SERVICE STATION MANUAL

ZP682837

Dune 125 - Dune X 125 - Euro 4

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THE VALUE OF SERVICE

Due to continuous updates and technical training programmes specific to the products, only **Malaguti** Official Network mechanics know this vehicle fully and have the specific tools necessary to carry out maintenance and repair operations correctly.

The reliability of the vehicle also depends on its mechanical conditions. Checking the vehicle before riding it, performing maintenance correctly and using only **original Malaguti spare parts** are essential factors for the reliability of your vehicle!

For information on the nearest **Official Dealer and/or Service Centre** consult our website:
www.ksr-group.com

Only by requesting original spare parts can you be of purchasing products that were developed and tested during the design and development of the vehicle itself. All Malaguti original spare parts undergo quality control procedures to guarantee reliability and durability.

The descriptions and images in this publication are given for illustrative purposes only.

While the basic features as described and illustrated in this manual remain unchanged, KSR Solution GmbH reserves the right, at any time and without being required to update this publication beforehand, to make any changes to components, parts or accessory supplies which it deems necessary to improve the product, or which are required for manufacturing or commercial reasons.

Not all versions/models shown in this publication are available in all countries. The availability of individual versions/models should be confirmed with the official Malaguti sales network.

The Malaguti trademark is the property of KSR Solution GmbH.

KSR Solution GmbH Im Wirtschaftspark 15, 3494 Gedersdorf, Austria

www.ksr-group.com

SERVICE STATION MANUAL
Dune 125 - Dune X 125 - Euro 4

This manual provides the main information to carry out regular maintenance operations on your vehicle. This manual is intended to Malaguti Dealers and their qualified mechanics; several concepts have been deliberately omitted as they are considered unnecessary. As it is not possible to include complete mechanical notions in this manual, users should have basic mechanical knowledge or minimum knowledge about the procedures involved when repairing motorcyle. Without this knowledge, repairing or checking the vehicle may be inefficient or even dangerous. As the vehicle repair and check procedures are not described in detail, be extremely cautious so as not to damage components or injure individuals. In order to optimise customer satisfaction when using our vehicles, **KSR Solution GmbH** commits itself to continually improve its products and the relative documentation. The main technical modifications and changes in repair procedures are communicated to all **Malaguti Sales Outlets and its International Subsidiaries**. These changes will be introduced in the subsequent editions of the manual. In case of need or further queries on repair and check procedures, consult **Malaguti CUSTOMER DEPARTMENT**, which will be prepared to provide any information on the subject and any further communications on updates and technical changes related to the vehicle.

NOTE Provides key information to make the procedure easier to understand and carry out.

CAUTION Refers to specific procedures to carry out for preventing damages to the vehicle.

WARNING Refers to specific procedures to carry out to prevent injuries to the repairer.

Personal safety Failure to completely observe these instructions will result in serious risk of personal injury.

Safeguarding the environment Sections marked with this symbol indicate the correct use of the vehicle to prevent damaging the environment.

Vehicle intactness The incomplete or non-observance of these regulations leads to the risk of serious damage to the vehicle and sometimes even the invalidity of the guarantee

Dune 125

Dune X 125

INDEX OF TOPICS

INDEX OF TOPICS

Rules

Safety rules

Carbon monoxide

If you need to keep the engine running while working on the vehicle, please ensure that you do so in an open or very well ventilated area. Never run the engine in an enclosed area. If you do work in an enclosed area, make sure to use a fume extraction system.

CAUTION

EXHAUST EMISSIONS CONTAIN CARBON MONOXIDE, A POISONOUS GAS WHICH CAN CAUSE LOSS OF CONSCIOUSNESS AND EVEN DEATH.

Fuel

CAUTION

FUEL USED TO DRIVE EXPLOSION ENGINES IS HIGHLY INFLAMMABLE AND CAN BECOME EXPLOSIVE UNDER SPECIFIC CONDITIONS. IT IS THEREFORE RECOMMENDED TO CARRY OUT REFUELLING AND MAINTENANCE PROCEDURES IN A VENTILATED AREA WITH THE ENGINE SWITCHED OFF. DO NOT SMOKE DURING REFUELLING OR NEAR FUEL VAPOUR. AVOID ANY CONTACT WITH NAKED FLAME, SPARKS OR OTHER HEAT SOURCES WHICH MAY CAUSE IGNITION OR EXPLOSION.
DO NOT ALLOW FUEL TO DISPERSE INTO THE ENVIRONMENT.
KEEP OUT OF THE REACH OF CHILDREN.

Hot parts

The engine and the exhaust system components get very hot and remain in this condition for a certain time interval after the engine has been switched off. Before handling these components, make sure that you are wearing insulating gloves or wait until the engine and the exhaust system have cooled down.

Coolant

The coolant contains ethylene glycol which, under certain conditions, can become flammable.

When it burns, ethylene glycol produces an invisible flame which however can cause burns.

CAUTION

TAKE PARTICULAR CARE NOT TO SPILL COOLANT ONTO HOT PARTS OR THE ENGINE AND EXHAUST SYSTEM; THE FLUID MAY CATCH FIRE AND BURN WITH INVISIBLE FLAMES. WHEN CARRYING OUT MAINTENANCE OPERATIONS, IT IS ADVISABLE TO WEAR LATEX GLOVES. WHILE POISONOUS, COOLANT HAS A SWEET TASTE WHICH MAKES IT EXTREMELY APPEALING TO ANIMALS. NEVER LEAVE COOLANT IN OPEN CONTAINERS WHERE IT MAY BE REACHED AND DRUNK BY AN ANIMAL.

KEEP OUT OF THE REACH OF CHILDREN.
NEVER REMOVE THE RADIATOR CAP WHILE THE ENGINE IS STILL HOT. COOLANT IS UNDER PRESSURE AND MAY CAUSE BURNS.

Used engine oil

CAUTION

IT IS ADVISABLE TO WEAR PROTECTIVE IMPERMEABLE GLOVES WHEN SERVICING THE VEHICLE.
HANDLING ENGINE OIL FOR PROLONGED PERIODS AND ON A REGULAR BASIS CAN CAUSE SERIOUS SKIN DAMAGE.
WASH YOUR HANDS CAREFULLY AFTER HANDLING OIL.
HAND THE OIL OVER TO OR HAVE IT COLLECTED BY THE NEAREST USED OIL RECYCLING COMPANY OR THE SUPPLIER.
DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT.
KEEP OUT OF THE REACH OF CHILDREN.

Brake fluid

THE BRAKE FLUID MAY DAMAGE PAINTED, PVC OR RUBBER SURFACES. WHEN SERVICING THE BRAKING SYSTEM, PROTECT THESE COMPONENTS WITH A CLEAN CLOTH. ALWAYS WEAR PROTECTIVE GOGGLES WHEN SERVICING THE BRAKING SYSTEM. THE BRAKE FLUID IS EXTREMELY DANGEROUS TO THE EYES. IN THE EVENT OF ACCIDENTAL CONTACT WITH THE EYES, RINSE THEM IMMEDIATELY WITH PLENTY OF COLD, CLEAN WATER AND SEEK MEDICAL ADVICE.
KEEP OUT OF THE REACH OF CHILDREN.

Battery electrolyte and hydrogen gas

CAUTION

THE BATTERY ELECTROLYTE IS TOXIC, CORROSIVE AND AS IT CONTAINS SULPHURIC ACID, IT CAN CAUSE BURNS WHEN IN CONTACT WITH THE SKIN. WHEN HANDLING BATTERY ELECTROLYTE, WEAR TIGHT-FITTING GLOVES AND PROTECTIVE APPAREL. IN THE EVENT OF SKIN CONTACT WITH THE ELECTROLYTIC FLUID, RINSE WELL WITH PLENTY OF CLEAN WATER. IT IS PARTICULARLY IMPORTANT TO PROTECT YOUR EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS. IF THE FLUID GETS IN CONTACT WITH YOUR EYES, WASH WITH ABUNDANT WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY. THE BATTERY RELEASES EXPLOSIVE GASES; KEEP IT AWAY FROM FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCES. ENSURE ADEQUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY.
KEEP OUT OF THE REACH OF CHILDREN.
BATTERY LIQUID IS CORROSIVE. DO NOT POUR OR SPILL ON PLASTIC COMPONENTS IN PARTICULAR. ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING ACTIVATED.

Maintenance rules

GENERAL PRECAUTIONS AND INFORMATION

When repairs, disassembly and reassembly of the vehicle is carried out, follow the following recommendations strictly.

BEFORE DISASSEMBLING COMPONENTS

- Remove the dirt, mud, dust and foreign objects from the vehicle before disassembling components. Wherever required, use the special tools designed for this vehicle.

DISASSEMBLING COMPONENTS

- Do not loosen and/or tighten the screws and nuts using pliers or other tools, but always use the specific wrench.
- Mark the positions on all the connection joints (hoses, cables, etc.) before separating them and identify them with different distinctive marks.
- Each piece should be clearly marked in order to be identified during the installation phase.
- Carefully clean and wash the disassembled components with detergents with a low flammability grade.
- Keep the coupled parts together because they have "adapted" to one another following normal wear.
- Some components must be used together or replaced entirely.
- Keep away from heat sources.

REASSEMBLING COMPONENTS

CAUTION

BEARINGS MUST ROTATE FREELY, WITHOUT JAMMING AND/OR NOISE, OTHERWISE, THEY NEED TO BE REPLACED.

- Only use ORIGINAL Malaguti SPARE PARTS.
- Comply with lubricant and consumables use guidelines.
- Lubricate parts (whenever possible) before reassembling them.
- When tightening nuts and screws, start either from the components with the largest diameter or from the innermost components, proceeding diagonally. Tighten nuts and screws in successive steps before applying the tightening torque.
- Always replace self-locking nuts, washers, sealing rings, circlips, O-rings (OR), cotter pins and screws with new parts if the thread is damaged.
- When assembling the bearings, make sure to lubricate them well.
- Check that each component is assembled correctly.
- After a repair or routine maintenance, carry out pre-ride checks and test the vehicle on private grounds or in an area with low traffic.
- Clean all mating surfaces, oil seal rims and gaskets before refitting. Smear a thin layer of lithium-based grease on the oil seal rims. Reassemble oil seals and bearings with the brand or batch number facing outward (visible side).

ELECTRICAL CONNECTORS

Electric connectors must be disconnected as described below; failure to comply with this procedure causes irreparable damage to both the connector and the wiring harness:

Press the relative safety clips, if applicable.

- Grip the two connectors and disconnect them by pulling them in opposite directions.
- If any signs of dirt, rust, moisture, etc. are noted, clean the inside of the connector carefully with a jet of compressed air.
- Ensure that the cables are correctly fastened to the internal connector terminals.
- Then connect the two connectors, ensuring that they couple correctly (if fitted with clips, you will hear them "click" into place).

CAUTION

DO NOT DISCONNECT CONNECTORS BY PULLING THE CABLES.

NOTE

THE TWO CONNECTORS CAN ONLY BE CONNECTED IN ONE DIRECTION: CONNECT THEM THE RIGHT WAY ROUND.

TIGHTENING TORQUE

CAUTION

REMEMBER THAT THE TIGHTENING TORQUE FOR ALL THE FIXING ELEMENTS LOCATED ON WHEELS, BRAKES, WHEEL AXLES AND OTHER SUSPENSION COMPONENTS PLAY A FUNDAMENTAL ROLE IN GUARANTEEING THE SAFETY OF THE VEHICLE AND MUST BE KEPT AT THE PRESCRIBED VALUES. REGULARLY CHECK THE TIGHTENING TORQUE OF THE FIXING ELEMENTS AND ALWAYS USE A TORQUE WRENCH WHEN REFITTING. IF THESE WARNINGS ARE NOT OBSERVED, ONE OF THESE COMPONENTS COULD LOOSEN AND COME OFF, BLOCKING A WHEEL OR CAUSING OTHER PROBLEMS THAT WOULD COMPROMISE MANOEUVRABILITY, LEADING TO A CRASH WITH THE RISK OF SERIOUS INJURY OR EVEN DEATH.

Running-in

Running the engine in correctly is essential for ensuring engine longevity and functionality. Twisty roads and gradients are ideal for running in the engine, brakes and suspension effectively. Vary your riding speed during the running in period. This ensures that components operate in "loaded" conditions and then "unloaded" conditions, allowing the engine components to cool.

CAUTION

THE FULL PERFORMANCE OF THE VEHICLE IS ONLY AVAILABLE AFTER THE SERVICE AT THE END OF THE RUNNING IN PERIOD.

Follow these guidelines:

- Do not fully open the throttle grip abruptly at low engine speeds, either during or after the running in period.
- During the first 100 Km (62 miles) use the brakes gently, avoiding sudden or prolonged braking. That is to permit the adequate adjustment of the pad friction material to the brake discs.

AFTER THE SPECIFIED MILEAGE, TAKE YOUR VEHICLE TO AN Official Malaguti Dealer FOR THE CHECKS INDICATED IN THE "RECOMMENDED PRODUCTS" TABLE IN THE SCHEDULED MAIN- TENANCE SECTION TO AVOID INJURING YOURSELF, OTHERS AND /OR DAMAGING THE VEHICLE.

Vehicle identification

SERIAL NUMBER LOCATION

These numbers are necessary for vehicle registration.

NOTE

ALTERING IDENTIFICATION NUMBERS MAY BE SERIOUSLY PUNISHABLE BY LAW. IN PARTICULAR, MODIFYING THE CHASSIS NUMBER IMMEDIATELY VOIDS THE WARRANTY.

This number consists of numbers and letters, as in the example shown below.

VB4ET500XXXXXXXXX

KEY:

VB4: WMI (World Manufacturer Identifier) code;

ET5: model;

00: (Dune 125) version; **01**: (Dune X 125) version;

X: digit free;

X: year of manufacture;

X: production plant;

XXXXXX: serial number (6 digits);

CHASSIS NUMBER

The chassis number is stamped on the RH side of the headstock.

ENGINE NUMBER (in countries where applicable)

The engine number is stamped on the top of the right hand side of the crankcase, near the rear shock absorber.

The engine number is visible from right hand side of the vehicle, looking from the rear.

Engine No.:.....

Dimensions and mass

WEIGHT AND DIMENSIONS

Specification	Desc./Quantity
Maximum length (Dune 125)	2130 mm
Maximum length (Dune X 125)	2180 mm
Maximum width (Dune 125)	790 mm
Maximum width (Dune X 125)	795 mm
Maximum height to top fairing (Dune 125)	1245 mm
Maximum height to top fairing (Dune X 125)	1445 mm
Wheel base(Dune 125)	1425 mm
Wheel base(Dune X 125)	1435 mm
Kerb weight (Dune 125)	205 kg
Kerb weight (Dune x 125)	211 kg

Engine

ENGINE

Specification	Desc./Quantity
Engine type	Single cylinder 4 stroke
Engine capacity	124.2 cm³ (7.58 cu in)
Bore x stroke	(58 x 47) mm; (2.28 x 1.85) in
Compression ratio	12.0 +/- 0.5: 1
Start-up	electric
Idle speed	1700 +/- 100 rpm
Clutch	multi plate wet clutch operated from hand lever on left hand side of handlebar.
Cooling	liquid

GEARBOX

Specification	Desc./Quantity
Type	6 speed mechanical gearbox with pedal shifter on the left hand side of engine, which operates the fork and drum selector mechanism.

Transmission

DRIVE RATIOS

Specification	Desc./Quantity
Drive ratio, 1st gear	11 / 33 = 1: 3.000
Drive ratio, 2nd gear	15 / 30 = 1: 2.000
Drive ratio, 3rd gear	18 / 27 = 1: 1.500
Drive ratio, 4th gear	20 / 24 = 1: 1.200
Drive ratio, 5th gear	25 / 27 = 1: 1.080
Drive ratio, 6th gear	23 / 22 = 1: 0.956
Final drive ratio	13 / 62 = 1: 4.769

Capacities

CAPACITY

Specification	Desc./Quantity
Fuel tank	11.2+/- 3% L
Fuel tank reserve	1.5 L
Engine oil	1000 cm³
Seats	2
Coolant	0.8 L
Maximum weight limit	300 kg (rider + passenger + luggage)

Electrical system

IGNITION

Specification	Desc./Quantity
Type	EFI

SPARK PLUG

Specification	Desc./Quantity
Spark plug	NGK CR9EKB or NGK CR9EB / NGK CR8EB
Electrode gap	0.6-0.7 mm (0.024-0.027 in)

ELECTRICAL SYSTEM

Specification	Desc./Quantity
Battery	12V - 6Ah
Fuses	30A,10A
Alternator	13V - 235W

BULBS

Specification	Desc./Quantity
Low-beam/high-beam headlight (1 dual-filament bulb)	HS1 - 12V - 35W
Daylight running light	12V - 5W
Turn indicator light	LED
tail light /stop lights	LED
Licence plate light	12V - 5W

WARNING LIGHTS

Specification	Desc./Quantity
Instrument cluster indicator lamps	LED

Frame and suspensions

CHASSIS

Specification	Desc./Quantity
Frame type	Steel outer frame

SUSPENSIONS

Specification	Desc./Quantity
Front	Upright hydraulic telescopic fork Front
fork travel（Dune125）	160 mm (6.30 in)
fork travel（Dune X 125）	182 mm（7.165 in）
Rear	hydraulic single shock-absorber
Rear shock absorber travel（Dune125）	42.5 mm (1.673 in)
Rear shock absorber travel（DuneX125）	47.5 mm（1.87 in）

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	disc
Rear brake	disc

Wheels and tyres

WHEELS

Specification	Desc./Quantity
Type	with spokes with alloy rims, for tyres with inner tubes
Front (Dune 125)	2.15"x 18"
Front (Dune X 125)	1.85"x 21"
Rear (Dune 125)	3.00"x 17"
Rear (Dune X 125)	3.00"x 17"

TYRES

Specification	Desc./Quantity
Front (Dune 125)	100/90-18" 56P
Front (Dune X 125)	90/90-21" 54P

Specification	Desc./Quantity
Front tyre pressure, rider only	1.9 bar (190 kPa) (27.56 PSI)
Front tyre pressure, rider+ passenger	2.0 bar (190 kPa) (29.01 PSI)
Rear (Dune 125)	130/80-17" 65P
Rear (Dune X 125)	130/80-17" 65P
Rear tyre pressure, rider only	2.1 BAR (210 kPa) (30.46 PSI)
Rear tyre pressure, rider + passenger	2.2 BAR (210 kPa) (31.91 PSI)

Supply

FUEL SYSTEM

Specification	Desc./Quantity
Fuel	Unleaded petrol max E10 (95 RON)

Tightening Torques

If the following tables do not expressly indicate the tightening torque values, refer to the table with the generic torque values indicated below.

GENERAL TIGHTENING TORQUES

	M4	M5	M6	M8	M10	M12
Metric tightening torque: TE - TEFL - SHC - TBEI - TCC - TS	3 Nm (2.21 lb ft)	6 Nm (4.43 lb ft)	10 Nm (7.38 lb ft)	25 Nm (18.44 lb ft)	50 Nm (36.88 lb ft)	80 Nm (59.00 lb ft)

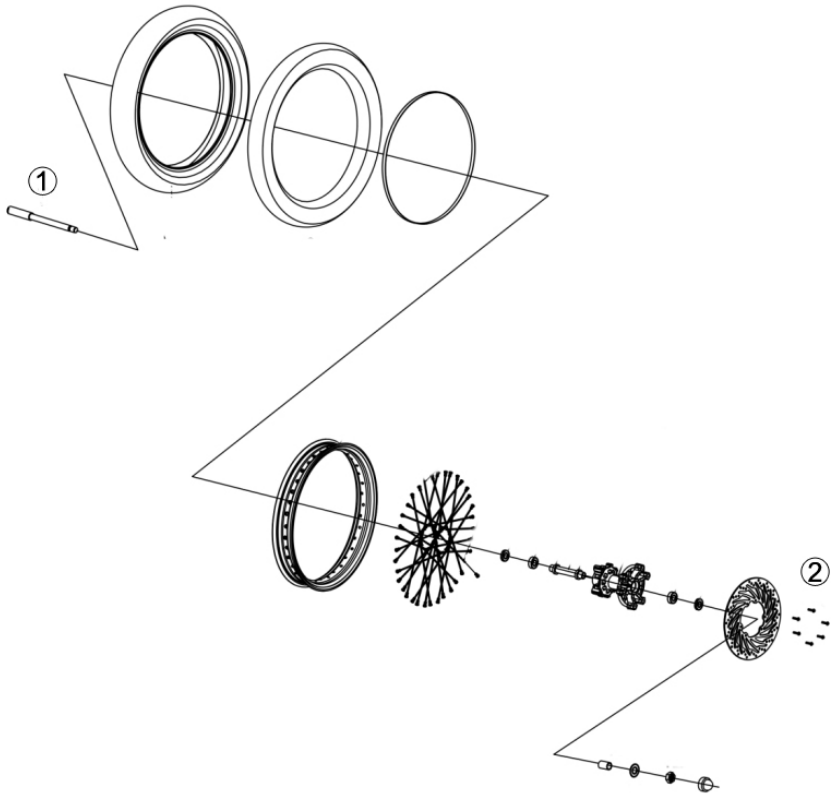
GENERAL TIGHTENING TORQUES FOR SELF TAPPING SCREWS FOR PLASTIC

	2.9 mm	3.9 mm	4.2 mm	5 mm
Tightening torque	2 Nm (1.48 lb ft)	2 Nm (1.48 lb ft)	3 Nm (2.21 lb ft)	3 Nm (2.21 lb ft)

CAUTION

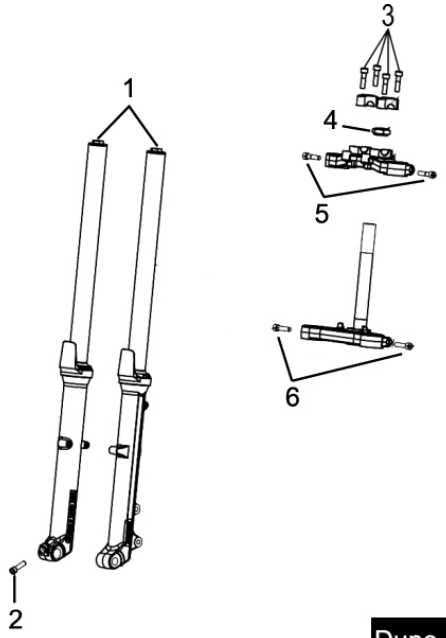
THE SCREWS WITH THREAD-LOCK SEALANT (PRE-IMPREGNATED) MUST BE REPLACED WITH NEW SCREWS AFTER THEY HAVE BEEN LOOSENED.
BEFORE FITTING THE NEW SCREWS, CLEAN THE THREADED HOLES CAREFULLY, MAKING SURE THAT ALL TRACES OF THE OLD THREAD-LOCK SEALANT HAVE BEEN ELIMINATED.

Chassis



FRONT WHEEL

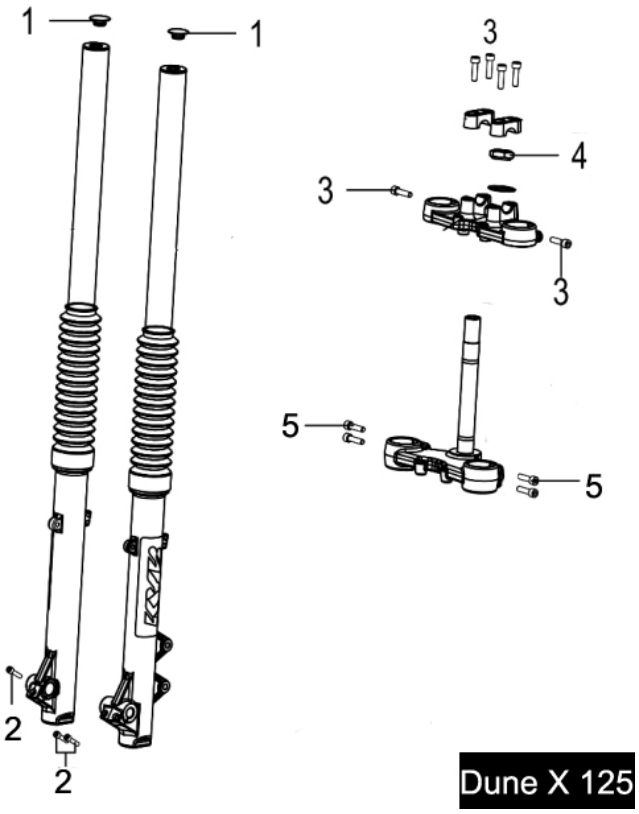
pos.	Description	Type	Quantity	Torque	Notes
1	Wheel fastening pin	M14	1	70/80 Nm (51.63/59 lb ft)	-
2	SHC front brake disc fastening screws	M6x20	6	10/12 Nm (7.38/8.85 lb ft)	Loct. 243



Dune 125

FORK

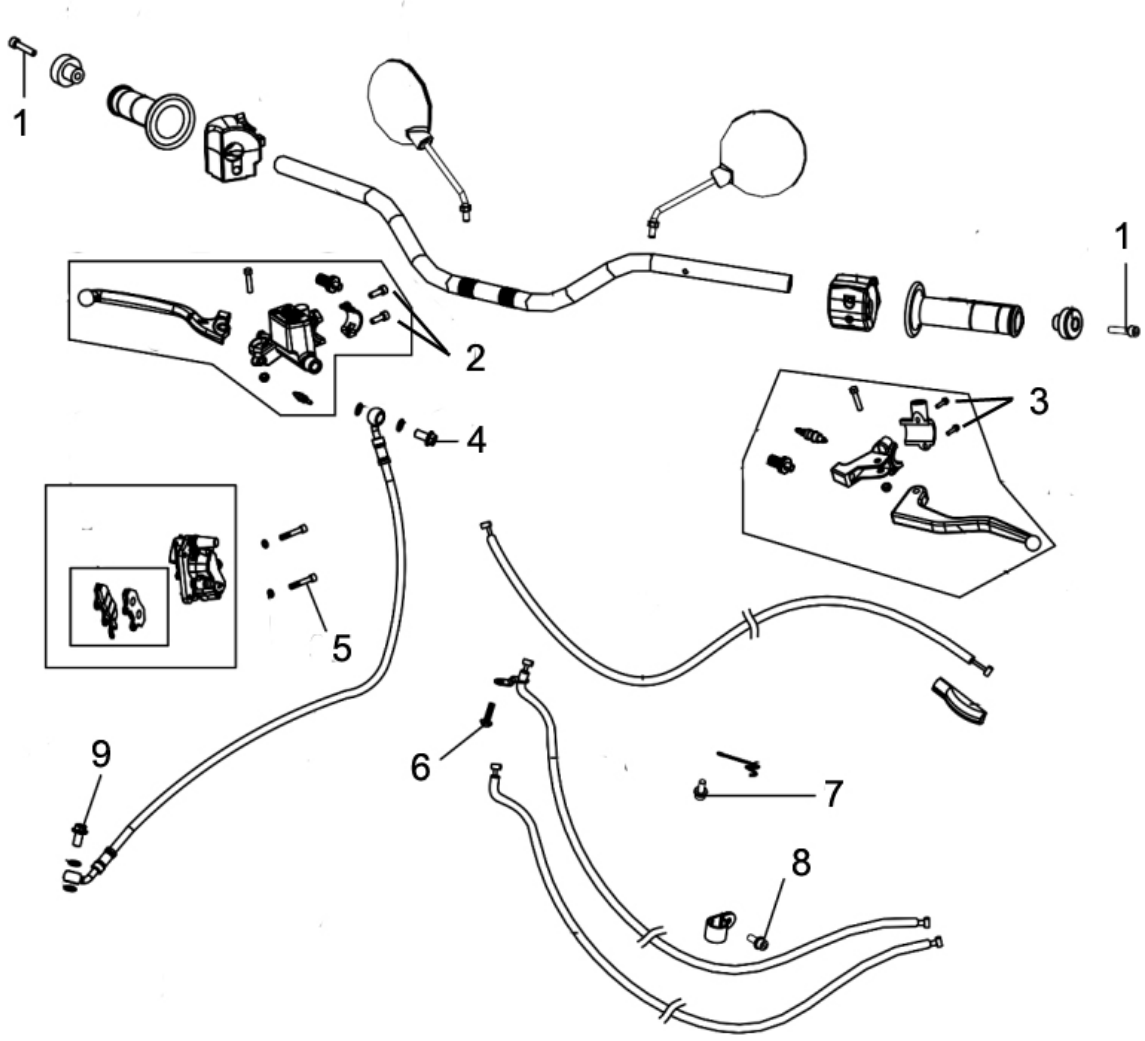
pos.	Description	Type	Quantity	Torque	Notes
1	Caps	-	2	15/25 Nm (11.06/18.44 lb ft)	-
2	SHC wheel axle clamp fastening screws	M8×25	1	15/18 Nm (11.06/13.27 lb ft)	-
3	Hex head handlebar U-bolt flanged fastening screws	M8×35	4	20/24 Nm (14.75/17.70 lb ft)	-
4	NUT	M25×1	1	50/60 Nm (36.87/44.12 lb ft)	-
5	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-
6	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-



Dune X 125

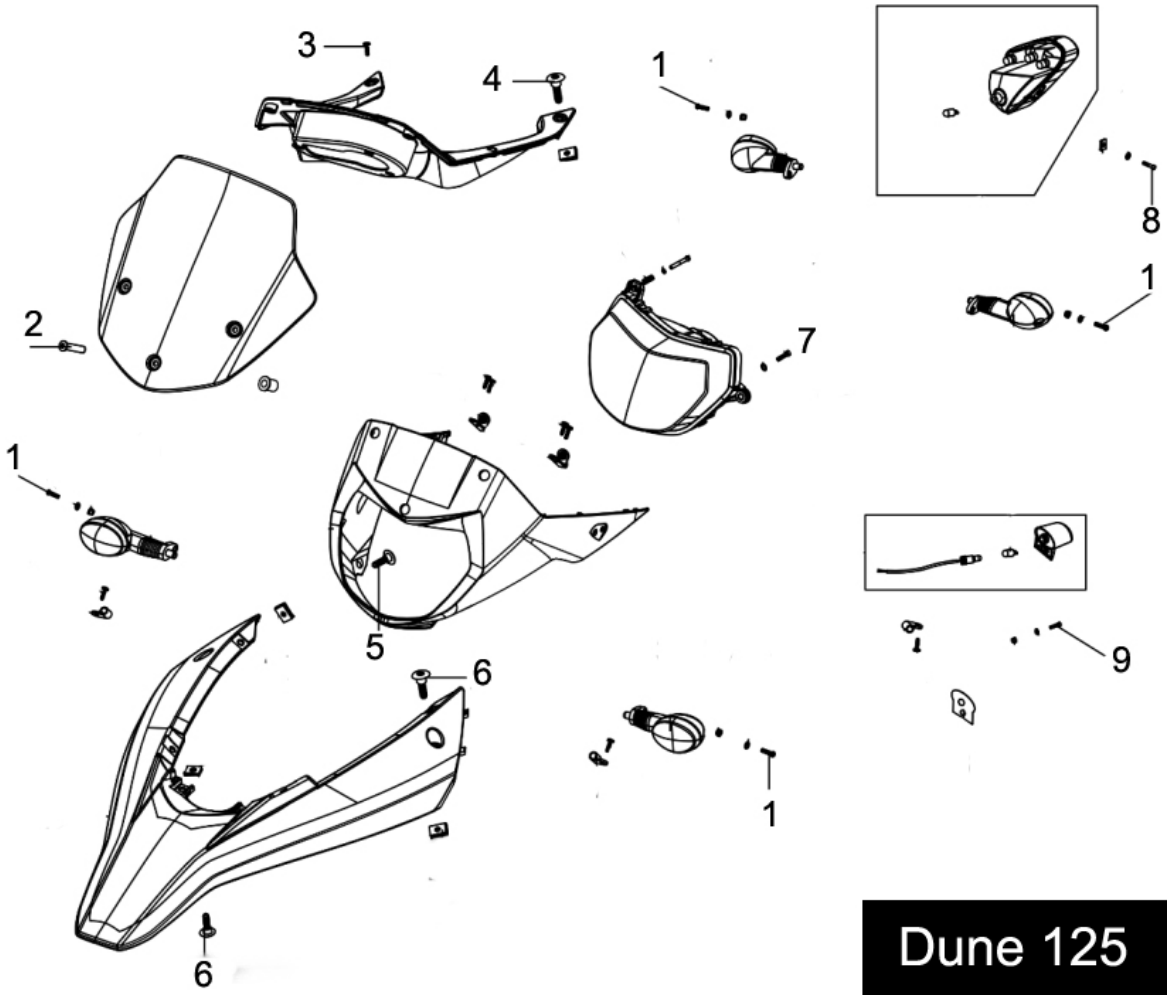
FORK

pos.	Description	Type	Quantity	Torque	Notes
1	Caps	-	2	15/25 Nm (11.06/18.44 lb ft)	-
2	SHC wheel axle clamp fastening screws	M6×25	3	4/6 Nm (2.95/4.42 lb ft)	-
3	Hex head handlebar U-bolt flanged fastening screws	M8×30	6	20/25 Nm (14.75/18.44 lb ft)	-
4	NUT	M24×1	1	50/60 Nm (36.87/44.12 lb ft)	-
5	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-
6	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-



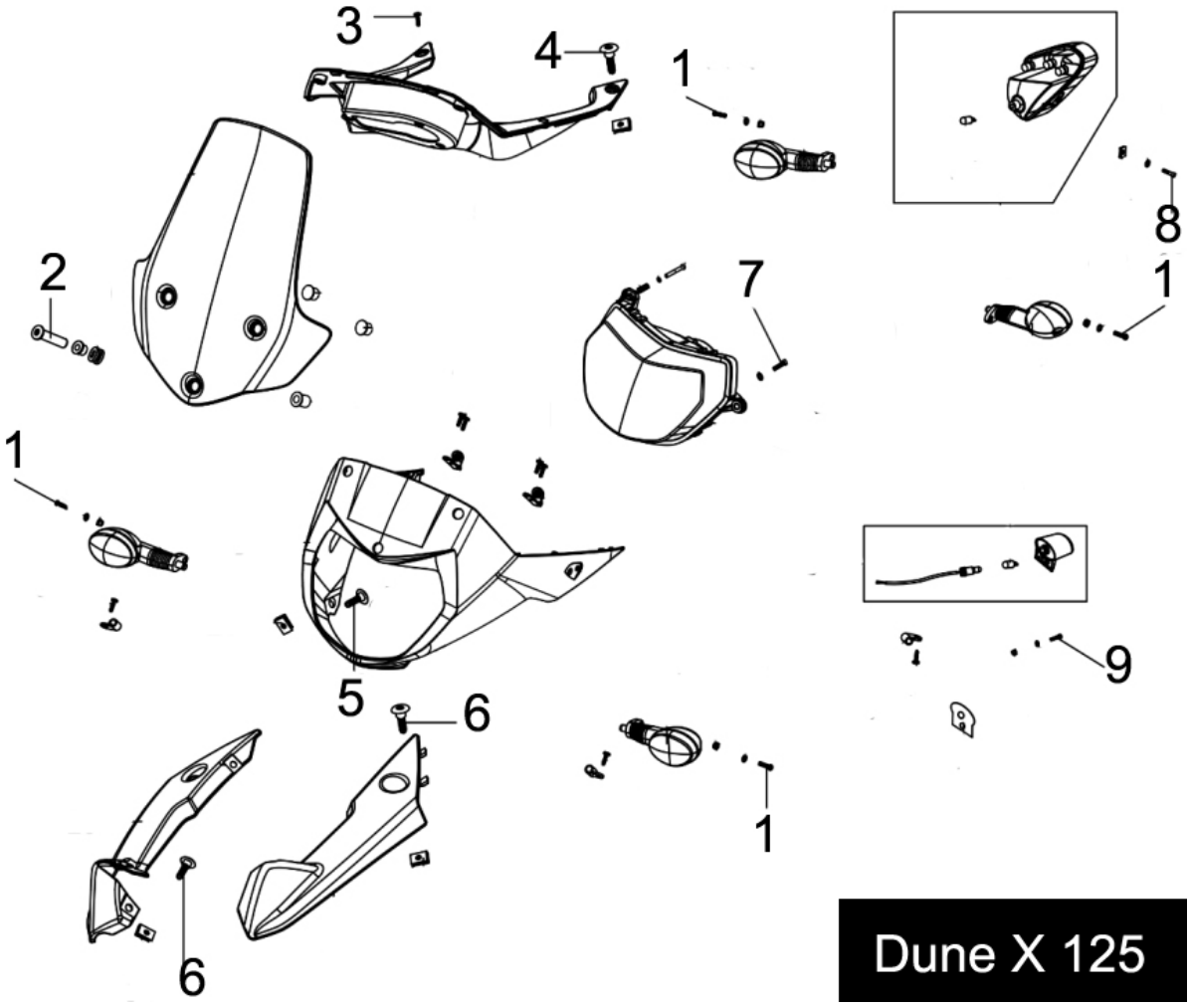
HANDLEBAR AND CONTROLS

pos.	Description	Type	Quantity	Torque	Notes
1	Balance hammer bolt	M6×25	2	7/10 Nm (5.16/7.38 lb ft)	-
2	SHC brake master cylinder fastening screws	M6×25	2	7/10 Nm (5.16/7.38 lb ft)	-
3	Clutch control fastening screws	M6×25	2	6/8 Nm (4.43/5.90 lb ft)	-
4	Front brake upper pump brake hose bolt	M10×1	1	28/33 Nm (20.66/24.35 lb ft)	-
5	PUMP ,FR DISC BRAKE	M8×30	2	17/19 Nm (12.54/14.01 lb ft)	Loct. 243
6	Throttle cable bolt	M5×8	1	5/6 Nm (3.69/4.43 lb ft)	-
7	Brake oil line clamp bolt	M6×16	1	7/10 Nm (5.16/7.38 lb ft)	-
8	Brake oil line clamp screw	ST5,1×14	1	3Nm (2.21 lb ft)	-
9	Front brake upper pump brake hose bolt	M10×1.25	1	28/33 Nm (20.66/24.35 lb ft)	-



LIGHTS

pos.	Description	Type	Quantity	Torque	Notes
1	Turninglight bolt	M6×20	4	2/3 Nm (1.48/2.21 lb ft)	-
2	Windshield bolt	M6×20	3	2/3 Nm (1.48/2.21 lb ft)	-
3	Instrument cover self-tapping screws	St2.8×13	4	0.6 Nm (0.44 lb ft)	-
4	Instrument cover self-tapping bolt	M5×16	2	2/3 Nm (1.48/2.21 lb ft)	-
5	Headlight cover bolt	M5×16	2	2/3 Nm (1.48/2.21 lb ft)	Loct. 243
6	Front shroud bolt	M5×16	4	2/3 Nm (1.48/2.21 lb ft)	-
7	Headlight bolt	M6×20	2	2/3 Nm (1.48/2.21 lb ft)	-
8	Rearlight bolt	M5×35	2	2/3 Nm (1.48/2.21 lb ft)	-
9	License plate light bolt	M5×16	1	2/3 Nm (1.48/2.21 lb ft)	-



LIGHTS

pos.	Description	Type	Quantity	Torque	Notes
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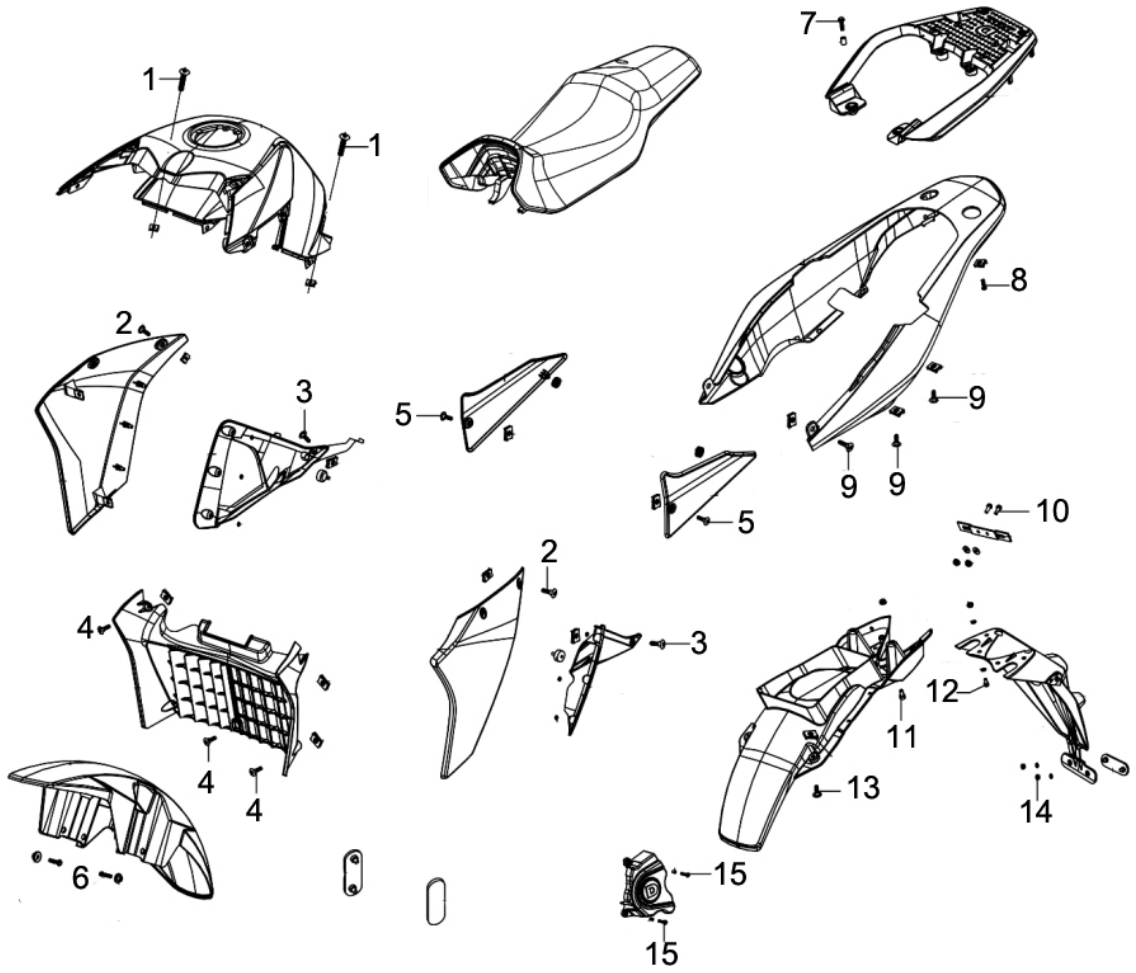
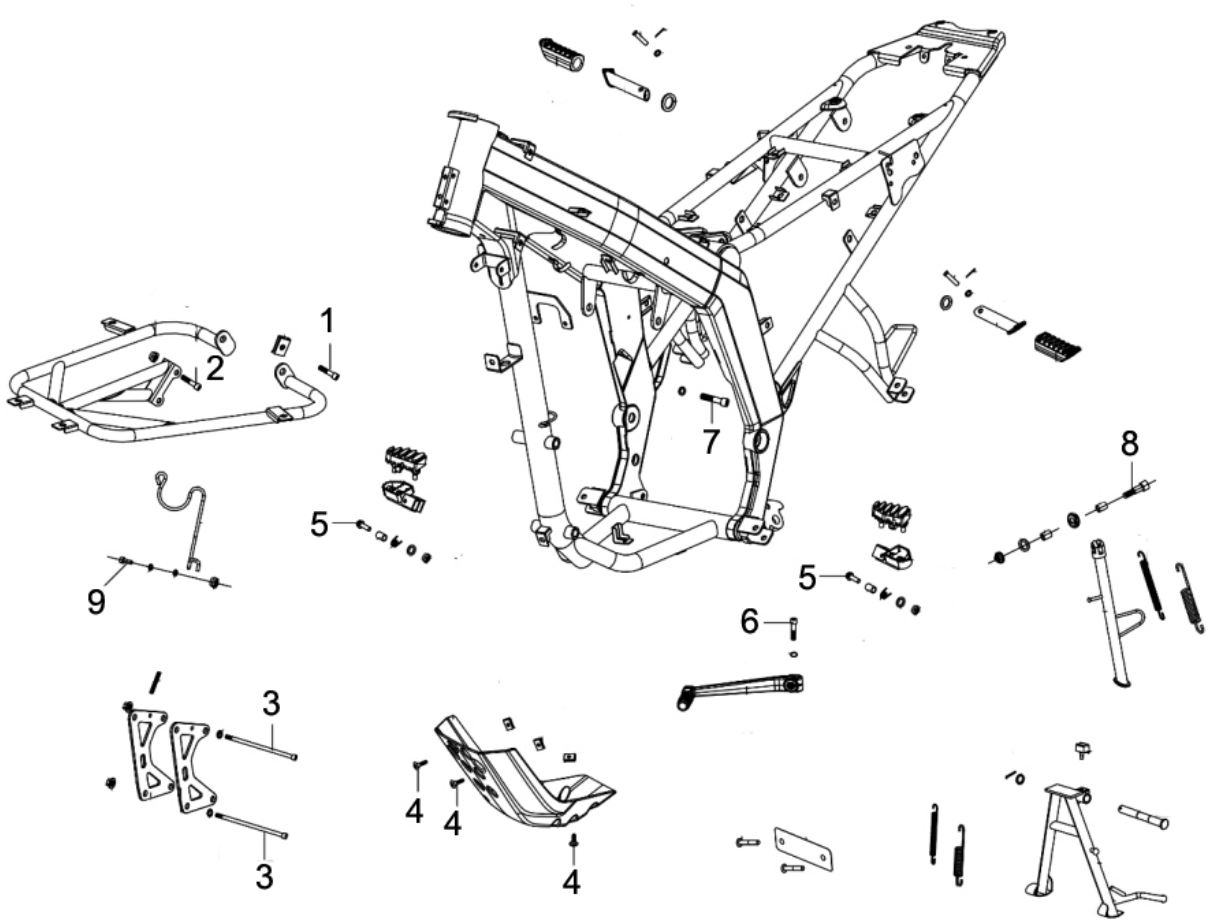
2	Windshield bolt	M6×30	3	2/3 Nm (1.48/2.21 lb ft)	-
3	Instrument cover self-tapping screws	St2.8×13	4	0.6 Nm (0.44 lb ft)	-
4	Instrument cover self-tapping bolt	M5×16	2	2/3 Nm (1.48/2.21 lb ft)	-
5	Headlight cover bolt	M5×16	2	2/3 Nm (1.48/2.21 lb ft)	Loct. 243
6	Front shroud bolt	M5×16	4	2/3 Nm (1.48/2.21 lb ft)	-
7	Headlight bolt	M6×20	2	2/3 Nm (1.48/2.21 lb ft)	-
8	Rearlight bolt	M5×35	2	2/3 Nm (1.48/2.21 lb ft)	-
9	License plate light bolt	M5×16	1	2/3 Nm (1.48/2.21 lb ft)	-



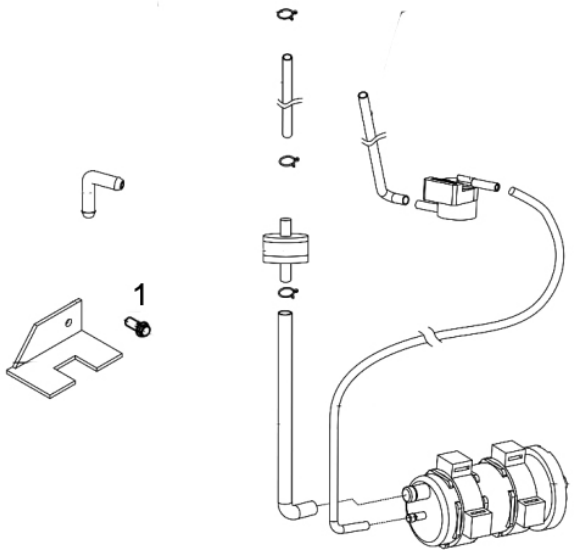
PLASTIC COVERS

pos.	Description	Type	Quantity	Torque	Notes
1	Fuel tank shell bolt	M6×25	2	8/10 Nm (5.90/7.38 lb ft)	-
2	Fuel tank shroud bolt	M5×9	4	2/3 Nm (1.48/2.21 lb ft)	-
3	Fuel tank shroud connecting plate bolt	M5×9	2	2/3 Nm (1.48/2.21 lb ft)	-
4	Radiator shroud bolt	M5×9	5	2/3 Nm (1.48/2.21 lb ft)	-
5	Side cover bolt	M5×9	2	2/3 Nm (1.48/2.21 lb ft)	-
6	Front fender bolt	M6×16 (Dune125) M6×25 (Dune X125)	4	8/10 Nm (5.90/7.38 lb ft)	-
7	Rear armrest bolt	M8×30	4	17/19 Nm (12.54/14.01 lb ft)	Loct. 243
8	Rear tail bolt	M5×16	2	2/3 Nm (1.48/2.21 lb ft)	-
9	Rear tail bolt	M5×16	6	2/3 Nm (1.48/2.21 lb ft)	-
10	License bracket bolt	M6×16	2	8/10 Nm (5.90/7.38 lb ft)	-
11	Rear fender bolt	M6×16	2	8/10 Nm (5.90/7.38 lb ft)	-
12	Rear fender bolt	M5×16	4	5-6 Nm (3.69-4.43 lb ft)	-
13	Rear fender bolt	M5×9	2	2/3 Nm (1.48/2.21 lb ft)	-
14	Back reflector nut	M4	2	2/3 Nm (1.48/2.21 lb ft)	-
15	Small sprocket cover bolt	M5×14	2	5-6 Nm (3.69-4.43 lb ft)	Loct. 243



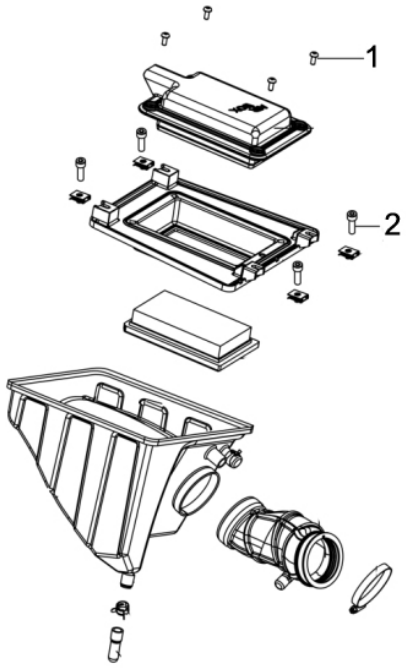
FRAME

pos.	Description	Type	Quantity	Torque	Notes
1	Headlight bracket bolt	M6×16	2	5/7 Nm (3.69/5.16 lb ft)	-
2	Headlight bracket bolt	M6×30	2	8/10 Nm (5.90/7.38 lb ft)	-
3	Engine bracket bolt	M10×100	4	37/39 Nm (27.29/28.76 lb ft)	-
4	Engine shroud bolt	M5×16	3	2/3 Nm (1.48/2.21 lb ft)	-
5	Front Pedal bolt	M8×40	2	17/19 Nm (12.54/14.01 lb ft)	-
6	Front fender bolt	M6×25	1	8/10 Nm (5.90/7.38 lb ft)	-
7	Engine bracket bolt	M10×25	2	37/39 Nm (27.29/28.76 lb ft)	-
8	Side bracket bolt	M8	1	17/19 Nm (12.54/14.01 lb ft)	-



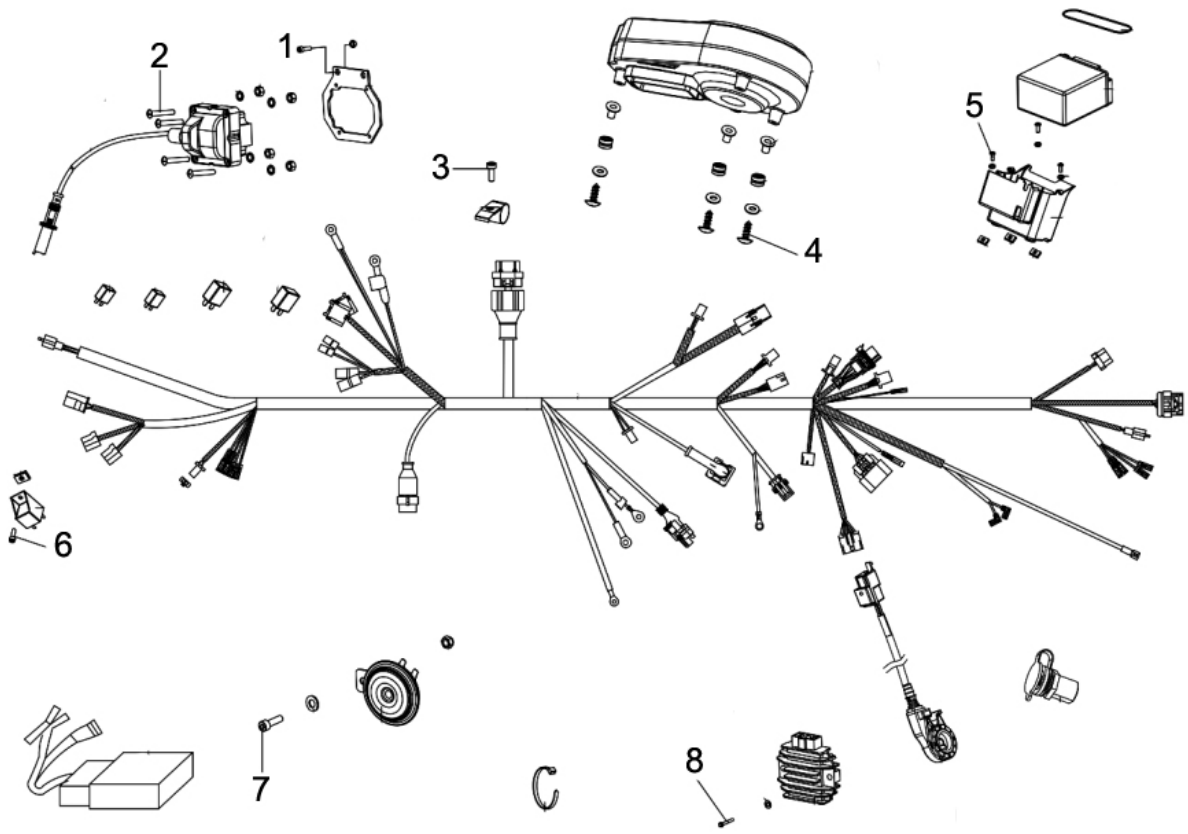
CANISTER ASSEMBLY

pos.	Description	Type	Quantity	Torque	Notes
1	Canister bracket bolt	M6×10	1	5/7 Nm (3.69/5.16 lb ft)	-



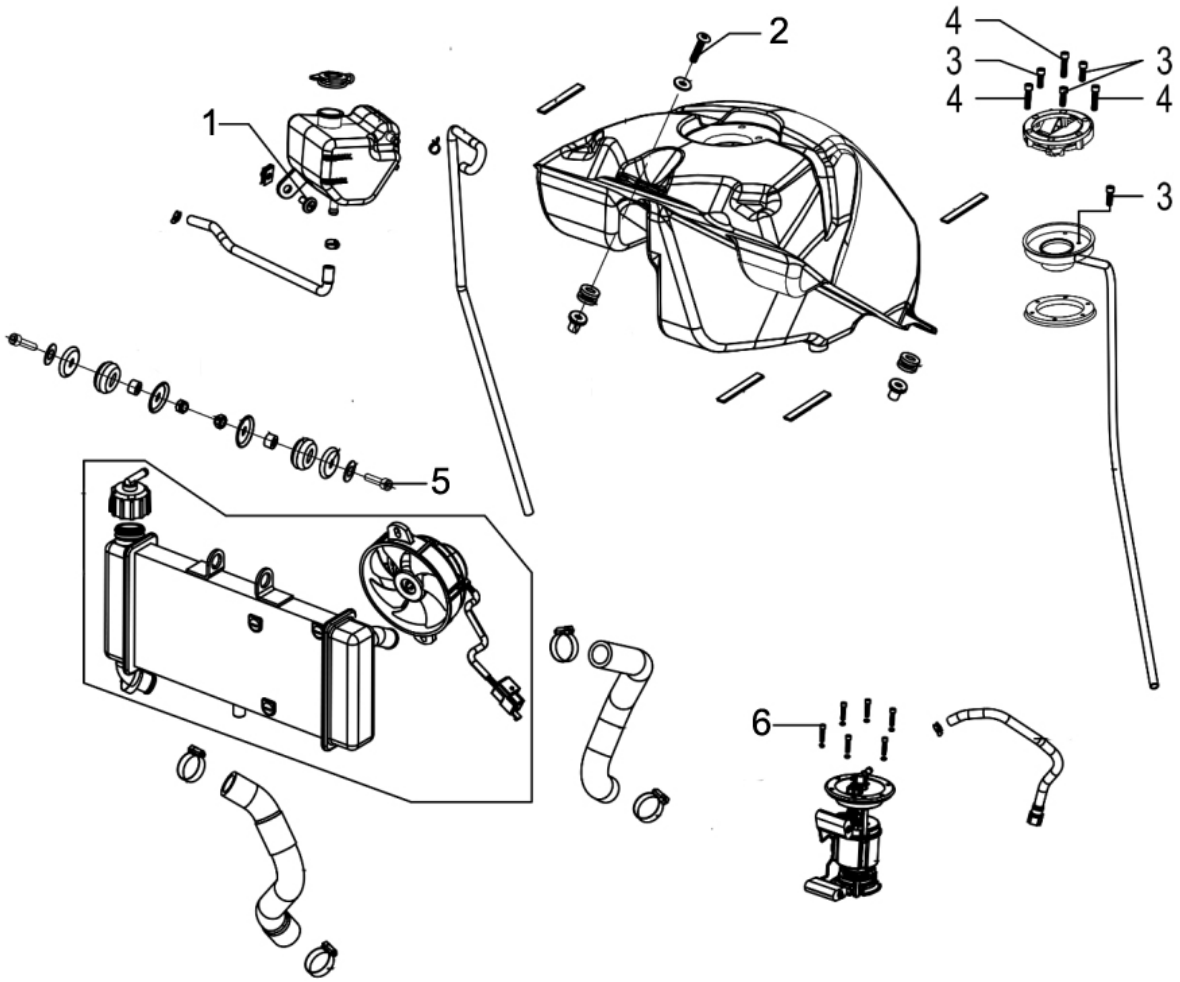
FILTER BOX

pos.	Description	Type	Quantity	Torque	Notes
1	Air filter box fastening screw	M5×12	4	3.5 Nm (2.58 lb ft)	-
2	Air filter box bolt	M6×16	4	5/7 Nm (3.69/5.16 lb ft)	-



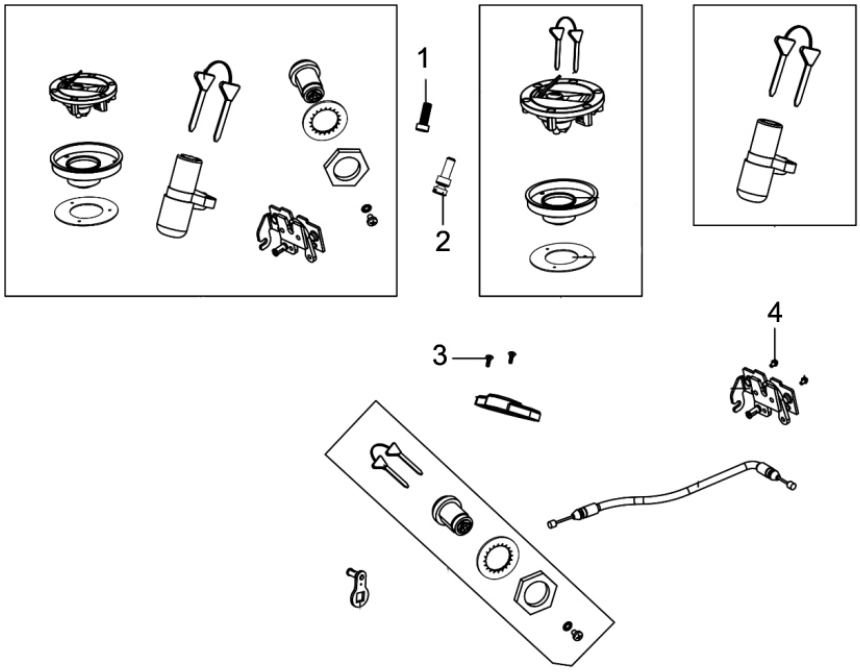
ELECTRICAL SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Ignition coil Assy bracket bolt	M6×16	2	5/7 Nm (3.69/5.16 lb ft)	-
2	Ignition coil Assy bolt	M3×25	4	4/6 Nm (2.95/4.43 lb ft)	-
3	ECU cable bracket bolt	M5×15	1	2.7/3.3 Nm (1.99/2.43 lb ft)	-
4	Instrument screw	ST3.6×18	3	0.6 Nm (0.44 lb ft)	-
5	Battery box bolt	M6×16	3	5/7 Nm (3.69/5.16 lb ft)	-
6	Relay bolt	M6×16	1	5/7 Nm (3.69/5.16 lb ft)	-
7	Horn bolt	M8×20	1	17/19 Nm (12.54/14.01 lb ft)	-
8	Rectifier bolt	M6×25	2	8/10 Nm (5.90/7.38 lb ft)	-



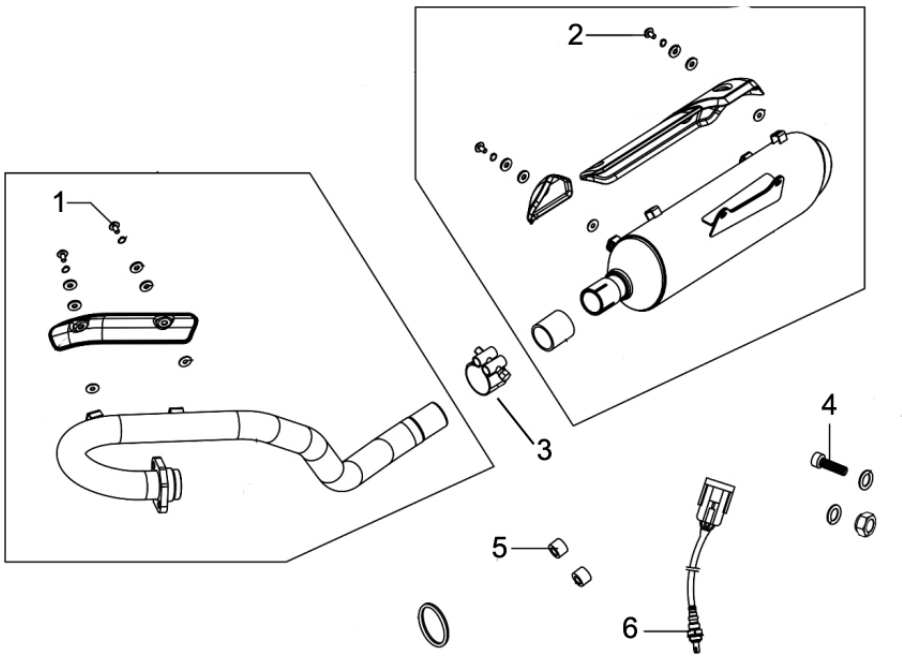
FUEL TANK

pos.	Description	Type	Quantity	Torque	Notes
1	Coolant tank bolt	M6×16	2	8/10 Nm (5.90/7.38 lb ft)	-
2	Fuel tank bolt	M6×30	1	8/10 Nm (5.90/7.38 lb ft)	-
3	Fuel tank lock bolt	M5×12	4	2.7/3.3 Nm (1.99/2.43 lb ft)	-
4	Fuel tank lock bolt	M5×30	3	2.7/3.3 Nm (1.99/2.43 lb ft)	-
5	Radiator bolt	M6×25	3	8/10 Nm (5.90/7.38 lb ft)	-
6	Oil pump bolt	M5×16	6	4.5/5.5 Nm (3.32/4.06 lb ft)	-



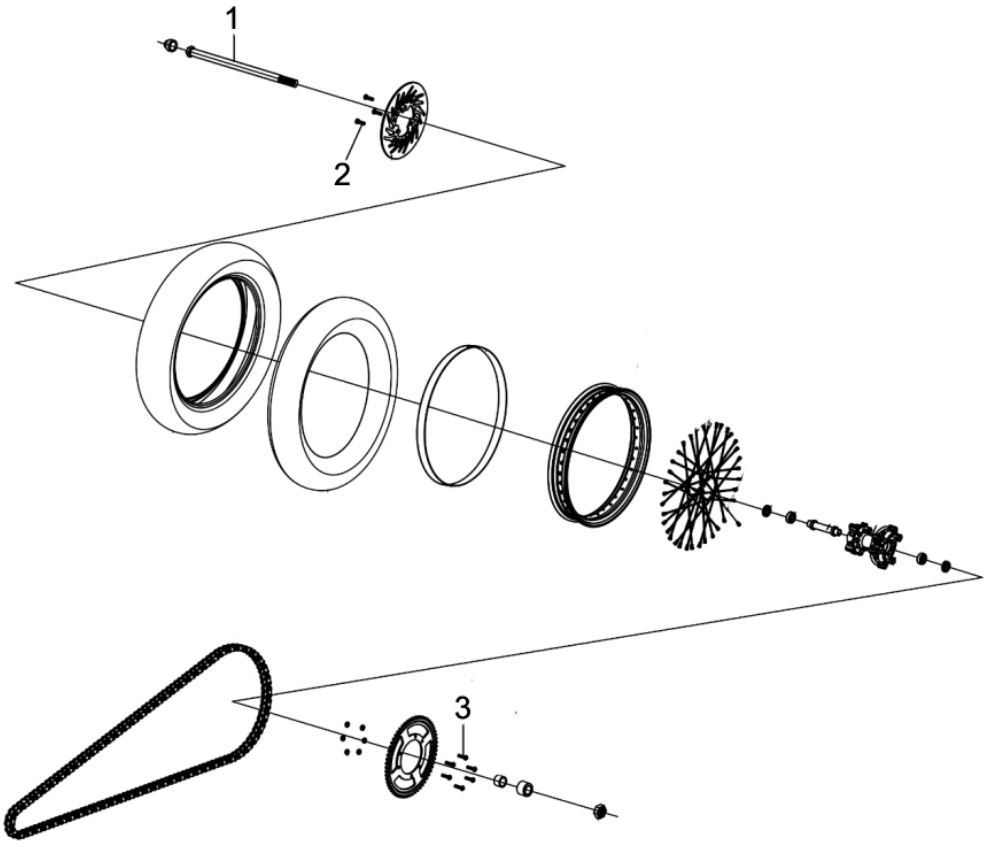
LOCK ASSY

pos.	Description	Type	Quantity	Torque	Notes
1	Electric Lock bolt	M8×20	1	18/20 Nm (13.28/14.75 lb ft)	-
2	Electric Lock bolt	M8×20	1	18/20 Nm (13.28/14.75 lb ft)	-
3	Electric Lock cover bolt	M5×9	2	2/3 Nm (1.48/2.21 lb ft)	-
4	Seat lock bolt	M6×10	2	8/10 Nm (5.90/7.38 lb ft)	-



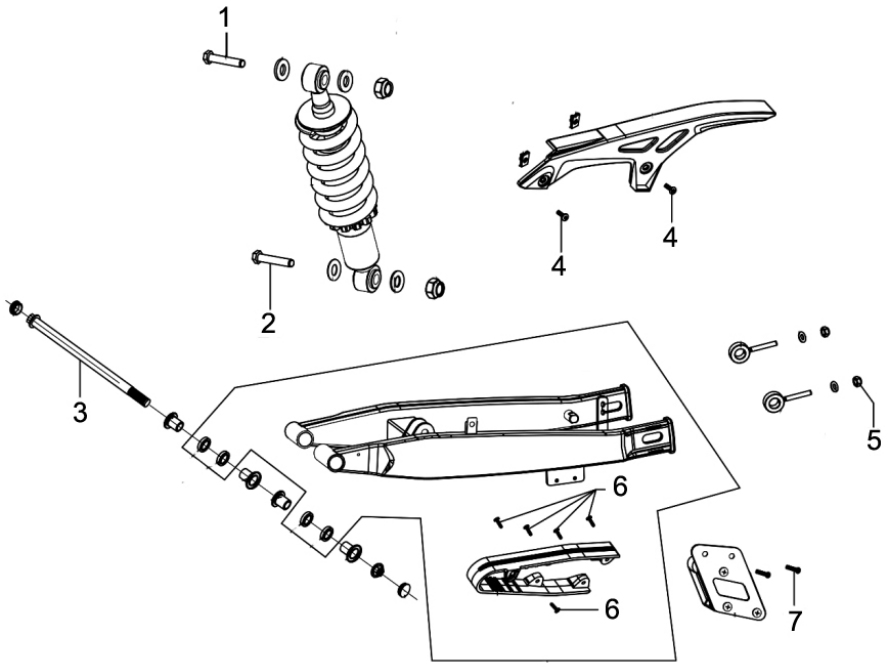
EXHAUST SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Muffer bent pipe cover bolt	M5	2	5/6 Nm (3.69-4.43 lb ft)	-
2	Muffer cover bolt	M5	4	5/6 Nm (3.69-4.43 lb ft)	-
3	Muffler fixing clamp	M6	1	8/10 Nm (5.90-7.38 lb ft)	-
4	Muffer bolt	M8×20	2	18/22 Nm (13.28-16.23 lb ft)	-
5	Muffer bent pipe bolt	M8	2	18/22 Nm (13.28-16.23 lb ft)	-
6	Oxygen Sensor bolt	M12	1	17/20 Nm (12.54-14.75 lb ft)	-



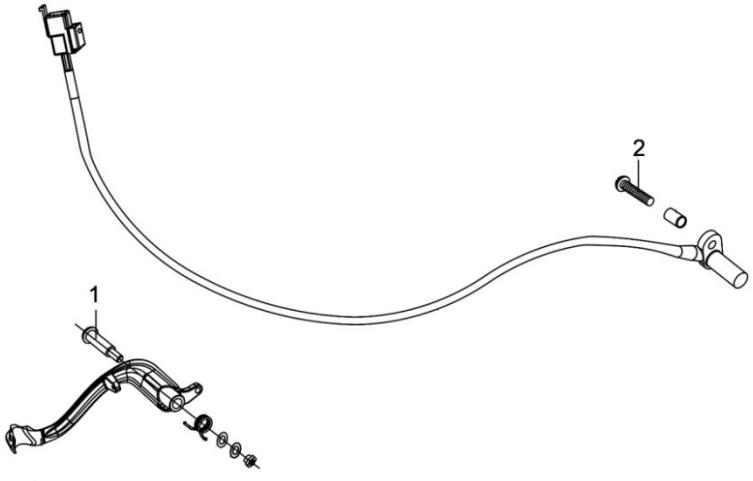
REAR WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Rear axle	M14	1	70/80 Nm (51.63/59 lb ft)	-
2	Rear brake disc bolt	M8×24.2	3	15/18 Nm (11.06-13.27 lb ft)	Loct. 243
3	Rear sprocket bolt	M8×30	6	17/19 Nm (12.54/14.01 lb ft)	Loct. 243



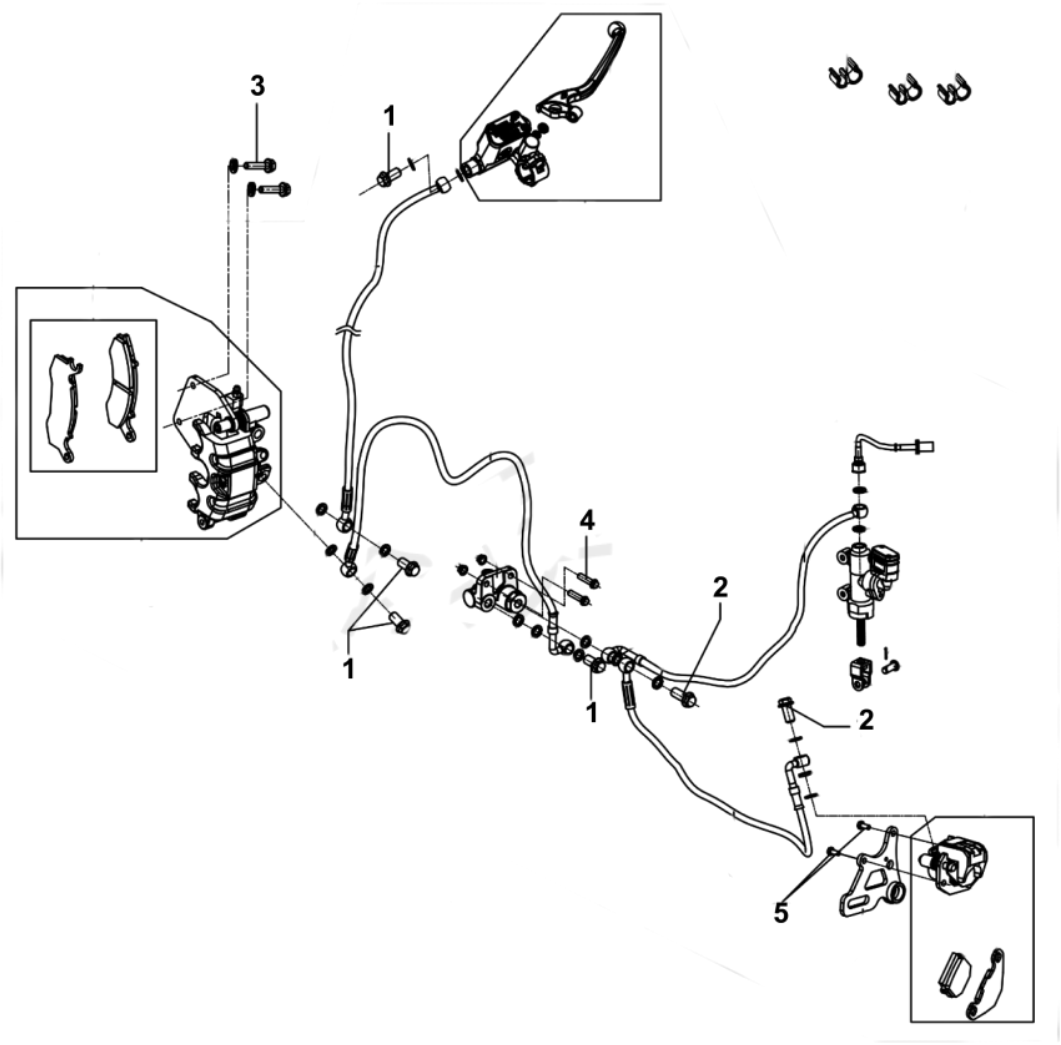
REAR FORK

pos.	Description	Type	Quantity	Torque	Notes
1	Rear shock absorber bolt	M12×58	1	55/65 Nm (10.56/47.94 lb ft)	-
2	Rear shock absorber bolt	M12×50	1	55/65 Nm (10.56/47.94 lb ft)	-
3	Flat fork shaft	M12	2	70/75 Nm (51.62/55.56 lb ft)	-
4	Chain guard bolt	M6×12	2	5/7 Nm (3.69/5.16 lb ft)	-
5	Chain adjuster bolt	M6	2	5/7 Nm (3.69/5.16 lb ft)	-
6	Chain slider bolt	M4.8×19	2	3 Nm (2.21 lb ft)	-
7	Chain guide bolt	M6×12	2	5/7 Nm (3.69/5.16 lb ft)	Loct. 243



Rear Brake Pedal

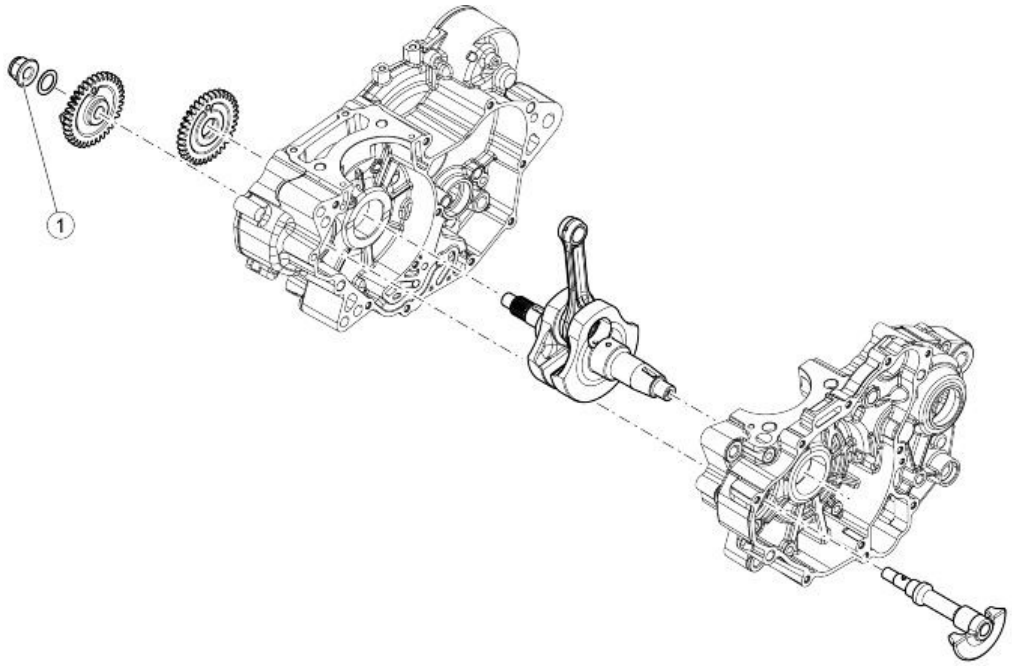
pos.	Description	Type	Quantity	Torque	Notes
1	Rear brake disc fastening torx button head screws	M8	1	17/19 Nm (14.75/16.23 lb ft)	-
2	Speed sensor fastening screws	M6×35	1	8/10 Nm (5.90/7.38 lb ft)	-



CBS SYSTEM

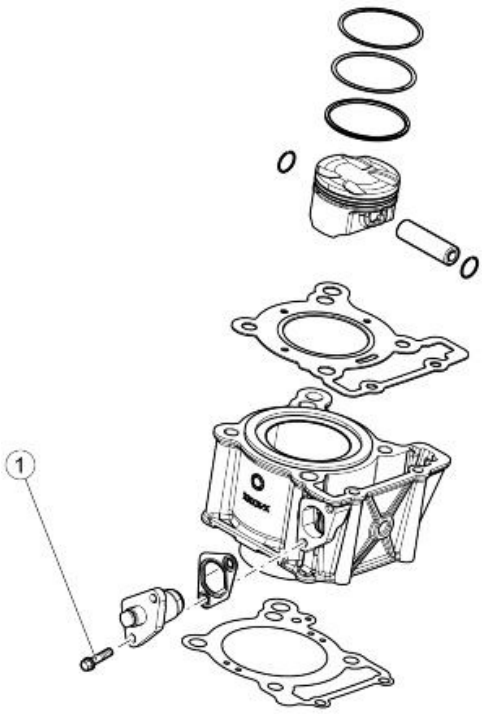
pos.	Description	Type	Quantity	Torque	Notes
1	Special brake pipe fastening screws	M10×22	4	28/33 Nm (20.66/24.35 lb ft)	-
2	Special brake pipe fastening screws	M10×32	2	28/33 Nm (20.66/24.35 lb ft)	-
3	SHC front brake caliper fastening screws	M8	2	22/24 Nm (16.23/17.70 lb ft)	Loct. 243
4	CBS control unit fastening screws	M6×20	2	8/10 Nm (5.90/7.38 lb ft)	-
5	SHC front brake caliper fastening screws	M8×12	2	25/30 Nm (18.45/22.14 lb ft)	

Engine



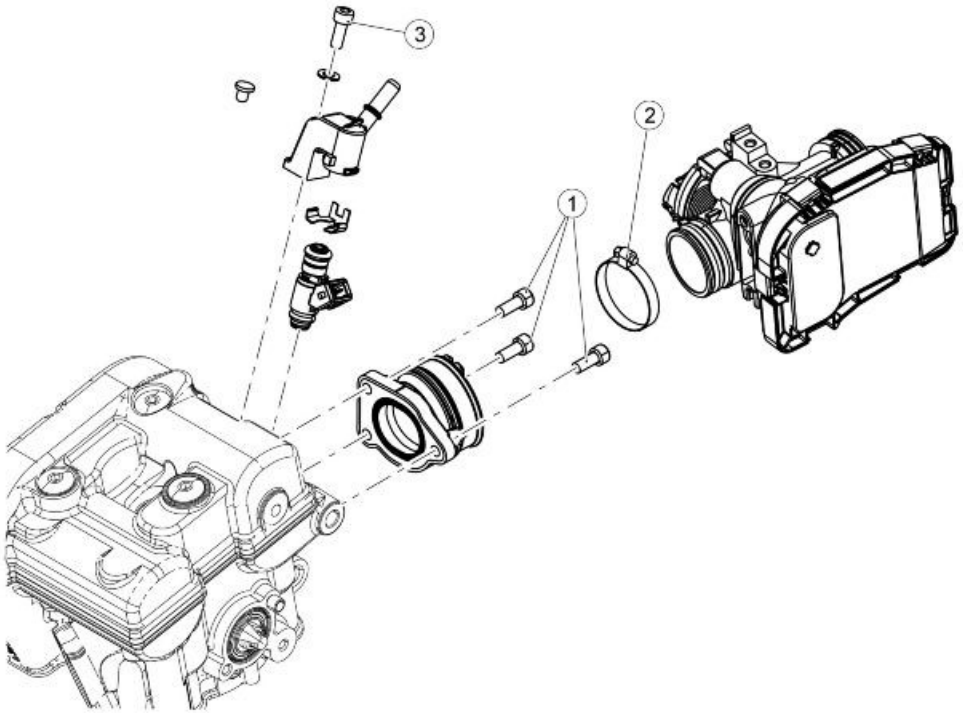
CRANKSHAFT

pos.	Description	Type	Quantity	Torque	Notes
1	Gear fixing screw	M10	1	40 Nm (29.50 lb ft)	-



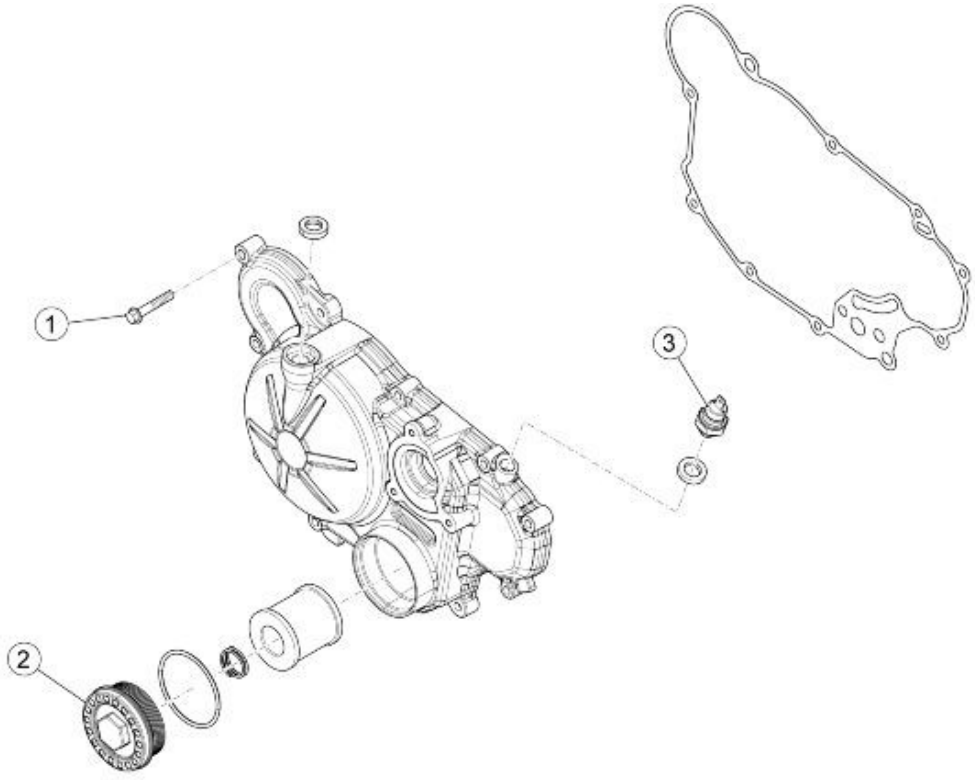
CYLINDER - PISTON

pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner fastener screw	M6×16	2	12 Nm (8.85 lb ft)	-



THROTTLE BODY

pos.	Description	Type	Quantity	Torque	Notes
1	Sleeve fixing screw	M6×20	3	12 Nm (8.85 lb ft)	-
2	Sleeve fixing clamp	-	1	0.8 Nm (0.59 lb ft)	-
3	Injector mounting fixing screw	M6×20	1	10 Nm (7.38 lb ft)	-
4	Cable stay on throttle body	M4	1	4 Nm (2.95 lb ft)	-

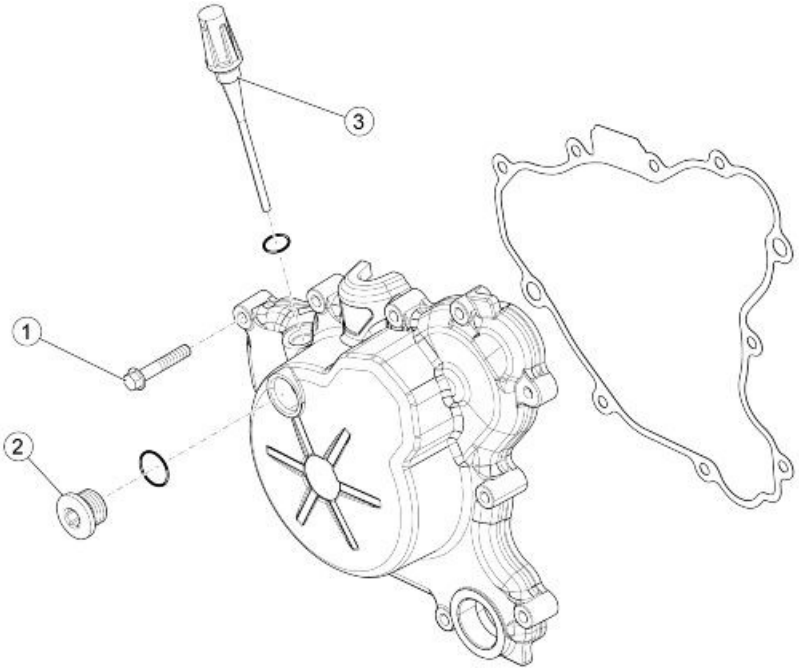


CLUTCH COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch cover fixing screw	M6×35	10	12 Nm (8.85 lb ft)	-
2	Oil filter cover	M56×1.5	1	25 Nm (18.44 lb ft)	-
3	Oil pressure sensor	M10	1	13 Nm (9.59 lb ft)	-

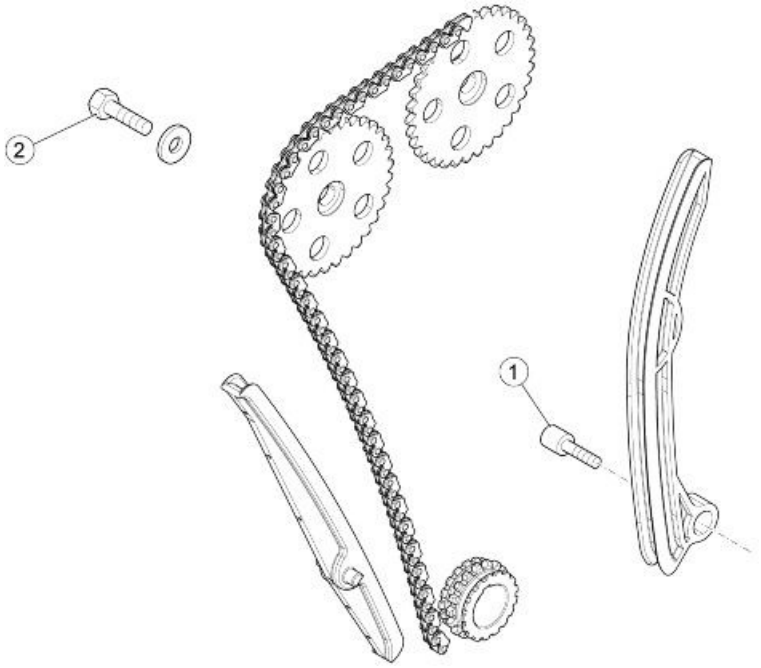
HEAD COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Spark plug	M10	1	13 Nm (9.59 lb ft)	-
2	Head cover fastener screw	M6	4	11 Nm (8.11 lb ft)	-



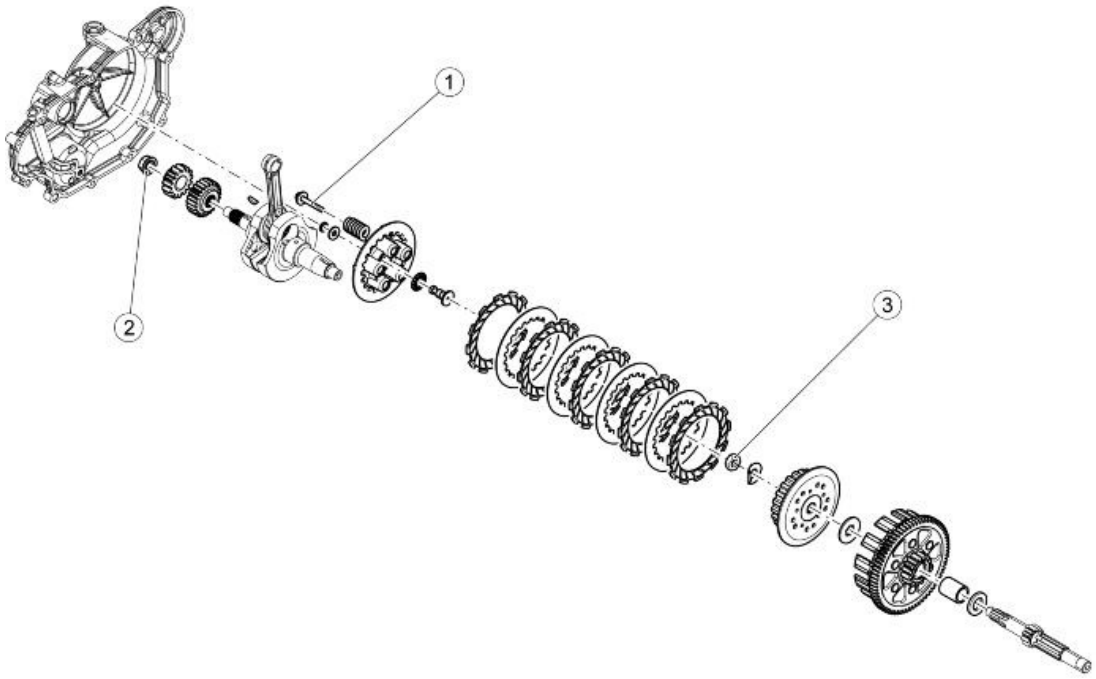
FLYWHEEL COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel cover fastener screw	M6	10	12 Nm (8.85 lb ft)	-
2	Timing control cap	M18	2	4 Nm (2.95 lb ft)	
3	Oil dipstick	M12×1.5	1	5 Nm (3.69 lb ft)	



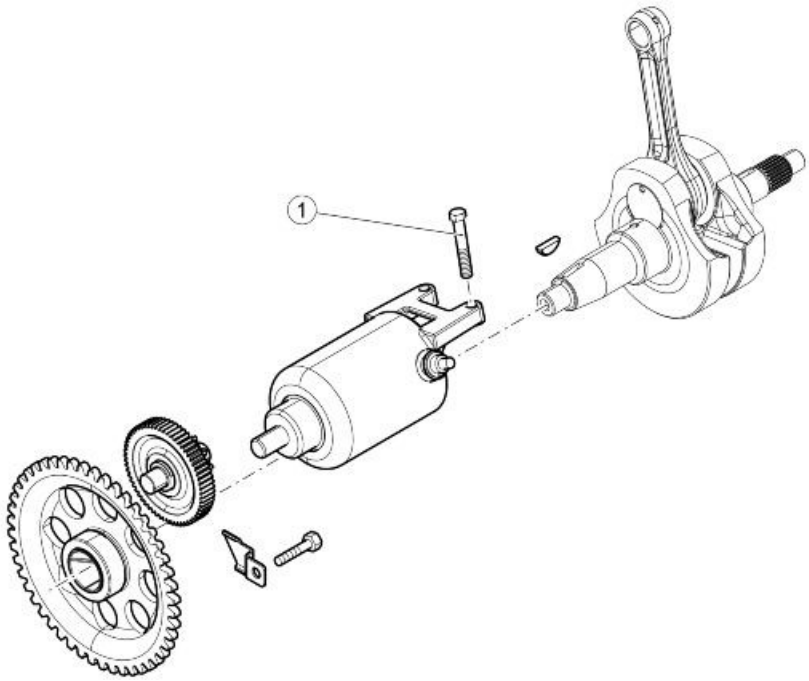
TIMING SYSTEM

pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner pad fastener screw	M6×16	1	10 Nm (7.38 lb ft)	Loctite 243
2	Timing system gear fastener screw	M8×40	2	27 Nm (19.91 lb ft)	Loctite 243



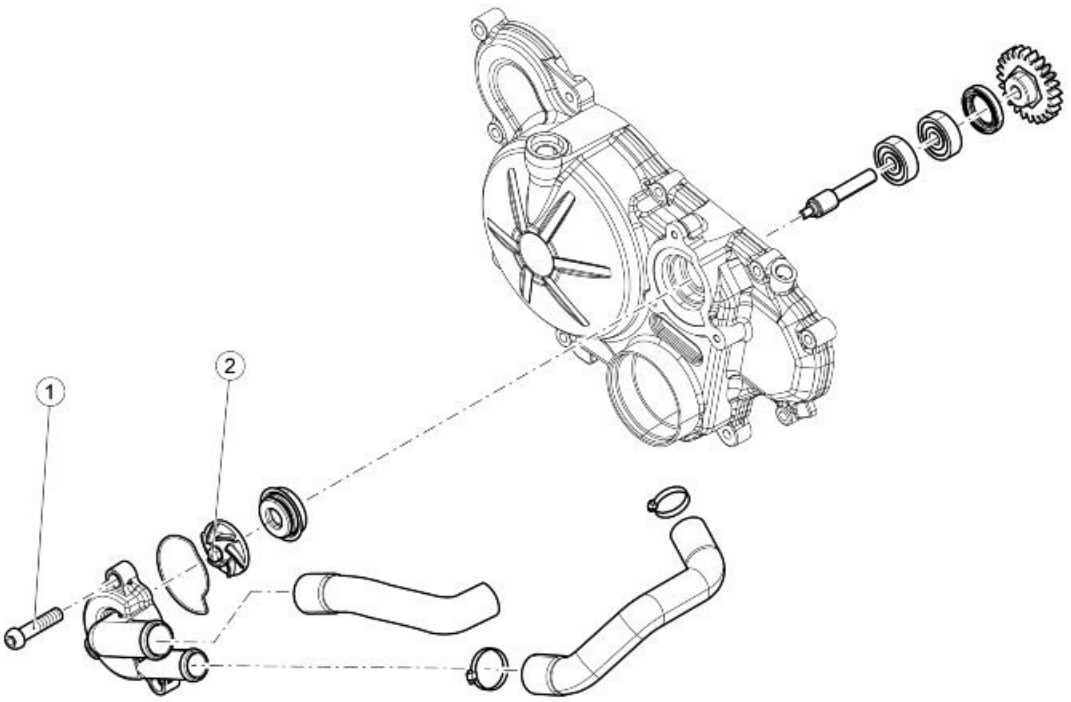
CLUTCH

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch spring screw	M5	5	4 Nm (2.95 lb ft)	-
2	Crankshaft primary gear fastener nut	M12	1	79 Nm (58.27 lb ft)	-
3	Clutch nut	-	1	40 Nm (29.50 lbf ft)	-



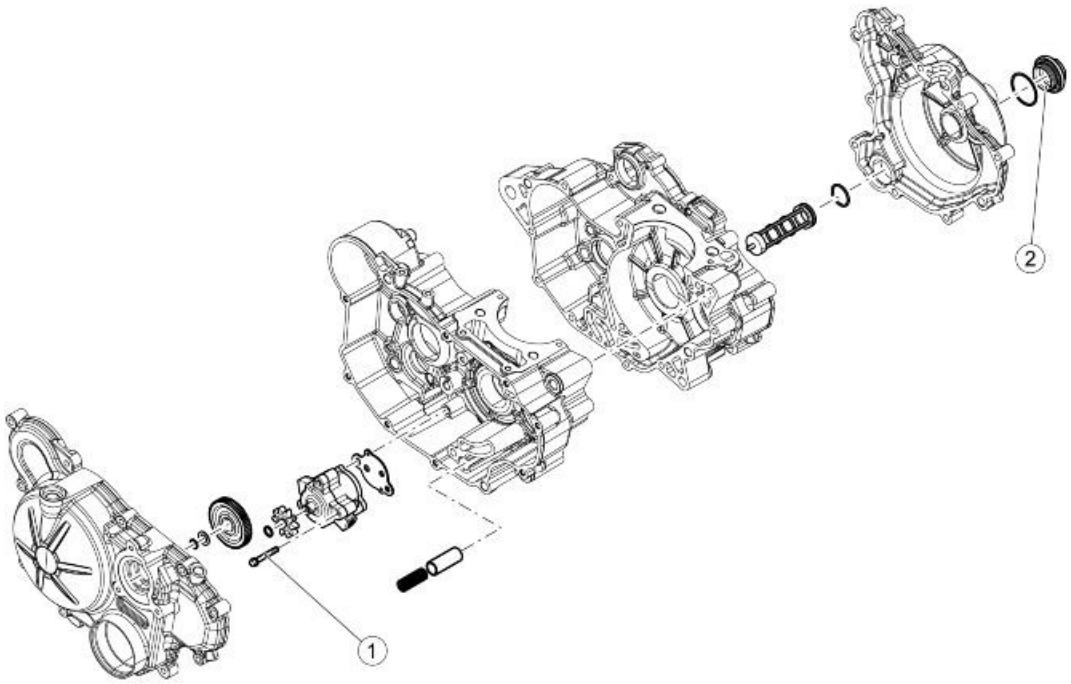
STARTER MOTOR

pos.	Description	Type	Quantity	Torque	Notes
1	Starter motor fastener screw	M6x25	2	12 Nm (8.85 lb ft)	-



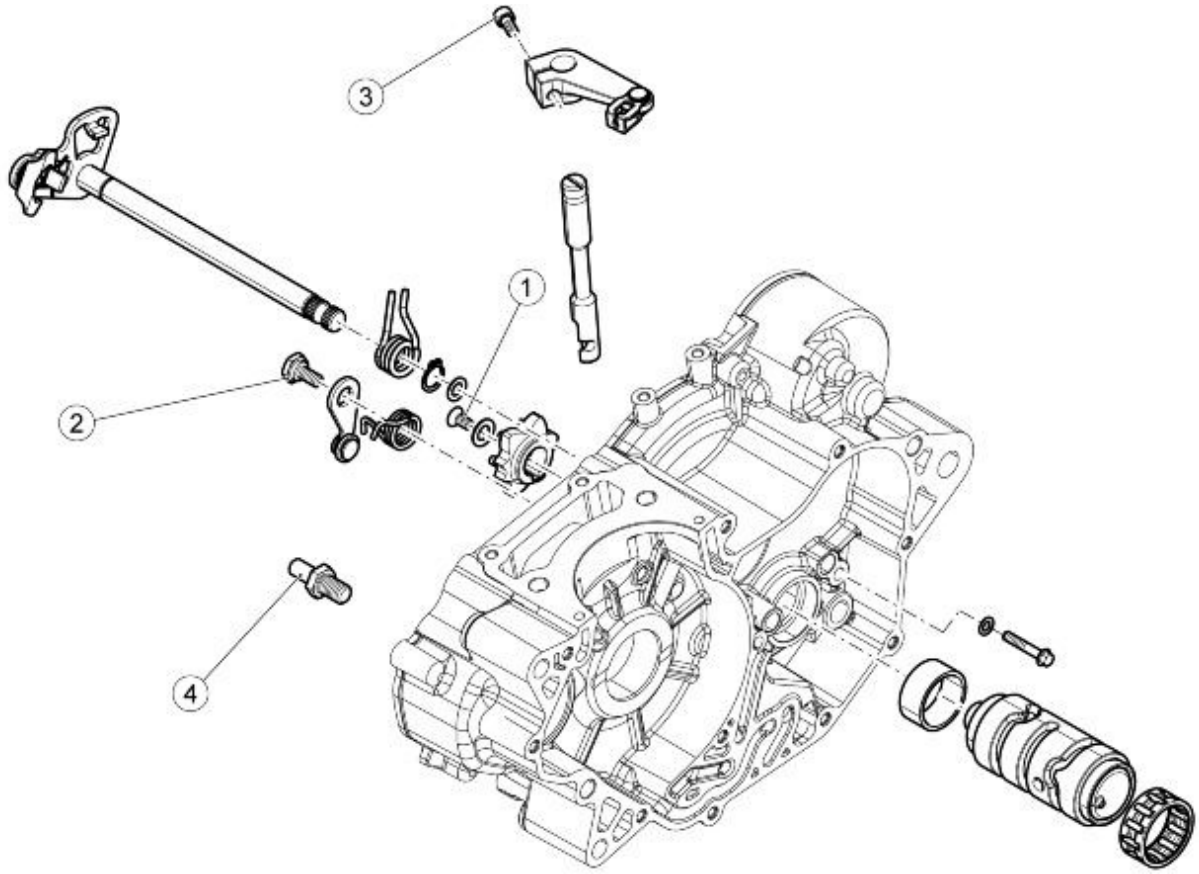
WATER PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Water pump fastener screw	M5	3	3.5 Nm (2.58 lb ft)	-
2	Water pump rotor fastener screw	-	1	5 Nm (3.69 lb ft)	-



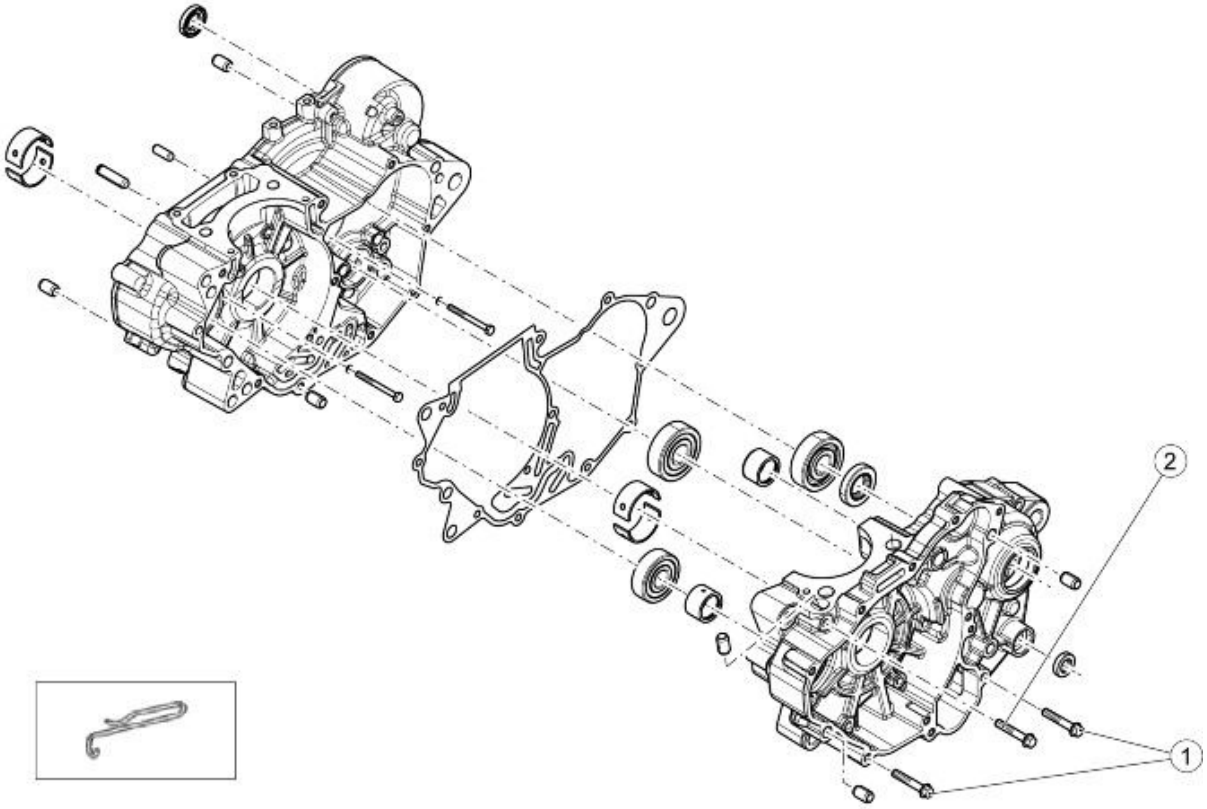
OIL PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Oil pump fastener screw	M5x35	3	4 Nm (2.95 lb ft)	Loctite 243
2	Oil cap retainer	-	1	25 Nm (18.44 lb ft)	-



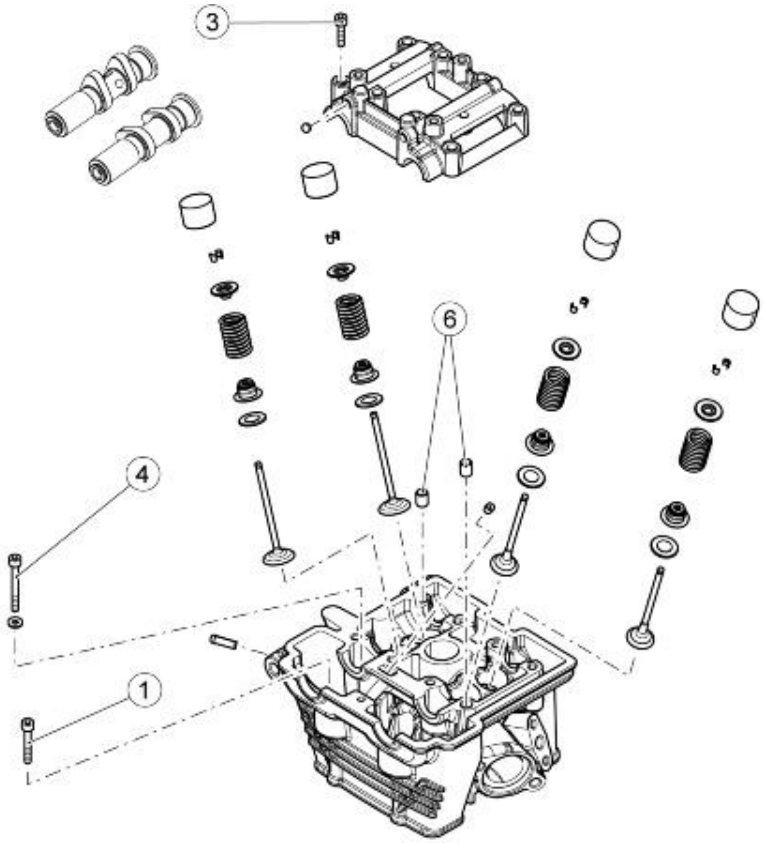
GEAR SELECTOR

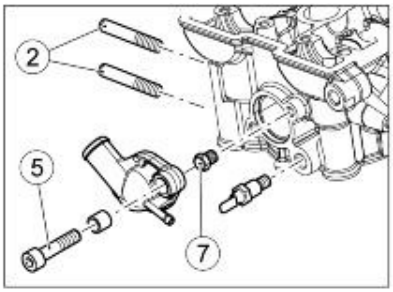
pos.	Description	Type	Quantity	Torque	Notes
1	Selector sprocket fastener screw	M5	1	4 Nm (2.95 lb ft)	-
2	Lever fastener screw	M6	1	9 Nm (6.64 lb ft)	-
3	Clutch lever fastener screw	-	1	9 Nm (6.64 lb ft)	-
4	Gear shift selector pin fixing	-	1	9 Nm (6.64 lb ft)	-



ENGINE CRANKCASE

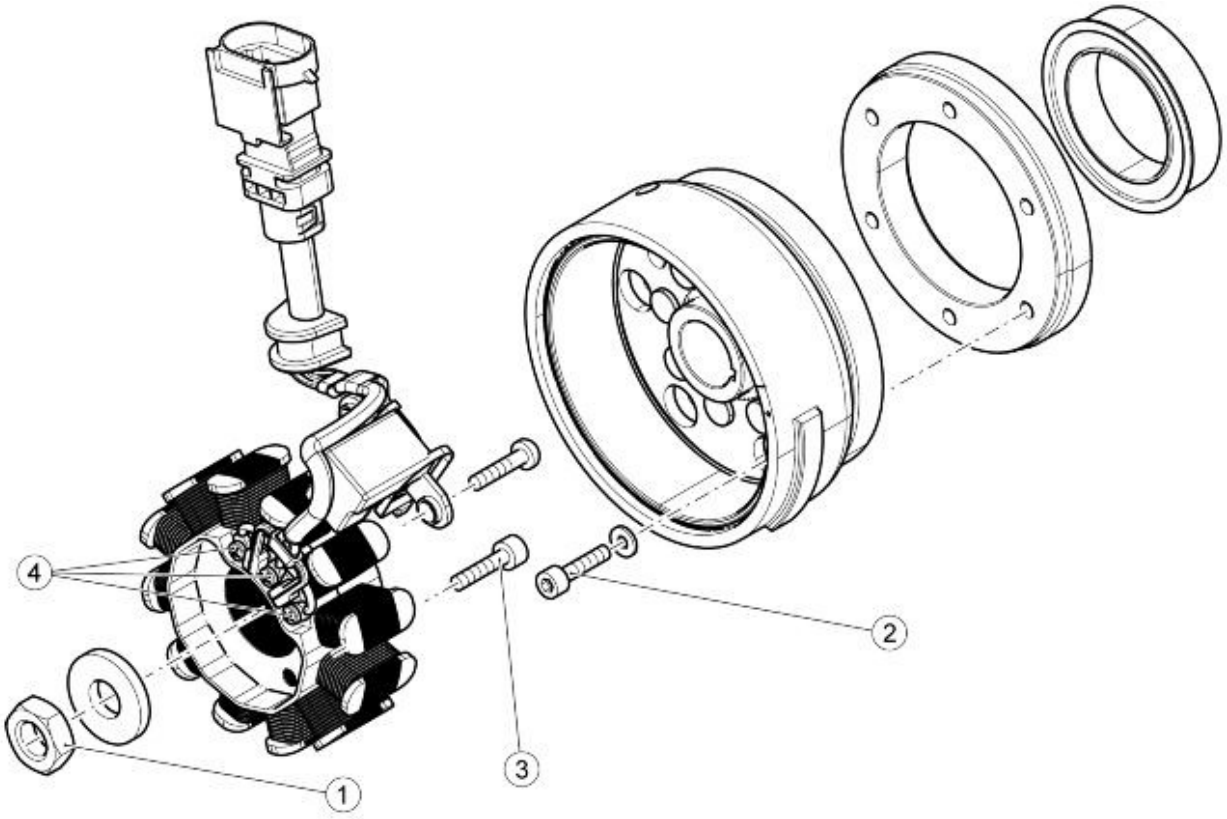
pos.	Description	Type	Quantity	Torque	Notes
1	Crankcase retainer screw	M6x60	4	12 Nm (8.85 lb ft)	-
2	Crankcase retainer screw	M6x75	4	12 Nm (8.85 lb ft)	-





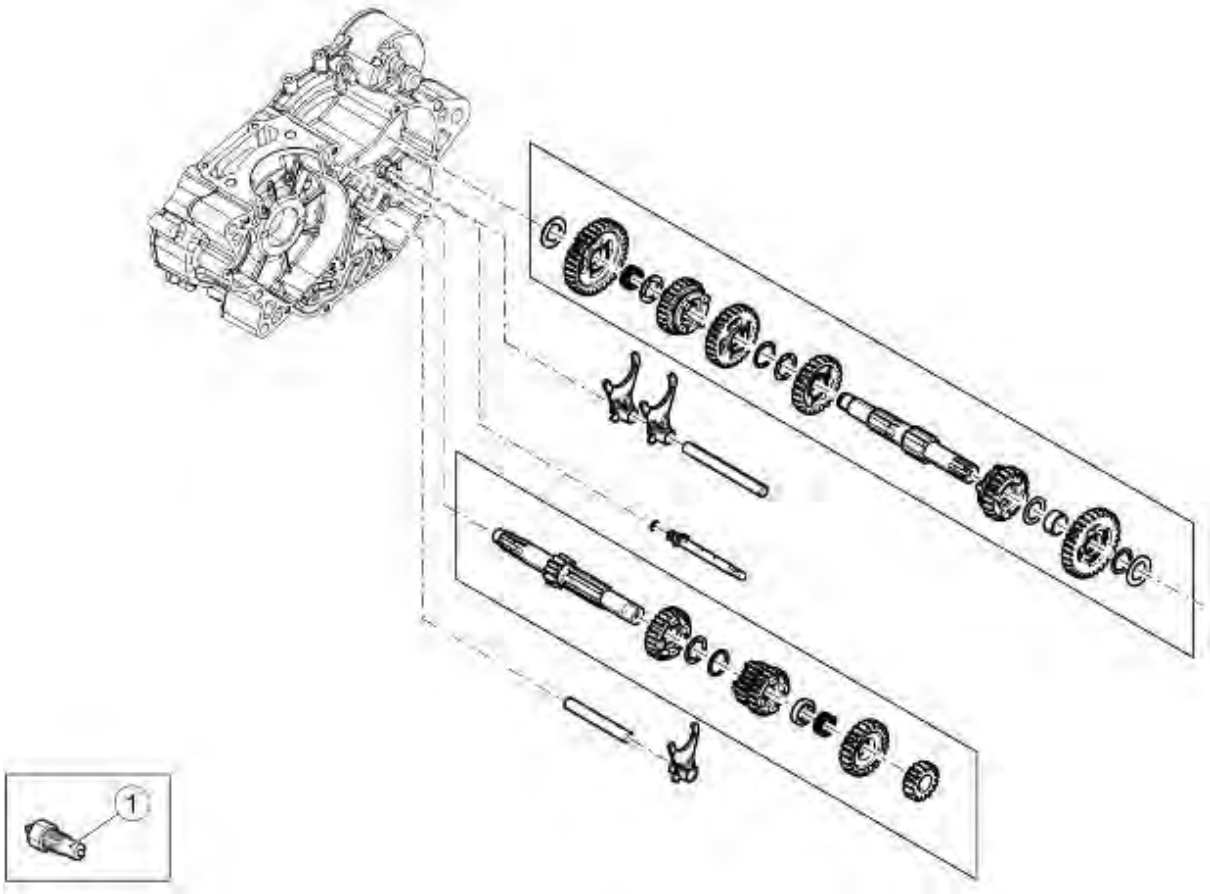
HEAD - VALVES

pos.	Description	Type	Quantity	Torque	Notes
1	Head fastener screw	M6x130	2	12 Nm (8.85 lb ft)	-
2	Drainage side stud bolt retainer	M8x40	2	12 Nm (8.85 lb ft)	-
3	Camshaft cover fastener screw	M6x40	4	11 Nm (8.11 lb ft)	-
4	Head fastener screw	M8x166	4	27 Nm + 90° (19.91 lb ft + 90°)	-
5	Thermostat cover fastener screw	M6x20	2	11 Nm (8.11 lb ft)	-
6	Head dowels retainer	M8x10	2	6.5 Nm (4.79 lb ft)	-
7	Thermostat retainer	-	1	9 Nm (6.64 lb ft)	-



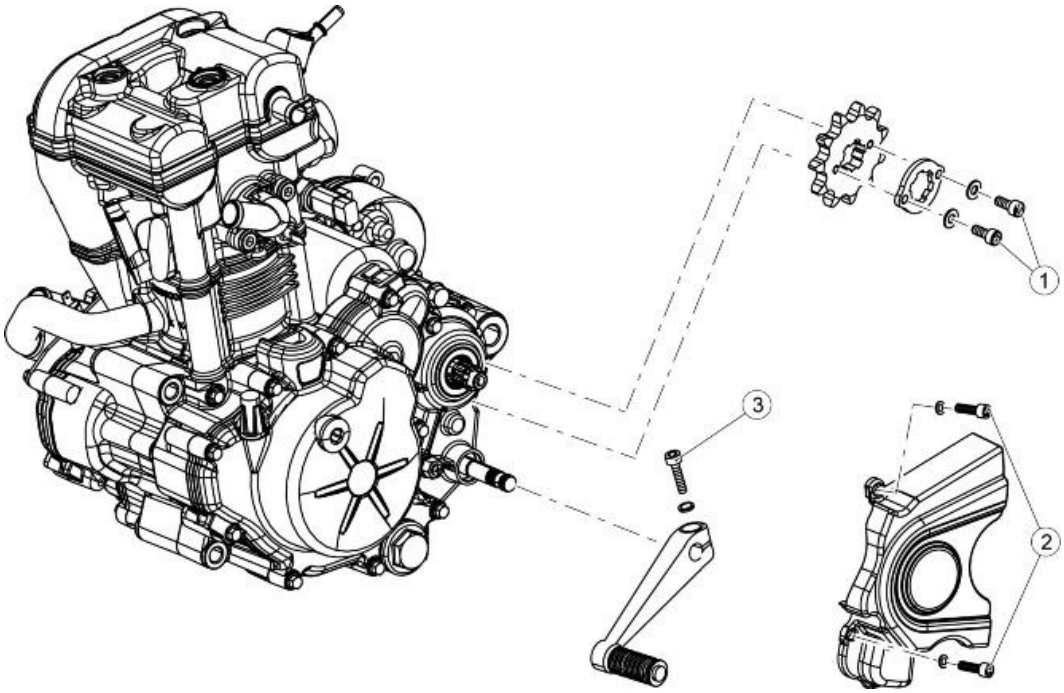
IGNITION UNIT

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel rotor fixing nut	M14x1.5	1	86 Nm (63.43 lb ft)	-
2	Rotor fastener screw	-	6	12 Nm (8.85 lb ft)	-
3	Stator clamping screws	-	2	6 Nm (4.43 lb ft)	-
4	Pick-Up clamping screw	-	3	3.5 Nm (2.58 lb ft)	-



COMPONENTS OF GEARBOX

pos.	Description	Type	Quantity	Torque	Notes
1	Gear sensor retainer	-	1	3 Nm (2.21 lb ft)	-



LINKAGE

pos.	Description	Type	Quantity	Torque	Notes
1	Pinion fastening screws	M5	2	4-5 Nm (2.95-3.69 lb ft)	Loctite 270
2	Pinion cover fastening screws	M5	2	2.5-3.5 Nm (1.84-2.58 lb ft)	-
3	Gearbox lever fixing screws	M6	1	9-11 Nm (6.64-8.11 lb ft)	-

Overhaul data

Assembly clearances

Cylinder - piston assy.

CYLINDER - PISTON COUPLING CLEARANCE 125 CM³

Coupling categories with cast-iron cylinder

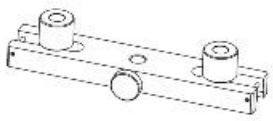
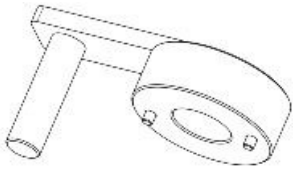
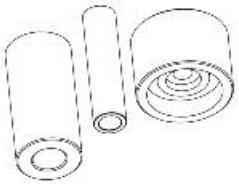
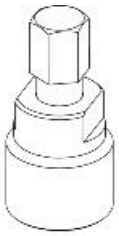
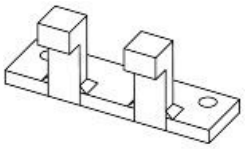
NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	58.010	58.017	57.963	57.970	0.040	0.054
Cylinder/Piston	N	58.017	58.024	57.970	57.977	0.040	0.054
Cylinder/Piston	O	58.024	58.031	57.977	57.984	0.040	0.054
Cylinder/Piston	P	58.031	58.038	57.984	57.991	0.040	0.054

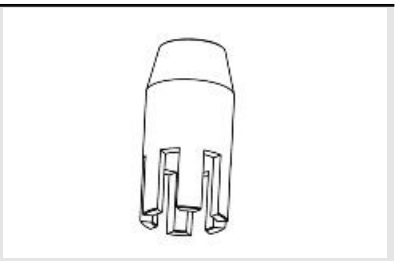
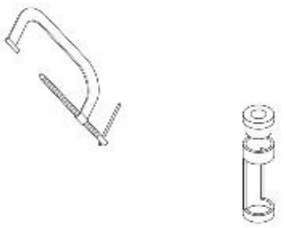
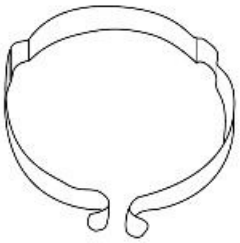
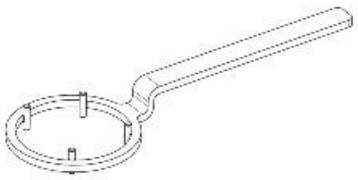
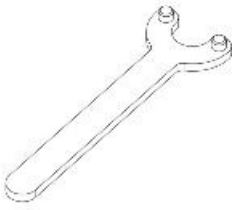
Rod small end - pin - piston

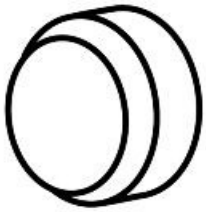
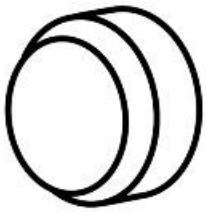
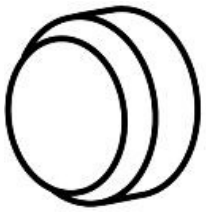
Characteristic
Rod small end
Maximum diameter: 15.023 mm (0.591 in)
Standard diameter: 15.010 - 15.018 mm (0.5910 - 0.5912 in)

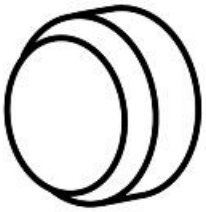
INDEX OF TOPICS

SPECIAL TOOLS

Stores code	Description	
AP8140266	Dial gauge mount	
865259	Flywheel retainer	
866380	Water pump tool set	
864868	Flywheel extractor	
864567	Camshaft timing adjustment lock pins	
864486	Countershaft lock tool	

Stores code	Description	
00H05600351	Oil seal guide	
020382Y011	Valve removal/installation tool	
020287Y	Tool for installing seal rings	
865261	Piston retainer	
00H05300041	Clutch lock	
865260	Camshaft sprocket lock tool	
020376Y	Sleeve for adaptors	

Stores code	Description	
020359Y	42 x 47 mm Adaptor	
020358Y	37 x 40 mm Adaptor	
020357Y	32 x 35-mm Adaptor	
020439Y	17 mm punch for secondary shaft oil seal	
020891Y	25 mm (0.98 in) adapter	
020363Y	20 mm diam. punch for crankshaft oil seal	
020412Y	15 mm diam. punch for clutch oil seal	

Stores code	Description	
020375Y	28x30 mm punch	
020483Y	30-mm guide	
020364Y	25 mm adapter	

INDEX OF TOPICS

Scheduled maintenance table

Correct maintenance is fundamental for ensuring the longevity of your vehicle and maintaining optimum function and performance.

Services must be performed as soon as the specified mileage and time intervals are reached. Services must be performed punctually at the correct intervals to maintain the validity of the warranty. See the "Warranty Booklet" for all other information concerning the applicability of the Warranty and on performing "Scheduled Maintenance" correctly.

NOTE

CARRY OUT MAINTENANCE OPERATIONS AT HALF THE INTERVALS SPECIFIED IF THE VEHICLE IS USED IN PARTICULAR RAINY OR DUSTY CONDITIONS, OFF ROAD OR FOR TRACK USE.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

(1) Grease every 500 km (310.69 mi) and before use in extreme conditions.

(2) Replace every 4 years.

(3) Check and clean and adjust or replace, if necessary, before every journey.

(4) Check after every engine start (check brake function, check that handlebar turns freely, check clutch, suspension, engine, lights, indicator lamps).

(5) Replace at whichever of the following occurs first: 36,000 km (22,369.36 mi) or 4 years.

(6) Check every 1,000 km (621.37 mi)

(7) Replace every 30,000 km (18,641.14 mi)

SCHEDULED MAINTENANCE TABLE

Km x 1,000 (mi x 1,000)	1 (0.6)	6 (3.7)	12 (7.5)	18 (11.2)	24 (14.9)	30 (18.6)	36 (22.4)	42 (26.1)	48 (29.8)	EVERY 12 MONTHS	EVERY 24 MONTHS
Rear shock absorber			I		I		I		I	I	I
Audible and visual warning devices	I	I	I	I	I	I	I	I	I		
Battery		I	I	I	I	I	I	I	I		
Spark plug		I	R	I	R	I	R	I	R		
Timing chain (7)						R					
Steering bearings and steering clearance	I	I	I	I	I	I	I	I	I	I	I
Diagnosis by tool	I	I	I	I	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R	R	R		
Engine oil filter	R	R	R	R	R	R	R	R	R	R	R
General vehicle operation (4)	I	I	I	I	I	I	I	I	I	I	I
Front light assembly		A	A	A	A	A	A	A	A		
Cooling system		I	I	I	I	I	I	I	I		
Safety switches (front brake, rear brake, stand, clutch)	I	I	I	I	I	I	I	I	I	I	I
Clutch lever and cable		L		L		L		L		I	I
Brake lever and throttle grip		I	I	I	I	I	I	I	I	I	I
Brake fluid	I	I	I	R	I	I	R	I	I	I	R
Coolant	I	I	I	R	I	I	R	I	I	I	R
Engine oil	R	R	R	R	R	R	R	R	R	R	R
Brake pads	I	I	I	I	I	I	I	I	I	I	I
Brake callipers and discs	I	I	I	I	I	I	I	I	I	I	I
Tyres - pressure / wear (3)	I	I	I	I	I	I	I	I	I	I	I

Km x 1,000 (mi x 1,000)	1 (0.6)	6 (3.7)	12 (7.5)	18 (11.2)	24 (14.9)	30 (18.6)	36 (22.4)	42 (26.1)	48 (29.8)	EVERY 12 MONTHS	EVERY 24 MONTHS
Valve clearance adjustment		I		I		I		I			
Screw tightness	I	I	I	I	I	I	I	I	I		
Front suspension: oil (5)							R				
Indicator lamps	I	I	I	I	I	I	I	I	I		
Final drive (1)(6)	I	I	I	I	I	I	I	I	I	I	I
Fuel and oil pipes + filters (2)	I	I	R	I	I	R	I	I	R	I	I
Brake pipes		I	I	I	I	I	I	I	I		
Labour time (minutes)	60	140	80	170	80	250	170	140	80	50	80

SCHEDULED MAINTENANCE TABLE RESERVED TO THE USA-LATAM MARKET

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

(1) Grease every 500 km (310.69 mi) and before use in extreme conditions.

(2) Replace every 2 years or 18,000 Km (11,184.68 mi).

(3) Replace every 4 years.

(4) Check and clean and adjust or replace, if necessary, before every journey.

(5) Check after every engine start (check brake function, check that handlebar turns freely, check clutch, suspension, engine, lights, indicator lamps).

(6) Replace at whichever of the following occurs first: 36,000 km (22,369.36 mi) or every 4 years.

(7) Check every 1,000 km (621.37 mi)

(8) Replace every 30,000 km (18,641.14 mi)

SCHEDULED MAINTENANCE TABLE

km (mi) x1000	1 (0.6)	6 (3.7)	12 (7.5)	18 (11.2)	24 (14.9)	30 (18.6)	36 (22.4)	42 (26.1)	48 (29.8)
Rear shock absorber			I		I		I		I
Audible and visual warning devices	I	I	I	I	I	I	I	I	I
Battery		I	I	I	I	I	I	I	I
Spark plug		I	R	I	R	I	R	I	R
Timing chain (8)						R			
Steering bearings and steering clearance	I	I	I	I	I	I	I	I	I
Diagnosis by tool	I	I	I	I	I	I	I	I	I
Air filter		R	R	R	R	R	R	R	R
Oil filter	R	R	R	R	R	R	R	R	R
General vehicle operation (5)	I	I	I	I	I	I	I	I	I
Front light assembly		A	A	A	A	A	A	A	A
Cooling system		I	I	I	I	I	I	I	I
Safety switches (front brake, rear brake, stand, clutch)	I	I	I	I	I	I	I	I	I
Clutch lever and cable		L		L		L		L	
Brake lever and throttle grip		I	I	I	I	I	I	I	I
Brake fluid - level (2)	I	I	I	I-R	I	I	I-R	I	I
Coolant - level (2)	I	I	I	I-R	I	I	I-R	I	I
Engine oil	R	R	R	R	R	R	R	R	R
Brake pads	I	I	I	I	I	I	I	I	I
Brake callipers and discs	I	I	I	I	I	I	I	I	I
Tyres - pressure / wear (4)	I	I	I	I	I	I	I	I	I
Valve clearance adjustment		I		I		I		I	
Screw tightness	I	I	I	I	I	I	I	I	I
Front suspension: oil (6)							R		
Indicator lamps	I	I	I	I	I	I	I	I	I

km (mi) x1000	1 (0.6)	6 (3.7)	12 (7.5)	18 (11.2)	24 (14.9)	30 (18.6)	36 (22.4)	42 (26.1)	48 (29.8)
Final drive (1)(7)	I	I	I	I	I	I	I	I	I
Fuel and oil pipes + filters (3)	I	I	R	I	I	R	I	I	R
Brake pipes		I	I	I	I	I	I	I	I
Labour time (minutes)	60	140	80	170	80	250	170	140	80

NOTE

AT EACH SCHEDULED MAINTENANCE MUST BE VERIFIED WITH THE DIAGNOSTIC TOOL IF THERE ARE ERRORS AND THE IF THE PARAMETERS ARE CORRECT.

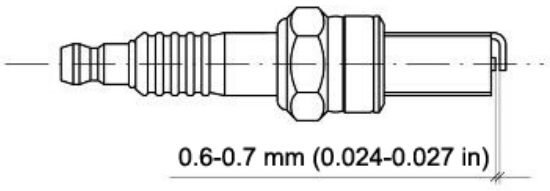
Recommended products

RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
Engine oil 10W-40	Synthetic-based lubricant for four-stroke engines.	SAE 10W-40; JASO MA, MA2; API SL; ACEA A3
Anti-freeze liquid, ready to use, colour red	Ethylene glycol antifreeze liquid with organic inhibition additives. Red, ready to use.	ASTM D 3306 - ASTM D 4656 - ASTM D 4985 - CUNA NC 956-16
Brake fluid DOT 4	Synthetic brake fluid.	SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4
Lithium-based grease	Lithium-calcium soap based grease	colour - black, contains EP (Extreme Pressure) additives, excellent water-repellent properties
Vaseline	neutral grease for battery terminals	-
Spray grease for chains	Spray lubricant grease	-
Fork oil 7.5W	Fork oil.	SAE 7.5W

Spark plug

- Lift the tank.
- Disconnect the spark plug H.V. cable boot and remove the spark plug.
- Check the condition of the spark plug, check that the insulating material is undamaged and measure the gap between the electrodes with a feeler gauge.
- If necessary, adjust the gap by bending the side electrode very carefully.
- If any defects are found, replace the spark plug with a new component of the specified type.
- Fit the spark plug with the correct inclination and hand-tighten it completely into its seat, then tighten definitively to the specified torque.



- Fit the cap on the spark plug as far as it will go.

CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE ENGINE IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 12,000 KM. USING NON-COMPLYING IGNITION CONTROL UNITS OR SPARK PLUGS OTHER THAN THOSE PRESCRIBED MAY SERIOUSLY DAMAGE THE ENGINE.

SPARK PLUG

Specification	Desc./Quantity
Spark plug	NGK CR9EKB or NGK CR9EB / NGK CR8EB
Electrode gap	0.6-0.7 mm (0.024-0.027 in)

Engine oil

Check

Check the engine oil level frequently.

NOTE

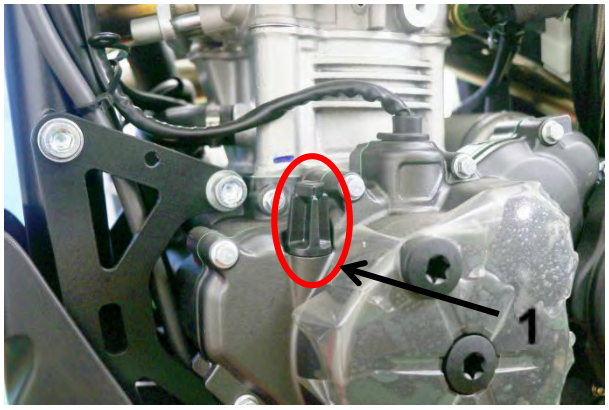
CARRY OUT MAINTENANCE OPERATIONS AT HALF THE INTERVALS SPECIFIED IF THE VEHICLE IS USED IN PARTICULAR RAINY OR DUSTY CONDITIONS, OFF ROAD OR FOR TRACK USE.

THE OIL LEVEL MUST BE CHECKED WHEN THE ENGINE IS WARM.
THE OIL LEVEL MAY TEMPORARILY DROP BELOW THE "MIN' MARK WHEN THE ENGINE IS COLD, GIVING A FALSE READING'.
THIS SHOULD NOT BE CONSIDERED A PROBLEM PROVIDED THAT THE ALARM WARNING LIGHT AND THE ENGINE OIL PRESSURE ICON DISPLAY DO NOT TURN ON SIMULTANEOUSLY.

CAUTION

DO NOT LET THE ENGINE IDLE WITH THE VEHICLE AT A STANDSTILL TO WARM UP THE ENGINE AND OBTAIN THE OPERATING TEMPERATURE OF ENGINE OIL.
PREFERABLY CHECK THE OIL AFTER A JOURNEY OF AFTER TRAVELLING APPROXIMATELY 15 Km (10 miles) IN EXTRA-URBAN CONDITIONS (ENOUGH TO WARM UP THE ENGINE OIL TO OPERATING TEMPERATURE).

- Stop the engine and wait at least five minutes.
- Keep the vehicle upright with both wheels on the ground.
- From the left hand side of the engine, unscrew and remove the oil dipstick-cap (1).
- Wipe the dipstick clean with a clean cloth, then refit and retighten it into the oil filler.



- Unscrew and remove the dipstick-cap again and check that the engine oil level is between the two markings:

MAX = maximum level;

MIN = minimum level.

- The oil level should be almost at the "MAX" marking.
- If it is not, top up to the correct level indicated.

CAUTION

THE OIL LEVEL MUST NEVER DROP BELOW THE MINIMUM MARKING OR EXCEED THE MAXIMUM MARKING; AN OIL LEVEL NOT WITHIN THE MINIMUM AND MAXIMUM MARKINGS MAY CAUSE SEVERE ENGINE DAMAGE

Fill with engine oil as required:

- Unscrew and remove the cap (1).

When using a funnel or any other element, make sure it is perfectly clean.

DO NOT ADD ADDITIVES OR ANY OTHER SUBSTANCES TO THE OIL.

CAUTION

USE OIL MEETING THE SPECIFICATIONS INDICATED IN THE TABLE OF RECOMMENDED PRODUCTS AT THE END OF THIS MANUAL.

CAUTION

DO NOT GO BEYOND THE "MAX" AND BELOW THE "MIN" LEVEL MARK TO AVOID SEVERE ENGINE DAMAGE.

- Top-up the oil in the reservoir until you reach the correct level.

Replacement

- Remove the left engine fairing before starting the procedure.
- Start the engine and run at idle speed for a few minutes. This is necessary to facilitate subsequent drainage.

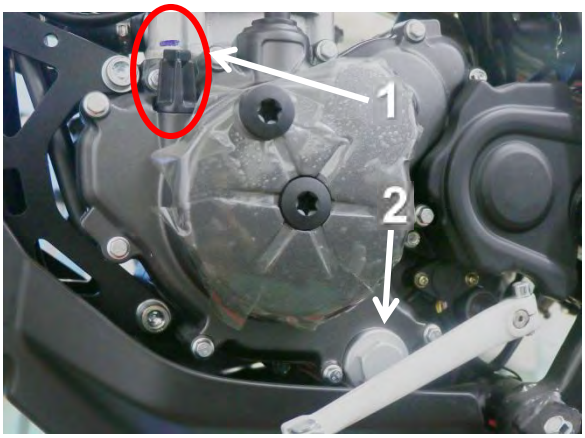
CAUTION

PARK THE MOTORCYCLE ON SAFE AND LEVEL GROUND.

- Shut off the engine.

OIL BECOMES VERY HOT WHEN THE ENGINE IS HOT; BE CAREFUL NOT TO GET BURNED WHEN CARRYING OUT THE OPERATIONS DESCRIBED BELOW.

- Keep the vehicle upright with both wheels on the ground.
- Place a container of suitable capacity under the drain plug (2).
- Unscrew and remove the drainage plug (2).
- Unscrew and remove the filler plug (1).
- Drain the oil into the container; allow several minutes for oil to drain completely.
- Remove any metal scrap attached to the drainage plug (2) magnet.
- Check and, if necessary, replace the drain plug seal washer (2).
- Fit and tighten the drain plug (2) to the specified tightening torque.
- Fill with the specified quantity of engine oil via the filler port (1).



Recommended products

Engine oil 10W -40 Synthetic-based lubricant for four-stroke engines.

SAE 10W-40; JASO MA, MA2; API SL; ACEA A3

Characteristic

Engine oil

1000 cm³ (61.01 cu in)

- Fit and tighten the filler plug (1).
- Start the engine and run at idle speed for approximately a minute to allow the oil to distribute correctly throughout the circuit.
- Check the oil level and top up if necessary.

TIGHTEN THE FILLER PLUG SECURELY AND CHECK THAT OIL DOES NOT SEEP FROM AROUND THE PLUG.
PERIODICALLY CHECK THAT THERE IS NO OIL LEAKAGE FROM THE CRANKCASE COVER GASKET.
NEVER USE THE VEHICLE WITH INSUFFICIENT LUBRICANT OR WITH CONTAMINATED OR UNSUITABLE LUBRICANTS, AS THIS WILL ACCELERATE WEAR OF MOVING PARTS AND CAUSE IRREPARABLE DAMAGE.

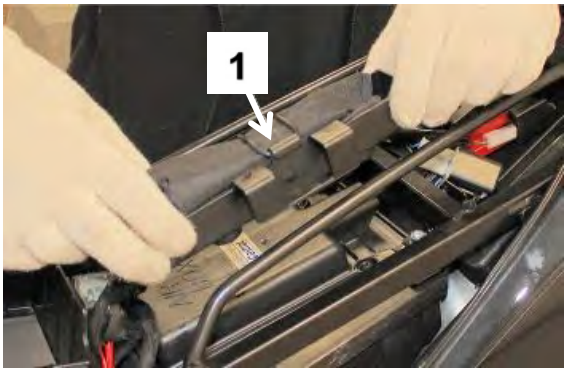
Engine oil filter

- Remove the engine fairing lug and drain off the engine oil
- Undo and remove the oil filter cap (1)
- Retrieve the spring (2)

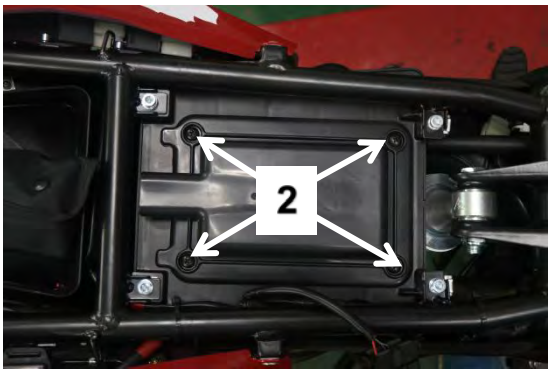
- Remove the oil filter (3)

Air filter

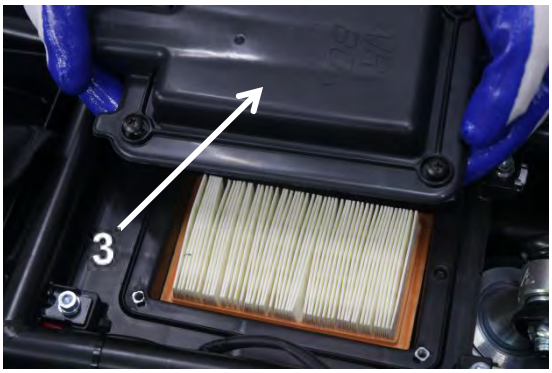
- Remove the saddle
- Remove the tool kit (1)



- Unscrew and remove the four screws (2)



- Remove the cover (3).



- Remove the filter element (4)

CLEANING - AIR FILTER

NEVER USE SCREWDRIVERS OR OTHER TOOLS TO WORK ON THE FILTER.

- Clean the filter element (4) with compressed air, blowing from the inside of the filter outwards.
- Clean the outside of the filter element (4) with a clean cloth.
- Clean the interior of the filter housing and the intake ducts with a clean cloth.

CAUTION

WHEN CLEANING THE FILTER ELEMENT, CHECK THAT THERE ARE NO TEARS IN THE ELEMENT ITSELF. REPLACE THE FILTER ELEMENT IF NECESSARY.

REPLACING THE AIR FILTER

Replace the air filter with a new component of the same type.

NOTE

NEVER REUSE AN OLD FILTER.

Braking system

Top-up

RISK OF BRAKE FLUID SPILLING. DO NOT OPERATE THE BRAKE LEVER IF THE BRAKE FLUID RESERVOIR CAP IS LOOSE OR HAS BEEN REMOVED.

CAUTION

AVOID PROLONGED AIR EXPOSURE OF THE BRAKE FLUID. BRAKE FLUID IS HYGROSCOPIC AND ABSORBS MOISTURE WHEN IN CONTACT WITH AIR. LEAVE THE BRAKE FLUID RESERVOIR OPEN ONLY FOR THE TIME NEEDED TO COMPLETE THE TOPPING-UP PROCEDURE.

TO AVOID SPILLING FLUID WHILE TOPPING UP, KEEP THE LEVEL OF THE FLUID IN THE RESERVOIR PARALLEL WITH THE EDGE OF THE RESERVOIR ITSELF (IN HORIZONTAL POSITION). DO NOT ADD ADDITIVES OR OTHER SUBSTANCES TO THE FLUID. FUNNELS OR ANY OTHER IMPLEMENTS USED MUST BE PERFECTLY CLEAN.

BRAKE FLUID IS HIGHLY CORROSIVE. AVOID CONTACT WITH THE SKIN, EYES AND PARTS OF THE MOTORCYCLE.
WHEN TOPPING UP, PROTECT PARTS OF THE MOTORCYCLE IN THE VICINITY OF THE RESERVOIR WITH ABSORBENT MATERIAL.

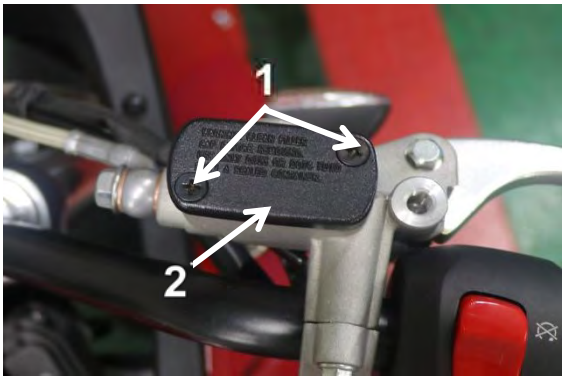
Recommended products

Brake fluid DOT 4 Synthetic brake fluid.

SAE J 1703; FMVSS 116; ISO 4925; CUNA NC 956 DOT4

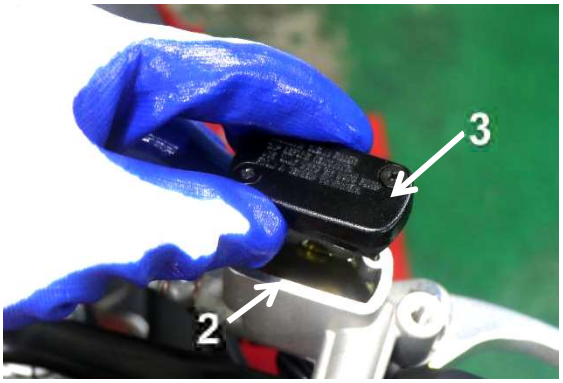
Front braking system

- Unscrew and remove the screws (1) on the front braking circuit fluid tank (2).
- Lift and remove the cover (3) and the gasket.
- Top up the tank (2) with the recommended brake fluid until the sight glass is completely covered.



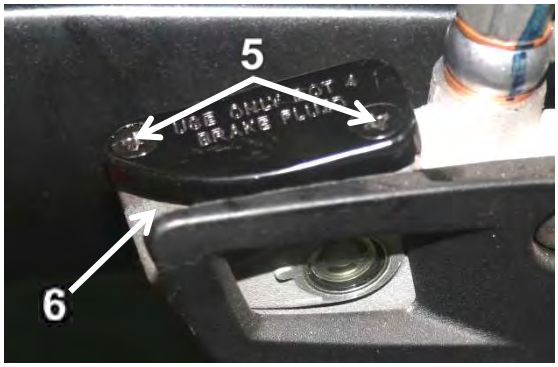
CAUTION

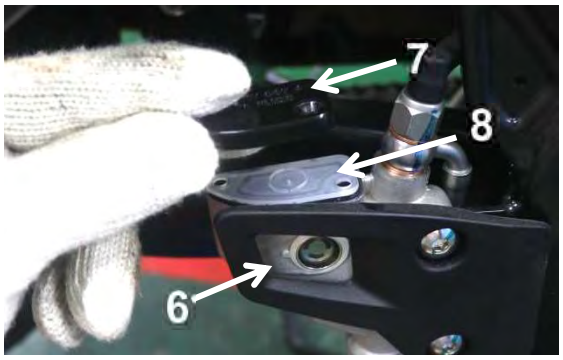
ONLY FILL TO THE "MAX" LEVEL AFTER FITTING NEW BRAKE PADS. DO NOT FILL TO THE "MAX" LEVEL WITH WORN PADS, AS THIS WILL CAUSE FLUID TO ESCAPE WHEN REPLACING BRAKE PADS.
CHECK BRAKING EFFICIENCY.
IF THE DEAD ZONE OF THE BRAKE PEDAL OR BRAKE LEVER IS TOO LONG, OR IN CASE OF FLUID LOSS, IT MAY BE NECESSARY TO BLEED THE AIR TRAPPED IN THE SYSTEM.



Rear braking system

- Unscrew and remove the screws (5) on the rear braking circuit fluid tank (6).
- Lift and remove the cover (7)
- Lift and remove the Teflon lid (8) and the gasket (9).
- Top up the tank (6) with the recommended brake fluid until the sight glass is completely covered.





CAUTION

ONLY FILL TO THE "MAX" LEVEL AFTER FITTING NEW BRAKE PADS. DO NOT FILL TO THE "MAX" LEVEL WITH WORN PADS, AS THIS WILL CAUSE FLUID TO ESCAPE WHEN REPLACING BRAKE PADS.
CHECK BRAKING EFFICIENCY.
IF THE DEAD ZONE OF THE BRAKE PEDAL OR BRAKE LEVER IS TOO LONG, OR IN CASE OF FLUID LOSS, IT MAY BE NECESSARY TO BLEED THE AIR TRAPPED IN THE SYSTEM.

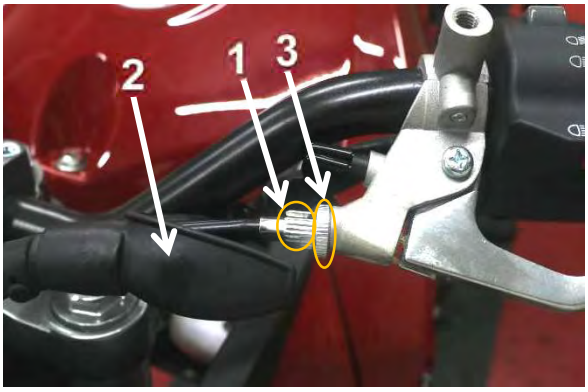
Adjusting the levers

NOTE

NO ADJUSTMENT IS POSSIBLE FOR THE FRONT BRAKE LEVER.
SEE THE CHAPTER "INSTALLING THE REAR BRAKE MASTER CYLINDER" FOR THE PROCEDURE FOR ADJUSTING THE REAR BRAKE LEVER.

Clutch system

Adjusting the lever



Adjustment clutch when the engine stops or the vehicle tends to move forward even when clutch lever is operated and the gear engaged, or if the clutch "slides", resulting in acceleration delay considering the engine revs.

Minor adjustments can be carried out through the set screw (1):

- Rest the vehicle on its stand.
- Remove the protection casing (2).
- Loosen the lock nut (3).
- Turn the set screw (1) until the empty travel at the clutch lever end is approximately 10 - 15 mm (0.39 - 0.59 in) (see figure).
- After adjusting, tighten the check nut (3) to lock the adjuster screw (1).
- Check the empty travel at the clutch lever end.
- Refit he protection casing (2).

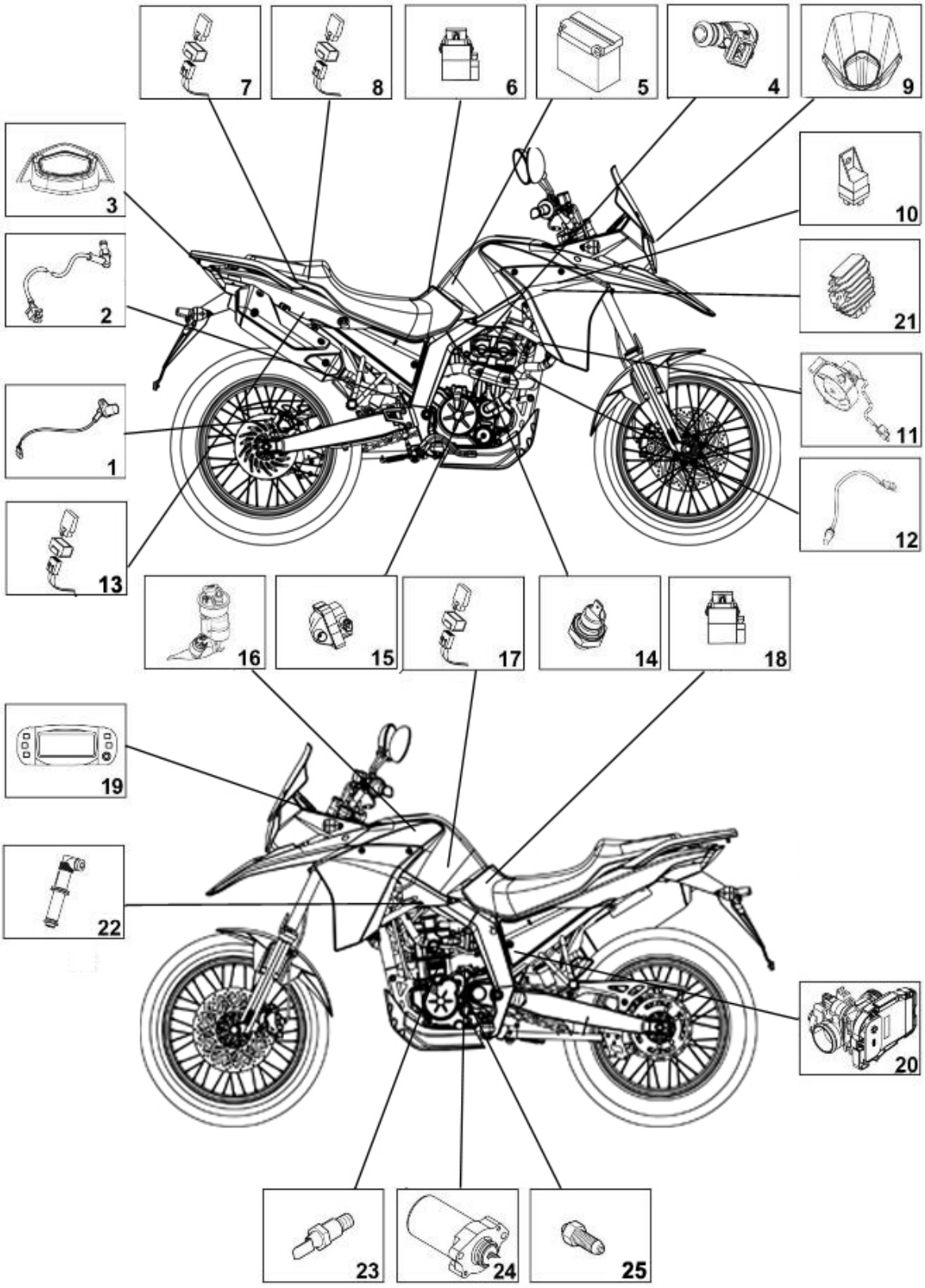
NOTE

CHECK THE CONDITION OF THE CLUTCH CABLE: THERE MUST BE NO SIGNS OF CRUSHING OR WEAR ALONG THE ENTIRE LENGTH OF THE CABLE SHEATH.

- Lubricate the clutch cable periodically with suitable lubricant to prevent premature wear and corrosion.

INDEX OF TOPICS

Components arrangement



KEY:

1. Speed sensor
2. Stop switch
3. Taillight
4. Injector
5. Battery
6. Main fuses
7. Fan relay
8. Light relay
9. Front light assembly
10. Starter relay
11. Electric fan
12. Oxygen sensor
13. Flasher unit
14. Oil pressure sensor
15. Coil
16. Fuel pump
17. Injection relay
18. Secondary fuses
19. Instrument
20. MIU G3 control unit
21. Regulator
22. Spark plug boot
23. Temperature sensor
24. Starter motor
25. Neutral sensor

Electrical system installation

Scope and applicability

The purpose of this document is to define the correct cable harness routing layout to ensure the reliability of the vehicle.

Materials used and corresponding quantities

The electrical system consists of the following wiring harnesses and parts:

1 x main cable harness.

Consumables such as cable clamps, cable fasteners or cable glands are indicated in the figures.

Special checks for the correct connection and routing of cables

It is extremely important that any security-locks for the following connectors are properly connected and correctly tightened to ensure proper engine, and therefore proper vehicle, operation.

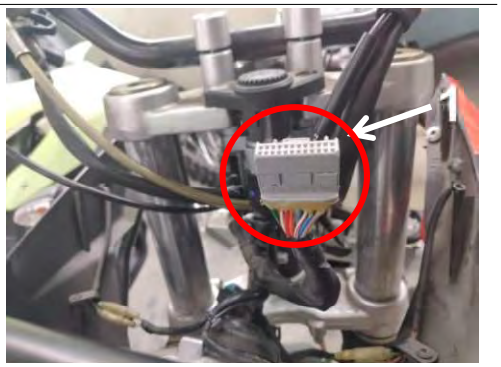
The installation is shown with the vehicle ideally divided into three parts:

1. Front section
2. Central section
3. Rear section

Front side

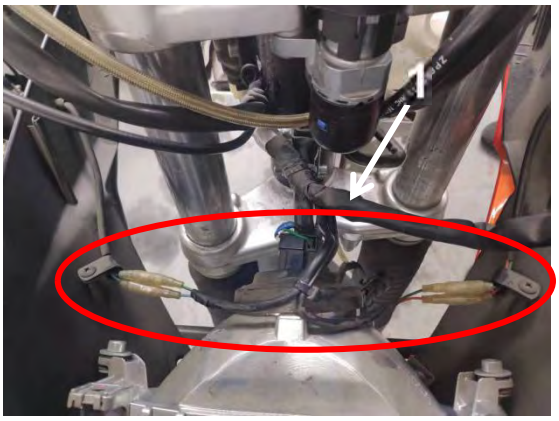
INSTRUMENT PANEL

- Make sure the instrument panel connector (1) is correctly connected to the instrument panel.



TURN INDICATORS

- Make sure the turn indicators connector (1) is correctly connected to the turn indicators.



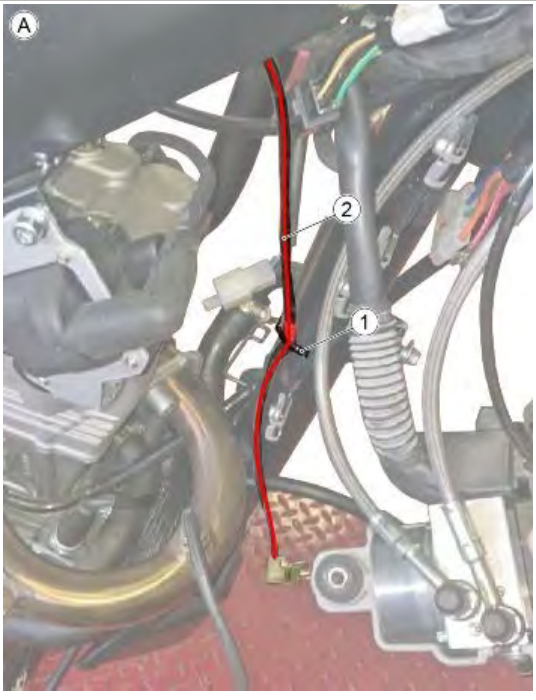
CABLE ROUTING ON RH SIDE

- Secure the wiring harnesses on the RH side of the motorcycle as indicated and pass them through the metal cable gland (1) on the chassis.

Central part

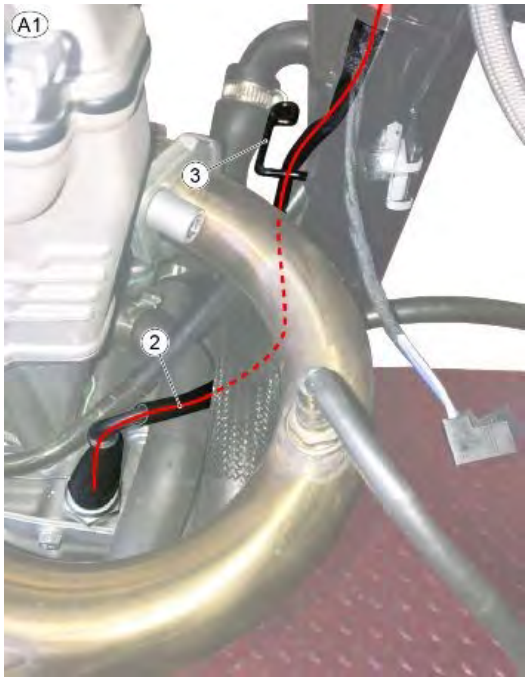
A-OIL PRESSURE SENSOR

- Using a clamp (1), placed near the red taping, secure the oil pressure sensor wiring harness (2).



A1-OIL PRESSURE SENSOR

- The oil pressure sensor wiring harness (2) must pass through the metal cable gland of the frame (3).

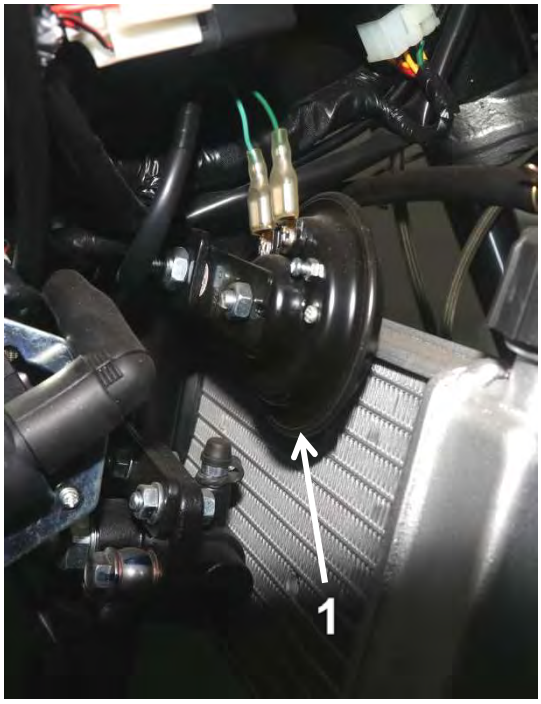


A2-OIL PRESSURE SENSOR

- The oil pressure sensor wiring harness (2) must pass under the water pipe (4).

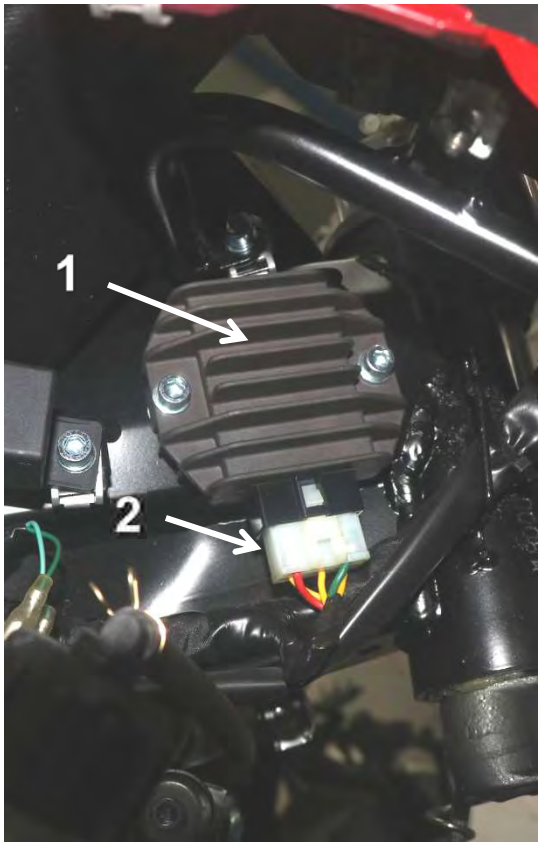
HORN

- Place the horn (1) as shown in the figure and once you have connected the Faston connectors, secure the wiring harness with a clamp.



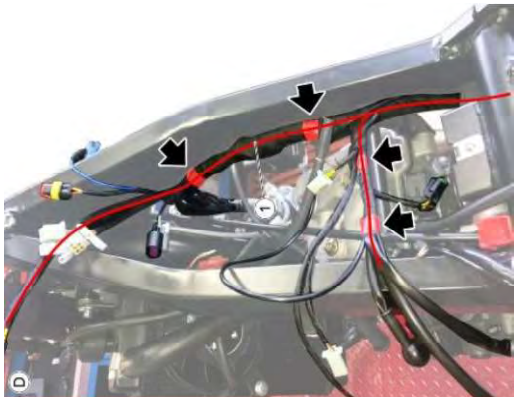
VOLTAGE REGULATOR

- After securing the voltage regulator (1),connected the wiring harness (2) .



MAIN WIRING HARNESS

- Place the main wiring harness (1) in- side the chassis making sure that the red taping is placed near the metal flanges which must be covered with a piece of PVC pipe.



MAIN WIRING HARNESS

- Place the main wiring harness (1) on the metal flange which must be cov- ered with a piece of PVC pipe.

MAIN WIRING HARNESS

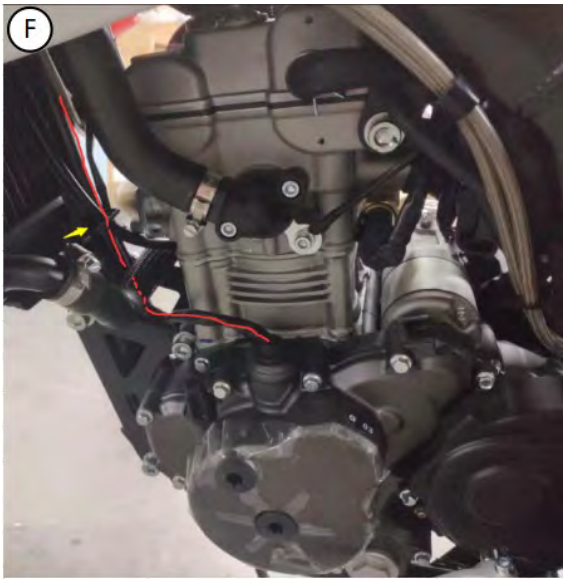
- Place the main wiring harness (1) on the metal flanges and tighten them to stop the wiring harness from moving.

ECU

- Secure the ECU connector using the special metal plate.

FLYWHEEL

- The flywheel wiring harness must be fastened to the other wiring harnesses by a clamp.

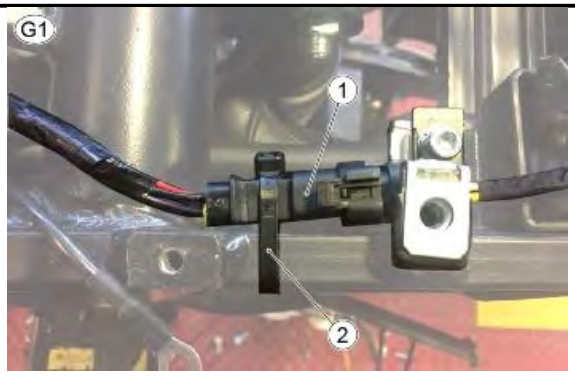


STARTER MOTOR

- Make sure that the starter motor earth cable is fastened correctly.

STARTER MOTOR

- Connect the starter motor connector (1) and secure it to the chassis with a clamp (2).



FUSES

- Place the fuses as shown

Back side

MAIN WIRING HARNESS ON REAR CHASSIS

- Secure the main wiring harness using two clamps (2) near the red taping.

FLASHER

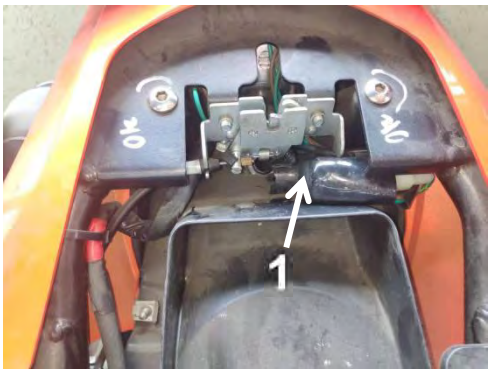
- Make sure the flasher(1) is connected to the right side of the tailgate.

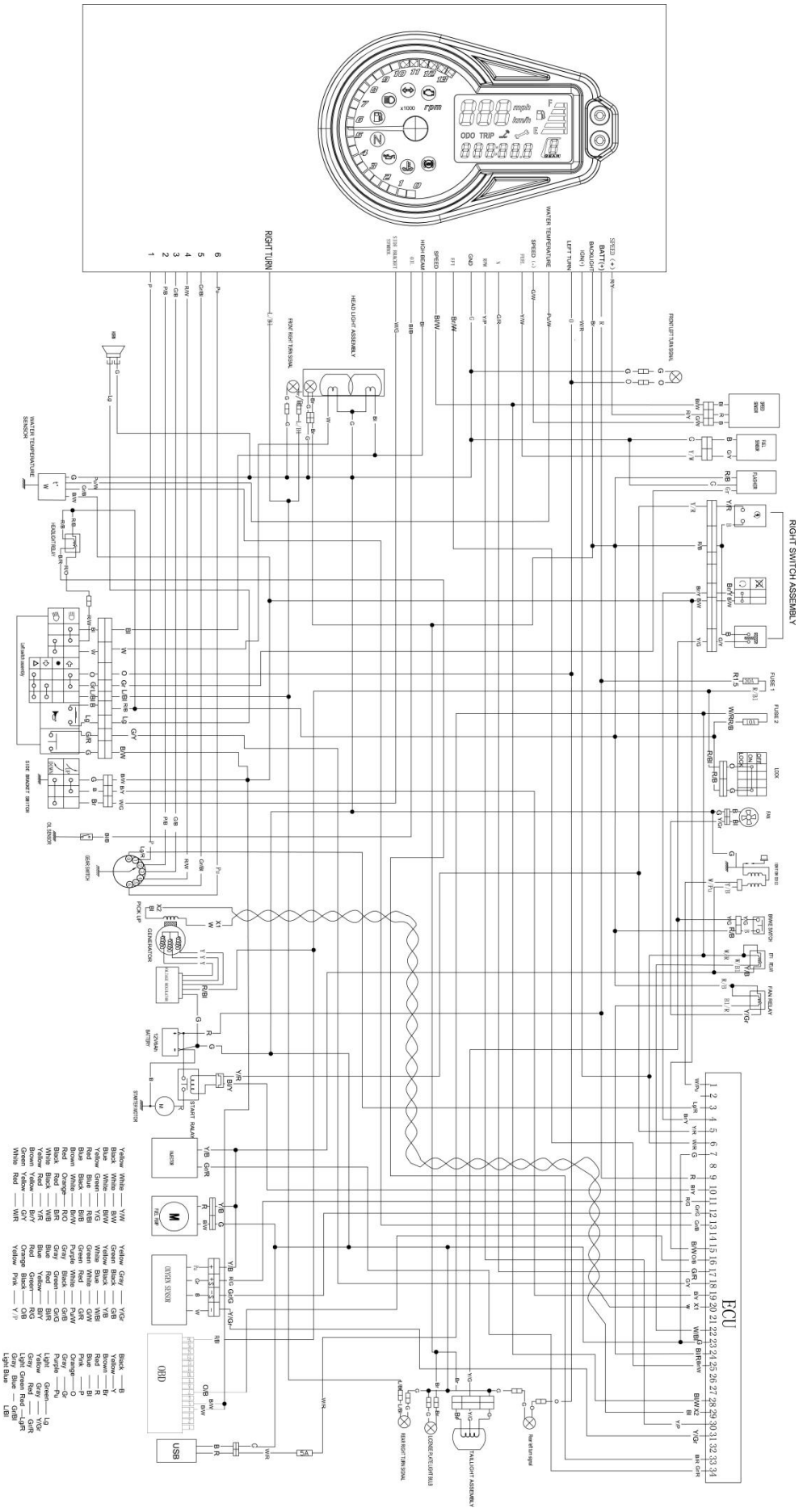
RELAY

- Make sure that the relays(1) are connected to the left side of the tailgate.

Taillight and rear turn indicators cable

- Make sure that the taillight and rear turn indicators cable(1) are connected to the rear side of the tailgate.





General wiring diagram

Checks and inspections

GENERAL NOTIONS FOR TROUBLESHOOTING ELECTRICAL FAULTS

THE SECTIONS RELATIVE TO THE ELECTRICAL SYSTEM CONTAIN DRAWINGS OF CONNECTORS; NOTE THAT THE DRAWING ALWAYS DEPICT THE CONNECTOR/COMPONENT VIEWED FROM THE WIRING HARNESS SIDE, I.E. FROM THE SIDE ON WHICH THE CABLES LEADING FROM THE MAIN WIRING HARNESS ENTER THE CONNECTOR/COMPONENT.

CAUTION

BEFORE STARTING ANY TROUBLESHOOTING PROCEDURES ON THE VEHICLE, CHECK THAT THE BATTERY VOLTAGE IS ABOVE 12V.

PROCEDURE FOR CHECKING CONNECTOR

This procedure consists of the following checks and inspections:

1. Visually inspect connector and check that it is fitted correctly onto the component or onto the relative connection point, and where applicable, check that the connector retainer or clip is correctly fastened.

2. Visually inspect the terminals on the connector: there must be no signs of corrosion or dirt. It is also important to check that the terminals are positioned correctly on the connector (terminals must all be straight and of the same length) and to check the condition of the terminals themselves (terminals must not be loose, bent etc.).

CAUTION

IN THE CASE OF SPORADIC FAULTS, MOVE OR WIGGLE THE RELATIVE WIRING HARNESS SLIGHTLY WHILE PERFORMING EACH OF THE CHECKS INDICATED FOR TROUBLESHOOTING.

3. Pull cables gently from the back of the connector to check that the terminals are fitted correctly on the connector and that the wires are fastened correctly to the terminals.

Checking electrical CONTINUITY

Purpose of check: the purpose of this check is ensure that there are no interruptions or excess resistance (due to corroded terminals, for example) in the circuit under inspection.

Tester: set the tester selector to the "continuity" symbol and place the probes of the tested at the two ends of the circuit. Normally, the tester will sound an audible signal to confirm continuity in the section of circuit tested. Continuity may also be tested by setting the tester selector to the "Ohm" symbol and checking that the resistance in the circuit is zero or of a few tenths of an Ohm.

IMPORTANT: THE CIRCUIT MUST BE UNPOWERED DURING THIS TEST. IF THE CIRCUIT IS POWERED, THE RESULTS OF THIS TEST ARE MEANINGLESS.

Checking GROUND CONNECTION

Purpose of check: the purpose of this check is to verify that a cable or circuit is correctly connected to the ground (-) of the vehicle.

Tester: set the tester selector to the "continuity" symbol and place one of the tester probes on the vehicle ground point (or on the battery negative pole) and the other probe on the cable under inspection. Normally, the tester will sound an audible signal to confirm continuity in the section of circuit tested. Continuity may also be tested by setting the tester selector to the "Ohm" symbol and checking that the resistance in the circuit is zero or of a few tenths of an Ohm.

IMPORTANT: WHERE GROUND IS PROVIDED BY THE ECU, CHECK THAT THE ECU IS EFFECTIVELY PROVIDING THE GROUND CONNECTION FOR THE CIRCUIT DURING THE TEST.

Checking VOLTAGE

Purpose of check: the purpose of this check is to determine if a cable is carrying voltage, in other terms, to verify whether it powered by the battery or ECU.

Tester: set the tester selector to the "DC voltage" symbol and place the red tester probe on the cable under inspection and the black tester probe on the vehicle ground point (or on the battery negative pole).

CAUTION

IN THE CASE OF SPORADIC FAULTS, MOVE OR WIGGLE THE RELATIVE WIRING HARNESS SLIGHTLY WHILE PERFORMING EACH OF THE CHECKS INDICATED FOR TROUBLESHOOTING.

Dashboard

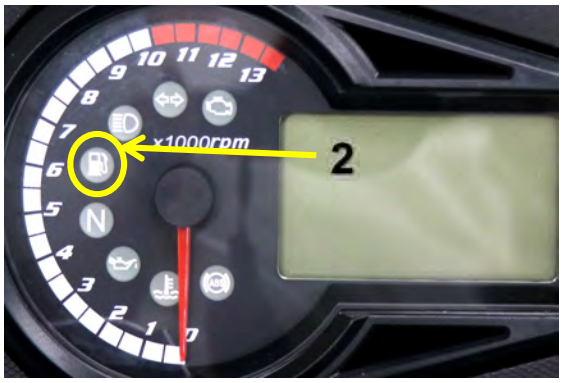
Diagnosis

Oil pressure

- The red oil warning lamp (1) illuminates if the pressure in the oil circuit is too low.
- If this occurs, determine the cause of the low oil level.

Fuel reserve

- In the event of a broken circuit, the MI engine alarm warning lamp does not light, no icons illuminate and none of the fuel gauge indicator bars are displayed. In this case, the fuel reserve warning lamp will not illuminate even when the tank is empty.



Water temperature

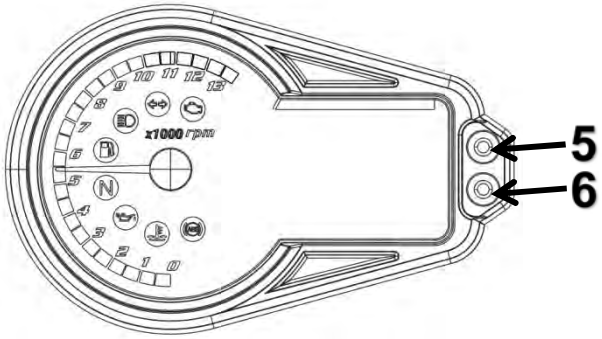
- The red water temperature warning lamp (3) illuminates in the event of excessive coolant temperature (T>116° C).

Engine alarm warning MI

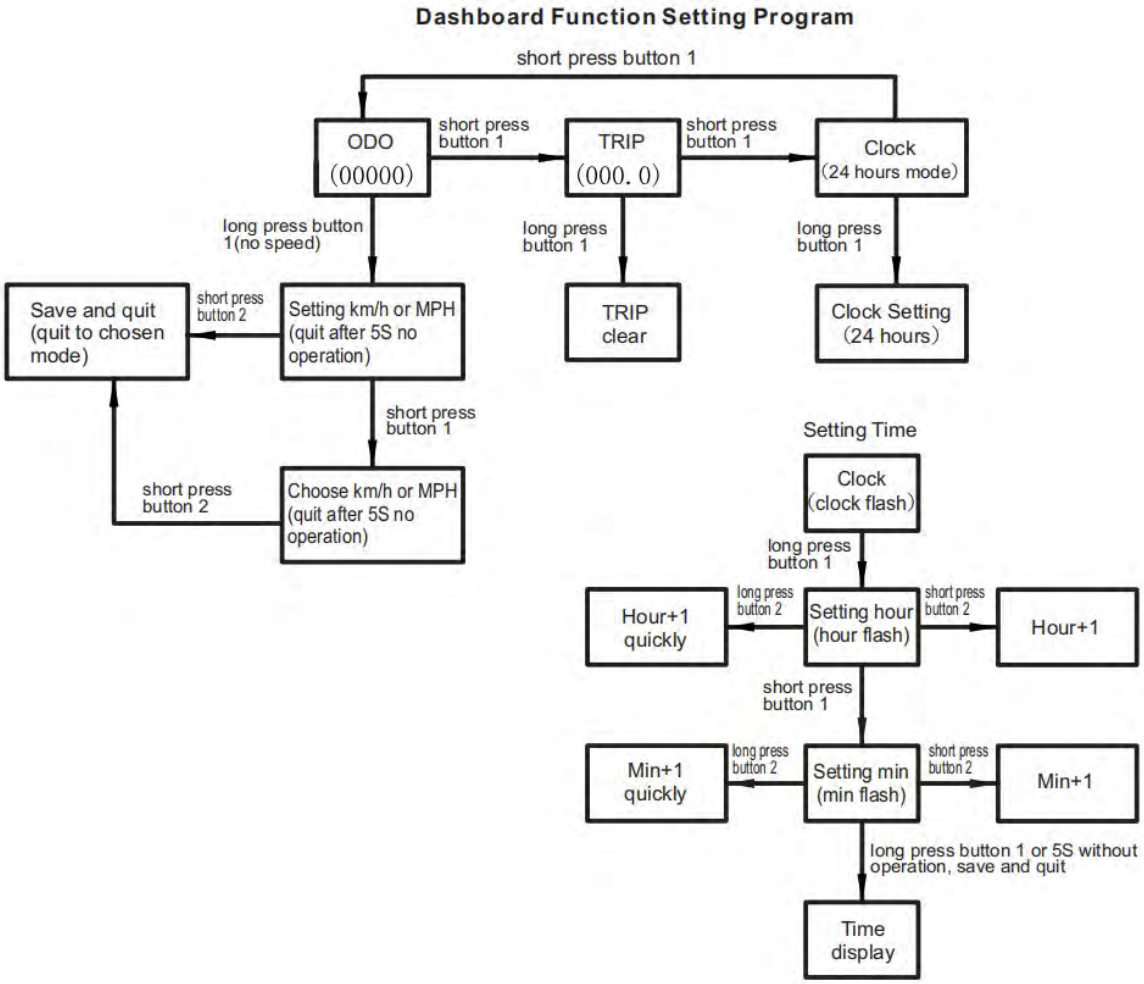
- The amber engine alarm warning lamp MI (4) lights continuously in the event of a fault identified by the engine control unit. Check for errors with the diagnostic tool.

Instrument function button

- Function switch button II(5).
- Function switch button I(6).

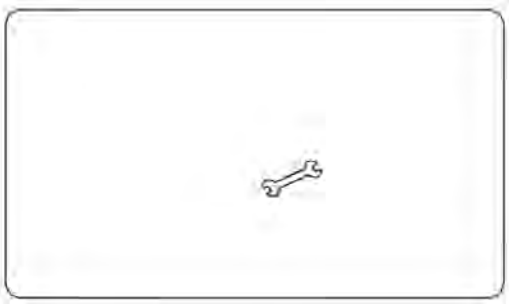


Instrument function button operation instructions



RESETTING THE SCHEDULED MAINTENANCE ICON

- Elimination warning： only connect battery and ignition switch is off ,long press the function button I over 5S,and switch on the ignition switch at the same time to remove warning.



Ignition circuit

Characteristic

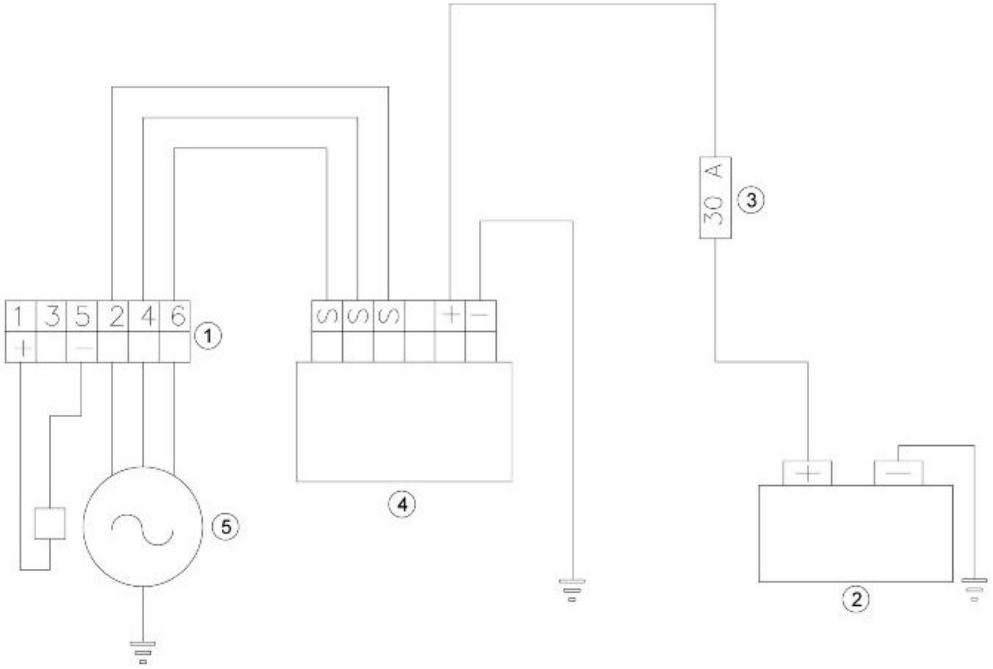
Spark plug

NGK CR9EKB or NGK CR9EB / NGK CR8EB

Electrode gap

0.6-0.7 mm (0.024-0.027 in)

Battery recharge circuit



Key:

1. Multiple connectors
2. Battery
3. Main fuses
4. Voltage regulator
5. Alternator

RECHARGING SYSTEM

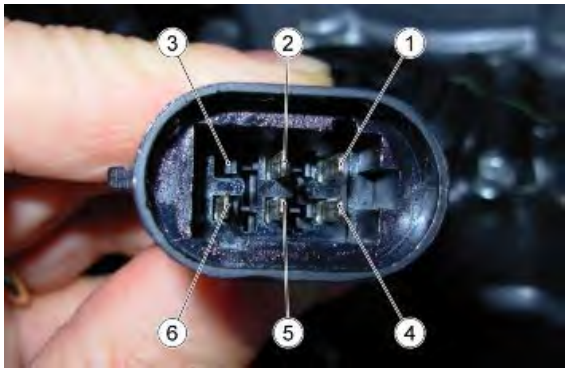
- Disconnect the six-way connector (1) (black colour) located behind the left side cover.

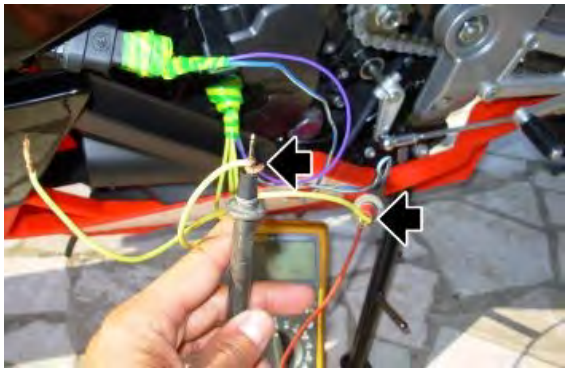
NOTE

THE ENGINE SIDE IS IDENTIFIED WITH THE LETTER "A"

Measurement of resistance (with engine off)

- For a correct detection of the alternator resistance, an ambient temperature measurement must be carried out and afterwards a heat stabilisation (after turning fan on) by using a tester, using alternatively 3 of the 5 connector pins (no. 2, 4, 6): stage "1" (pin 2-4), stage "2" (pin 2-6), stage "3" (pin 4-6).





- Take the measurement; The correct value is determined by the value measured for each stage in which from time to time the resistance of the tester wires is subtracted, obtained by touching the two lugs.

Example:

- Resistance of stage 1 read on the display = 0.67 Ohm

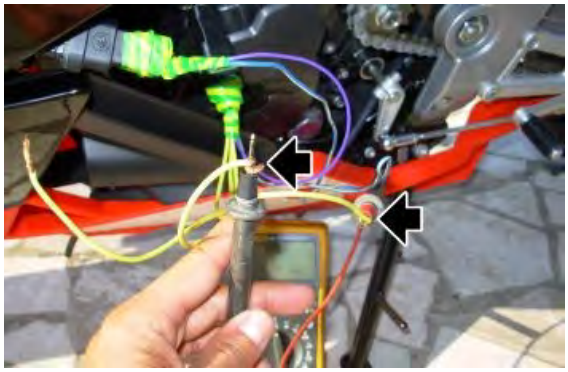
- Resistance of the wires read on the display = 0.47 Ohm

- Effective resistance stage 1 = 0.67-0.47 = 0.20 Ohm
- If there is a significant difference between one stage and another (other than 0.20 Ohm), this means that the alternator is defective and must be replaced.

RESISTANCE MEASUREMENT

Winding stage	Ambient temperature (ohm)	Afterwards heat stabilisation (ohm)
Stage 1	0.15 - 0.30	0.20 - 0.35
Stage 2	0.15 - 0.30	0.20 - 0.35
Stage 3	0.15 - 0.30	0.20 - 0.35

Empty voltage



- Disconnect the six-way connector (1).
- Make a special cable harness using two connectors that can be coupled with those on the alternator side and the chassis side of the motorcycle. The outgoing wires from pins 1 and 5 must maintain the continuity of the positive and negative of the pick-up, otherwise the engine will not start; while the outgoing cables from pins 2, 4, 6 (alternator side) must have the ends free in order to perform the appropriate action.

CAUTION

KEEP THE THREE ENDS OF THE FREE CABLES WELL SEPARATED TO AVOID DANGEROUS SHORT CIRCUITS.

- For a correct detection of the alternator voltage, the measurements must be carried out using alternatively the 3 ends of the free cables: stage "1" (outgoing cables from pins 2 and 4), stage "2" (outgoing cables from pins 2 and 6), stage "3" (outgoing cables from pins 4 and 6).
- Start the engine and carry out the measurement.

- If there is a significant difference between one stage and another (other than 15 V), this means that the alternator is defective and must be replaced.

CAUTION

WITH THE ENGINE HOT THE VALUES RECORDED ARE ON AVERAGE 4-5 V LESS THAN THOSE DETECTED WITH THE ENGINE COLD.

EMPTY VOLTAGE

rpm	2000	6000	8000
Vm linked voltage Reference values (V rms)	20 - 30	75 - 85	95 - 105

Short circuit current

- For correct detection of short circuit current it is necessary to make a special cable harness using two connectors that can be coupled with those on the alternator side and the chassis side of the motorcycle. The outgoing wires from pins 1 and 5 must maintain the continuity of the positive and negative of the pick-up, otherwise the engine will not start; while the ends of the outgoing cables from pins 2, 4, 6 (alternator side) must be short circuited with each other in order to be able to perform the appropriate action.
- Start the engine and with an ammeter clamp measure each single cable.
- If there is a significant difference between the measurement taken of the single cables (other than 10 A), this means that the alternator is defective and must be replaced.

CAUTION

WITH THE ENGINE HOT THE VALUES RECORDED ARE ON AVERAGE 2-3 A LESS THAN THOSE DETECTED WITH THE ENGINE COLD.

WARNING

NEVER KEEP THE ENGINE RUNNING FOR MORE THAN ONE MINUTE; FAILURE TO DO SO COULD CAUSE SERIOUS OVERHEATING DAMAGES TO THE MOTORCYCLE CIRCUITS.

COLD SHORT CIRCUIT CURRENT

RPM	2000	4000	6000	8000
RMS DC current (Arms) (average of the 3 stage currents)	12 - 18	12 - 18	12 - 18	12 - 18

Voltage on battery poles with engine speed always between 3000 - 5000 RPM

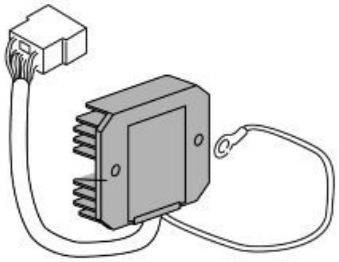
- Start the engine, after about one minute of operating bring the speed to 3000-5000 RPM, then measure with a tester the voltage at the battery poles that must always be between 13V and 15V. Otherwise, if the correct operation of the alternator has already been checked, replace the regulator.

CAUTION

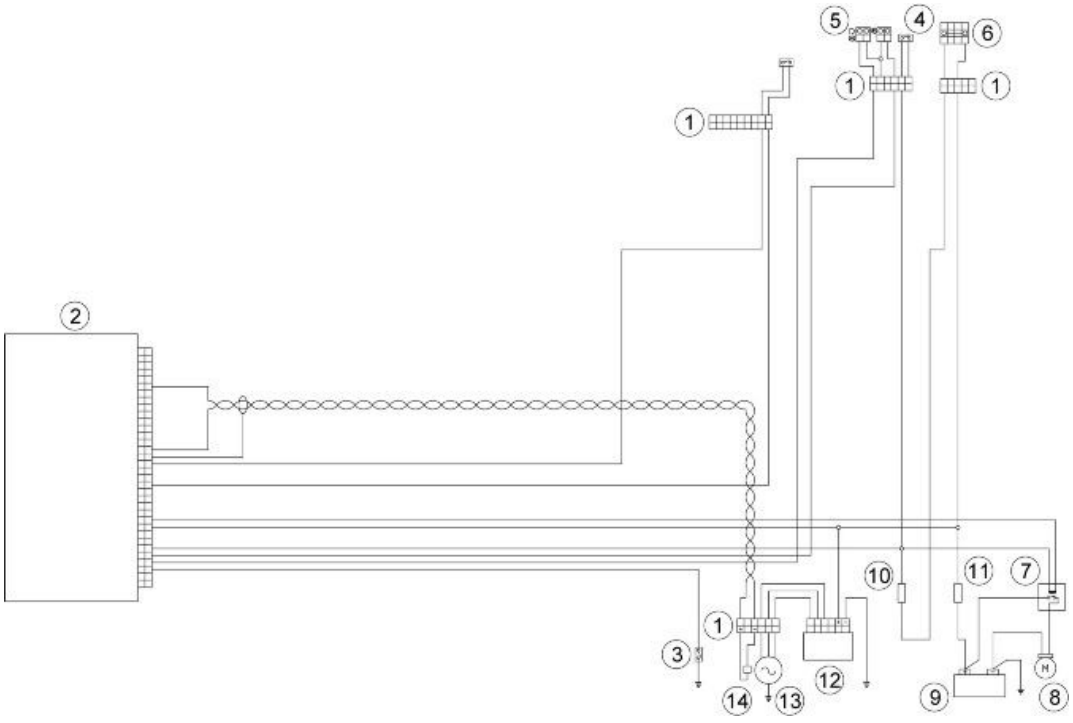
PERFORM THE CHECK DESCRIBED ABOVE WITH A BATTERY IN GOOD CONDITION (START VOLTAGE ABOUT 13V) MAKING SURE THAT THERE ARE NO ELEMENTS IN THE SHORT CIRCUIT.

Voltage regulator check

- Output voltage 13.5 V - 15 V
- Output current higher than 10 A (with load)



Start-up system check

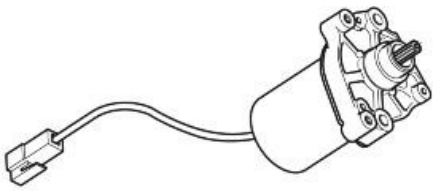


Key:

1. Multiple connectors
2. MIU G3 control unit
3. Gear in neutral switch
4. Clutch switch
5. Right light switch
6. Ignition switch
7. Starter motor relay
8. Starter motor
9. Battery
10. Secondary fuses
11. Main fuses
12. Regulator
13. Alternator
14. Pick-up

CHECKING THE STARTER MOTOR

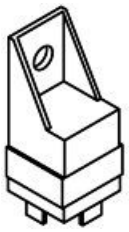
- To carry out the check, power up the motor with a 12 V 9 AH battery.
- Win an AC ammeter clamp measure the steady running absorbed current (after 5 seconds).



Correct value 50 - 60 A.

CHECKING THE STARTER MOTOR RELAY

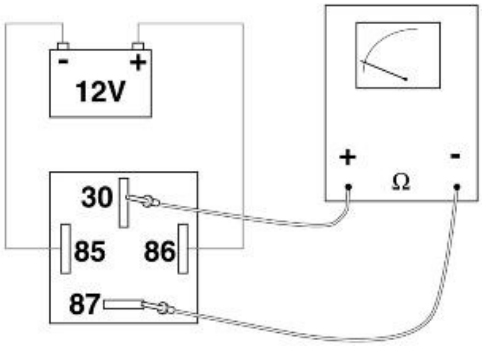
- To check that the relay is operating correctly:
- Power the two male terminals (85 - 86) with a 12 V voltage.
- Using a tester (in ohmmeter mode) check the continuity between the other two terminals (87 - 30).



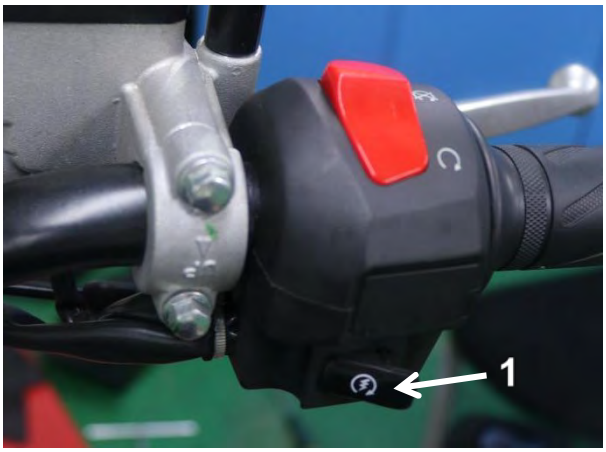
Correct value with relay energised: 0 Ohm

Correct value with relay not energised: infinite ohm

- If the values do not correspond to those indicated, replace the relay.



STARTER COMMAND



Function

Commands engine starting through the injection control unit.

Operation / Operating principle

The starter button, brake switches, No. 25 starter relay and the injection control unit are involved, via PINs 5 and 10.

Level in electrical circuit diagram Start enable signals, Starting **Position**

Starter button: on right hand switch set

Connector: ...

Electrical specifications

- Button released: open circuit
- Button pressed: closed circuit

Diagnostic tool - Parameters and statuses

- Starting request - (Absent, Present, Closed Loop, Closed)

Diagnostics tool - Logic errors

Starter button P0512 - signal not valid

Error cause

- Fault in the switch (lock) of the engine start-up or short circuit to ground

Troubleshooting

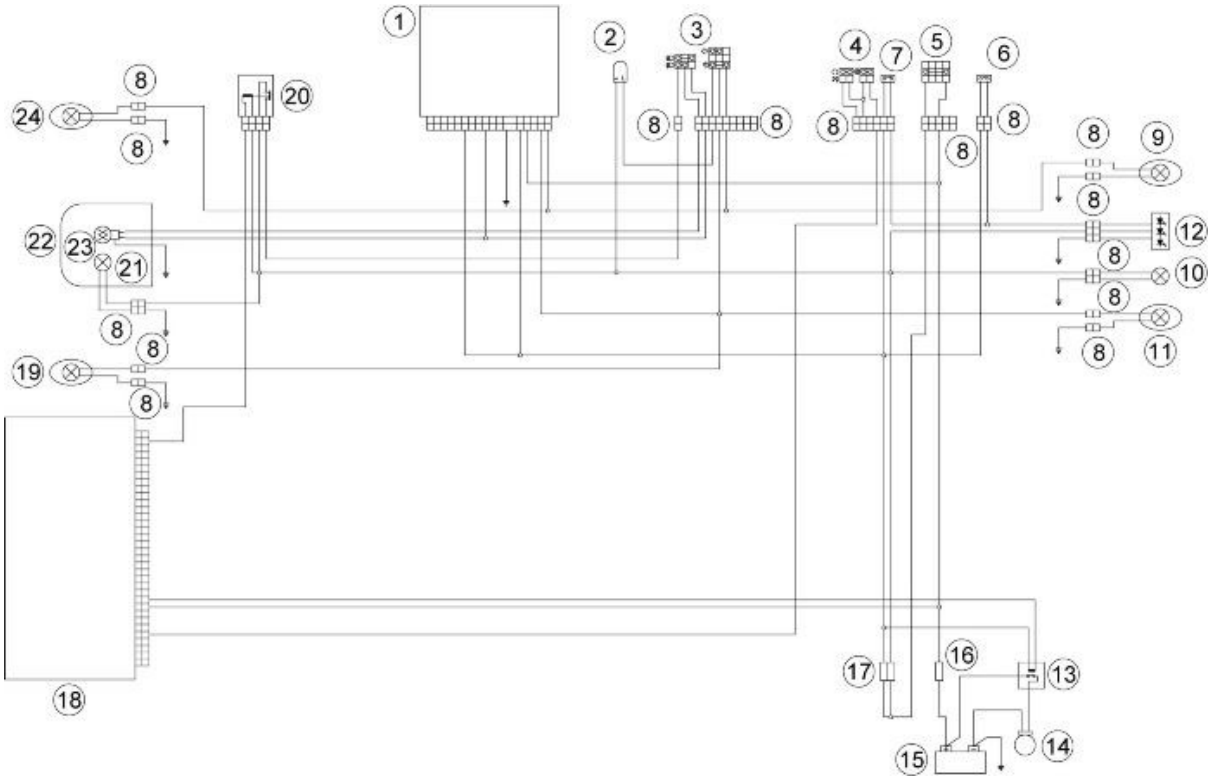
- Check if the button remains in start position; if not OK, restore, if OK check that there is no short circuit to ground of the grey/red cable; if it is not, restore. If it is OK, replace

Horn control

Testing voltage: 13 V (nominal 12 V)

Input: < 3.5 A

Lights list



Lights list

Key:

1.Instrument panel
2.Flasher unit
3.Left light switch
4.Right light switch
5.Ignition switch
6.Rear stop switch
7.Front stop switch
8.Multiple connectors
9.Rear right turn indicator
10.Licence plate light
11.Rear left turn indicator
12.Taillight
13.Starter motorrelay
14.Starter motor
15.Battery
16.Main fuses
17.Secondary fuses
18.MIU G3 control unit
19.Front left turn indicator
20.Light relay
21.Front daylight running light
22.Headlamp
23.High beam/low beam light
24.Front right turn indicator

HEADLAMP

Low-beam/high-beam headlight (1 dual-filament bulb): HS1 - 12 V - 35 W

Daylight running light 12 V - 5 W

TAILLIGHT

- Rear daylight running light /stop light: LED
- License plate light (where applicable): 12 V - 5W

Fuses

MAIN FUSES DISTRIBUTION

Specification	Desc./Quantity
A) 30A fuse	Main fuse：Vehicle circuit fuse
B) 10A fuse	Secondary fuse：EFI System and front / back position lamp

The fuses are located in the central part of the motorcycle, under the saddle on the left hand side.

Battery

Function

Provides electrical power to vehicle: the battery (YTX7L-BS) must be activated and charged.

Level in electrical circuit diagram:

Start, ECU base power circuit, injection utilities relay, turn indicators, battery charging, high beam lights logic, low beam lights and DRL lights logic, brake lights logic, instrument cluster, horn, preconfiguration for BlueDash, USB port, electric fan

Position:

- on the vehicle: behind headstock
- connector: on the battery

Electrical specifications: 12 V / 4 Ah

Pin out:

1. Positive pole (red): approx. 12,6 V
2. negative pole (black): ground lead

DIAGNOSTIC TOOL:PARAMETERS

Battery voltage

- Example value with key ON: 12.0 V
- Example value with engine on: 14.2 V

This is one of the values set by the ECU in the event of recovery mode

Battery voltage before prior to Recovery mode

- Example value with key ON: 12.0 V
- Example value with engine on: 14.2 V

Value determined from signal read without taking considering whether recovery mode is implemented

Diagnostics tool - Logic errors

Battery voltage P0560

- Too high/Too low

Error cause

- If too high: excessively high voltage detected at PIN 9 If too low: excessively low voltage detected at PIN 9 Instrument cluster does not indicate this error even if in ATT state.

Troubleshooting

- If too high: check that the voltage regulator is working correctly.
- If too low: check voltage regulator connectors, engine-vehicle wiring harness connector and ECU connector (check in particular for oxidation): if not OK, repair. If OK, check that resistance of the Red/White cable from the voltage regulator connector to the ECU connector is a few tenths of an Ohm; if not OK, repair the wiring harness. If OK, check that the alternator is working correctly: if not OK, repair. If OK, check that the voltage regulator is working correctly

Engine rpm sensor

Function

It informs crankshaft position and speed to the Marelli control unit

Operation / Operating principle

Inductive sensor: sinusoidal-type generated voltage; two teeth are missing on the flywheel for the reference position

Level in electrical circuit diagram

Engine speed sensor

Position

- Sensor: LH side of motorcycle, near flywheel
- Connector: ...

Electrical specifications

Winding resistance 105-124 Ω at 20°

Pin-out

Engine revolution sensor positive signal (X2)

Engine revolution sensor negative signal (X1)

Engine speed sensor anti-disturbance cable (blue)

Diagnostic tool - Parameters and statuses

- Engine speed - (rpm)
- Target engine revs - (rpm) (Parameter valid at idle, setting depends especially on engine temperature: the ECU unit will try to keep the engine running at this revs, acting on the ignition advance)

Diagnostic tool - Electrical errors

Engine revolution sensor P0336 - inconsistent signal

Cause of error

- Possible false contact in the electric circuit detected at PIN 20 and 29 of the engine control unit connector

Troubleshooting

- Check the electric circuit is in good conditions and the flywheel teeth cleaning and correct positioning of the sensor in its own housing; if it is not, replace it. If it is OK, replace the sensor

Engine temperature sensor

Function

Serves the purpose of communicating the engine temperature to the control unit in order to optimise performance.

Operation / Operating principle

NTC type sensor (resistance sensor, inversely variable with temperature).

Level in electrical circuit diagram

Temperature sensors

Position

Sensor: On the head, LH side

Connector: near the sensor

Electrical specifications

- Resistance (PIN B1 - B2) at 25°C (77° F): 2.05 kΩ +/- 100 Ω
- Resistance (PIN B1 - B2) at 60°C (158° F): 575 Ω +/- 15 Ω
- Resistance (PIN B1 - B2) at 90°C (194°
- F): 230 Ω +/- 5 Ω
- Resistance (PIN A1 - A2) at 25°C (77° F): 2.4 kΩ +/- 200 Ω
- Resistance (PIN A1 - A2) at 60°C (158°
- F): 557 Ω +/- 30 Ω
- Resistance (PIN A1 - A2) at 90°C (194° F): 196 Ω +/- 8 Ω

Pin-out:

1. Control unit ground (B2)
2. Instrument panel power (A2)
3. Control unit power (B1)
4. Instrument panel ground (A1)

ELECTRICAL ERRORS

Engine temperature sensor P0115 - open circuit or shorted to positive / shorted to negative.

Cause of error

Open circuit or short circuit to positive: interruption of the circuit or excessive voltage at PIN 13 of the control unit connector.

Short circuit to negative: null voltage between PIN 13 and 15 of the control unit connector.

Troubleshooting

Open circuit:

- Disconnect the connector of the control unit.
- Measure the resistance value of the sensor at different temperatures between PIN 13 and 15.
- Disconnect the sensor connector.
- Verify continuity of the wiring harness between the sensor connector and the control unit connector: Control unit PIN 13 - sensor PIN 3 and control unit PIN 15 - sensor PIN 1. If necessary, restore the wiring harness.
- If the wiring harness is intact but the sensor resistance value is incorrect, this means that the sensor is faulty and must be replaced, otherwise proceed with the checks.

Short-circuit to positive:

- With the sensor connector and the control unit disconnected, verify that the fault is shorted with the battery positive of sensor connector PIN 3 (or control unit connector PIN 13) and restore the cabling.

Short circuit to negative:

- Disconnect the sensor connector.
- Check the sensor connector PIN 3 ground insulation.
- If there is no ground insulation restore the wiring harness.
- If PIN 3 is insulated from the ground and the error persists, this means that there is a probable fault in the control unit.

Lambda sensor

Function

In charge of telling the control unit whether the mixture is lean or rich.

Operation / Operating principle

Based on the difference of oxygen in the exhaust fumes and the environment, this generates voltage which is read and interpreted by the injection control unit. It does not require an external supply source but, in order to work properly, it should reach a high operating temperature: that is why there is a heating circuit inside.

Level in electrical circuit diagram

Lambda probe, Injection utilities relay

Position

- Sensor: exhaust duct
- Connector: underneath battery, behind headstock, RH side

Electrical specifications

- Heater circuit: 12 -14 Ω at 20 °C (68 ° F)

Pin-out:

1. Heater power (A)
2. Heater ground (B)
3. Sensor signal + (C)
4. Sensor signal - (D)

Diagnostic tool - Electrical errors

Check the air-fuel ratio / Lambda probe P0130 - short circuit to positive / open circuit, short circuit to negative or mixture excessively lean / signal not plausible for abnormal title correction or probe signal fault.

Cause of error

Short-circuit to positive: excessive voltage at PIN 11 or PIN 12 of the control unit connector.
Open circuit or short-circuit to negative: interruption of the circuit or null voltage between control unit connector PIN 11 and 12.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN C (corresponding to control unit connector PIN 11); if there is a short, restore the wiring harness.
- Verify that there is no short to battery positive on sensor connector PIN D (corresponding to control unit connector PIN 12); if there is a short, restore the wiring harness.

Open circuit:

- Disconnect the control unit connector and the sensor connector.
- Check the continuity of the wiring harness between the sensor connector and the control unit connector: Control unit PIN 11 - sensor PIN C and control unit PIN 12 - sensor PIN D. If necessary, restore the wiring harness.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Short circuit to negative:

- Disconnect the sensor connector and the control unit connector.
- Check the sensor connector PIN C ground insulation. If there is no insulation, restore the wiring harness.
- Check the sensor connector PIN D ground insulation. If there is no insulation, restore the wiring harness.
- If PIN C and PIN D are insulated from the ground and the error persists, this means that there is a probable fault in the control unit.

Lambda probe heater P0135 - shorted to positive / shorted to negative / open circuit.

Cause of error

Short-circuit to positive: excessive voltage at PIN 31 of the control unit connector.
Short circuit to negative: lack of insulation from ground on the sensor connector PIN A.
Open circuit: circuit interruption.

Troubleshooting

Short-circuit to positive:

- Disconnect the control unit connector and the sensor connector.
- Verify that there is no short to battery positive on sensor connector PIN B (corresponding to control unit connector PIN 31); if there is a short, restore the wiring harness.

Open circuit:

- Disconnect the control unit connector and the sensor connector.

- Verify continuity of the wiring harness between the sensor connector and the control unit connector: control unit PIN 31 - sensor PIN B. If necessary, restore the wiring harness.
- Verify continuity of the wiring harness between the sensor connector and the injection relay: sensor PIN A - injection relay PIN 3. If necessary, restore the wiring harness.
- If the wiring harness is intact and the error persists, proceed with the following checks.

Short circuit to negative:

- Disconnect the sensor connector.
- Check the sensor connector PIN B ground insulation. If there is no insulation, restore the wiring harness.
- If PIN B is insulated from ground and in the absence of other errors (fuel pump, injector, coil), this means that the control unit is most likely faulty.

Injector

Function

Provide the correct amount of fuel at the correct time.

Operation / Operating principle

Injector coil is excited for the petrol passage to open.

Level in electrical circuit diagram

Relay for injection utilities, Coils and injectors

Electrical specifications

- 14.8 Ω +/- 5% (at 20 °C - 68°F)

Pin-out:

1. Control unit ground
2. Power via relay

Diagnostic tool - Activation

- Injector control

Diagnostic tool - Electrical errors

Injector P0201 - short circuit to positive / short circuit to negative / open circuit.

Error cause

Short-circuit to positive: excessive voltage to PIN 34 of the control unit connector.

Short circuit to negative: zero voltage to the PIN 2 of the injector connector.

Open circuit: circuit interruption.

Troubleshooting

Short-circuit to positive:

- Disconnect the injector connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the absence of voltage at the injector connector PIN 1; if present restore the wiring harness, otherwise proceed with the following checks.

Short circuit to negative:

- Disconnect the injector connector, turn the key to ON and activate the component through the diagnostic tool.
- Verify the presence of voltage at the ends of the injector connector; if there is no voltage, restore the wiring harness, otherwise proceed with the following checks.

Open circuit:

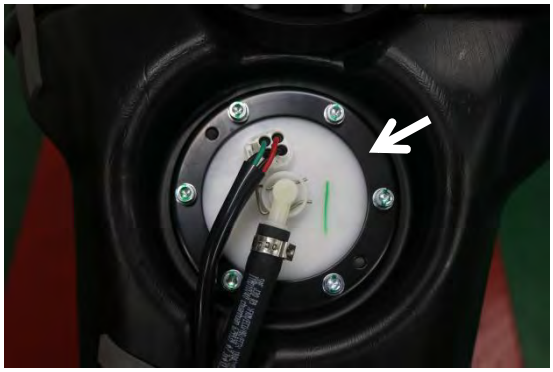
- Carry out the check procedure of the injector and control unit connectors.
- Check continuity of cable between ECU connector and injector connector (ECU PIN 34 - injector PIN 1). In the absence of continuity restore the wiring harness.

Fuel pump

CAUTION

BEFORE CARRYING OUT ANY TROUBLESHOOTING, CAREFULLY READ THE GENERAL TROUBLESHOOTING CONCEPTS FOR ELECTRICAL DEVICES AT THE BEGINNING OF THE CHECK AND CONTROL SECTION IN THE ELECTRICAL SYSTEM CHAPTER.

ELECTRICAL ERRORS



Fuel pump relay P0230 - shorted to positive / shorted to negative / open circuit.

Error cause

Shorted to positive: excessive voltage at PIN 22 of the control unit connector.

Shorted to negative: null voltage at PIN 2 of the injection relay.

The circuit is open: interruption of the circuit.

Troubleshooting

Shorted to positive:

- Disconnect the injection relay (No. 35 on the electrical circuit diagram), turn the key to the ON position and activate the relay through the diagnostics instrument.
- Verify the presence of voltage between relay connector PIN 1 and 2 toward the cabling.
- If no voltage is read, disconnect the control unit and verify insulation from battery positive of the relay PIN 1 (or control unit PIN 22). Restore the cabling if necessary.

Shorted to negative:

- Disconnect the injection relay (No. 35 on the electrical circuit diagram) and the control unit.
- Verify ground insulation of the relay connector PIN 1 and 2 toward the cabling: if there is no insulation, restore the cabling.

The circuit is open:

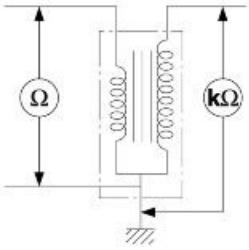
- Disconnect the injection relay (No. 35 on the electrical circuit diagram) and the control unit.
- Verify continuity of the cabling between the relay and control unit: Relay PIN 1

- control unit PIN 22. Restore the cabling if necessary.

Coil

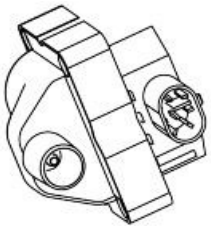
Check

A tester can be used for the check. In every case the continuity of the primary and secondary windings must be checked. The reading in ohms does not need to be exact but, if the windings are intact, their continuity must be detected with the resistance values indicated above.



Primary: 550 +/- 50 mOhm

Secondary: 3.3 +/- 0.3 kOhm

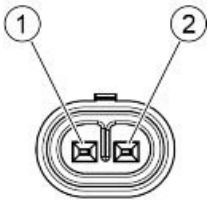


Function

Allows generation of the electrical discharge on the spark plug, with an increase of voltage.

Pin-out:

1. Relay powered (PIN 3 relay side)
2. Activation by control unit (control unit side PIN 1)



CAUTION

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ELECTRICAL ERRORS

H.V. Coil P0351 - shorted to positive / open circuit or shorted to negative.

Error cause

Shorted to positive: excessive voltage at PIN 1 of the control unit connector.

Circuit open or shorted to negative: interruption of the circuit or null voltage at PIN 1 of the control unit connector.

Troubleshooting

Shorted to positive:

- Disconnect the coil connector, turn the key to ON and activate the component through the diagnostics instrument.
- Verify the presence of voltage on the coil connector PIN 2: if present, restore the cabling, otherwise replace the coil.

The circuit is open:

- Carry out the check procedure of the coil and control unit connectors.
- Verify continuity of the cabling between the coil and control unit: Coil PIN 2 - control unit PIN 1. In the absence of continuity restore the cabling.
- Verify, with the key turned ON, the presence of voltage on the coil connector PIN 1. If no voltage is read, verify the continuity of the cabling between coil and injection relay (No. 35 on the electrical circuit diagram): Coil PIN 1 - relay PIN 3.
- If the above tests provided a positive result, the coil should be replaced.

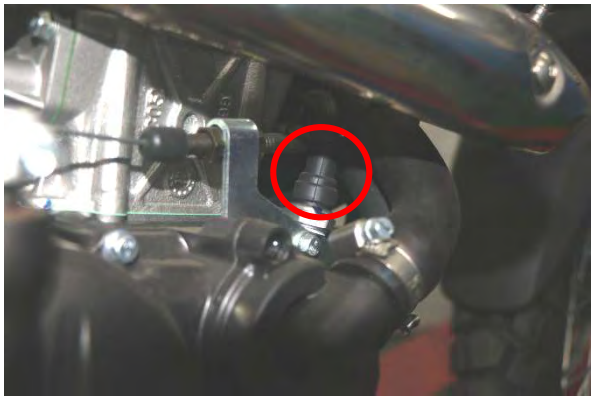
Shorted to negative:

- Disconnect the control unit connector and the coil connector.
- Verify the coil connector PIN 2 ground insulation (or control unit connector PIN 1). Restore the cabling if necessary.

Engine oil pressure sensor

Function

Notifies the instrument panel that the oil pressure in the engine is sufficient.



Operation / Operating principle

The switch is normally closed (connects ECU signal to ground). At pressures above ... bar, the switch opens.

Level in electrical circuit diagram:

Low fuel and oil pressure

Position:

- on the vehicle: RH side, near the water pump
- connector: on the sensor

Electrical specifications: -

Pin out:

1. Voltage: 5 V

NOTE
NO ERRORS

Neutral sensor

Function

Indicates the gear position to the instrument panel: if it is in neutral or in gear

Operation / Operating principle

For neutral gear, the circuit is closed to ground connection: the instrument panel turns on the neutral warning light

Level in electrical circuit diagram

Neutral sensor, Start enable signals.

Position

- Sensor: rear / upper side of the gearbox
- Connector: on the sensor

Electrical specifications

- Gear in neutral: closed circuit (0 V on wire from control unit to sensor / switch in continuity).
- Gearshift engaged: open circuit (12 V on the wire from control unit to sensor)

Pin-out:

1. Voltage 12V (green/black)

Diagnostic tool - Parameters and statuses

- Gear in neutral - (YES, NO)

Diagnosis

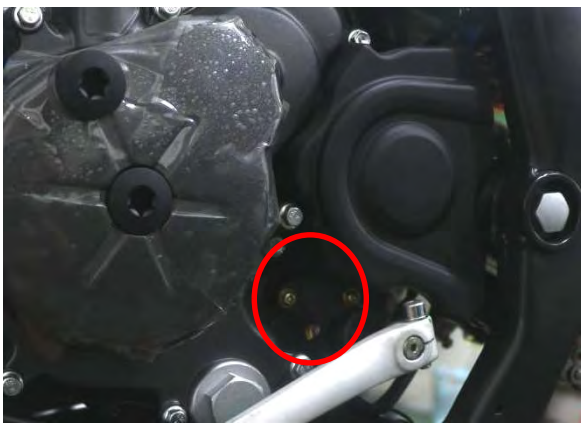
Warning light "N" always off

Error cause

- Possible malfunction

Troubleshooting

- Carry out the check procedure on the green/black sensor/control unit cable.
- Restore if damaged.
- If OK, with the transmission in neutral, check for continuity to ground of the sensor connector.
- If there is no continuity, replace the sensor.
- Restore if damaged.
- If OK, check continuity.



- If there is no continuity, restore the wiring harness.
- If OK, replace the instrument panel if the vehicle performs properly.

Warning light "N" always on

Error cause

- Possible malfunction

Troubleshooting

- Disconnect the terminals from the sensor and verify that, with the transmission in gear, there is continuity with the ground.
- If there is continuity, replace the sensor.
- If there is no continuity this meansthat there is a short to ground of the green black cable which goes to PIN 3 of the control unit, therefore restore the wiring harness.
- If there is no continuity, restore the wiring harness.
- If there is no continuity, replace the wiring harness.

Clutch lever sensor

Function

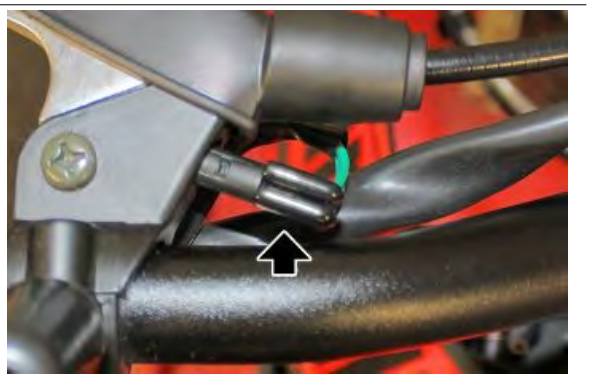
Indicates the clutch lever position to the control unit

Operation / Operating principle

In order to start the engine, pull the clutch also with the gear in neutral

Level in electrical circuit diagram

Start enable switches



Position

- Sensor: under clutch lever
- Connector: ...

Electrical specifications

- Clutch engaged: closed circuit (continuity)
- Clutch released: open circuit (infinite resistance)

Pin-out

1. 12 V Voltage (brown/white)
2. Ground (blue/green)

Diagnostic tool - Parameters and statuses

- Clutch - (Pulled, Released)

Diagnosis

Even with the clutch lever engaged, the vehicle does not start

Error cause

- Possible malfunction

Troubleshooting

- Verify that, if a gear is engaged, the stand is up.
- If it is up, check continuity of the brown/white cable and control unit PIN 18.
- If there is no continuity, restore the wiring harness.
- If there is continuity, disconnect the sensor and, with the clutch engaged, check for continuity between the two sensor PINs.
- If absent, replace the sensor.
- If present, check for continuity of the blue/green cable between the sensor and control unit PIN 15.
- If absent, restore the wiring harness.

The vehicle starts even without pulling the clutch lever

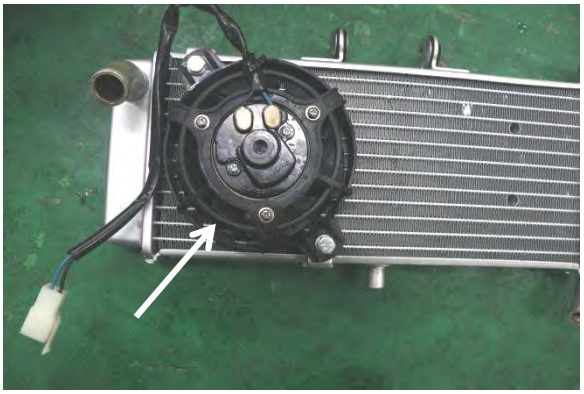
Error cause

- Possible malfunction

Troubleshooting

- Disconnect the terminals from the sensor and check that, with the clutch released, there is continuity between the two PINs.
- If there is continuity, replace the sensor.
- If there is no continuity, this means that the blue/green cable which goes from the sensor PIN 2 to the control unit PIN 15 is shorted to ground.

Electric fan circuit



Function

Activates coolant radiator fan

Operation / Operating principle

When the ECU detects a temperature of approximately 101°C, it closes the connection between the fan control relay excitation circuit and ground

Level in electrical circuit diagram:

Electric fan.

Position:

- sensor: relay installed in front frame recess on left hand side
- connector: on relay

DIAGNOSTIC TOOL:STATUSES

Fan relay

- on/off

DIAGNOSTIC TOOL:ACTIVATIONS

Fan

- The fan relay is excited (No. 42 in electrical circuit diagram - ALWAYS CHECK colour of wires to identify relay correctly) for 10 seconds. Electrical continuity is required in the wiring for the relay to activate correctly: no errors are generated if the relay fails to activate

ELECTRICAL ERRORS

Fan relay P0480 - short circuit to positive / short circuit to negative / open circuit.

Error cause

Short-circuit to positive: excessive voltage to PIN 24 of the control unit connector.

Short circuit to negative: null voltage at PIN 24 of the control unit connector.

Open circuit: circuit interruption.

Troubleshooting

Short-circuit to positive:

- Disconnect the fan control relay (No. 42 in electrical circuit diagram), turn the ignition switch to ON and measure the voltage at PIN 1 of the relay connector leading to the wiring harness side: if the voltage is 12V, repair the wiring harness, if the voltage is zero, replace the relay.

Short circuit to negative:

- Disconnect the fan control relay (No. 42 in electrical circuit diagram) and the control unit.
- Check that the cable between the fan control relay (PIN 1) and the ECU (PIN 24) is insulated from ground. Repair the wiring harness if necessary.

Open circuit:

- Check the ECU and relay connectors.
- Check continuity of the cable between the relay connector (PIN 1) and the ECU connector (PIN 2).
- Check continuity of the cable between the relay connector (PIN 2) and the secondary fuse box.
- Check continuity between PIN 1 and PIN 2 of the relay. If continuity is not confirmed, replace the relay.

RUN/STOP switch

Function

Indicates the control unit if the rider wishes to enable engine start-up or to keep the engine running

Operation / Operating principle

If the driver wants to shut off the engine or to disable engine start-up, the switch should be open, i.e. the Marelli control unit should not detect voltage at PIN 4 of the control unit connector

Level in electrical circuit diagram

Start-up enabling switches

Position

- Sensor: right light switch
- Connector: next to the headstock, right side

Electrical specifications

- STOP position: open circuit
- RUN position: closed circuit (continuity)

Pin-out

1. Voltage 0 V with engine kill in STOP; 12V if engine kill in RUN (pink/yellow cable)
2. Always voltage 12 V (with key on) (red/yellow cable)

Diagnostic tool - Parameters and statuses

- RUN/OFF Switch - (RUN-OFF)

Diagnosis

Engine does not start

Error cause

- Possible malfunction

Troubleshooting

- Disconnect the connector and check, with the switch set to RUN, that there is continuity between the two grey/light blue and red/grey cables (sensor side); If not ok, replace the sensor; if ok, check the connector; if not ok, restore the wiring harness; if ok, check, with key set to ON, if there is voltage on Yellow/Red cable (wiring harness side). If not ok,restore the wiring harness; if ok, check the red/yellow cable ground insulation (wiring harness side); If there is continuity with ground connection, restore the wiring harness; if it is OK, set the key to KEY OFF and check the engine control unit connector; if it is OK, replace the engine control unit

Engine does not shut off with switch in "STOP"

Error cause

- Possible malfunction

Troubleshooting

- Disconnect the connector and verify, with the switch set to STOP, that there is continuity between the two grey/light blue and red/grey cables (sensor side). If present, replace the switch; if absent this means that, with the key ON, the pink/yellow cable shorts to positive; if not OK, restore the wiring harness; if OK, replace the engine control unit

Connectors

ECU

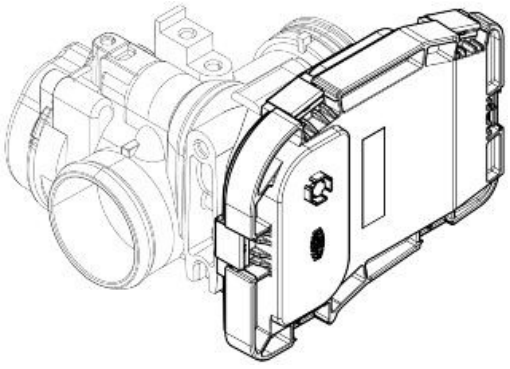
Function

It manages injection/ignition, the system safety checks and the self-diagnosis function. The con- trol unit is Magneti Marelli MIU G3

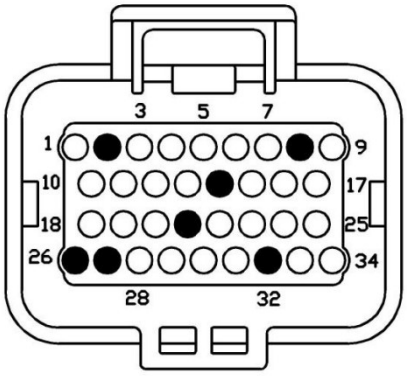
Level in electrical circuit diagram Diagnostics, pre-configuration for BlueDash

Position

- on the vehicle: under tank, by filter box
- connector: on ECU with 34 PINs



Key



1. Coil output (green-black)
2. NO
3. Neutral signal input (light green-red)
4. RUN-OFF input (brown-yellow)
5. Start button input (yellow-red)
6. Ignition switch (+) input (white-red)
7. Ground (-) (green)
8. NO
9. 12V battery voltage (+) (red)
10. Starter motor relay output (blue-yellow)
11. Positive lambda probe input (+) (red-green)
12. Negative lambda probe input (-) (grey- green)
13. Temperature sensor input (grey-black)
14. NO
15. External sensor ground (black-white)
16. "K" line (orange-black)
17. Neutral indicator lamp output (green-red)
18. Analogue clutch input (green-yellow)
19. Side stand input (black-yellow)
20. Pick-up input (-) (X1)
21. NO
22. Injection relay (white-blue)
23. Ground 2 (power) (green)
24. Fan relay output (blue-red)
25. Warning lamp output (green-white)
26. NO
27. NO
28. Speed sensor input (S) (yellow-white)
29. Pick-up input (+) (X2)
30. NO
31. Lambda probe heater output (yellow-grey)
32. NO
33. Lights relay output (black-red)
34. Injector output (grey-red)

Diagnostic tool - Control unit info screen page

In this screen page are read the general data regarding the control unit, for example: type of software, mapping, control unit programming data

- ISO code
- Drawing number (identification inserted by manufacturer)
- Marelli spare part number
- SW ver. (software version)
- Approval number
- Author last progr. (author of the last programming)
- HW MM version (hardware MM version)
- Marelli SW part number (software part number)
- Programming data (control unit programming data)
- NIP code

Diagnostic tool - Parameters and statuses

This screen page shows the parameters measured by the several sensors (engine revs, engine temperature, etc.) or values set by the control unit (injection time, ignition advance); in addition to the parameters, the status of the vehicle devices or the operation condition of some vehicle systems (for example, lambda probe functioning status) are also shown in this screen page

- Engine speed - (rpm)
- Air temperature - (°C)
- Water temperature - (°C)
- Throttle valve angle (°)
- Implemented advance (°)
- Injection time (ms)
- Battery voltage (V)
- Checking of lambda probe 1 (%)

- Engine status - (Undetermined, Po- wON/Engine off, KeyON/engine off, Rotation, Engine Stall, Pwr latch in pro- gress, Pow.Latch Term, Stop, Syn- chronis. 4 strokes)
- Throttle valve status - (---, idle, full power, partial position)
- Lambda probe voltage (...)
- Atmospheric pressure - (mbar)
- Target minimum revs (rpm)
- Opening of Stepper Cl.Loop (...)
- Int. manifold pressure - (mbar)
- Programmed advance (...)
- Vehicle speed (km/h)
- Throttle valve equiv. stepper - (°)
- Opening of Stepper Base (...)
- Opening of Stepper Reg. (...)
- KON count (...)
- Injector bleeding (...)
- Coil dwell (...)
- RUN/OFF Switch - (RUN-OFF)
- Start enable - (NO, YES)
- Checking of Probe1 value (...)
- Lambda probe - (---, Not enabled, Not active (start), Not active (heat.), Not active (rich), Operating, Not active (lean), Fault
- Engine mode (...)
- Stepper motor status (...)
- Tone wheel (...)
- Recharge status Enabling Ignition (...)
- Fan relay (OFF)
- Side stand - (Up, Down)
- Starting request - (Absent, Present, Closed Loop, Closed)
- Gearbox in neutral (...)
- Clutch - (Pulled, Released)

Diagnostic tool - Activation

On this screen page, you can delete the errors from the memory of the controller and enable some systems controlled by the control unit

- Coil
- Rpm indicator
- Injector activation
- Stepper circuit

- Fan activation
- Lambda probe heater 1
- Fuel manifold test
- Injector control
- Headlights relay
- Stepper
- Fuel pump

General warning light

Diagnostic tool - Errors screen page

This display shows potential errors detected in the vehicle (ATT) or stored in the control unit (MEM) and it allows to check error clearing (STO).

Diagnostic tool - Electrical errors

Air pressure sensor P0105 - short circuit to positive / open circuit, short circuit to negative, signal not valid

Cause of error

- Malfunction of sensor inside the control unit

Troubleshooting

- Replace the control unit

Air temperature sensor P0110 - short circuit to positive, open circuit / short circuit to negative

Cause of error

- Malfunction of sensor inside the control unit

Troubleshooting

- Replace the control unit

Error EEPROM P0601 - circuit not working

Cause of error

- The instrument panel does not indicate the presence of this error even in the ATT status

Troubleshooting

- Replace the engine control unit

Saved data file (for safety) P1607 - filled

Cause of error

- This indication appears only if the Level 2 safety has reset the engine (C gravity). The in- strument panel does not indicate the presence of this error even in the ATT status.

Troubleshooting

Replace the engine control unit

Sensor potentiometer throttle valve position P0120 - short circuit to positive, open circuit / short circuit to negative

Cause of error

- Malfunction of sensor inside the control unit Troubleshooting
- Replace the control unit

Diagnostic tool - Adjustment

This screen page is used to adjust some control unit parameters

- Self-adaptive parameters reset

Diagnostic tool - Adjustment

Throttle positioner autodetection

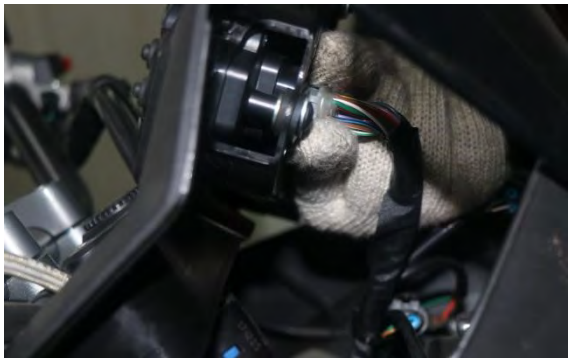
- It allows the control unit to detect the closed throttle position; just press the Enter key Reset of self-adaptive parameters
- operation to be carried out after the throttle body is cleaned or in the case a new engine, a new lambda probe or a new injector is fitted, or the correct operation of the injection system or the valves is restored.

Diagnostic tool - Reset

- Once the throttle body or the injection control unit is replaced, it is necessary to connect to the diagnostic tool selecting FUEL INJECTION and carry out the operation "THROTTLE POSITIONER AUTODETECTION"

Dashboard

Key:



1.EFI warning light（brown-white）

2.Oil level or pressure warning light（blue-black）

3.No

4.Rotating speed（yellow-pink）

5.Speed（blue-white）

6.Side stand status indicator（white-green）

7.6th gear light（purple）

8.Neutral warning light（green-red）

9.1th gear light（pink）

10.2th gear light（pink-black）

11.3th gear light（green-black）

12.Speed sensor(-)（green-white）

13.GND（green）

14.Speed sensor(+)（red-yellow）

15.IGN(+)（white-red）

16.BATT(+)（red-blue）

17.Left turn indicator light（orange）

18.Right turn indicator light（light blue）

19.Headlight（brown）

20.High light（blue）

21.4th gear light（red-white）

22.5th gear light（grey-blue）

23.Fuel level light（yellow-white）

24.Water temperature warning light（purple-white）

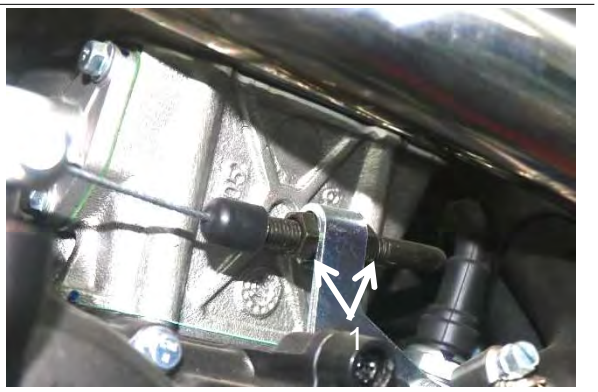
INDEX OF TOPICS

Vehicle preparation

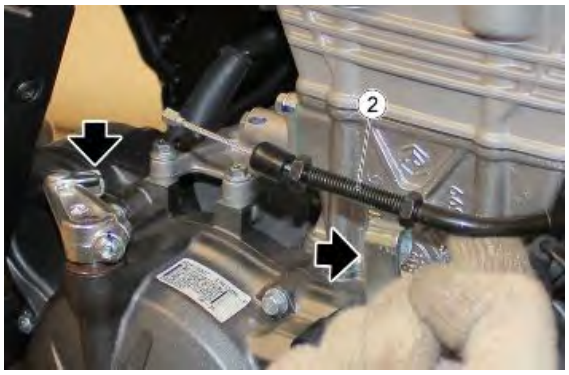
- Support the front of the vehicle using a hoist, make it safe by using belts and support it in the centre using a support.
- Drain off the cooling system.
- First remove the fairing lug, the side fairings, the battery, the fuel tank, the side fairing panels, the drive chain, the side bumpers, the radiator and the expansion tank

Removing the engine from the vehicle

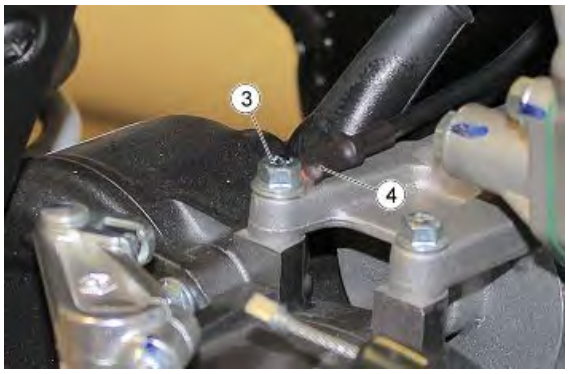
- Undo and loosen the clutch cable adjustment nuts (1)



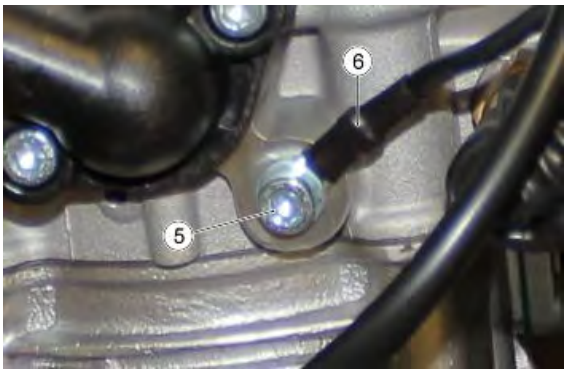
- Remove the clutch cable (2) from the points indicated in the figure



- Undo and remove the screw (3)
- Remove the earth cable (4)



- Undo and remove the screw (5)
- Remove the earth cable (6)

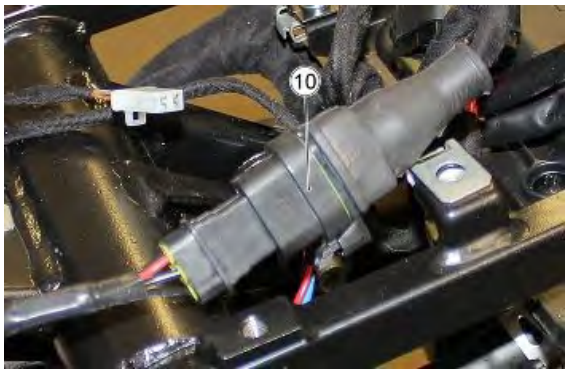


- Remove the spark plug tube (7)

- Remove the fuel pipe (8)

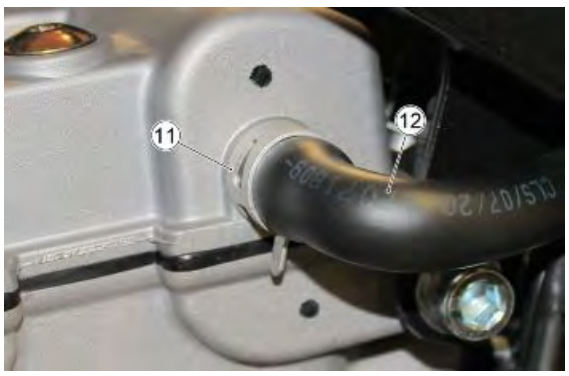
- Disconnect the water temperature sensor (9)

- Disconnect the engine speed sensor connector (10)

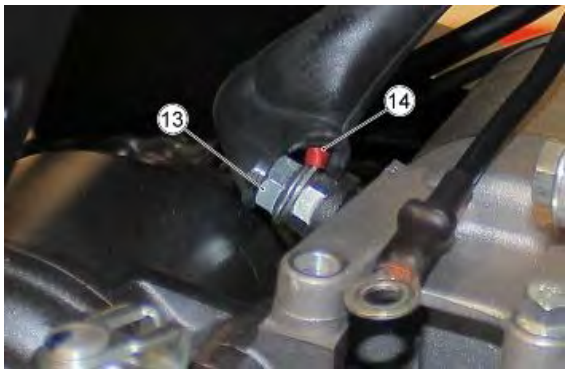


- Remove the connector wiring harness (10) from the chassis area as shown in the figure

- Loosen the clamp (11) and disconnect the pipe (12)



- Undo the screw (13) and remove the cable (14)



- Remove the cables from the cable gland shown in the figure

- Unscrew the pin (15) and remove it.

- Block the nuts (16) and unscrew and remove the screws (17)

- Remove the support bracket (18)

- Remove the support bracket (19)

- Disconnect the engine oil sensor connector (20)
- undo the screw (21).
- Remove the hose guide (22)

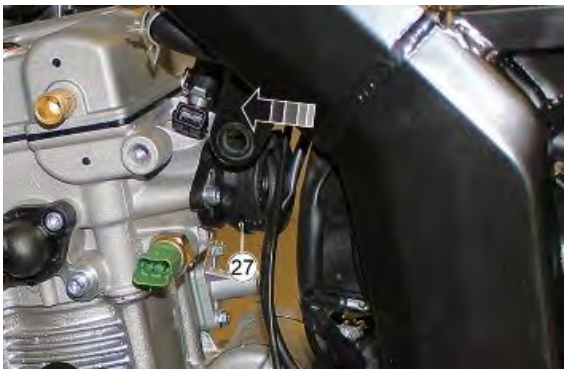
- Disconnect the injector connector (23)

- Loosen the clamp (24)

- Unscrew and remove the screw (25)

- Unscrew and remove the screw (26)

- Move the entire engine block to slide the sleeve (27) off the throttle body as shown in the figure



- Remove the complete engine (28)

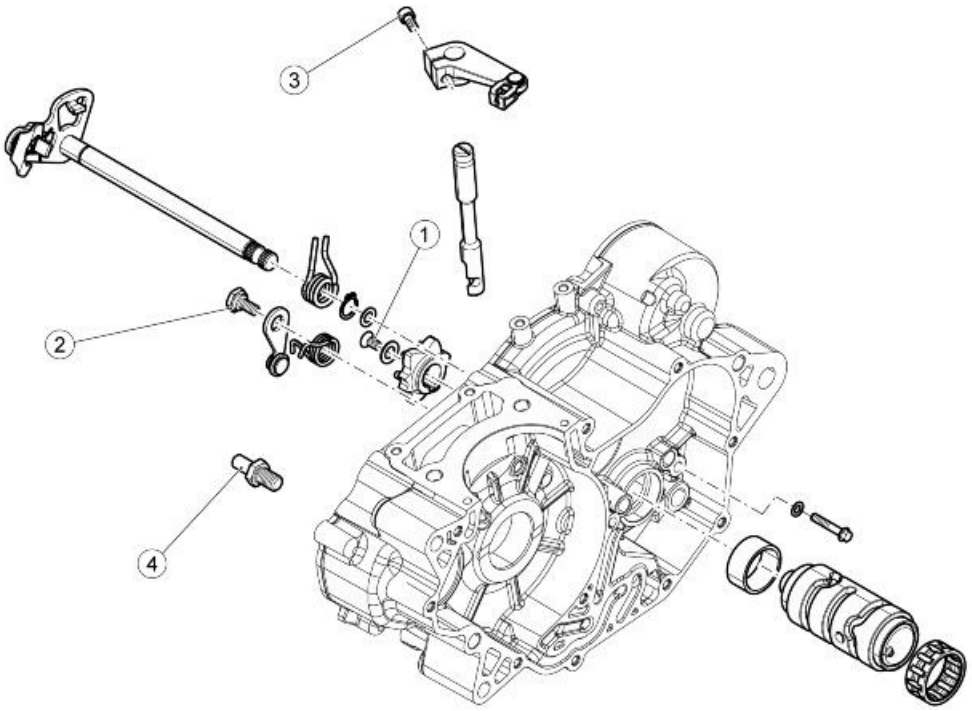
Installing the engine to the vehicle

NOTE

FOR REFITTING, FOLLOW THE PROCEDURE IN THE REVERSE ORDER

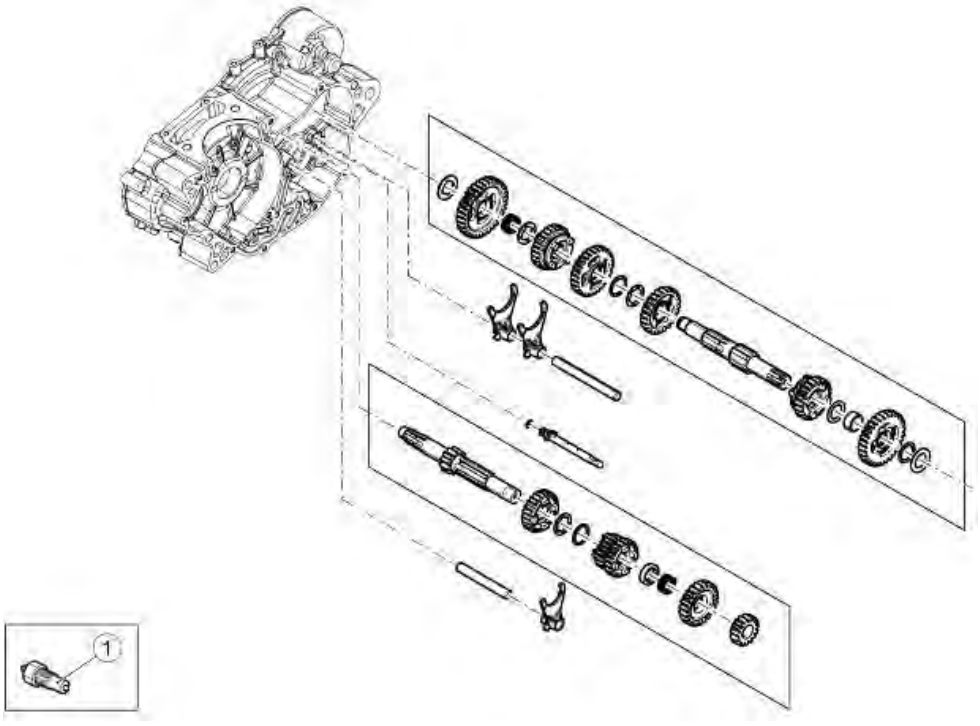
INDEX OF TOPICS

Gearbox



GEAR SELECTOR

pos.	Description	Type	Quantity	Torque	Notes
1	Selector sprocket fastener screw	M5	1	4 Nm (2.95 lb ft)	-
2	Lever fastener screw	M6	1	9 Nm (6.64 lb ft)	-
3	Clutch lever fastener screw	-	1	9 Nm (6.64 lb ft)	-
4	Gear shift selector pin fixing	-	1	9 Nm (6.64 lb ft)	-



COMPONENTS OF GEARBOX

pos.	Description	Type	Quantity	Torque	Notes
1	Gear sensor retainer	-	1	3 Nm (2.21 lb ft)	-

Diagram

Filtro olio

- Place a recipient with a capacity of at least 1000 cm³ (61.01 cu.in) under the drain plug (1) on the clutch side. Remove the plug and drain the oil into the recipient for a few minutes.

NOTE

CHECK AND, IF NECESSARY, REPLACE THE DRAIN PLUG SEAL WASHER

- Remove the gearbox oil filter (2) and replace.

- Remove the drain plug (3) on the alternator side.

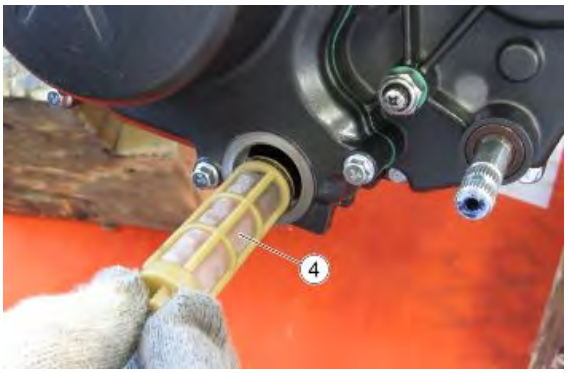
NOTE

CHECK AND, IF NECESSARY, REPLACE THE DRAIN PLUG SEAL WASHER

- Remove the oil filter (4) and clean thoroughly before refitting.

NOTE

CHECK AND, IF NECESSARY, REPLACE THE FILTER SEAL WASHER



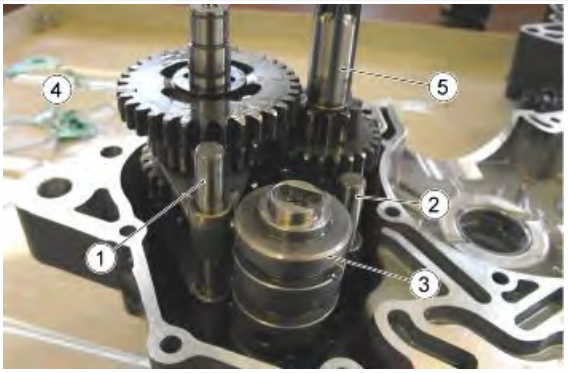
Gearbox shafts

Disassembling the gearbox

- Remove the desmodromic drum

- Separate the crankcase halves.
- Remove the gasket from the crankcase.

- Remove both the gearbox selector fork rods and the forks (1) (2).
- Remove the desmodromic selector (3).
- Remove the secondary shaft (4).
- Remove the primary shaft (5).



Removing the primary shaft

CAUTION

THE PRIMARY SHAFT CANNOT BE DISASSEMBLED. IF NECESSARY, REPLACE THE ENTIRE PRIMARY SHAFT.

Removing the secondary shaft

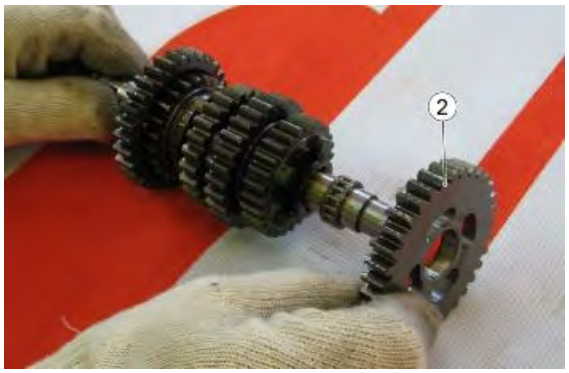
CAUTION

FIT NEW CIRCLIPS WHEN REASSEMBLING

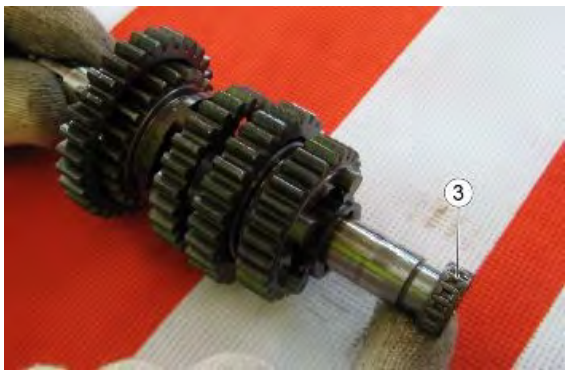
Disassemble the secondary shaft as follows:

- Remove the shim washer (1)

- Remove the first speed gear (2).

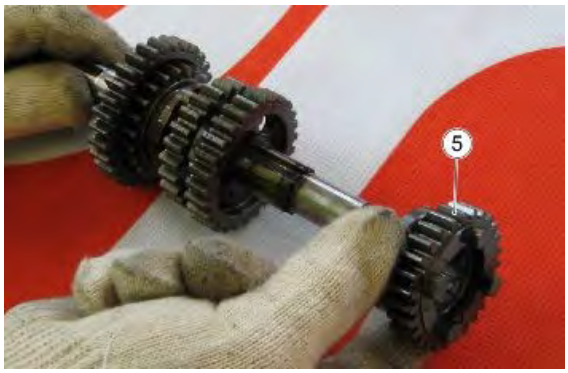


- Remove the roller bearing cage (3).



- Remove the spacer washer (4)

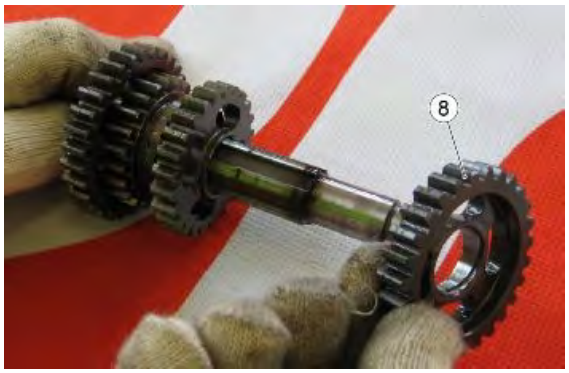
- Remove the fifth speed gear (5).



- Remove the circlip (6).

- Remove the spacer washer (7)

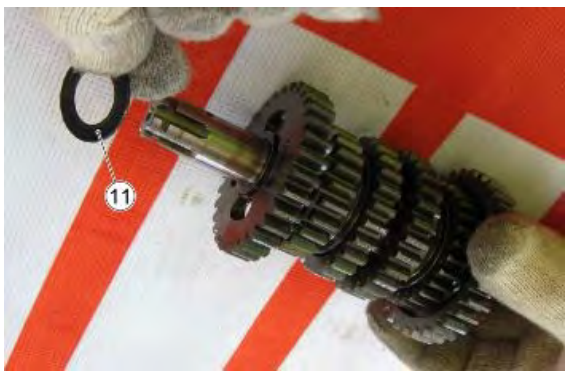
- Remove the third speed gear (8).



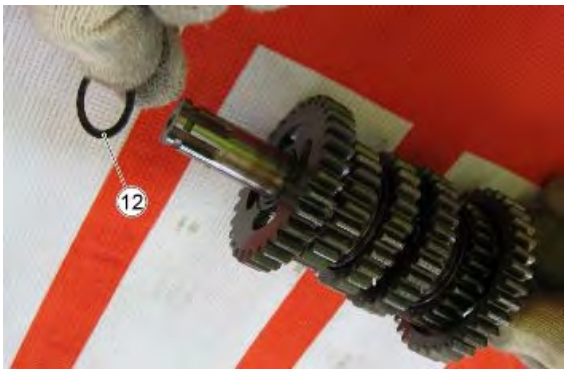
- Remove the fourth speed gear (9).

- Remove the sixth speed gear (10).

- Remove the spacer washer (11)



- Remove the spacer washer (12)



- Remove the second speed gear (13).

- Remove the bush (14).

- Remove the shim washer (15)

Desmodromic demounting

- Remove the fork carrier shaft (1)

- Remove the desmodromic shaft (2)

- Remove the forks (3)

Checking the desmodromic drum

Check the desmodromic shaft and drum for any signs of damage, scratches or wear, and replace if necessary.

Check the channels in the desmodromic drum for any signs of damage or and replace the drum if necessary.

Check the desmodromic drum bearing for any signs of damage or pitting, and change the drum if necessary.

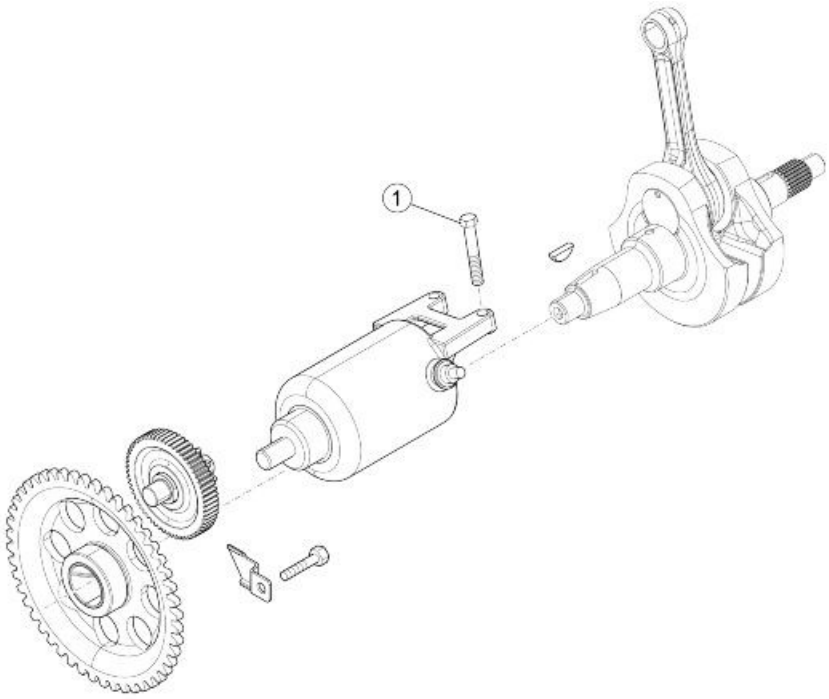
Checking the forks

NOTE

THE FOLLOWING PROCEDURE IS APPLICABLE FOR ALL THE GEARBOX SELECTOR FORKS

- Check that the fork moves uniformly and without impediment; check for damage, dents and signs of wear on the roller (1) and on the teeth (2) of the fork.
- Replace the fork if necessary.

Starter motor



STARTER MOTOR

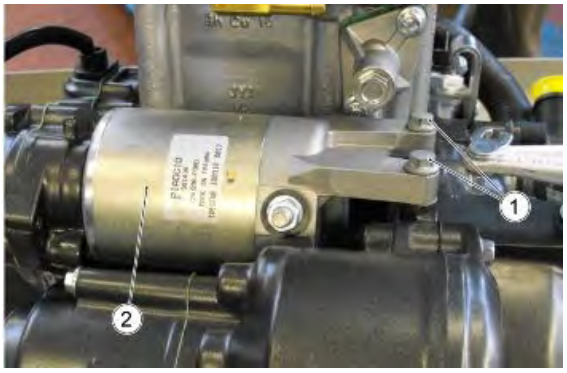
pos.	Description	Type	Quantity	Torque	Notes
1	Starter motor fastener screw	M6x25	2	12 Nm (8.85 lb ft)	-

Removing the starter motor

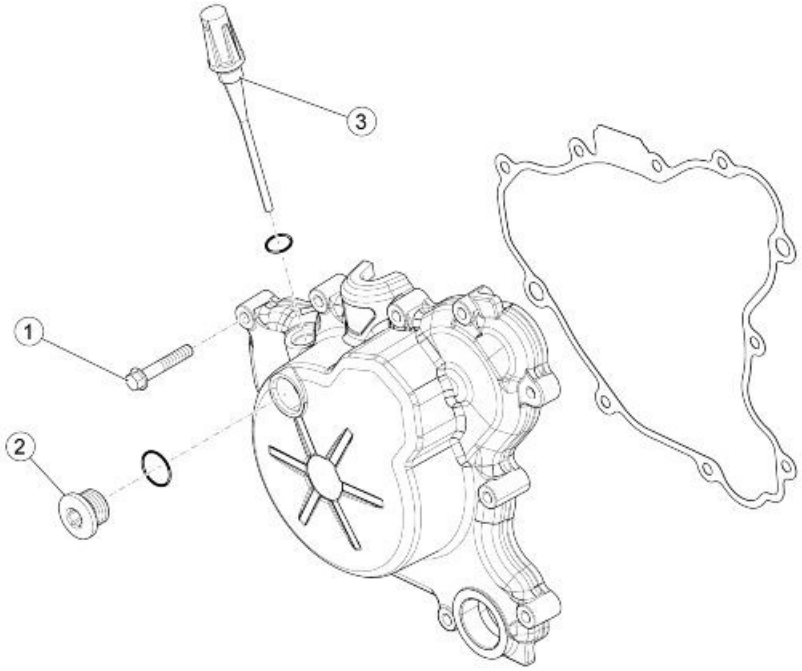
- Undo and remove the two fixing screws (1).
- Remove the starter motor (2).

NOTE

THE STARTER MOTOR CAN ALSO BE REMOVED IF THE ENGINE IS FITTED TO THE VEHICLE.

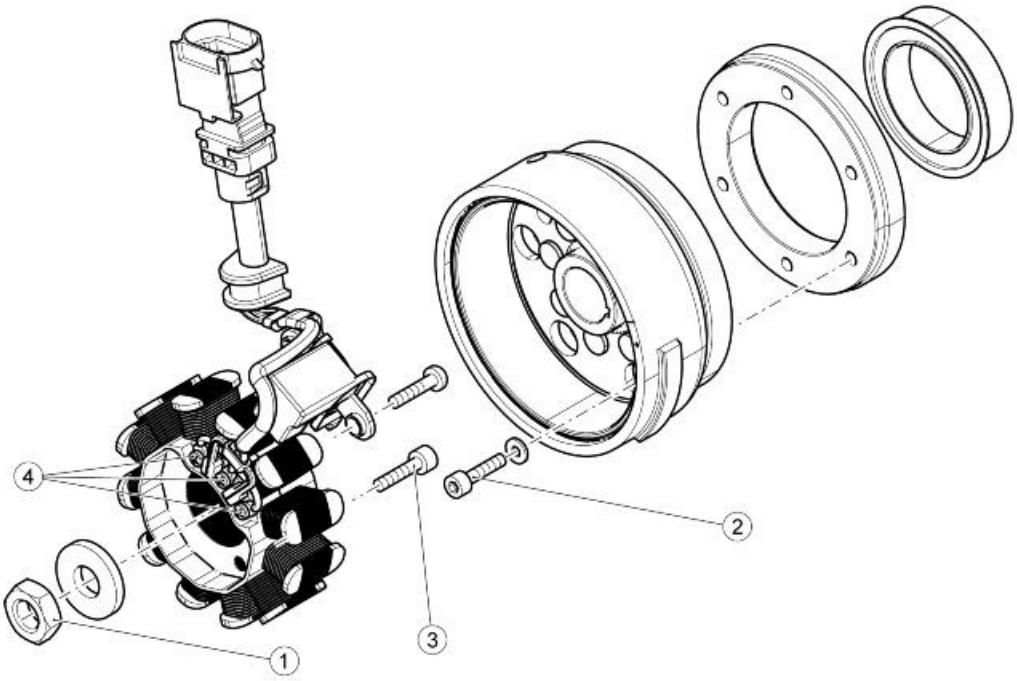


Generator side



FLYWHEEL COVER

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel cover fastener screw	M6	10	12 Nm (8.85 lb ft)	-
2	Timing control cap	M18	2	4 Nm (2.95 lb ft)	-
3	Oil dipstick	M12x1.5	1	5 Nm (3.69 lb ft)	-

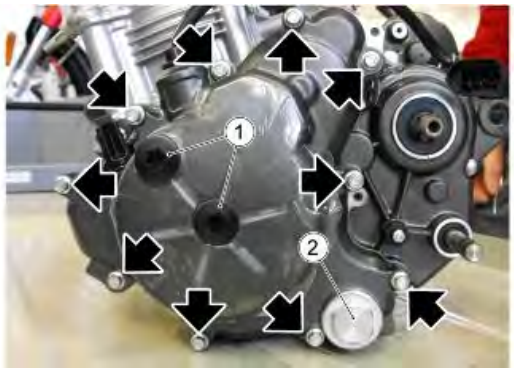


IGNITION UNIT

pos.	Description	Type	Quantity	Torque	Notes
1	Flywheel rotor fixing nut	M14x1.5	1	86 Nm (63.43 lb ft)	-
2	Rotor fastener screw	-	6	12 Nm (8.85 lb ft)	-
3	Stator clamping screws	-	2	6 Nm (4.43 lb ft)	-
4	Pick-Up clamping screw	-	3	3.5 Nm (2.58 lb ft)	-

Removing the flywheel cover

- Unscrew and remove the two adjustment plugs (1).
- Unscrew and remove the engine oil pre-filter plug (2).
- Remove the engine oil pre-filter.
- Undo and remove the ten screws fixing the flywheel cover.
- Remove the flywheel cover.



Rimozione rotore

- Remove the starter motor gear.

- Fit the specific tool.
- Undo and remove the hex socket screw.

Specific tooling

865259 Flywheel retainer

- Retrieve the washer.

- Fit the tool and pull out the rotor.

Specific tooling

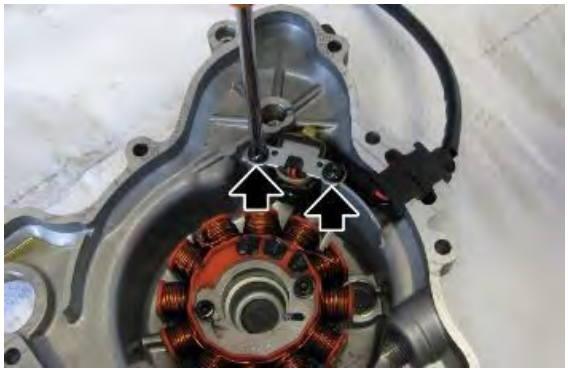
864868 Flywheel extractor

- Remove the rotor.

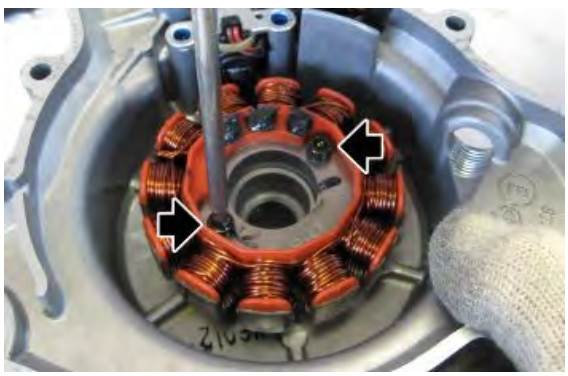
- Remove the key.

Removing the stator

- Remove the two screws fastening the plate securing the stator cable



- Remove the two screws fastening the stator



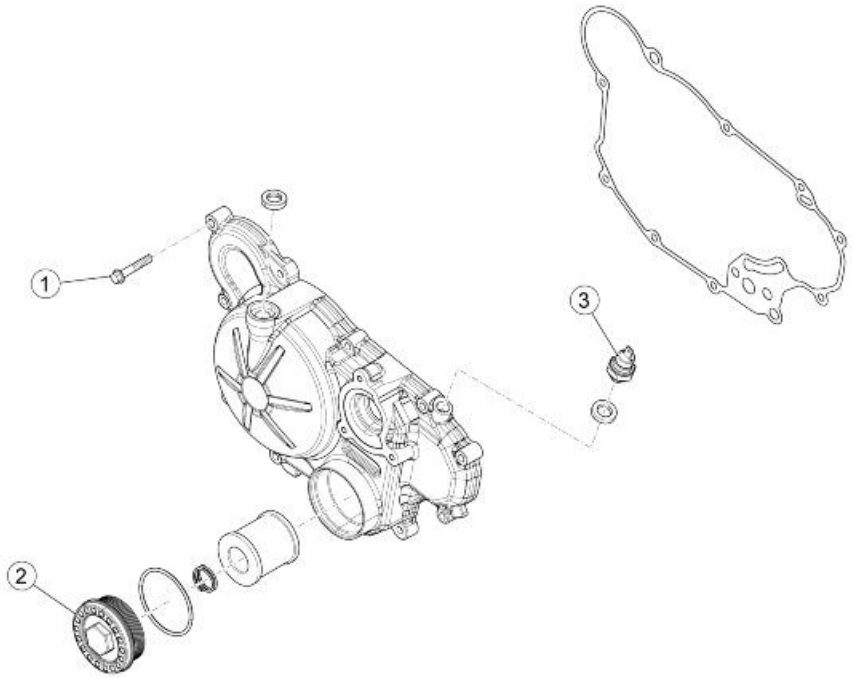
- Remove the stator.

Freewheel removal

- Undo and remove the indicated retainer screw with the relative plate.

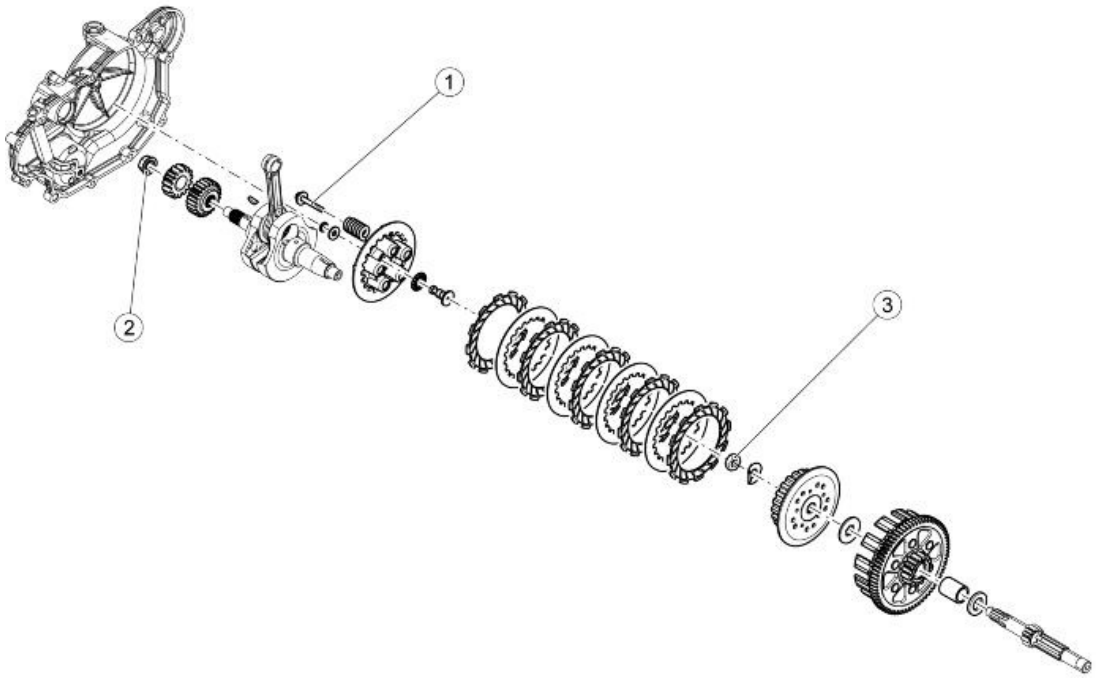
- Remove the freewheel.

Clutch side



CLUTCH COVER

Pos.	Description	Type	Quantity	Torque	Notes
1	Clutch cover fixing screw	M6x35	10	12 Nm (8.85 lb ft)	-
2	Oil filter cover	M56x1.5	1	25 Nm (18.44 lb ft)	-
3	Oil pressure sensor	M10	1	13 Nm (9.59 lb ft)	-

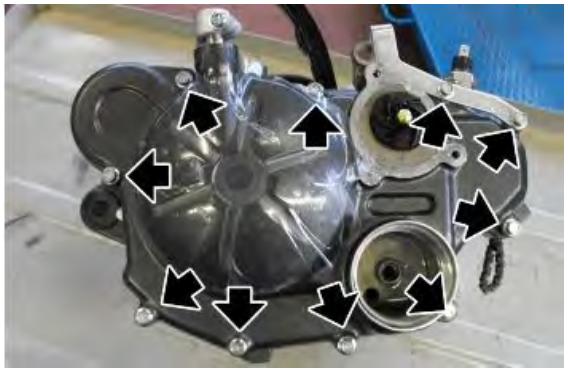


CLUTCH

pos.	Description	Type	Quantity	Torque	Notes
1	Clutch spring screw	M5	5	4 Nm (2.95 lb ft)	-
2	Crankshaft primary gear fastener nut	M12	1	79 Nm (58.27 lb ft)	-
3	Clutch nut	-	1	40 Nm (29.50 lbf ft)	-

Removing the clutch cover

- Undo and remove the ten screws of the clutch cover.

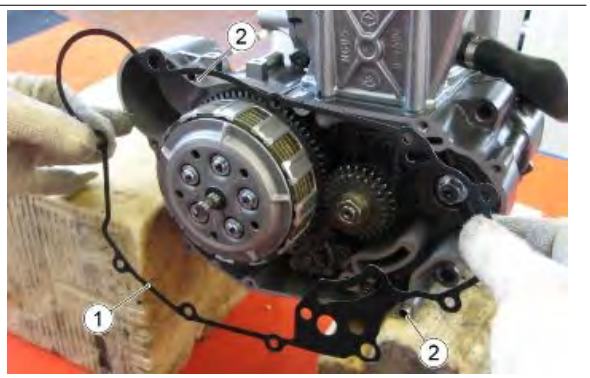


- Remove the clutch cover.

- Remove the gasket (1) and retrieve the locating dowels (2).

WARNING

REPLACE THE GASKET WHEN REASSEMBLING.



Disassembling the clutch

- Unscrew and remove the six screws by loosening them 1/4 of a turn at a time; operate in stages and diagonally, and retrieve the washers and the clutch springs.

- Remove the thrust bearing.
- Remove the discs.

- Release the screw by lowering the lock tab.

- Block clutch bell rotation using the specific tool.
- Unscrew and remove the clutch bell fixing nut.
- Remove the clutch hub.

Specific tooling

00H05300041 Clutch lock

- Remove the shim and the clutchhousing.

- Remove the shim.

Checking the clutch plates

Characteristic

Driving plates thickness

2.85 - 2.95 mm (0.112 - 0.116 in)

Number of driving plates

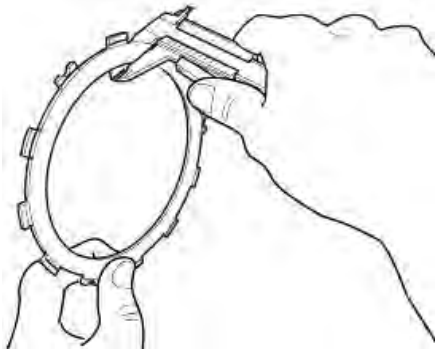
5

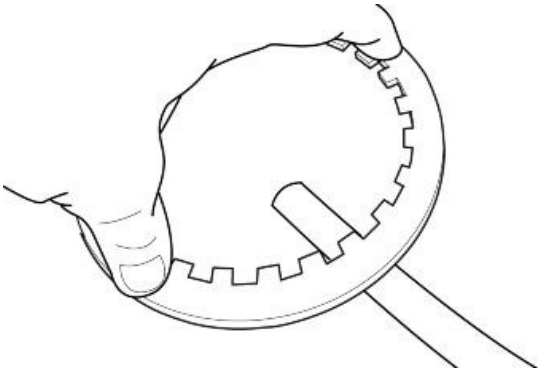
Driven plates thickness

1.46 - 1.53 mm (0.057 - 0.06 in)

Number of driven plates

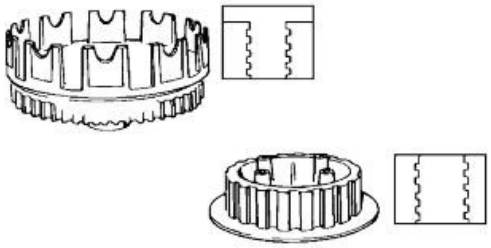
4



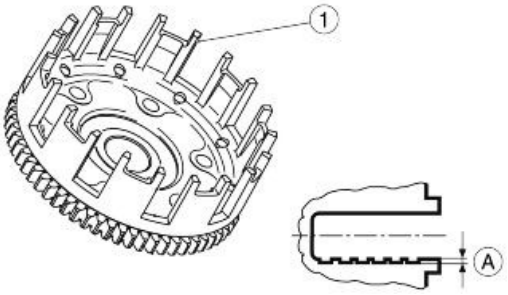


Checking the clutch housing

Check the primary driven gear for damage and wear and, if necessary, replace the primary driven gear and the clutch bell all together.
Make sure there is not excessive noise during operation; if necessary, replace the primary drive gear and the clutch bell all together.

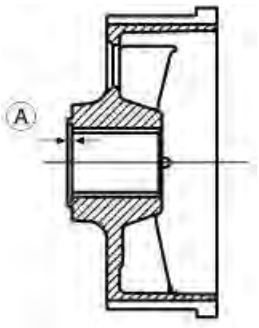


- Check the worn guiding grooves of the clutch bell (1); max. insertion depth (A) = 0.5 mm (0.020 in).

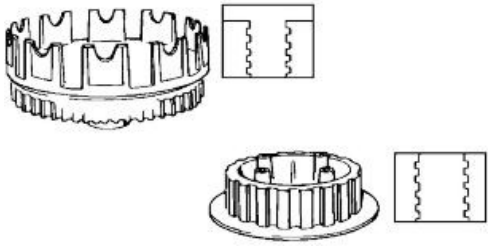


Checking the clutch hub

- When the clutch hub is worn it can create problems with sliding of the housing. The hub should be replaced if the surface of the spring has exceeded the wear limits. Max. wear limit (A) 0.3 mm (0.012 in).

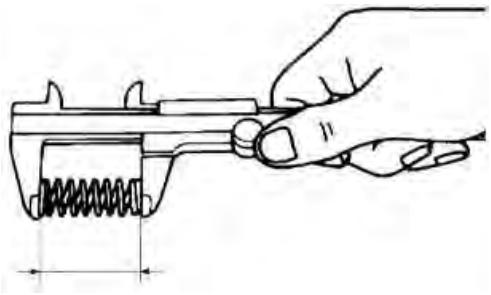


Check the clutch hub for damage and wear that may result in clutch irregular operation. If necessary, replace the hub.



Checking the springs

- Check the springs for damage and, if necessary, replace the them all together.
- Measure the clutch spring length when unloaded; if necessary, replace the springs all together.



Characteristic

Minimum wear limit in the release position of the individual clutch springs

31.6 mm (1.24 in)

Assembling the clutch

- Insert the shim.

- Fit the clutch housing.
- Fit the shim washer.

- Insert the clutch hub.
- Screw in the retainer nut locking the rotation of the clutch housing with the specific tool.

Specific tooling

00H05300041 Clutch lock

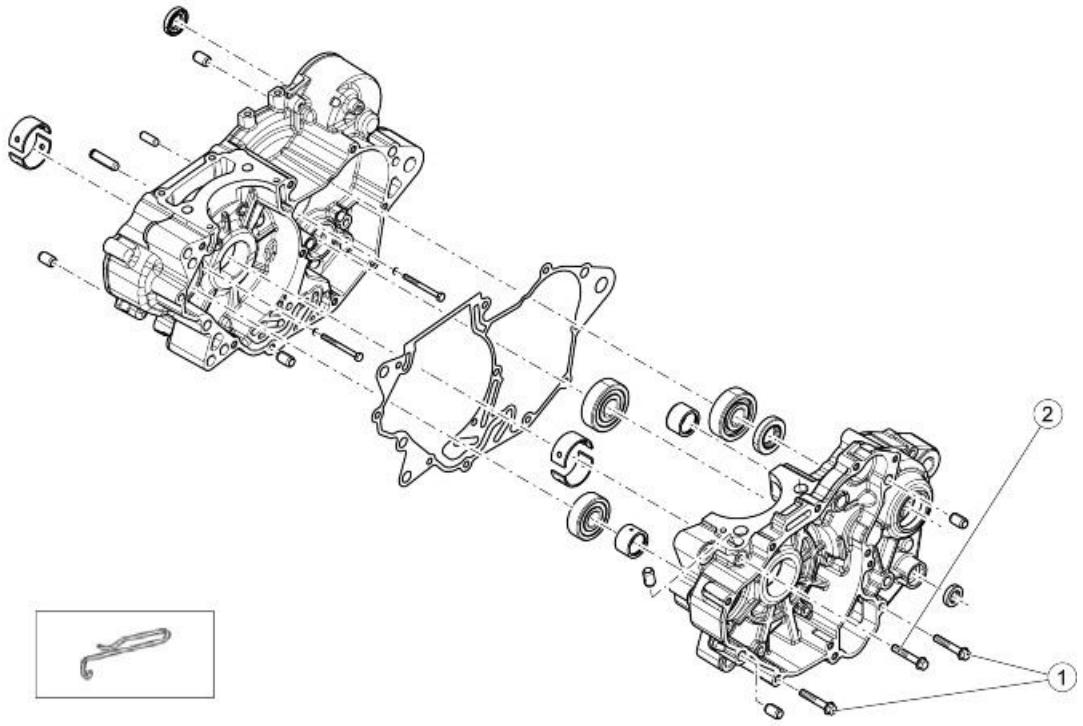
- Lift one side of the lock tab.

- Insert the disc covered with friction material into the housing.
- Continue inserting, alternating a metal disc with one with friction material, finishing with a friction material disc with a black tooth.

- Place the thrust plate.

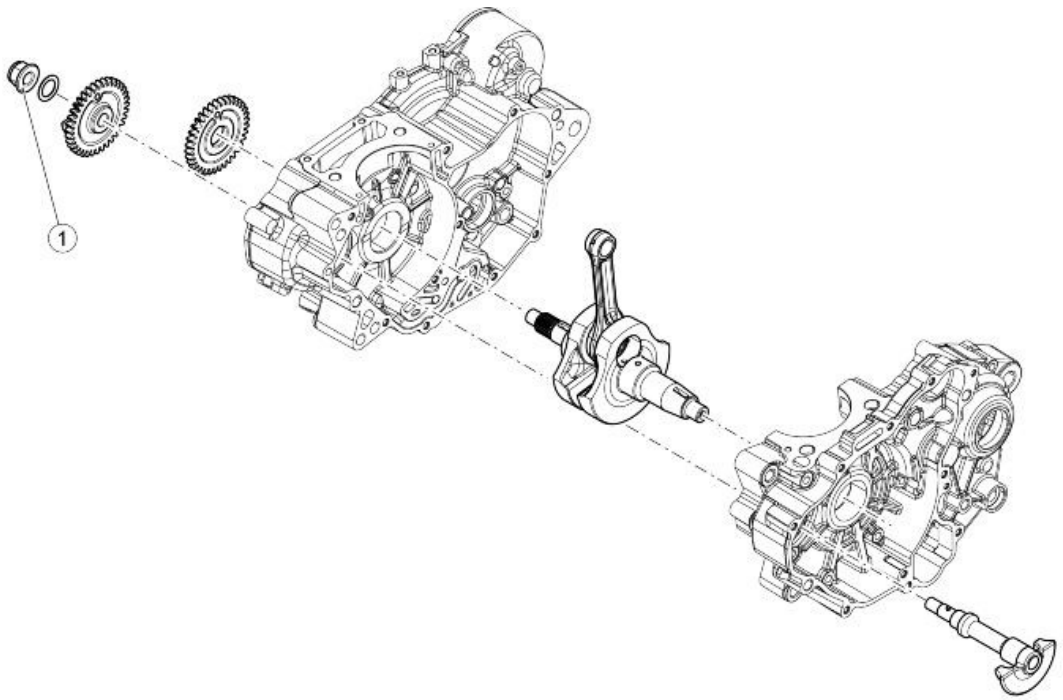
- Fit the clutch springs.
- Fit the screw washers.
- Tighten the six screws operating in stages and diagonally.

Crankcase



ENGINE CRANKCASE

pos.	Description	Type	Quantity	Torque	Notes
1	Crankcase retainer screw	M6x60	4	12 Nm (8.85 lb ft)	-
2	Crankcase retainer screw	M6x75	4	12 Nm (8.85 lb ft)	-



CRANKSHAFT

Pos.	Description	Type	Quantity	Torque	Notes
1	Gear fixing screw	M10	1	40 Nm (29.50 lb ft)	-

Balancing countershaft removal

- Before taking out the balancing countershaft the clutch cover and flywheel cover must be removed.
- Lock the countershaft with the specific tool.

Specific tooling

864486 Countershaft lock tool

- Unscrew and remove the nut and collect the washer

- Remove the countershaft gear.

- Remove the countershaft from the alternator side.

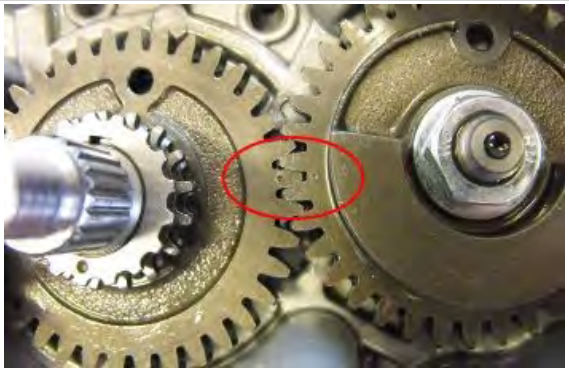
Balancing countershaft fitting

- Insert the countershaft from the alternator side.

- Insert the gear aligning its reference to the primary gear.
- Using the specific tool, tighten the nut remember first to place the washer.

Specific tooling

864486 Countershaft lock tool



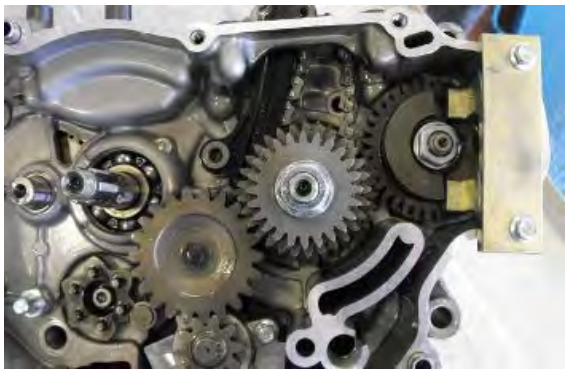
Crankcase opening

- Beforehand remove the clutch cover and the clutch.
- Remove the gear selector.

- Install the countershaft blocking tool.

Specific tooling

864486 Countershaft lock tool



- Remove the primary gear unscrewing and removing the nut.
- Collect the washer.
- Remove the countershaft gear.

- Remove the primary remaining gears.
- Remove the head and cylinder.

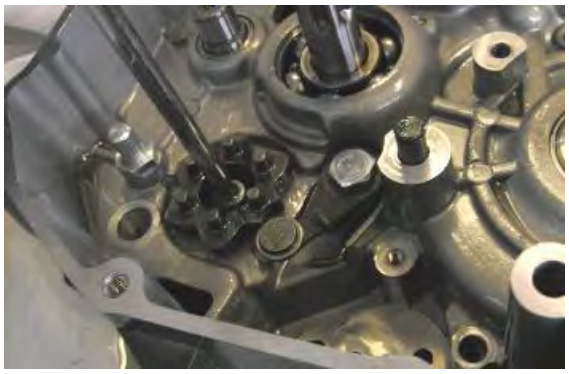
- Remove the chain guide slider, unscrewing and removing the fixing screw.
- Remove the timing chain gear.

- Remove the pump drive gear, removing the seeger and recovering the washer.

- Remove the base gear of the main shaft.
- Remove the cotter.

- Remove the oil pump unscrewing the three fixing screws.
- Collect the gasket.

- Remove the gear spider screw, unscrewing and removing the fixing screw.



- Moving from the left side of the engine, remove the flywheel and all of its components beforehand.
- Unscrew and remove the six screws on the outside of the crankcase (1).

- Unscrew and remove the longest screw (2).

- Unscrew and remove the five screws (3).
- Unscrew and remove the short screw (4).

- Remove the left crankcase.

Bearing removal

- Heat the crankcase surface with a heat gun.
- Remove the bearing using the specific extractor.

List of extractors to be used with sleeve 020376Y:

RIGHT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo bearing: 020439Y+020357Y Removal of desmo bearing: 020891Y
- Insertion of secondary shaft roller bearing cage: 020891Y Removal of the secondary shaft roller bearing cage:020363Y
- Insertion of countershaft bearing: 020412Y+020358Y Removal of countershaft bearing: 020375Y

LEFT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo roller bearing cage: 020375Y Removal of desmo roller bearing cage: use universal extractor
- Insertion of secondary shaft roller bearing cage: 020363Y Removal of the secondary shaft roller bearing cage: use universal extractor
- Insertion of countershaft roller bearing cage: 020483Y Removal of countershaft roller bearing cage: 020364Y

Crankcase check

- Before checking the crankcase halves, thoroughly clean all the surfaces and the oil pipes.
- For the crankcase half on the transmission side, take particular care when handling the housing and hoses for the oil pump, the duct with the by-pass valve and the main bushings.
- As already described in the lubrication chapter, it is especially important that the by-pass valve housing shows no wear that may impair the proper sealing of the lubrication pressure adjustment ball.
- Check that the surfaces are free from dents or deformations, with special attention to both the crankcase coupling and the cylinder-crankcase surfaces.
- Defects in the crankcase coupling gasket or the surfaces indicated in the figure can cause a drop in the oil pressure and affect the lubrication pressure for the main bushings and the connecting rod.
- Check that the surfaces that limit crankshaft axial clearance show no signs of wear. To measure and check sizes follow the procedure described previously for checking crankshaft axial clearance and dimensions.

Bushing selection

BUSHING SEAT DIAMETER ON CRANKCASE

Specification	Desc./Quantity
Class 1	**MIN** 36.500 mm (1.4370 in) **MAX** 36.508 mm (1.4373 in)
Class 2	**MIN** 36.508 mm (1.4373 in) **MAX** 36.516 mm (1.4376 in)

CRANKSHAFT DIAMETER

Specification	Desc./Quantity
Class 1	**MIN** 32.480 mm (1.2787 in) **MAX** 32.485 mm (1.2789 in)
Class 2	**MIN** 32.485 mm (1.2789 in) **MAX** 32.490 mm (1.2791 in)

BUSHING THICKNESS

Specification	Desc./Quantity
Red	**MIN** 2.005 mm (0.0789 in) **MAX** 2.010 mm (0.0791 in)
Blue	**MIN** 2.010 mm (0.0791 in) **MAX** 2.015 mm (0.0793 in)

CRANKSHAFT COUPLING/BUSHING SEAT DIAMETER

Specification	Desc./Quantity
Crankshaft type 2	**Type 1 crankcase diameter** RED + RED **Type 2 crankcase diameter** RED + BLUE
Crankshaft type 1	**Type 1 crankcase diameter** RED + BLUE **Type 2 crankcase diameter** BLUE + BLUE

Bearing fitting

- Heat up the crankcase using the thermal gun.
- Fit the bearing in the seat with the aid of the specific tool.

List of tools for refitting, to be coupled with sleeve 020376Y:

RIGHT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo bearing: 020439Y+020357Y Removal of desmo bearing: 020891Y
- Insertion of secondary shaft roller bearing cage: 020891Y Removal of the secondary shaft roller bearing cage:020363Y
- Insertion of countershaft bearing: 020412Y+020358Y Removal of countershaft bearing: 020375Y

LEFT CRANKCASE

- Insertion of main shaft bearing: 020439Y+020359Y Removal of the main shaft bearing: 020358Y
- Insertion of desmo roller bearing cage: 020375Y Removal of desmo roller bearing cage: use universal extractor

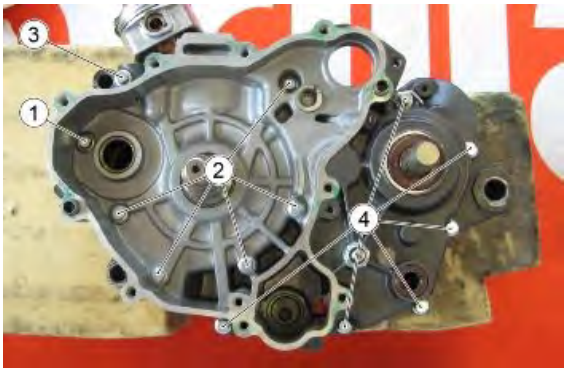
- Insertion of secondary shaft roller bearing cage: 020363Y Removal of the secondary shaft roller bearing cage: use universal extractor
- Insertion of countershaft roller bearing cage: 020483Y Removal of countershaft roller bearing cage: 020364Y

NOTE: insertion of the roller bearing cages in line with the crankcase is recommended from the inside to the outside.

Crankcase closing

- After installing the gearbox, fit a new gasket.
- Join the two crankcase halves together, using the locating dowels to align correctly.

- Fit and tighten the short screw (1).
- Fit and tighten the five screws (2).
- Fit and tighten the long screw (3).
- Move to the left hand side of the crankcase and fit and tighten the six screws (4).

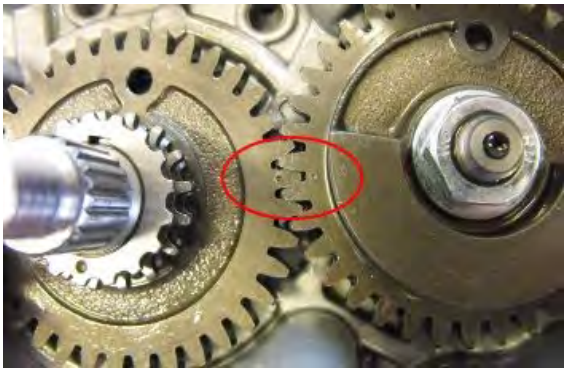


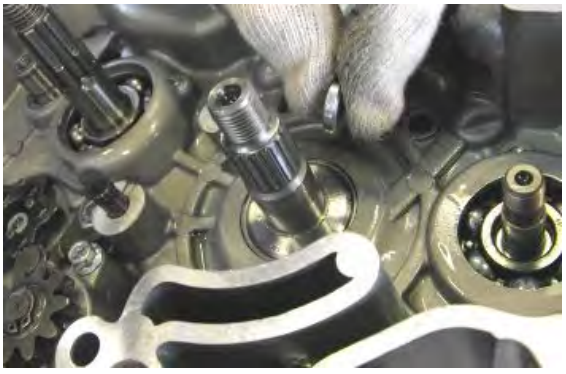
- Install the countershaft.

- Fit the selector star.
- Fit and tighten the screw.

- Fit a new oil pump gasket.
- Fit the oil pump, screwing the three screws.

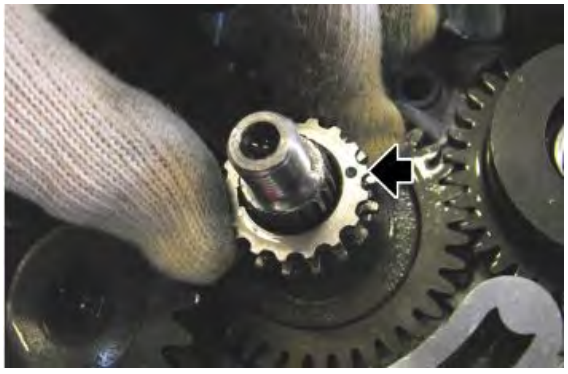
- Insert the countershaft gear and position the washer.
- Use the specific tool to tighten the nut.
- Apply the cotter to the main shaft.
- Position the base gear of the primary, aligning the two references.





- Insert the pump drive gear.
- Insert the washer and apply the fixing seeger.

- Insert the timing chain gear, paying attention to the direction. The engraving must face upward.
- Fit the timing chain.



- Position the chain guide slider.
- Position and screw the fixing screw.

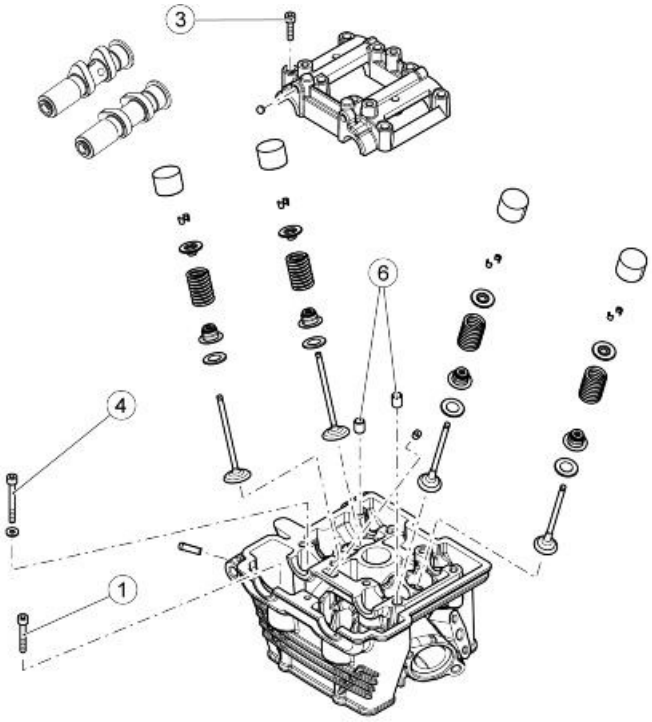
- Fit the rest of the primary gears.
- Tighten the fixing nut.
- Remove the countershaft locking tool.

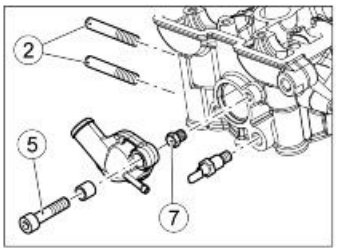
- Fit the gear selector.

Head and timing

HEAD COVER

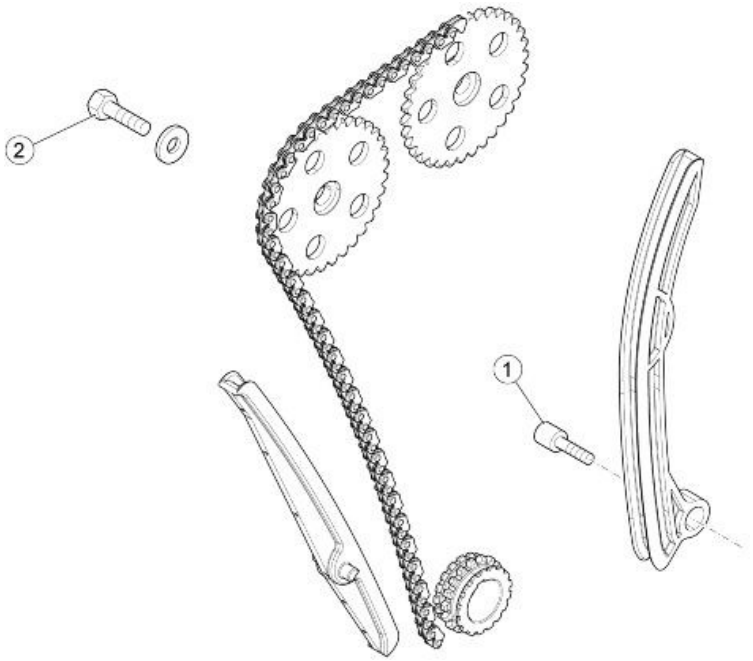
pos.	Description	Type	Quantity	Torque	Notes
1	Spark plug	M10	1	13 Nm (9.59 lb ft)	-
2	Head cover fastener screw	M6	4	11 Nm (8.11 lb ft)	-





HEAD - VALVES

pos.	Description	Type	Quantity	Torque	Notes
1	Head fastener screw	M6x130	2	12 Nm (8.85 lb ft)	-
2	Drainage side stud bolt retainer	M8x40	2	12 Nm (8.85 lb ft)	-
3	Camshaft cover fastener screw	M6x40	4	11 Nm (8.11 lb ft)	-
4	Head fastener screw	M8x166	4	27 Nm + 90° (19.91 lb ft + 90°)	-
5	Thermostat cover fastener screw	M6x20	2	11 Nm (8.11 lb ft)	-
6	Head dowels retainer	M8x10	2	6.5 Nm (4.79 lb ft)	-
7	Thermostat retainer	-	1	9 Nm (6.64 lb ft)	-



TIMING SYSTEM

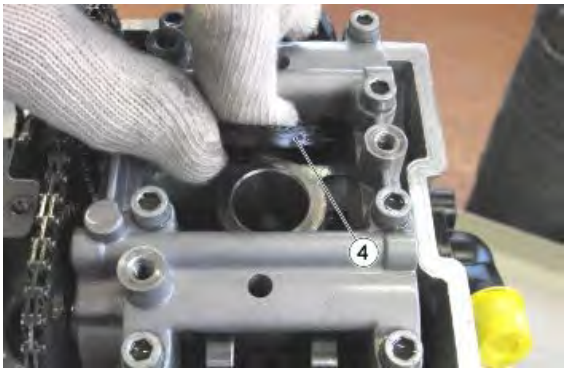
pos.	Description	Type	Quantity	Torque	Notes
1	Chain tensioner pad fastener screw	M6x16	1	10 Nm (7.38 lb ft)	Loctite 243
2	Timing system gear fastener screw	M8x40	2	27 Nm (19.91 lb ft)	Loctite 243

Removing the head cover

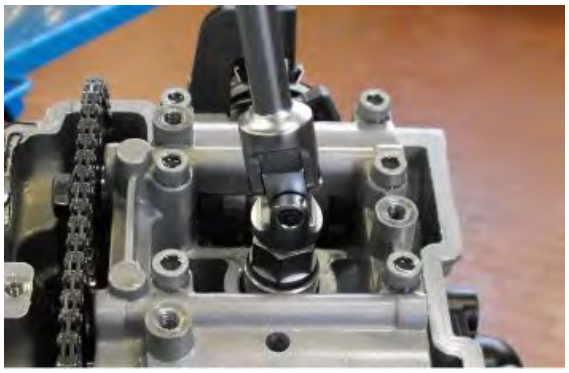
- Remove the adjuster screw covers (1).

- Unscrew and remove the four cylinder head screws (2).
- Remove the cylinder head (3).

- Remove the gasket (4).

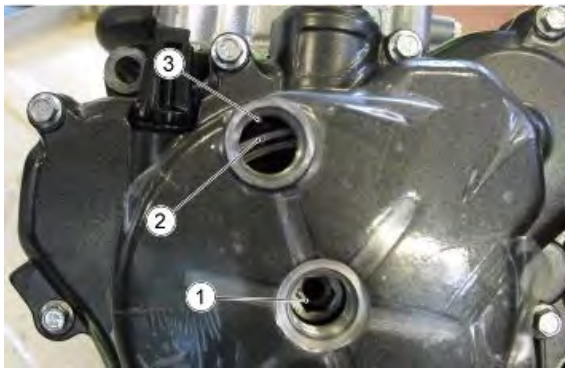


- Remove the spark plug.



Removing the timing control

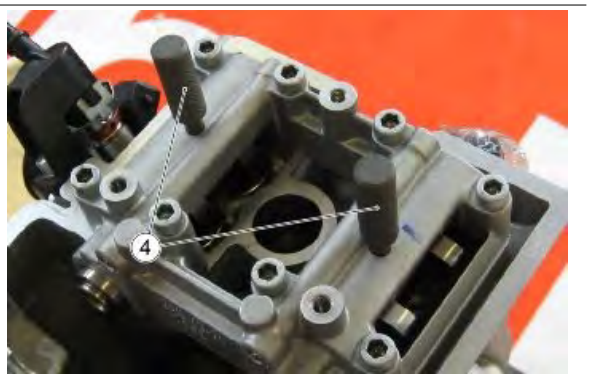
- Turn the crankshaft from the hole on the cover (1)
- Take the piston to TDC.
- The sign (2) must be aligned with the sign (3).



- Insert the specific pins (4) on the valves cam tower.

Specific tooling

864567 Camshaft timing adjustment lock pins



- Remove the starter motor beforehand.
- Loosen and remove the tensioner screw (5).

- Remove the spring.
- Unscrew and remove the two screws (6) and remove the entire tensioner control.

- Lock the timing gear using the specific tool.

Specific tooling

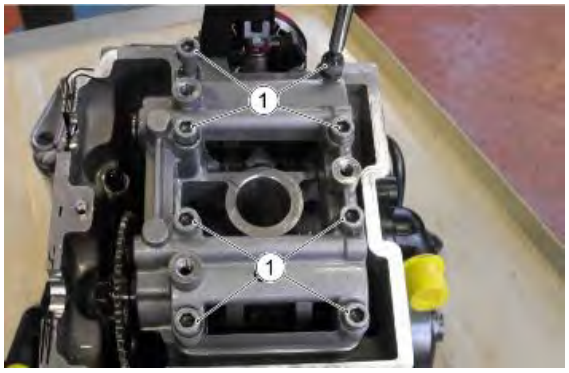
865260 Camshaft sprocket lock tool

- Unscrew and remove the gear.
- Repeat the operation with the other gear.

Cylinder head

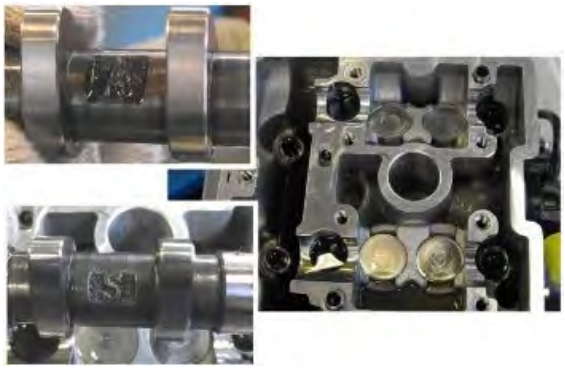
Removing the overhead camshaft

- Remove the two pins from the cam tower.
- Remove the eight screws (1).

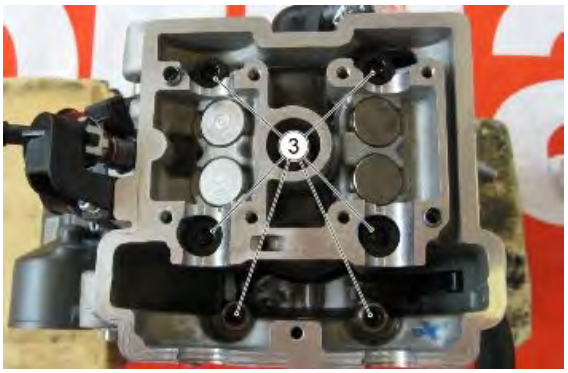


- Remove the cam tower (2).

- Remove the two camshafts (intake side and exhaust side).



- Undo and remove the six screws fastening the head (3)



- Remove the head (4).

Removing the valves

- Remove the head.
- Place the head on supporting surface.
- Number the valves and their bucket tappets in order to position them correctly upon refitting.

- Remove the valve bucket tappets.

- Compress the valve spring using the specific tool.

Specific tooling

020382Y011 Valve removal/installation tool

- Remove both cotter pins.

- Release the valve springs.
- Remove the cap and the valve spring.

Checking the overhead camshaft

- Check the camshaft bearings for signs of abnormal wear.

Characteristic

Standard diameter - Bearing A

19.980 - 19.959 mm (0.7866 - 0.7858 in)

Minimum diameter allowed - Bearing A

19.95 mm (0.7854 in)

Inlet cam height

31.488 mm (1.23968 in)

Exhaust cam height

30.864 mm (1.21511 in)

- Check that the holes used for timing and their shoulders are not worn.
- If values measured are not within the specified limits or there are signs of wear, replace the defective components with new ones.

Characteristic

Maximum axial clearance allowed:

0.4 mm (0.0157 in)

Valve check

- Measure the width of the sealing surface on the valve seats and on the valves themselves.
- If the sealing surface on the valve is wider than the specified limit, damaged in one or more points or curved, replace the valve with a new one.

CAUTION

DO NOT CHANGE THE VALVE FITTING POSITION (RH - LH).

Characteristic

Minimum diameter allowed - Intake

3.96 mm (0.1559 in)

Minimum diameter allowed - Exhaust:

3.95 mm (0.1555 in)

Standard clearance - Intake

0.15/0.20 mm (0.0059/0.0079 in)

Standard clearance - Exhaust

0.20/0.25 mm (0.0079/0.0098 in)

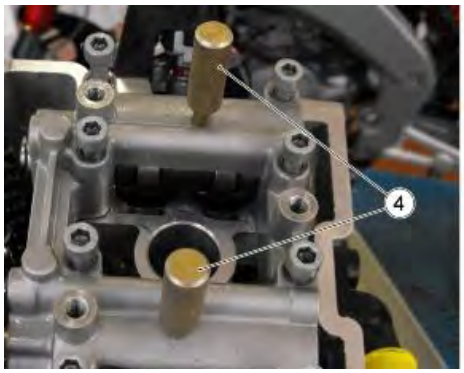
Maximum clearance admitted - Intake:

0.060 mm (0.0023 in)

Maximum clearance admitted - Exhaust:

0.070 mm (0.0027 in)

- Remove the head cover.
- Bring the engine to reach the top dead centre and lock it at that position using the specific tool (4).



Specific tooling

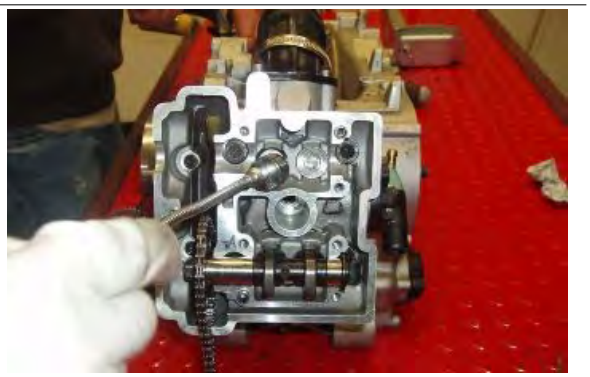
864567 Camshaft timing adjustment lock pins

- Use a feeler gauge to check clearance on the four valves.
- If the values measured differ from the values specified, record the difference between MAXIMUM ALLOWED CLEARANCE e CLEARANCE MEASURED.

- Remove the chain tensioner.
- Undo and remove the eight screws and remove the cam tower.

- Remove the timing chain and the gears of the camshaft of the valves in question.

- Remove the bucket tappet of the valve in question and read the calibration value for that bowl, found inside the bucket tappet itself.
- Replace the bucket tappet with new one of a size suitable to restore the correct clearance.



Characteristic

Standard clearance - Intake

0.15/0.20 mm (0.0059/0.0079 in)

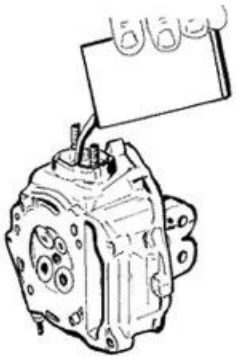
Standard clearance - Exhaust

0.20/0.25 mm (0.0079/0.0098 in)

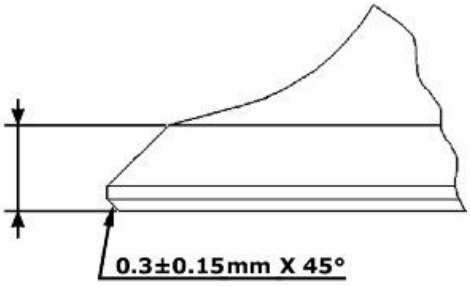
- Fit the camshaft, the gears and the chain in their correct positions, using the references located on the flywheel side of the crankcase.
- Fit the cam tower and tighten the eight screws to the prescribed torque.
- Fit the chain tensioner.
- Check for correct valve clearance.
- Fit the head cover.

Inspecting the valve sealings

- Fit the valves into the cylinder head.
- Alternatively test the intake and exhaust valves.
- This test should be carried out by filling the manifold with petrol and checking that the head does not excessively ooze through the valves.



- Measure the sealing surface width on the valve seats.



VALVE SEALING SURFACE

Specification	Desc./Quantity
Inlet valve - seal surface	2.30 +/- 0.15 mm (0.0905 +/- 0.0059 in)
Outlet valve - seal surface	2.95 +/- 0.15 mm (0.1161 +/- 0.0059 in)
Valve chamfering	0.2 +/- 0.1 mm x 45° (0.0079 +/- 0.0039 in x 45°)

Inspecting the valve housings

- Remove any carbon deposits from the valve guides.
- Measure the inside diameter of each valve guide.
- Measure according to the thrust direction at three different heights.

Characteristic

Intake guide - standard diameter

4.012 mm (0.1579 in)

Intake guide: Wear limit

4.020 mm (0.1582 in)

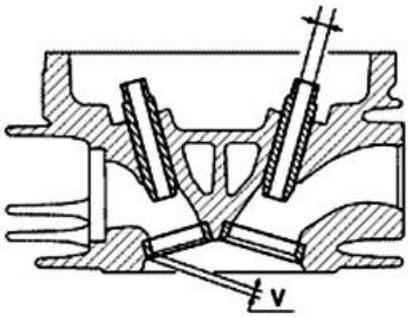
Discharge guide - standard diameter

4.012 mm (0.1579 in)

Discharge guide: Wear limit

4.020 mm (0.1582 in)

- Replace the head if the values corresponding to the width of the mark on the valve seat or the valve guide diameter exceed the specified limits.
- Check the width of the mark on the valve seat «V».



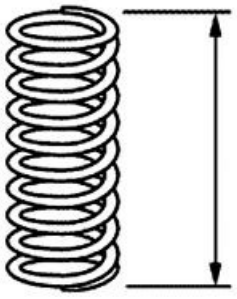
Characteristic

Wear limit for the width of the mark on the valve seat "V"

- Intake: 1.6 mm (0.0630 in)
- Outlet: 1.8 mm (0.0708 in)

Inspecting the springs and half-cones

- Check that the spring upper supporting caps and the cotters show no signs of abnormal wear.
- Check the unloaded spring length.



Characteristic

Valve spring length:

33.24 +/- 0.25 mm (1.3086 +/-0.0098 in)

Checking the cylinder head

- Using a trued bar, check that the head surface is not worn or distorted.

- Check that the camshaft bushings are not worn.
- Check that the head cover surface, the intake manifold and the exhaust manifold are not worn.

Installing the valves

- Lubricate the valve guides with engine oil.
- Position the two oil seals on the cylinder head.

- Fit the valves, the springs and the caps. Using the specific tool, compress the springs and fit the cotters in their seats.

Specific tooling

020382Y011 Valve removal/installation tool

Timing

Checking the chain tensioner

- Remove the centre screw with the washer and the tensioner spring. Check that the one-way mechanism is not worn.
- Check the condition of the tensioner spring.
- Replace the whole unit if any wear is found.

Checking the chain

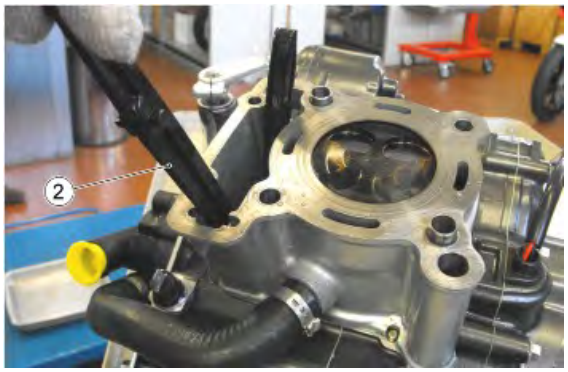
- Check that the guide slider and the tensioner pad are not excessively worn.
- Check that the chain assembly, the camshaft driving pulleys and the sprocket wheel are not worn.
- Replace the parts if signs of wear are found.

Cylinder-piston assembly

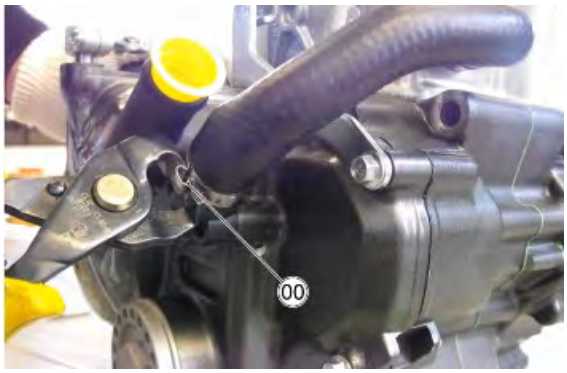
Removing the cylinder

- Remove the head gasket (1).

- Remove the guide shoe (2).



- Remove the water hose clamp (3).



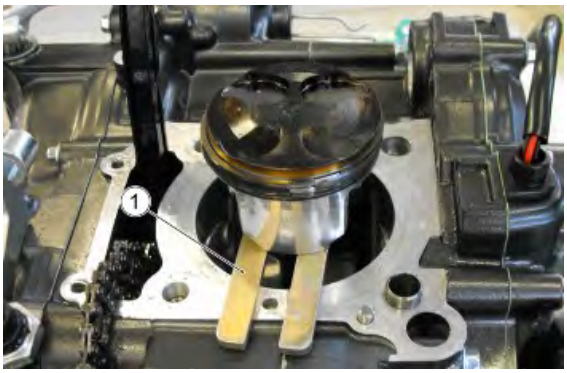
- Remove the cylinder (4).
- Remove the gasket (5).

Disassembling the piston

- Apply the tool under the piston (1).
- Cover the base of the cylinder with a cloth.

Specific tooling

865261 Piston retainer



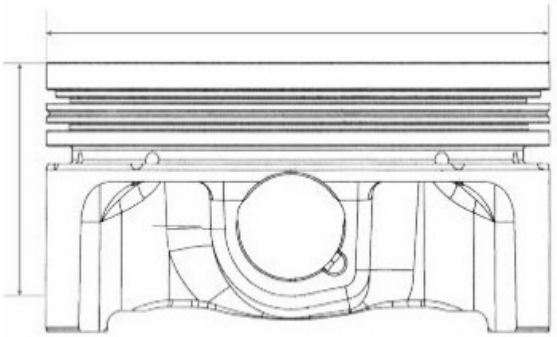
- Remove the retainer ring which locks the pin (2).

- Remove the pin (3).
- Remove the piston (4).

Checking the piston

- Measure the pin seat diameter on the piston.
- Calculate the pin - piston coupling clearance.

- Measure the piston outside diameter, perpendicular to the pin axis.
- Take the measurement at 6 mm (0.24 in) from the base, at the position shown in the figure.



- Carefully clean the sealing rings housings.
- Measure the sealing rings - grooves coupling clearance using suitable sensors, as shown in the diagram
- If clearances measured exceed the limits specified in the table, the piston should be replaced by a new one.

NOTE

MEASURE CLEARANCE BY INSERTING THE BLADE OF THE FEELER GAUGE FROM THE 2nd SEALING RING SIDE.

Characteristic

Piston / cylinder

Piston pin hole - standard: 15.003 - 15.008 mm (0.5907 - 0.5908 in)

Maximum piston / cylinder coupling clearance after use

- top ring: 0.075 mm (0.0029 in)
- middle ring: 0.065 mm (0.0025 in)
- oil scraper: 0.25 mm (0.0098 in)

Standard piston / cylinder coupling clearance

- top ring: +0.03 / 0.062 mm (0.0012 / 0.0024 in)
- middle ring: +0.02 / 0.052 mm (0.0008 / 0.0020 in)
- oil scraper: +0.01 / 0.19 mm (0.0004 / 0.007480 in)

cylinder check

- Using a bore meter, measure the cylinder inside diameter at three different points according to the directions shown in the figure.
- Check that the coupling surface with the head is not worn or misshapen.

CAUTION

THE MARKING IS LOCATED ON THE PISTON CROWN.

Characteristic

Maximum run-out allowed:

0.05 mm

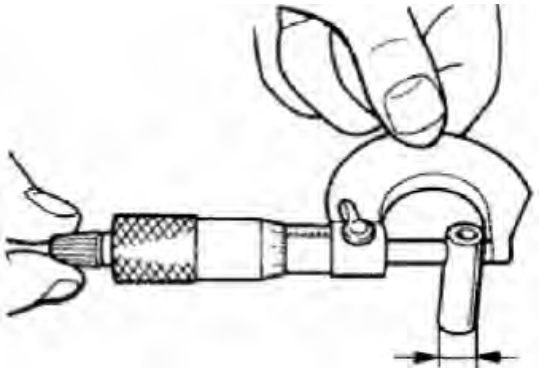
CYLINDER - PISTON COUPLING CLEARANCE 125 CM³

Coupling categories with cast-iron cylinder

NAME	ABBREVIATION	CYLINDER		PISTON		FITTING CLEARANCE	
		min	max	min	max	min	max
Cylinder/Piston	M	58.010	58.017	57.963	57.970	0.040	0.054
Cylinder/Piston	N	58.017	58.024	57.970	57.977	0.040	0.054
Cylinder/Piston	O	58.024	58.031	57.977	57.984	0.040	0.054
Cylinder/Piston	P	58.031	58.038	57.984	57.991	0.040	0.054

Inspecting the wrist pin

- Check the pin outside diameter.



Characteristic

Pin

Minimum diameter: 14.995 mm (0.590 in)

Standard diameter: 15.0000 +0/-0.0030 mm (0.00012 in)

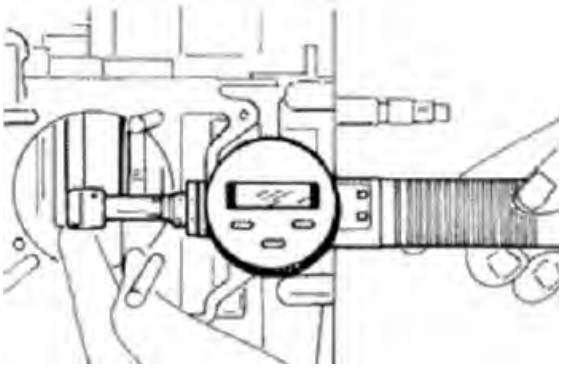
Inspecting the piston rings

ANELLI DI TENUTA

Specification	Desc./Quantity
Compression ring (top)	0.2 / 0.35 mm (0.0079 / 0.014 in)
Compression ring (middle)	0.2 / 0.35 mm (0.0079 / 0.014 in)
Oil scraper ring	0.2 / 0.7 mm (0.0079 / 0.027 in)
Top ring maximum value	0.45 mm (0.18 in)
Middle ring maximum value	0.45 mm (0.18 in)

Checking the connecting rod small end

- Measure the inside diameter of the connecting rod small end using a specific micrometer.



NOTE

IF THE DIAMETER OF THE CONNECTING ROD SMALL END EXCEEDS THE MAXIMUM DIAMETER ADMISSIBLE, SHOWS SIGNS OF WEAR OR OVERHEATING REPLACE THE CRANKSHAFT AS DESCRIBED IN THE "CRANKCASE AND CRANKSHAFT" CHAPTER".

Characteristic

Rod small end

Maximum diameter: 15.023 mm (0.591 in)

Standard diameter: 15.010 - 15.018 mm (0.5910 - 0.5912 in)

Fitting the piston

- Install the piston and the piston pin on the connecting rod, orienting the piston with the arrow facing towards the exhaust side.

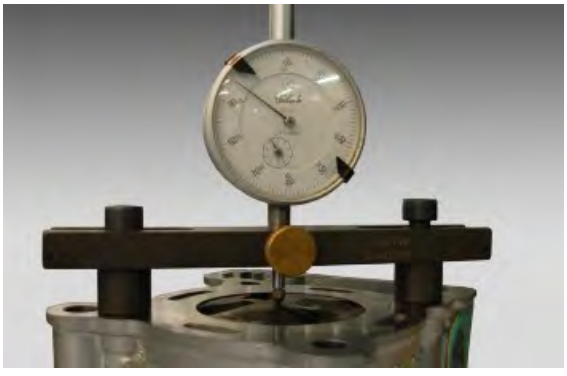
- Fit the retainer circlip.

- Provisionally fit the cylinder onto the piston, without fitting the cylinder base gasket.
- Fit a dial gauge on the specific tool.
- Bring the piston to TDC.
- Place the dial gauge against one side of the cylinder and fasten securely to ensure that the zero position is read correctly.

Specific tooling

AP8140266 Dial gauge mount

- Move the dial gauge diagonally and measure the protrusion of the piston relative to the reference surface.
- Calculate the thickness of the gasket necessary and select the appropriate gasket by referring to the values indicated in the table in the chapter "SELECTING BASE GASKETS".



Installing the cylinder

- Fit a new cylinder base gasket of the chosen thickness.
- Refit the cylinder as indicated in the figure using the specific clamp tightener tool.

NOTE

BEFORE FITTING THE CYLINDER, CAREFULLY BLOW OUT THE LUBRICATION DUCT AND OIL THE CYLINDER BARREL.

Specific tooling

020287Y Tool for installing seal rings

- Fit a new gasket between the cylinder and the head.
- Place the two dowels.
- Install the head.

Selecting the base gasket

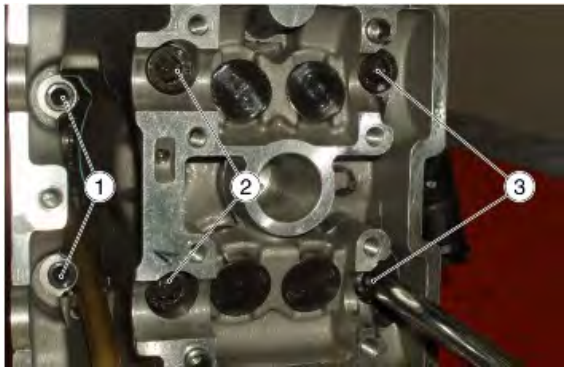
BASE GASKET SELECTION

Specification	Desc./Quantity
Size measured: 0.95 / 1.09 mm (0.037 - 0.042 in)	Gasket 0.3+/-0.05 mm (0.012+/-0.001 in)
Size measured: 1.1 / 1.25 mm (0.043 - 0.049 in)	Gasket 0.4+/-0.05 mm (0.015+/-0.001 in)
Size measured: 1.26 / 1.45 mm (0.049 - 0.057 in)	Gasket 0.5+/-0.05 mm (0.019+/-0.001 in)

Installing the cylinder head

- Fit the chain guide slider onto the cylinder.
- Fit the head gasket and the alignment dowels
- Fit the head.

- Screw but do not tighten both central long screws (3) and position thewash-ers.
- Screw but do not tighten both central long screws (2) and position the wash-ers.
- Screw but do not tighten the two side short screws (1).



NOTE

BEFORE INSTALLING THE HEAD, MAKE SURE THAT THE LUBRICATION CHANNEL IS GENERALLY CLEAN AND USE A JET OF COMPRESSED AIR FOR CLEANING.

- Tighten the four central screws (2 - 3) crosswise.
- Lastly, tighten the two side screws (1).

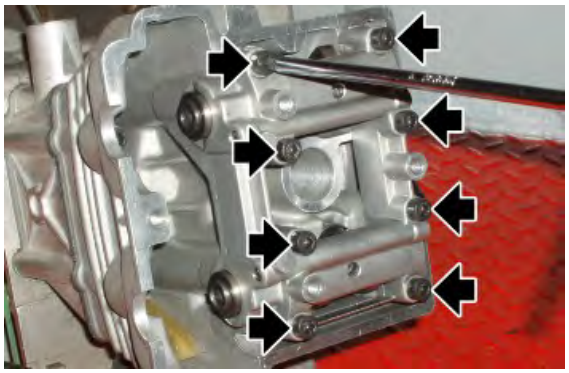
- Insert the timing control chain on the crankshaft.
- Insert the chain tensioner pad of the head and lock it with the fixing screw.

- Insert the camshafts in their seats on the head, remember to position the camshaft marked with the letter (A) on the intake side and the camshaft marked with the letter (S) on the ex-haust side.

WARNING

POSITION THE CAMS OF BOTH SHAFTS FACING OUT-WARDS.

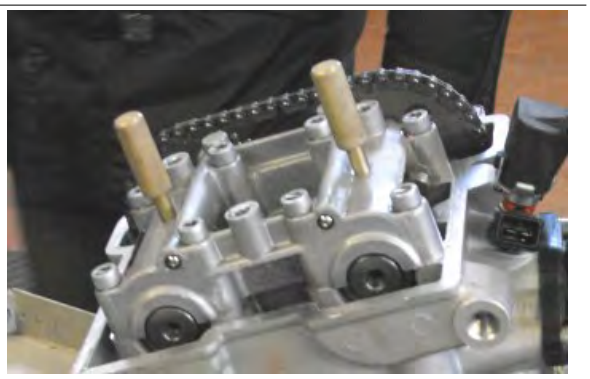
- Position the cam tower cap.
- Screw but do not and tighten the eight screws.



- Place the pins in their positions on the overhead camshafts.

Specific tooling

864567 Camshaft timing adjustment lock pins



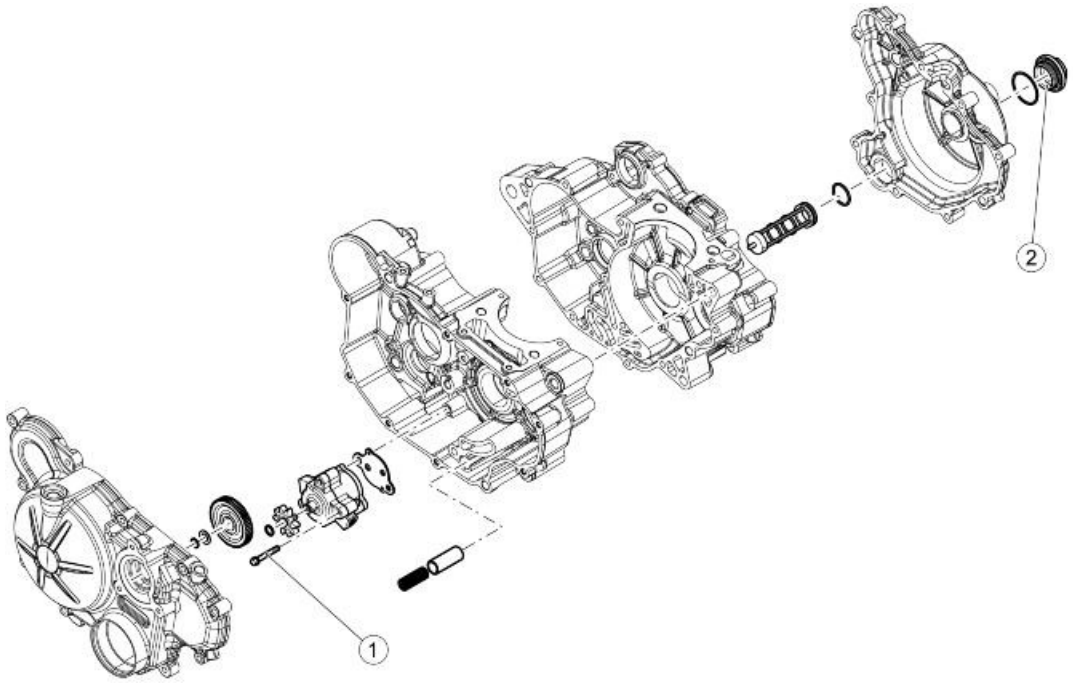
- Place the camshaft gears on the chain, be careful not to invert the original direction of rotation.
- Keep the camshafts locked with the pins and screw but do not tighten the screws fixing the gears using Loctite 243.

- Fit the chain tensioner on the cylinder using a new gasket, and tighten the two screws (1) to the prescribed torque.
- Insert the spring with the central screw (2) and o-ring, and tighten the cap to the prescribed torque.

- Tighten the screws fixing the camshaft gears to the prescribed torque.
- Remove the pins on the camshafts.
- Remove the specific crankshaft locking tool.
- Tighten the screw on the crankcase.

- Check the valve clearance and adjust it if required.
- Refit the tappet cover.

Lubrication



OIL PUMP

pos.	Description	Type	Quantity	Torque	Notes
1	Oil pump fastener screw	M5x35	3	4 Nm (2.95 lb ft)	Loctite 243
2	Oil cap retainer	-	1	25 Nm (18.44 lb ft)	-

Oil pump

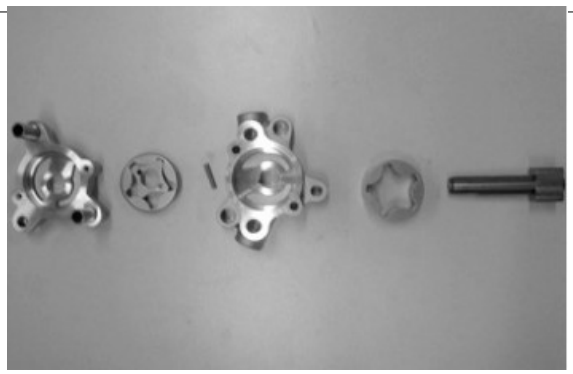
Removing

- Remove the Seeger ring.

- Remove the pump gear.

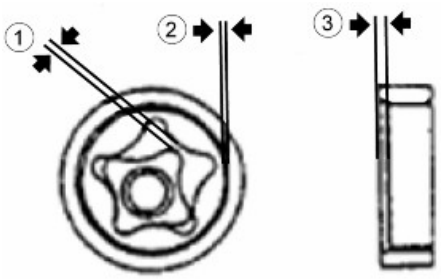
- Remove the pump gear.

- Separate the components to inspect them.



Inspection

- Measure distance between rotors with a feeler gauge at the positions shown in the picture.



Characteristic

Oil intake rotor

Thickness: 13.5 mm (0.53 in)

Oil supply rotor Thickness:

8.5 mm (0.33 in) **Standard values**

Radial clearance (1) between points of the rotor:

0.04 mm (0.0015 in)

Radial clearance (2) between points of the rotor: 0.08 mm (0.003 in)

Radial clearance (3) between rotor 1 and the pump body: 0.04 mm (0.0015 in)

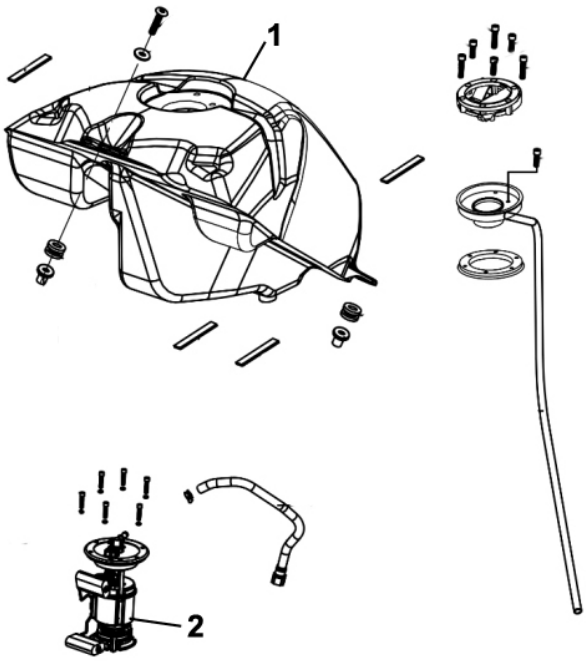
Radial clearance (3) between rotor 2 and the pump body: 0.05 mm (0.0019 in)

Installing

- Refit the oil pump proceeding in reverse order of disassembly. Pay attention to the direction of the rotor, the dot should stay on the opposite part of the resting face.

INDEX OF TOPICS

Circuit diagram



Key:

1. Fuel tank
2. Fuel pump

Fuel pump

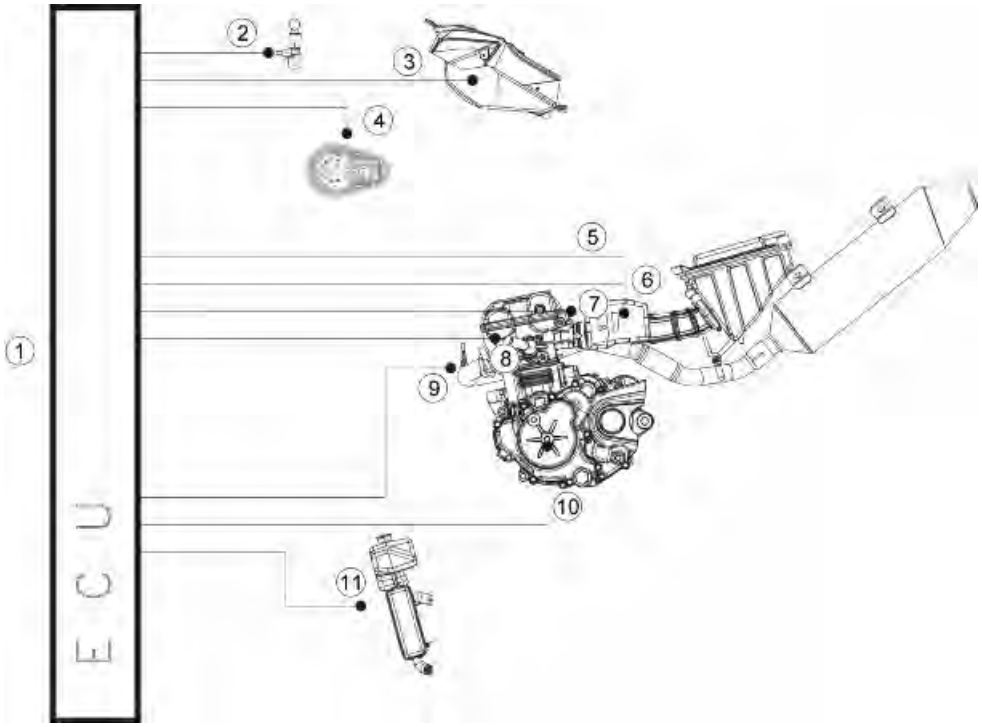
Injection

Diagram

Key

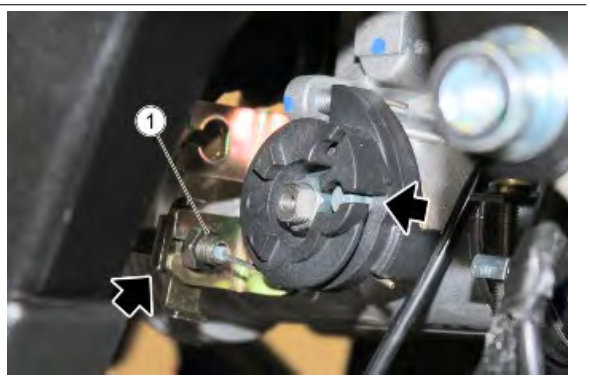
1. ECU control unit position
2. Ignition switch
3. Fuel pump
4. Instrument panel
5. Air temperature sensor
6. Throttle valve position sensor
7. Injector
8. Coolant temperature sensor

9. Lambda probe position
10. Engine speed sensor
11. Electric fan



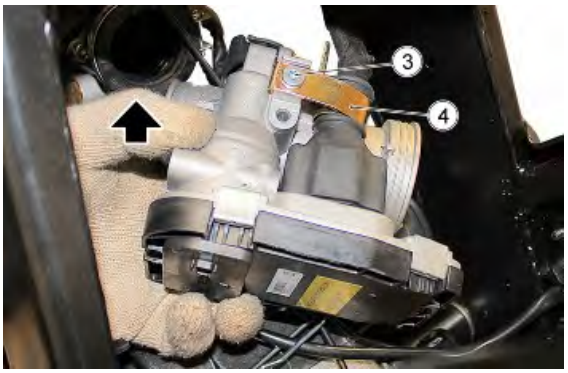
Removing the throttle body

- Remove the filter box
- Loosen the nut (1)
- Remove the gas control cable from the points indicated in the figure



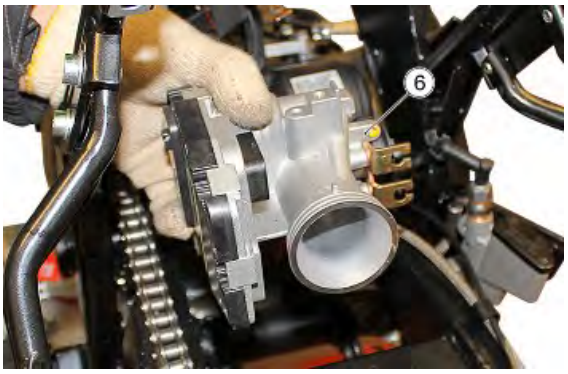
- Loosen the clamp (2)

- Remove the throttle body from the sleeve indicated in the figure
- Unscrew the screw (3) and remove the bracket (4)



- Disconnect the connector (5)

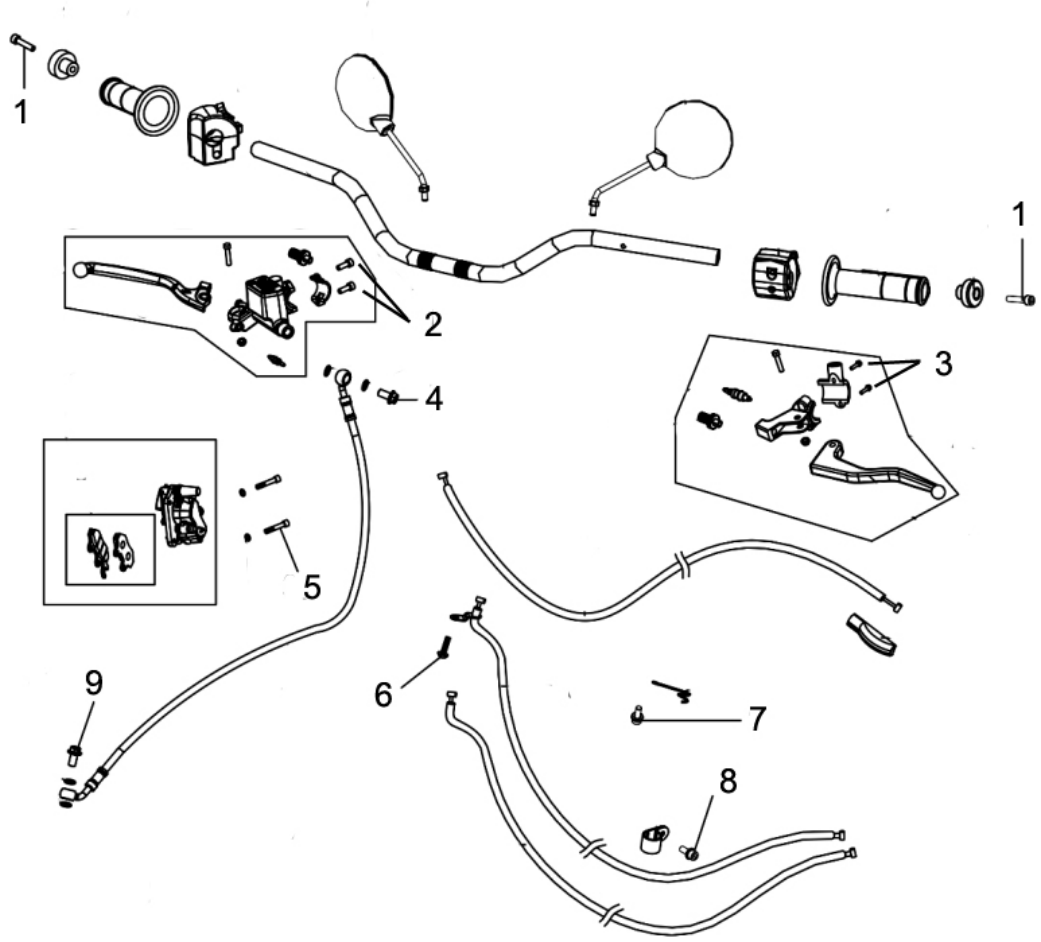
- Removing the throttle body (6)



INDEX OF TOPICS

Front

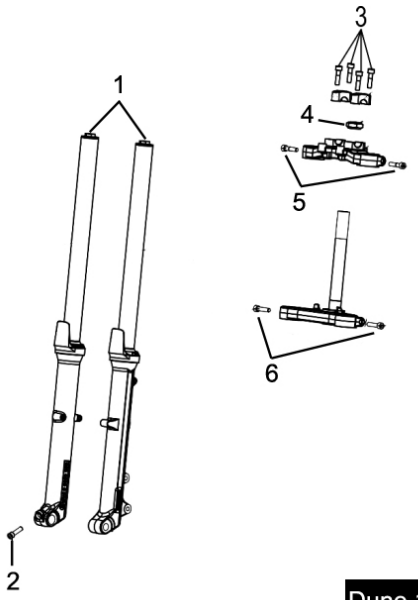
Handlebar



HANDLEBAR AND CONTROLS

pos.	Description	Type	Quantity	Torque	Notes
1	Balance hammer bolt	M6×25	2	7/10 Nm (5.16/7.38 lb ft)	-
2	SHC brake master cylinder fastening screws	M6×25	2	7/10 Nm (5.16/7.38 lb ft)	-
3	Clutch control fastening screws	M6×25	2	6/8 Nm (4.43/5.90 lb ft)	-
4	Front brake upper pump brake hose bolt	M10×1	1	28/33 Nm (20.66/24.35 lb ft)	-
5	PUMP ,FR DISC BRAKE	M8×30	2	17/19 Nm (12.54/14.01 lb ft)	Loct. 243
6	Throttle cable bolt	M5×8	1	5/6 Nm (3.69/4.43 lb ft)	-
7	Brake oil line clamp bolt	M6×16	1	7/10 Nm (5.16/7.38 lb ft)	-
8	Brake oil line clamp screw	ST5,1×14	1	3Nm (2.21 lb ft)	-
9	Front brake upper pump brake hose bolt	M10×1.25	1	28/33 Nm (20.66/24.35 lb ft)	-

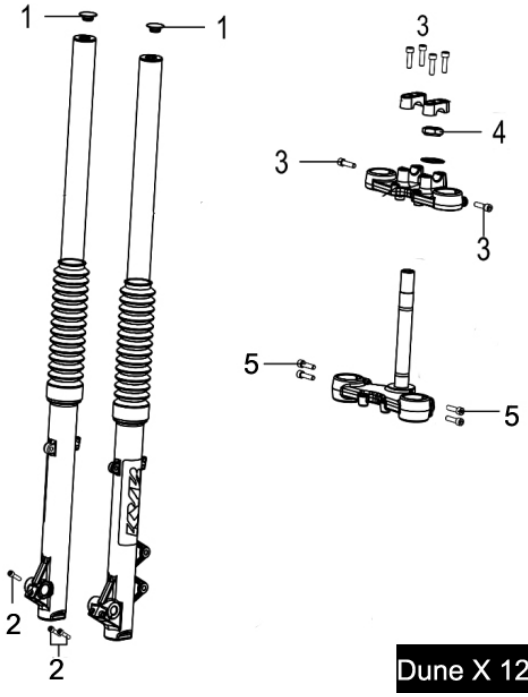
Front fork



Dune 125

FORK

pos.	Description	Type	Quantity	Torque	Notes
1	Caps	-	2	15/25 Nm (11.06/18.44 lb ft)	-
2	SHC wheel axle clamp fastening screws	M8×25	1	15/18 Nm (11.06/13.27 lb ft)	-
3	Hex head handlebar U-bolt flanged fastening screws	M8×35	4	20/24 Nm (14.75/17.70 lb ft)	-
4	NUT	M25×1	1	50/60 Nm (36.87/44.12 lb ft)	-
5	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-
6	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-



Dune X 125

FORK

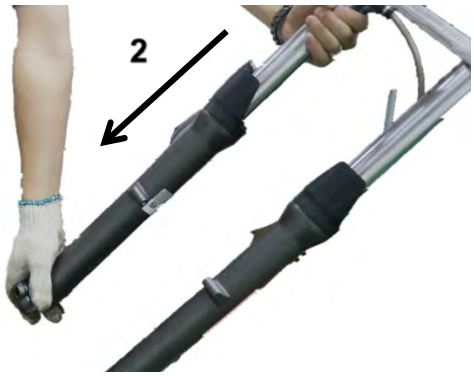
pos.	Description	Type	Quantity	Torque	Notes
1	Caps	-	2	15/25 Nm (11.06/18.44 lb ft)	-
2	SHC wheel axle clamp fastening screws	M6×25	3	4/6 Nm (2.95/4.42 lb ft)	-
3	Hex head handlebar U-bolt flanged fastening screws	M8×30	6	20/25 Nm (14.75/18.44 lb ft)	-
4	NUT	M24×1	1	50/60 Nm (36.87/44.12 lb ft)	-
5	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-
6	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-

Removing the fork legs

REMOVING THE RIGHT-HAND FOR

- Loosen the screws (1)

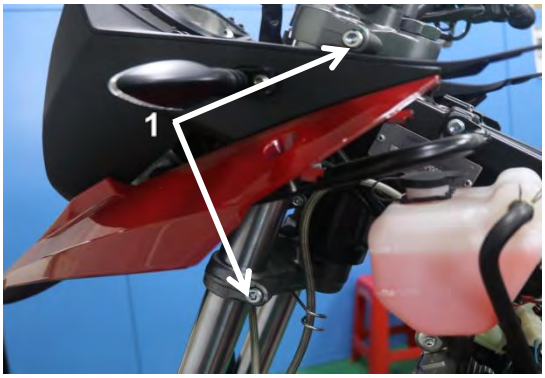
- Remove the right-hand fork (2)



REMOVING THE LEFT-HAND FORK

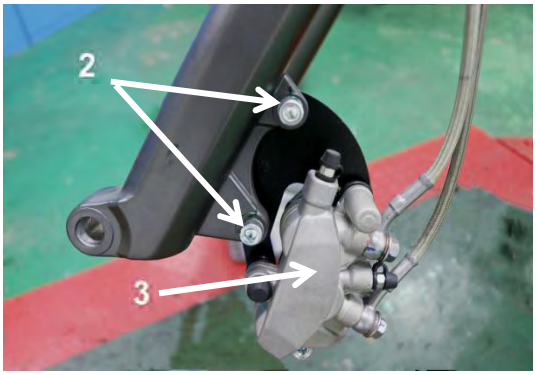
Remove the left-hand fork cover

Undo and remove the screw (1)



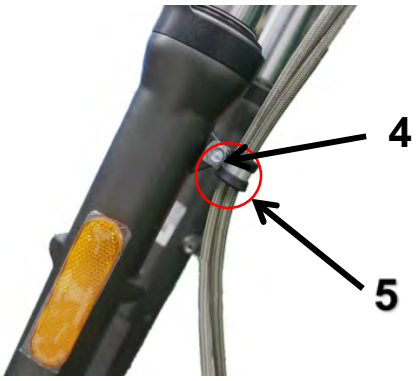
Unscrew and remove the screws (2)

Remove the front brake calliper (3) from the fork together with the support bracket



Loosen the screws (4)

Loosen the clamp(5)



Remove the left-hand fork (6)

Draining oil

- Clamp the fork in a vice using the appropriate protection (1) to avoid damaging the sleeve.
- Unscrew the cap (2).

Specific tooling

AP8140149 Guard for assembly operations

CAUTION

THE FOLLOWING OPERATIONS REFER TO A SINGLE STEM BUT APPLY TO BOTH.

- Remove the complete fork stem.
- Carefully clean the entire fork stem be- fore removing it.

CAUTION

BEFORE CARRYING OUT THE OPERATIONS BELOW, GET A 500 cm³ (30,51 cu in) CONTAINER TO COLLECT THE OIL.

- Unscrew (3) and take out (4)

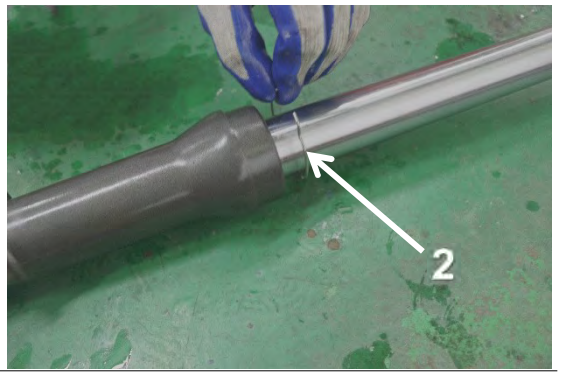
- Drain the oil into a suitably sized con- tainer to collect fluids by pumping out the oil a few times.

DO NOT DISPOSE OF OIL INTO THE ENVIRONMENT. DISPOSE OF ENGINE OIL IN A SEALED CONTAINER AND TAKE IT TO YOUR SUPPLIER OR TO THE NEAREST USED OIL COLLECTION CENTRE.

Disassembling the fork

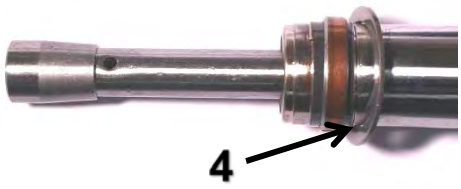
- Remove the dust guard(1)

- Remove the retainer circlip (2).



- Remove the oil seal (3).

- Remove the spacer (4).



Checking the components

Bearing tube

Check that the sliding surface is not scratched or scored.

Any scoring can be removed by sanding with damp sandpaper (grain 1).

If the scorings are deep, replace the bearing tube.

Use a dial gauge to check that bending of the bearing tube is below the limit value.

If it is over the limit, replace the stem.

CAUTION

A BENT TUBE SHOULD NEVER BE STRAIGHTENED BECAUSE THIS WEAKENS ITS STRUC TURE AND MAKES USING THE VEHICLE DANGEROUS.

Characteristic

Bending limit:

0.2 mm (0.00787 in)

Sleeve

Check for damage and/or cracks; if it is damaged, replace it.

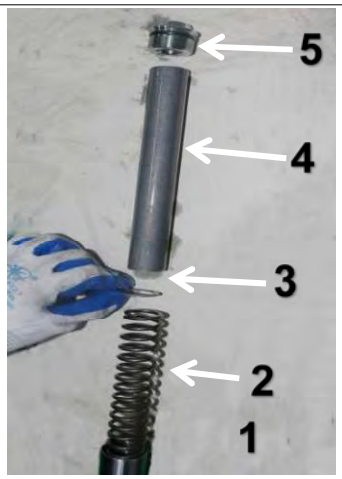
Spring

Check that the spring is in good condition. (where possible) Replace the oil seal and dust guard with new parts.

Replace the O-ring on the cap.

Reassembling the fork

Please install in sequence



Filling oil

Place the fork upright in a vice fitted with protection jaws

Push the stem into the sleeve as far as it will go.

Pour part of the fork oil into the stanchion.

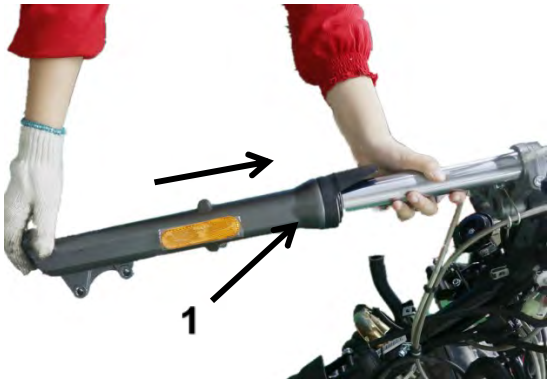
Wait a few minutes until the oil fills all the ducts.

Pour the remaining oil.

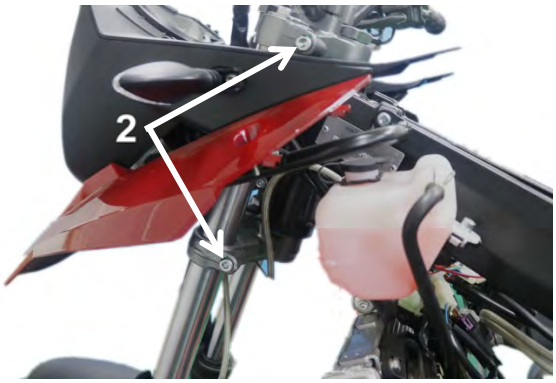
Pump out oil a few times.

Installing the fork legs

- Insert the left-hand fork (1)



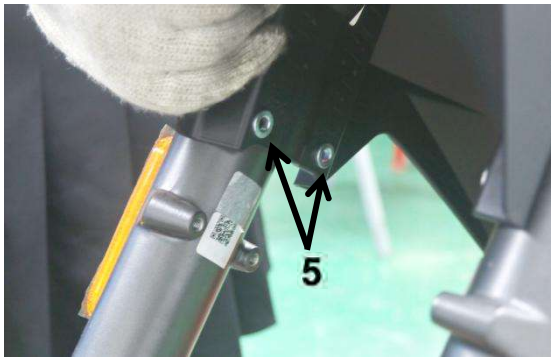
- Tighten the screws (2)



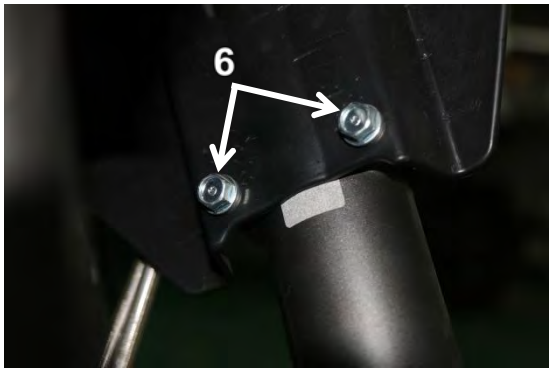
- Insert the left-hand fork (3)

- Tighten the screws (4)

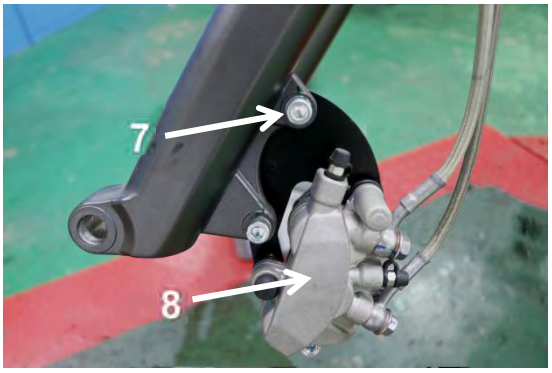
- Tighten the top fairing support screws (5)



- Tighten the top fairing support screws (6)



- Mount the front wheel
- Secure the front brake calliper (7) with support bracket by tightening the screw (8)
- Check that the forks are working correctly by applying the front brake and pushing repeatedly on the forks. Operating must be progressive and there must not be any traces of oil on the stanchions



CAUTION

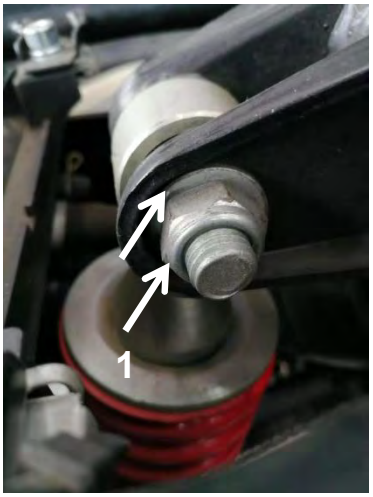
BEFORE USING THE VEHICLE, CHECK THAT IT IS CORRECTLY SET.

Rear

Removing

Lift the vehicle using a hoist and support it in the centre using a support.

- Remove the nut (1)
- Remove the washer (2)



- Remove the screws (3)
- Remove the washer (4)

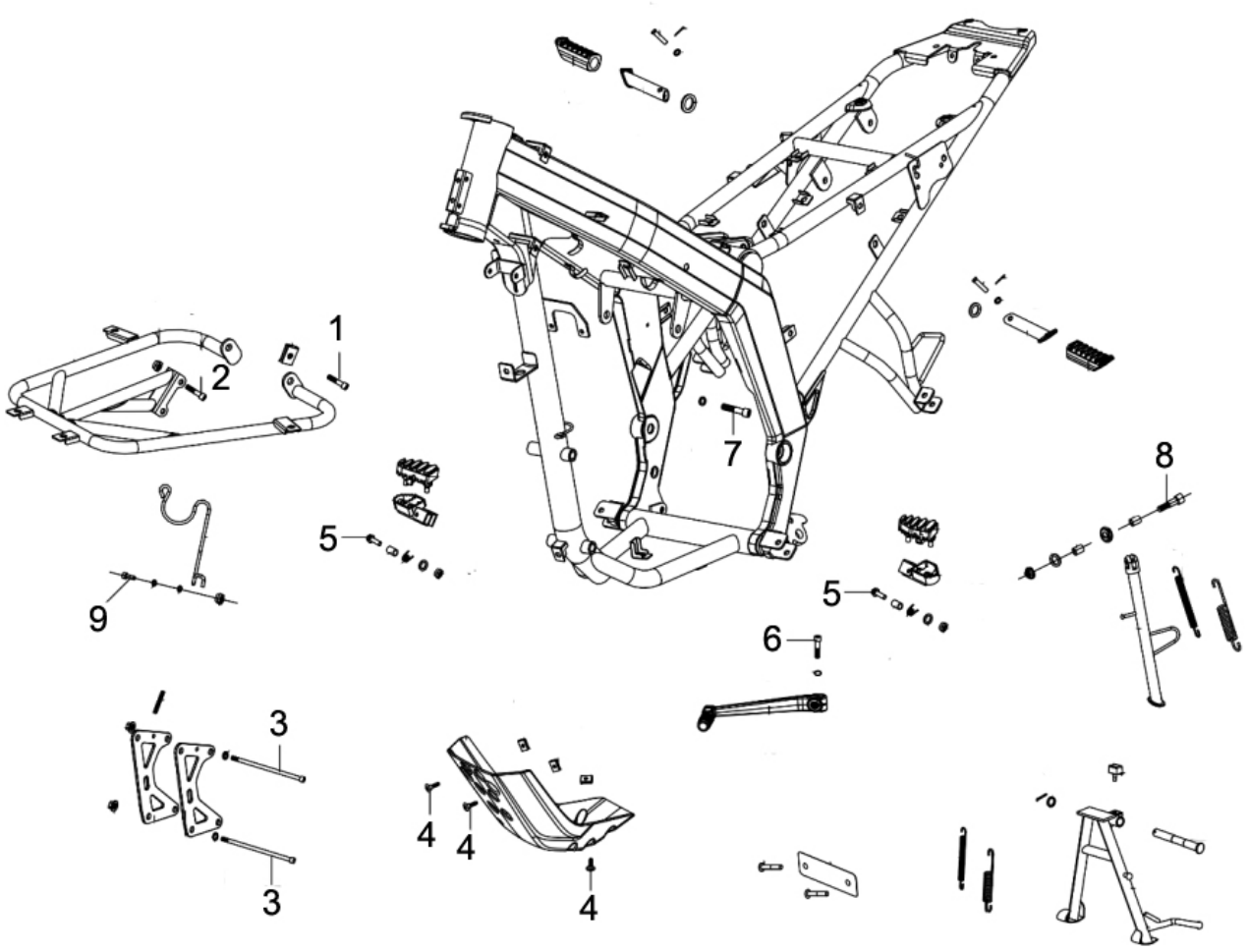
- Remove the nut (5)
- Remove the washer (6)

- Remove the screw and washer (7)

- Remove the shock absorber (8)

INDEX OF TOPICS

Chassis

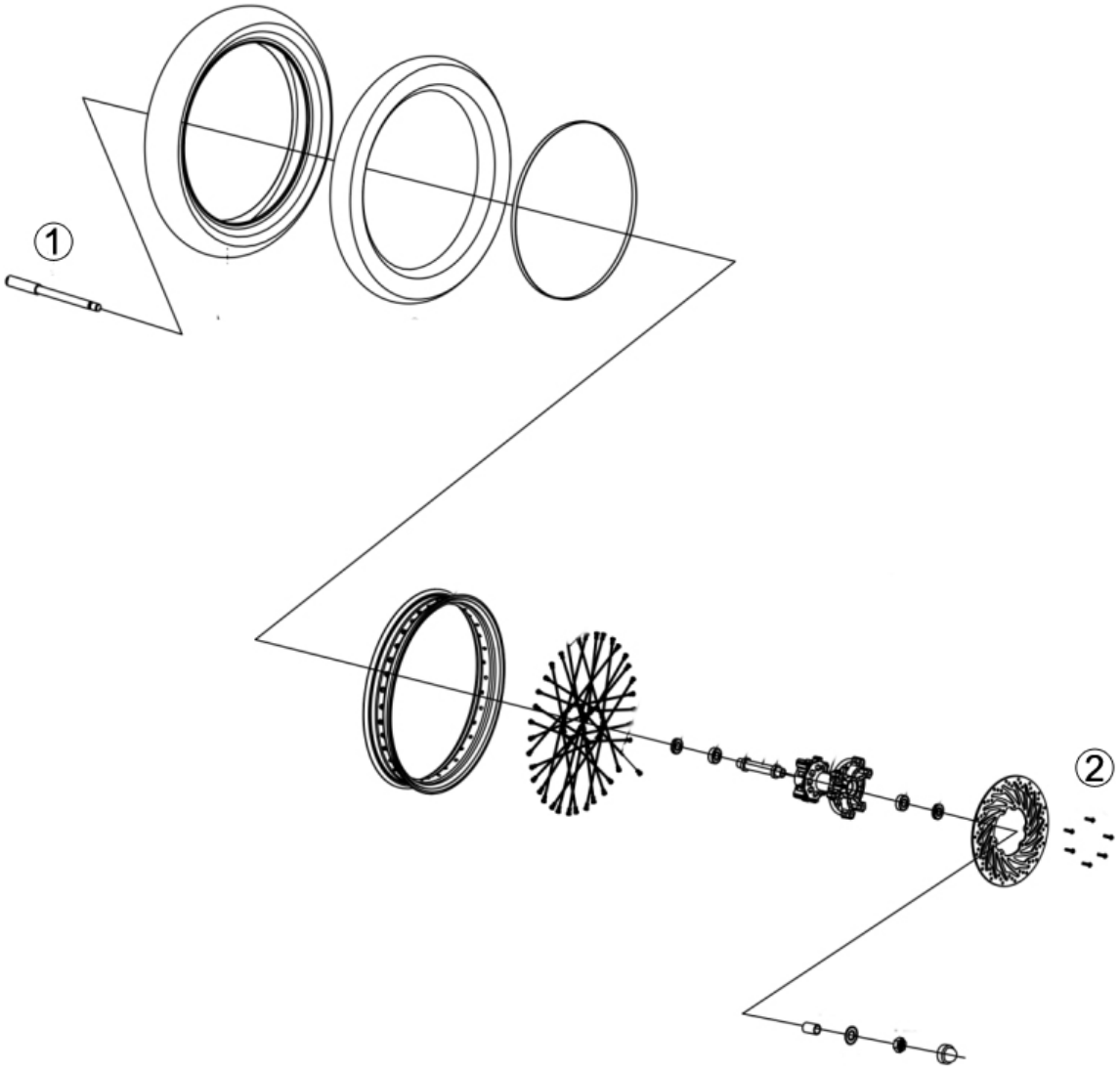


CHASSIS

pos.	Description	Type	Quantity	Torque	Notes
1	Headlight bracket bolt	M6×16	2	5/7 Nm (3.69/5.16 lb ft)	-
2	Headlight bracket bolt	M6×30	2	8/10 Nm (5.90/7.38 lb ft)	-
3	Engine bracket bolt	M10×100	4	37/39 Nm (27.29/28.76 lb ft)	-
4	Engine shroud bolt	M5×16	3	2/3 Nm (1.48/2.21 lb ft)	-
5	Front Pedal bolt	M8×40	2	17/19 Nm (12.54/14.01 lb ft)	-
6	Front fender bolt	M6×25	1	8/10 Nm (5.90/7.38 lb ft)	-
7	Engine bracket bolt	M10×25	2	37/39 Nm (27.29/28.76 lb ft)	-
8	Side bracket bolt	M8	1	17/19 Nm (12.54/14.01 lb ft)	-

Wheels

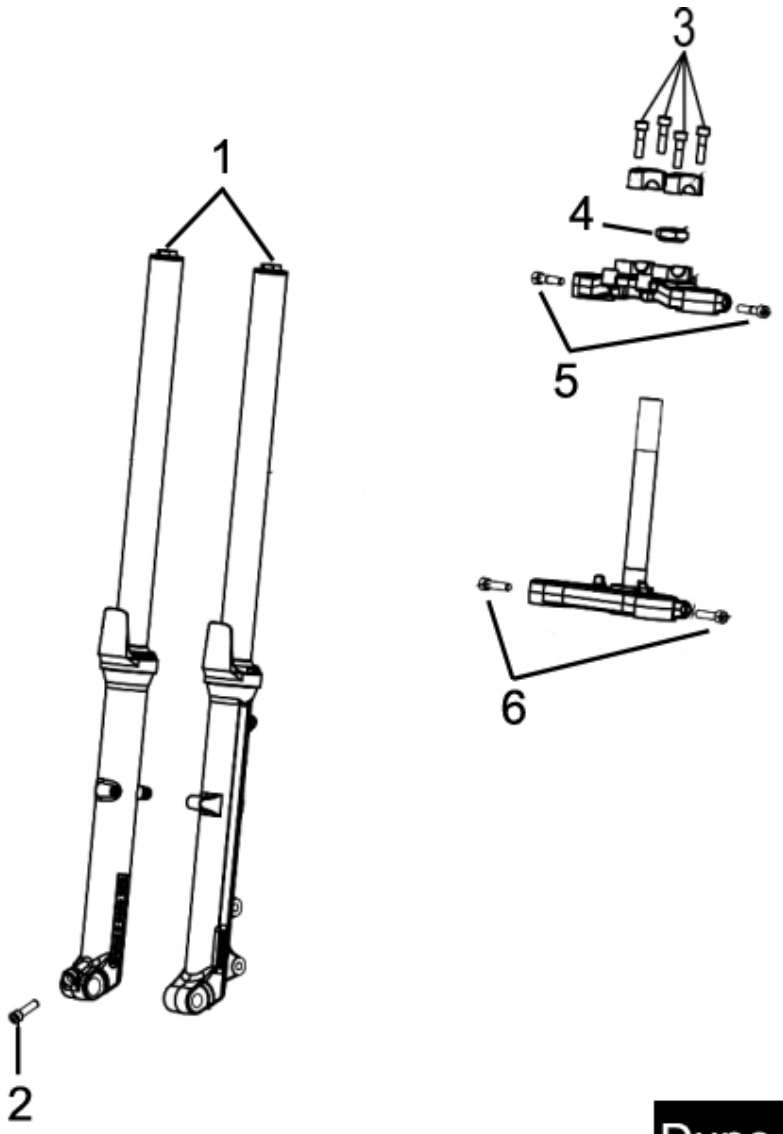
Front wheel



FRONT WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Wheel fastening pin	M14	1	70/80 Nm (51.63/59 lb ft)	-
2	SHC front brake disc fastening screws	M6x20	6	10/12 Nm (7.38/8.85 lb ft)	Loct. 243

FORK



FORK

pos.	Description	Type	Quantity	Torque	Notes
1	Caps	-	2	15/25 Nm (11.06/18.44 lb ft)	-
2	SHC wheel axle clamp fastening screws	M8×25	1	15/18 Nm (11.06/13.27 lb ft)	-
3	Hex head handlebar U-bolt flanged fastening screws	M8×35	4	20/24 Nm (14.75/17.70 lb ft)	-
4	NUT	M25×1	1	50/60 Nm (36.87/44.12 lb ft)	-
5	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-
6	SHC steering yoke fastening screws	M8×35	2	20/24 Nm (14.75/17.70 lb ft)	-

Removal

- Lift the front of the vehicle using a hoist, make it safe by using belts and support it in the centre using a support.
- Remove the cap (1)
- Unscrew the nut (2) and remove it.

- Retrieve the washer (3)

- Loosen the screws (4)

- Remove the front wheel axle (5)

- Remove the front wheel (6)

Checking

FRONT WHEEL BEARINGS

Check the bearings installed on the wheel.

CHECK THE CONDITION OF ALL COMPONENTS AND OF THE COMPONENTS INDICATED AS FOLLOWS IN PARTICULAR.

CHECKING ROTATION

- Manually rotate the inner race of each bearing. The race must turn smoothly without impediment or noise.

If one or both bearings are not conformant:

- Replace both wheel bearings.

CHECKING RADIAL AND AXIAL PLAY

- Check the radial and axial play.

Axial play: minimal axial play is permitted.
Radial: none.
If one or both bearings are not conformant:

- Replace both wheel bearings.

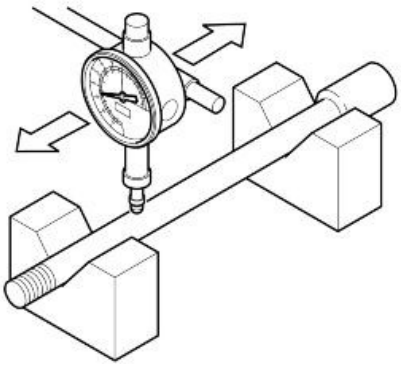
ALWAYS REPLACE BOTH BEARINGS.
ALWAYS REPLACE THE BEARINGS WITH COMPONENTS OF THE SAME TYPE.

- Check the condition of the seals; replace if damaged or excessively worn.

ALWAYS REPLACE BOTH SEALS TOGETHER.
ALWAYS REPLACE THE SEALS WITH COMPONENTS OF THE SAME TYPE.

WHEEL AXLE

- Use a dial gauge to measure the eccentricity of the wheel axle. Replace the wheel axle if the eccentricity measured exceeds the specified limit.



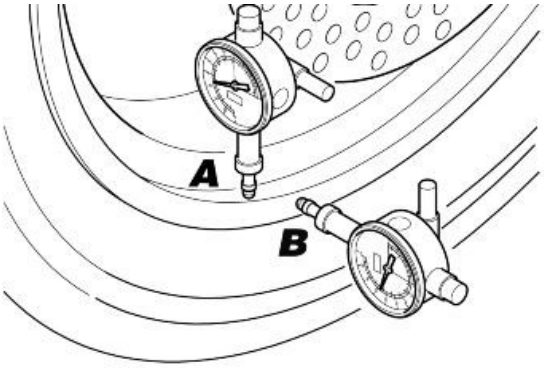
Characteristic

Maximum eccentricity:

0.2 mm (0.0079 in)

WHEEL

- Use a dial gauge to check that the ra- dial (A) and axial (B) eccentricity of the wheel do not exceed the specified lim- its. Excessive eccentricity is usually caused by worn or damaged bearings. If eccentricity is not within the indicated limits after replacing the bearings, re- place the wheel.



Characteristic

Maximum radial (A) eccentricity:

0.6 mm (0.0236 in)

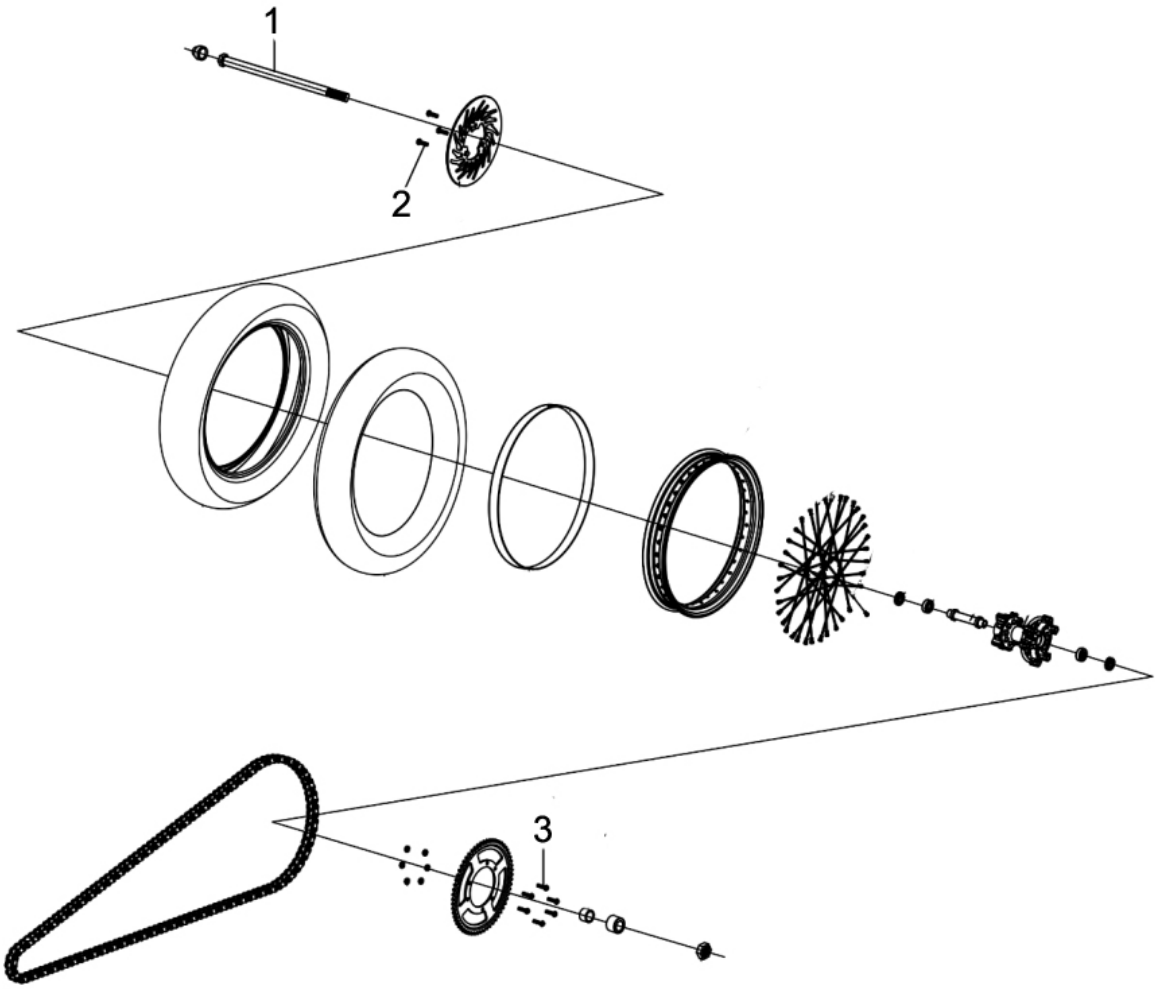
Maximum lateral (B) eccentricity:

0.5 mm (0.0197 in)

Installing

- Repeat the front wheel removal procedure in reverse order, making sure that the compo- nents are positioned correctly and that the correct tightening torques are applied.

Rear wheel



REAR WHEEL

pos.	Description	Type	Quantity	Torque	Notes
1	Rear axle	M14	1	70/80 Nm (51.63/59 lb ft)	-
2	Rear brake disc bolt	M8×24.2	3	15/18 Nm (11.06-13.27 lb ft)	Loct. 243
3	Rear sprocket bolt	M8×30	6	17/19 Nm (12.54/14.01 lb ft)	Loct. 243

Rimozione

BEFORE CARRYING OUT THE FOLLOWING OPERATIONS, LEAVE THE ENGINE AND MUFFLER TO COOL TO AMBIENT TEMPERATURE TO PREVENT THE RISK OF BURNS.

CAUTION

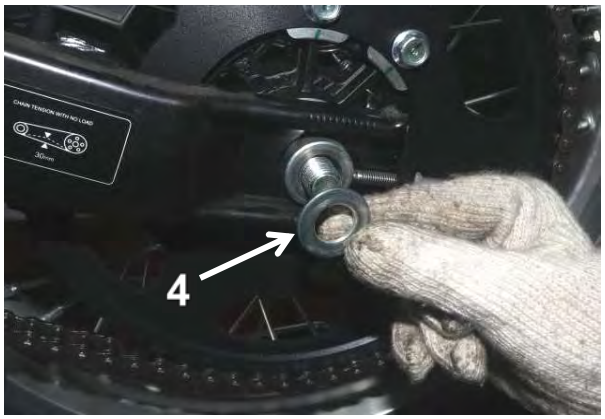
DURING REMOVAL, TAKE CARE NOT TO DAMAGE THE PIPE, THE DISC AND THE BRAKE PADS.

- Lift the front of the vehicle using a hoist, make it safe by using belts and support it in the centre using a support.
- Remove the chain guard
- Remove the protective rubber (1)

- Remove the protective rubber (2)

- Unscrew the nut (3) and remove it

- Retrieve the washer (4)



- Remove the wheel axle (5)

- Remove the chain (6) from the crown

- Retrieve the washer (7)

- Remove the rear wheel (8)

REMOVING THE CROWN

- Remove the rear wheel
- Remove the spacer (1)

- Block the nuts at the rear and unscrew and remove the screws (2) at the points indicated in the figure

- Remove the crown (3)

Checking

CHECK THE CONDITION OF ALL COMPONENTS AND OF THE COMPONENTS INDICATED AS FOLLOWS IN PARTICULAR.

REAR WHEEL BEARINGS

Check the bearings installed on the wheel.

CHECKING ROTATION

- Manually rotate the inner race of each bearing. The race must turn smoothly without impediment or noise.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.

ALWAYS REPLACE BOTH BEARINGS.
ALWAYS REPLACE THE BEARINGS WITH COMPONENTS OF THE SAME TYPE.

- Check the radial and axial play.

Axial play: minimal axial play is permitted.

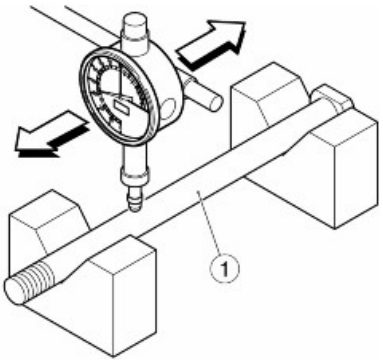
Radial: none.

If one or both bearings do not fall within the control parameters:

- Replace both wheel bearings.

WHEEL AXLE

- Use a dial gauge to measure the eccentricity of the wheel axle (1). Replace the wheel axle (1) if the eccentricity measured exceeds the specified limit.



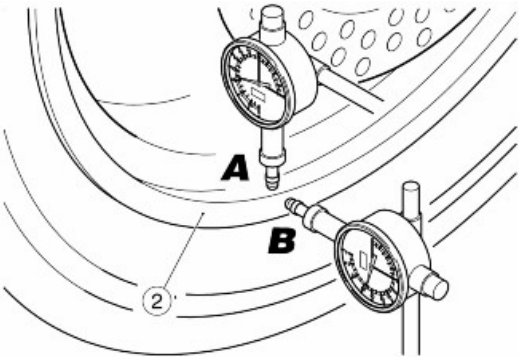
Characteristic

Maximum eccentricity:

0.2 mm (0.0079 in)

WHEEL RIM

- Use a dial gauge to check that the radial (A) and axial (B) eccentricity of the wheel (2) do not exceed the specified limits.



Excessive eccentricity is usually caused by worn or damaged bearings. If eccentricity is not within the indicated limits after replacing the bearings, replace the wheel (2).

Characteristic

Maximum radial (A) eccentricity:

0.6 mm (0.0236 in)

Maximum lateral (B) eccentricity:

0.5 mm (0.0197 in)

CROWN GEAR

- Check the condition of the teeth of the crown gear (3).

If excessively worn:

- replace the crown gear.

TO PREVENT NEW COMPONENTS FROM WEARING PREMATURELY, THE REAR SPROCKET, FRONT SPROCKET AND DRIVE CHAIN MUST ALWAYS BE REPLACED TOGETHER AS A SET.

CAUTION

WHEN REPLACING THE SPROCKET REPLACE THE PRE-IMPREGNATED SCREWS WITH NEW ONES. BEFORE FITTING THE SCREWS CAREFULLY CLEAN THE THREADED HOLES REMOVING ANY RESIDUES.

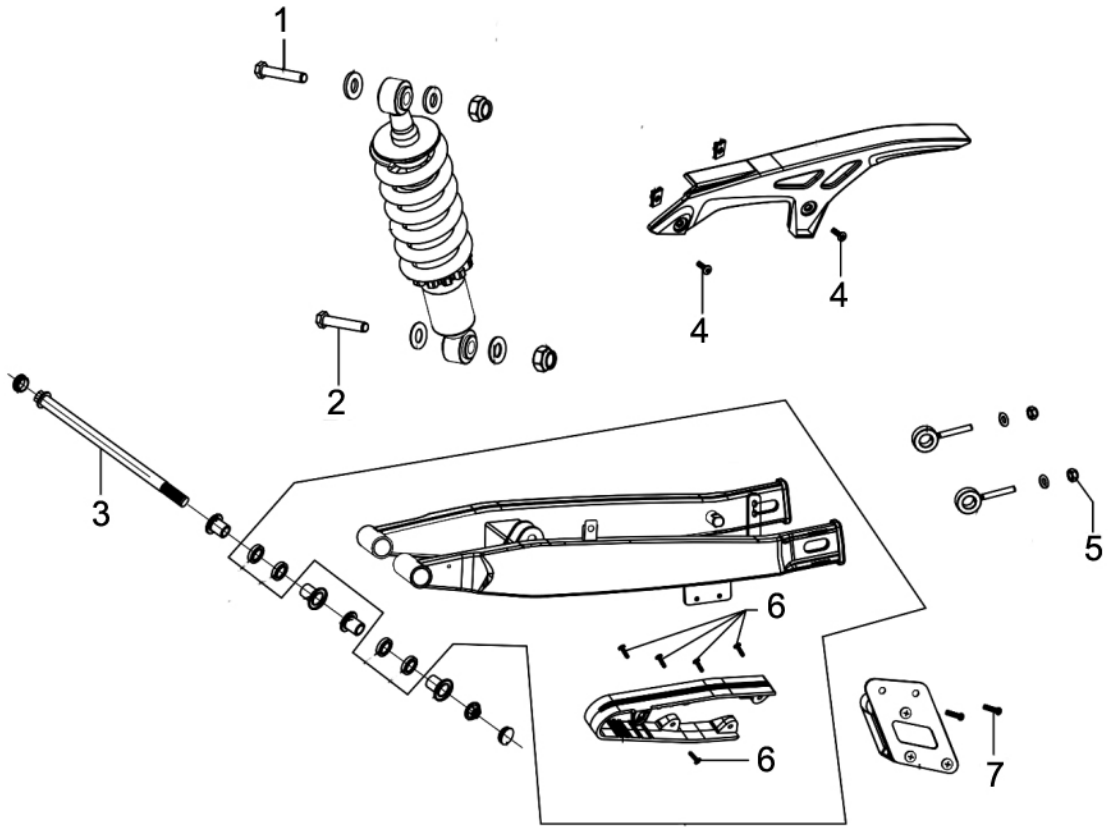
Installing

- Repeat the removal procedure in reverse order, taking care to insert the spacer correctly on the left hand side, as indicated in figure.
- Tighten the nuts, applying the predetermined torque.

CAUTION

AFTER MOUNTING THE REAR WHEEL, CHECK THAT THE DISTANCE BETWEEN THE SPEER SENSOR AND THE PHONIC WHEEL IS BETWEEN 0.3 mm (0.012 in) AND 2 mm (0.079 in).

Swinging arm

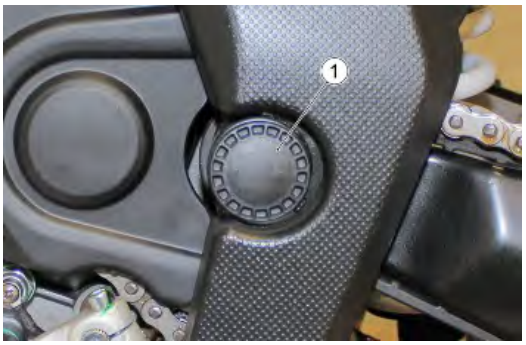


REAR FORK

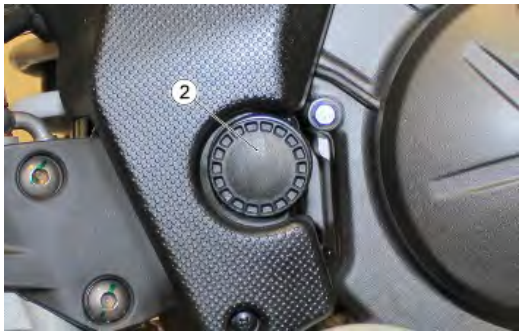
pos.	Description	Type	Quantity	Torque	Notes
1	Rear shock absorber bolt	M12×58	1	55/65 Nm (10.56/47.94 lb ft)	-
2	Rear shock absorber bolt	M12×50	1	55/65 Nm (10.56/47.94 lb ft)	-
3	Flat fork shaft	M12	2	70/75 Nm (51.62/55.56 lb ft)	-
4	Chain guard bolt	M6×12	2	5/7 Nm (3.69/5.16 lb ft)	-
5	Chain adjuster bolt	M6	2	5/7 Nm (3.69/5.16 lb ft)	-
6	Chain slider bolt	M4.8×19	2	3 Nm (2.21 lb ft)	-
7	Chain guide bolt	M6×12	2	5/7 Nm (3.69/5.16 lb ft)	Loct. 243

Removing

- Remove the rear mudguard
- Remove the rear wheel
- Remove the cap (1)

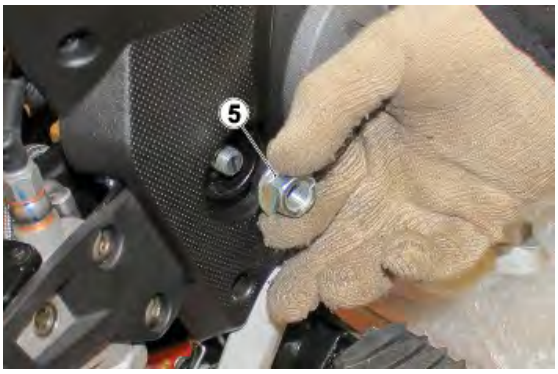


- Remove the cap (2)

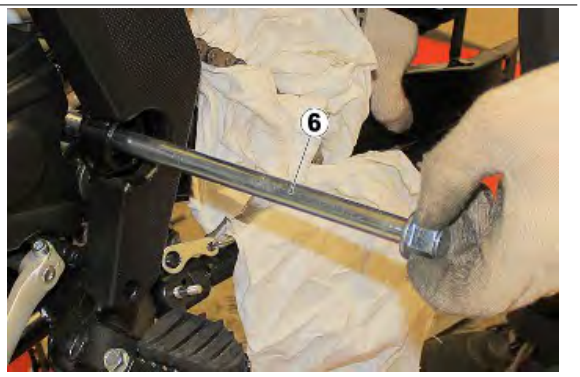


- Holding the pin (3) in place, unscrew the nut (4)

- Remove the nut (5)



- Extract the pin (6) and remove it.



- Remove the swingarm (7)

Checking

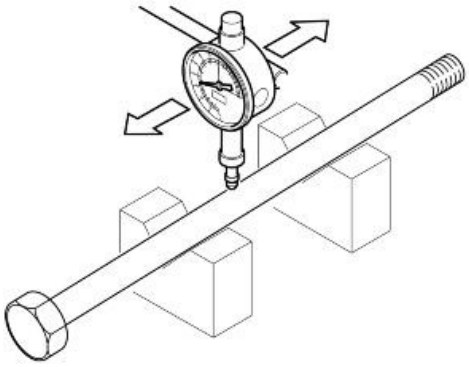
CAUTION

CHECK THAT NO COMPONENT IS NOTICEABLY DISTORTED, DAMAGED, CRACKED AND/OR DENTED.
REPLACE ALL DAMAGED COMPONENTS.

SWINGARM PIN

With a dial gauge check if the pin eccentricity exceeds the limit value. Otherwise, replace the pin.

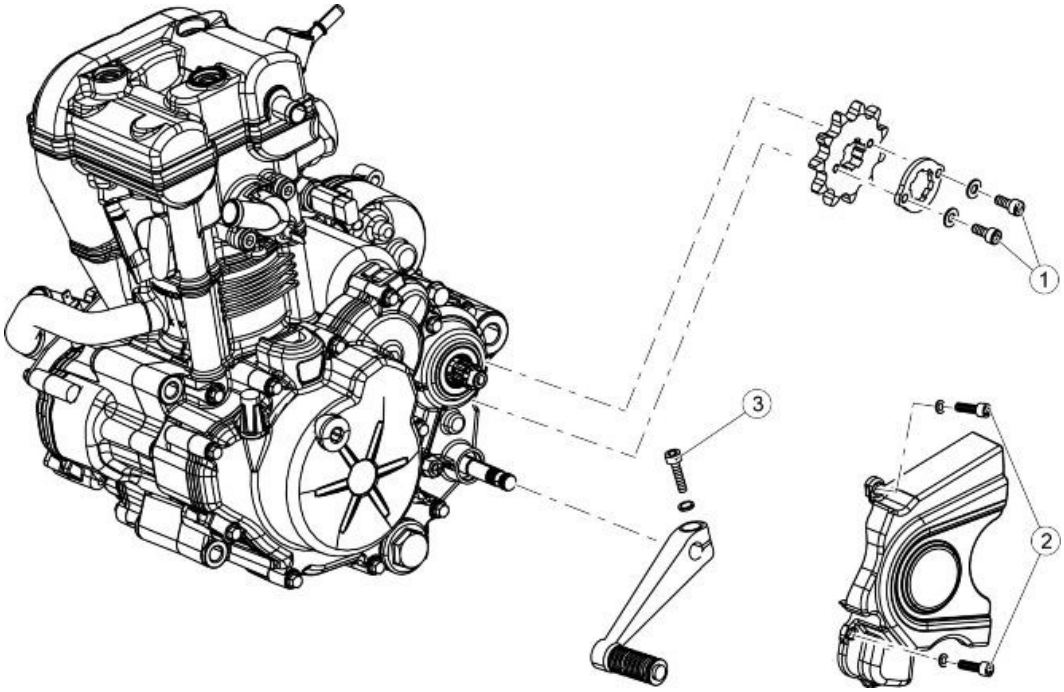
Maximum pin eccentricity: 0.3 mm (0.01 in)



Installing

- To install the swingarm follow the operations described for removal in reverse order, being careful to tighten the ring nuts, nuts and screws to the prescribed torque.

Pinion



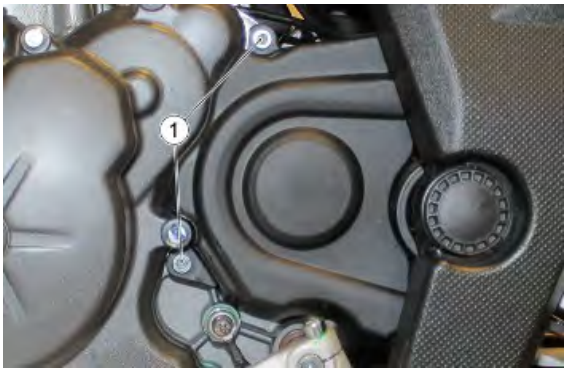
LINKAGE

pos.	Description	Type	Quantity	Torque	Note
1	Pinion fastening screws	M5	2	4-5 Nm (2.95-3.69 lb ft)	Loctite 270
2	Pinion cover fastening screws	M5	2	2.5-3.5 Nm (1.84-2.58 lb ft)	-
3	Gearbox lever fixing screws	M6	1	9-11 Nm (6.64-8.11 lb ft)	-

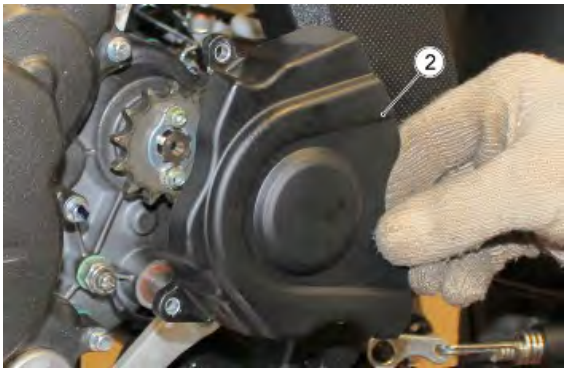
Removing

REMOVING THE PINION GUARD

- Unscrew and remove the two screws (1)



- Remove the pinion guard (2)

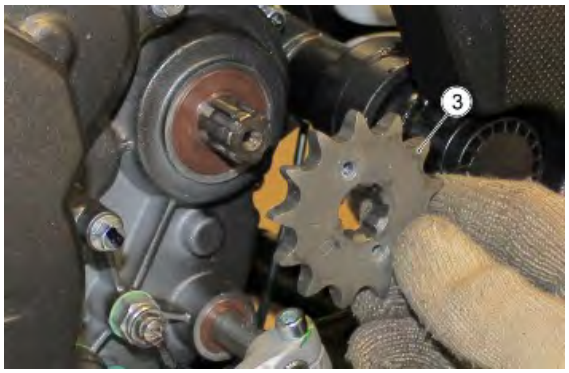


REMOVING THE PINION

- Remove the chain
- Remove the pinion guard
- Unscrew and remove the screws (1)

- Remove the plate (2)

- Remove the pinion (3)



Inspection

- Check the state of the teeth of the front and rear sprockets. If excessively worn, replace: the rear sprocket, front sprocket and drive chain.

CAUTION

TO PREVENT NEW COMPONENTS FROM WEARING PREMATURELY, REPLACE ALL THREE TOGETHER AS A SET.

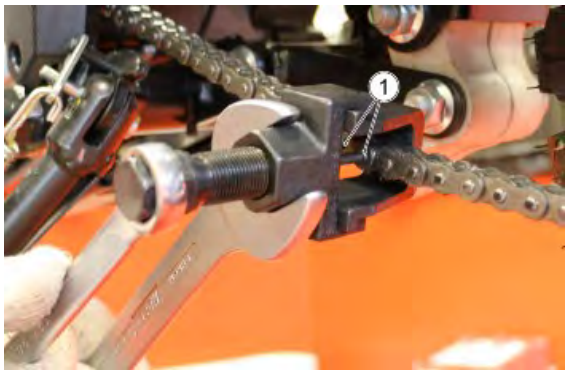
Installing

- To install the front sprocket, follow the procedure for removal described previously in reverse order, tightening the screws to the specified torque.

Drive chain

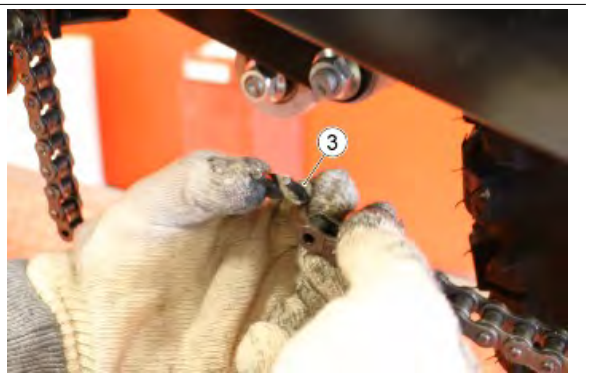
Removing

- Using a commercially available chain tool, partially remove the two pins (1) of a link.



- Remove the outer plate (2).

- Remove the inner plate (3) and the pins.
- Remove the drive chain.



inspection

Also check the following parts and check that the chain, the front sprocket and the rear sprocket do not have:

- Damaged rollers.
- Loosened pins.
- Dry, corroded, crushed or seized links.
- Excessive wear.
- Excessively worn or damaged front or rear sprocket teeth.

CAUTION

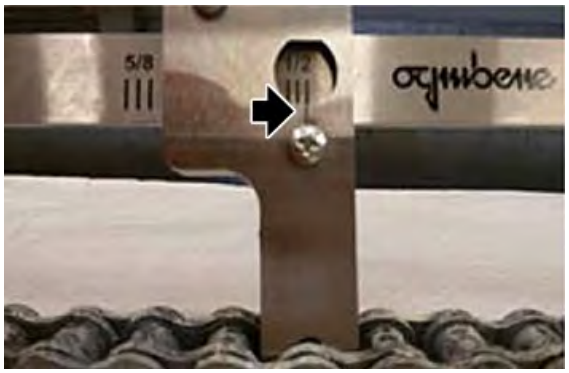
IF ANY DAMAGED CHAIN ROLLERS AND/OR LOOSENED PINS ARE FOUND, THE ENTIRE CHAIN SET (FRONT SPROCKET, REAR SPROCKET AND CHAIN) MUST BE REPLACED.
LUBRICATE THE CHAIN EVERY 500 km (310.69 mi), ESPECIALLY IF ANY DRY OR RUSTY PARTS ARE NOTED.
CRUSHED OR SEIZED LINKS MUST BE LUBRICATED AND RESTORED TO PROPER WORKING ORDER.

The vehicle has a chain with a 1/2" pitch closed using a link.
With wear, the chain lengthens. Replace the chain if there is lengthening equal to or more than 2%.
To check the chain wear, use the **Ognibene 529510001** ruler and follow the instructions below:

- Tension the chain
- Place the Ognibene 529510001 ruler on the chain rollers, in a section formed by eight chain steps
- Check that the measurement notches between the mobile part and the fixed part of the instrument match (1/2 step)

New chain:

- the notch of the mobile measuring instrument coincides with the first notch on the right of the fixed part of the instrument



Chain to be replaced:

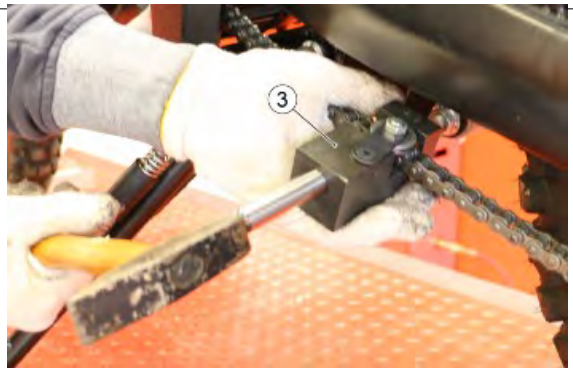
- the notch of the mobile measuring instrument coincides with the central notch of the fixed part of the instrument

Installing

- After fitting the chain on the pinion and on the crown, connect the two ends of the chain by placing the inner plate (1) complete with pins on the chain.

- Put the outer plate (2) into position.

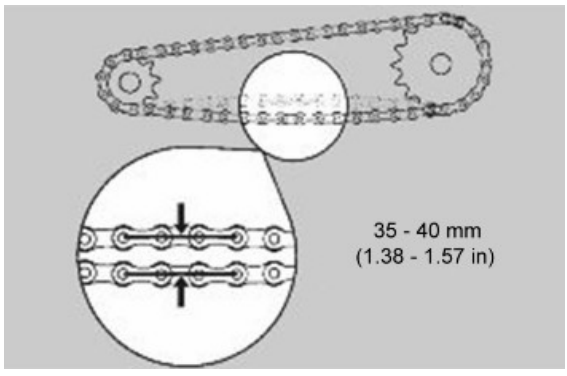
- Using a general purpose riveter (3), rivet the chain pins in several points.



Adjusting

To check the clearance:

- Shut off the engine.
- Rest the vehicle on the side stand.
- Select neutral.
- Check that the vertical oscillation at a point between the pinion and the sprocket on the lower branch of the chain is 35 - 40 mm (1.38 -1.57 in).



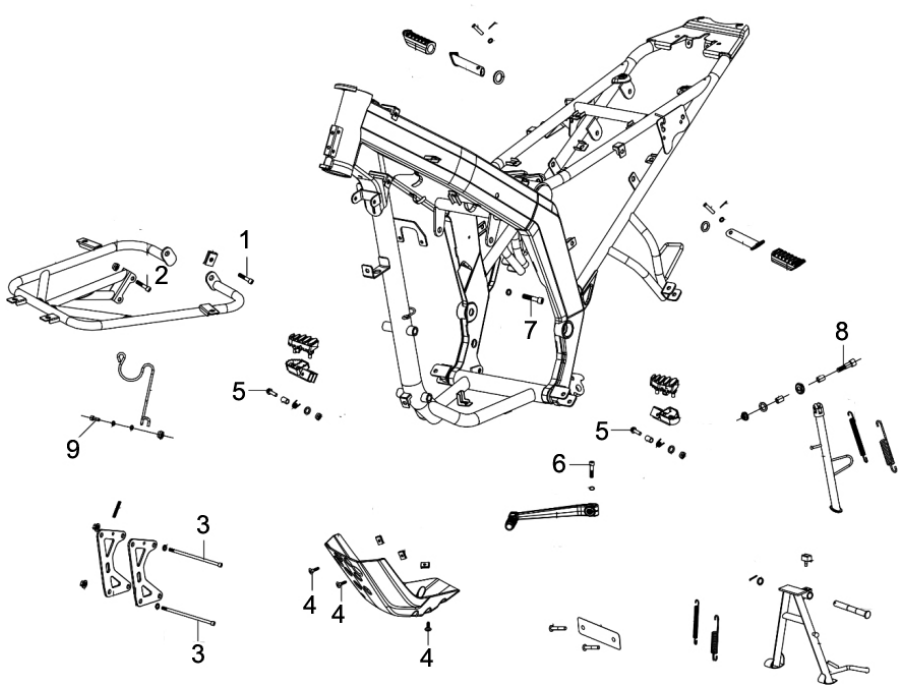
- Move the vehicle forwards to check the vertical deflection of the chain in other positions; the chain deflection must be constant throughout the entire rotation of the wheel.

CAUTION

IF THE DEFLECTION MEASURED IS LARGER IN CERTAIN POSITIONS, THIS IS INDICATIVE OF CRUSHED OR SEIZED CHAIN LINKS, AND THE CHAIN MUST BE RE-PLACED.
TO PREVENT THE RISK OF SEIZURE, LUBRICATE THE CHAIN REGULARLY - AT LEAST EVERY 500 km (310.69 mi)
SEE SCHEDULED MAINTENANCE TABLE

If the deflection is uniform but greater or less than 35 -40 mm (1.38 -1.57 in), adjust the chain tension.

Pedaline



FRAME

pos.	Description	Type	Quantity	Torque	Notes
1	Headlight bracket bolt	M6×16	2	5/7 Nm (3.69/5.16 lb ft)	-
2	Headlight bracket bolt	M6×30	2	8/10 Nm (5.90/7.38 lb ft)	-
3	Engine bracket bolt	M10×100	4	37/39 Nm (27.29/28.76 lb ft)	-
4	Engine shroud bolt	M5×16	3	2/3 Nm (1.48/2.21 lb ft)	-
5	Front Pedal bolt	M8×40	2	17/19 Nm (12.54/14.01 lb ft)	-
6	Front fender bolt	M6×25	1	8/10 Nm (5.90/7.38 lb ft)	-
7	Engine bracket bolt	M10×25	2	37/39 Nm (27.29/28.76 lb ft)	-
8	Side bracket bolt	M8	1	17/19 Nm (12.54/14.01 lb ft)	-

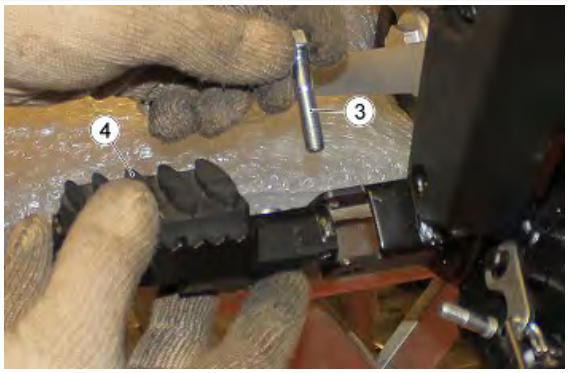
Rimozione

REMOVING THE RIDER FOOTRESTS

The following procedure is only shown from the left-hand side of the vehicle, but is valid for both footrests

- Unscrew the nut (1) and remove it.
- Retrieve the washer (2)

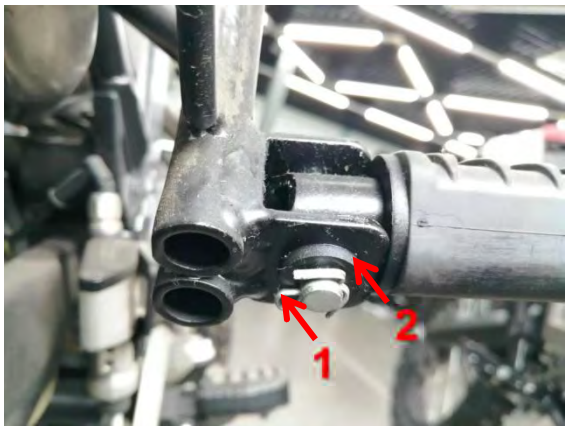
- Remove the pin (3)
- Remove the left-hand rider footrest (4)
- Repeat the entire procedure to remove the right-hand rider footrest



REMOVING THE PASSENGER FOOTRESTS

The following procedure is only shown from the left-hand side of the vehicle, but is valid for both footrests

- Remove the cotter pin(1)
- Remove the washer (2)

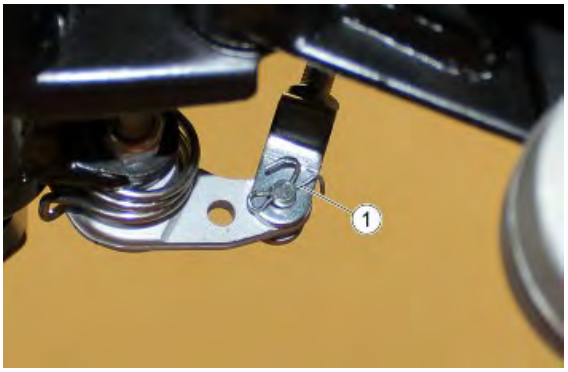


- Remove the pin (3)

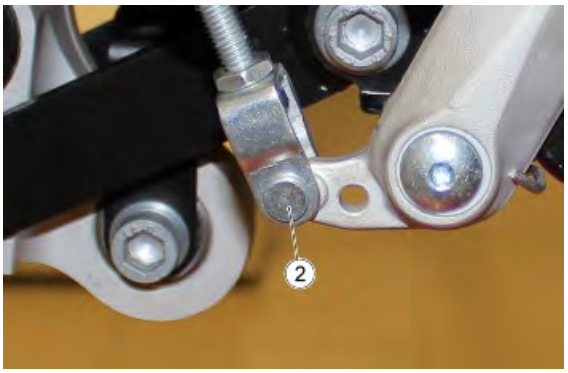
- Remove the left-hand passenger foot-rest (4)
- Repeat the entire procedure to remove the right-hand passenger footrest

REMOVING THE REAR BRAKE LEVER

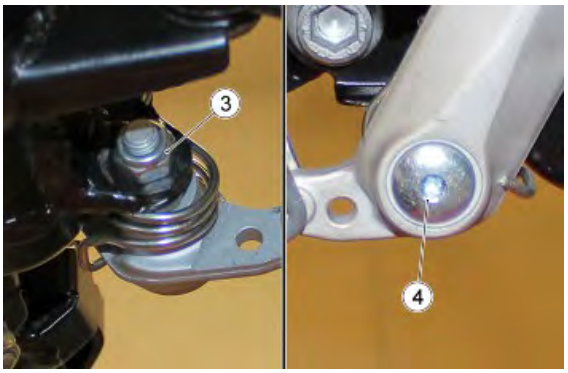
- Remove the clip (1)



- Remove the pin (2)



- Block the nut (3) so that it cannot rotate and remove the screw (4).



- Remove the rear brake lever (5)

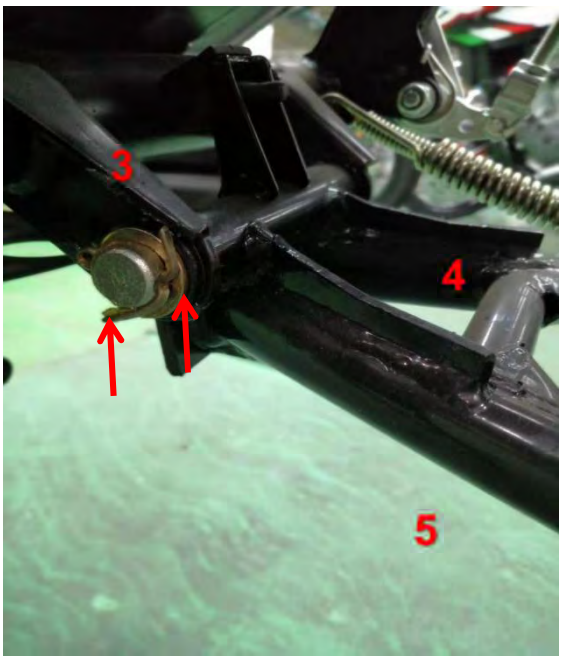
REMOVING THE GEAR SHIFT LEVER

- Unscrew and remove the gear lever (1)

- Remove the gear lever (2)

Main stand

- Remove the cotter pin (1)
- Remove the washer (2)
- Remove the pin (3)
- Remove the springs (4)
- Remove the main stand (5)

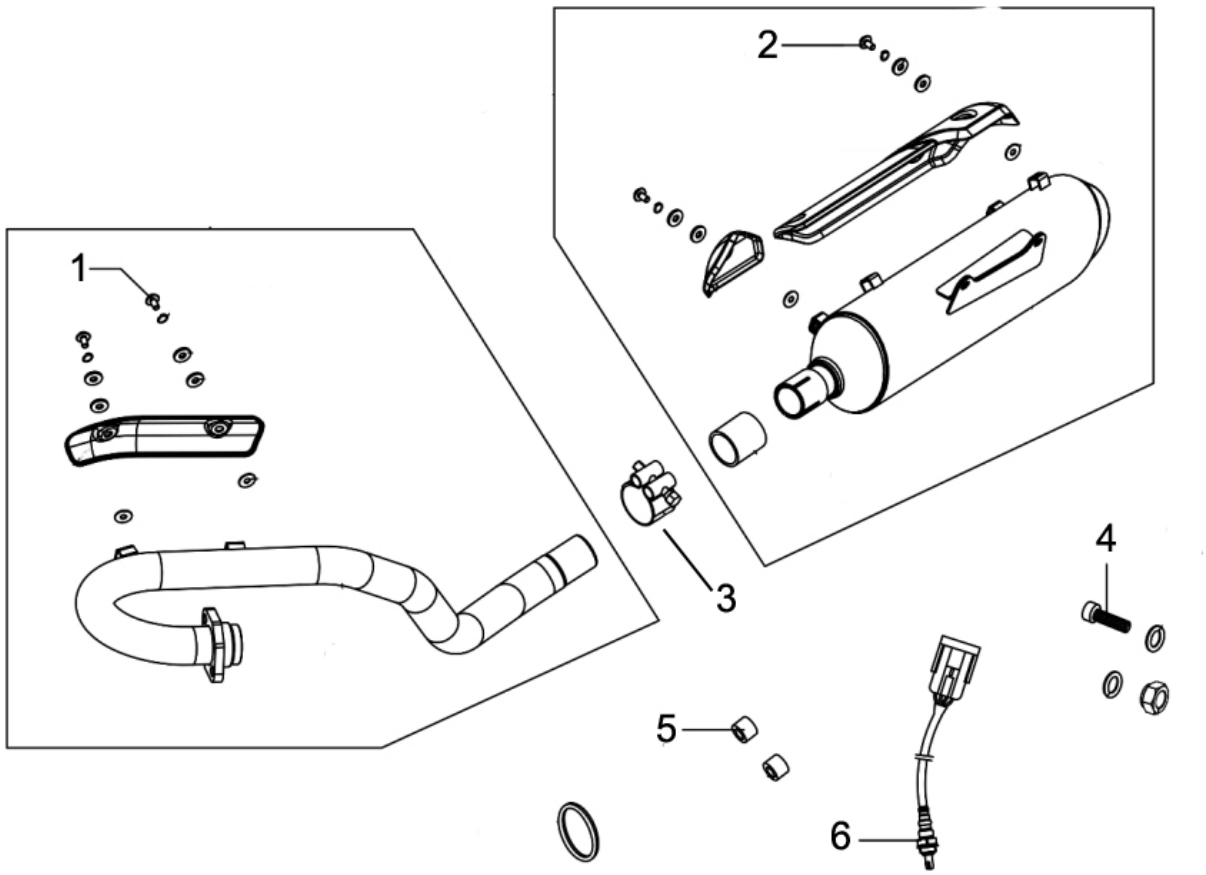


Side stand

- Remove the the nut (1).
- Remove the the turn-off switch (2)

- Remove the bolt (3)
- Remove the side stand (4)
- Remove the springs (5)

Exhaust

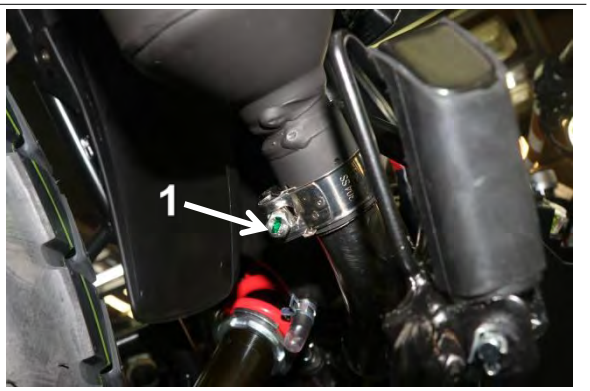


EXHAUST SYSTEM

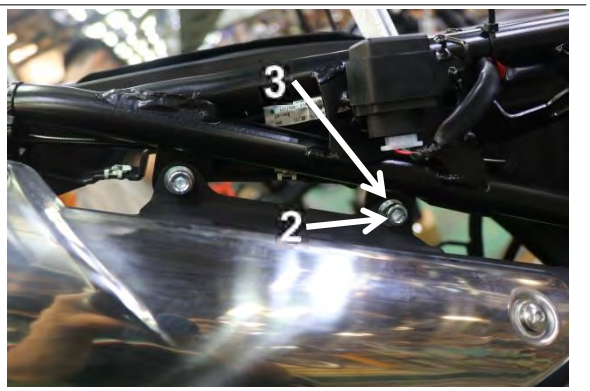
pos.	Description	Type	Quantity	Torque	Notes
1	Muffer bent pipe cover bolt	M5	2	5/6 Nm (3.69-4.43 lb ft)	-
2	Muffer cover bolt	M5	4	5/6 Nm (3.69-4.43 lb ft)	-
3	Muffler fixing clamp	M6	1	8/10 Nm (5.90-7.38 lb ft)	-
4	Muffer bolt	M8×20	2	18/22 Nm (13.28-16.23 lb ft)	-
5	Muffer bent pipe bolt	M8	2	18/22 Nm (13.28-16.23 lb ft)	-
6	Oxygen Sensor bolt	M12	1	17/20 Nm (12.54-14.75 lb ft)	-

Removing the tail pipe

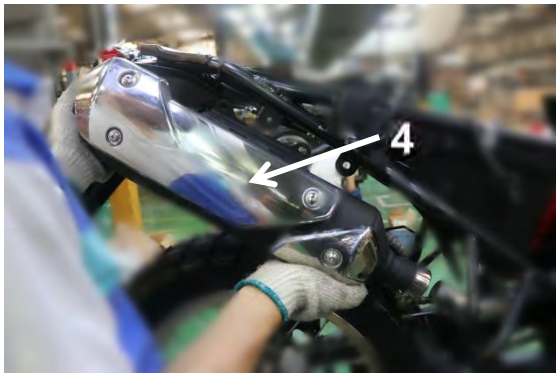
- Loosen the clamp (1)



- Unscrew the screws (2) blocking, at the rear, the nuts at the points indicated in the figure
- Retrieve the washers (3)



- Remove the muffler (4)



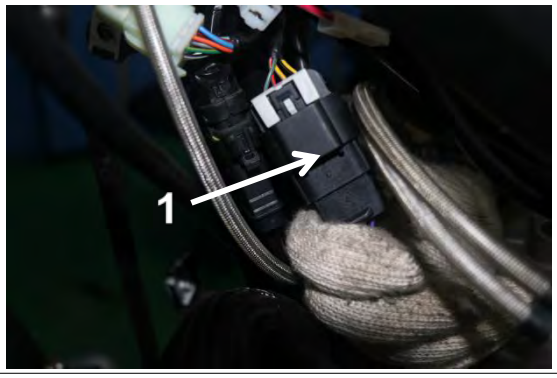
Removing the exhaust manifold

- Remove the muffler
- Remove the lambda probe
- Unscrew and remove the screws(1)

- Remove the exhaust manifold (2)

Removing the lambda sensor

- Remove the horn
- Disconnect the connector (1)



- Undo and remove the probe (2)

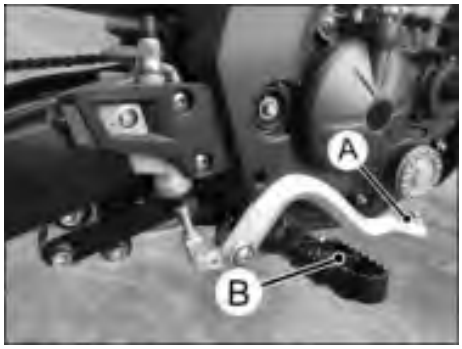
INDEX OF TOPICS

Brake Pedal

Brake Pedal Position Inspection

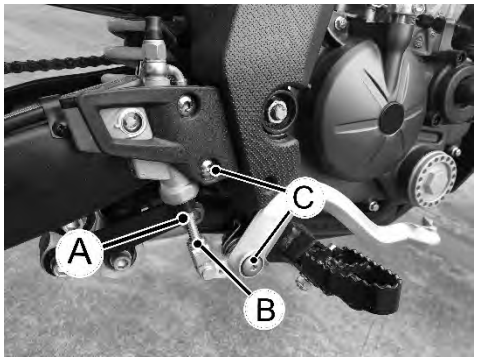
Check that the brake pedal [A] is in the correct position.

Footpeg [B]



Brake Pedal Position Adjustment

- Loosen the locknut [A] and turn the push rod with the hex head [B] to achieve the correct pedal position
- Tighten: Torque - Rear Master Cylinder Push Rod Locknut: 17 N·m (1.7 kgf·m, 13 ft·lb)
- Check the brake light switch operation (see Brake Light Switch Operation Inspection in the Periodic Maintenance chapter).



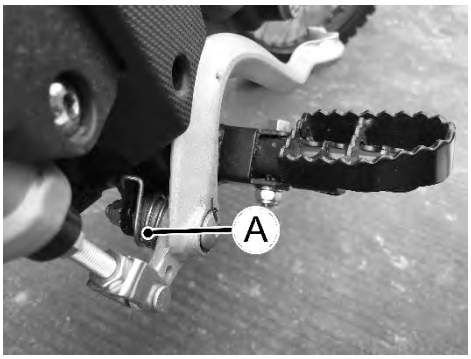
NOTE

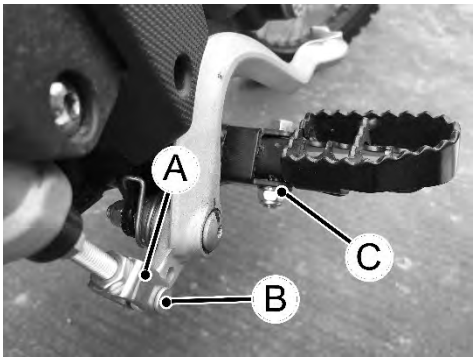
FIRST HAND-TIGHTEN TIGHTEN ALL THE SCREWS, THEN TIGHTEN TO THE DEFINITIVE TORQUE IN A CROSSED PATTERN IN THE SEQUENCE A-D-B-E-C-F USUALLY IT IS NOT NECESSARY TO ADJUST THE PEDAL POSTION. BUT ALWAYS ADIUST IT WHEN THE PUSH ROD LOCKNUT HAS BEEN LOOSENED.

Brake Pedal Removal

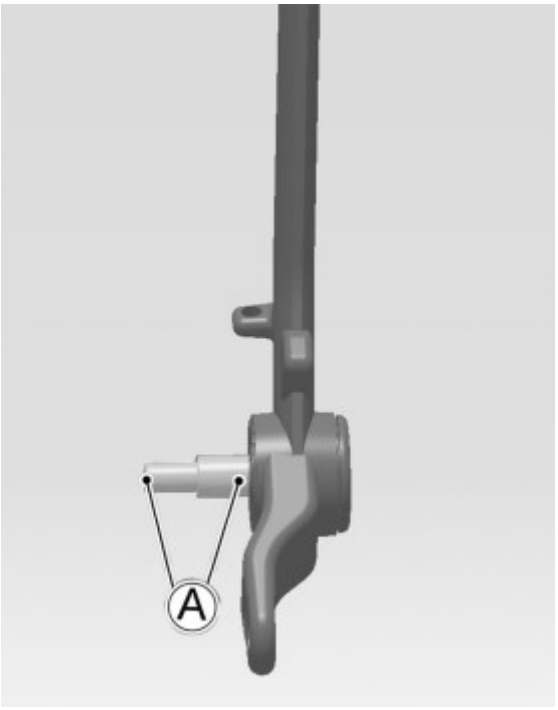
- Remove:
  Brake Pedal Return Spring [A]

- Remove:
  Cotter Pins [A]
  Joint Pin [B]
  Washers [C]
  Brake Pedal





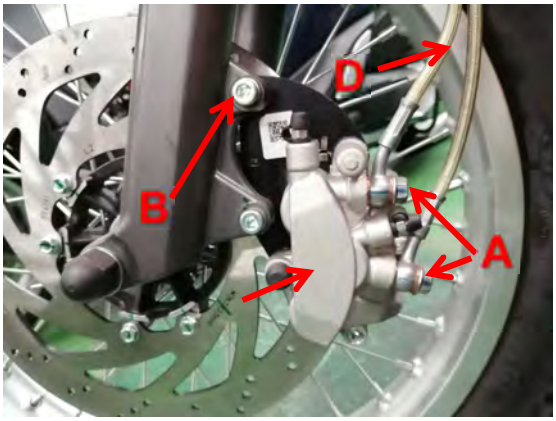
Brake Pedal Installation



- Replace O-rings [A] with new ones, and apply grease to the O-rings.
- Apply grease to the shaft portion of the brake pedal.
- Install the brake pedal onto the frame with the return spring and brake light switch spring.
- Face the return spring ends forward.
- Replace the cotter pins of the brake pedal pivot and rear master cylinder joint pin with new ones.
- Insert washer and cotter pin into the shaft portion of the brake pedal, and bend cotter pin end.
- Insert a cotter pin into the joint pin, and bend its ends.
- Adjust the brake pedal position (see Brake Pedal Position Adjustment).
- Check the brake light switch operation (see Brake Light Switch Operation Inspection in the Periodic Maintenance chapter).

Calipers

Front Caliper Removal

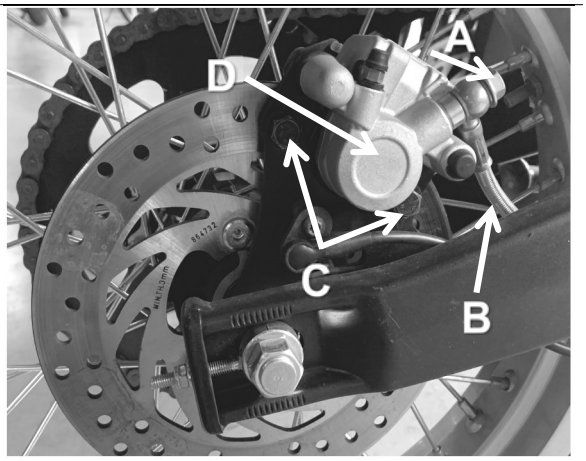


- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper (see Brake Hose Replacement in the Periodic Maintenance chapter)

CAUTION
IMMEDIATELY WASH AWAY ANY BEAKE FLUID SPILLS.

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 (see Caliper Rubber Parts Replacement in the Periodic Maintenance chapter)

Rear Caliper Removal



- Remove:

  Brake Hose Banjo Bolt [A]

  Brake Hose [B]

  Rear Caliper Mounting Bolts [C]

  Rear Caliper [D]

CAUTION
IMMEDIATELY WASH AWAY ANY BEAKE FLUID SPILLS.

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 (see Caliper Rubber Parts Replacement in the Periodic Maintenance chapter)

Caliper Installation

- Install the caliper and brake hose lower end.
- Replace the washers on each side of hose fitting with new ones.
- Tighten:

  Torque - Caliper Mounting Bolts

  Front: 34 N·m (3.5 kgf·m, 25 ft·lb)

  Rear: 25 N·m (2.5 kgf·m, 18 ft·lb)

  Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

WARNING
IMMEDIATELY WASH AWAY ANY BEAKE FLUID SPILLS.DO NOT ATTEMPT TO DRIVE THE MOTOCYCLE UNTIL A FULL BRAKE LEVER OR PEDAL IS OBTAINED BY PUMPING THE BRAKE LEVER PEDAL UNTIL THE PADS ARE AGAINST THE DISC,. THE BRAKES WILL NOT FUNCTION ON THE FIRST APPLICATION OF THE LEVER OR PRDAL IF THIS IS NOT DONE.

Front Caliper Disassembly

Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Front Caliper Assembly

Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Rear Caliper Disassembly

Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

Rear Caliper Assembly

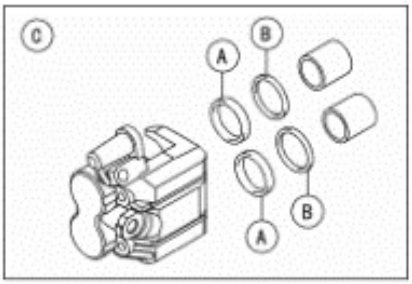
Refer to the Caliper Rubber Parts Replacement in the Periodic Maintenance chapter.

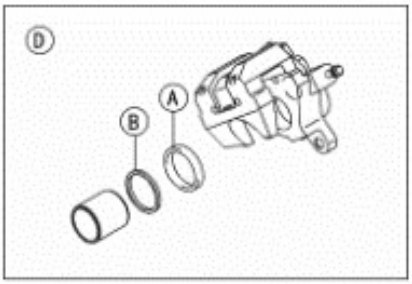
Caliper Fluid Seal Damage

The fluid seal (piston seal) [A] is placed around the piston to maintain clearance between the pad and the disc. If the seal is in a poor condition, it could lead the pad to wear. Excessively or the brake to drag, which may cause the temperature of the discs or the brake fluid to increase.

- Replace the fluid seal if it exhibits any of the conditions listed below.
  - Brake fluid leakage around the pad.
  - Brakes overheat.
  - Considerable difference in inner and outer pad wear.
  - Seal and piston are stuck together.
- If the fluid seal is replaced, replace the dust seal [B] as well. Also, replace all seals every other time the pads are changed.

  Front Caliper [C]
  Rear Caliper [D]





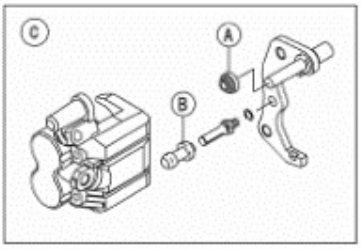
Caliper Dust Boot and Friction Boot Damage

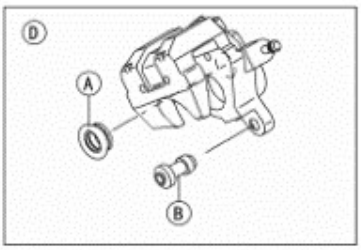
Check that the dust boot [A] and friction boot [B] are not cracked, worn, swollen, or otherwise damaged.

If they show any damage, replace it.

Front Caliper [C]

Rear Caliper [D]





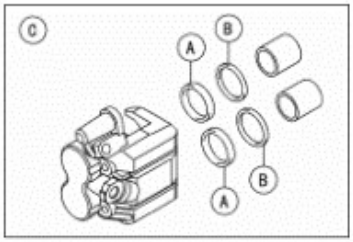
Caliper Piston and Cylinder Damage

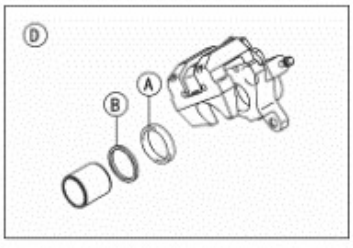
Visually inspect the pistons [A] and cylinder surfaces.

Replace the caliper if the cylinder and piston are badly scores or rusty.

Front Caliper [B]

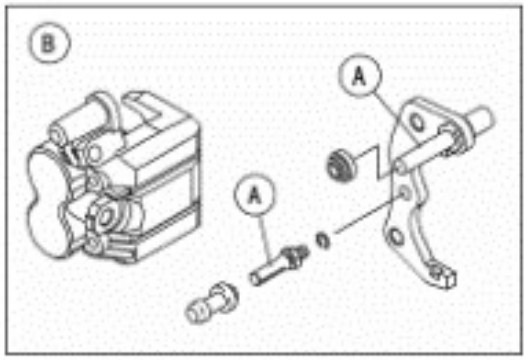
Rear Caliper [C]

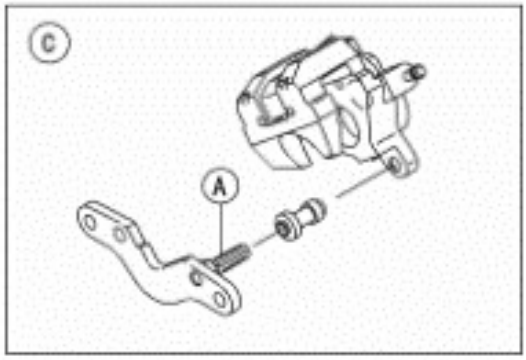




Caliper Holder Shaft Wear

The caliper body must slide smoothly on the caliper holder shafts [A]. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.





- Check to see that the caliper holder shafts are not badly worn or stepped, and that the rubber friction boots are not damaged.
- If the rubber friction boot is damaged, replace the rubber friction boot. To replace the friction boot, remove the pads and the caliper bracket.
- If the caliper holder shaft is damage, replace the caliper bracket or holder shaft (front caliper).

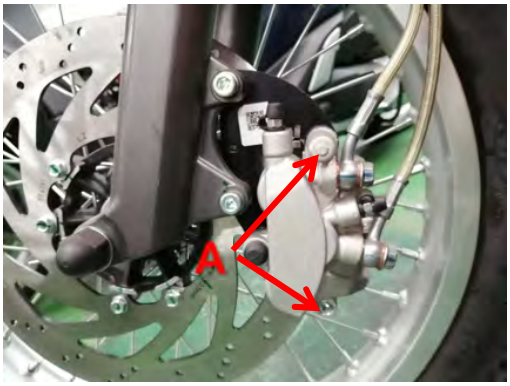
  Torque - Front Caliper Holder Shaft: 17 N·m (1.7 kgf·m, 13 Ft·lb)

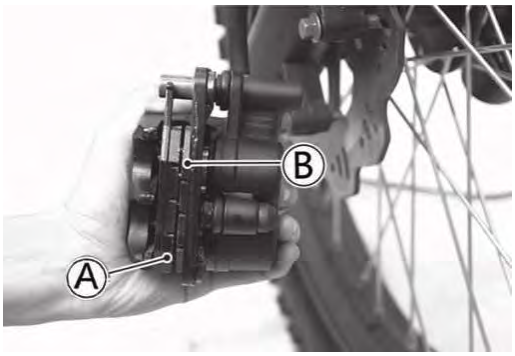
  Front Caliper [B] Rear Caliper [C]

Brake Pads

Front Brake Pad Removal

- Loosen the brake pad pins [A].
- Remove the front caliper with the brake hose installed (see Front Caliper Removal).
- Remove the pad pins.
- Remove the pad [A] of the jaw side.
- Remove the pad [B] of the piston side





Front Brake Pad Installation

- Push the caliper pistons in by hand as far as they will go.
- Install the anti-rattle spring in its correct position.
- Install the pad on the piston side first, then install the other pad.
- Tighten the brake pad pins temporary.
- Install the front brake caliper (see Caliper Installation).
- Tighten:

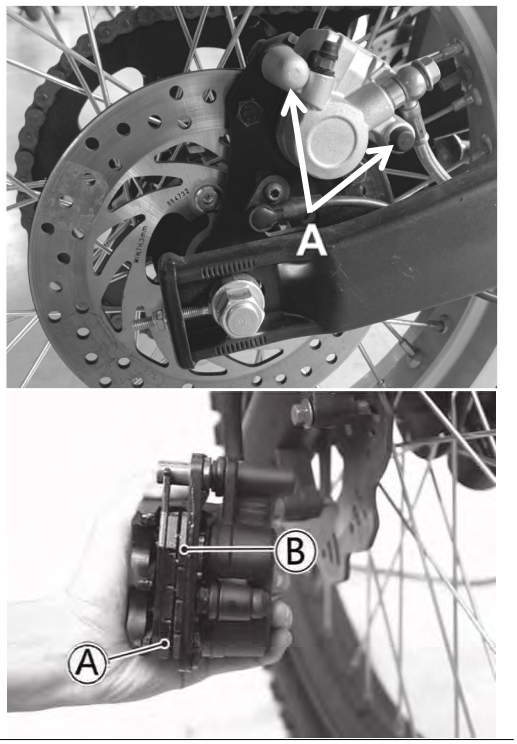
Torque - Front Caliper Brake Pad Pins: 17 N· m (1.7 kgf · m, 13 ft· lb)

WARNING

DO NOT ATTEMPT TO DRIVE THE MOTOCYCLE UNTIL A FULL BRAKE LEVER IS OBTAINED BY PUMPING THE BRAKE LEVER UNTIL THE PADS ARE AGAINST THE DISC. THE BRAKE WILL NOT FUNCTION ON THE FIRST APPLICATION OF THE LEVER IF THIS IS NOT DONE.

Rear Brake Pad Removal

- Loosen the brake pad pins [A]
- Remove the rear caliper with the brake hose installed (see rear Caliper Removal).
- Remove: Pad Pin Jaw Side Pad [A] Piston Side Pad [B]



Rear Brake Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Install the anti-rattle spring in its correct position.
- Install the pad on the piston side first, then install the other pad.
- Tighten the brake pad pins temporary.
- Install the rear brake caliper (see Caliper Installation).
- Tighten:

Torque - Rear Caliper Brake Pad Pins: 17 N· m (1.7 kgf · m, 13 ft· lb)

WARNING

DO NOT ATTEMPT TO DRIVE THE MOTOCYCLE UNTIL A FULL BRAKE LEVER IS OBTAINED BY PUMPING THE BRAKE LEVER UNTIL THE PADS ARE AGAINST THE DISC. THE BRAKE WILL NOT FUNCTION ON THE FIRST APPLICATION OF THE LEVER IF THIS IS NOT DONE.

Brake Pad Wear Inspection

Refer to the Brake Pad Wear Inspection in the Periodic Maintenance chapter.

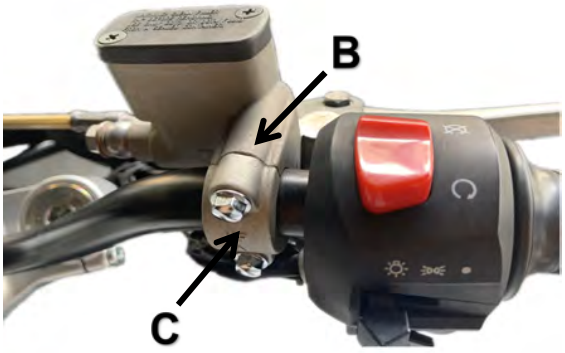
Master Cylinder

Front Master Cylinder Removal

- Disconnect the brake hose from the master cylinder (see brake Hose Replacement in the Periodic Maintenance chapter).
- Disconnect the front brake light switch connectors [A].
- Unscrew the clamp bolts [A], and take off the master cylinder as an assembly with the reservoir, brake lever andbrake light switch installed.

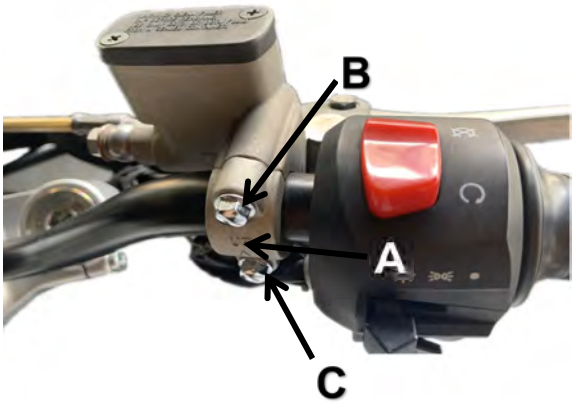
CAUTION
IMMEDIATELY WASH AWAY ANY BRAKE FLUID THAT SPILLS.

Front Master Cylinder Installation



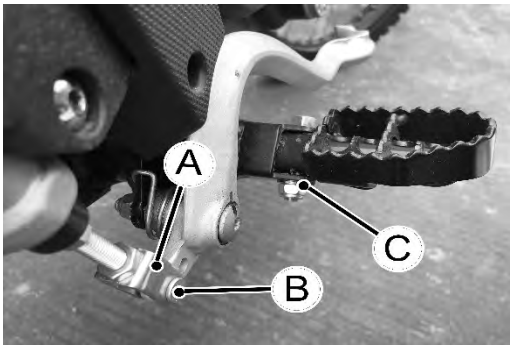
- Install the front master cylinder so that the punch mark [A] of the handlebar is aligned with the mating surface [B] of the master cylinder clamp to level the reservoir.
- The master cylinder clamp must be installed with the arrow mark [A] upward.
- Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C].
- There will be a gap at the lower part of the clamp after tightening.

  Torque - Front Master Cylinder Clamp Bolts: 8.8 N8m (0.90Kgfg·m, 78 in·lb)



- Replace the washers on each side of the hose fitting with new ones.
- Tighten: **Torque - Brake Hose Banjo Bolt: 25 N5m (2.5 kgf·m, 18 ft·lb)**
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage

Rear Master Cylinder Removal



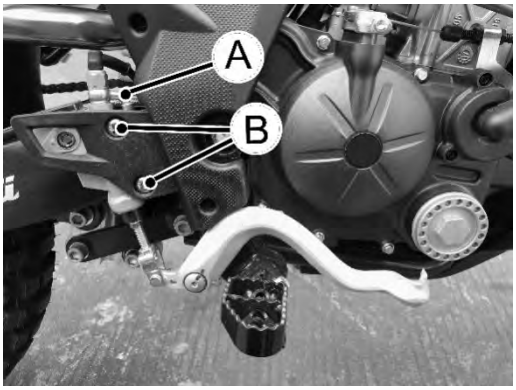
- Remove:

  Cotter Pin [A]

  Joint Pin [B]

  Washer [C]
- Unscrew the brake hose banjo bolt [A] on the master cylinder (see Brake Hose Replacement in the Periodic Maintenance chapter).
- Remove:

  Rear Master Cylinder Mounting Bolts [B]
- Slide the reservoir hose lower end clamp [A].
- Pull off the reservoir hose lower end, and drain the brake fluid into a container.

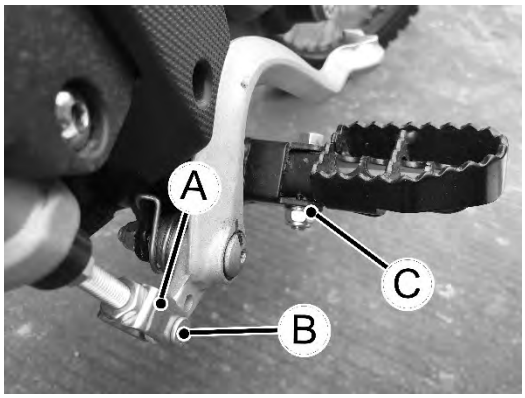


Rear Master Cylinder Installation

- Replace the washers on each side of hose fitting with new ones.
- Tighten:

  Torque - Rear Master Cylinder Mounting Bolts: 10 N·m (1.0 Kgf·m, 89 in·lb)

  Brake Hose Banjo Bolts: 25 N·m (2.5 kgf· m , 18 Ft·lb)
- Replace the cotter pin [A] with a new one.
- Install the joint pin [B] and washer [C].
- Insert the cotter pin and bend the pin ends.
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.



Front Master Cylinder Disassembly

Refer to the Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter.

Rear Master Cylinder Disassembly

Refer to the Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter.

Master Cylinder Assembly

Refer to the Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter.

Master Cylinder Inspection

- Remove the master cylinders (see Front/Rear Master Cylinder Removal).
- Disassemble the front and rear master cylinders.
- Check that there are no scratches, rust or pitting on the inner wall [A] of each master cylinder and on the outside of each piston [B].

  If a master cylinder or piston shows any damage, replace them.
- Inspect the primary cup [C] and secondary cup [D].

  If a cup is worn, damaged softened (rotted) or swollen, the piston assembly should be replaced to renew the cups.

  If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cups.
- Check the dust covers [E] for damage.

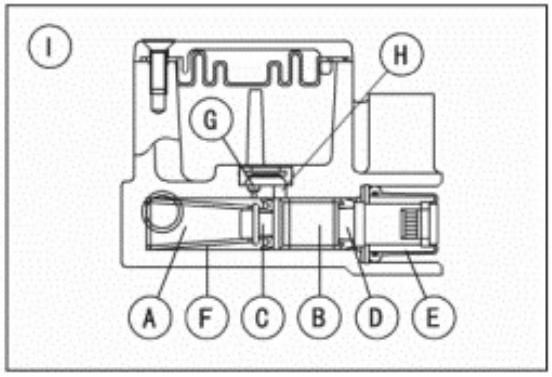
  If they are damaged, replace them.
- Check the piston return springs [F] for any damage.

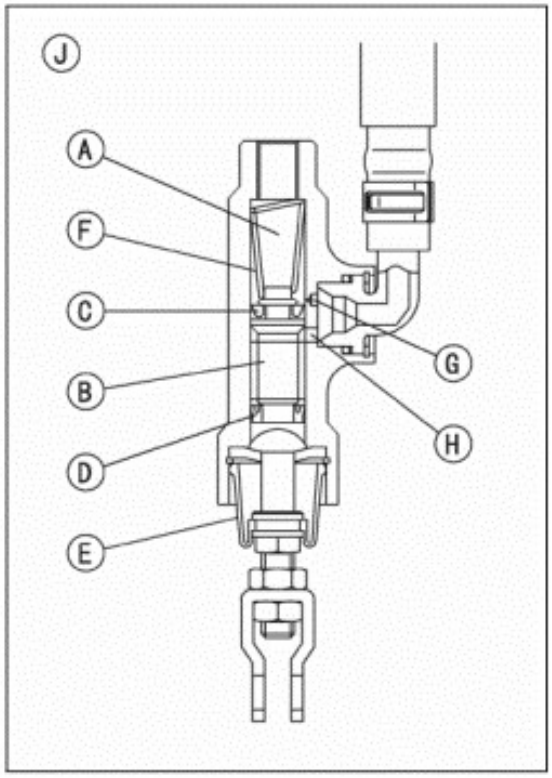
  If the springs are damaged, replace them.
- Check that relief port [G] and supply port [H] are not plugged.

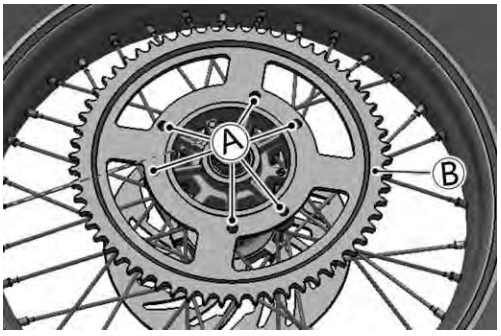
  If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

  Front Master Cylinder [I]

  Rear Master Cylinder [J]







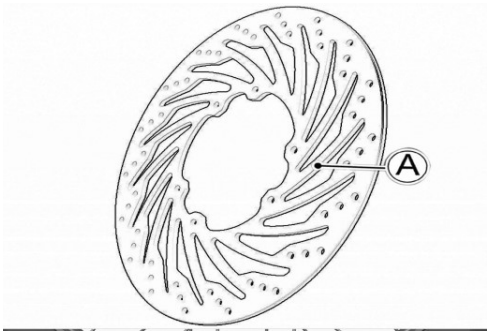
Brake Disc Removal

- Remove the wheel(see Front/Rear Wheel Removal in the Wheels/Tires chapter).
- Unscrew the mounting bolts [A], and take off the brake disc [B].

Brake Disc Installation

- Install the brake disc on the wheel so that the marked side [A] faces out.
- Tighten:

Torque - Brake Disc Mounting Bolts:
25~30N.m(2.55~3.6kgf·m 1 8 . 4 ~ 22.1 Ft·lb)

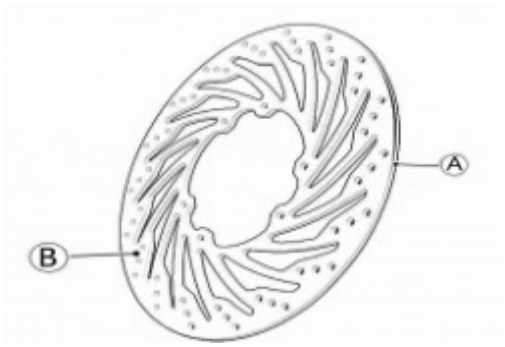


Brake Disc Wear

- Measure the thickness of each disc [A] at the point where it has worn the most.

If the disc has worn past the service limit, replace it. Measuring Area [B]

Brake Discs Thickness
Standard:
Front: 3.4~ 3.7 mm (0.13 ~0.15 in.)
Rear 3.4~ 3.7 mm (0.13 ~0.15 in.)
Service Limit:
Front 3.0 mm (0.12 in.)
Rear 3.0 mm (0.12 in.)



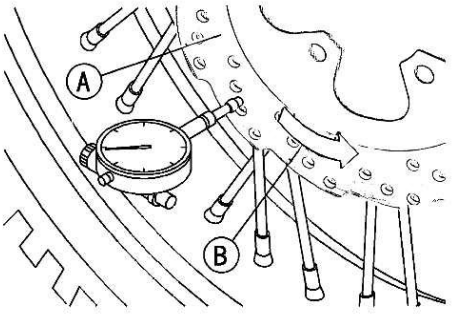
Brake Disc Warp

- Raise the wheel off the ground with jack (see Front/Rear Wheel Removal in the Wheels/Tires chapter).

Special Tool - Jack: 57001-1238

For front disc inspection, turn the handlebar fully to one side.

- Set up a dial gauge against the disc [A] as shown and measure disc runout, while turning [B] the wheel by hand.



If runout exceeds the service limit, replace the disc.

Disc Runout

Standard: TIR 0.15 mm (0.0059 in.) or less

Service Limit: TIR 0.3 mm (0.01 in.)

Brake Fluid

Brake Fluid Level Inspection

Refer to the Brake Fluid Level Inspection in the Periodic Maintenance chapter.

Brake Fluid Change

Refer to the Brake Fluid Change in the Periodic Maintenance chapter.

Brake Line Bleeding

The brake fluid has a very low compression coefficient so that almost all the movement of the brake lever or pedal is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake lever or pedal movement will be partially used in compressing the air. This will make the lever or pedal feel spongy, and there will be a loss in braking power.

BE SURE TO BLEED THE AIR FROM THE BRAKE LINE WHENEVER BRAKE LEVER OR PEDAL ACTION FEELS SOFT OR SPONGY AFTER THE BRAKE FLUID IS CHANGE, OR WHENEVER A BRAKE LINE FITTING HAS BEEN LOOSENED FOR ANY REASON.

NOTE

THE PROCEDURE YO BLEED THE FRONT BRAKE LINE IS AS FOLLOWS. BLEEDING THE REAR BRAKE LINE IS THE SAME AS FOR THE FRONT BRAKE.

- Remove the reservoir cap [A] and diaphragm.
- Fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
- Slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.

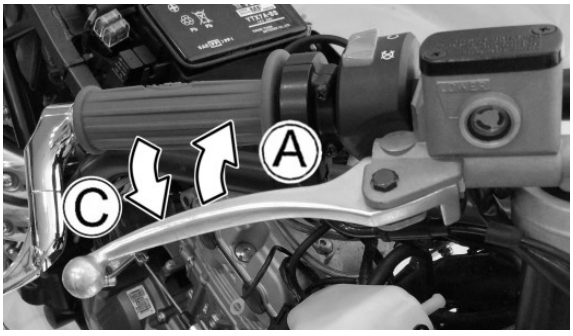
Bleed the air completely from the master cylinder by this operation.

- Remove the rubber cap from the bleed valve [A] on the caliper.
- Attach a clear plastic hose to the bleed valve[B], and run the other end of the hose into a container.

- Bleed the brake line and the caliper.

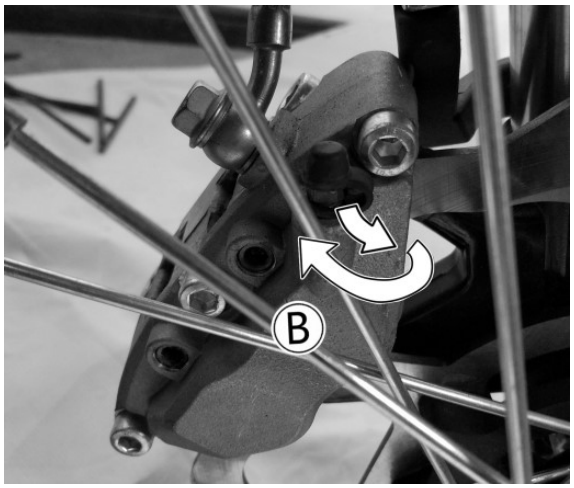
Repeat this operation until no more air can be seen coming out into the plastic hose.

1. Pump the brake lever until it becomes hard, and apply the brake and hold it [A].
2. Quickly open and close [B] the bleed valve while holding the brake applied.
3. Release the brake [C].



NOTE

THE FLUID LEVEL MUST BE CHECKED OFTEN DURING THE BLEEDING OPERATION AND REPLENISHED WITH FRESH BRAKE FLUID AS NECESSARY. IF THE FLUID IN THE RESERVOIR RUNS COMPLETELY OUT ANY TIME DURING BLEEDING, THE BLEEDING OPERATION MUST BE DONE OVER AGAIN FROM THE BEGINNING SINCE AIR WILL HAVE ENTERED THE LINE. TAP THE BRAKE HOSE LIGHTLY FROM THE CALIPER TO THE RESERVOIR FOR MORE COMPLETE BLEEDING.



- Remove the clear plastic hose.
- Install the diaphragm and reservoir cap.
- Tighten:

Torque - Brake Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)

- Tighten the bleed valve, and install the rubber cap. Torque - Caliper Bleed Valve: 5.4 N·m (0.55 kgf·m, 48 in·lb)
- Check the fluid level (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

WHEN WORKING WITH THE DISC BRAKE, OBSERVE THE PRECAUTIONS LISTED BELOW. 1. Never reuse old brake fluid. 2. Do not use fluid from a container that has been left unsealed or that has been open for a long time. 3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate. 4. Don` t leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid. 5. Don` t change the fluid in the rain or when a strong wind is blowing. 6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning of the brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake. 7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily. 8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately. 9. If any of the brake line fittings or the bleed valve is opened at any time, the air must be bled from the brake line.

Brake Hose

Brake Hose Removal/Installation

Refer to the Brake Hose Replacement in the Periodic Maintenance chapter.

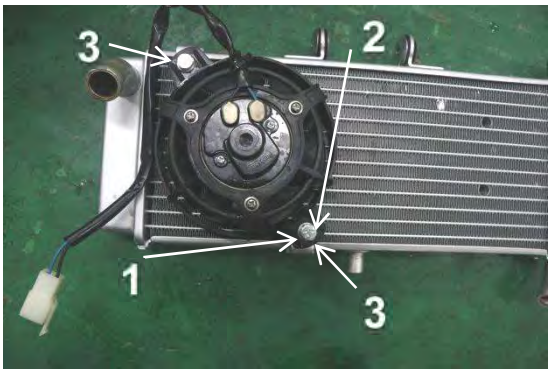
Brake Hose Inspection

Refer to the Brake Hose Damage and Installation Condition Inspection in the Periodic Maintenance chapter.

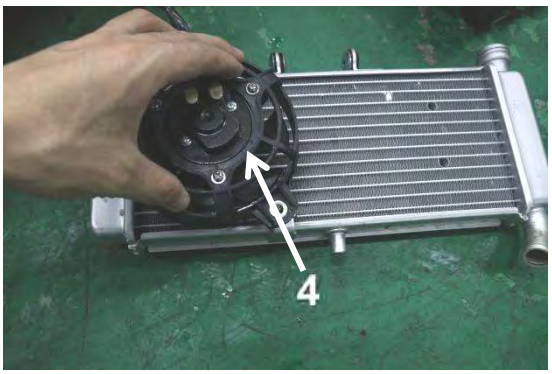
INDEX OF TOPICS

Electric fan

- Remove the radiator
- Unscrew and remove the screws (1)
- Retrieve the grooved washers (2) and washers (3)



- Remove the electric fan (4)



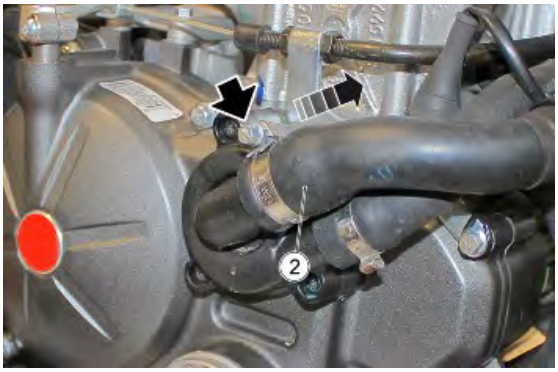
Coolant replacement

- Remove the side fairings
- Unscrew and remove the cap

- Loosen the clamp shown in the figure and disconnect the pipe (2)
- Collect the coolant that flows out in a suitably sized container

CAUTION

DO NOT DISPOSE OF THE FLUID INTO THE ENVIRONMENT.



- Reconnect the pipe (2) and tighten the clamp shown in the figure
- Refill the system with the quantity described in the technical characteristics

CAUTION

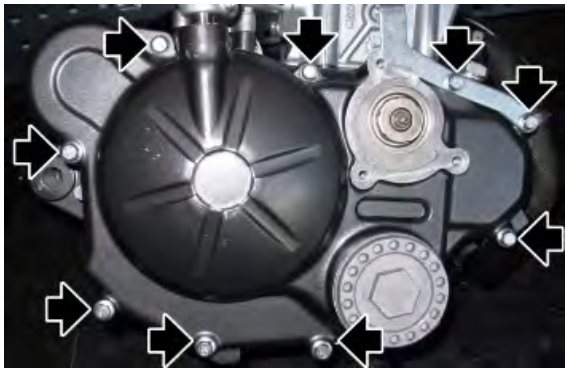
CHECK THAT THE COOLANT LEVEL IS BETWEEN THE REFERENCE MARKS "MIN" AND "MAX"

Water pump

Removal

- Remove the water pump and rotor cover;
- Remove the rotor;

- Remove the clutch cover;



- Heat the clutch cover to facilitate extraction of the water pump spindle assembly;

- Support the clutch cover on a press and with the specific tool "B", remove the water pump shaft group, acting from the external part to the internal one.

Specific tooling

866380 tool description

- Turn the clutch cover and acting from the internal part to the external one with the specific tool "C", take out the seal ring;

Specific tooling

866380 tool description

- Support the group of the water pump shaft on a vice and after it is sufficiently heated up, separate it with a punch from the gear;

Installing

CAUTION

ALWAYS REPLACE THE BEARINGS, THE OIL SEAL, AND THE SEALING RING, WHENEVER IT IS NECESSARY TO REMOVE THE WATER PUMP.

- Place the new bearings on the press and with the specific tool "B" push the shaft until it stops;

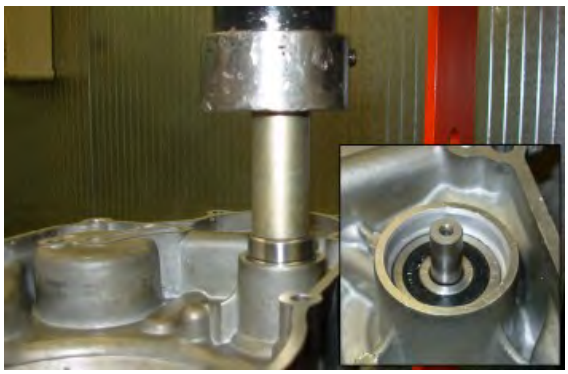
Specific tooling

866380 tool description

- Warm up the clutch cover to facilitate the insertion of the shaft with the bearings;
- Place the specific tools "B" and "A" as in the figure in order to push with the press the shaft and the bearings until it stops;

Specific tooling

866380 tool description



- Place the oil seal as in figure and push it until it stops;

- Place the gear paying attention that the operation is oriented to the cover;
- Use the specific tool "B" as an endstop in order to push the gear, with the press, until it is in line with the shaft.

Specific tooling

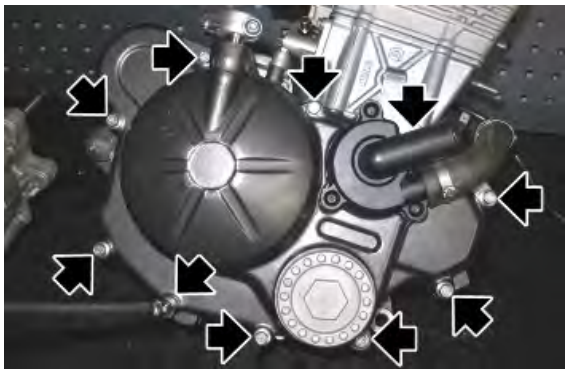
866380 tool description

- Place the sealing ring and push it until it stops with the specific tool "C" by using the press.

Specific tooling

866380 tool description

- Install the clutch cover;
- Install the rotor and the water pump cover.



Removing the radiator

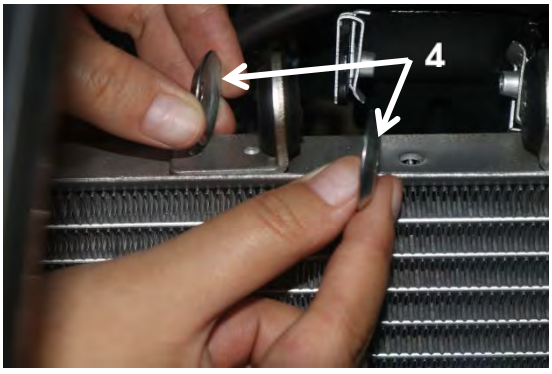
WARNING

THIS OPERATION MUST BE CARRIED OUT WHEN THE ENGINE IS COLD BECAUSE THE BOILING COOLANT OR VAPOURS MAY CAUSE SERIOUS BURNS. COLLECT THE COOLANT IN A SPECIAL CONTAINER. COOLANT IS HARMFUL, AVOID CONTACT WITH THE SKIN AND EYES.

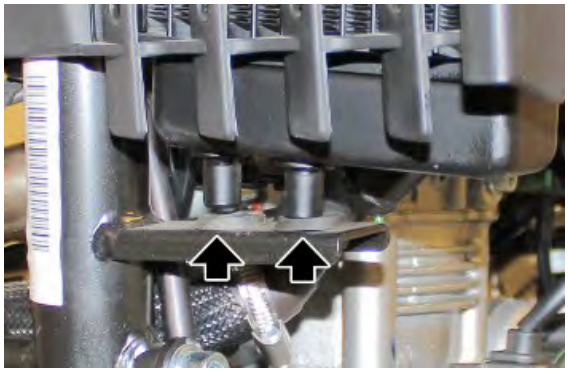
- Remove the side fairings
- Unscrew and remove the cap (1)

- Loosen the clamp shown in the figure (2) and disconnect the pipe (3)

- Retrieve the spacers (4)



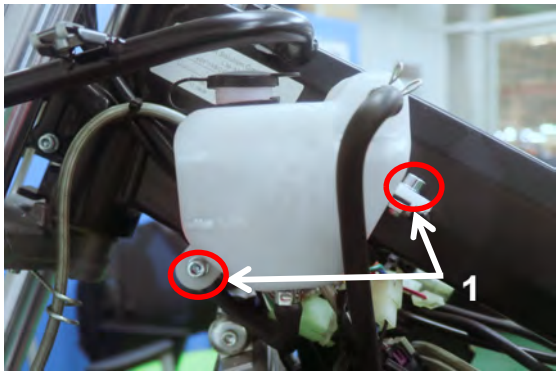
- Extract the radiator from the points shown in the figure



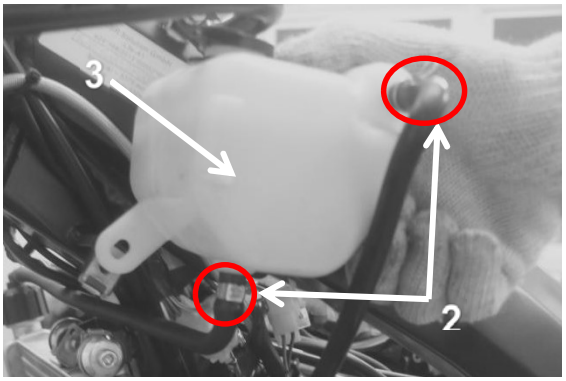
- Remove the radiator (5)

Removing the expansion tank

- Remove the side fairings
- Remove the radiator cover
- Unscrew and remove the screws (1)



- Disconnect the two pipes (2)
- Remove the expansion tank (3)

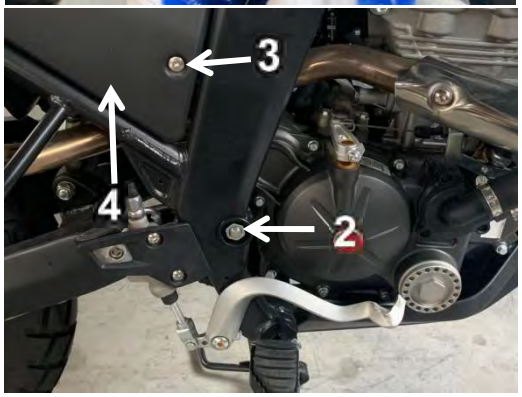


INDEX OF TOPICS

Side fairings

The following procedure is only shown from the RH side of the vehicle but is valid for both side bumpers

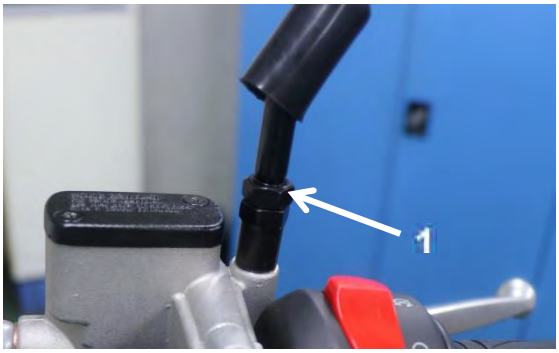
- Open the bottom plug(1)
- Unscrew and remove the screws (2)
- Unscrew and remove the screws(3)
- Remove the side cover(4)



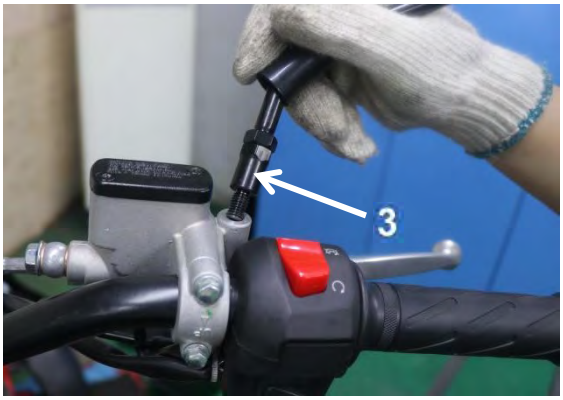
Driving mirrors

The following procedure is only shown from the RH side of the vehicle but is valid for both rear-view mirrors

- Remove the protective rubber (1)
- Using a suitable wrench unscrew the threaded pin (2)

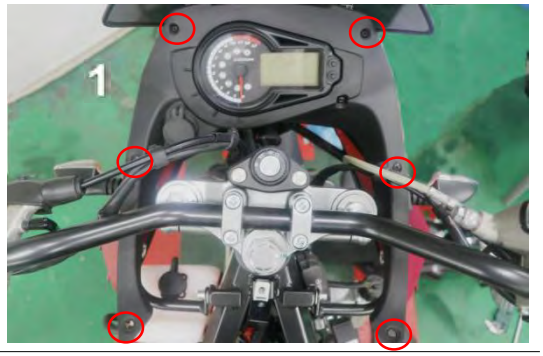


- Remove the right rear view mirror (3)
- Repeat the entire procedure to remove the left rear-view mirror

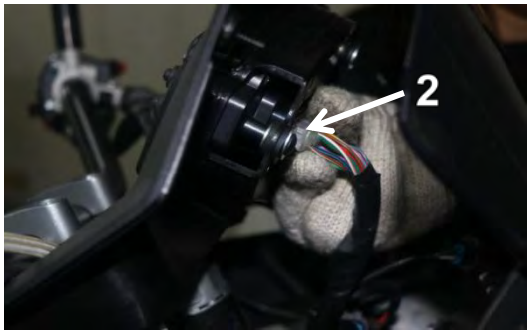


Instrument panel

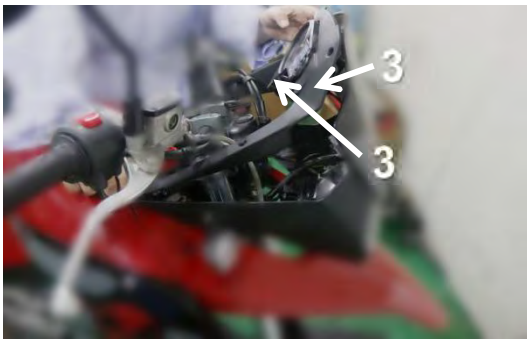
- Unscrew and remove the screws(1)



- Disconnect the connector (2)



- Remove the top fairing/headlamp(3)



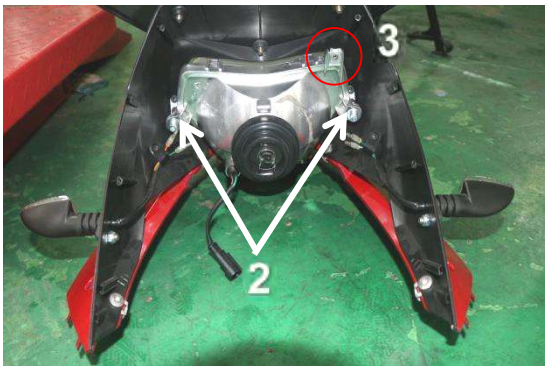
- Disconnect the connector(4)

- Remove the instrument panel.

Headlight assy.

- Disconnect the connector
- Remove the top fairing
- Remove the daylight running light (1)

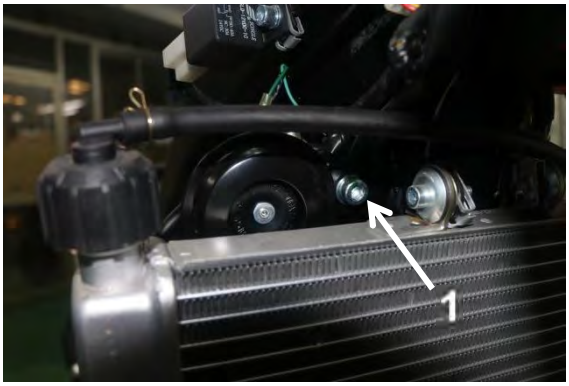
- Unscrew and remove the screws (2)
- Remove the pin (3)



- Remove the front light (4)

Horn

- Undo and remove the screw (1)

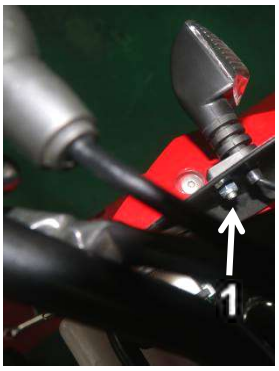


- Disconnect the connectors (2)
- Remove the horn (3)

Turn indicators

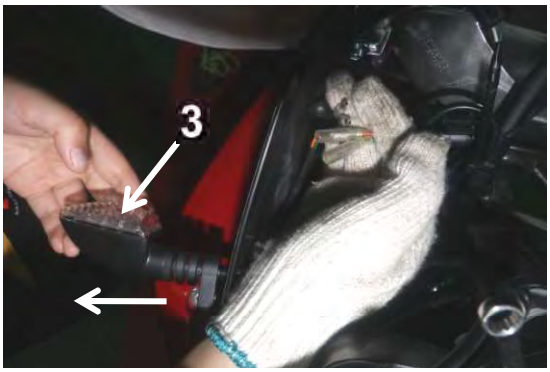
REMOVING THE FRONT TURN INDICATORS

- Remove the top fairing
- They cannot rotate and unscrew and remove the screws (1)



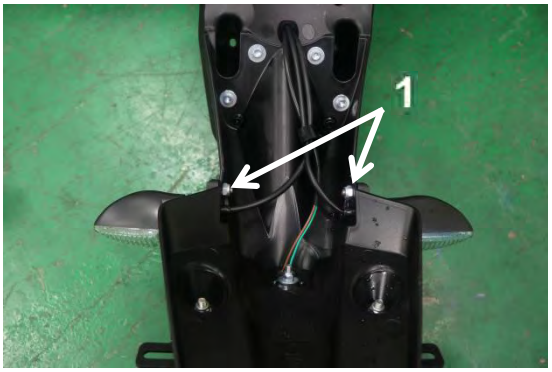
- Remove the right-hand front turn indicator (2)

- Remove the left-hand front turn indicator (3)

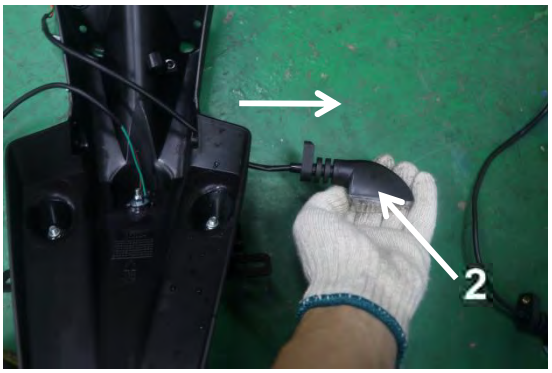


REMOVING THE REAR TURN INDICATORS

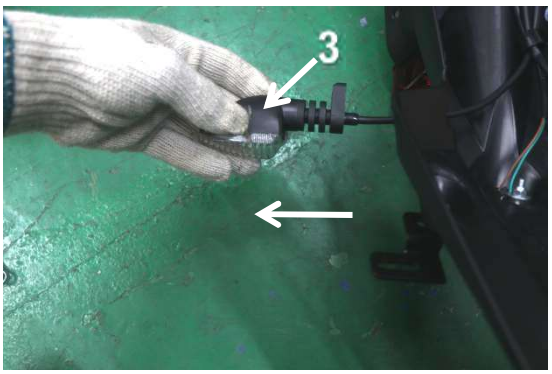
- Remove the license plate holder bracket
- Unscrew and remove the screws (1)



- Remove the right-hand rear turn indicator (2)



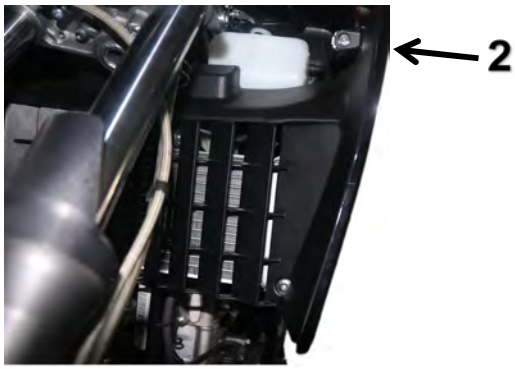
Remove the left-hand rear turn indicator (3)



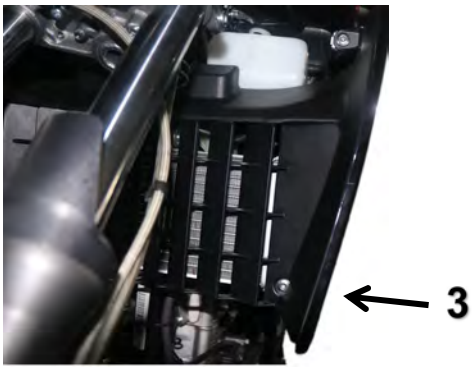
Side fairings

- Unscrew and remove the screws (1)

- Undo and remove the screw (2)



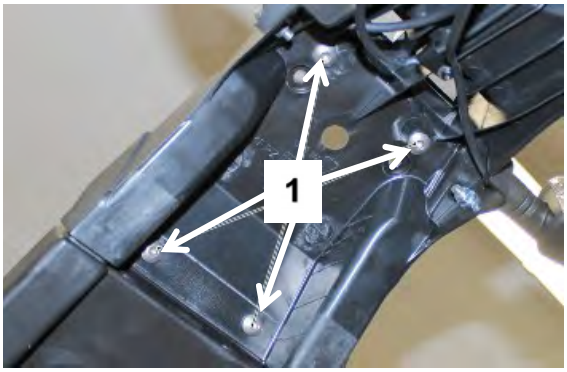
- Unscrew and remove the screw (3)



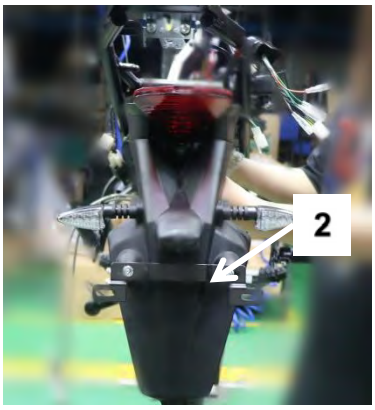
- Remove the left side engine fairing (4)

License plate holder

- Remove the rear light cluster
- Unscrew and remove the screws (1)

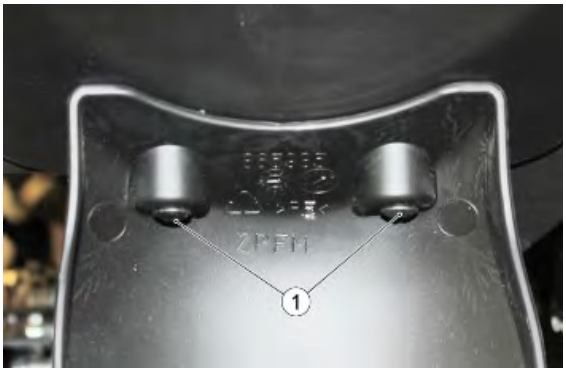


- Remove the license plate holder
- Remove the rear turn indicators
- Remove the licence plate light

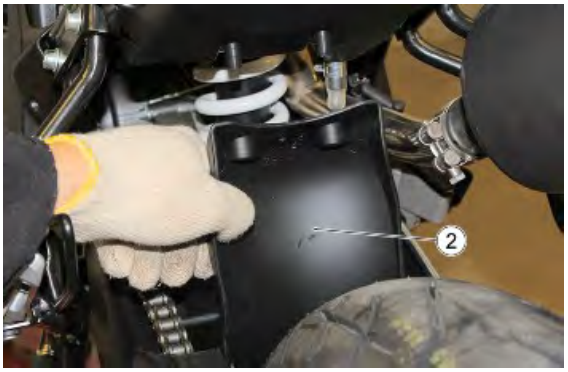


Rear mudguard

- Unscrew and remove the screws (1)

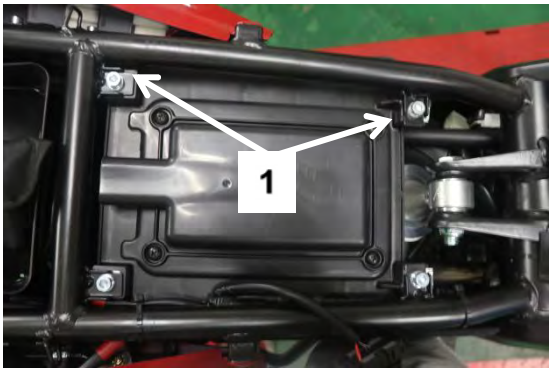


- Remove the rear mudguard (2)

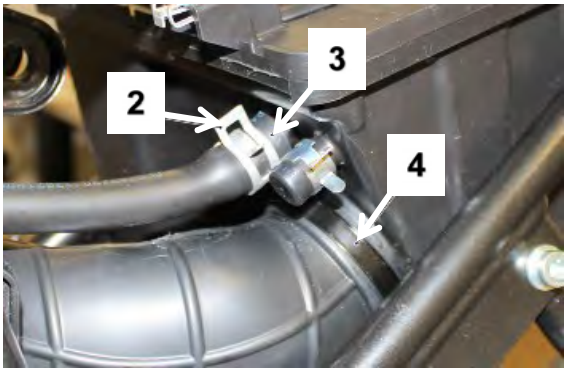


Air box

- Remove the side fairing panels
- Remove the tail fairing
- Remove the battery
- Remove the exhaust system
- Remove the rear mudguard
- Remove the rear wheelhouse
- Remove the rear shock absorber
- Unscrew and remove the screws (1)

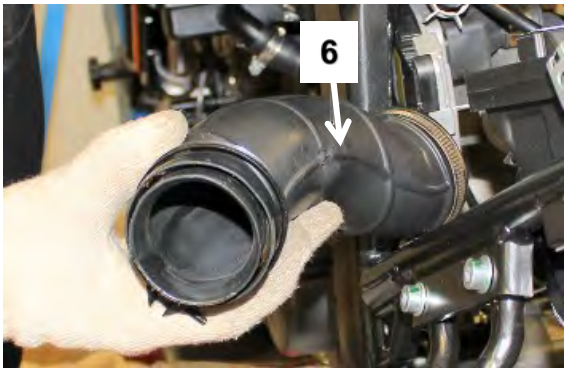


- Loosen the clamp (2)
- Disconnect the pipe (3)
- Loosen the clamp (4)

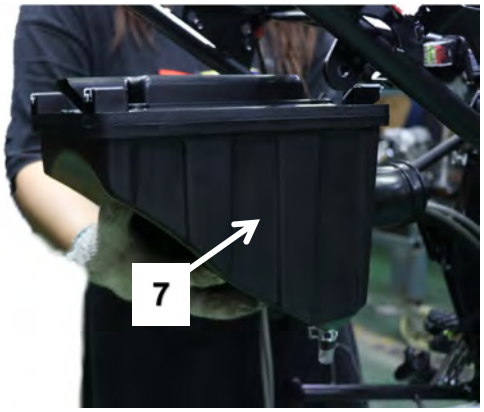


- Loosen the clamp (5)

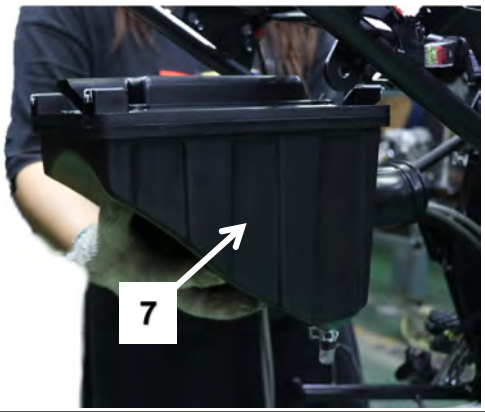
- Remove the sleeve (6)



- To unload the filter box (7)



- Remove the filter box (7)



Lower cowl

- Unscrew and remove the screws (1)

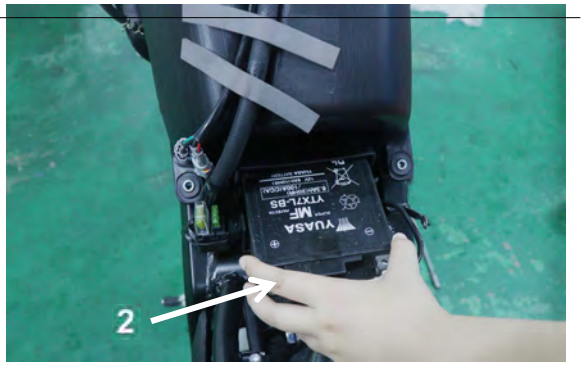
- Undo and remove the screw (2)

- Remove the engine fairing lug (3)

Fuel tank

- Undo and remove the screw (1)

- Remove the battery.



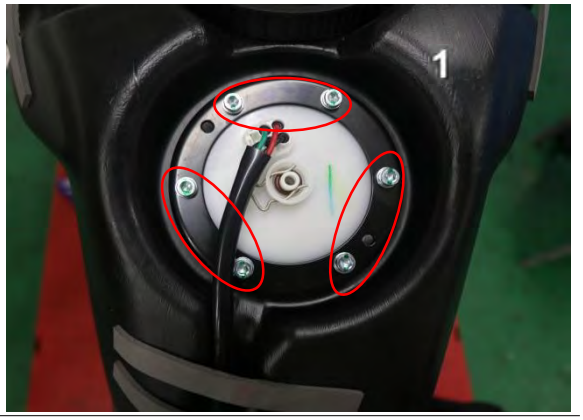
- Remove the battery box(3).

- Remove the screw(4)

- Remove the fuel tank (5)

REMOVING THE FUEL PUMP

- Remove the fuel tank
- Unscrew and remove the screws (1)



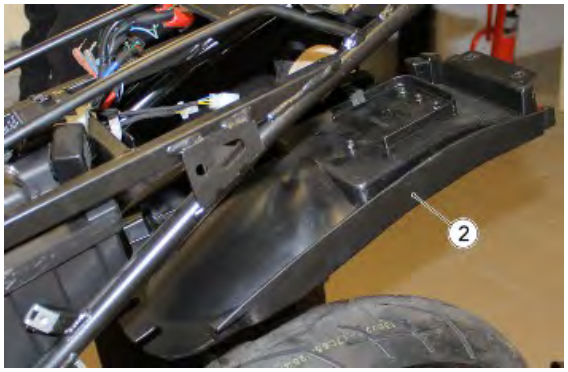
- Remove the fuel pump (2)

Rear wheelhouse

- Remove the side fairing panels
- Remove the tail fairing
- Remove the rear light cluster
- Remove the rear mudguard
- Remove the electrical components shown in the figure from the rear wheelhouse

- Unscrew and remove the screws (1)

- Remove the rear wheelhouse(2)



Front mudguard

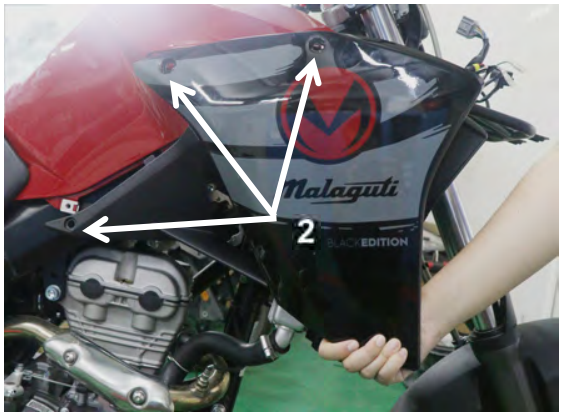
- Unscrew and remove the screws (1).

- Remove the front mudguard (2)

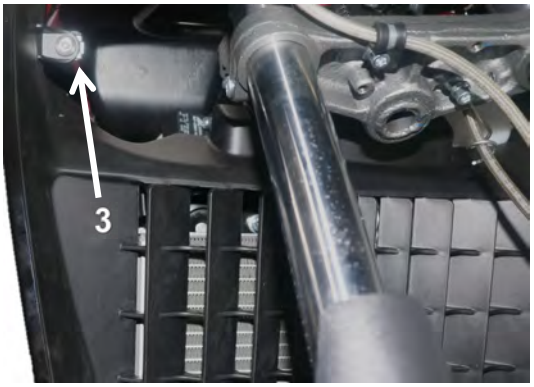
Radiator cover

- Remove the front mudguard
- Undo and remove the screw (1)

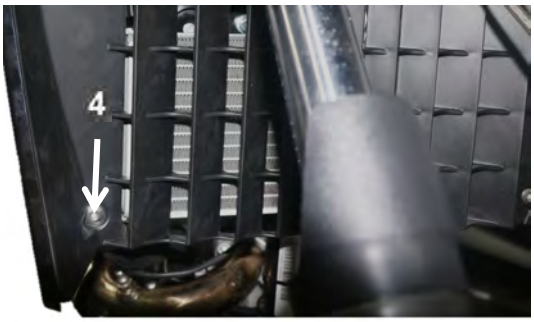
- Undo and remove the screw (2)



- Undo and remove the screw (3)



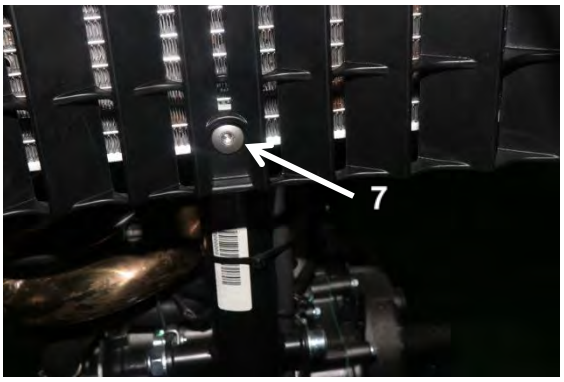
- Undo and remove the screw (4)



- Undo and remove the screw (5)

- Undo and remove the screw (6)

- Unscrew and remove the screws (7)

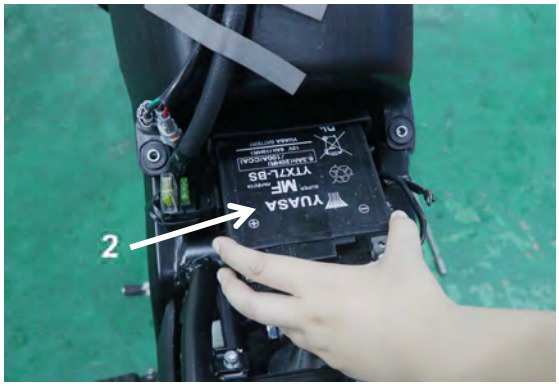


- Remove the radiator cover (8)

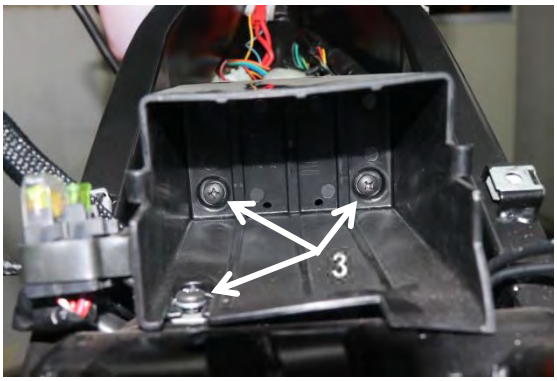
Battery

- Remove the saddle
- Remove the side fairing panels
- Unscrew and remove the screws (1)

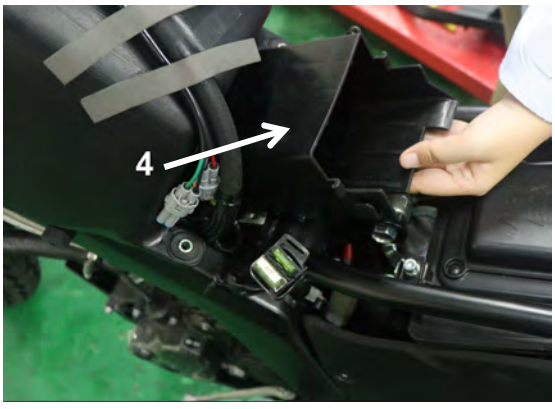
- Disconnect the battery cables
- Remove the battery (2)



- Detach and remove the fuses shown in the figure from the battery support
- Unscrew and remove the screws (3)

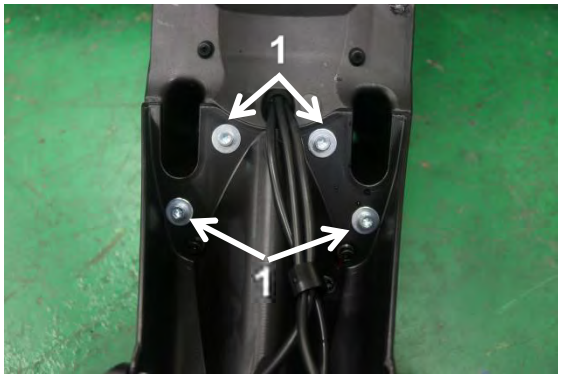


- Remove the battery support (4)



Tail guard

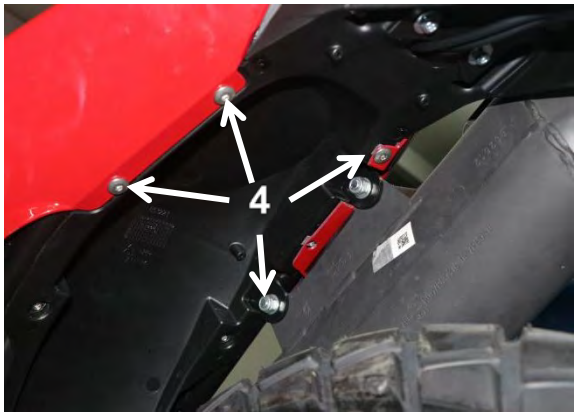
- Remove the saddle
- Remove the side fairing panels
- Unscrew and remove the screws (1)



- Unscrew and remove the screws (2)

- Unscrew and remove the screws(3) in the left and right.

- Unscrew and remove the screws(4)



- Remove the tail guard(5)

INDEX OF TOPICS

Carry out the listed checks before delivering the motorcycle.

WARNING

HANDLE FUEL WITH CARE.

Aesthetic inspection

- Paintwork
- Fitting of Plastic Parts
- Scratches
- Dirt

Tightening torques inspection

- Safety fasteners:

front and rear suspension unit

front and rear brake calliper retainer unit

front and rear wheel unit

engine - chassis retainers

steering assembly

- Plastic parts fixing screws

Electrical system

- Main switch
- Headlamps: high beam lights, low beam lights, tail lights (front and rear) and their warning lights
- Headlight adjustment according to regulations in force
- Front and rear stop light switches and their bulbs
- Turn indicators and their warning lights
- Instrument panel lights
- Instrument panel: fuel and temperature indicator (if present)
- Instrument panel warning lights
- Horn
- Electric starter
- Engine stop via emergency stop switch and side stand
- Electric helmet compartment lock release switch (if applicable)

- Through the diagnostic tool, check that the last mapping version is present in the control unit/s and, if required, program the control unit/s again: consult the technical service website to know about avail- able upgrades and details regarding the operation.

CAUTION

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW LEVEL OF ELECTROLYTE BEFORE IT IS FIRST USED SHORTENS THE LIFE OF THE BATTERY.

CAUTION

WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEG- ATIVE ONE, AND PERFORM THE REVERSE OPERATION DURING REMOVAL.

CAUTION

THE BATTERY ELECTROLYTE IS TOXIC, CORROSIVE AND AS IT CONTAINS SULPHURIC ACID, IT CAN CAUSE BURNS WHEN IN CONTACT WITH THE SKIN. WHEN HANDLING BATTERY ELECTROLYTE, WEAR TIGHT-FITTING GLOVES AND PROTECTIVE APPAREL. IN THE EVENT OF SKIN CONTACT WITH THE ELECTROLYTIC FLUID, RINSE WELL WITH PLENTY OF CLEAN WATER. IT IS PARTICULARLY IMPORTANT TO PROTECT YOUR EYES BECAUSE EVEN TINY AMOUNTS OF BATTERY ACID MAY CAUSE BLINDNESS. IF THE FLUID GETS IN CONTACT WITH YOUR EYES, WASH WITH ABUNDANT WATER FOR FIFTEEN MINUTES AND CONSULT AN EYE SPECIALIST IMMEDIATELY. THE BATTERY RELEASES EXPLOSIVE GASES; KEEP IT AWAY FROM FLAMES, SPARKS, CIGARETTES OR ANY OTHER HEAT SOURCES. ENSURE ADE- QUATE VENTILATION WHEN SERVICING OR RECHARGING THE BATTERY.
KEEP OUT OF THE REACH OF CHILDREN.
BATTERY LIQUID IS CORROSIVE. DO NOT POUR OR SPILL ON PLASTIC COMPONENTS IN PARTICULAR. ENSURE THAT THE ELECTROLYTIC ACID IS COMPATIBLE WITH THE BATTERY BEING ACTIVATED.

CAUTION

NEVER USE FUSES WITH A CAPACITY HIGHER THAN THAT RECOMMENDED. THE USE OF A FUSE OF UNSUITABLE CAPACITY MAY RESULT IN SERIOUS DAMAGES TO THE WHOLE VE- HICLE OR EVEN CAUSE A FIRE.

Levels check

- Hydraulic braking system fluid level
- Clutch system fluid level (if present)
- Gearbox oil level (if present)
- Transmission oil level (if present)
- Engine coolant level (if present)
- Engine oil level
- Mixer oil level (if present)

Road test

- Cold start
- Instrument panel operation
- Response to throttle control
- Stability when accelerating and braking
- Front and rear brake efficiency
- Front and rear suspension efficiency
- Abnormal noise

Static test

Static check after test drive:

- Restarting when warmed up
- Starter operation (if present)
- Minimum holding (turning the handlebar)
- Uniform turning of the steering
- Possible leaks
- Radiator electric fan operation (if present)

Functional inspection

- Hydraulic braking system
- Clutch travel
- Rear brake lever travel (see chapter "installing rear brake master cylinder")
- Clutch - Check for correct operation
- Engine - Check for correct general operation and absence of abnormal noise
- Other
- Check documentation
- Check the chassis and engine numbers
- Licence plate fitting
- Locks checking
- Tyre pressure check
- Fitting of mirrors and possible accessories

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES SINCE THE TYRES MAY BURST.

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

OBD LIST

The OBD list are the following:

Ignition coil	P0351	xxxx.0001 SCVbat	check circuit voltage	Error detected if, upon the ON command, the logic level of the internal voltage feedback to the ECU is High	1 cycle	None	None	key on
		xxxx.0010 SCGnd,OC	check circuit voltage	Error detected if, upon the OFF command, the logic level of the internal voltage feedback to the ECU is Low	1 cycle	None	None	key on and push start-switch
Oxygen sensor Heather	P0135	xxxx.0001 SCVbat	check circuit voltage	circuit high	1 cycle	None	None	IDLE
		xxxx.0010 SCGnd	check circuit voltage	circuit low	1 cycle	None	None	IDLE
		xxxx.0100 OC	check circuit voltage	circuit open	1 cycle	None	None	IDLE
Fuel pump relay	P0230	xxxx.0001 SCVbat	check circuit voltage	circuit high	1 cycle	None	None	key on
		xxxx.0010 SCGnd,OC	check circuit voltage	circuit open	1 cycle	None	None	key on
Light out diagnosis	P1300	xxxx.0001 SCVbat	check circuit voltage	circuit high	0 cycle	None	None	key on
		xxxx.0010 SCGnd	check circuit voltage	circuit low	0 cycle	None	None	key on
		xxxx.0100 OC	check circuit voltage	circuit open	0 cycle	None	None	key on
Cooling Fan diagnosis	P0480	xxxx.0001 SCVbat	check circuit voltage	circuit high	1cycle	None	None	key on
		xxxx.0010 SCGnd	check circuit voltage	circuit low	1cycle	None	None	key on
		xxxx.0100 OC	check circuit voltage	circuit open	1 cycle	None	None	key on

Stepper motor diagnosis	P0505	xxxx.0010 SCGnd xxxx.1000 signal not valid	check circuit voltage check circuit voltage	feedback voltage by hardware feedback voltage by hardware	1 cycle 1 cycle	None None	None None	IDLE IDLE
Starter switch diagnosis	P0512	xxxx.1000 SCVbat	check circuit voltage	Error detected when IN_CSTARTRQ=1 for at least CSTARTERTIME calibration time msec	0 cycle	None	None	At engine start
EEPROM Error diagnosis	P0601	xxxx.1000	Check signal of EEPROM cell	Check by hardware	1 cycle	None	None	Key on
Battery Voltage diagnosis	P0560	xxxx.0001 xxxx.0010	check battery voltage check battery voltage	Over maximum limit Below minimum limit	1 cycle 1 cycle	None None	None None	IDLE IDLE
Atmospheric Pressure diagnosis	P0105	xxxx.0001	check circuit voltage	The error is detected if PREA > PRESDIAGTHMAX or alternative definition PREAD > PRESDIAGMAXTHMV	3 cycle	None	None	Key on
		xxxx.0010	check circuit voltage	The error is detected if PREA > PRESDIAGTHMIN or alternative definition PREAD < PRESDIAGMINTHMV	3 cycle	None	None	Key on
		xxxx.1000	check circuit voltage	The error is detected if |PREA - PREAREC| > PREATHR, or alternative definition |PREAREC-PREAD| > PREADTHRMV , where PREAREC is obtained from the table TBPREAREC f(RPM,ANGFARC)	3 cycle	None	None	Key on

SMOT(ENGINE SPEED SENSOR) Functional diagnosis	P0336	xxxx.1000	Check flywheel signal	Error detected when SISTFAS <> FLYWHEEL_SYNCHRO and WAITTRANSCNT = = VRS_NDENTE for a CAMEDGEFAULTH number of events (applicable).	1 cycle	None	None	At engine start
Water Temperature diagnosis	P0115	xxxx.0001 SCVbat or OC	check circuit voltage	Error detected when TH2OI >MAXEAU Mv	1 cycle	None	None	IDLE
		xxxx.0010 SCGnd	check circuit voltage	Error detected when TH2OI < MINEAU mV	1 cycle	None	None	IDLE