

SERVICE STATION MANUAL



Pure Passion since 1911



SN 600R

code:.....

WARNINGS:

This manual has been written by Benelli Q.J. s.r.l., mainly for use by Benelli dealers and their specially trained mechanics. It is not possible to give a mechanic all of the information they require in a single manual. It is therefore presumed that the persons using this manual for the maintenance and repairs of Benelli bikes have a basic knowledge of mechanics and the procedures necessary for repairs and maintenance of this type of vehicle. Without this experience, any repairs or maintenance to this type of vehicle may be dangerous or ineffective.

It is company policy at Benelli Q.J. s.r.l. to continuously upgrade and improve its models. Any changes or significant modifications to technical data or procedures will be made known to all authorised Benelli Dealers and will be published in future editions of the manual.

NOTE:

Drawings and specifications are subject to change without prior warning.

IMPORTANT INFORMATION ABOUT THE MANUAL

This manual contains the following important reminders:

WARNING:

Failure to follow the instructions after this symbol may lead to serious injury or even death for the rider, people in the vicinity, or people inspecting or repairing this bike.

IMPORTANT NOTICE:

"Important Notice" means that specific precautions are required to avoid causing damage to the bike.

NOTE:

A "Note" provides key information that will make the procedure either easier or clearer.

HOW TO USE THIS MANUAL

This manual is a practical reference guide that is both easy to handle and use for mechanics. The explanations of all of the procedures for installing, removing, disassembling, fitting, repairing and checking, are organised in sequence, one step at a time.

1. Each chapter is divided into sections. The top part of each page contains the title of the current section.
2. To help with the identification of parts and to make the different processes clearer, exploded drawings are provided at the start of each section dealing with the removal or disassembly of parts.
3. The sequence of operations is listed on the exploded drawing, and numbered progressively. Each number refers to a step in the disassembly process.
4. Parts needed lubricating or replacing are marked by symbols. See the "SYMBOLS" section.
5. The exploded drawing is accompanied by a table with instructions for the intervention. These state the order of operations, the name of the parts, any notes for the job, etc.
6. Interventions requiring any other information (e.g., special tools and technical data) are described in sequence.



SYMBOLS

SUBJECT SYMBOLS



General Information



Specifications



Inspections and Periodic Adjustments



Frame



Engine



Cooling system

EXPLANATORY SYMBOLS



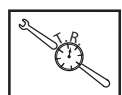
Wear limits, Backlash



Thread locker application



Special tool



Tightening torque



Lubrication points



Grease application



Sealant paste



Part replacement

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CHAPTER 1

GENERAL INFORMATION

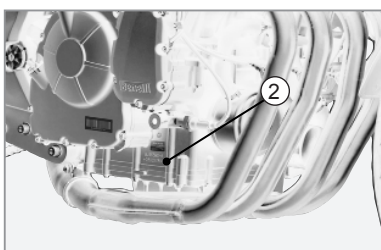
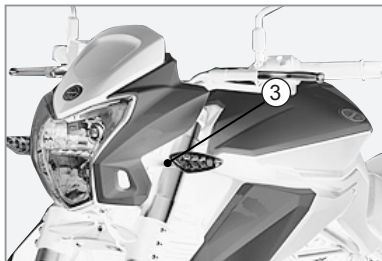
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IDENTIFICATION

MOTORCYCLE IDENTIFICATION

The identification data are:

1. Serial number of the frame (on the steering head)
2. Engine serial number (on the bottom base)
3. Approval details (on frame)



CHARACTERISTICS

INSTRUMENTS AND LIGHTS

The instruments and lights will switch on when the ignition key is turned to "ON".

After an initial check-up, the information will correspond to the overall condition of the bike at that time.

The dashboard has the following instruments.

2 REV COUNTER

This shows the number of engine revs per minute, expressed in thousands.

1 STATUS INDICATOR LIGHTS

1A. Neutral gear light (green)

This switches on when the gear is in "Neutral".

1B. Oil level warning light (red)

This switches on when the oil pressure is insufficient. It is possible to check the electrical circuit of the light by turning the key to "ON". Once the engine is running, the light should switch off. If the light does not switch on at the start, when the key is turned to "ON", or if the light stays on, have the electric circuit checked by an authorised Benelli service centre.

1C. High beam light (blue)

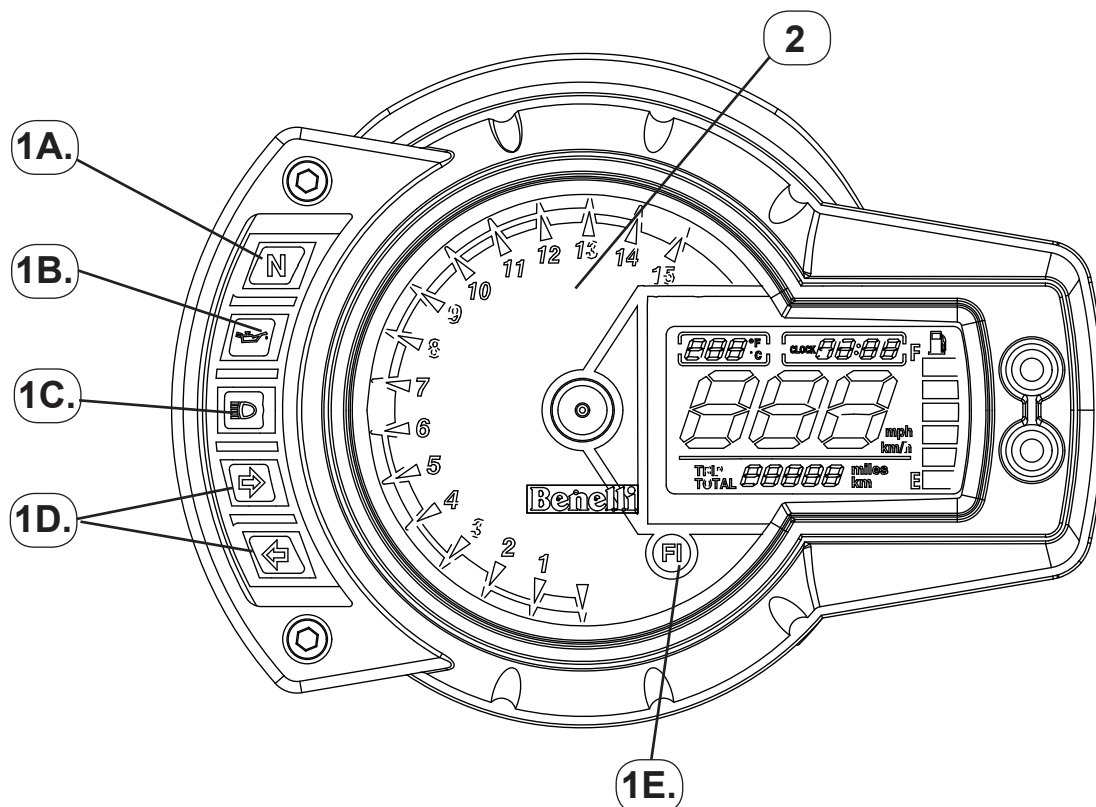
This switches on when the high beam is switched on.

1D. Indicator light (green)

This switches on when the indicators are working.

1E. "FI" Injection diagnostic light

When the vehicle is started, the light will switch on orange for a few seconds to show that the injection system is operating correctly.



CHARACTERISTICS

MULTIPURPOSE DISPLAY

3 COOLANT TEMPERATURE GAUGE

Shows the coolant temperature in °F (Fahrenheit) or C° (Celsius) .

4 DIGITAL CLOCK

Shows the time in hours, minutes and seconds

5 SELECT BUTTON

6 RESET BUTTON

Digital clock setting

Hold down the "Select" button for 5 seconds until the reading begins to flash.

Adjust the hour by pressing the "Select" button.

Press the "Reset" button to pass on to the minutes adjustment.

Adjust the minutes by pressing the "Select" button.

Press the "Reset" button to pass on to the seconds adjustment.

Reset the seconds to zero by pressing the "Reset" button.

7 FUEL TANK CAPACITY AND RESERVE FUEL GAUGE

The digital fuel gauge shows the capacity of the fuel tank. As the fuel level drops, the lines on the gauge will become closer and closer to the "E" reserve area.

As soon as the final line starts to flash, there is an autonomy of about 2 litres of fuel.

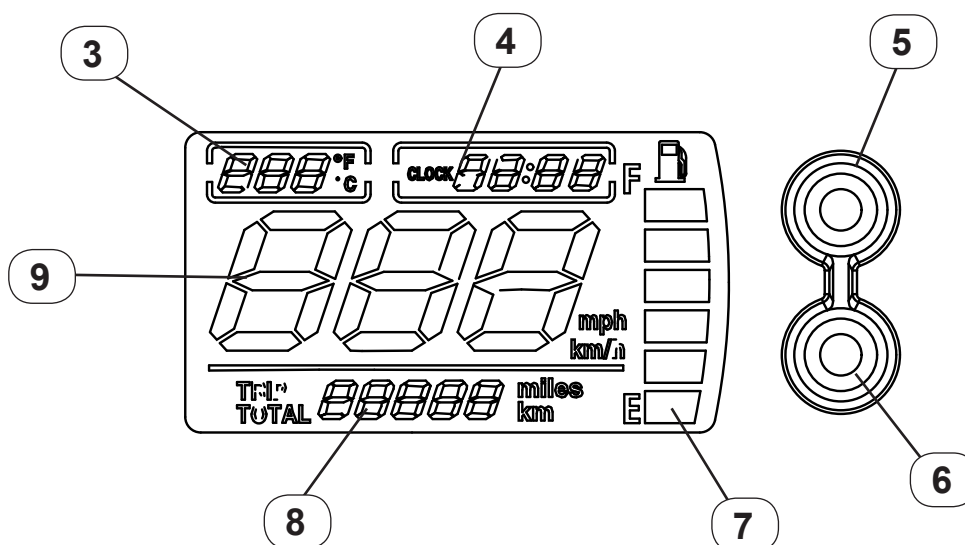
8 TOTAL/PARTIAL KILOMETRE COUNTER

The total kilometre counter shows the total distance covered in kilometres. The partial kilometre counter (TRIP) shows the distance covered since the last reset in kilometres.

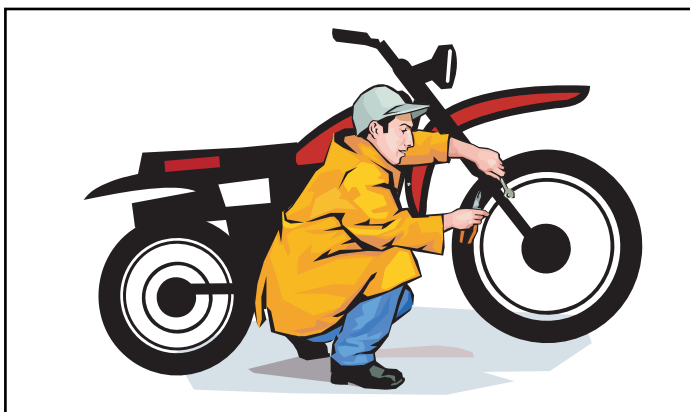
The partial kilometre counter can be used to estimate the possible distance to cover with a full tank of fuel. This information may make it possible to schedule future fuelling stops.

9 SPEEDOMETER

Indicates the vehicle's speed in km/h or mph. To pass from km to mph and vice versa, press and hold down the "Select" button 5 for at least one second.

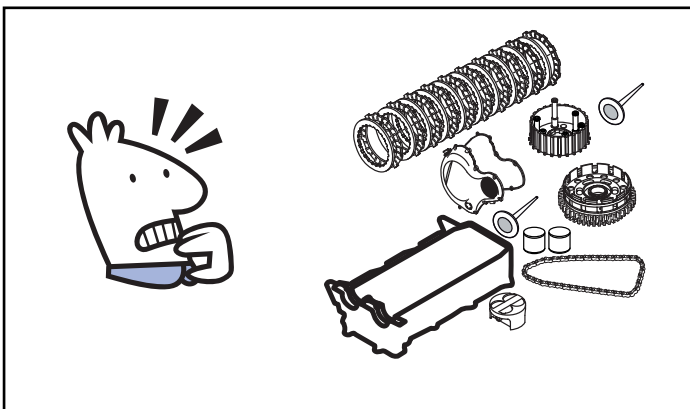


IMPORTANT INFORMATION



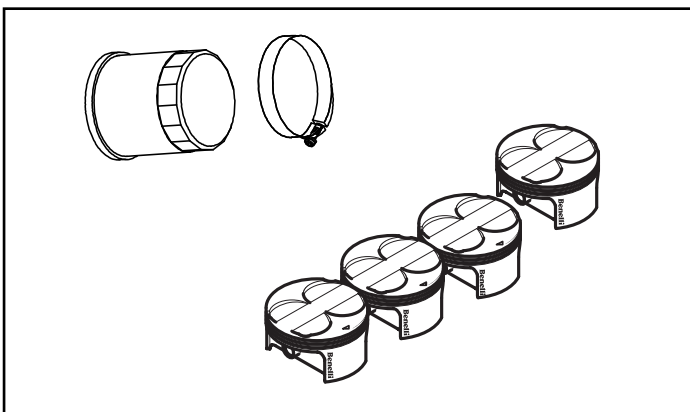
PREPARATIONS FOR REMOVAL AND DISASSEMBLY OPERATIONS

- Before carrying out any removal and disassembly operations, remove any dirt, mud, dust or foreign bodies.
- Only use suitable cleaning tools and products.
See the "SPECIAL EQUIPMENT" section.
- While disassembling the vehicle, we recommend keeping coupled parts together at all times. These parts include gears, cylinders, pistons and other parts, whose surfaces will be "coupled" during the normal wear and tear of work. Coupled pieces must always be re-used or replaced in groups. During the disassembly operation, clean all parts and place them in a bowl, using the same order as for disassembly. This will make reassembly operations easier and allows for the correct installation of all parts.
- Keep all parts away from any source of heat.



REPLACEMENT PARTS

Only use original Benelli replacement parts. Only use oils and grease recommended by Benelli to lubricate parts. Other brands may look similar and operate in a similar manner, but will be of lower quality.



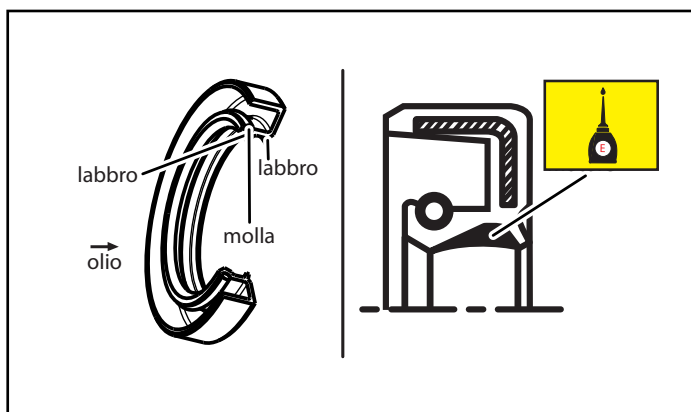
IMPORTANT INFORMATION

GASKETS, O-RINGS, SEALS AND BEARINGS

Always replace all gaskets, oil seals and O-rings when carrying out repairs to the engine.

The gasket surfaces, oil seal lips and O-rings must always be clean.

During installation, always oil the coupled parts and bearings, and lubricate the oil seal lips with engine oil.



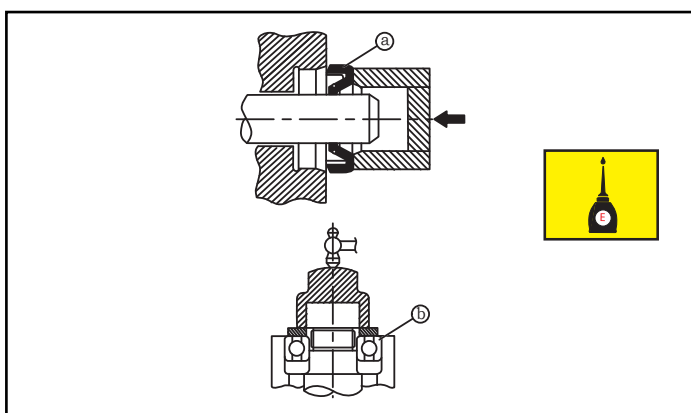
Fit the bearings and oil seals so that the brand or manufacturer's number is facing outwards and visible. To fit the oil seal, lubricate the lips with a fine layer of engine oil.

Always apply plenty of oil to bearings when fitting them.

- a. Oil seal
- b. Bearing

IMPORTANT NOTICE:

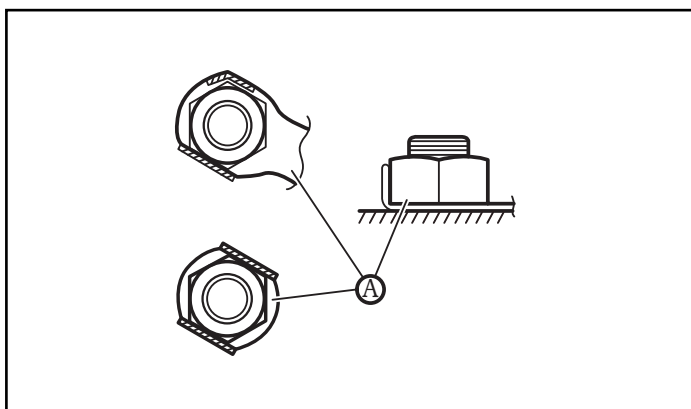
Never use compressed air to dry bearings, allowing them to turn, as this will damage the surfaces.



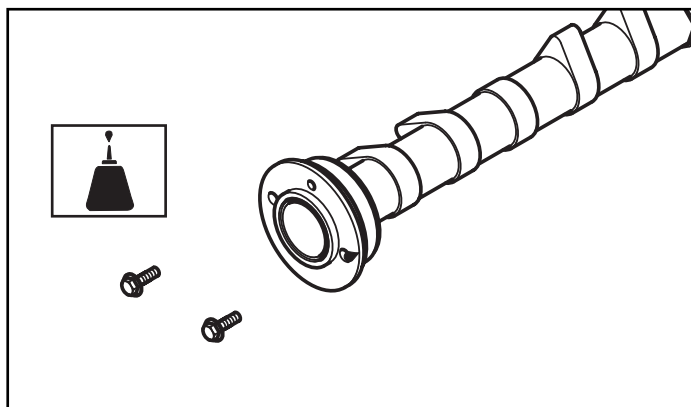
SAFETY WASHERS/SAFETY PLATES, COTTERS AND THREAD BLOCKERS

After removing, replace all of the safety washers "A", and the safety plates and cotters.

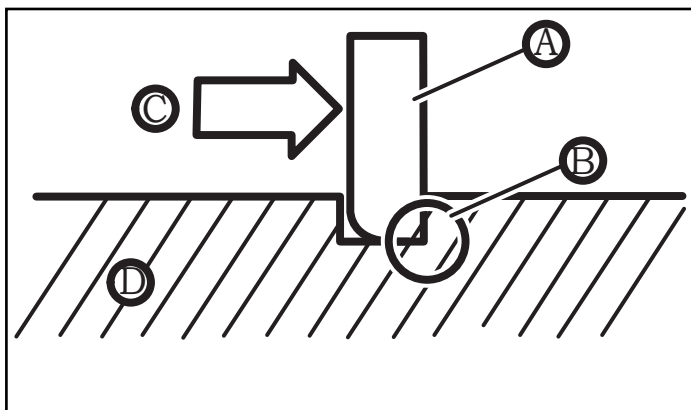
After tightening the bolt or nut according to specification, bend the locking tabs and the ends of the cotter against the flat sides of the nut.



Whenever applying thread blocker, always first degrease both sides, with solvent.



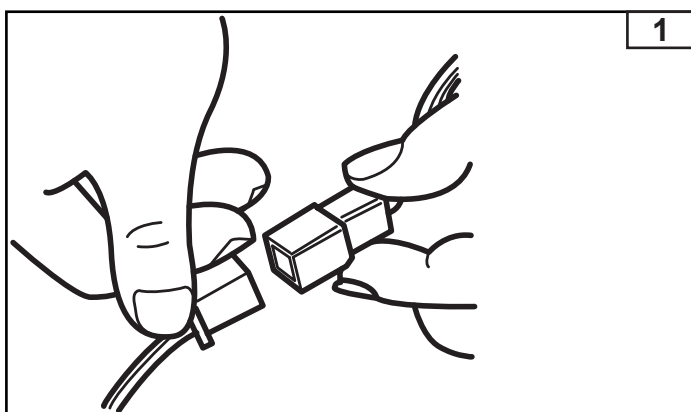
IMPORTANT INFORMATION



ELASTIC RETAINING RINGS

Before refitting them, check all of the retaining rings and replace any that have become damaged or are out of shape. Always replace the retaining rings on the gudgeon pin after using them once. If fitting a retaining ring "A", make sure that the sharp edge "B" is positioned on the other side to the thrust, "C" that it receives.

"D" Shaft

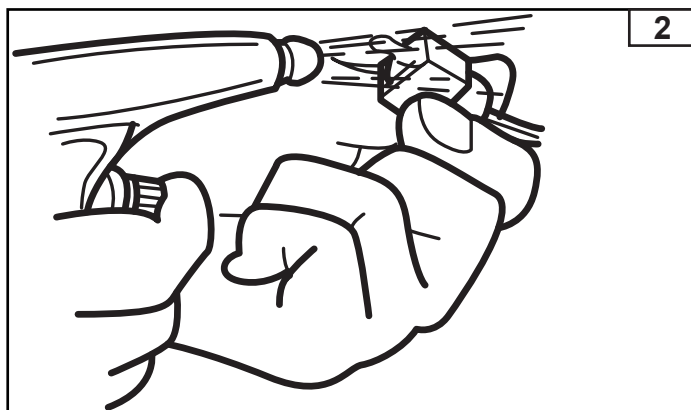


1

CONNECTION CHECKS

Make sure that there are no marks, rust, moisture, etc. on wiring, couplers, or connectors.

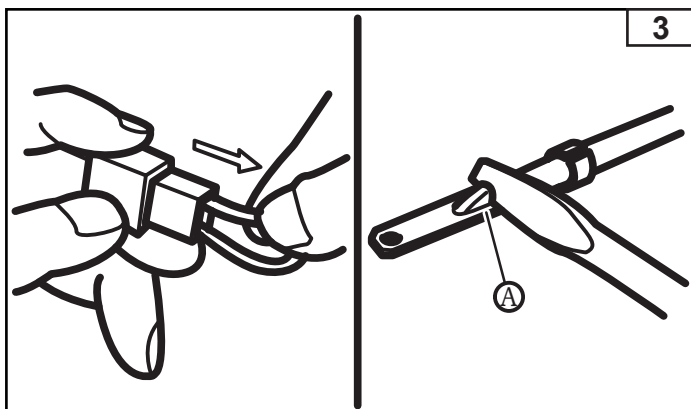
1. Disconnect:
 - the wire
 - the coupler
 - the connector



2

2. Check:
 - the wire
 - the coupler
 - the connector

If there are traces of moisture → Use a fan to dry.
If there is any rust/marks → Connect and disconnect the parts several times.



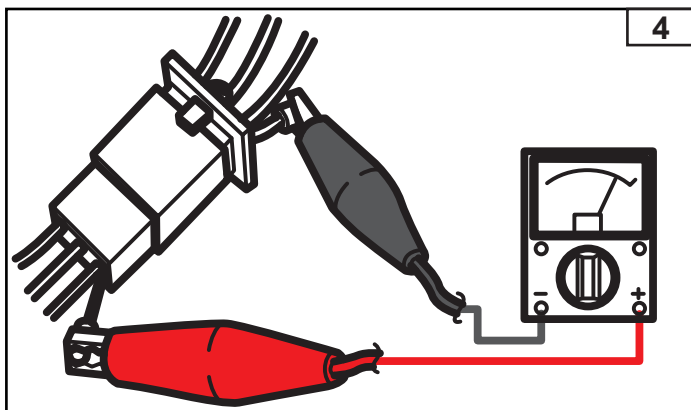
3

3. Check:
 - all connections
 If there are any loose connections → Reconnect them properly.

NOTE:

If the foot of terminal "A" is bent, raise it.

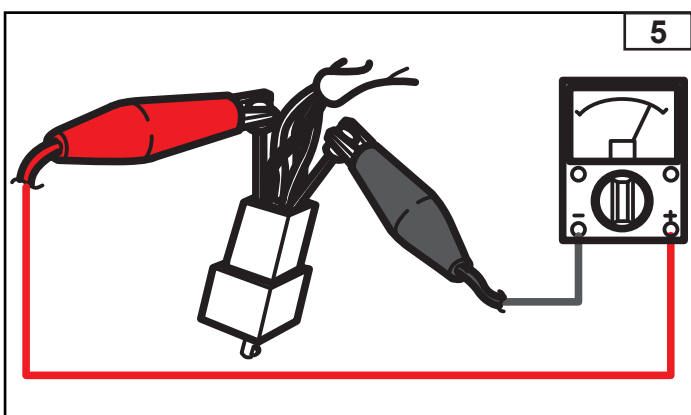
IMPORTANT INFORMATION



4. Connect:
- the wire
 - the coupler
 - the connector

NOTE:

Make sure all connections are firmly installed.



5. Check:
- **continuity** (with a pocket tester)

NOTE:

- If there is no continuity, clean the terminals.
- To control the wiring, follow the steps from "1" through to "3"
- For a quick fix, we recommend using a specific product for contacts, which can be found on sale in spare parts stores.

SPECIAL EQUIPMENT

The special equipment listed here serves for the complete, thorough performance of fine tuning and assembly operations. The use of this equipment will help to prevent damage caused through using unsuitable tools or makeshift techniques. When completing an order, please check the list below to avoid any errors.

SPECIAL ENGINE EQUIPMENT		
Tool Code	Name-Tool Function	Image
1	Valve stem seal tool This serves to insert the valve oil seal in situ.	
1	Clutch removal tool This serves to block the clutch drum and loosen the nut	
1	Gudgeon pin removal tool This tool serves to take out the gudgeon pin	
1	Valve stem seal removal tool This tool serves to take out the oil seal from valves	
1	Ring clamp tool This tool serves to fit retaining rings on the piston and to insert this into the cylinder	
1	Gear selector drum fitting tool This tool serves to fit the gear selector drum	
1	Flywheel extractor This tool serves to remove the flywheel from the engine shaft	
1	Flywheel cover extractor This tool serves to remove the cover housing the flywheel	

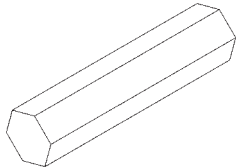
SPECIAL EQUIPMENT

SPECIAL ENGINE EQUIPMENT		
Tool Code	Name-Tool Function	Image
1	Engine tuning tool This tool serves to establish the TDC position	
1	Oil filter tool This tool serves to tighten or remove the engine oil filter	
1	Chain tensioner locking tool This tool serves to lock the tensioner piston while fitting the chain tensioner	
1	Oil seal insertion tool This tool is used to fit the oil seal on the engine casing near the gear	
1	Tool to remove/fit the clutch bell housing ring nut This tool is used to remove and fit the notched ring nut that holds the clutch bell housing	
1	Valve spring compressor tool This tool is used to remove springs from valves	
1	Valve removal adaptor This tool is used to remove valves	
1	Measuring gauge This tool is used to measure the inner dimensions of bores	
1	Measuring gauge This tool is used to measure the external dimensions of parts	

SPECIAL EQUIPMENT

SPECIAL ENGINE EQUIPMENT		
Tool Code	Name-Tool Function	Image
1	Measuring gauge This tool is used to measure thickness	
1	Flywheel tightening tool This tool serves to remove the flywheel on the engine shaft	

SPECIAL EQUIPMENT

SPECIAL TOOLS (FRAME)		
Tool Code	Name-Tool Function	Image
1	Tightening tool for steering head lock nut This assembled tool is used to tighten the lock nut securing the steering head.	
1	Front wheel steering arm tightening tool This tool is used to tighten the front wheel pin	

SPEC 	Specifications	CHAPTER 2
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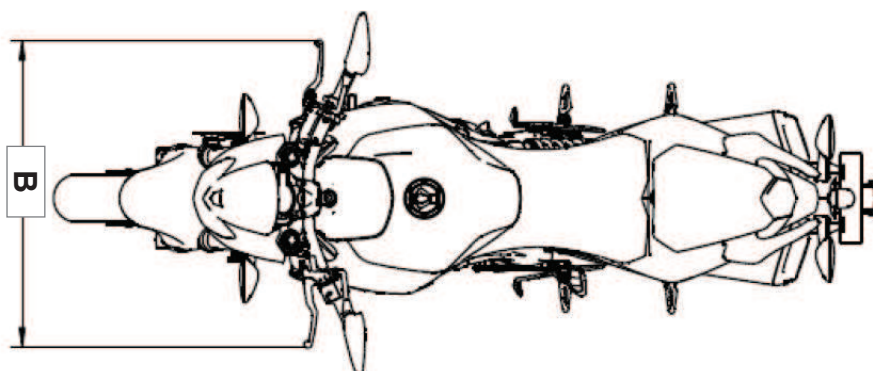
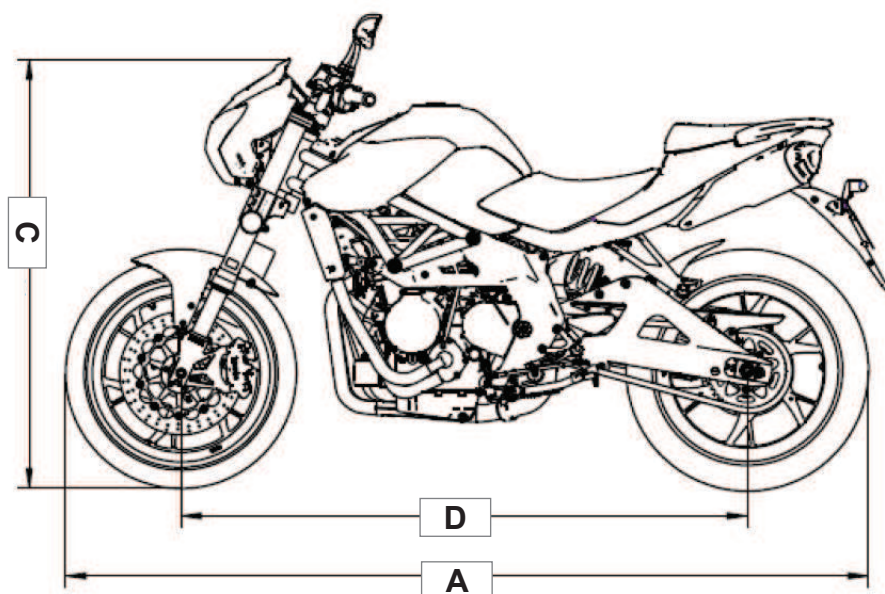
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**GENERAL SPECIFICATIONS**

DIMENSIONS	STANDARD
Overall length (A)	2160 mm
Overall width (B)	800 mm
Overall height (C)	1180 mm
Distance between centres	1480 mm
WEIGHT	STANDARD
Kerb weight (with oil and fuel tank full)	220 kg
Empty (with no oil and empty tank)	208 kg
Maximum permissible load capacity (with rider and load)	410 kg





TECHNICAL DETAILS

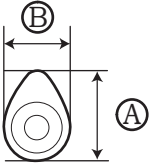
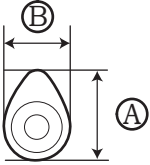
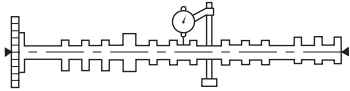
ENGINE SPECIFICATIONS

ENGINE	STANDARD
Engine	Four-stroke inline four-cylinder liquid cooled, 4 valves per cylinder Double overhead camshaft (DOHC)
Cubic capacity	600 c.c
Number of cylinders	4
Cylinder layout	in line
Stroke ratio	65x45.2
Compression ratio:	11.5:1
Low idling speed	
High idling speed	
Distribution	Double overhead camshaft, chain control, with 4 valves per cylinder
Maximum net power	60 kW/11500rpm(82CV)
Max. net torque	52 N.m/10500rpm
FUEL	STANDARD
Recommended fuel	Lead-free RON95
ENGINE OIL	STANDARD
Lubrication system	forced, wet sump
Total amount	3.2 l
Amount without oil filter cartridge replacement	3.2 l
Amount with oil filter cartridge replacement	3.2 l
Recommended oil:	API SJ 15W50 (synthetic) Jaso -MACCMC g4
OIL FILTER	STANDARD
Oil filter type	Paper
OIL PUMP	STANDARD
Oil pump type	Lobe
Clearance between the inner and outer rotor tips	0.25 mm max.
Clearance between outer rotor and oil pump	0.2 mm max
IGNITION	STANDARD
Ignition system type	electrical



TECHNICAL DETAILS

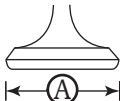
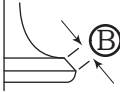
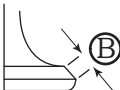
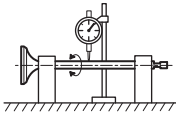
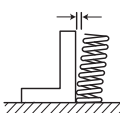
ENGINE SPECIFICATIONS

SPARK PLUGS	STANDARD
Model (make) x quantity	NGN CR9E
Distance between electrodes	0.6-0.7 mm
CYLINDER HEAD	STANDARD
Head gasket maximum warping	0.03 mm
CAMSHAFT	STANDARD
Control system	chain transmission
Camshaft support diameter	Ø23 (0,+0.021) mm
Clearance between support and camshaft follower	0.03 - 0.064
Cam lobe dimensions, intake side 	Measurement "A"= 32.495 mm Measurement "B"= 25 mm
Cam lobe dimensions, exhaust side 	Measurement "A"= 32.495 mm Measurement "B"= 25 mm
Maximum camshaft eccentricity 	0.02 mm
FUEL	STANDARD
Recommended fuel	Lead-free RON95
CHAIN DISTRIBUTION	STANDARD
Model/number of links	120
Automatic tensioning	system



TECHNICAL DETAILS

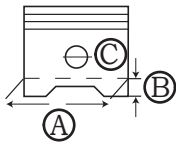
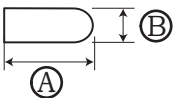
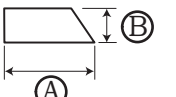
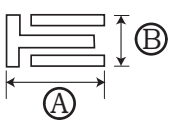
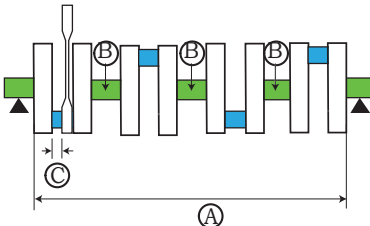
ENGINE SPECIFICATIONS

VALVES, VALVE SEATS, VALVE GUIDES		STANDARD
Aspirator valve clearance (cold)		0.13 ~ 0.19 mm
Exhaust valve clearance (cold)		0.19 ~ 0.25 mm
VALVE DIMENSIONS		
 Head diameter "A"	Intake	Ø 25 mm
	Exhaust	Ø 22 mm
 Contact surface length "B"	Intake	1.9-2.1 mm
	Exhaust	1.75 ~ 1.95 mm
 Seat width "C"	Intake	1 ~ 1.1 mm
	Exhaust	1 ~ 1.1 mm
 Contact surface length "B"	Intake	1.9 ~ 2.1 mm
	Exhaust	1.75 ~ 1.95 mm
Valve stem diameter	Intake	3.965 ~ 3.98 mm
	Exhaust	3.965 ~ 3.98 mm
Clearance between valve stem and valve guide	Intake	0.05 ~ 0.075 mm
	Exhaust	0.04 ~ 0.065 mm
 Valve stem eccentricity		0.05 mm
VALVE SPRINGS		STANDARD
Intake/exhaust effective length	External	38.8 mm
	Internal	41.6 mm
Intake/exhaust installed length (valve closed)	External	152.8 N m / 15.58 Kg•m
	Internal	143 N m / 15.58 Kg•m
	Intake	1.2 mm
	Exhaust	1.2 mm
CYLINDERS		STANDARD
Cylinder layout		perpendicular inline
Stroke ratio		65.0:45.2
Compression ratio:		11.5x1
Stroke		65
Maximum ovalisation		/o/ 0.008
		/o/ 0.006



TECHNICAL DETAILS

ENGINE SPECIFICATIONS

PISTON		STANDARD
Clearance between piston and cylinder		0.05 ~ 0.07 mm
	Piston diameter "A"	$\varnothing 65 \begin{smallmatrix} 0.002 \\ 0.003 \end{smallmatrix}$ mm
	Piston height "B"	25 mm
	Gudgeon pin seat diameter "C"	$\varnothing 16 \begin{smallmatrix} 0.002 \\ 0.003 \end{smallmatrix}$ mm
Gudgeon pin external diameter		$\varnothing 16 \begin{smallmatrix} 0 \\ 0.008 \end{smallmatrix}$ mm
Top band		
	Band type	elastic
	Dimensions "A" X "B"	2.3 x 0.8 mm
2nd band		
	Band type	elastic
	Dimensions "A" X "B"	2.3 x 0.8 mm
Oil scraper ring		
	Dimensions "A" X "B"	2.3 x 1.93 mm
PISTON ROD		STANDARD
Bearing colour codes		A = Red B = Blue C = Yellow
Rod weight code		K1 = Black K2 = Green K3 = White K4 = Brown K5 = Orange
ENGINE SHAFT		STANDARD
		
Width "A"		269.5 mm
Maximum eccentricity "B"		22.6 ± 0.01 mm
Side clearance at connecting rod big end "C"		0.1 - 0.25
Main bearing colour code		A = Red B = Blue C = Yellow



TECHNICAL DETAILS

ENGINE SPECIFICATIONS

CLUTCH	STANDARD
Clutch:	oil bath clutch, multiple discs
Clutch release method	wire cable and spring
Clutch release action	wire cable action
action	with left grip lever
Clutch cable clearance (at the ends of the clutch lever)	2 ~ 3 mm
Friction plate thickness	2.8 ± 0.05 mm - 3 (0. - 0.1) mm
Number of fiction plates	7
Steel disc thickness	1.6 (0. -0.05) mm
Steel disc thickness	7
Disc pack thickness	11.2 mm
Max. warping	0.05 mm
Friction spring effective length	40 ± 0.01 mm
Spring quantity	4
TRANSMISSION	STANDARD
Transmission type	Straight tooth gear
Primary reduction ratio	44:82
Secondary reduction system	
Transmission ratio	Chain, ratio 14:46
1st	13-37
2nd	19-37
3rd	18:-28
4th	24-32
5th	21-25
6th	24-26
GEAR CONTROL MECHANISM	STANDARD
Type of gear control mechanism	sequential with desmodronic drive and pre-selector
Maximum warp on gear shift guide bar	Straightness 0.02 Roundness 0.005
AIR FILTER	STANDARD
Air filter type	SPONGE
FUEL PUMP	STANDARD
Pump type	electric pump
Model (make)	Delphi
Outgoing pressure	250 KPa
THROTTLE BODIES	STANDARD
Diameter	37 mm
Accelerator cable clearance (at the accelerator grip flange)	Rotary



TECHNICAL DETAILS

FRAME SPECIFICATIONS

FRAME	STANDARD
Frame type:	Dismountable truss-type, the rear one with steel tube truss, the front one of aluminium alloy
Steering sleeve inclination	N.A.
Trail	N.A.
FRONT WHEEL	STANDARD
Wheel type	6-spoke alloy type
Rim (Size)	17 M/C x MT3.50 DOT-D
Rim (Material)	Aluminium
Wheel travel	120 mm
REAR WHEEL	STANDARD
Wheel type	6-spoke alloy type
Rim (Size)	17 M/C x MT5.50 Dot -D
Rim (Material)	Aluminium
Wheel travel	122 mm
FRONT TYRE	STANDARD
Tyre type	tubeless
Size	120/70 ZR17 M/C (58W)
Model (brand)	N.A.
Tyre pressure (cold)	2.4 Bar.
REAR TYRE	STANDARD
Tyre type	tubeless
Size	180/55 ZR17 M/C (73W)
Model (brand)	N.A.
Tyre pressure (cold)	2.4 Bar.



TECHNICAL DETAILS

FRAME SPECIFICATIONS

FRONT BRAKE		STANDARD	LIMIT
Brake type		Floating double-disc brake	
Activation		With the right hand	
Recommended fluid		DOT 4	
Brake discs			
 Diameter x thickness		320 x 4 mm (12.5 x 0.15 in)	
Minimum thickness			4.0 mm (0.15 in)
Max. deformation			0.1 mm (0.004 in)
Worn brake pad thickness		4 mm (0.15 in)	
Pump cylinder ID		16 mm (0.62 in)	
Caliper cylinder ID		34 and 30 mm (1.33 and 1.18 in)	
REAR BRAKE		STANDARD	LIMIT
Brake type		Single-disc brake	
Activation		With the right foot	
Recommended fluid		DOT 4	
Brake discs			
 Diameter x thickness		260 x 5 mm	
Minimum thickness			4.5 mm (0.17 in)
Max. deformation			0.15 mm (0.006 in)
Worn brake pad thickness		4 mm	
Pump cylinder ID		12 mm (0.47 in)	
Caliper cylinder ID		32 mm (1.25 in)	



TECHNICAL DETAILS

FRAME SPECIFICATIONS

FRONT SUSPENSION	STANDARD
Suspension type	Upside-down fork with stems diameter 50mm
Fork stroke	120 mm
Spring	
Free length	295 mm
Spacer length	137 mm
Flexibility (K1)	8.6 Nm (0.96 Kgf-m)
Spring stroke (K1)	0 ~ 120 mm (0 ~ 4.72 in)
Fork oil	
Recommended oil	SAE 7.5 Marzocchi 19
Amount for each stem	770 cc.
Level (from the top of the outside pipe, with the pipe completely compressed without the fork spring)	95 mm
STEERING	STANDARD
Steering bearing type	Ball bearings
Angle from end-of-stroke to end-of stroke (lh)	30°
Angle from end-of-stroke to end-of stroke (rh)	30°



TECHNICAL DETAILS

FRAME SPECIFICATIONS

REAR SUSPENSION	STANDARD
Suspension type	Swinging fork in aluminium alloy, adjustable gas shock absorber in spring extension and pre-load
Fork travel	123 mm
Spring	
Free length	178 +/- 1,5 mm
Installed length	167 +/- 1,5 mm
Flexibility (K1)	16 Nm
Spring stroke (K1)	42+/- 1 mm
Spring pre-load gas/air standard pressure	1200 kPa (12 bar)
Spring pre-load adjustment positions	
Minimum	0
Standard	0
Maximum	10 mm (0.39 in)
Bounce damping adjustment positions	
Minimum*	0
Standard*	-17
Maximum*	-30
* from the completely returned position	
DRIVE CHAIN	STANDARD
Model (brand)	REGINA 137-ORPB
Link number	118
Drive chain loosening	15 mm (0.59 in) from skid



TECHNICAL DETAILS

ELECTRICAL SPECIFICATIONS

SYSTEM VOLTAGE	STANDARD
System voltage	12 V
STARTING COILS	STANDARD
Model (brand)	N.D.
Primary coil resistance	0.6 Ω
Secondary coil resistance	10 k Ω
Primary coil choke	2.5 mH (1 kHz 0.3V)
Secondary coil choke	23.5 mH (1kHz)
Max. current withstand value	7.6 A
RECHARGING SYSTEM	STANDARD
System type	Magnetic AC
Model (brand)	5-101211-502-1 (DENSO)
Nominal output	13.5 V 48 A at 5000 rpm
Voltage regulator (inside the alternator)	semiconductor, FieldControl
Voltage setting	14.5 + 0.3 V (5000 rpm 10 A 25 C°)
STARTING RELAY	STANDARD
Model (brand)	N.A.
Amps	100 A
Coil resistance	4.4 Ω at 20 C°
BATTERY	STANDARD
Model (brand)	YTX9-BS
Battery capacity voltage	12 V / 14 A
Relative density	1.310
HEADLIGHT	STANDARD
Headlight type	Halogen bulb
BULBS (WATT x QTY)	STANDARD
Headlight	12 V 55 W x 2
Front position indicator	12 V 5 W x 2
Rear position indicator/brake light	A LED
Turn indicators	



TECHNICAL DETAILS

ELECTRICAL SPECIFICATIONS

Plate light	12 V 5 W x 1
Instrument cluster light	LED x 1
LIGHTS (WATT x QTY.)	STANDARD
Neutral indicator light	LED x 1
High beam light	LED x 1
Oil level alarm light	LED x 1
Turn indicator lights	LED x 1
Engine failure alarm light	LED x 1

ELECTRIC START SYSTEM	STANDARD
Model (brand)	5-128-330
Power output	0.7 kw
HORN	STANDARD
Horn type	low
Model (brand)	N.D.
Max. amps	3 A
Performance	105 ~ 118 db (A)
FLASHER RELAY	STANDARD
Relay type	elettro lasher
Model (brand)	355 E10
Turn indicators flashing frequency	80 ~160 cycles/min
Watt	10W x4
OIL PRESSURE SENSOR	STANDARD
Model (brand)	N.A.



TECHNICAL DETAILS

ELECTRICAL SPECIFICATIONS

FUSES (AMPS x QTY)	STANDARD
Fuse CD1(Control unit)	15 A (Blue)
Fuse CD2(Control unit)	15 A (Blue)
Headlight fuse	15 A (Blue)
Service fuse	15 A (Blue)
Radiator fan fuse	15 A (Blue)
Spare fuse	15 A (Blu) + 40 A (Red)
Fuel pump fuse	15 A (Blue)
THROTTLE VALVE SENSOR	STANDARD
Model (brand)	6PX 008476-11
Resistance	4.0 KO $\pm$ 20%
FUEL PUMP	STANDARD
Model	N.A.
Max. amps	N.A.
Level sensor	inside
Min.Max. resistance	285 O (empty) - 12 O (full)
SAFETY SWITCHES	STANDARD
Stand switch	CE75A
Idle switch	20.00.057 (MONT.EL)
Tilt	YE69A (DENSO)
AIRBOX AIR TEMPERATURE SENSOR	STANDARD
Model (brand)	15TT001 (JCI)
Resistance	23.75 O 20 C°, 16.7 O 30 C°
THROTTLE BODY AIR PRESSURE SENSOR	STANDARD
Model (brand)	N.A.



TECHNICAL DETAILS

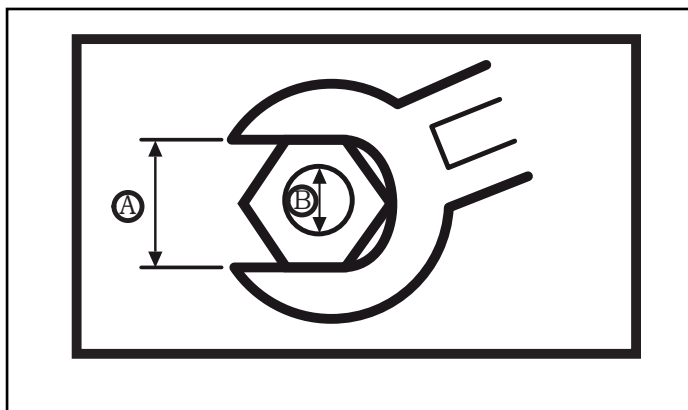
ELECTRICAL SPECIFICATIONS

LIQUID TEMPERATURE SENSOR	STANDARD
Model (brand)	N.A.
Resistance	N.A.
SPEED SENSOR	STANDARD
Model (brand)	N.A.
LAMBDA	STANDARD
Model (brand)	N.A.
INJECTOR	STANDARD
Model (brand)	N.A.
RELAY UNIT	STANDARD
Model (brand)	CM1 NAIS
IGNITION SYSTEM	STANDARD
Start system type	DELPHI MT05
Ignition timing	5° before TDC from 900 to 1800 r/min
Tone wheel sensor (Pick-Up)	O1VR002 (JCI)
Model (brand)	DELPHI
STEPPER	STANDARD
Model (brand)	N.A.
Stepper type	two phases
RADIATOR FAN	STANDARD
Model (brand)	N.A.



TECHNICAL DETAILS

GENERAL TIGHTNESS SPECIFICATIONS



The tightness torques for parts or special assemblies are provided in each chapter of this manual.

As far as concerns assemblies with multiple fastening elements, in order to avoid the risk of warping, cross-tighten the parts in successive stages until the required torque is achieved.

Unless otherwise stated, tightness torques refer to parts with clean, dry threads.

Parts must be at ambient temperature.

"B" NUT	GENERAL TIGHTNESS TORQUES	
	N.m	Kgf.m
4mm	2.3	0.23
5mm	4.5	0.45
6mm	10	1.01
8mm	25	2.54
10mm	45	4.58
12mm	80	8.15
14mm	130	13.25
16mm	200	20.39
18mm	240	24.47



TECHNICAL DETAILS

TIGHTENING TORQUES

TIGHTNESS TORQUES AND RELEVANT PRELOADS FOR STANDARD CONNECTIONS

The values given in the following table refer to standard tightness, i.e., for metric screws coupled with the relevant nut, or with screw nut in metal.

The bodies to be tightened must be metal or sufficiently rigid not to require the insertion of bushing or shims.

Coupling is always made with the thread slightly oiled or greased; alternatively, the type of thread blocker required must be stated.

Axial preloads related to tightening torque have increased by 10% compared to the value calculated, to take into account the tolerance on the nominal torque and the variation that the friction coefficient may undergo from tightening to tightening.

SCREW	8.8 CLASS		10.9 CLASS		12.9 CLASS	
	TIGHTNESS TORQUES [Nm]	AXIAL PRELOAD [Nm]	TIGHTNESS TORQUES N.m	AXIAL PRELOAD [Nm]	TIGHTNESS TORQUES N.m	AXIAL PRELOAD [Nm]
M4 X 0.7	3	3.870	4.2	5.420	5.2	6.710
M5 X 0.8	6	6.350	7.5	7.930	9	9.520
M6 X 1	10	8.860	13	11.520	16	14.180
M8 X 1.25	22	14.900	30	20.330	40	27.100
M8 X 1 (*)	25	17.280	36	24.890	45	31.110
M10 X 1.5	45	24.680	65	35.640	80	43.870
M10 X 1.25 (*)	50	27.870	70	39.013	85	47.380
M12 X 1.75	80	37.640	110	51.750	135	63.510
M12 X 1.5 (*)	85	40.547	120	57.250	145	69.170
M12 X 1.25 (*)	90	43.550	130	62.900	150	72.580
M14 X 2	130	52.670	185	74.800	220	88.950
M14 X 1.5 (*)	150	62.900	205	85.960	245	102.780
M16 X 2	200	74.070	280	103.690	335	124.060
M16 X 1.5 (*)	225	86.140	310	118.680	360	137.820
M18 X 2.5	265	83.650	370	116.790	450	142.040
M18 X 1.5 (*)	320	104.900	450	147.520	550	180.300
M20 X 2.5	390	111.870	550	257.770	650	186.450
M20 X 1.5 (*)	440	130.620	630	187.020	750	222.650
M22 X 2.5	540	141.950	750	197.150	900	236.580
M22 X 1.5 (*)	600	162.750	850	230.560	1.000	271.240
M24 X 3	670	160.238	950	227.203	1.130	270.252
M24 X 2 (*)	750	184.566	1.050	258.392	1.250	307.610

(*) The metric screw named has a fine pitch.

<table><tr><td>CHK ADJ</td><td></td></tr></table>	CHK ADJ		<u>Inspections and Periodic Adjustments</u>	CHAPTER 3
CHK ADJ				



CHAPTER 3 REGULAR MAINTENANCE

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PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

Intervals given in the scheduled maintenance table must be considered as a general guideline for conditions of normal use only. It may be necessary to reduce these intervals according to weather conditions, terrain, geographical situation and individual use. Some operations can be performed by the user as long as they have the necessary skills and in any case, as long as this is expressly mentioned in this manual.

In any case, carry out operations at an authorised Benelli workshop. A list of workshops is available on our website www.benelli.com or from our customer service (T_ +39 0721 41871).

In general, maintenance needs to be carried out with the motorbike on the rear stand, engine off and switch set to OFF:

While checking fluid levels, it is preferable to keep the motorbike upright without using the rear stand.

NOTE:

- Annual checks need to be carried out every year unless maintenance is carried out on the base of servicing at set distance intervals (or in the case of the UK, mileage).
- At 36,000 km, repeat maintenance services as begun at 12,000 km.
- For intervals for those items marked "☐", we recommend contacting a Benelli dealer, given that it is necessary to have special equipment, specific information and specific technical experience-

The following section shows all of the maintenance operations-

NOTE:

AIR FILTER

- The air filter needs to be replaced more often if the vehicle is used in particularly damp or dusty environments.

HYDRAULIC BRAKE MAINTENANCE

- Check brake fluid levels on a regular basis and top up as necessary.
- Replace the parts inside the brake pump and callipers every two years. Also change the brake fluid.
- Replace brake hoses every 4 years, or before if cracked or damaged.

KEY	
I	Inspection and adjustment, cleaning, lubrication or replacement, as needed
R	Replacement
T	Tighten
☐	Dealer



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

FREQUENCY

NO.	Part	Maintenance intervention or control	0 km (0 mi) Pre-delivery	1000 km (621 mi) 1° Service	6,000 km (3,726 mi) 2° Service	12,000 km (7,452 mi) 3° Service	18,000 km (11,178 mi) 4° Service	24,000 km (14,904 mi) 5° Service	Annual inspection
1	Engine oil:	Check/Top up/Replacement	I	R	R	R	R	R	R
			Before every use of the vehicle						
2	Oil filter	Replacement		R	R	R	R	R	
			Or at any engine oil replacement						
3	Fuel filter	Check/Replacement			I	I	R	I	
4	Air Filter	Check/Replacement			I	R	I	R	
5	Cooling Fluid	Check/Top up/Replacement	I	I	I	I	I	I	I
		Replace	Every 2 years or 18.000 km						
6	Cooling system:	Check the level of the cooling fluid	I	I	I	I	I	I	I
		and make sure there are no leaks							
		of fluid from the vehicle							
7	Spark plugs	Check/Replacement			I	R	I	R	I
			Check the conditions, clean and restore the distance between electrodes						
8	Transmission Chain	Check chain tension Make sure that the rear wheel is correctly aligned Clean and lubricate		I	I	I	I	I	I
			Every 500 km and after every wash or if the motorcycle has been used in the rain.						
9	Crown	Check /Lubricate		I	I	I	I	I	I
			Replace every time the chain is replaced						
10	Pinion/Retaining washer	Check/Replacement		I	I	I	I	I	I
			Replace every time the chain is replaced						
11	Circuit hoses fuel	Check for faults/leaks			I	I	R	I	
			Replace every 24000 km or in any case, every 3 years						
12	Brake fluid *clutch	Check/Top up/	I	I	I	I	I	I	I
		Replace	Replace every 18000 km or in any case, every 2 years						
13	Front brake/ Rear brake:	Check operation and fluid level, and make sure that there are no leaks of fluid from the vehicle	I	I	I	I	I	I	I
14	Brake pads	Check/Replacement		I	I	I	I	I	
			Replace if worn to the limit						
15	Fork chain slide	Check/Replacement		I	I	I	I	I	
			Replace if worn to the limit						
16	Fork chain slide	Check/Replacement		I	I	I	I	I	
			Replace if worn to the limit						
17	Accelerator grip	Check operation and if necessary, adjust the accelerator cable backlash Lubricate the accelerator grip housing and cable	I	I	I	I	I	I	I



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

FREQUENCY

NO.	Part	Maintenance intervention or control	0 km (0 mi) Pre-delivery	1000 km (621 mi) 1° Service	6,000 km (3,726 mi) 2° Service	12,000 km (7,452 mi) 3° Service	18,000 km (11,178 mi) 4° Service	24,000 km (14,904 mi) 5° Service	Annual inspection
18	Throttle valve	Check operation/Adjust backlash		I	I	I	I	I	
19	Clutch control	Check/Adjustment	I	I	I	I	I	I	I
20	Throttle valve	Check/Adjustment		I	I	I	I	I	
21	Valve clearance	Check operation/Adjust clearance						I	
		Check clearance every 24000 km (14904 mi)							
22	Distribution chain	Check/Replacement						R	
		Every 24000 km (14904 mi)							
23	Distribution chain slides	Check/Replacement						R	
		Every time the distribution chain is replaced							
24	Chain tensioner distribution	Check/Replacement						R	
		Every time the distribution chain is replaced							
25	Steering ring nut and sleeve	Check/Adjustment	T	T	T	T	T	T	T
		Before every use of the vehicle							
26	Steering bearings	Check/Replacement				T		T	
		Every 18000 km lubricate with lithium soap-based grease							
27	Wheel bearings front / back	Check/Replacement				I		I	
		Every 24000 km (24900 mi)							
28	Fork bearings	Check/Replacement			I	I	I	R	
		Every 24000 km (14904 mi)							
29	Swing arm	Check operation and make sure there is no excessive clearance. Lubricate.			I	I	I	I	
30	Front suspension	Check operation and make sure there are no leaks		I	I	I	I	I	I
31	Front suspension oil	Replacement					R		
		Every 24000 km (11178 mi)							
32	Rear suspension	Check/adjustment make sure that there are no leaks			I	I	I	I	
		Before every use of the vehicle							
33	Wheels	Make sure they are not off centre or damaged				I	I	I	
		Every 18000 km lubricate with lithium soap-based grease							
34	Tyres	Check the depth of tread and make sure they are not damaged. Replace if necessary. Check inflation pressure. Replace if necessary		I	I	I	I	I	I
		Replace if worn to the limit							
35	Side stand	Check operation	I	I	I	I	I	I	I
36	Switch Side stand	Check operation	I	I	I	I	I	I	I



PERIODIC MAINTENANCE AND LUBRICATION INTERVALS

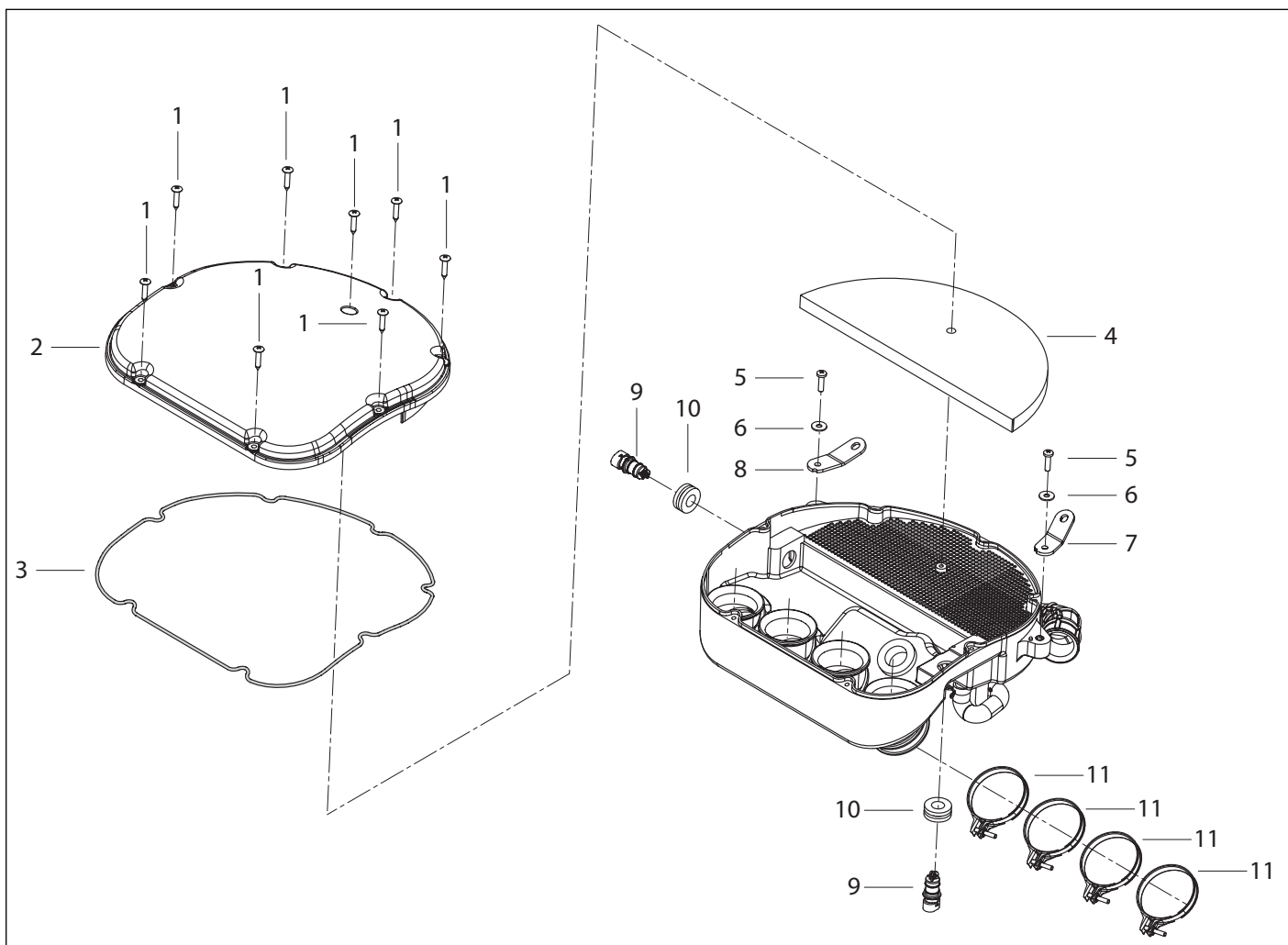
FREQUENCY

NO.	Part	Maintenance intervention or control	0 km (0 mi) Pre-delivery	1000 km (621 mi) 1° Service	6,000 km (3,726 mi) 2° Service	12,000 km (7,452 mi) 3° Service	18,000 km (11,178 mi) 4° Service	24,000 km (14,904 mi) 5° Service	Annual inspection
37	■ Instruments, lights, signals and switches	Check operation							
38	■ Head light	Check operation							
		Adjustment	At every change in vehicle set-up						
39	■ Acoustic warning	Check operation							
40	■ Instruments	Check operation							
41	■ Connections Battery	Check operation							
42	■ Electrical System	Check operation							
43	■ Ignition switch	Check operation							
44	■ Electric fans	Check operation							
45	■ Electronic injection fuel consumption	Set the minimum running speed for engine and synchronisation							
46	■ Fuel /CO*	Check/Adjustment							
			Every 12000 km (7452 mi)						
47	■ Cyclist part fastening	Make sure all nuts, bolts and screws are correctly tightened,		T	T	T	T	T	T
48	■ Oil sump screws	Replacement		T	T	T	T	T	
49	■ Lid screws clutch	Replacement		T	T	T	T	T	
50	■ Catalytic converter	Check for faults/leaks						R	
			No maintenance required. In case of malfunction replace.						
51	■ USA canister version	Check for faults/leaks						R	
			No maintenance required. In case of malfunction replace.						
52	■ Brake/clutch hoses	Check for faults/leaks							
			Every 4 years						
53	■ Parts and wires subject to movement	Check/Replacement							
			Before every use of the vehicle						
54	■ Oil suction filter	Check/Replacement							



ENGINE/AIR FILTER

AIR FILTER REMOVAL/FITTING



Position	Description	Quantity
1	SCREW ST4.8X25	8
2	AIR BOX COVER	1
3	GASKET	1
4	AIR FILTER	1
5	SCREW M5X19	2
6	WASHER	2
7	PLATE	1
8	PLATE	1
9	AIR TEMPERATURE SENSOR	2
10	RUBBER TIP	2
11	SCREW CLIP	4



ENGINE/AIR FILTER

AIR FILTER REMOVAL/FITTING

Removal:

1. Remove the passenger seat, using the wrench provided and remove the rider's seat with the release knob (A) Fig. A.
2. Remove the side fairings from the tank and fuel tank.
3. Remove the two screws fastening the plates (7-8) securing the filter body to the frame. Fig. B
4. Loosen the two screw clips (11) and separate the filter body from the throttle valves.
5. Place the filter on a flat surface.
6. Remove the 11 screws (1) fastening the cover (2) Fig. B.
7. Take out the filter element (4) Fig. C.

NOTE:

Replace the air filter element every 12,000 km. If the vehicle is used in particularly damp or dusty climates, it will be necessary to change the air filter more often.

Check:

To make sure there is no damage to the air filter. If damaged, it will need to be replaced and if intact, proceed to wash:

1. Wash the filter element with specific solvents for this purpose.
2. Air dry.
3. Apply a specific oil to the whole surface of the filter element.

NOTE:

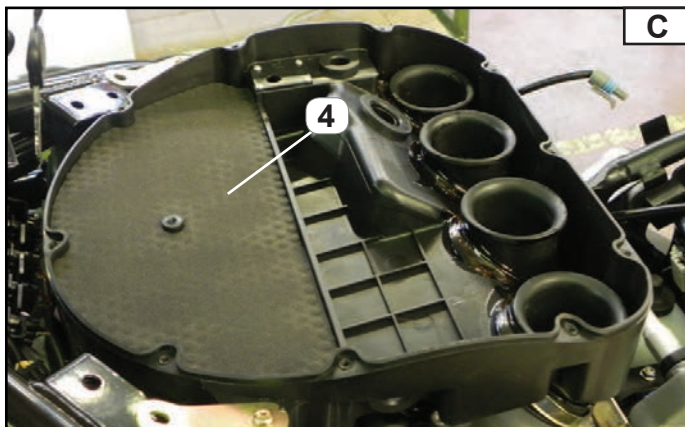
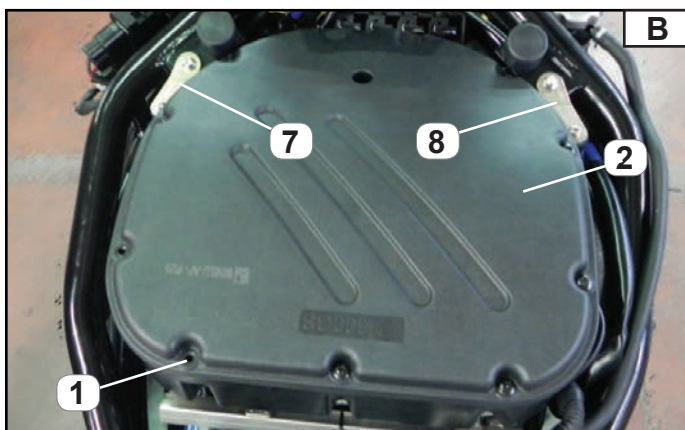
Before fitting the filter element into the air box., be sure to drain off any excess oil and make sure that it is no longer dripping.

Installation:

1. During the installation stage, follow the steps for removing the filter, as described above, only this time in reverse order.

IMPORTANT NOTICE:

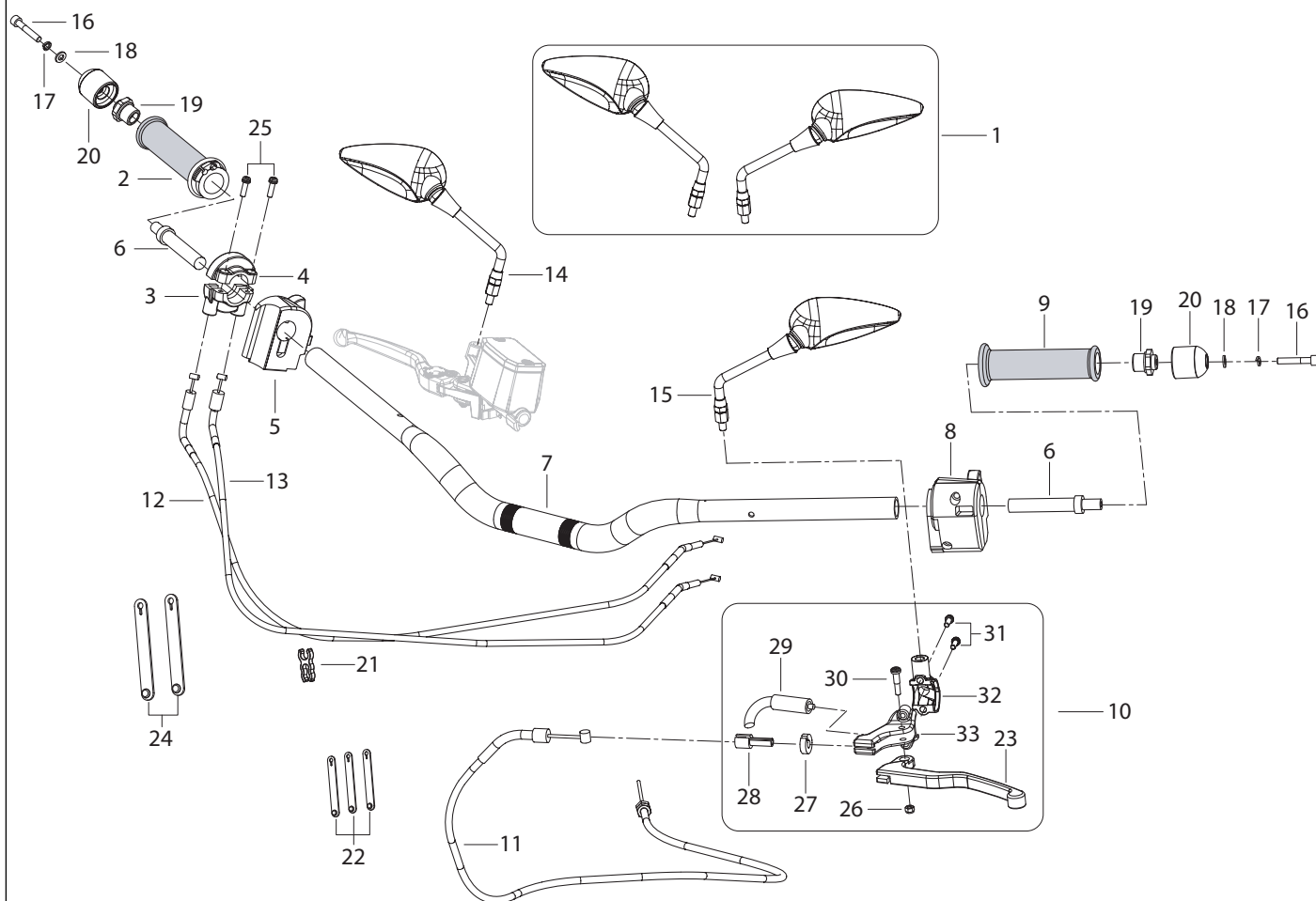
Never start the engine without the air filter installed. If not filtered, air will cause engine parts to wear out quickly and may even damage the engine. Using the engine without air filter will also have a negative effect on the fine tuning of the throttle valves and this in turn will cause the engine's performance to suffer and even to eventually overheat. Make sure that the air filter is always in good working order. The lifetime of the engine depends mainly on this part.





ENGINE/ACCELERATOR CABLE CLEARANCE

ACCELERATOR CABLE CLEARANCE ADJUSTMENT



Position	Description	Quantity
1	PAIR OF REAR VIEW MIRRORS	1
2	ACCELERATION CONTROL	1
3	BOTTOM ACCELERATION CONTROL	1
4	TOP ACCELERATION CONTROL	1
5	RIGHT SWITCH	1
6	GRIP END	2
7	HANDLEBAR	1
8	LEFT SWITCH	1
9	LH GRIP	1
10	CLUTCH CONTROL	1
11	CLUTCH CABLE	1
12	THROTTLE OPENING CABLE	1
13	THROTTLE CLOSING CABLE	1
14	REAR VIEW MIRROR (RIGHT)	1
15	REAR VIEW MIRROR (LEFT)	1
16	SCREW M6X35	2
17	ELASTIC WASHER	2
18	WASHER	2
19	GRIP CAP	2



ENGINE/ACCELERATOR CABLE CLEARANCE

ACCELERATOR CABLE CLEARANCE ADJUSTMENT

Position	Description	Quantity
20	ROCKER ARM	2
21	CABLE GLAND	1
22	TUBE GUIDE	3
23	CLUTCH CONTROL LEVER	1
24	RUBBER CLAMP	2
25	SCREW	2
26	NUT M6	1
27	SPECIAL NUT	1
28	SPECIAL SCREW	1
29	CLUTCH SWITCH	1
30	SCREW	1
31	SCREW M6X14	2
32	U-BOLT	1
33	LEVER SUPPORT	1

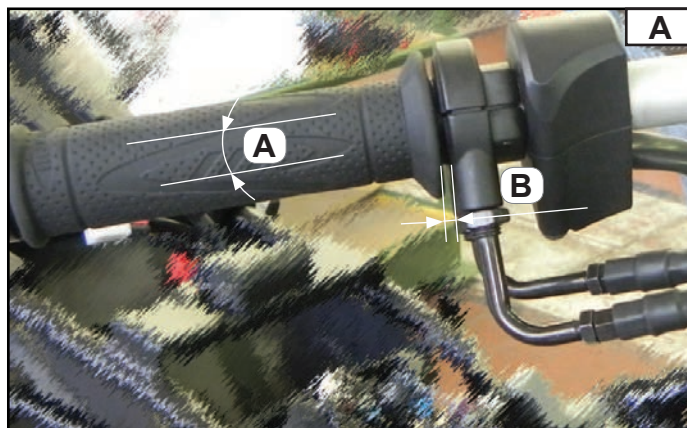
NOTE:

Before adjusting accelerator cable clearance, it is necessary to set the minimum idle speed of the engine.
First check at 1000 km (621 mi) and then every 6,000 km (3,726 mi).

Check:

• accelerator cable clearance (A)

Make sure that the accelerator control grip (2) is working normally and that it is possible to reach the maximum open position and automatic closure position in all steering positions. If necessary, adjust. Fig.A



Accelerator cable clearance (A)	Size
Accelerator cable	3 - 5 mm

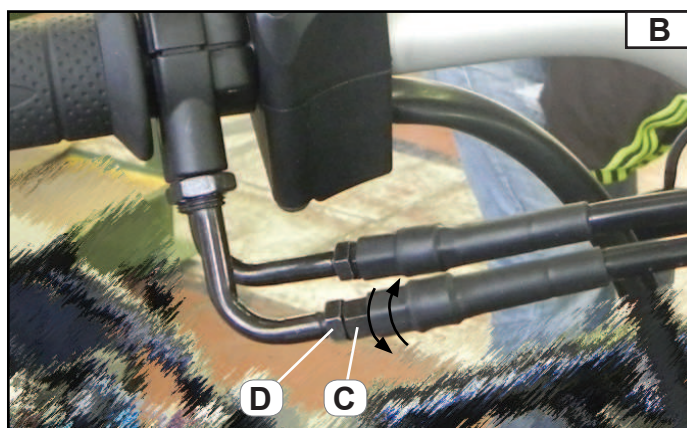
Adjust:

• accelerator cable clearance

Handlebar side

- Loosen the nut support "D"
- Turn the adjustment nut "C" clockwise or anticlockwise to set the accelerator cable clearance as specified. Fig.B

Accelerator cable clearance	Clearance
Clockwise	Increases clearance
Anticlockwise	Reduces clearance



- Tighten the support nut "D"
- Make the adjustment to both acceleration controls.

IMPORTANT NOTICE:

After adjusting the clearance of the accelerator, start the engine and turn the handlebars to the right and left, making sure that the minimum idle speed of the engine does not change.



ENGINE/CLUTCH CABLE

CLUTCH CABLE CLEARANCE ADJUSTMENT

Check:

- clutch cable clearance (A)

If necessary, adjust.



Clutch cable clearance	Clearance distance
Clutch lever	3 - 4 mm

Adjust:

- Clutch cable clearance

Handlebar side

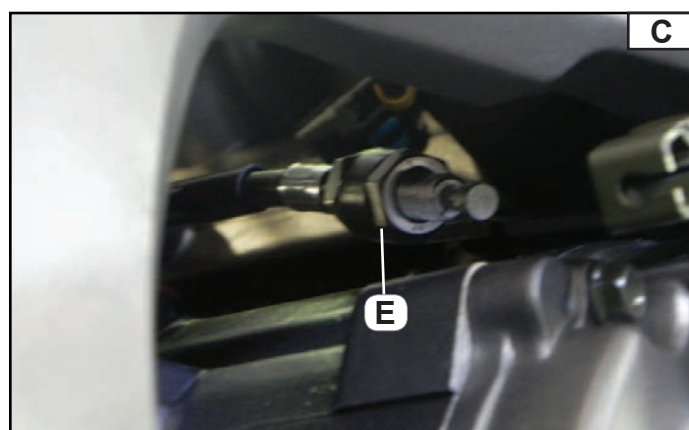
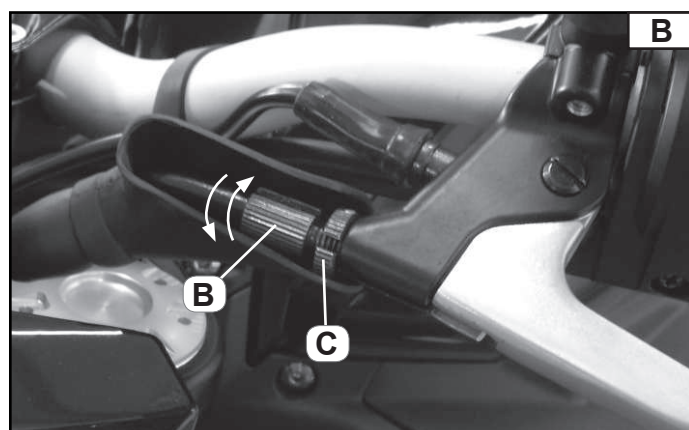
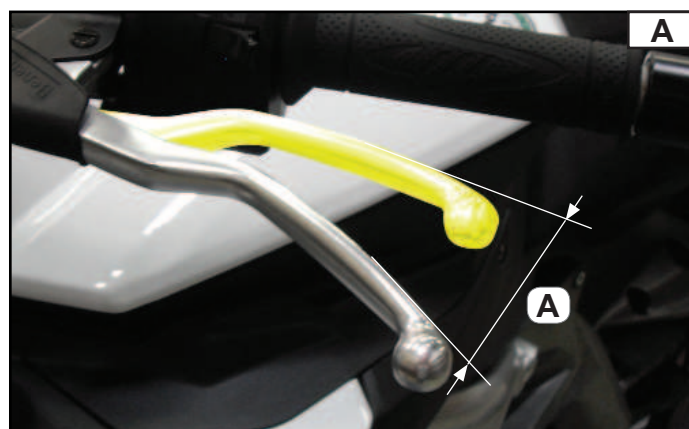
- Loosen the ring nut "C"
- Turn the adjustment device "B" clockwise or anticlockwise to set the clutch cable clearance as specified. Fig.B

Clutch cable clearance	Clearance
Clockwise	Increases clearance
Anticlockwise	Reduces clearance

- Tighten the ring nut "C"

NOTE:

If it is not possible to achieve the specified clearance for the clutch cable from the handlebar side, use the adjustment nut on the engine side "E". Fig.C





FRAME/HANDLEBAR

REAR VIEW MIRROR ADJUSTMENT

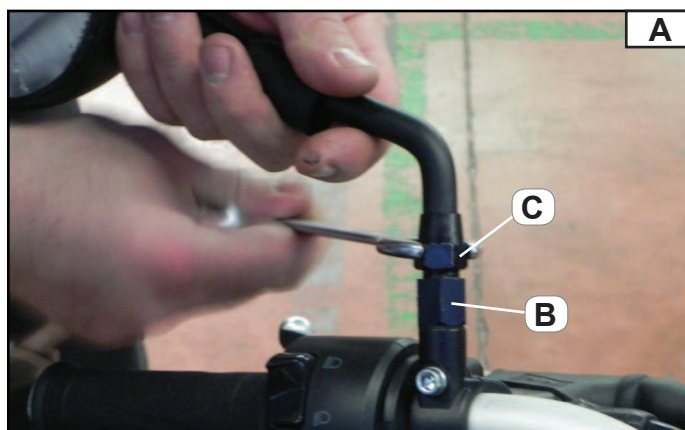
The following procedure applies to both rear view mirrors.

- **Installation**

1. Tighten the mirror (15) on the lever body (32).
2. Tighten the nut "B" as far as it will go.
3. Adjust the mirror position by turning it to the required position.
4. Tighten the support nut "C"

NOTE:

Perform the same procedure on the right-hand mirror.





ENGINE/ENGINE OIL

ENGINE OIL LEVEL CHECK

Park:

- the bike on a level surface.

NOTE:

- Place the motorbike on suitable stands so that the tyres are at the same height from ground level.
- Make sure that the bike is upright.

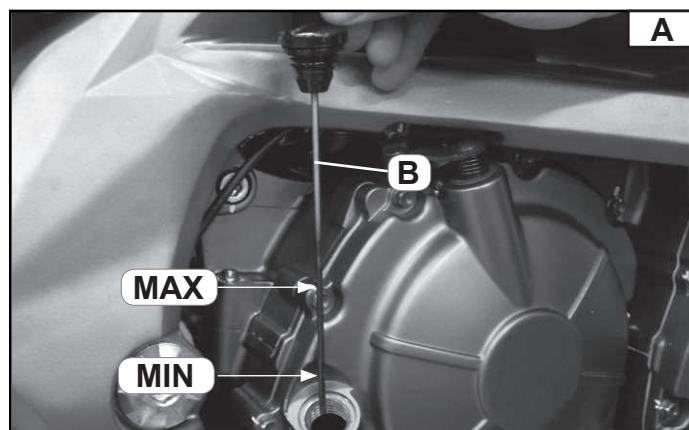
Start:

- the engine.

leave it to warm up for a few minutes before switching it off.

IMPORTANT NOTICE:

Do not start the engine if the oil is under the MIN reference of the rod "B" Fig. A,

**Check:**

- the engine oil level

the oil level must be between the minimum level (MIN) and maximum level (MAX) marks on the dipstick.

If it is below the minimum level mark, top up to the correct level with the recommended engine oil.

To top up the engine oil:

1. unscrew the oil cap with the engine switched off
2. Pour in enough of a suitable type of oil between the MAX and MIN levels, Fig. A,

NOTE:

The engine oil level must be checked without screwing in the dipstick cap

IMPORTANT NOTICE:

Given that engine oil also lubricates the clutch, if it is not the right type or if it contains additives, it could cause the clutch to slip. Therefore, we recommend not adding any chemical additives or using oils of other types than the one listed in the technical specifications for the engine.

Engine oil, whether new or spent, can be dangerous.

If ingested, engine oil may be poisonous to people or pets. In the event of ingestion, seek medical attention immediately; do not provoke vomiting to avoid breathing the product into the lungs.

Brief contact with engine oil may irritate the skin.

- Keep the engine oil out of reach of children and pets.
- Wear long-sleeved clothing and waterproof gloves every time you top up the engine oil.
- Wash off any oil that has come into contact with the skin with soap and water.
- Recycle or correctly dispose of spent engine oil.

3. Screw the filler cap back in place.

NOTE:

When checking the engine oil level, restart the engine, leave it to warm up for a few minutes and then switch it off. Wait a few moments to give the oil enough time to flow down.



ENGINE/ENGINE OIL

ENGINE OIL CHECK

Start:

- the engine and leave it to warm up for a few minutes before switching it off.

Remove:

- the sump plug

Place:

- a suitable container under the magnetic cap "A" to recover the engine oil. Fig. A

Remove:

- the magnetic cap "A" (together with the copper gasket).

Drain:

- the engine oil out of the crankcase.

NOTE:

Replace the oil filter cartridge if necessary.

Replace:

- the seal on the magnetic cap.

Install:

- the new seal
- the magnetic cap

Tighten the magnetic cap with the following torque:



Torque 24 N*m

Fill:

- the crankcase with the recommended engine oil in the amount specified.

Install:

- the oil cap "B" Fig. B

Start:

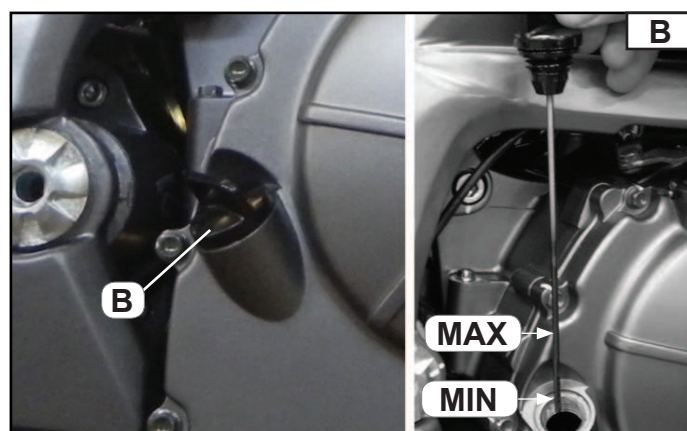
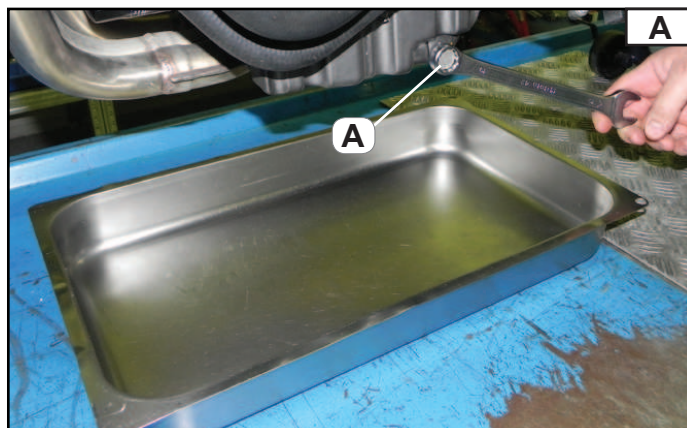
- the engine.

leave it to warm up for a few minutes before switching it off.

NOTE:

Always make sure that the level is midway between the MIN and MAX marks on the dipstick Fig.B.

Top up the engine oil level if needed.





ENGINE/SPARK PLUGS

REMOVING THE SPARK PLUGS

The following procedure applies to all spark plugs.

WARNING:

Spark plugs must be checked and replaced when the engine is cool.

Remove:

Carry out the removal procedure for the air filter, as described previously in the "Engine/Air Filter" chapter, in the paragraph "Air filter removal/installation."

IMPORTANT NOTICE:

Before removing the spark plugs, remove any build up of dirt from the seat with a jet of compressed air, to prevent it from dropping down into the cylinders.

Remove:

- The two screws (6*)
- The two brackets (8*)
- The four rubber pads (2*) and four OR gaskets (3*) Fig. A

Disconnect:

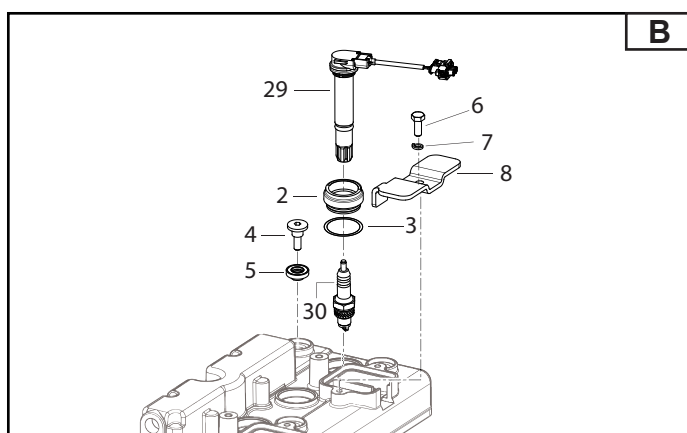
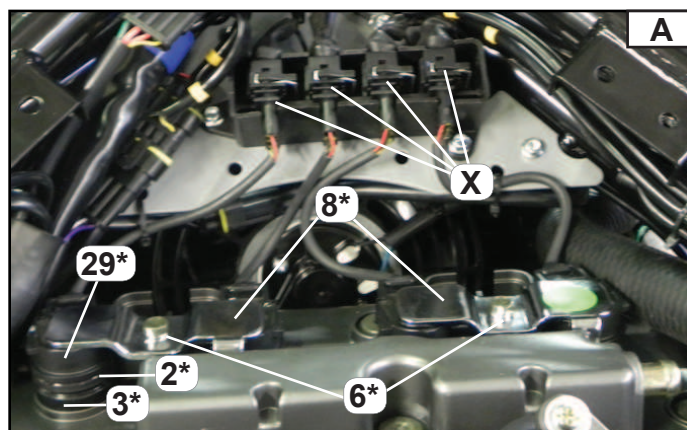
- The connectors (X) from the coils (29*) Fig. A

Slide out:

- The coil (29*)
- The spark plug (30*) underneath it Fig. B

NOTE:

The numbers marked with (*) are part of the table of replacement parts in Chapter 5 "Engine", "Removing the timing belt cover" paragraph



CHECKING THE SPARK PLUGS

The following procedure applies to all spark plugs.

Check:

- The type of spark plug

Check:

1. the electrodes (A) Fig. C

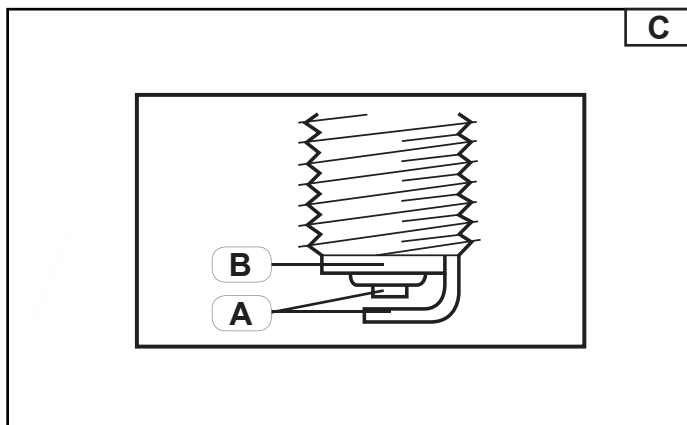
If there is any damage/wear/rounding
Replace the spark plugs.

2. the insulation section (B) Fig. C

Abnormal colour

Replace the spark plug.

The usual colour is a mid- to light-brown





ENGINE/SPARK PLUGS

CHECKING THE SPARK PLUGS

The following section contains a table with the typical conditions of spark plugs with the different causes of damage and any remedies.

	SOILED SPARK PLUG		OVERHEATED SPARK PLUG
Cause	Solutions	Cause	Solutions
Over rich mix of air/fuel Carburettor incorrectly calibrated Electrical system fault -Imperfect coil connection Specific riding conditions -Prolonged periods at "minimum" -Long sections at low speed Spark plug too cold	The fuel/carburettor system needs to be fine tuned Check the coil connections and relevant impedance Every so often, the bike needs to be taken to speeds of about 80 km/h Use a warmer spark plug, as per specifications	Ignition too advanced Insufficient air/fuel mix Insufficient coolant and/or lubricant Spark plug torque too low The spark plug used is too hot	Adjust advanced ignition Adjust air/fuel ratio Add coolant and/or lubricant Tighten to the correct torque Use cooler spark plugs as per specifications

SPARK PLUG INSTALLATION

The following procedure applies to all spark plugs. Fig. D/

WARNING:

Lubricate the plug threads with copper grease.

NOTE:

Before installing the spark plug, clean it and also the surfaces in contact with the gasket.

Install:

- the spark plug on the head, tightening it by hand until you can feel it come into contact with the base of the head. Tighten to the correct torque.



Torque 12 N*m

Install:

- The coil (29*)
- The rubber tips (2*) and the OR gasket (3*) Fig.D

Connect:

- the coil connector

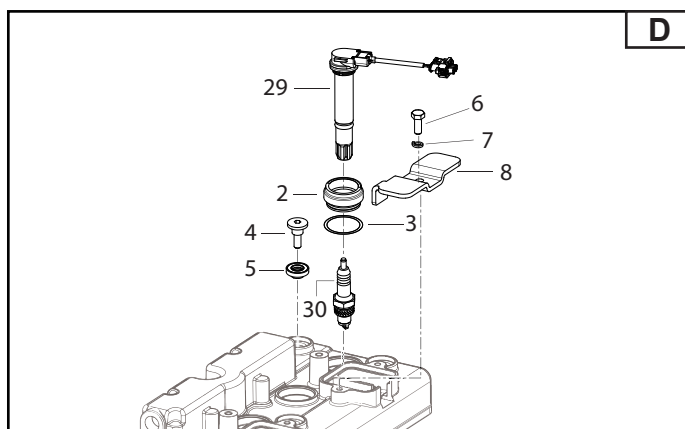
Install:

- The coil (6*)
- The bracket (8*)

Tighten to the correct torque.



Torque 8 N*m





FRAME/BRAKE ADJUSTMENT

FRONT BRAKE ADJUSTMENT

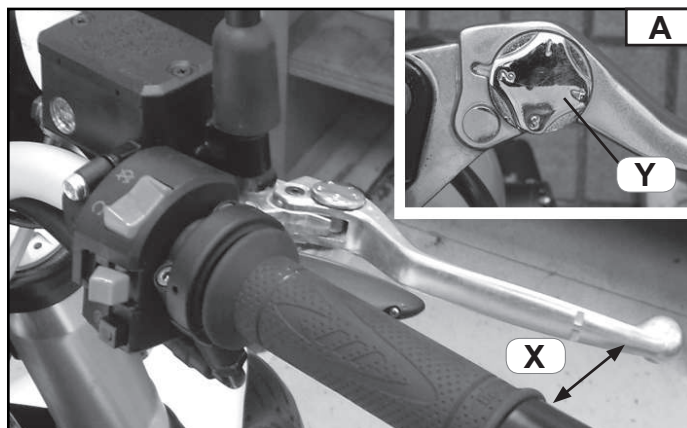
Adjust:

- the position of the brake lever Fig. A
(the distance "x" between the accelerator and the brake lever).

NOTE:

Push the brake lever forwards to neutralise the thrust of the spring and at the same time, adjust the position, turning the ring nut, "y" clockwise or anticlockwise until the brake lever is where it should be.

Ring nut Position	Distance
Position 1	the distance is further from the handlebar.
Position 4	The distance is nearer to the handlebars

**WARNING:**

If the brake lever is soft or spongy to the touch, this may be a symptom of air in the brake system. Before using the motorbike, it is necessary to bleed out the air by emptying out the brake circuit. Air in the brake circuit will considerably reduce the performance of the system and may even lead to a loss of vehicle control and possible accidents. Therefore, check the system and if necessary, bleed it.

IMPORTANT NOTICE:

After adjusting the position of the brake lever, make sure that there is no brake drag of any kind.



FRAME/BRAKE ADJUSTMENT

FRONT BRAKE ADJUSTMENT

Adjust:

- the position of the brake pedal, using the eccentric pin Fig.A.
- Loosen the lock nut "A" .
- Unscrew the threaded pin "B"
- Take out the return spring (C) connecting the eccentric pin (D) to the frame Fig. B
- Use an open wrench to adjust the position of the eccentric (D) compared to the stop screw (E)

Eccentric position	Brake pedal position
Clockwise	The pedal lifts
Anticlockwise	The pedal lowers

NOTE:

We recommend leaving a gap of about 5/10 mm between the stop head and eccentric pin Fig. B

- Tighten the lock nut "A" .

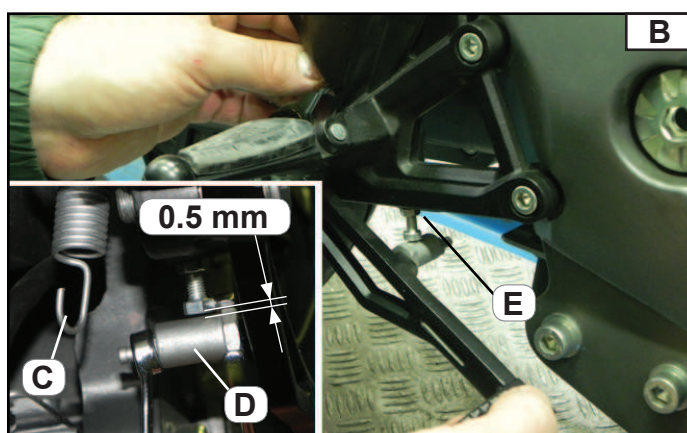
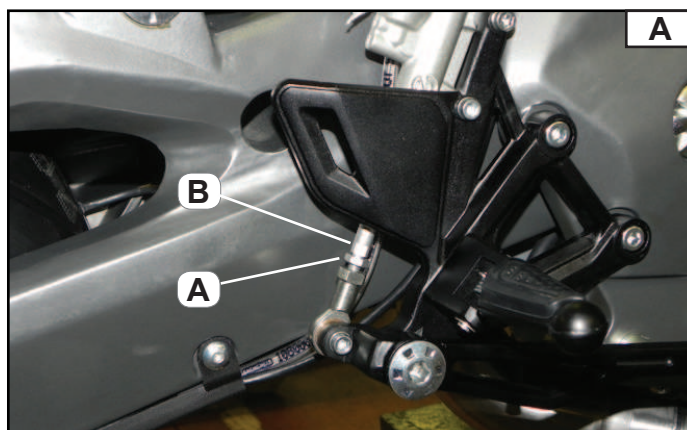
- Insert the spring "C".

WARNING:

If the brake lever is soft or spongy to the touch, this may be a symptom of air in the brake system. Before using the motorbike, it is necessary to bleed out the air by emptying out the brake circuit. Air in the brake circuit will considerably reduce the performance of the system and may even lead to a loss of vehicle control and possible accidents
Therefore, check the system and if necessary, bleed it.

IMPORTANT NOTICE:

After adjusting the position of the brake pedal, make sure that there is no brake drag of any kind.





FRAME/BRAKE FLUID CHECK

CHECK THE LEVEL OF THE REAR BRAKE FLUID / TOP UP

Park:

- the bike on a level surface.

NOTE:

Place the motorbike on a stand and make sure that it is in the upright position.

Check:

- Brake fluid levels

If it is below the minimum level mark "A" Fig. A, top up to the correct level with the recommended engine oil.

Fluid top up procedure:

- Once the motorbike is level, unscrew the top cap "B" from the brake pump Fig. A

Check:

the seal on the cap.

If there is any damage/wear

Replace the gasket

IMPORTANT NOTICE:

Brake fluid can damage painted surfaces or plastic parts. Therefore, apply absorbent paper around the pump and always clean up any break fluid spills immediately.

- Apply the vacuum device "B" to the bleeding screw "C".
- Top up the fluid as far as the level in the peep hole on the pump Fig. C.
- Pump the brake fluid until the brake lever moves.
- Once the top up process is complete, fit the cap and tighten the two fastening screws to the cover:

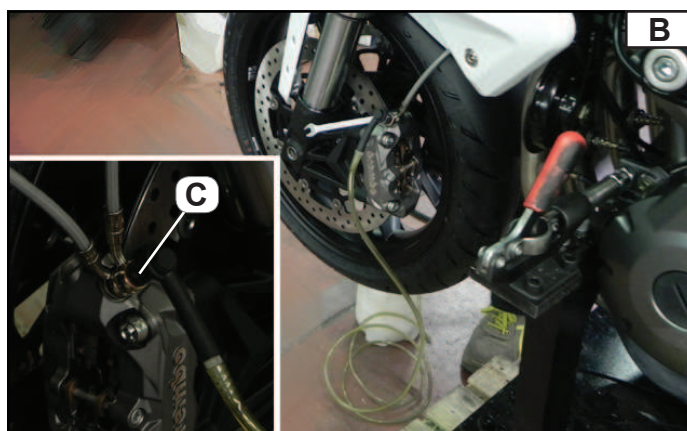
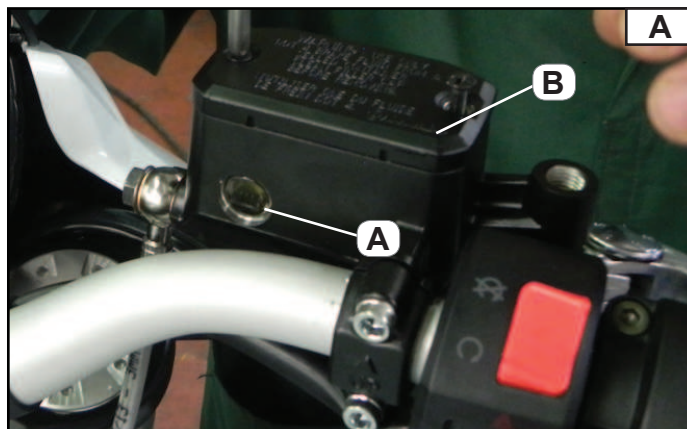
WARNING:

Only use the prescribed brake fluid. Other brake fluids may be the cause of deterioration to rubber gaskets, causing leaks and an unsuitable operation of the braking system.

Top up with the same brake fluid already in the system. The mix of different brake fluids may lead to a harmful chemical reaction, able to cause incorrect operation of the braking system.

While topping up, take care not to let any water into the tray.

Water would significantly lower the boiling point of the brake fluid and could cause steam bubbles.





FRAME/BRAKE FLUID CHECK

CHECK THE LEVEL OF THE REAR BRAKE FLUID / TOP UP

Park:

- the bike on a level surface.

NOTE:

Place the motorbike on a stand and make sure that it is in the upright position.

Check:

- Brake fluid levels

If it is below the minimum level mark "A" Fig. A, top up to the correct level with the recommended engine oil.

Fluid top up procedure:

- Once the motorbike is level, unscrew the top cap "B" from the brake pump Fig. B

Check:

the seal on the cap "C"

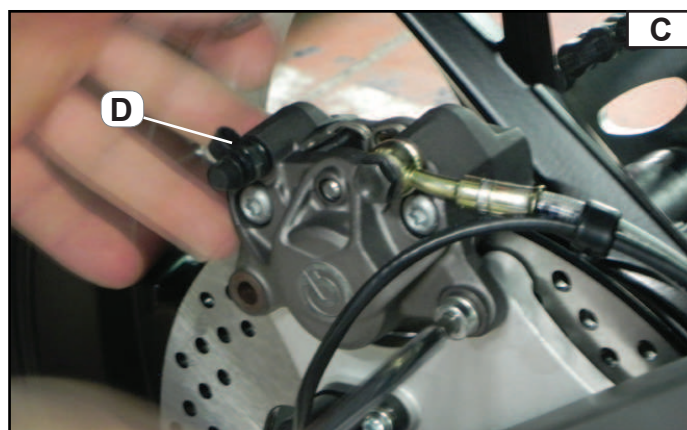
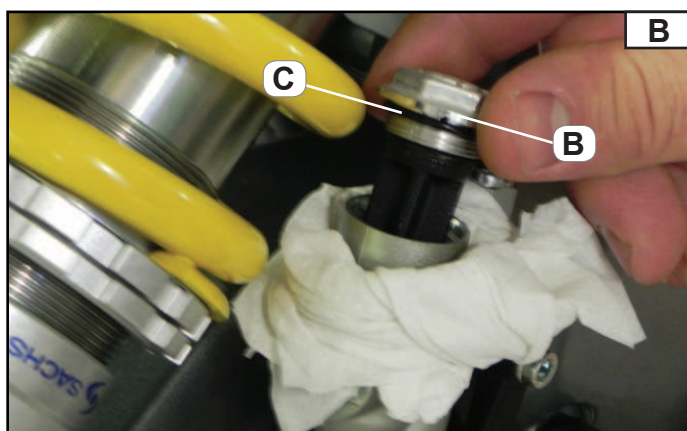
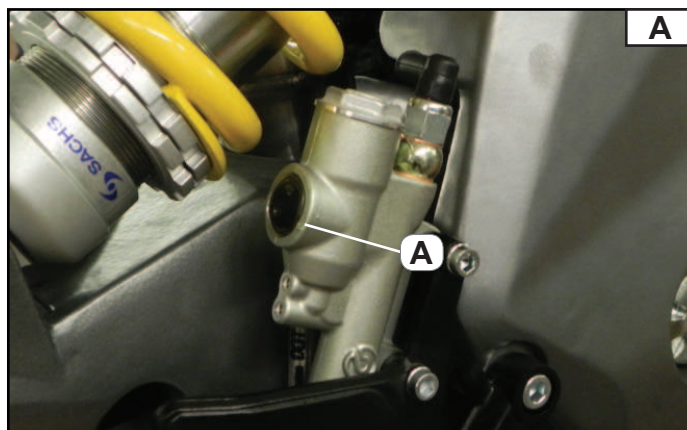
If there is any damage/wear

Replace the gasket

IMPORTANT NOTICE:

Brake fluid can damage painted surfaces or plastic parts. Therefore, apply absorbent paper around the pump and always clean up any break fluid spills immediately.

- Remove the screw fastening the rear brake outer calliper and loosen the internal fastening screw Fig. C so as to lift the brake calliper. This will completely bleed the circuit, removing all air bubbles.
- Apply the vacuum device "D" to the bleeding screw and loosen the screw.
- Top up the fluid as far as the level in the peephole on the pump.
- Pump the brake fluid until the brake lever moves.
- Once the top up process is complete, lower the calliper and tighten the two fastening screws to the following torque:



Torque 22 N*m

- Close the pump cover.

WARNING:

Only use the prescribed brake fluid. Other brake fluids may be the cause of deterioration to rubber gaskets, causing leaks and an unsuitable operation of the braking system.

Top up with the same brake fluid already in the system. The mix of different brake fluids may lead to a harmful chemical reaction, able to cause incorrect operation of the braking system.

While topping up, take care not to let any water into the tray.

Water would significantly lower the boiling point of the brake fluid and could cause vapour bubbles.



FRAME/BRAKE PAD CHECK

FRONT AND REAR BRAKE PAD CONTROL

The following procedure applies to all brake pads.

Enable:

- the brake

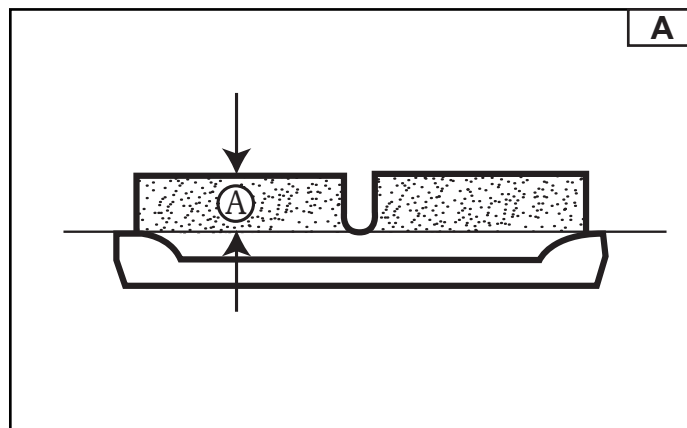
Check:

- The front brake pads Fig. A
- The rear brake pads Fig. A
- Wear limit for the front and rear brake pads

If the wear limit has been reached, replace the brake pads in block.



Pads	Wear limit (A)
Front	1 mm
Rear	1 mm

**NOTE:**

To replace the pads, please see the "Frame" chapter, in the section "Front brake pad removal and installation."



FRAME/BRAKE SYSTEM HOSE CHECK

BRAKE HOSE CHECK

The following procedure serves for all brake hoses and brake hose clamps.

Check:

- The front and rear brake hose.

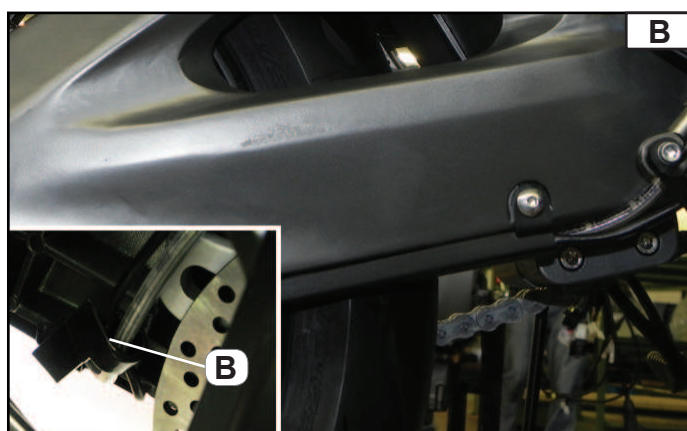
If there are any cracks/signs of wear or damage, replace.

Check:

- The hose clamp for the front brake "A" Fig. A. If loose, tighten the clamp screw.

Check:

- The hose clamp "B" for the rear brake Fig. A. If loose, tighten the clamp screw.





FRAME/TRANSMISSION CHAIN ADJUSTMENT

ADJUSTMENT

NOTE:

Do not inspect or adjust the transmission chain while the engine is running.

NOTE:

Check the feed of the transmission chain in the point where it seems most taut.

WARNING:

If the transmission chain is too taut, this will cause the engine to overload, as well as other vital parts, while if too slack, it may come off and damage the fork arm or cause an accident. We recommend keeping the chain slack to within specified limits.

Park:

- the bike on a level surface.

WARNING:

Support the motorbike correctly, so that it cannot fall over and so that the rear wheel is raised.

- Allow the rear wheel to turn several time and identify the position where the transmission chain is at its most taut.

Check:

- the slackness of the transmission chain, if not within specifications, adjust Fig. A.



Transmission belt slackening	10-15 mm
------------------------------	----------

Adjust:

- the slackness of the transmission chain Fig. B.

If the chain tension is not correct, adjust it as follows.

- Loosen the wheel pin nut on the left side of the swinging arm.
- To tension the transmission chain, turn the tension adjustment screw on each side of the swinging arm (anti-clockwise).
- To loosen the transmission chain, turn the tension adjustment bolt on the left side of the swinging arm (clockwise) and push the rear wheel forwards.
- At the end of adjustment, tighten the wheel pin nut to the following torque:

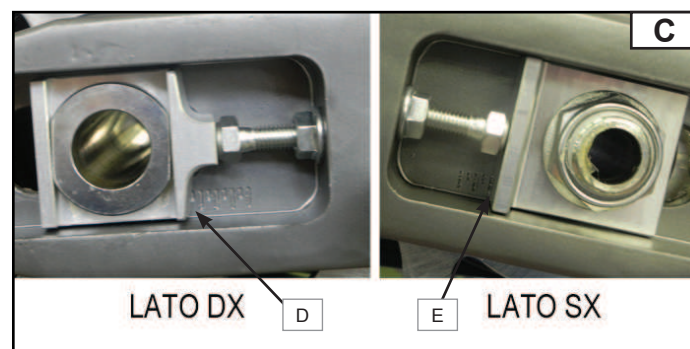
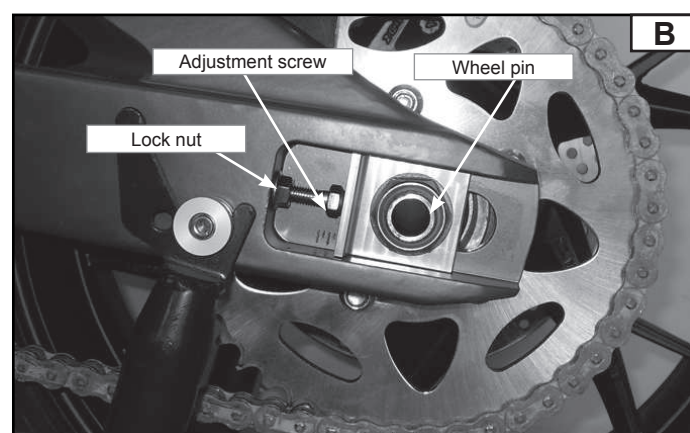
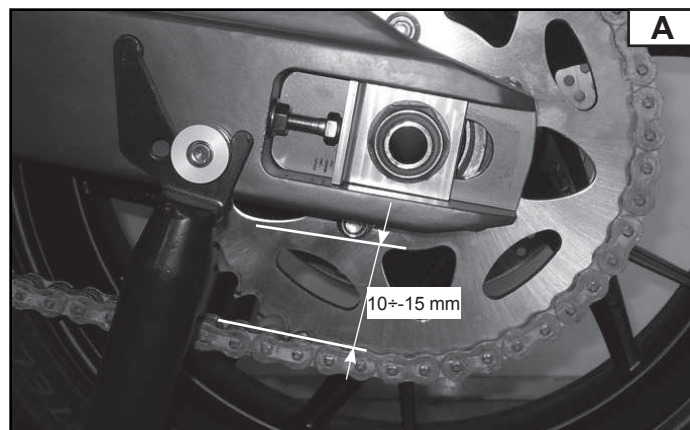


Torque 80 N*m

IMPORTANT NOTICE:

Incorrect transmission chain tension will overload the engine and other vital parts of the motorcycle, and it may cause the chain to slip or break/ To stop this from happening, keep the transmission chain tension within the specified limits.

Make sure that the distance for the right side (RH) is at the **eighth**



slot on the swinging arm "D", while on the left side (LH), it is at the **fifth** slot on the swinging arm "E" Fig.C.

FRAME/TRANSMISSION CHAIN ADJUSTMENT

LUBRICATION

IMPORTANT NOTICE:

The transmission chain is comprised of many parts that interact with one another.

The chain needs to be subjected to the correct maintenance to prevent its rapid deterioration.

We therefore recommend that the transmission chain be subject to maintenance, especially when used in very dusty areas.

This motorbike is fitted with a transmission chain fitted with small rubber O-rings inserted between a side plate and the other.

Never use steam jets or jets of highly pressurized water, aggressive solvents or brushes with overly stiff bristles, as they could damage the O-rings.

We recommend using only those products recommended for cleaning transmission chains.

Dry the chain and lubricate it carefully using engine oil or another lubricant specifically for chains with O-ring.

Do not use other types of lubricant on the transmission chain, as they may contain solvents that would damage the O-rings.

Apply:

- A fine, even layer of lubricant to the whole chain, taking care not to reach the parts around it, especially the pneumatic parts.



FRAME/STEERING HEAD CHECK AND ADJUSTMENT

CHECK/ADJUSTMENT

Park:

- The bike on a level surface.

NOTE:

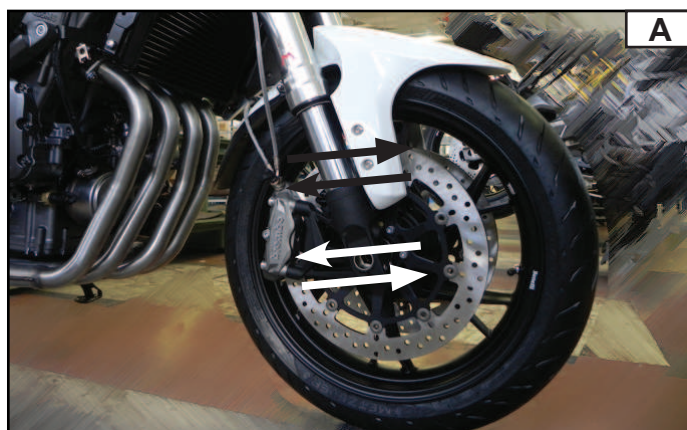
Place the bike on suitable supports so that the front wheel is raised.

Check:

- The steering head

Allow the front fork swing gently, holding it by the ends of the tubes Fig. A.

If there are any sticking/slackening points, adjust the steering head.



Remove:

- the handlebar (see the specific paragraph)

Loosen:

- The screws securing the upper steering plate "A" Fig. B.

Remove:

- The upper steering plate "B" Fig. B.

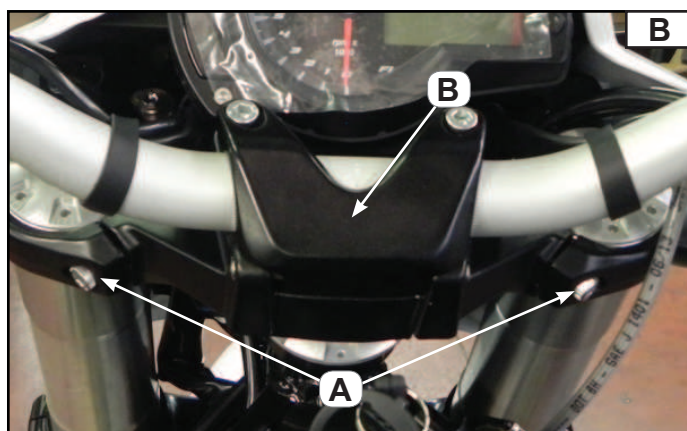
Adjust:

- The steering head
- Remove the ring nut from the steering pin "D" Fig. C.
- Loosen the steering ring nut "E" and tighten it to the specified value using the relevant wrench.



(**) Tightening tool for steering head lock nut

Code:.....



Torque 16 N*m

- Tighten the ring nut "D" with the specific tool, to the following torque:



Torque 60 N*m

WARNING:

Do not overly tighten the steering ring nut.

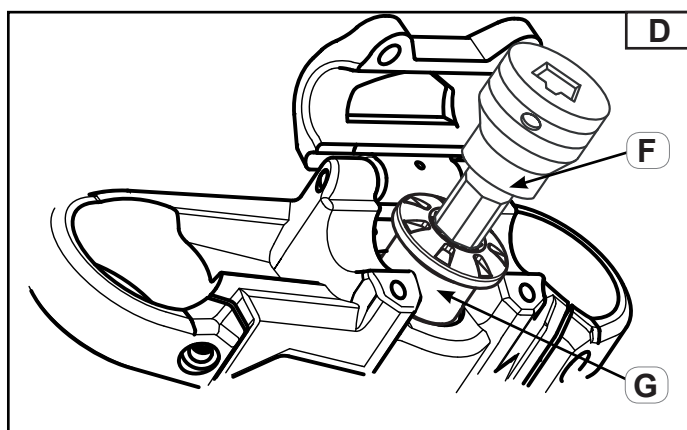
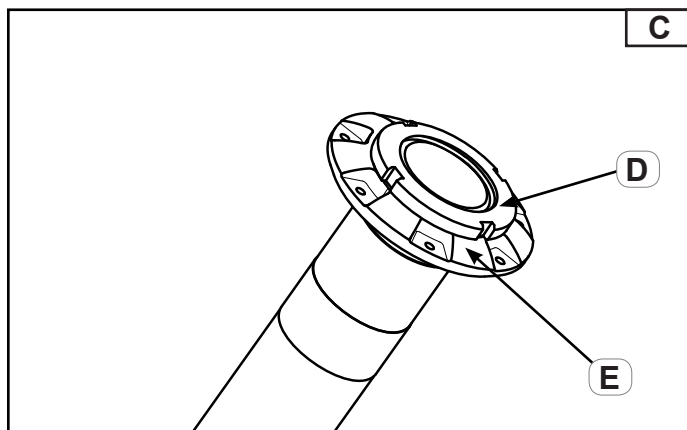
Remove:

- The cap "F" with the special tool "G" Fig. D



(**) steering head wrench tool

Code:.....





FRAME/STEERING HEAD CHECK AND ADJUSTMENT

CHECK/ADJUSTMENT

Check:

- Make sure that the steering head is not loose and that there are no sticking points by turning the front fork to the end of travel in both directions. If there are any sticking points, remove the bottom steering base and check the top and bottom bearings.

Install:

- The upper steering plate "B" Fig. B.
- The screws securing the upper steering plate "A" Fig. B.

Check again:

- The steering head
- Make the front fork swing gently, holding it by the ends of the tubes Fig. A.
- If there are any sticking/slackening points, repeat the operations to adjust the steering head.

FRAME/FRONT FORK CHECK

CHECK

Park:

- The bike on a level surface.

NOTE:

Support the motorbike correctly, so that it cannot fall over.

Check:

- The fork stem "A" Fig. A.
- The fork sleeve "B" Fig. A.

If there is any damage/lines, replace

- Oil seal

If there are any leaks, replace

Keep:

- The bike upright.

Enable:

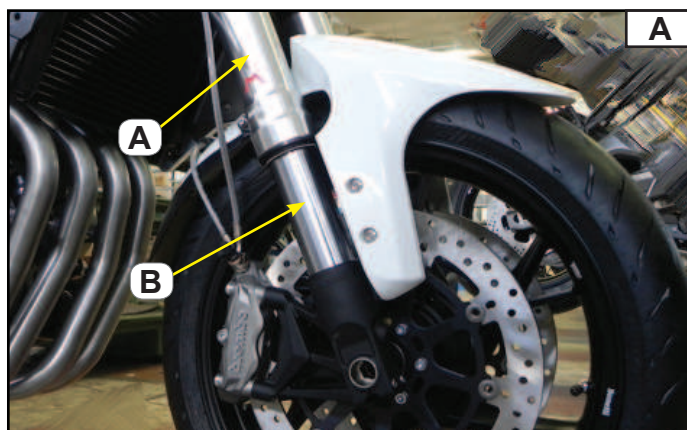
- The front brake

Check:

- Fork operation.

Push hard on the handlebars several times and make sure that the front fork slides easily back into place.

- If the movement is not smooth, repair.



FRAME/REAR SHOCK ABSORBER CHECK

SHOCK ABSORBER ADJUSTMENT

NOTE:

Support the motorbike correctly, so that it cannot fall over.

Adjustment

- Adjust the spring preload Fig. A
- The rear shock absorber is fitted with an adjustment ring nut for the pre-load of spring *A and a return ring nut (D) *



(**)Shock absorber ring nut adjustment tool

Code:.....

- To **increase** the spring's preload and therefore make the suspension more rigid, turn the adjustment ring nut "A" in direction (B).
- To **reduce** the spring's preload and therefore make the suspension softer, turn the adjustment ring nut "A" in direction (C). At the end of the adjustment, tighten the return ring nut (D).

IMPORTANT NOTICE:

To avoid damaging the mechanism, do not try turning over the maximum or minimum setting.

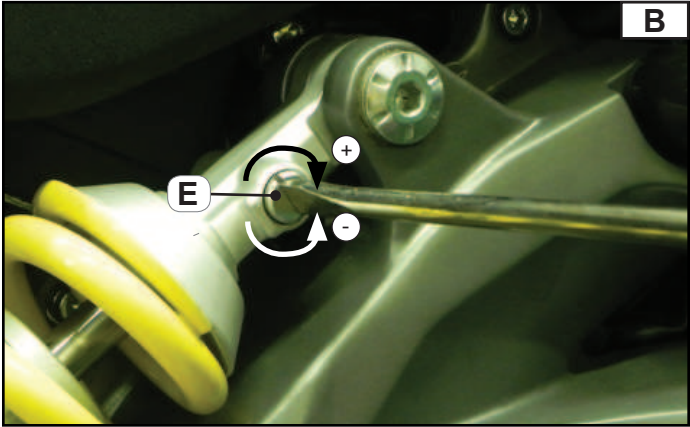
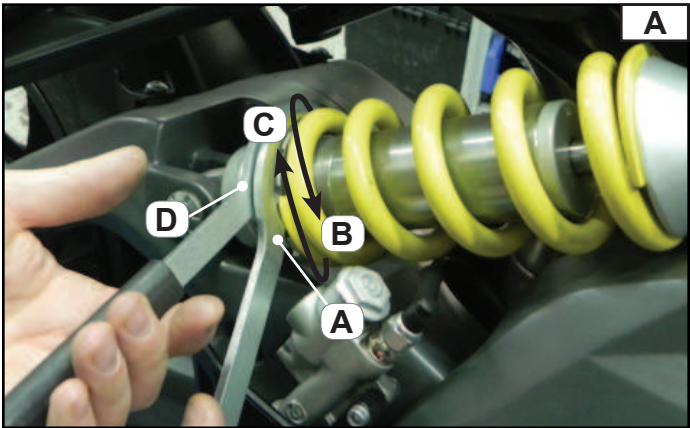
Position	Distance
Min.	0 mm
Max.	10 mm

Adjustment

- Adjustment of the hydraulic brake action in extension Fig. B
- It is possible to adjust the hydraulic brake device using the adjustment screw "E" using a screwdriver.
- Turn it clockwise to increase the brake action and anticlockwise to reduce it.

IMPORTANT NOTICE:

To avoid damaging the mechanism, do not try turning over the maximum or minimum setting.





FRAME/REAR AND FRONT TYRE CHECK

CHECK

The following procedure applies to both tyres.

Check:

- Tyre pressure and if it is not within the specified levels, adjust. Fig.A.

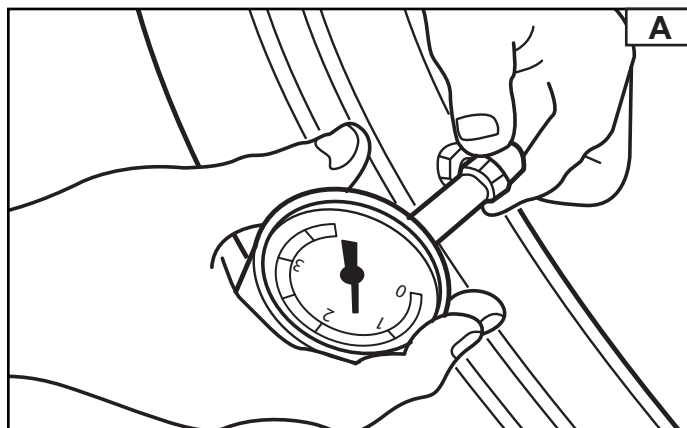
WARNING:

Tyre pressure must be checked and adjusted only when the wheel is at ambient temperature.

Tyre pressure and suspensions need to be adjusted according to total weight (including baggage, rider, passenger and accessories) taking into account the riding speed envisaged.

Riding the bike when overloaded may cause damage to the tyres, with the risk of accident or injury.

NEVER OVERLOAD THE BIKE UNDER ANY CIRCUMSTANCES.



Position	Wear limit (A)	
Net weight (with oil and full fuel tank)	See general specifications	
Maximum load*	See general specifications	
COLD TYRE PRESSURE	FRONT	REAR
Up to 90 kg load*	2.4 bar	2.4 bar
90 kg ~ maximum load*	2.4 bar	2.6 bar

*Including baggage, rider, passenger and accessories.

WARNING:

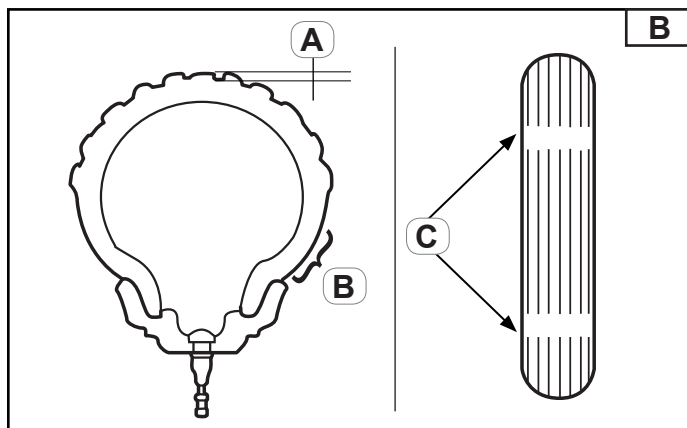
It is dangerous to ride with worn treads.

If the tread reaches wear limits, replace the tyre immediately.

Check:

- The tyre surface Fig.B.

If there is any damage/wear, replace the tyre.



Minimum tread depth "A"

- A. Tread depth
- B. Side
- C. Signs of wear

WARNING:

If tyres are new, their grip on the road will not be as good as when they are slightly worn. Therefore, we recommend riding at normal speeds for the first 100 km, before going at speed.



ELECTRIC SYSTEM/CHECK AND BATTERY CHARGE

BATTERY

WARNING:

Batteries can generate explosive gas containing nitrogen and they contain electrolyte, comprised of sulphuric acid, which is a poisonous and highly caustic substance.

Therefore, the following precautions are required:

- Wear protective goggles when handling the battery or working near it.
- Batteries must be charged in suitably ventilated areas.
- Keep batteries away from fire, sparks or naked flame (for example: welding accessories, lit cigarettes).
- NEVER SMOKE while charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTE WELL OUT OF REACH OF CHILDREN.
- Do not allow electrolyte to come into contact with any are of the body as it can cause serious burns or permanent injury to eyes.

FIRST AID IN CASE OF CONTACT:

EXTERNAL CONTACT

- Skin: wash with water.
- Eyes: Wash with plenty of running water for 15 minutes and seek immediate medical attention.

INGESTION

- Drink large amounts of water or milk, then milk of magnesium, beaten egg or vegetable oil. Seek immediate medical attention.

IMPORTANT NOTICE:

This battery is sealed. Never remove the sealed caps under any circumstances, as this will damage the balance between the cells and affect battery performance.

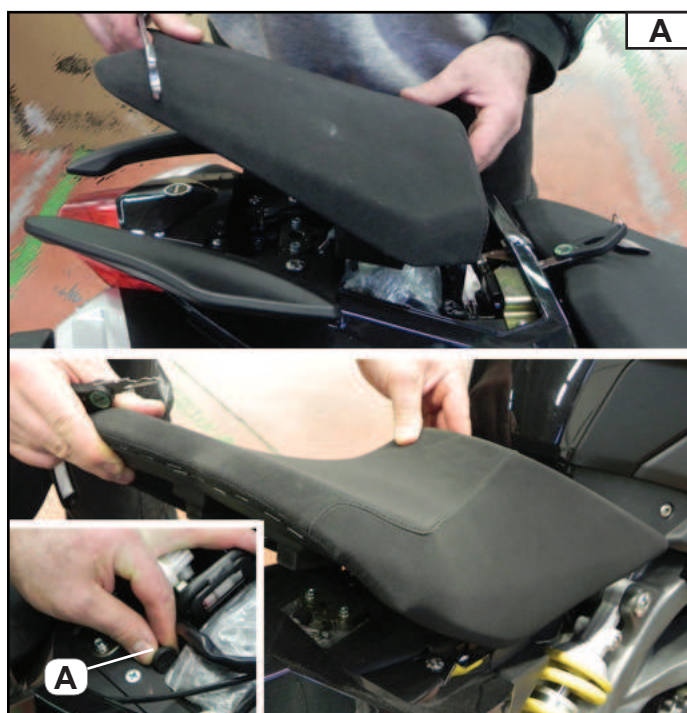
Charge time, amperage and voltages for this battery are different from those of conventional batteries. Charge the battery as illustrated in the figures. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take the utmost care while the battery is charging.

NOTE:

Given that the battery is sealed, it is necessary to check the charge by measuring the density of the electrolyte. Therefore, the battery charge is checked by measuring the voltage on the battery terminals.

Removal:

- Remove the passenger seat, using the wrench provided and remove the rider's seat with the release knob (A) Fig. A.





ELECTRIC SYSTEM/CHECK AND BATTERY CHARGE

BATTERY

Disconnect:

- The cables from the terminal batteries Fig. B

IMPORTANT NOTICE:

Disconnect the negative cable from the battery "A" first, then the positive cable "B" Fig. B

Disconnect:

- The battery
- Remove the 2 screws "C" fastening the battery lock bracket and remove the battery "D".

Check:

- Battery charge

Connect a pocket tester to the battery terminals Fig. C

Check the battery charge as shown in the tables below Fig.D.

NOTE:

A battery charge can be checked measuring the voltage in an open circuit (the voltage when the positive terminal is disconnected).

If the open-circuit voltage is equal to or over 12.8 V, no charge is required.

EXAMPLE:

- Open circuit voltage = 12.0 V
- Charge time = 6.5 hours
- Battery charge = 20 ~ 30 %

Charge:

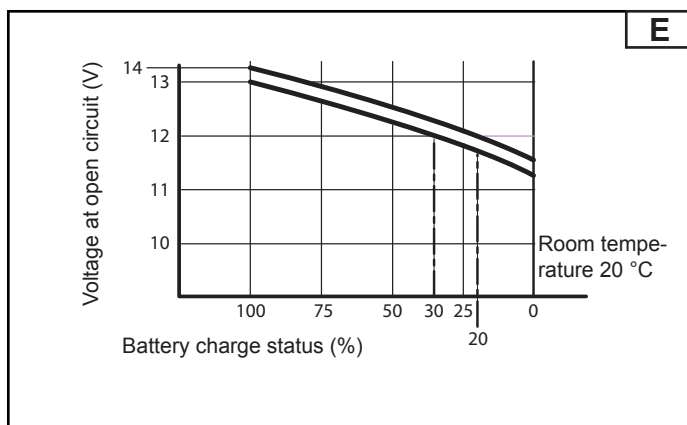
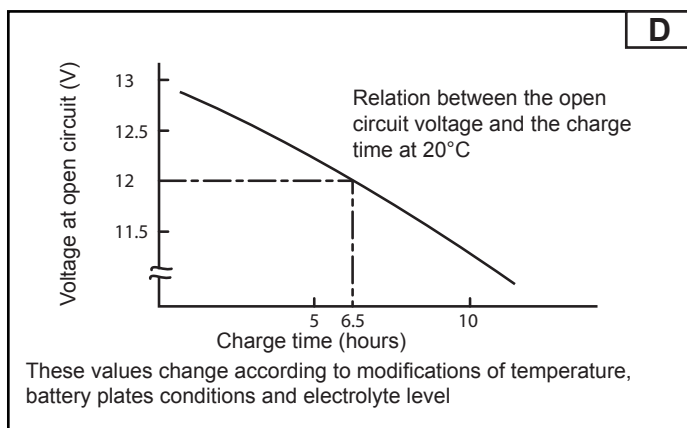
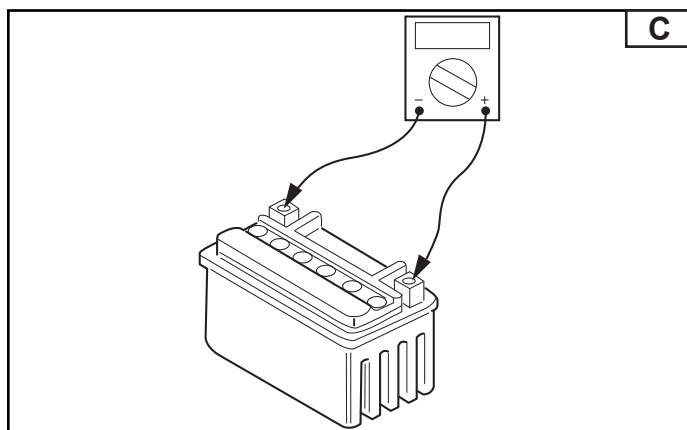
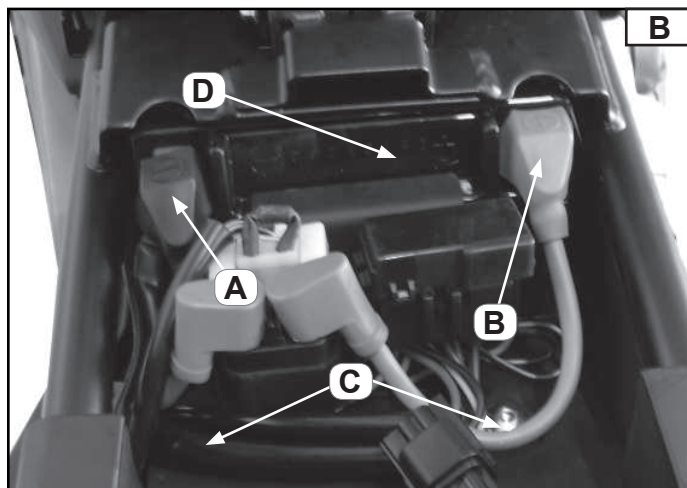
- Battery (see figure with the appropriate charge method).

IMPORTANT NOTICE:

Do not subject the battery to rapid charging.

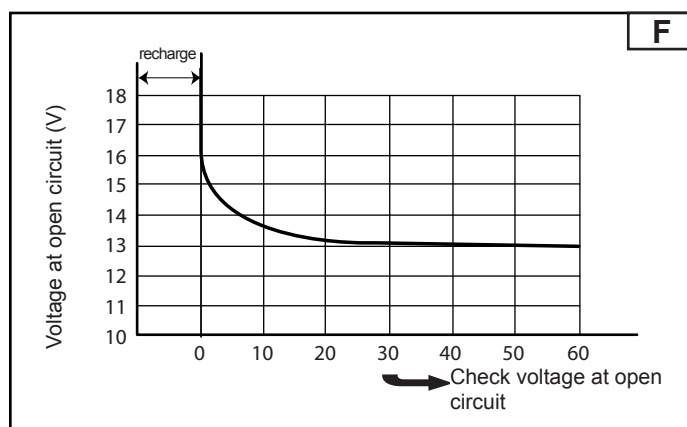
WARNING:

- Never remove the caps sealing the battery.
- Never use fast chargers as they emit a high amp current into the battery at high speed; this can overheat and damage the battery.
- If it is not possible to adjust the charge current of the battery charger, take care not to overcharge the battery.
- The battery must be removed from the bike for charging. (If it is necessary to charge the battery with it fitted on to the bike, disconnect the negative cable from the battery terminal).
- To reduce the possibility of sparks, connect the battery charger to the power supply only after connecting the cables to the battery.
- Before removing the clips from the battery terminals, remember to switch off the charger.
- Make sure that the clips on the battery charger cables are completely in contact with the battery terminals and that there are no short circuits. A corroded terminal may generate heat in the contact area, while an inefficient terminal spring may cause sparks.
- If the battery overheats at any time during charging, disconnect the charger and leave the battery to cool before continuing. Overheated batteries can explode!
- As illustrated in Fig. F, the open circuit voltage of a battery



**ELECTRIC SYSTEM/CHECK AND BATTERY CHARGE****BATTERY**

stabilises within 30 minutes or so after the charge is complete, before measuring the open circuit voltage.





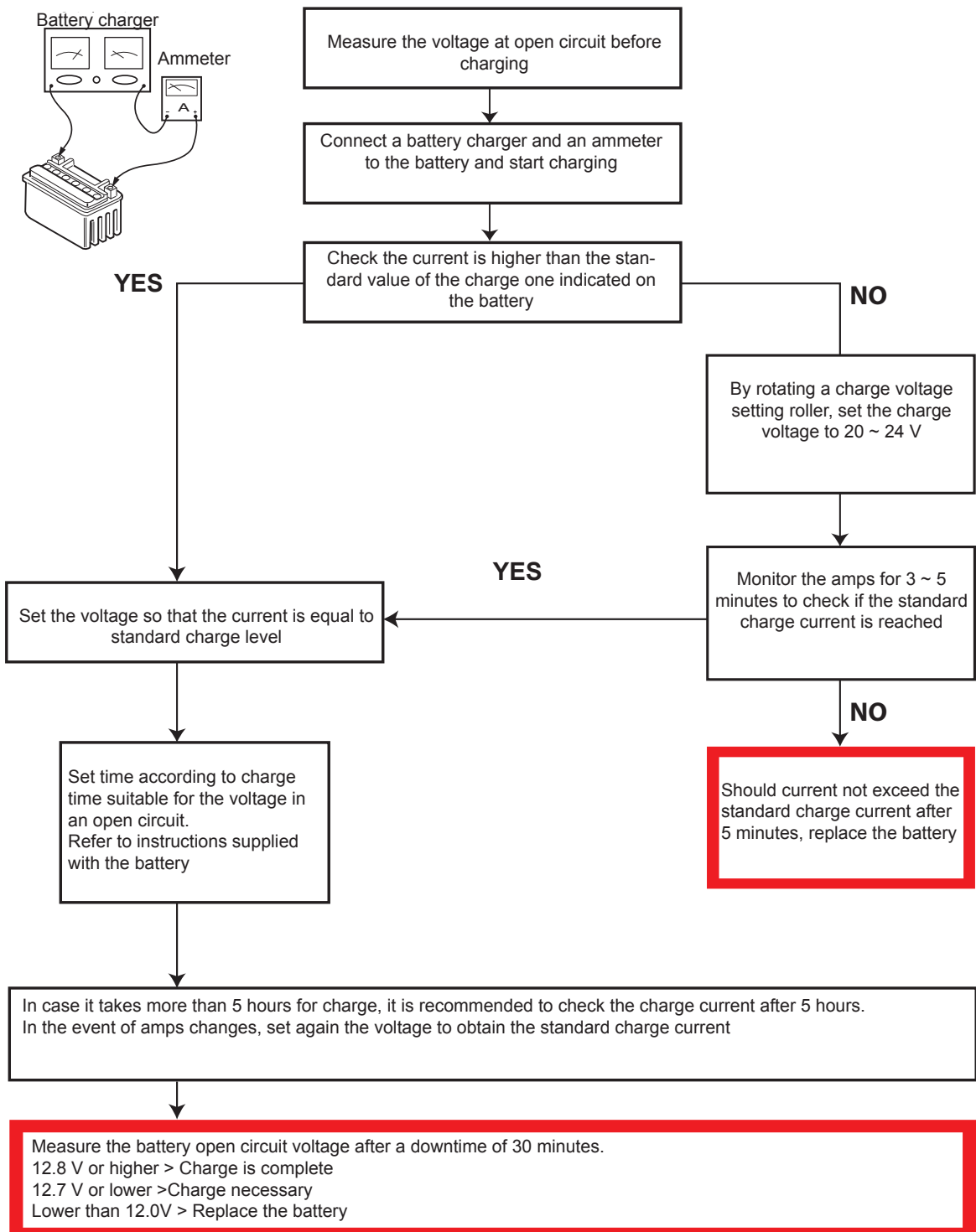
ELECTRIC SYSTEM/CHECK AND BATTERY CHARGE

BATTERY

CHARGE METHOD USING A CHARGER WITH VARIABLE CURRENT (VOLTAGE)

NOTE:

- Measure the voltage 30 minutes after switching off the equipment.
- Set the charge voltage to 16 ~ 17 V. (A lower setting will not give sufficient charge.
- A setting that is too high will overload the battery).





ELECTRIC SYSTEM/CHECK AND BATTERY CHARGE

BATTERY

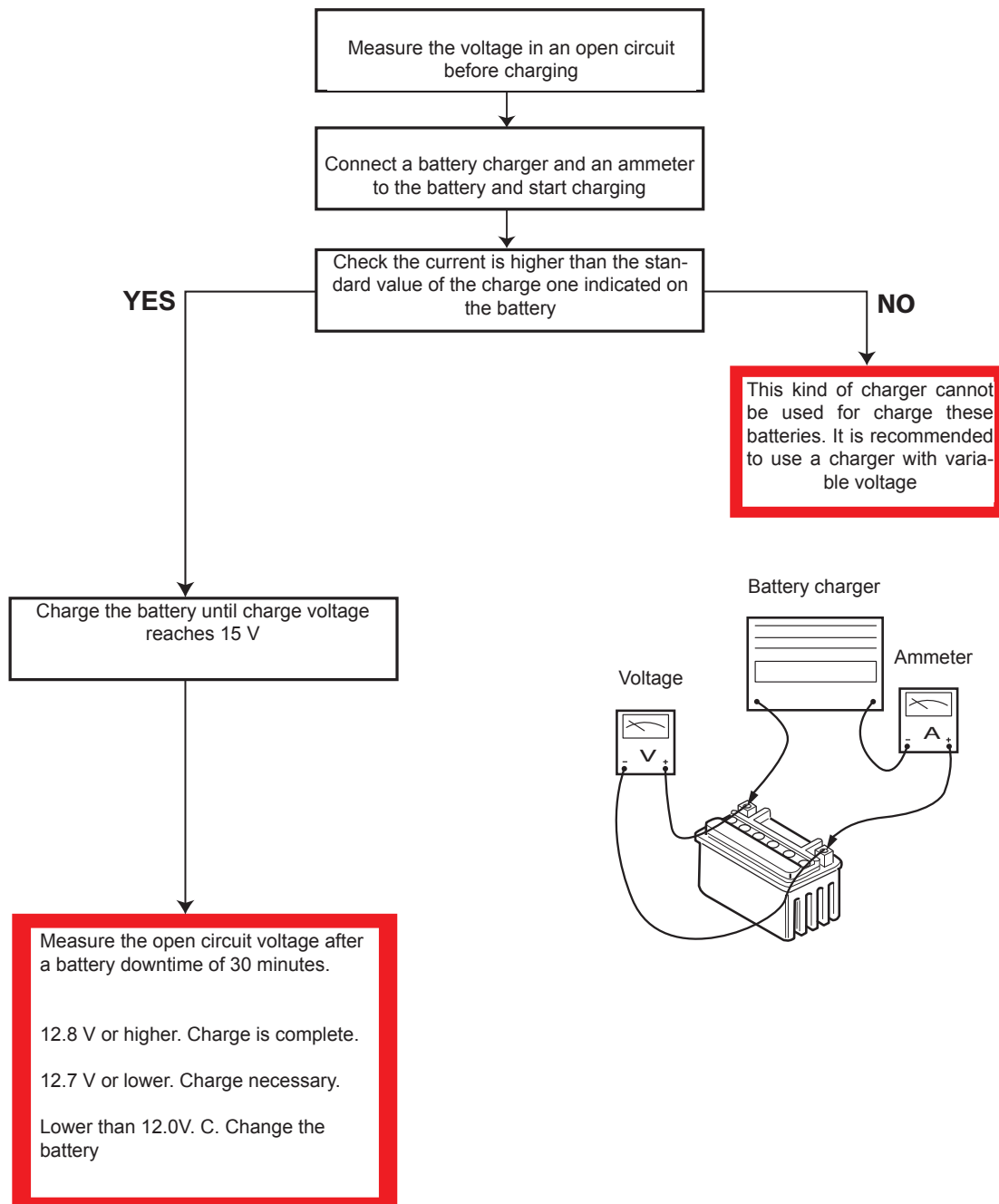
CHARGE METHOD USING A CHARGER WITH CONSTANT VOLTAGE

NOTE:

- Measure the voltage 30 minutes after switching off the equipment.
- Set the charge time to a maximum of 20 hours.

NOTE:

- To guarantee maximum performance and duration for the battery, we advise using electronic chargers, which are able to provide the correct charging voltage and current, based on the specifications required for sealed battery technology.





ELECTRIC SYSTEM/CHECK AND BATTERY CHARGE

BATTERY

Install:

- The battery
- Tighten the 2 screws "C" fastening the battery bracket.

Connect:

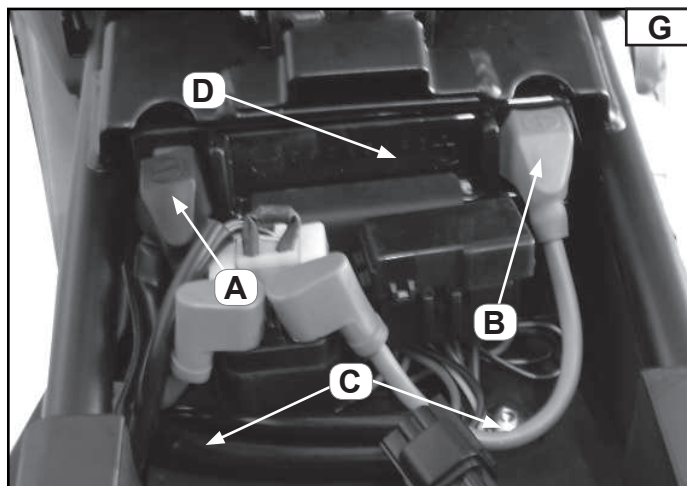
- The cables from the battery (to the battery terminals)

IMPORTANT NOTICE:

First connect the positive cable "B" of the battery, then the negative cable "A" Fig. G.

Check:

- The battery terminals
- If dirty, clean with a metal brush.
If there are any loose connections → Reconnect them properly.



ELECTRICAL SYSTEM/FUSE CHECK

FUSES

The following procedure applies to all fuses.

IMPORTANT NOTICE:

To avoid short circuits, always switch off the main switch by setting it to "OFF" when checking or replacing fuses.

- Remove the passenger seat, using the wrench provided and remove the rider's seat with the release knob (A) Fig. A.
- Open the fuse box "B" Fig. B

Check:

- the fuse

Connect a pocket tester to the fuse and check continuity.

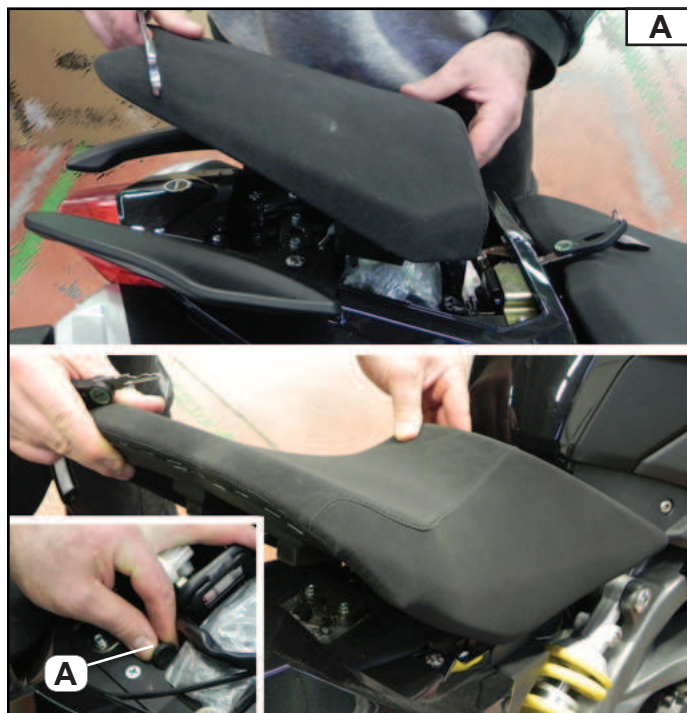
NOTE:

Set the tester selector to " $\Omega \times 1$ "

- If the pocket tester reads " ∞ ", replace the fuse.

Replace:

- Burnt fuses.
- Turn the main switch to "OFF".
- Fit a new fuse with the correct amperage.
- Switch on the switches to make sure that the electrical circuit is working,
- If the fuse burns out immediately, check the power circuit.



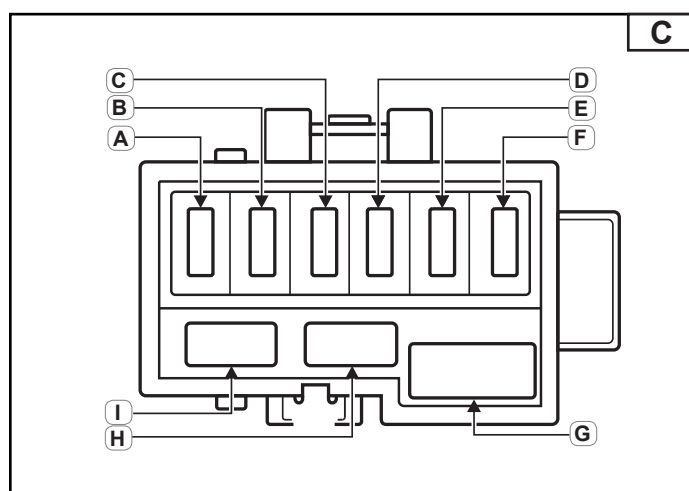
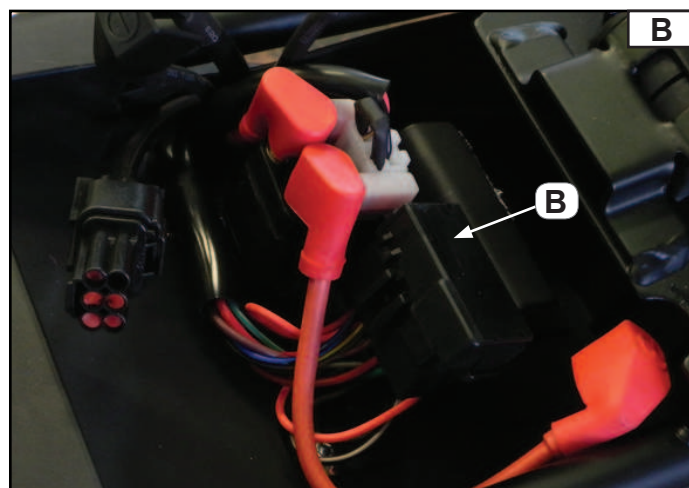
WARNING:

Never use a fuse with amperage other than the one specified. The use of makeshift techniques or of fuses with the incorrect amperage may cause irreversible damage to the electrical system, causing operating defects in the lights and ignition, or even cause fire.

**ELECTRICAL SYSTEM/FUSE CHECK****FUSES****KEY TO FUSES**

Refer to Fig. C

- A. Fuel Pump :15A (blue)
- B. Fan:15A (blue)
- C. CD2 (power unit):15A (blue)
- D. CD1(power unit):15A (blue)
- E. Services: 40 A(red)
- F. Headlamps: 15A(blue)
- G. Spare fuse 40A (red)
- H. Spare fuse 15A (blue)
- I. Spare fuse 15A (blue)





ELECTRICAL SYSTEM/HEAD LAMP REPLACEMENT

REPLACEMENT

The following procedure applies to headlamps only.

IMPORTANT NOTICE:

Given that the lamp reaches very high temperatures inside the light, we recommend not touching it until it has cooled.

Remove:

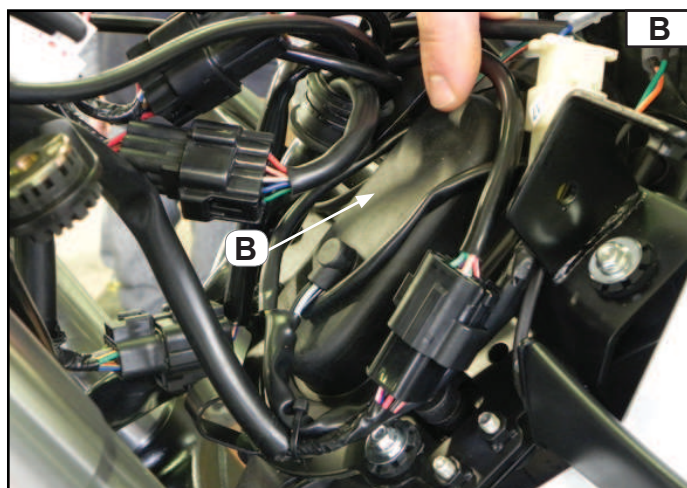
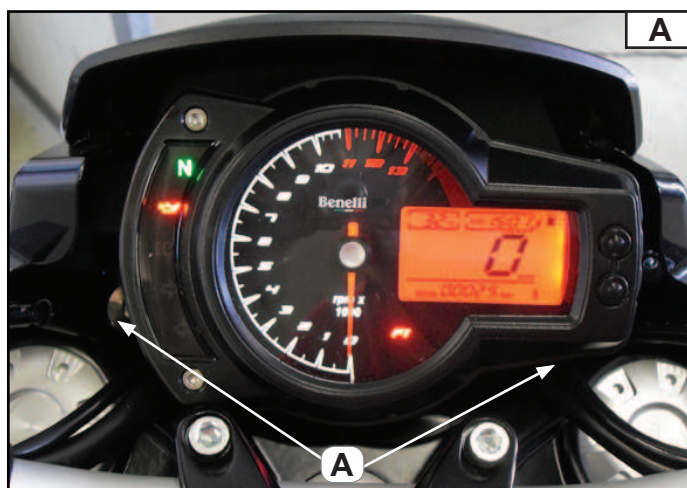
- The two screws "A" fastening the front lamp to the plate Fig.A.
- Lower the headlight and remove the protective cap "B" Fig. B
- Disconnect the lamp.

Install:

- Insert the new lamp

Connect:

- Connect the new lamp to the connectors.
- Fit the cap.
- Raise the headlamp and fasten the two screws removed previously.





ELECTRICAL SYSTEM/HEADLAMP ADJUSTMENT REMOVAL/INSTALLATION

Remove:

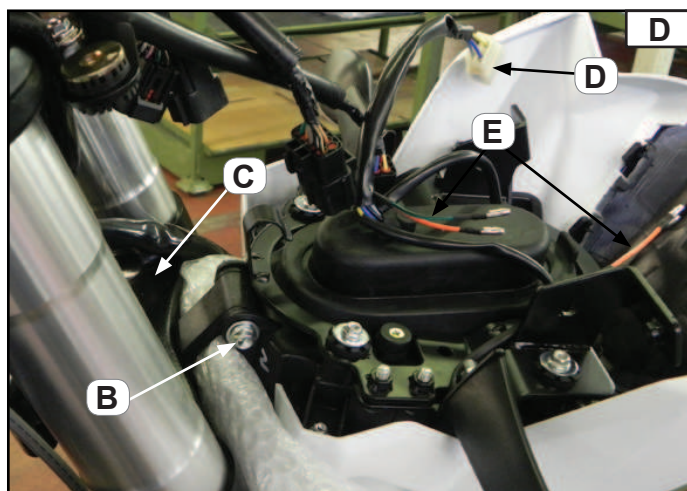
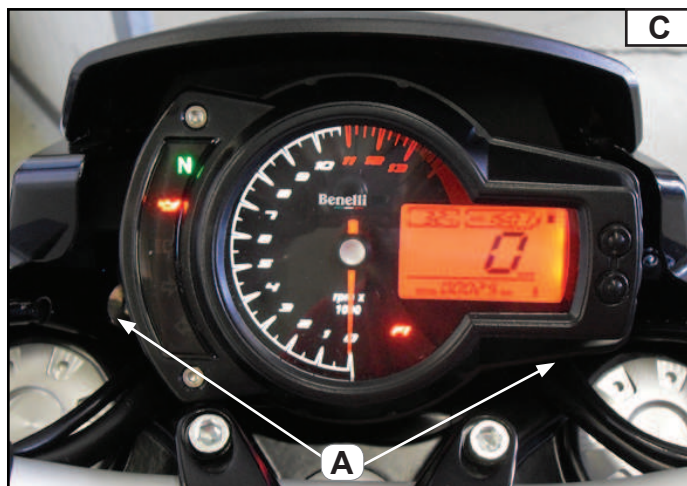
- The two screws "A" fastening the front lamp to the plate Fig.C.
- Lower the lamp.
- Remove the screw "B" fastening the headlamp to the hinge of the lamp support "C" Fig. D
- Disconnect the connector to the headlamp "D" and the four cables connecting the two indicators "E".

Install:

- To install the headlamp, follow the same steps for its removal, this time in reverse order.
- Secure the fastening screws "A" with Loctite and with the following torque



Torque 10 N*m



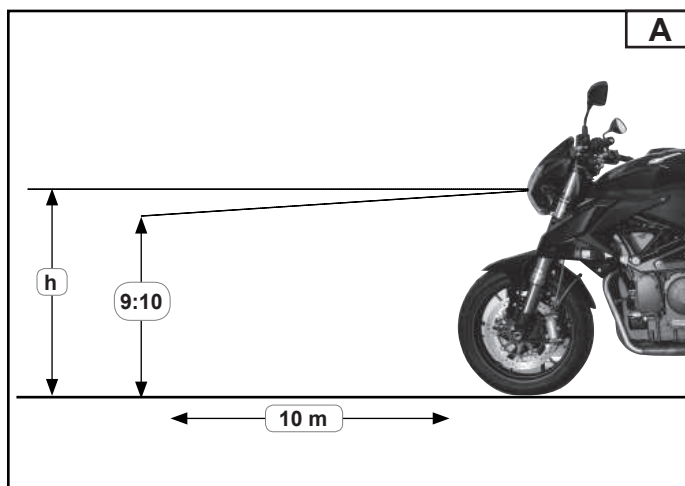


ELECTRICAL SYSTEM/HEADLAMP ADJUSTMENT

ADJUSTMENT

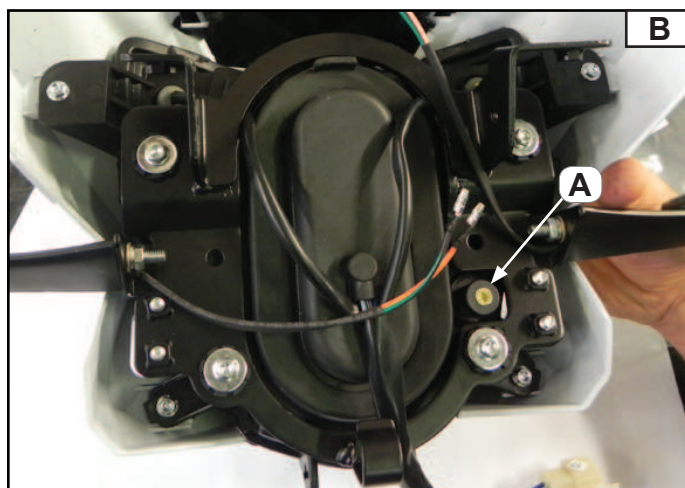
To adjust the beam from the headlight correctly:

- Place the vehicle about 10 metres away from a vertical wall on a perfectly flat surface. Fig. A.
- Sit on the bike in the rider's position.
- Make sure that the upper limit of the beam as shining on the wall, is lower than 1/10 of the horizontal axis of the headlamp.
- If the beam does not fall within these limits, make the adjustments to set it to the correct position,



Adjust:

- The headlamp beam using the adjustment screw "A" in the bottom right of the light, at the back. Fig. B
- Turn the screw anticlockwise to raise the beam.
Turn the screw clockwise to lower the beam.





ELECTRICAL SYSTEM/REAR LAMP REPLACEMENT

REPLACEMENT

Remove:

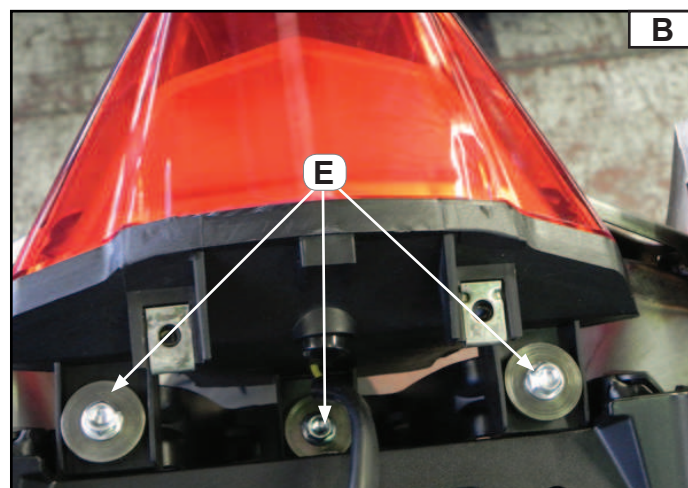
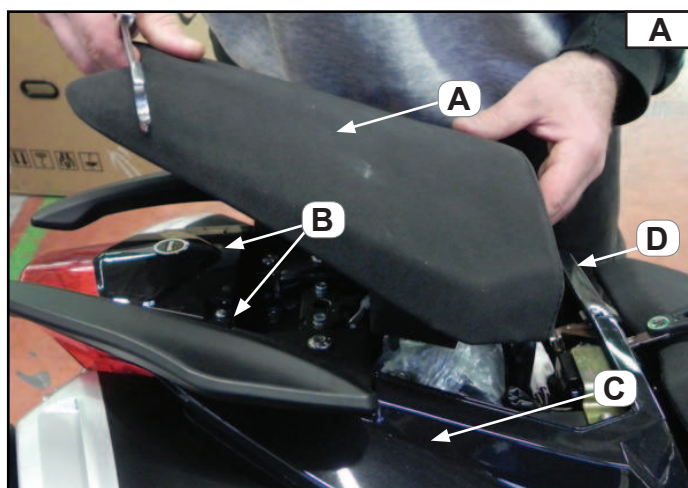
- The passenger seat "A" at the back, using the tool provided Fig.A.
- The two fastening screws of the plastic tail section "B" to the side tail sections "C" and "D"
- The three fastening screws "E" Fig.B>
- Remove the cap protecting the connector
- Disconnect the connector

Replace:

- Remove the rear light and replace with a new one.

Install:

- To install the rear light, follow the same steps for its removal, this time in reverse order.



ELECTRICAL SYSTEM/LICENCE PLATE LAMP REPLACEMENT

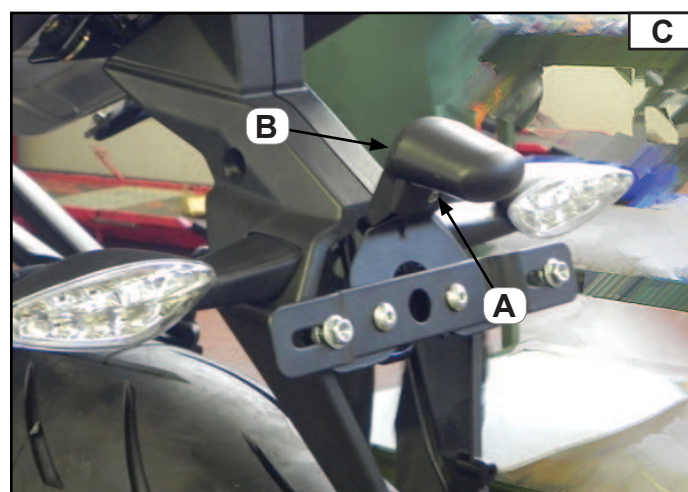
REPLACEMENT

Remove:

- The screw "A" Fig.C.
- The rubber lamp holder "B" Fig.C.
- The park light
-

Install:

- To install the licence plate light, follow the same steps for its removal, this time in reverse order.





ELECTRICAL SYSTEM/REAR INDICATOR REPLACEMENT

REPLACEMENT

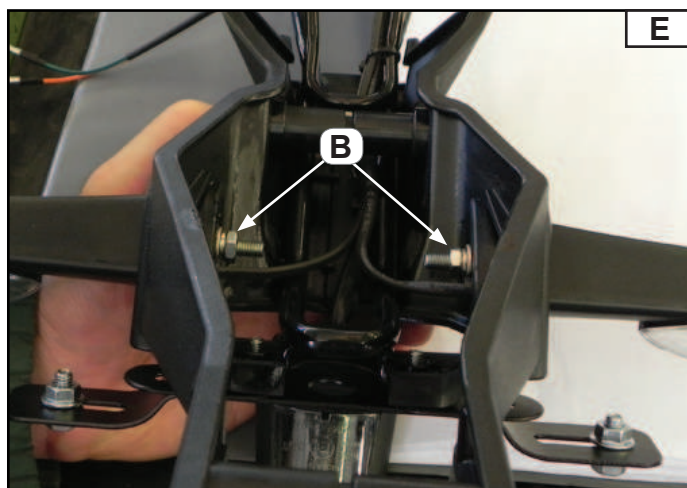
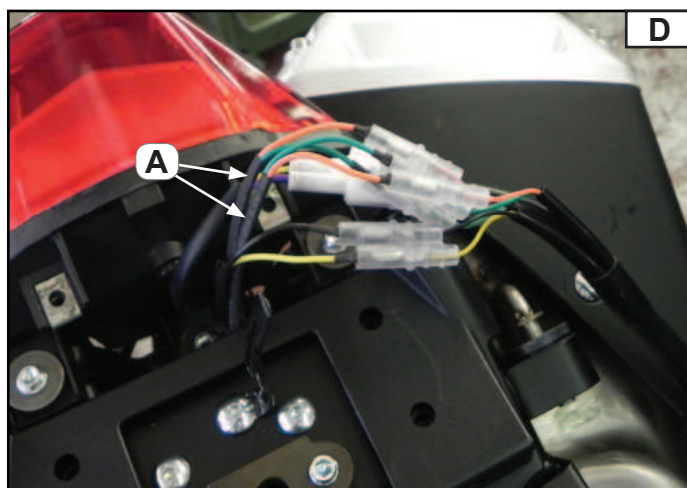
The following procedure applies to both rear indicators.

Remove:

- The passenger seat at the back, using the tool provided Fig.A.
- Remove the protective cap
- Disconnect the electrical connections "A" of the indicators, orange-green and illustrated in Fig. D.
- Remove the clips fastening the cables on the licence plate holder.
- Remove the support nuts for the rear indicators "B" Fig, E
- Remove the indicators and replace with new ones.

Install:

- To install the new indicators, follow the same steps for their removal, this time in reverse order.





ELECTRICAL SYSTEM/FRONT INDICATOR REPLACEMENT REPLACEMENT

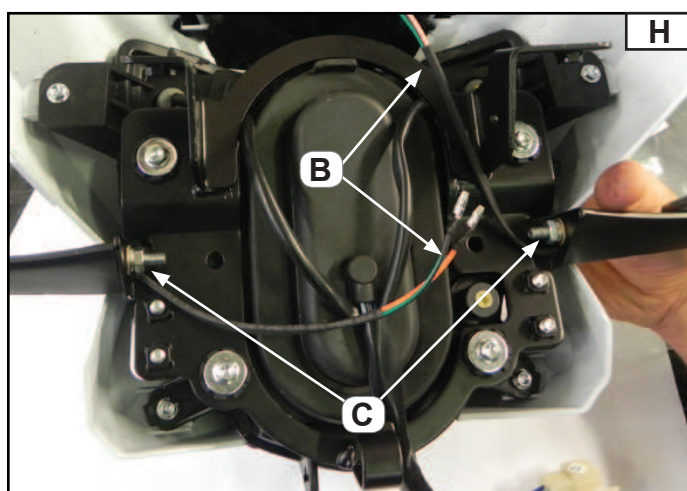
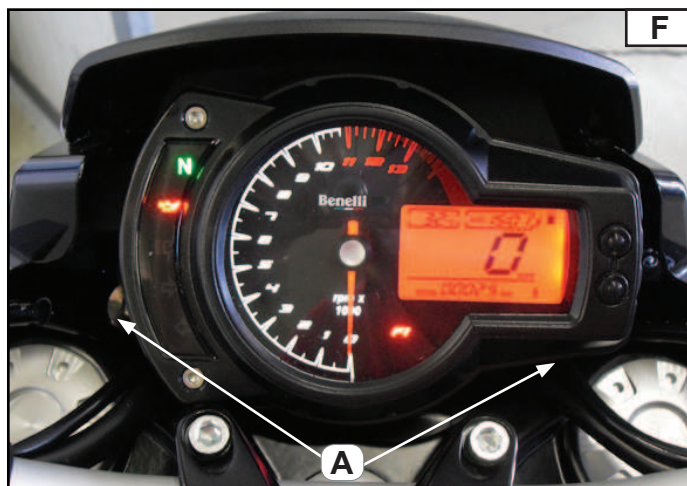
The following procedure applies to both front indicators.

Remove:

- The two screws "A" fastening the front lamp to the plate Fig.F.
- Lower the lamp Fig. G.
- Disconnect the electrical connections "B" of the indicators, orange and green/black Fig. H.
- Remove the support nuts for the indicators "C" Fig.H
- Remove the indicators and replace with new ones.

Install:

- To install the new indicators, follow the same steps for their removal, this time in reverse order.





CHAPTER 4

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FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL REMOVAL

Park:

- The bike on a level surface

NOTE

Place the bike on a suitable support so that the front wheel is raised.

Remove:

- the fastening screws "A" from both brake callipers Fig. A

Detach:

- the left front calliper

NOTE

Repeat the above procedure for the right brake calliper.

NOTE

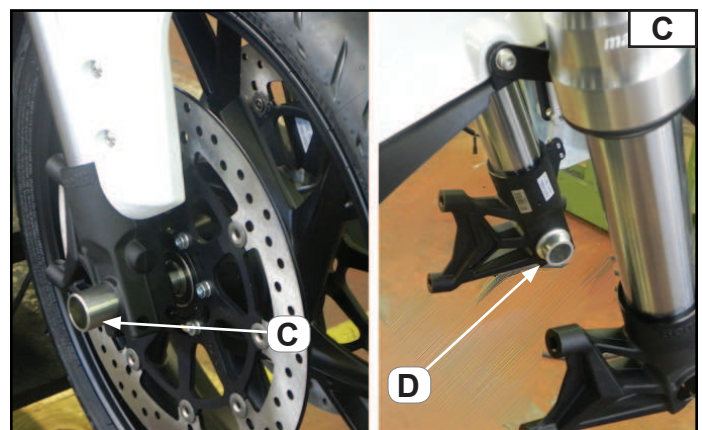
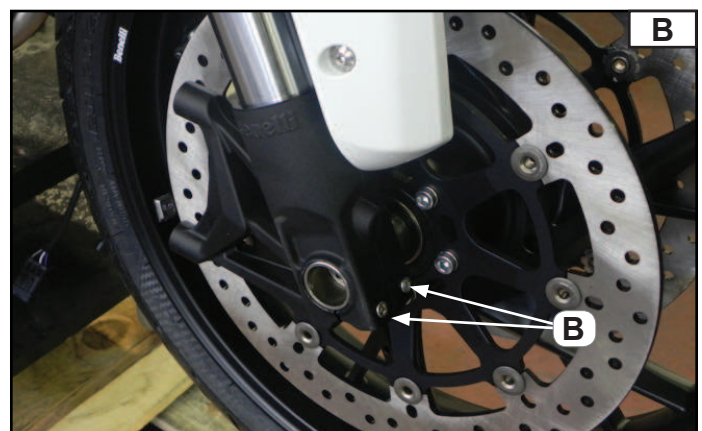
Do not pull the front brake lever while removing the callipers.

Loosen:

- the setscrews "B" Fig.B

Remove:

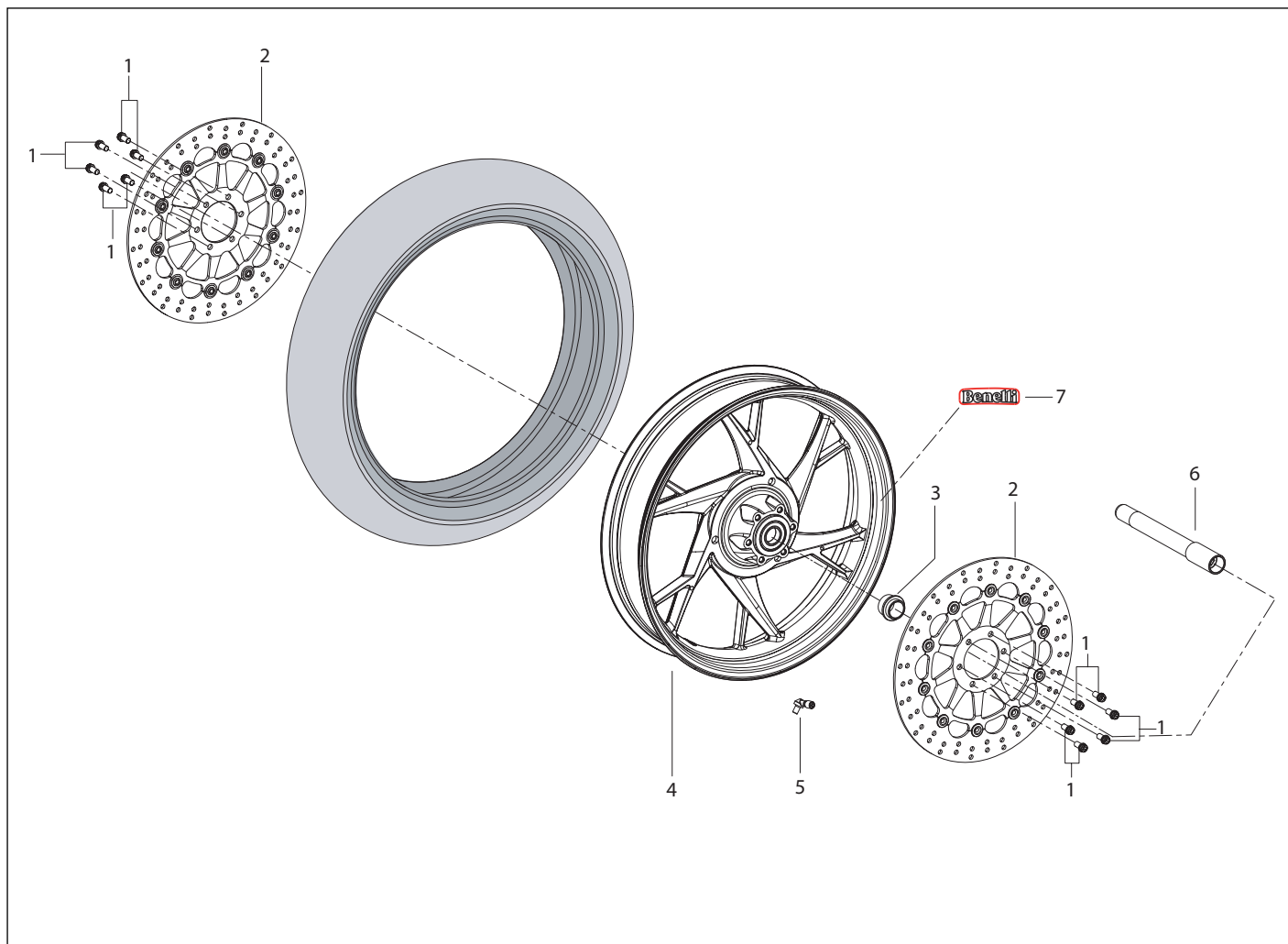
- the front wheel pin "C" Fig. C
- front wheel
- The left shim "D" Fig.C





FRONT WHEEL AND BRAKE DISCS

REMOVAL/INSTALLATION OF BRAKE DISCS



Position	Description	Quantity
1	COUNTERSUNK HEX-HEAD SCREW M8X16 8.8 ZB	12
2	FRONT BRAKE DISC	2
3	LEFT SHIM	1
4	FRONT WHEEL RIM	1
5	VALVE	1
6	FRONT WHEEL PIN	1
7	ADHESIVE	2



FRONT WHEEL AND BRAKE DISCS

REMOVAL/INSTALLATION OF BRAKE DISCS

Removal:

- Once the wheel has been removed from the fork, remove the 6 screws (1) fastening the two discs (2). Fig A

In case of replacement of the two discs, proceed as described:

Fitting:

- Insert the front brake disc (2) on the edge of the rim (4)
- Insert the 6 fastening screws (1) after putting a drop of thread locker (medium type) on the end of the thread.



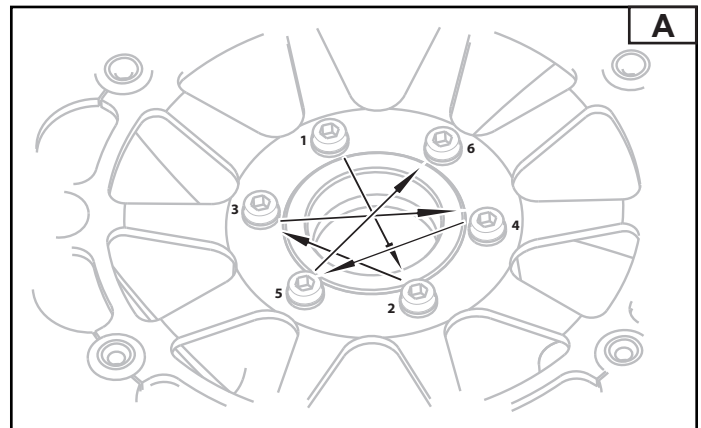
NOTE

Repeat the above procedure for the front right brake disc.
The procedure below applies to both brake discs.
Tighten the bolts on the brake disc in successive steps and proceeding in a crossover fashion Fig A.

- Tighten the 6 screws with the following torque:



Torque 22N*m





FRONT WHEEL AND BRAKE DISCS

CHECK OF BRAKE DISCS

The procedure below applies to all **brake** discs.

Check:

- the brake disc

If there is any damage/abrasion, replace.

Measure:

- The deformation of the brake disc.

If out of specified values, correct the deformation or replace the brake disc.



Brake disc	Deformation limit
Front	0.1 mm
Rear	0.15 mm

- Place the bike on a suitable support so that the wheel is raised.
- Before measuring the bending of the front brake disc, turn the handlebar right and then left to make sure that the front wheel stops.
- Remove the brake calliper.
- Keep the gauge at a right angle to the surface of the brake disc.
- Measure the bending 1.5 mm (0.05 in) under the edge of the brake disc Fig.A.

Adjust:

- The deformation of the brake disc.
- Remove the brake disc.
- Turn the brake disc, moving it one hole per bolt Fig.B.
- Fit the brake.

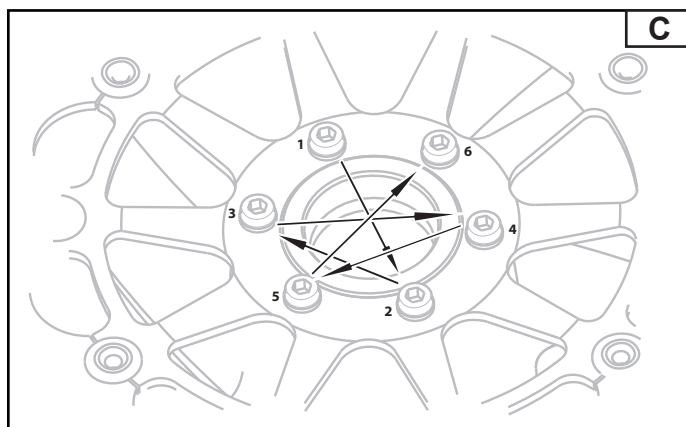
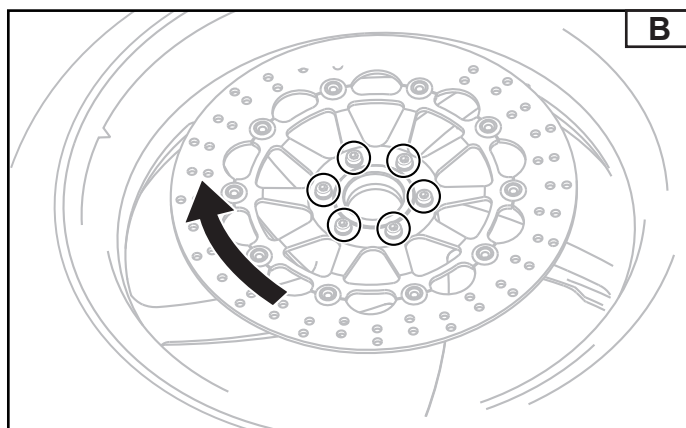
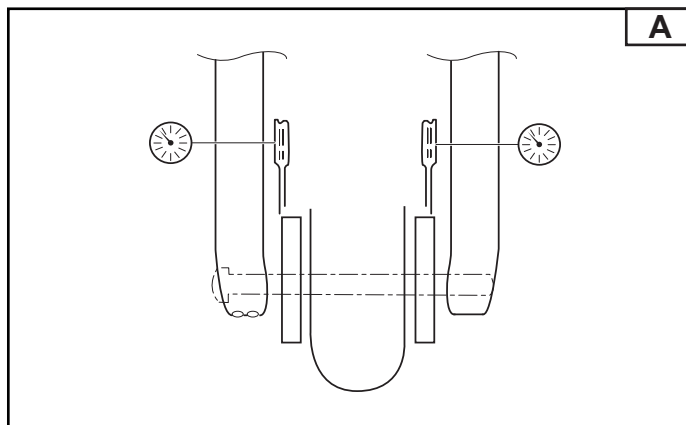
NOTE

Tighten the bolts on the brake disc in successive steps and proceeding in a crossover fashion Fig.C.



Tightness torque:

Brake disc	Tightness torque
Front	22 N.m
Rear	10 N.m





FRONT WHEEL AND BRAKE DISCS

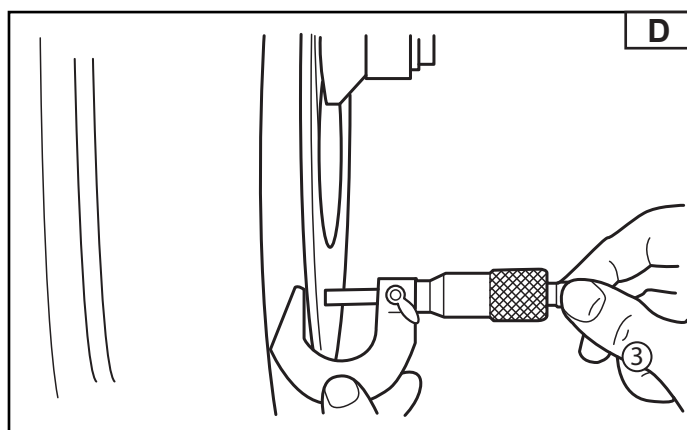
CHECK OF BRAKE DISCS

Measure:

- Brake disc thickness.
- Measure the brake disc thickness in several different points Fig.D.
- If outside specifications, replace.



Brake disc	Wear limits
Front	A
Rear	A



FRONT WHEEL AND BRAKE DISCS

WHEEL AXLE CHECK

Check:

- Wheel axle.
 - Roll the wheel axle "A" on a flat surface Fig.A.
- If there is any warping, replace.

WARNING

Do not try to straighten the wheel axle if it is warped.

Check:

- Tyre
- Front wheel

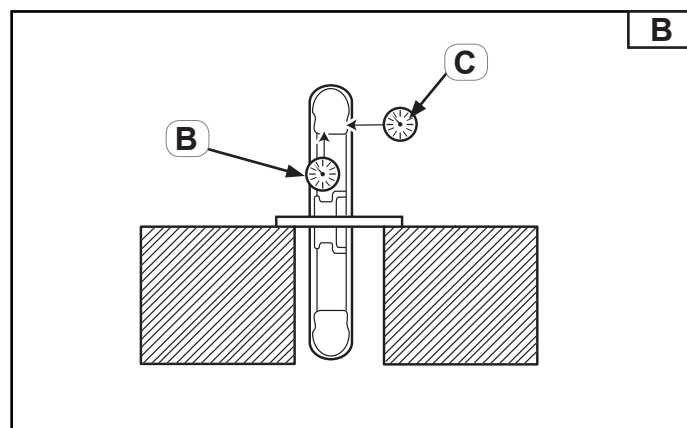
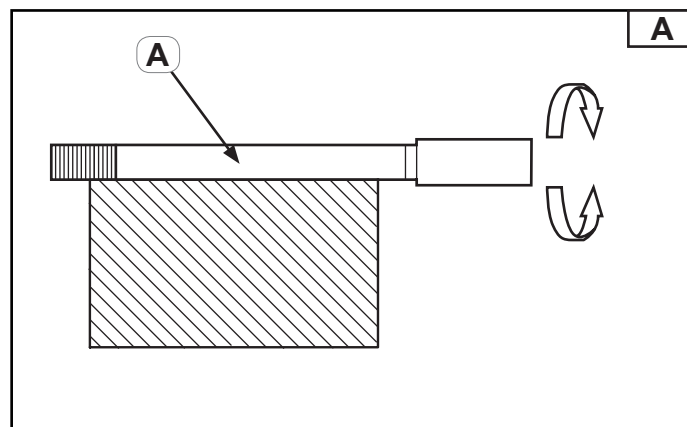
If there is any warping, replace.

Measure:

- The radial eccentricity of the wheel "B" Fig.B.
 - The side eccentricity of the wheel "C" Fig.B.
- If the specified limit is exceeded, replace.



Eccentricity	Limit
Radial(B)	0.05 mm
Side(C)	1 mm





FRONT WHEEL AND BRAKE DISCS

CHECK/REPLACEMENT OF WHEEL BEARINGS

Check:

- Wheel bearings

If the front wheel turns irregularly or is loose, replace the wheel bearings.

Replace:

- Wheel bearings

Remove the wheel bearings "A" using a general bearing extractor Fig.B.

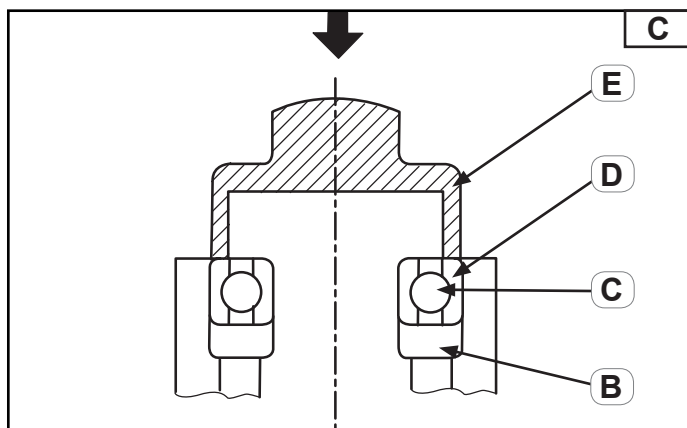
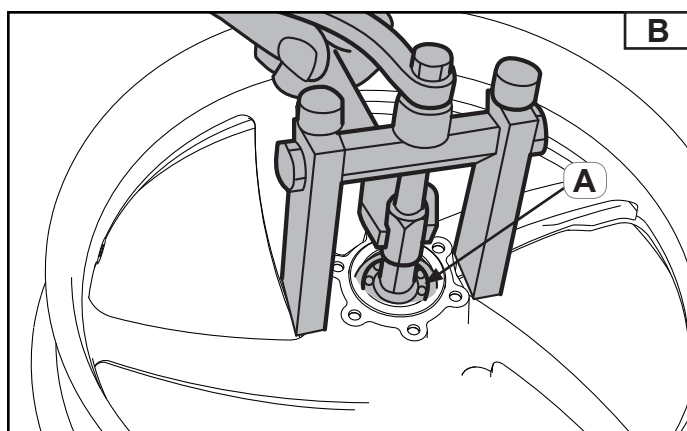
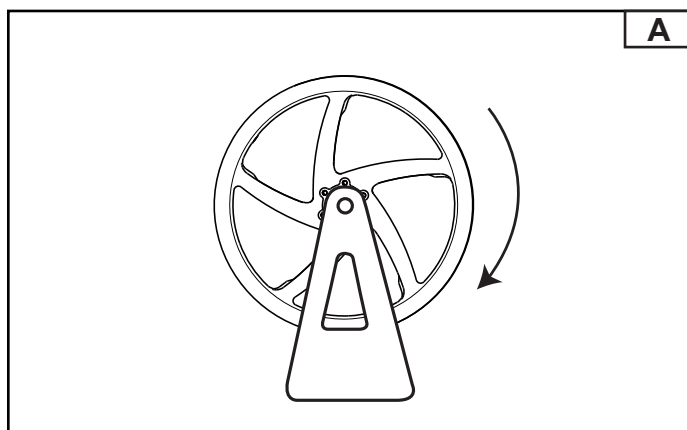
Fit the new wheel bearing, following the removal steps in reverse order.

IMPORTANT NOTICE

During the bearing insertion, do not touch the inner seat "B" or the ball bearings of the wheel "C". Contact must only occur with the outer seat of bearing "D" Fig. C.

NOTE

Use a wrench that is adapted to the diameter of the outer edge "E" of the wheel bearing, Fig.C.





FRONT WHEEL AND BRAKE DISCS

FRONT WHEEL INSTALLATION

Fitting:

- Insert the full wheel, complete with discs, between the two front fork stems.
- Insert the bushing(3) in the seat at base of the left stem
- insert the wheel pin (6) after greasing it.
- Tighten the wheel pin using the specific tool.



(**) tool to tighten the front wheel column.

Code:.....



Tightness torque:

Torque 60 N*m

- Insert the two screws "B", and tighten by hand.
- compress the fork two-three times so as to settle the wheel pin (6) Fig.B
- Tighten the two screws "B" with the following torque:



Torque 8 N*m

Fit:

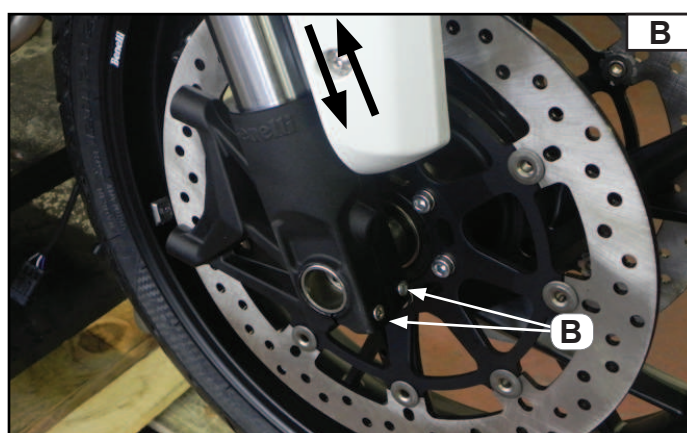
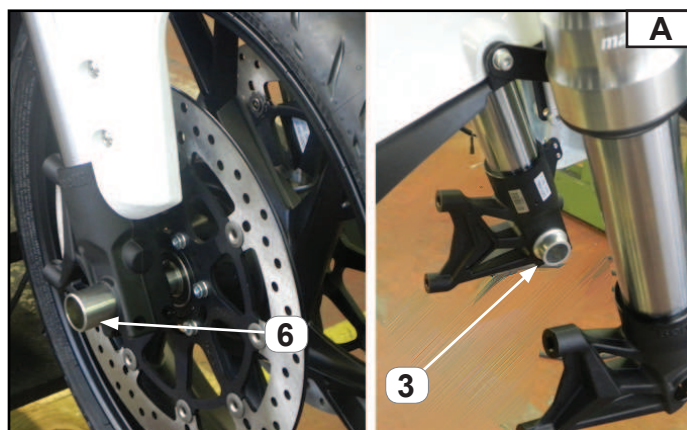
- the right brake calliper, inserting the fastening screws "A", after greasing them with the special copper grease Fig. C.
- Tighten the two screws "A" with the following torque:



Torque 45 N*m

NOTE

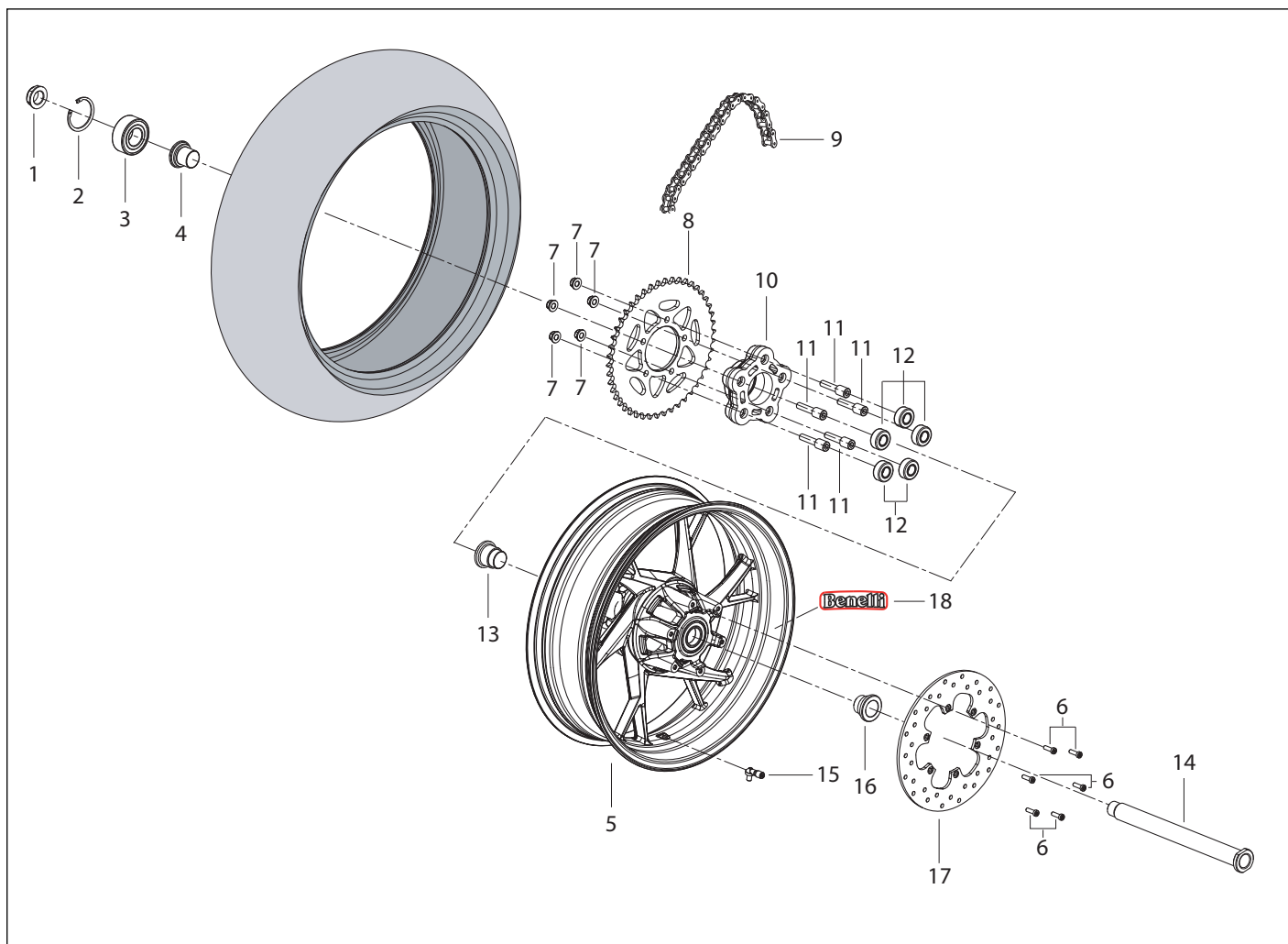
Repeat the above procedure for the left brake calliper.
Make sure that there is enough space between the brake pads before fitting the callipers to the brake discs.
Check that the path of the brake hose is correct.





REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL



Position	Description	Quantity
1	NUT M24	1
2	ELASTIC RING	1
3	BEARING	1
4	SHIM	1
5	REAR WHEEL RIM (BLACK)	1
6	SCREW	6
7	NUT	5
8	SPROCKET	1
9	CHAIN 137ZRPK 118 LINKS	1
10	SPROCKET SUPPORT FLANGE	2
11	SCREW (M10X41)	5
12	FLEXIBLE COUPLING	5
13	BUSHING	1
14	REAR WHEEL PIN	1
15	VALVE	1
16	BUSHING	1
17	REAR BRAKE DISC	1
18	ADHESIVE	2



REAR WHEEL AND BRAKE DISC

REAR WHEEL REMOVAL

Park:

- The bike on a level surface

NOTE

Place the bike on a suitable support so that the rear wheel is raised.

Remove:

- the fastening screws "A" from the brake calliper Fig. A

Detach:

- the brake calliper.
- Completely slacken the transmission chain tension.
- Move the wheel forwards and free the transmission chain from the sprocket Fig. B.

Remove:

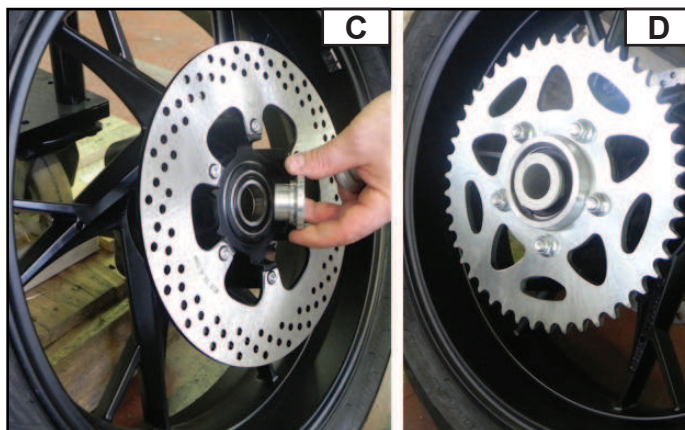
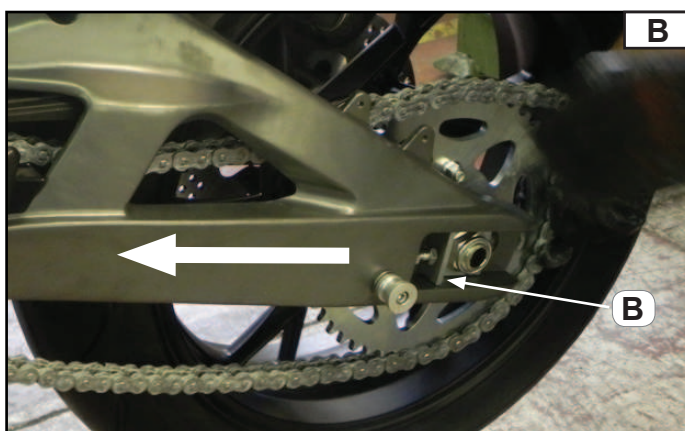
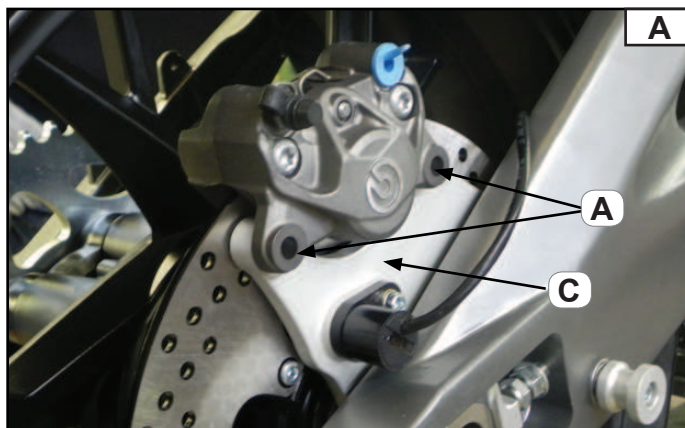
- The nut(1) and pin (14).

NOTE

During this stage, take care as the following parts will also be separated: chain tensioner "B" adjustments Fig B sprocket side and brake disc side, and the brake calliper support plate "C" Fig.A.

Remove:

- The bushing (16) brake disc side (FigC) e the shim (4) sprocket side (FigD).





REAR WHEEL AND BRAKE DISC SPROCKET AND REAR BRAKE DISC REMOVAL

Brake disc removal:

- Once the rear wheel has been removed, take out the brake disc.
- Unscrew the 6 fastening screws (6) and take out the brake disc (17) Fig. A

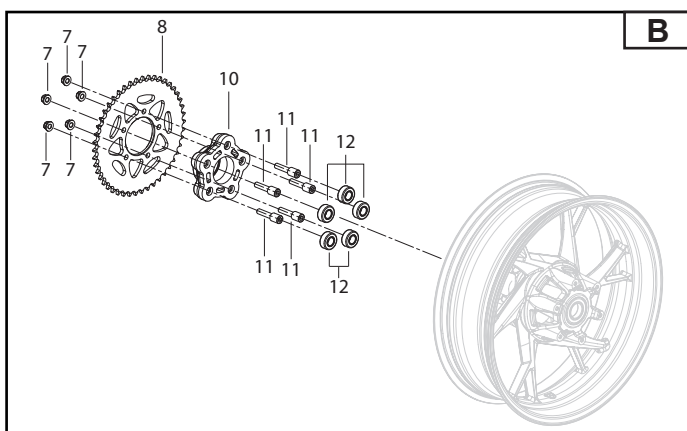
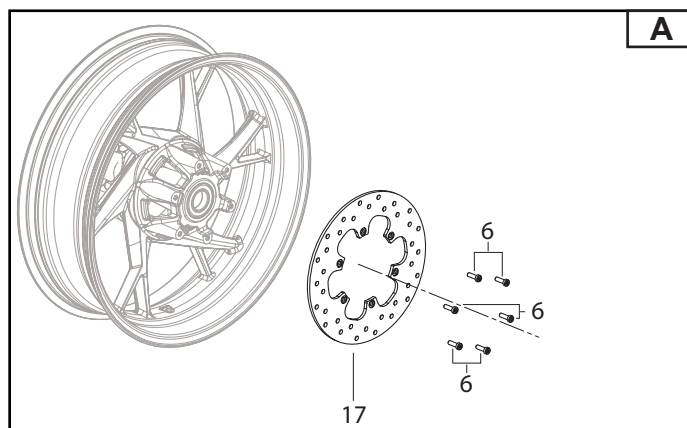
Sprocket removal:

- Once the rear wheel has been removed, take out the sprocket (8) Fig.B.
- Take out the 5 fastening nuts (7) and separate the sprocket from the flange (10).
- Separate the flange (10) from the screws (11) and the flexible couplings (12).

Check:

- Sprocket support flange.
- If there is any cracking/damage, replace.
- Flexible couplings.

If there is any damage or wear, replace.





REAR WHEEL AND BRAKE DISC

WHEEL AXLE CHECK

Check:

- Wheel axle.
- Roll the wheel axle "A" on a flat surface Fig.A.

If there is any warping, replace.

WARNING

Do not try to straighten the wheel axle if it is warped.

Check:

- Tyre
- Front wheel

If there is any warping, replace.

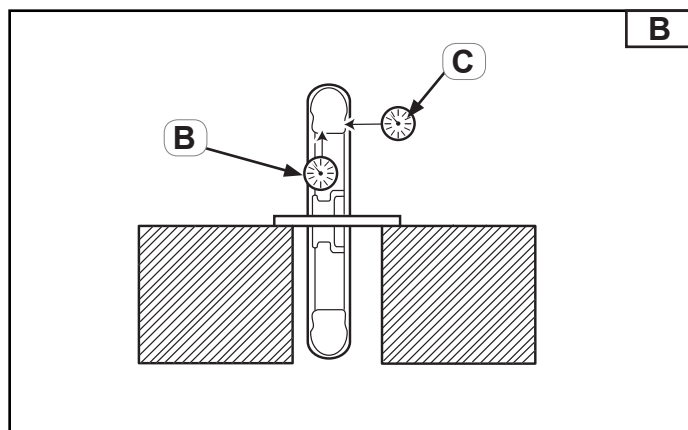
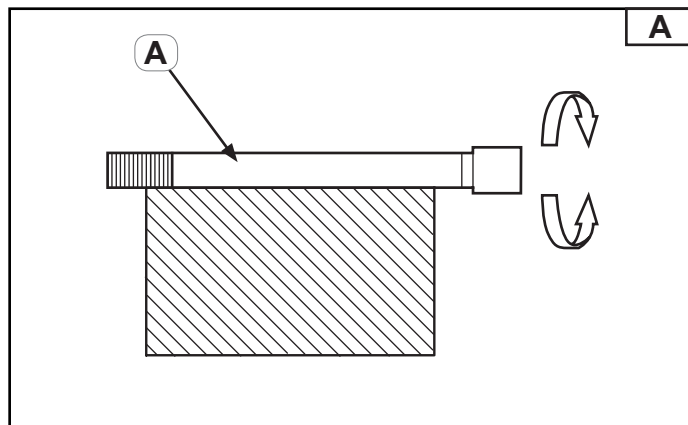
Measure:

- The radial eccentricity of the wheel "B" Fig.B.
- The side eccentricity of the wheel "C" Fig.B.

If the specified limit is exceeded, replace.



Eccentricity	Limit
Radial(B)	0.05 mm
Side(C)	0.05 mm





REAR WHEEL AND BRAKE DISC

CHECK/REPLACEMENT OF WHEEL BEARINGS

Check:

- Wheel bearings

If the front wheel turns irregularly or is loose, replace the wheel bearings.

Replace:

- Wheel bearings

Remove the bearings from the wheel "A" with a generic bearing extractor Fig.B.

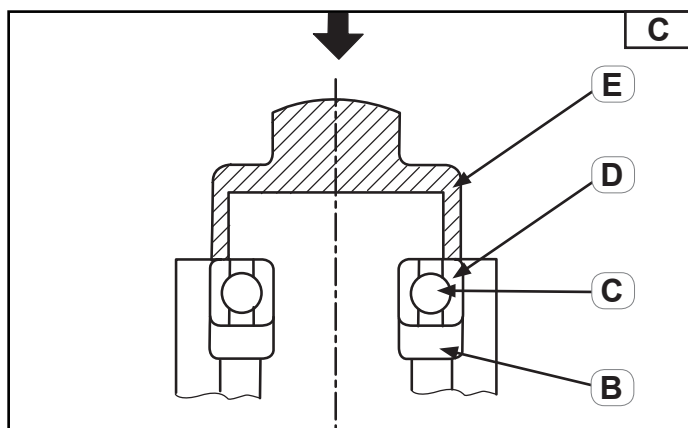
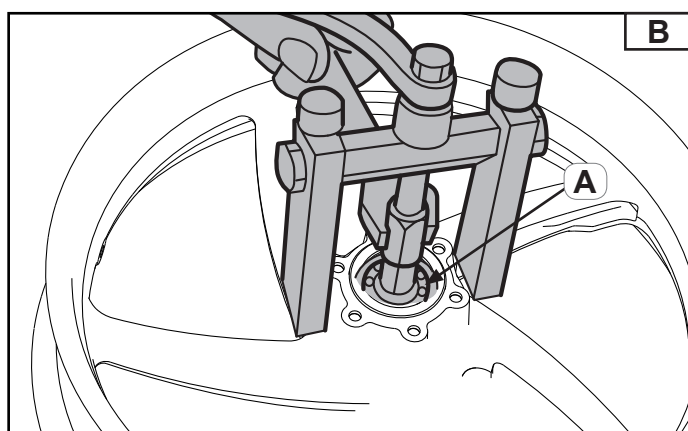
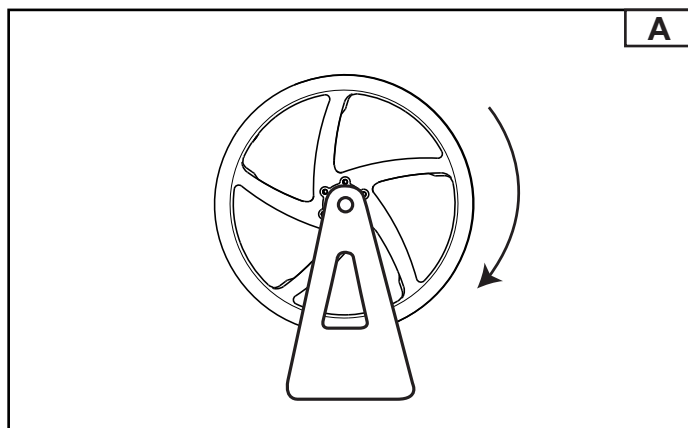
Fit the new wheel bearing, following the removal steps in reverse order.

IMPORTANT NOTICE

During the bearing insertion, do not touch the inner seat "B" or the ball bearings of the wheel "C". Contact must only occur with the outer seat of bearing "D" Fig. C.

NOTE

Use a wrench that is adapted to the diameter of the outer edge "E" of the wheel bearing, Fig.C.





REAR WHEEL AND BRAKE DISC SPROCKET CHECK AND REPLACEMENT

Check:

- The sprocket
- If more than 1/4 of each tooth is worn, replace the sprocket.
If the teeth are bent, replace the sprocket.

- 1/4 teeth
- Correct
- Transmission chain roller
- Sprocket

Sprocket replacement:

- Once the rear wheel has been removed, take out the sprocket, as described in the previous section.

Replace:

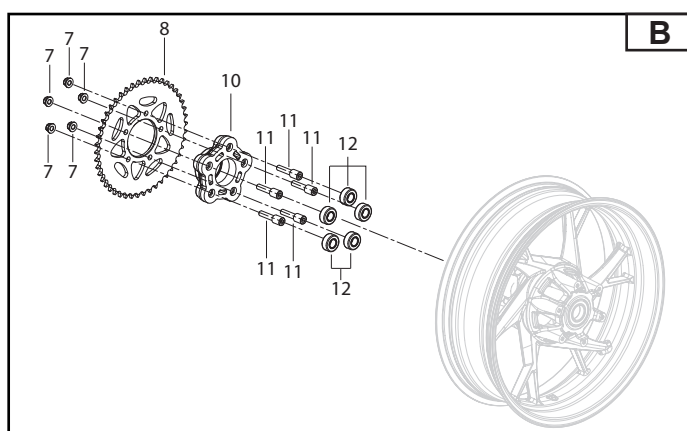
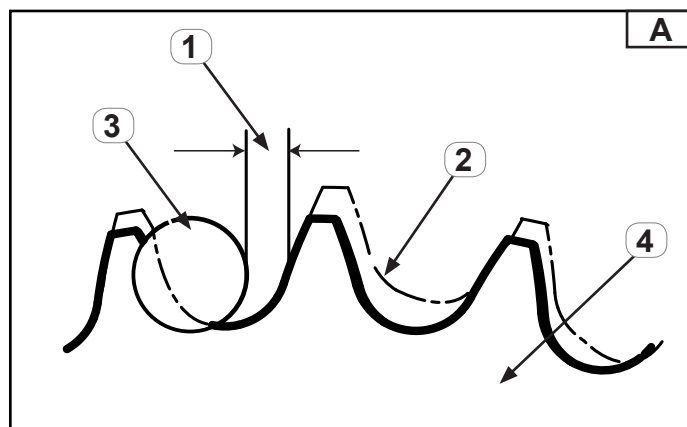
- Clean the sprocket flange (10) with a clean rag, especially the surfaces touching the sprocket.
- Insert the 5 fastening nuts (7) and tighten to the following torque.



Torque 45 N*m

NOTE

Tighten the self-locking nuts in several stages, proceeding with a crossover sequence.



REAR WHEEL AND BRAKE DISC BRAKE DISC ASSEMBLY

Brake disc assembly:

- Once the rear wheel has been removed, take out the brake disc, as described in the previous paragraph.
- Clean the sprocket flange with a clean rag, especially the surfaces touching the disc.

Fit:

- The brake disc (17) and the 6 screws (6) Fig. A
- Use thread locker (medium type) on the end of the thread.



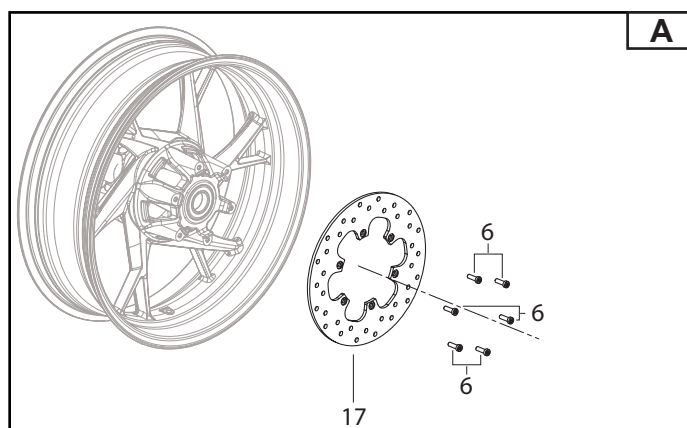
Tighten the fastening screws to the following torque:



Torque 10 N*m

NOTE

Tighten the self-locking nuts in several stages, proceeding with a crossover sequence.





REAR WHEEL AND BRAKE DISC BACK TYRE INSTALLATION

Fit:

- Pre-assemble the bracket supporting the brake (11), inserting the parts (13) and (12).
- Insert the bushing (16) on the sprocket side and (4) on the brake disc FigB.
- Insert the chain tensioner adjustment devices "A" on the sprocket side and "B" on the disc brake side Fig.C

Fit:

- The rear wheel

Lubricate and install:

- The pin (14)
- Tighten the nut (1) to the following torque FigC:



Torque 80 N*m

Fit:

- The brake callipers and respective fastening screws to the following torque:



Torque 25 N*m

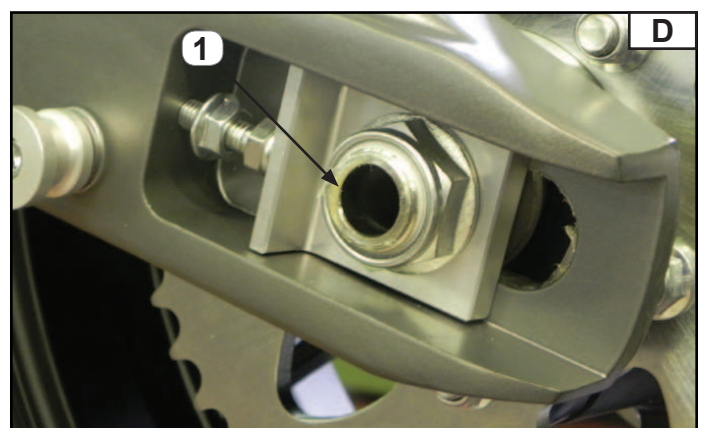
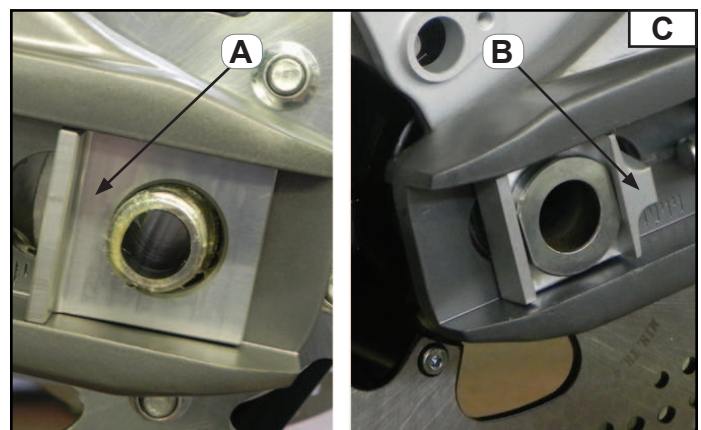
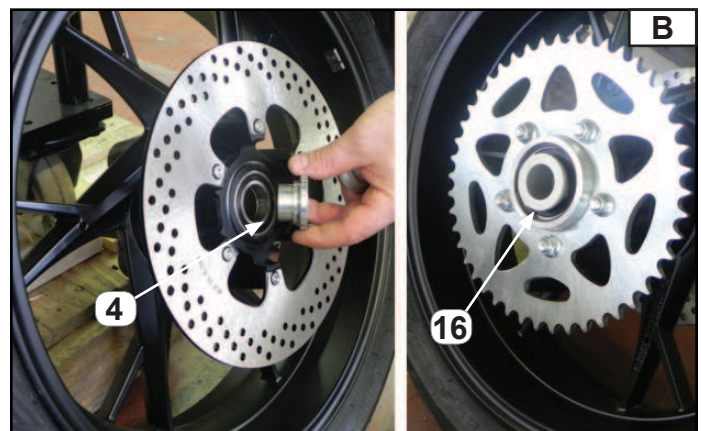
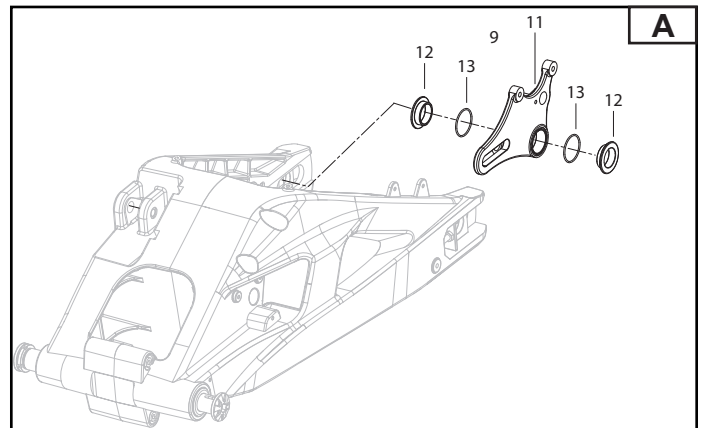
NOTE

Apply copper grease the fastening screws of the brake calliper before tightening.

Make sure that there is enough space between the brake pads before fitting the calliper to the relevant brake discs.

IMPORTANT NOTICE

Check that the path of the brake hose is correct.





FRONT AND REAR BRAKES

REMOVAL AND INSTALLATION OF FRONT BRAKE PADS

Removal:

- Use a Philips screwdriver to remove the centering pin "A" of the pads Fig.A.

NOTE

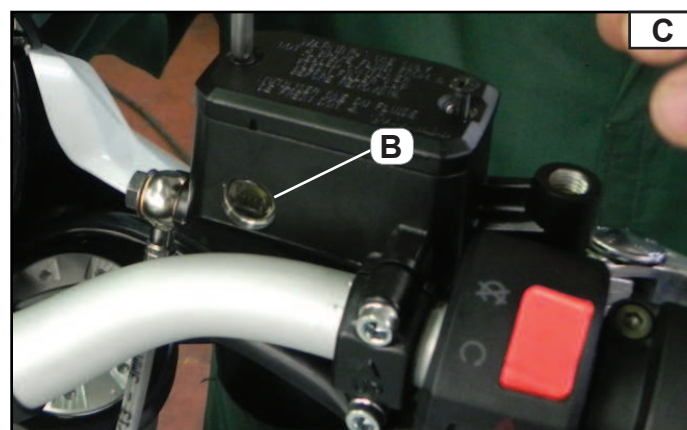
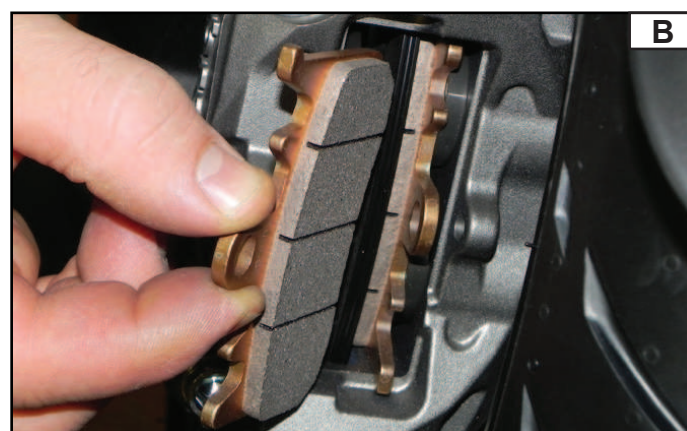
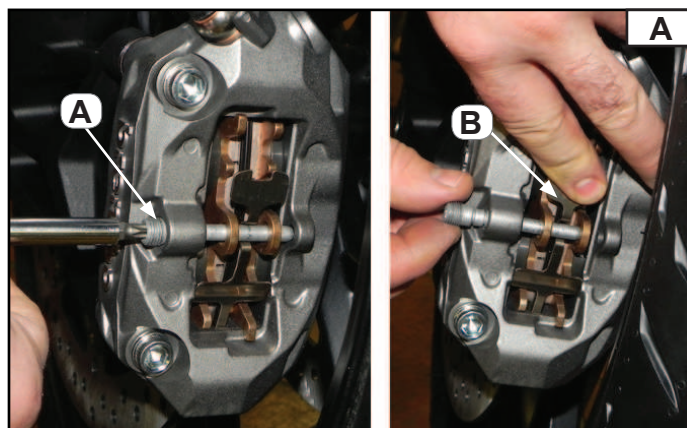
During the extraction phase of the pin "A", it is necessary to hold down the safety spring "B" Fig.A

- Remove the worn pad Fig.B

Measure:

- The wear limit for the brake pads.

If outside specifications, replace the brake pads as a block.



Pads	Wear limits
Front	1 mm

Fitting:

- Proceed to install, following the steps for removal in reverse order.

Check:

- The brake fluid level "B" Fig.C

If below the minimum notch, top up with the recommended brake fluid until it is at the correct level.

Check:

- Brake lever operation.

If the brake lever is soft or spongy to the touch, bleed the brake circuit.



FRONT AND REAR BRAKES

REMOVAL AND INSTALLATION OF REAR BRAKE PADS

Removal:

- Remove the two fastening screws "A" from the brake calliper Fig. A.
- Remove the centering pin "B" from the pads, freeing it from the safety O-ring "C".

NOTE

During the extraction phase of the pin "B", it is necessary to hold down the safety spring "X" Fig.A

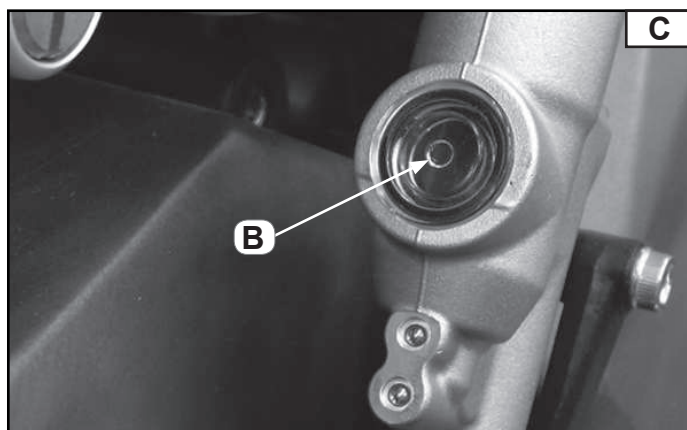
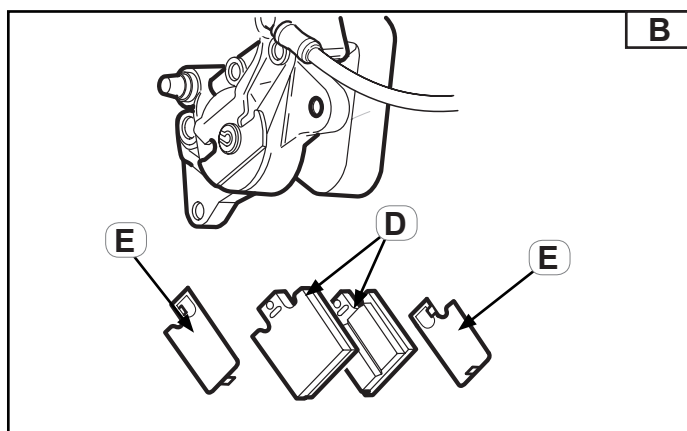
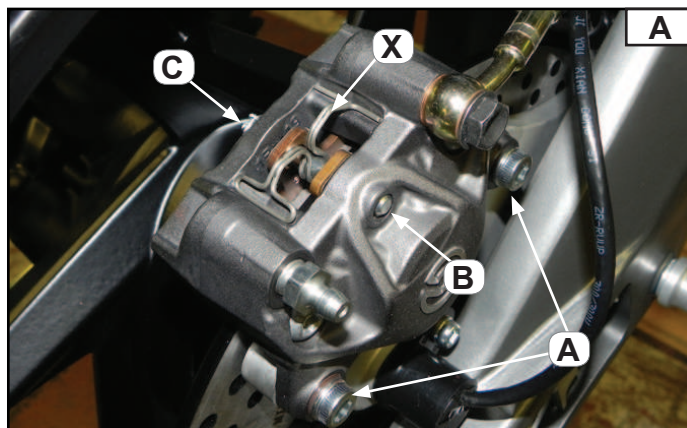
Take out:

- The brake pads "D" and shims "E" Fig.B.

Measure:

- The wear limit for the brake pads.

If outside specifications, replace the brake pads as a block.



Pads	Wear limits
Rear	1 mm

Fitting:

- Proceed to install, following the steps for removal in reverse order.

Check:

- The brake fluid level "B" Fig.C

If below the minimum notch, top up with the recommended brake fluid until it is at the correct level.

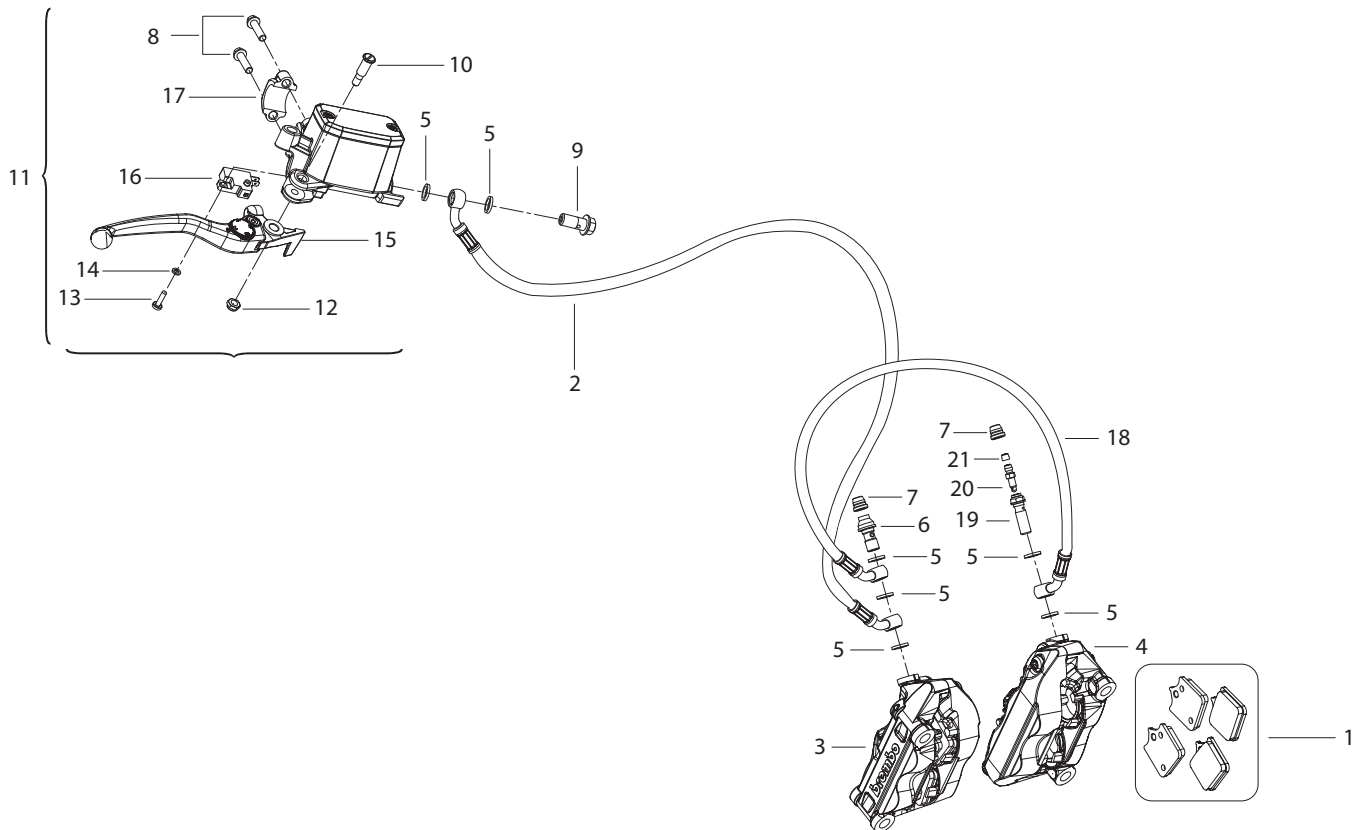
Check:

- Brake pedal operation.

If the brake lever is soft or spongy to the touch, bleed the brake circuit.

FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL



Position	Description	Quantity
1	RADIAL PAD PAIR	8
2	FRONT BRAKE HOSE	1
3	RIGHT BRAKE CALLIPER (RADIAL)	1
4	LEFT FRONT CALLIPER (RADIAL)	1
5	GASKET	7
6	SPECIAL SCREW	1
7	RUBBER TIP	1
8	SCREW	2
9	SPECIAL SCREW	1
10	SCREW	1
11	FRONT BRAKE PUMP	1
12	SELF-LOCKING NUT	1
13	SCREW (M6X12)	1
14	WASHER	1
15	FRONT BRAKE LEVER	1
16	MICROSWITCH	1
17	BRACKET	1
18	FRONT BRAKE HOSE	1
19	SPECIAL SCREW	1



FRONT AND REAR BRAKES

FRONT BRAKE PUMP REMOVAL

Position	Description	Quantity
20	DRAIN	1
21	DRAIN PLUG	1

Removal:

NOTE

Drain out the brake fluid before proceeding with these operations.

Follow the disassembly sequence shown below:

- Remove the special screw (9) and the relevant gaskets (5).
- Take out the front brake hose (2).
- Remove the "X" connection of the front brake microswitch (16) Fig.A.
- Remove the microswitch (16) by unscrewing the screw (13) and the washer (14).
- Remove the nut (12) and the fastening screw (10).
- Take out the front brake disc lever (15).
- Unscrew the screws (8) fastening the bracket (17).
- Take out the pump.



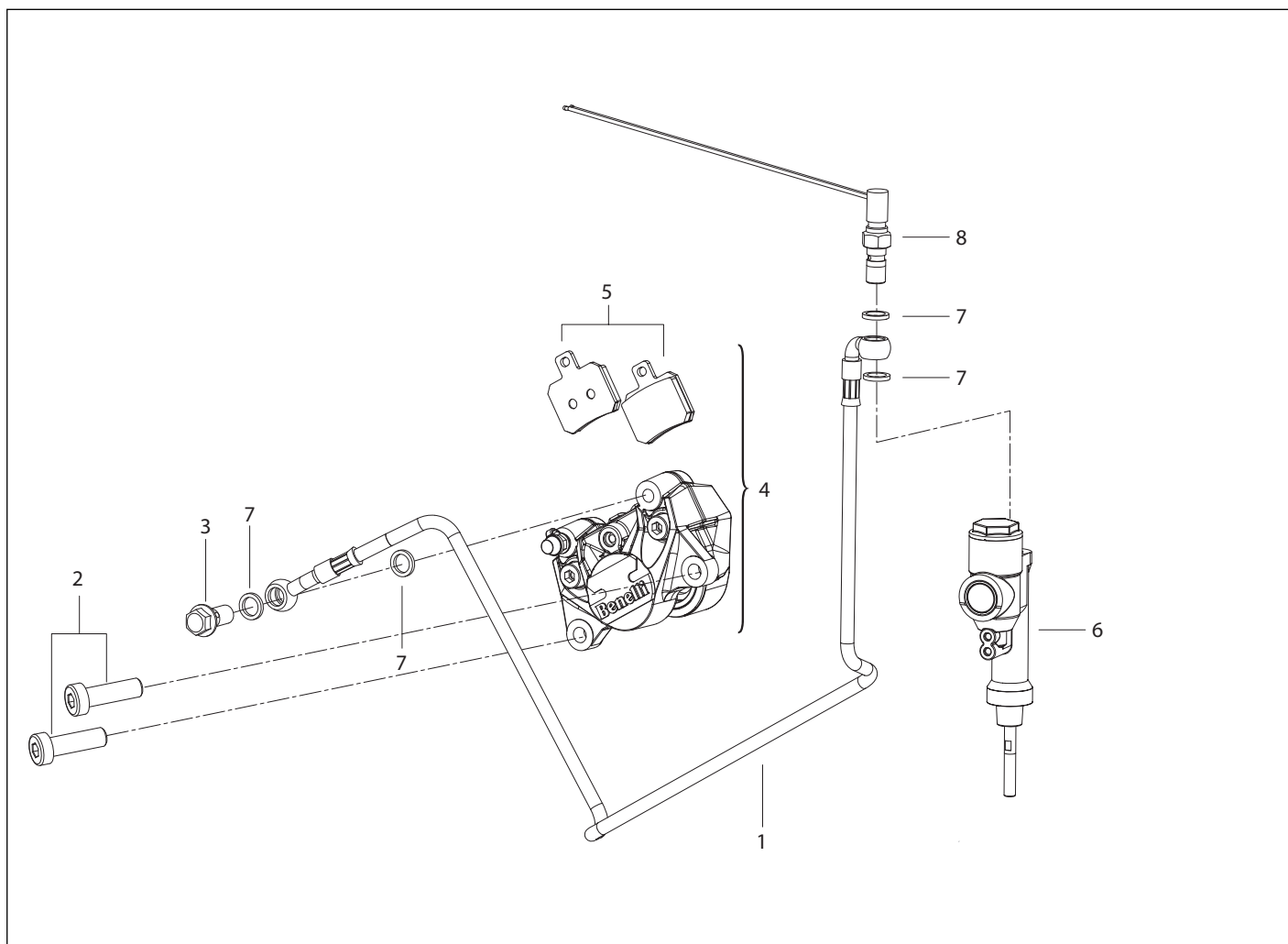
IMPORTANT NOTICE

during the disassembly stage, do not allow any brake fluid remaining in the circuit to drip onto the vehicle.



FRONT AND REAR BRAKES

REAR BRAKE PUMP REMOVAL



Position	Description	Quantity
1	REAR BRAKE HOSE	1
2	SCREW	2
3	SPECIAL SCREW	1
4	REAR BRAKE CALLIPER	1
5	REAR PAD PAIR	1
6	REAR BRAKE PUMP	1
7	GASKET	4
8	REAR IDROSTOP	1



FRONT AND REAR BRAKES

REAR BRAKE PUMP REMOVAL

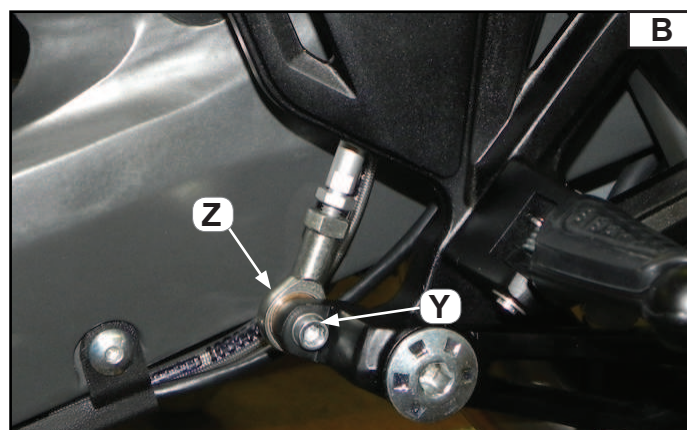
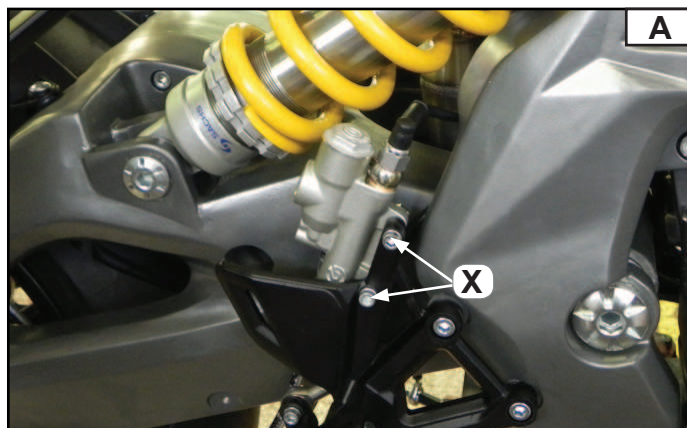
Removal:

NOTE

Drain out the brake fluid before proceeding with these operations.

Follow the disassembly sequence shown below:

- Remove the Idrostop (8) and the relevant gaskets (7).
- Take out the rear brake hose (1).
- Remove the fastening screws (x) from the brake pump Fig. A.
- Remove the nut and the fastening screw (y) Fig.B and free the ball joint (Z) from the brake control lever.
- Take out the brake pump(6).



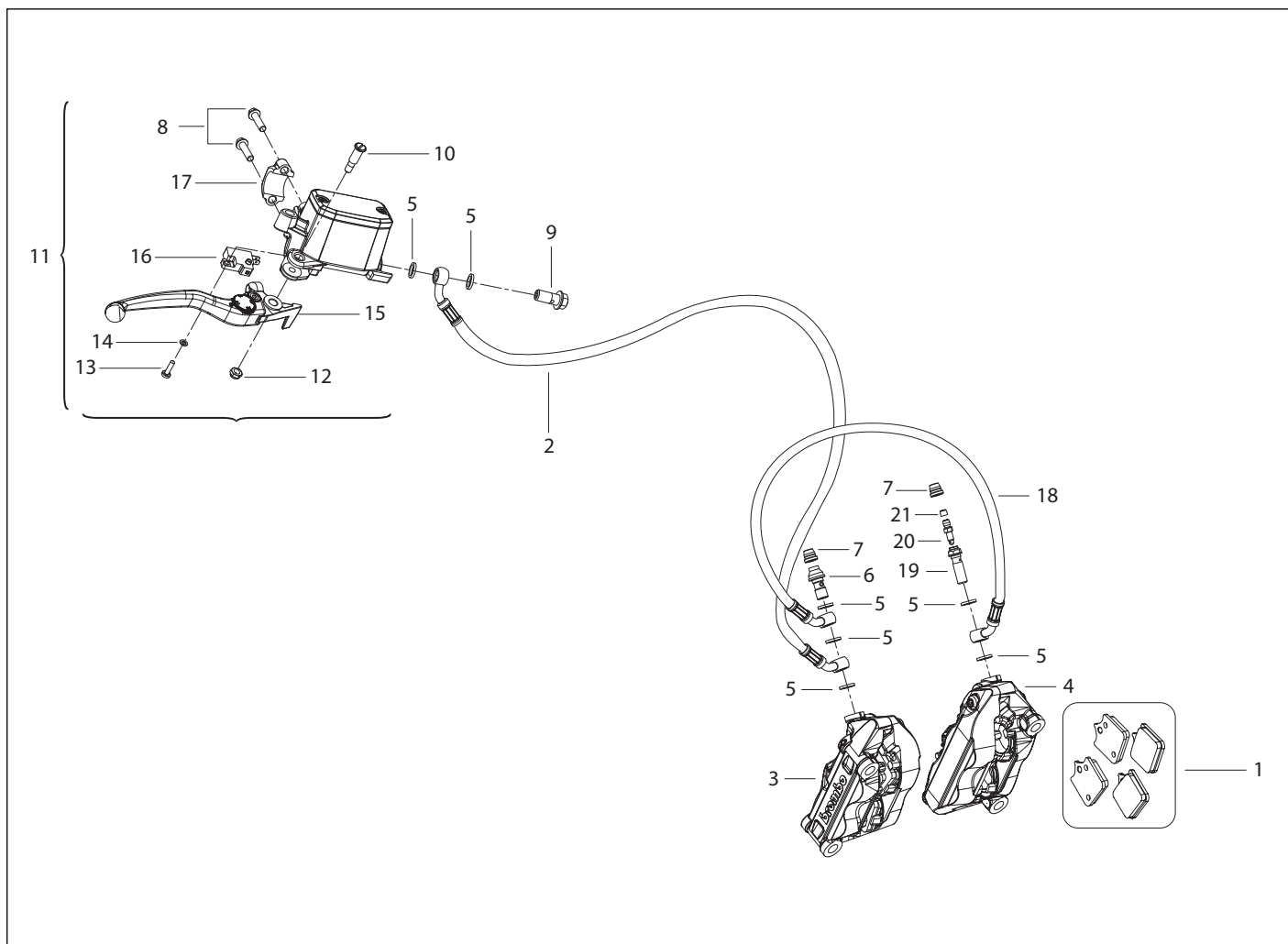
IMPORTANT NOTICE

During the disassembly stage, do not allow any brake fluid remaining in the circuit to drip onto the vehicle surfaces.



FRONT AND REAR BRAKES

FRONT BRAKE PUMP INSTALLATION



Position	Description	Quantity
1	RADIAL PAD PAIR	8
2	FRONT BRAKE HOSE	1
3	RIGHT BRAKE CALLIPER (RADIAL)	1
4	LEFT FRONT CALLIPER (RADIAL)	1
5	GASKET	7
6	SPECIAL SCREW	1
7	RUBBER TIP	1
8	SCREW	2
9	SPECIAL SCREW	1
10	SCREW	1
11	FRONT BRAKE PUMP	1
12	SELF-LOCKING NUT	1
13	SCREW (M6X12)	1
14	WASHER	1
15	FRONT BRAKE LEVER	1
16	MICROSWITCH	1
17	BRACKET	1
18	FRONT BRAKE HOSE	1
19	SPECIAL SCREW	1



FRONT AND REAR BRAKES

FRONT BRAKE PUMP INSTALLATION

Position	Description	Quantity
20	DRAIN	1
21	DRAIN PLUG	1

Fitting:

Follow the assembly sequence shown below:

WARNING

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid.

Never use solvents on the internal parts of the brake.

- Fit the microswitch (16) by screwing the screw (13) and the washer (14) to the pump body, with the following torque.



Torque 1.5 N*m

- Insert the "X" connection of the front brake microswitch (16) Fig.A.
- Assemble the special screw (9) and the relevant gaskets (5) to the front brake hose(2) and apply it to the pump body. Tighten the screw to the following torque:



Torque 26 N*m

WARNING

To guarantee the safety of the bike, it is essential for the path of the brake hose to be correct.

- Assemble the front brake lever (15) by tightening the nut (12) and the fastening screw (10) to the following torque:



Torque 7 N*m

- Fit the bracket (17) to the handlebar and tighten the two fastening screws (8), first the top and then the bottom, to the following torque:



Torque 8 N*m

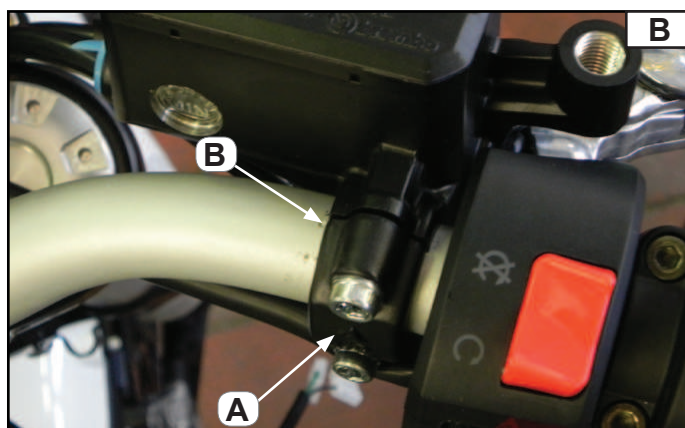
NOTE

Install the brake pump support with "UP" facing upwards "A" Fig. B.

Bring the end of the brake pump check element into line with the mark "B" on the right grip of the handlebar FigB.

NOTE

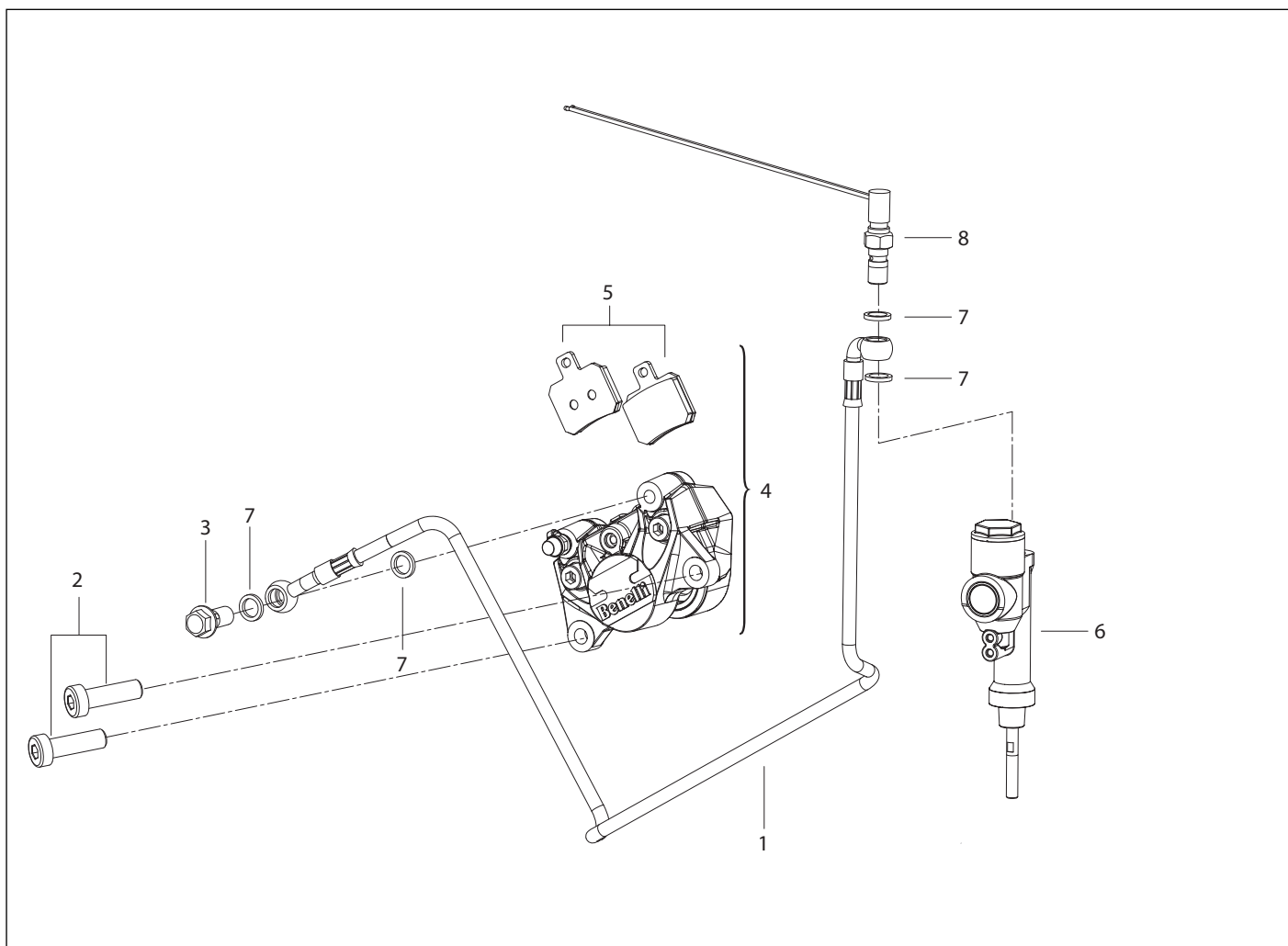
Once these operations are completed, top up with brake fluid. See chapter 3 "inspections and periodic maintenance", "frame/ front brake fluid check/topping up".





FRONT AND REAR BRAKES

REAR BRAKE PUMP INSTALLATION



Position	Description	Quantity
1	REAR BRAKE HOSE	1
2	SCREW	2
3	SPECIAL SCREW	1
4	REAR BRAKE CALLIPER	1
5	REAR PAD PAIR	1
6	REAR BRAKE PUMP	1
7	GASKET	4
8	REAR IDROSTOP	1



FRONT AND REAR BRAKES

REAR BRAKE PUMP INSTALLATION

Fitting:

Follow the assembly sequence shown below:

WARNING

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid.

Never use solvents on the internal parts of the brake.

- Assemble the ball joint (Z) to the brake control lever, tighten the nut and fastening screw (y) Fig.B to the following torque:



Torque 10 N*m

- Tighten the fastening screws (x) on the brake pump(6) Fig. A to the following torque:



Torque 10 N*m

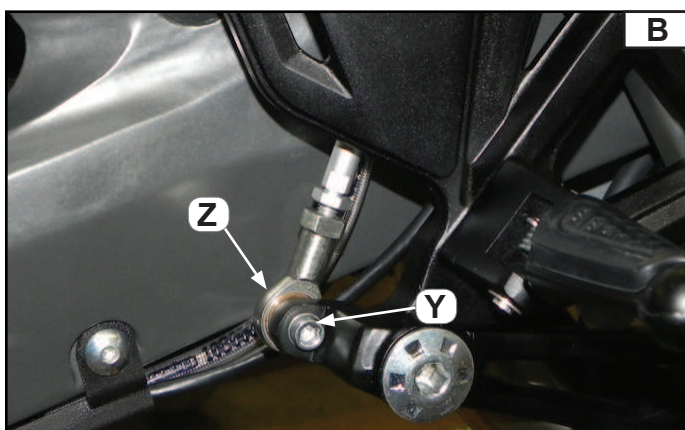
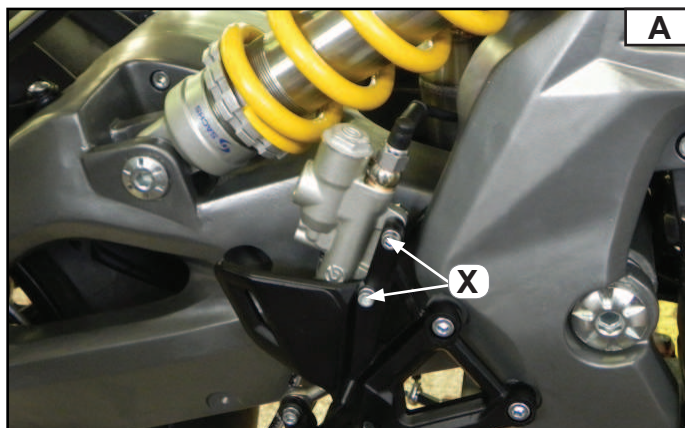
- Connect the idrostop (8) and the relevant gaskets (7) to the rear brake hose (1) and the brake pump. Tighten the idrostop to the following torque:



Torque 26 N*m

WARNING

To guarantee the safety of the bike, it is essential for the path of the brake hose to be correct.





FRONT AND REAR BRAKES

FRONT BRAKE CALLIPER TIGHTNESS

Removal:

The following procedure is applied to both brake callipers.

NOTE

Before removing the brake calliper, drain the brake fluid from inside the brake circuit.

Detach:

- the special screw (6) and gaskets (5) Fig.A
- Remove the front brake hoses.

NOTE

Insert the end of the brake hose into a container and slowly pump out and drain the brake fluid.

- Remove both callipers, unscrewing the fastening screws "A" on the front fork Fig. B

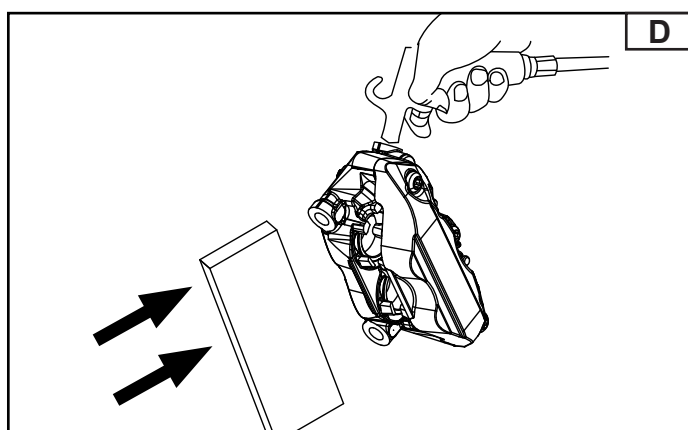
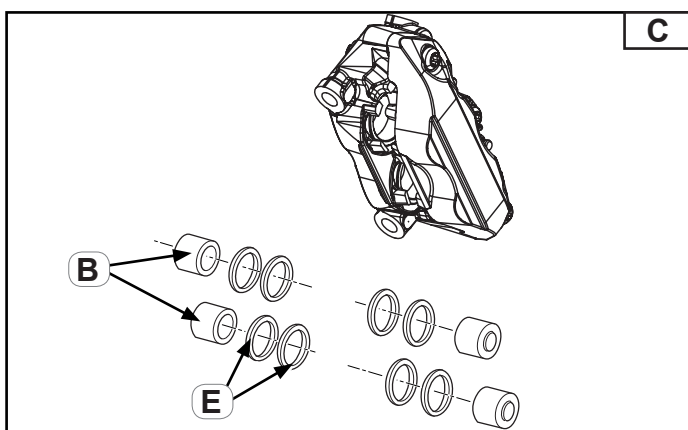
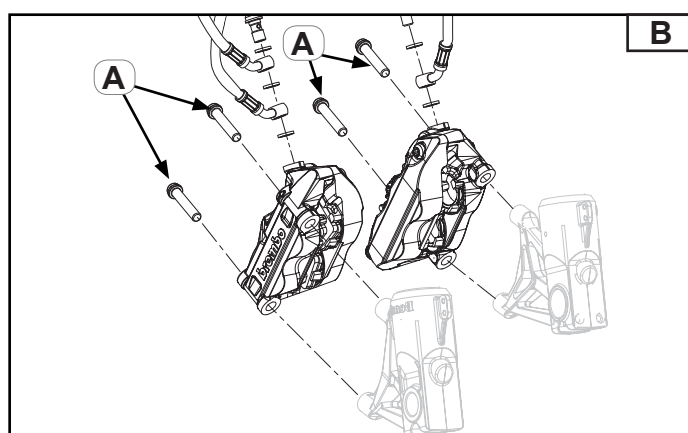
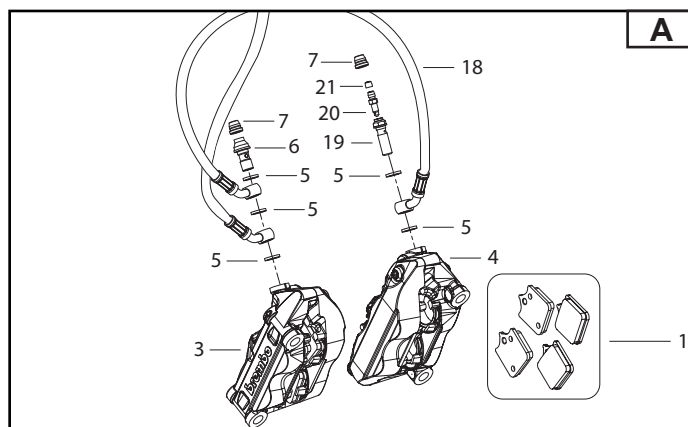
Detach:

- The brake calliper pistons "B" (2 Ø 34 mm and 2 Ø 30 mm) Fig. C
- The piston gaskets on the brake calliper "E" (first the smallest oil seals - gaskets, then the sealing rings - larger gaskets).
- Secure the pistons on the brake calliper with a block of wood Fig. D.
- Blow compressed air into the brake hose coupling to force out the pistons on the left of the brake calliper Fig.D.

WARNING

Never try to prise out the calliper pistons.

- Remove the piston seals from the brake calliper.
- Repeat the same procedure to force out the pistons on the right of the brake calliper Fig.D.





FRONT AND REAR BRAKES

REAR BRAKE CALLIPER

Removal:

NOTE

Before removing the brake calliper, drain the brake fluid from inside the brake circuit.

Detach:

- the special screw (A) and gaskets (B) Fig.A.
- Remove the rear brake hose.

NOTE

Insert the end of the brake hose into a container and slowly pump out and drain the brake fluid.

- Remove the calliper, unscrewing the fastening screws on the calliper support plate.

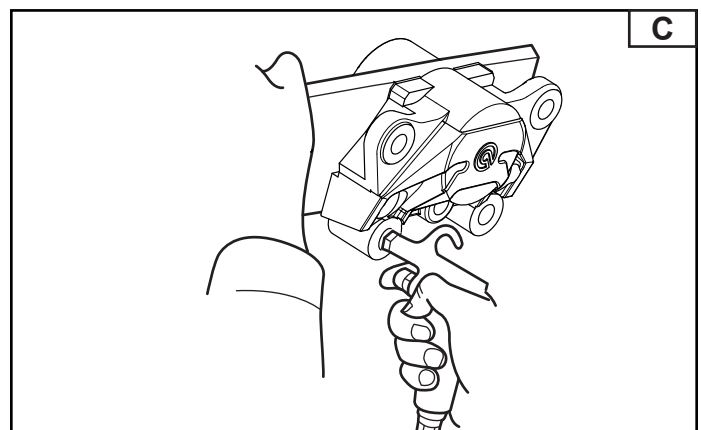
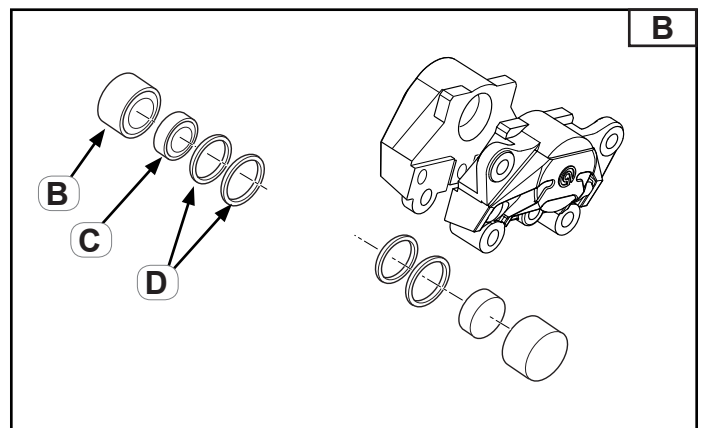
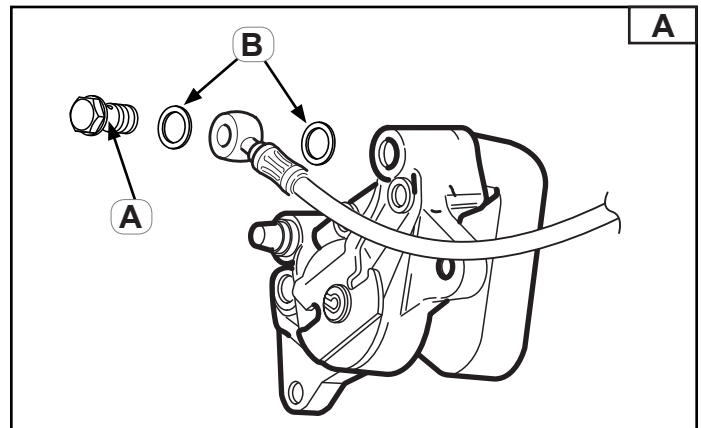
Detach:

- The pistons on the brake calliper "B" Fig.B
- Insulation "C".
- The piston gaskets on the brake calliper "D" (first the smallest oil seals - gaskets, then the sealing rings - larger gaskets).
- Secure the pistons on the brake calliper with a block of wood Fig. C.
- Blow compressed air into the brake hose coupling to force out the pistons on the left of the brake calliper Fig.C.

WARNING

Never try to prise out the calliper pistons.

- Remove the piston seals from the brake calliper.
- Repeat the same procedure to force out the pistons on the right of the brake calliper Fig.D.



**FRONT AND REAR BRAKES****CHECK THE FRONT AND REAR CALLIPERS****Check:**

- The brake calliper pistons.

If there are any rust spots/lines/signs of wear, replace the brake calliper pistons.

- The brake calliper cylinders.

If there are any lines/signs of wear, replace the whole brake calliper.

- The brake calliper body.

If there are any cracks/damage, replace the whole brake calliper.

- Brake fluid delivery passages (brake calliper body).

In the event of obstruction, clean with a jet of compressed air.

- Insulation

If there is any rust/lines/signs of wear, replace the brake calliper insulation.

IMPORTANT NOTICE

Every time the brake calliper is removed, replace the piston gaskets.

Check:

The rear brake calliper bracket and the couplings on the front fork.

If there are any rust spots/signs of wear, replace.



FRONT AND REAR BRAKES

FRONT BRAKE CALLIPER INSTALLATION

Removal:

The following procedure is applied to both brake callipers.

WARNING

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid.

- Never use solvents on the internal parts of the brake, as the piston gaskets would tend to swell and warp.
- Every time the brake calliper is removed, replace the piston gaskets.

Fit:

- The piston gaskets on the brake calliper "E" Fig.A (first the smallest oil seals - gaskets, then the sealing rings - larger gaskets).
- the brake calliper pistons "B" Fig. A (2 Ø 34 mm and 2 Ø 30 mm)

Fit:

- Both callipers, tightening the fastening screws "A" on the front fork Fig. B to the following torque:



Torque 45 N*m

- Front brake hoses (18) Fig.C.
- Copper washers (5).
- Special screws (6).

NOTE

Tighten the special screws, restoring the torque twice, after loosening them, to the following torque:



Torque 26 N*m

WARNING

To guarantee the safety of the bike, it is essential for the path of the brake hose to be correct.

Fill:

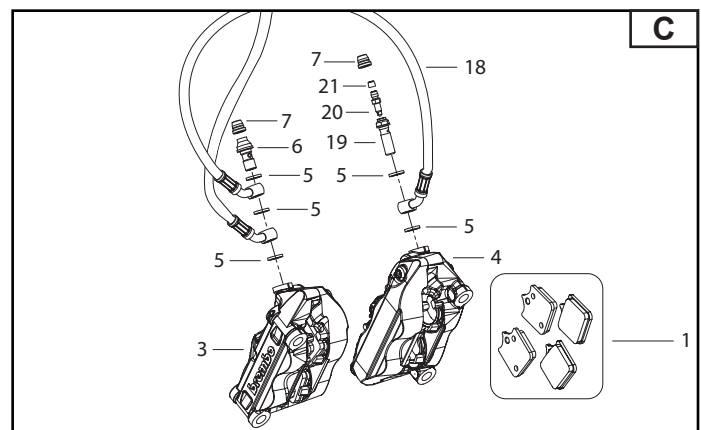
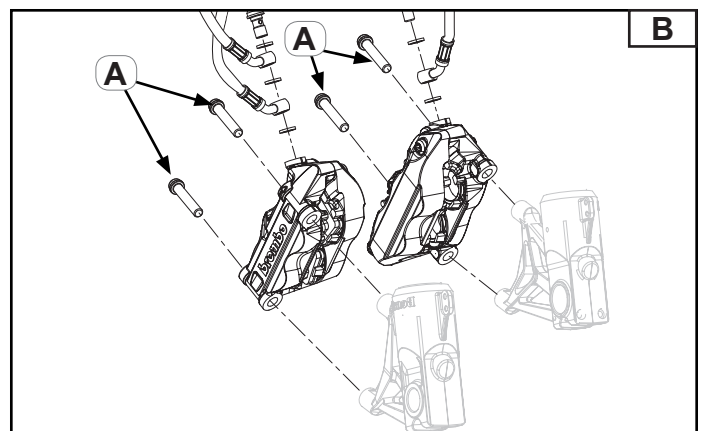
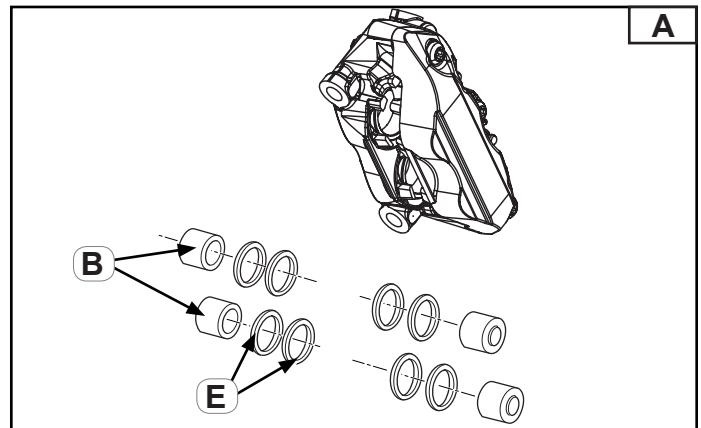
- The brake fluid container.

WARNING

Only use the prescribed fluid. The use of other types of brake fluid may cause damage to the rubber seals, leading to leaks and to a drop in brake performance.

Top up with the same type of brake fluid in the system. The brake fluid must never be mixed with fluids of other brands, since this could cause a dangerous chemical reaction, with a drop in brake performance as a result.

While topping up brake fluid, take care not to let any water enter the container. Water would considerably reduce the boiling point of the fluid and may lead to the formation of vapour bubbles.





FRONT AND REAR BRAKES

FRONT BRAKE CALLIPER INSTALLATION

IMPORTANT NOTICE

Brake fluid can damage painted surfaces and plastic parts.
Always clean up any brake fluid spills immediately.

Bleed:

- The brake circuit

Check:

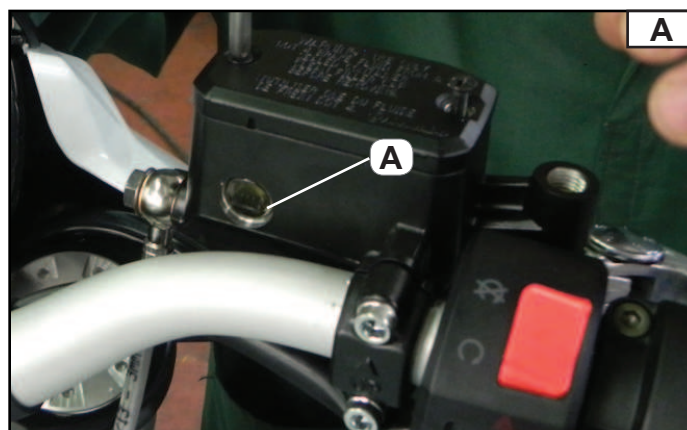
- Check the level of the brake fluid "A" Fig.A

If below the minimum notch, top up with the recommended brake fluid.

Check:

- Brake lever operation.

If the brake lever is soft or spongy to the touch, bleed the brake circuit.





FRONT AND REAR BRAKES

REAR BRAKE CALLIPER INSTALLATION

Fitting:

WARNING

Before installing, clean all of the internal parts of the brake, and lubricate them with clean or new brake fluid.

- Never use solvents on the internal parts of the brake, as the piston gaskets would tend to swell and warp.
- Every time the brake calliper is removed, replace the piston gaskets.

Fit:

- The piston gaskets on the brake calliper "D" Fig.A (first the smallest oil seals - gaskets, then the sealing rings - larger gaskets).
- Insulation "C" Fig.A
- The brake calliper pistons "B" Fig.A.

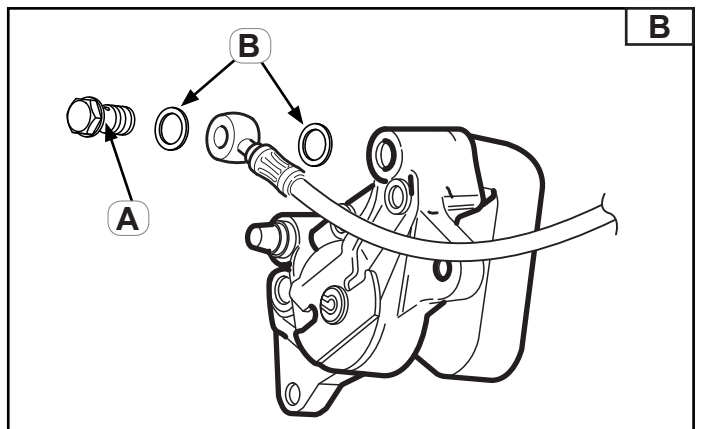
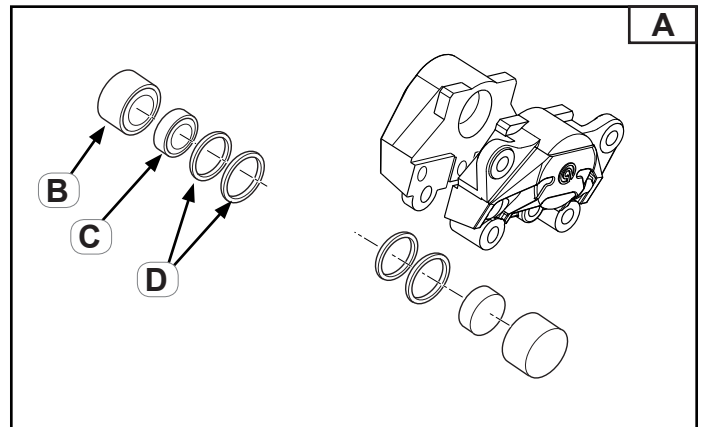
Fit:

- The calliper, and tighten the fastening screws on the calliper support plate to the following torque:



Torque 22 N*m

- Front brake hose.
- Copper washers "B" Fig.B
- Special screw "A" Fig.B



NOTE

Tighten the special screws, restoring the torque twice, after loosening them, to the following torque:



Torque 26 N*m

WARNING

To guarantee the safety of the bike, it is essential for the path of the brake hose to be correct.

Fill:

- The brake pump tank

WARNING

Only use the prescribed fluid. The use of other types of brake fluid may cause damage to the rubber seals, leading to leaks and to a drop in brake performance.

Top up with the same type of brake fluid in the system. The brake fluid must never be mixed with fluids of other brands, since this could cause a dangerous chemical reaction, with a drop in brake performance as a result.

While topping up brake fluid, take care not to let any water enter the container. Water would considerably reduce the boiling point of the fluid and may lead to the formation of vapour bubbles.



FRONT AND REAR BRAKES

REAR BRAKE CALLIPER INSTALLATION

IMPORTANT NOTICE

Brake fluid can damage painted surfaces and plastic parts.
Always clean up any brake fluid spills immediately.

Bleed:

- The brake circuit

Check:

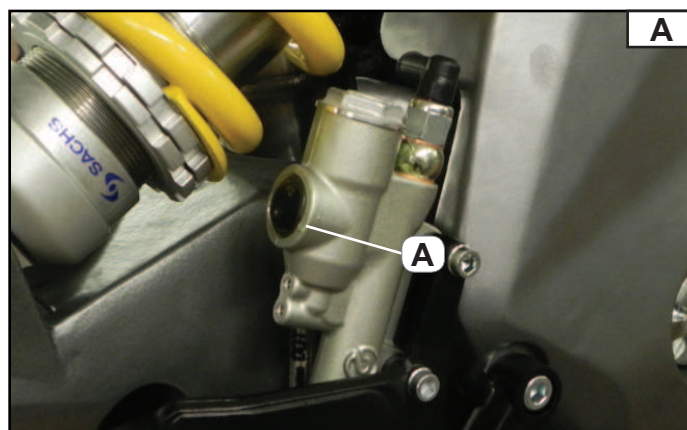
- Check the level of the brake fluid "A" Fig.A

If below the minimum notch, top up with the recommended brake fluid.

Check:

- Brake lever operation.

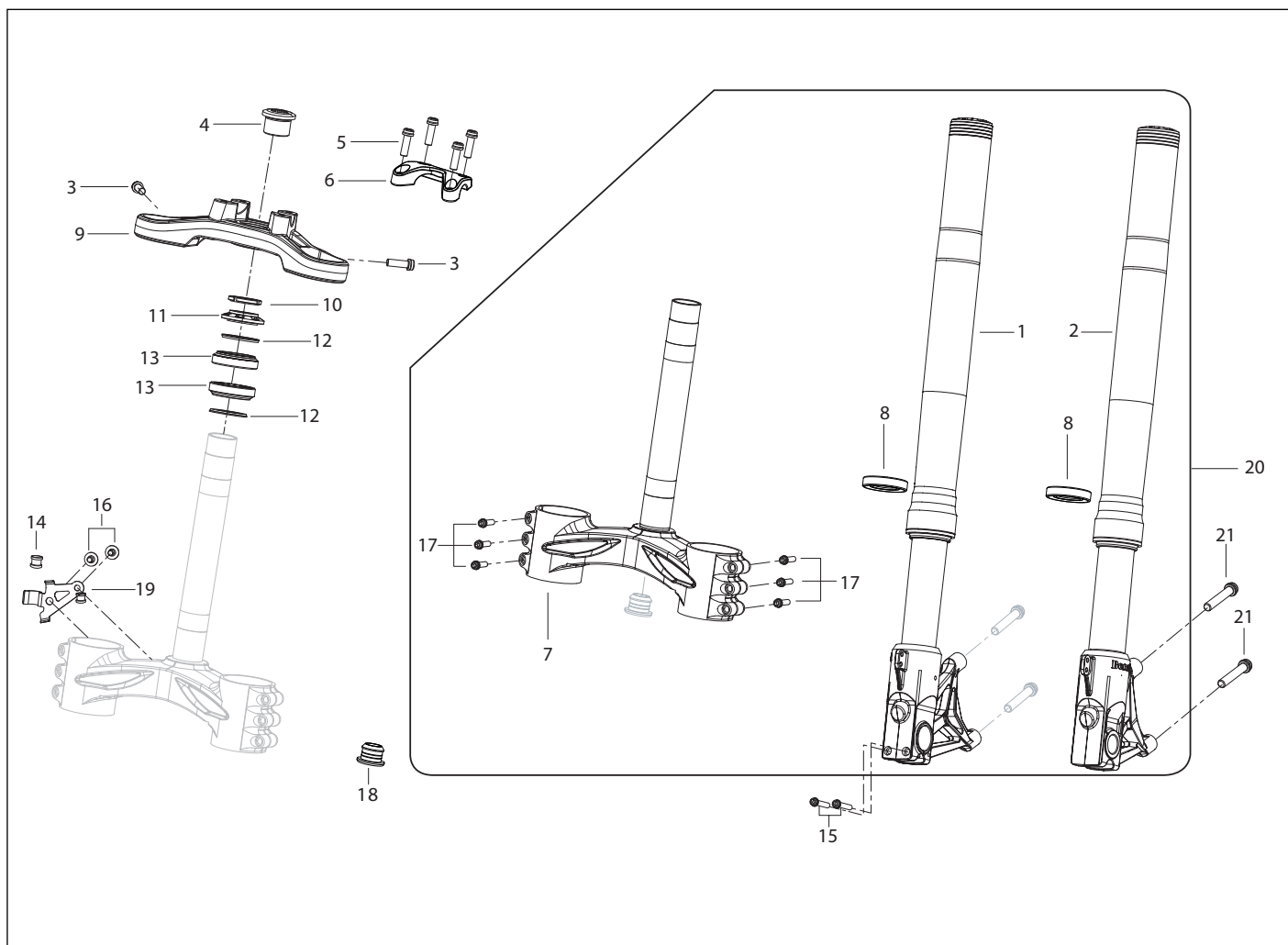
If the brake lever is soft or spongy to the touch, bleed the brake circuit.





FRONT FORK

FRONT FORK STEM REMOVAL



Position	Description	Quantity
1	RIGHT RADIAL STEM ASSEMBLY	1
2	LEFT RADIAL STEM ASSEMBLY	1
3	COUNTERSUNK HEX-HEAD SCREW M8X25 ZB	2
4	SPECIAL SCREW	1
5	COUNTERSUNK HEX-HEAD SCREW M8X25 ZB	4
6	HANDLEBAR BRACKET	1
7	STEERING BASE	1
8	OIL SEAL	1
9	STEERING HEAD	1
10	STEERING PIN RING NUT	1
11	STEERING RING NUT	1
12	DUST SEAL	2
13	BEARING	2
14	GUIDE BUSHING	1
15	SCREW	2
16	SCREW (M6X8)	2
17	SCREW	6
18	STEERING BASE CAP	1
19	CABLE GLAND	1



FRONT FORK

FRONT FORK STEM REMOVAL

Position	Description	Quantity
20	COMPLETE FRONT FORK	1
21	SCREW	4

The following procedure is applied to both front fork stems.

Park:

- The bike on a level surface

NOTE

Place the bike on a suitable support so that the front wheel is raised.

Remove:

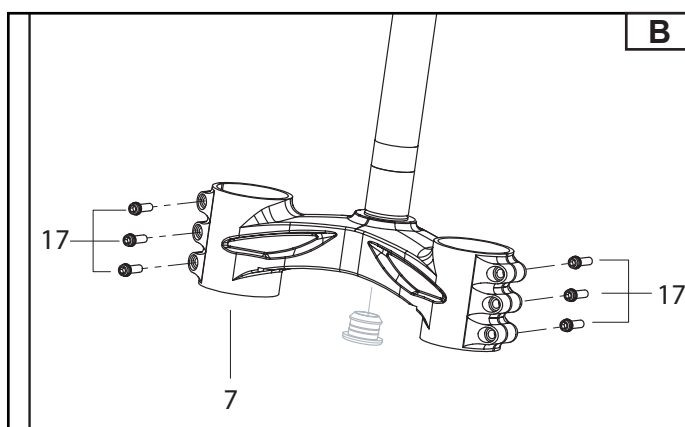
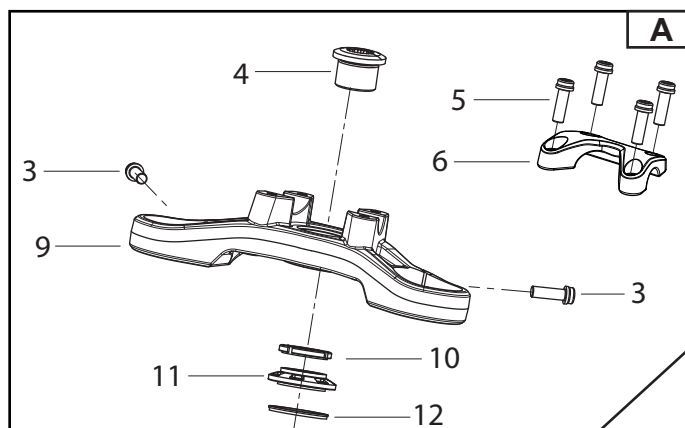
- The front brake calliper (see procedure).
- Front wheel (see procedure)
- Front mudguard (see procedure)

Loosen:

- The setscrews (3) from the top steering plate (9) Fig. A.
- The setscrews (17) from the bottom steering plate (7) Fig. B.

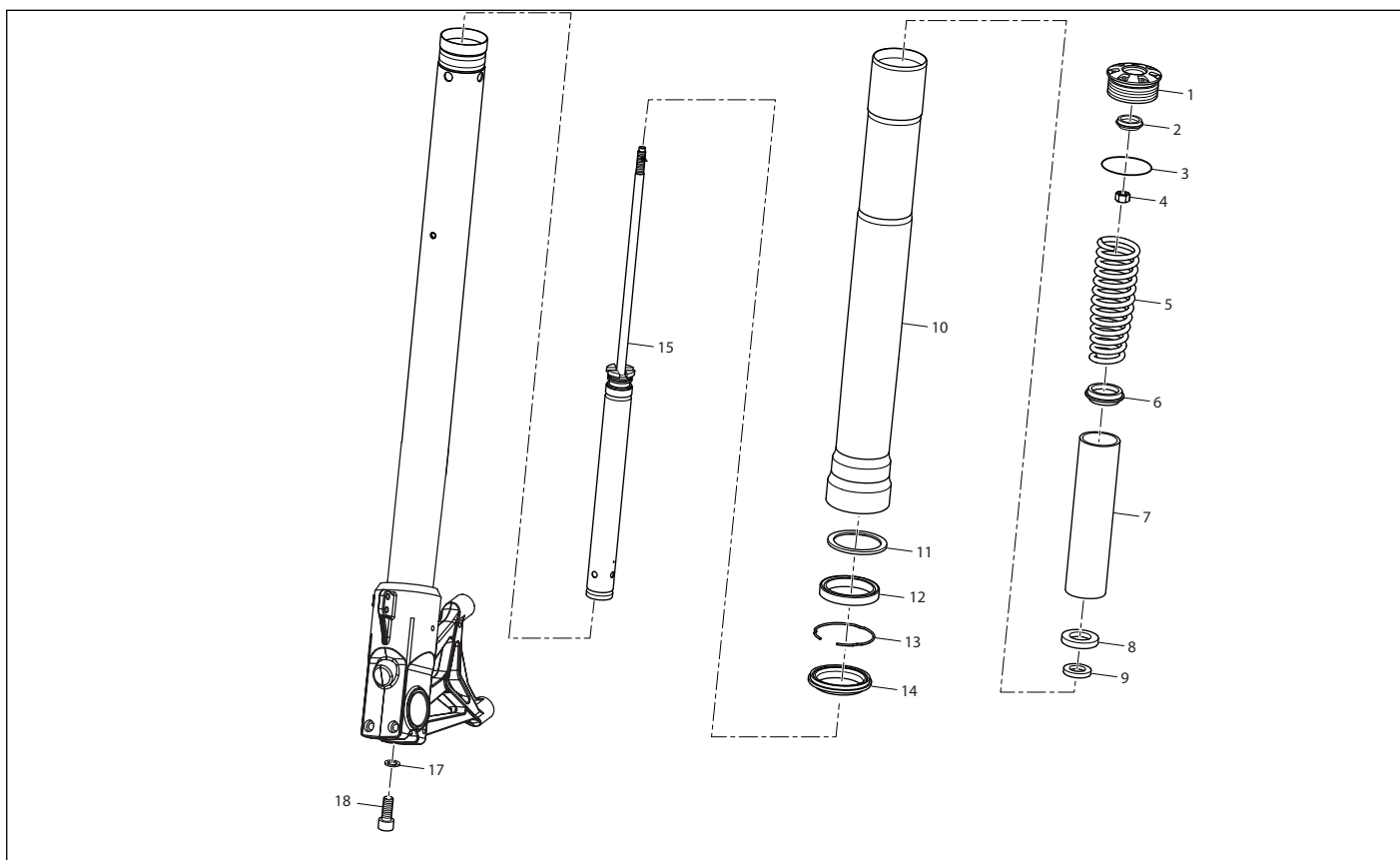
IMPORTANT NOTICE

Before loosening the setscrews on the top and bottom brackets, fit a support for the front fork stem.



FRONT FORK

FRONT FORK STEM DISASSEMBLY



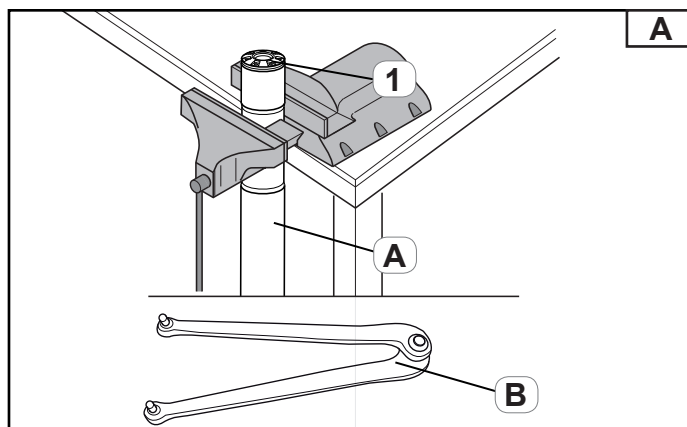
Disassemble the pieces in the order listed.

NOTE

The following procedure is applied to both front fork stems.

Secure:

- The fork sleeve (10) in a clamp Fig. A
- Completely unscrew the cap assembly (1) from the support tube, using a 4 mm pin and hook wrench(B).
- Lower the fork sleeve (10).

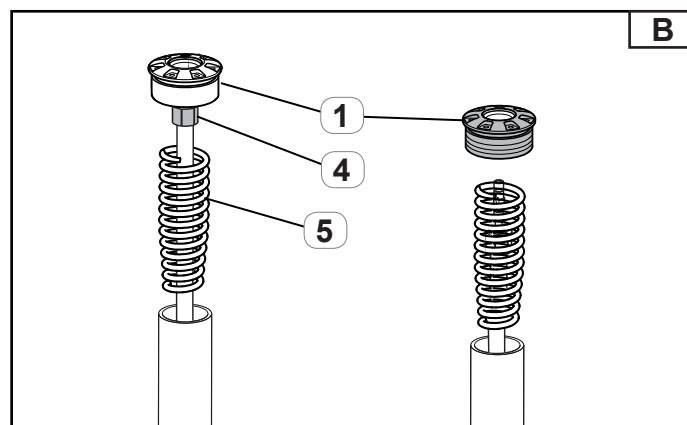


IMPORTANT NOTICE

The fork spring is compressed.

Push down:

- The fork spring (5) Fig.B
- The preload shim so as to be able to insert a 17 mm wrench in the nut (4).
- Hold the cap assembly (1) in place with a 4 mm pin and hook wrench and use a 17 mm wrench to loosen the nut (4).
- Unscrew and remove the top cap assembly(1).





FRONT FORK

FRONT FORK STEM DISASSEMBLY

Slide out from inside the sleeve Fig. C:

- The spring tip (2)
- The fork spring (5)
- The top spring guide bushing (6)
- The shim (7)
- The bottom spring guide bushing (8)
- The spring tip (9)

Release:

- The rod from the clamp
- Turn the rod towards a suitably sized container so as to allow the oil it contains to flow out Fig. D.

NOTE

To help drain the rod, it is necessary to pump a few times by pushing the pump rod forwards and backwards (15) Fig. D.

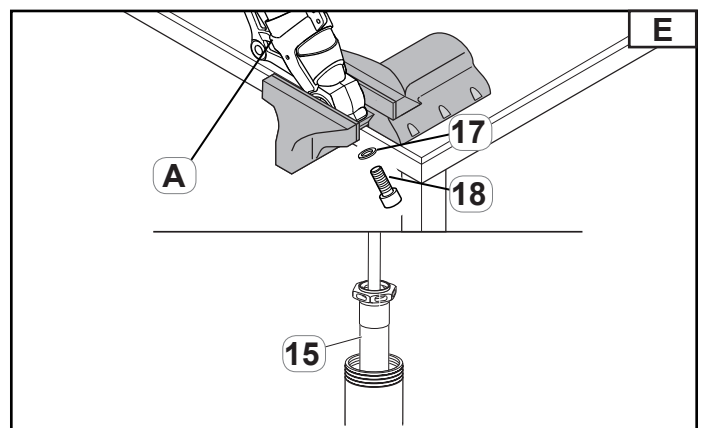
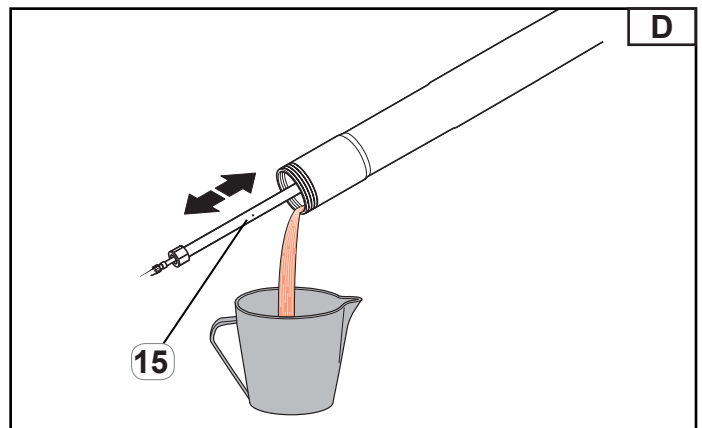
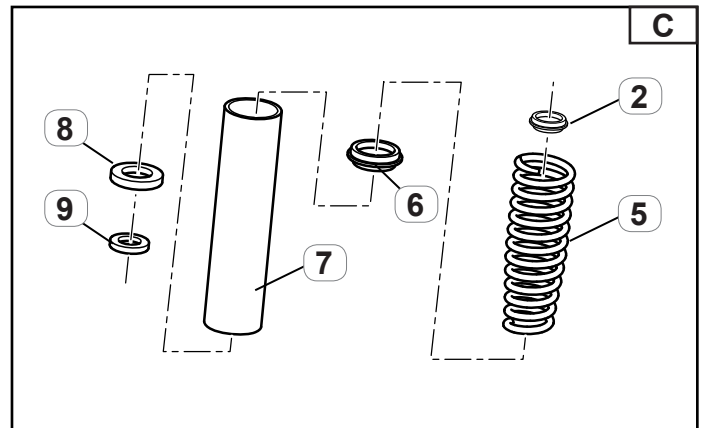
IMPORTANT NOTICE

This operation is only necessary after draining the oil from inside the rod.

- Lock the wheel shoe (A) in a clamp Fig.E.

Remove:

- The screw (18) fastening the pump unit (15)
- The washer (17)
- The pump unit (15)





FRONT FORK

FRONT FORK STEM DISASSEMBLY

IMPORTANT NOTICE

This operation is only necessary after completely draining the oil from inside the sleeve.

Remove:

- The dust seal (14) from the seat, using a small flathead screw driver.

Remove:

- The oil seal clip (13) using the same screwdriver Fig. G

Slide out:

- The fork stem (B) from the fork sleeve (10), Fig. H.

NOTE

To separate these two elements, it is necessary to pull them apart with a little force.

- Oil seal (12)
- Retaining ring (11)
- The bottom guide bushing (8)

Manually remove:

- The top guide bushing (6)

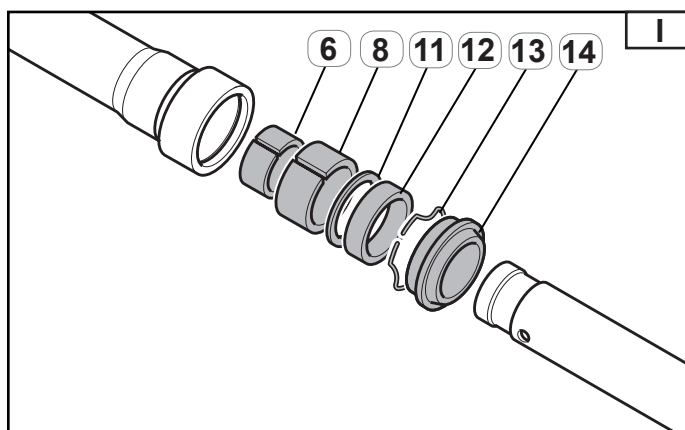
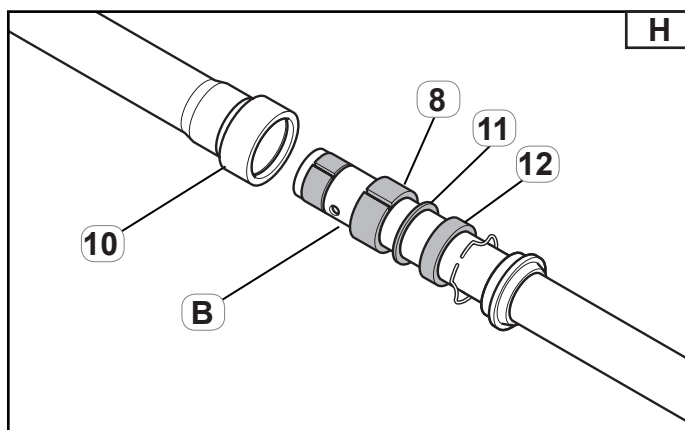
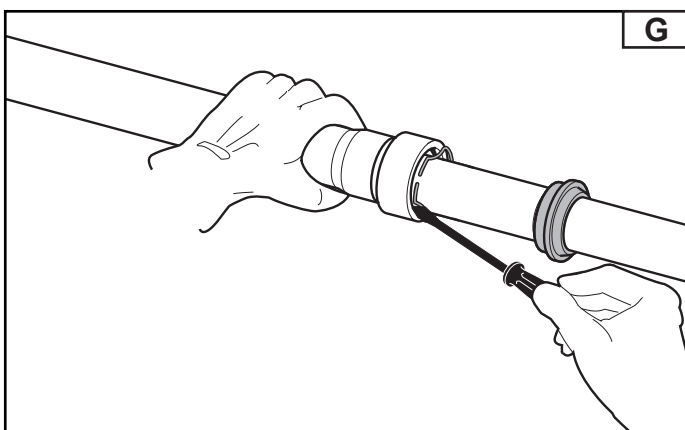
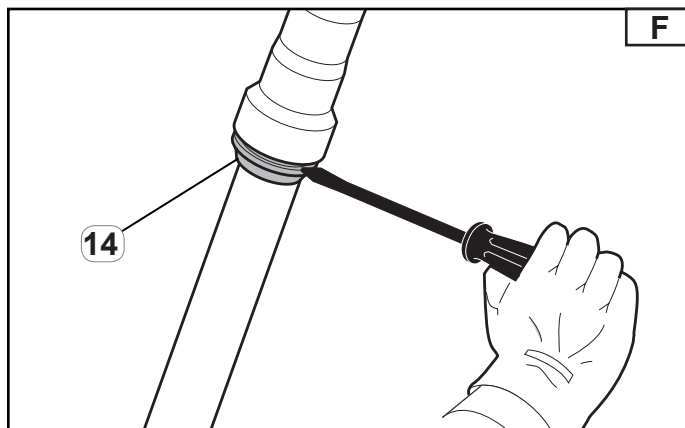
NOTE

If this operation becomes difficult, it is possible to use a flathead screwdriver in the slot in the bushing, to make it easier.

- The bottom guide bushing (8)
- Retaining ring (11)
- Oil seal (12)
- Dust seal clip (13)
- Dust seal (14)

NOTE

Once the oil and dust seals have been removed, they may not be re-used.





FRONT FORK

FRONT FORK STEM INSPECTION

The following procedure is applied to both front fork stems.

Check:

- Fork stem "A" Fig.A
- The fork sleeve (10).

If there is any deformation/damage/wear, replace.

WARNING

Do not try to straighten the inner fork if bent, since it will become weaker with time and could be dangerous.

Measure:

- The full length (B) of the spring (5). If outside specifications, replace.



Detail	The full length of the spring.
Spring	295 mm

Check:

- Damper shaft (15) Fig. C

If there is any damage or wear, replace.

If there are any obstructions, free all oil passages with compressed air.

IMPORTANT NOTICE

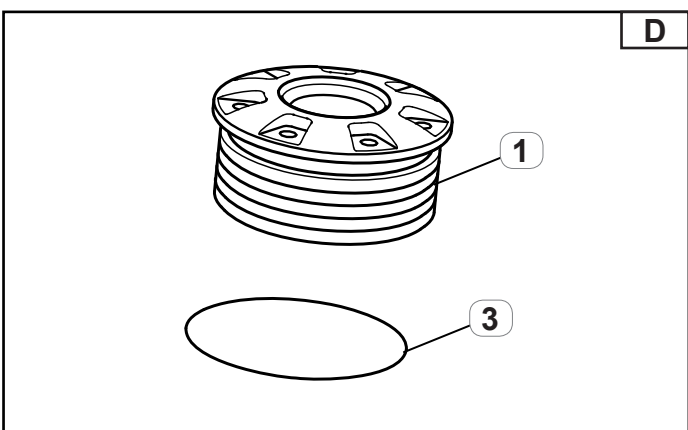
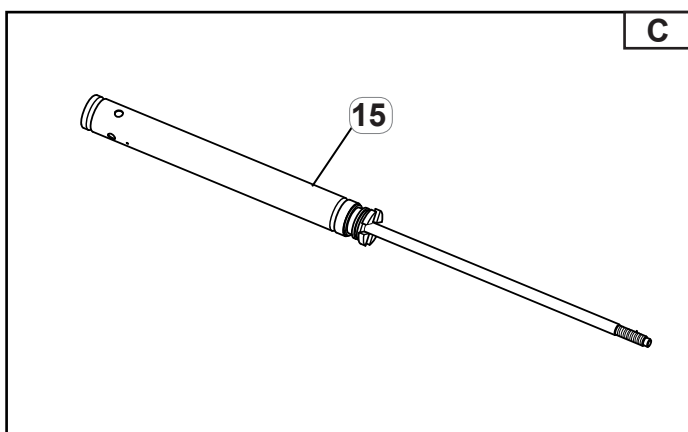
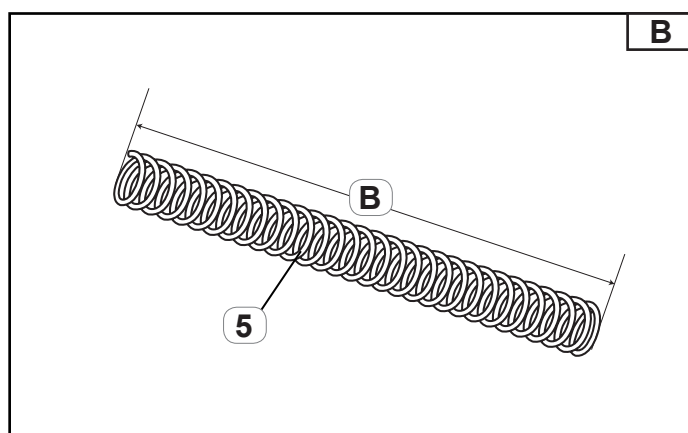
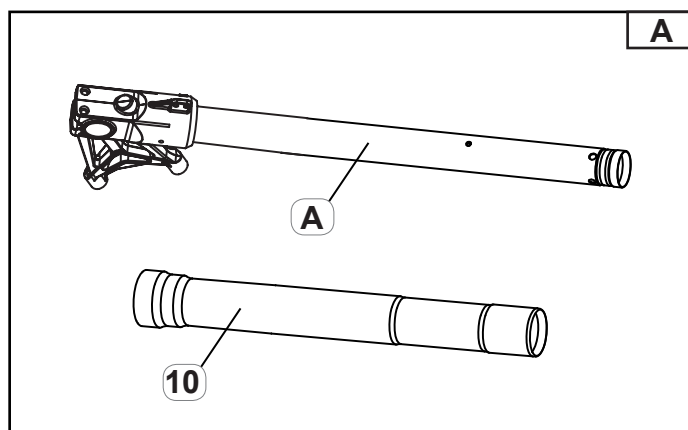
The pump unit contains elements that are very sensitive to foreign bodies.

While disassembling and refitting the front fork stem, never let foreign bodies enter the front fork.

Check:

- O-Ring (3) of the cap (1) Fig.D

If there is any damage or wear, replace.





FRONT FORK

FRONT FORK STEM ASSEMBLY

The following procedure is applied to both front fork stems.

IMPORTANT NOTICE

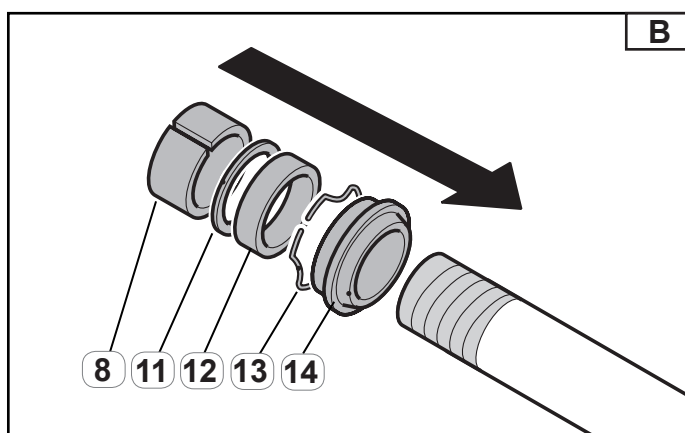
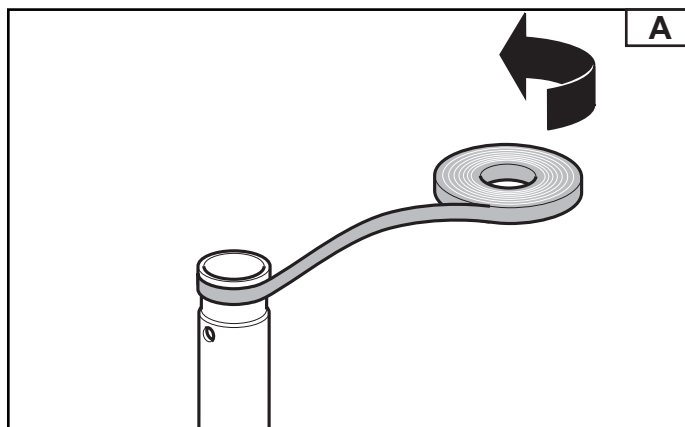
The oil and dust seals must not be reused after removal. Before refitting, check the condition of bushings and guides; check the guide bushings; if they are lined or scratch, replace them. Check the Teflon coating on the guide bushes as this must be integral.

Apply adhesive tape to the end of the supporting tube

- So as to cover the seat for the bushing.
- Slightly lubricate the oil and dust filters with grease.

Insert the dust seal Fig.B:

- Dust seal (14)
- Dust seal clip (13)
- Oil seal (12)
- Retaining ring (11)
- The bottom guide bushing (8)



IMPORTANT NOTICE

Take note of the direction in which the oil filter is facing (12) as it needs to be inserted with the hollow part facing the retaining ring (11).

- Remove the adhesive tape applied at the end of the fork stem, together with any traces of adhesive remaining.

Insert by hand:

- Top guide bushing(6) Fig. C

NOTE

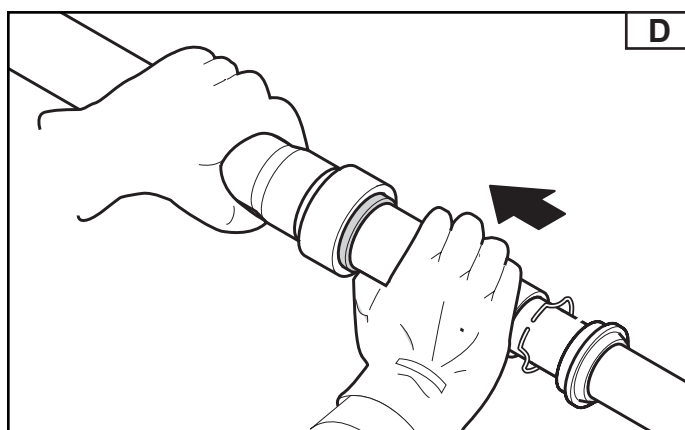
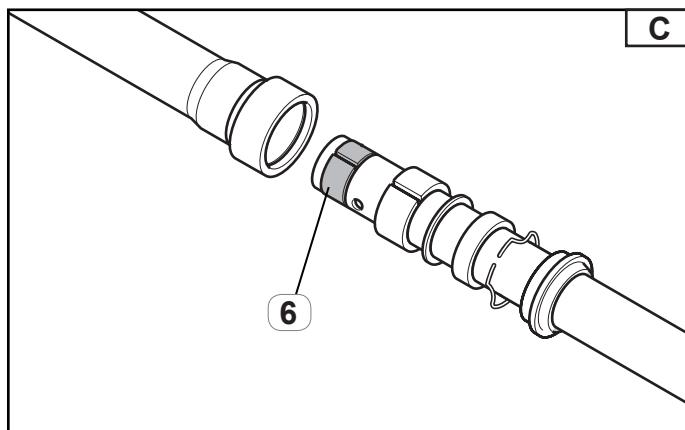
If this operation becomes difficult, it is possible to use a flathead screwdriver in the slot in the bushing, to make it easier.

- Insert the fork stem into the sleeve, very gently to make sure it does not damage the top guide bushing.

Accompany:

- The bottom guide bushing (8) as far as sleeve contact with the fork Fig.D
- Retaining ring (11)
- Oil seal (12)

Then place them in the seat.





FRONT FORK

FRONT FORK STEM ASSEMBLY

Fit:

- The clip on the oil seal (13) using a small flathead screwdriver, making sure that it is perfectly inserted into the special raceway and taking care not to scratch the fork stem Fig. E.

Then place the following in the seat:

- The dust seal (14) by pressing down manually Fig. F.

Insert:

- The assembled pump unit (15) into the fork sleeve (10) Fig. G.
- Fit the fork in a clamp by the wheel foot Fig. H.
- Lower the fork sleeve over the stem.

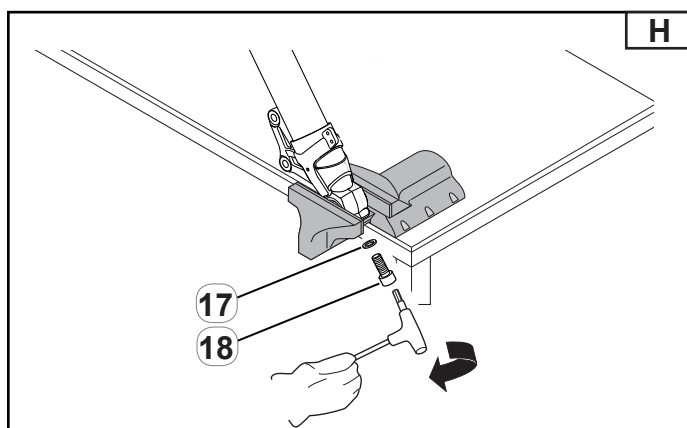
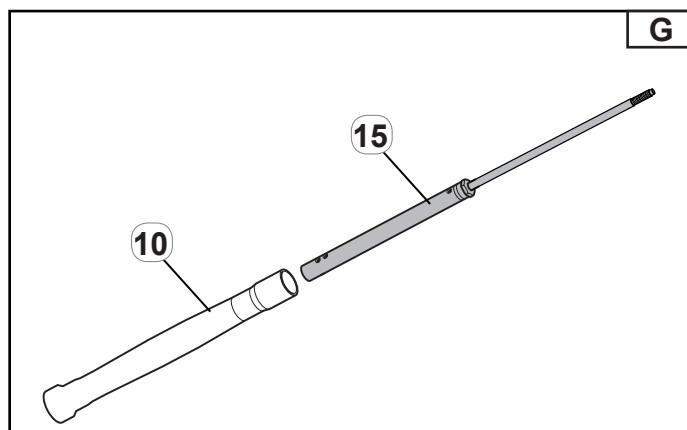
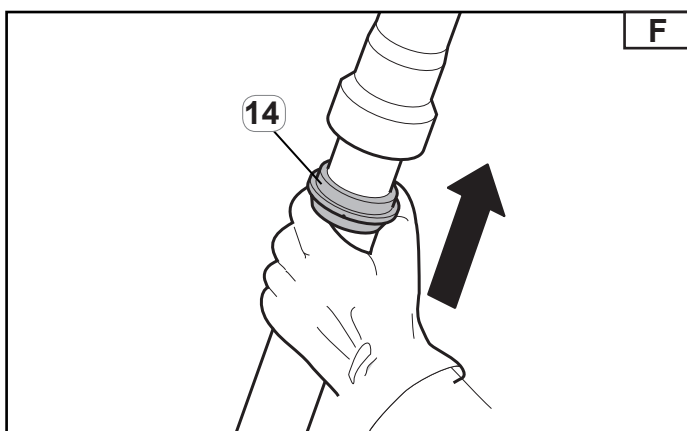
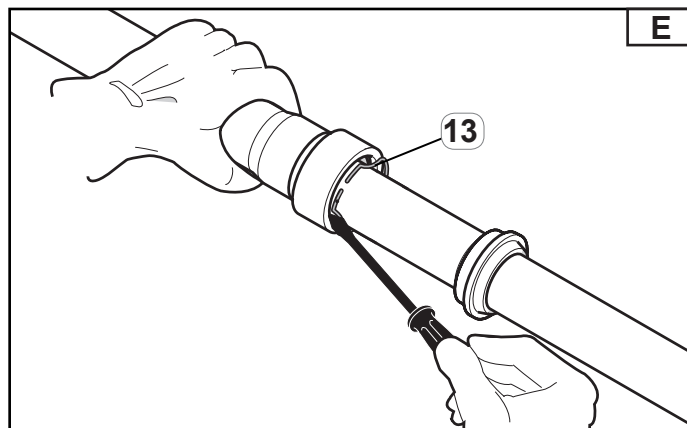
Insert:

- The washer (17)
- The screw (18) fastening the pump unit.

Use an 8 mm Allen key to tighten to the following torque:



Torque 50 N*m





FRONT FORK

FRONT FORK STEM ASSEMBLY

- Lift the fork sleeve completely Fig.I
- Using a graduated measuring container, prepare the correct amount of oil to be poured into the stem Fig.I.
- Pour about 2/3 of the oil into the fork sleeve (A), then pump the fork to eliminate any air.
- Continue pouring up to the required amount.
- Lower the fork sleeve over the stem as far as the dust seal stop on the wheel foot.
- Wait a few minutes and check the air volume then top up if necessary.

$h = 95 \text{ mm.}$

IMPORTANT NOTICE

A lower or higher air volume or a different type of oil to that recommended may change the behaviour of the fork at every stage.

Insert the following into the fork sleeve:

- Spring tip (2)
- Fork spring (5)
- Top spring guide bushing (6)
- Shim (7)
- Bottom spring guide bushing (8)
- Spring tip (9)

IMPORTANT NOTICE

In the same direction as spring insertion.
The narrowest section must be facing upwards.

Screw the following fully:

- Closing cap (1) Fig.M

Push down:

- The spring (5) Fig.N
- The preload shim
- Insert a 17 mm wrench in the nut (4).
- Hold the cap in place with a 4 mm pin and hook wrench and use a 17 mm wrench to tighten the nut.
- Tighten to the following torque:



Torque 20 N*m

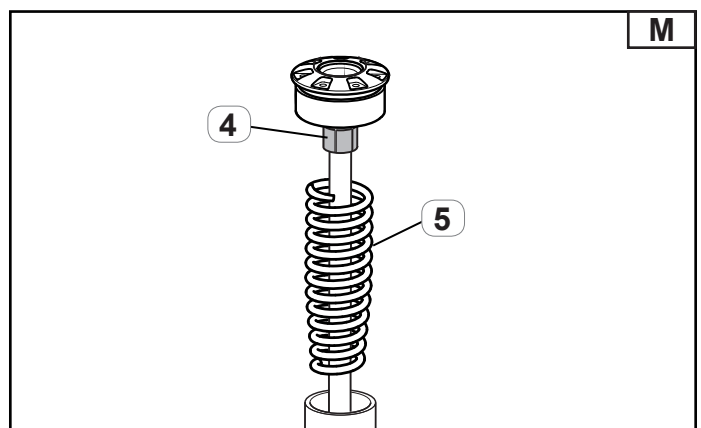
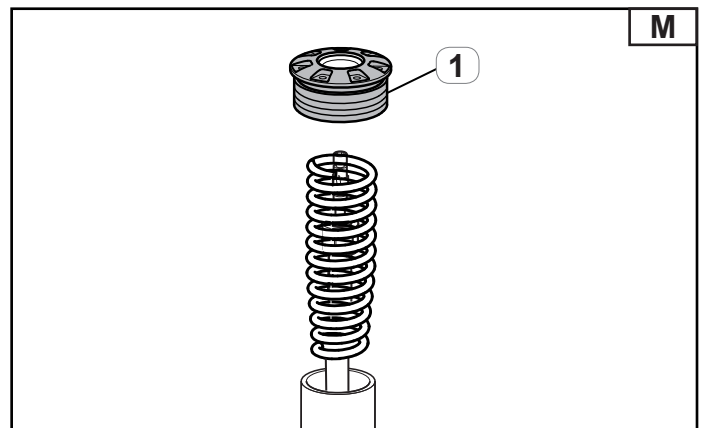
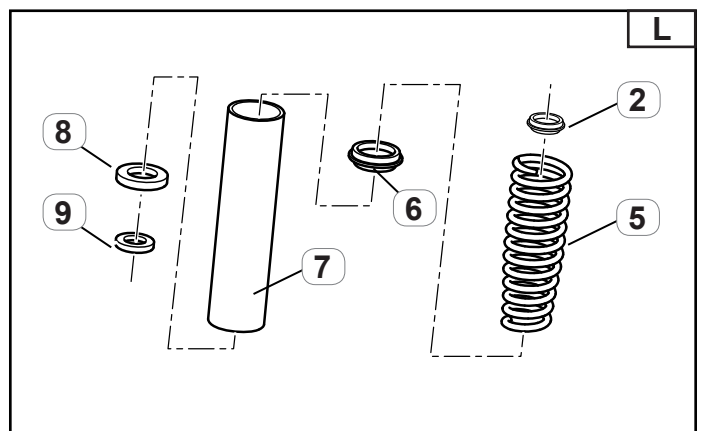
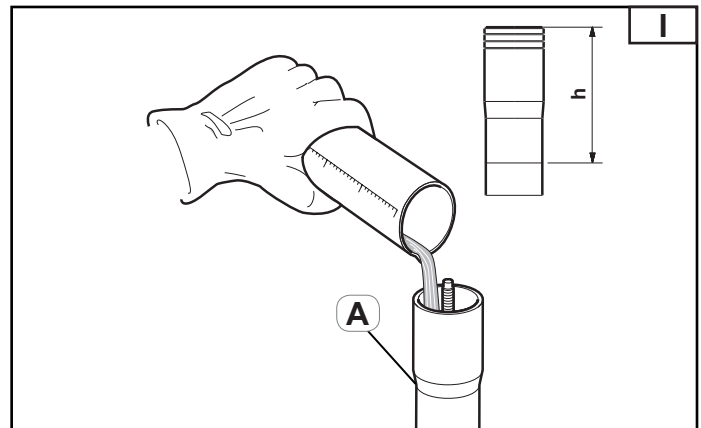
- Lift the fork sleeve over the stem.

Secure:

- The fork sleeve in a clamp
- Hold the cap in place with a 4 mm pin and hook wrench and tighten to the following torque:



Torque 20 N*m





FRONT FORK

FRONT FORK STEM FITTING

The following procedure is applied to both front fork stems.

Fit:

- The front fork stems (A) Fig.A.

tighten provisionally

- The stop screws (B) on the bottom steering plate Fig. A.

NOTE

Check the assembly position "x" Fig.B, which must be identified considering the bottom section of the steering base (7) and the end of the steering rod (excluding the dust seal shim).

Assembly position (X)

204.5 mm

Tighten:

- The stop screws (B) on the bottom steering plate to the following torque:



Torque 8 N*m

NOTE

Tighten in three steps.

- Insert the top steering plate, inserting shims (Y) into the openings, so as to make it easier to insert Fig.C.

Tighten:

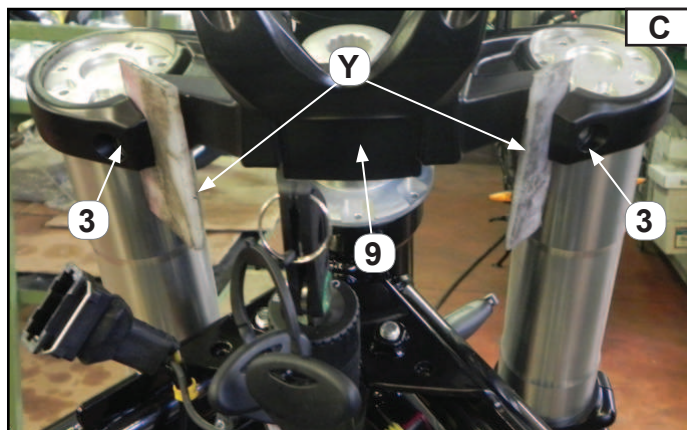
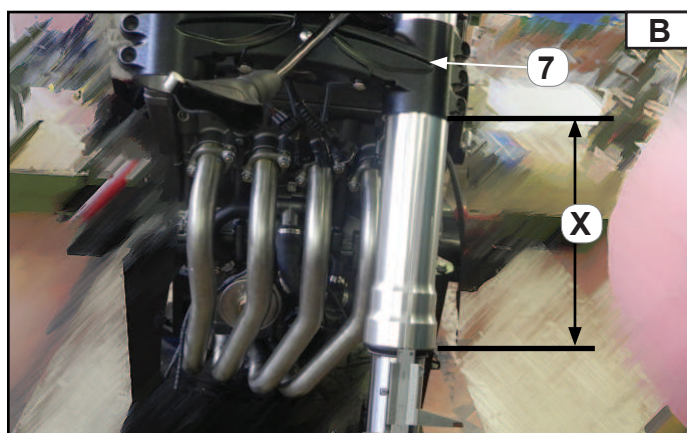
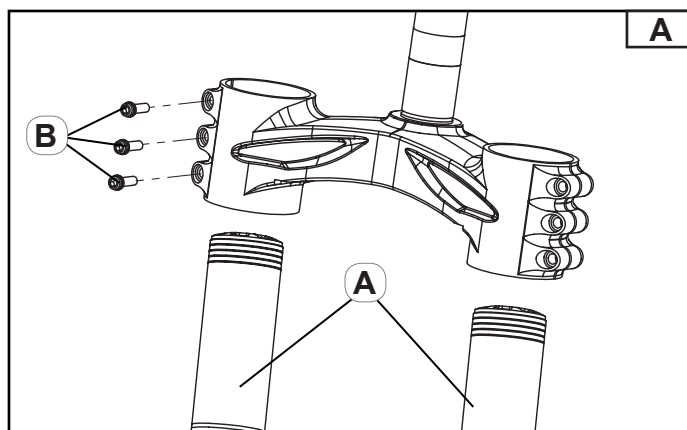
- The stop screws (3) on the top steering plate (9) Fig. C to the following torque:



Torque 22 N*m

IMPORTANT NOTICE

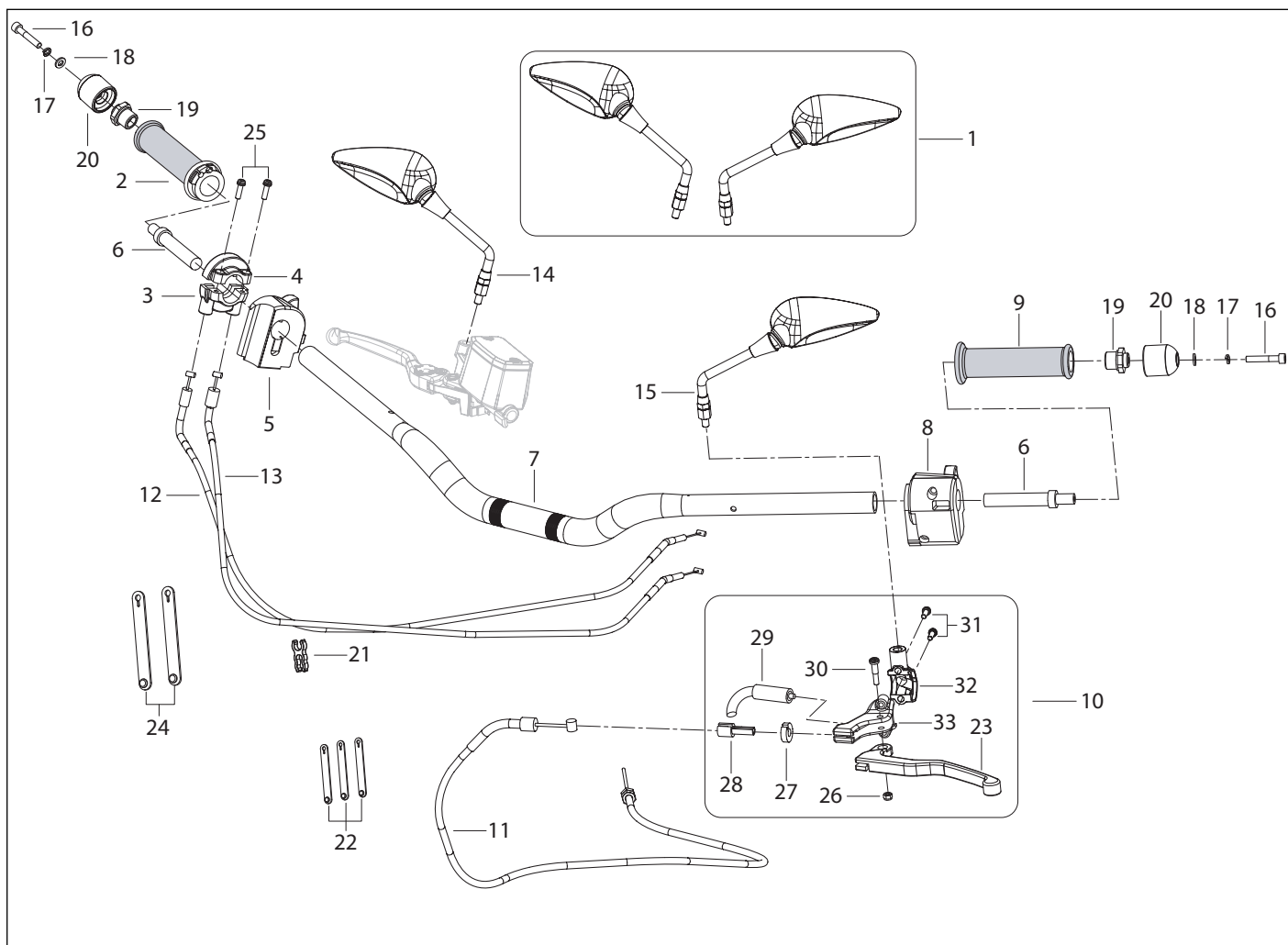
Check that the path of the brake hoses is correct.





HANDLEBAR

HANDLEBAR REMOVAL



Position	Description	Quantity
1	PAIR OF REAR VIEW MIRRORS	1
2	ACCELERATOR CONTROL	1
3	BOTTOM ACCELERATOR CONTROL	1
4	TOP ACCELERATOR CONTROL	1
5	RIGHT SWITCH	1
6	GRIP END	2
7	HANDLEBAR	1
8	LEFT SWITCH	1
9	LH GRIP	1
10	CLUTCH CONTROL	1
11	CLUTCH CABLE	1
12	ACCELERATOR OPENING CABLE	1
13	ACCELERATOR CLOSURE CABLE	1
14	REAR VIEW MIRROR (RIGHT)	1
15	REAR VIEW MIRROR (LEFT)	1
16	SCREW M6X35	2
17	ELASTIC WASHER	2
18	WASHER	2
19	GRIP CAP	2



HANDLEBAR

HANDLEBAR REMOVAL

Position	Description	Quantity
20	ROCKER ARM	2
21	CABLE GLAND	1
22	TUBE GUIDE	3
23	CLUTCH CONTROL LEVER	1
24	RUBBER CLIP	2
25	SCREW	2
26	NUT M6	1
27	SPECIAL NUT	1
28	SPECIAL SCREW	1
29	CLUTCH SWITCH	1
30	SCREW	1
31	SCREW M6X14	2
32	BRACKET	1
33	LEVER SUPPORT	1

Park the bike on a level surface.

IMPORTANT NOTICE

Prop the bike on suitable supports so that it cannot fall.

- Remove the screw (16), the washer (18) and the elastic washer (17)
- Take out the rocker arm (20)
- Take out the cap (19) and grip end piece (6)

Detach:

- The grip from the handlebar, using a flathead screwdriver to make it possible to insert a jet of air Fig.A.

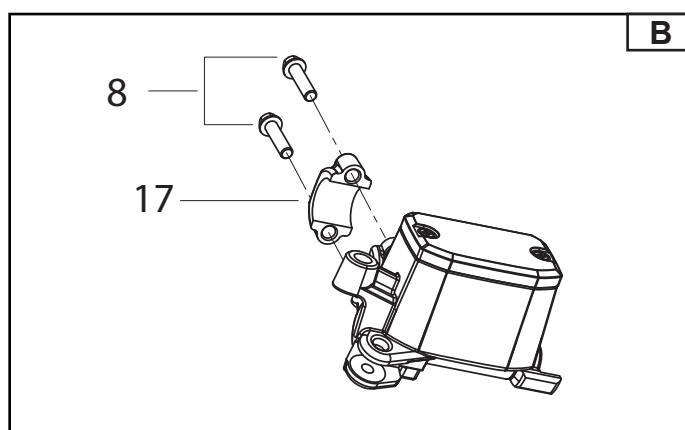
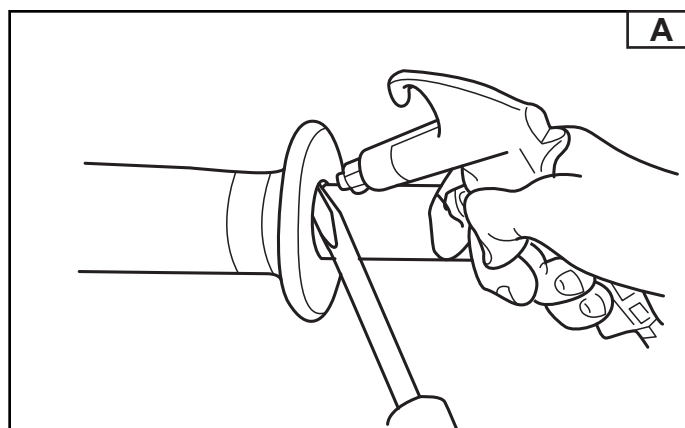
NOTE

Direct a jet of compressed air between the left of the handlebar and the relevant grip, so that it can be slid off the handlebar gradually.

- Take out the left switch (8).
- Detach the clutch cable (11).
- Remove the rear view mirror (15) with the adjustment nuts.
- Remove the clevis (32) by unscrewing the two fastening screws (31), then remove the support (33).

Repeat the procedure for the right-hand grip until the accelerator control grip (2) comes out and in this case, it must be removed by taking out the screws (25) securing the top (4) and bottom (3) accelerator control.

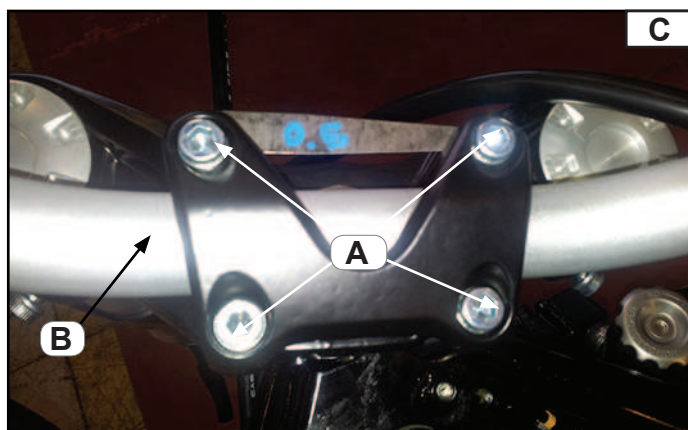
- Detach the accelerator opening cable (12) and the closure cable (11).
- Take out the right switch (5).
- Remove the clevis (17) by unscrewing the two fastening screws (8), then remove the brake pump Fig. B.





HANDLEBAR HANDLEBAR REMOVAL

Take out the handlebar, loosening the four fastening screws (A) of the handlebar clevis (B) Fig.C.



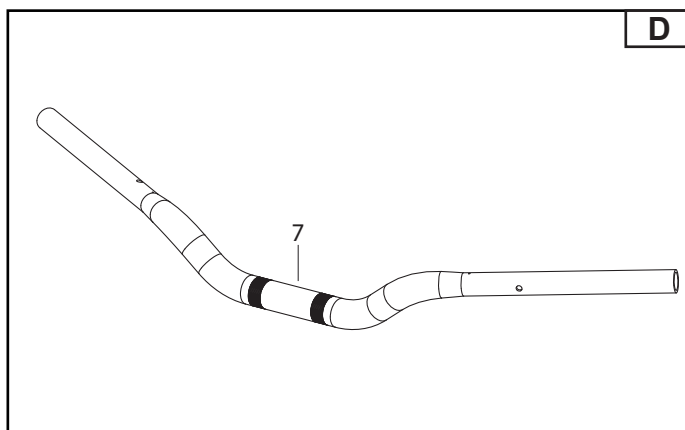
HANDLEBAR HANDLEBAR INSPECTION

Check:

- The handlebar (7) Fig.D
- If there is any warping/cracking/damage, replace.

WARNING

Do not try to straighten the handlebar if bent, since it will become weaker and could be dangerous.





HANDLEBAR

HANDLEBAR INSTALLATION

Proceed to install, following the steps for removal in reverse order, but taking care to observe the instructions below:

Fit:

- The switch on the right (5) and left (8) handlebars, taking care to align the projecting part "A" of the switch with the hole "B" on the right and left handlebars Fig. E.
- The brake clevis (17) Fig.B tightening the two screws (8) to the following torque:



Torque 8 N*m

NOTE

Install the brake pump clevis with "UP" facing upwards Fig. F. Tighten the top screw and then the bottom one. Line up the coupling surfaces of the brake pump clevis retainer with the punching on the right handlebar. There must be a gap of 2 mm between the switch on the right handlebar and the brake pump clevis.

Assemble:

- The handlebar grip

Apply a fine layer of rubber-based adhesive on the end of the handlebar.

Slip the grip over the end of the handlebar grip.

Remove all traces of excess rubber-based adhesive with a clean rag.

IMPORTANT NOTICE

Do not touch the handlebar grip until the rubber-based adhesive has dried completely.

Assemble:

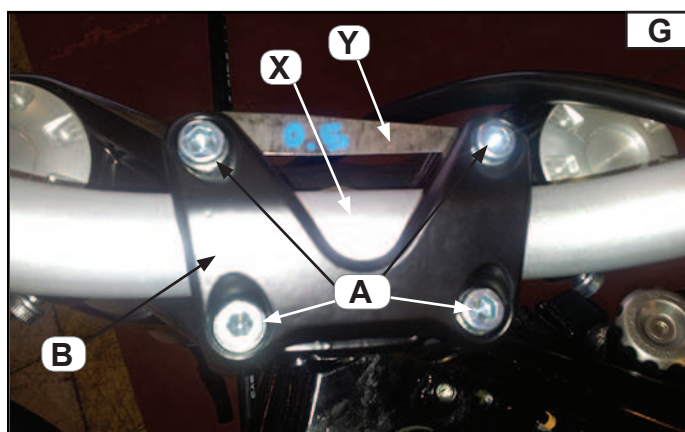
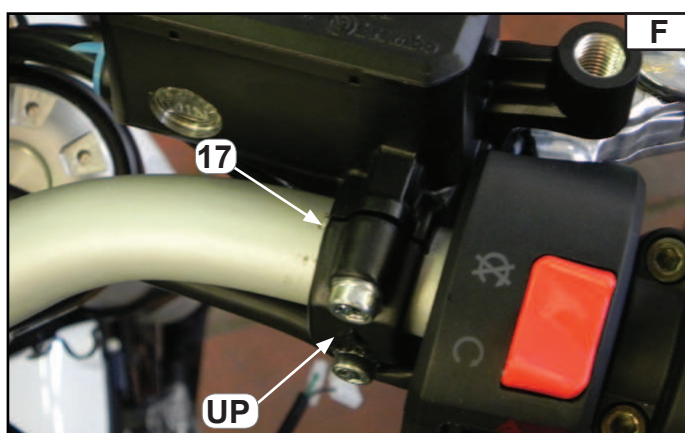
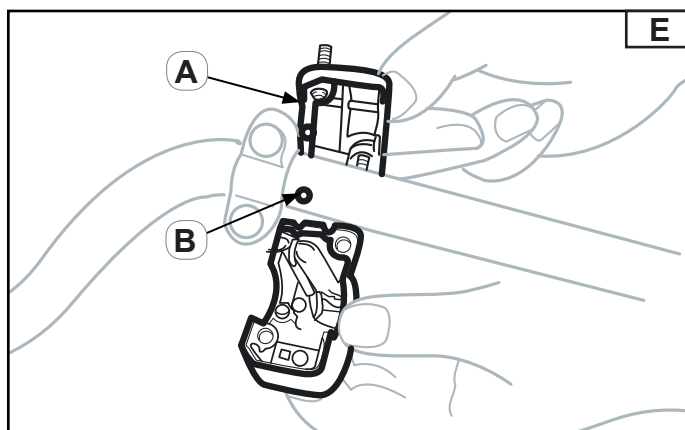
- The handlebar
- During the handlebar assembly, take care to place the handlebar in the position shown in Fig.G, at the fourth reference mark(X).
- Insert a 0.5 mm thickness gauge (Y) between the clamp and the plate in the top section Fig. G and position the two top screws (A).
- Tighten the back two screws (A) to 15 N*m and then to 22 N*m.
- Remove the thickness gauge.
- Tighten the front two screws (A) to 15 N*m and then to 22 N*m.

Tighten:

- The four fastening screws (A) of the handlebar clevis (B) Fig. G to the following torque:



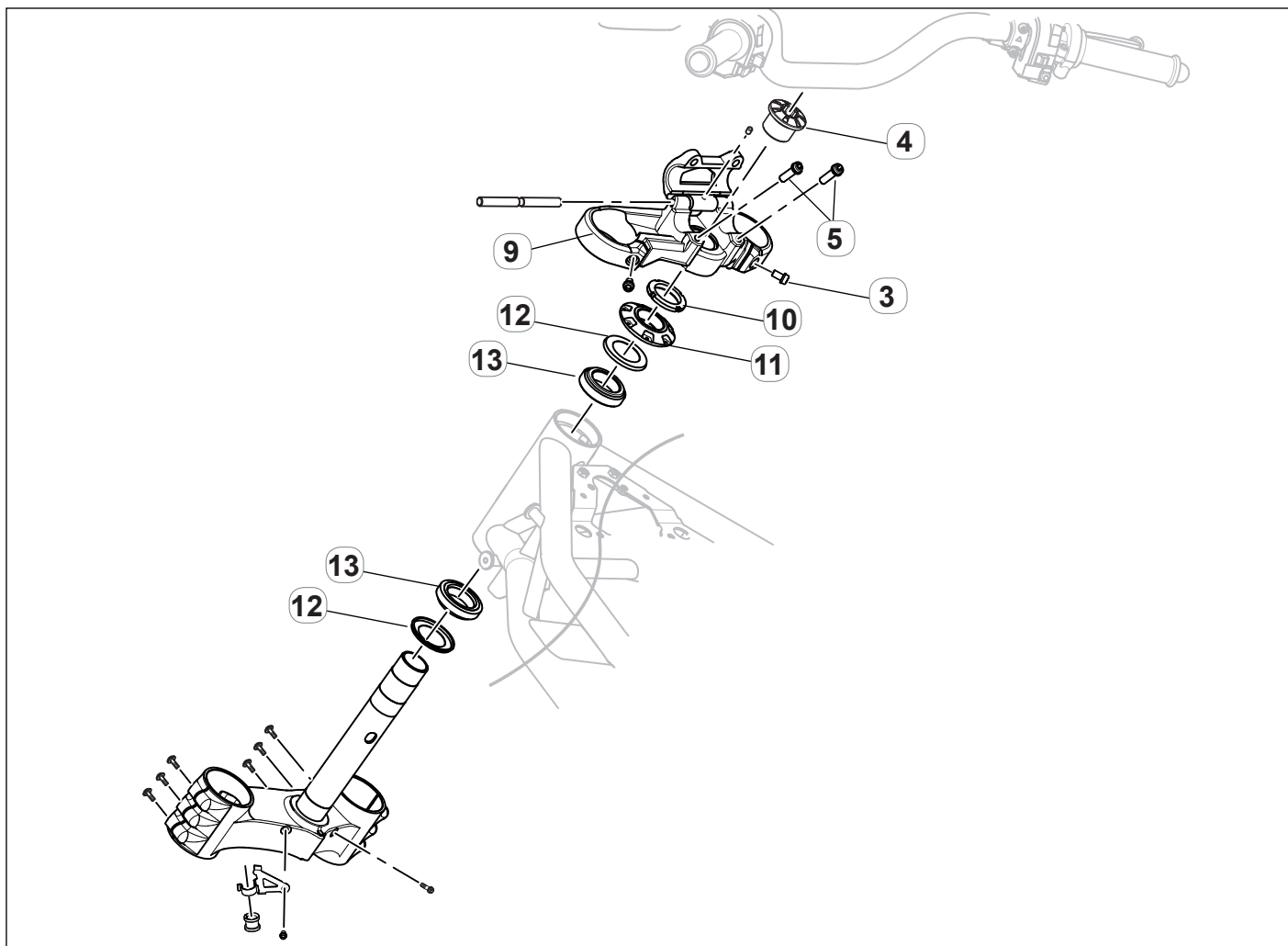
Torque 20 N*m





STEERING HEAD

REMOVAL OF THE TOP AND BOTTOM STEERING BASE



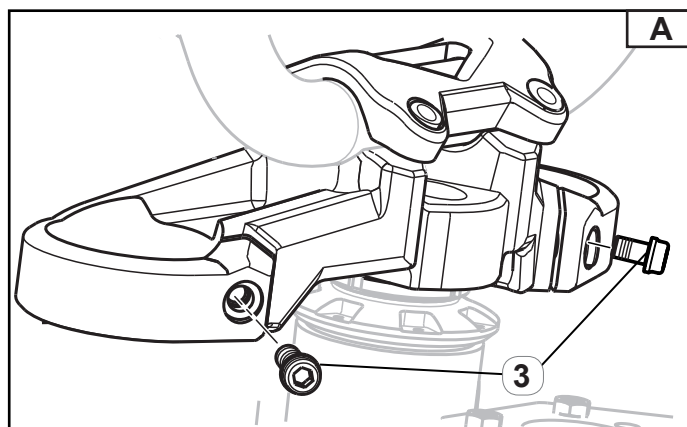
Park the bike on a level surface.

IMPORTANT NOTICE

Prop the bike on suitable supports so that it cannot fall.

Remove:

- The stop screws (3) on the top steering plate Fig. A.





STEERING HEAD

REMOVAL OF THE TOP AND BOTTOM STEERING BASE

Remove:

- The cap (4) with the special tool Fig. B



(**) steering head wrench

Code:.....

Loosen:

- The steering pin ring nut
- The steering ring nut (with the wrench for steering ring nut)
Fig. C

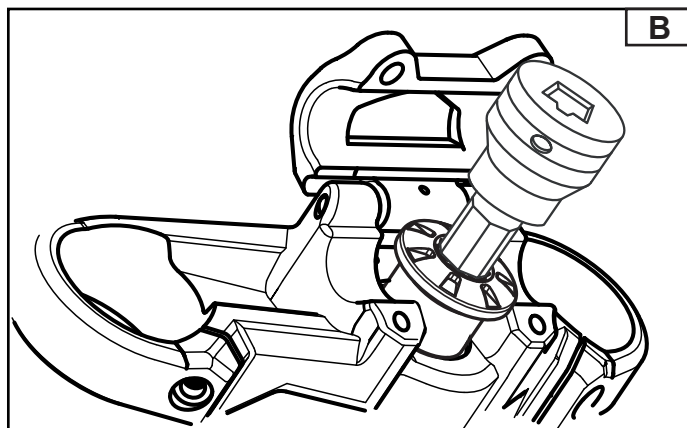


(**) Tool to tighten the steering sleeve lock nut

Code:.....

WARNING

Firmly support the bottom steering base, so that it cannot fall.





STEERING HEAD

TOP AND BOTTOM STEERING BASE INSPECTION

Wash:

- The bearings
- The bearing tracks

NOTE

Use special washing solvent.

Check:

- The bearings (13) Fig. A
- The dust seal rings (12) Fig. A

If there is any spotting/damage, replace.

Replace:

- The bearings
- The bearing tracks
- Remove the bearing tracks (A) from the steering column tube, using a long rod and a hammer (B) Fig. B.
- Separate the bearing track (C) from the bottom bearing with a chisel (D) and a hammer Fig. B.
- Fit a new rubber gasket and new bearing tracks.

IMPORTANT NOTICE

If the bearing track is not correctly fitted, this could damage the steering head tube.

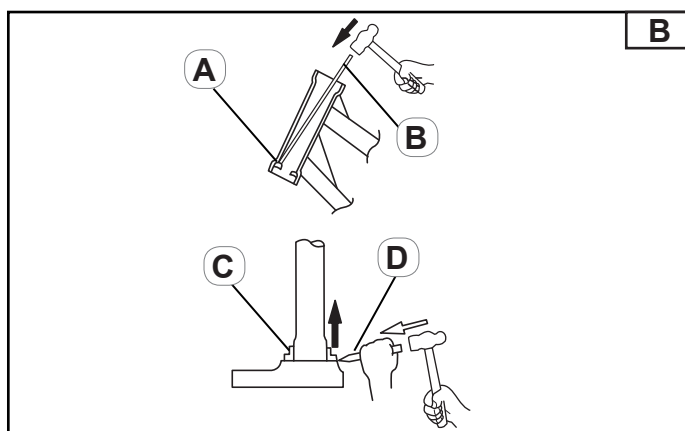
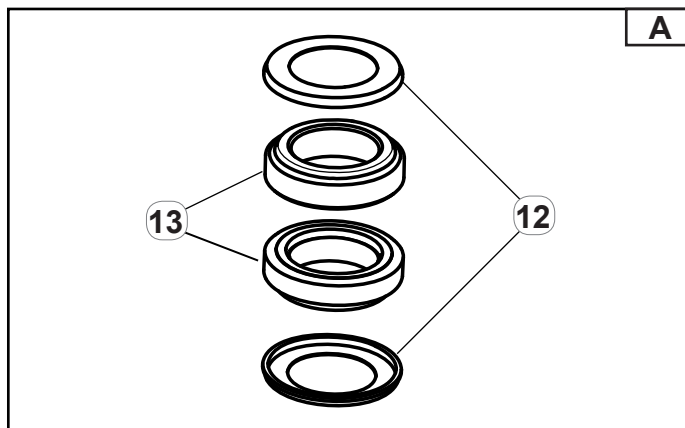
NOTE

- The bearings and tracks need to be replaced as a group.
- Every time the steering sleeve is removed, a new rubber gasket must be fitted.

Check:

- The top steering base.
- The bottom steering base (along with the sleeve).

If there is any warping/cracking/damage, replace.





STEERING HEAD

TOP AND BOTTOM STEERING BASE FITTING

Lubricate:

- The bearings Fig. A.
- The dust seal rings Fig. A.
- The bearing tracks Fig. A.

NOTE

Use special grease.

Fit:

- The steering ring nut with the special tool at the following torque:



Torque 16 N*m



() Tool to tighten the steering sleeve lock nut**

Code:.....

IMPORTANT NOTICE

Do not overtighten the steering ring nut.

- The steering ring nut support with the special tool to the following torque:



Torque 60 N*m

Fit:

- The front fork stems as described previously.

Fit:

- The cap (4) Fig. B with the special tool to the following torque:



Torque 60 N*m



() steering head wrench**

Code:.....

- The screws (3) securing the top steering column Fig. B to the following torque:

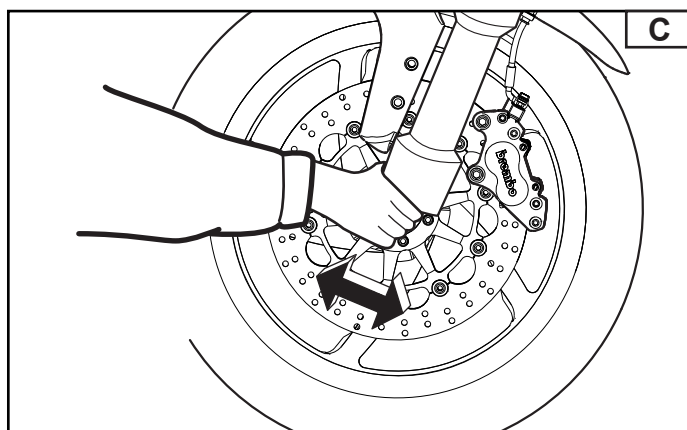
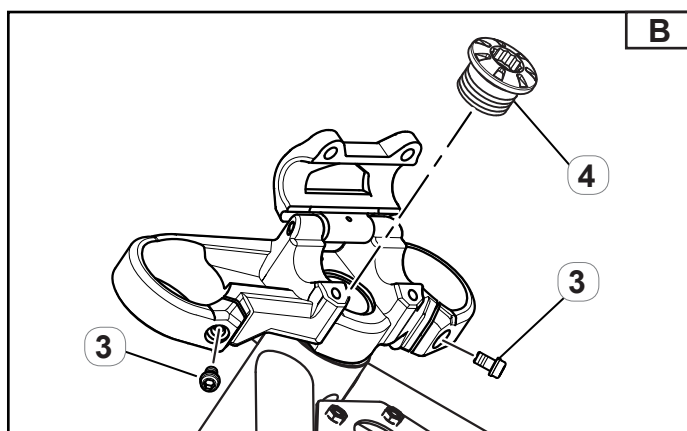
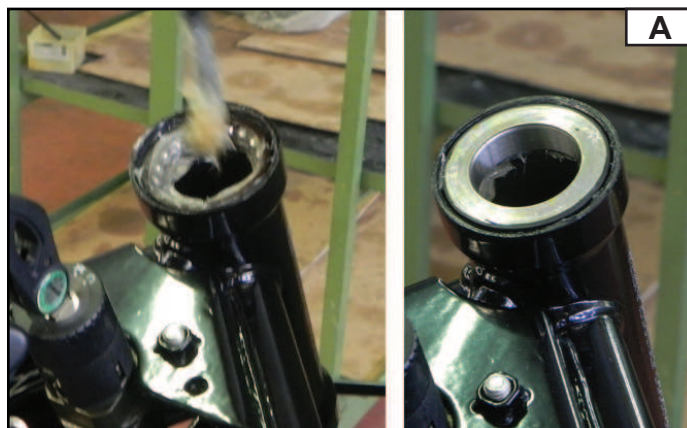


Torque 22 N*m

Check:

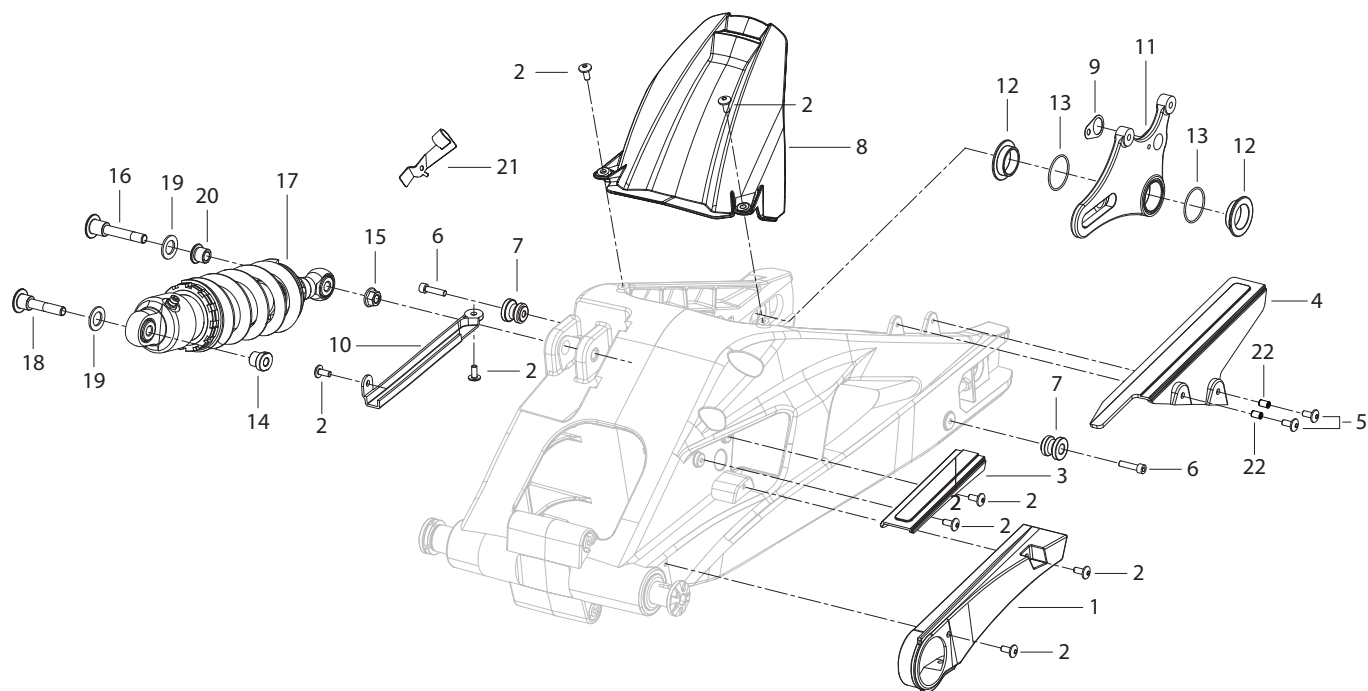
- The steering sleeve Fig. C.

Gently oscillate the front fork, holding it by the ends of the tubes.
If there is any jamming/loosening, adjust the steering sleeve.





REAR SHOCK ABSORBER REAR SHOCK ABSORBER REMOVAL



Position	Description	Quantity
1	TOP CHAIN SLIDE	1
2	SCREW	8
3	BOTTOM CHAIN SLIDE	1
4	CHAIN COVER	1
5	SCREW (M6X8)	2
6	SCREW M6X25	2
7	GUIDE BUSHING	2
8	REAR MUD GUARD	1
9	WASHER	1
10	BRACKET	1
11	PLATE	1
12	SHIM	2
13	O-RING	2
14	BUSHING	1
15	NUT	1
16	SCREW M10X70	1
17	REAR SHOCK ABSORBER	1
18	SCREW M10X60	1
19	WASHER	2
20	BUSHING	1
21	CABLE GLAND	1
22	BUSHING	2



REAR SHOCK ABSORBER

REAR SHOCK ABSORBER REMOVAL

Park the bike on a level surface.

IMPORTANT NOTICE

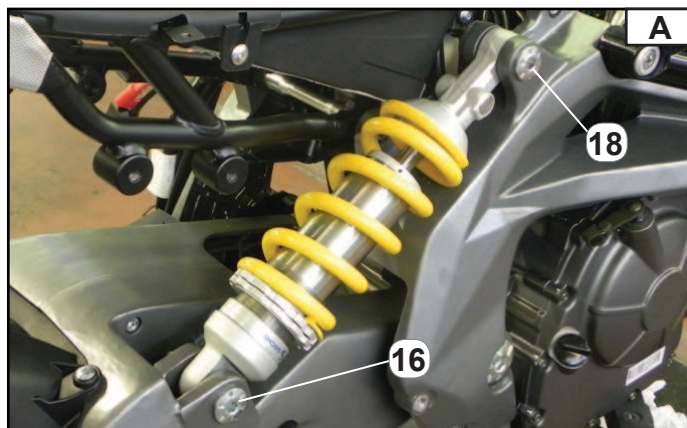
Prop the bike on suitable supports so that it cannot fall.

Remove:

- the screws (16) and (18) Fig. A

NOTE

Hold the swinging arm to make sure it does not fall.



REAR SHOCK ABSORBER

REAR SHOCK ABSORBER CHECK

Check Fig. B:

- Rear shock absorber rod

]If there is any warping/damage, replace the rear shock absorber assembly.

- Rear shock absorber

]If there is any gas/oil leak, replace the rear shock absorber assembly.

- Spring

]If there is any damage/wear, replace the rear shock absorber assembly.

- Bushing

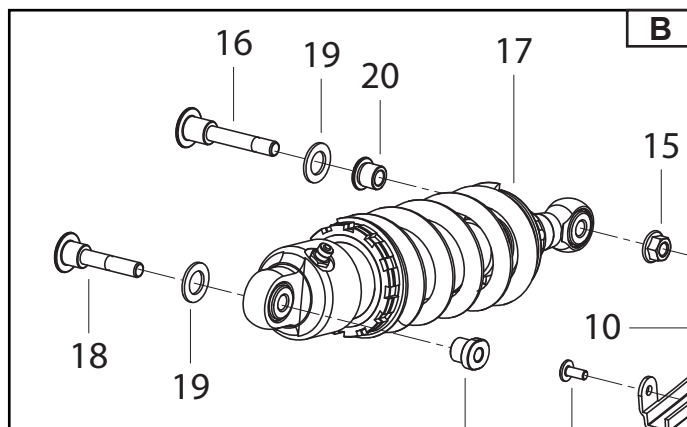
]If there is any damage or wear, replace.

- Dust seal

]If there is any damage or wear, replace.

- Screws

If there is any warping/damage/signs of wear, replace.





REAR SHOCK ABSORBER REAR SHOCK ABSORBER FITTING

Fit:

- the screw (18) FigC and its respective washer (19) and tighten to the following torque:

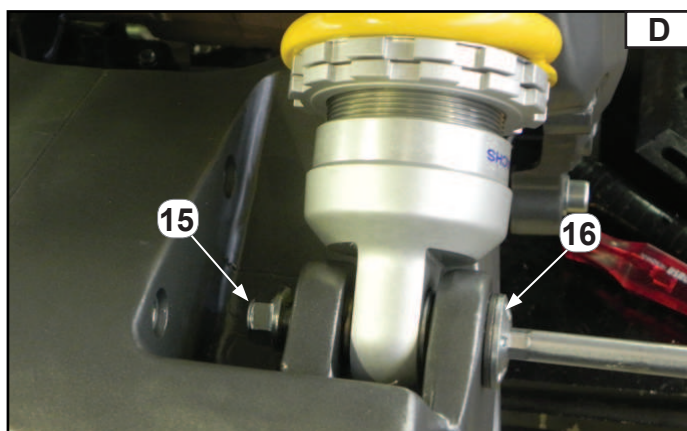
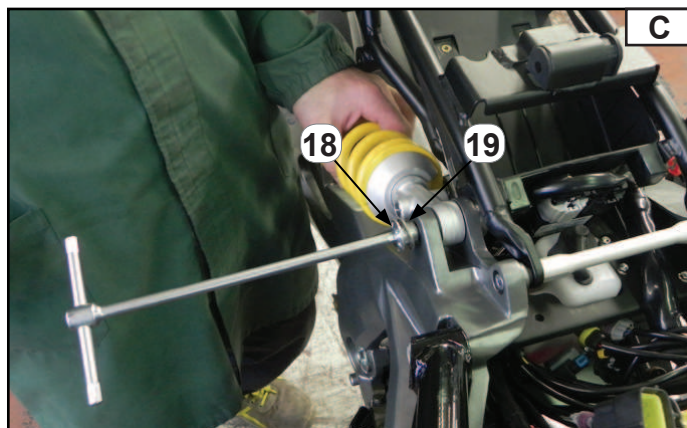


Torque 60 N*m

- the screw (16) FigC and its respective washer (19) and tighten to the washer (15) and the following torque:



Torque 60 N*m





TRANSMISSION CHAIN AND SWINGING ARM

TRANSMISSION CHAIN REMOVAL

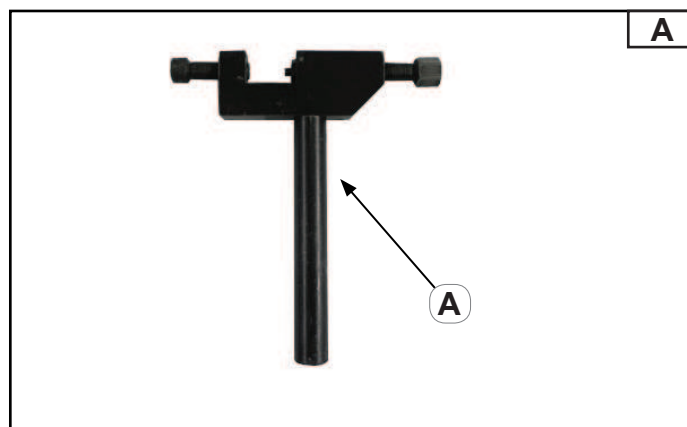
Park the bike on a level surface.

IMPORTANT NOTICE

Place the bike on a suitable support stand so that it cannot fall and the rear wheel is raised.

Detach:

- The transmission chain (with a suitable tool for transmission chains (A) Fig. A, or with the dedicated tool according to the transmission chain manufacturer's specifications.



TRANSMISSION CHAIN AND SWINGING ARM

TRANSMISSION CHAIN INSPECTION

Check:

- The transmission chain
- Rigidity Clean and lubricate or replace.

Clean:

- The transmission chain

Clean the transmission chain with a clean rag.

Soak the transmission chain in kerosene and remove any remaining dirt.

Remove the transmission chain from the kerosene and leave it to dry completely.

IMPORTANT NOTICE

This motorbike is fitted with a transmission chain complete with small rubber O-rings (B) Fig. C, inserted between one side plate and another.

To clean the transmission chain, do not use high-pressure jets of water or air, do not use steam, petrol, aggressive solvents (such as petroleum benzine), or brushes with overly stiff bristles.

Using high-pressure items could force dirt into the cavities inside the transmission chain, while solvents could cause the O-rings to deteriorate.

The O-rings could also be damaged by the use of brushes of overly stiff bristles.

Therefore, we recommend exclusive use of kerosene to clean the transmission chain.

Do not soak the transmission chain in kerosene for more than 10 minutes.

Kerosene can damage the O-rings.

Check:

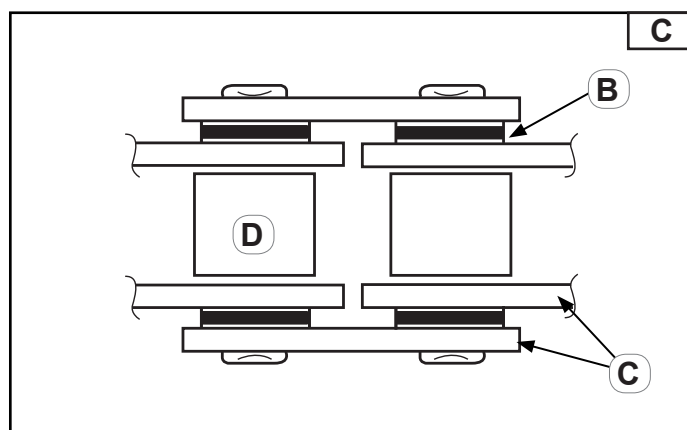
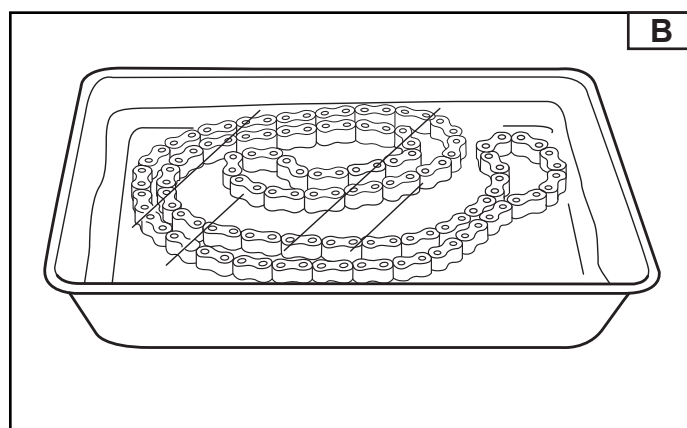
- O-rings (B)
- In the event of damage, replace the transmission chain.
- The transmission chain rollers (D)

In the event of damage/wear, replace the transmission chain.

- The side plates of the transmission chain (C)

In the event of damage/wear, replace the transmission chain.

If there are any cracks, replace the transmission chain and make sure that the bleeder pipe from the battery is correct and sufficiently distant from the transmission chain and below the swinging arm.





TRANSMISSION CHAIN AND SWINGING ARM

TRANSMISSION CHAIN INSPECTION

Lubricate:

- The transmission chain

NOTE

Use specific grease

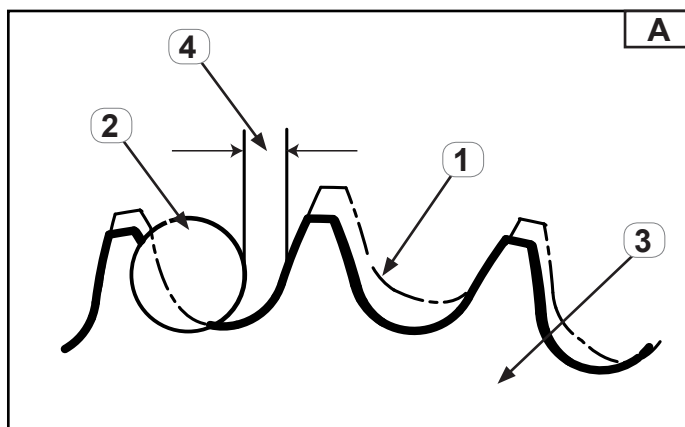
Check:

- Driving gear
- Rear toothed sprocket

If more than 1/4 of each tooth (4) is worn, replace the transmission chain sprockets all together.

If the teeth are bent, replace the transmission chain sprockets all together.

- Correct
- Transmission chain roller
- Transmission chain sprockets


NOTE

Never fit a new chain with worn sprockets.

Both the chain and sprockets need to be in good condition or the new chain will become quickly worn.



TRANSMISSION CHAIN AND SWINGING ARM

TRANSMISSION CHAIN REPLACEMENT

Loosen:

- The transmission chain

This chain uses a transmission chain with master link with safety side plate.

- Use the special tool, according to the chain manufacturer's specifications and the type of use required. In Fig. A there are three types of tool to remove the master link (A) and to fit the side plate (B) to snap on the pins of the side plate (C)

WARNING

Never use the old transmission chain, master link, side plate of the master link, or the O-rings.

Insert:

- The master link (A) Fig.B
- O-Rings (B) Fig.B
- side plate (C) Fig.B

IMPORTANT NOTICE

Insert the master link from inside the transmission chain, then fit the side plate with the ID mark facing out.

Tighten:

- Use the tool for fitting the side plate (B) Fig. C to press the side plate against the master link.

Clinch:

- Use the special tool to clinch the pins in the master link (C) Fig. D

Check:

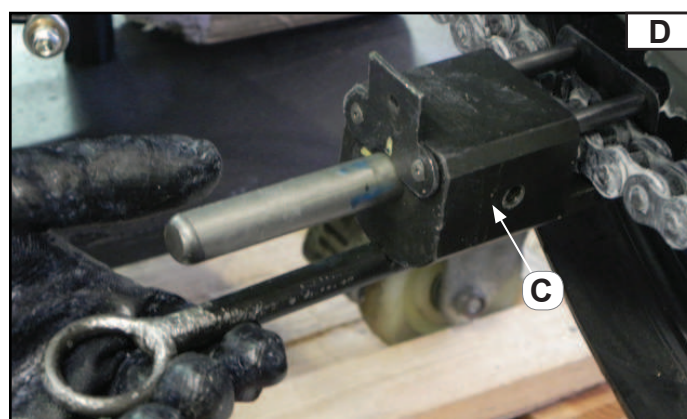
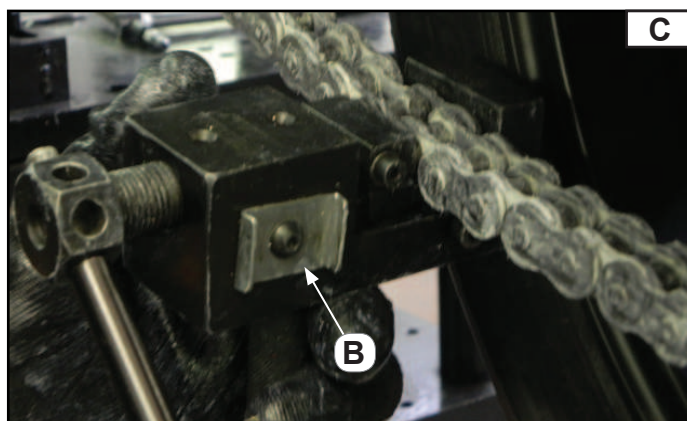
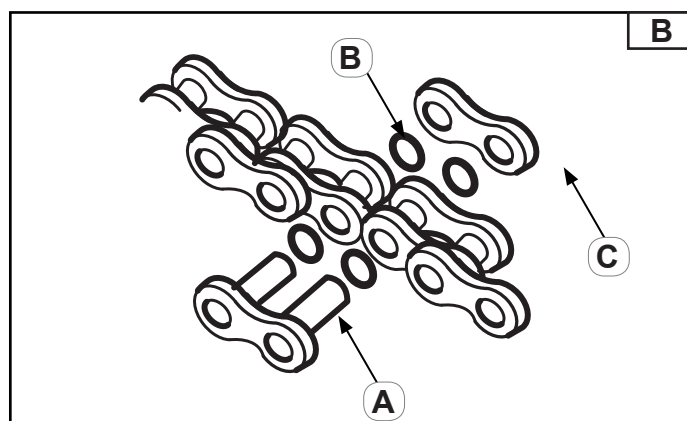
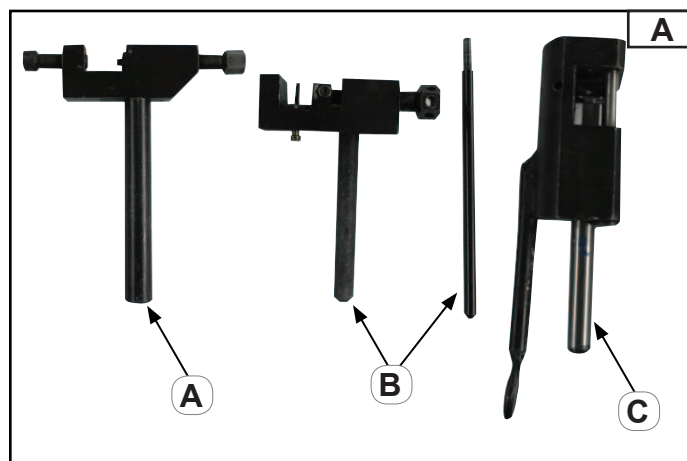
- The surface affected by the clinched master link.

This must have no apertures.

If there are apertures, replace the master link, seal rings and side plate.

IMPORTANT NOTICE

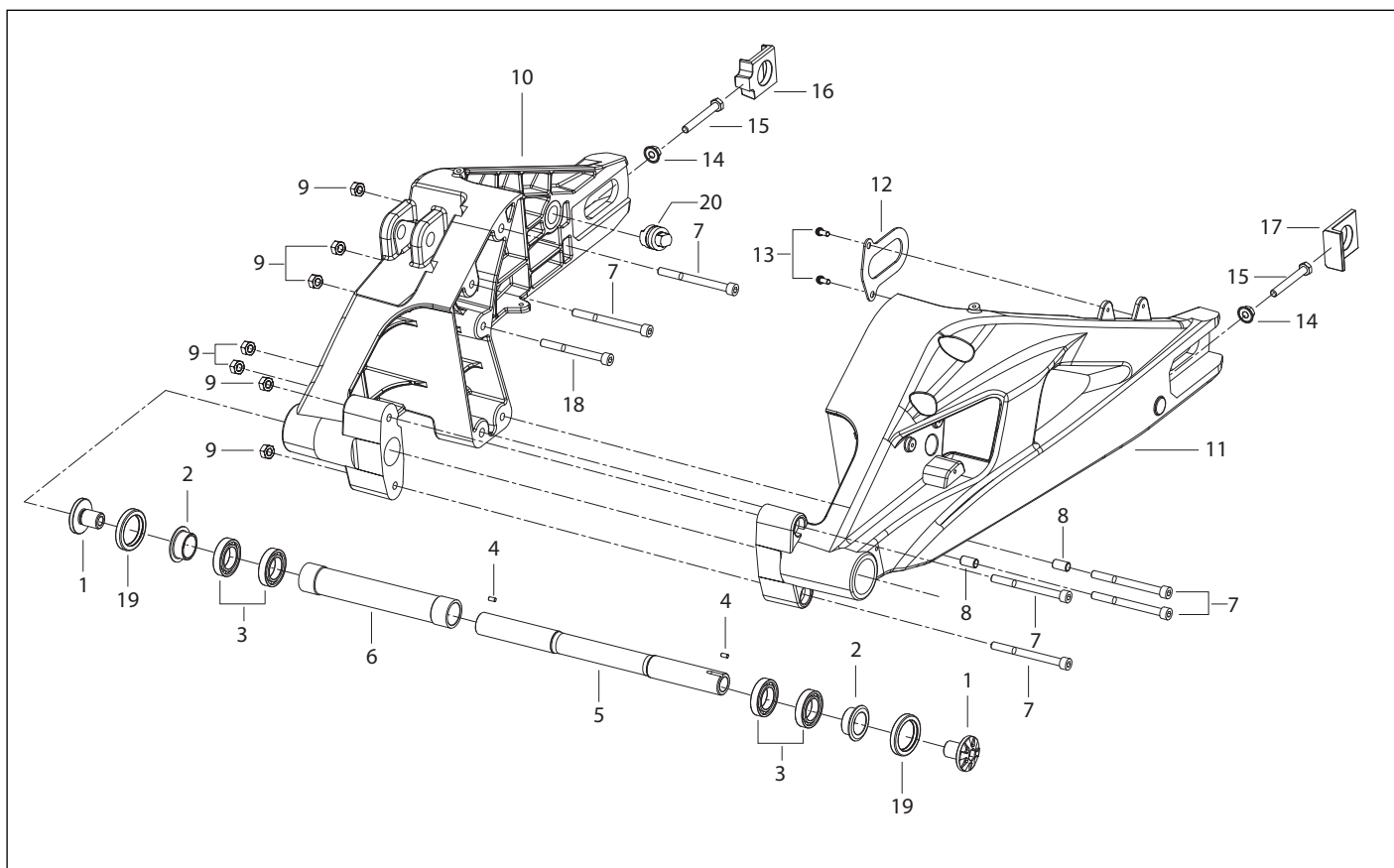
Never use a transmission chain with a clip master link.





TRANSMISSION CHAIN AND SWINGING ARM

SWINGING ARM FITTING



Position	Description	Quantity
1	SPECIAL SCREW	2
2	BUSHING	2
3	BEARING	4
4	PIN	2
5	INTERNAL SHIM	1
6	SHIM	1
7	SCREW M8X92	6
8	BUSHING	2
9	NUT M8	7
10	HALF SWINGER ARM (RIGHT)	1
11	HALF SWINGER ARM (LEFT)	1
12	SPECIAL PLATE	1
13	SCREW M5X10	2
14	NUT M8	2
15	SCREW M8	2
16	RIGHT CHAIN REGISTER	1
17	LEFT CHAIN REGISTER	1
18	SCREW M8X75	1
19	SEALING RING	2
20	SPEED SENSOR	1



TRANSMISSION CHAIN AND SWINGING ARM

SWINGING ARM FITTING

Fit:

- Swinging arm assembly (A)
- Swinging arm pin (5)

NOTE

Use specific grease during assembly.

- Line up the swinging arm pin seats (A) on both sides of the pin (5) Fig. B
- Insert the pins (4)
- Tighten the special screws (1) on both sides Fig. C to the following torque:



Torque 80 N*m

Fit:

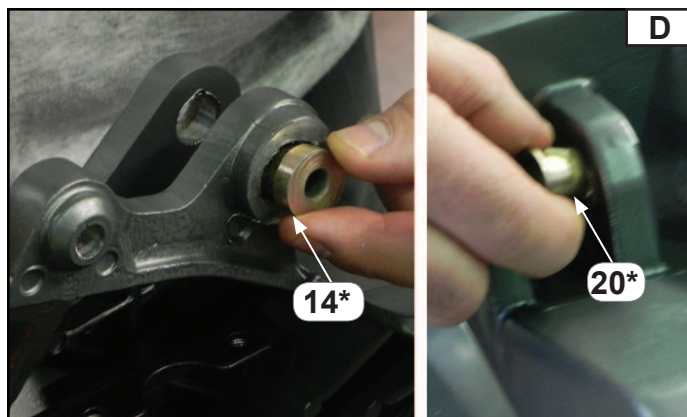
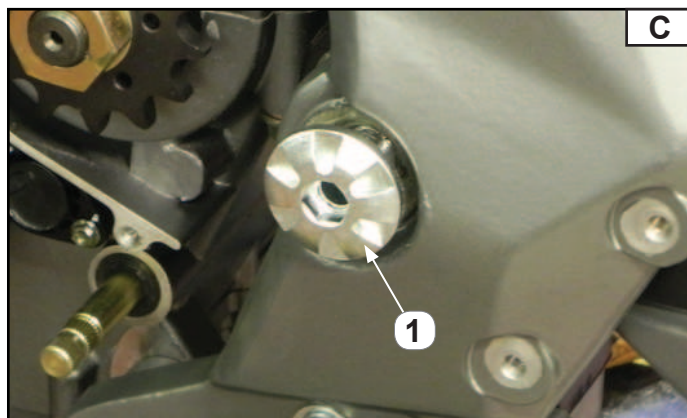
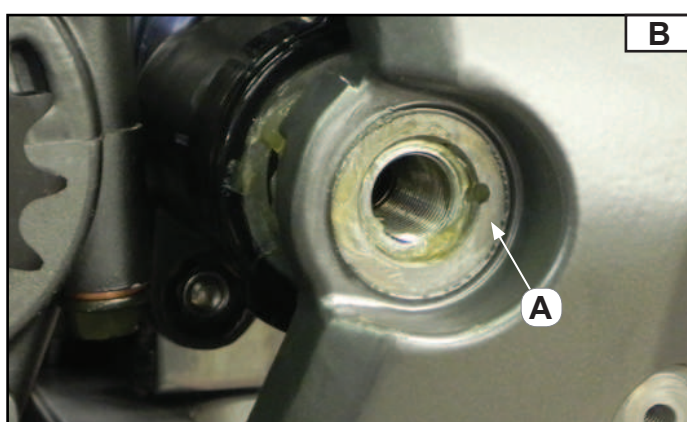
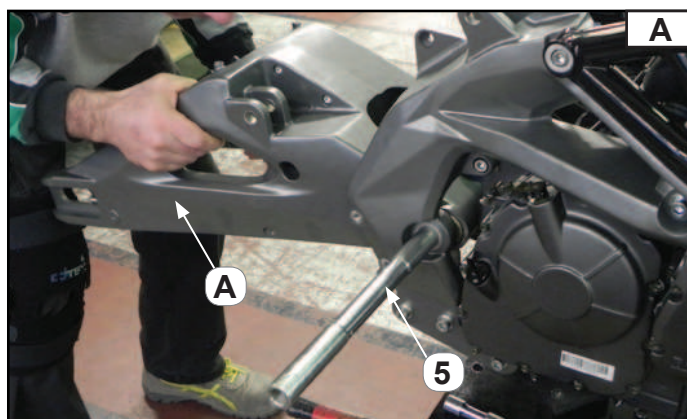
- The bushing (14*) on the front right half frame (20*) supporting the shock absorber in the relevant seat on the swinging arm Fig. D

Fit:

- Rear shock absorber
- Rear wheel

NOTE

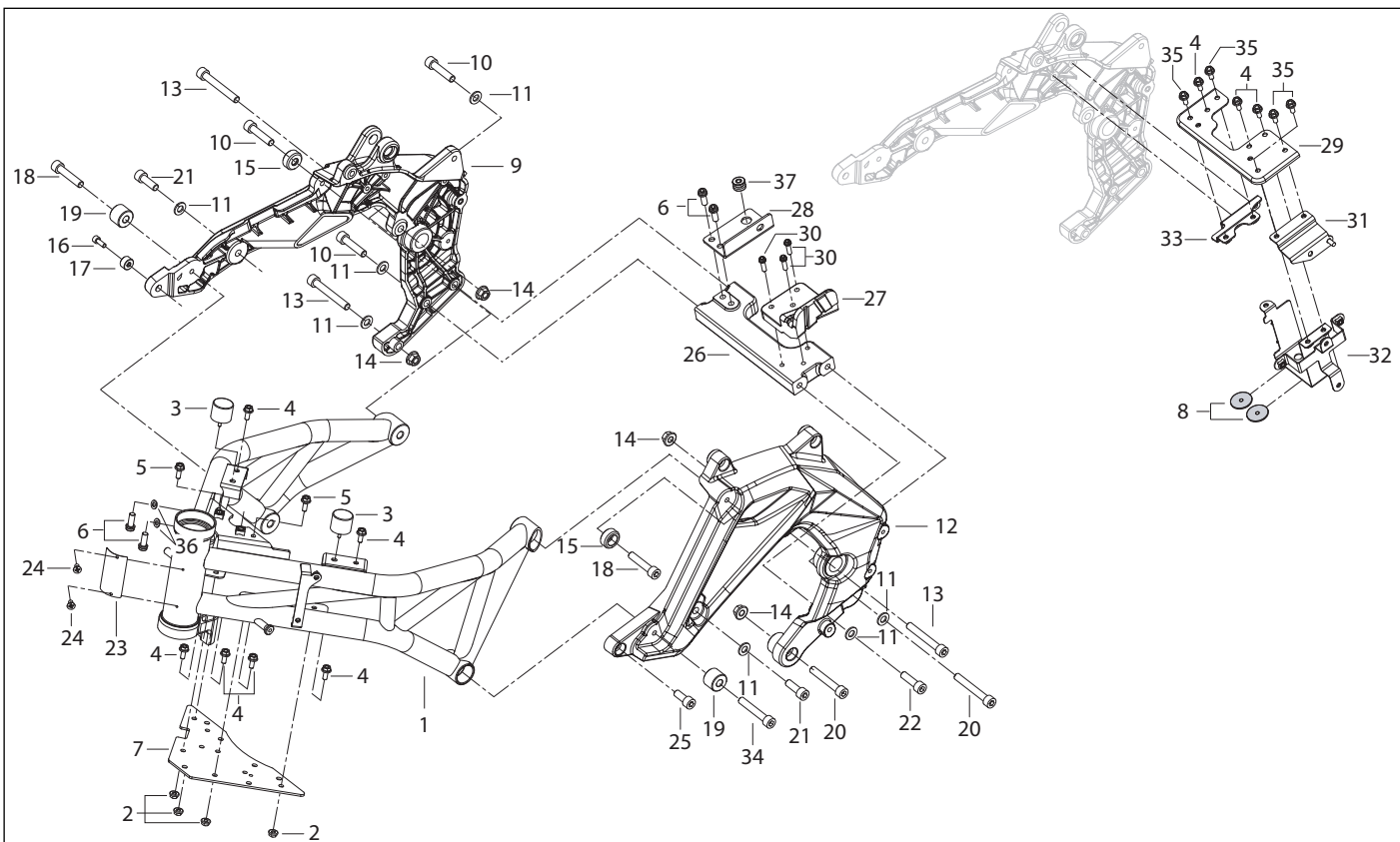
The numbers marked (*) are shown in the replacement parts table in the "Rear shock absorber" chapter, "Rear shock absorber removal" section.





FRAME

FRAME FITTING



Position	Description	Quantity
1	FRAME	1
2	NUT	8
3	PAD	1
4	TEF SCREW M6X14 8.8 ZB	10
5	SCREW M6X16	2
6	SCREW	4
7	BOTTOM COVER	1
8	RUBBER TIP	2
9	FRONT RIGHT HALF FRAME	1
10	SCREW (M10X45)	3
11	WASHER	2
12	FRONT LEFT HALF FRAME	1
13	SCREW (M10X75)	3
14	NUT M10	4
15	BUSHING	2
16	SCREW	1
17	BUSHING	1
18	SCREW M10X50	2
19	BUSHING	4
20	SCREW (M10X65)	2
21	SCREW (M10X30)	2
22	SCREW M10X35	1



FRAME

FRAME FITTING

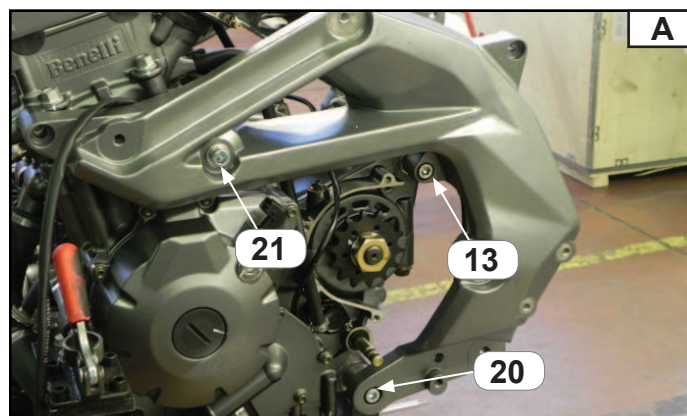
Position	Description	Quantity
23	PLATE	1
24	RIVET	2
25	SCREW M10X22	2
26	TOP FRAME BRACKET	1
27	PAD	1
28	SCREW M6X20	1
29	FRAME BRACKET	1
30	SCREW M6X25	3
31	LEFT BRACKET	1
32	BRACKET	1
33	RIGHT BRACKET	1
34	SCREW M6X60	1
35	SCREW (M6×10)	4
36	WASHER	2
37	VIBRATION DAMPING PAD	1

IMPORTANT NOTICE

Place the engine on a suitable support, so that all frame parts can be fitted without any danger to the operator of accidentally falling engine or parts.

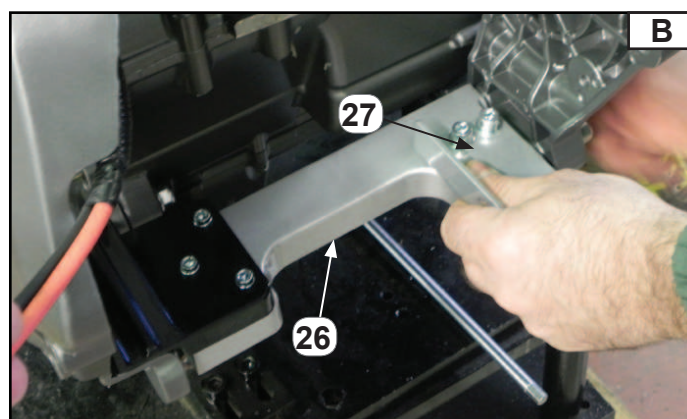
Fit:

- The two front half frames, right (9) and left (12) Fig. A, applying the screws (13), (21) and (20) on both sides:



Apply:

- The bottom frame bracket (26) and tighten the fastening screws (22) on both sides Fig. B.
- Fit the bracket (27) and tighten with the screws (30):





FRAME

FRAME FITTING

Apply:

- Insert the pin (X) of the swinging arm Fig. C.

Fit:

- The frame (1) to the two front half frames, right and left, applying the shims and screws (34), and (18) on both sides Fig. D.

Tighten:

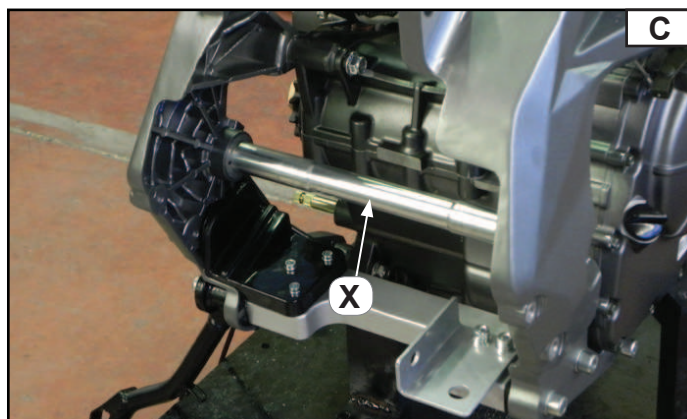
- The four frame/engine back anchor screws
- The bottom crosspiece screws
- The side/head fastening screws
- The trellis/side fastening screws



Torque 45 N*m

Take out:

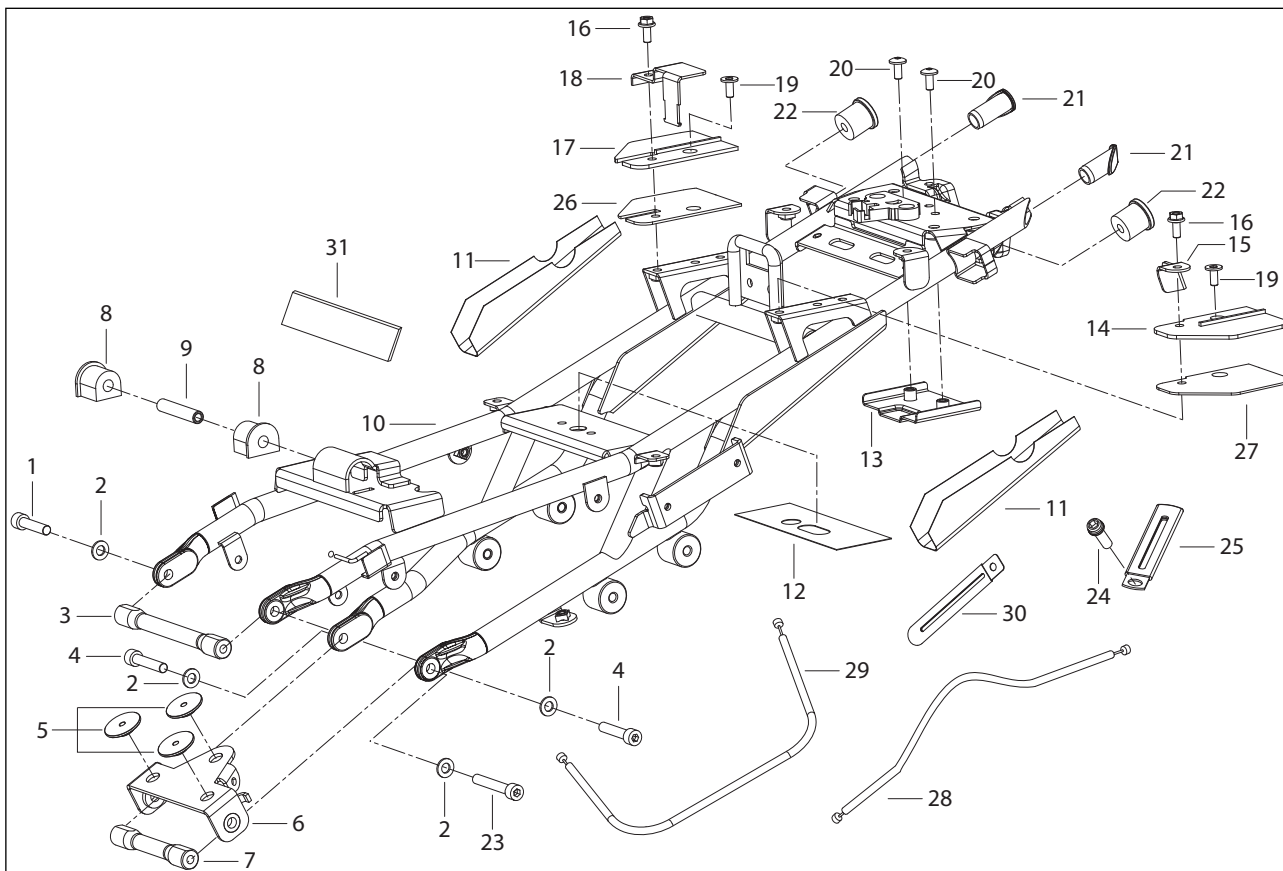
- The pin (X) Fig. C.





FRAME

REAR FRAME FITTING



Position	Description	Quantity
1	SCREW M8X35	1
2	WASHER	4
3	COLUMN	1
4	SCREW M8X40	2
5	RUBBER TIP	3
6	BATTERY SUPPORT	1
7	COLUMN	1
8	RUBBER BUSHING	2
9	BUSHING	1
10	REAR FRAME	1
11	THERMAL PROTECTION	2
12	THERMAL PROTECTION	1
13	FAIRING CLOSURE	1
14	LEFT INSULATING PLATE	1
15	PLATE	1
16	SCREW	2
17	RIGHT INSULATING PLATE	1
18	BRACKET	1
19	SCREW M6X16	2
20	SCREW	2
21	RUBBER TIP	2
22	RUBBER TIP	2



FRAME

REAR FRAME FITTING

Position	Description	Quantity
23	SCREW M8X55	1
24	SCREW (M6X8)	1
25	CABLE GLAND	1
26	RIGHT HEAT REFLECTIVE SHIELD	1
27	LEFT HEAT REFLECTIVE SHIELD	1
28	SADDLE OPENING CABLE	1
29	SADDLE OPENING CABLE	1
30	ELASTIC CLIP	1
31	HEAT REFLECTIVE SHIELD	1

Fit:

- The rear frame (10) applying the fastening screws (1) and (4) without tightening, to the right and then the screws (23) and (4) to the left, Fig. A.
- The battery support (6) and the column (7) Fig. B
- The column (3) taking care to insert the scraper washer (x) between the frame structure and the front right half frame Fig. C

Tighten:

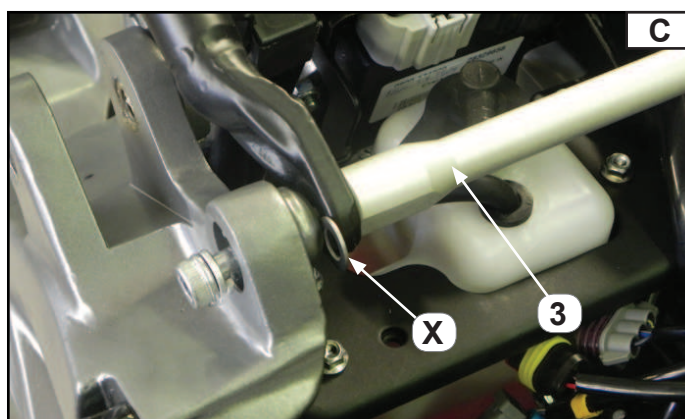
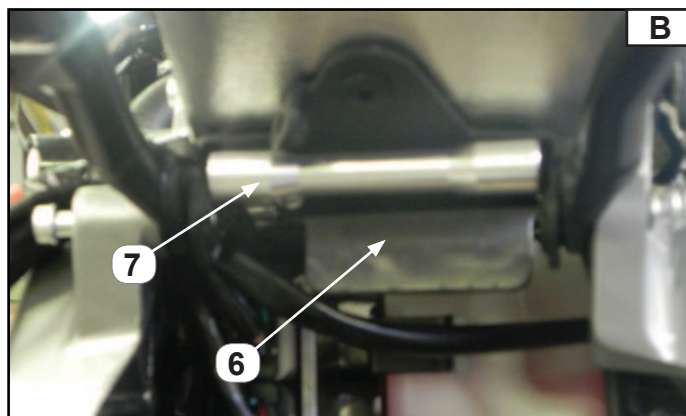
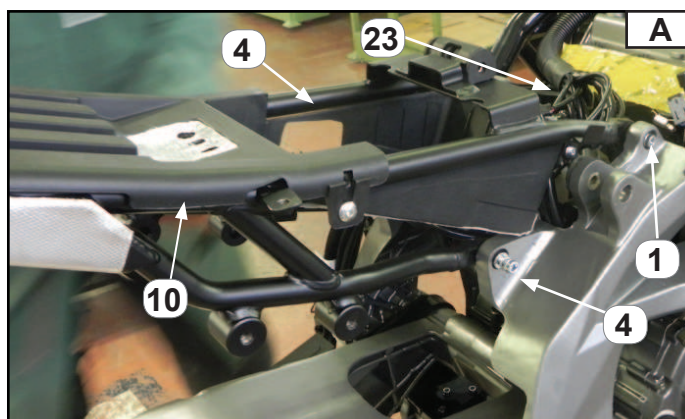
- The previously applied screws to the following torque:



Torque 25 N*m

NOTE

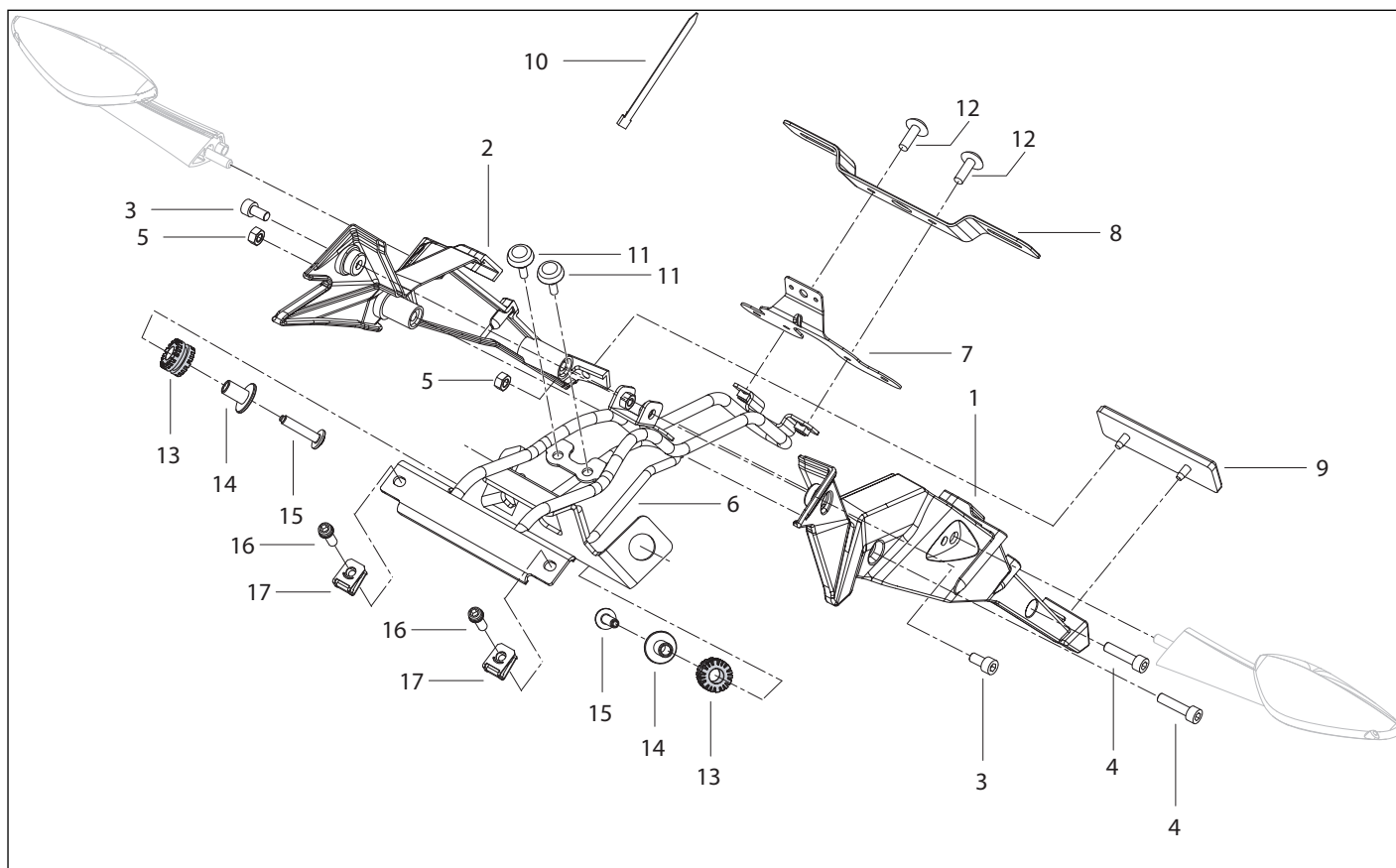
Use specific grease during assembly.





FRAME

LICENCE PLATE HOLDER FITTING



Position	Description	Quantity
1	LH LICENCE PLATE HOLDER	1
2	RH LICENCE PLATE HOLDER	1
3	SCREW (M6X12)	2
4	SCREW M6X25	2
5	NUT	2
6	LICENCE PLATE HOLDER SUPPORT	1
7	PLATE	1
8	LICENCE PLATE HOLDER	1
9	REFLECTOR	1
10	BAND	1
11	PAD	2
12	SCREW TBEI M5X16 8.8 ZB	2
13	RUBBER TIP	2
14	BUSHING	2
15	SPECIAL SCREW	2
16	COUNTERSUNK HEX-HEAD SCREW M6X16 8.8 ZB	2
17	SNAP-ON CLIP (M6)	2



FRAME

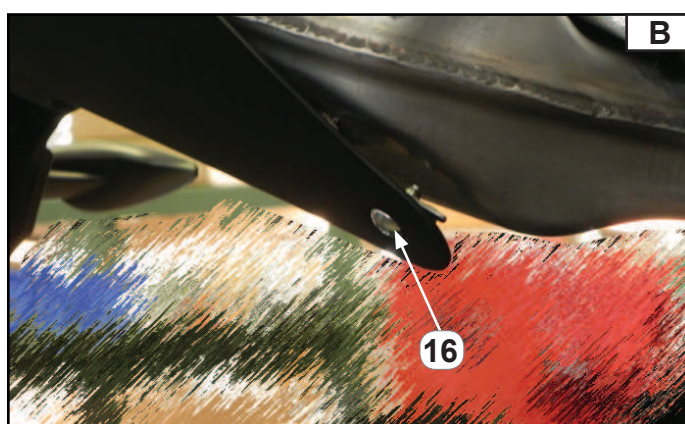
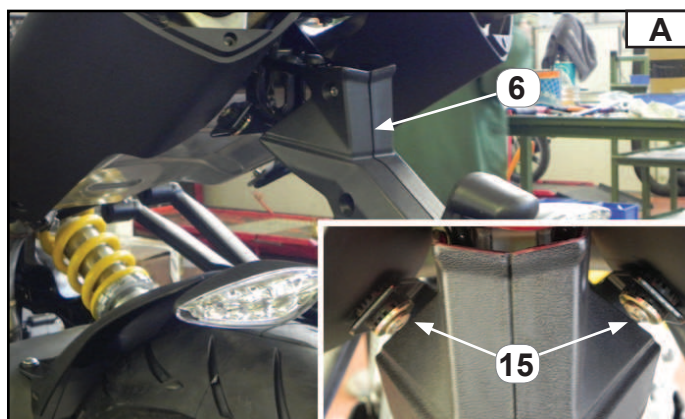
LICENCE PLATE HOLDER FITTING

Fit:

- The licence plate holder assembly (6) screwing in the two special screws (15) complete with bushing (14) and rubber tip (13) through the two exhaust pipe shells to the silencer Fig. A
- Tighten the screws (16) to the exhaust pipe shells Fig. B

Connect:

- Indicator and licence plate light wiring.



FRAME

LICENCE PLATE HOLDER REMOVAL

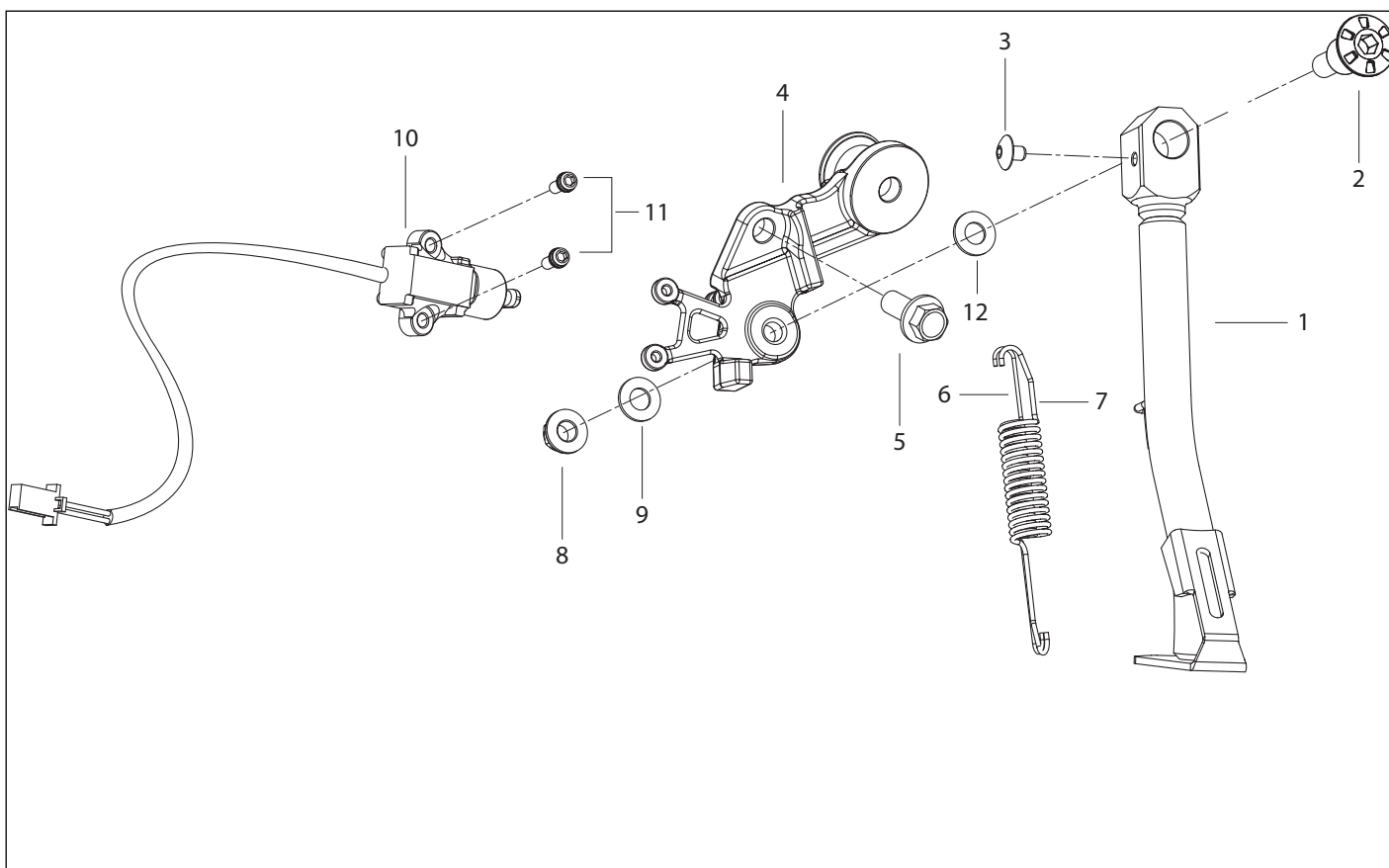
Removal:

- carry out the installation steps in reverse order.



CYCLING

STAND FITTING:



Position	Description	Quantity
1	SIDE STAND	1
2	SPECIAL SCREW	1
3	SCREW (M6X8)	1
4	STAND SUPPORT PLATE SIDE	1
5	SCREW M10X35	1
6	INTERNAL SCREW	1
7	EXTERNAL SCREW	1
8	NUT M12	1
9	WASHER	1
10	SIDE STAND SENSOR	1
11	SCREW	2
12	BELLEVILLE WASHER	1



CYCLING STAND FITTING:

Fit:

- The stand support plate (4) to the left front semi-frame, using the two fastening screws (X) (5) Fig. A

NOTE

Apply thread locker to each of the screws.

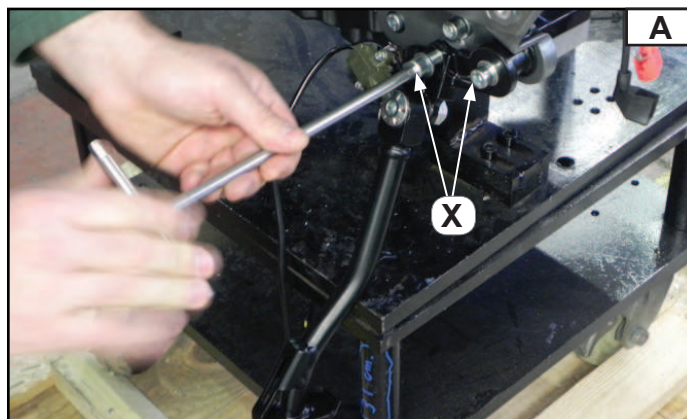
- Tighten the two screws with the following torque:



Torque 45 N*m

Apply:

- The inner (6) and outer (7) screws
- Connect the connector of the side stand sensor (10) to the system.



CYCLING STAND REMOVAL

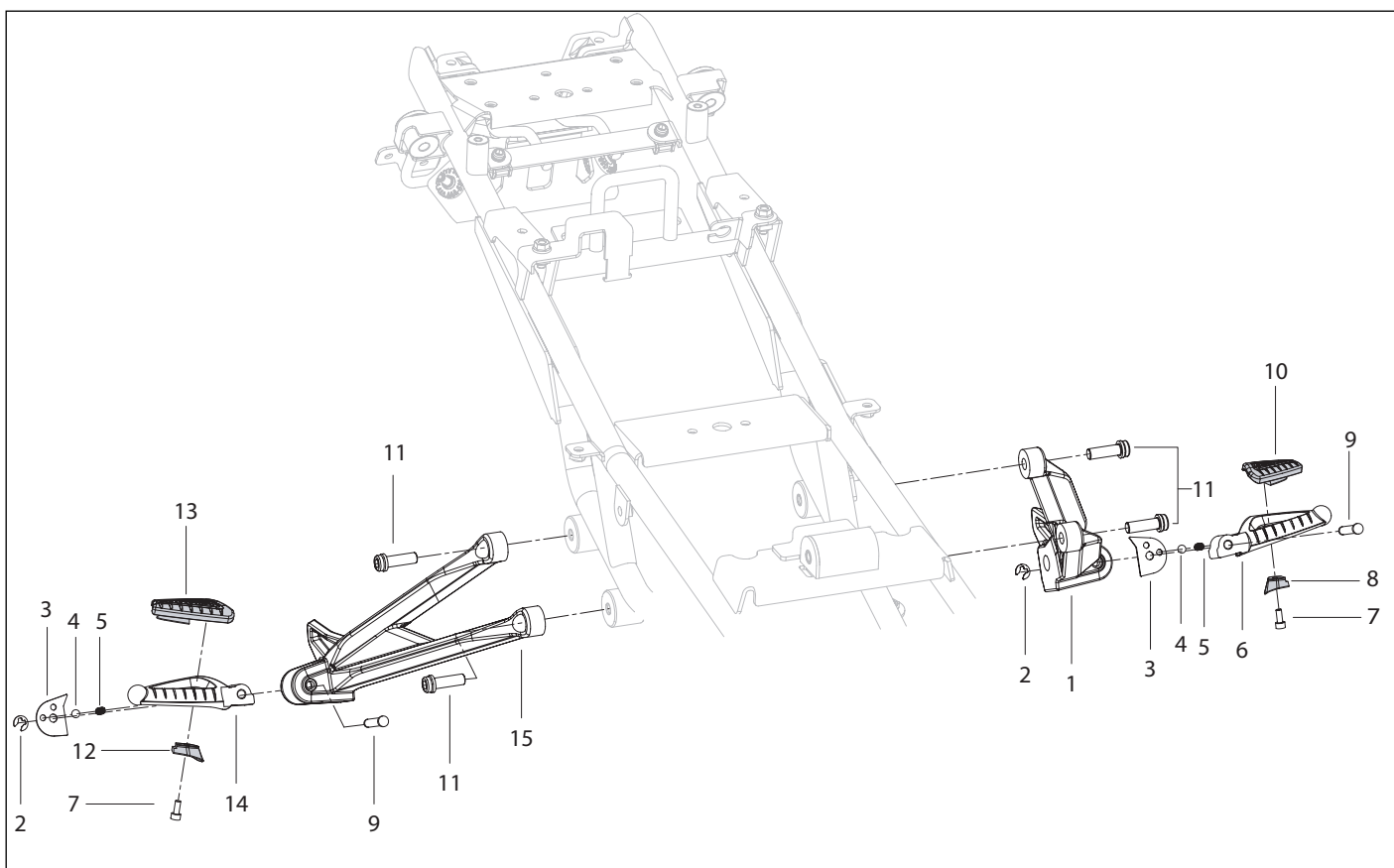
Removal:

- carry out the installation steps in reverse order.



CYCLING

REAR FOOTREST INSTALLATION



Position	Description	Quantity
1	REAR FOOTREST SUPPORT PLATE LH	1
2	ELASTIC RING	2
3	PLATE	2
4	BALL	2
5	SPRING	2
6	LH REAR FOOTREST	1
7	SCREW M4X10	2
8	LH FOOTREST RUBBER STOP	1
9	PIN FOR ZB FOOTREST	2
10	LH RUBBER FOOTREST COVER	1
11	COUNTERSUNK HEX-HEAD SCREW M8X25 ZB	4
12	RH FOOTREST RUBBER STOP	1
13	RH RUBBER FOOTREST COVER	1
14	RH REAR FOOTREST	1
15	REAR FOOTREST SUPPORT PLATE RH	1



CYCLING

REAR FOOTREST INSTALLATION

Fit:

- The left (1) and right (15) footrest plates.

NOTE

Apply thread locker to each of the screws.

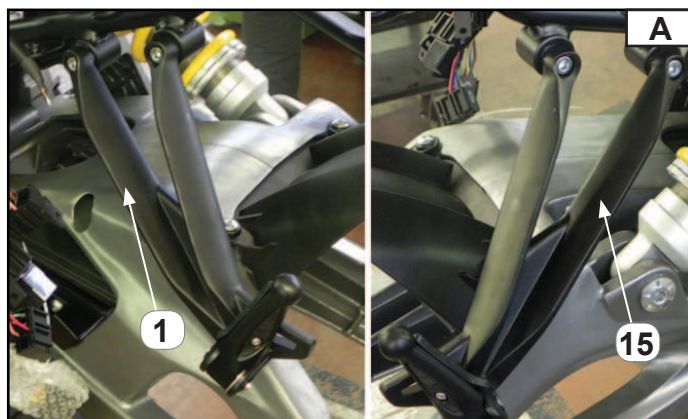
- Tighten the two screws (11) with the following torque:



Torque 25 N*m

NOTE

If the rubber footrest cover (13) is worn, replace.



CYCLING

REAR FOOTREST REMOVAL

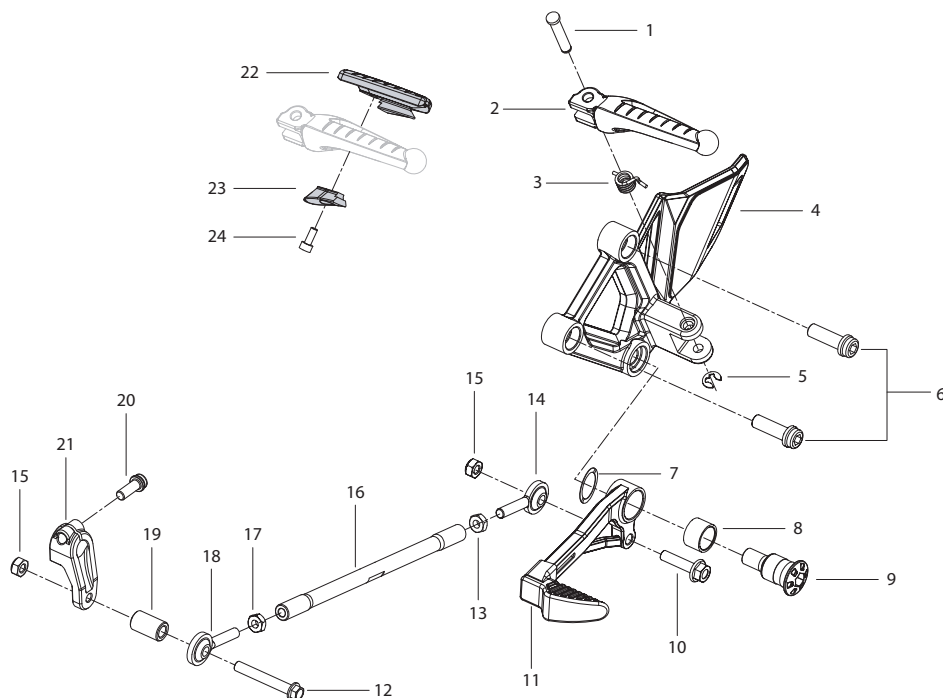
Removal:

- carry out the installation steps in reverse order.



CYCLING

LEFT FRONT FOOTREST INSTALLATION



Position	Description	Quantity
1	PIN	1
2	LH FRONT FOOTREST	1
3	SPRING	1
4	LH FRONT FOOTREST SUPPORT PLATE	1
5	ELASTIC RING	1
6	COUNTERSUNK HEX-HEAD SCREW M8X25 ZB	2
7	ELASTIC WASHER	1
8	BUSHING	1
9	SCREW	1
10	SCREW M6X20	1
11	GEAR PEDAL	1
12	SCREW M6X42	1
13	NUT M6	1
14	BALL JOINT	1
15	NUT	1
16	GEAR LEVER	1
17	NUT	1
18	BALL JOINT	1
19	BUSHING	1
20	SCREW	1
21	GEAR LEVER	1
22	LEFT RUBBER FOOTREST COVER	1
23	LH FOOTREST RUBBER STOP	1
24	SCREW M4X10	1



CYCLING

LEFT FRONT FOOTREST INSTALLATION

Fit:

- The left front footrest plate (4) Fig. A

NOTE

Apply thread locker to each of the fastening screws (6).

- Tighten the two screws (6) with the following torque:



Torque 25 N*m

NOTE

If the left rubber footrest cover (22) is worn, replace it.

Fit:

- The gear control lever (21) on the textured gear of the engine.

NOTE

Apply special grease to the screw (20) fastening the gear lever (21).

- Tighten the screw (20) to the following torque:



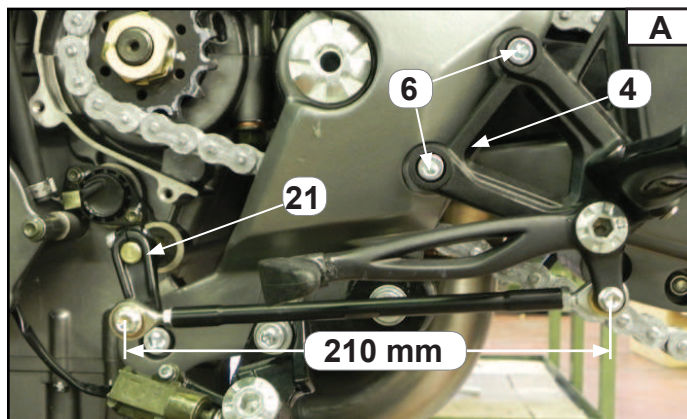
Torque 8 N*m

Adjust:

- The gear control arm (16) and 210 mm distance between the ball joints (18) and (14) Fig. A.

NOTE

According to the rider's sensitivity, it is also possible to change this as needed.



CYCLING

LEFT FRONT FOOTREST REMOVAL

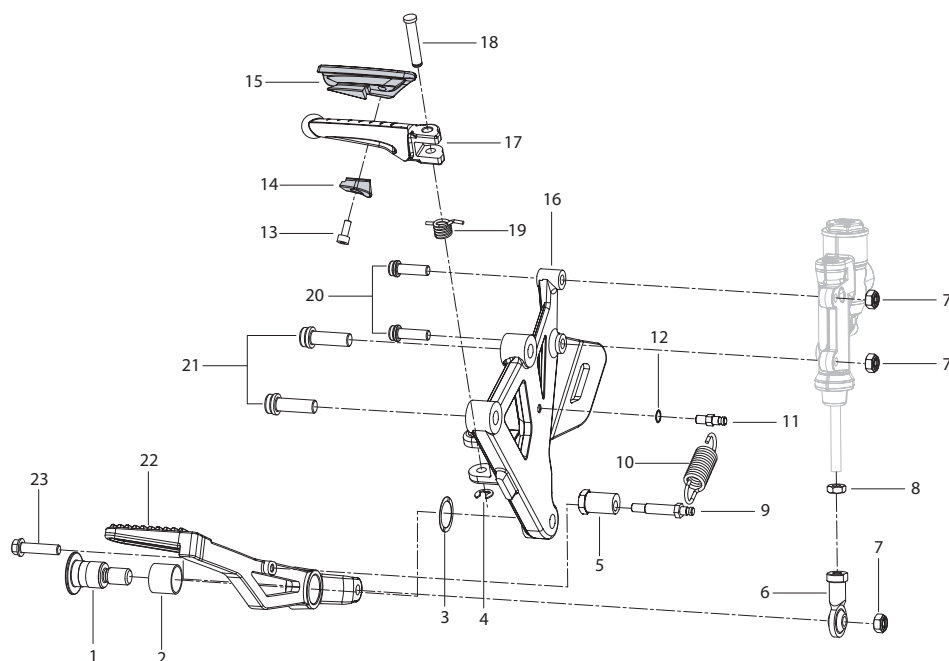
Removal:

- carry out the installation steps in reverse order.



CYCLING

RIGHT FRONT FOOTREST FITTING



Position	Description	Quantity
1	SCREW	1
2	BUSHING	1
3	ELASTIC WASHER	1
4	ELASTIC RING	1
5	ECCENTRIC	1
6	BALL JOINT	1
7	NUT	3
8	NUT	1
9	THREADED PIN	1
10	SPRING	1
11	THREADED PIN	1
12	WASHER	1
13	SCREW M4X10	1
14	RH FOOTREST RUBBER STOP	1
15	RIGHT RUBBER FOOTREST COVER	1
16	RH FRONT FOOTREST SUPPORT PLATE	1
17	RH FRONT FOOTREST	1
18	PIN	1
19	SPRING	1
20	SCREW	2
21	SCREW	2
22	BRAKE PEDAL	1
23	SCREW M6X25	1
24	STOP HEX	1



CYCLING

RIGHT FRONT FOOTREST FITTING

Fit:

- The right front footrest support plate (16) Fig. A.

NOTE

Apply thread locker to each of the fastening screws (21).

- Tighten the two screws (21) with the following torque:



Torque 25 N*m

NOTE

If the right rubber footrest cover (15) is worn, replace it.

Fit:

- The brake pedal (22) on the footrest support plate, inserting the first bushing (2) after greasing, then the screw (1), tightening to the following torque:



Torque 35 N*m

NOTE

Fit:

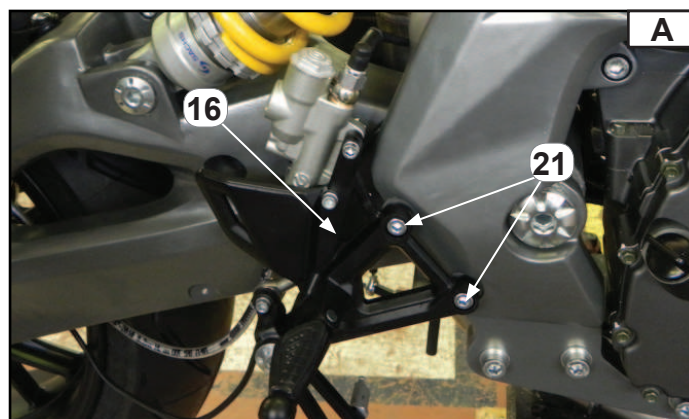
- The ball joint (6) fitting the fastening screw and nut (7) and tightening to the following torque:



Torque 10 N*m

Assemble:

- The spring (10) to the threaded pin-eccentric assembly (9-5) on the threaded pin (11)



CYCLING

RIGHT FRONT FOOTREST REMOVAL

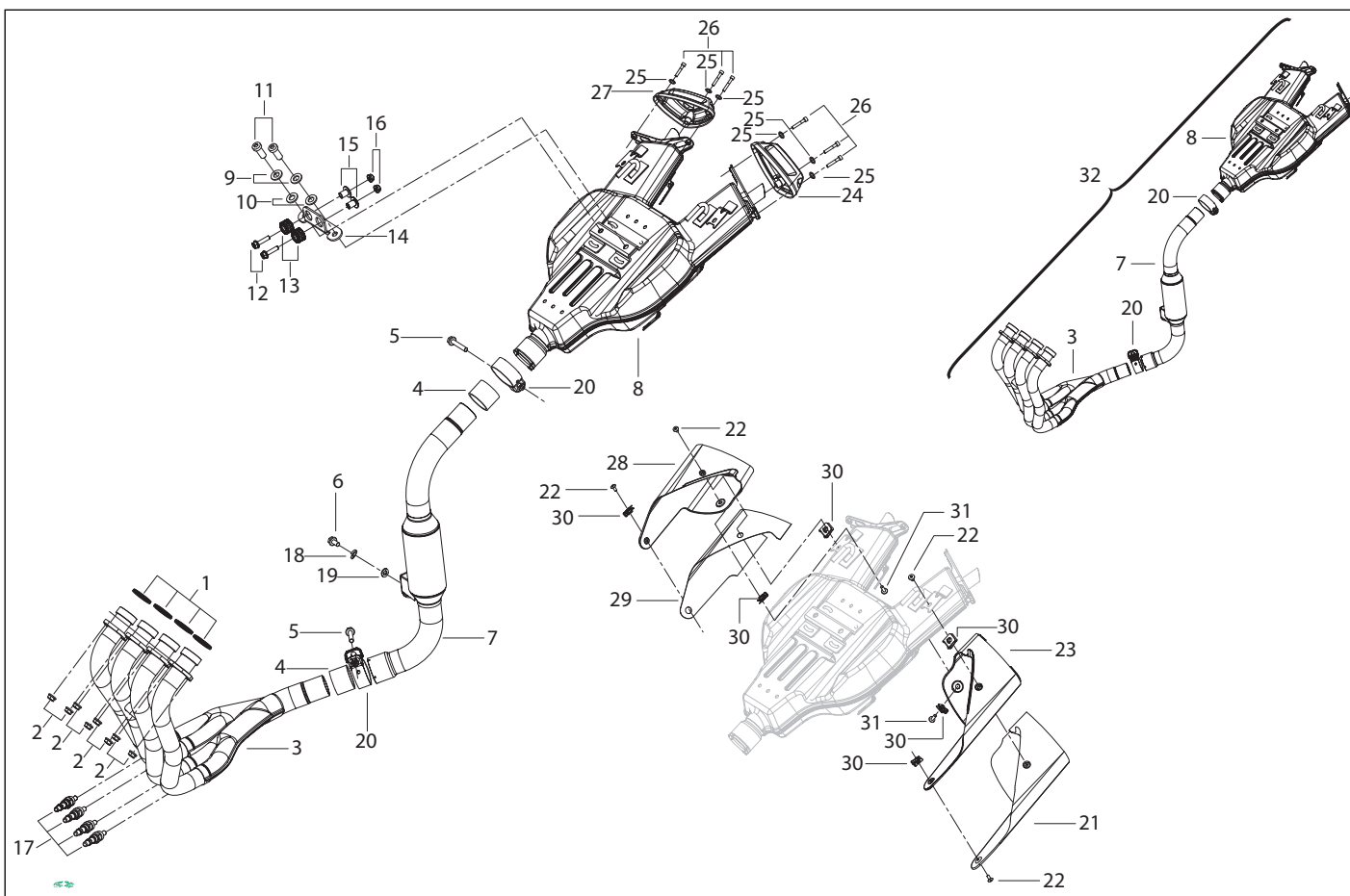
Removal:

- carry out the installation steps in reverse order.



EXHAUST

EXHAUST INSTALLATION



Position	Description	Quantity
1	EXHAUST GASKET	4
2	NUT M8	8
3	EXHAUST MANIFOLD	1
4	GRAPHITE GASKET	2
5	SCREW M8X45	2
6	SCREW M8X20	1
7	MANIFOLD FITTING (EXHAUST)	1
8	SILENCER	1
9	WASHER	4
10	WASHER	2
11	SCREW M10X22	2
12	SCREW M6X25	2
13	RUBBER TIP	2
14	BRACKET	1
15	TOP BUSHING	2
16	NUT	2
17	LAMBDA PROBE	4
18	ELASTIC WASHER	1
19	WASHER	1
20	SCREW CLIP	2



EXHAUST

EXHAUST INSTALLATION

Position	Description	Quantity
21	LH THERMAL PROTECTION	1
22	SCREW M6x10	4
23	LH EXHAUST PIPE PROTECTION	1
24	LH EXHAUST PIPE END PIECE	1
25	WASHER	6
26	SCREW M6X40	6
27	RH EXHAUST PIPE END PIECE	1
28	RH EXHAUST PIPE PROTECTION	1
29	RH THERMAL PROTECTION	1
30	SNAP-ON CLIP (M6)	6
31	SCREW (M6×19.2)	4
32	COMPLETE EXHAUST PIPE ASSEMBLY	1

Fit:

- The Lambda probes (17) in the exhaust manifold (3) Fig. A and tighten to the following torque.


Torque 1.5 N*m

- The exhaust gasket (1) on the four exhaust outlets of the engine Fig. B.

NOTE

Apply copper grease to the stud threads Fig. B

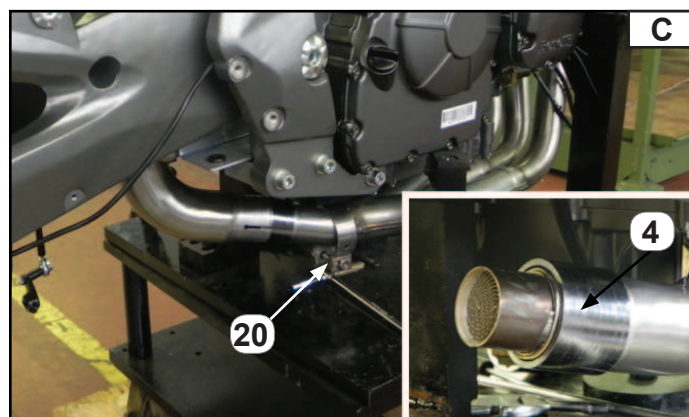
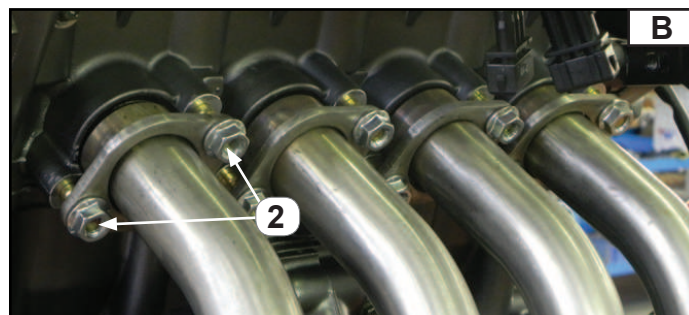
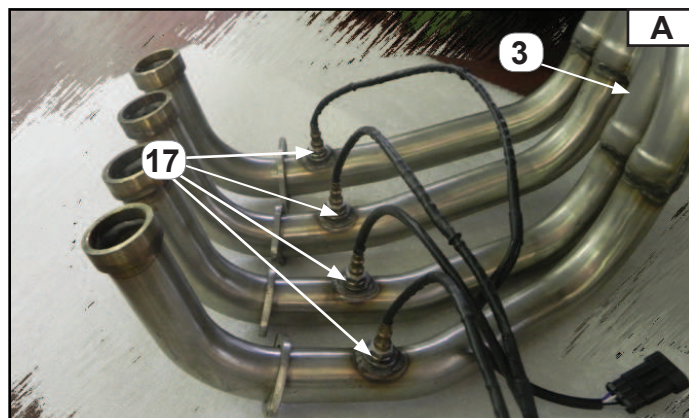
- Screw the nuts (2) onto the studs without tightening.

NOTE

Do this for all studs.

Assemble:

- The graphite gasket (4) on the exhaust manifold fitting Fig. C
- The screw clip (20), lubricating with copper grease, Fig. C





EXHAUST

EXHAUST INSTALLATION

Assemble:

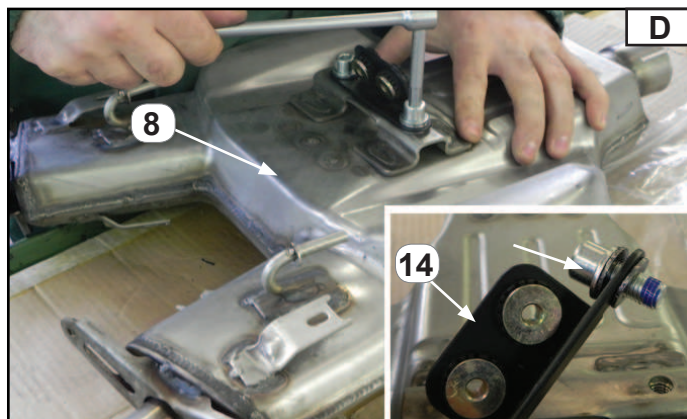
- The silencer (8) with the bracket (14) Fig. D
- Apply thread locker to the screws (11) and tighten to the following torque:



Torque 13 N*m

Fit:

- The two rubber tips (A) to the rear frame Fig. E
- Insert the pins (B) of the silencer (8) inside the rubber tips.
- Put in the fastening screws (12) and the relevant nuts (16) Fig. E



Assemble:

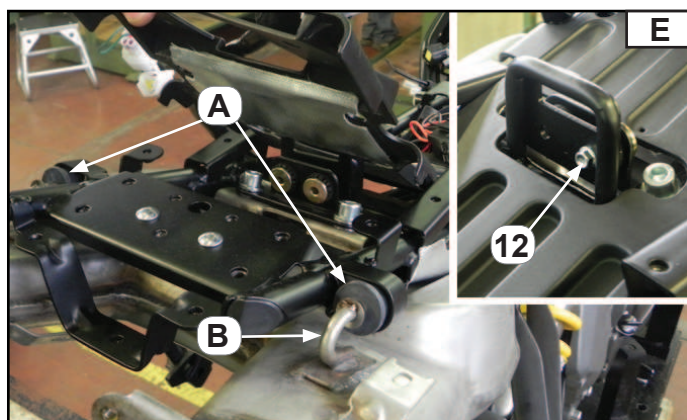
- The exhaust manifold fitting (7), inserting it between the silencer and the exhaust manifold, so that the two graphite gaskets (4) are aligned Fig. F.

Tighten:

- The nuts (2) previously screwed onto the engine block studs to the following torque:

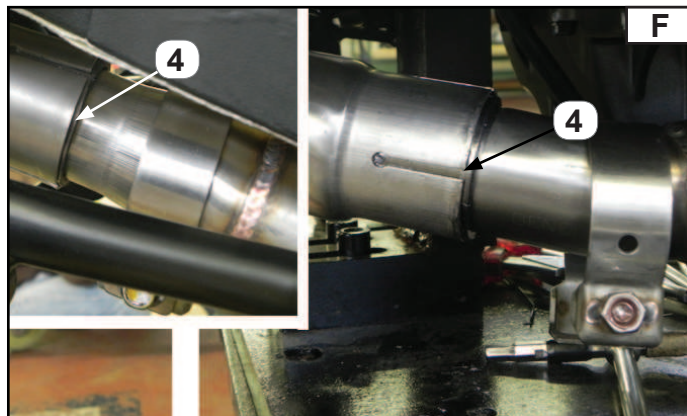


Torque 20 N*m



Tighten:

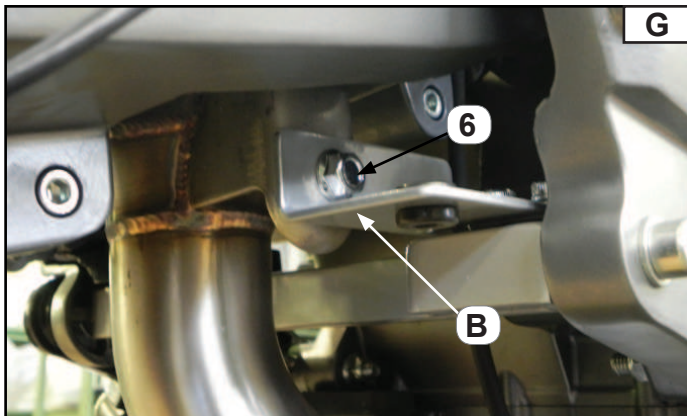
- The clips (20) to the respective manifolds and lastly, the screw (6) to the bracket (B) Fig. G.



EXHAUST ASSEMBLY REMOVAL

Removal:

- carry out the installation steps in reverse order.





FAIRING

EXHAUST PIPE PROTECTION INSTALLATION

Fit:

- The two exhaust pipe protections (23) and (28), complete with internal thermal protections, Fig. A, inserting them into the silencer.
- Tighten the two screws (22) Fig. A into the top section.
- Tighten the two screws (22) into the bottom part, in the special seats in the licence plate support Fig. B.

Fit:

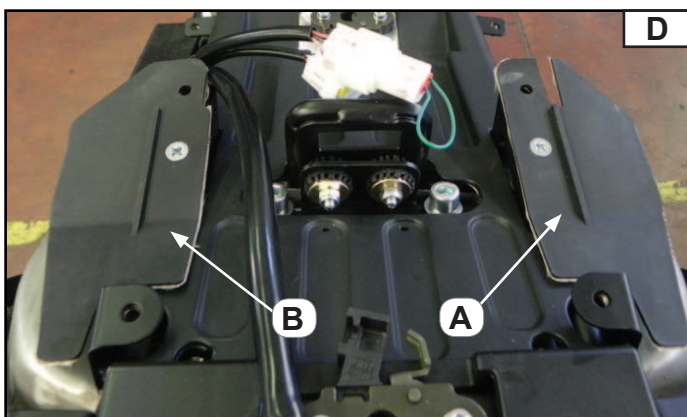
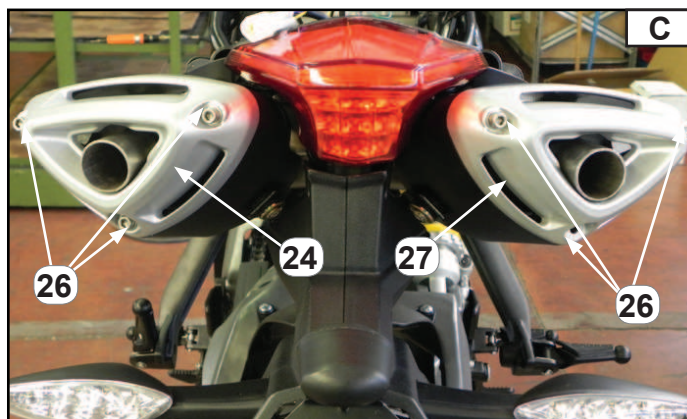
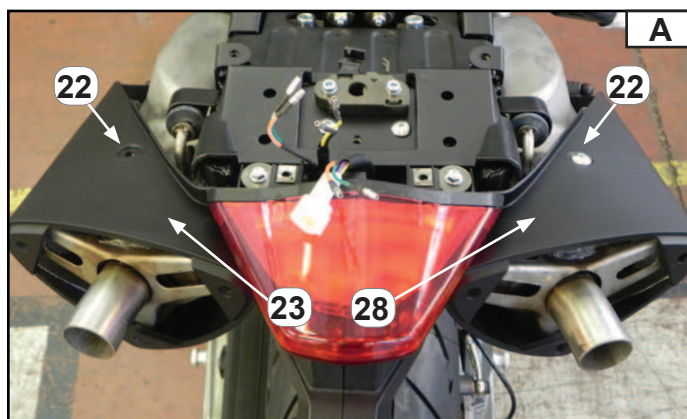
- The two exhaust pipe end pieces, right (27) and left (24), Fig. C.
- Tighten the six screws (26).
- Tighten the exhaust pipe protection screws.

NOTE

The two end pieces are not mirrored and therefore, careful assembly is required. Each terminal has its direction marked with an L (left) or (R), right section.

Fit:

- The two thermal bulkheads (A) left and right (B), securing with the relevant screws Fig. D.



EXHAUST PIPE PROTECTION REMOVAL

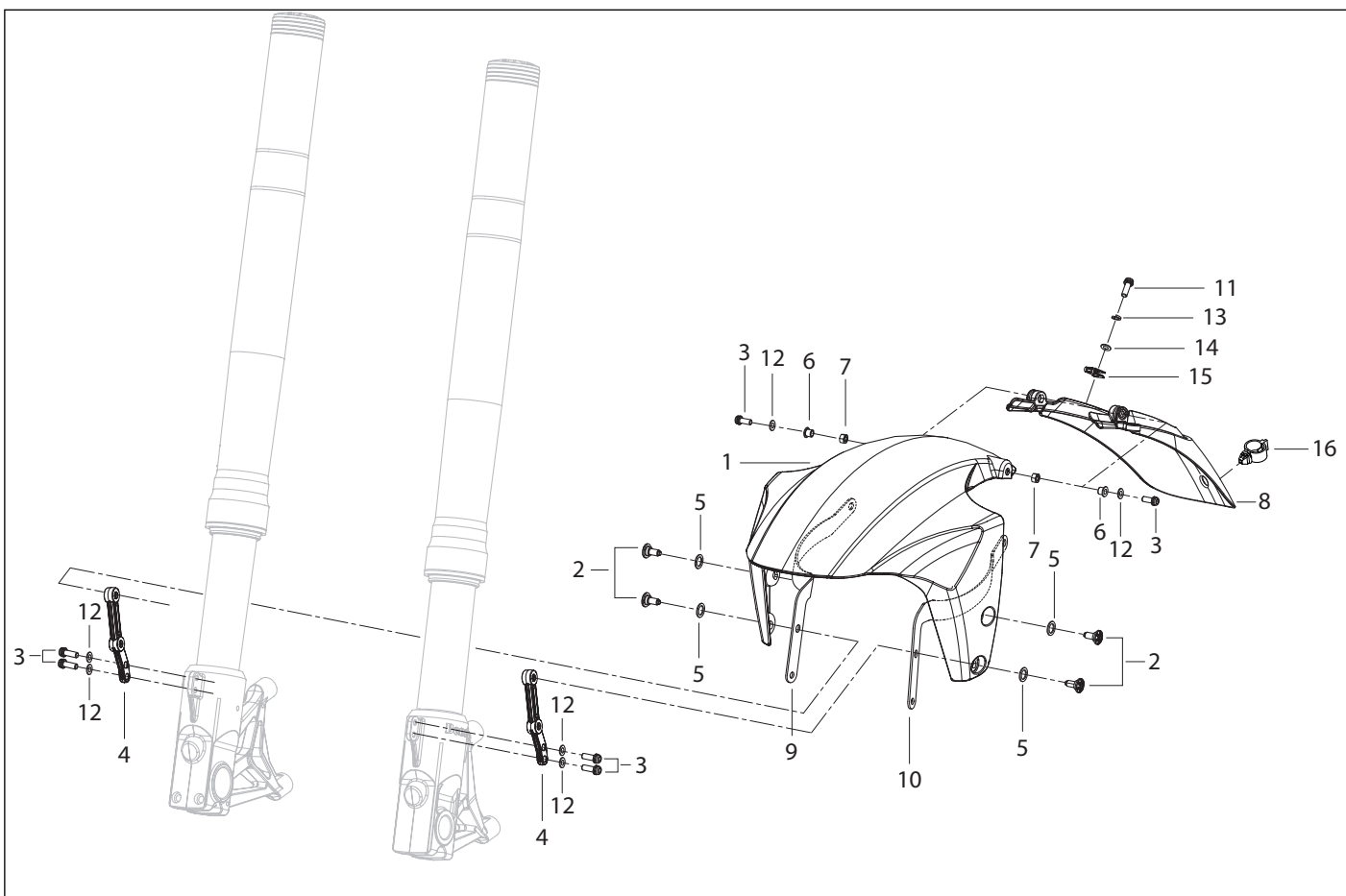
Removal:

- carry out the installation steps in reverse order.



FAIRING

FRONT MUD GUARD INSTALLATION



Position	Description	Quantity
1	FRONT MUD GUARD	1
2	SCREW	4
3	SCREW	6
4	BRACKET	2
5	NYLON WASHER	4
6	"T" BUSHING	2
7	NUT M5	2
8	BOTTOM MUD GUARD	2
9	RIGHT BRACKET	1
10	LEFT BRACKET	1
11	SCREW M5X12	1
12	WASHER	6
13	ELASTIC WASHER	1
14	WASHER	1
15	SNAP-ON CLIP (M5)	1
16	TUBE CLAMP	1



FAIRING

FRONT MUD GUARD INSTALLATION

Assemble:

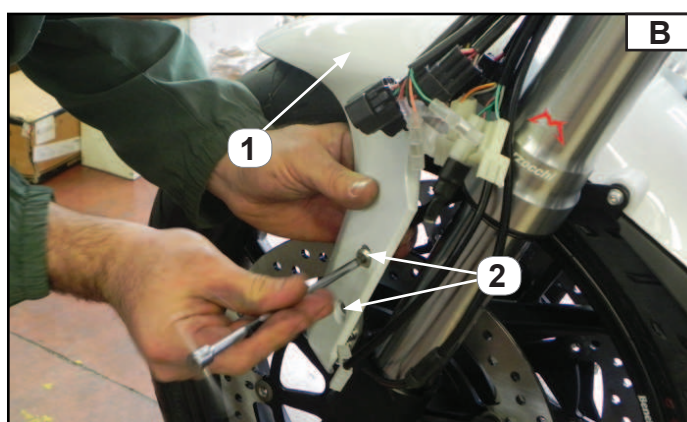
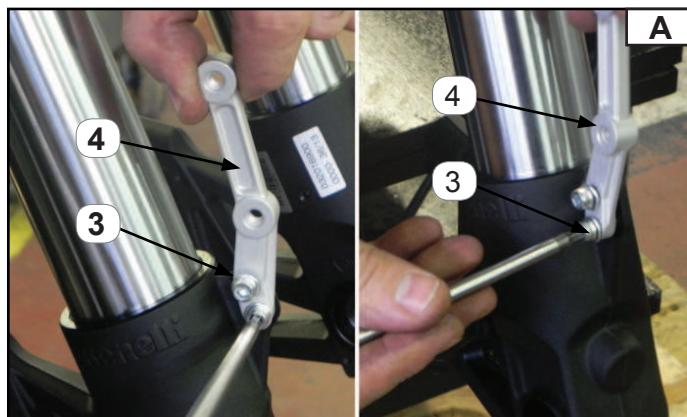
- The brackets (4) and the respective screws (3) at the base of the two front forks' feet.

Fit:

- The front mud guard (1) with the respective fastening screws (2) on both sides Fig. B.

NOTE

Once the mud guard is assembled, connect the hose from the front brake to the tube sleeve (A) Fig. C



FAIRING

FRONT MUD GUARD REMOVAL

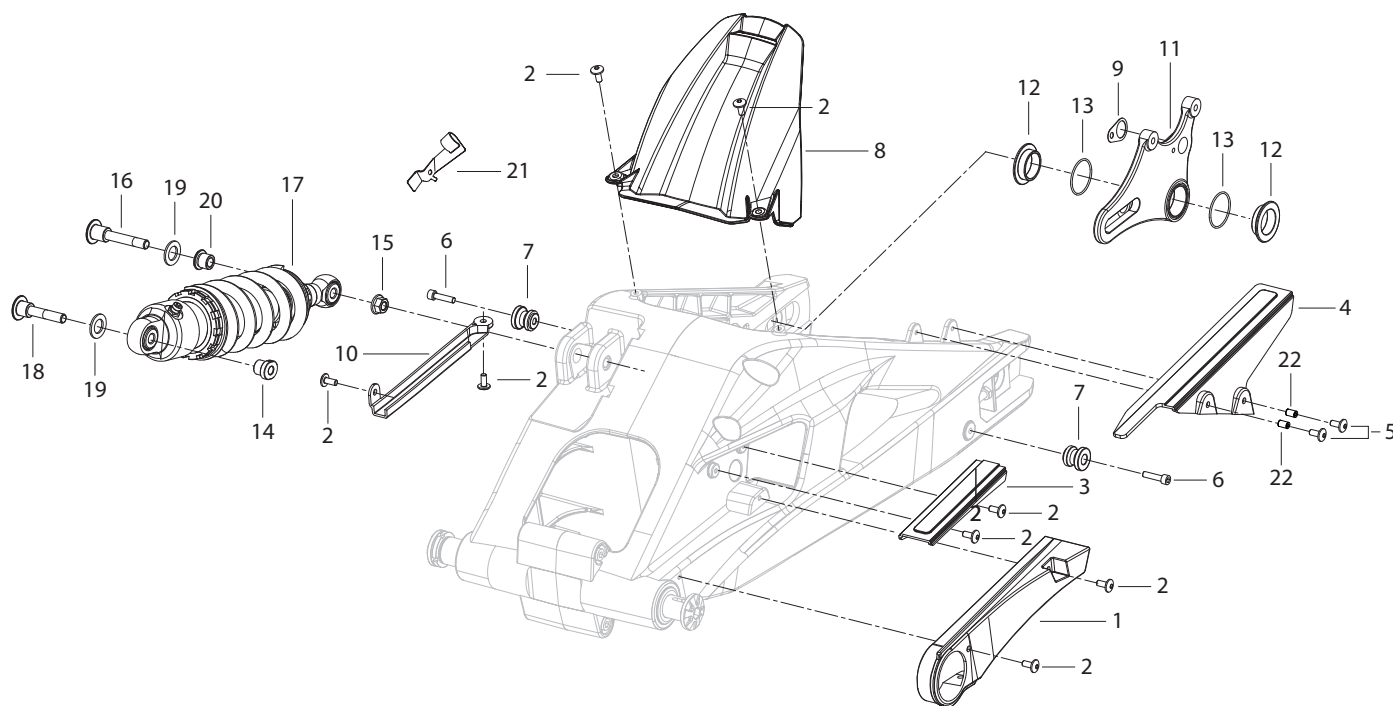
Removal:

- carry out the installation steps in reverse order.



FAIRING

REAR MUD GUARD INSTALLATION



Position	Description	Quantity
1	BOTTOM CHAIN SLIDE	1
2	SCREW	8
3	TOP CHAIN SLIDE	1
4	CHAIN COVER	1
5	SCREW (M6X8)	2
6	SCREW M6X25	2
7	GUIDE BUSHING	2
8	REAR MUD GUARD	1
9	WASHER	1
10	BRACKET	1
11	PLATE	1
12	SHIM	2
13	O-RING	2
14	BUSHING	1
15	NUT	1
16	SCREW M10X70	1
17	REAR SHOCK ABSORBER	1
18	SCREW M10X60	1
19	WASHER	2
20	BUSHING	1
21	CABLE GLAND	1
22	BUSHING	2



FAIRING

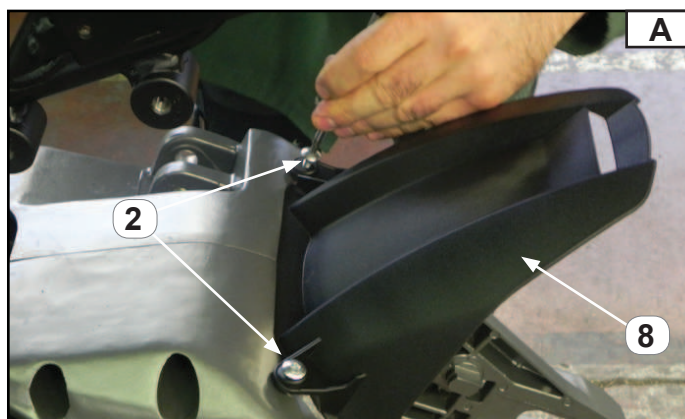
REAR MUD GUARD INSTALLATION

Assemble:

- The rear mud guard (8) with the respective fastening screws (2) Fig. A

NOTE

Apply thread locker to the respective screws.



FAIRING

REAR MUD GUARD REMOVAL

Removal:

- carry out the installation steps in reverse order.

FAIRING

TOP CHAIN SLIDE AND CHAIN COVER FITTING

Assemble:

- The chain cover (4) on the left half swinging arm with the respective fastening screws (5) Fig. A

Assemble:

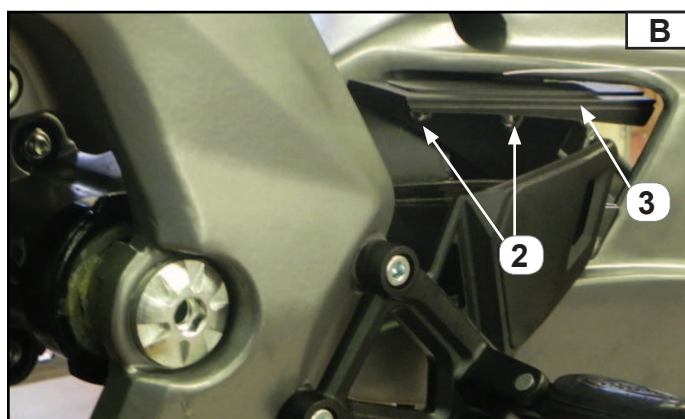
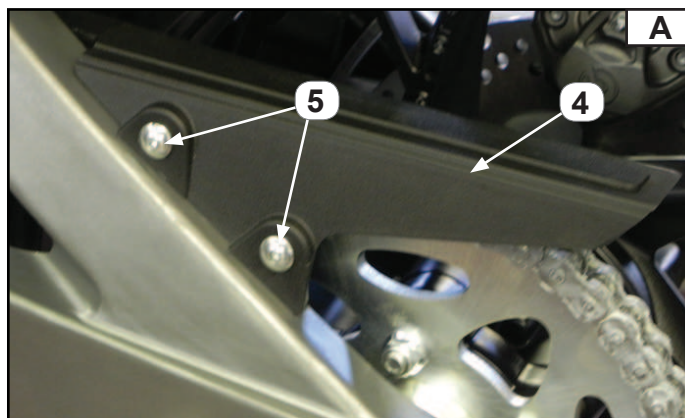
- The chain cover (4) on the left half swinging arm with the respective fastening screws (5) Fig. A

Assemble:

- The top chain slide (3) on the left half swinging arm with the respective fastening screws (2) Fig. B

NOTE

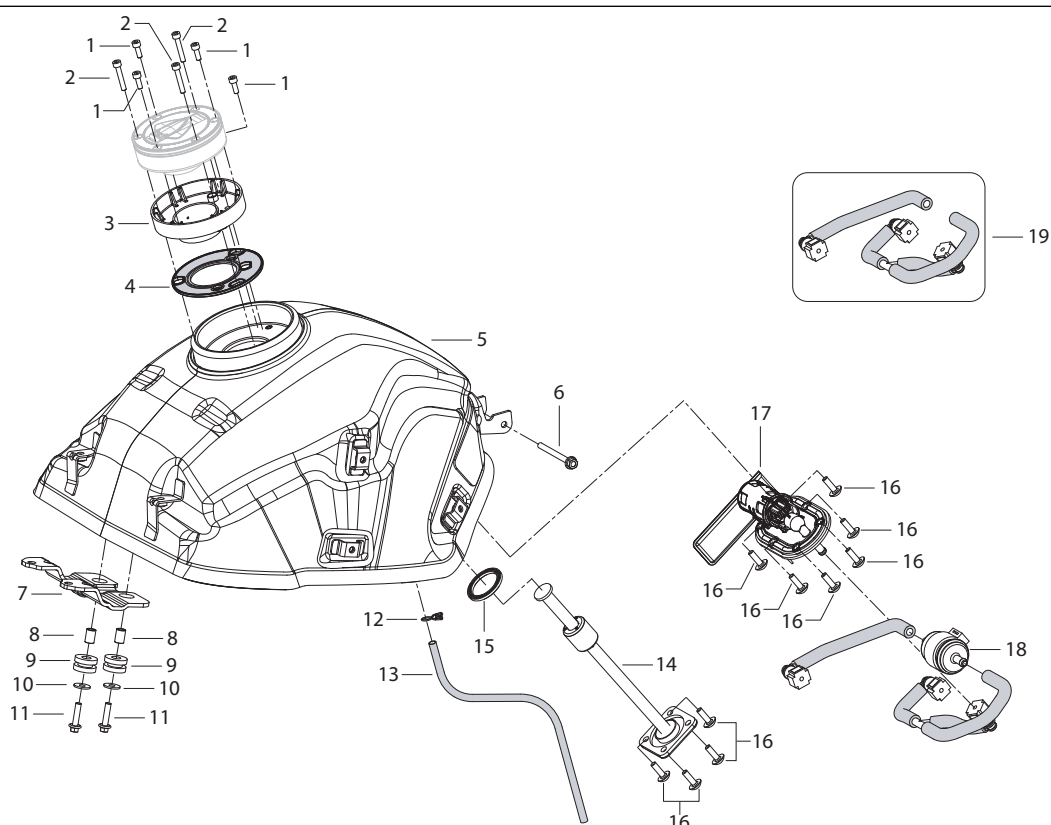
Apply thread locker to the respective screws.





FAIRING

TANK CAP FITTING



Position	Description	Quantity
1	SCREW	4
2	SCREW	3
3	OPENING	1
4	RUBBER GASKET	1
5	FUEL TANK	1
6	SCREW M6X70	1
7	PLATE	1
8	BUSHING	2
9	RUBBER TIP	2
10	WASHER	2
11	SCREW	2
12	SPRING	1
13	PIPE	1
14	FUEL TANK LEVEL PROBE	1
15	O-RING	1
16	SCREW	10
17	FUEL PUMP	1
18	FUEL FILTER	1
19	HOSES	1



FAIRING

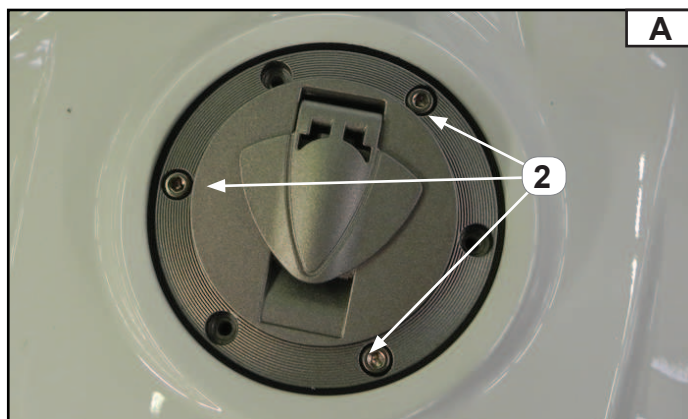
TANK CAP FITTING

Assemble:

- The rubber gasket (4) to the fuel tank (5)
- Apply the opening (3) over the gasket (4)
- Tighten the safety screw (1) and lock the opening.
- Tighten the lock in the opening (3) using the three longer fastening screws (2) Fig. A.

NOTE

The screws (1) fitted to the outside of the lock are only fitted for visual effect.



FAIRING

TANK CAP REMOVAL

Removal:

- carry out the installation steps in reverse order.



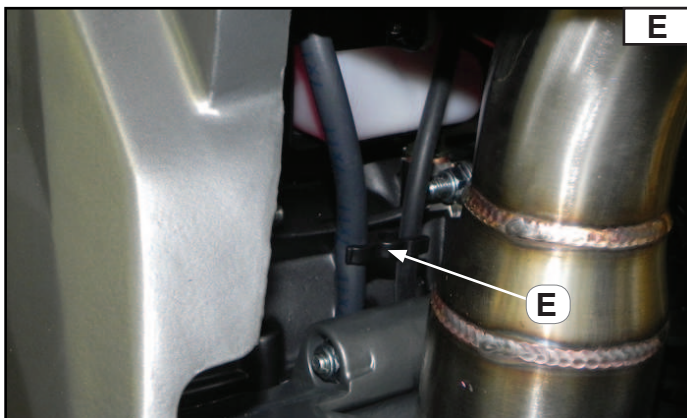
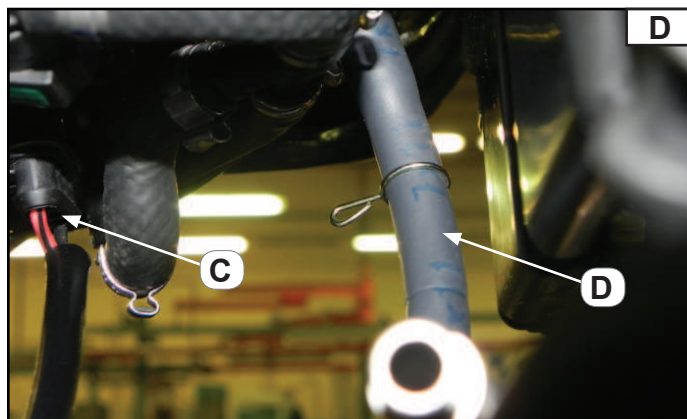
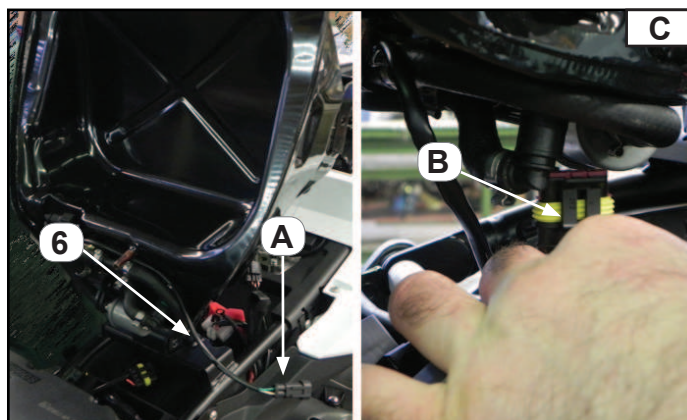
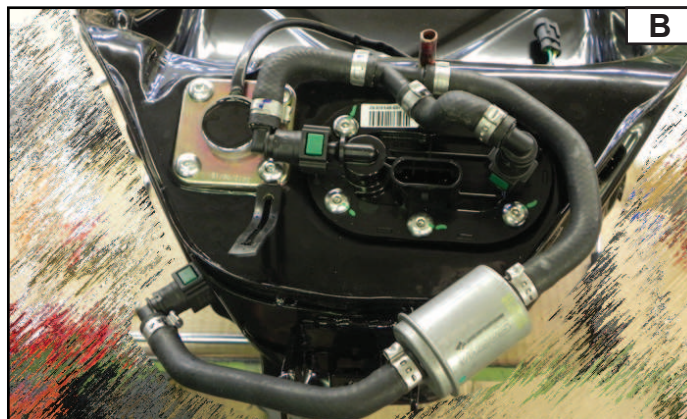
FAIRING TANK FITTING

Assemble:

- The hoses (19) correctly, as shown in Fig. B
- The tank (5) to the frame, fastening the screw (6) first Fig. C
- The level gauge in the tank (A)
- The supply inlet (C) to the pump and tank and the breather pipe (D) Fig. D

Apply:

The clip (E) to the breather pipe to keep it away from the rest of the engine Fig. E



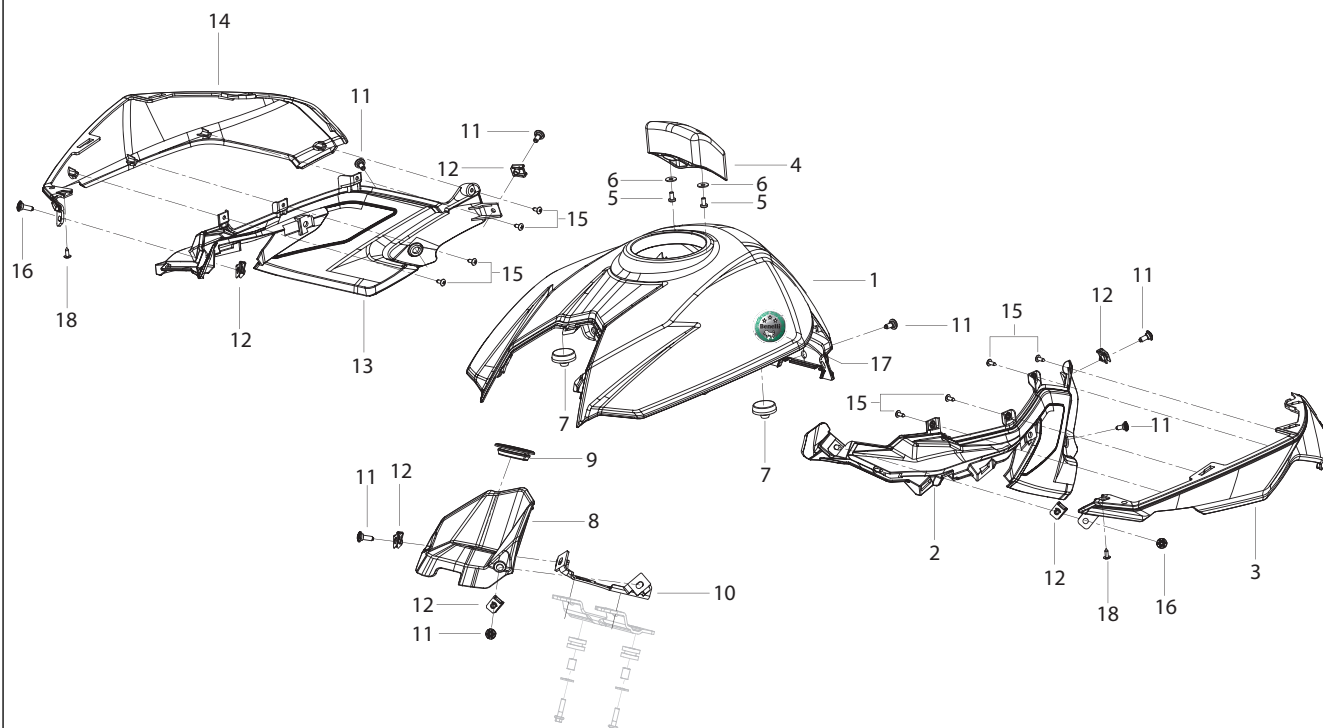
TANK REMOVAL

Removal:

- Once the plastic parts have been removed, follow the installation steps in reverse order.



FAIRING TANK COVER FITTING



Position	Description	Quantity
1	FUEL TANK CAP	1
2	LEFT PANEL	1
3	BOTTOM LEFT PANEL	1
4	FRONT TANK PAD	1
5	SCREW ST4.2X13	2
6	WASHER	2
7	RUBBER TIP	2
8	STEERING BLOCK COVER	1
9	LOCK CAP	1
10	BRACKET	1
11	SCREW	7
12	SNAP-ON CLIP (M6)	5
13	RIGHT PANEL	1
14	RIGHT BOTTOM PANEL	1
15	SCREW (ST4.2×13)	10
16	SCREW (M6×19.2)	2
17	BENELLI EMBLEM	2
18	SCREW	4



FAIRING

TANK COVER FITTING

Apply:

- The two snap-on clips (12) to the frame Fig. A

Secure:

- The front pad of the tank (4) to the tank cap (1), securing with the two screws (5) Fig. B

Pre-assemble:

- The right panel (13) with the bottom right panel (14)
- The left panel (2) with the bottom left panel (3)

Secure:

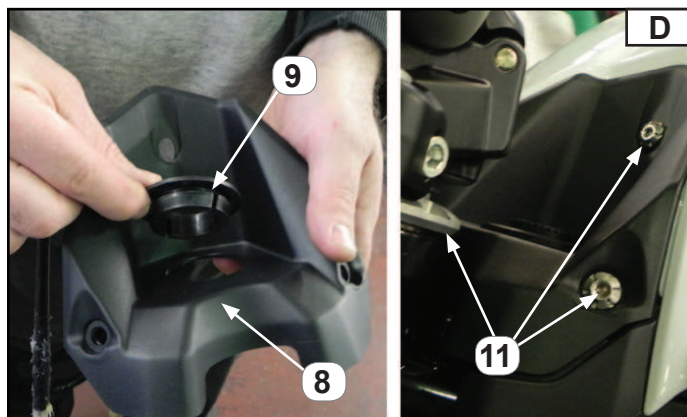
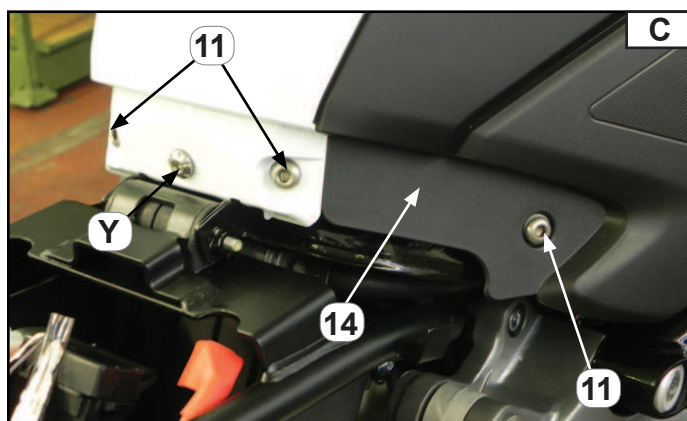
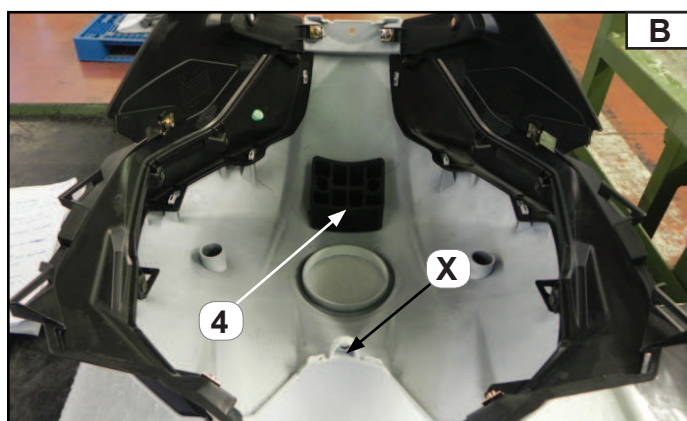
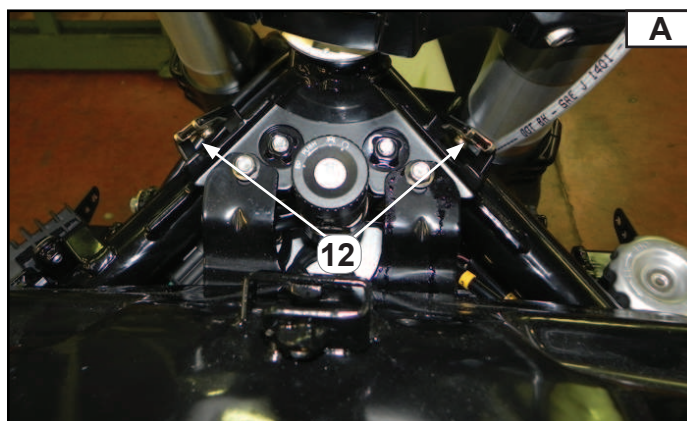
- The tank cap, screwing the screw (X) to the front of the tank cap, the two screws (11) to the rear, and the special screw (Y) to the centre Fig. C
- the bottom right panel (14) with the screws (11) Fig. C

Apply:

- The lock cap (9) to the steering block cover (8) Fig. D

Secure:

- The steering block cover (8) with the three fastening screws (11) Fig. D



TANK COVER REMOVAL

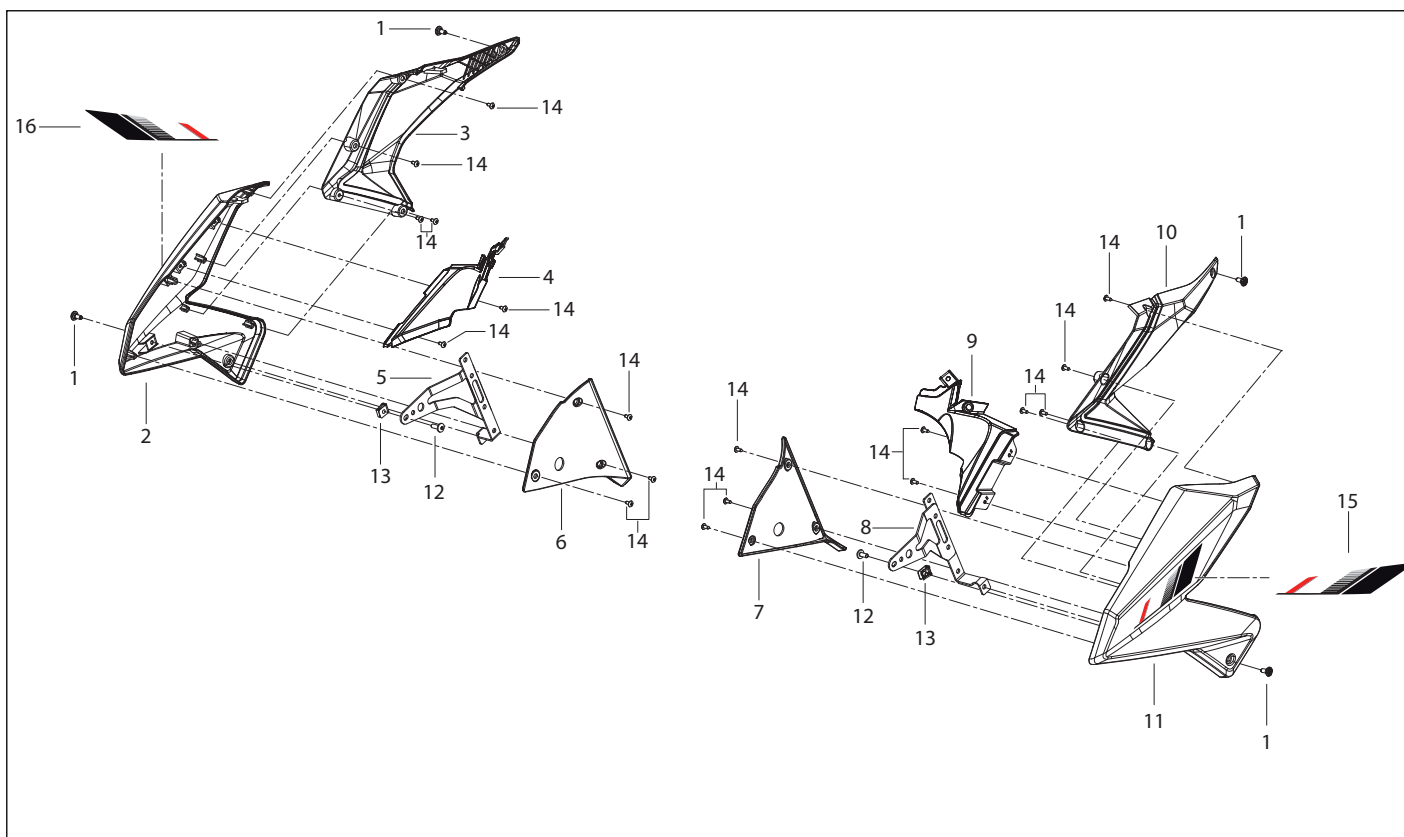
Removal:

- carry out the installation steps in reverse order.



FAIRING

FAIRING FITTING



Position	Description	Quantity
1	SCREW	4
2	RH EXTERNAL TOP FAIRING	1
3	FAIR. RH EXTERNAL BOTTOM	1
4	TANK CAP FUEL RIGHT	1
5	RIGHT BRACKET	1
6	RH COVER	1
7	LH COVER	1
8	LEFT BRACKET	1
9	TANK CAP FUEL LEFT	1
10	FAIR. LH EXTERNAL BOTTOM	1
11	LH EXTERNAL TOP FAIRING	1
12	SCREW M6X14	2
13	SNAP-ON CLIP (M6)	2
14	SCREW (ST4.2×13)	18
15	ADHESIVE LH BN600i BW	1
16	ADHESIVE RH BN600i BW	1



FAIRING

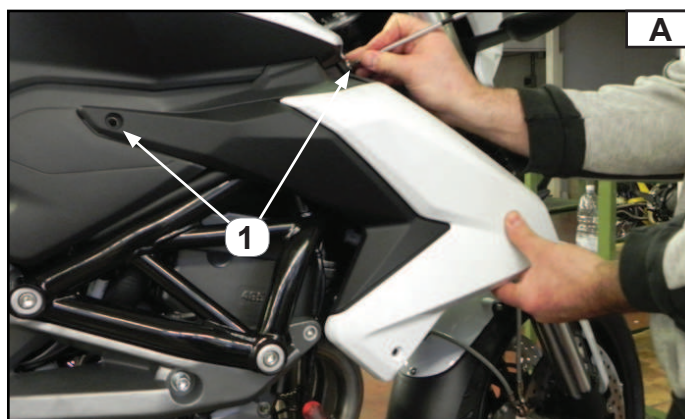
FAIRING FITTING

Pre-assemble:

- The top right external fairing (2) with the bottom right external fairing (3) and apply the right cover (6).
- The top left external fairing (11) with the bottom left external fairing (10) and apply the left cover (7).

Secure:

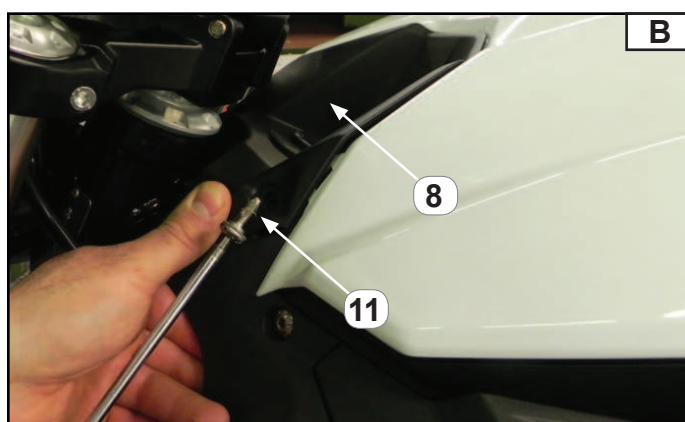
- The right and left fairing with the respective fastening screws (1) Fig. A



FAIRING REMOVAL

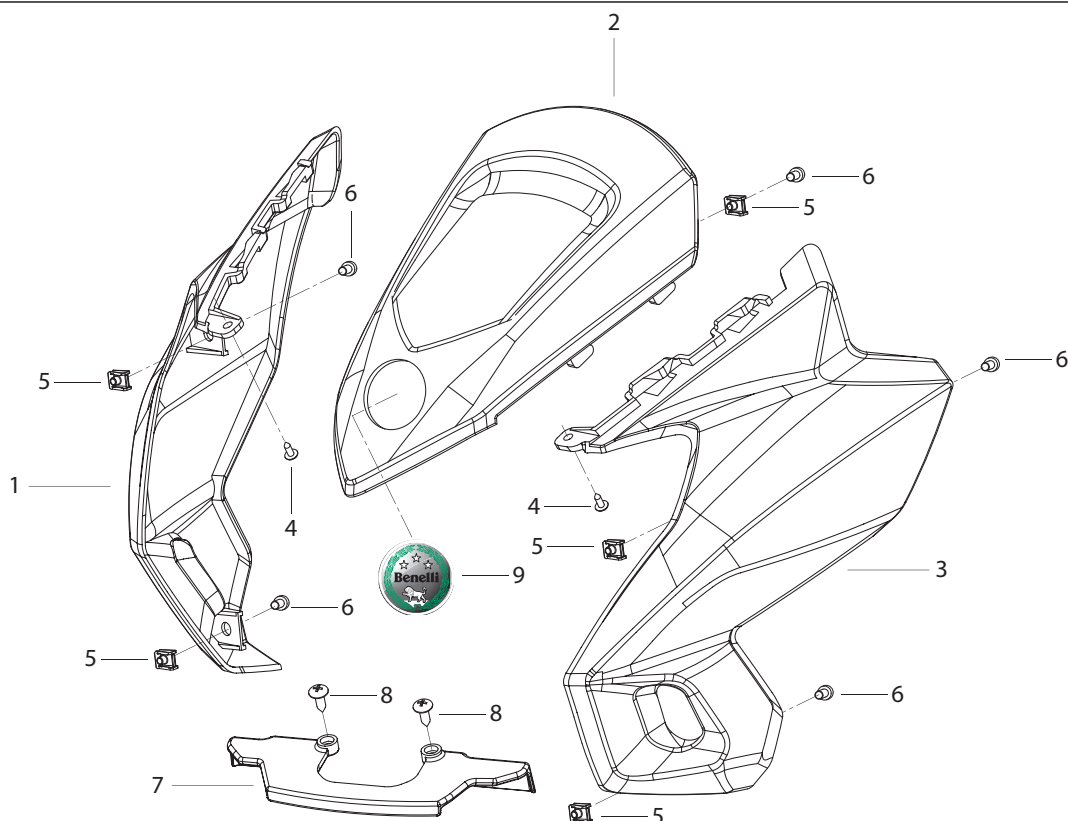
Removal:

- Take out the steering block cover (8) first, unscrewing the three fastening screws (11) Fig. B
- Remove the other parts in reverse order to installation.





FAIRING COWL FITTING



Position	Description	Quantity
1	RH SIDE	1
2	COWL	1
3	LH SIDE	1
4	SCREW ST4,2X9,5	2
5	SNAP-ON CLIP (M5)	5
6	SCREW M5X10	5
7	FAIRING CLOSURE	1
8	SCREW ST4,2X12	2
9	"BENELLI Ø 40" DECAL	1

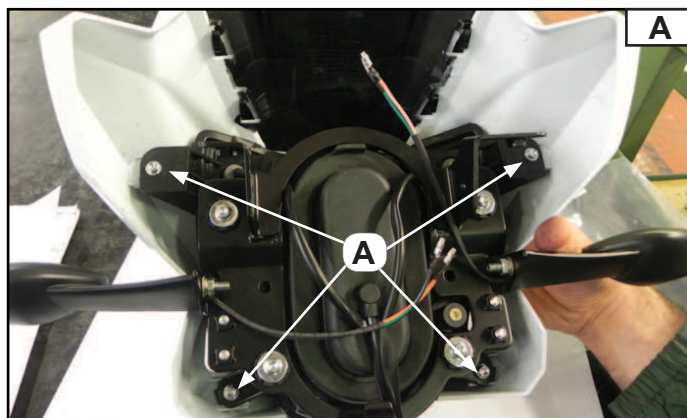
Pre-assembly:

- The right side (1) and the left side (3) to the cowl (2).
- Secure the assembled dome to the front light group, with the five screws (A) and thread blocker

COWL REMOVAL

Removal:

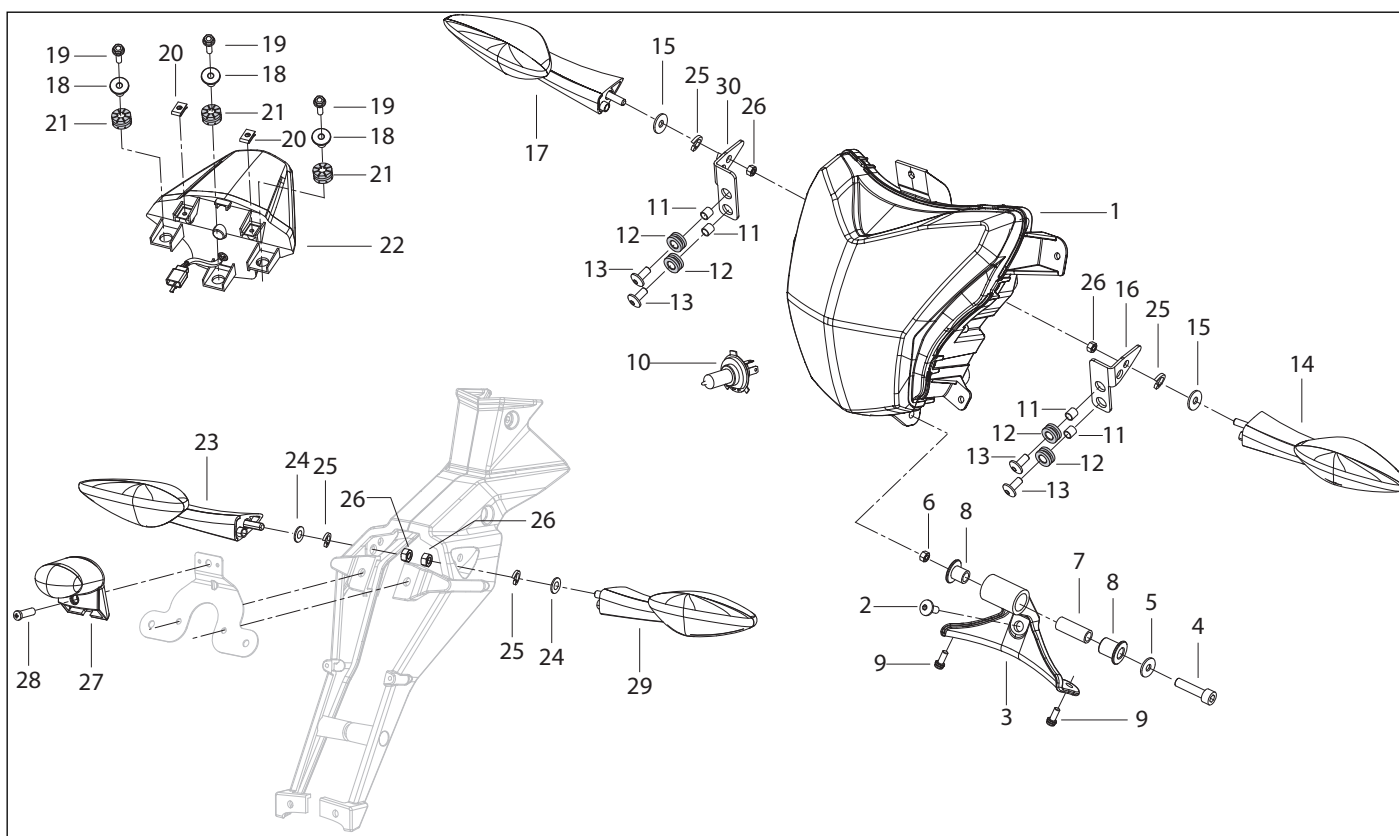
- carry out the installation steps in reverse order.





FAIRING

COMPLETE HEADLAMP FITTING



Position	Description	Quantity
1	HEADLAMP	1
2	SCREW	1
3	HEADLAMP SUPPORT	1
4	SCREW M6X60	1
5	WASHER	1
6	NUT	1
7	SHIM	1
8	BUSHING	2
9	SCREW	2
10	LAMP	2
11	BUSHING	4
12	VIBRATION DAMPING RUBBER	4
13	SCREW M6X20	4
14	DIRECTION INDICATORS FRONT LH	1
15	WASHER	2
16	LH PLATE	1
17	DIRECTION INDICATORS FRONT RH	1
18	BUSHING	3
19	SCREW M6X25	3
20	SNAP-ON CLIP	2
21	VIBRATION DAMPING RUBBER	3
22	REAR LIGHT	1
23	DIRECTION INDICATORS REAR LH	1



FAIRING

COMPLETE HEADLAMP FITTING

Position	Description	Quantity
24	WASHER	2
25	ELASTIC WASHER	4
26	NUT	2
27	LICENCE PLATE LIGHT	1
28	SCREW ST4,2X9,5	1
29	DIRECTION INDICATORS REAR RH	1
30	RH PLATE	1

Pre-assemble:

- The cowl to the assembled headlamp.

Secure:

- The cowl to the frame with the screw (4) of the headlamp support (3) Fig. A

Connect:

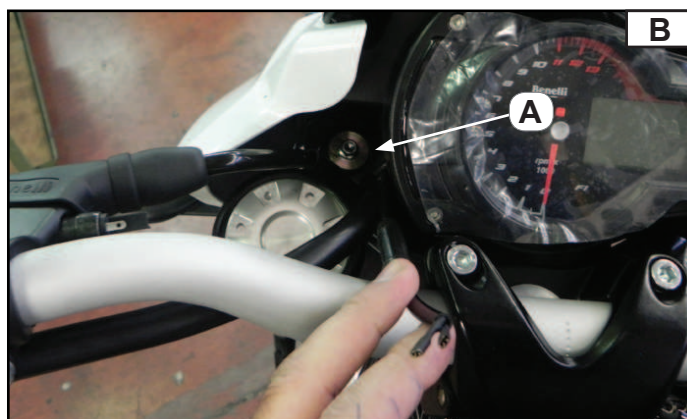
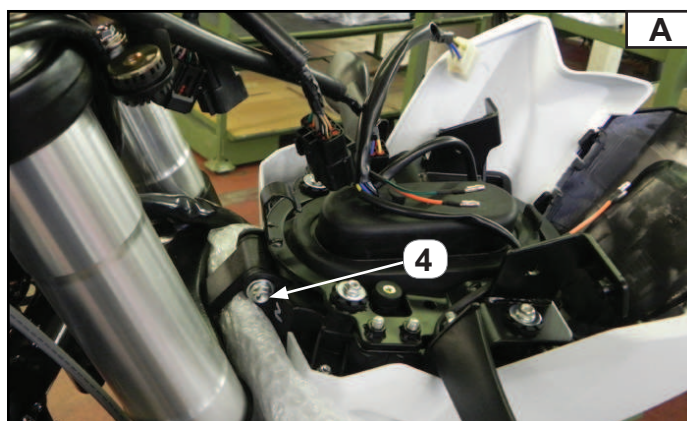
- the wiring to the indicators and headlamp.
- Lift the full headlamp.

NOTE

Take care not to crush the wiring while lifting the headlamp.

Secure:

- The full headlamp with the fastening screw (A) on both sides Fig. B



FULL REAR LIGHT REMOVAL

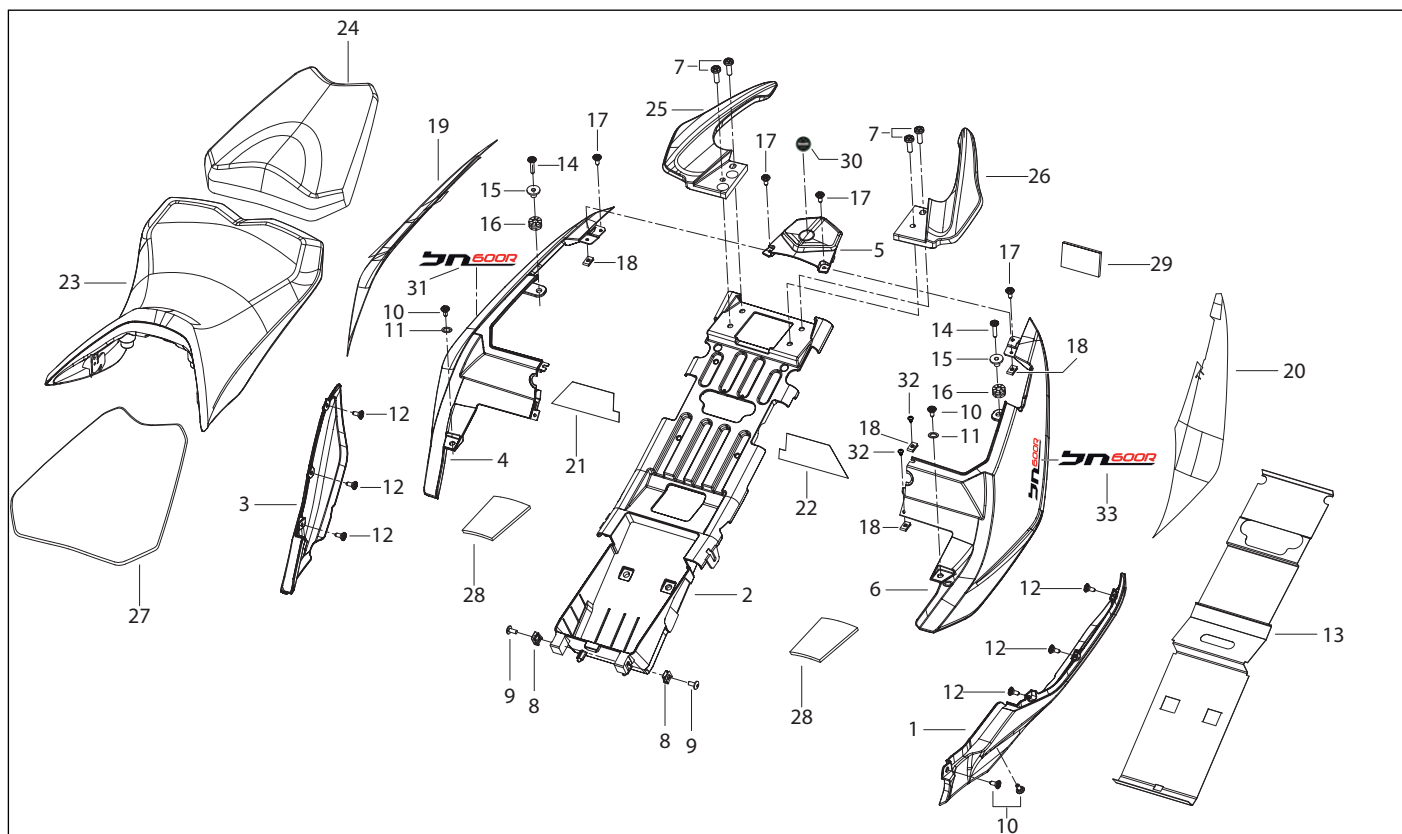
Removal:

- carry out the installation steps in reverse order.



FAIRING

TAILPIECE FITTING



Position	Description	Quantity
1	BOTTOM LEFT PANEL	1
2	BATTERY BOX	1
3	RIGHT BOTTOM PANEL	1
4	RIGHT TAILPIECE (WHITE)	1
5	CENTRAL TAILPIECE (WHITE)	1
6	LEFT TAILPIECE (WHITE)	1
7	SCREW M8X25	4
8	SNAP-ON CLIP (M6)	2
9	SCREW TBEI M6X14 8.8 ZB	4
10	SCREW (M6×15.2)	4
11	NYLON WASHER	2
12	SCREW ST4,2X9,5	6
13	BATTERY COVER	1
14	SPECIAL SCREW	2
15	BUSHING	2
16	VIBRATION DAMPING RUBBER	2
17	SCREW ST4,2X13	4
18	SNAP-ON CLIP	6
19	RH TAILPIECE THERMAL PROTECTION	1
20	LH TAILPIECE THERMAL PROTECTION	1
21	RH THERMAL PROTECTION	1
22	LH THERMAL PROTECTION	1
23	SADDLE	1

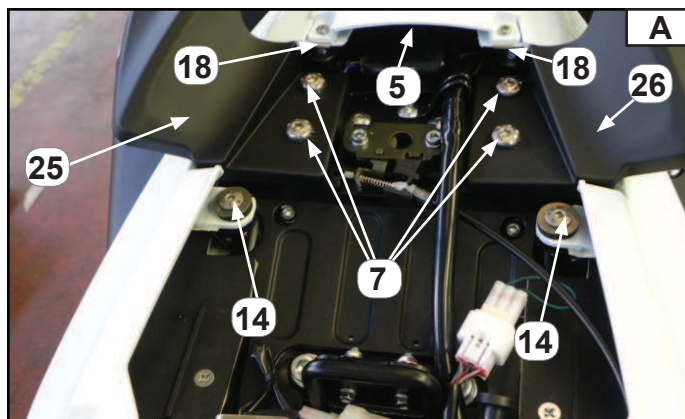


FAIRING TAILPIECE FITTING

Position	Description	Quantity
24	PASSENGER SEAT	1
25	RH REAR HANDLE	1
26	LH REAR HANDLE	1
27	HEAT REFLECTIVE SHIELD	1
28	VIBRATION DAMPING RUBBER	2
29	THERMAL PROTECTION	2
30	"BENELLI" LOGO ADHESIVE	1
31	RH TAILPIECE ADHESIVE BN600i BW	1
32	SCREW	2
33	LH TAILPIECE ADHESIVE BN600i BW	1

Assembly

- Assemble the left tailpiece (6) and the right piece (4) with the fastening screws (10) at the bottom and (14) and the intermediate part of the frame.
- Fit the handles (25) and (26) with the four fastening screws (7) applying thread blocker to the ends of the screws.
- Tighten the top screws (17) on the tailpieces
- Apply the snap-on clips (18) and assemble the central tailpiece (5), securing it with the two screws (17) Fig. A.



TAILPIECE REMOVAL

Removal:

- carry out the installation steps in reverse order.

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ENG				



CHAPTER 5

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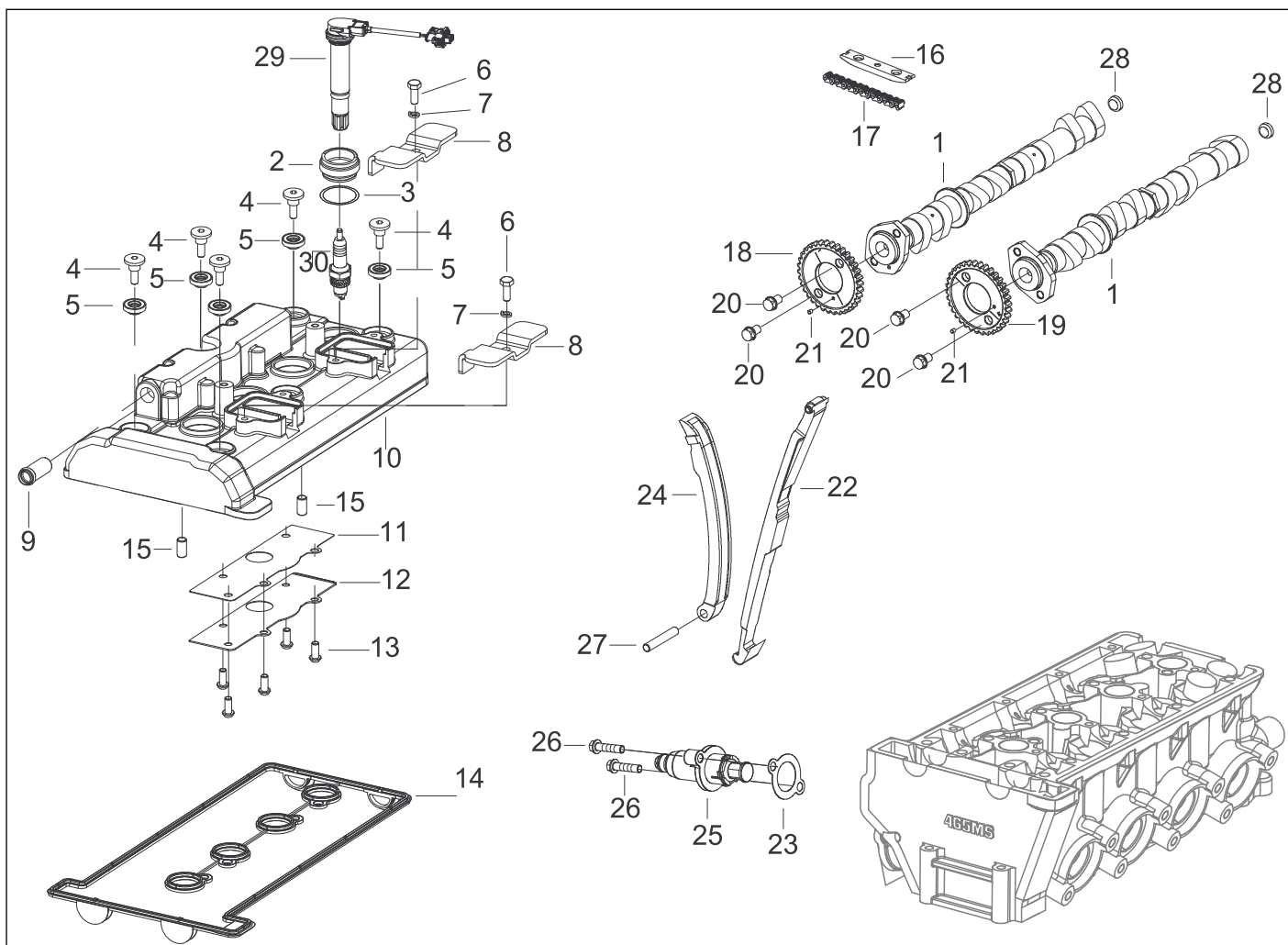
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HEAD TIMING GEAR

HEAD TIMING GEAR COVER REMOVAL



Position	Description	Quantity
1	DISTRIBUTION GEAR	2
2	RUBBER TIP	4
3	O-RING	4
4	SCREW	6
5	RUBBER TIP	6
6	SCREW (M6X16)	2
7	WASHER M.6	2
8	BRACKET	2
9	PLUG	1
10	DISTRIBUTION GEAR COVER	1
11	DIAPHRAGM	1
12	DIAPHRAGM	1
13	SCREW (M6X14)	5
14	DISTRIBUTION GEAR COVER GASKET	1
15	PLUG	2
16	TOP CHAIN SLIDES	1
17	DISTRIBUTION CHAIN	1
18	DISTRIBUTION GEAR	1
19	DISTRIBUTION GEAR	1



HEAD TIMING GEAR

HEAD TIMING GEAR COVER REMOVAL

Position	Description	Quantity
20	SCREW (M7)	4
21	PIN (3X6)	2
22	BOTTOM CHAIN SLIDE	1
23	GASKET	1
24	CHAIN SLIDE	1
25	CHAIN TENSIONER	1
26	SCREW (M6X25)	2
27	PIN	1
28	COVER	2
29	COIL	4
30	SPARK PLUG	4

Once the engine has been moved to the relevant support, disassemble the parts as described below:

1. Remove the bracket (8) by loosening the screw (6) and washer (7) Fig. A.
2. Take out the 4 coils (29) Fig. B
3. Remove the 4 spark plugs (30) using the relevant tool Fig. C
4. Take out the 6 screws (4) and relevant rubber tips (5) Fig. D.

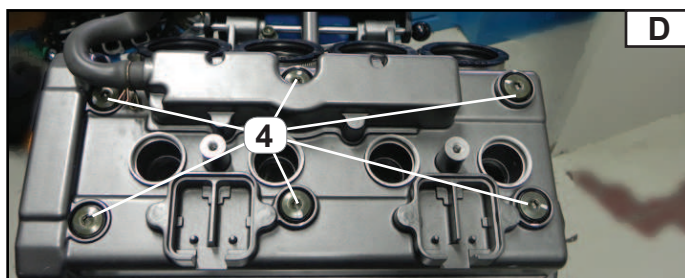
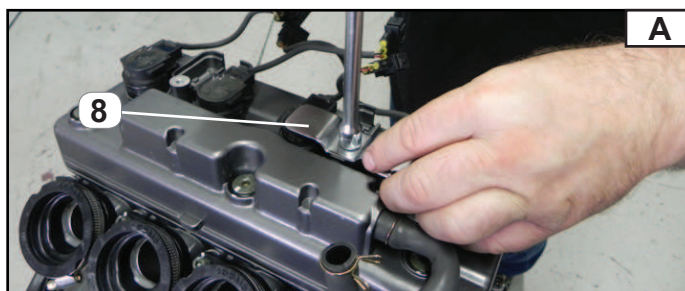
NOTE

We recommend replacing the rubber tips (5) during the reassembly stage, as they are subject to wear.
As far as concerns tightening torque to reassemble the timing gear with the 6 screws (4), this is as follows:



Torque 10 N*m

As far as concerns refitting the coils, it is advisable to use copper grease.





HEAD TIMING GEAR

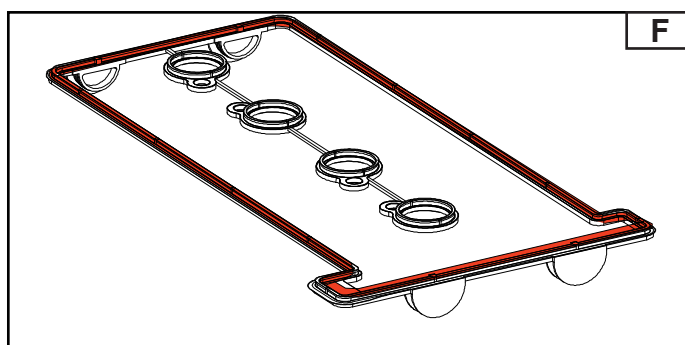
HEAD TIMING GEAR COVER REMOVAL

As soon as the timing gear cover (10) has been lifted, take care with the removal of the cover seal (14) Fig.E.

NOTE

If the timing gear cover seal (10) should be broken, it must be replaced with an original

When the cover is being refitted, it is necessary to apply sealant paste to the surface of the gasket, as shown in red in Fig.F



REMOVAL OF THE DISTRIBUTION CHAIN TENSIONER

Take out the chain tensioner (25), loosening the tensioner screw "A", recovering the spring and washer, followed by the two tightening screws (26) Fig. G.

NOTE

Operation to perform with the engine in TDC.

During the refitting stages, take care to ensure that the gasket (23) Fig. H is not worn or damaged and if this is not the case, replace it.

Bring the tensioner to the retracted position before inserting it in its housing.

To secure the tensioner to the cylinder body, it is necessary to tighten the two screws (26) with the following torque:



Torque 10 N*m



Use Loctite thread locker to secure.

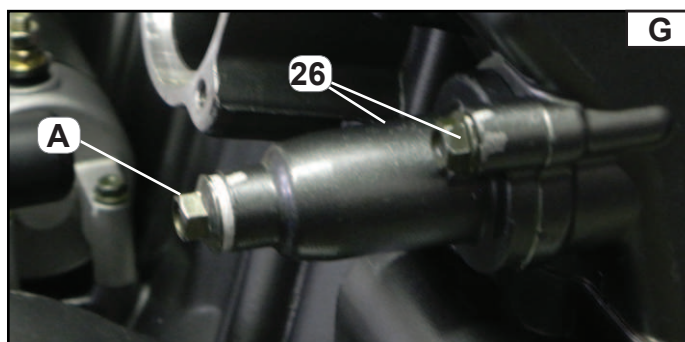
Use the relevant tool* to keep the tensioner retracted, Fig.I and proceed to secure the screw "A" with the following torque:



Torque 10 N*m



(*) Tool
Code:.....





HEAD TIMING GEAR

INLET CAMSHAFT REMOVAL

Remove the 2 fastening screws (20) of the distribution gears (18) Fig.A.

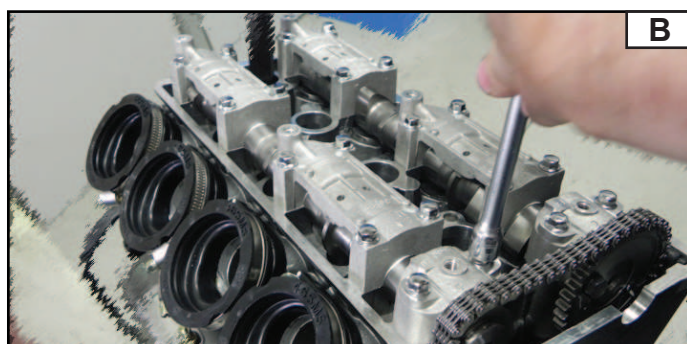
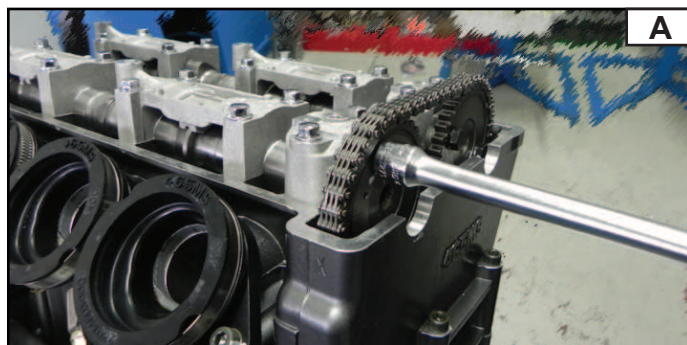
Proceed to take out 10 fastening screws from the underframes supporting the inlet camshaft Fig. B.

Take out the inlet camshaft

NOTE

During this stage of disassembly, take care to mark the positions of the different underframes with a marker pen, since they need to be in their original positions when reassembling.

This operation is also made easier by the "arrows" stamped above the underframes, indicating the assembly direction.



REMOVAL OF CAMSHAFT, OUTLET SIDE

Remove the 2 fastening screws (20) of the distribution gears (18) Fig.C.

Proceed to take out 10 fastening screws from the underframes supporting the outlet camshaft Fig. C.

Take out the outlet camshaft.

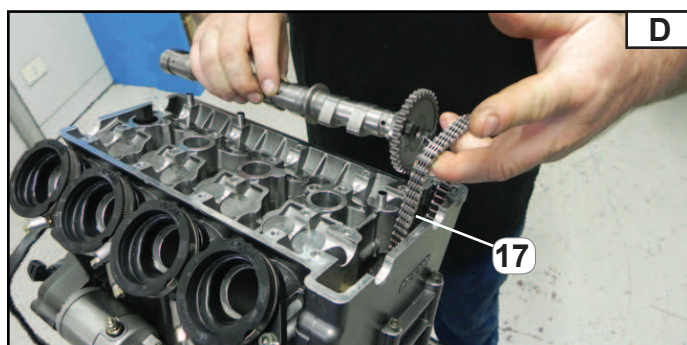
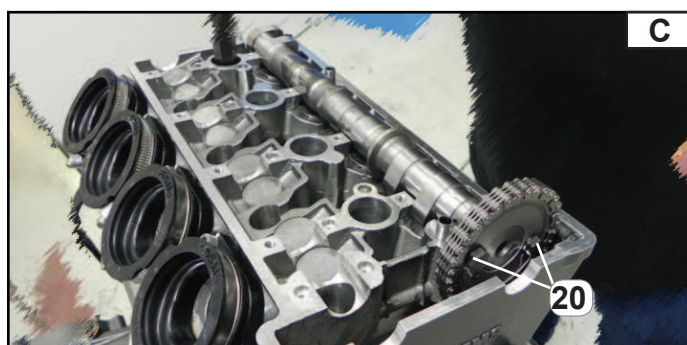
NOTE

To prevent the distribution chain (17) from falling into the crank case, secure it with some wire.

NOTE

During this stage of disassembly, take care to mark the positions of the different underframes with a marker pen, since they need to be in their original positions when reassembling.

This operation is also made easier by the "arrows" stamped above the underframes, indicating the assembly direction.





HEAD TIMING GEAR

CAMSHAFT CHECK

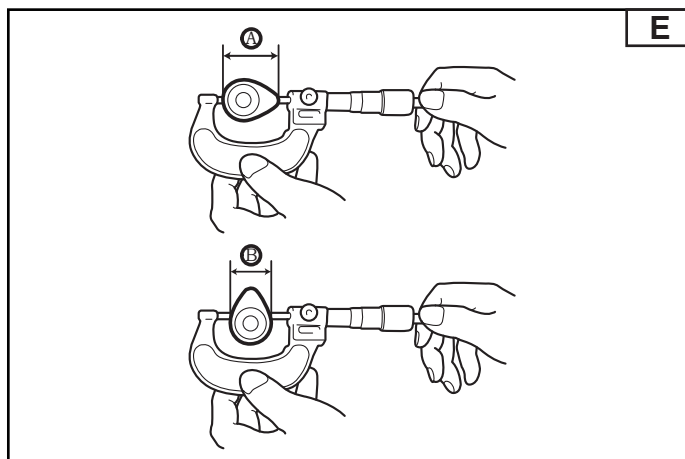
Make a visual check of the camshaft lobes and if there is any blue discolouration/blotching or lines, replace.

- **Measure the size of the lobes.**

If the measurements taken (Fig. E) are not within the specifications, proceed with shaft replacement.

Specifications Table

Camshaft	Limit (a)	Limit (b)
Camshaft outlet side	32,495 mm	25 mm
Camshaft inlet side	32.2 mm	24.85 mm

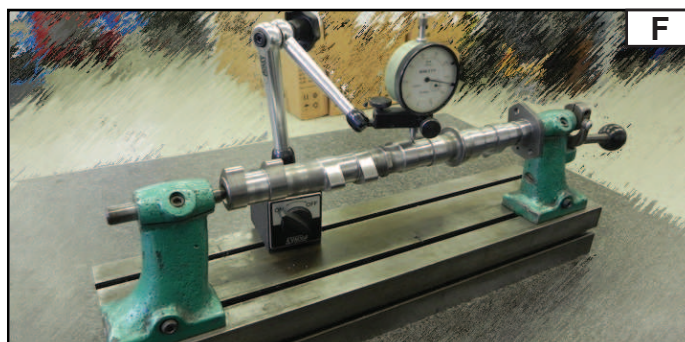


- **Measure the eccentricity of the camshaft**

If the measurements taken (Fig. F) are not within the specifications, proceed with shaft replacement.

Specifications Table

Camshaft	Eccentricity limit
Camshaft outlet side	0.02 mm
Camshaft inlet side	0.06 mm

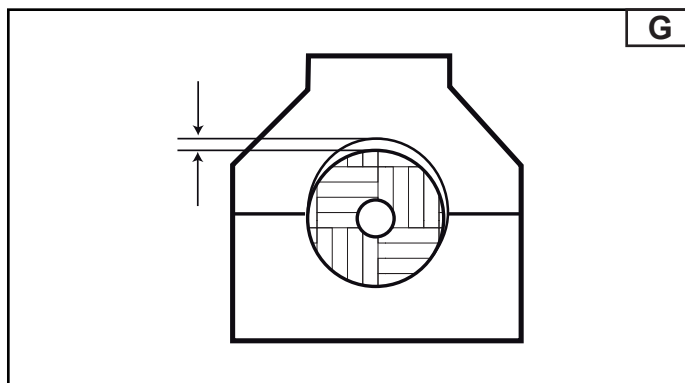


- **Measure the clearance between the bearing journals, camshaft and underframe.**

If the measurements taken (Fig. G) are not within the specifications, proceed with full head and underframe replacement.

Specifications Table

Camshaft	Clearance between bearing journals and camshaft
Camshaft outlet side	0.09 mm
Camshaft exit side	0.09 mm

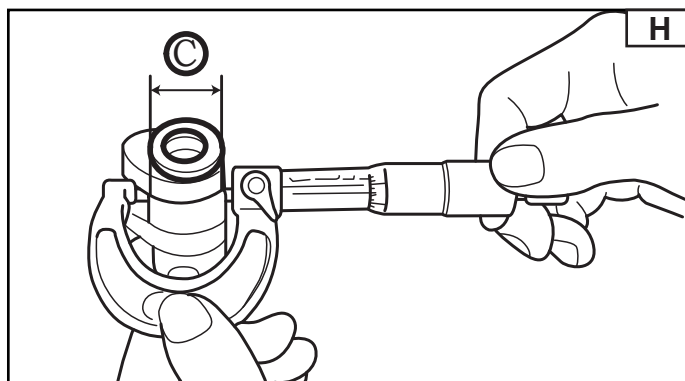


- **Measure the bearing journals, camshaft and underframe.**

If the measurements taken (Fig.H) are not within the specifications, proceed with shaft replacement.

Specifications Table

Camshaft	Bearing journal measurement (C)
Camshaft outlet side	Ø 23 mm(-0.03/-0.043)
Camshaft inlet side	





HEAD TIMING GEAR

OUTLET CAMSHAFT FITTING

Insert the relevant tool* inside the spark plug hole, as described previously, to check the TDC Fig. A.

(*) **Engine tuning tool**

Code:.....

Once the TDC has been established, proceed to assemble the outlet camshaft.

NOTE

During this assembly, it is important for the shaft lobes to be placed inwards, Fig.B and the two reference notches X of the distribution gear to be in line, as in the figure.

NOTE

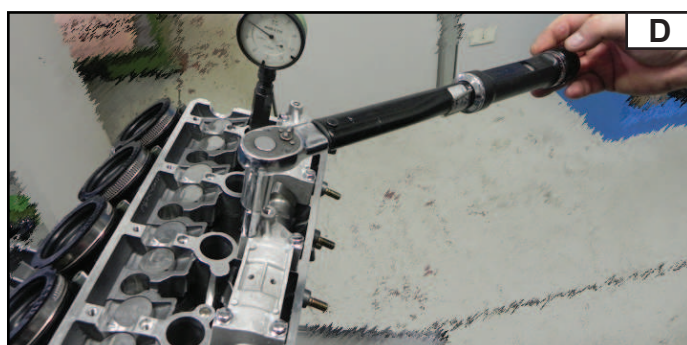
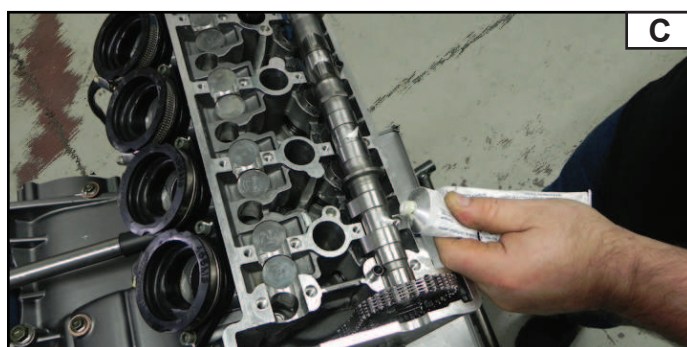
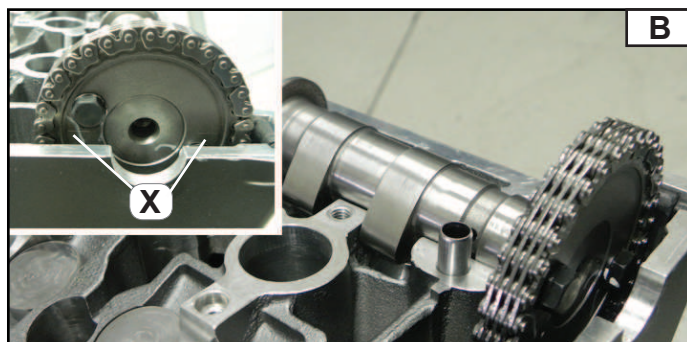
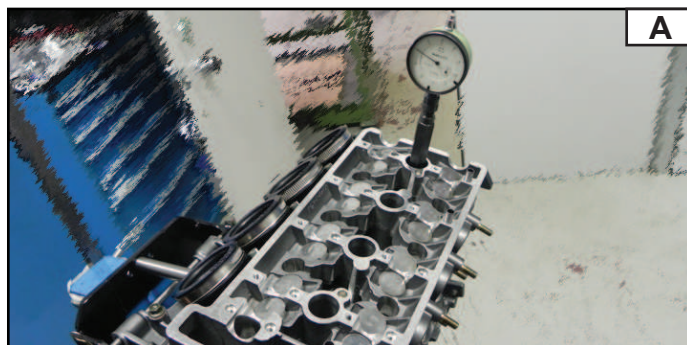
When assembling the underframes, it is necessary to add special grease to prevent the shafts from turning dry when the engine is first started Fig. C.

Place the underframes according to the sequence previously shown in the removal stage, and tighten the fastening screws Fig. D to the following torque:



Torque 6-13 N*m

Use special grease to secure the screws.





HEAD TIMING GEAR

INLET CAMSHAFT FITTING

Keep the relevant tool* inside the spark plug hole, as described previously, to check the TDC Fig. A.

(*) **Engine tuning tool**

Code:.....

Once the TDC for the cylinder 1 has been established, proceed to assemble the inlet camshaft.

NOTE

During this assembly, it is important for the shaft lobes to be placed inwards, Fig.B and the two reference notches X of the distribution gear to be in line, as in the figure.

NOTE

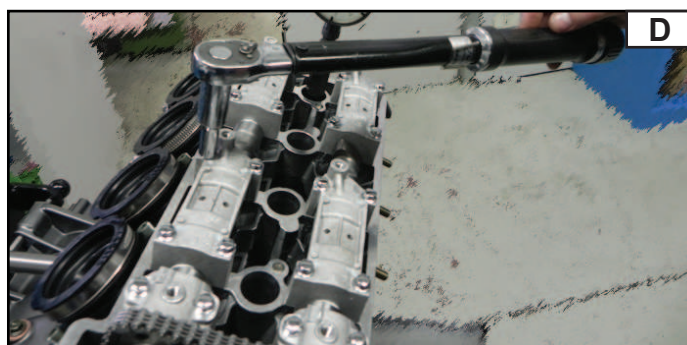
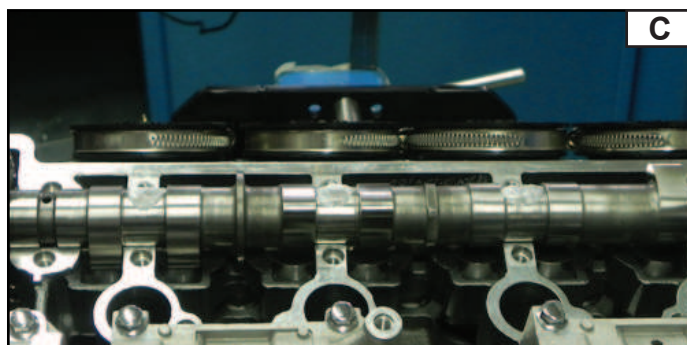
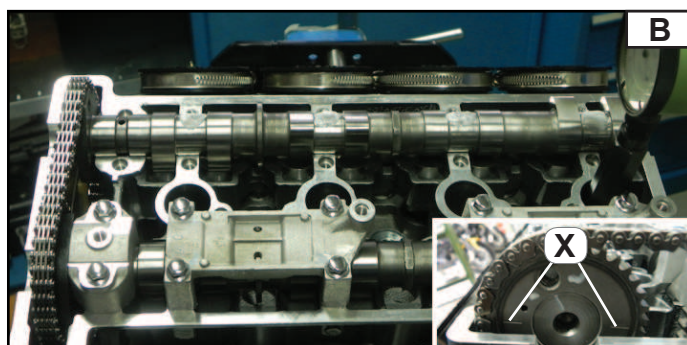
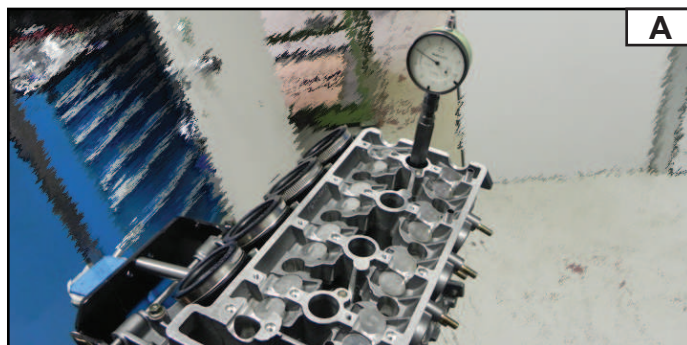
When assembling the underframes, it is necessary to add special grease Fig. C, to prevent the shafts from turning dry when the engine is first started.

Place the underframes according to the sequence previously shown in the removal stage, and tighten the fastening screws Fig. D to the following torque:



Torque 6-13 N*m

Use special grease to secure the screws.





HEAD TIMING GEAR

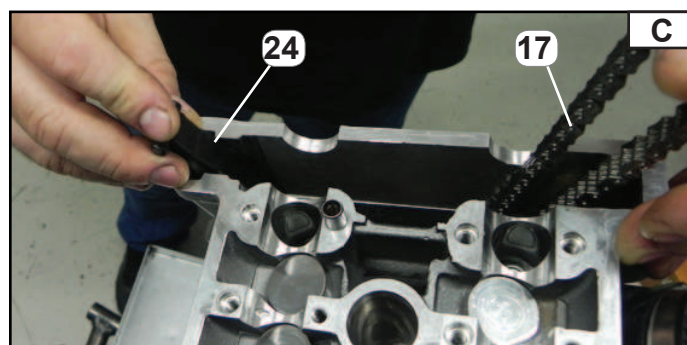
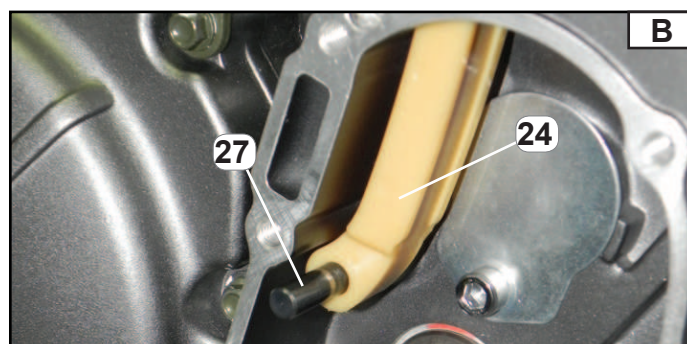
CHAIN SLIDE REMOVAL

Open the chain tensioner housing cover Fig.A, removing the 7 tightening screws.

- Remove The pin (27) of the mobile chain slide (24) Fig.B and take out the slide.
- Remove the fixed chain slide (24) Fig.C .
- Take out the distribution chain (17) Fig.C .

NOTE

Every time that the chain is replaced, it is also necessary to replace the slides.



CHAIN SLIDE ASSEMBLY

To assemble the chain slides, follow the steps for removal in reverse order.

NOTE

When closing the cover of the chain tensioner housing, Fig.D, take care with the seal.
If the seal is damaged, it must be replaced.

NOTE

Take care when assembling screws on the chain tensioner housing, since the screw shown in Fig. D "Y" has a seal washer.
Tighten the screws to the following torque:



Torque 10-12 N*m





HEAD TIMING GEAR

DISTRIBUTION CHAIN INSTALLATION

Pass the distribution chain (17) on the drive shaft pinion, as shown in Fig. A

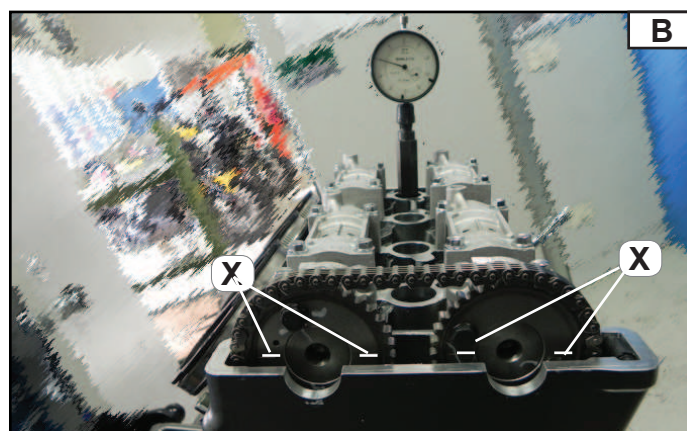
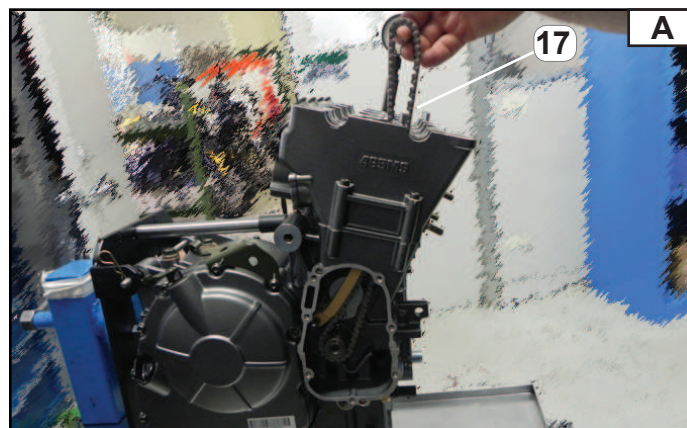
Insert the fixed and mobile chain tensioner slides as shown in the previous section and then the two distribution gear cams, making sure that both are fitted referring to the timing "x" as shown in Fig. B.

NOTE

Distribution chain assembly is necessary always taking into account the fact that the engine needs to be in TDC condition Fig.B.

(*) **Engine tuning tool**

Code:.....



NOTE

During this operation, the chain and distribution gears need to be lubricated with engine oil.

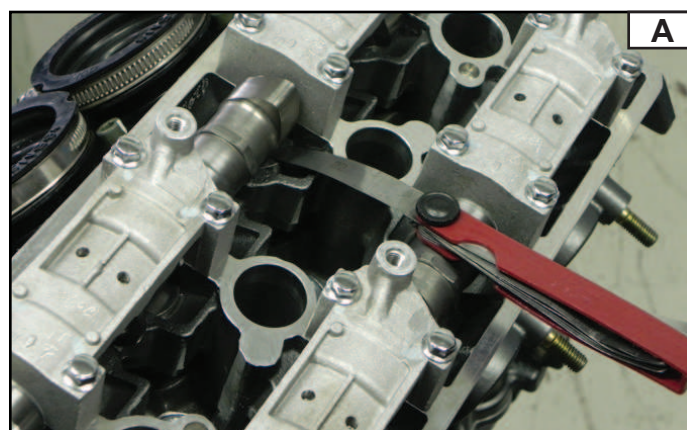
VALVE CLEARANCE ADJUSTMENT

Once the distribution cover has been removed (see previous section) use a thickness gauge to check the clearance between the cam and hydraulic cup, as shown in Fig. A. If the measurement is outside specifications, replace the calibrated pad.

NOTE

This measurement is necessary for all cams.

Camshaft	Cup-cam clearance
Camshaft outlet side	0.19 ~ 0.25 mm
Camshaft inlet side	0.13 ~ 0.19 mm



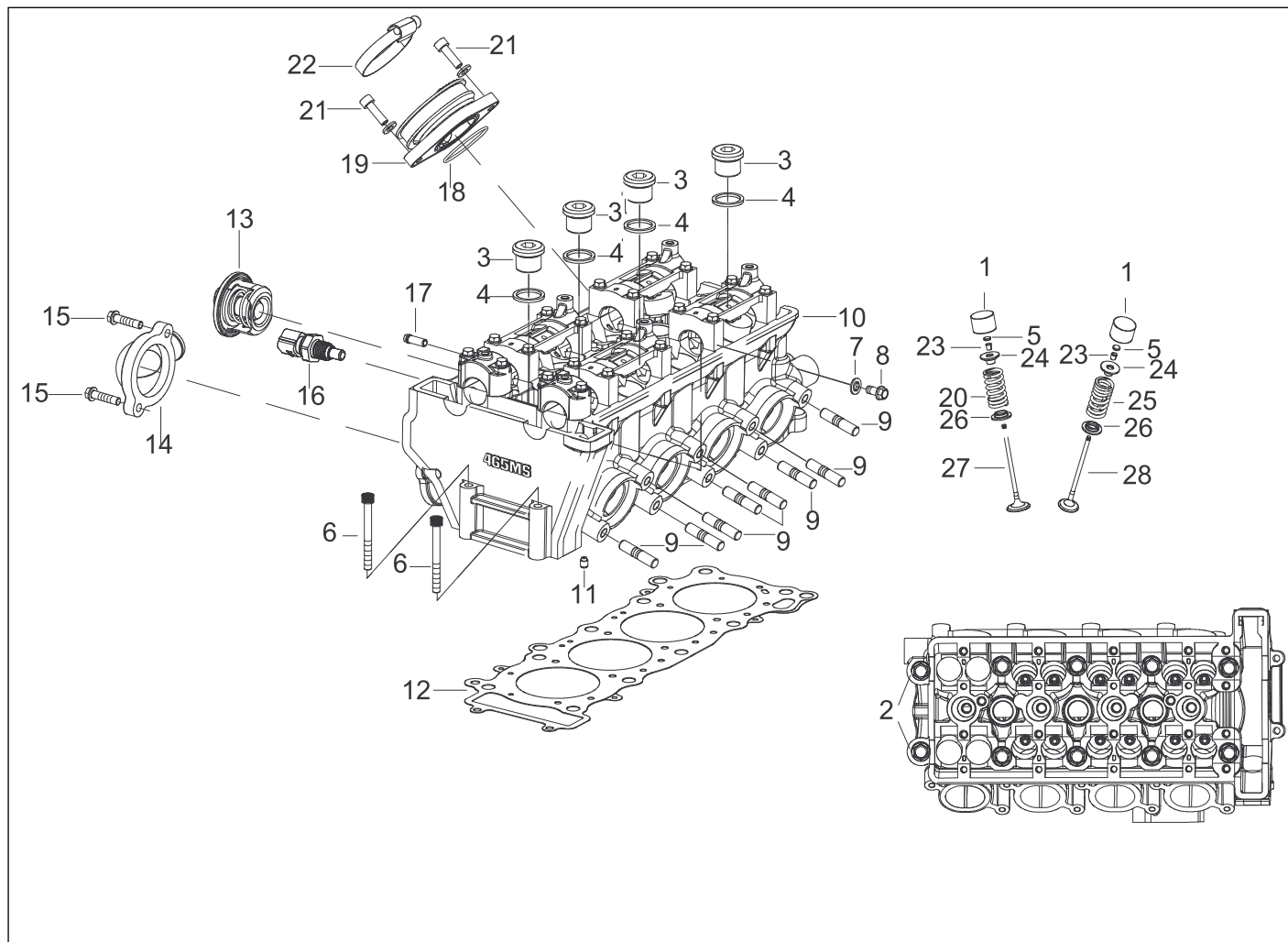
NOTE

In case of valve clearance correction, replace the calibrated pads provided (see following table).



HEAD TIMING GEAR

VALVE FLAP AND CALIBRATED PAD REMOVAL



Position	Description	Quantity
1	HYDRAULIC CUP	16
2	SCREW	10
3	BUSHING	3
4	WASHER	3
5	VALVE PAD MM 1,600	16
5	VALVE PAD MM 1,625	16
5	VALVE PAD MM 1,650	16
5	VALVE PAD MM 1,675	16
5	VALVE PAD MM 1,700	16
5	VALVE PAD MM 1,725	16
5	VALVE PAD MM 1,750	16
5	VALVE PAD MM 1,775	16
5	VALVE PAD MM 1,800	16
5	VALVE PAD MM 1,825	16
5	VALVE PAD MM 1,850	16
5	VALVE PAD MM 1,875	16
5	VALVE PAD MM 1,900	16
5	VALVE PAD MM 1,925	16
5	VALVE PAD MM 1,950	16



HEAD TIMING GEAR

VALVE FLAP AND CALIBRATED PAD REMOVAL

Position	Description	Quantity
5	VALVE PAD MM 1,975	16
5	VALVE PAD MM 2,000	16
5	VALVE PAD MM 2,025	16
5	VALVE PAD MM 2,050	16
5	VALVE PAD MM 2,075	16
5	VALVE PAD MM 2,100	16
5	VALVE PAD MM 2,125	16
5	VALVE PAD MM 2,150	16
5	VALVE PAD MM 2,175	16
5	VALVE PAD MM 2,200	16
5	VALVE PAD MM 2,225	16
5	VALVE PAD MM 2,250	16
5	VALVE PAD MM 2,275	16
6	SCREW (M6X60)	2
7	RETAINING WASHER	1
8	SCREW (M6X12)	1
9	SCREW (M8X36.5)	8
10	CYLINDER	1
11	GRUB SCREW	1
12	HEAD GASKET	1
13	THERMOSTAT	1
14	THERMOSTAT CUP	1
15	SCREW (M6X25)	2
16	WATER TEMPERATURE SENSOR	1
17	COUPLING	1
18	O-RING	4
19	SUCTION PIPE	4
20	INTERNAL SPRING	8
21	SCREW (M6X20)	8
22	SCREW CLIP	4
23	VALVE RUBBER TIP	32
24	TOP SHIELDED BULB	16
25	EXTERNAL VALVE SPRING	8
26	BOTTOM SHIELDED BULB	16
27	INLET VALVE	8
28	EXHAUST VALVE	8



HEAD TIMING GEAR

VALVE FLAP AND CALIBRATED PAD REMOVAL

Once the distribution cover, chain tensioner and camshafts have been removed, it is possible to remove the inlet and outlet valve flaps, proceeding as follows:

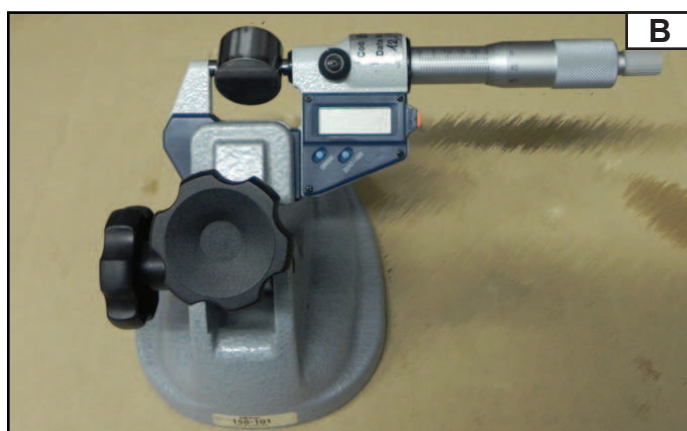
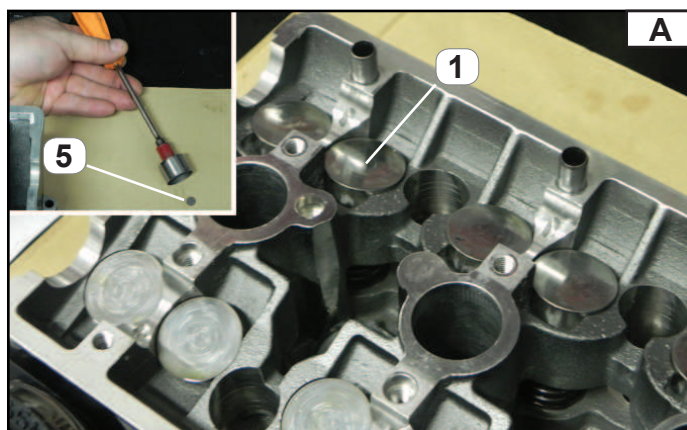
- Use a magnet to take out the valve flap cup (1), which will also take out the calibrated pad (5) Fig. A.
- Make a visual inspection of the valve flap, making sure that there are no lines or damage and if so, replace them.
- Check the outer diameter with a micrometer to make sure there is no warping Fig. B.

NOTE

Each time tappets or pads are removed, grease the parts carefully with Sintoflon grease.

NOTE

At the end of the parts check, always check the valve clearance (see previous paragraph).

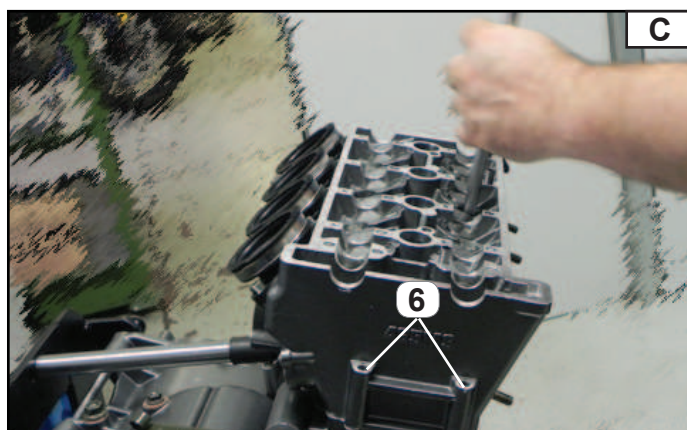


HEAD REMOVAL

To remove the head, after taking out the parts listed above, loosen the two allen screws (6) and then the 10 fastening screws Fig. C.

NOTE

Loosen each screw 1/2 turn at a time.
After loosening all of the screws completely, remove them.





HEAD TIMING GEAR

VALVE FLAP AND SPRING REMOVAL

Use a special combined tool to remove the valves (27-28) and springs (29-25) Fig. A.

(*) Valve spring compressor tool

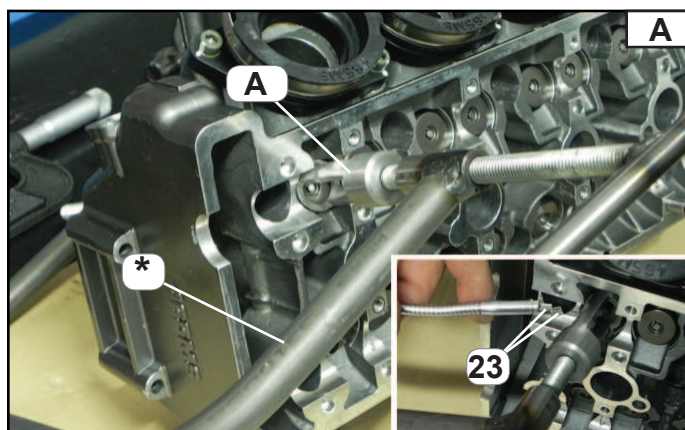
Code:.....

(**) Valve disassembly adaptor

Code:.....

NOTE

While taking out the two half shells (23) locking the valve, using a magnet to retrieve them.



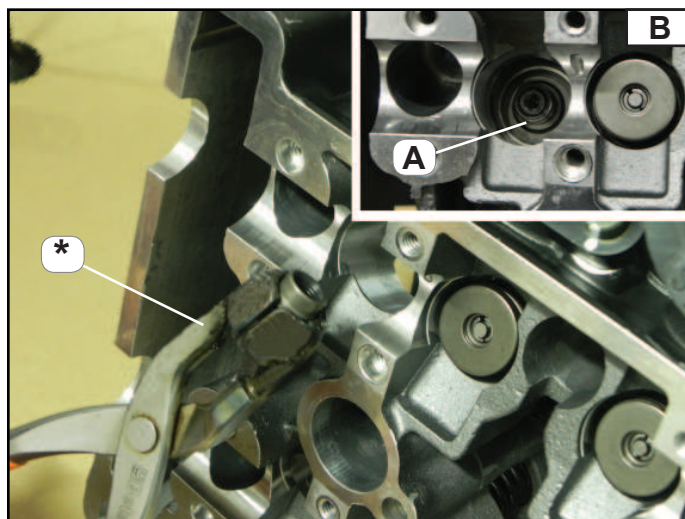
VALVE OIL SEAL REMOVAL - INSERTION

REMOVAL

Once the valve has been removed, it is possible to remove the oil seal (A) Fig.B, using the special tool * .

(*) Tool for valve oil seal removal

Code:.....

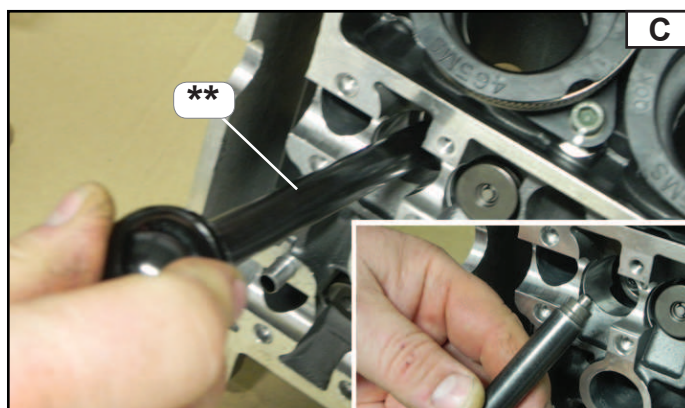


INSERTION

Insert the oil seal (A) using the special tool ** Fig. C

(**) Tool for valve oil seal insertion

Code:.....





HEAD TIMING GEAR

VALVE CHECK

Replace the valves one at a time, taking care not to mix the parts. Each valve needs to be inserted into its own seat, as marked before it was removed.

NOTE

The seat (A) on the valve head cannot be ground; if necessary, replace the valve.
It is possible to apply some abrasive paste, although it is prohibited to grind a valve at the end of the valve stem.

Remove the combustion residues from the valves.
Check the seat (A) on the valve head with a straight edge rule Fig. A

The seat surface must not be concave;
if necessary, replace the valve .

Check the clearance between the stem and valve guide:

Valve	Stem - guide clearance
Inlet	0.05 ~ 0.075 mm
Discharge	0.04 ~ 0.065 mm

NOTE

In case of sizes not listed in the table, replace the valve guide.

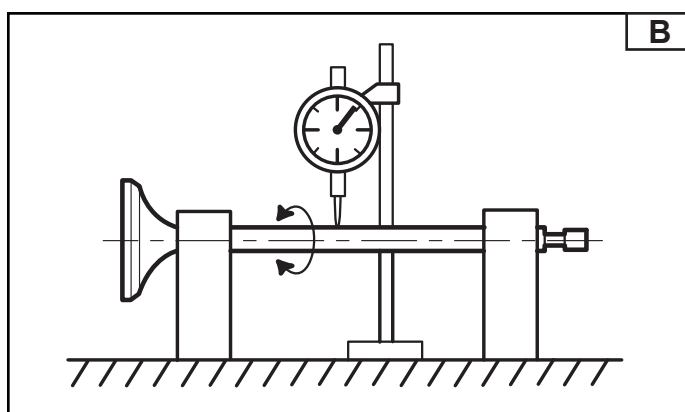
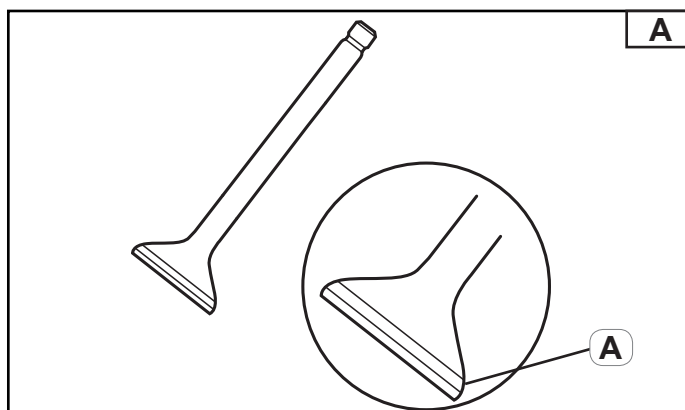
Check the eccentricity of the valve stem Fig.B, using the table below.

If outside specifications, replace the valve.

Valve	Eccentricity
Inlet	0.1 mm
Discharge	

NOTE

If installing a new valve, always replace the relevant guide
If the valve is removed or refitted, always replace the oil seal.





HEAD TIMING GEAR

VALVE SEAT CHECK

The following procedure applies to all valves and valve seats Fig. C.

Eliminate:

- carbon deposits
(from the contact surfaces and valve seat (A))

Check:

- the valve seat (A)
- If there are marks/signs of wear, replace the head.

Measure:

- the width of the valve seat (A)
- If outside specifications, replace the head.

Valve	Width of the valve seat (A)
Inlet	1 ~ 1.1 mm
Discharge	0.9 ~ 1.1 mm

- Apply some blue colorant (Dykem) for mechanics to the contact surface of the valve (B).
- Fit the valve in the head.
- Push the valve into the guide and against its seat to leave a well-defined mark.
- Measure the width of the valve seat.

NOTE

Where the valve seat and valve face are in contact with one another, the Prussian blue liquid will have been removed.

Lap:

- the valve contact surfaces
- the valve seat Fig. D.

NOTE

After replacing the head or the valve and the relevant guide, it is necessary to lap the seat and contact surfaces of the valve.

- Apply a rough lapping paste to the valve contact surfaces (C) (Fig. D).

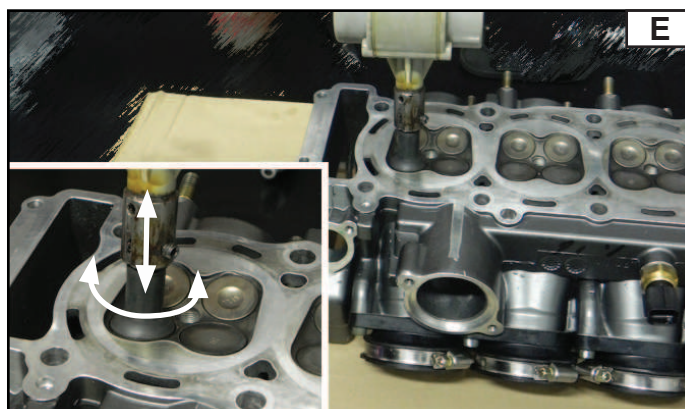
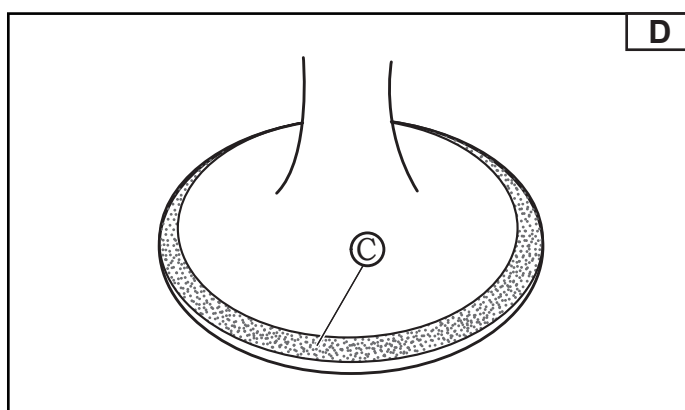
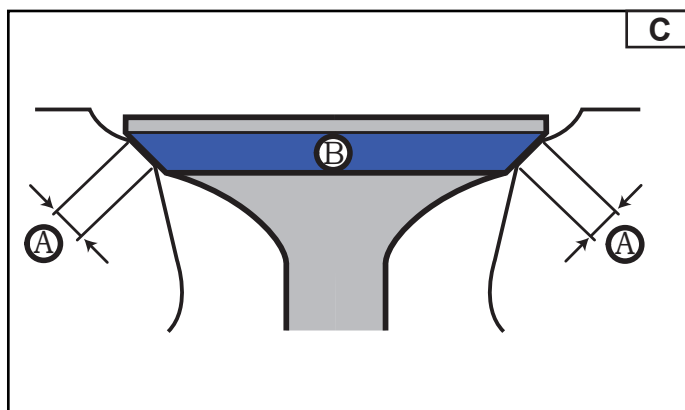
IMPORTANT NOTICE

Do not allow the lapping paste to enter the area between the valve stem and the guide.

- Apply molybdenum disulphide oil to the valve stem.
- Fit the valve in the head.
- Turn the valve until the contact surface and the seat have been polished evenly, then remove all the lapping paste.

NOTE

- For the best lapped results, pinch the valve seat gently and rotate the valve back and forth by hand Fig. E.



HEAD TIMING GEAR

VALVE SPRING TEST

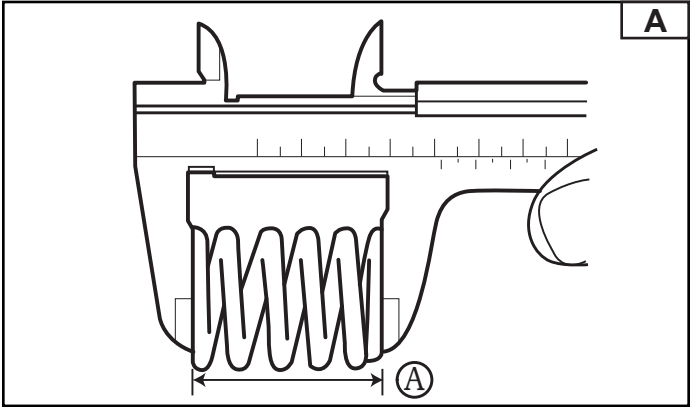
The following procedure applies to all valve springs Fig. A.

Carry out a measuring check and visual inspection of springs to make sure there are no breakages, warping, or loss of tension.

Valve spring	Dimension (A)
Inlet	38.8 mm - 37.3 mm
Discharge	41.6 mm - 40.1 mm

NOTE

If outside specification, replace.



VALVE AND VALVE SPRING FITTING

Use a special combined tool to remove the valves (27-28) and springs (29-25) Fig. B.

(*) Valve spring compressor tool

Code:.....

(**) Valve disassembly adaptor

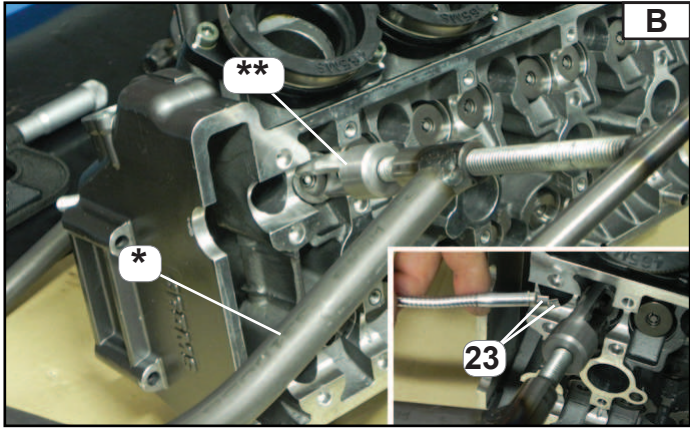
Code:.....

NOTE

Take care when inserting the two half shells (23) to lock the valve, to make sure it is inserted correctly.
Make sure to fit each valve in the original position.

NOTE

During assembly of valve flaps and calibrated pads. lubricate the valve flap with copper grease.
Refit each valve flap and pad in the original position.





HEAD TIMING GEAR

CYLINDER CHECK

The following procedure applies the whole cylinder group.

Check:

- the walls of the cylinder Fig.A

If there are any vertical lines, replace the cylinder and the piston all together and the relevant clips.

- The cooling cavity of the cylinder, in case of build up, remove scale deposits.

Measure:

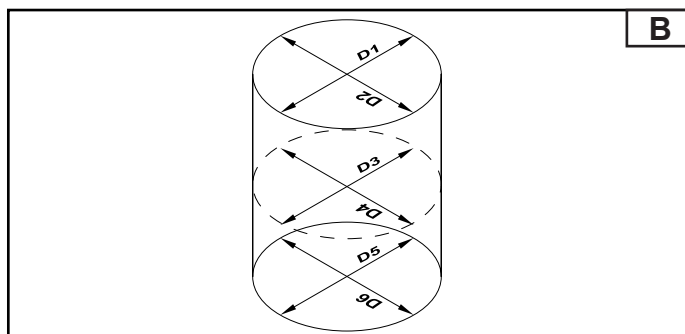
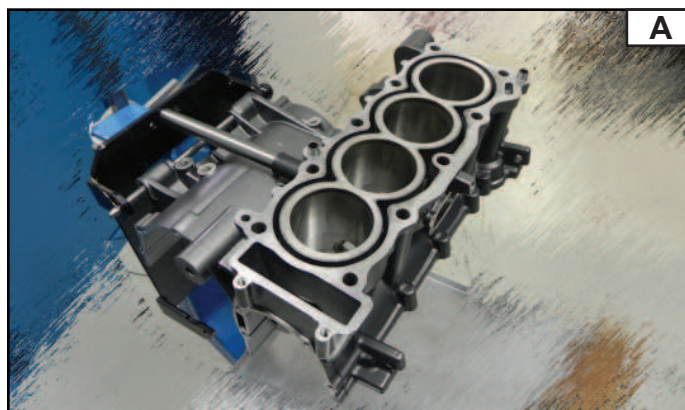
- Cylinder stroke Fig. B

Take different measurements at a distance f 10-43-90 mm from the head coupling.

The highest value is considered when calculating wear limits.

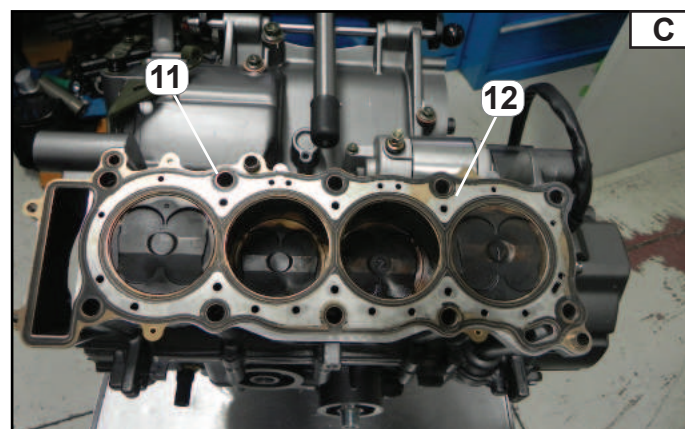
CYLINDER Bore (C)= 65 ± 0.02 mm

C=Max D1 or D2 65 ± 0.003 mm



HEAD FITTING

Before assembling the head, replace the seal (12).
Make sure that the centering pin (11) is in position Fig. C



To assemble the head, first tighten the 10 fastening screws (X) Fig. D and then the two allen screws (6).

NOTE

During assembly of the head. lubricate the head screws with copper grease.

Tighten the screws (X) to the following torque:

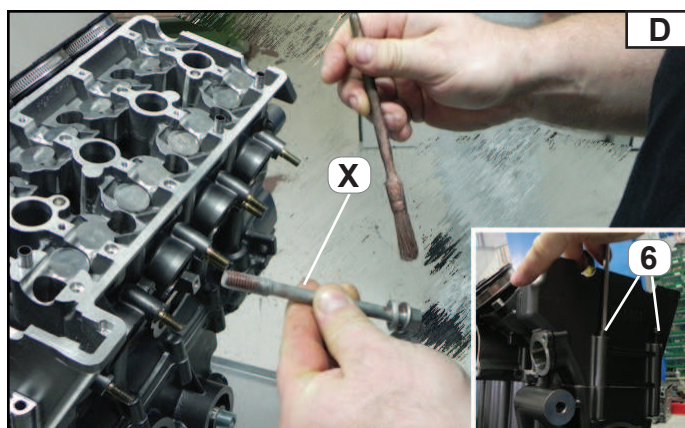


Torque 55 N*m

Tighten the screws (6) to the following torque:

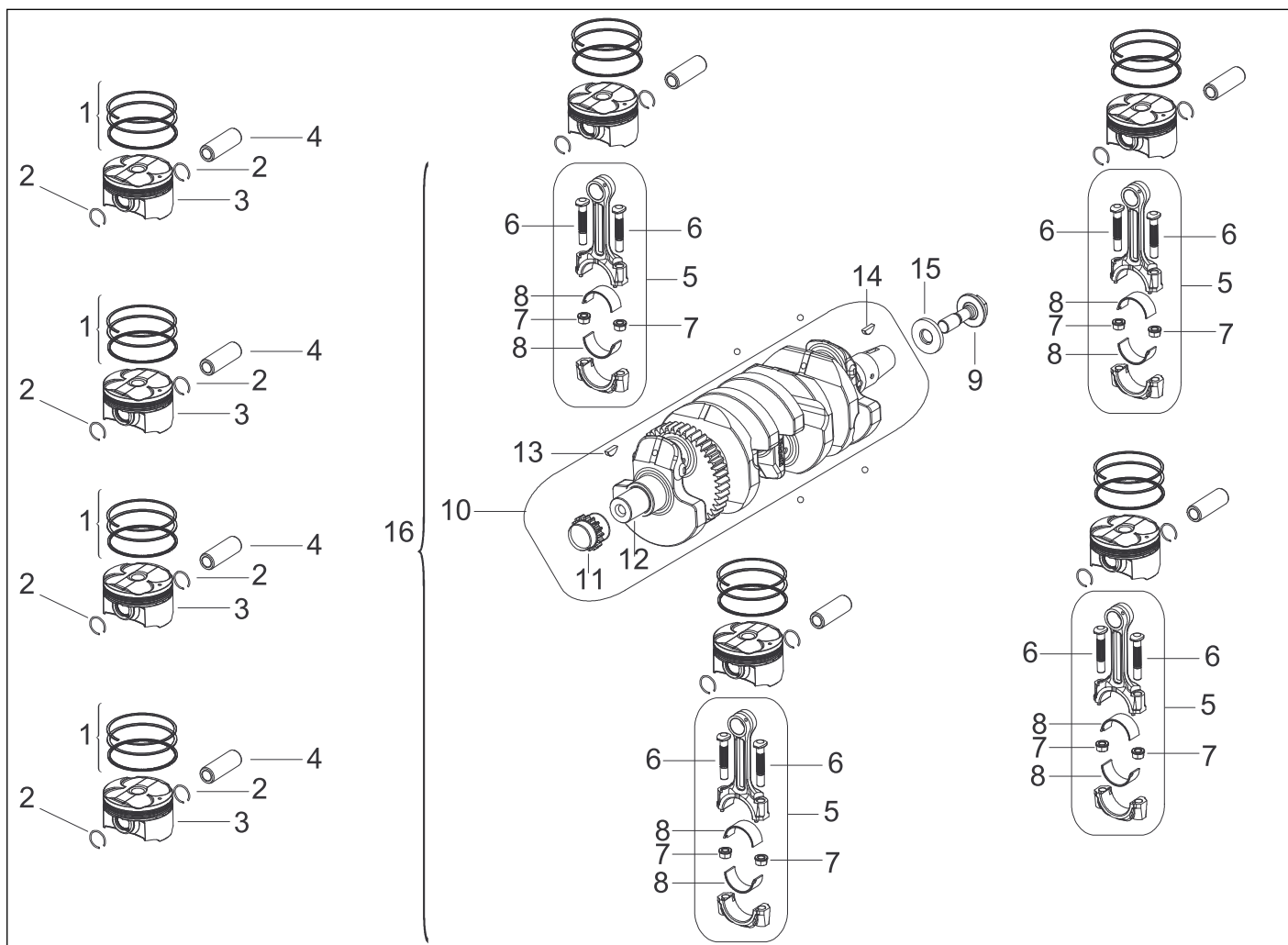


Torque 12 N*m





PISTONS



Position	Description	Quantity
1	PISTON SEGMENT SERIES	4
2	PIN RETAINING RING	8
3	PISTON	4
4	PISTON PIN	4
5	4	4
6	SCREW (M7)	8
7	NUT M7	8
8	HALF BEARING (YELLOW)	8
8	HALF BEARING (BLUE)	8
8	HALF BEARING (GREEN)	8
9	SCREW	1
10	FULL DRIVE SHAFT	1
11	DISTRIBUTION CHAIN PINION	1
12	DRIVE SHAFT	1
13	SPLINE	1
14	FLYWHEEL KEY	1
15	WASHER	1
16	FULL DRIVE SHAFT	1



PISTONS

PISTON PIN REMOVAL

The following removal procedure applies to all piston pins (4).
Once the pin retaining ring (2) has been removed from both sides of the cylinder (3), proceed to remove the pins from each piston with the special tool (*) Fig. A

(*) **Piston removal tool**

Code:.....

NOTE

Never use hammers to remove the pins.



PIN CHECK:

The following removal procedure applies to all pins (4).

Check:

- piston pin

If there is blue discolouration or grooves, replace the piston pin and check the lubrication system.

Measure:

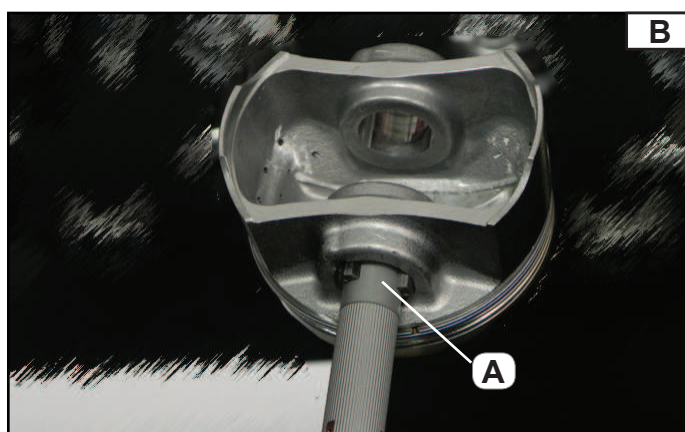
- The outer diameter of the piston Fig.B

If outside the specifications, replace the piston pin.

Measure:

- the inner bore diameter of the piston pin.

If outside specifications, replace the piston.



Internal bore (A)	Size
Pin bore	Ø16 mm +0,008/+0.002



PISTONS

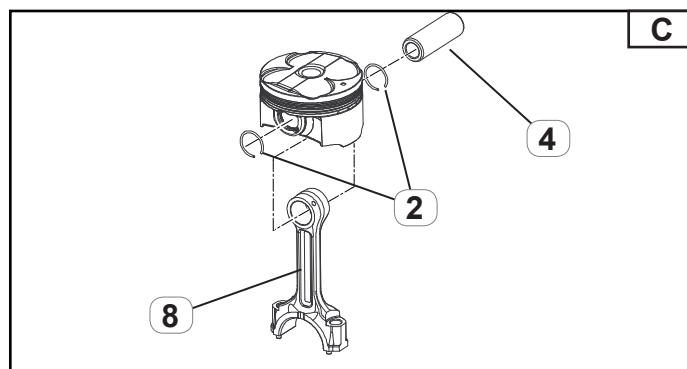
PIN ASSEMBLY

The following refitting procedure applies to all piston pins (4).

- Before lubricating, insert the pin (4) into the piston (3), making it pass by the fork foot (8) Fig. C.
- Insert the pin retaining ring (2) from both sides of the cylinder (3)

NOTE

- Lubricate with engine oil



PISTON CHECK

The following procedure applies to all four pistons (4).

Check:

- The walls of the piston "B" Fig.D.

If there are any vertical lines, replace the piston all together with the relevant clips.

Measure:

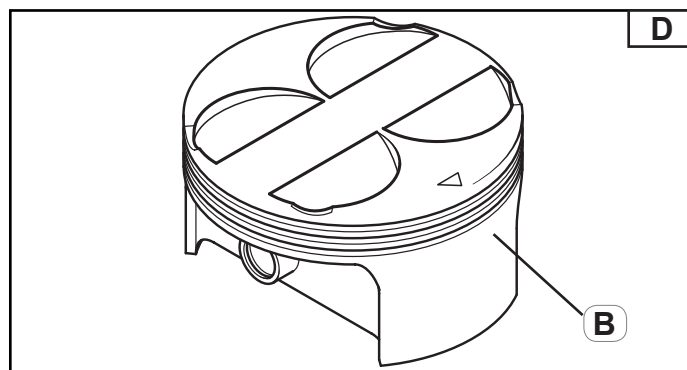
- The diameter of the piston ("P") jacket using a micrometer, considering a distance from the bottom edge of the piston, of some 10.5 mm. Fig. E.

CLASS	P P
A	Ø65(-0.025/ -0.03)
B	Ø65(-0.02/ -0.025)

If outside specifications, replace the cylinder and the relevant clips all together.

IMPORTANT NOTICE

The piston is marked by a letter stating its class. The cylinder piston coupling needs to be between identical classes.





PISTONS

ELASTIC CLIP CONTROL

The following procedure applies to all elastic clips (1)

Check:

- for the absence of lines and stress traces on each clip Fig. A.

If outside specification, replace the relevant clips and pistons.

NOTE

Before measuring side clearance between the piston clips, remove any carbon deposits from the piston clips and grooves.

Measure:

- The side clearance between a piston clip and another, using a thickness gauge Fig. B.

If outside specifications, replace the piston and the relevant clips all together.

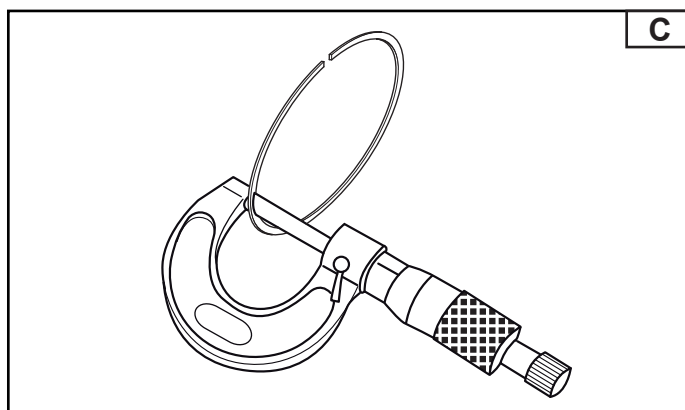
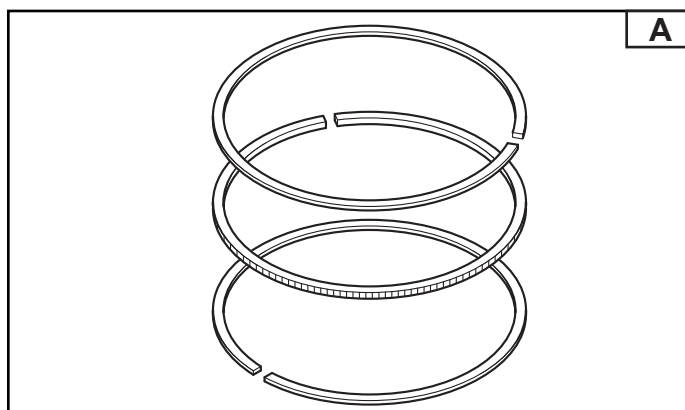
Clip	Piston clip side clearance.
Top clips	0.04±0.08 mm
Clips	0.05±0.09 mm

Measure:

- The thickness of the top clip.
- The thickness of the second clip.

See Fig. C

Clip	Piston clip thickness
Top clips	0.8 -0.01/-0.03 mm
Clips	0.8 -0.02/-0.04 mm





PISTONS

CLIP FITTING

The following procedure applies to all pistons.
During the clip assembly process, install them in the following order:

1. Oil scraper clip
2. Clips
3. Top clips

See Fig.A

NOTE

The first and second ring are marked D on the top side and PVD Fig. A.

Remember to fit the piston clips so that the letters are facing upwards.

It is important to lubricate the piston well with engine oil when fitting the clips.

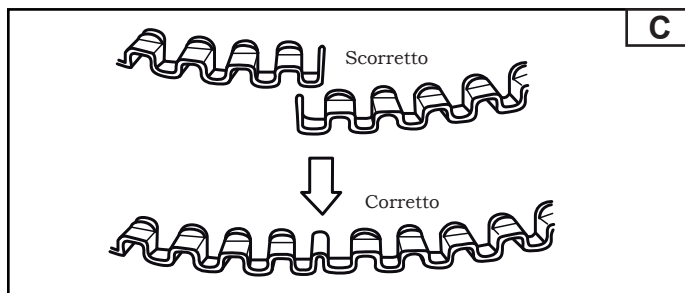
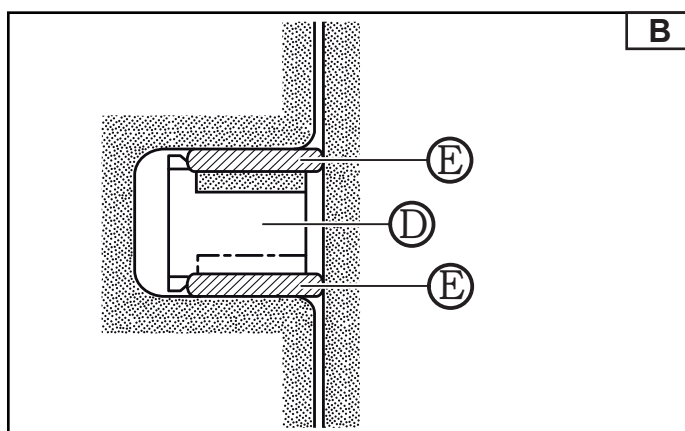
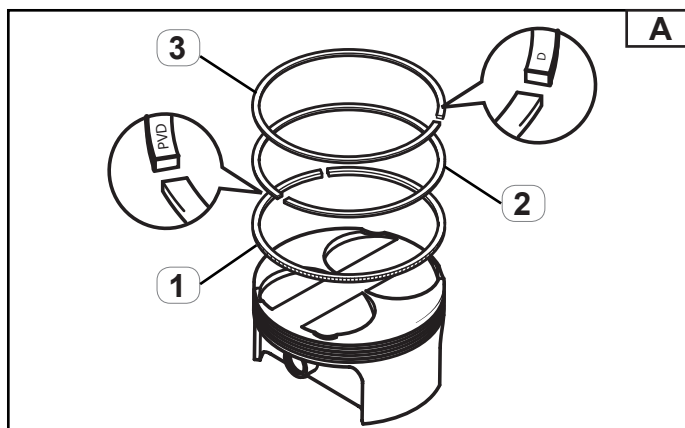
The first element to insert in the oil scraper slot is the shim (D).
After placing the shim, insert the side rings (E) Fig. B.

NOTE

The shim and side rings have no top or bottom side, meaning they can be inserted in any way.

IMPORTANT NOTICE

When installing the shim (D), make sure that the ends are not overlapping in the slot Fig. C.



PISTON FITTING

Piston fitting

Once the piston is assembled (see dedicated paragraph)
To insert the piston inside the cylinders, a special tool* is required, allowing the seals to be contained (*)

(*) **Piston ring clamp**

Code:.....

NOTE

During this stage, lubricate parts with engine oil

IMPORTANT NOTICE

The pistons need to be inserted in sequence as they were removed; do not mix up the order of assembly.





CRANK GEAR

CHECK OF CONNECTING ROD AND CONNECTING ROD HALF BEARINGS

Check:

- For any breakages or excessive clearance on the connecting rod (5) and connecting rod head half bearings (8) Fig. A.

If replacing the connecting rod, check the class of origin marked on the head.

Measure:

- It is necessary to measure the internal dimension of the steering head to check for any anomalies using the special gauge Fig. B. Before measuring, assemble the connecting rod head, tightening the screws with the following torque:

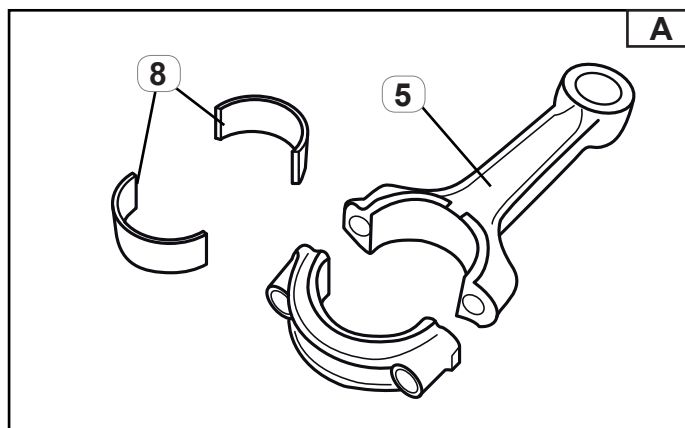


Torque 25 N*m

- It is necessary to measure the internal dimension of the connecting rod foot to check for any anomalies using the special gauge Fig. B.

Part	Reference size
Steering head	Ø33 mm(+0.016/ 0)
Steering foot	Ø16mm(+0.034/+0.016)

Before assembling the bushings (8) on the steering head, measure them with a specific micrometer. See Fig. C.



CONNECTING ROD AND CONNECTING ROD HALF BEARING INSTALLATION

Fit:

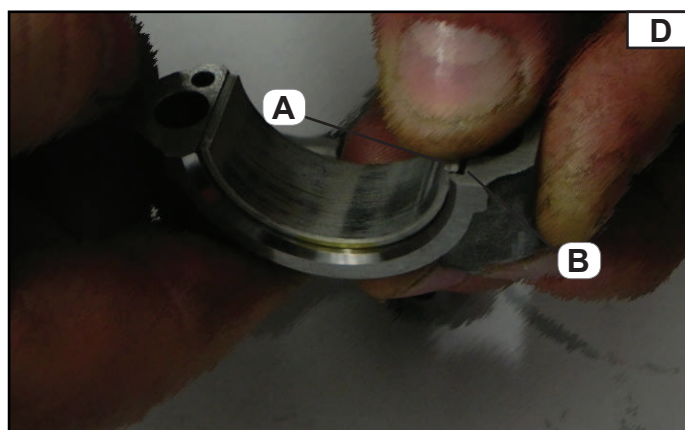
- The connecting rod half bearings:

Clean the steering head, connecting rod supports and the inner half of each rod.

Fit the top bearing of the steering head in the connecting rod and the bottom bearing in the steering in the connecting rod cap.

NOTE

Bring the projections "A" on the head's half bearings into line with the notches "B" in the connecting rod and relevant cap Fig. D.





CRANK GEAR

CONNECTING ROD AND CONNECTING ROD HALF BEARING INSTALLATION

Fit:

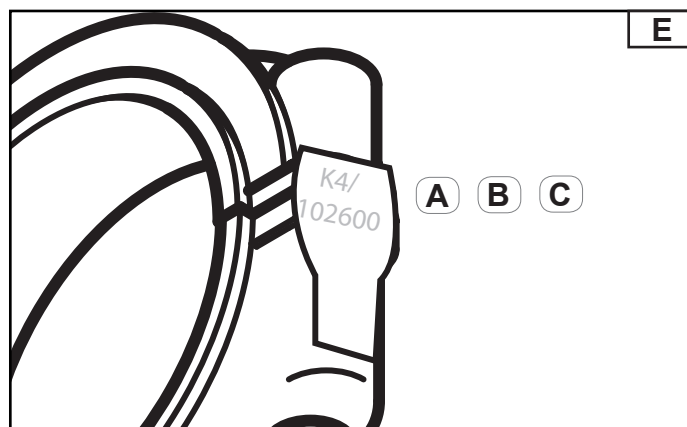
- The connecting rod half bearings:

Clean the steering head, connecting rod supports and the inner half of each rod.

Fit the top bearing of the steering head in the connecting rod and the bottom bearing in the steering in the connecting rod cap.

NOTE

Bring the projections "A" on the head's half bearings into line with the notches "B" in the connecting rod and relevant cap Fig. D.

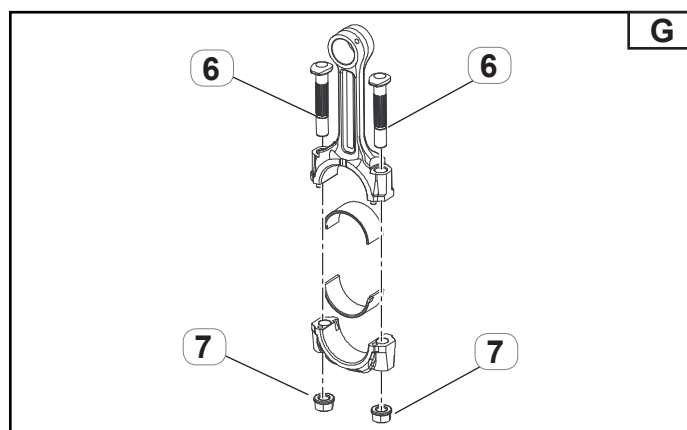
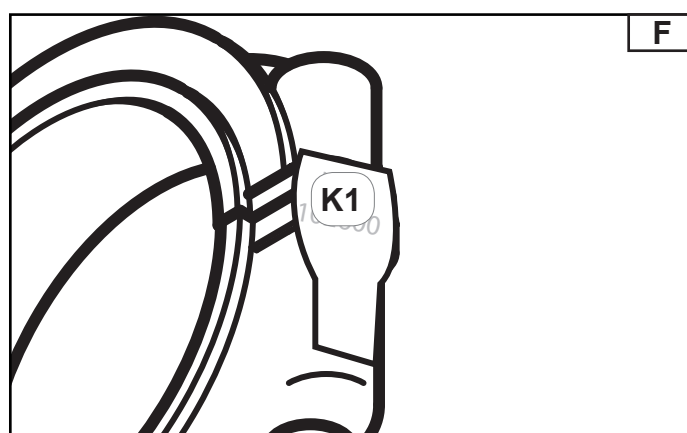

NOTE

Do not mix up the steering head bushing and the connecting rods. For the correct clearance between the steering head support and the steering head half bearing, and to prevent damage to the engine, the steering head half bearings must be fitted back in their original positions Fig. E.

According to the bushing type, make the envisaged couplings, see table:

STEERING HEAD HALF BEARING		
STD	COLOUR	THICKNESS
A	Green	1.503~1.506 mm
B	Blue	1.506~1.509 mm
C	Yellow	1.500~1.503 mm
Ø std seat A green		Ø 33mm (+0.008/0)
Ø std seat A blue		Ø 33mm (+0.008/+0.016)
Ø std seat C yellow		Ø 30mm (-0.034/-0.041)

According to the class shown on the side of the connecting rod Fig. F, associate the different types according to the table below:



SELECTION TABLE				
			Connecting rod internal Ø	
			1	2
			33.000 ~ 33.008 mm	33.008 ~ 33.016 mm
Crank pin external Ø	A	Ø 30 ^{-0.034/-0.041}	A (yellow) ^{+0.003/0}	B (green) ^{-0.006/-0.003}
	B	Ø 30 ^{-0.041/-0.048}	B (green) ^{-0.006/-0.003}	C (brown) ^{-0.009/-0.006}

After these checks, fit the fastening screws (6) Fig. G and tighten the nuts (7) to the following torque:

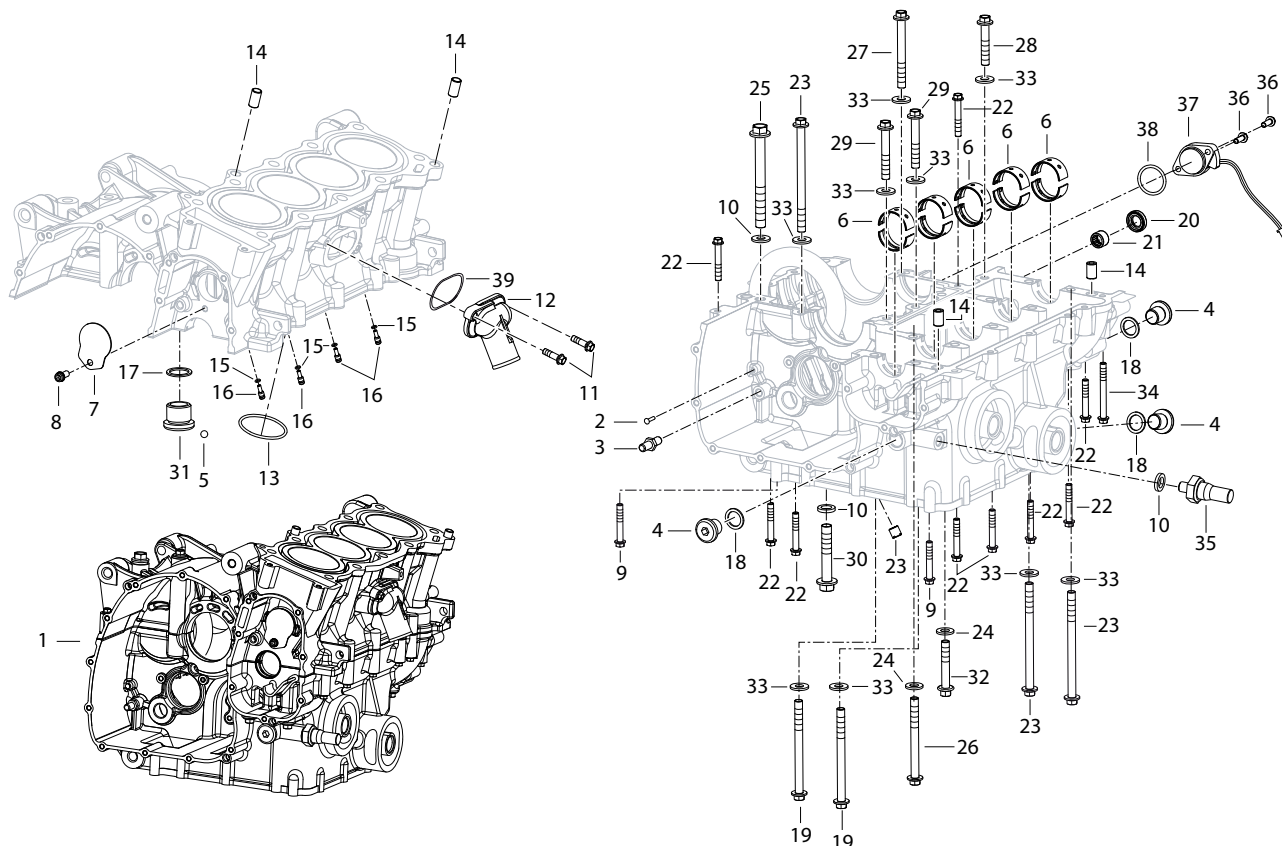


Torque 25 N*m



CRANK GEAR

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION



Position	Description	Quantity
1	BOTTOM CASING	1
1	CASING (GREY)	1
2	RIVET	1
3	SPECIAL SCREW	1
4	SPECIAL SCREW	3
5	BALL	1
6	ROLLER BEARING (YELLOW)	10
6	ROLLER BEARING (RED)	10
6	ROLLER BEARING (GREEN)	10
6	ROLLER BEARING (BLUE)	10
7	COVER	1
8	SCREW (M6X12)	1
9	SCREW (M6X45)	7
10	WASHER	3
11	SCREW (M6X20)	2
12	WATER FITTING	1
13	O-RING	1
14	CENTERING BUSHING	2
15	O-RING	4



CRANK GEAR

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION

Position	Description	Quantity
16	JET	4
17	WASHER	1
18	RETAINING WASHER	3
19	SCREW (M8X100)	2
20	OIL SEAL	1
21	ROLLER BEARING	1
22	SCREW (M6X40)	7
23	SCREW (M8X115)	3
24	WASHER	12
25	SCREW (M10X100)	1
26	SCREW (M8X85)	6
27	SCREW (M8X75)	1
28	SCREW (M8X45)	1
29	SCREW (M8X55)	2
30	SCREW (M10X60)	1
31	BUSHING	1
32	SCREW (M8X50)	1
33	WASHER	5
34	SCREW (M6X60)	1
35	OIL PRESSURE VALVE	1
36	SCREW (M5X16)	2
37	IDLE SENSOR	1
38	O-RING	1
39	GASKET	1
40	SCREW (M6X12)	1



CRANK GEAR

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION

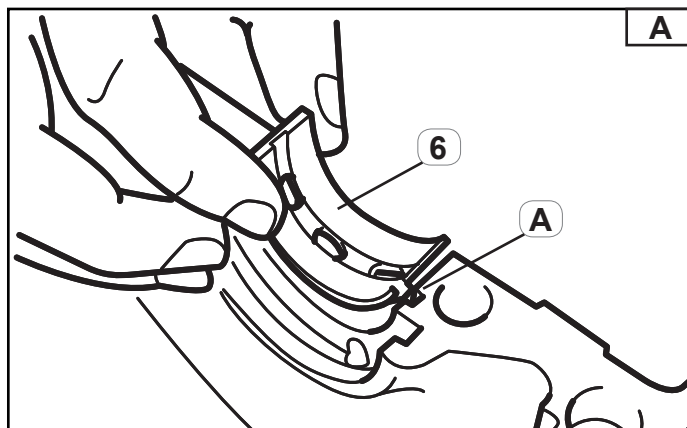
Fit:

- connecting rod main half bearings:

Clean the main half bearings (6), the main supports and the crankcase sections in contact with the half bearings Fig. A.
Rest the bottom crankcase on the work bench, Fig. B.
Fit the main half bearings (6) in the main support seats (A), including on the top crankcase.

NOTE

Bring the projecting parts of the main half bearings into line with the notches in the upper crankcase Fig. A.
Use copper grease for assembly.


IMPORTANT NOTICE

Do not get the main half bearings mixed up.
For the correct clearance between the main support and the half bearing, and to prevent damage to the engine, the half bearings must be fitted back in their original positions.

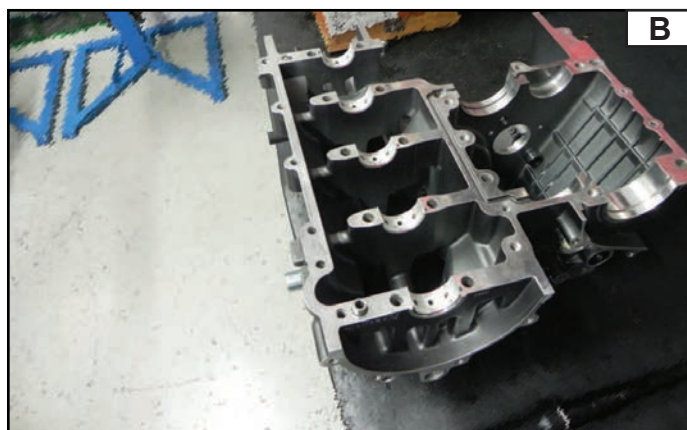
- Main half bearings are marked with different colours and letters, as shown in the table

MAIN HALF BEARINGS		
STD	COLOUR	THICKNESS
A	Green	1.503~1.506 mm
B	Blue	1.506~1.509 mm
C	Yellow	1.500~1.503 mm
Ø std seat A green		Ø 35.007~Ø 35.014 mm
Ø std seat A blue		Ø 35.014~Ø 35.021 mm
Ø std seat C yellow		Ø 35~Ø 35.007 mm
Ø std seat only		Ø 31.958~Ø 31.965 mm Ø 31.965~Ø 31.972 mm

- The layout of main bearings is shown on the bottom case, as shown in Fig. C

NOTE

In case of replacement of the drive shaft, it is necessary to replace the connecting rod main half bearings.





CRANK GEAR

MAIN HALF BEARING AND DRIVE SHAFT INSTALLATION

- Assemble the half casings on the bottom crank case, previously fixed to the support and turned 180° Fig.D.
- Insert the 4 fastening screws for the two half casings (25-23-27-28) and proceed with the following torque:



Torque 120~130 N*m

Measure:

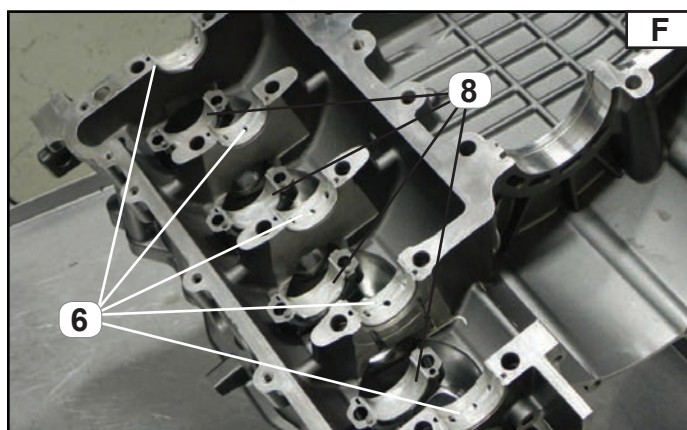
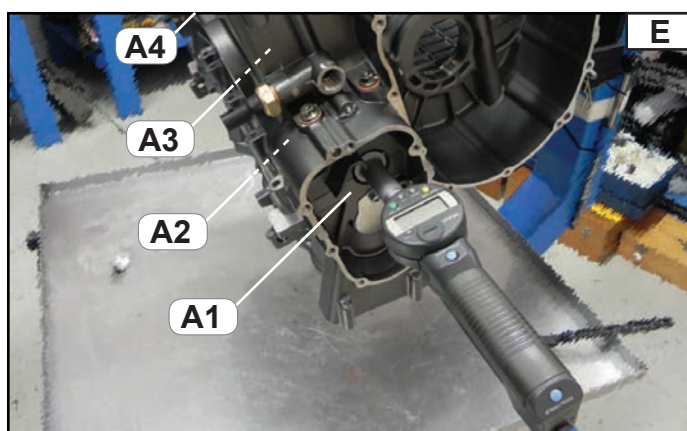
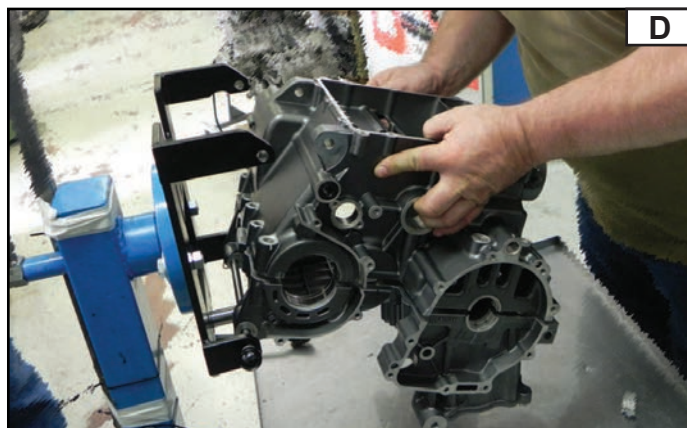
- Use the specific measuring tool with an inner contact diagram of the four housings of the main bearings Fig. E

Internal diameter (A)	Size
Coupling housing 1 (A1)	31.99~32.009 mm
Coupling housing 2 (A2)	31.99~32.009 mm
Coupling housing 3 (A3)	31.99~32.009 mm
Coupling housing 4 (A4)	31.99~32.009 mm

- Once the bottom half casing is removed, proceed to lubricate the main half bearings (6) of the top half casing, using copper grease Fig. F

NOTE

While fitting the drive shaft, the pistons must be pre-assembled. Also lubricate the connecting rod half bearings (8) Fig. F.





CRANK GEAR

DRIVE SHAFT CHECK

Measure:

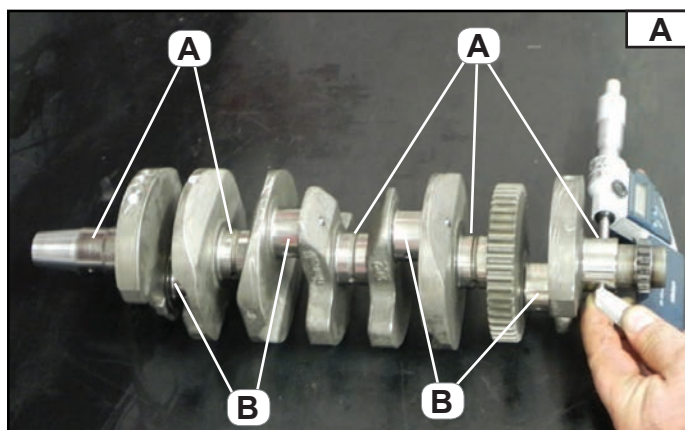
- the eccentricity of the camshaft

If outside specifications, replace the drive shaft.

Drive shaft eccentricity	Size
Drive shaft	A: $\varnothing 32$ (-0.028, -0.042) mm B: $\varnothing 32$ (-0.034, -0.048) mm

Check:

- The main support surfaces (A) Fig. A.
 - The connecting rod support surfaces (B) Fig. A.
- If there is any rust/lines/signs of wear, replace the drive shaft.



DRIVE SHAFT INSTALLATION

Once the drive shaft has been inserted, proceed to assemble the steering heads Fig. B.

Tighten the nuts to the following torque:

Torque 25 N*m

NOTE

Lubricate the steering head pins with copper grease

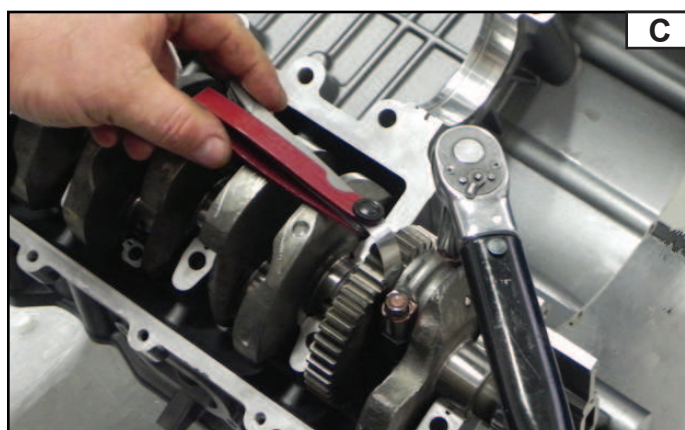
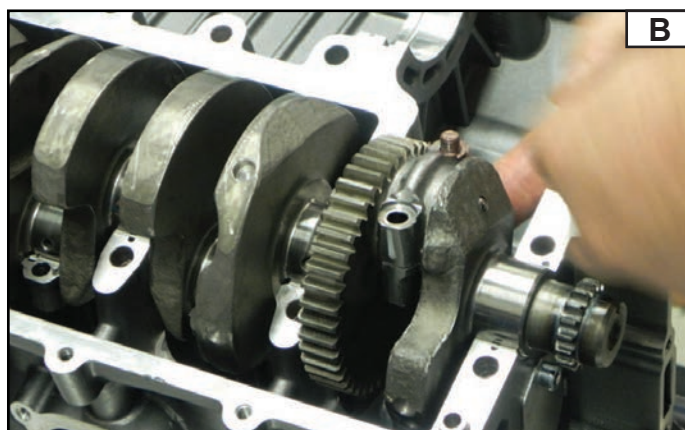
Measure:

Once all the steering heads have been measured, use a thickness gauge to measure the distance between the drive shaft - steering head Fig. C.

Measuring	Size
Drive shaft - steering head	0.1~0.25 mm

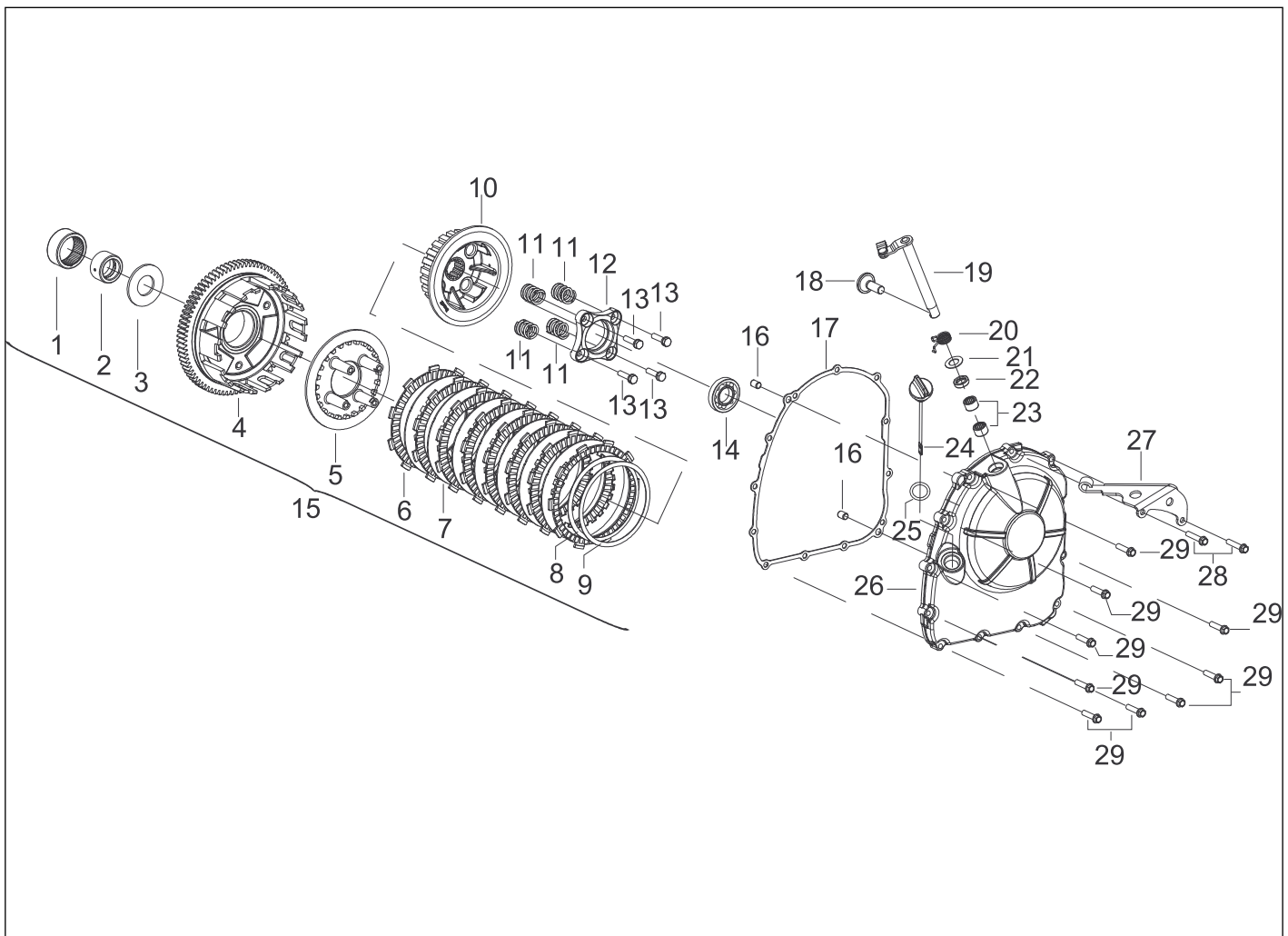
NOTE

Measure all four steering heads.





CLUTCH



Position	Description	Quantity
1	ROLLER BEARING	1
2	GUIDE BUSHING	1
3	WASHER	1
4	CLUTCH BELL	1
5	CLUTCH DRUM	1
6	DRIVEN CLUTCH DISC	8
7	STEEL CLUTCH DISC	7
8	BELLEVILLE WASHER	1
9	GASKET	1
10	PRESSURE PLATE	1
11	CLUTCH SPRING	4
12	FLANGE	1
13	SCREW (M6X25)	4
14	BEARING	1
15	COMPLETE CLUTCH	1
16	BUSHING	2
17	GASKET	1
18	GUIDE BUSHING	1



CLUTCH

Position	Description	Quantity
19	CLUTCH CONTROL SHAFT	1
20	SPRING	1
21	WASHER	1
22	OIL SEAL	1
23	ROLLER BEARING	2
24	OIL FILLER CAP	1
25	O-RING (18X3.5)	1
26	CLUTCH COVER	1
27	PLATE	1
28	SCREW (M6X30)	2
29	SCREW (M6X25)	10

CLUTCH AND DISC REMOVAL

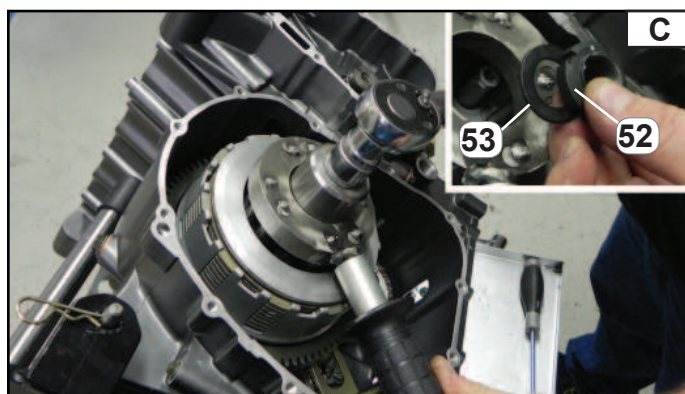
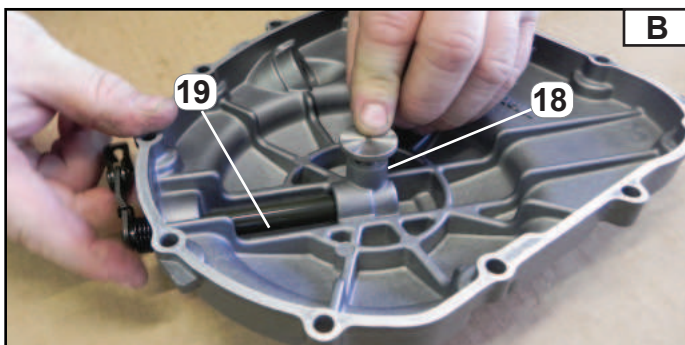
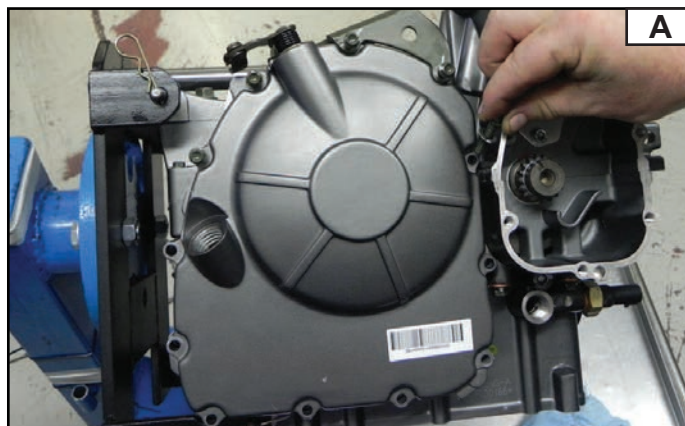
Removal:

- Remove the clutch cover, unscrewing the 12 screws (29) fastening the cover to the engine casing Fig. A.
- Take out the seal (17) and check it is integral

NOTE

In case of anomaly, replace with a new seal.

- Take out the guide bush (18) and the clutch control shaft (19) from the friction cover Fig.B.
- Remove the 4 screws (13) the flange (12) and the 4 springs (11).
- Use the specific tool (**) to remove the fastening nut (52*) and the wear washer (53*) as in Fig.C.



(**)Tool to remove/fit the clutch bell ring nut

Code:.....



(**)Clutch disassembly wrench

Code:.....

Take out the pressure plate (10), the clutch bell (4), the drum (5) and the guide bushing (2).

(*) Refer to the "Gear" chapter



CLUTCH

FRICTION DISC CHECK

The following procedure applies to all friction discs.

Check:

- Friction disc

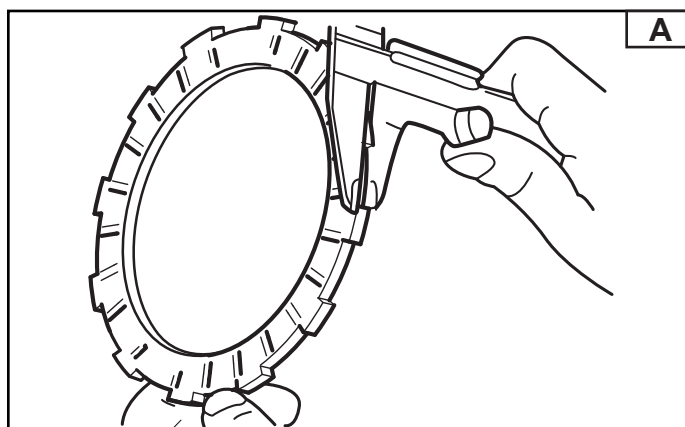
If there is any damage/wear, replace the friction discs.

Measure:

- The thickness of the friction discs Fig. A

If not within specifications, replace the friction discs together.

Disc	Size
Friction disc	Thickness 3(0,-0.1) - 2.8(±0.05) mm



NOTE

Measure the friction disc in four points.

STEEL DISC CHECK

The following procedure applies to all steel discs.

Check:

- Steel discs

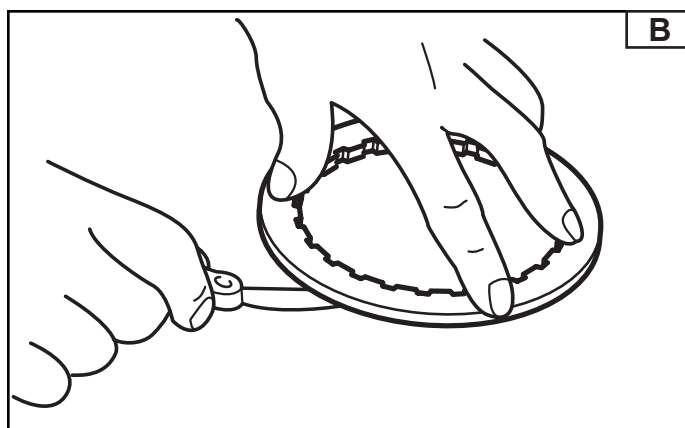
If there is any damage/wear, replace the steel discs all together.

Measure:

- Steel disc warpage Fig. B

If not within specifications, replace the steel discs together.

Disc	Twist limit
Disc	1.6(0.-0.05) mm

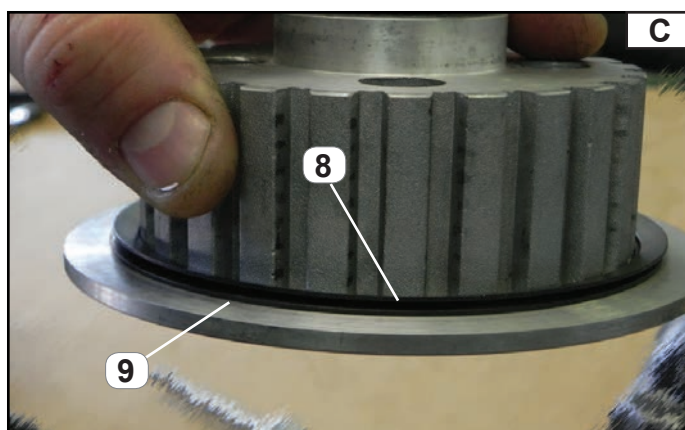


NOTE

Carry out the check, placing the disc on a reference surface and take the measurements using a thickness gauge.

DISC ASSEMBLY

Assemble the discs in the reverse order to disassembly, taking care to fit the Belleville washer (8) correctly and the gasket (9) on the pressure plate (10) see Fig. C.





CLUTCH

CLUTCH ASSEMBLY

Assembly

During the assembly process, follow the order below:

1. Oil pump pinion (complete with chain)
2. Guide bushing (2)
3. Clutch bell (4)
4. Scraper washer (3)
5. Friction drum (5) complete with discs
6. Pressure plate (10)
7. Use the specific tool (**) to assemble the fastening ring nut (XX) and the scraper washer (YY) as in figure Fig.D. to the following torque:



Torque 105 N*m



(**)Tool to remove/fit the clutch bell ring nut

Code:.....



(**)Clutch disassembly wrench

Code:.....

NOTE

Rescrew the fastening ring nut (XX) using a pin punch Fig. E

8. Clutch spring (11)
9. Flange (12)
10. Fastening screws (13) Flange

NOTE

The fastening screws (13) need to be greased with lithium grease and tightened to the following torque:



Torque 12 N*m

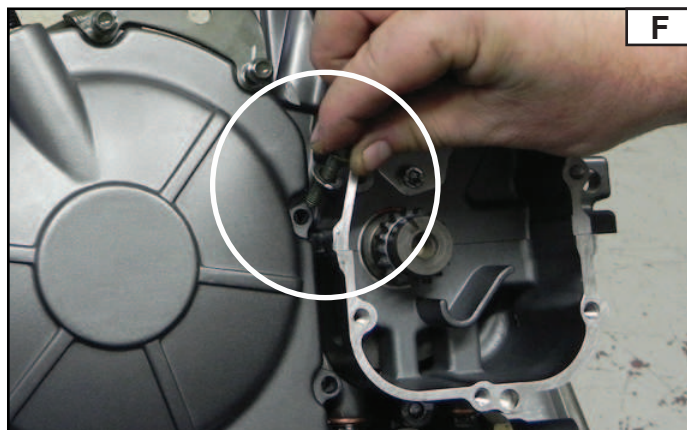
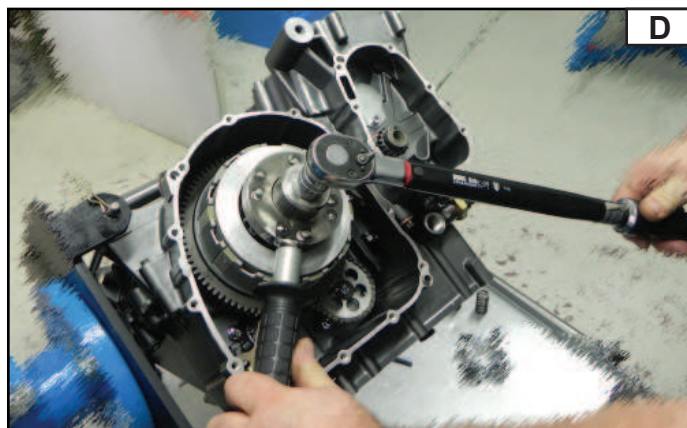
11. Insert the bearing (14)
12. Reassemble the guide bush (18) and the clutch control shaft (19).
13. Insert the seal (17)
14. Position the clutch cover, inserting and tightening the 12 screws (29) fastening the cover (26) to the engine casing.

NOTE

The fastening screws (29) need to be greased with lithium grease and tightened.

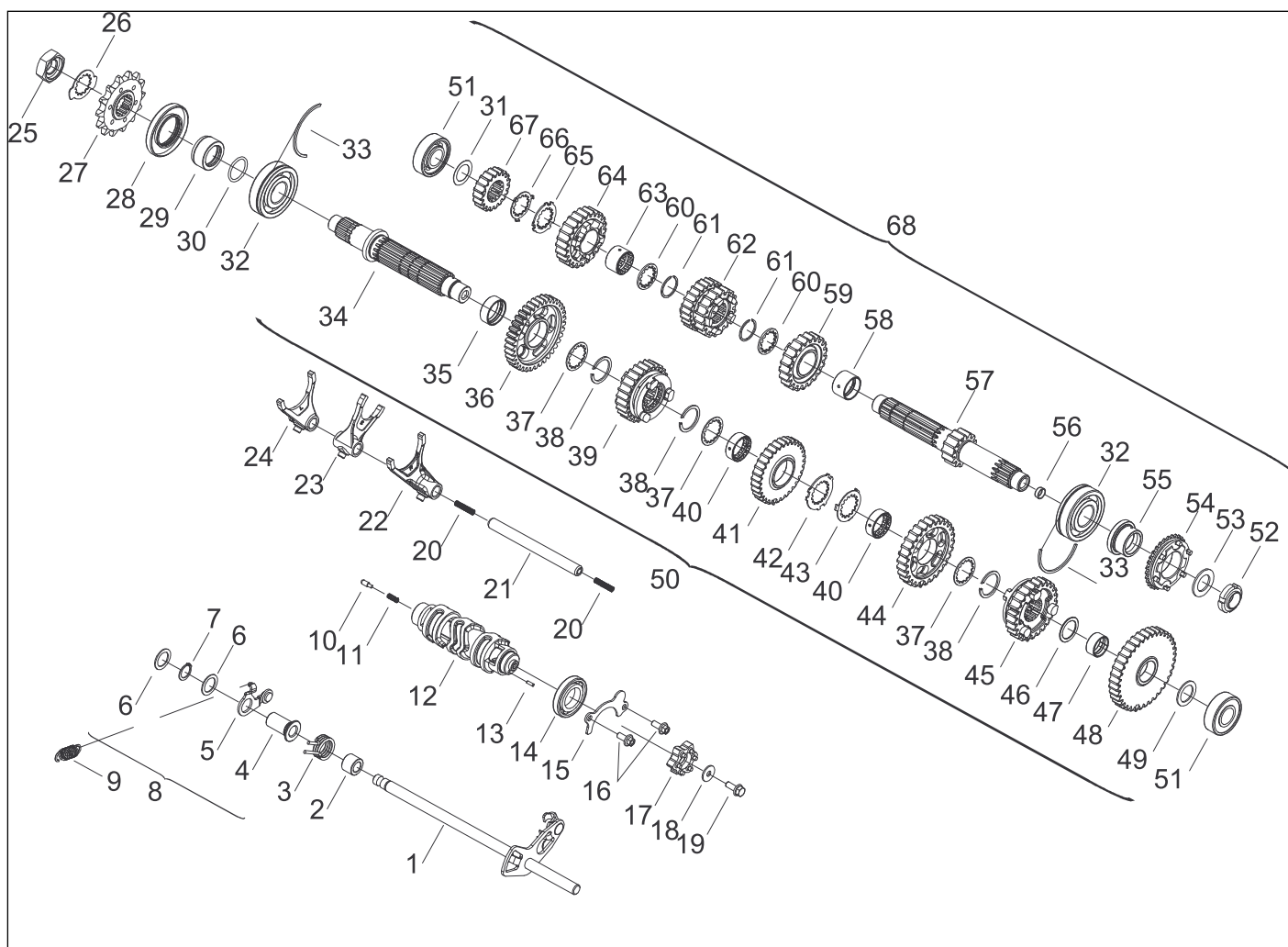
IMPORTANT NOTICE

The fastening screws (29) highlighted in Fig. F need to be assembled with a washer.





GEAR ASSEMBLY



Position	Description	Quantity
1	SELECTOR SHAFT	1
2	SHIM	1
3	STOP SPRING	1
4	BUSHING	1
5	GEAR STOP DEVICE	1
6	SCRAPING	2
7	ELASTIC RING	1
8	COMPLETE GEAR STOP DEVICE	1
9	SPRING	1
10	PLUG	1
11	SPRING	1
12	DESMODROMIC	1
13	PIN	1
14	BEARING	1
15	PLATE	1
16	SCREW (M6X14)	2
17	GEAR DRUM	1
18	WASHER	1
19	SCREW (M6X15)	1



GEAR ASSEMBLY

Position	Description	Quantity
20	SPRING	2
21	PIN	1
22	GEAR SELECTION FORK 1ST/4TH - 2ND/3RD	1
23	GEAR SELECTION FORK 5TH/6TH	1
24	GEAR SELECTION FORK 5TH/6TH	1
25	NUT	1
26	WASHER	1
27	PINION	1
28	OIL SEAL	1
29	BROACHED BUSHING	1
30	O-RING	1
31	GASKET	1
32	BEARING	2
33	BEARING RETAINER	2
34	SECONDARY SHAFT	1
35	BROACHED BUSHING	1
36	DRIVEN GEARS 2ND Z39	1
37	SCRAPING	3
38	ELASTIC RING	3
39	DRIVEN GEARS 6TH Z27	1
40	BROACHED BUSHING	2
41	DRIVEN GEARS 4TH Z30	1
42	NOTCHED WASHER	1
43	NOTCHED WASHER	1
44	DRIVEN GEARS 3RD Z32	1
45	DRIVEN GEARS 5TH Z28	1
46	SCRAPING	1
47	BROACHED BUSHING	1
48	DRIVEN GEARS 1ST Z39	1
49	WASHER	1
50	COMPLETE SECONDARY SHAFT	1
51	BEARING	2
52	NOTCHED NUT	1
53	WASHER	1
54	OIL PUMP PINION	1
55	SHIM	1
56	STOPPER	1
57	MAIN SHAFT Z14	1
58	SHIM	1
59	DRIVEN GEAR 5TH Z24	1
60	NOTCHED WASHER	2
61	ELASTIC RING	2
62	DRIVE GEAR 3RD/4TH	1
63	SHIM	1
64	DRIVEN GEAR 6TH Z25	1



GEAR ASSEMBLY

Position	Description	Quantity
65	NOTCHED WASHER	1
66	NOTCHED WASHER	1
67	DRIVING GEAR 2ND ZI8	1
68	COMPLETE MAIN SHAFT	1

GEAR ASSEMBLY

Measurement:

Use the specific measuring device to check the size of the hole (B) inside the bottom casing of the neutral sensor assembly Fig. A, which is also the support for the desmodromic extremities (12).

Housing port desmodromic	size: 26 (0.+0.021) mm
--------------------------	------------------------

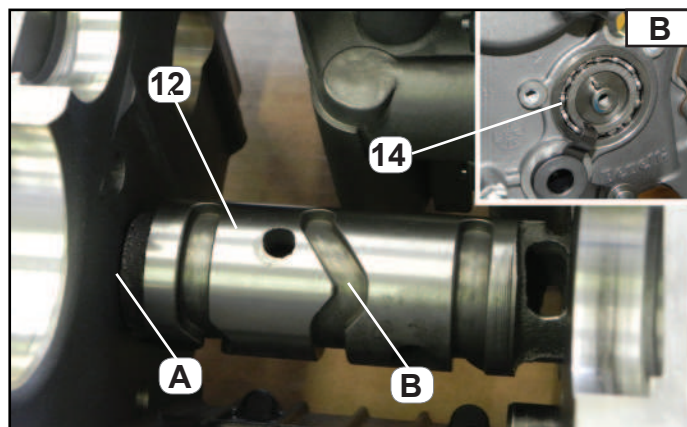
If outside specifications, replace the bottom casing.



Check:

- The groove in the desmodromic shaft (A) Fig. B.
- In the presence of damage/lines/signs of wear, replace the whole desmodromic shaft.
- Desmodromic shaft segment (B) Fig. B.

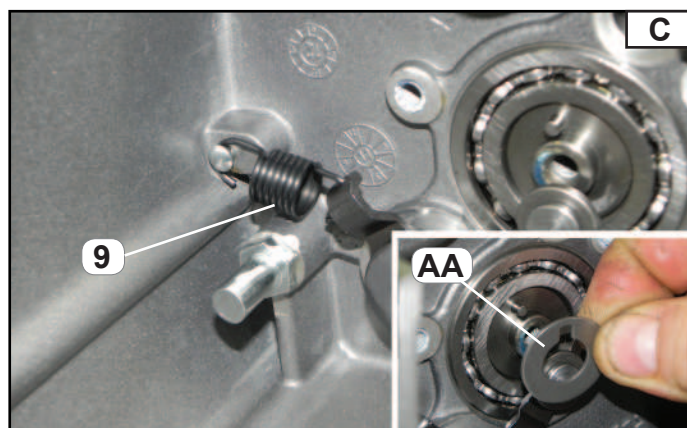
If there is any damage/wear, replace the desmodromic shaft assembly.



Assembly

Insert the desmodromic (12) inside the casing and fit the bearing (14) Fig. B.

Assemble Spring (9) to the gear stop (5) and Insert the SCRAPING WASHER (AA) Fig. C





GEAR ASSEMBLY

GEAR ASSEMBLY

Assembly

Use the specific tool (*) to assemble the gear drum (17) Fig.D



(**) Gear selector drum assembly tool

Code:.....

Tighten the drum via the washer (19) and screw (18) in Fig.D, to the following torque:



Torque 12 N*m

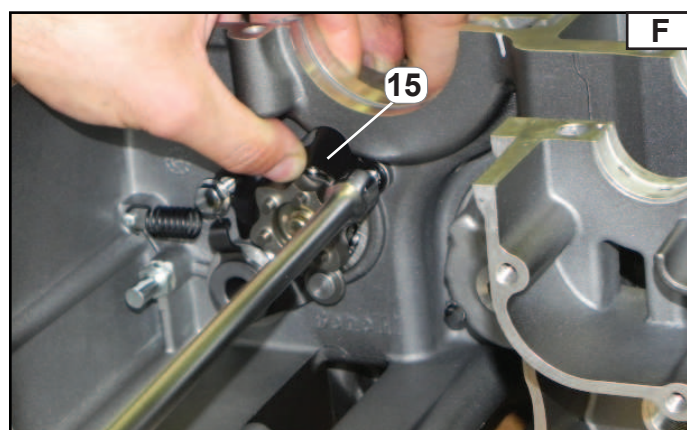
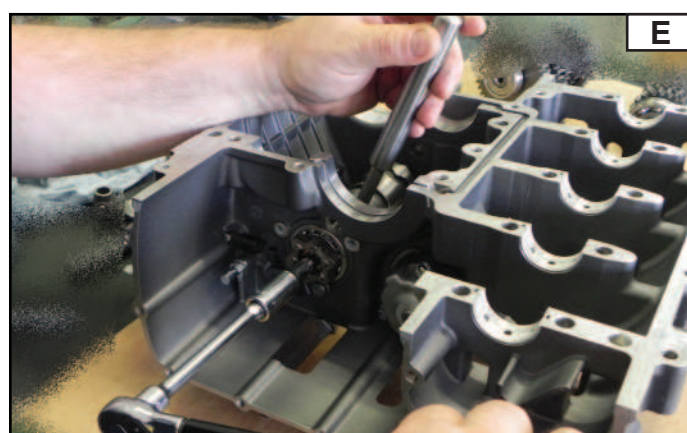
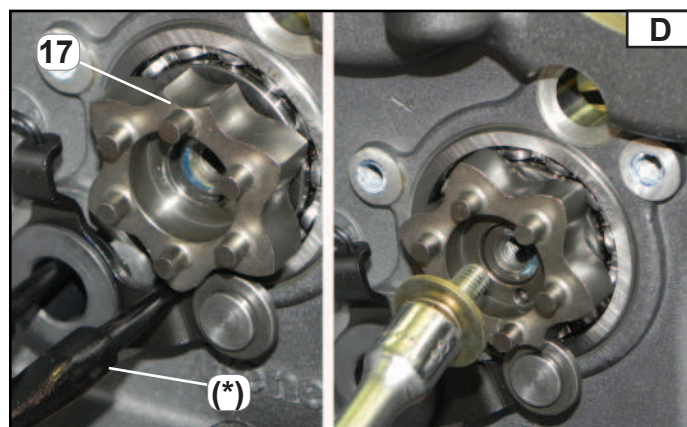
NOTE

To tighten the drum, use an aluminium tool to keep the desmotic still Fig. E

Insert the plate (*) to hold the bearing (14), tightening the screws (16) Fig. F to the following torque:



Torque 12 N*m





GEAR ASSEMBLY

GEAR FORK CHECK

Measurement:

The following procedure applies to all gear forks (1) Fig. G.

Check:

- the transfer part of the gear fork cam (A).
- The tooth on the gear fork cam (B).

If there is warping/damage/lines/traces of wear, replace the gear fork.

Measure:

- the thickness of the gear fork, using a slide gauge.

Part	Size
Gear fork	5.85 ± 0.05 mm

Check:

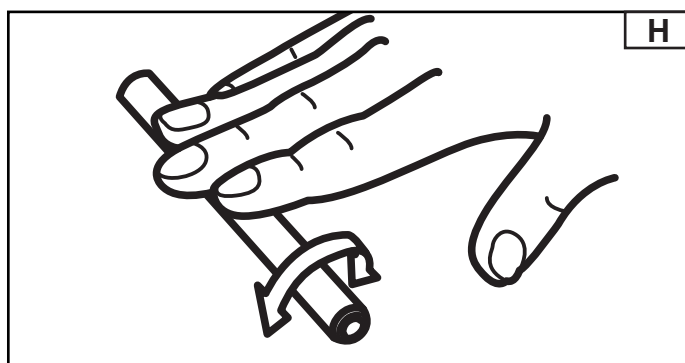
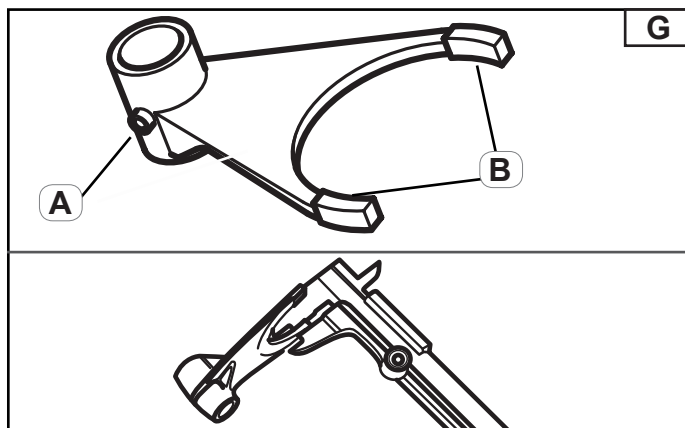
- The gear fork pin (21).

Roll the gear fork guide pin over a flat surface, Fig. H

If there is any warping, replace.

NOTE

Do not try to straighten the fork guide if it is warped.





GEAR ASSEMBLY

GEAR ASSEMBLY

Assemble the forks and gear pin, complete with springs (20), following the sequence illustrated in Fig. I.

1. Spring
2. Gear selection fork 5th/6th
3. Gear selection fork 5th/6th
4. Gear selection fork 1st/4th - 2nd/3rd
5. Spring

Check:

- The two bearing retainers (33) Fig. L.
If there is any warping/damage/lines/signs of wear, replace.

Check:

- The seats of the two bearing retainers (33) Fig. L.
If there is any warping/damage/lines/signs of wear, replace.

Assembly

For the main shaft (68) assembly sequence, with all of the parts of which it is comprised, see the exploded drawing at the beginning of this chapter.

For the secondary shaft (50) assembly sequence, with all of the parts of which it is comprised, see the exploded drawing at the beginning of this chapter.

Place the complete main shaft (68) and the secondary shaft (50) in their respective seats, taking care to match up the grooves on the two bearings (32) with the bearing retainers fitted previously Fig. M.

NOTE

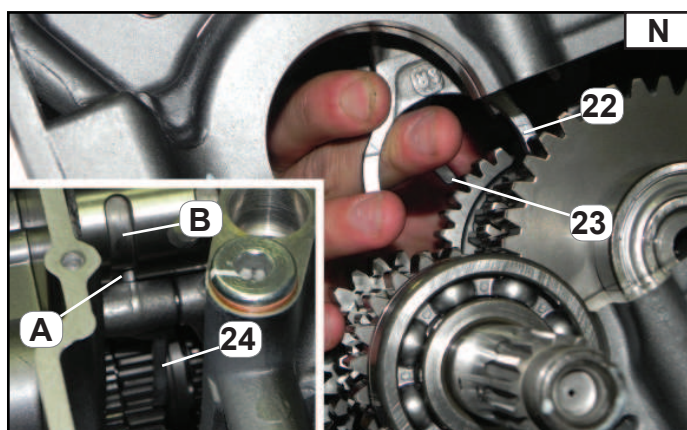
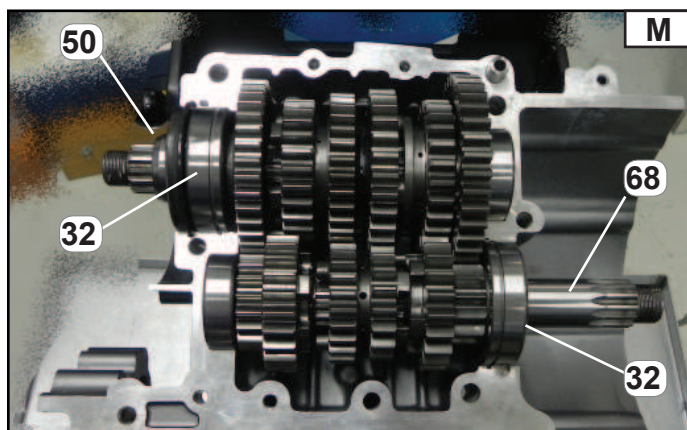
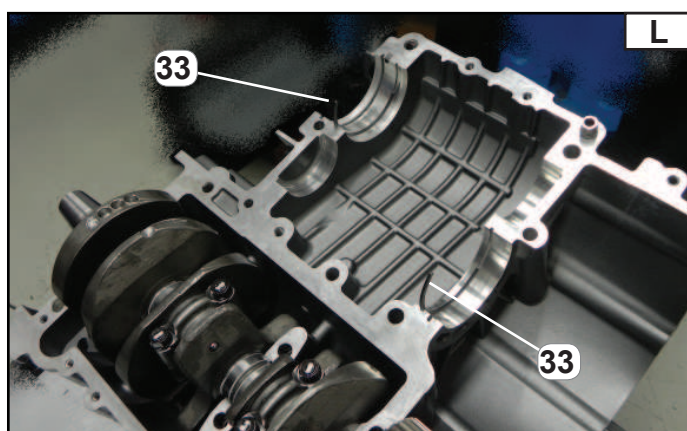
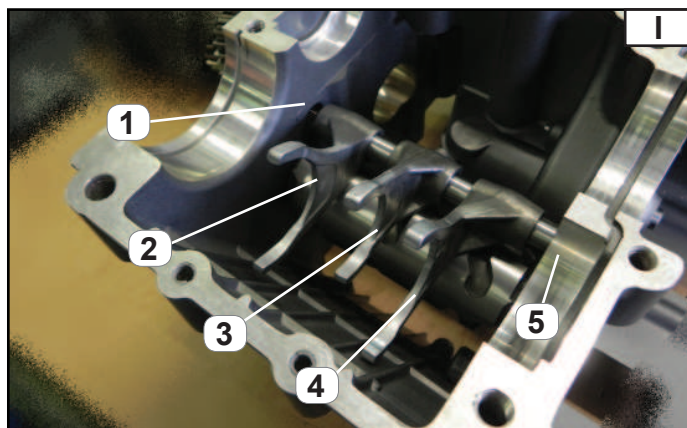
Before assembling the two half casings, top and bottom, it is necessary to apply sealant paste along the whole profile of the top casing, in order to achieve a good hold.

Assembly

Assemble the bottom casing over the top casing, which will have been turned through 180°, taking care to insert the transfer part (A) in the corresponding section of the desmodronic shaft and forks (22-23-24) in the respective seats Fig. N.

NOTE

Two operators are required to carry out this assembly, since this is a complex operation.





GEAR ASSEMBLY

GEAR ASSEMBLY

Check:

Make sure that the end of the gear retainer spring (3) does not come away from the selector plate (1) and that when idle, the two ends of the spring and strike pin is "0", Fig. O.

Measure:

- the size of the spring Fig.P.

If there is any warping or weakening, replace.

Gear stop spring	Size
A	14.5 mm
B	8 mm

Assembly

Insert the selector shaft as in Fig. O

Assembly

After assembling the two half casings, tighten the relevant screws Fig.Q to the following torque:

Outer screws (xx) and (zz)

Inner screws (yy)



M6 X40: Torque 22 N*m

M6X60: Torque 22 N*m

M10: Torque 39 N*m

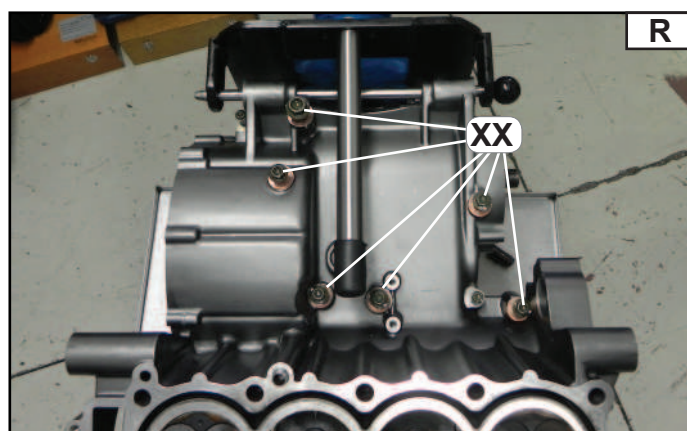
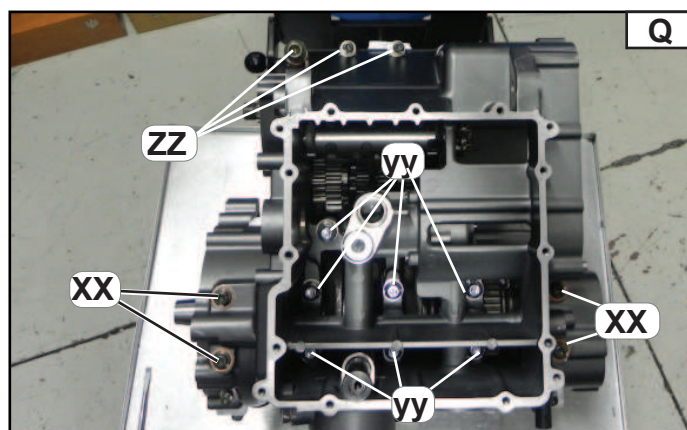
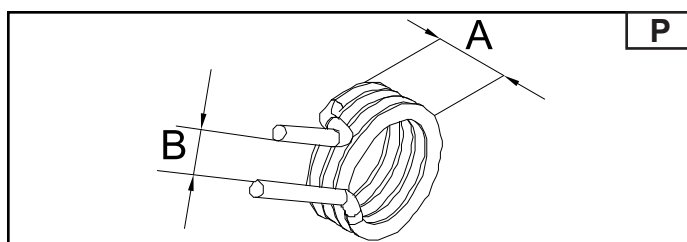
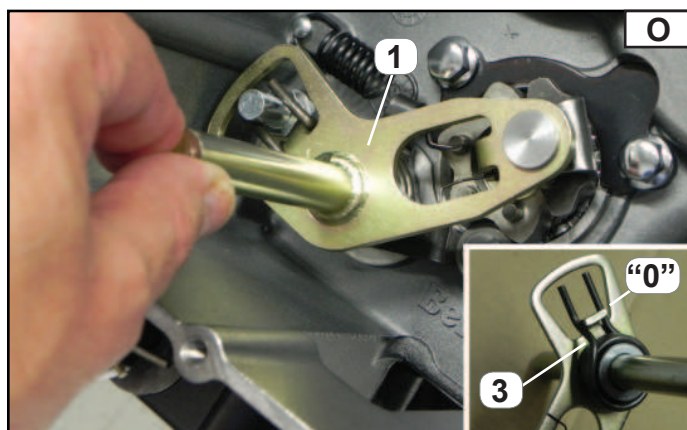
NOTE

Before securing the screws, they must be greased with copper grease.

Turn the full casing by 180° and tighten the respective screws Fig. R, to the following torque:

NOTE

Before securing the screws, they must be greased with copper grease.



GEAR DISASSEMBLY

Disassembly:

To disassemble, follow the assembly procedure in the previous section, in reverse order.



GEAR ASSEMBLY

NEUTRAL SENSOR ASSEMBLY

Assembly

Fit the neutral sensor (37*) taking care to insert first the spring (11) and then the pin (10) Fig. A.

NOTE

Before assembly, check the sensor continuity (see specific section).

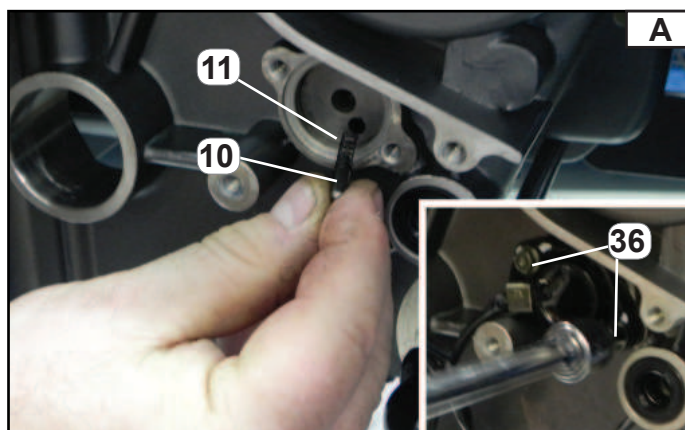
Tighten the two fastening screws (36*) of the sensor to the following torque:



Torque 12 N*m

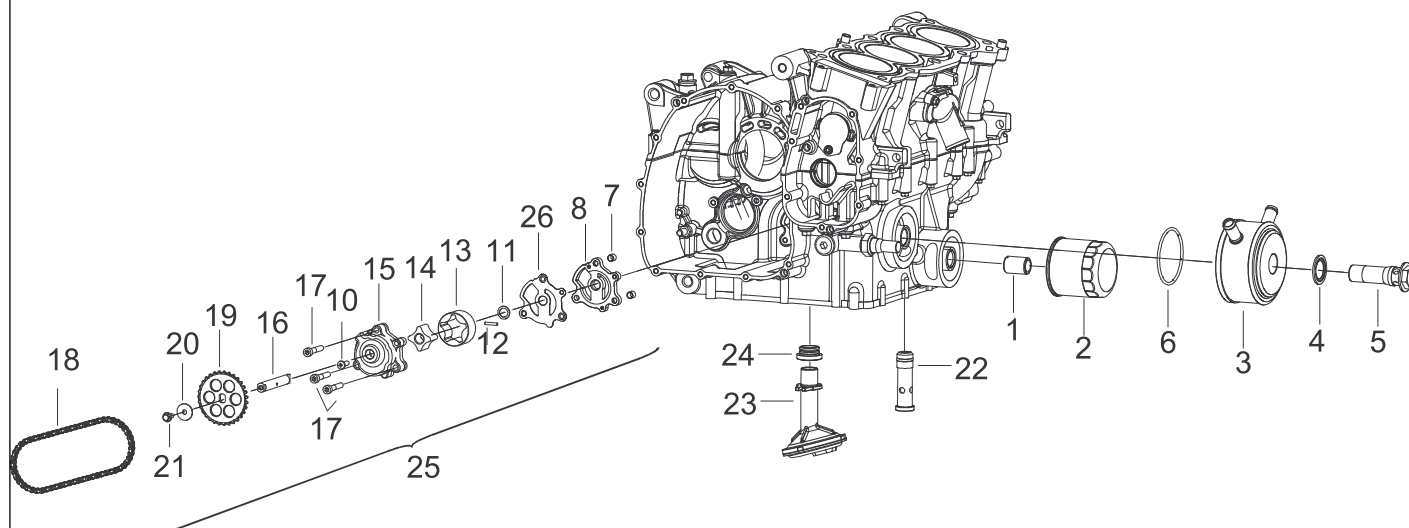
NOTE

The numbers marked (*) are shown in the replacement parts table in the Chapter 5, "Crank gear" chapter, "main half bearings and engine shaft fitting" section.





LUBRICATION SYSTEM



Position	Description	Quantity
1	SCREW	1
2	OIL FILTER	1
3	DISTRIBUTOR	1
4	GASKET	1
5	SCREW M14	1
6	O-RING	1
7	GUIDE BUSHING	2
8	OIL PUMP COVER	1
9	GUIDE BUSHING	2
10	SCREW	1
11	WASHER	1
12	PIN	1
13	OUTER ROTOR	1
14	INNER ROTOR	1
15	OIL PUMP	1
16	OIL PUMP SHAFT	1
17	SCREW (M6×35)	3
18	OIL PUMP CHAIN	1



LUBRICATION SYSTEM

Position	Description	Quantity
19	PUMP GEARS	1
20	WASHER	1
21	SCREW (M5X10)	1
22	OIL PRESSURE VALVE	1
23	INLET FILTER	1
24	INLET FILTER FITTING	1
25	COMPLETE OIL PUMP	1
26	OIL PUMP GASKET	1

OIL SUMP AND INLET FILTER REMOVAL

Removal:

NOTE

Before carrying out disassembly of the oil sump, it is necessary to remove the oil from the engine, removing the magnetic seal cap.

1. Remove the 17 screws fastening the oil sump Fig. A.

Check:

2. Oil sump

If there is any damage replace.

3. Seal (A) Fig. B.

If there is any damage replace.

4. Inlet filter fitting (B) Fig. B.

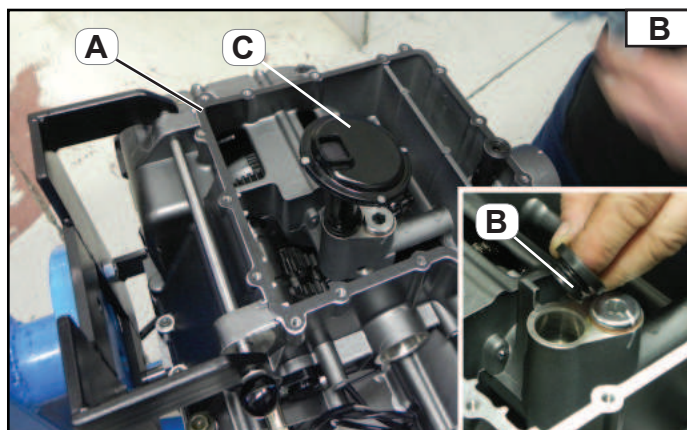
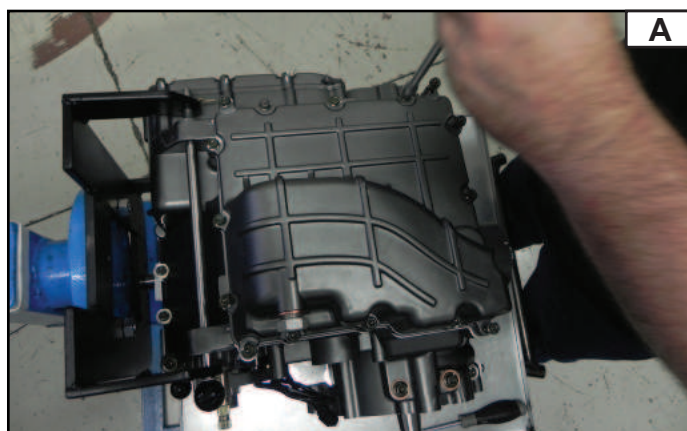
If there is any damage replace.

5. Inlet filter (C) Fig. B.

If there is any damage replace.

NOTE

If there is any sediment or residue, clean the filtering area carefully with solvent.



OIL SUMP AND INLET FILTER INSTALLATION

Fitting:

Proceed using the opposite order to removal.

Tighten the oil sump fastening screws to the following torque:



Torque 21 N*m

Tighten the magnetic seal cap, complete with copper washer, to the following torque:



Torque 105 N*m

NOTE

Add engine oil once these steps have been completed.



LUBRICATION SYSTEM

PRESSURE-RELIEF VALVE INSTALLATION

Check:

Before fitting the valve, make sure that all of its component parts are free from anomalies Fig. A.

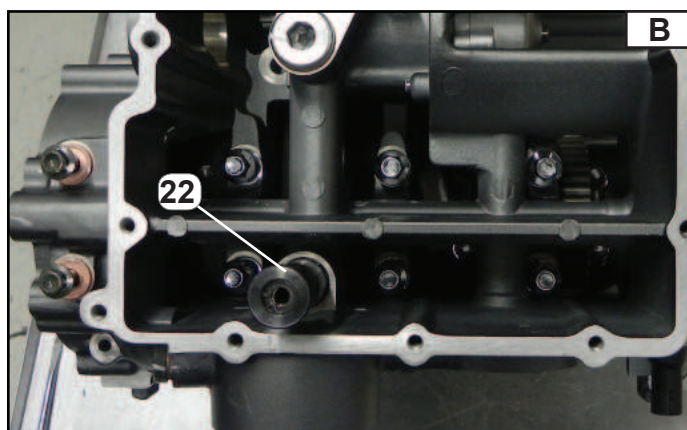
If there is any damage or wear, replace.

Fitting:

Insert the pressure-relief valve (22) complete with O-ring inside the bottom casing, by simply fitting it in.

NOTE

Fig. B. Lubricate the pressure-relief valve carefully and plentifully during insertion.



OIL PUMP REMOVAL

Removal:

NOTE

This procedure is only possible after removing the whole clutch.

1. Use a commonly found tool (pin and hook wrench), lock the pump gear (19) and loosen the screw (21) and washer (20) fastening Fig. A.
2. Remove the screws (17) locking the pump to the casing, and the gasket (26) Fig. B.

If there is any damage/wear, replace the gasket.

Disassembly:

Once the pump body has been removed, disassemble by unscrewing the assembly screws (10), separating the pump cover (8) from the pump body (15). Take out the parts from the inside.

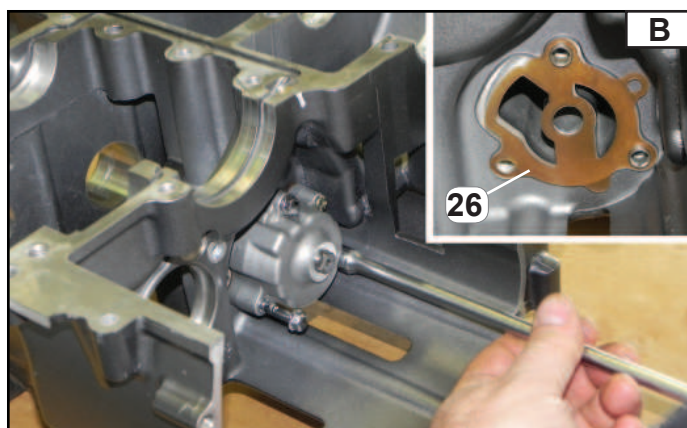
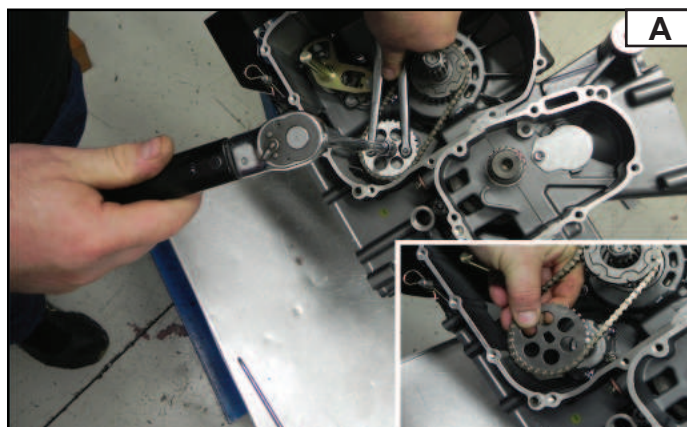
Check:

- The pump body (15)

If there are any lines/damage/wear, replace.

- Pump gear (19)

If there is any damage or wear to the gears, replace.





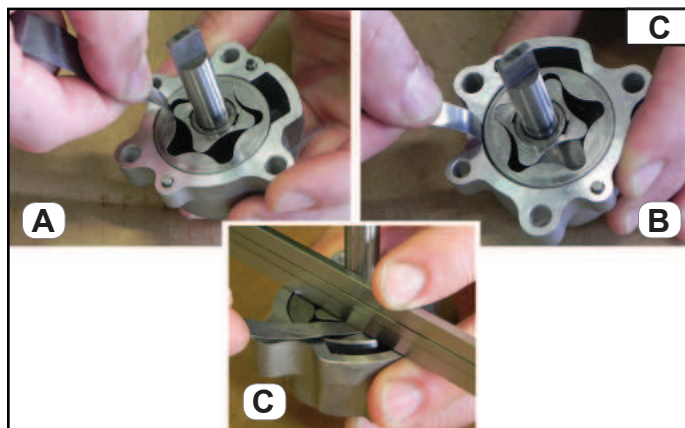
LUBRICATION SYSTEM

OIL PUMP REMOVAL

Measure:

- Tolerance between the inner rotor (14) and the outer rotor (13) "A".
- Fig.C Tolerance between the outer rotor (13) and the oil pump housing (15), Fig. C
- The planarity of both rotors, compared to the oil pump housing (15) "C" Fig C.

Clearance	Tolerance
between the inner rotor and the outer rotor "A".	0.15 mm
between the outer rotor and the oil pump housing "B".	+0.06, +0.09 mm



OIL PUMP ASSEMBLY

Fitting:

Proceed using the opposite order to removal.

Tighten the assembly screws (10) to the following torque:



Torque 12 N*m

Tighten the pump gear assembly screw (21) to the following torque:



Torque 7 N*m

NOTE

Add engine oil once these steps have been completed.

OIL FILTER REMOVAL/INSTALLATION

Removal:
NOTE

Before removing the oil filter, it is necessary to remove the oil from the engine.

1. Place a collection container under the engine Fig. A.
2. Use the specific tool (**) to turn the oil filter (2) and remove it.



(**) Oil filter removal/assembly tool

Code:.....


Fitting:
NOTE

Before fitting a new oil filter, apply a fine layer of engine oil to the contact surfaces of the filter to lubricate it.

1. Proceed using the opposite order to removal.
- Tighten the filter (2) to the following torque:



Torque 22 N*m

IMPORTANT NOTICE

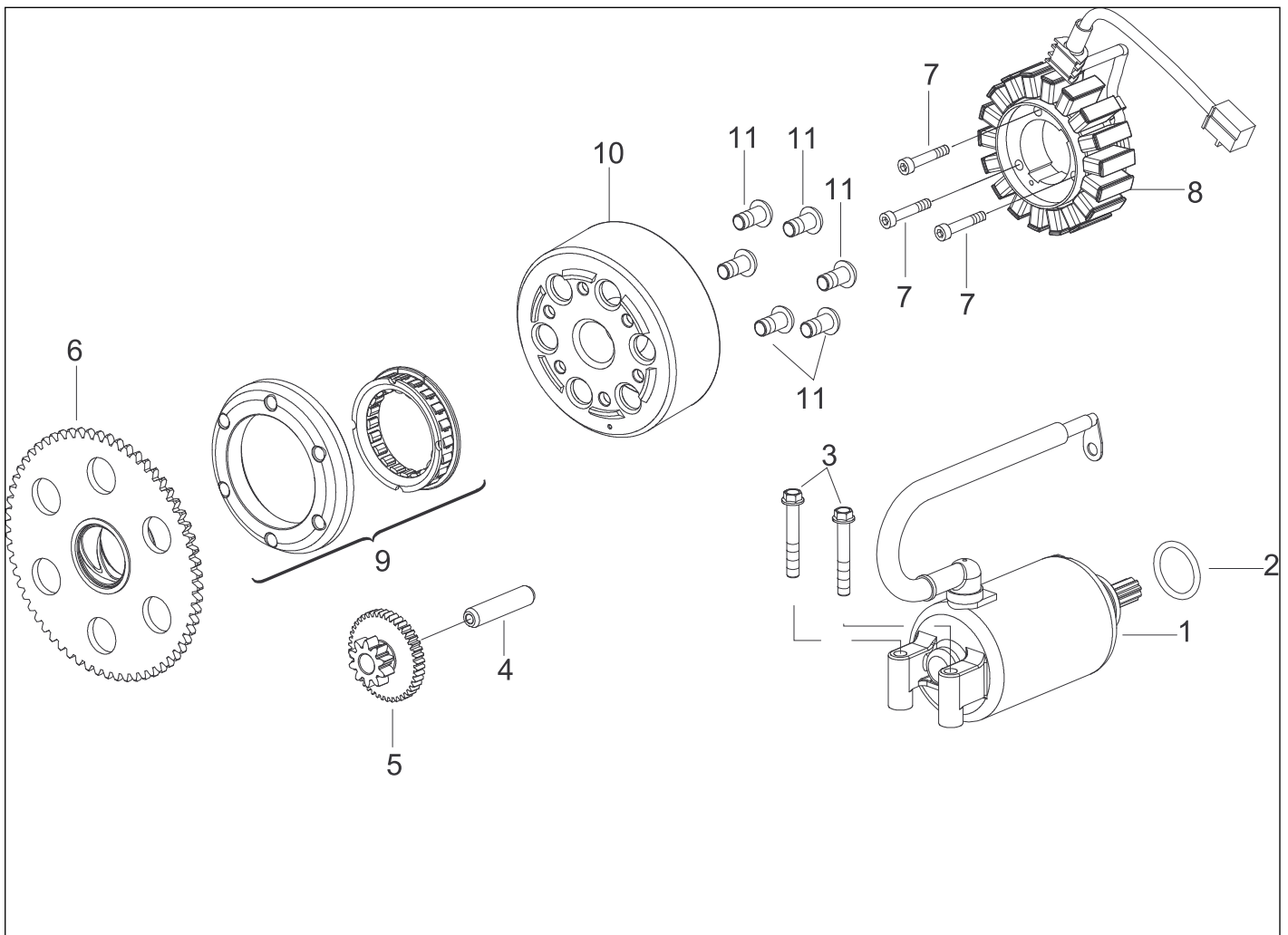
Always use original Benelli oil filters.

Other brands of oil filter can be different in terms of thread (diameter and pitch).

The use of other types of filter may affect the filter performance and duration, which will cause possible damage to the engine or oil leaks.



STARTING



Position	Description	Quantity
1	STARTER MOTOR	1
2	O-RING	1
3	SCREW (M6X40)	2
4	IGNITION SHAFT	1
5	DOUBLE GEAR	1
6	START GEAR	1
7	SCREW (M6X32)	3
8	MAGNET FLYWHEEL	1
9	COMPLETE FREEWHEEL	1
10	FLYWHEEL	1
11	SCREW (M6X16)	6



STARTING

STARTER MOTOR REMOVAL/INSTALLATION

Removal:

1. Remove the two screws (3) locking the motor-casing Fig. A.
2. Take out the motor from the clutch side.

Check:

- Starter motor operation.

If the starter motor turns over with effort, replace the part.

- O-RING gasket (2)

If there is any damage/spotting/traces of wear, replace the O-ring gasket.

Fitting:

NOTE

Lubricate the O-ring and take care not to damage it.

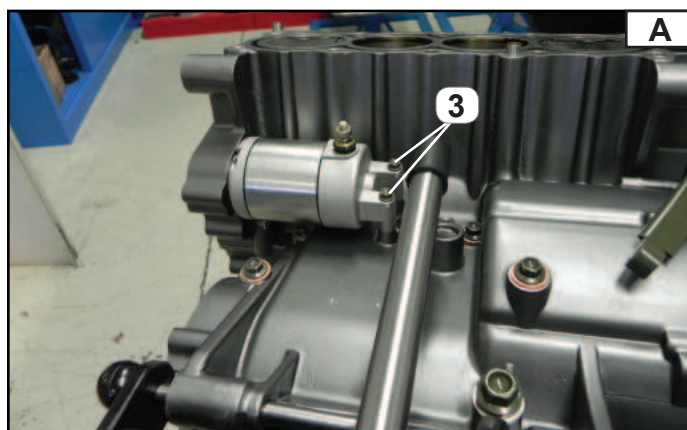
1. Proceed using the opposite order to removal.
- Tighten the two screws (3) to the following torque:



Torque 12 N*m



Use Loctite thread locker to secure.





STARTING

FLYWHEEL REMOVAL

Removal:

1. Remove the caps (3*) and (5*) and the relevant gaskets from the left casing cover (10*) Fig. A.
2. Remove the 9 fastening screws (1*)
3. Use the specific tools (**) to remove the cover (10*)



(**) tool to remove the flywheel cover

Code:.....

Check:

1. gasket (11*)

If there is any tearing/traces of wear, replace the gasket.

2. Remove the 3 fastening screws (7)
3. Remove the fastening screw (13*) fastening plate support (12*)
4. Use the specific tools (**) to take out the flywheel (10) Fig. B.



(**) tool to take out flywheel

Code:.....

NOTE

The numbers marked (*) are shown in the replacement parts table in the "Starting" chapter, "Phase sensor installation/adjustment" section.

IMPORTANT NOTICE

During the removal of the flywheel, remove the flywheel-drive shaft locking key (x) Fig.B.

5. Take out the double gear (5), shaft (4) and starter gear (6) Fig. C.

Removal:

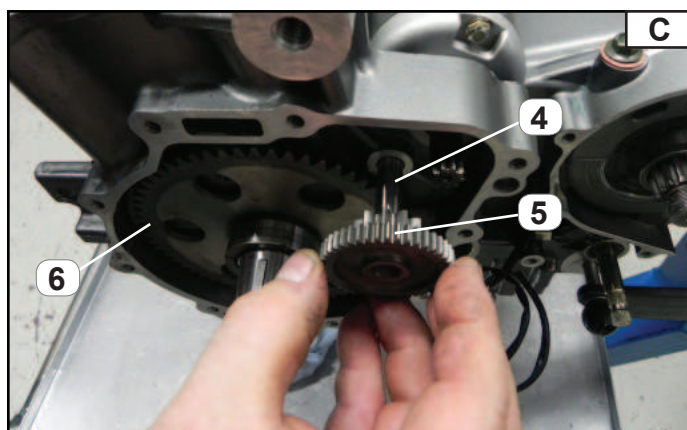
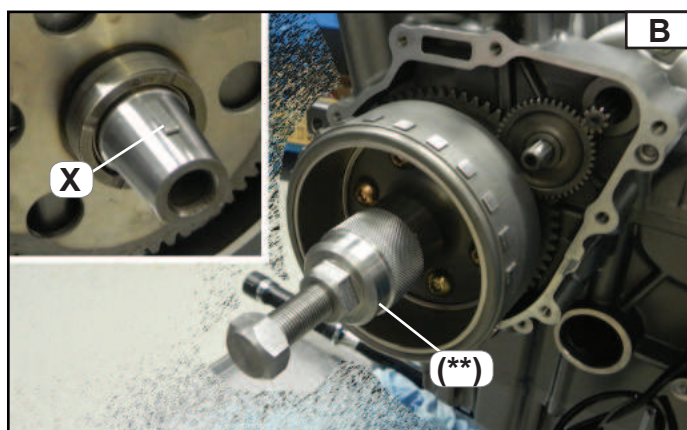
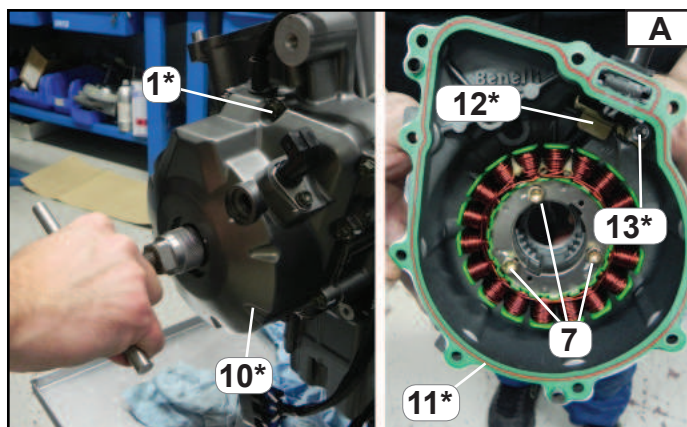
Removal of complete freewheel parts (9) Fig.D.

1. Remove the 6 fastening screws (11)

Check:

- the roller cage and support.

If there are any anomalies/traces of wear, replace the whole freewheel.





STARTING

FLYWHEEL FITTING

Fitting:

1. Assemble the parts of the whole freewheel (9) and tighten the 6 fastening screws (11) Fig. A. to the following torque:



Torque 24 N*m

2. Insert the double gear (5), shaft (4) and starter gear (6) Fig. B

IMPORTANT NOTICE

During the insertion of the flywheel, remove the flywheel-drive shaft locking key (x) Fig.C .

3. Insert the flywheel (10) Fig. C .
4. Use the specific tool (**) to tighten the screw (16*) and the washer (15*) to the following torque:



Torque 120 N*m



(**) flywheel assembly tool

Code:.....

NOTE

The numbers marked (*) are shown in the replacement parts table in the "Pistons" chapter, "Piston removal" section.

5. Tighten the fastening screw (13*) fastening the plate support (12*)
6. Tighten the 3 fastening screws (7)
7. Apply the gasket (11*)
If there is any tearing/trace of wear, replace the gasket.

8. Use the specific tools (**) to fit the cover (10*)



(**) tool to remove the flywheel cover

Code:.....

9. Tighten the 9 fastening screws (*1) to the following torque:



Torque 12 N*m

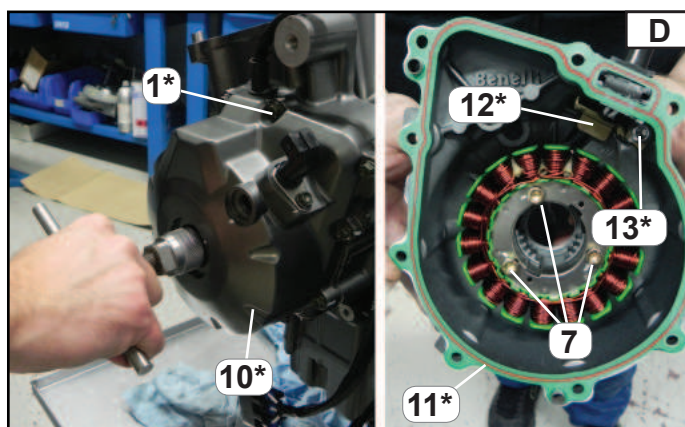
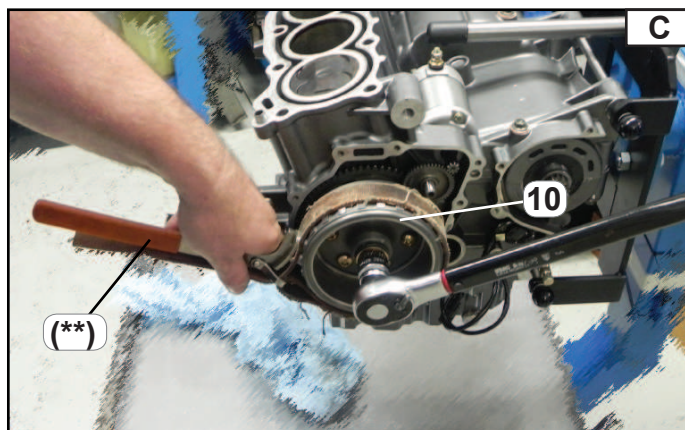
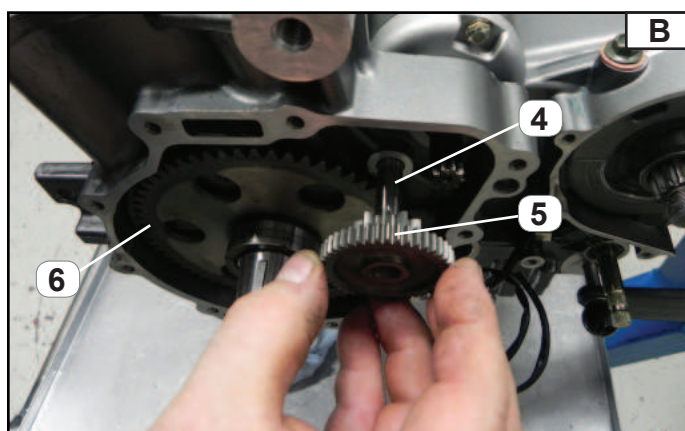


Use Loctite thread locker to secure.

10. Assemble the cap (3*) and the relevant gaskets to the left casing cover (10*) Fig. D.

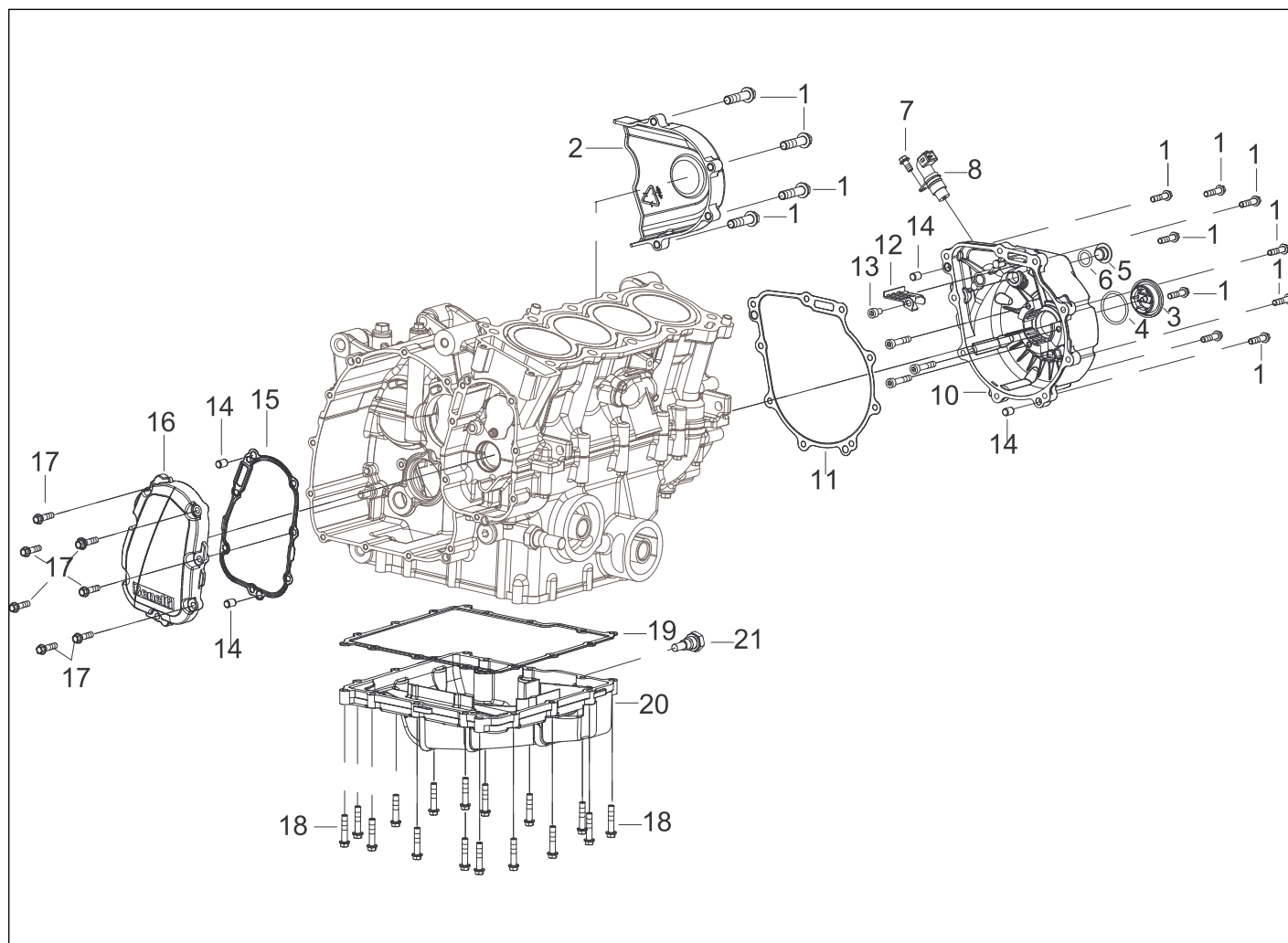
NOTE

The numbers marked (*) in points (5-7-8-9-10) are shown in the replacement parts table in the "Starting" chapter, "Phase sensor installation/adjustment" section.





STARTING



Position	Description	Quantity
1	SCREW (M6X25)	14
2	PINION COVER	1
3	MAGNETIC CAP	1
4	O-RING	1
5	MAGNETIC CAP	1
6	CAP	1
7	SCREW (M6X12)	1
8	PHASE SENSOR	1
18	RETAINING WASHER	1
10	LEFT CASING	1
11	GASKET	1
12	PLATE	1
13	SCREW (M6X10)	1
14	BUSHING	4
15	GASKET	1
16	COVER	1
17	SCREW (M6X22)	6
18	SCREW (M6X30)	16



STARTING

PHASE SENSOR INSTALLATION/ADJUSTMENT

Position	Description	Quantity
19	OIL SUMP GASKET	1
20	OIL SUMP	1
21	MAGNETIC CAP	1

Fitting:

1. Apply a suitably thick copper scraper shim (x) to keep the distance for the phase sensor compared to a suitable pickup for reading the number of revolutions Fig. A.
2. Insert the phase sensor (8) into its housing in the left casing (10) Fig. A.
3. Tighten the fastening screw (7) to the following torque: B:



Torque 12 N*m

Measure:

- The distance (A) between the phase sensor (8) and the pick-up on the magnet flywheel Fig. C.

NOTE

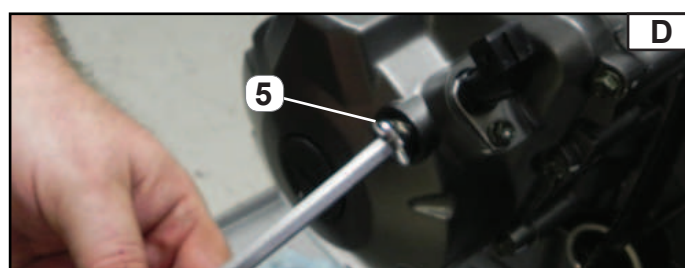
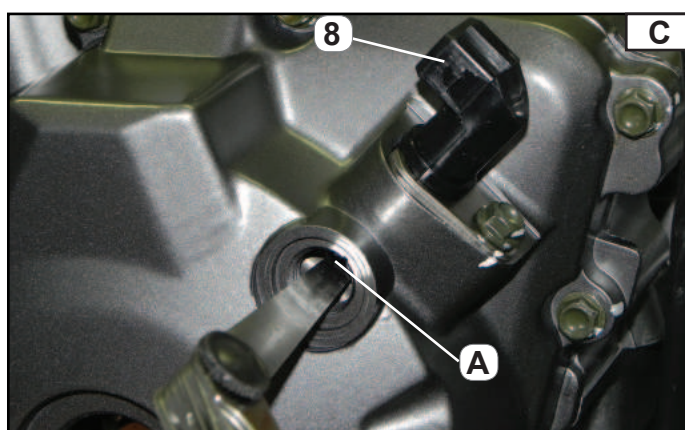
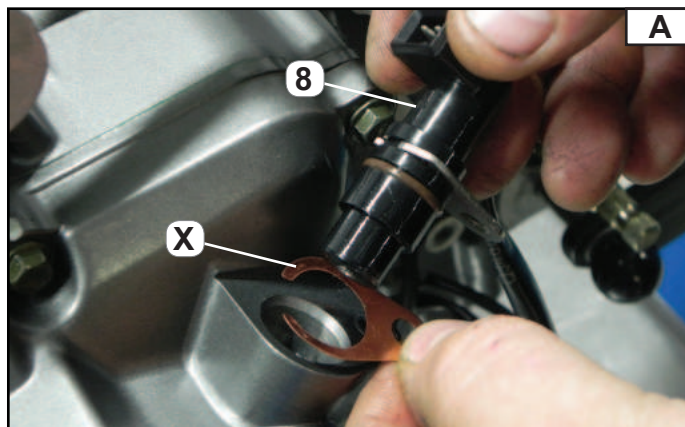
Use a thickness gauge to take this measurement.

IMPORTANT NOTICE

During measurement, apply or remove scraper shims to reach the required distance (A).

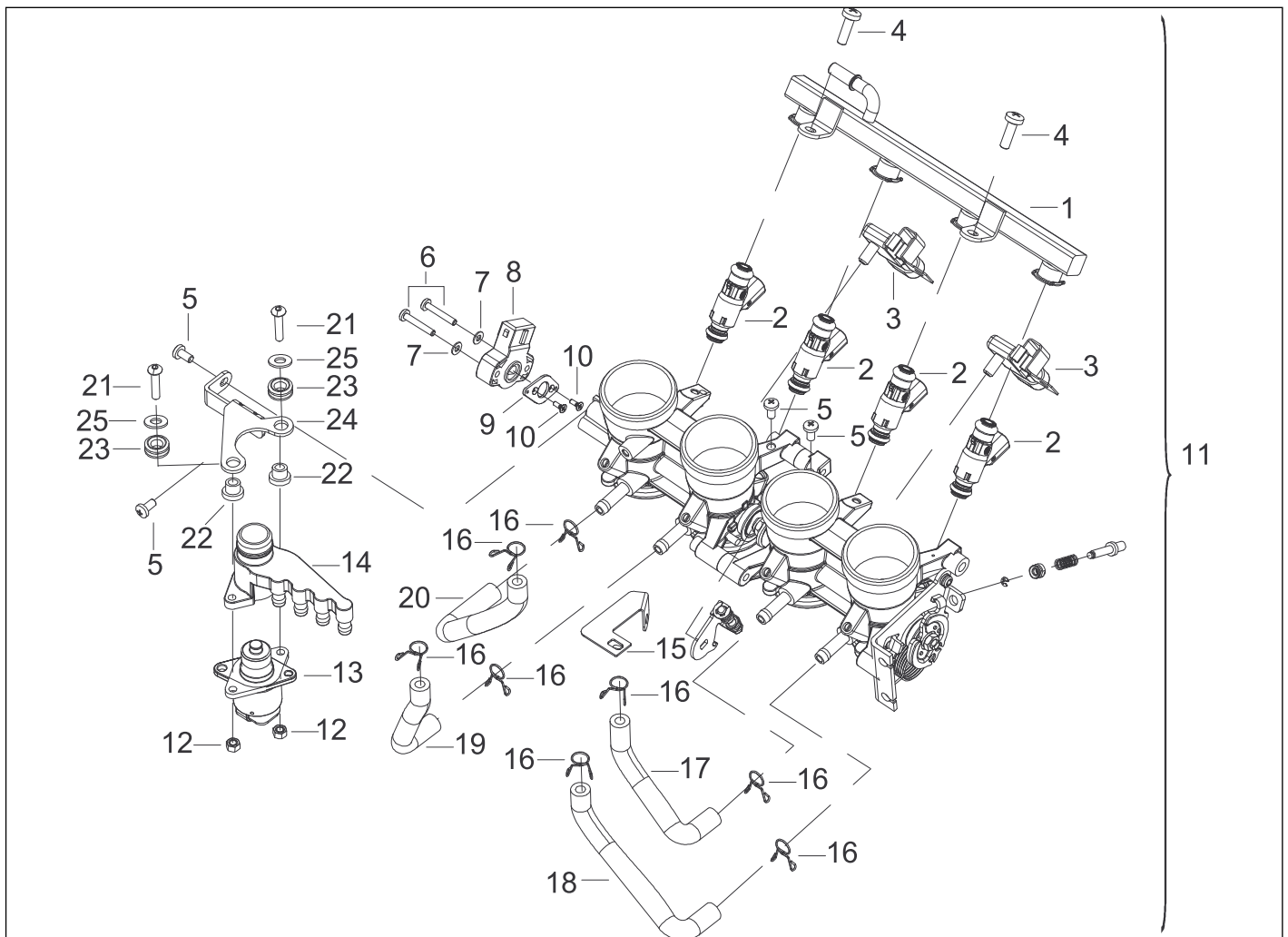
Thickness	Measure
Scraper thickness (x)	0.20 mm

4. Once the right value has been found, assemble the cap (5) and the relevant gaskets to the left casing cover (10) Fig. D.





SUPPLY



Position	Description	Quantity
1	BRACKET	1
2	INJECTOR	4
3	INJECTOR SUPPORT	2
4	SCREW (M5X16)	2
5	SCREW (M5×10)	4
6	SCREW (M4X10)	2
7	O-RING	2
8	POTENTIOMETER	1
9	SCREW	
10	PLATE	
11	THROTTLE VALVE	1
12	NUT M5	2
13	STEPPER MOTOR	1
14	DISTRIBUTOR	1
15	PLATE	2
16	CLIP	8
17	MINIMUM AIR PIPE 4	1
18	MINIMUM AIR PIPE 3	1



SUPPLY

Position	Description	Quantity
19	MINIMUM AIR PIPE 2	1
20	MINIMUM AIR PIPE 1	1
21	SCREW (M5×25)	2
22	BUSHING	2
23	VIBRATION DAMPING RUBBER	2
24	SPECIAL PLATE	1
25	WASHER	2

THROTTLE VALVE REMOVAL

Removal:

1. Remove the 4 suction pipes (19*) and the relevant gaskets (18*), loosening the 8 screws (21*) Fig.A.
2. Loosen the screw clip (22*) and take out the throttle valve (11) Fig.B.

Check:

- Suction pipes (19*)
- If there are any anomalies/traces of wear, replace
- the relevant gaskets (18*).
- If there are any anomalies/traces of wear, replace

NOTE

The numbers marked (*) are part of the replacement parts table in the chapter "Head timing belt" chapter, "valve flap and calibrated pad removal" section.

Adjustment

NOTE

Make this adjustment with the engine running.

Connect:

- The tubes of the vacuum gauge to the 4 fittings (A) Fig. C

Start:

- The engine to get it to a temperature of about 90°/95° C.

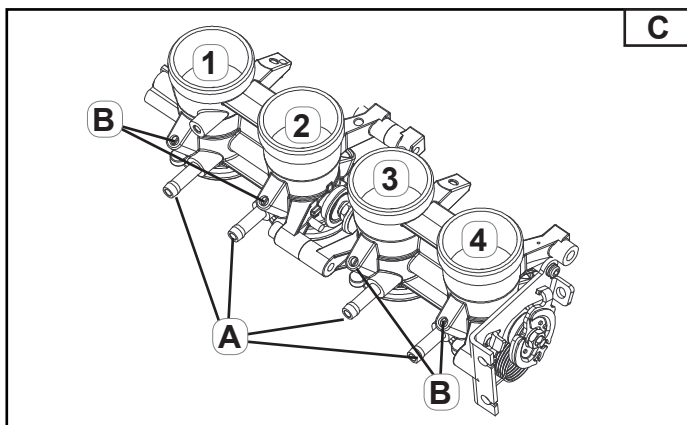
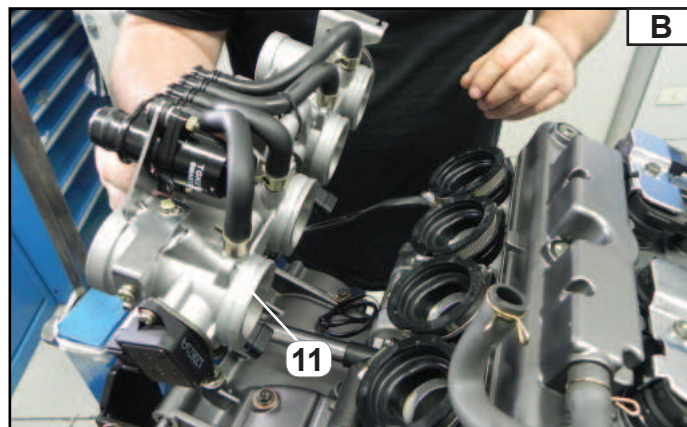
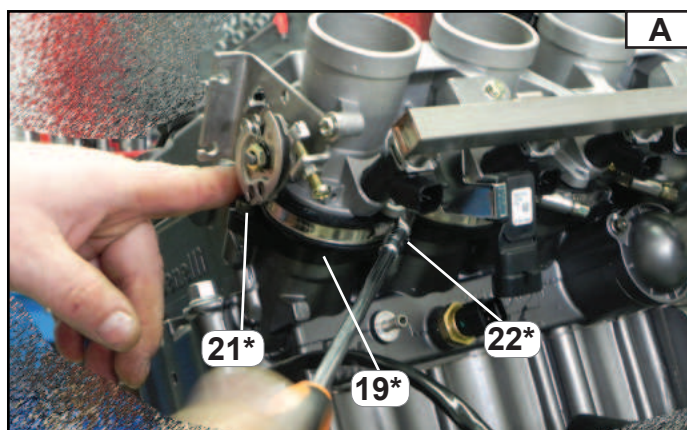
Check:

- Alignment of the mercury column with the engine running at minimum.

Proceed to balance, if necessary.

NOTE

Make sure the bypass screws (B) on valves 1-2-3-4 are completely closed Fig.C.





SUPPLY

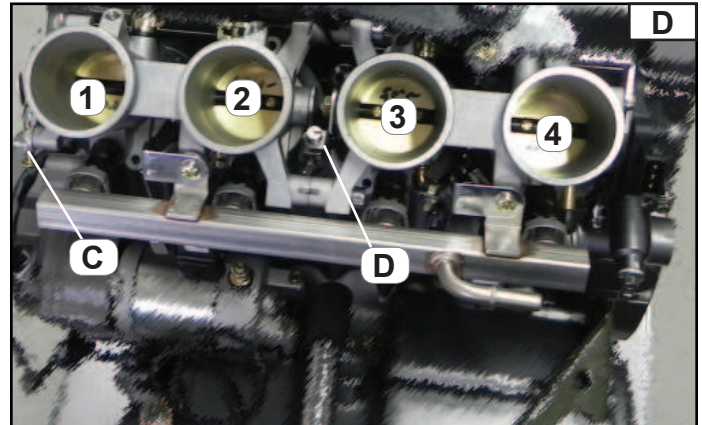
THROTTLE VALVE REMOVAL

Correct:

- Alignment values via the 2 screws (D) using a screw driver.
- Align valve 1 with valve 2, using the screw (C) Fig. D.
- Align valve 3 with valve 4, using the screw (C) Fig. D.
-

NOTE

Once the four valves are all aligned, it is possible to perfect this correction using the individual by-pass screws (B) Fig. C.



THROTTLE VALVE FITTING

Fitting:

Proceed using the opposite order to removal.

1. Tighten the 8 screws (21*) Fig.A to the following torque:



Torque 6 N*m



Use Loctite thread locker to secure.



COOL



Cooling system

CHAPTER 6

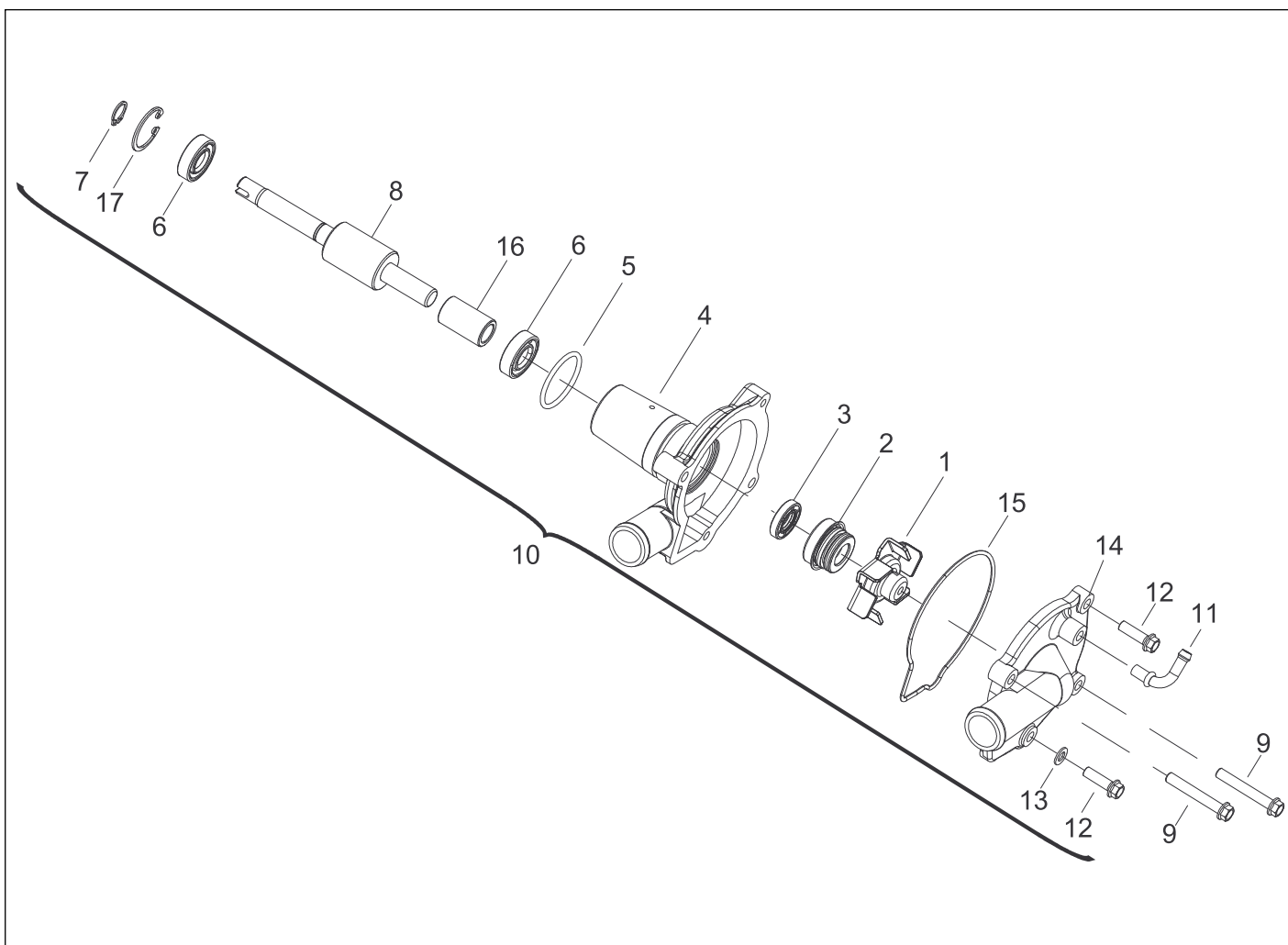
CHAPTER 6

- COOLING SYSTEM

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WATER PUMP



Position	Description	Quantity
1	WATER PUMP ROTOR	1
2	RETAINING RING	1
3	OIL SEAL	1
4	WATER PUMP COVER	1
5	O-RING	1
6	BEARING	2
7	ELASTIC RING	1
8	WATER PUMP SHAFT	1
9	SCREW (M6X40)	2
10	COMPLETE WATER PUMP	1
11	"L" FITTING	1
12	SCREW (M6X20)	2
13	WASHER	1
14	WATER PUMP BODY	1
15	RETAINING RING	1
16	BUSHING	1
17	SEEGER RING	1



WATER PUMP

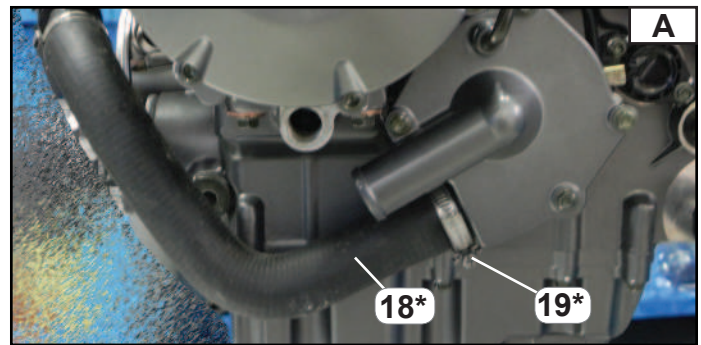
WATER PUMP REMOVAL/FITTING

Removal:

NOTE

Remove coolant before removing parts.

1. Remove the two pump delivery and return hoses (17*-18*), taking off the clamps (19*) Fig.A.
 2. Remove the 4 fastening screws (9) and take out the pump Fig.B
 3. Take out all of the parts in the order shown in the exploded drawings and check to ensure each part is intact.
- Parts showing signs of wear must be replaced.



IMPORTANT NOTICE

If the ceramic seals (3) are no longer tight, it is possible to see dripping from the hole shown in Fig.C

NOTE

The numbers marked (*) are shown in the replacement parts table in the "Cooling circuit" chapter, "radiator removal" section.



Fitting:

1. Once each part has been checked, proceed to assemble the pump, lubricating the pump shaft (8), bushing (16). and bearings (6) with engine oil and following the procedure for removal described above, this time in reverse order.

NOTE

When inserting the pump, make sure that the groove in the water pump shaft (8) is facing the direction shown in Fig.B.

2. Apply thread locker to the 4 screws (9) and tighten to the following torque:



Torque 12 N*m



Use Loctite thread locker to secure.





THERMOSTAT

THERMOSTAT REMOVAL/FITTING

Removal:

1. Remove the two screws (15*) fastening the thermostat cup (14*) Fig. A
2. Take out the thermostat (13*)

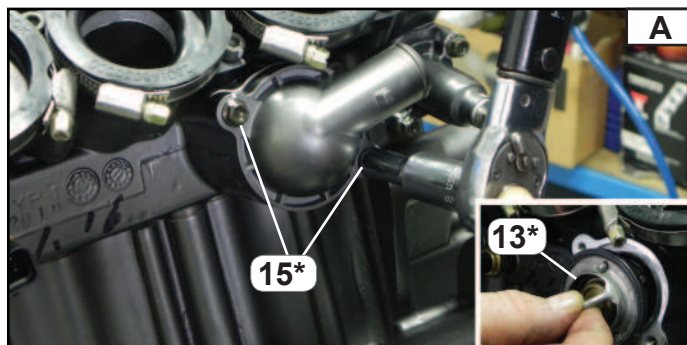
NOTE

Remove coolant before carrying out these steps.

Check:

- The by-pass hole (A)
- If there is any clogging, replace.
- Thermostat (13*)

If it does not open at 75° ~ 90° C (167~ 194° F) replace Fig.B.


Thermostat check

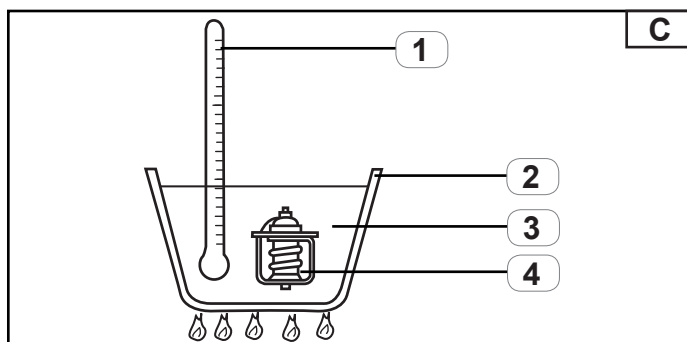
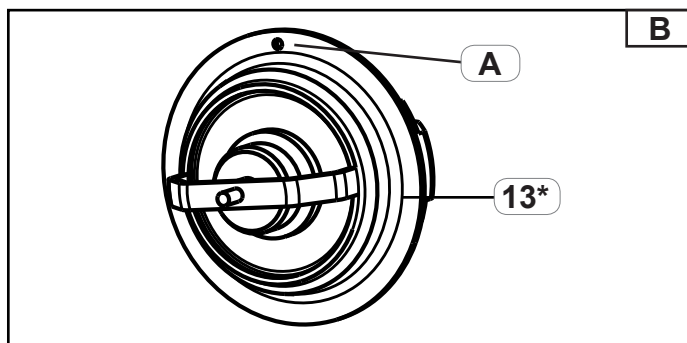
1. Immerse the thermostat in a container full of water Fig. C
2. Slowly heat the water.
3. Immerse a thermometer in water.
4. Mixing the water, monitor the thermostat and the temperature reading on the thermometer.
5. When the temperature of 75°C is reached, the thermostat valve will start to open, reaching a temperature of 90°C. The thermostat valve will open to at least 7 mm.

Key to Fig. C

1. Thermometer
2. Container
3. Water
4. Thermostat

Thermostat opening/closure graphic Fig. D

- A. Completely closed
B. Completely open


IMPORTANT NOTICE

If there are any doubts as to thermostat precision, it is better to replace it. A faulty thermostat can cause serious overheating or overcooling.

Fitting:

1. Fit the thermostat with bypass hole (A) Fig. B facing upwards
2. Apply thread locker to the 2 screws (15*) and tighten to the following torque:



Torque 12 N*m



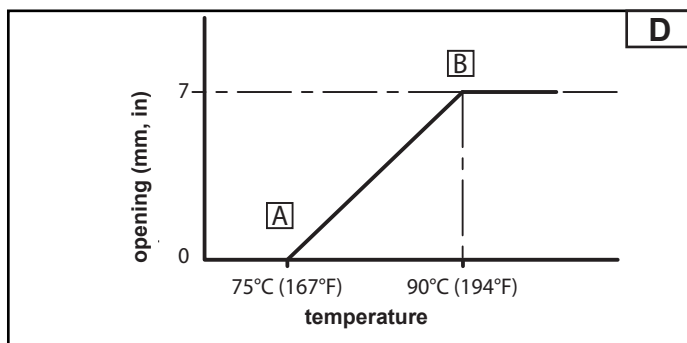
Use Loctite thread locker to secure.

NOTE

Add coolant once these steps have been completed.

NOTE

The numbers marked (*) are shown in the replacement parts table in the Chapter 5, "Head distribution" chapter, "valve flap and tappet shim removal" section.





MANIFOLD

MANIFOLD REMOVAL/FITTING

Removal:

1. Remove the two screws (11*) fastening the water fitting (12*) Fig. A

Check:

- The water fitting (12*)
If there is any damage/breakage, replace.
- The seal (39*).
If there is any damage/breakage, replace.

Fitting:

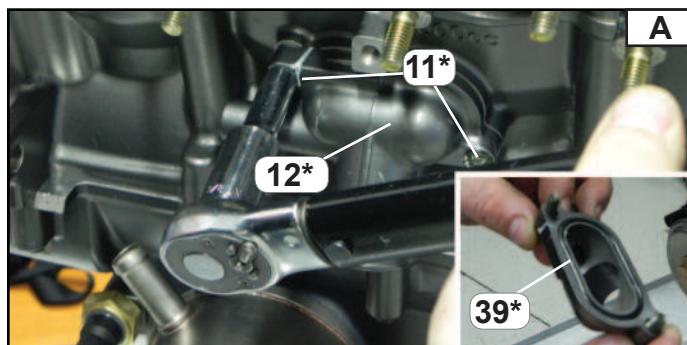
1. Install the water fitting (12*) complete with gasket (39*)
2. Apply thread locker to the 2 screws (11*) and tighten to the following torque:



Torque 12 N*m



Use Loctite thread locker to secure.

**NOTE**

Add coolant once these steps have been completed.

NOTE

The numbers marked (*) are shown in the replacement parts table in the Chapter 5, "Crank gear" chapter, "crankshaft half bearings and engine shaft fitting" section.



HEAT EXCHANGER

HEAT EXCHANGER REMOVAL/FITTING

Removal:

1. Remove the connection pipes (10*) and (13*) of the distributor (3*), loosening the clips (9*) Fig. A

NOTE

The numbers marked (*) are shown in the replacement parts table in Chapter 5 "Cooling circuit" chapter, "radiator removal" section.

2. Remove the screw (5*) fastening the distributor (3*) and gasket (4*) Fig.B.

Check:

- visually inspect the distributor for any build up or breakages
If there is any damage/breakage, replace.

Fitting:

1. Assemble the screw (5*) and gasket (4*) to the distributor (3*)
2. Tighten the screw (5*) to the following torque:



Torque 60 N*m

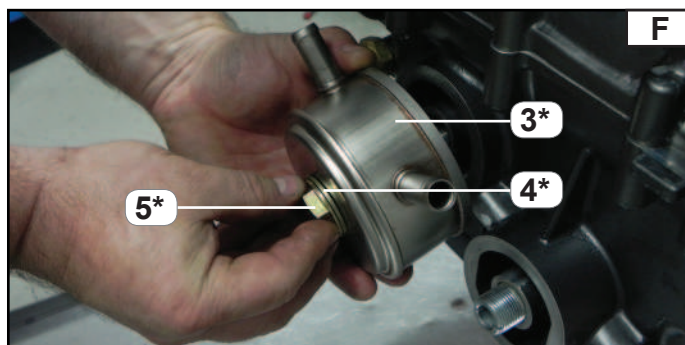
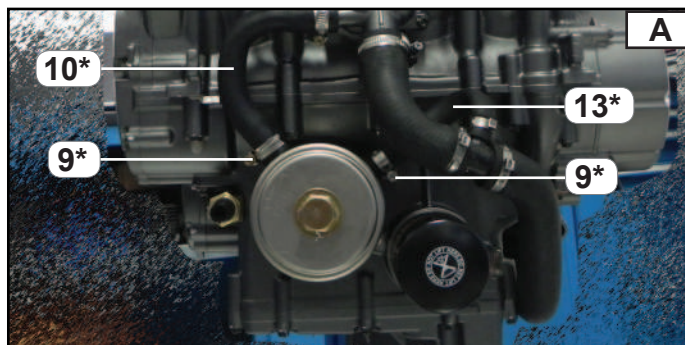
NOTE

The numbers marked (*) are shown in the replacement parts table in Chapter 5 "Lubrication circuit" .

3. Connect the connection pipes (10*) and (13*) of the distributor (3*), tightening the clips (9*) Fig. A

NOTE

If not worn, re-use the clips previously removed, otherwise replace them.

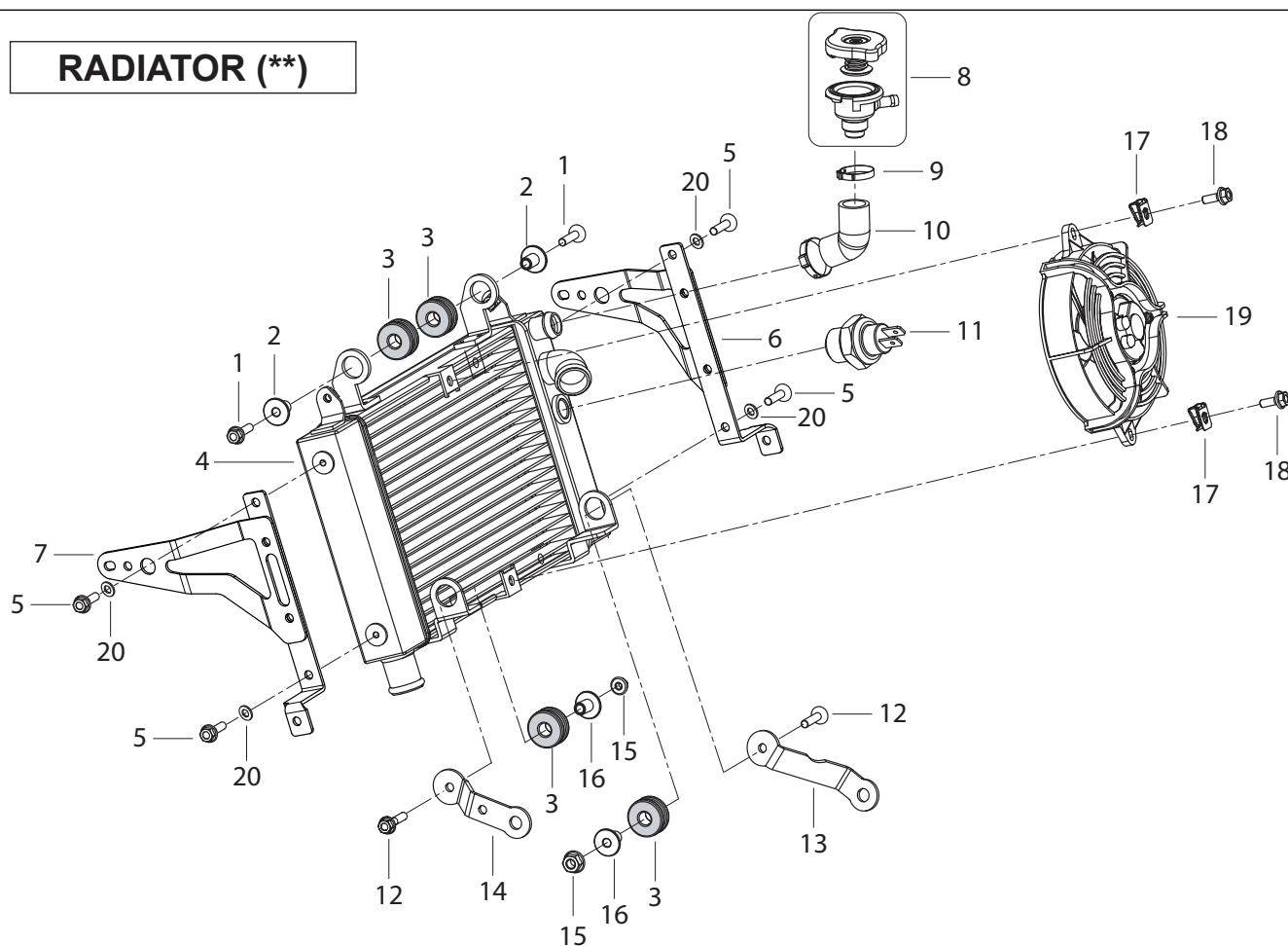




RADIATOR

RADIATOR REMOVAL/FITTING

RADIATOR (**)



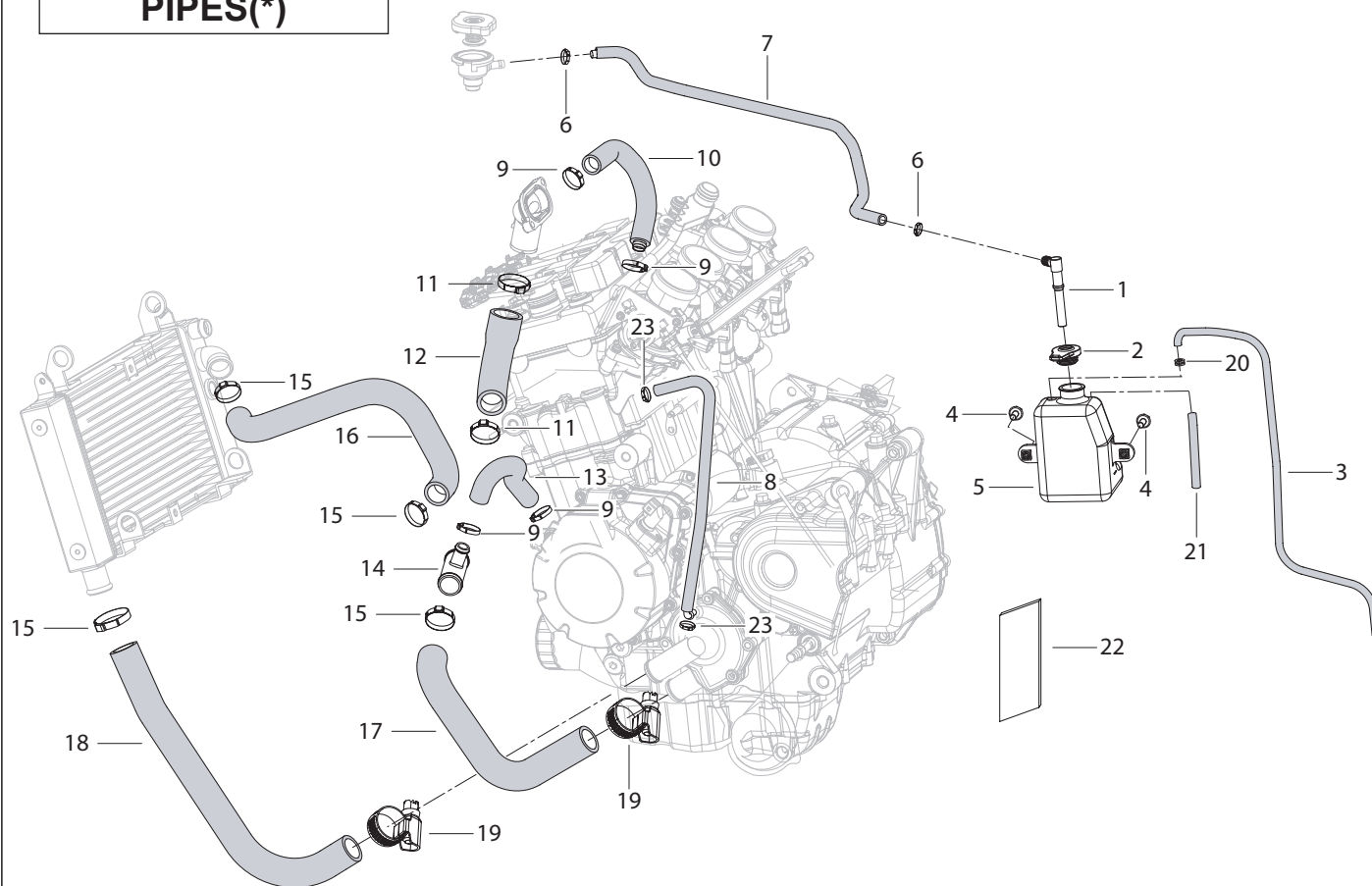
Position	Description	Quantity
1	SCREW	2
2	BUSHING	2
3	RUBBER TIP	4
4	WATER RADIATOR	1
5	SCREW	4
6	LH RADIATOR GUARD	1
7	RH RADIATOR GUARD	1
8	WATER DELIVERY OPENING	1
9	CLIP	2
10	HOSE	1
11	RADIATOR BULB	1
12	SCREW (M6X30)	2
13	RIGHT BRACKET	1
14	LEFT BRACKET	1
15	NUT	2
16	BUSHING	2
17	SNAP-ON CLIP (M6)	2
18	SCREW (M6X12)	2
19	FAN	1



RADIATOR

RADIATOR REMOVAL/FITTING

PIPES(*)



Position	Description	Quantity
1	SUCTION PIPE	1
2	WATER TANK CAP	1
3	PIPE	1
4	TEF SCREW M6X14 8.8 ZB	2
5	WATER TANK	1
6	CLIP	4
7	PIPE	1
8	PIPE	1
9	CLIP	4
10	HOSE	1
11	CLIP	2
12	HOSE	1
13	HOSE	1
14	"T" FITTING	1
15	CLIP	5
16	HOSE	1
17	HOSE	1
18	HOSE	1
19	SCREW CLIP	2



RADIATOR

RADIATOR REMOVAL/FITTING

Position	Description	Quantity
20	RUBBER VIBRATION DAMPING PAD	1
21	PIPE	1
22	THERMAL PROTECTION	1
23	CLIP	2

IMPORTANT NOTICE

Remove coolant before carrying out these steps.

Removal:

1. Remove the connecting pipe (18*), loosening the clip (19*) Fig.A

NOTE

The numbers marked (*) are shown in the replacement parts table in Chapter 6 "COOLING CIRCUIT" "radiator removal/fitting" paragraph PIPES(*).

After taking off the two top outer fairings on the right and left:

2. Remove the two screws (1**-12**) fastening the radiator to the frame. Fig.B e and the fastening screw (12**) on the opposite side Fig.C
3. Remove the clamp fastening the hose (10**) Fig. D

NOTE

The numbers marked (**) are shown in the replacement parts table in Chapter 6 "COOLING CIRCUIT" "radiator removal/fitting" paragraph RADIATOR (**).

Check:

- the radiator fins.
- In the event of obstruction, clean.
Use a jet of compressed air to the rear section of the radiator.
- In the event of damage, repair or replace.

NOTE

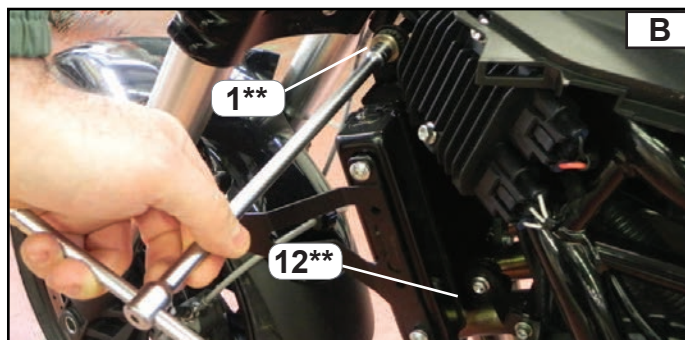
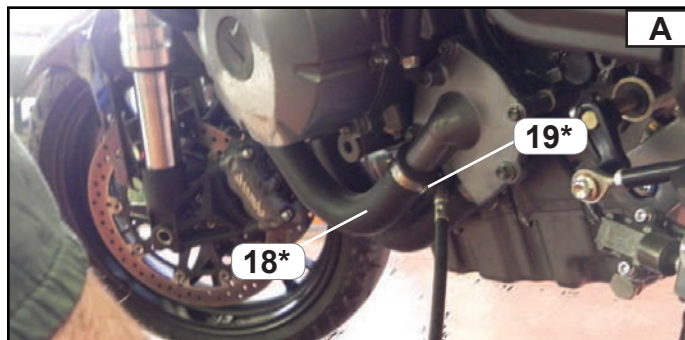
Straighten any fins with a fine, flathead screwdriver.

Check:

- the radiator hoses.
 - the radiator pipes.
- If there is any cracking/damage, replace.

Check:

- the radiator vent (19**)
- In the event of damage, replace.
If operation is faulty, check and repair.





RADIATOR

RADIATOR REMOVAL/FITTING

Fitting:

1. Once each part has been checked, proceed to assemble the radiator, following the procedure for removal described above, this time in reverse order.
2. Tighten the fastening screws of the radiator (1**-12**) to the following torque:



Torque 10 N*m

3. The clips ("klik" 10**) must be replaced each time they are open.
4. Once the parts are assembled, connect the electrical parts of the radiator bulb and fan and proceed to fill the circuit Fig.E

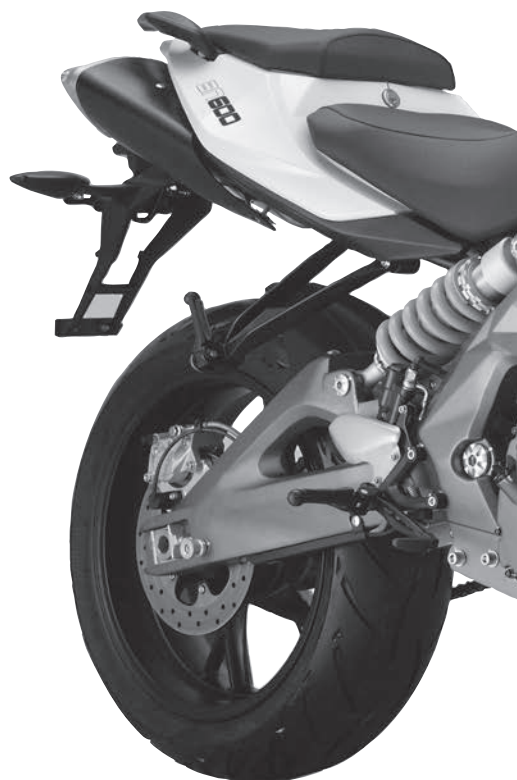


NOTE

While filling the circuit, pinch the hose as the fluid is being delivered to remove any air bubbles.



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