5) (a)** on the fuel pump.



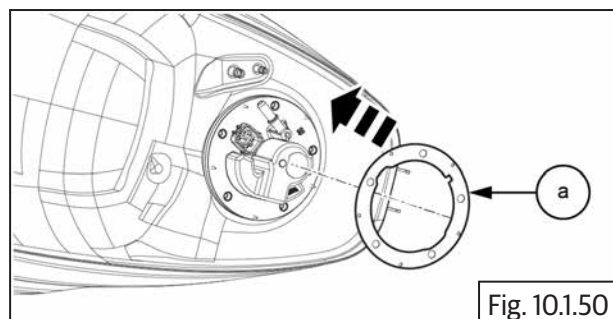
- Locate and place the fuel pump **(a)** into fuel tank.



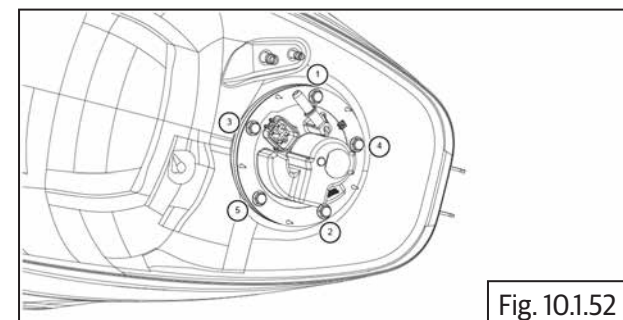
NOTE

- Fuel pump assembly to the tank it can be assembled in only one direction.

- Locate and position the lock plate **(a)** on the fuel pump.



- Tighten the bolts below sequence.



	8 mm Socket with Ratchet
	5 N-m / 0.5 kgf-m

- Assemble fuel tank assembly Refer fuel system chapter.

⚠ CAUTION

- **Ensure the following:**
- **Fuel is refilled into fuel tank.**
- **Fuel feed and return hoses are connected into fuel rail.**
- **Wiring couplers to fuel pump and low fuel sensor are connected.**
- **EVAP hose pipes are connected.**
- **Water drain hose are connected.**

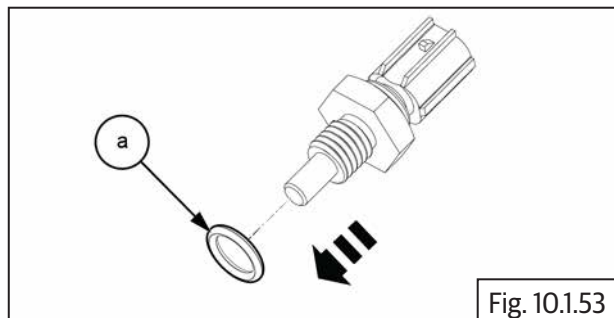
⚠ WARNING

Gasoline is extremely flammable.

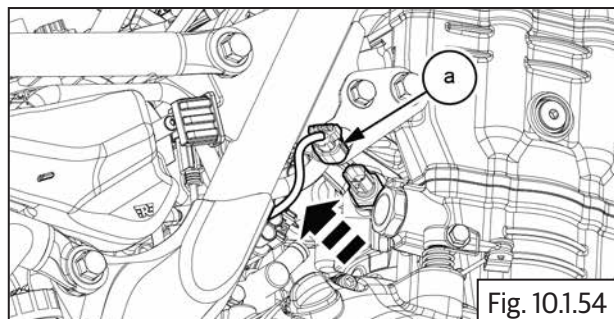
- Assemble rider seat. [Refer side panel and seat chapter](#)
- Assemble side panel RH [Refer side panel and seat chapter](#).

10.1.20. Coolant Temperature Sensor

- Install "O" ring **(a)** on the temperature sensor.

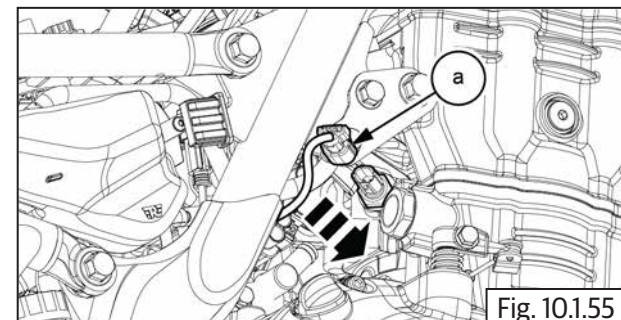


- Locate and tighten the coolant temperature sensor **(a)**.



	18 mm Long Socket with Ratchet
	7.5 Nm /0.75 kgf-m

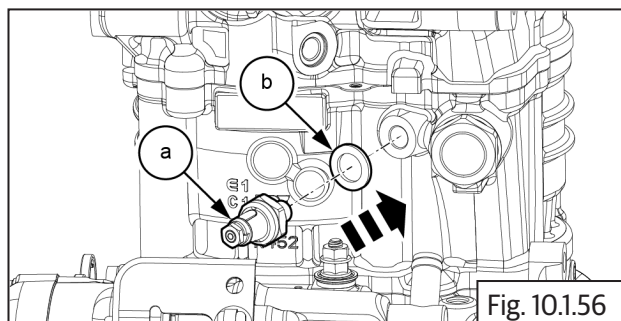
- Connect coolant temperature sensor coupler **(a)**.



Fill the recommended coolant [Refer cooling system chapter](#) .

10.1.21. Engine Oil Pressure Switch

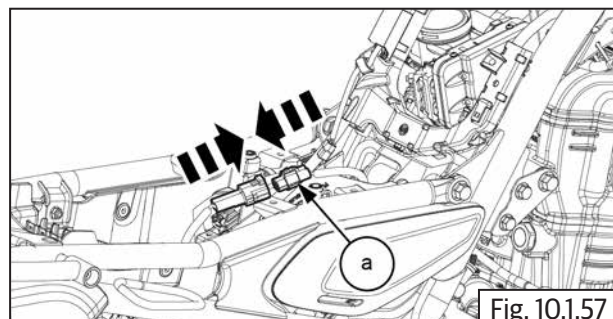
- Locate and tighten the Oil pressure switch **(a)** along with washer **(b)**.
- Apply the Loctite 542 around the thread before assembling.



	Loctite 542
---	-------------

	21 mm Long Socket with Ratchet
	9 Nm / 0.9 kgf-m

- Connect the oil pressure switch coupler **(a)**.



Fill the recommended Engine oil **Refer engine install chapter**

10.1.22. HEGO (O2) Sensors

- The HEGO sensors are located on the exhaust pipes near the cylinder head.

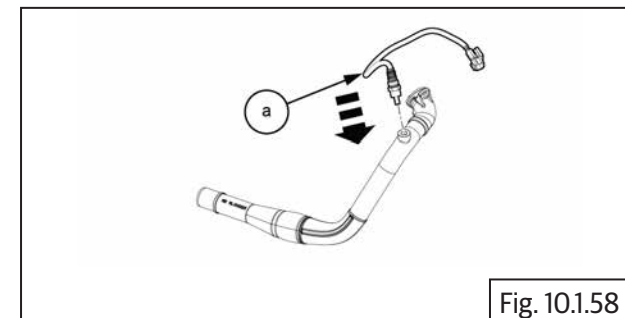
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and is at the same levels of ambient/surrounding temperature, whenever working on the engine or exhaust systems.

NOTE

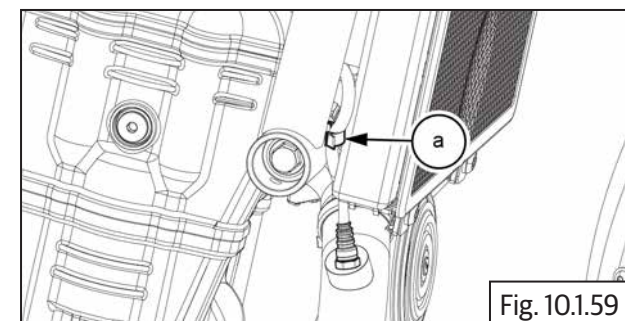
- Ensure the engine/exhaust is cold before assembling the HEGO (O2) sensors.
- Ensure Ignition switch and Engine stop switch are in OFF position.

- Gently locate and tighten the Oxygen sensor **(a)** into exhaust pipe.

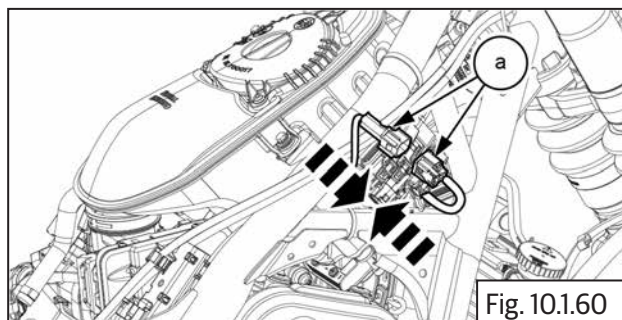


	17mm Double end spanner/Deep groove spanner
	18 Nm / 1.8 kgf-m

- Connect the omega clip **(a)** into Oxygen Sensor wiring harness.



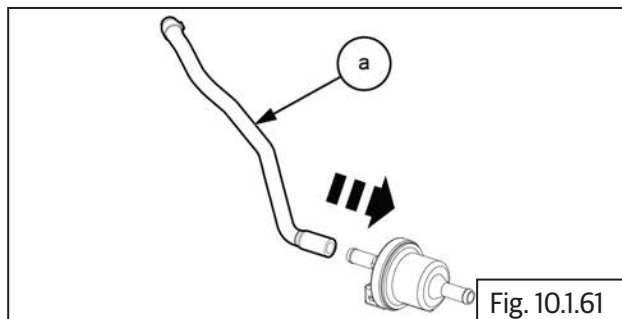
- Oxygen sensor coupler **(a)** located on RHS chassis frame.
- Connect oxygen sensor coupler **(a)**.



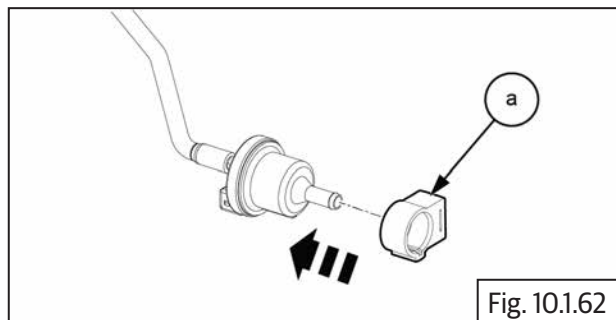
	17 mm Double end spanner/Deep groove spanner
	18 Nm / 1.8 kgf-m

10.1.23. Purge Valve

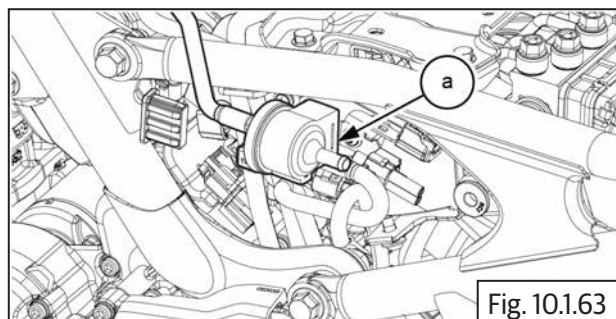
- Connect output hose **(a)** to purge valve.



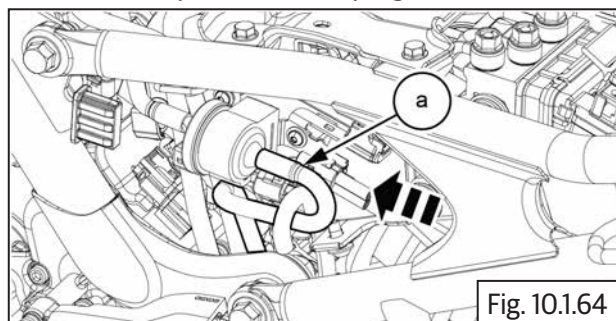
- Fix purge valve into the rubber boot **(a)**.



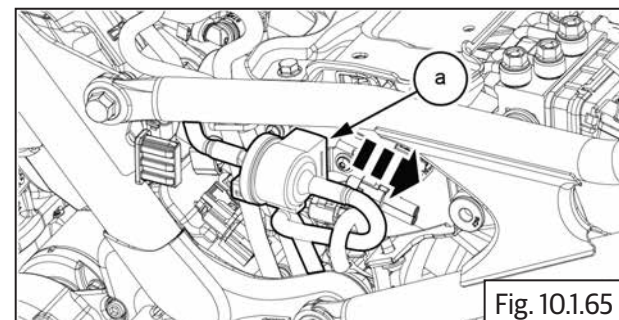
- Locate the purge valve with hose assembly **(a)** on LHS chassis frame.



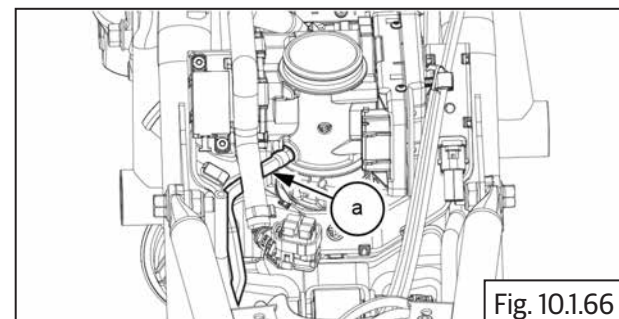
- Connect input hose **(a)** to purge valve.



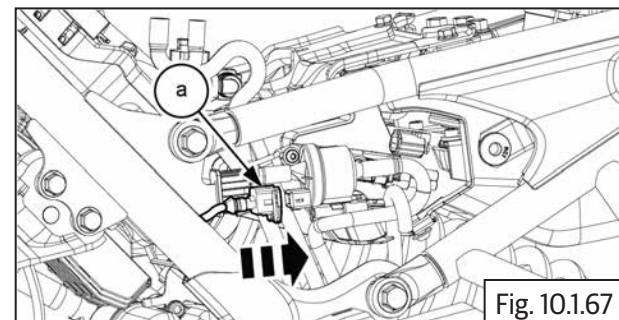
- Slide and fix the purge valve with rubber boot **(a)** to the bracket.



- Connect hose **(a)** to throttle body.



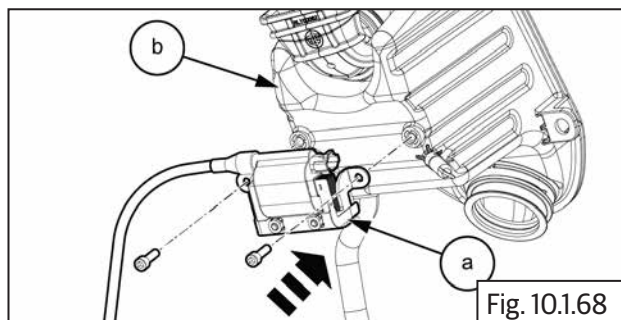
- Connect electrical coupler **(a)** to purge valve.



- Assemble the Fuel Tank. **Refer fuel system chapter.**
- Assemble the Seat assembly. **Refer side panel and seat chapter .**

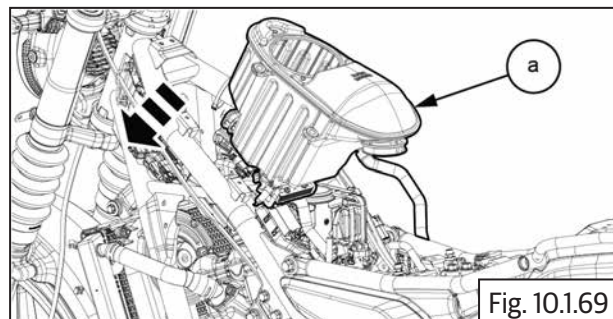
10.1.24. Ignition Coil

- Locate the ignition coil with high tension cable on air filter box **(b)**.
- Locate and tighten **2 Nos** cap head screws **(M6)** on ignition coil **(a)**.

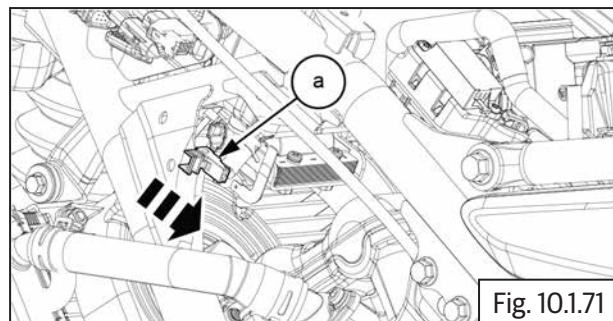
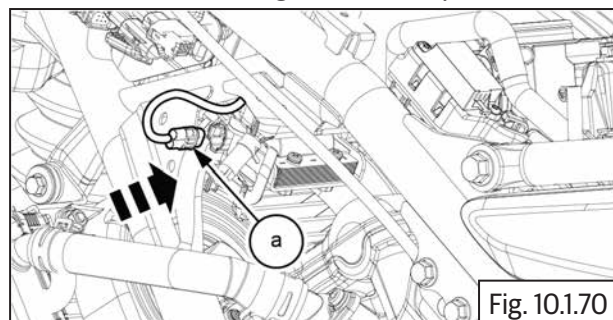


	5mm Allen Socket and Ratchet
	3 to 4 Nm -/ 0.3 to 0.4 kgf-m

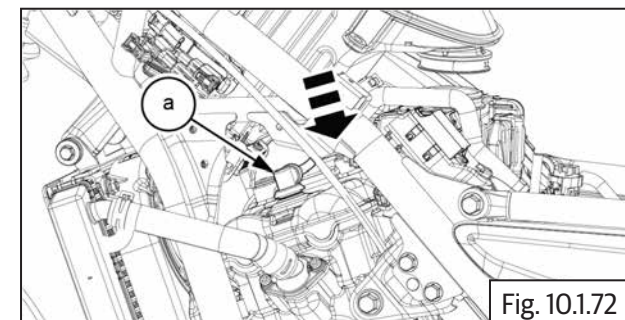
- Locate the air filter box **(a)** with ignition coil on front chassis frame.



- Connect the **2 Nos** ignition coil couplers **(a)**.



- Connect spark plug cap **(a)** on engine.



- Assemble the Air Filter. **Refer air filter system chapter.**
- Assemble the fuel tank. **Refer fuel system chapter**
- Assemble the Seat. **Refer side panel and seat chapter**

! CAUTION

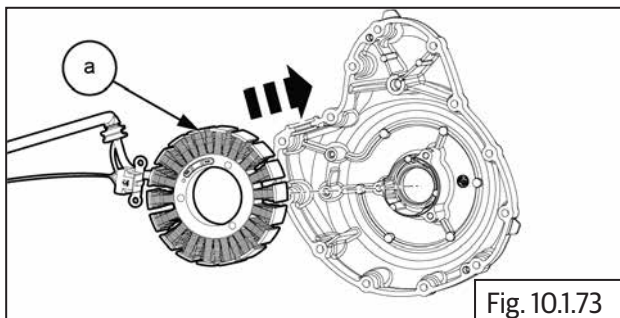
- **Ensure the following:**
- **Fuel is refill into fuel tank.**
- **Fuel feed and return hoses are connected into fuel rail.**
- **Wiring couplers to fuel pump and low fuel sensor are connected.**
- **EVAP hose pipes are connected.**
- **Water drain hose are connected.**

⚠ WARNING

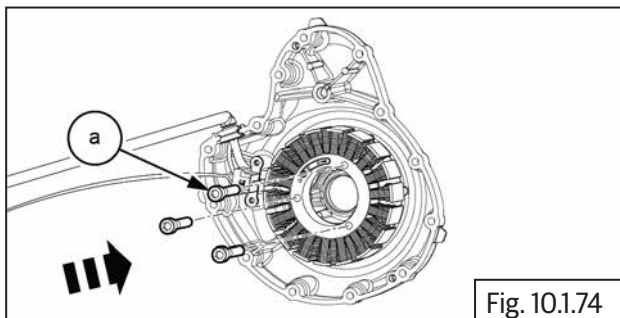
Gasoline is extremely flammable.

10.1.25. Crank Position Sensor

- Gently Install the magneto starter (a) into LH side cover assembly.

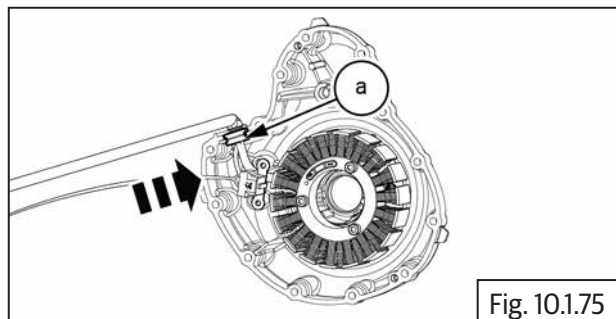


- Locate and tighten 3 Nos. Hex socket head screws (M6) (a) on magneto starter mounting.



	5 mm Allen Socket with ratchet
	11 Nm / 1.1 kgf-m

- Gently insert wiring grommet (a) into magneto cover.

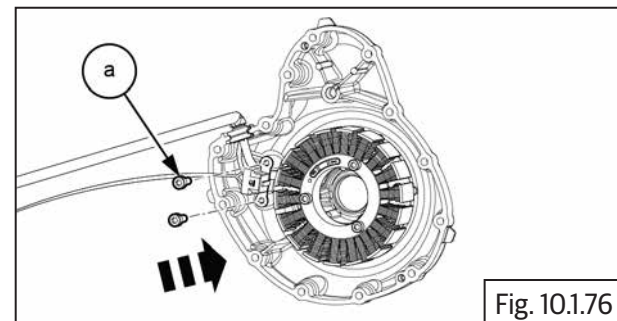


	Loctite Superflex 24
---	----------------------

NOTE

- Apply the Loctite Superflex 24 to on cable grommet.

- Locate and tighten 2 Nos Hex socket head screws (M5) (a) on crank position sensor (CPS).



	4 mm Allen Socket with ratchet
	9 Nm / 0.9 kgf-m

	Loctite 243
---	-------------

NOTE

- Apply the Loctite 243 on bolts.

- Assemble the FD sprocket cover. Refer engine install chapter.
- Assemble the Cover LH . Refer engine install chapter.

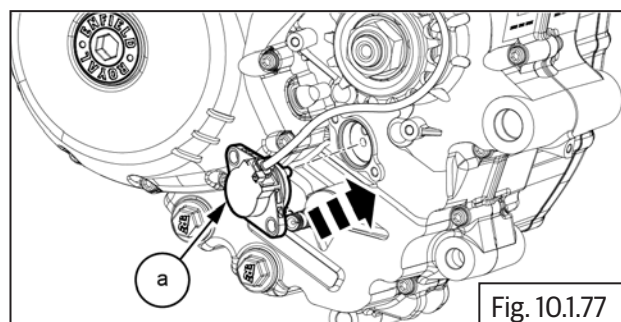
10.1.26 Gear Position Sensor

- The gear position sensor is located on the crankcase LH before FD sprocket
- Ensure Ignition switch and Engine stop switch are in OFF position.

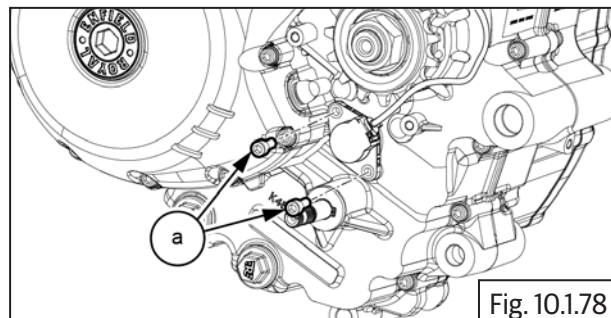
NOTE

- O ring to checked and replace if required.
- Apply tire lube or silicone lube on O ring (all around 360).

- Install Gear position sensor **(a)** from engine.

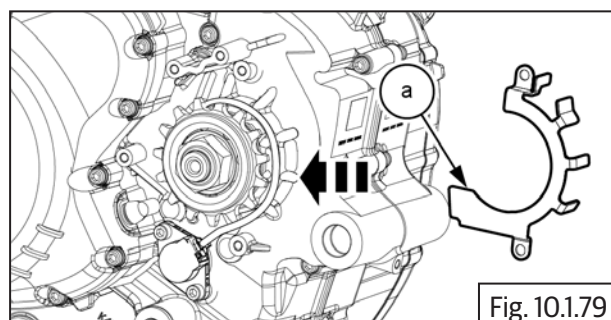


- Locate and tighten **2 Nos (M6)** Gear position sensor mounting bolts **(a)**.

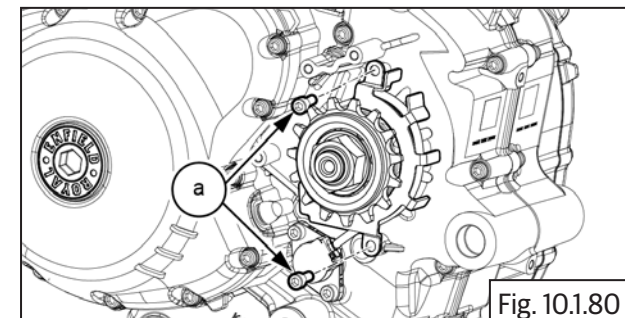


	4 mm Allen Socket with ratchet
	11 Nm /1.1 kgf-m

- Install the cable guide bracket **(a)**.

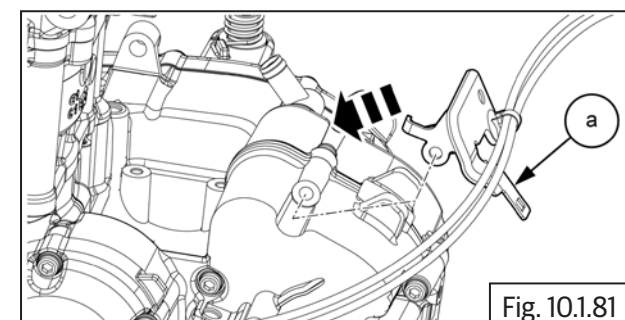


- Locate and tighten **2 Nos** Hex socket head bolts **(M6) (a)** gear position sensor cable mounting.

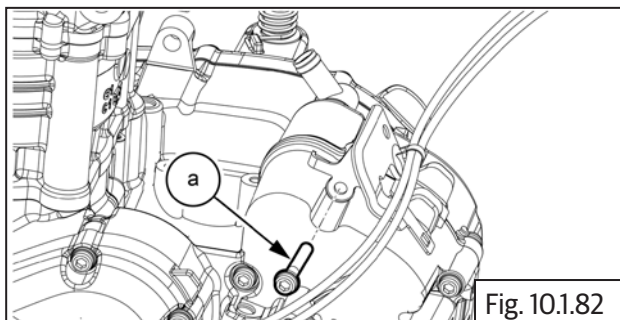


	4 mm Allen Socket with ratchet
	11 Nm /1.1 kgf-m

- Install Cable mounting bracket **(a)** on the engine.



- Locate and tighten 1 No **(M6)** Cable mounting bolt **(a)**.



	4 mm Allen Key with ratchet
	11 Nm /1.1 kgf-m

- Assemble FD sprocket cover. **Refer engine install chapter.**

10.1.27. Side Stand Switch

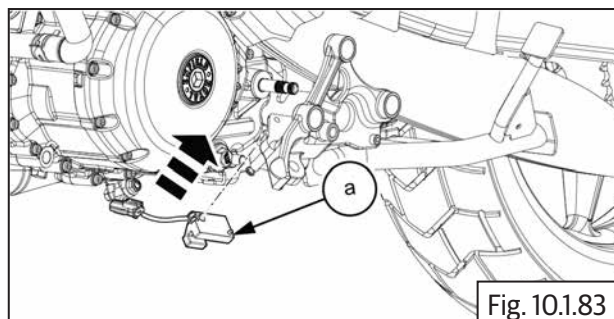
⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

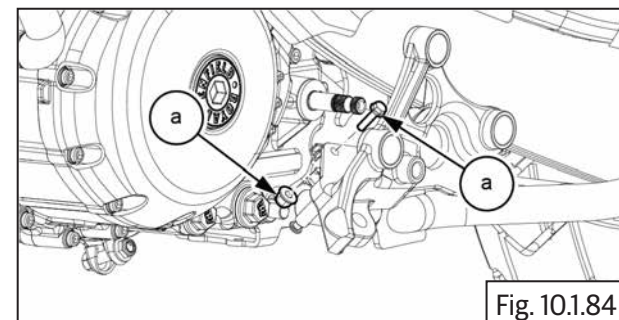
⚠ CAUTION

Be extremely careful when removing and installing the springs as the combined tension of the springs is very strong. Keep the motorcycle on its side stand when removal and installing the center stand. The spring removal and installation shall be performed by two people. While one person holds the motorcycle, another person installs the spring.

- Locate the side stand switch **(a)** into frame .

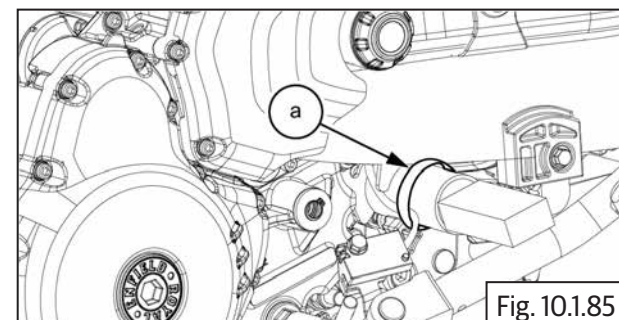


- Locate and tighten hex flange bolt **(M6)** **(a)** & hex nut **(b)** into side stand switch plate.

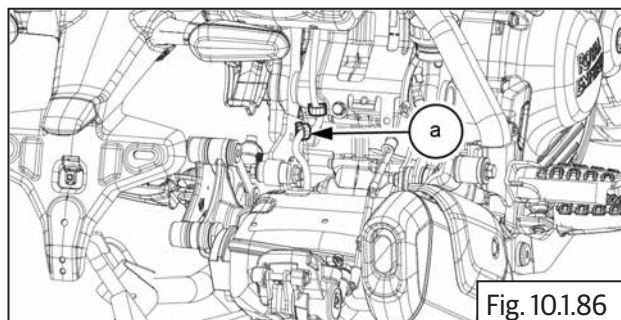


	10 mm Allen Socket with Ratchet
	10 Nm / 1.0 kgf-m

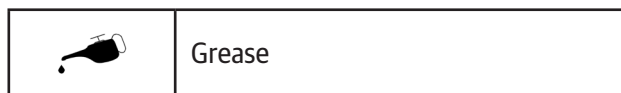
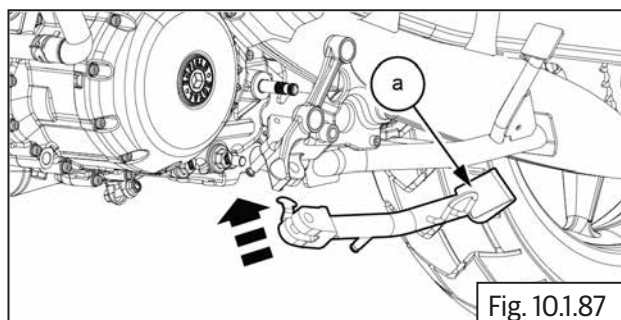
- Fix the wire tag **(a)** on side stand switch wiring harness.



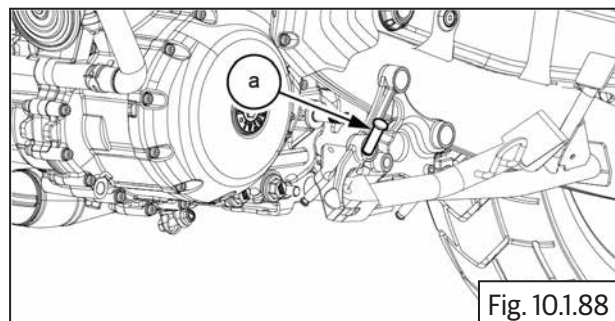
- Fix the **2 Nos** omega clips **(a)** on side stand switch wiring harness.



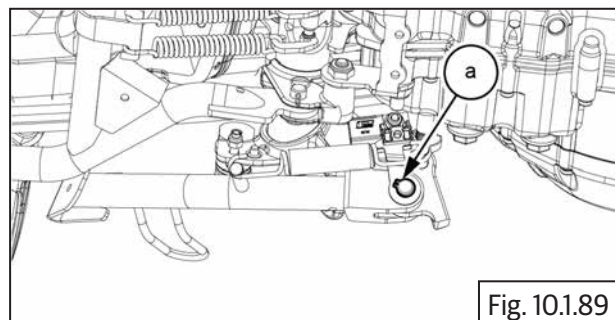
- Apply grease on the inner surface of the stand.
- Locate side stand **(a)** into the frame.



- Locate clevis pin **(a)** into side stand.

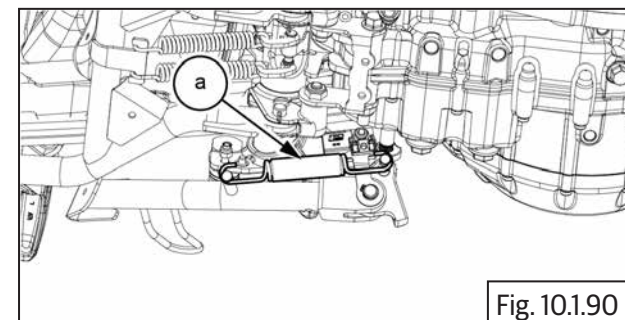


- Fix the circlip **(a)** into the clevis pin.



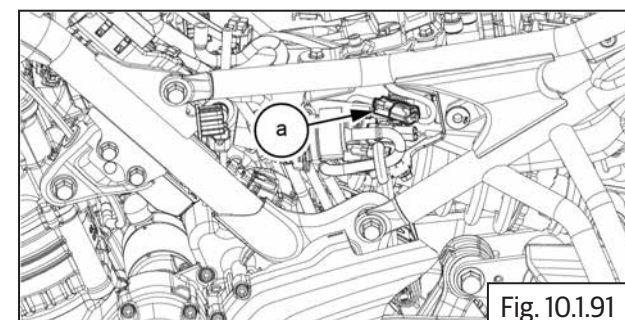
- Install spring **(a)** into the side stand.

NOTE
• Spring must be orientated as per below image.



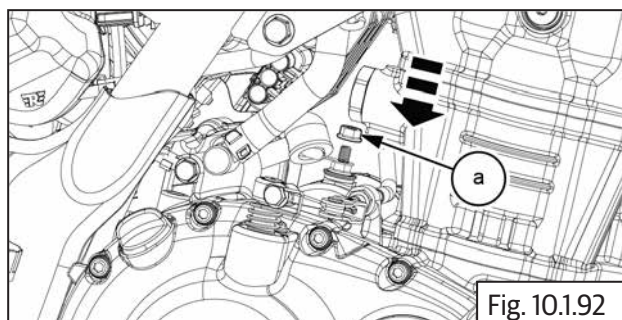
	Screw driver
--	--------------

- Connect the side stand switch coupler **(a)**.



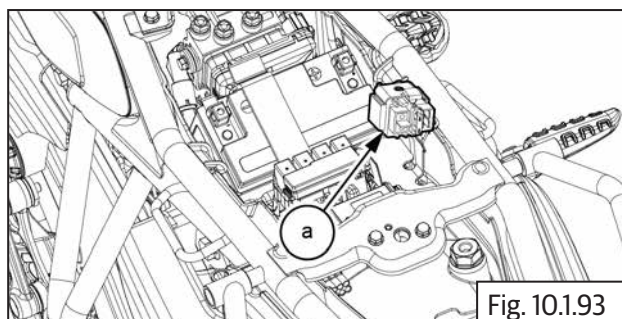
10.1.28. Starter Relay

- Locate and tighten the nut to self motor main cable **(a)**.

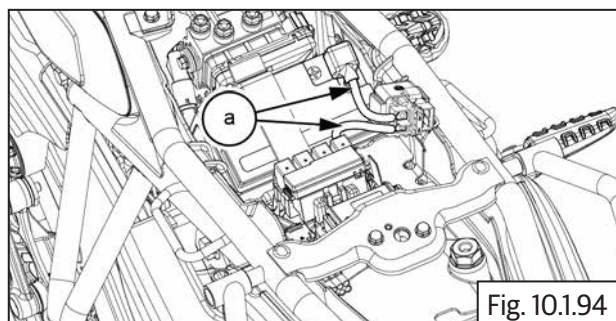


	10 mm Socket with Ratchet
	3.5 - 4 Nm / 0.35 - 0.4 kgf-m

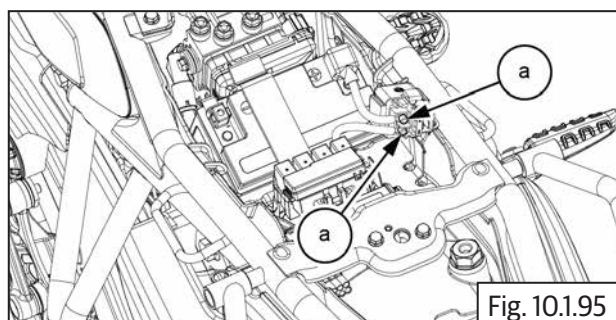
- Locate and align starter relay **(a)** to battery tray.



- Locate the battery main cables **(a)** to starter relay.

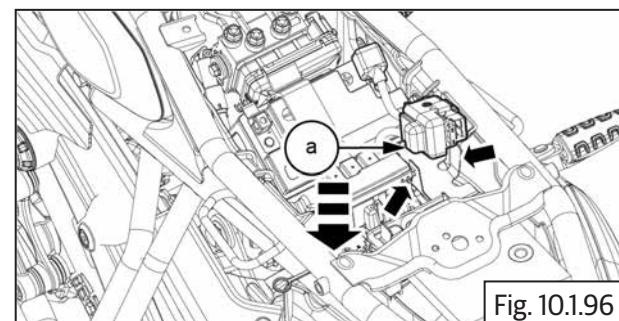


- Locate and tighten the 2 Nos screws **(a)** to the main cable.

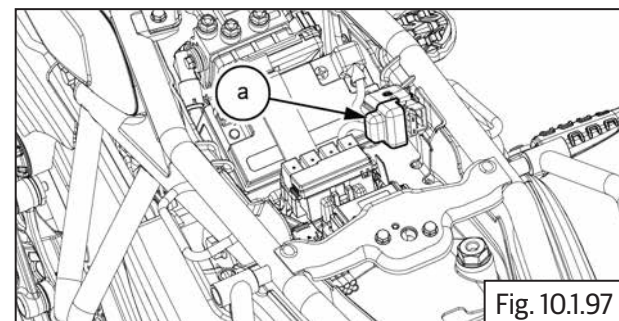


	4mm Allen socket with ratchet
	5 Nm / 0.5 kgf-m

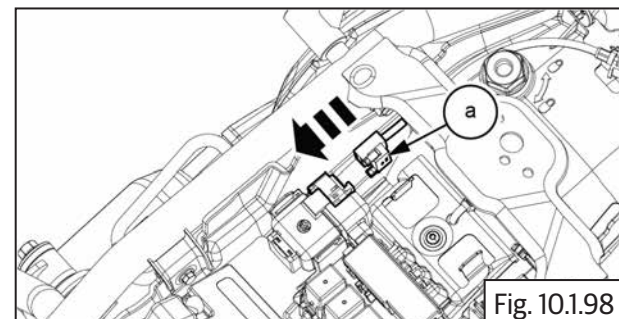
- Insert the starter relay **(a)** into the slot.



- Close the cap **(a)** on the starter relay.

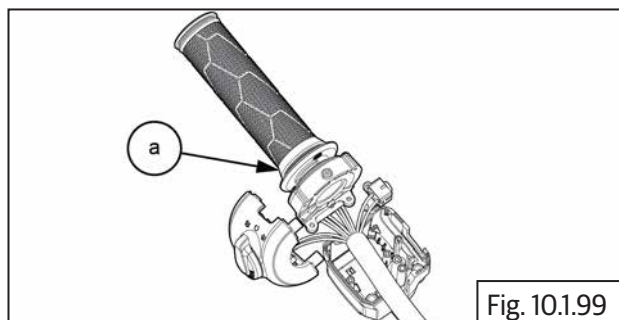


- Connect the starter relay coupler **(a)**.

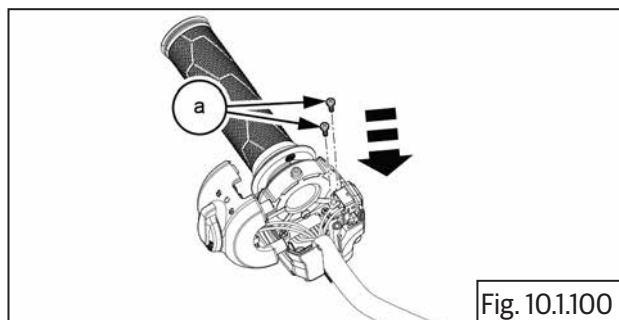


10.1.29 Throttle Grip Assembly

- Locate the throttle grip **(a)** into RH switch cube.

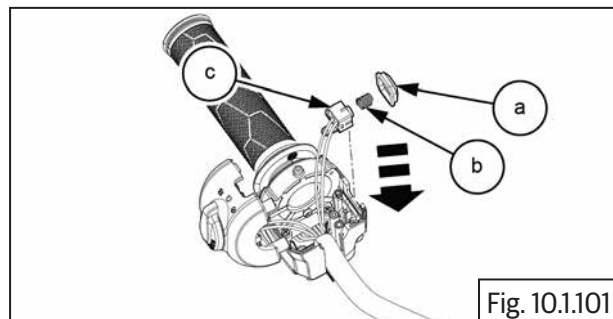


- Locate and tighten **2 Nos** philips head screws **(a)** into throttle grip.

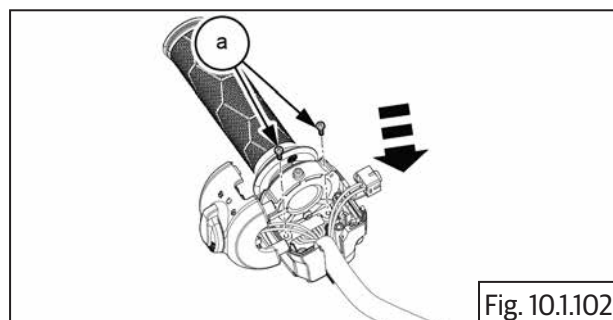


Philips Screw Driver

- Gently locate the mode switch **(c)** along with button **(a)** & spring **(b)** into lower RH switch cube.

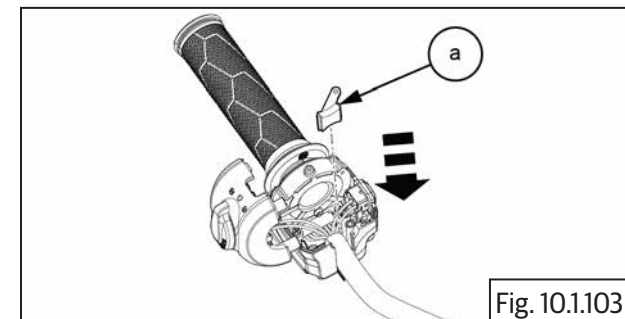


- Locate and tighten **2 Nos** philips head screws **(a)** into the mode switch.

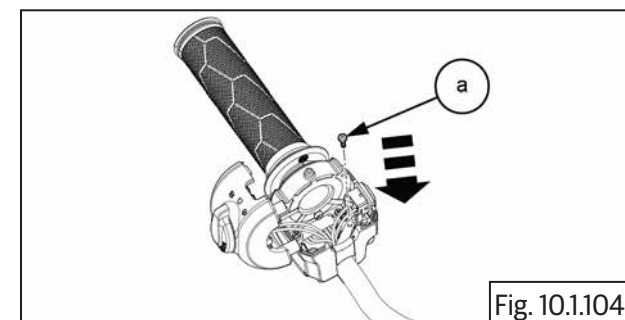


Philips Screw Driver

- Locate wire stopper **(a)** into lower RH switch cube **(b)**.

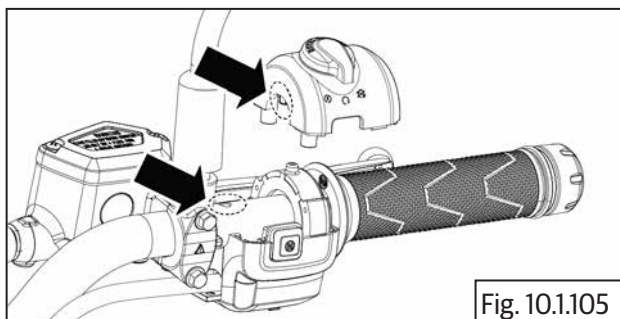


- Locate and tighten philips head screw **(a)** into the wire stopper.

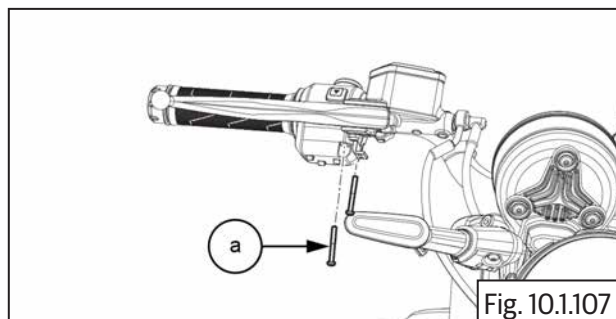


Philips Screw Driver

- Gently align the upper RH switch cube **(a)** and lower RH switch cube **(b)** along with throttle grip into handle bar.

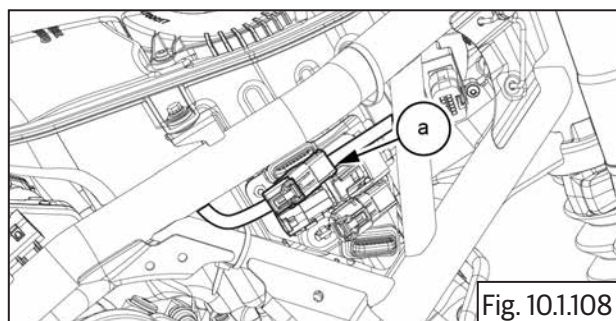


- Locate and tighten **2 Nos** philips head screws **(a)** from the RH switch cube along with throttle grip into handle bar.



Philips Screw Driver

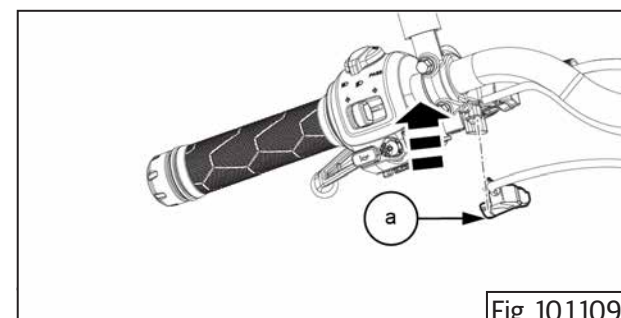
- Connect Accelerator position sensor coupler **(a)**.



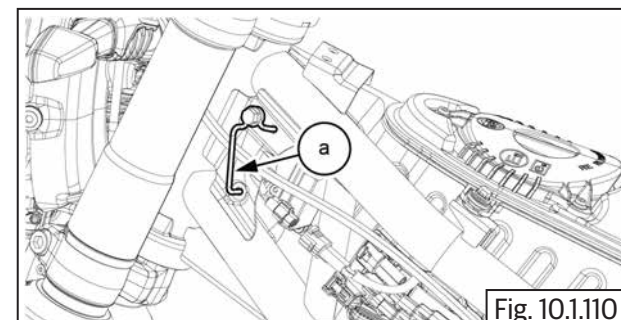
- Assembly the Fuel tank. Refer fuel system chapter.
- Assembly the Seat assembly. Refer side panel chapter.

10.1.30. Clutch Switch

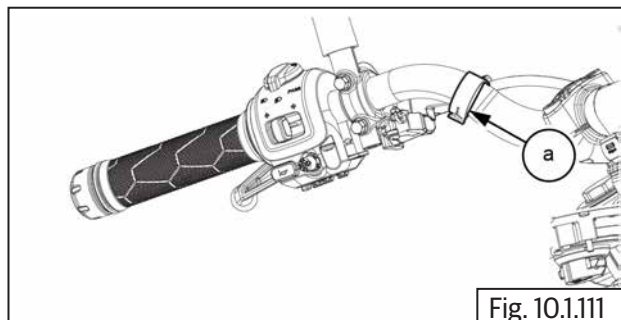
- Locate the clutch switch **(a)** into clutch lever.



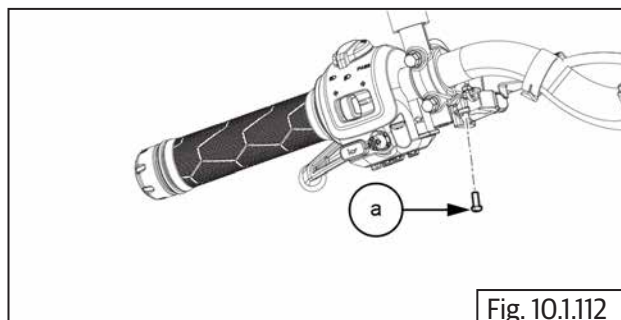
- Locate and tighten the hex head bolt on harness clip **(a)** on frame.



- Fix the cable strap **(a)**.

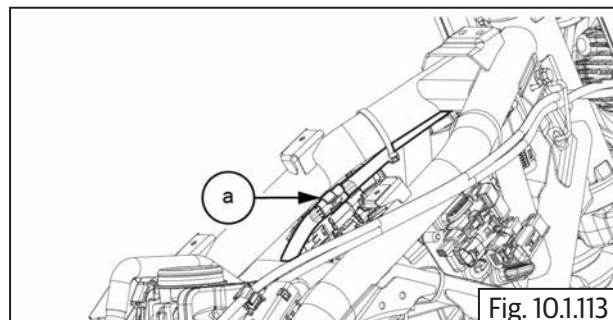


- Locate and tighten of screw **(a)** into clutch lever .



Philips Screw Driver

- Connect clutch switch coupler **(a)**.



- Assembly the Fuel tank. Refer fuel system chapter.
- Assembly the Seat assembly. Refer side panel chapter.

10.1.31 Actuator

Actuator Tests

- The following actuators can be tested for their functionality using the diagnostic tool/ PC software.
 1. Fuel Pump
 2. Injector
 3. Ignition Coil
 4. O2 sensor heater
 5. Malfunction Indication Lamp (MIL)
 6. Idle Air Control Valve (IACV)
 7. Canister Purge Valve (CPV)
 8. Accessory Relay

Test Procedure

• Entry Conditions

1. Actuator tests can be carried out when the ignition key and kill switch are ON and engine speed is 0.
2. For IACV alone, engine speed can be greater than 0.
3. For actuation of injector and ignition coil, gear should be in neutral. If not in neutral, clutch lever should be pressed.
4. Errors associated to the corresponding actuator, if present, will inhibit the actuation.

• Procedure

A. In DOL software

1. Connect the tool with the diagnostic coupler in the vehicle and connect it with PC using the USB cable.
2. Select the option "DOL" & select Actuator.
3. Select the required actuator and press.

B. In NACSII tool

1. Connect the tool with the diagnostic coupler in the vehicle

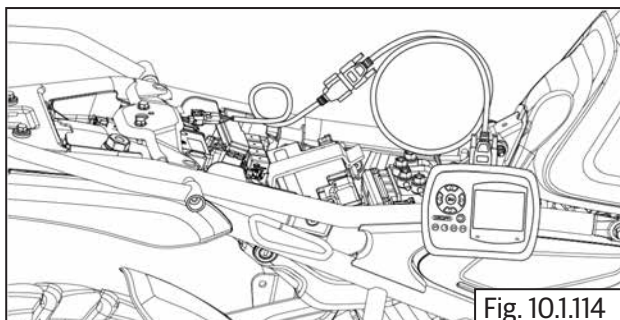


Fig. 10.1.114

2. Select the vehicle model name and select Bosch Engine Management System
3. Select the option Actuator
4. Select the required actuator and press F3 to actuate

• **Method of verification**

4. For fuel pump, when actuated, an audible sound can be heard for 5 seconds .

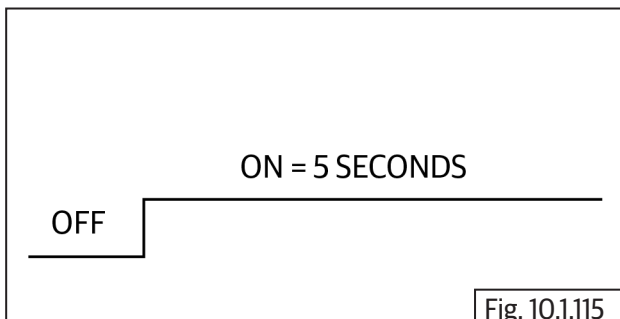


Fig. 10.1.115

5. Prior to actuation of injector, prime the fuel pump 3 times to build up sufficient pressure in fuel line. To ensure injectors are working properly, remove the throttle body from the intake manifold, connect all

the injector couplers and actuate. When actuated, 3 pulses of fuel spray from the injector can be seen.

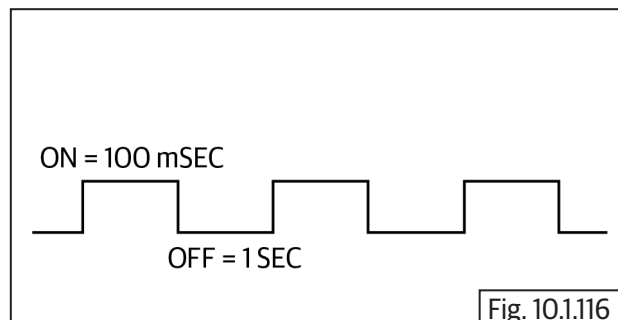


Fig. 10.1.116

6. Prior to the actuation of ignition coil, remove the suppressor cap and connect with an external spark plug and ground it to engine. Do not ground the ignition coil directly. When actuated, 3 sparks can be seen.

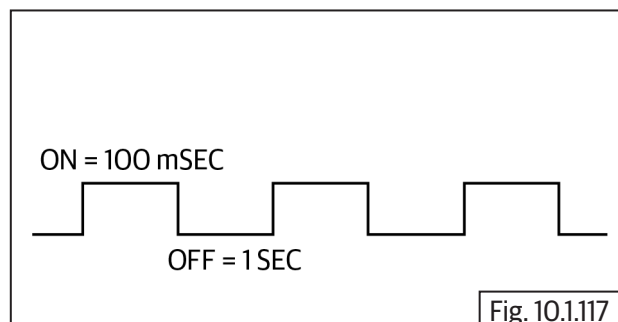


Fig. 10.1.117

7. To check O2 sensor heater, the sensor has to be removed from the exhaust pipe. When actuation is requested, the sensor will get heated up and this happens for 5 seconds.

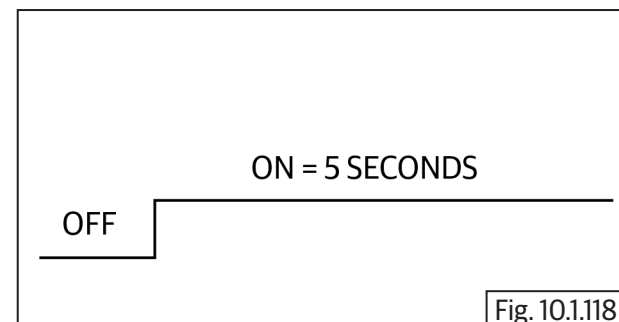


Fig. 10.1.118

8. When MIL is actuated, the bulb goes ON & OFF for 5 times.

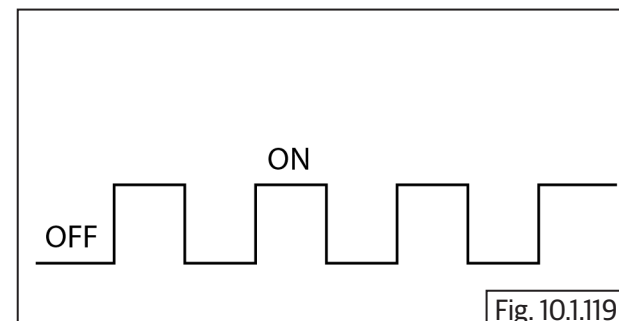
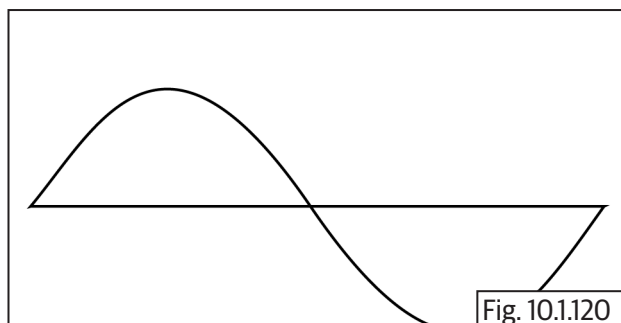
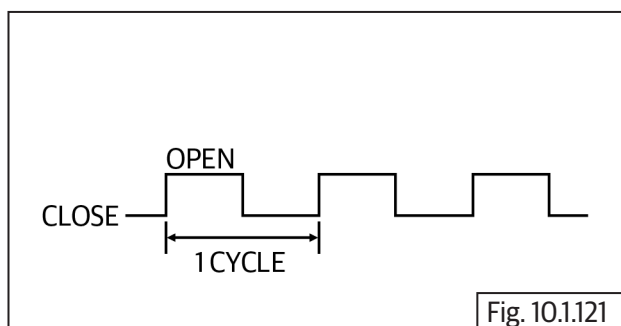


Fig. 10.1.119

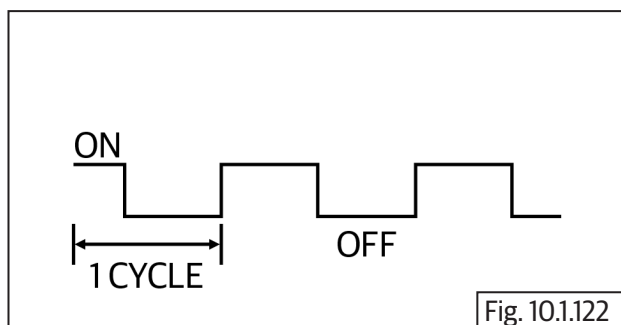
9. Start and idle the engine before actuating IACV. If actuation command is given, one can observe the engine rpm rising up & falling down the target idle speed. Once actuation is completed, it settles back to target idle speed.



10. When CPV is actuated, a pulsating sound can be observed. If not, the canister purge valve has to be manually touched to feel actuation.



11. Accessory relay gets actuated for 5 cycles.



EMS ADAPTATION PROCEDURE

EMS Adaptation procedure

The following procedure to be followed when if any change in the EMS sensors or fuel type:

Step 1 - Check for the Engine Oil Temperature (EOT) at start is less than **40°C**.

Step 2 - Allow the engine to idle and leave it undisturbed till the engine oil temperature reaches **115°C**. (Time required for the EOT to reach 115°C is 30 minutes approx.)

Step 3 - Once the engine oil temperature reached **115°C**, turn "OFF" the ignition key and DO NOT turn it back "ON" for 30 seconds.

ELECTRICAL SYSTEM

CONTENTS	PAGE
11. Electrical System.....	529
Dismantling.....	529
11.1 Battery.....	529
11.2 RR Unit.....	530
11.3 Electronic flasher.....	531
11.4 Starter relay with cable.....	531
11.5 Headlamp	532
11.6 Front Trafficators LH.....	533
11.7 Front Trafficators RH.....	535
11.8 TFT Instrument Cluster.....	536
11.9 Ignition Switch Cum Steering Lock.....	537
11.10 Rear Trafficator.....	538
11.11 License plate illuminator.....	539
11.12 Ambient temperature sensor.....	540
11.13 Horn Dismantling.....	540
11.14 USB C type adaptor.....	540
11.15 Rear wiring harness.....	541
11.16 Complete Wiring Harness.....	541
Inspection.....	546
Assembly.....	547
11.17. Complete Wiring Harness.....	547
11.18 Rear wiring harness.....	551
11.19 USB C type adaptor.....	552
11.20 Horn.....	552
11.21 Ambient temperature sensor.....	553
11.22 License plate illuminator.....	553
11.23 Rear Trafficator.....	554
11.24 Ignition Switch Cum Steering Lock.....	555
11.25 TFT Instrument Cluster.....	556
11.26 Front Trafficators RH.....	557
11.27 Front Trafficators LH.....	558
11.28 Headlamp.....	560
11.29 Starter relay with cable.....	560
11.30 Electronic flasher.....	562
11.31 RR Unit.....	562
11.32 Battery.....	563
11.33 Battery Charging Voltage Check.....	563
Electrical Schematics.....	566
ECM & Spark delivery system.....	567
Lighting system.....	568
Starting system.....	569
Complete wiring harness.....	570
ABS - System.....	571
Accessory system.....	572
Charging system.....	573
Horn system.....	574
Ignition ,starting and charging system.....	575
Signaling system.....	576

11. Electrical System

Dismantling

11.1 Battery

Ensure Ignition and stop switch are in OFF position before disconnecting battery cables.

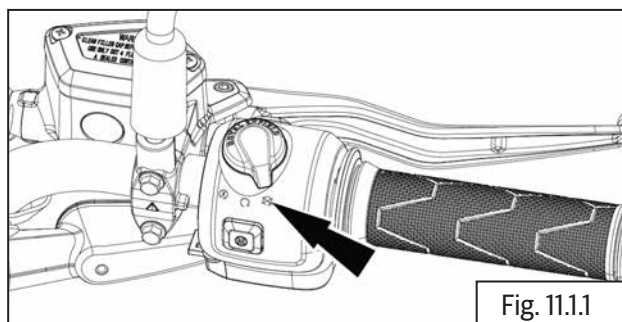


Fig. 11.1.1

- Switch "OFF" the engine and remove ignition key **(a)** from the key barrel.

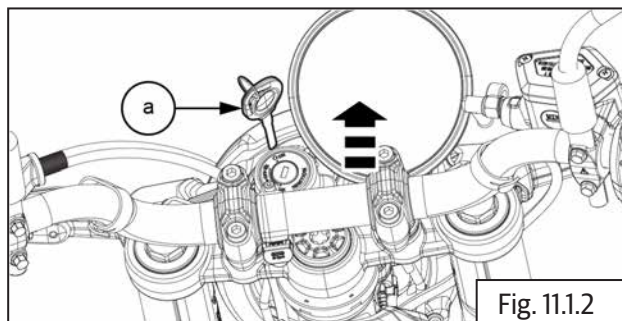


Fig. 11.1.2

NOTE

- If battery lead is difficult to disconnect due to rust or corrosion of battery terminals, pour recommended battery terminal cleaning solution on terminals and then try to disconnect.

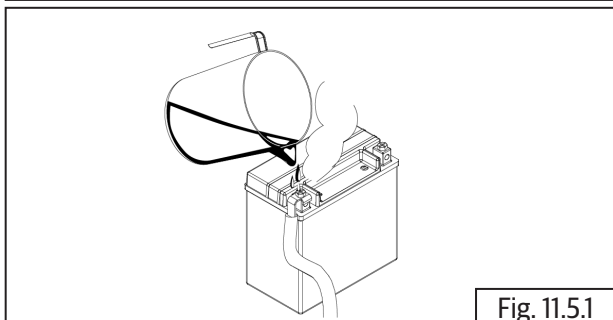


Fig. 11.5.1

- Remove the Seat assembly. Refer side panel and seat chapter.
- Disconnect the negative (-ve) coupler **(a)**.

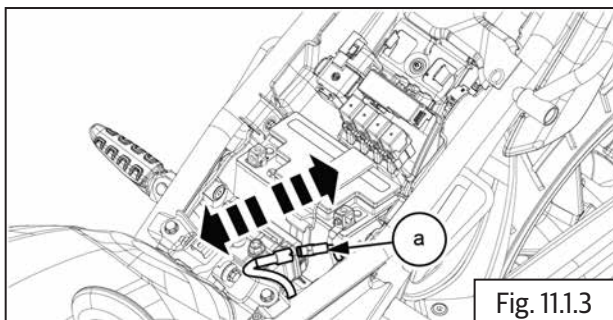


Fig. 11.1.3

- Disconnect negative (-ve) terminal bolt **(a)**.

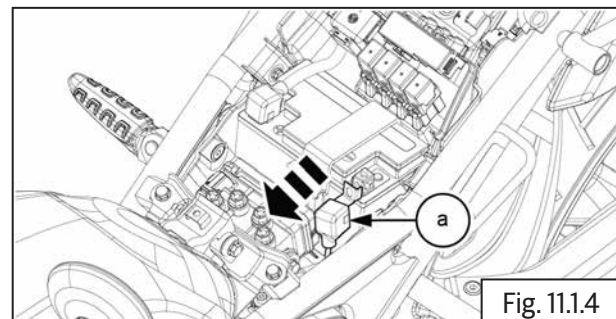


Fig. 11.1.4



10 mm Socket with Ratchet

- Disconnect positive (+ve) terminal bolt **(a)**.

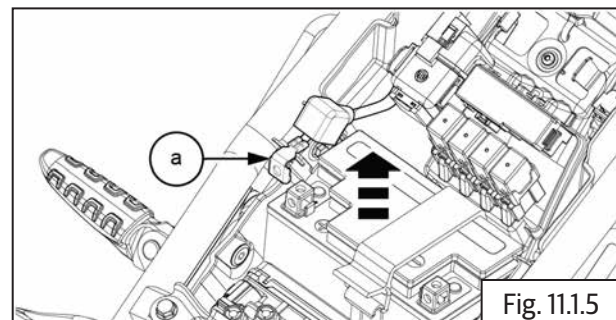
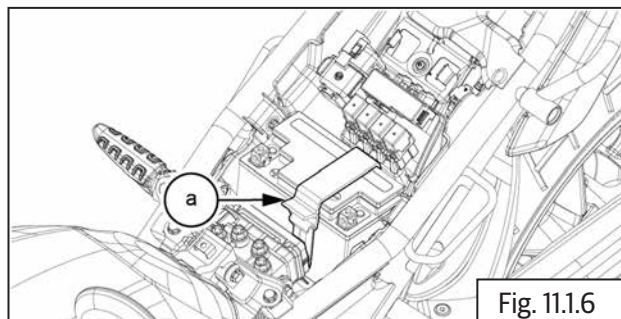


Fig. 11.1.5

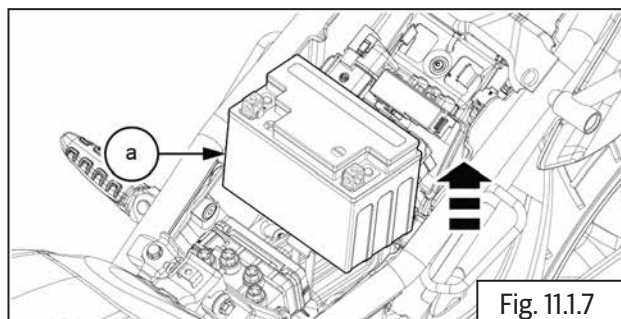


10 mm Socket with Ratchet

- Pull battery strap (belt) **(a)** downwards and release strap lock from battery strap bracket.



- Remove battery **(a)** from tray.

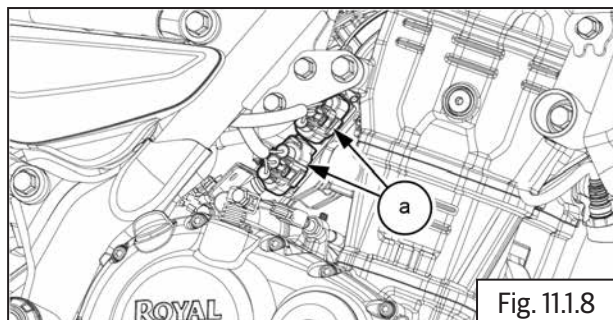


⚠ CAUTION

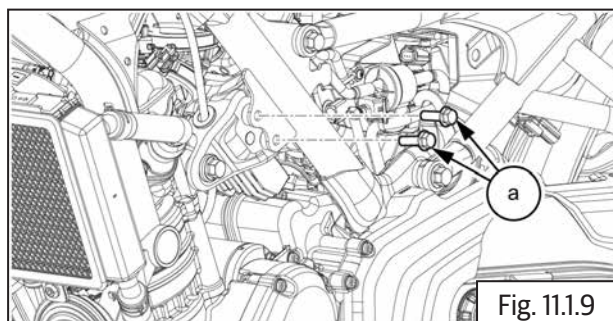
Store and use the batteries away from direct sunlight, high temperature and high humidity. Otherwise, it can lead to leakage, heat generation, explosion or fire. If stored or used in such environment, batteries may suffer from deteriorated performance and life

11.2 RR Unit

- Disconnect **2Nos** electrical connector **(a)** from RR unit.

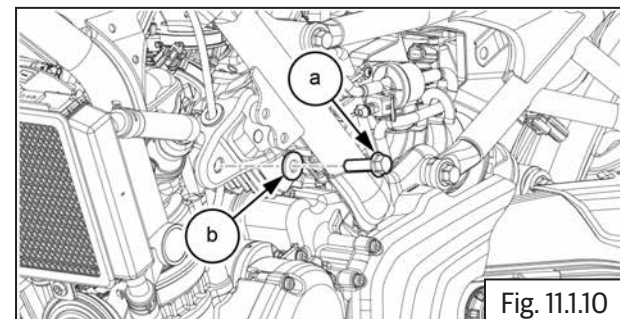


- Loosen and remove Hex flange head bolts **2Nos (M6) (a)** from RR unit bracket.



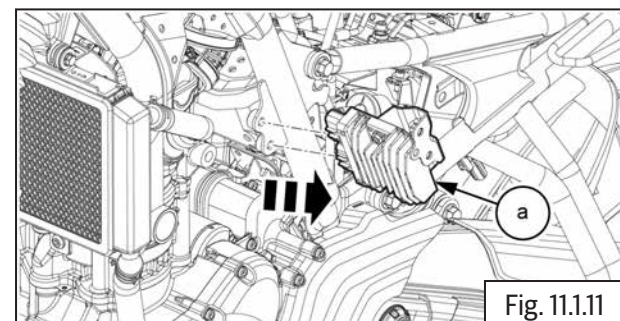
12mm Socket with Ratchet

- Loosen and remove Hex flange head bolt **(M10) (a)** with washer **(b)** from RR unit bracket.

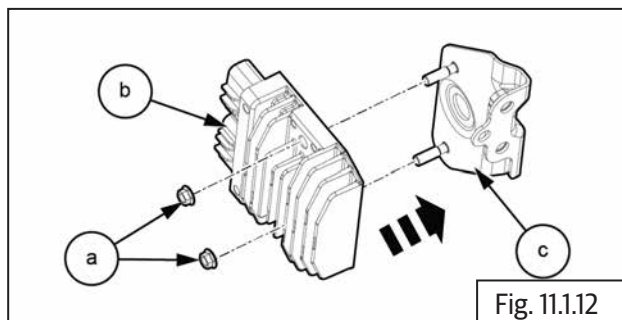


14mm Socket with Ratchet

- Remove RR unit **(a)** with bracket.



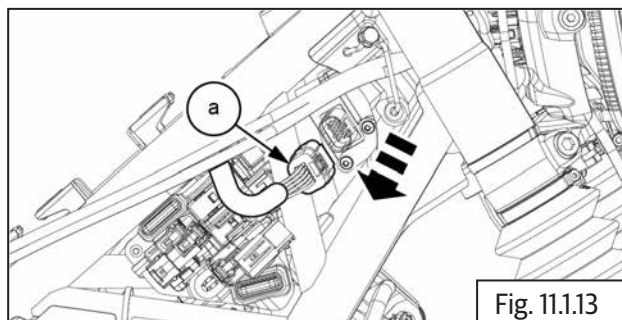
- Loosen and remove Hex flange head nuts **2Nos (M6) (a)** from RR unit.
- Remove RR unit **(b)** from bracket **(c)**.



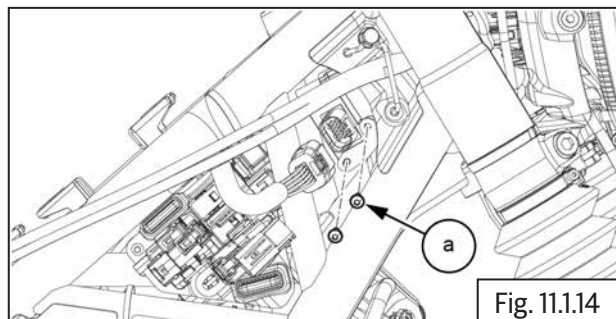
10mm Socket with Ratchet

11.3 Electronic flasher

- Disconnect the flasher coupler **(a)**.

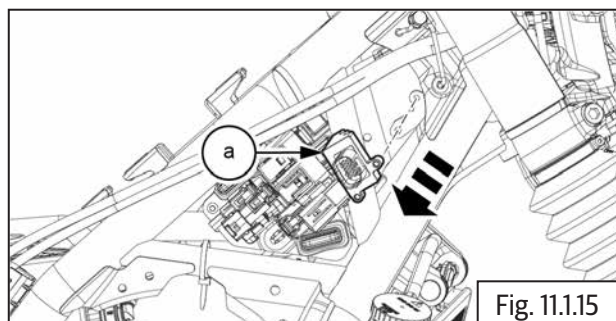


- Loosen and remove **2Nos** screws **(a)** from Electronic flasher.



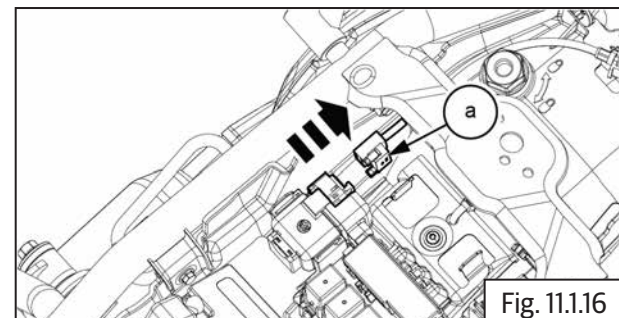
T20 Torx socket with Ratchet

- Remove the flasher **(a)** from chassis frame.

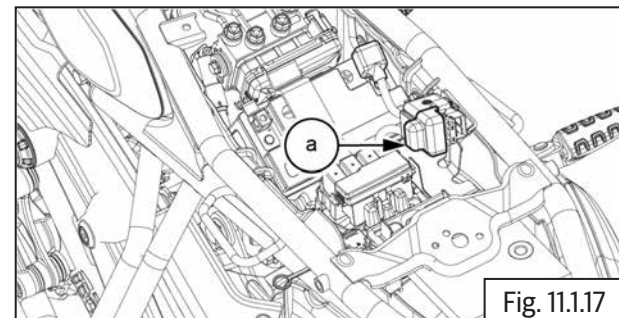


11.4 Starter relay with cable

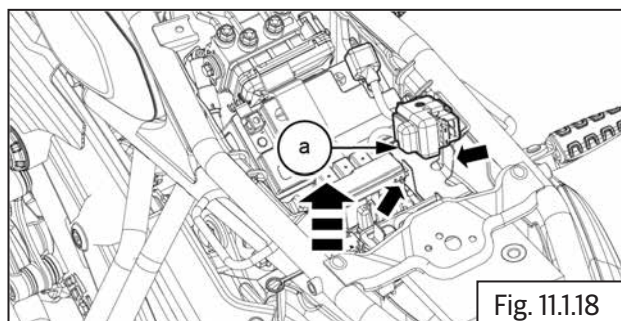
- Disconnect the starter relay coupler **(a)**.



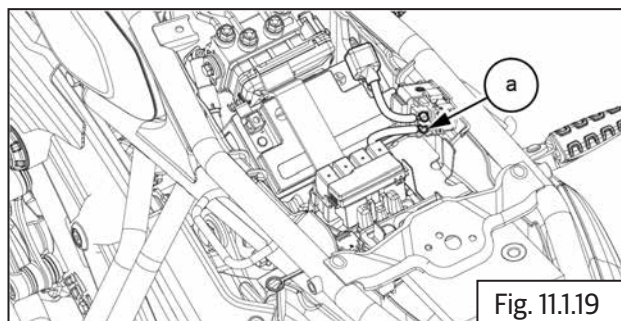
- Open the cap **(a)** from the relay.



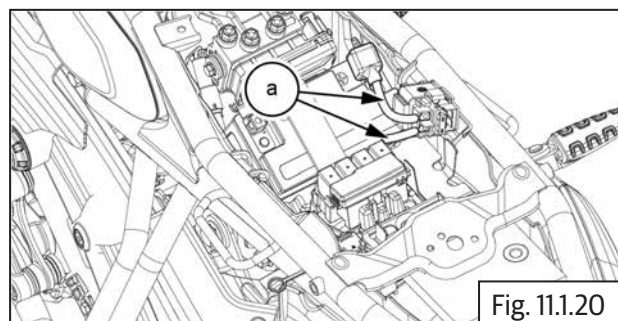
- Remove the starter relay **(a)** from the slot.



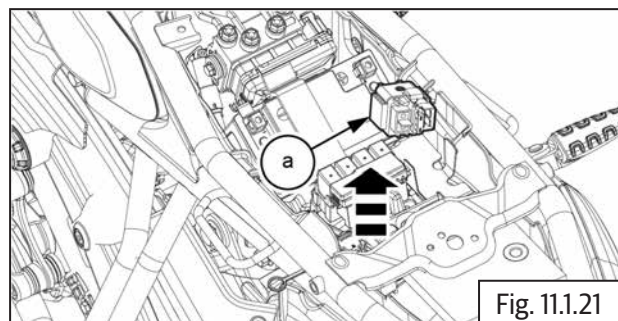
- Remove the 2Nos screws **(a)** from the main cable.



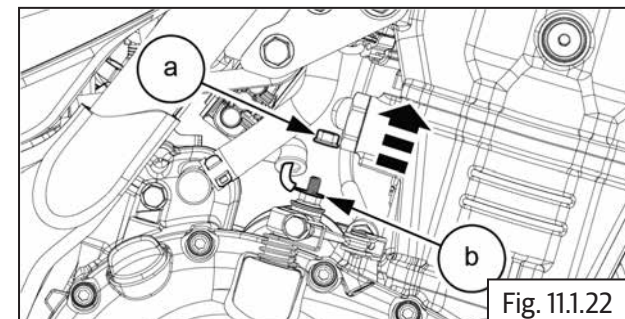
- Remove the battery main cables **(a)** from the relay.



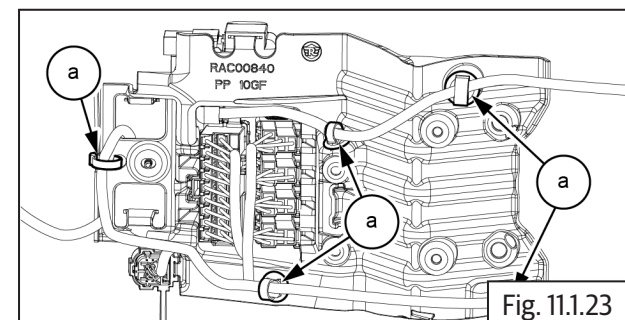
- Remove the starter relay **(a)** from battery tray,



- Loosen and remove the nut **(a)** from self motor and remove the main cable **(b)**.



- Remove the **5Nos** wire tags **(a)** from the battery tray.
- Remove the main cable from battery tray.



11.5 Headlamp

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

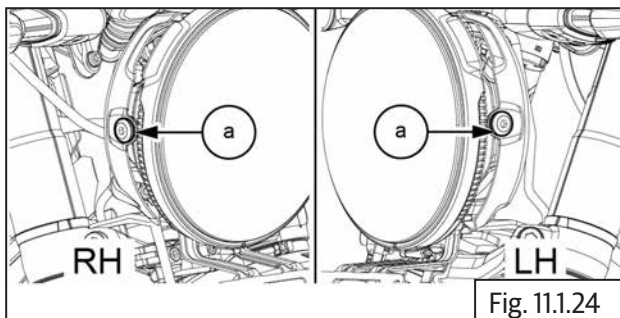
NOTE

- Ensure ignition and stop switch are in off position.
- Disconnect the battery terminals.

⚠ CAUTION

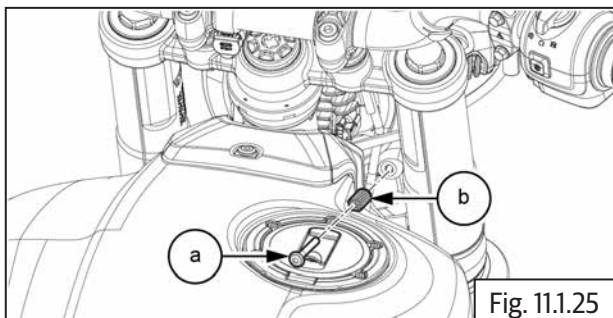
Support the Headlamp assembly carefully.

- Gently loosen and remove the shoulder head bolts (a) from LH & RH side of head lamp holder.



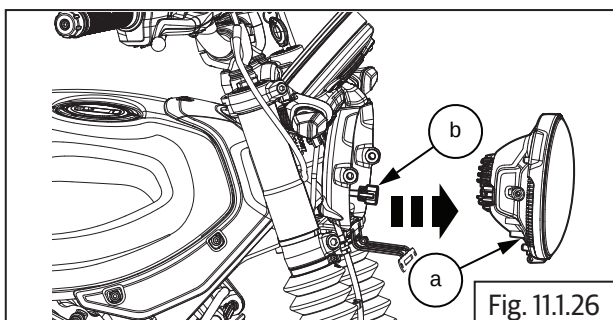
4mm Allen Socket with Ratchet

- Gently loosen and remove the head lamp adjuster screw (a) and spring (b).



4mm Allen Socket with Ratchet

- Disconnect the headlamp coupler (b). Remove the head lamp assembly (a).

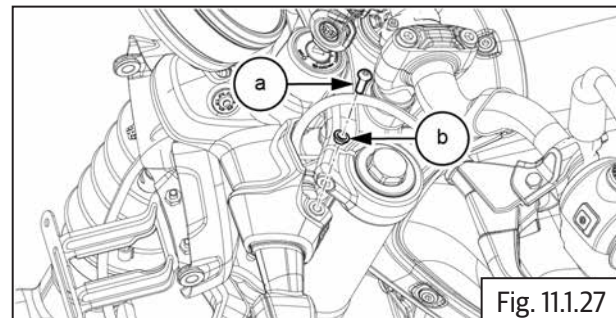


NOTE

- The headlamp has a LED lighting system. In the event of failure, the headlamp LED assembly should be replaced.

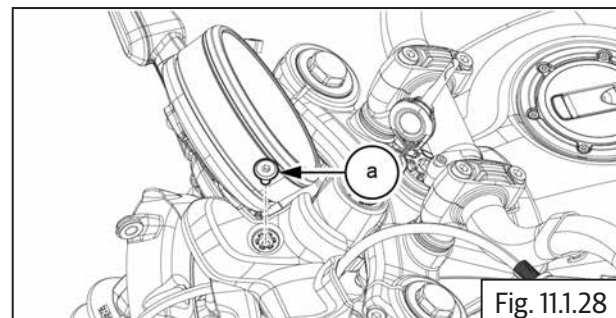
11.6 Front Trafficators LH

- Loosen and remove the button head bolt (M5) (a) with top hat washer (b) from the trafficator upper mount cover.



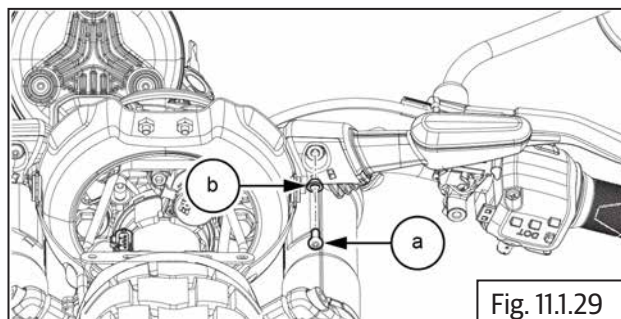
3mm Allen Socket with Ratchet

- Loosen and remove the shoulder button head bolt M6 (a) from the trafficator upper mount cover.



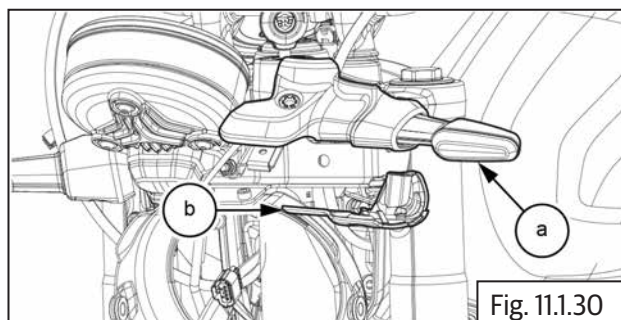
5mm Allen Socket with Ratchet

- Loosen and remove the button head bolt **(M5) (a)** with top hat washer **(b)** from the trafficator lower mount cover.

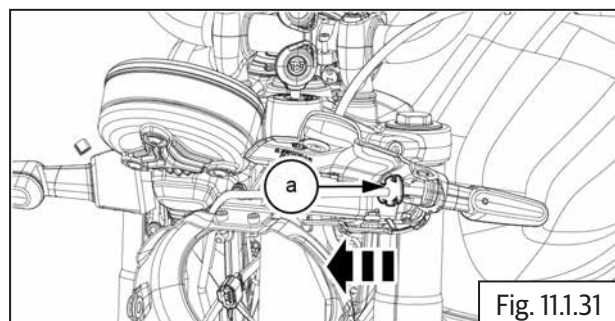


3mm Allen Socket with Ratchet

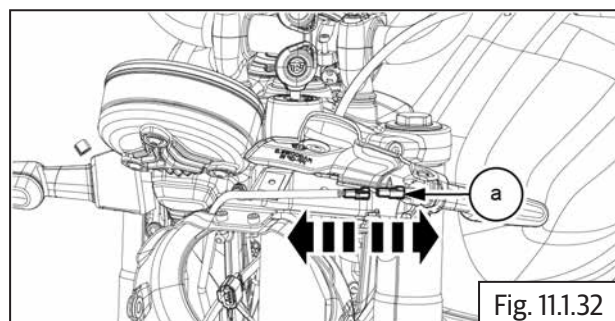
- Separate the top **(a)** and bottom **(b)** trafficator mount covers from the front frame assembly.



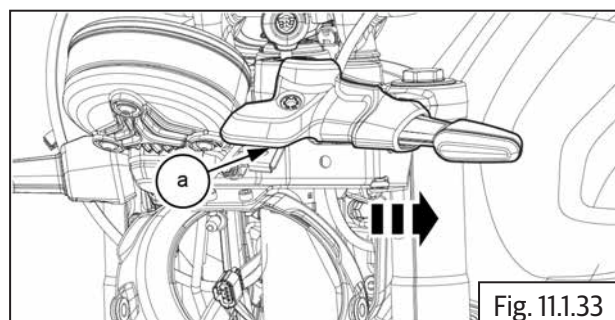
- Remove the retainer clip **(a)** from the trafficator.



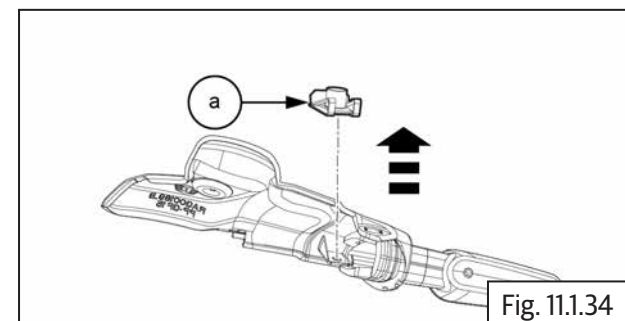
- Disconnect the trafficator coupler **(a)**.



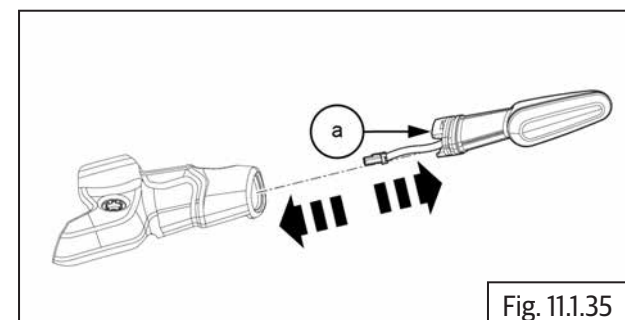
- Remove the trafficator assembly **(a)** from the front frame assembly.



- Remove the clip nut **(a)** from the top mount cover.

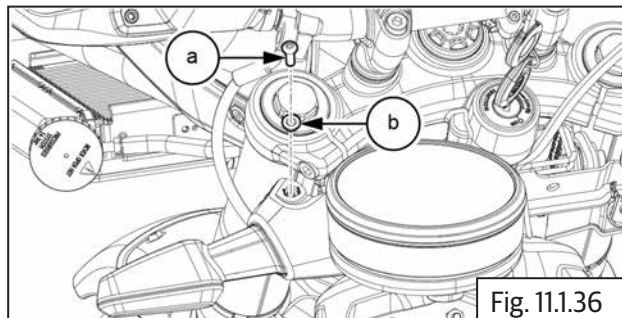


- Remove the indicator **(a)** from the top mount cover.



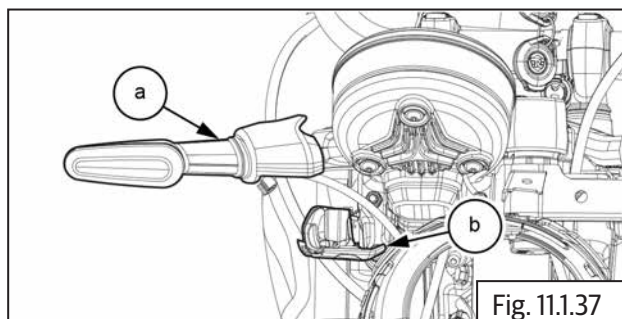
11.7 Front Trafficators RH

- Loosen and remove the button head bolt (M5) **(a)** with top hat washer **(b)** from the trafficator upper mount cover.

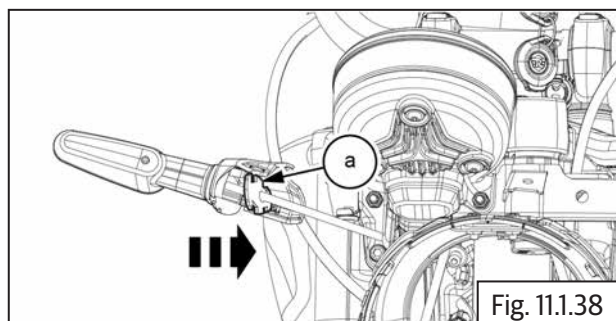


3mm Allen Socket with Ratchet

- Loosen and remove the button head bolt M5 **(a)** with top hat washer **(b)** from the trafficator lower mount cover.

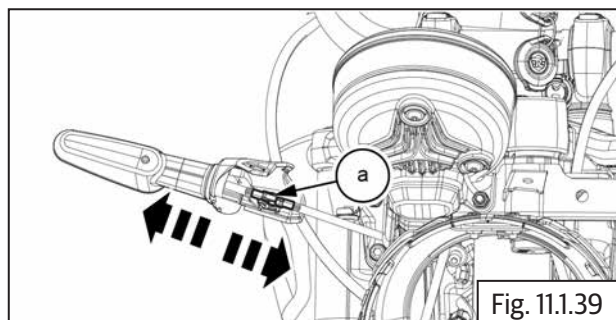


- Remove the retainer clip **(a)** from trafficator RH.

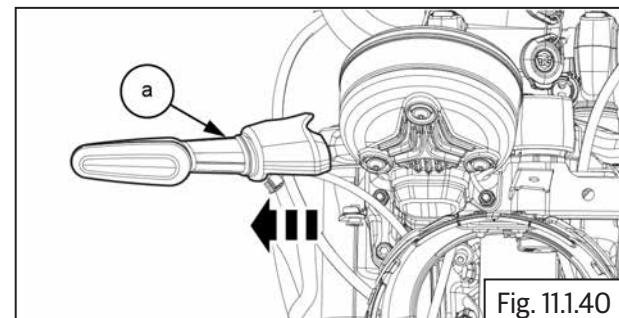


Screw driver

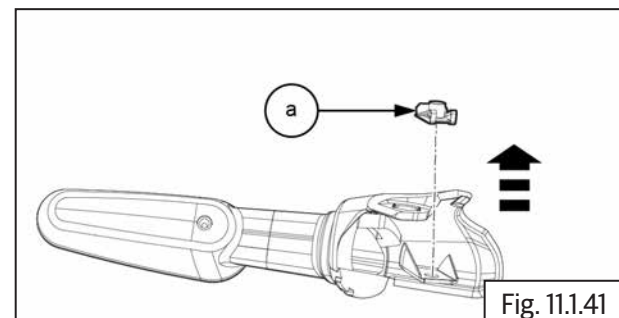
- Disconnect electrical coupler **(a)**.



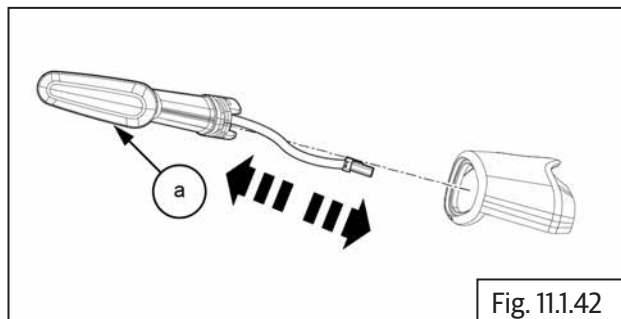
- Gently pull out and remove front trafficator RH **(a)** from RH side bar.



- Remove the clip nut **(a)** from the top cover.

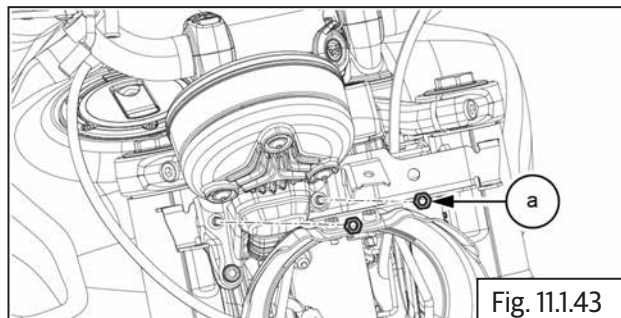


- Remove the trafficator **(a)** from the upper mount cover.



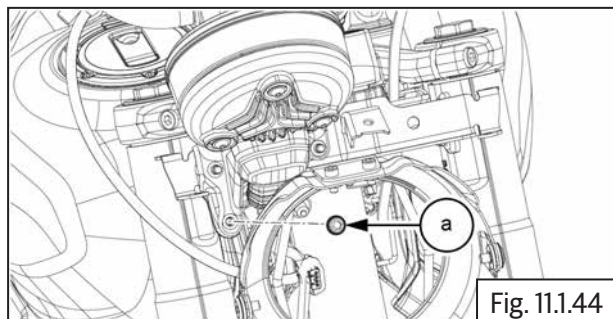
11.8 Cluster

- Loosen and remove the **2Nos** nuts **(M6)** **(a)** from mounting bracket.

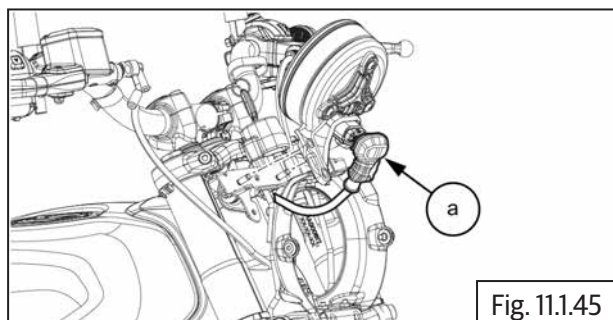


10mm Socket with Ratchet

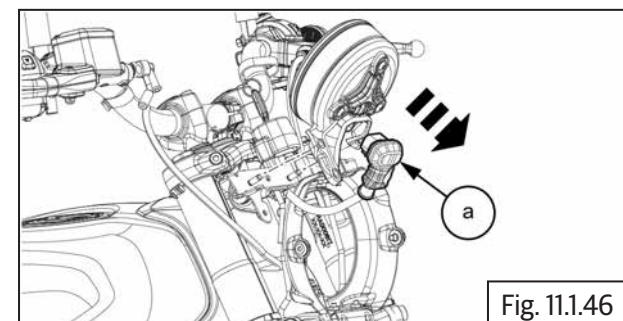
- Loosen and remove the button head bolt **(M6)** **(a)** from mounting bracket.



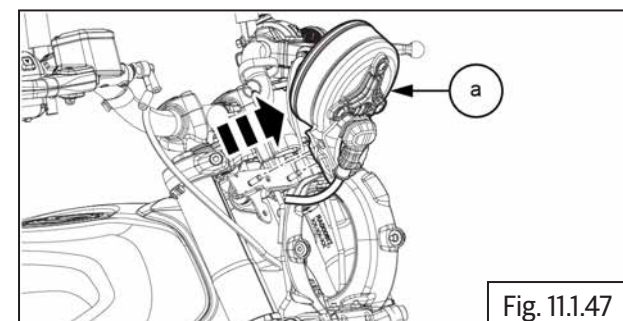
- Detach the cover **(a)** from the instrument cluster coupler.



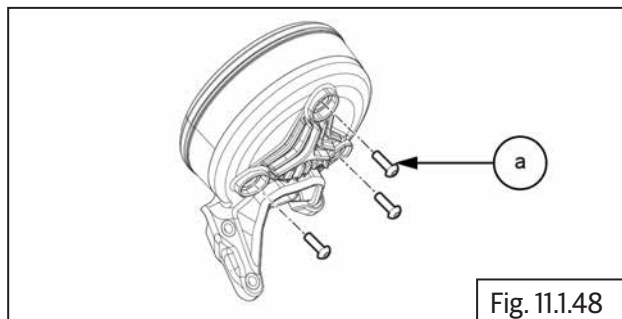
- Disconnect the instrument cluster coupler **(a)**.



- Remove the instrument cluster with mount **(a)** from front frame assembly.

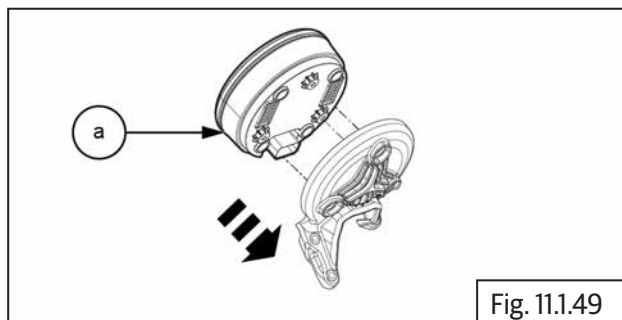


- Loosen and remove the **3Nos** button head bolts (**M5**) (**a**) from instrument cluster.

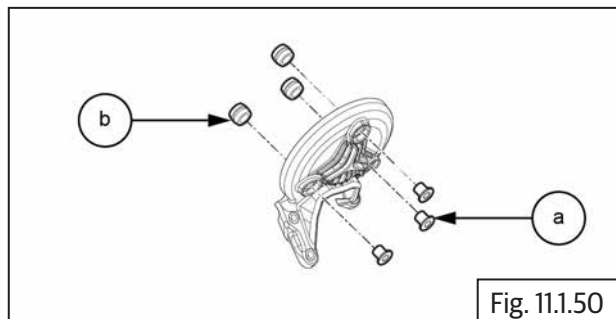


3mm Allen Socket with Ratchet

- Remove the cluster (**a**) from the cluster bracket.

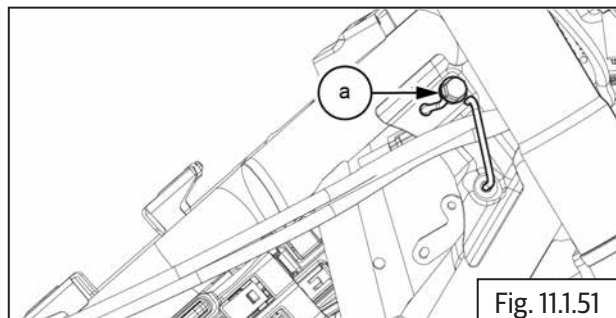


- Remove the **3Nos** top hats (**a**) and grommets (**b**) from cluster bracket.



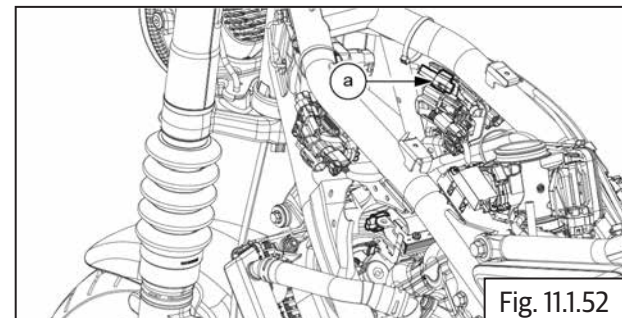
11.9 Ignition Switch Cum Steering Lock

- Remove the fuel tank. [Refer fuel system chapter.](#)
- Loosen and remove hex head flange bolt (**M6**).
- Remove harness clip (**a**) from RHS chassis frame.

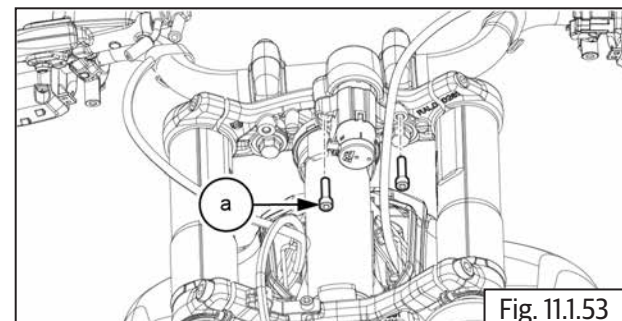


10mm Socket with Ratchet

- Slightly pullout the RH connector holder to access the coupler.
- Disconnect the ignition switch coupler (**a**).

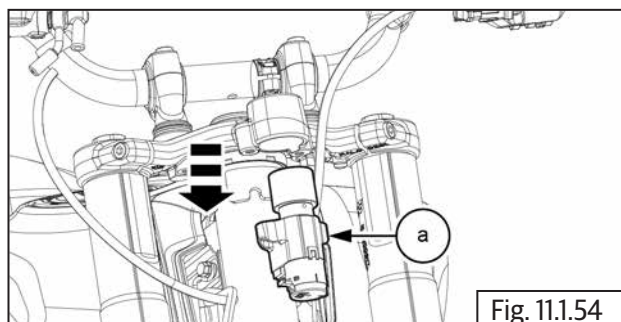


- Remove **2Nos** cap bolts (**M6**) (**a**) located below key set.



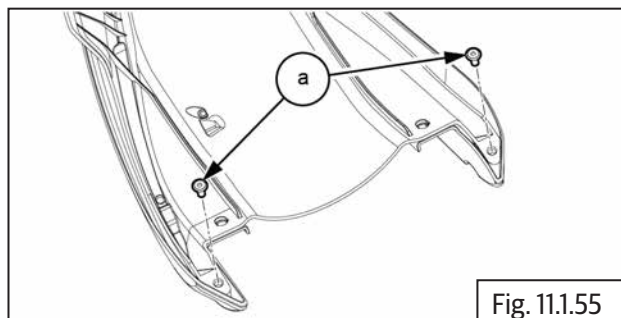
5mm Allen socket with Ratchet

- Gently remove ignition key set **(a)**.

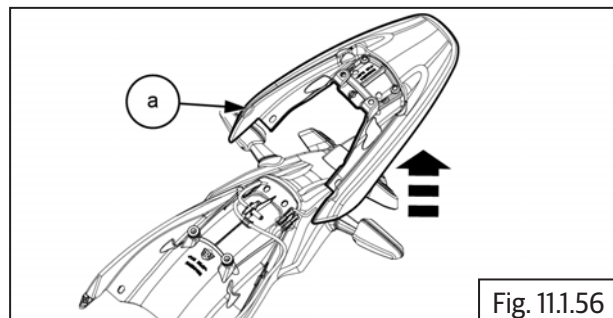


11.10 Rear Trafficator

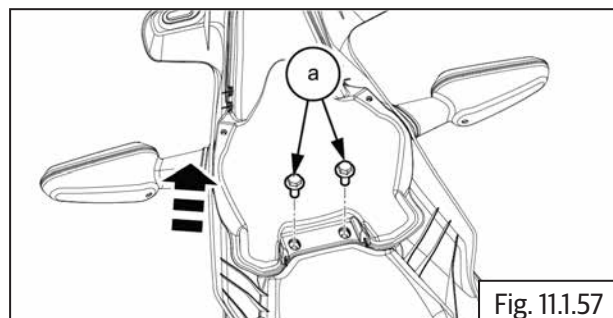
- Loosen and remove **2Nos** button head bolts **(M5)** **(a)** from the rear mudguard.



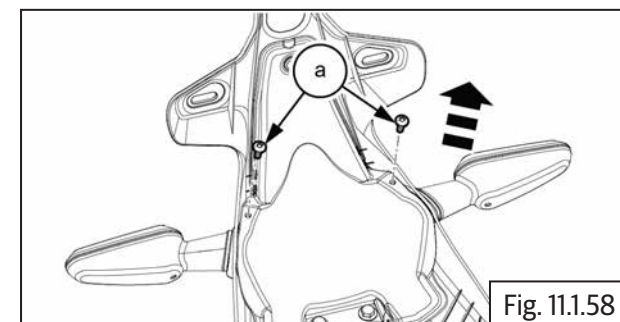
- Remove rear mudguard **(a)** from number plate hanger.



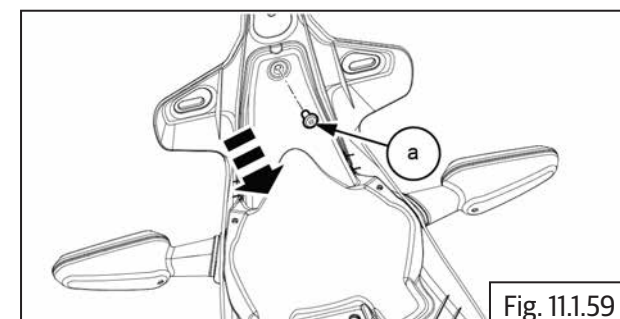
- Loosen and remove **2Nos** hex head bolts **(M6)** **(a)** from cover.



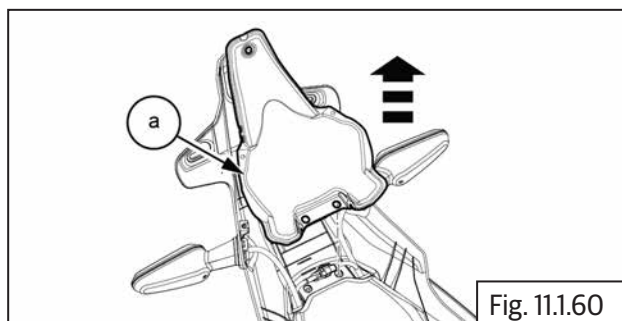
- Loosen and remove **2Nos** screws **(a)** from cover.



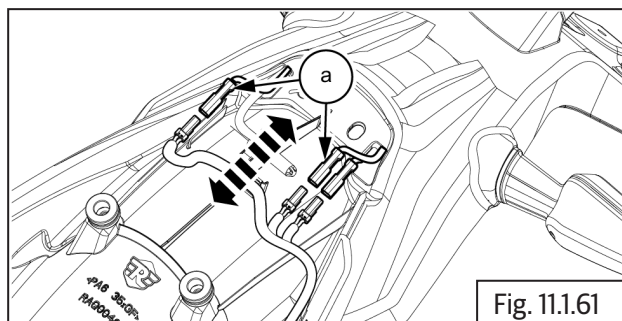
- Loosen and remove button head bolt **(M5)** **(a)** from cover.



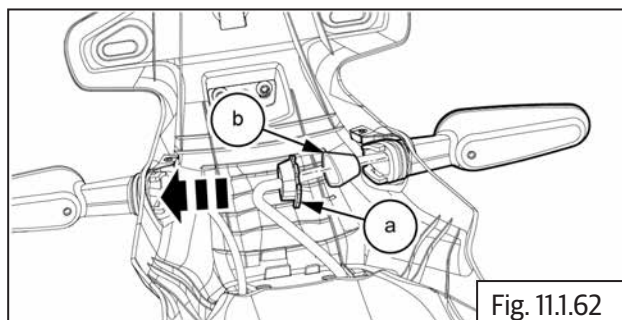
- Remove the cover **(a)** from the rear mudguard .



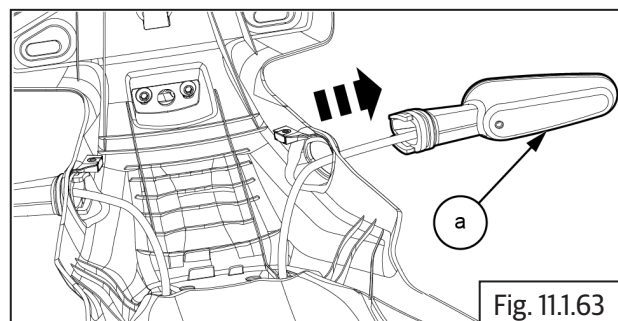
- Disconnect LHS and RHS trafficator connectors **(a)**.



- Remove the retainer clip **(a)** and sleeve **(b)** from RH trafficator.



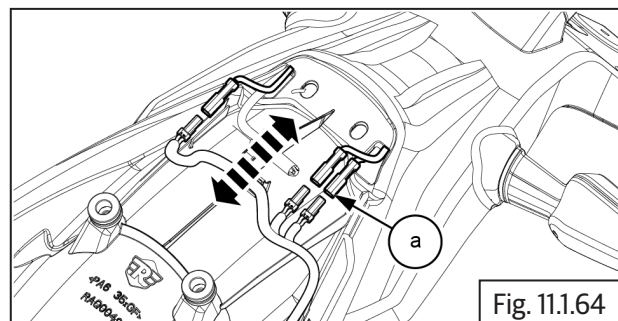
- Gently Pull out and remove the rear trafficator **(a)**.



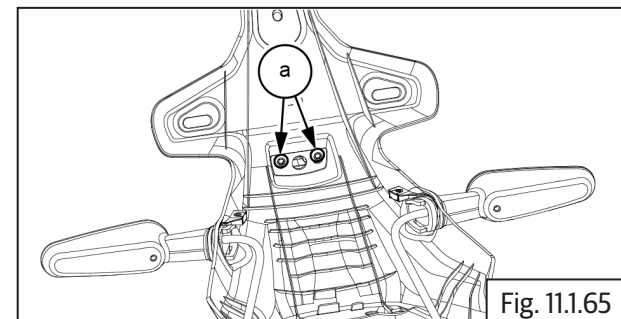
- Repeat the same procedure to LHS trafficator.

11.11 License plate illuminator

- Disconnect license plate illuminator connector **(a)**.

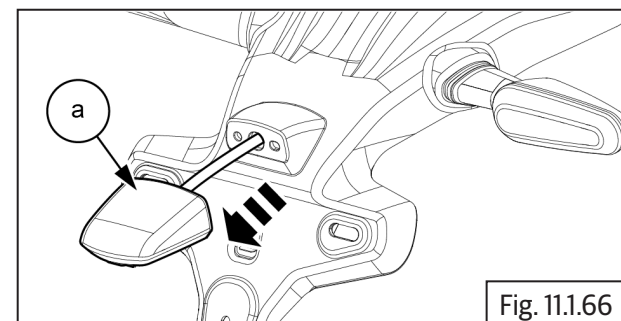


- Loosen and remove **2Nos** button head screws **(M5) (a)** from license plate illuminator.



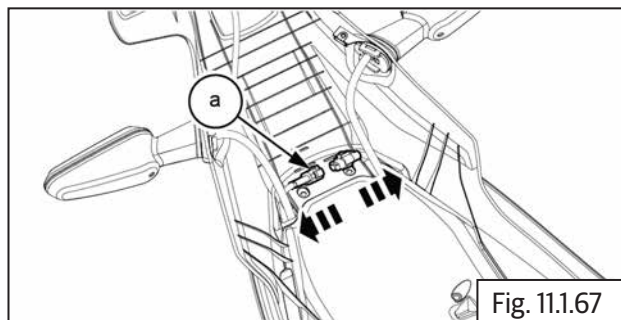
4mm Allen socket with Ratchet

- Remove the license plate illuminator **(a)** from the rear mudguard.

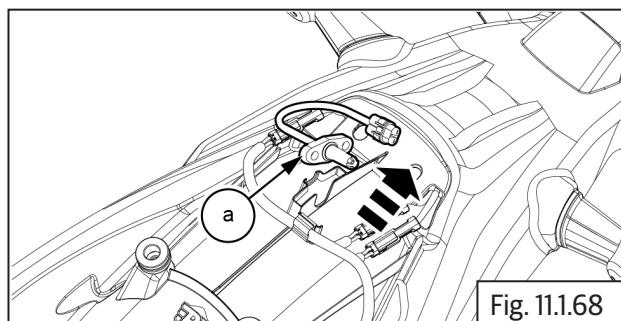


11.12 Ambient temperature sensor

- Disconnect ambient temperature sensor coupler **(a)**.

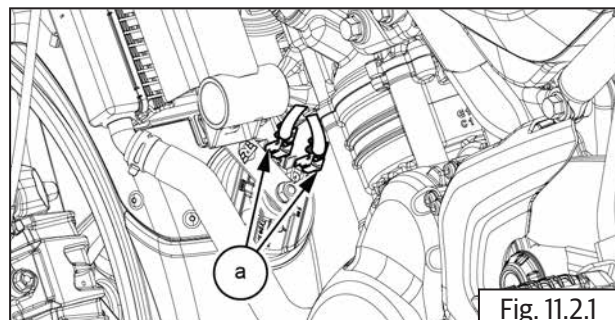


- Remove ambient temperature sensor **(a)** from the rear mudguard.

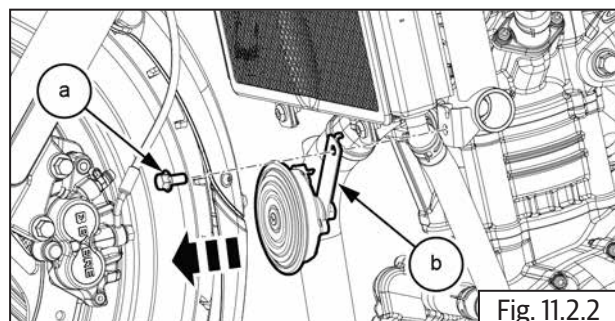


11.13 Horn

- Disconnect horn couplers **(a)** from the horn.

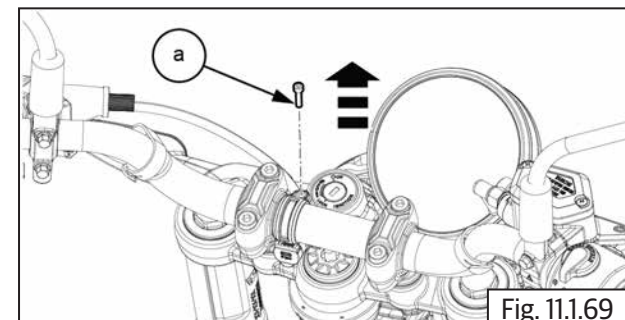


- Loosen and remove Hex flange bolt and nut **(M8)** **(a)** to remove horn with bracket **(b)**.

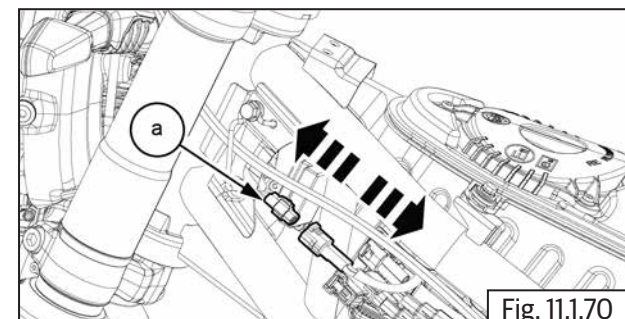


11.14 USB C type adaptor

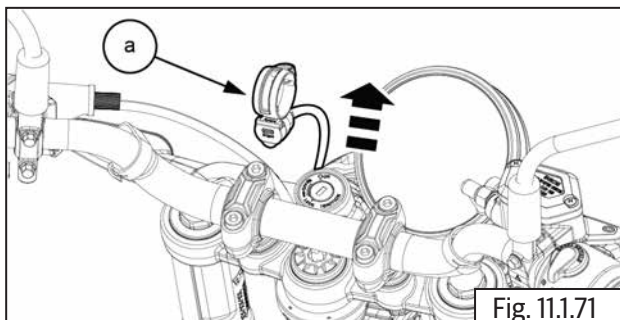
- Loosen and remove cap bolt **(M4)** **(a)** from USB mount.



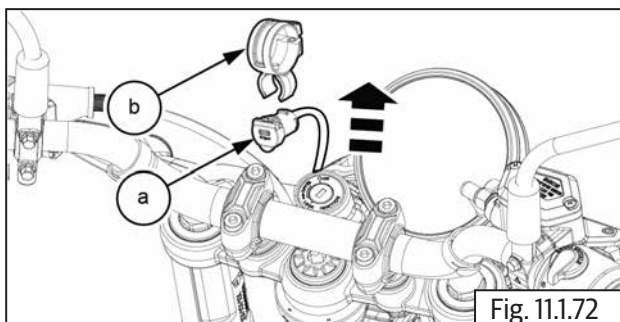
- Disconnect the USB coupler **(a)**.



- Remove the USB and mount **(a)** from handle bar.

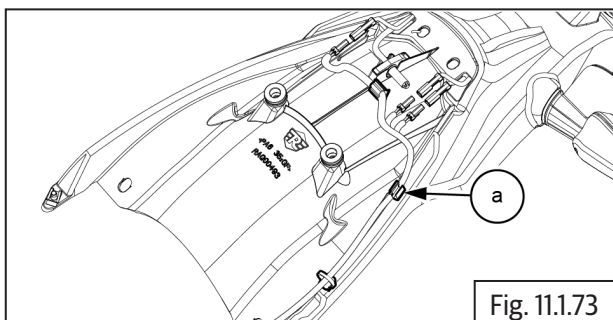


- Detach the USB **(a)** from mount **(b)**.

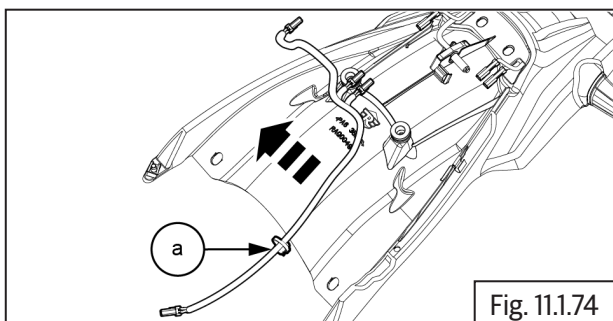


11.15 Rear wiring harness

- Remove **2Nos** cable holder clips **(a)** from wiring harness.
- Detach the wire tag from wiring harness.

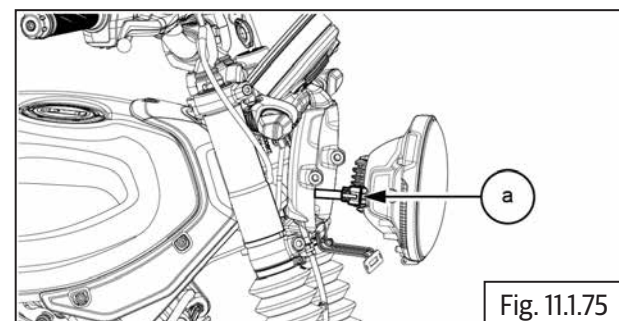


- Remove wiring harness **(a)** from rear mudguard.

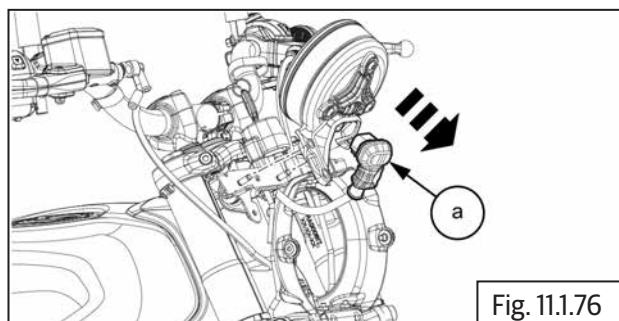


11.16 Complete Wiring Harness

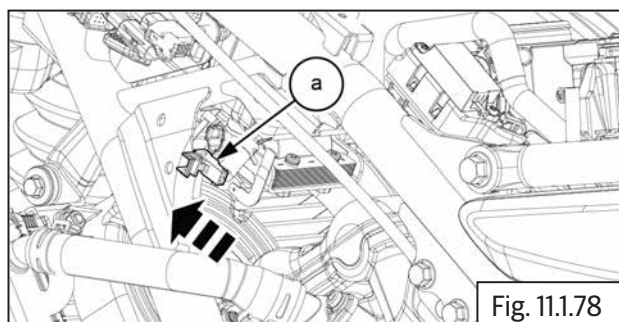
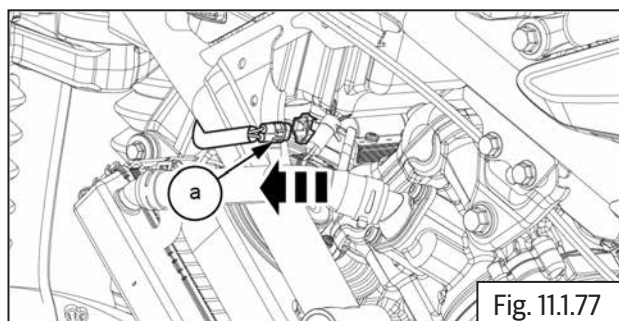
- Remove the following parts:
- Remove the fuel tank assembly. [Refer fuel system chapter.](#)
- Remove the air filter box assembly. [Refer Air filter chapter.](#)
- LHS and RHS side panels assembly. [Refer side panel chapter.](#)
- Disconnect the Headlamp coupler **(a)**.



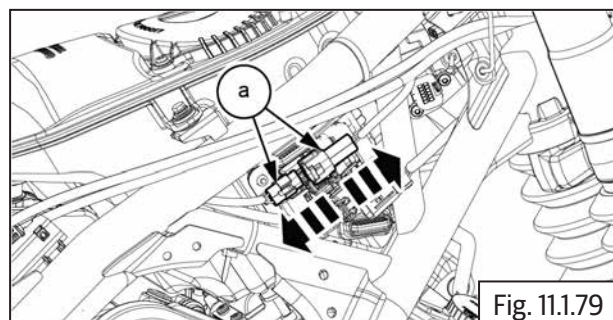
- Disconnect the cluster coupler **(a)**.



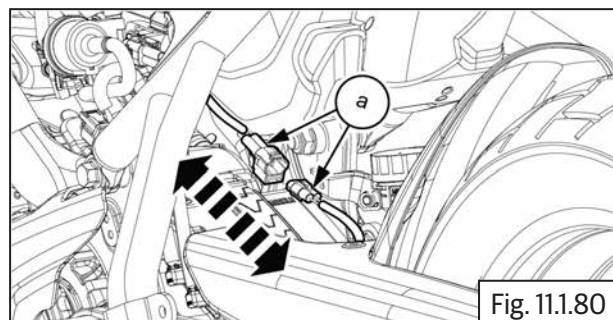
- Disconnect the **2 Nos** ignition coil couplers **(a)**.



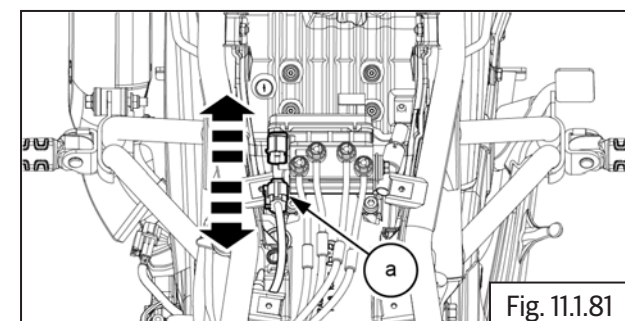
- Disconnect the front brake pressure switch connector **(a)**.



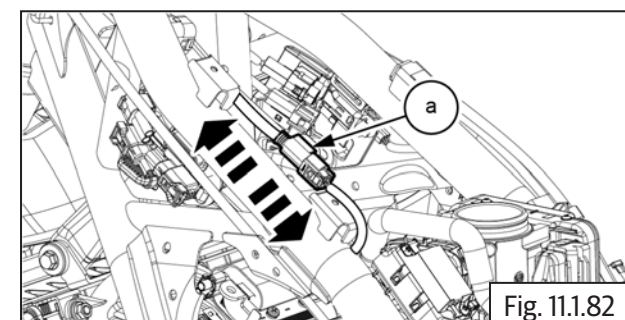
- Disconnect rear brake pressure switch coupler **(a)**.



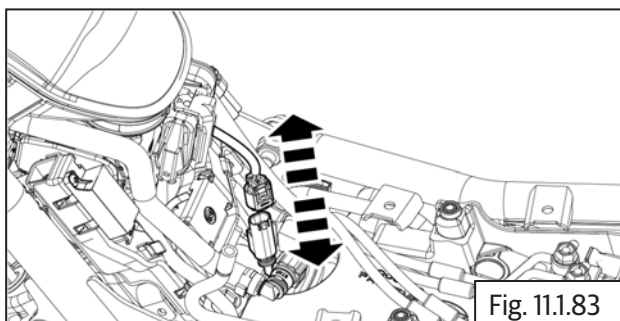
- Disconnect the ABS modulator coupler **(a)**.



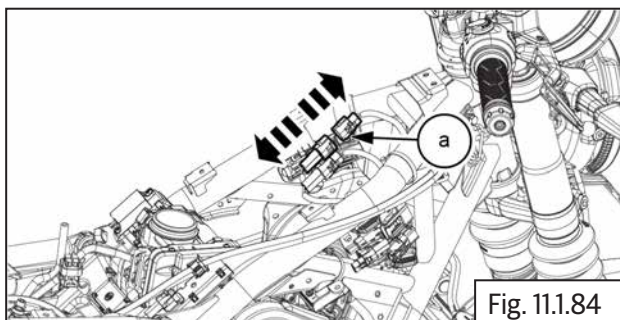
- Disconnect the Front ABS sensor coupler **(a)** from near RHS air filter.



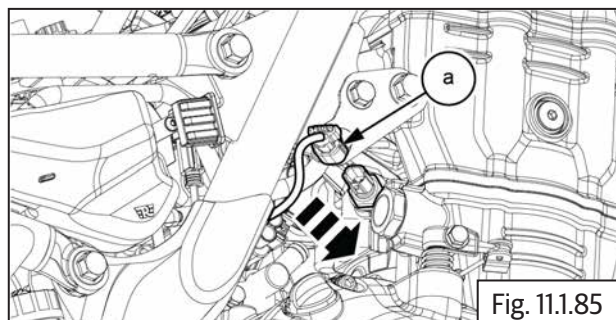
- Remove ABS sensor coupler from rear RHS frame.



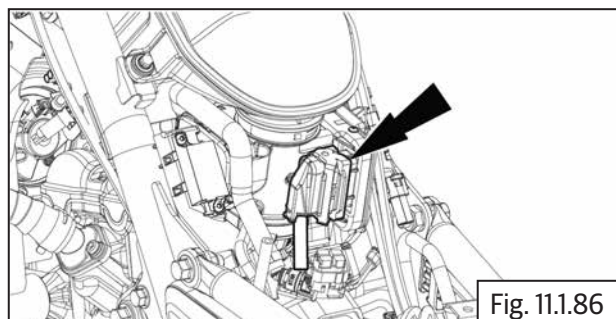
- Disconnect the cooling fan coupler (a).



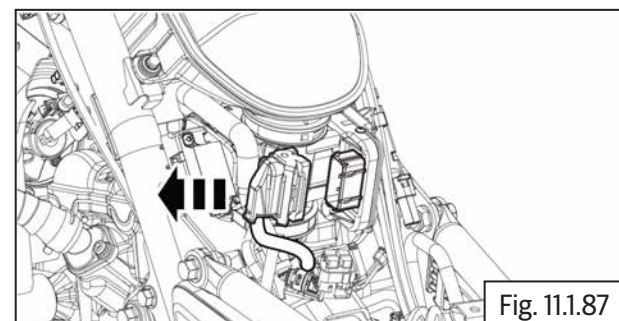
- Coolant temperature sensor located on rear side of cylinder head.
- Remove coolant temperature sensor coupler (a).



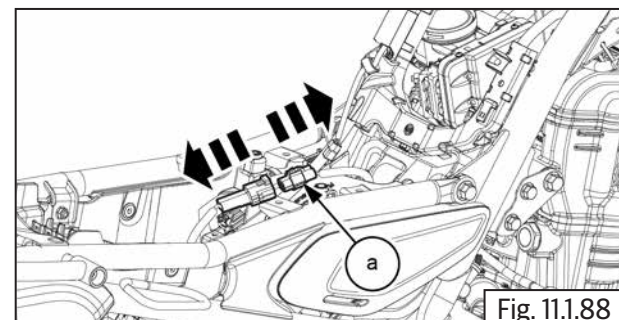
- ECU is located on the throttle body assembly.



- Disconnect coupler from ECU.



- Disconnect the oil pressure switch coupler (a).



- Disconnect below listed couplers from LH bottom battery tray.

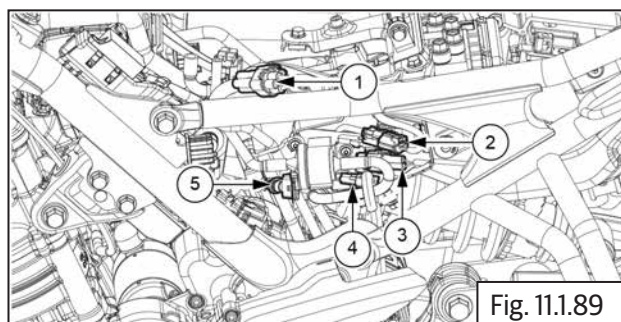
1. Side stand switch

2. Gear position sensor

3. Crank position sensor

4. Purge valve

5. Charger Module



- Disconnect below listed couplers from outside LH & RH connector holders.

1. Flasher Unit.

2. Accessories coupler

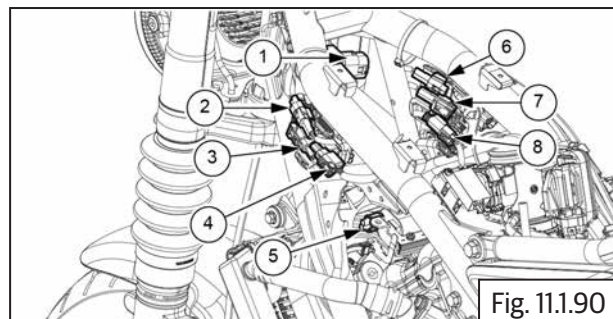
3 & 4. LH switch cube coupler 2Nos.

5. Ignition coil.

6. Ignition key set coupler

7. O2 Sensor

8. Front wheel speed Sensor

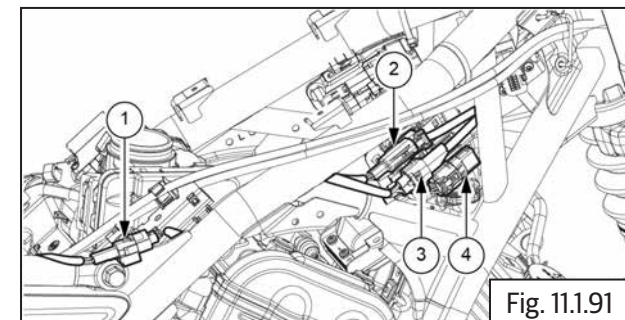


- Disconnect below listed couplers from outside RH connector holder.

1. Fuel level sensor coupler

2 & 3. RH switch cube coupler 2Nos.

4. Throttle sensor coupler.

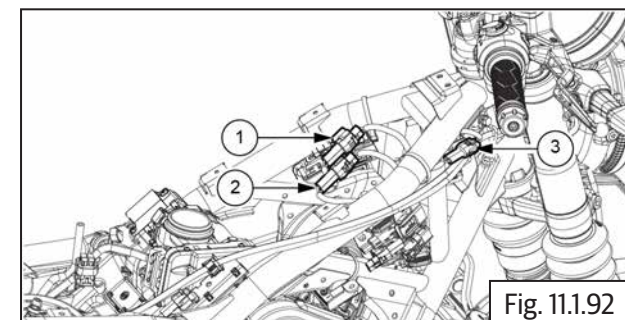


- Disconnect below listed couplers from inside LH connector holder.

1. Cooling fan coupler

2 Clutch switch.

3. USB port coupler.

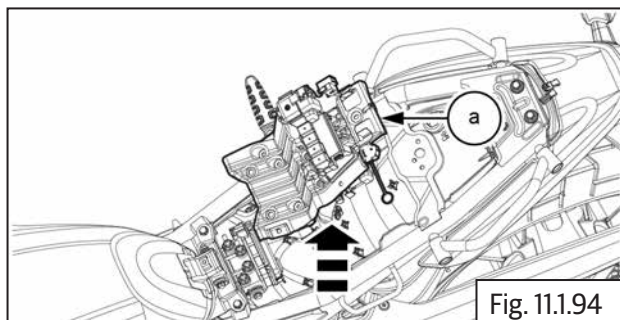


- Loosen and Remove **7Nos** screws **(a)** with washers **(b)** from battery tray.

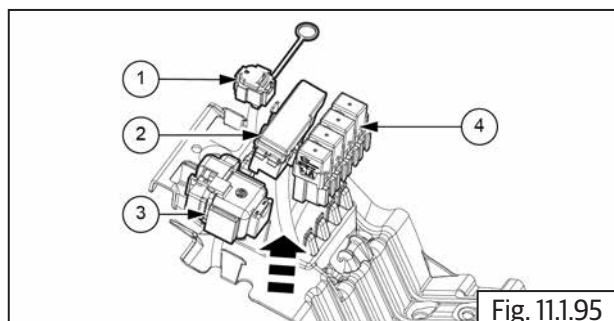


T20 Torx socket with Ratchet

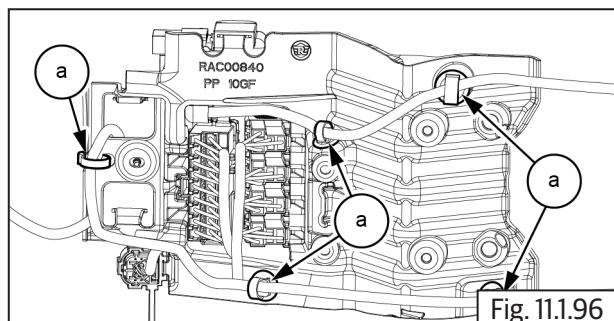
- Slide and move the battery tray with relay holders **(a)**.



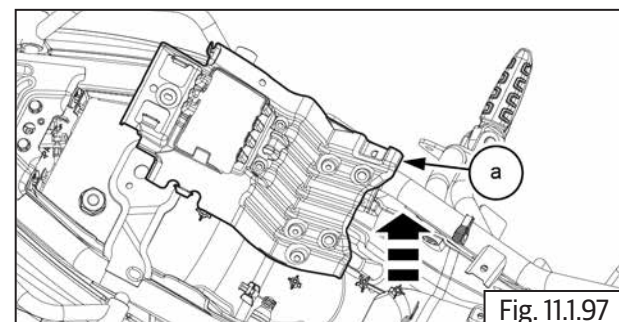
- Remove OBD coupler **(1)** from battery tray.
- Release the lock and detach the fuse with holders **(2)** from battery tray.
- Remove starter relay **(3)** from battery tray.
- Release the lock and detach the relay with holders **(4)** from battery tray.



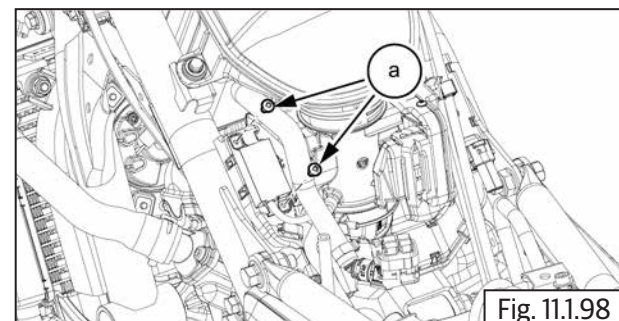
- Remove the wire tag and clips **(a)** from main battery and wiring harness.



- Remove the battery tray **(a)** from wiring harness.

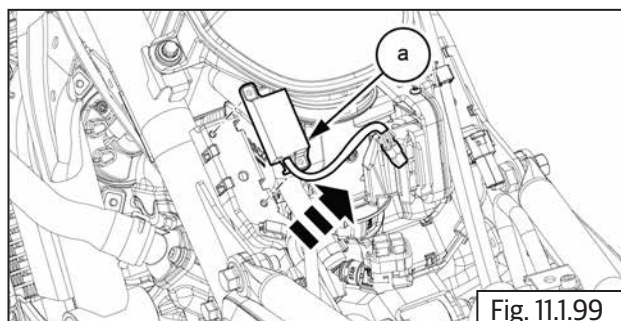


- Loosen and Remove **2Nos** screws **(a)** from charger module.

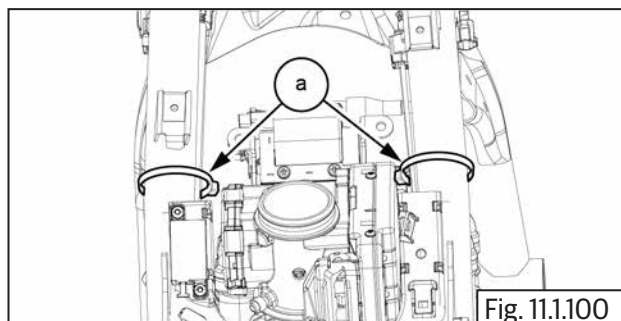


T20 Torx socket with Ratchet

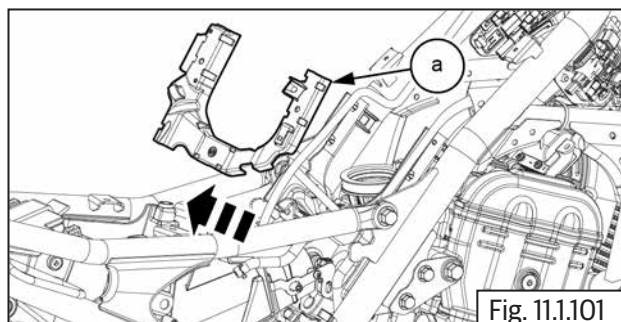
- Remove charger module **(a)** from conduit cover.



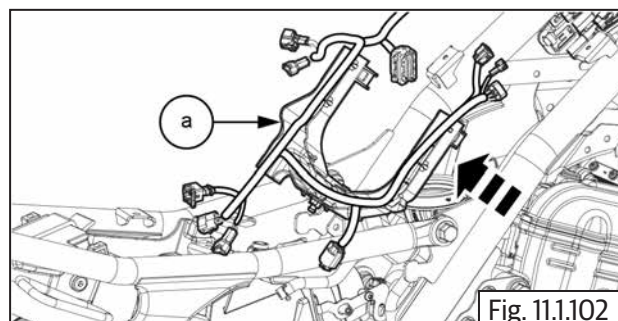
- Remove 2Nos wire tags **(a)** from conduit cover.



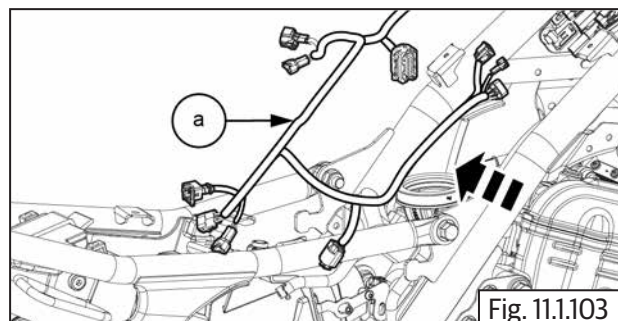
- Release the lock and open the top conduit cover **(a)**.



- Remove the bottom conduit cover **(a)**.



- Remove the wiring harness from chassis frame **(a)**.

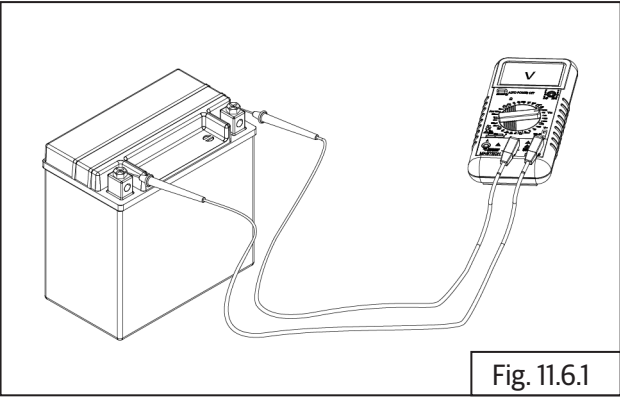


Inspection

- Inspect connector pins for any bends, corruptions and damages.
- Inspect headlamp holder for any scratches, rust, cracks and damages. Replace if it is defective.
- Inspect and replace reflector if it has any damages and/or distraction.
- Inspect if wire clips are loosened and tighten appropriately.
- Inspect if headlamp holder bolt is loosened and tighten appropriately.
- Inspect the trafficators bulb filament for any damages and replace.

Battery

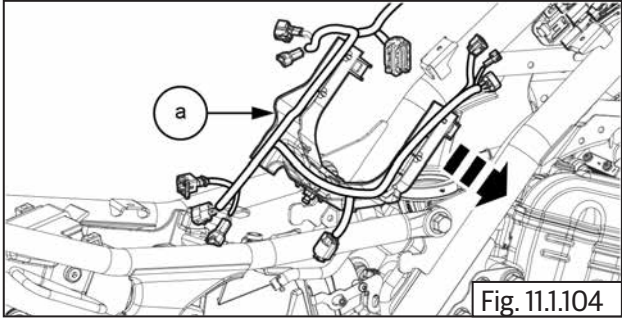
- Check battery for any damages.
- Check the battery terminals for sulfating, corrosion or damages.
- Test voltage level. It should be 12.8V to 13.2V approximately.



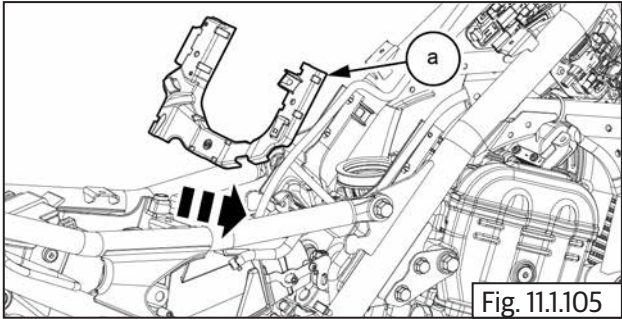
Assembly

11.17. Complete Wiring Harness

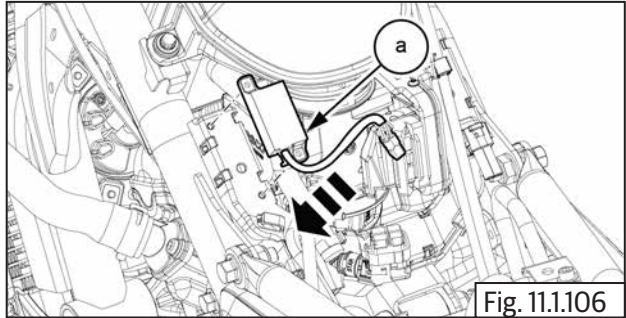
- Locate and align the wiring harness **(a)** to the chassis frame.
- Locate and fix the bottom conduit cover **(a)**.



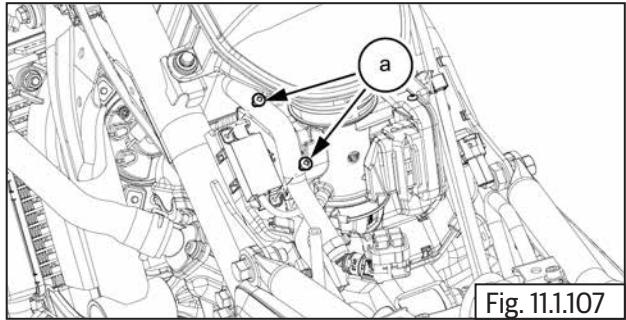
- Close the top conduit cover **(a)** and secure the lock.



- Fix the **2Nos** wire tags **(a)** to the conduit cover.
- Locate the USB charger module on top conduit cover.



- Locate and tighten **2Nos** screws **(a)** on USB charger module.

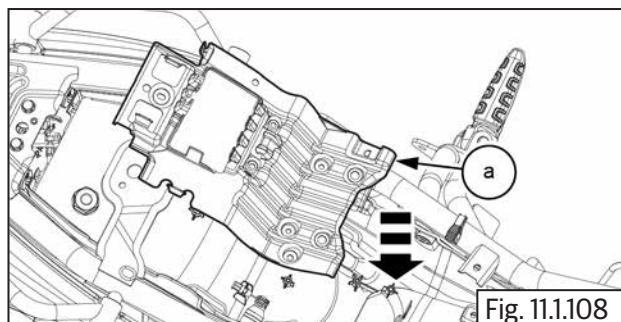


	T20 Trox socket with ratchet
	3Nm / 0.3Kgf-m

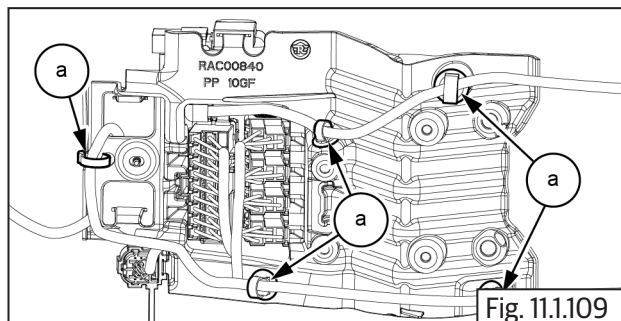
⚠ CAUTION

DO NOT over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

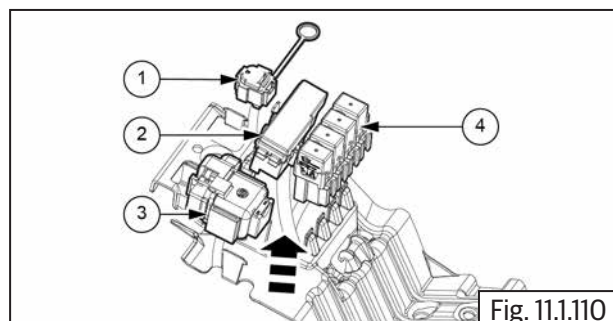
- Locate the battery tray **(a)** to the wiring harness.



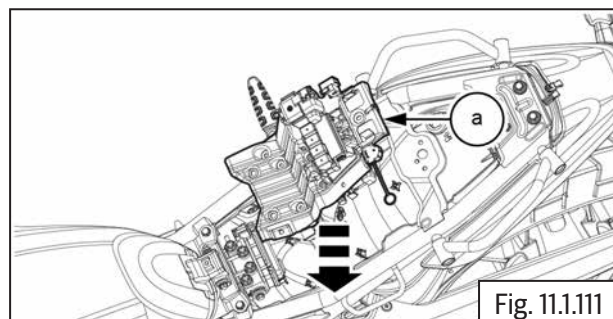
- Fix the wire tag and clips **(a)** to the main battery and wiring harness.



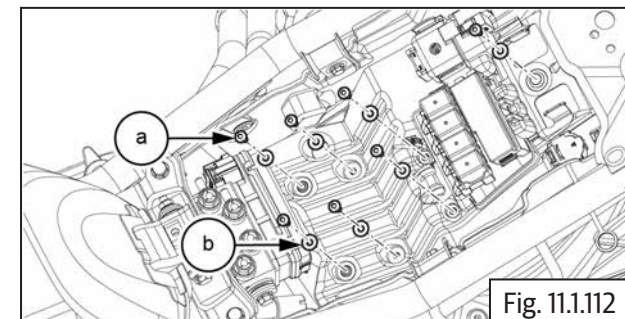
- Locate and fix OBD coupler **(1)** on battery tray
- Fix the fuse with holders **(2)** to the battery tray and secure the lock.
- Fix the relay with holders **(4)** to the battery tray and secure the lock.
- Locate and fix starter relay **(3)** on battery tray



- Locate and fix the battery tray with relay holders **(a)**.

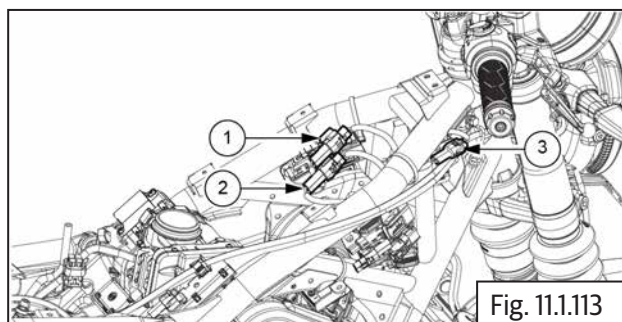


- Locate and tighten **7Nos** screws **(a)** with washers **(b)** on battery tray.

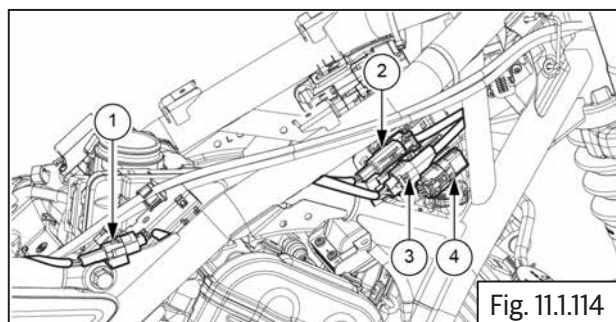


	T20 Trox socket with ratchet
	1.5Nm / 0.15kgf-m

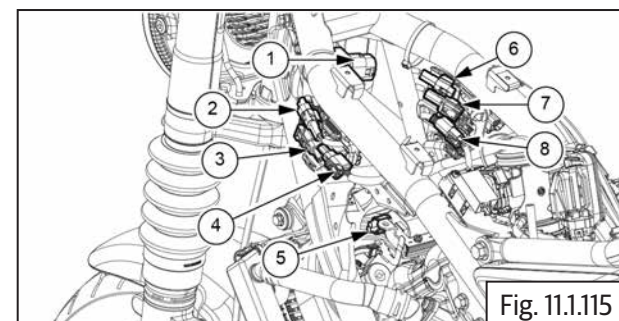
- Connect below listed couplers to inside LH connector holder.
- **1. Cooling fan coupler**
- **2 Clutch switch.**
- **3.USB port coupler.**



- Connect below listed couplers on outside RH connector holder.
- **1. Fuel level sensor coupler**
- **2 & 3. RH switch cube coupler 2Nos.**
- **4. Throttle sensor coupler.**

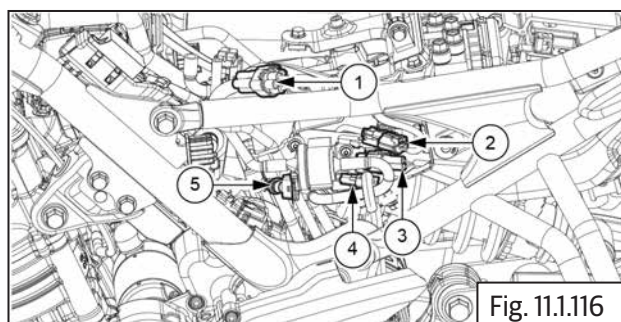


- Connect below listed couplers on outside LH & RH connector holders.
- **1. Flasher Unit.**
- **2. Accessories coupler**
- **3 & 4. LH switch cube coupler 2Nos.**
- **5. Ignition coil.**
- **6. Ignition key set coupler**
- **7. O2 Sensor**
- **8. Front wheel speed Sensor**

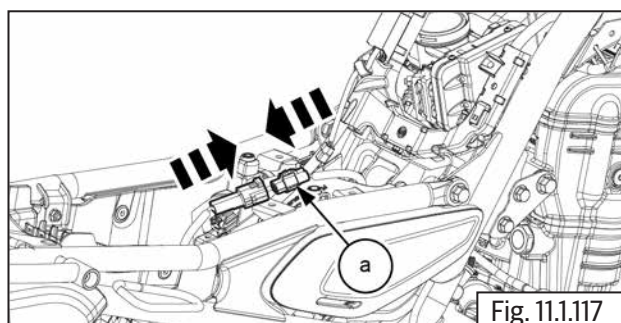


- Connect below listed couplers on LH bottom battery tray.

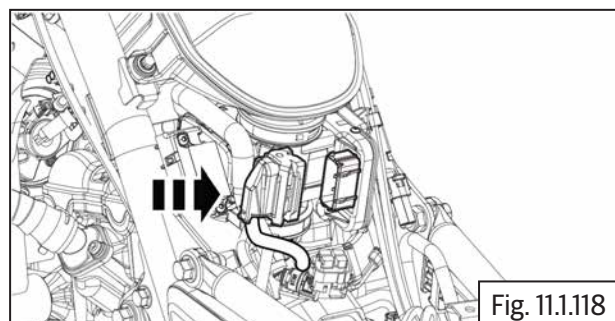
- **1. Side stand switch**
- **2. Gear position sensor**
- **3. Crank position sensor**
- **4. Purge valve**
- **5. Charger Module**



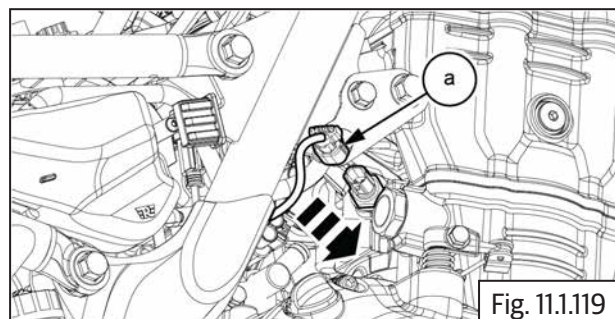
- Connect oil pressure switch coupler **(a)**.



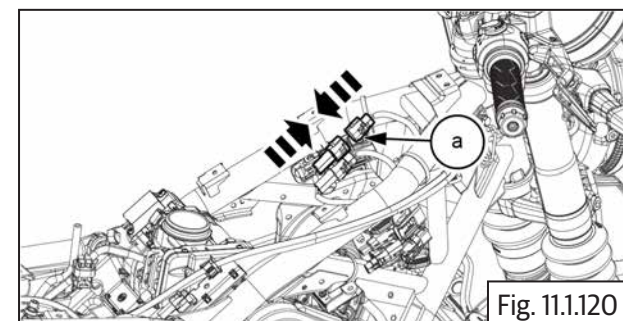
- Connect ECU coupler to ECU (a).



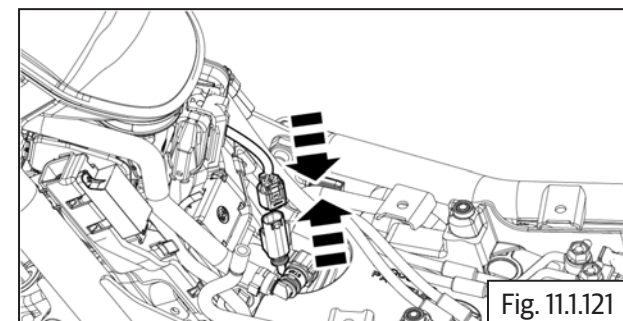
- Coolant temperature sensor located on rear side of cylinder head.
- Connect coolant temperature sensor coupler **(a)**.



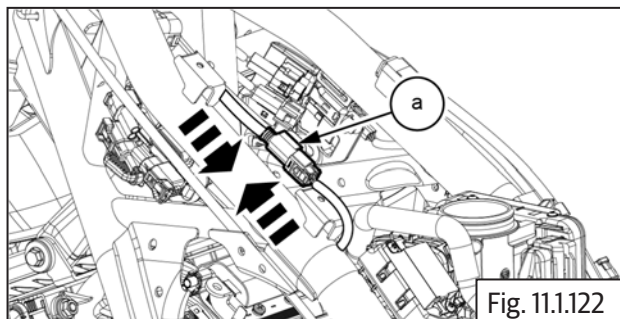
- Connect cooling fan coupler **(a)**.



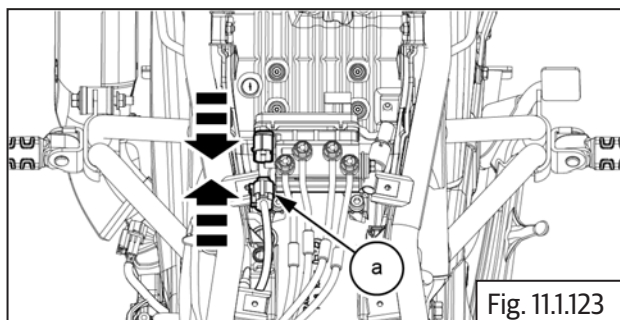
- Connect rear wheel speed sensor coupler.



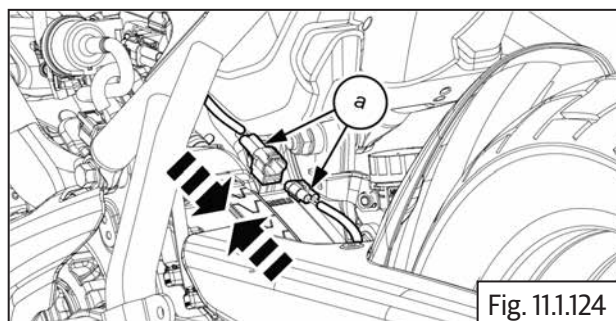
- Connect front wheel speed sensor coupler **(a)** on near RHS air filter.



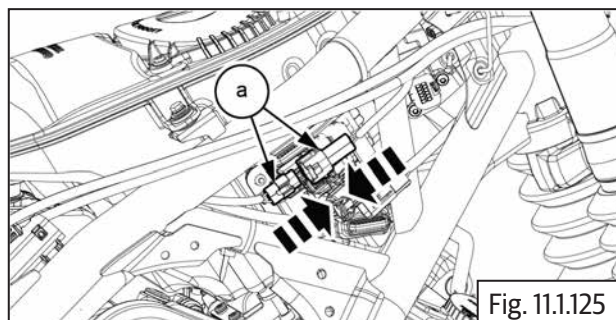
- Connect ABS modulator coupler **(a)**.



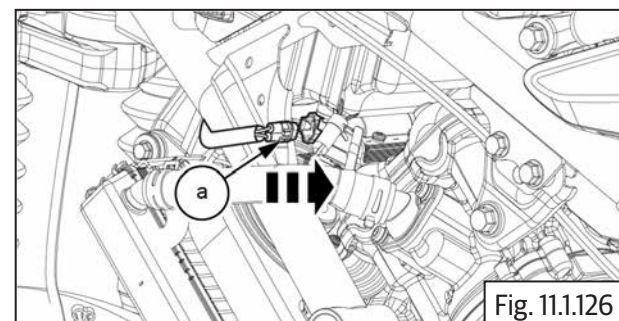
- Connect rear brake pressure switch coupler **(a)**.



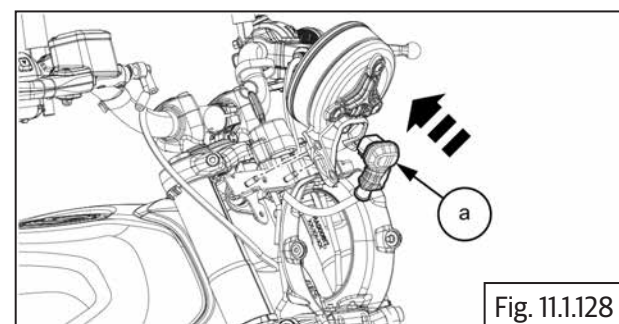
- Connect front brake pressure switch connector **(a)**.



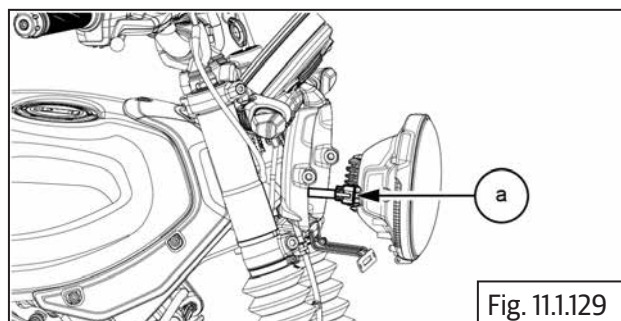
- Connect **2 Nos** ignition coil couplers **(a)**.



- Connect cluster coupler **(a)**.



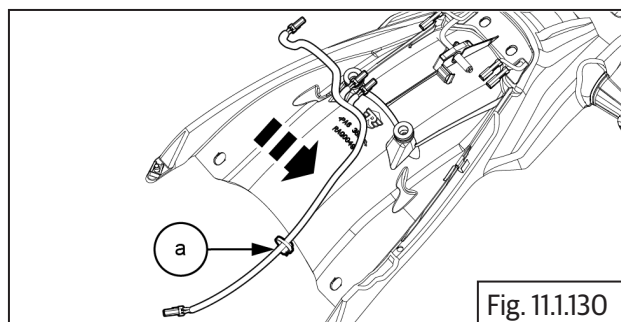
- Connect Headlamp coupler **(a)**.



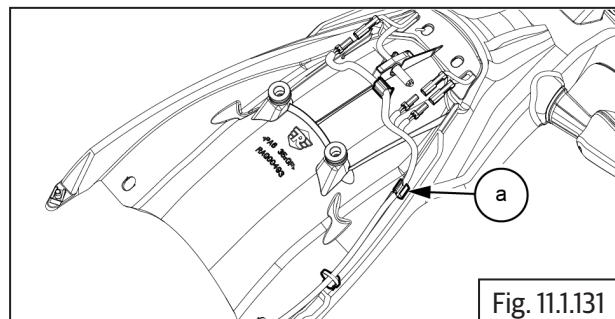
- Fix LHS and RHS side panels assembly. Refer side panel chapter.
- Fix air filter box assembly. Refer Air filter chapter.
- Fix fuel tank assemble. Refer Fuel system chapter.

11.18 Rear wiring harness

- Locate and align the wiring harness **(a)** on rear mudguard.

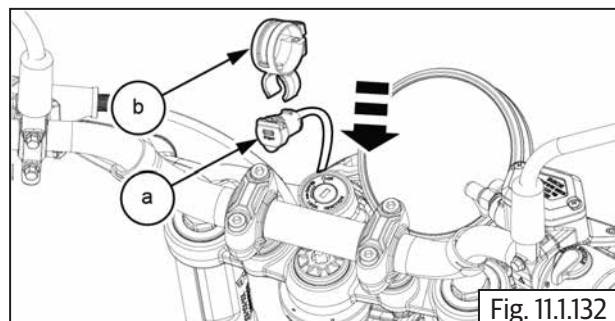


- Attach **2Nos** cable holder clips **(a)** on wiring harness.

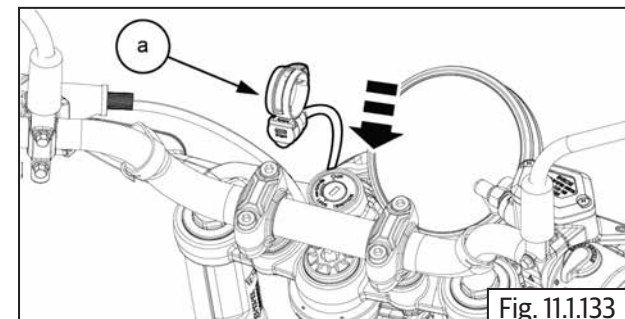


11.19 USB C type adaptor

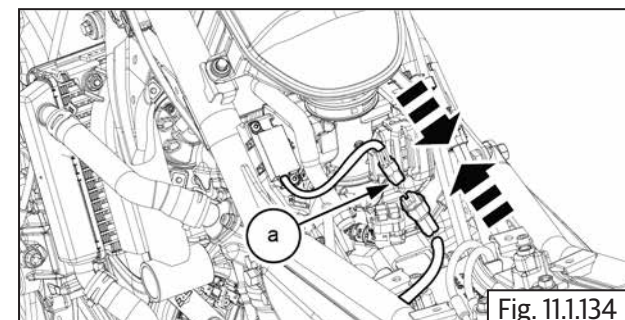
- Align the USB **(a)** to mount **(b)**.



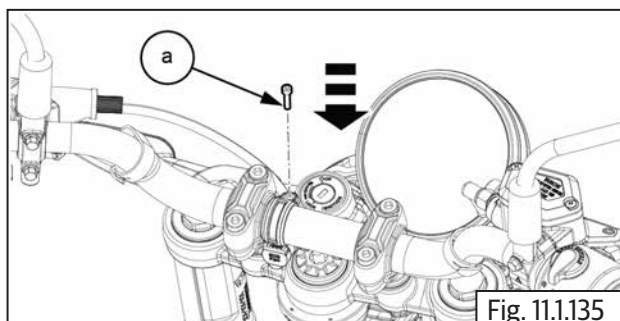
- Locate and align the USB and mount **(a)** to handle bar.



- Connect the USB coupler **(a)**.



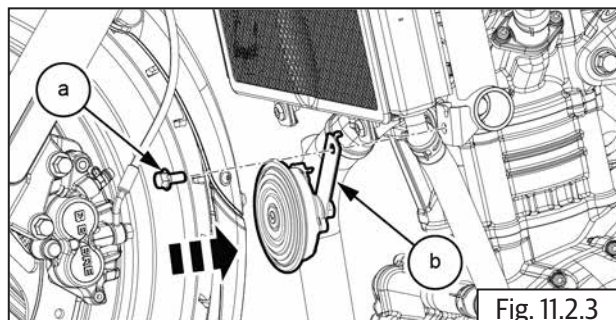
- Locate and tighten the cap bolt **(M4) (a)** to USB mount.



	3mm Allen socket with Ratchet
	1Nm / 0.1kgf-m

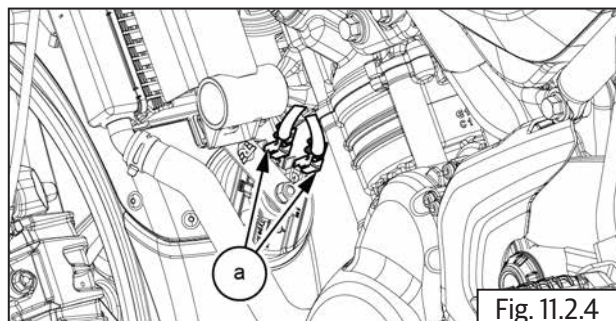
11.20 Horn

- Locate and tighten Hex flange bolt with nut **(M8) (a)** on horn bracket **(b)**.



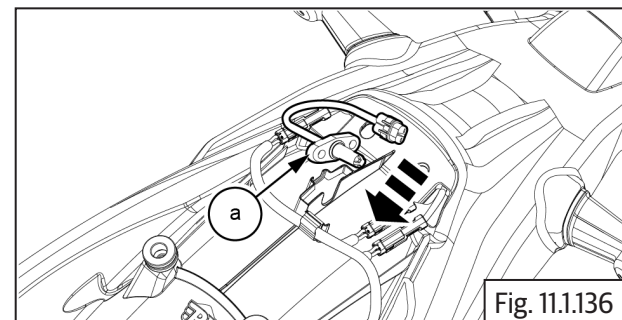
	12mm Socket with Ratchet
	25Nm / 2.5kgf-m

- Connect couplers **(a)** to horn.

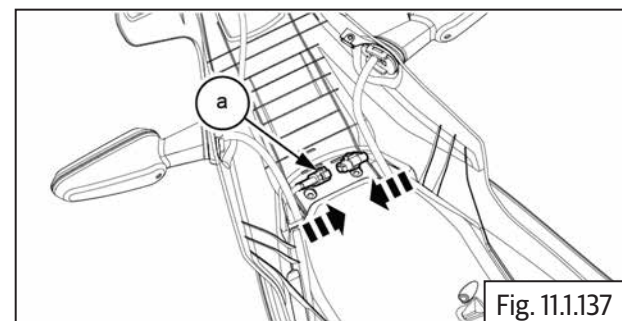


11.21 Ambient temperature sensor

- Locate and align ambient temperature sensor **(a)** on rear mudguard.

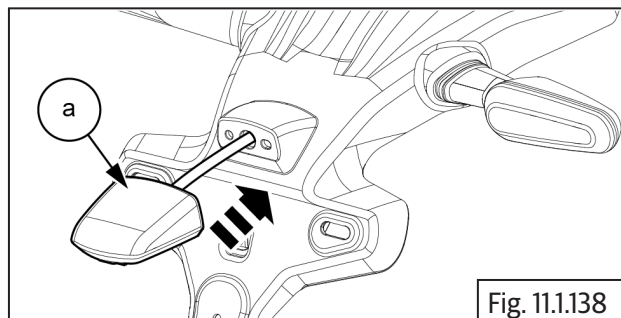


- Connect ambient temperature sensor coupler **(a)**.

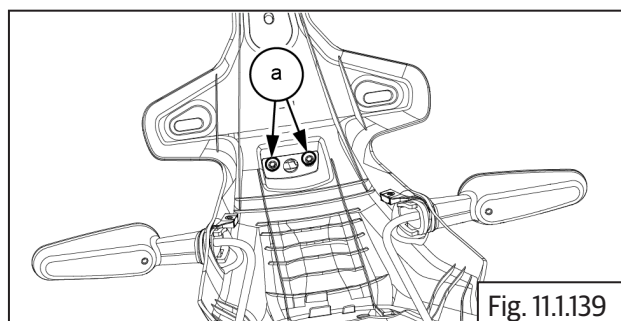


11.22 License plate illuminator

- Locate and align the license plate illuminator **(a)** to rear mudguard.

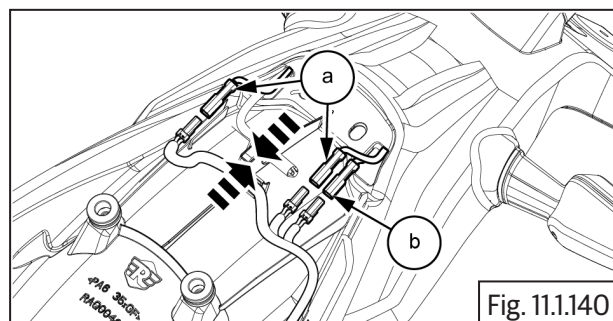


- Locate and Tighten **2 Nos** button head screws **(M5) (a)** to license plate illuminator.



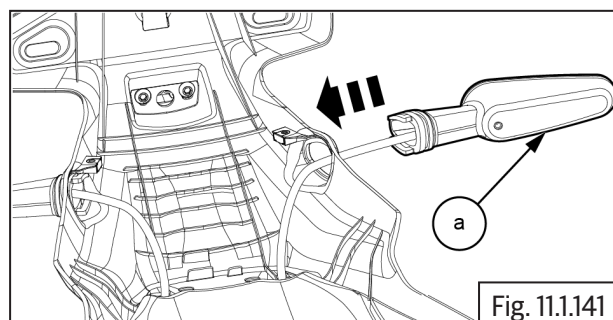
	4mm Allen socket with Ratchet
	5Nm / 0.5kgf-m

- Connect license plate illuminator connector **(b)**.

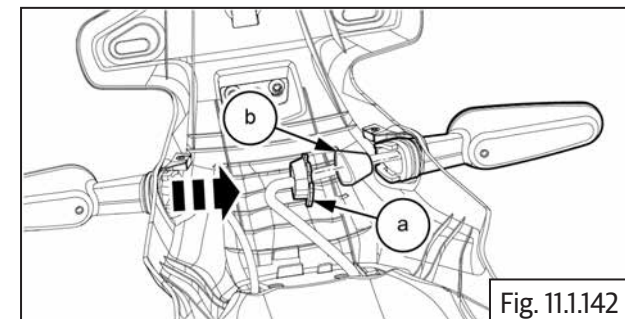


11.23 Rear Trafficator

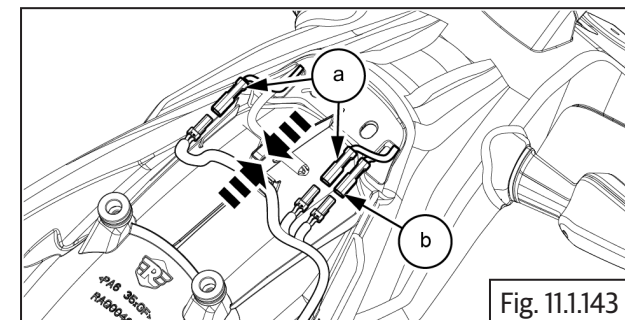
- Gently insert and attach the rear trafficator **(a)**.



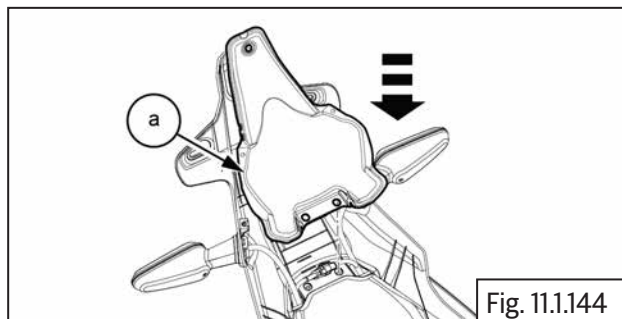
- Locate and fix retainer clip **(a)** and sleeve **(b)** on RH trafficator.



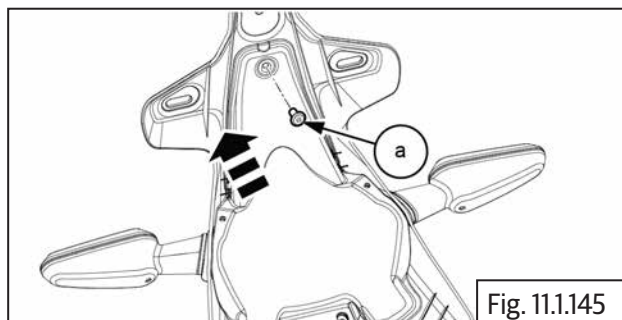
- Connect LHS and RHS trafficator connector **(a)**.



- Locate and align the cover **(a)** on rear mudguard.

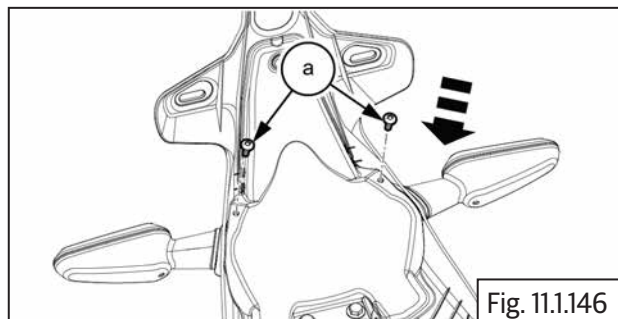


- Locate and Tighten the button head bolt **(M5) (a)** on cover.



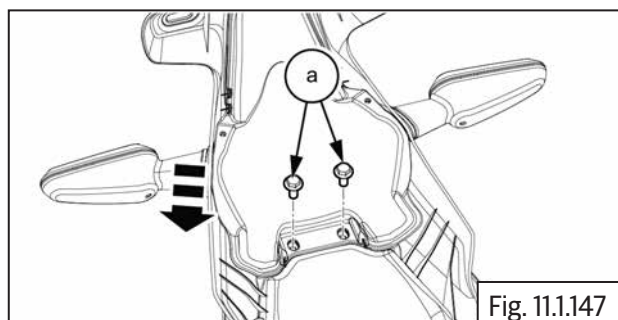
	4mm Allen socket with Ratchet
	5Nm / 0.5kgf-m

- Locate and tighten **2 Nos** screws **(a)** on cover.



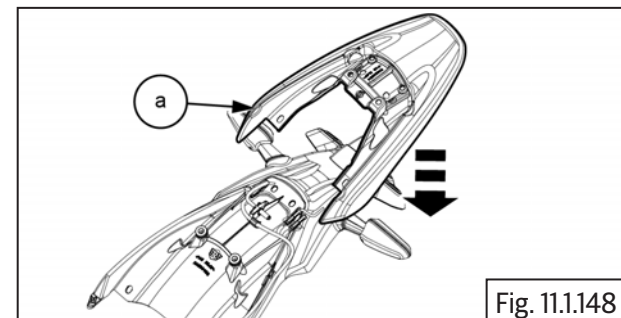
	T20 Torx socket with Ratchet
	1.5Nm / 0.15kgf-m

- Locate and tighten 2Nos hex head bolts **(M6) (a)** from cover.

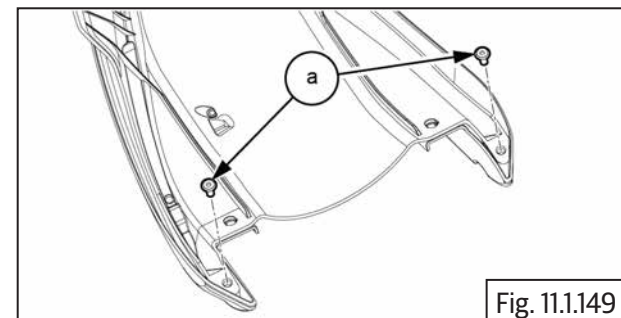


	10mm socket with Ratchet
	10Nm / 1.0kgf-m

- Locate the rear mudguard **(a)** on number plate hanger.



- Locate and tighten **2Nos** button head bolts **(M5) (a)** on rear mudguard.

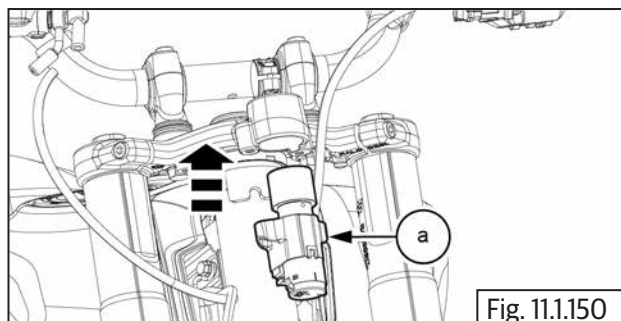


	4mm Allen socket with Ratchet
	5 Nm / 0.5kgf-m

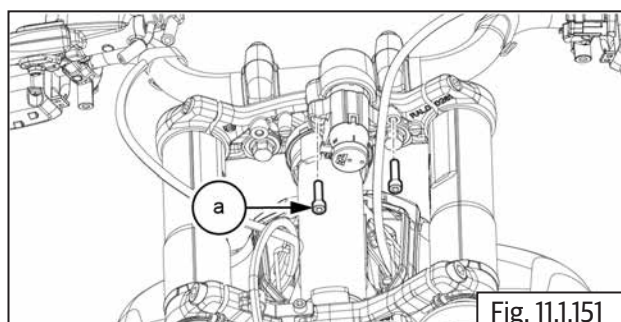
- Repeat the same procedure to LHS trafficator.

11.24 Ignition Switch Cum Steering Lock

- Gently locate the ignition key set **(a)**.

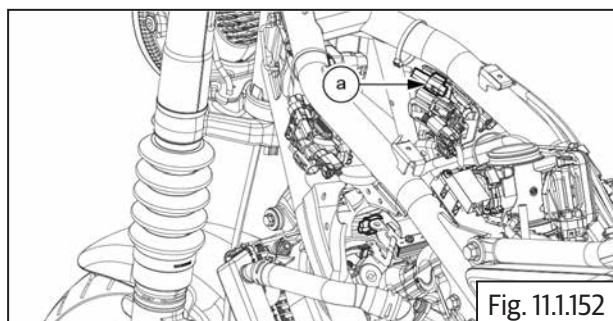


- Locate and tighten **2Nos** Cap bolts **(M6)** **(a)** to below key set.

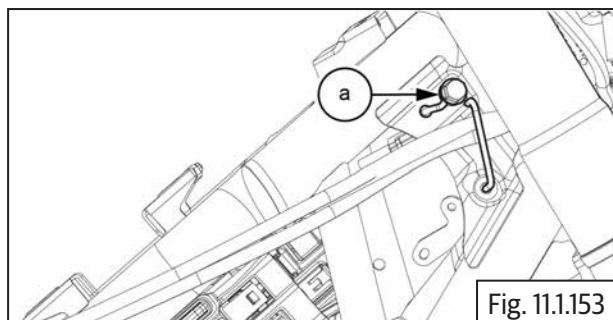


	5mm Allen socket with Ratchet
	10Nm / 1.0kgf-m

- Connect the ignition switch coupler **(a)**.



- Locate and tighten harness clip and hex head flange bolt **(M6)** **(a)** on RHS chassis frame.

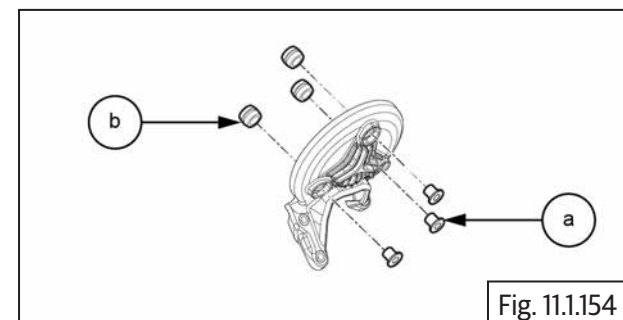


	10mm Socket with Ratchet
	10Nm / 1.0 kgf-m

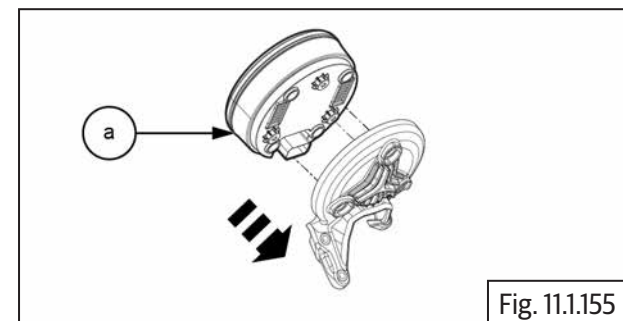
- Fix fuel tank assemble. Refer Fuel system chapter.

11.25 Cluster

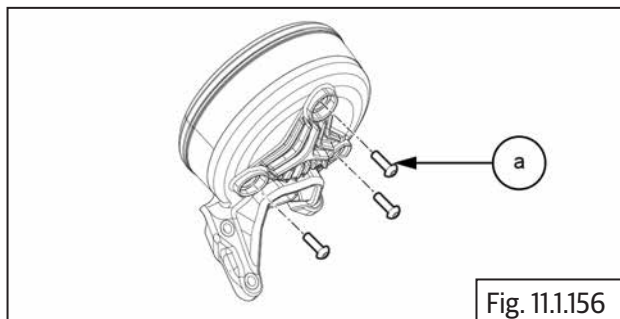
- Locate the **3Nos** top hats **(a)** and grommets **(b)** into the cluster bracket.



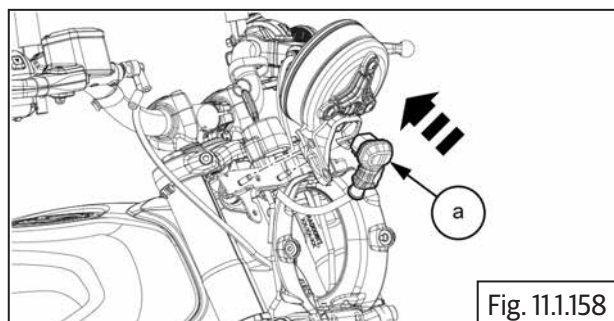
- Locate the cluster **(a)** on cluster bracket.



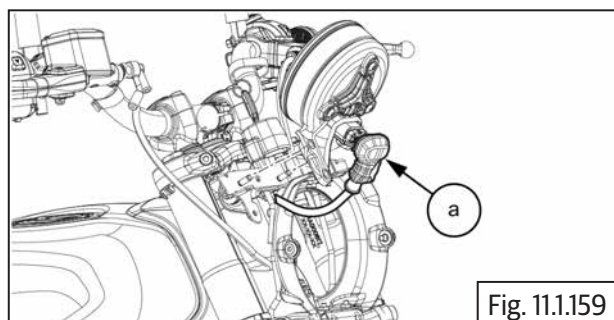
- Locate and tighten the **3Nos** button head bolts (**M5**) (**a**) on the instrument cluster.



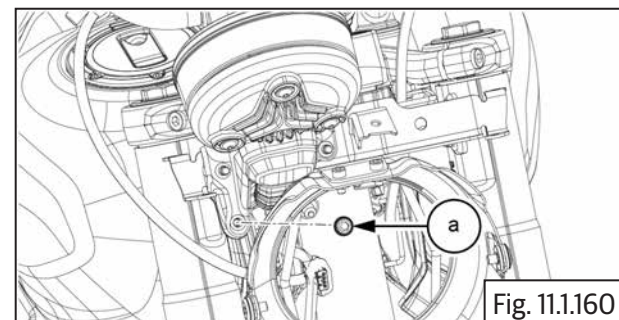
- Connect the instrument cluster coupler (**a**).



- Fix the cover (**a**) to the instrument cluster coupler.

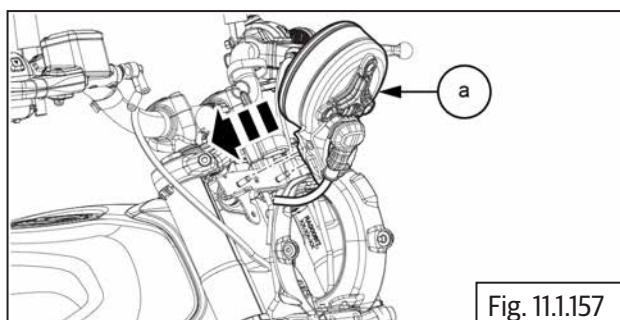


- Locate and tighten the button head bolt (**M6**) (**a**) on the mounting bracket.



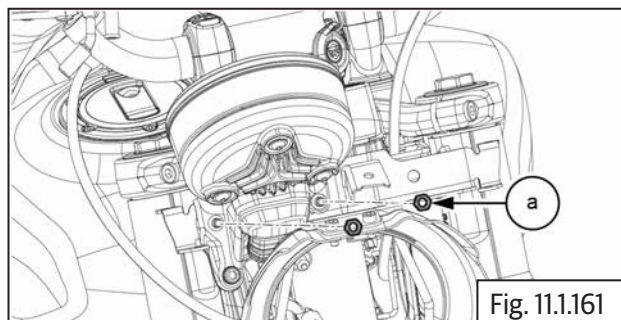
	3mm Allen socket with ratchet
	$5 \pm 0.7 \text{ Nm} / 0.5 \pm 0.07 \text{ Kg} \cdot \text{m}$

- Locate the instrument cluster with mount (**a**) to the front frame assembly.



	5mm Allen socket with ratchet
	$10 \pm 1 \text{ Nm} / 1.0 \pm 0.1 \text{ Kg} \cdot \text{m}$

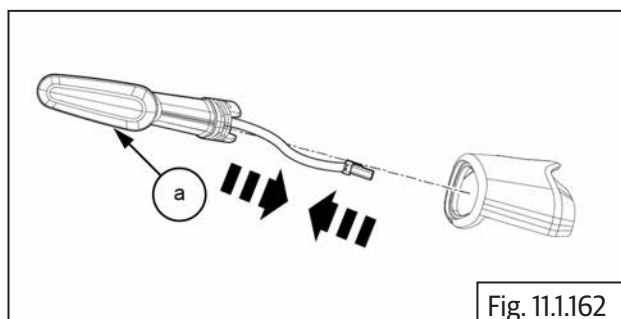
- Locate and tighten the **2 Nos** nuts **(M6) (a)** on the mounting bracket.



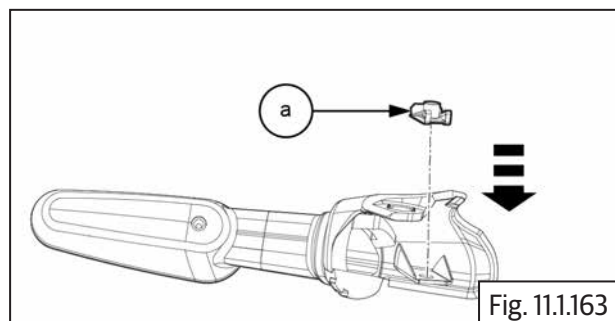
	10mm Socket with Ratchet
	10 ± 1Nm / 1.0 ± 0.1Kgf - m

11.26 Front Trafficators RH

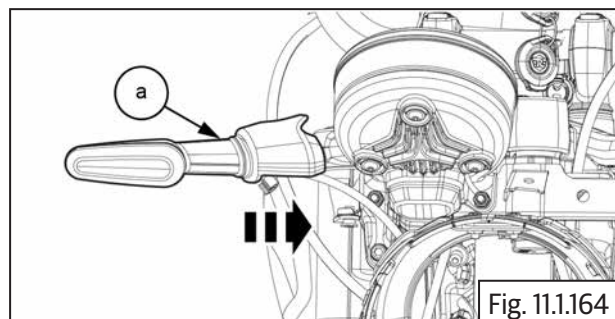
- Install the trafficator **(a)** to the upper mount cover.



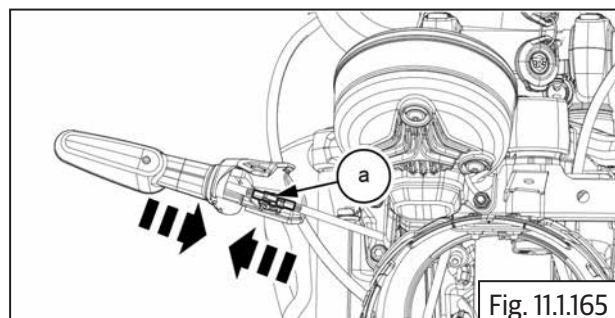
- Fix the clip nut **(a)** to the top cover.



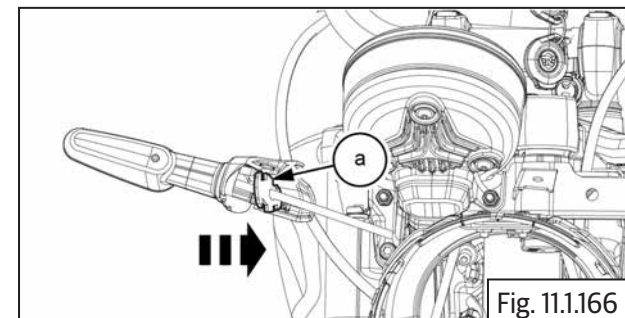
- Locate front trafficator RH **(a)** into RH side bar.



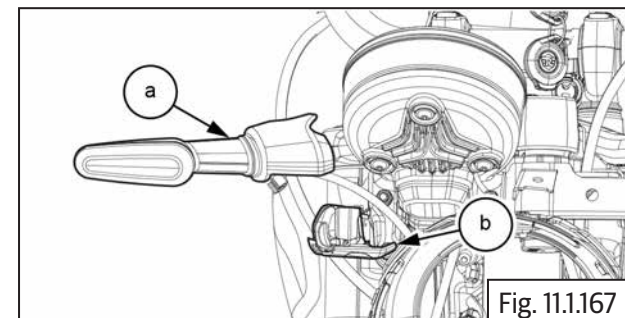
- Connect electrical coupler **(a)** into front trafficator RH.



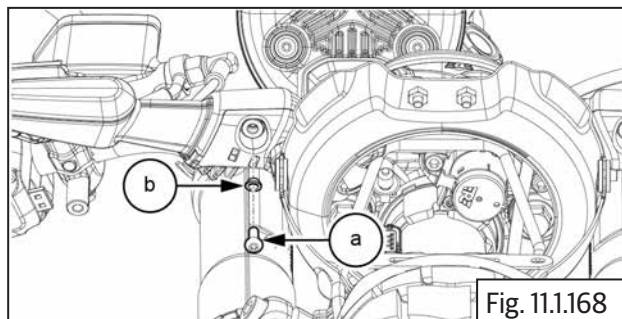
- Gently press and locate retainer clip **(a)** into trafficator RH.



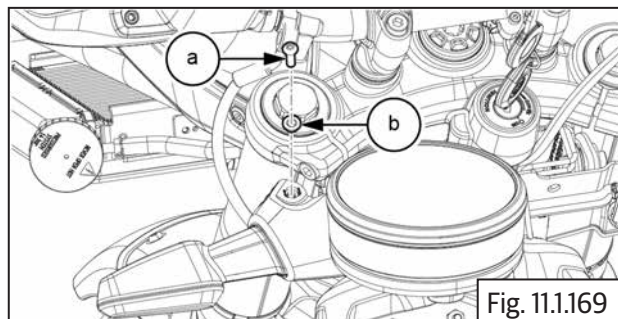
- Locate the top **(a)** and bottom **(b)** trafficator cover on front frame assembly.



- Locate and tighten the button bolt **(M5) (a)** with top hat washer **(b)** on trafficator bottom cover.



- Locate and tighten the button head bolt **(M5) (a)** and top hat washer **(b)** on trafficator upper cover.

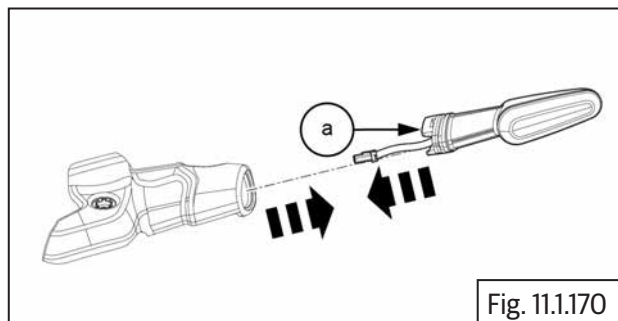


	3mm Allen socket with ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

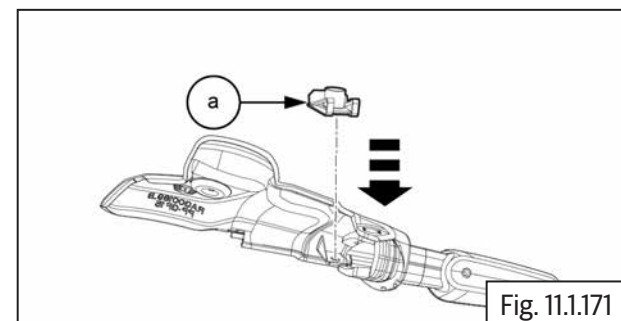
	3mm Allen socket with ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kgf} \cdot \text{m}$

11.27 Front Trafficators LH

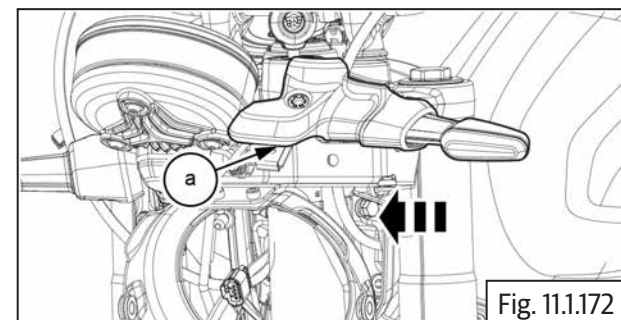
- Install the indicator **(a)** on upper mount cover.



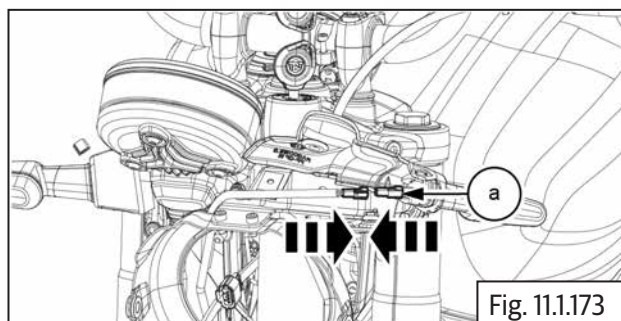
- Fix the clip nut **(a)** on upper mount cover.



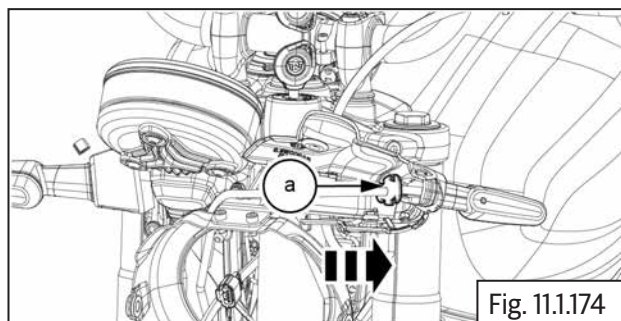
- Locate the trafficator assembly **(a)** on front frame assembly.



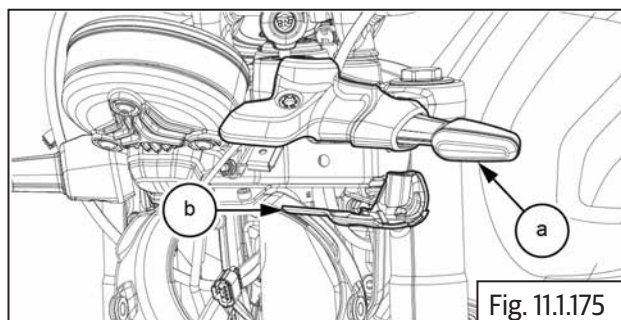
- Connect electrical coupler **(a)**.



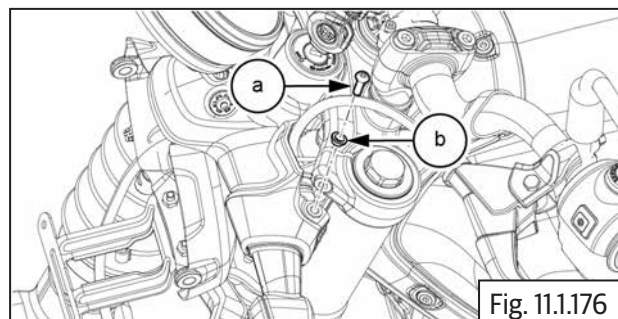
- Fix the retainer clip **(a)** on trafficator.



- Locate the upper **(a)** and lower **(b)** mount cover on front frame assembly.

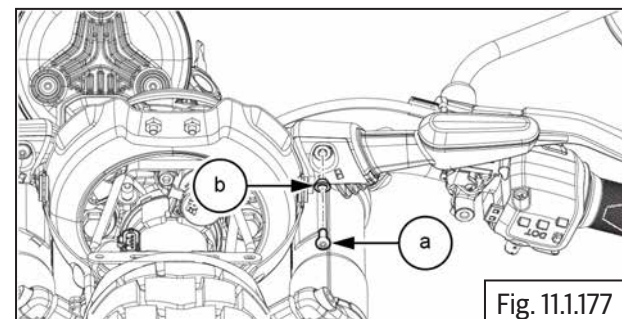


- Locate and tighten the but- ton head bolt **(M5) (a)** and top hat washer **(b)** on trafficator upper mount cover.



	3mm Allen Socket with Ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kg} \cdot \text{m}$

- Locate and tighten the shoulder head bolt **(M6) (a)** with top hat washer **(b)** on trafficator bottom cover.



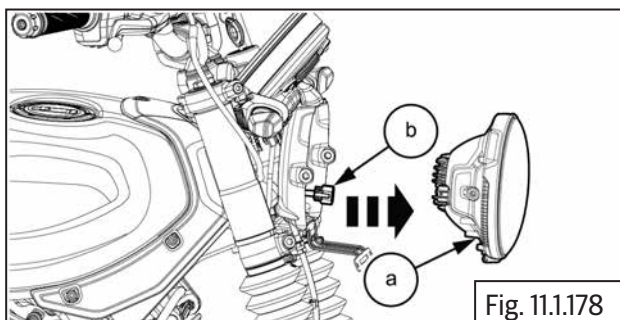
	3mm Allen Socket with Ratchet
	$5 \pm 0.5 \text{ Nm} / 0.5 \pm 0.05 \text{ Kg} \cdot \text{m}$

11.28 Headlamp

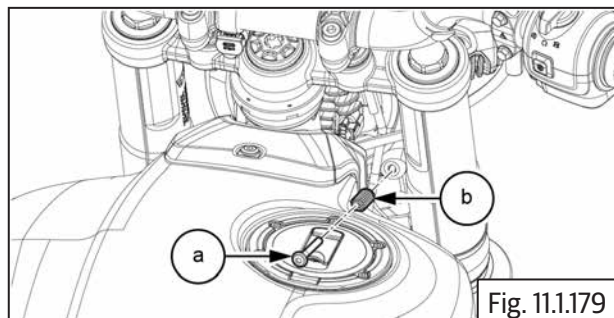
NOTE

- The headlamp has a LED lighting system. In the event of failure, the headlamp LED assembly should be replaced.

- Locate the head lamp assembly **(a)**. Connect the headlamp coupler **(b)**.

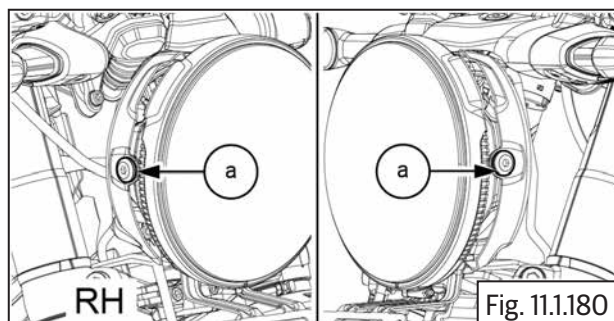


- Gently locate and tighten the head light beam adjustment screw **(a)** with spring **(b)**.



4mm Allen Socket with Ratchet

- Locate and tighten the shoulder head bolts **(a)** on the LH and RH side of the head lamp holder.



4mm Allen Socket with Ratchet

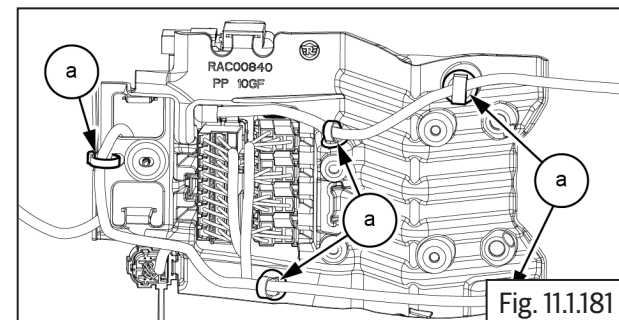


3 - 4 Nm / 0.3 - 0.4kgf-m

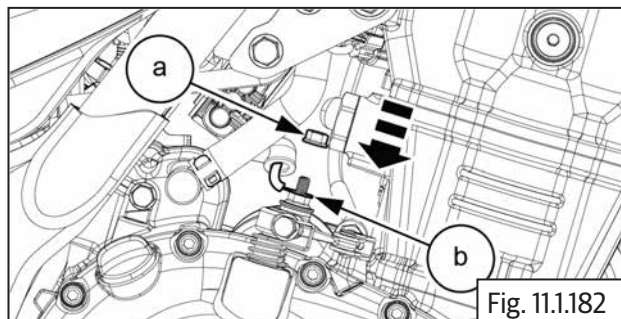
- Connect the battery terminals.
- Make sure the cluster, front trafficators and headlamp are working properly.

11.29 Starter relay with cable

- Locate and align the main cable.
- Fix the **5Nos** wire tags **(a)** to the battery tray.

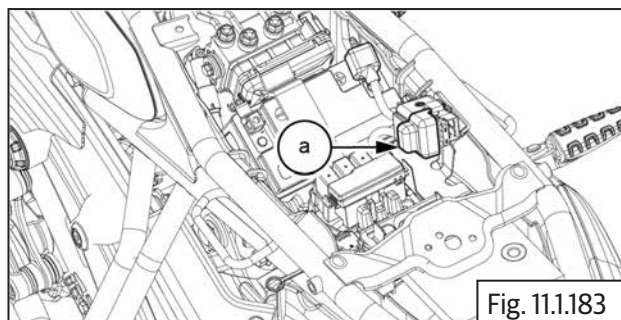


- Locate and tighten the nut **(a)** to self motor main cable **(b)**.

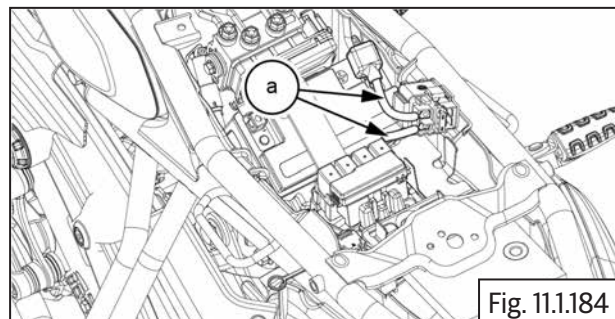


	10mm Socket with Ratchet
	3.5 - 4Nm / 0.35 - 0.4kgf-m

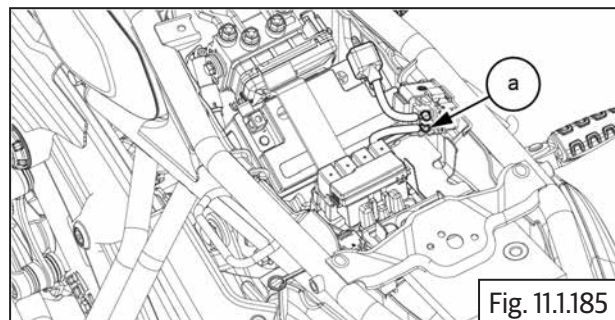
- Locate and align starter relay **(a)** to battery tray.



- Locate the **2Nos** battery main cables **(a)** to starter relay.

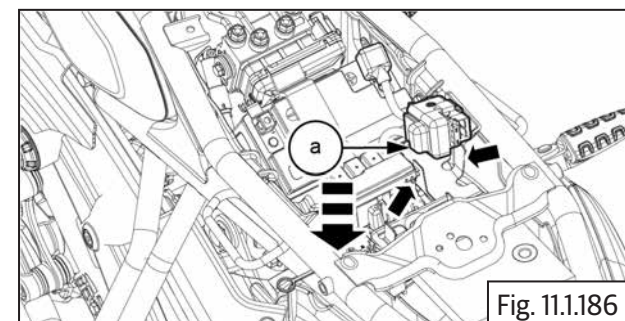


- Locate and tighten the **2Nos** screws **(a)** to the main cable.

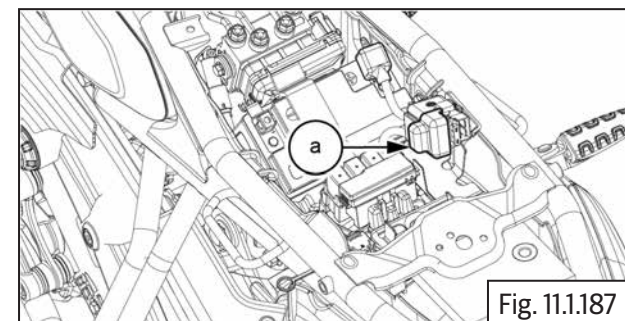


	4mm Allen socket with ratchet
	5Nm / 0.5kgf-m

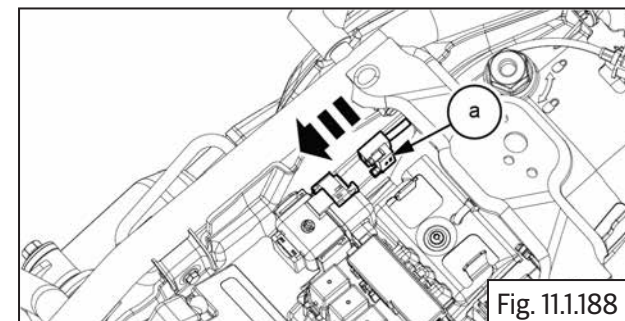
- Insert the starter relay **(a)** into the slot.



- Close the cap **(a)** on the starter relay.

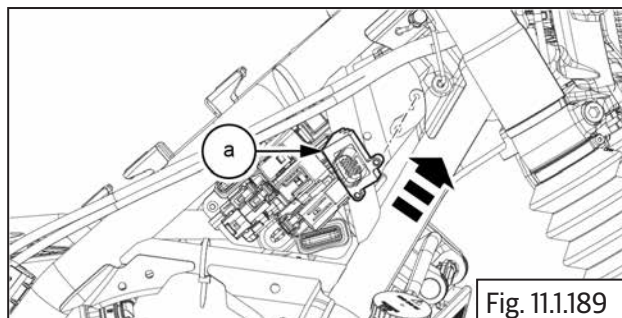


- Connect the starter relay coupler **(a)**.

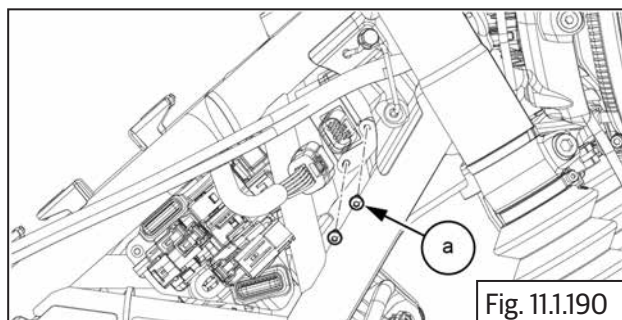


11.30 Electronic flasher

- Locate and align the flasher **(a)** to the chassis frame.

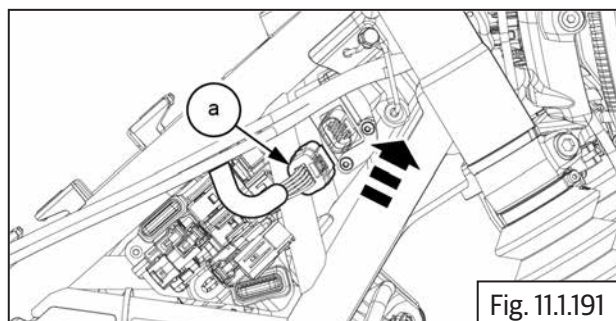


- Locate and tighten **2Nos** screws **(a)** to the Electronic flasher.



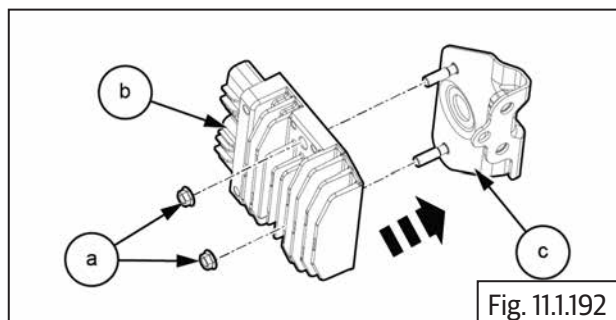
	T20 Torx socket with Ratchet
	1.5 Nm / 0.15 kgf-m

- Connect the flasher coupler **(a)**.



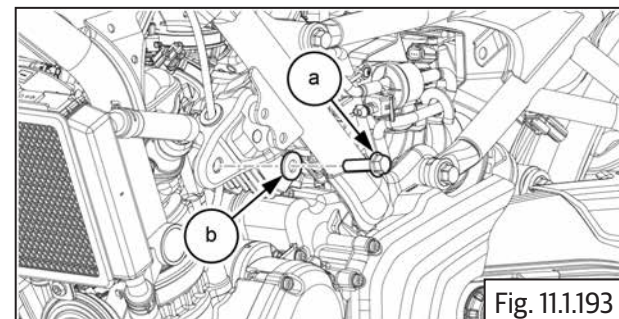
11.31 RR Unit

- Locate and align RR unit **(b)** to bracket **(c)**.
- Locate and tighten **2Nos** nut **(M6)** **(a)** to the RR unit **(b)**.



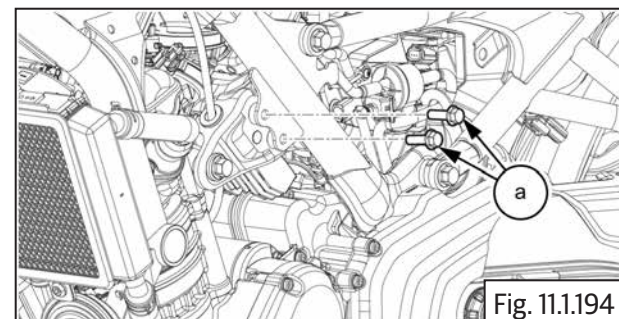
	10 mm Socket with Ratchet
	10 Nm / 1.0 kgf-m

- Locate and tighten Hex flange head bolt **(M10)** **(a)** with washer **(b)** on RR unit bracket.



	14mm Socket with Ratchet
	45Nm / 4.5kgf-m

- Tighten and attach Hex flange head bolts **2 Nos** **(M6)** **(a)** to RR unit bracket.



	12mm Socket with Ratchet
	25Nm / 2.5kgf-m

- Connect **2 Nos** electrical connector **(a)** to RR unit.

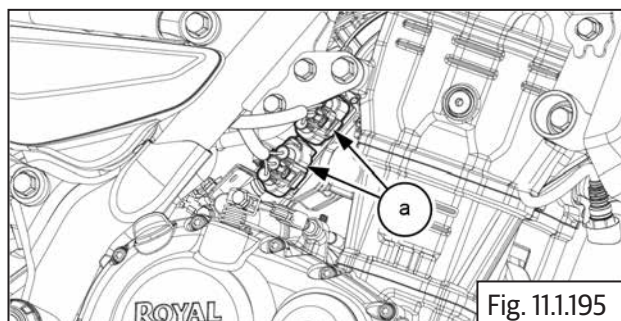


Fig. 11.1.195

11.32 Battery

Battery Terminals

! CAUTION

- **Ensure Ignition and stop switch are in OFF position before connecting battery cables.**

- Locate the battery **(a)** to tray.

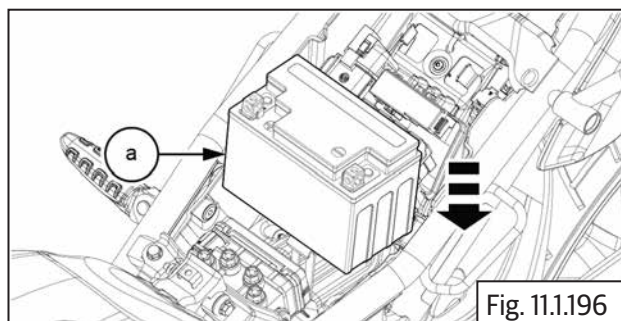


Fig. 11.1.196

- Pull battery strap (belt) **(a)** downwards and secure strap lock to battery strap bracket.

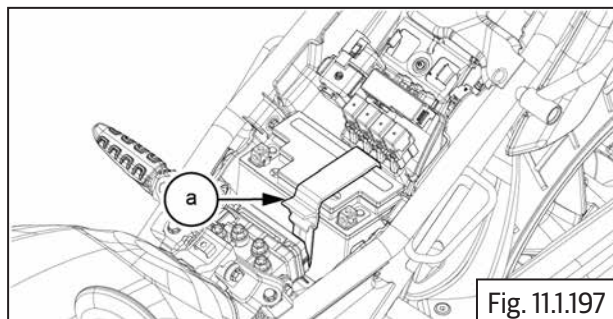


Fig. 11.1.197

- Connect battery negative (-ve) terminal bolt **(a)**.

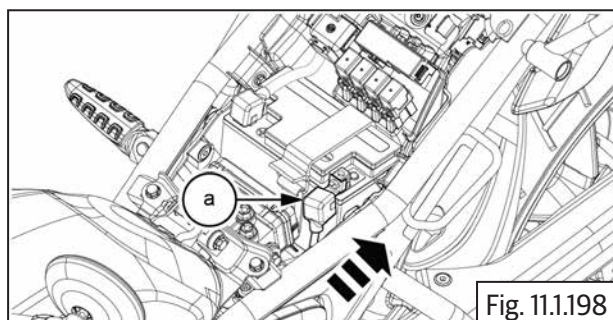


Fig. 11.1.198

	10mm Socket with Ratchet
	3-4Nm / 0.3 - 0.4kgf-m

- Connect battery positive (+ve) terminal bolt **(a)**.

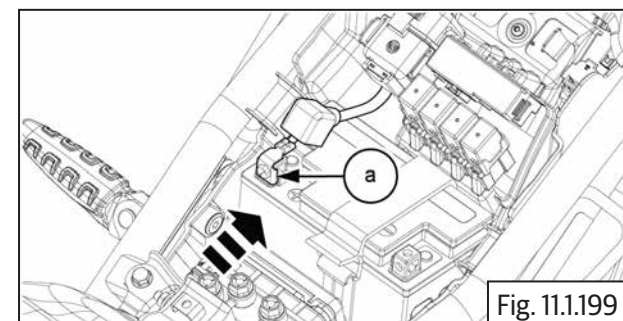


Fig. 11.1.199

	10mm Socket with Ratchet
	3-4Nm / 0.3 - 0.4kgf-m

- Connect the negative (-ve) coupler **(a)**.

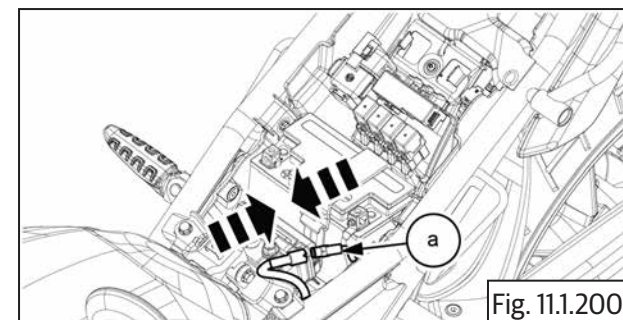
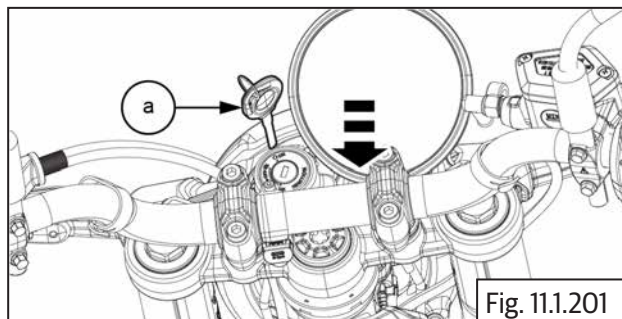


Fig. 11.1.200

- Insert ignition key into the key **(a)** barrel and switch "ON" the engine.

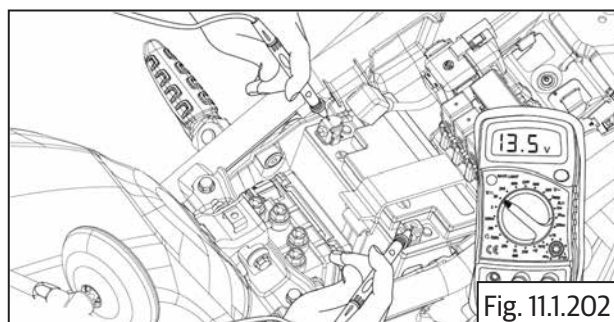


- Make sure the cluster, front trafficators, and head lamps work properly.
- Install the Pillion seat and rider seat assembly. Refer side panel and seat chapter.
- Install the fuel tank assembly. Refer Fuel system chapter

11.33 Battery Charging Voltage Check

Procedure:

- **(i)** Make sure that the battery, RR unit coupler and magneto coupler are connected with the wiring harness.
- **(ii)** Select 20V DC range / VDC range in the multimeter.
- **(iii)** Connect the positive probe (red) of the multimeter to the battery positive terminal and negative probe (black) to the negative terminal of the battery (As shown below).

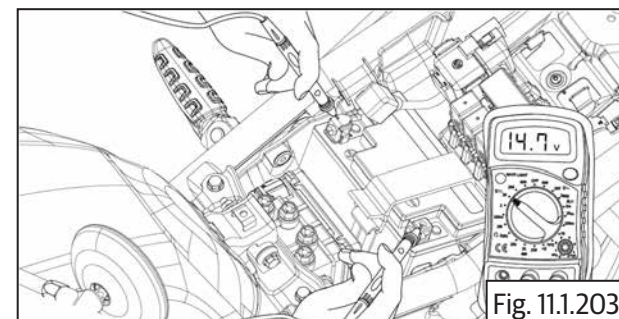


- **(iv)** Turn on the Ignition key and Start the engine.
- **(v)** Increase the throttle and check the battery voltage.

NOTE

- While checking throttle half to full condition Trafficator lamp, Brake lamp and Horn should be in OFF Condition.

- If the voltage is lesser than the specification **(13.5V)** then increase the throttle and check the voltage after **15 - 20 secs**.
- If the problem still remains, then the battery will be either in a discharged or defective condition. Replace with a new battery and repeat the steps from **(i)** to **(v)**.
- If the voltage is greater than the specification **(14.7V)** then change the RR unit and repeat the steps from **(i)** to **(v)**.

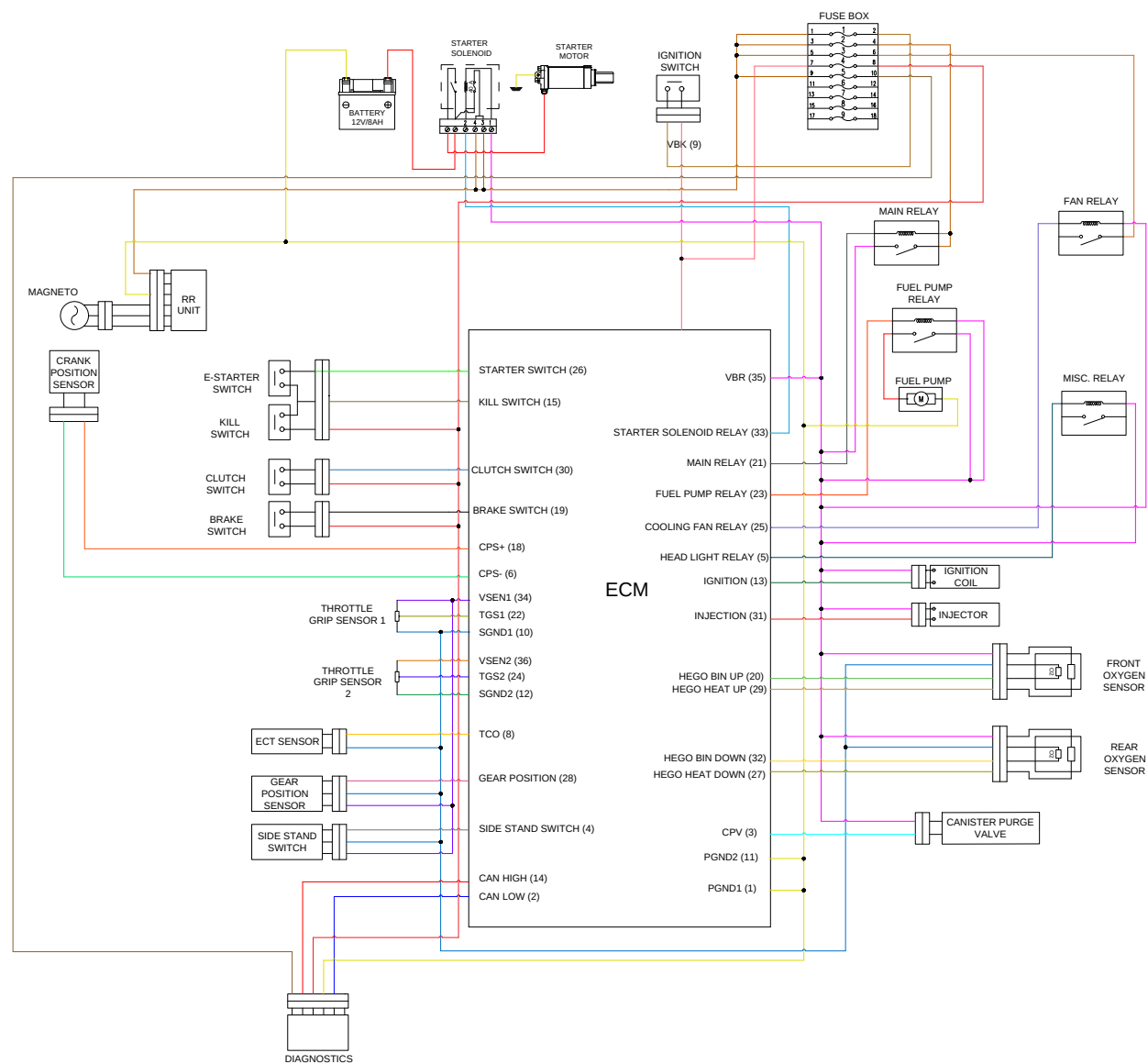


 CAUTION

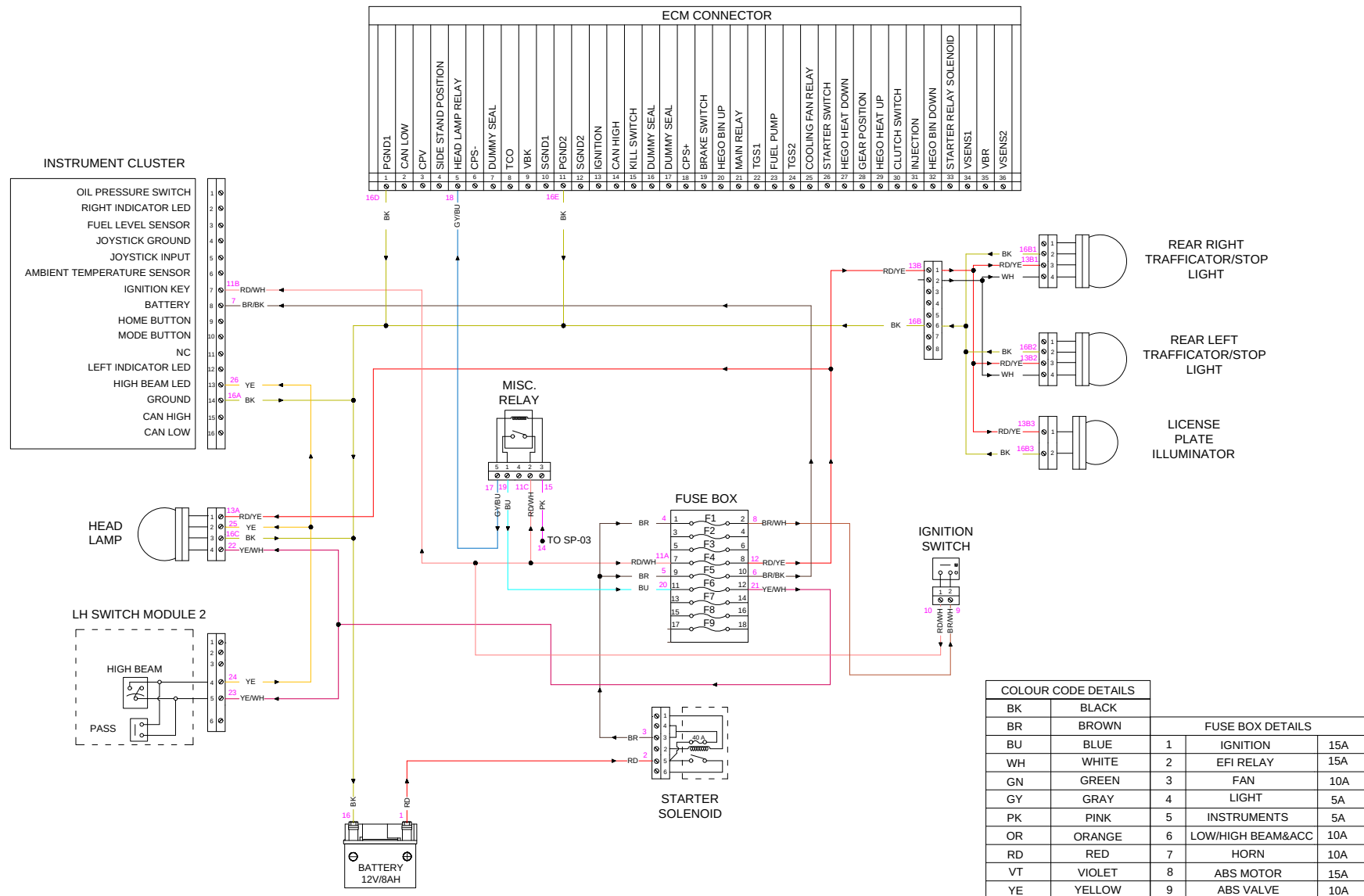
- **Vehicle ignition key shall not be kept ON without engine running for more than 30 secs. Which will lead to Battery discharge.**
- **Electric start switch (ES) shall not be pressed continuously for more than 15 secs. Which will lead to Battery discharge.**

ELECTRICAL SCHEMATICS

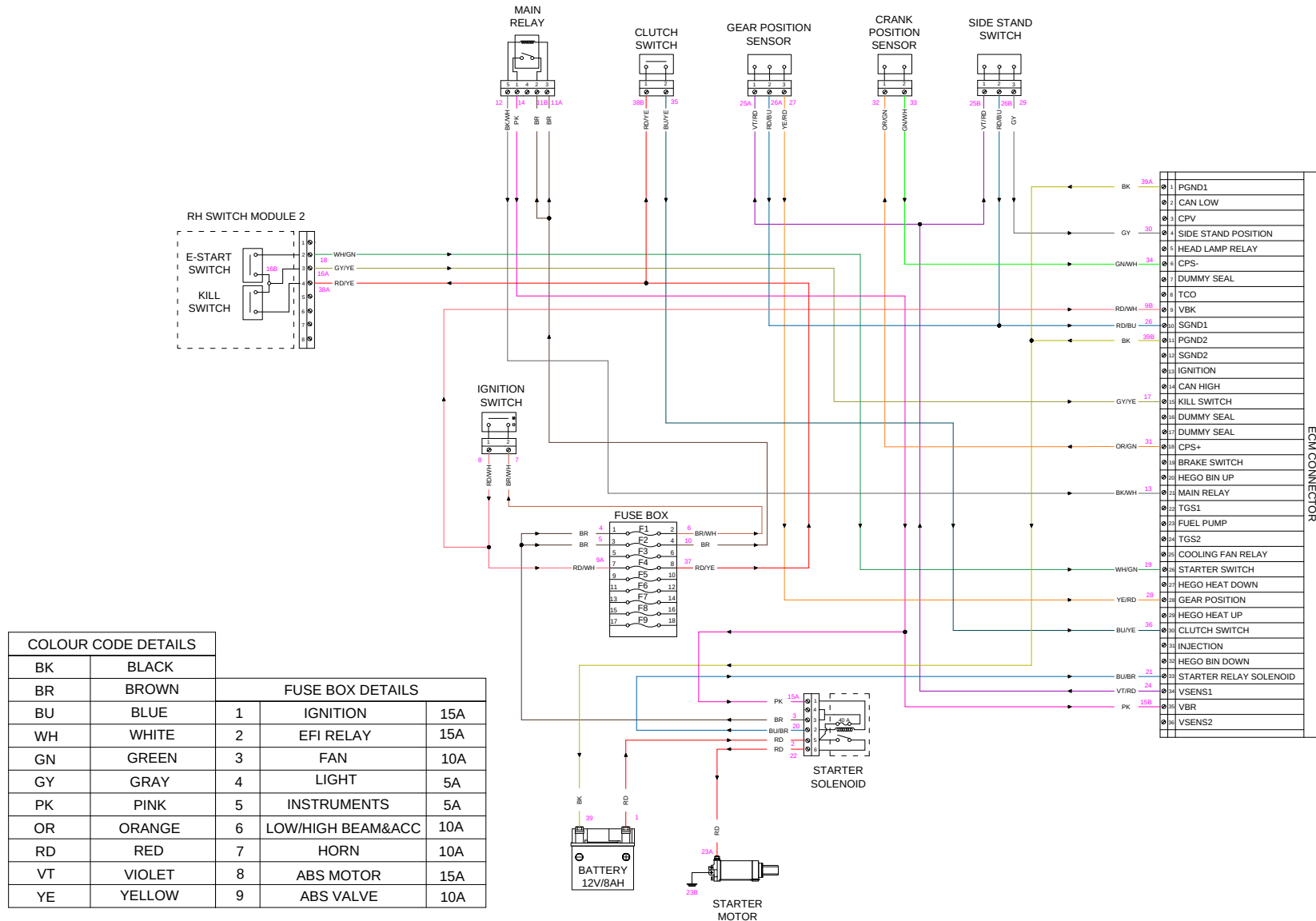
ECM & SPARK



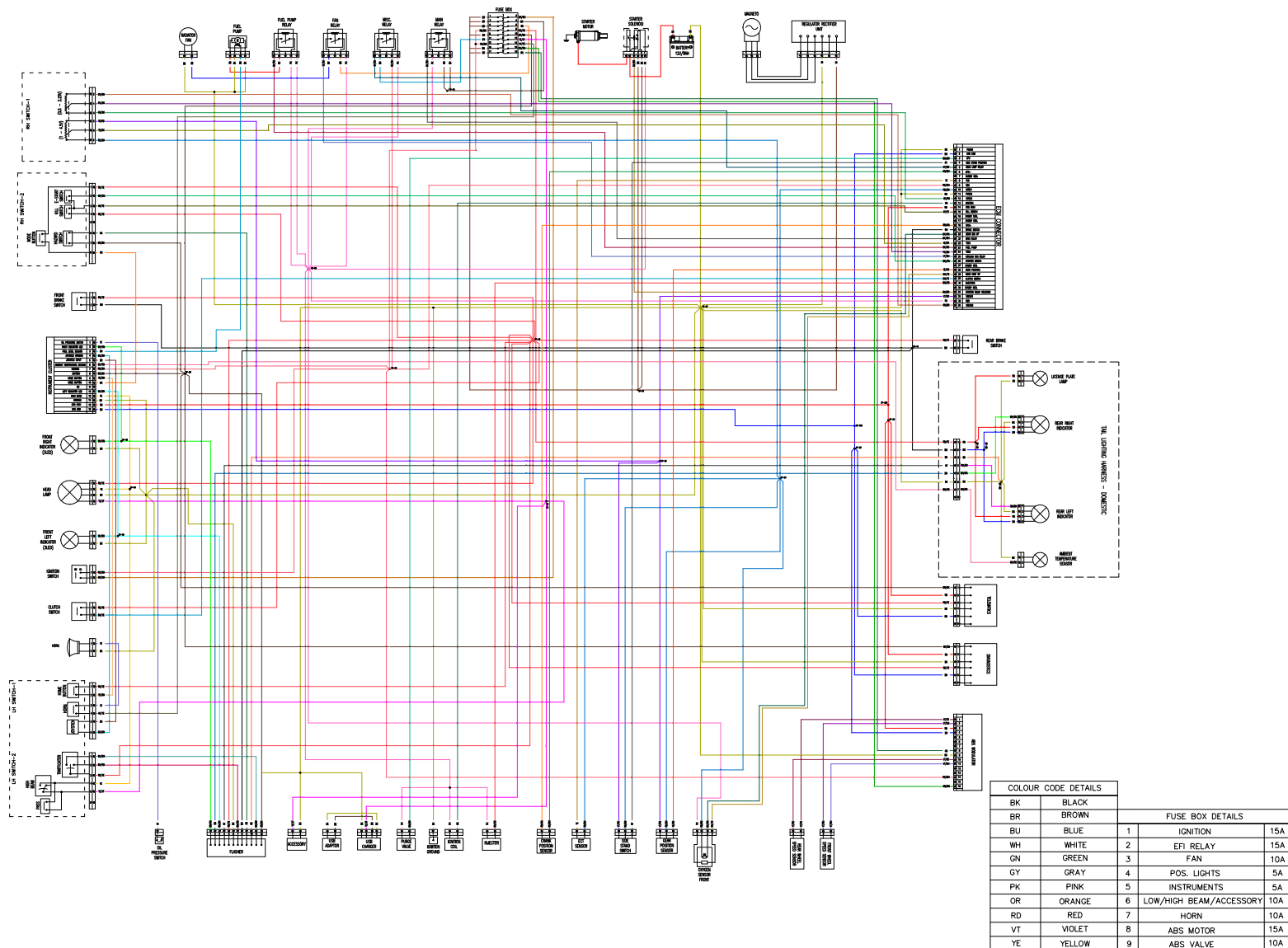
LIGHTING SYSTEM



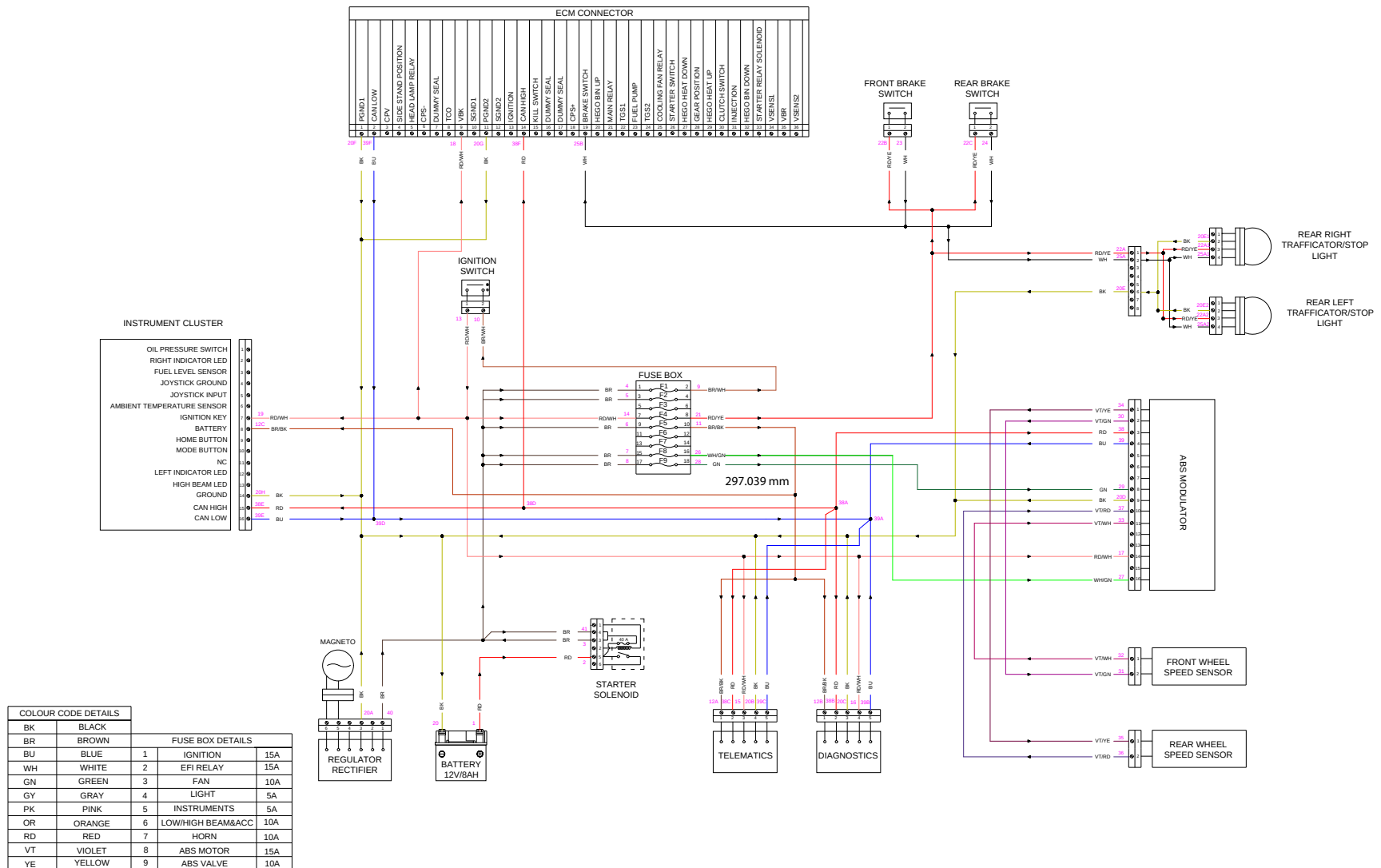
STARTING SYSTEM



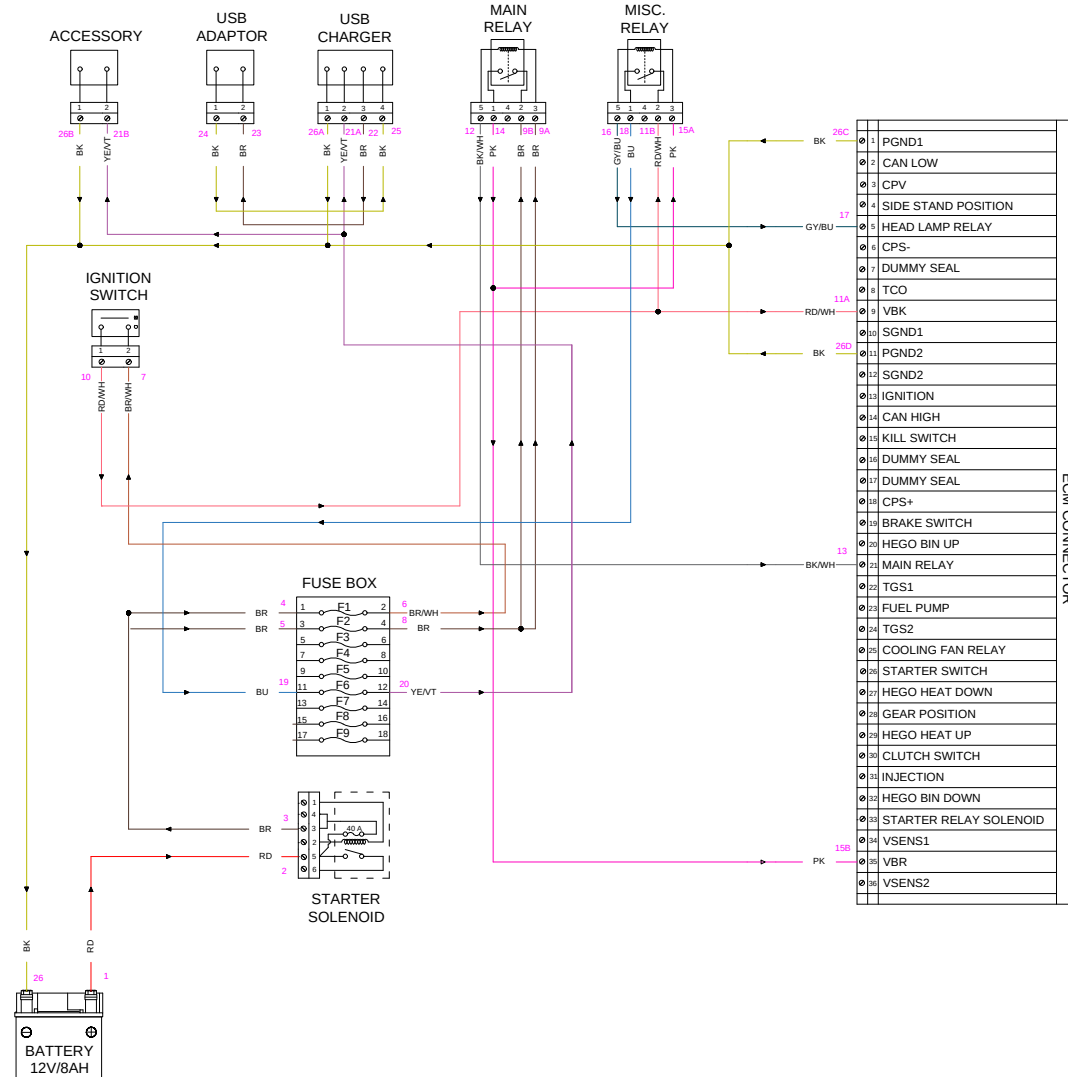
COMPLETE WIRING HARNESS



ABS SYSTEM



ACCESSORY SYSTEM



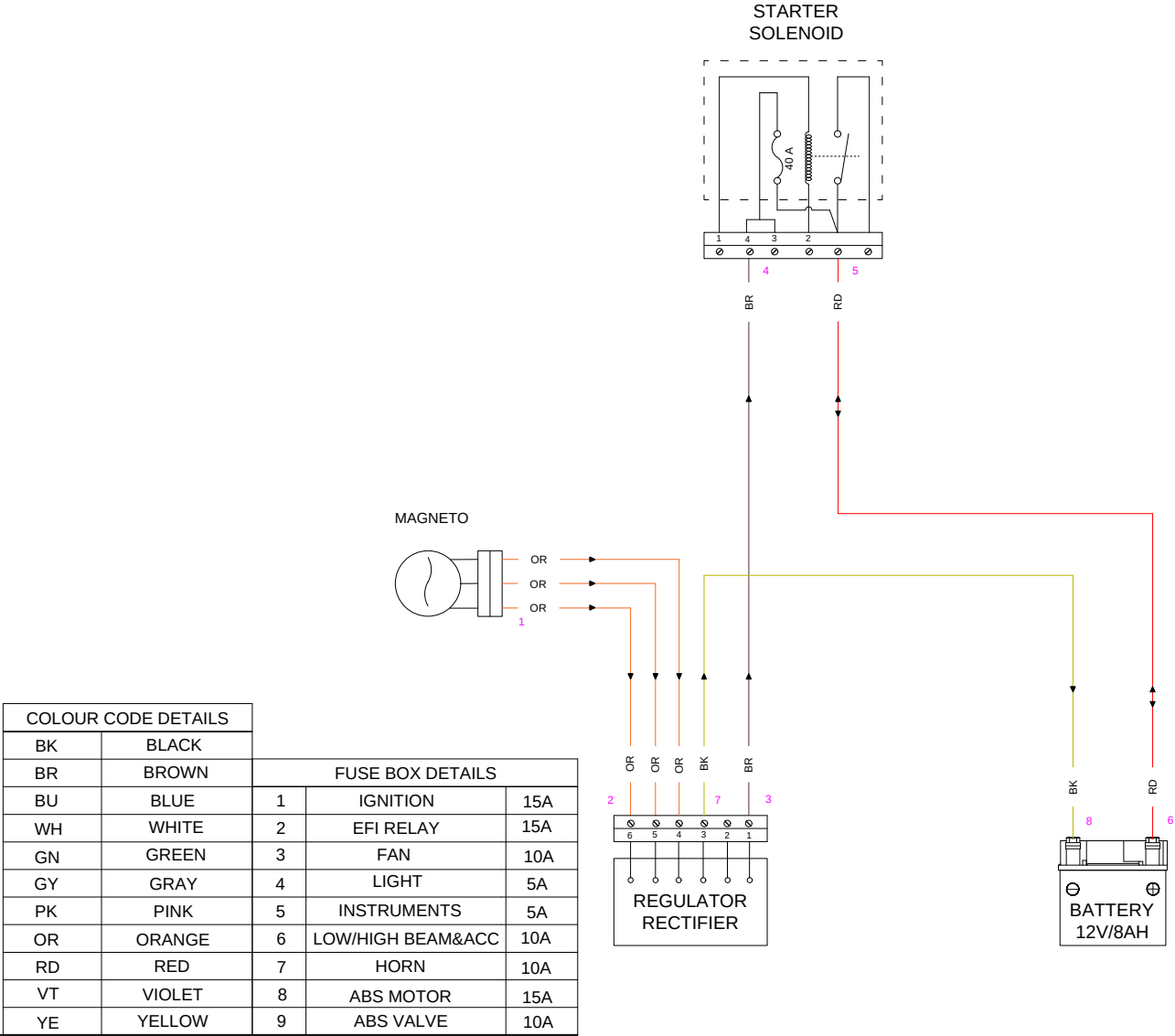
COLOUR CODE DETAILS

BK	BLACK
BR	BROWN
BU	BLUE
WH	WHITE
GN	GREEN
GY	GRAY
PK	PINK
OR	ORANGE
RD	RED
VT	VIOLET
YE	YELLOW

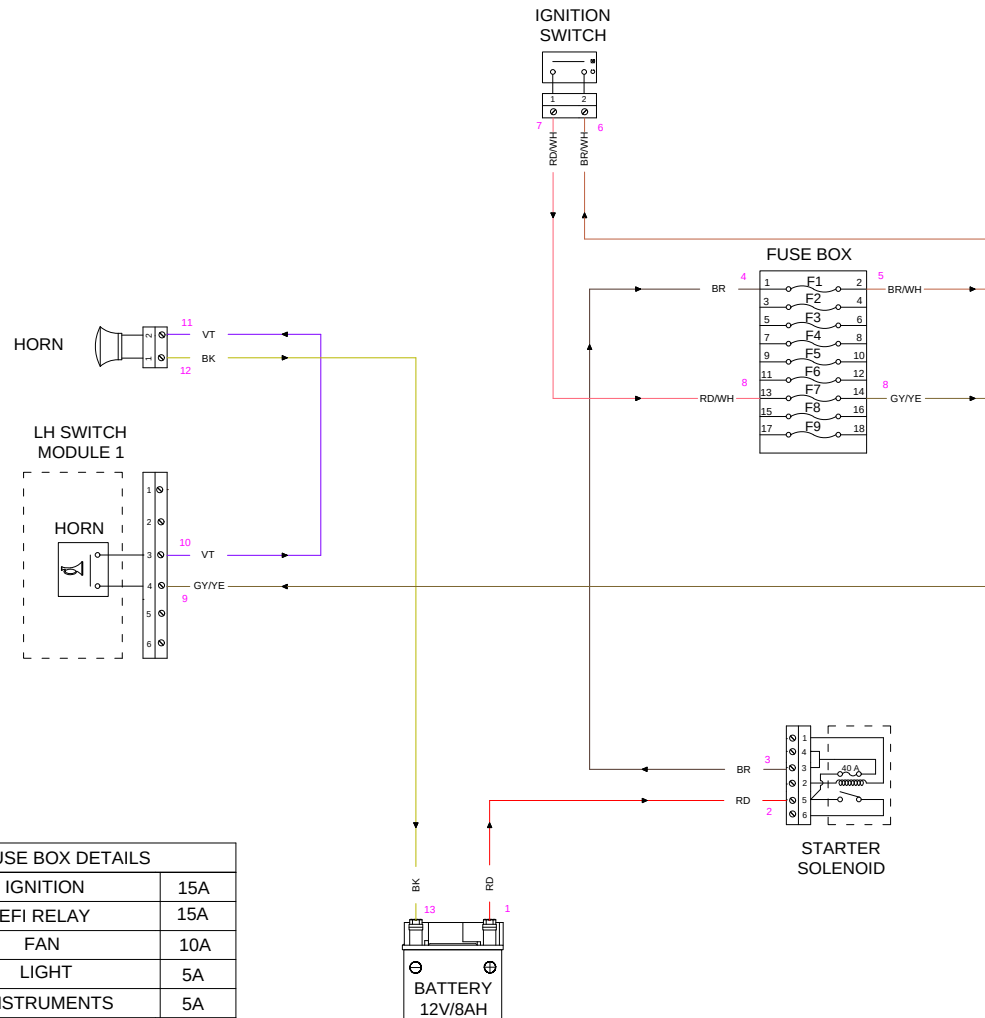
FUSE BOX DETAILS

1	IGNITION	15A
2	EFI RELAY	15A
3	FAN	10A
4	LIGHT	5A
5	INSTRUMENTS	5A
6	LOW/HIGH BEAM&ACC	10A
7	HORN	10A
8	ABS MOTOR	15A
9	ABS VALVE	10A

CHARGING SYSTEM

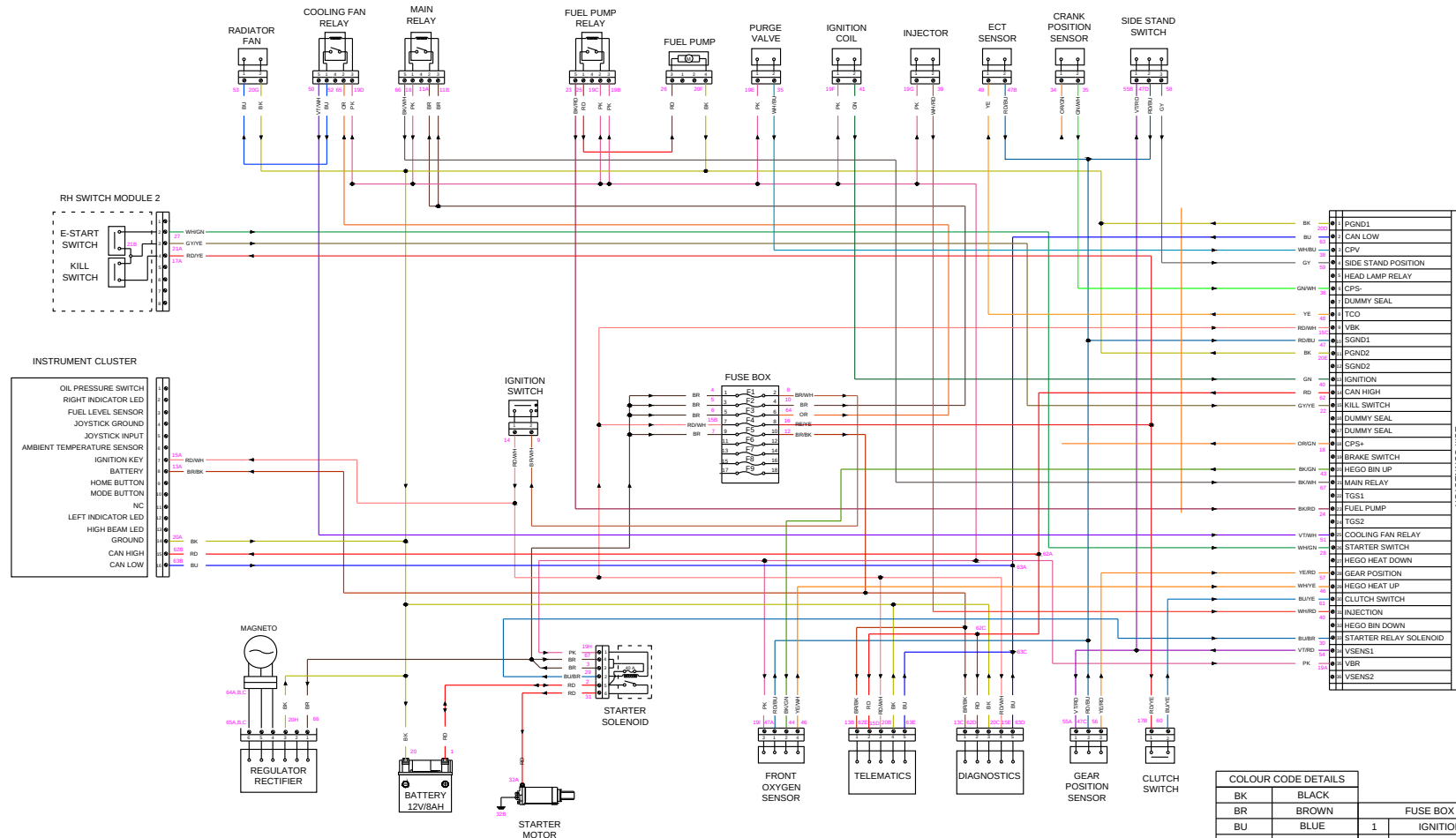


HORN SYSTEM

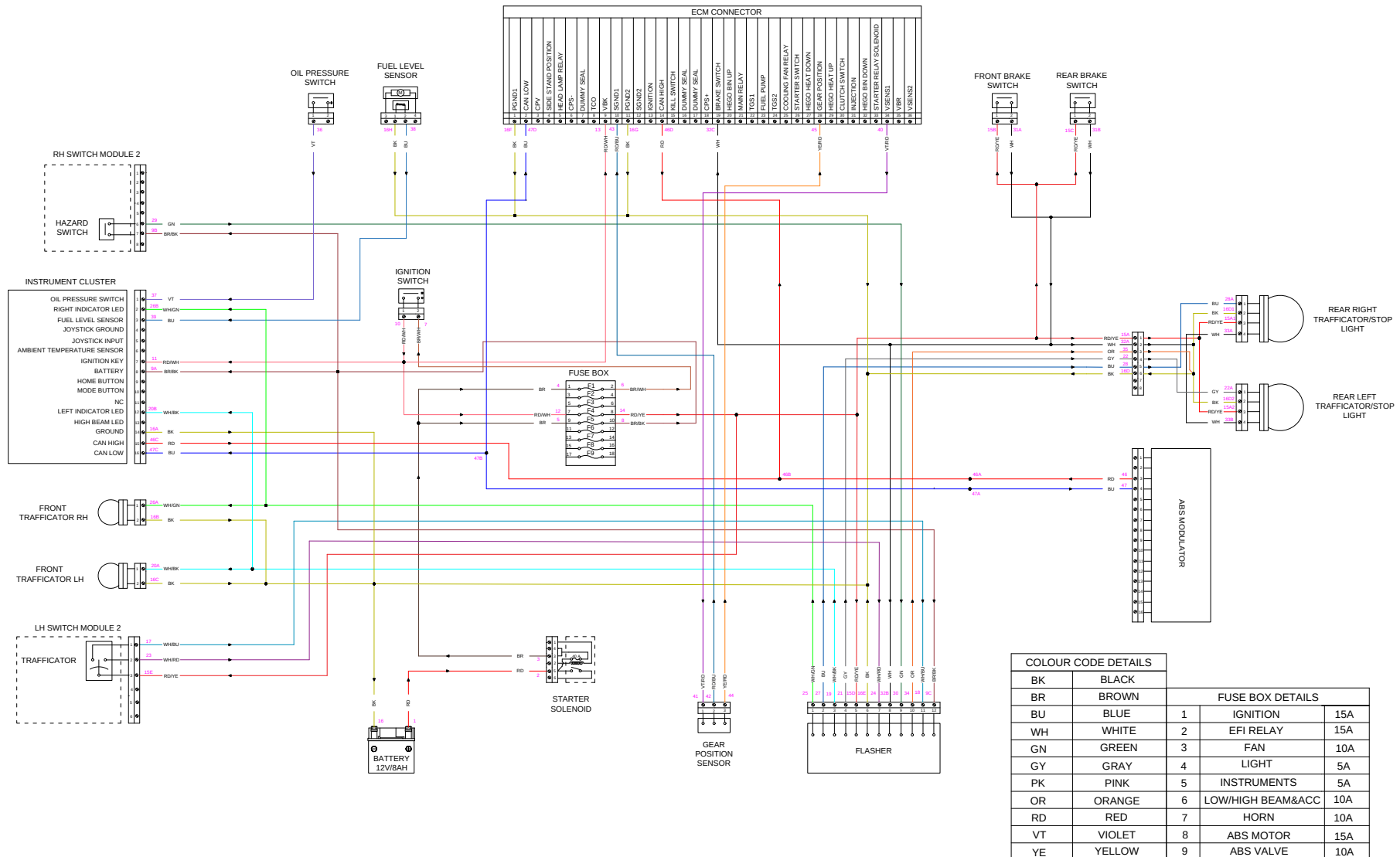


COLOUR CODE DETAILS				
BK	BLACK			
BR	BROWN	FUSE BOX DETAILS		
BU	BLUE	1	IGNITION	15A
WH	WHITE	2	EFI RELAY	15A
GN	GREEN	3	FAN	10A
GY	GRAY	4	LIGHT	5A
PK	PINK	5	INSTRUMENTS	5A
OR	ORANGE	6	LOW/HIGH BEAM&ACC	10A
RD	RED	7	HORN	10A
VT	VIOLET	8	ABS MOTOR	15A
YE	YELLOW	9	ABS VALVE	10A

IGNITION, STARTING & CHARGING SYSTEM



SIGNALLING SYSTEM



INDEX

A

ABS toner wheel
Adjuster nut
Air Filter Box Assembly
Air Filter Element

B

Balancer Shaft
Battery
Bearing
Brake lamp switch
Brake pedal
Breather Hose

C

Camshaft
Center Stand
Chain adjusters
Chain drive sprocket
Clevis pin
Clutch
Clutch Cable
Clutch Cable
Clutch Cover
Connecting Rod
Control Cables
Countershaft
Crankshaft
Cylinder Barrel

Cylinder Head
Cylinder Head Cover

D

Drain Hose
Drain Plug
Drive chain
Drive chain
Driveshaft

E

E-clip
Engine
Engine Oil
Engine Troubleshooting
EVAP
Exhaust Pipes and Silencers

F

FD Sprocket
Footrests
Fork Assembly
Frame Adjuster
Front Brake Disc
Front Mudguard
Front Number Plate
Front Wheel
Fuel Filter
Fuel Float
Fuel Tank

G

Gear Position Indicator Sensor
Grab Handle

H

Handlebar
Handlebar Race
Headlamp
Heel guard

I

Ignition switch
Injector
Inlet Manifold Rubber

J

Journal Bearing

L

LH Cylinder Rocker Carrier
Limiter pad
Lower Crankcase
Lubrication

M

Magneto Cover
Magneto Rotor
Manifold Absolute Pressure (MAP) Sensor
Master cylinder assembly
Mudflap

O

Oil Filter
Oil Jet
Oil Pan
Oil Pressure Switch
Oil Pump

P

Piston
Piston Ring

R

Rear Brake Disc
Rear Mudguard
Rear Mudguard Infill Cover
Rear Number Plate
Rear view mirror
Rear Wheel
Reed Valves
Rider Seat

S

Seat Assembly
Sensors
Shifter Drum
Shifter fork
Shifter Shaft
Shock absorber
Side Panels

Side Stand

Spark Plug

Spark Plug Suppressor Caps

Starter Motor

Steering Stem

Swing Arm

Switch module

T

Throttle Body with ECU

Throttle grip sensor

Throttle Position Sensor (TPS)

Timing Chain Tensioner

Toner wheel

V

Valve

W

Wheel hub

Wheel speed sensor assembly

Wheels



Edition : 30th July 2024

ROYALENFIELD.COM