



TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

Revision Record			
Rev. No.	Date	Page	Description
01	11/06/2012	Chapter B	Inserted " Tables of periodic maintenance MY11".
01	11/06/2012	D.20	"Shock absorber adjustment": Inserted different values for models and Model year
01	11/06/2012	D.21	"Shock absorber spring preload adjustment (TE-TC-TXC): Inserted different values for models and Model year
01	11/06/2012	D.23	"Shock absorber damping adjustment"): Inserted different values for models and Model year
01	11/06/2012	D.24	"KAYABA fork adjustment (TC - TE - TXC)": Inserted different values for models and Model year
01	11/06/2012	D.25	"Fork oil level (TC - TE - TXC)": Inserted different values for models and Model year
01	11/06/2012	D.26	"Fork oil level (SMR)": Inserted different values for models and Model year
01	22/06/2012	M.2	Updated index cause correction applied on page M.56
01	22/06/2012	M.3	Updated index cause corrections applied on pages M.58 - M.59
01	22/06/2012	M.56 M.57 M.58 M.59	"Digital dashboard, warning lights (TE - SMR)": Inserted different instructions for models and Model year; "Digital dashboard drawings": Applied correction; "Instructions for the instrument setting": Inserted new note.
02	18/07/2012	D.12	"Engine oil level check": modified procedure in the paragraph.
02	18/07/2012	D.14	"Engine oil replacement and mesh filters-filter cartridge cleaning or replacement": modified procedure in the paragraph.

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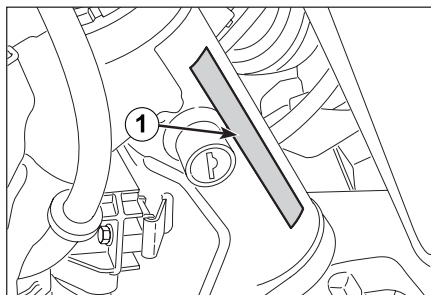
Workshop Manual

TC 449 2011/2012 I.E. TE 449 - 511 2011/2012 I.E. TXC 449 - 511 2011/2012 I.E. SMR 449 2011 I.E. SMR 511 2011/2012 I.E.

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MODELS COVERED (from serial number onwards)



1. Chassis serial number

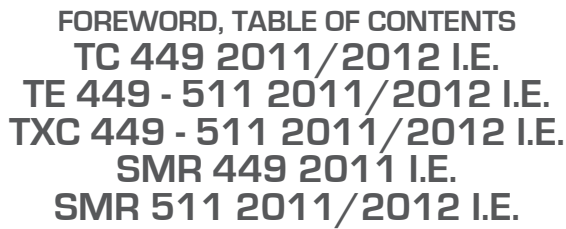
MY11

TC 449: ZKHA600AABV050001
TC 449 (USA): ZKHTC443#BV000001
TE 449: ZKHA600AABV000001
TE 511: ZKHA601AABV000001
TE 449 (USA): ZKHKEEFM#BV000001
TE 511 (USA): ZKHKEEGM#BV000001
TXC 449 (USA): ZKHTX440#BV000001
TXC 511 (USA): ZKHTX510#BV000001
SMR 449: ZKHA600ABBV000001
SMR 499 (USA): ZKHLEEFM#BV000001
SMR 511: ZKHA601ABBV000001
SMR 511 (USA): ZKHLEEGM#BV000001

MY12

TC 449: ZKHA600AABV050001
TC 449 (USA): ZKHTC443#BV000001
TE 449: ZKHA600AABV000001
TE 511: ZKHA601AABV000001
TE 449 (USA): ZKHKEEFM#BV000001
TE 511 (USA): ZKHKEEGM#BV000001
TXC 449 (USA): ZKHTX440#BV000001
TXC 511 (USA): ZKHTX510#BV000001

SMR 511: ZKHA601ABBV000001
SMR 511 (USA): ZKHLEEGM#BV000001



This publication is designed for use by **HUSQVARNA** Service Centres to assist authorised personnel in the maintenance and repair of the models covered in this manual. The technical information provided in this manual is a critical complement to operator training and operators should become thoroughly familiar with it.

For ease of understanding, diagrams and photographs are provided next to the text.

Notes with special significance are identified as follows throughout the manual:



Accident-prevention rules for operator and persons working nearby.



Damage to vehicle and/or its components may result from noncompliance with relevant instructions.



Additional information concerning the operation covered in the text.

Useful tips

To prevent problems and ensure effective service work, observe the following **HUSQVARNA** recommendations:

- before repair, evaluate the customer's description of the problem and ask the appropriate questions to clearly identify problem symptoms;
- diagnose the problem and identify the causes clearly. This manual provides basic background information that must be supplemented with the operator's expertise and specific training available through **HUSQVARNA** held at regular periods;
- plan ahead before starting work: gather any spare parts and tools to avoid unnecessary delays;
- avoid unnecessary disassembly work to get to the part that needs repairing.

Always read the relevant instructions and follow the disassembly sequence outlined in this manual.

Recommended shop practices

- 1 Always replace gaskets, sealing rings and split pins with new ones.
- 2 When loosening or tightening nuts or bolts, always begin with the bigger ones or from the centre. Tighten to the specified torque and follow a cross pattern.
- 3 Always mark any parts or positions that might be confused upon assembly.
- 4 Use genuine **HUSQVARNA** parts and the recommended lubricant brands.
- 5 Use special tools where specified.
- 6 Technical Bulletins might contain more up-to-date setting data and procedures than this manual. Be sure to read them.

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NOTES

Unless otherwise specified, data and specifications apply to all models.



IMPORTANT NOTICES
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Section

b



1) **TC and TXC** models are RACING motorcycles and are warranted to be free from operating defects; a scheduled maintenance chart for racing use is provided in Section B.

2) The **TE and SMR** models are for ROAD USE; it is warranted to be free from defects and covered by legal warranty, provided that the STANDARD CONFIGURATION IS MAINTAINED and the maintenance chart provided in Section B is observed.

* This motorcycle has not been designed to travel over long distances with the engine at top rpm, as in long-distance road or highway travel. Riding over long distances at full throttle may result in severe engine damage.



* ALWAYS remember that these motorcycles are specifically designed for racing, i.e. for usage conditions significantly different from those experienced in regular road use.

* In order to maintain the vehicle's "Guarantee of Functionality", the client must follow the maintenance programme indicated in Section B by having the required maintenance inspections carried out at authorised HUSQVARNA dealers. The cost for changing parts and for the labour necessary in order to comply with the maintenance plan is charged to the Client. The warranty becomes NULL AND VOID if the motorcycle is rented.

Notes

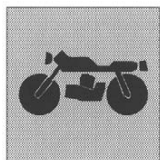
Left and right side is determined when seated on motorcycle.

Z: number of teeth

A: Austria
 AUS: Australia
 B: Belgium
 BR: Brazil
 CDN: Canada
 CH: Switzerland
 D: Germany
 E: Spain
 F: France
 FIN: Finland
 GB: Great Britain
 I: Italy
 J: Japan
 USA: United States of America



Unless otherwise specified, data and instructions apply to all market variants.

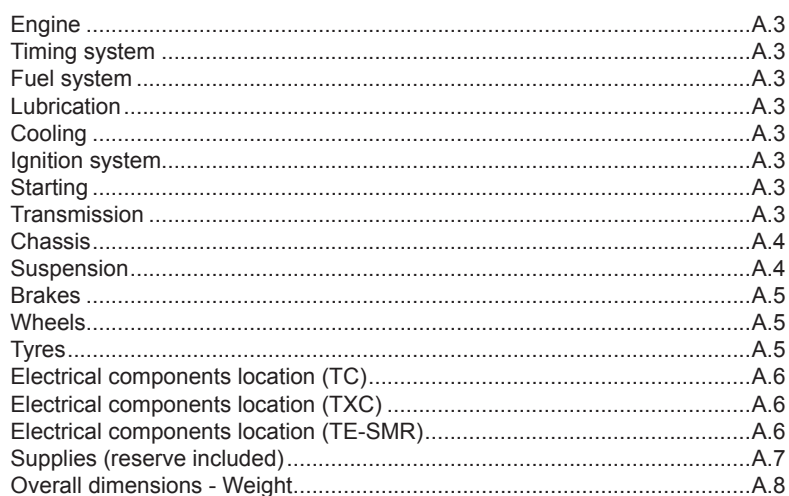
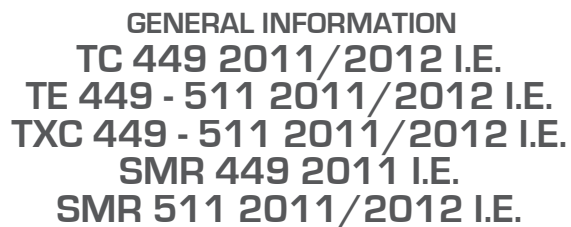


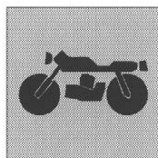
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A





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Engine

Single cylinder, 4 stroke

TC-TE-TXC-SMR 449

Bore 3.86 in (98 mm)

Stroke 2.35 in (59.6 mm)

Displacement 27.44 cu.in (449.6 cu.cm)

Compression ratio (TC) 13:1

Compression ratio (TE-TXC-SMR) 12:1

TE-TXC-SMR 511

Bore 3.98 in (101 mm)

Stroke 2.35 in (59.6 mm)

Displacement 29.14 cu.in (477.5 cu.cm)

Compression ratio 12:1

Timing system

Type double overhead camshaft; chain operated; 4 valve

Valve clearance (with engine cold)

TE-TXC-SMR

INTAKE 0.002 ÷ 0.004 in (0.05 ÷ 0.10 mm)

EXHAUST 0.01 ÷ 0.012 in (0.25 ÷ 0.30 mm)

TC

INTAKE 0.008 ÷ 0.01 in (0.20 ÷ 0.25 mm)

EXHAUST 0.012 ÷ 0.014 in (0.30 ÷ 0.35 mm)

Fuel system

Type Electronic injection feed

Air filtering through lubricated filter

Lubrication

Type wet sump with two lobe pumps and cartridge filter

Cooling

Liquid with double radiator and electric fan

Ignition system

Electronic, capacitive discharge with adjustable advance (digital control)

Spark plug type "NGK" CR 9EKB

Spark plug electrode gap 0.03 in (0.7 mm)

Starting electric

Transmission

Clutch: oil bath multiple disc clutch, hydraulic control

Transmission: with constant mesh gears

Motion is transmitted from engine to gearbox primary shaft through spur gears

Primary drive

Drive pinion gear Z 32

Clutch ring gear Z 22

Transmission ratio 2.618

Gear ratios (TC)

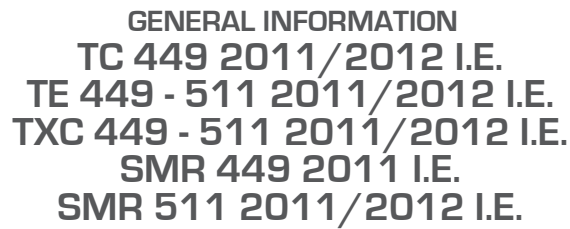
1st gear 2.286 (32/14)

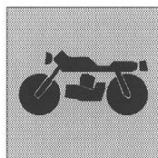
2nd gear 1.875 (30/16)

3rd gear 1.533 (23/15)

4th gear 1.260 (29/23)

5th gear 1.043 (24/23)





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Brakes

Front (TC - TE - TXC)

Fixed disc type "WAVE" Ø 10.24 in (Ø 260 mm) with hydraulic control and floating calliper.

Brake pad surface area 2.56 sq.in (16.50 sq.cm) x 2

Front (SMR)

"WAVE" Ø 12.6 in (Ø 320 mm) with hydraulic control and floating calliper.

Brake pad surface area 1.53 sq.in (9.90 sq.cm) x 2

Separate hydraulic circuit and master cylinder with control on right handlebar.

Rear

Fixed disc type "WAVE" Ø 9.45 in (Ø 240 mm) with hydraulic control and floating calliper

Brake pad surface area 1.82 sq.in (11.76 sq.cm) x 2

Separate hydraulic circuit, pedal and master cylinder on right side of vehicle.

Wheels

Rims

Front (TC - TE - TXC)..... in light alloy: 1.6x21"

Front (SMR)..... in light alloy: 3.5x17"

Rear (TC)..... in light alloy: 2.15x19"

Rear (TE - TXC) in light alloy: 2.15x18"

Rear (SMR) in light alloy: 4.25x17"

Tyres

(TC)

Front 80/100x21"

Rear 110/90x19"

(TXC)

Front 80/100x21"

Rear 110/100x18"

(TE)

Front 90/90x21"

Rear 140/80x18"

(SMR)

Front 120/70x17"

Rear 150/60x17"

Cold tyre pressure

Front

TC 12.8 ÷ 14.22 psi (0.9 ÷ 1.0 Kg/sq.cm)

TE - TXC (*) 12.8 ÷ 14.22 psi (0.9 ÷ 1.0 Kg/sq.cm)

TE (%) 15.65 psi (1.1 Kg/sq.cm)

SMR (*) 19.91 psi (1.4 Kg/sq.cm)

SMR (▲) 25.6 psi (1.8 Kg/sq.cm)

SMR (&) 28.45 psi (2.0 Kg/sq.cm)

Rear

TC 11.38 ÷ 12.8 psi (0.8 ÷ 0.9 Kg/sq.cm)

TE - TXC (*) 11.38 ÷ 12.8 psi (0.8 ÷ 0.9 Kg/sq.cm)

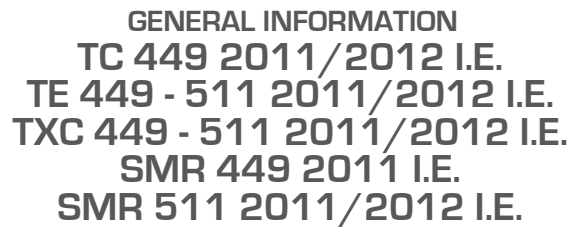
TE (%) 14.22 psi (1.0 Kg/sq.cm)

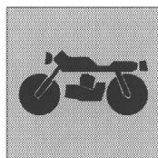
SMR (*) 22.76 psi (1.6 Kg/sq.cm)

SMR (▲) 28.45 psi (2 Kg/sq.cm)

SMR (&) 31.29 psi (2,2 Kg/sq.cm)

(*) Racing use - (%) Road use - (▲) Rider only - (&) Rider and passenger



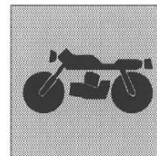


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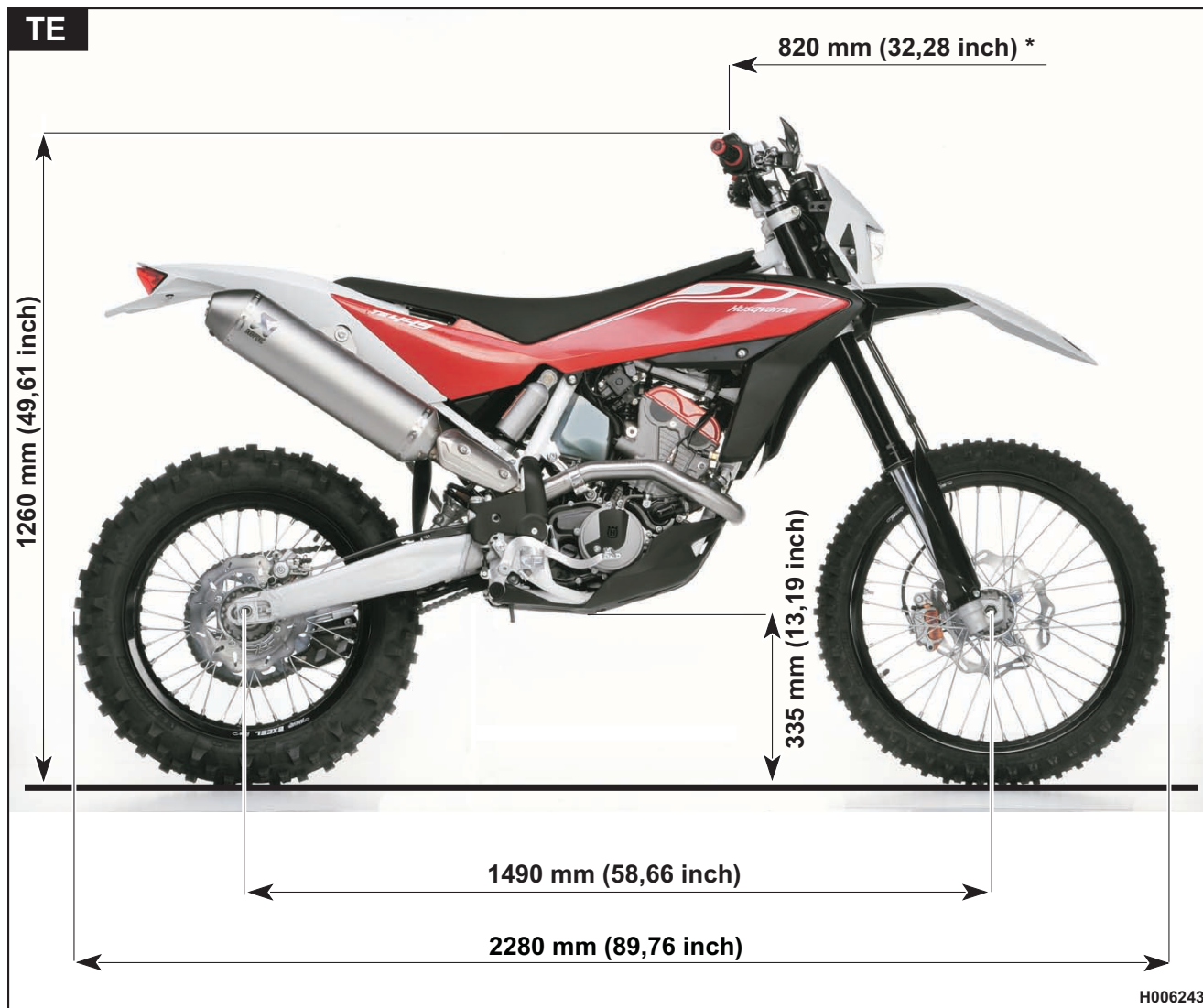
Supplies (reserve included)	Type	Quantity
Fuel tank (TC)	Unleaded fuel 95R0Z/R0N	2.25 gal (8.5 litres)
Fuel tank (TE-SMR 499/511)	Unleaded fuel 95R0Z/R0N	2.25 gal (8.5 litres)
Fuel tank (TE-SMR 499/511 USA)	Unleaded fuel 95R0Z/R0N	2.51 gal (9.5 litres)
Fuel tank (TXC)	Unleaded fuel 95R0Z/R0N	2.51 gal (9.5 litres)
Gearbox lubrication oil, engine oil	CASTROL GPS SAE 10W-40	Max 0.3 gal (1.15 litres) (oil change and oil filter replacement) 0.26 gal (1 litres) (oil change)
Front fork oil	CASTROL SYNTHETIC FORK OIL 5W	33.93 cu.in (556 cu.cm)
TC - TXC:		11.35 cu.in (186 cu.cm)
Cartridge:		22.58 cu.in (370 cu.cm)
Fork sleeve:		40.28 cu.in (660 cu.cm)
TE:		45.16 cu.in (740 cu.cm)
SMR:		
Rear shock absorber oil	CASTROL SYNTHETIC FORK OIL (5W)	
Cooling system fluid	CASTROL MOTORCYCLE COOLANT	0.24 gal (0.9 litres)
Front brake fluid	CASTROL RESPONSE SUPER (DOT 4)	
Rear brake fluid	CASTROL RESPONSE SUPER (DOT 4)	
Clutch fluid	CASTROL RESPONSE SUPER (DOT 4)	
Drive chain lubrication	CASTROL CHAIN LUBE RACING	
Grease lubrication	CASTROL LM GREASE 2	
Electric contact protection	CASTROL METAL PARTS CLEANER	
Fillers for radiator	AREXONS LIQUID FILLER	
Air filter oil	AGIP FORMULA FILTER "Foam air filter protection oil"	
Air filter detergent	AGIP "Filter clean foam air detergent fluid"	

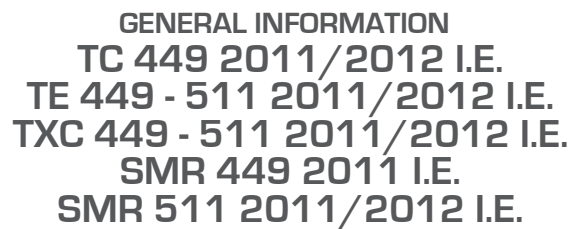
IMPORTANT - Do not add any additives to fuel or lubricants.

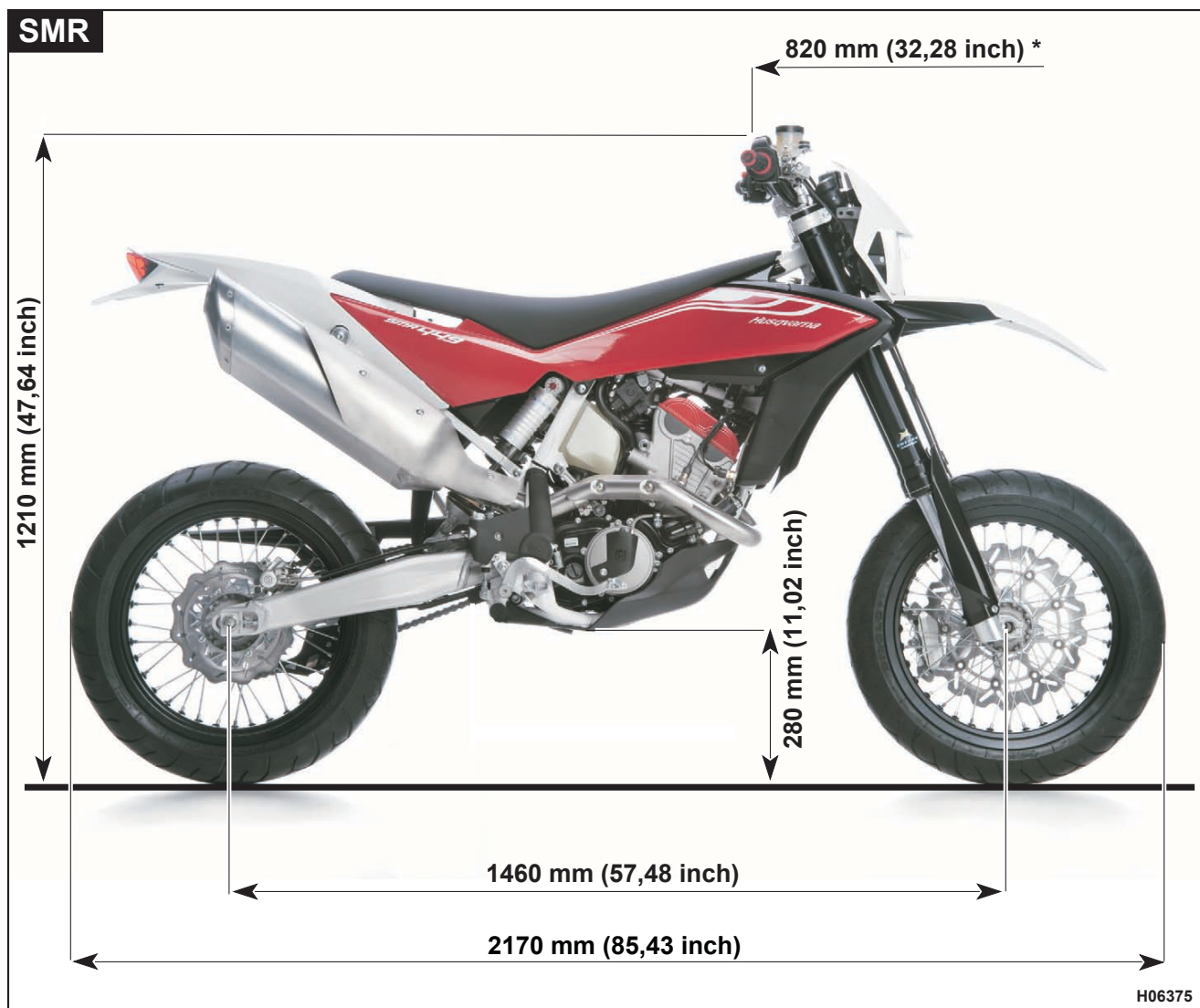
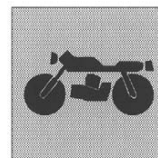


Overall dimensions - Weight

Kerb weight, without fuel (TC):108 Kg (238.1 lb)
 Kerb weight, without fuel (TE): 113 Kg (249.12 lb)
 Kerb weight, without fuel (TXC): 110 Kg (242.51 lb)
 Kerb weight, without fuel (SMR): 123,5 Kg (272,27 lb)
 *: max. width







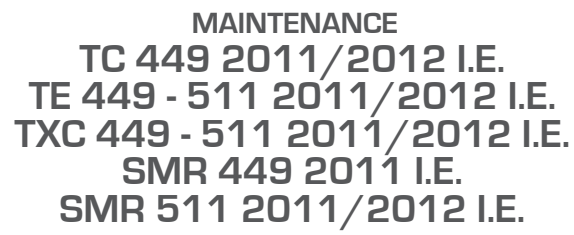


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Section

B



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TABLES OF PERIODIC MAINTENANCE MY11



TE -TXC 449 /511 MY11	SCHEDULED MAINTENANCE CHART (TO BE CARRIED OUT AT THE HUSQVARNA DEALER)				
COMPETITION MOTORCYCLE, RACING USE: WITH FULL POWER ENGINE					
ENGINE					
	EVERY 10 h	EVERY 20 h	EVERY 30 h	EVERY 70 h	REPLACE IF NECESSARY
ENGINE OIL	S				
ENGINE OIL FILTERS	S/P				X
VALVES			C (*)	S	
VALVE SPRINGS				C	X
VALVE SPRING RETAINERS, VALVE COLLETS				C	X
VALVE BUCKETS + ROCKER ARM				C	X
CYLINDER HEAD				C	
CAMSHAFT				C	
TIMING CHAIN SLIDER				C	X
TIMING CHAIN				S	
TIMING DRIVEN GEAR				C	X
TIMING DRIVE GEAR				C	X
TIMING CHAIN TENSIONER				C	X
INTAKE COUPLING	C				X
CYLINDER				C	X
CYLINDER HEAD GASKET				S	
SPARK PLUG	P			S	
PISTON				S	
CRANKSHAFT				S	
CRANKCASE BEARINGS				S	
OIL PUMP				C	
PRIMARY TORQUE LIMITER				C	X
GEARBOX				C	X
CLUTCH HUB				C	X
CLUTCH PLATES		C			X
CLUTCH PRESSURE PLATE				C	X
CLUTCH HOUSING				C	X
CLUTCH PUSHROD				C	X
STARTER GEARS				C	X
GEAR SHIFT PEDAL		C			
AIR FILTER	P/L (*)				X

C: CHECK

C (*): CHECK CLEARANCE

P: CLEAN

P/S (*): CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)

S: CHANGE

P/L (*): EVERY 5 HOURS FOR OFF-ROAD USE.



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TC 449 MY11	SCHEDULED MAINTENANCE CHART (TO BE CARRIED OUT AT THE HUSQVARNA DEALER)				
COMPETITION MOTORCYCLE, RACING USE: WITH FULL POWER ENGINE					
ENGINE					
	EVERY 10 h	EVERY 25 h	EVERY 50 h	EVERY 70 h	REPLACE IF NECESSARY
ENGINE OIL	S				
ENGINE OIL FILTERS	S/P				X
VALVES		C (*)	S		
VALVE SPRINGS			C		X
VALVE SPRING RETAINERS, VALVE COLLETS			C		X
VALVE BUCKETS + ROCKER ARM			C		X
CYLINDER HEAD				C	
CAMSHAFT			C		
TIMING CHAIN SLIDER			C		X
TIMING CHAIN			S		
TIMING DRIVEN GEAR			C		X
TIMING DRIVE GEAR			C		X
TIMING CHAIN TENSIONER			C		X
INTAKE COUPLING	C				X
CYLINDER			C		X
CYLINDER HEAD GASKET		S			
SPARK PLUG	P	S			
PISTON		S			
CRANKSHAFT		S			
CRANKCASE BEARINGS			S		
OIL PUMP			C		
PRIMARY TORQUE LIMITER		C			X
GEARBOX				C	X
CLUTCH HUB			C		X
CLUTCH PLATES	C				X
CLUTCH PRESSURE PLATE			C		X
CLUTCH HOUSING			C		X
CLUTCH PUSHROD			C		X
STARTER GEARS		C			X
GEAR SHIFT PEDAL	C				
AIR FILTER	P/L (*)				X

C: CHECK
C (*): CHECK CLEARANCE
L: LUBRICATE
P: CLEAN

P/S ():** CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
S: CHANGE
P/L (*): EVERY 5 HOURS FOR OFF-ROAD USE.



C:	CHECK	S:	CHANGE
C (*):	CHECK CLEARANCE	L:	LUBRICATE
P:	CLEAN		
P/S (**):	CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)		



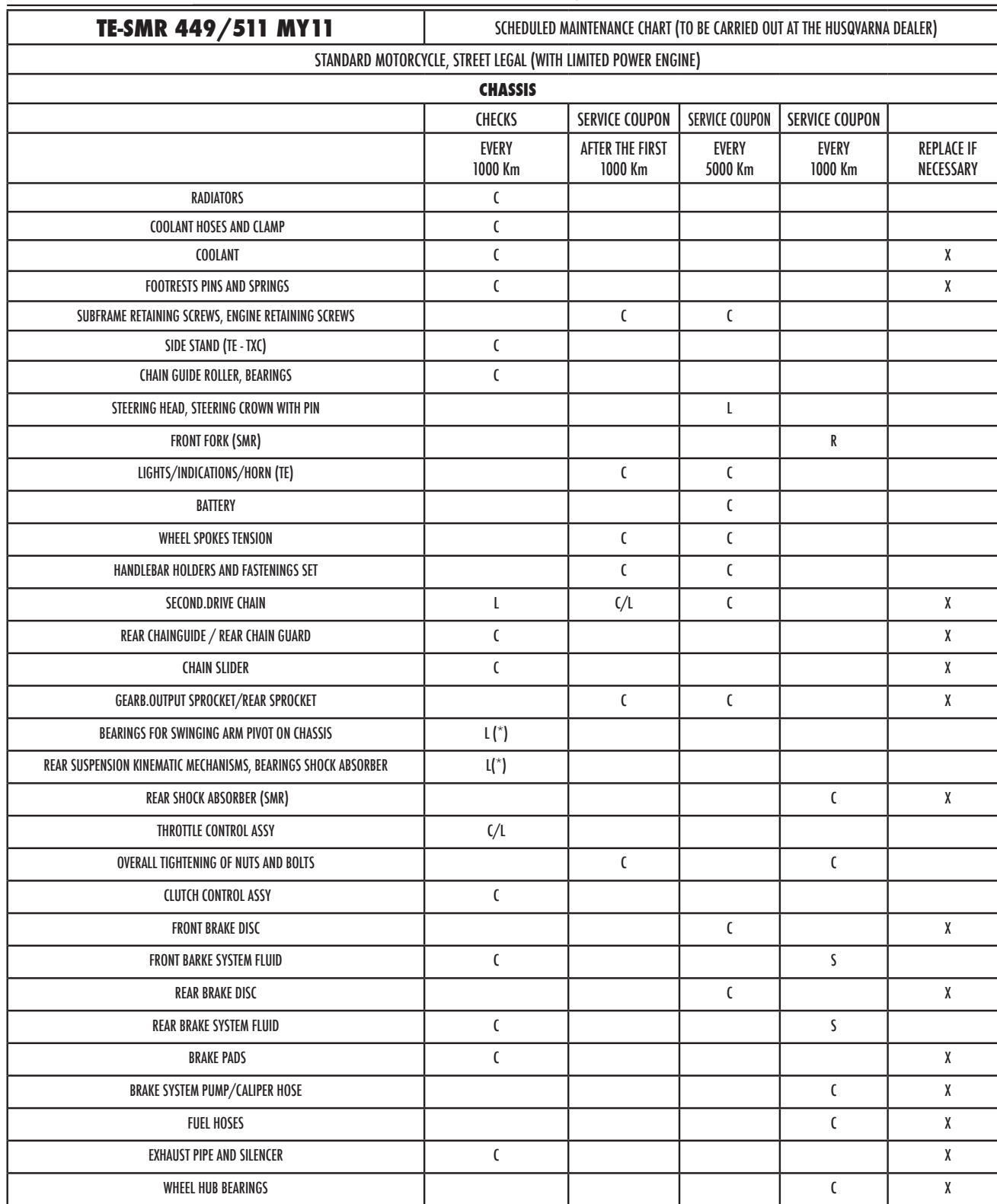
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TC 449 _TE -TXC 449 /511 MY11		SCHEDULED MAINTENANCE CHART (TO BE CARRIED OUT AT THE HUSQVARNA DEALER)			
COMPETITION MOTORCYCLE, RACING USE: WITH FULL POWER ENGINE					
CHASSIS					
	AFTER FIRST 3 HOURS (150 Km)	EVERY 4h (200 Km)	EVERY 8h (400 Km)	EVERY 16h (800 Km)	REPLACE IF NECESSARY
RADIATORS		C			
COOLANT HOSES AND CLAMP		C			
COOLANT		C			X
FOOTRESTS PINS AND SPRINGS		C			X
SUBFRAME RETAINING SCREWS, ENGINE RETAINING SCREWS	C		C		
SIDE STAND (TE - TXC)		C			
CHAIN GUIDE ROLLER, BEARINGS		C			
STEERING HEAD, STEERING CROWN WITH PIN			L		
LIGHTS/INDICATIONS/HORN (TE)	C		C		
BATTERY			C		
WHEEL SPOKES TENSION	C		C		
HANDLEBAR HOLDERS AND FASTENINGS SET	C		C		
SECOND.DRIVE CHAIN	C/L		S		
REAR CHAINGUIDE / REAR CHAIN GUARD		C			X
CHAIN SLIDER		C			X
GEARB.OUTPUT SPROCKET/REAR SPROCKET	C	C			X
BEARINGS FOR SWINGING ARM PIVOT ON CHASSIS		L (*)			
REAR SUSPENSION KINEMATIC MECHANISMS, BEARINGS SHOCK ABSORBER		L (*)			
THROTTLE CONTROL ASSY		C/L			
OVERALL TIGHTENING OF NUTS AND BOLTS	C			C	
CLUTCH CONTROL ASSY		C			
FRONT BRAKE DISC			C		X
FRONT BARKE SYSTEM FLUID		C		S	
REAR BRAKE DISC			C		X
REAR BRAKE SYSTEM FLUID		C		S	
BRAKE PADS		C			X
BRAKE SYSTEM PUMP/CALIPER HOSE				C	X
FUEL HOSES				C	X
EXHAUST PIPE AND SILENCER		C			X
WHEEL HUB BEARINGS				C	X

C: CHECK
C (*): CHECK CLEARANCE
L: LUBRICATE
L (*): LUBRICATE EVERY TIME AFTER WASHING WITH A PRESSURE WASHER

P: CLEAN
P/S ():** CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
R: FRONT FORK OVERHAUL
S: CHANGE



C:	CHECK	P:	CLEAN
C (*):	CHECK CLEARANCE	P/S (**):	CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
L:	LUBRICATE	R:	FRONT FORK OVERHAUL
L (*):	LUBRICATE EVERY TIME AFTER WASHING WITH A PRESSURE WASHER	S:	CHANGE



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TABLES OF PERIODIC MAINTENANCE MY12



C: CHECK
C (*): CHECK CLEARANCE
P: CLEAN

P/S ():** CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
S: CHANGE
P/L (*): EVERY 5 HOURS FOR OFF-ROAD USE.



MAINTENANCE
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TC 449 MY12		SCHEDULED MAINTENANCE CHART (TO BE CARRIED OUT AT THE HUSQVARNA DEALER)			
COMPETITION MOTORCYCLE, RACING USE: WITH FULL POWER ENGINE					
ENGINE					
	EVERY 10 h	EVERY 25 h	EVERY 40 h	EVERY 70 h	REPLACE IF NECESSARY
ENGINE OIL	S				
ENGINE OIL FILTERS	S/P				X
VALVES		C (*)	S		
VALVE SPRINGS			C		X
VALVE SPRING RETAINERS, VALVE COLLETS			C		X
VALVE BUCKETS + ROCKER ARM			C		X
CYLINDER HEAD				C	
CAMSHAFT			C		
TIMING CHAIN SLIDER			C		X
TIMING CHAIN			S		
TIMING DRIVEN GEAR			C		X
TIMING DRIVE GEAR			C		X
TIMING CHAIN TENSIONER			C		X
INTAKE COUPLING	C				X
CYLINDER			C		X
CYLINDER HEAD GASKET		S			
SPARK PLUG	P	S			
PISTON			S		
CRANKSHAFT			S		
CRANKCASE BEARINGS			S		
OIL PUMP			C		
PRIMARY TORQUE LIMITER		C			X
GEARBOX				C	X
CLUTCH HUB			C		X
CLUTCH PLATES	C				X
CLUTCH PRESSURE PLATE			C		X
CLUTCH HOUSING			C		X
CLUTCH PUSHROD			C		X
STARTER GEARS		C			X
GEAR SHIFT PEDAL	C				
AIR FILTER	P/L (*)				X

C:
C (*):
L:

CHECK
CHECK CLEARANCE
LUBRICATE

P:

P/S ():**

CLEAN
CLEAN OR CHANGE (depending on the conditions
of use of the motorcycle)

S:

P/L (*):

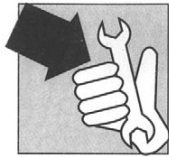
CHANGE
EVERY 5 HOURS FOR OFF-ROAD USE.



TE/SMR 449/511 MY12		SCHEDULED MAINTENANCE CHART (TO BE CARRIED OUT AT THE HUSQVARNA DEALER)			
STANDARD MOTORCYCLE, STREET LEGAL (WITH LIMITED POWER ENGINE)					
ENGINE					
	CHECKS	SERVICE COUPON	SERVICE COUPON	SERVICE COUPON	
	EVERY 1000 Km	AFTER THE FIRST 1000 Km	EVERY 5000 Km	EVERY 1000 Km	REPLACE IF NECESSARY
ENGINE OIL	C	S	S		
ENGINE OIL FILTERS		S	S		
VALVES		C (*)	C (*)	S	
VALVE SPRINGS				C	X
VALVE SPRING RETAINERS, VALVE COLLETS				C	X
VALVE BUCKETS + ROCKER ARM				C	X
CYLINDER HEAD				C	
CAMSHAFT				C	
TIMING CHAIN SLIDER				C	X
TIMING CHAIN				S	
TIMING DRIVEN GEAR				C	X
TIMING DRIVE GEAR				C	X
TIMING CHAIN TENSIONER				C	X
INTAKE COUPLING			C		X
CYLINDER				C	X
CYLINDER HEAD GASKET				S	
SPARK PLUG				S	
PISTON				S	
CRANKSHAFT				S	
CRANKCASE BEARINGS				S	
OIL PUMP				C	
PRIMARY TORQUE LIMITER				C	X
GEARBOX				C	X
CLUTCH HUB				C	X
CLUTCH PLATES			C		X
CLUTCH PRESSURE PLATE				C	
CLUTCH HOUSING				C	X
CLUTCH PUSHROD				C	X
STARTER GEARS				C	X
GEAR SHIFT PEDAL				C	X
AIR FILTER	P/L	P/L			

C: CHECK
C (*): CHECK CLEARANCE
P: CLEAN

P/S ():** CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
S: CHANGE
L: LUBRICATE



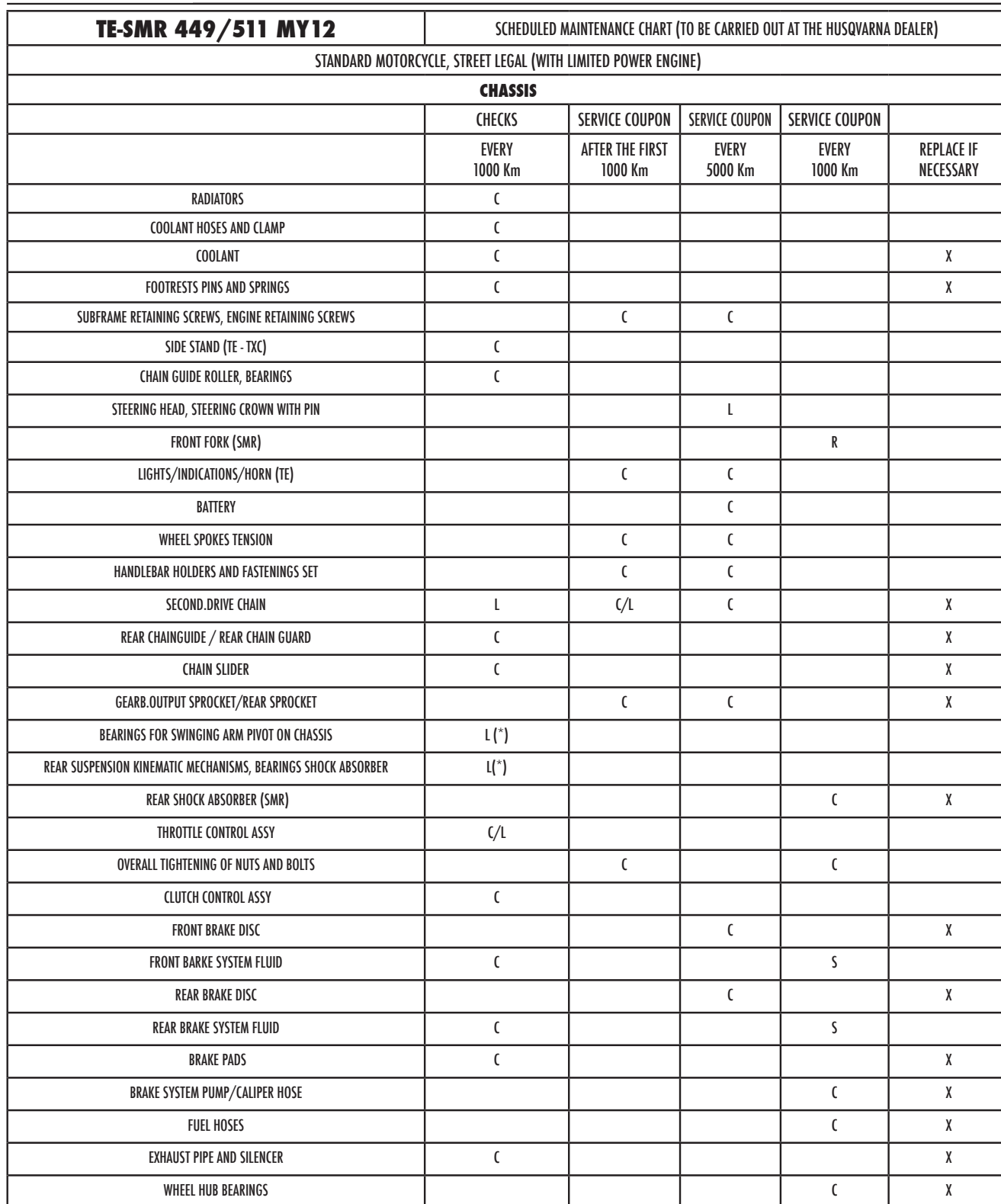
MAINTENANCE
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TXC 449 - 511 2011/2012 I.E.
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SMR 511 2011/2012 I.E.



TC 449 _TE -TXC 449 /511 MY12		SCHEDULED MAINTENANCE CHART (TO BE CARRIED OUT AT THE HUSQVARNA DEALER)				
COMPETITION MOTORCYCLE, RACING USE: WITH FULL POWER ENGINE						
CHASSIS						
	AFTER FIRST 4 HOURS	EVERY 4h	EVERY 8h	EVERY 16h	REPLACE IF NECESSARY	
RADIATORS		C				
COOLANT HOSES AND CLAMP		C				
COOLANT		C			X	
FOOTRESTS PINS AND SPRINGS		C			X	
SUBFRAME RETAINING SCREWS, ENGINE RETAINING SCREWS	C		C			
SIDE STAND (TE - TXC)		C				
CHAIN GUIDE ROLLER, BEARINGS		C				
STEERING HEAD, STEERING CROWN WITH PIN			L			
LIGHTS/INDICATIONS/HORN (TE)	C		C			
BATTERY			C			
WHEEL SPOKES TENSION	C		C			
HANDLEBAR HOLDERS AND FASTENINGS SET	C		C			
SECOND.DRIVE CHAIN	C/L		S			
REAR CHAINGUIDE / REAR CHAIN GUARD		C			X	
CHAIN SLIDER		C			X	
GEARB.OUTPUT SPROCKET/REAR SPROCKET	C	C			X	
BEARINGS FOR SWINGING ARM PIVOT ON CHASSIS		L (*)				
REAR SUSPENSION KINEMATIC MECHANISMS, BEARINGS SHOCK ABSORBER		L (*)				
THROTTLE CONTROL ASSY		C/L				
OVERALL TIGHTENING OF NUTS AND BOLTS	C			C		
CLUTCH CONTROL ASSY		C				
FRONT BRAKE DISC			C		X	
FRONT BARKE SYSTEM FLUID		C		S		
REAR BRAKE DISC			C		X	
REAR BRAKE SYSTEM FLUID		C		S		
BRAKE PADS		C			X	
BRAKE SYSTEM PUMP/CALIPER HOSE				C	X	
FUEL HOSES				C	X	
EXHAUST PIPE AND SILENCER		C			X	
WHEEL HUB BEARINGS				C	X	

C: CHECK
C (*): CHECK CLEARANCE
L: LUBRICATE
L (*): LUBRICATE EVERY TIME AFTER WASHING WITH A PRESSURE WASHER

P: CLEAN
P/S ():** CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
R: FRONT FORK OVERHAUL
S: CHANGE



P/S ():** CLEAN OR CHANGE (depending on the conditions of use of the motorcycle)
R: FRONT FORK OVERHAUL

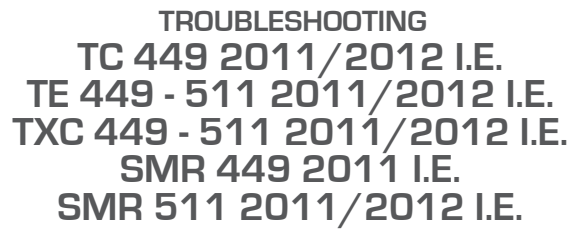


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Section

C



ENGINE

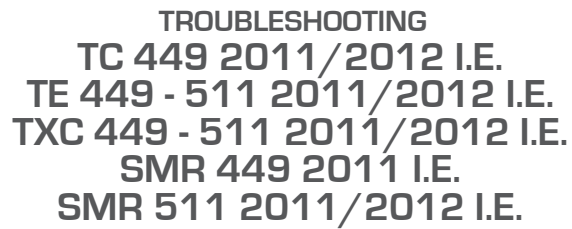
Trouble	Cause	Remedy
Engine does not start or has starting trouble	Insufficient compression	
	1. Piston seized	Replace
	2. Connecting rod small or big end seized	Replace
	3. Worn piston rings	Replace
	4. Worn cylinder	Replace
	5. Cylinder head loosely tightened	Tighten
	6. Head gasket leaking	Replace
	7. Spark plug loose	Tighten
	8. Incorrect valve clearances	Adjust
	9. Weak or seized valve springs	Replace
	10. Seized valves	Replace
	Weak or no spark	
	1. Spark plug faulty	Replace
	2. Fouled or wet spark plug	Clean or dry
	3. Spark plug electrode gap too wide	Adjust
	4. Ignition coil faulty	Replace
	5. High-tension cables open circuit or shorted	Check
	6. Electronic control unit faulty	Replace
	7. Right-hand switch faulty	Replace
	The throttle body is not receiving fuel	
	1. Faulty fuel pump relay	Change
	2. Faulty fuel pump	Check / change
	3. Clogged fuel inlet hose	Clean
Engine stalls easily	1. Fouled spark plug	Clean
	2. Electronic control unit faulty	Replace
	3. Dirty injector	Clean
	4. Low idle	Adjust
Engine is noisy	Noise seems to come from piston	
	1. Too much piston-to-cylinder clearance	Replace
	2. Worn piston rings or piston grooves	Replace
	3. Too much carbon build-up in combustion chamber or on piston crown	Clean
	4. Valve clearances too large	Adjust
	5. Weak or seized valve springs	Replace
	6. Worn timing chain	Replace
	7. Incorrect timing chain tension	Adjust
	Noise seems to come from crankshaft	
	1. Worn main bearings	Replace
	2. Connecting rod big end has too much side clearance or end float	Replace
	3. Crankshaft gear damaged	Replace
	4. Crankshaft locknut loose	Tighten



TROUBLESHOOTING
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Trouble	Cause	Remedy
Noise seems to come from the clutch	1. Worn plates 2. Too much clearance between clutch housing and friction plates	Replace Replace
Noise seems to come from gearbox	1. Worn gears 2. Worn gear grooves	Replace Replace
Noise seems to come from secondary drive chain	1. Chain stretched (worn) or improperly adjusted 2. Worn transmission sprocket and rear chain sprocket	Replace or adjust Replace
Clutch slips	1. Weak clutch springs 2. Worn clutch plates 3. Loosened clutch idler gear nut	Replace Replace Tighten nut
Clutch is hard to operate	1. Uneven spring load 2. Bent clutch plates	Replace Replace
Gears do not engage	1. Bent or seized shifter forks 2. Worn gear ratchets 3. Damaged shifter fork shafts	Replace Replace Replace
Gear shift pedal does not return to original position	1. Weak or broken selector return spring 2. Worn shifter forks	Replace Replace
Transmission jumps out of gear	1. Worn sliding gear dogs 2. Worn gear grooves 3. Worn dog slots in gears 4. Worn selector shaft splines 5. Damaged shifter fork shafts	Replace Replace Replace Replace Replace
Engine has low power	1. Dirty air filter 2. Poor fuel quality 3. Intake coupling loose 4. Spark plug electrode gap too wide 5. Insufficient compression 6. Incorrect valve clearances 7. Valve seats or guides faulty 8. Weak or seized valve springs	Clean Replace Tighten Adjust Identify cause Adjust Replace Replace
Engine overheats	1. Combustion chamber and/or piston crown fouled with carbon deposits 2. Insufficient oil in engine or wrong oil 3. Obstructions blocking air flow on radiator 4. Cylinder head gasket leaking 5. Clutch slips 6. Cooling fan faulty (TE-TXC-SMR) 7. Low coolant level	Clean Top up or change Clean Replace Adjust Replace thermal switch Top up to correct level



Trouble	Cause	Remedy
Handlebar turns hard	1. Insufficient tyre pressure	Inflate
	2. Bearing adjuster ring nut or steering stem nut overtightened	Adjust
	3. Bent steering stem	Replace bottom yoke
	4. Worn or seized steering bearings	Replace
Handlebar vibration	1. Bent fork legs	Replace
	2. Bent front wheel axle	Replace
	3. Warped chassis	Replace
	4. Bent front wheel rim	Replace
	5. Worn front wheel bearings	Replace
Damping is too hard	1. Too much oil in fork legs	Remove excess oil
	2. Fork oil viscosity too high	Change
	3. Overinflated tyres	Deflate
	4. Improperly set rear shock absorber	Adjust
Damping is too soft	1. Insufficient oil in fork legs	Top up
	2. Fork oil viscosity too low	Change
	3. Weak fork springs	Replace
	4. Weak rear shock absorber spring	Replace
	5. Improperly set rear shock absorber	Adjust
(Front / rear) wheel shakes	1. Bent wheel rim	Replace
	2. Worn wheel hub bearings	Replace
	3. Incorrect spoke tension	Adjust
	4. Wheel axle nut loose	Tighten
	5. Worn rear swinging arm bearings	Replace
	6. Improperly adjusted chain tensioners	Adjust
	7. Improperly balanced wheel	Balance
Rear suspension is noisy	1. Worn link rod spacers or bearings	Replace
	2. Worn shock absorber ball joints	Replace
	3. Shock absorber faulty	Replace
Poor braking (front and rear)	1. Air in brake system	Bleed
	2. Insufficient fluid in tank	Top up
	3. Worn brake pad and/or disc	Replace
	4. Damaged disc	Replace
	5. Improperly adjusted brake pedal	Adjust
	6. Water in brake system	Change fluid



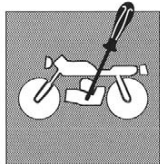
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ELECTRICAL SYSTEM (see also Section M)

Trouble	Cause	Remedy
Spark plug fouls easily	1. Dirty air filter 2. Worn piston rings 3. Worn piston or cylinder liner	Clean Replace Replace
Spark plug electrodes overheat	1. Spark plug electrode gap too close 2. Heat rating too high	Adjust Replace with recommended spark plug
Generator does not charge or is not providing enough charge	1. Cables running to voltage regulator improperly connected or shorted 2. Voltage regulator faulty 3. Generator coil faulty	Connect correctly or replace Replace Replace
Generator overcharges battery	1. Voltage regulator faulty	Replace
Battery does not hold charge	1. Battery terminals dirty	Clean
Starter motor does not start or slips	1. Battery is flat 2. Control on R.H. switch faulty 3. Starter relay faulty 4. Starter motor faulty 5. Worn starter gears 6. Worn or damaged freewheel rollers	Charge Replace Replace Repair or replace Replace Replace freewheel

INJECTION FUEL FEEDING SYSTEM (See Section S)

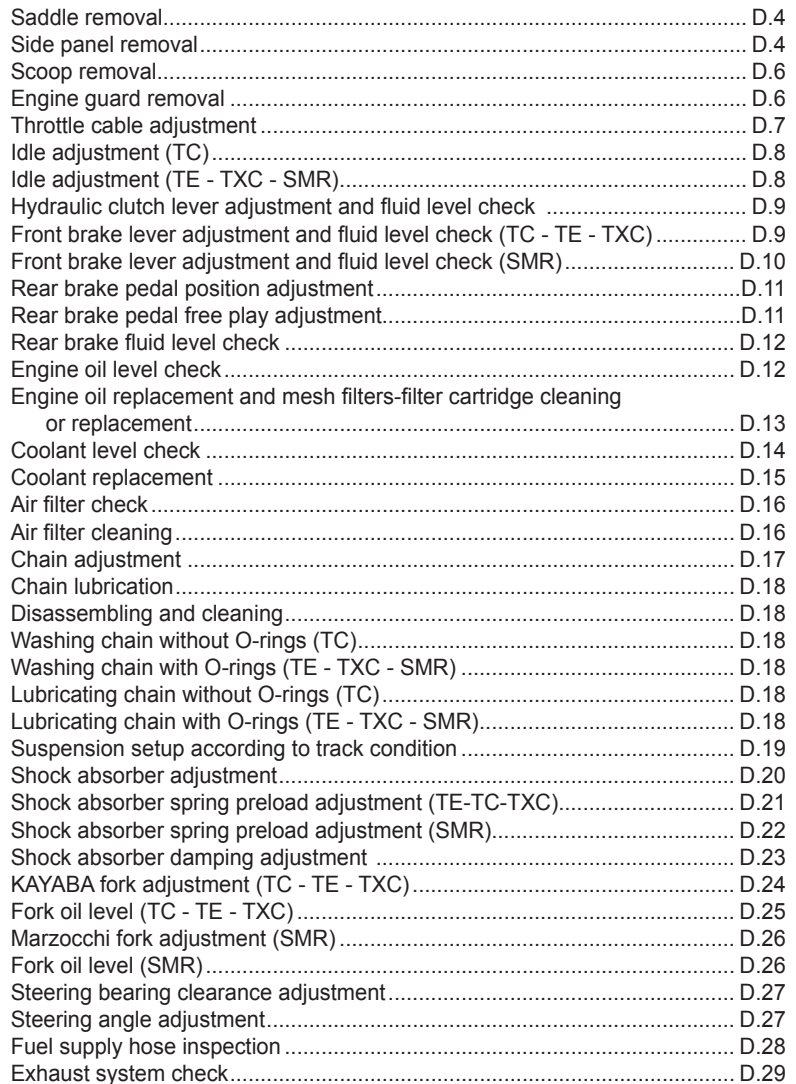
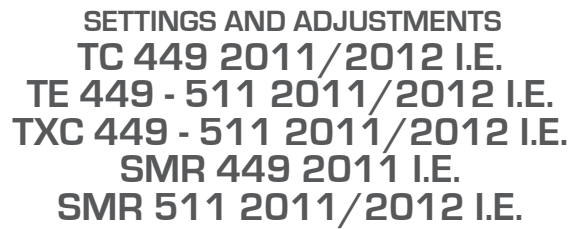


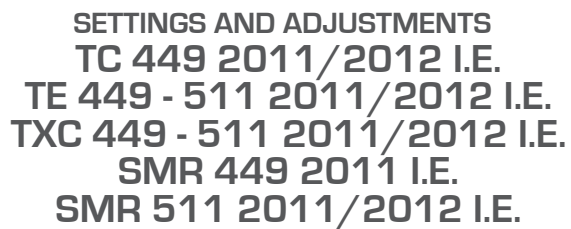
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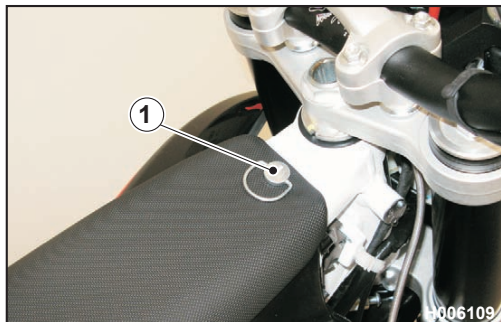
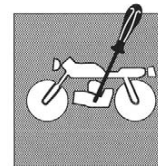


Section

D

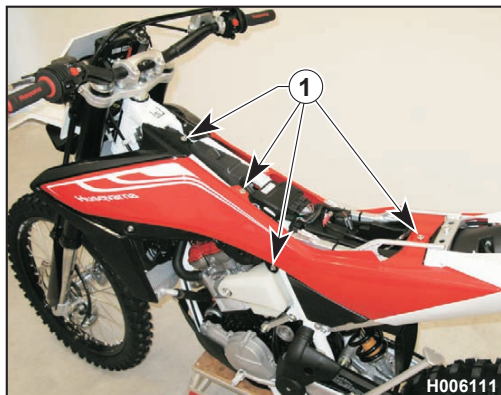






Saddle removal

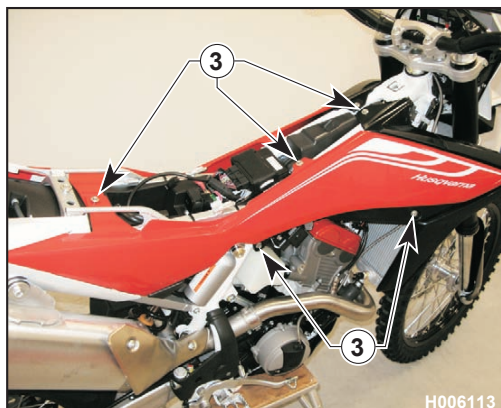
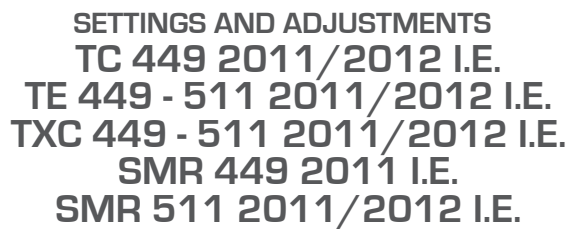
Turn pin (1) counter clockwise, and remove saddle (2) from central retaining screw.



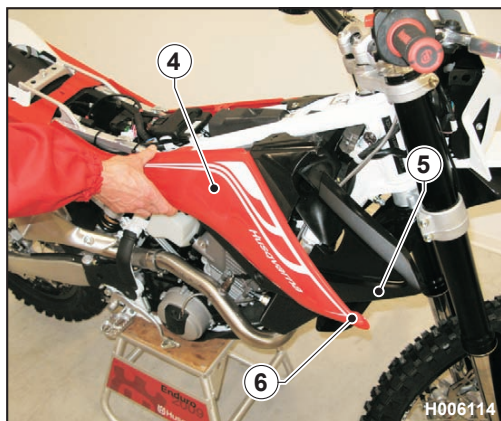
Side panel removal

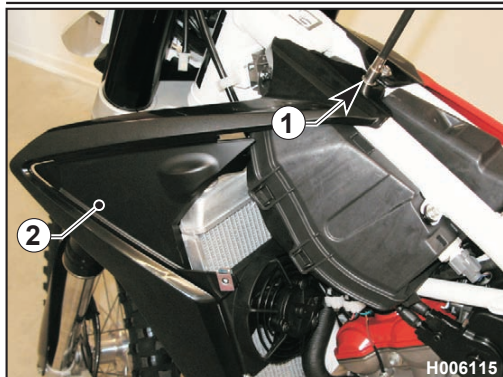
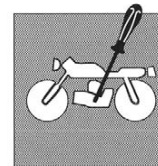
- Remove the saddle as described in the relevant paragraph.
- Left-hand side panel:
Loosen the four screws (1) using an 8 mm wrench, and remove the side panel (2).





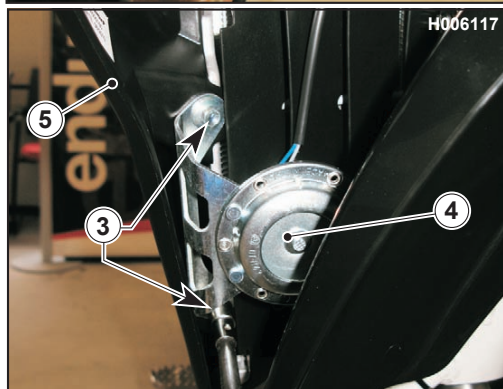
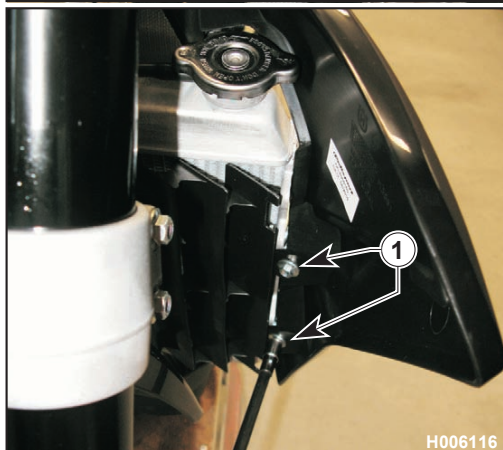
- Right-hand side panel:
Loosen the five screws (3) using an 8 mm wrench, release side panel (4) from scoop (5) by disengaging retaining tabs (6).



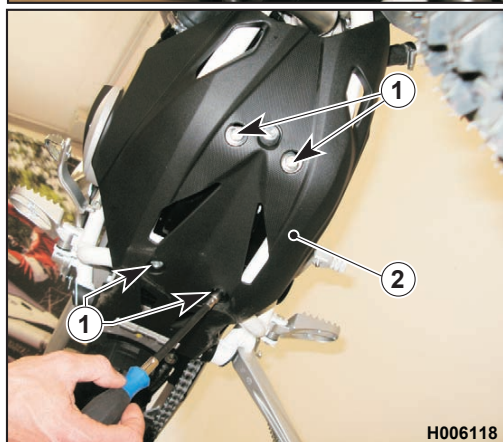


Scoop removal

- Remove the saddle and side panels, as described in the relevant paragraphs.
- Left-hand side scoop:
Loosen the three screws (1) using an 8 mm wrench, and remove the scoop (2).

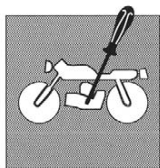


- Right-hand side scoop:
Loosen the two screws (3) (using an 8 mm wrench) and remove horn (4) and scoop (5).

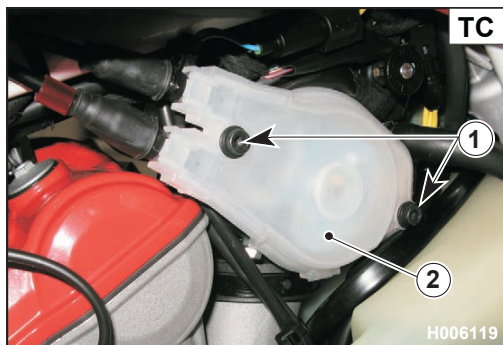


Engine guard removal

- Loosen the screws (1) using an 8 mm wrench, and remove the engine guard (2).



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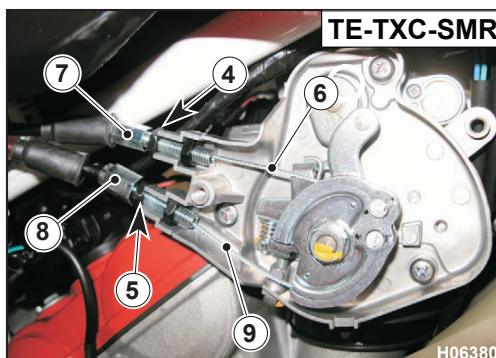
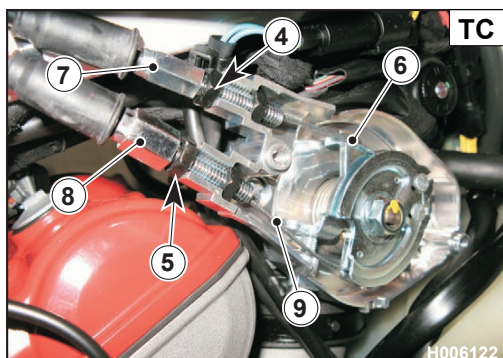
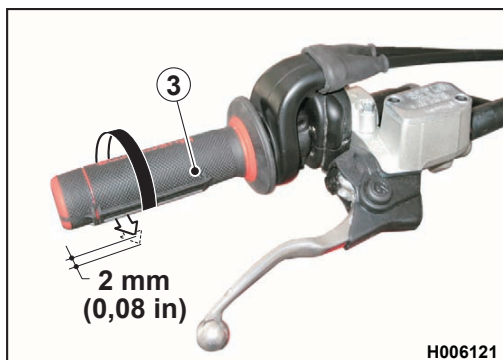
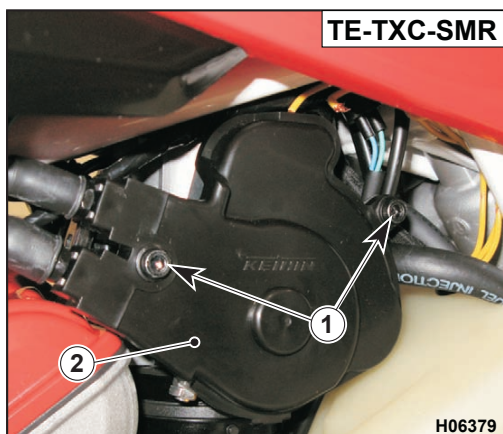
Throttle cable adjustment

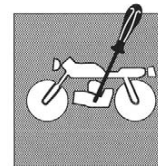
- To check the correct adjustment of the throttle control cable, operate as follows:
- loosen screws (1) and remove protective cap (2);
 - turn throttle twistgrip (3) and make sure that there is a clearance of approx. 2 mm (0.08 in);
 - should this not be the case, loosen check nuts (4) and (5);
 - turn and keep twistgrip (3) in the fully closed position;
 - loosen upper "return" cable (6) using adjuster screw (7);
 - keeping twistgrip (3) fully closed, reset cable (6) clearance by turning adjuster screw (7);
 - tighten check nut (4);
 - turn adjuster screw (8) until reaching an opening clearance of approx. 2 mm (0.08 in);
 - tighten check nut (5).
 - reassemble all parts, in the reverse order compared to disassembly.



Operation with damaged throttle cable could result in an unsafe riding condition.

When throttle control cables (6) and (9) are replaced, adjust new cables as previously explained.

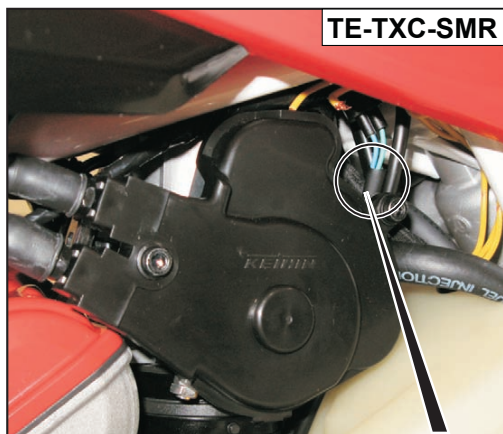




Idle adjustment (TC)

Adjust the carburettor with warm engine and with the throttle control in closed position. Proceed as follows:

- Turn knob (1) clockwise until fully closed position, then turn anticlockwise through 33 clicks until obtaining an idle speed of 1,850 - 1,950 rpm, which can be read using the suitable diagnosis instrument.



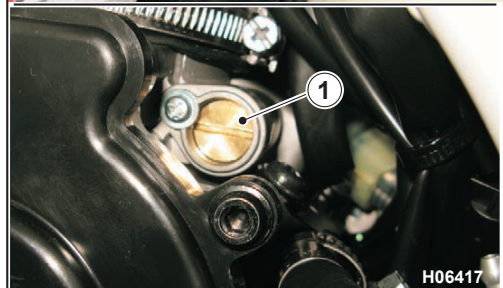
Idle adjustment (TE - TXC - SMR)

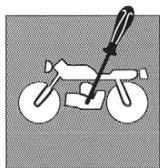
Adjust the carburettor with warm engine and with the throttle control in closed position. Proceed as follows:

- Turn adjuster screw (1) with a screwdriver until reaching an idle speed of 1,850 - 1,950 rpm, to be detected by the special diagnosis tester.

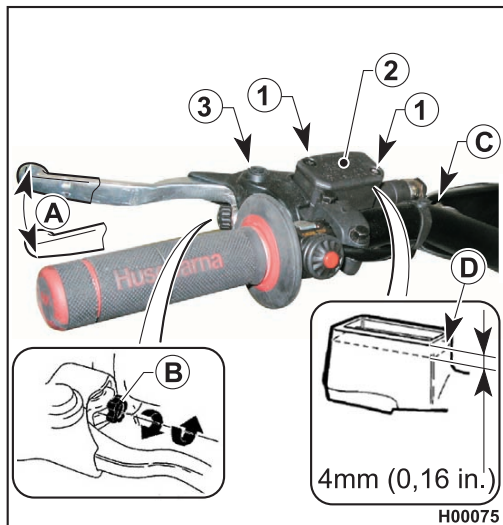


Exhaust gas contains poisonous carbon monoxide. Never run the engine indoors.





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Hydraulic clutch lever adjustment and fluid level check

Free play (A) shall be of at least 3 mm (0.12 in.).

The lever position can be adjusted to suit the rider hand size.

To decrease the lever distance from the handgrip, rotate the adjuster (B) CLOCKWISE.

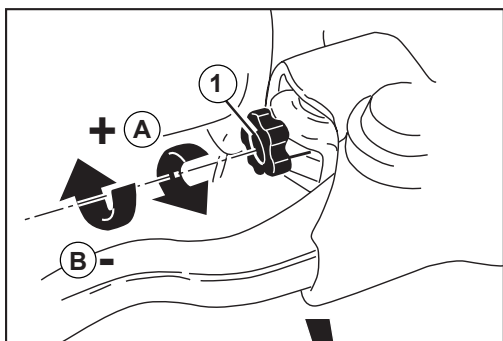
To increase the lever distance from the handgrip, rotate the adjuster (B) COUNTER CLOCKWISE.

Fluid level is checked as follows:

- Remove screws (1), cover (2) and rubber diaphragm from the control;
- Keep the control cylinder (3) in a horizontal position and make sure that fluid level has not dropped lower than 4 mm (0.16 in.) below the upper edge (D) of master cylinder body;
- If needed, top up with the fluid specified in the LUBRICANT CHART included in Section "A".

Refit any parts you have removed.

Periodically check the connecting hose (see "Scheduled Maintenance Chart"); if hose (C) is worn or cracked, its replacement is advised.



Front brake lever adjustment and fluid level check (TC - TE - TXC)

The adjuster (1) located on the control lever, allows adjusting of the free play (a). Free play (a) shall be of at least 3 mm (0.12 in.).

The level of the fluid in master cylinder reservoir must never be below the minimum value (2), which can be checked from the inspection window on the rear of the master cylinder body. A decrease of the fluid level will let air into the system, hence an extension of the lever stroke.



If the brake lever feels mushy when pulled, there may be air in the brake line or the brake may be defective: CHECK THE BRAKING SYSTEM (see Section "L").



Too much brake lever free play may reduce braking action: CHECK BRAKE PAD THICKNESS (see Section "L").



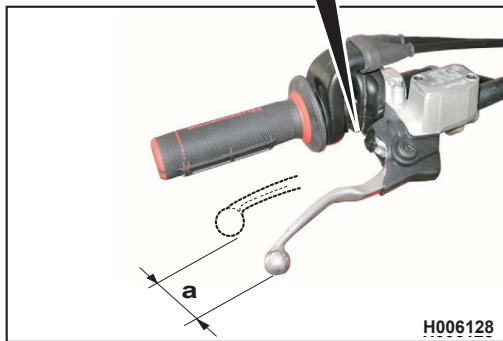
Do not spill brake fluid onto any painted surface or lens (for example lights lens).



Do not mix two brands of fluid. Completely change the brake fluid in the brake system if you wish to switch to another fluid brand.

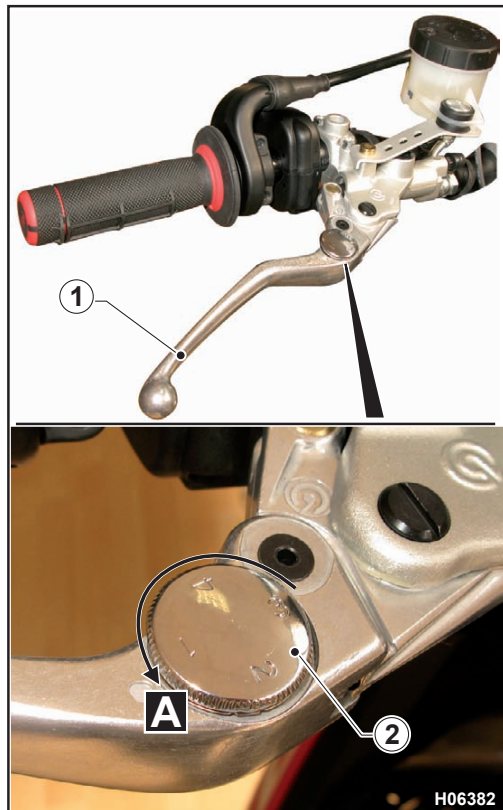
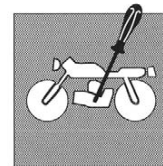


Brake fluid may cause irritation. Avoid contact with skin or eyes. In case of contact, flush thoroughly with water and call a doctor if your eyes were exposed.



A: to increase clearance

B: to decrease clearance



Front brake lever adjustment and fluid level check (SMR)

The lever (1) can be adjusted (4 settings available) to suit the rider's hand size. To decrease the lever (1) distance from the handgrip, turn the adjuster screw (2) COUNTER CLOCKWISE "A".

Fluid level inside master cylinder tank shall never be below the min. level (3) indicated on the transparent tank (4).

A decrease of the fluid level will let air into the system, hence an extension of the lever stroke.



If the brake lever feels mushy when pulled, there may be air in the brake line or the brake may be defective: **CHECK THE BRAKING SYSTEM** (see Section "L").



Too much brake lever free play may reduce braking action: **CHECK BRAKE PAD THICKNESS** (see Section "L").



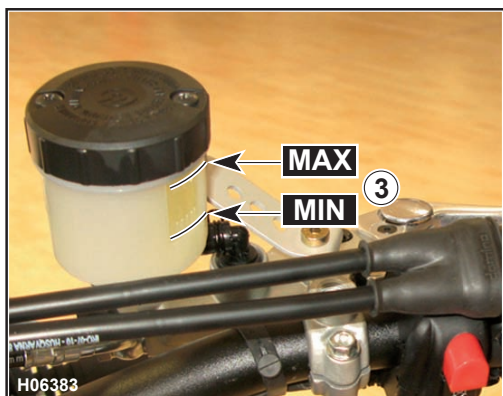
Do not spill brake fluid onto any painted surface or lens (for example lights lens).

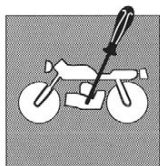


Do not mix two brands of fluid. Completely change the brake fluid in the brake system if you wish to switch to another fluid brand.

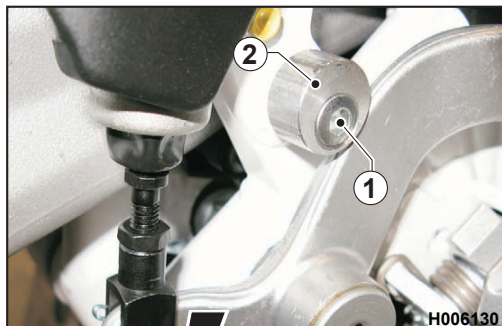


Brake fluid may cause irritation. Avoid contact with skin or eyes. In case of contact, flush thoroughly with water and call a doctor if your eyes were exposed.





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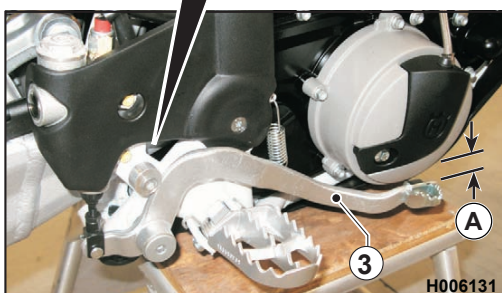
Rear brake pedal position adjustment

The position of the rear brake pedal with respect to the footrest may be adjusted according to individual needs.

For adjusting, proceed as follows:

- Loosen the screw (1).
- Turn the cam (2) in order to raise or lower the brake pedal within the range available (A).
- When finished, tighten the screw (1).

Once this adjustment is completed, adjust the free play of the pedal (3), according to the instructions provided under paragraph "Rear brake pedal free play adjustment".



Rear brake pedal free play adjustment

Before starting the braking action, rear brake pedal shall have a free play (B) of 5 mm (0.2 in). Should this not happen, operate as follows:

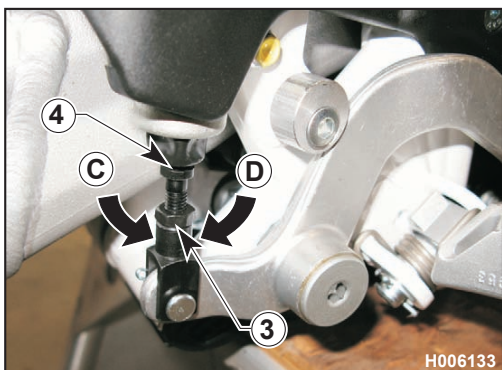
- Loosen the nut (3);
- Operate the master cylinder linkage (4) to increase or decrease free play;
- Tighten the nut (3) at the end of the operation.



When the free play requirement is not met, the brake pads will be subjected to an early wear that may lead to TOTAL BRAKE INEFFECTIVENESS.

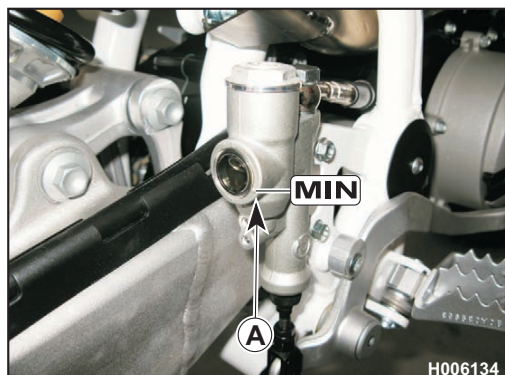
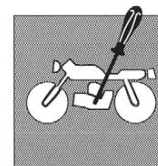


If the brake pedal feels mushy when pulled, there may be air in the brake line or the brake may be defective. CHECK THE BRAKING SYSTEM (see Section L).



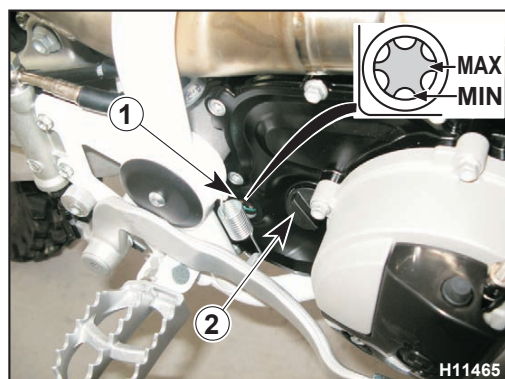
C: to increase clearance

D: to decrease clearance



Rear brake fluid level check

Level (A) must be between the MIN and MAX notches visible on the master cylinder reservoir.

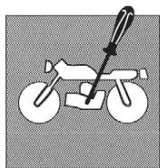


Engine oil level check

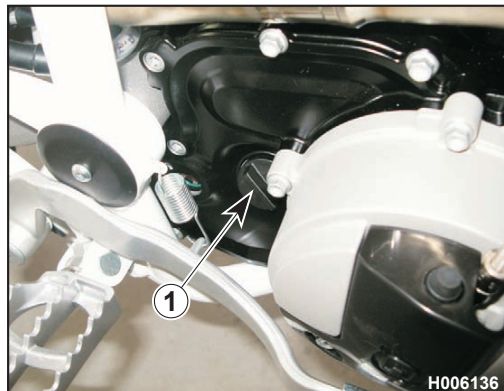


Oil level depends on oil temperature. The higher the temperature, the higher the oil level inside oil sump. Should oil level be checked with the engine cold or after short runs, wrong readings may be taken, with consequent wrong topping-up.

- Start vehicle as described in the relevant section, let it run for approx. 3 to 5 minutes so as to warm engine up.
- Turn engine off.
- **With the vehicle in a flat ground and in vertical position**, check oil level through the inspection sight glass (1) positioned on engine right casing. Make sure the level is in between the MIN and MAX notches.
- To top up, remove filler cap (2).



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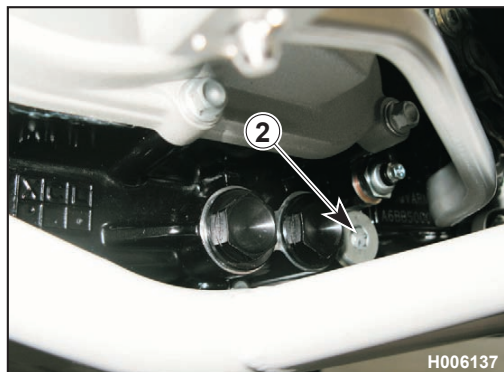
Engine oil replacement and mesh filters-filter cartridge cleaning or replacement



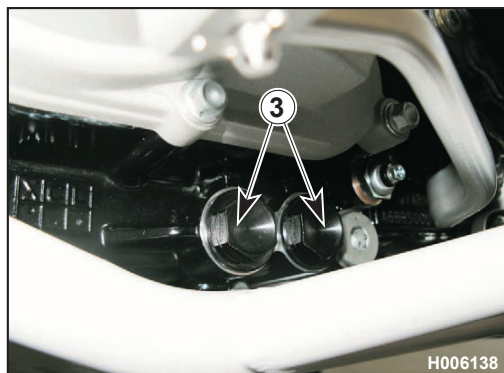
Be careful not to touch hot engine oil.

Drain the oil with WARM ENGINE; proceed as follows:

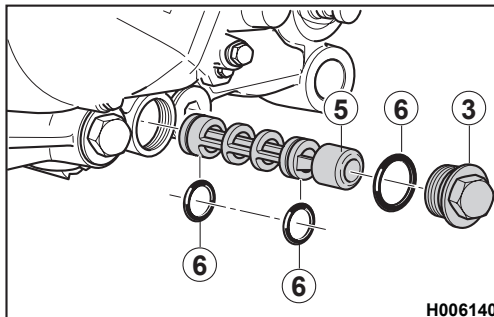
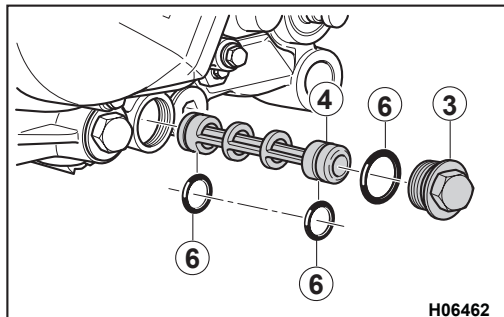
- Remove the engine guard as described under the relevant paragraph;
- Remove the oil filler cap (1).
- put a drip pan under engine;



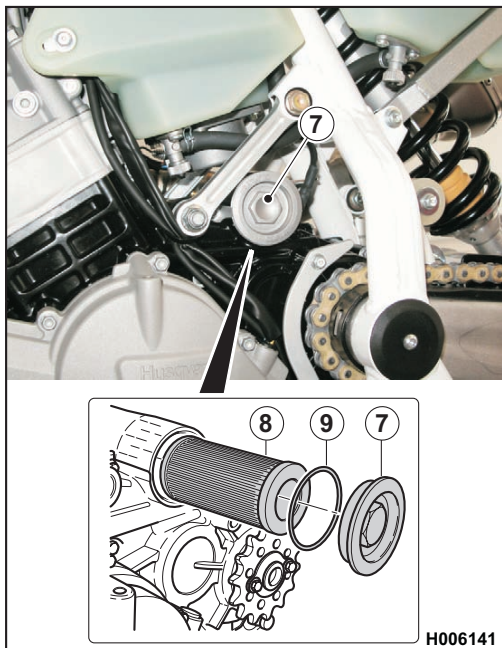
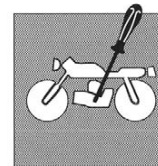
- remove oil drainage plug (2);
- evacuate the exhausted oil, and clean magnet on plug (2);
- (on reassembly, tighten plug (2) to a torque of 15 Nm / 1.5 Kgm / 11.6 ft/lb)



- loosen the two caps (3), and remove the two mesh filters (4) and (5);
- (on reassembly, tighten the two plugs (3) to a torque of 10 Nm / 1.0 Kgm / 7.38 ft/lb)



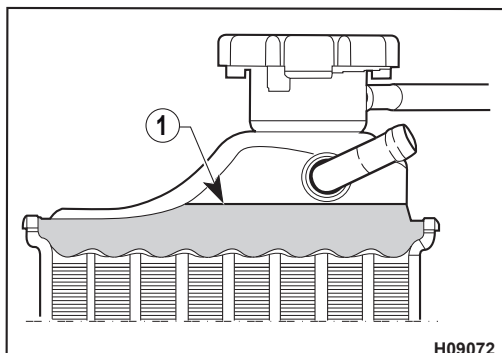
- check for O-rings (6) conditions. If worn, change them. Then clean filters (4) and (5) using gasoline;



- reassembly is a reverse of removal;
- undo cap (7) and remove cartridge filter (8);
 (on reassembly, tighten plug (7) to a torque of 15 Nm / 1.5 Kgm / 11.6 ft/lb)
- replace filter (8), lubricate O-ring (9), and screw cap (7);
- once filter has been replaced, refit oil drainage plug (2), and pour the recommended quantity of oil.



Start the engine to allow the oil to reach all the points of the engine and check the level as described in the relevant paragraph.



Coolant level check

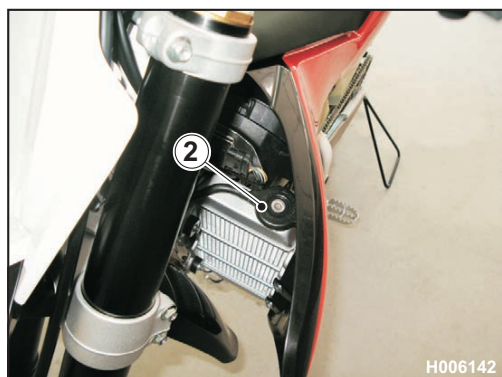
Check level (1) inside left radiator, with the engine cold and the vehicle in vertical position. The coolant should be approximately 10 mm (0.4 in) above the cells. The radiator cap (2) features two locking positions, the first one is for prior discharge of pressure from the cooling system.

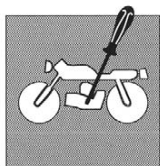


Avoid removing radiator cap (2) when engine is hot, as coolant may spout out and cause scalding.

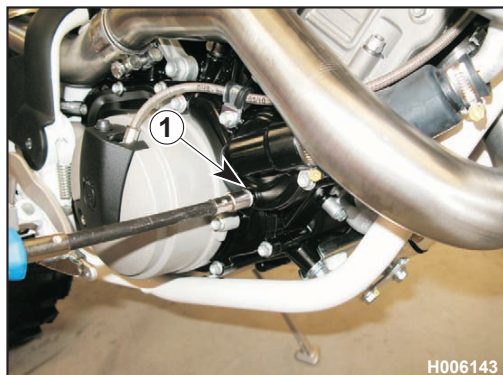


Difficulties may arise in eliminating coolant from painted surfaces. If this occurs, wash off with water.





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Coolant replacement



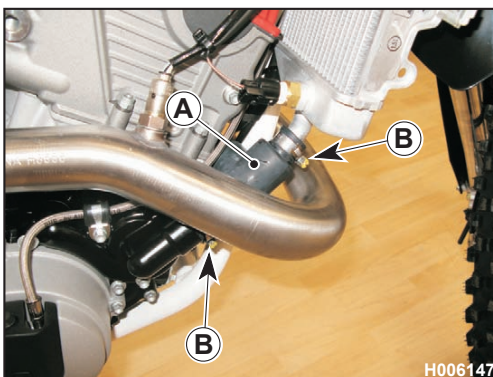
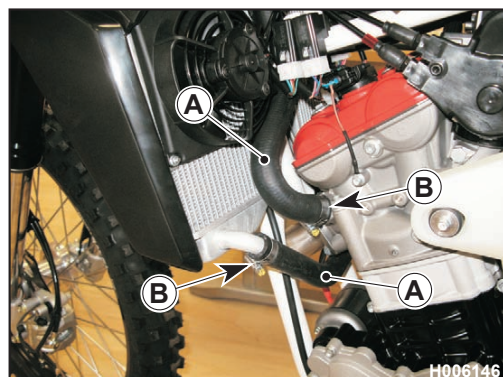
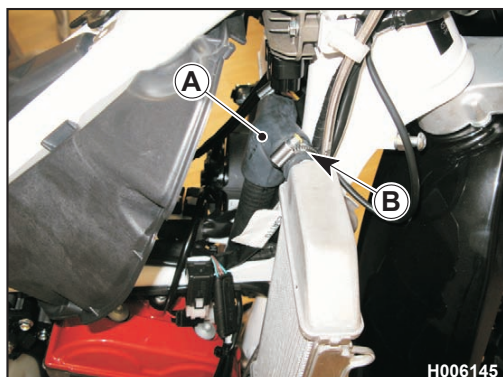
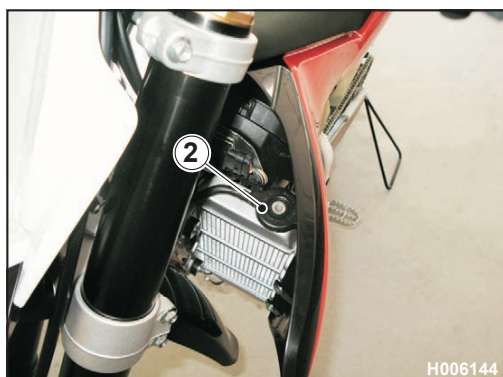
Coolant shall be replaced with cold engine and coolant.

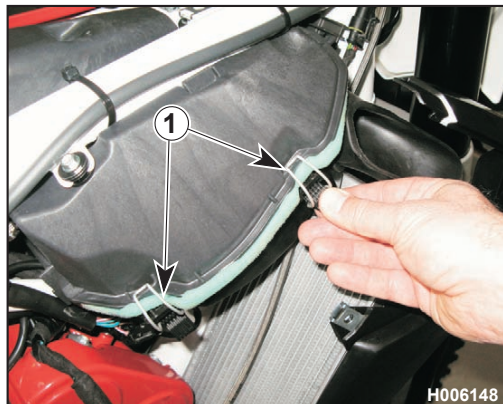
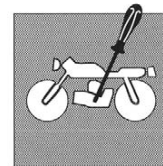
- Remove the engine guard as indicated under the relevant paragraph.
- Place a vessel on the R.H. side of the cylinder, under the coolant drain screw (1). FIRST remove the screw (1) then SLOWLY open the L.H. radiator cap (2); slope the motorcycle on the right side to drain the coolant easily in the vessel. Reassemble the screw (1).



To fill in the system, set motorcycle on a central stand, or in any case keep the bike in a vertical position (not on the side stand).

- Pour the necessary quantity of coolant in the radiator then warm up the engine in order to eliminate any possible air bubbles.
- Allow the coolant to cool down then remove cap (2) and check the level as explained under "Coolant level check".
- Periodically check the connecting hoses (see "Scheduled Maintenance Chart"); this will avoid coolant leakage and consequent engine seizure: If hoses (A) show cracks, swelling or hardening due to sheaths desiccation, their replacement shall be advisable.
- Check the correct tightening of the clamps (B).





Air filter check

- Remove the saddle and right-hand side panel, as described in the relevant paragraphs.
- release retaining clips (1), and slide filter (2) out of vehicle right side, taking special care not to damage the two retaining hooks;
- widen the two retaining tabs (3) and remove subframe (4) with sponge (5);
- remove sponge (5) from subframe (4) and check if it needs cleaning or replacing;
- refit all the disassembled parts in reverse order, making sure to position filter sponge (5) with the "TOP" wording facing up. Refit filter (2) inside guides, push it all the way down and lock it using the clip-on fasteners (1).



Air filter cleaning

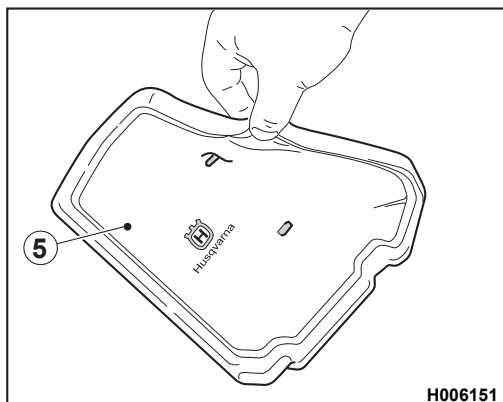
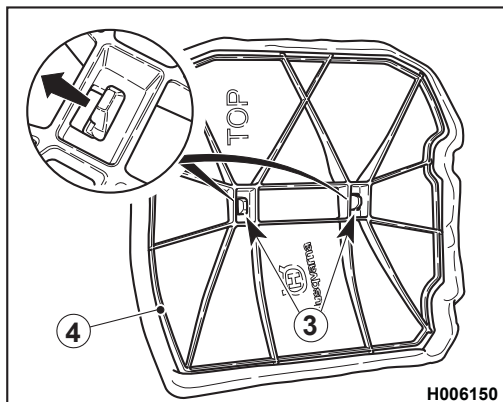
Wash the filter with a specific detergent (CASTROL FOAM AIR FILTER CLEANER or similar) then dry it fully (wash filter with gasoline only in case of need). Plunge the filter in special oil for filters (CASTROL FOAM AIR FILTER OIL or similar), then wring it to drain superfluous oil.

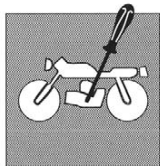


Do not use fuel or a low flash-point solvent to clean the filtering element. A fire or explosion could result.

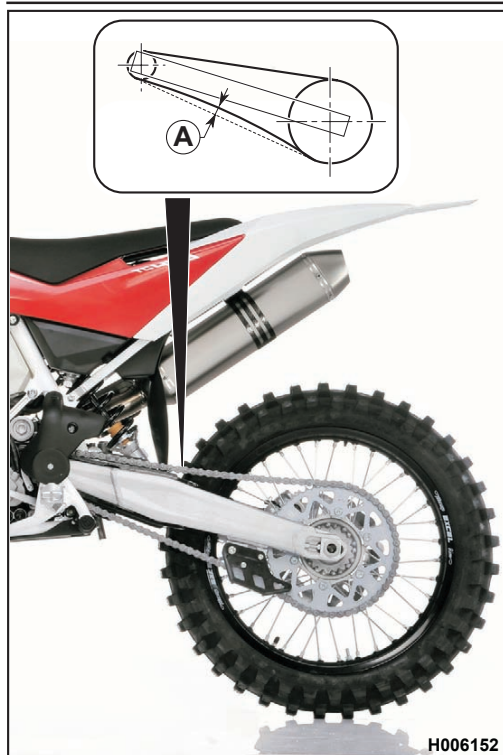


Clean the filtering element in a well ventilated area and do not allow sparks or flames anywhere near the working area.





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Chain adjustment

Chain should be checked, adjusted and lubricated as per the Maintenance Chart to ensure safety and prevent excessive wear. If the chain becomes badly worn or is poorly adjusted (i.e., if it is too loose or too taut), it could escape from sprocket or break.

Check that chain has a max. 5 mm (0.04 in.) gap (A).



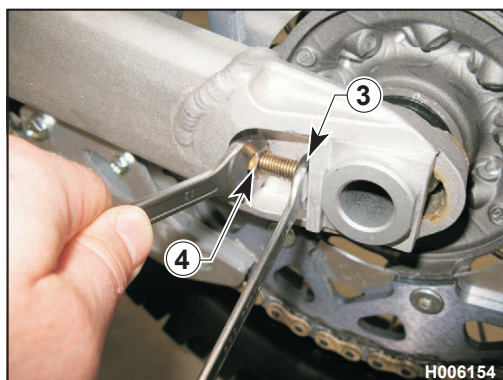
Incorrect chain tension involves excessive and early wear of the chain slider lower part; periodically check for wear and replace it if worn out.

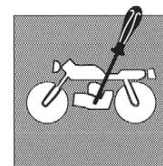


If it is not, proceed as follows:

- on the right side, with a 27 mm Allen wrench, loosen the locking nut (2) of the wheel axle;
- loosen the check nuts (3) on both chain tensioners, with a 12 mm wrench, and work on the screws (4) with a 10 mm wrench to achieve the right tension;
- when the adjustment is completed, tighten the check nuts (3) and the wheel axle nut (2).

Once adjustment is over, always check that chain has a max. 5 mm (0.04 in.) gap. Check wheel alignment and fully tighten its pin (142.1 Nm - 14.1 Kgm - 104.8 ft-lb).





Chain lubrication

Lubricate the chain following these instructions.



Never use grease to lubricate the chain. Grease helps to accumulate dust and mud, which act as abrasive and help to rapidly wear out the chain, the front and rear sprockets.

Disassembling and cleaning

When particularly dirty, remove and clean the chain before lubrication. Proceed as follows:

- Set a stand or a block under the engine and see that the rear wheel is lifted from the ground.
- remove clip (1), master link (2), then remove chain (3).

Make sure that the chain is neither worn out nor damaged. If the rollers or the links are damaged, replace the chain by following the instructions given in the Scheduled Maintenance Chart. Ensure that the sprockets are not damaged. Wash and clean the chain as described hereunder.

Washing chain without O-rings (TC)

Wash using petroleum or naphtha. If you use fuel or especially trichloroethylene, dry and lubricate the chain to avoid oxidation.

Washing chain with O-rings (TE - TXC - SMR)

Wash using petroleum, naphtha or paraffin oil. Never use fuel, trichloroethylene or solvents, as the O-rings may get damaged. Use instead special sprays for chains with O-rings.

Lubricating chain without O-rings (TC)

After drying, dip the chain in Molybdenum Disulphide chain lubricant, if possible, or in warm high-viscosity engine oil (if warmed up, oil will be more fluid).



As an alternative, you can use suitable spray lubricants.

Lubricating chain with O-rings (TE - TXC - SMR)

Lubricate all metallic and rubber (O-ring) elements using a brush and engine oil with SAE 80-90 viscosity, inside and outside parts.

Assemble the master link clip (1) by setting the closed side facing the chain direction of rotation, as shown in the figure.



As an alternative, you can use suitable spray lubricants.



The master link is the most critical safety part in the drive chain. Even if the master links are reusable when in good conditions, for safety purposes we advise using a new master link when reassembling the chain.

Accurately adjust the chain as described in the relevant paragraph.



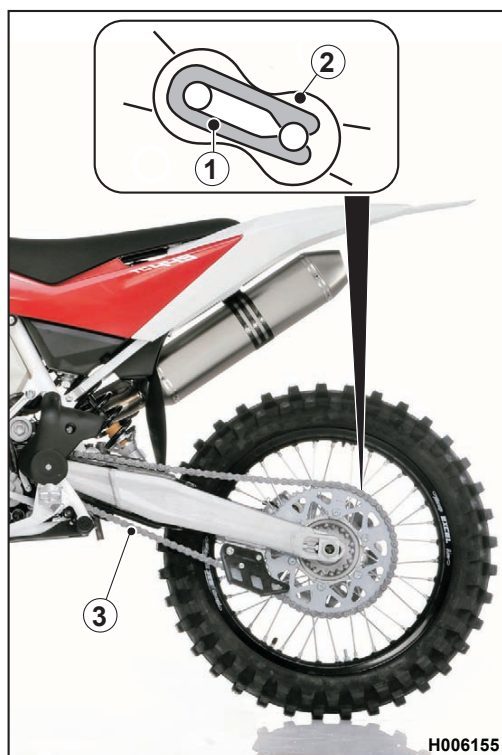
The chain lubricant shall NEVER get in contact with the tyres or the rear brake disc.

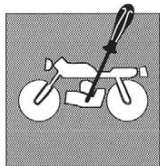


Chain tensioner roller, chain guide roller, chain guide, chain slider
 Check the wear of the above-mentioned elements and replace them when necessary.



Check the chain guide alignment, and remember that a bent element can cause chain early wear. In this case, chain might unwrap from the sprocket.





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Suspension setup according to track condition

Following are a few guidelines to find the right suspension setup for different types of terrain. Always start from the suspensions standard setting before making any change. Afterwards, increase or decrease the adjusting clicks, one at a time.

HARD GROUND

Front fork: softer compression setting.

Shock absorber: softer compression setting.

For fast tracks, a softer compression and rebound setting both front and rear will give more grip.

SANDY GROUND

Front fork: set compression harder, or replace the standard spring with a harder spring and set the compression softer and the rebound harder.

Shock absorber: harder compression, and especially harder rebound settings. Work on the spring preload to lower the motorcycle riding height (rear end).

MUDDY GROUND

Front fork: set compression harder, or replace the standard spring with a harder spring.

Shock absorber: harder compression and rebound settings

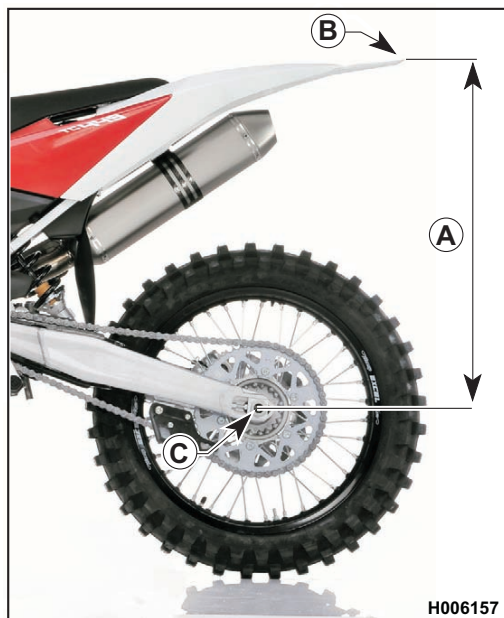
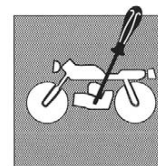
or replace the standard spring with a harder spring. Work on the spring preload to lift the motorcycle riding height (rear end). Changing the springs front and rear is advised in order to compensate for increased motorcycle weight due to caked-on mud.

NOTES

Should the fork be too soft or too hard under all adjustment conditions, check oil level inside fork leg as it could be too low or too high; Remember that the more oil you add, the more frequently you will need to bleed the forks. If changes to suspension settings take no effect, check the adjuster assemblies, as they might be stuck.

Standard settings, available replacement springs and adjusting procedures are outlined in the following pages.





B: rear mudguard top height
 C: rear wheel axle height

Shock absorber adjustment

The rear shock absorber must be adjusted to suit rider weight and terrain conditions.

Proceed as follows:

1. With the motorcycle on the stand and the rear wheel lifted from the ground, measure dimension (A);
2. Have bike resting on ground without rider; Measure dimension "A";

TC-TE-TXC MY11 + MY12

The difference between dimension "A" with the wheel raised off the ground and dimension "A" with the wheel on the ground shall be 40÷45 mm (1.57 ÷ 1.77 in).

SMR MY11 + MY12

The difference between dimension "A" with the wheel raised off the ground and dimension "A" with the wheel on the ground shall be 20÷25 mm (0,79 ÷ 0,98 in).

3. Have bike resting on the ground with rider sitting on it; Measure dimension "A";

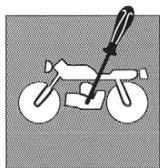
TC-TE-TXC MY11 + MY12

The difference between dimension "A" with the wheel raised off the ground and dimension "A" with the wheel on the ground and rider sitting on it shall be 100÷105 mm (3.93 ÷ 4.13 in).

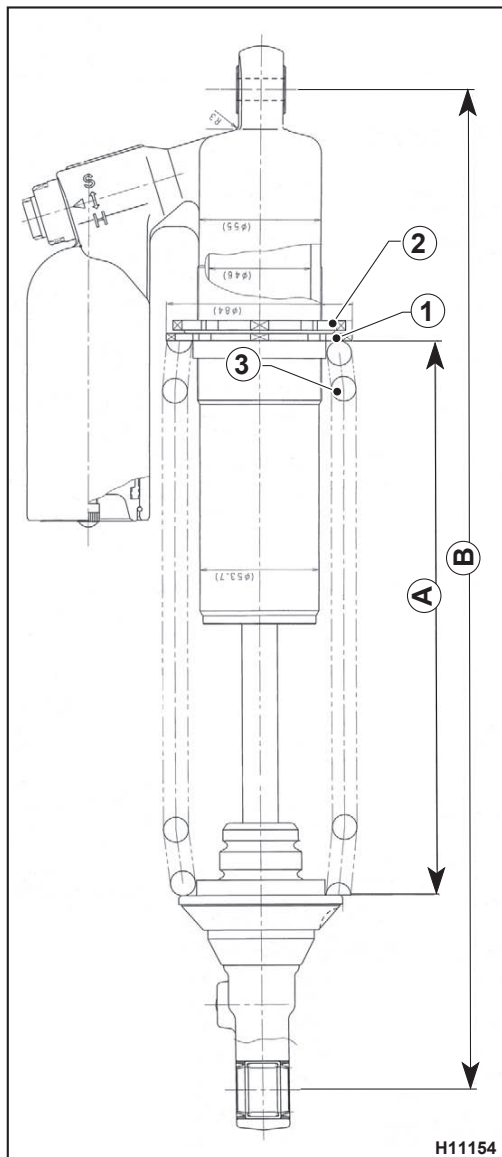
SMR MY11 + MY12

The difference between dimension "A" with the wheel raised off the ground and dimension "A" with the wheel on the ground and rider sitting on it shall be 75÷80 mm (2,95 ÷ 3,15 in).

Adjust spring preload as indicated in the corresponding paragraph.



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Shock absorber spring preload adjustment (TE-TC-TXC)

Proceed as follows:

1. Remove the saddle and right-hand side panel, as described in the relevant paragraph.
2. Clean lock ring nut (1) and adjuster ring nut (2) of the spring (3).
3. Either with a hook wrench or an aluminium punch, loosen the lock ring nut.
4. Turn the adjuster ring nut as required.
5. Adjust preload to suit your weight or riding style and tighten the lock ring nut firmly (tightening torque 10 Nm - 1 Kgm - 7.38 ft-lb).
6. Refit the right-hand side panel and the saddle.



Be careful not to touch hot exhaust pipe while adjusting the shock absorber.

TE-TC-TXC MY11:

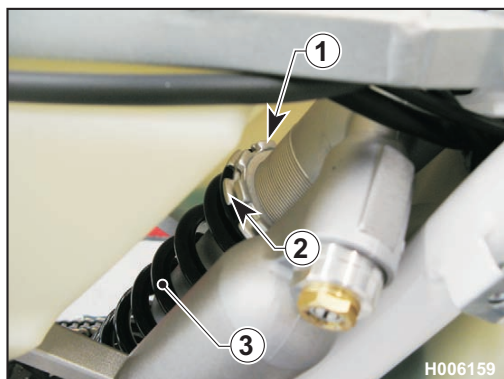
- A** = Spring standard length, when preloaded: $251 \pm 0,5$ mm (9,88 $\pm$ 0,02 in.)
B = Free length = 451,5 mm (17,78 in.)
 Maximum length = 453 mm (17,83 in.)
 Minimum length = 323 mm (12,72 in.)

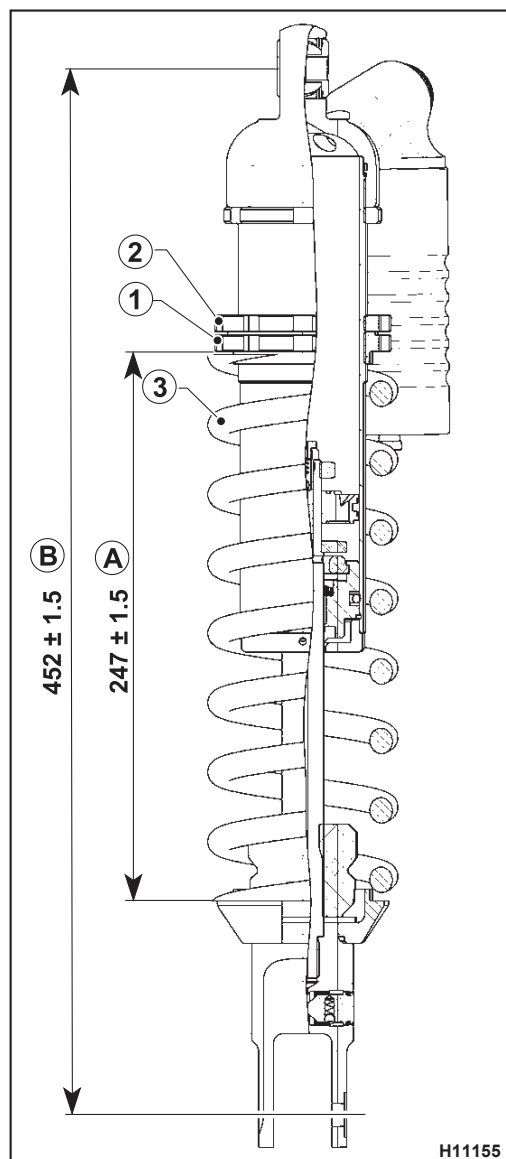
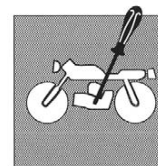
TE MY12:

- A** = Spring standard length, when preloaded: $251 \pm 0,5$ mm (9,88 $\pm$ 0,02 in.)
B = Free length = 448,0 mm (17,64 in.)
 Maximum length = 449,0 mm (17,68 in.)
 Minimum length = 326,5 mm (12,85 in.)

TC-TXC MY12:

- A** = Spring standard length, when preloaded: $270 \pm 0,5$ mm (10,63 $\pm$ 0,02 in.)
B = Free length = 452,0 mm (17,8 in.)
 Maximum length = 453,0 mm (17,83 in.)
 Minimum length = 326,5 mm (12,85 in.)





Shock absorber spring preload adjustment (SMR)

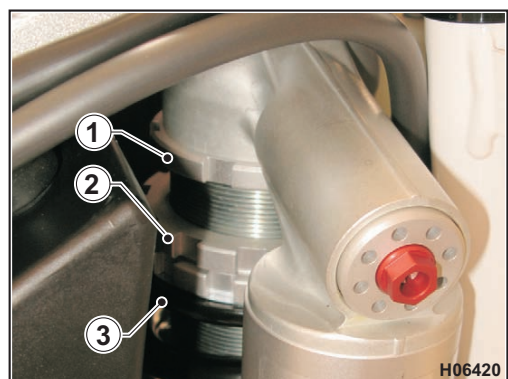
Proceed as follows:

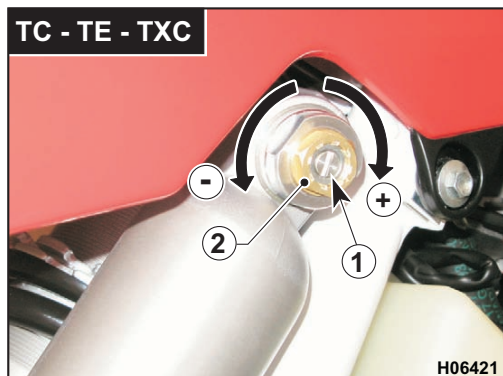
1. Remove the saddle and right-hand side panel, as described in the relevant paragraph.
2. Clean lock ring nut (1) and adjuster ring nut (2) of the spring (3).
3. Either with a hook wrench or an aluminium punch, loosen the lock ring nut.
4. Turn the adjuster ring nut as required.
5. Adjust preload to suit your weight or riding style and tighten the lock ring nut firmly (tightening torque 10 Nm - 1 Kgm - 7.38 ft-lb).
6. Refit the right-hand side panel and the saddle.



Be careful not to touch hot exhaust pipe while adjusting the shock absorber.

A = SPRING IN ITS SEAT
B = CENTRE DISTANCE





Shock absorber damping adjustment

Adjustment of the compression stroke is independent from the rebound stroke.

MY11:

A) COMPRESSION - Standard setting:

1) Low damping speed:

TC - TE - TXC: -11 click
SMR: -11 click (± 2 click)

(adjuster 1)

MY12:

A) COMPRESSION - Standard setting:

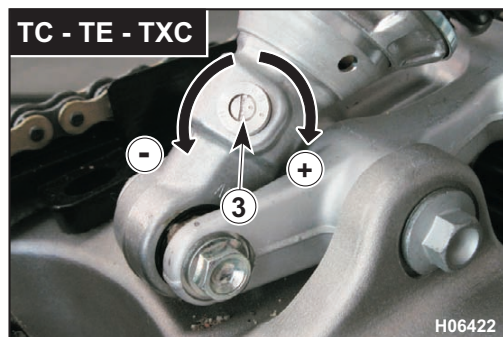
1) Low damping speed:

TC-TXC: 13 +1/-2 click

TE: 16 +1/-2 click

SMR: -11 click (± 2 click)

(adjuster 1)



MY11:

TC - TE - TXC: -1.1/4 turns

SMR: -18 click (± 2 click)

(adjuster 2)

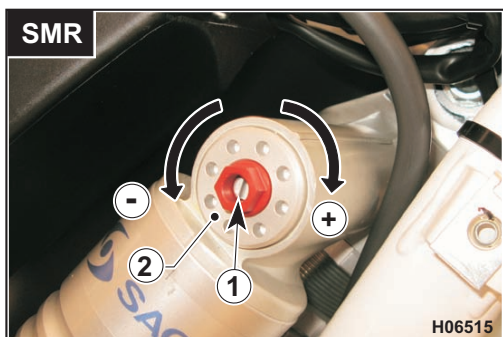
MY12:

2) High damping speed:

TC - TE - TXC: $1 \pm 1/2$ turns

SMR: -18 click (± 2 click)

(adjuster 2)



To reset the standard setting, turn upper adjusters (1) and (2) clockwise until reaching fully closed position. Then turn them back to the above-mentioned positions. In order to obtain a smooth braking action, turn the adjusters counter clockwise. Vice versa to obtain a harder braking action.

MY11:

B) REBOUND - Standard setting:

TE= -18 turns

TC-TXC= -17 turns

SMR= -11 click (± 2 click)

MY12:

B) REBOUND - Standard setting:

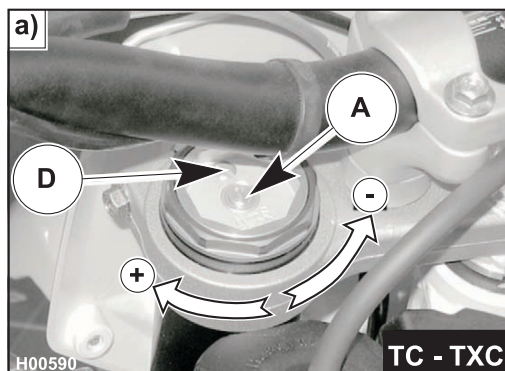
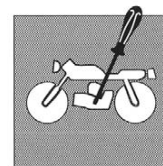
TC-TXC: 13 +1/-2 click

TE: 16 +1/-2 click

SMR= -11 click (± 2 click)

To reset the standard setting, turn lower adjuster (3) clockwise until reaching fully closed position. Then turn it back by the mentioned clicks.

In order to obtain a smooth braking action, turn the adjuster counter clockwise. Vice versa to obtain a harder braking action.



KAYABA fork adjustment (TC - TE - TXC)

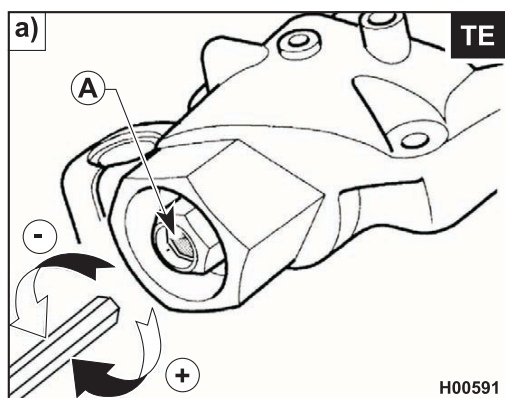
- COMPRESSION (Fig. a)
(TC - TXC: TOP ADJUSTER; TE: LOWER ADJUSTER)

MY11 + MY12:

TC-TXC= -11 clicks

TE= -10 clicks

To reset standard calibration, turn adjuster screw (A) clockwise to reach the fully closed position; then turn it back by the mentioned clicks. In order to obtain a smooth braking action, turn the adjuster counter clockwise. Vice versa to obtain a harder braking action.



- REBOUND (Fig. b)
(TC - TXC: LOWER ADJUSTER; TE: TOP ADJUSTER)

MY11:

TC-TXC= -10 clicks

TE= -14 clicks

MY12:

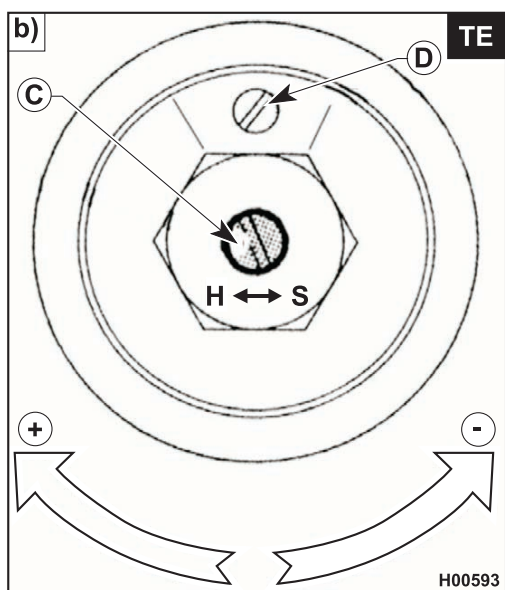
TC-TXC= -14 clicks

TE= -14 clicks

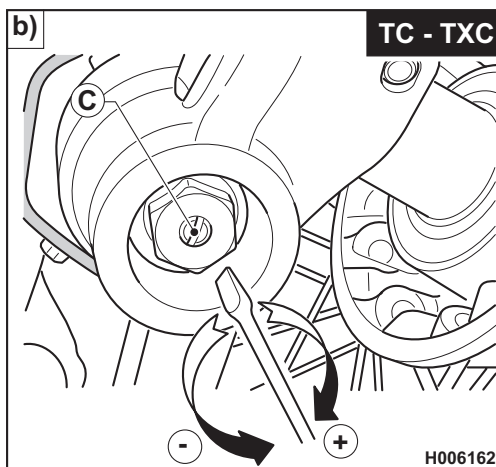
To reset standard calibration, turn adjuster (C) clockwise to reach the fully closed position; then, turn it back by the mentioned clicks. In order to obtain a smooth braking action, turn the adjuster counter clockwise. Vice versa to obtain a harder braking action.

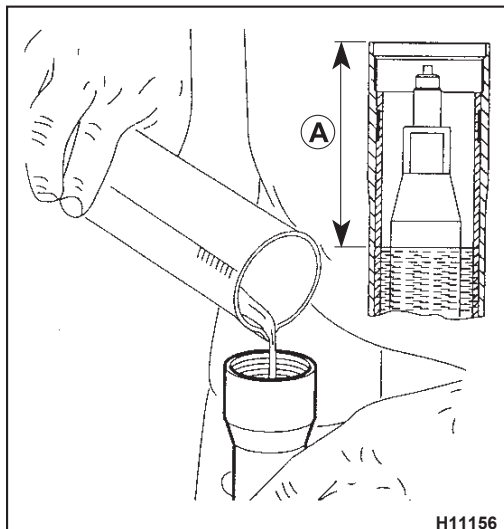
- BLEEDING (Fig. a/b) (to carry out after each competition, or monthly).

Set the motorcycle on a central stand, release the fork fully extended and loosen the bleed valve (D). Once this operation is over, tighten the valve.



Never force the adjuster screws beyond the maximum open and closed positions.





Fork oil level (TC - TE - TXC)

For regular fork operation, both legs must be provided with the necessary oil quantity.

TE: Remove the fork legs from the fork to check the oil level. Work as follows:

- remove the damper rod caps;
- remove springs from the legs letting the oil drain into the legs;
- bring fork to stroke end;
- TE: check that level is at the distance (A) of 118 mm (4.65 in.) from rod upper limit.

MY11:

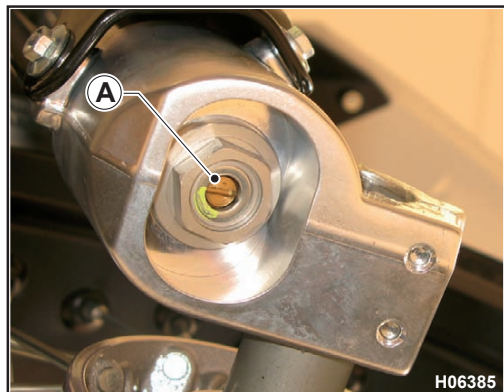
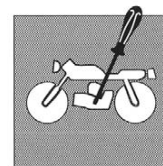
OIL QUANTITY IN EACH FORK LEG

- TC - TXC: 556 cu.cm (34.54 cu.in)
Cartridge: 186 cu.cm (11.35 cu.in)
Fork sleeve: 370 cu.cm (22.58 cu.in)
- TE: 660 cu.cm (40.27 cu.in)

MY12:

OIL QUANTITY IN EACH FORK LEG

- TC - TXC: 566 cu.cm (34.54 cu.in)
Cartridge: 196 cu.cm (11.96 cu.in)
Fork sleeve: 370 cu.cm (22.58 cu.in)
- TE: 670 cu.cm (40.89 cu.in)



Marzocchi fork adjustment (SMR)

a) COMPRESSION (LOWER ADJUSTER)

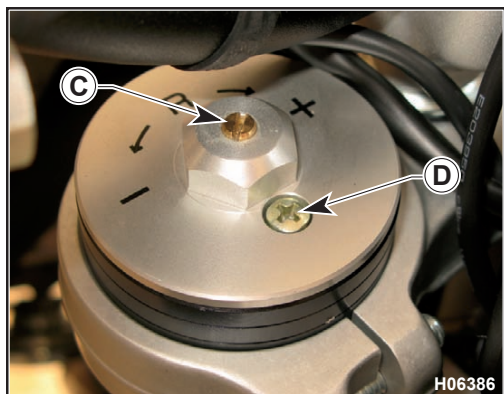
Standard setting: -16 clicks (± 1 click)

To reset standard calibration, turn adjuster screw (A) clockwise to reach the fully closed position; then turn it back by the mentioned clicks. In order to obtain a smooth braking action, turn the adjuster counter clockwise. Vice versa to obtain a harder braking action.

b) REBOUND (TOP ADJUSTER)

Standard setting: -10 clicks (± 1 click)

To reset standard calibration, turn adjuster (C) clockwise to reach the fully closed position; then, turn it back by the mentioned clicks. In order to obtain a smooth braking action, turn the adjuster counter clockwise. Vice versa to obtain a harder braking action.

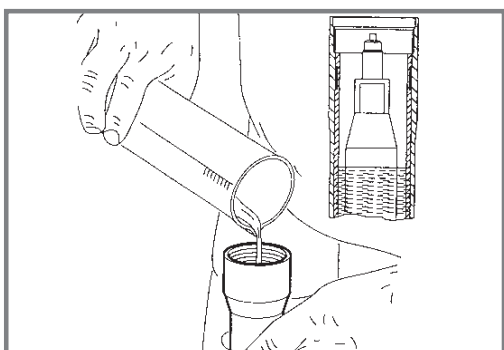


c) BLEEDING (to carry out after each competition, or monthly).

Set the motorcycle on a central stand, release the fork fully extended and loosen the air vent valve (D). Once this operation is over, tighten the valve.



Never force the adjusting screws beyond the maximum open and closed positions.



Fork oil level (SMR)

For regular fork operation, both legs must be provided with the necessary oil quantity.

Remove the fork legs from the fork to check the oil level. Work as follows:

- remove the damper rod caps;
- remove springs from the legs letting the oil drain into the legs;
- bring fork to stroke end;
- check that level is at the distance (A) of 100 mm (3.94 in.) from rod upper limit.

MY11:

OIL QUANTITY IN EACH FORK LEG

740 cm³ (45.16 cu.in)

MY12:

OIL QUANTITY IN EACH FORK LEG

720 cm³ (43.94 cu.in)



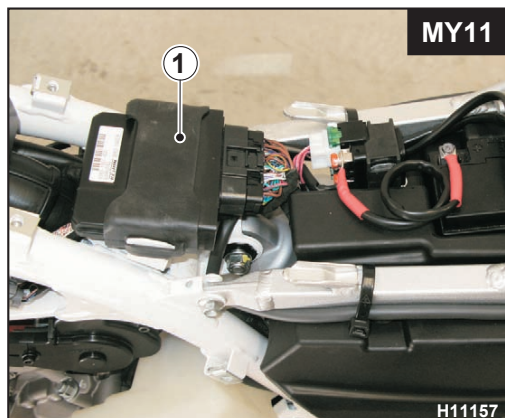
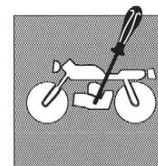
For safety reasons, the steering should always be adjusted so that the handlebar turns freely and without play. To check steering adjustment, set a stand or a block under the engine and see that the front wheel is lifted from the ground. Press lightly on the handlebar grips to cause the front end to rotate; the handlebar should turn smoothly. Sit on the ground in front of the front wheel and hold the lower ends of the fork legs. Push and pull in a front to rear motion to feel for play.

If any play is detected, adjust as follows:

- Remove the saddle;
- Loosen the steering head tube nut (1);
- Loosen the two bolts (3) that secure the fork legs to the steering head;
- turn ring nut (2) on steering tube clockwise using the suitable special wrench, until obtaining correct clearance;
- tighten the steering head tube nut (1) to 8-9 Kgm. (78.4-88.3 Nm);
- Tighten the four bolts (3) on the steering head to 22.5-26.5 Nm (2.3-2.7 Kgm).



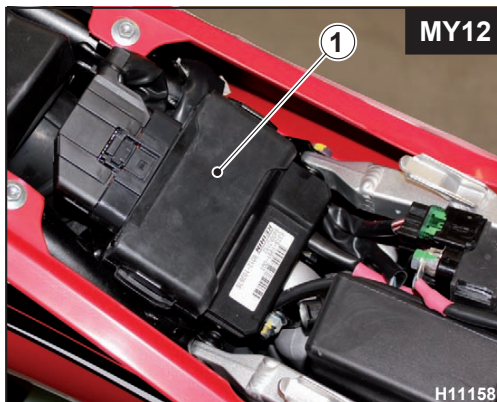
Steering angle can be modified by means of the adjuster assemblies located on either side of the steering head tube as follows: loosen the check nut (1), turn the adjuster screw (2) until setting the desired steering angle and then re-tighten the check nut (1). Make the same changes on both sides.



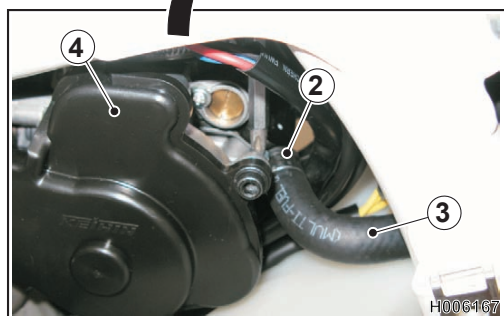
Fuel supply hose inspection

Check fuel supply hose conditions; if cracked, swollen etc. it is necessary to change it as follows:

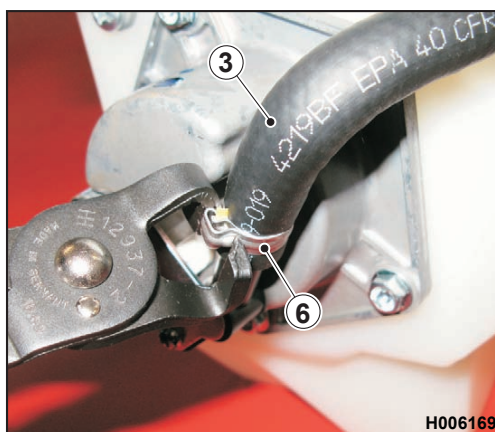
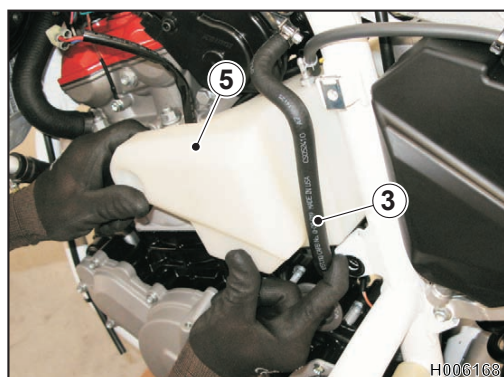
- Remove the saddle and left-hand side panel, as described in the relevant paragraphs.
- Release the control unit (1) off its mounts and remove it from its housing.

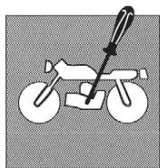


- Using a Phillips screwdriver, loosen the clamp (2) connecting the tube (3) to throttle body (4).
- Remove the front tank (tank with pump) as described in the corresponding paragraph.

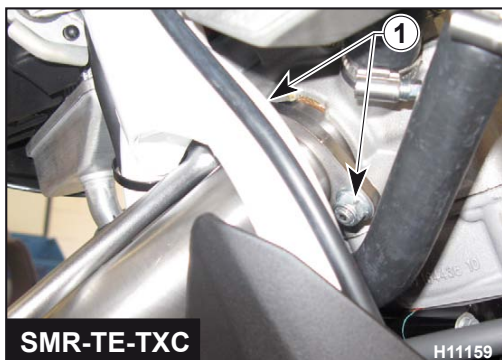


- Slide the tank (5) with tube (3) connected off the bike.
- Using the suitable pliers, open clamp (6) and remove tube (3) from the fuel pump.
- Reassemble all parts, in the reverse order compared to disassembly.





SETTINGS AND ADJUSTMENTS TC 449 2011/2012 I.E. TE 449 - 511 2011/2012 I.E. TXC 449 - 511 2011/2012 I.E. SMR 449 2011 I.E. SMR 511 2011/2012 I.E.



Exhaust system check

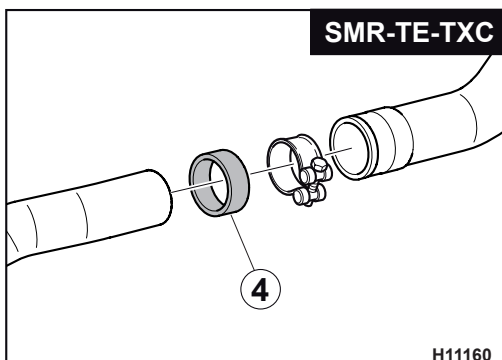
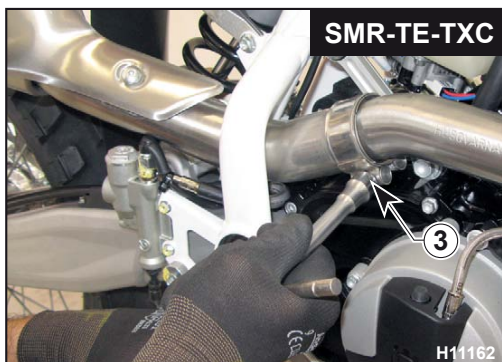
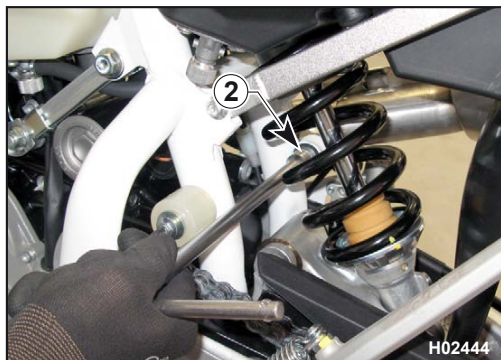
Perform a visual inspection of the exhaust system first, in order to identify possible gas leaks from the sealing elements (gaskets), and to ensure that the Silent-Blocks are not damaged.

Subsequently, inspect the single components by disassembling the exhaust system.

Also check that the flange nuts (1), the screws (2) that fix the silencer to the supports and the screw (3) (TE-TXC-SMR) that fixes the manifold to the silencer are tightly fastened.

Check (TE-TXC-SMR) the state of the gasket (4).

The damaged or broken parts must be replaced.



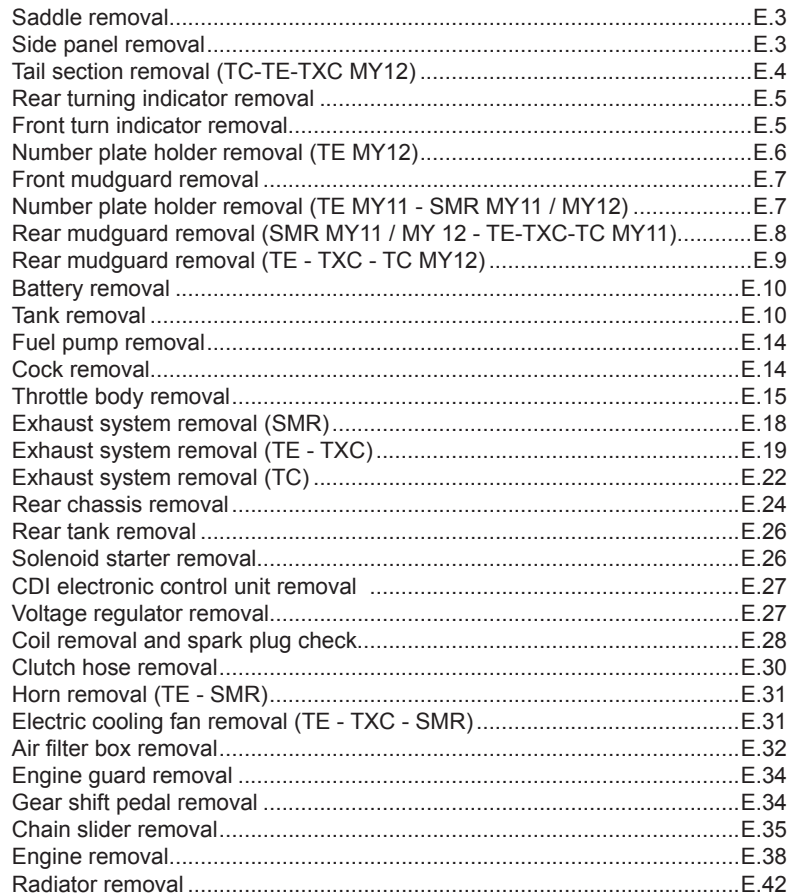
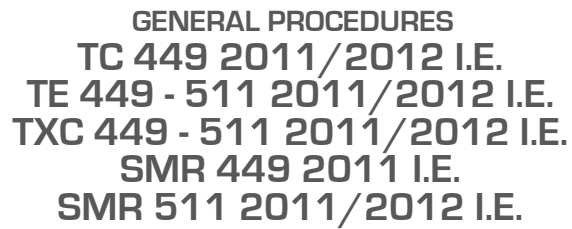


GENERAL PROCEDURES
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



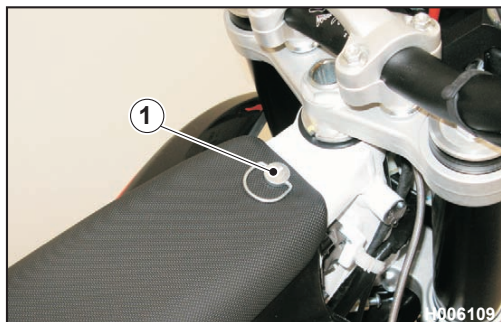
Section

E



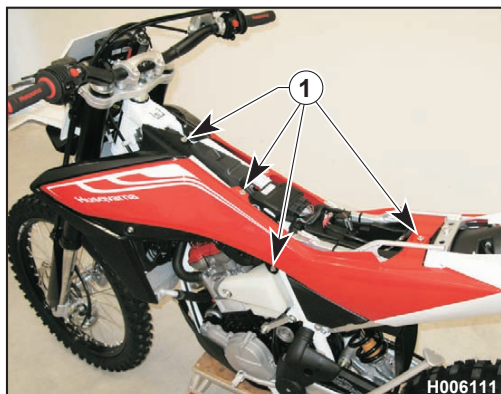


GENERAL PROCEDURES
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



Saddle removal

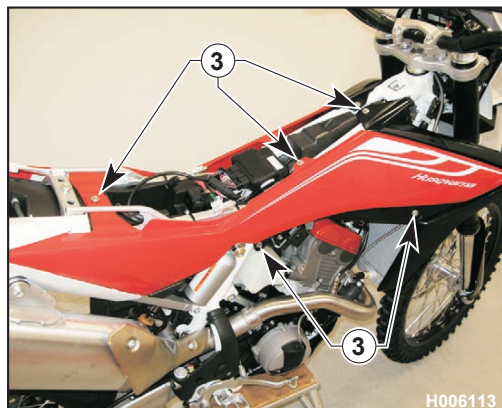
Turn pin (1) counter clockwise, and remove saddle (2) from chassis fastening.



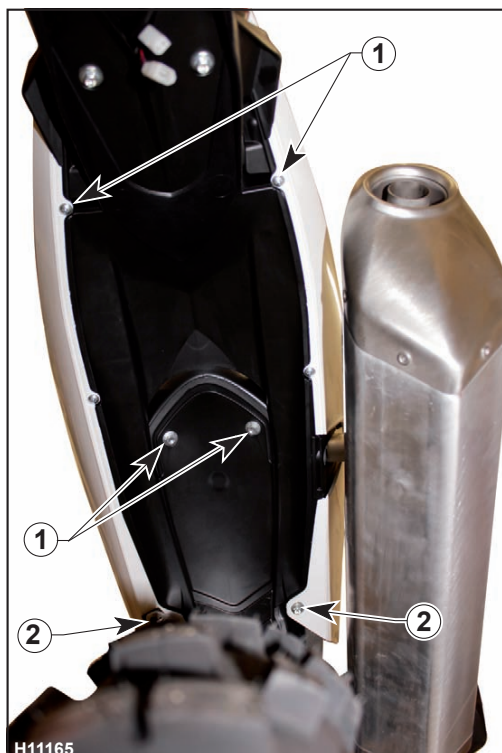
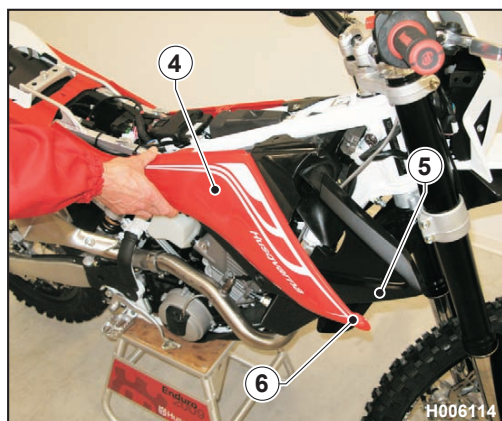
Side panel removal

- Remove the saddle as described in the relevant paragraph.
- Left-hand side panel:
Loosen the four screws (1) using an 8 mm wrench, and remove the side panel (2).





- Right-hand side panel:
 Loosen the five screws (3) using an 8 mm wrench, release side panel (4) from scoop (5) by disengaging retaining tabs (6).



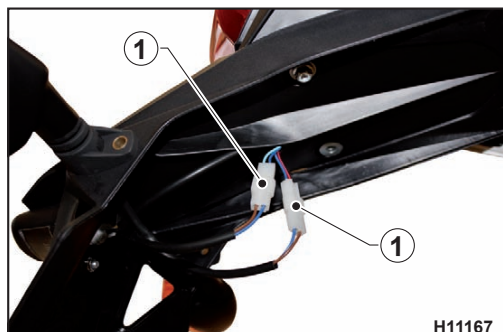
Tail section removal (TC-TE-TXC MY12)

- Remove the side panels as described in the relevant paragraph.
- Loosen the four self-tapping screws (1).
- Loosen the screws (2) using a suitable tool.
- Pull the plastic parts apart slightly and slide the tail section (3) off towards the rear of the motorcycle.





GENERAL PROCEDURES
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

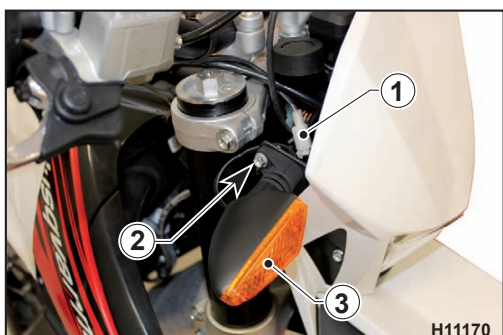
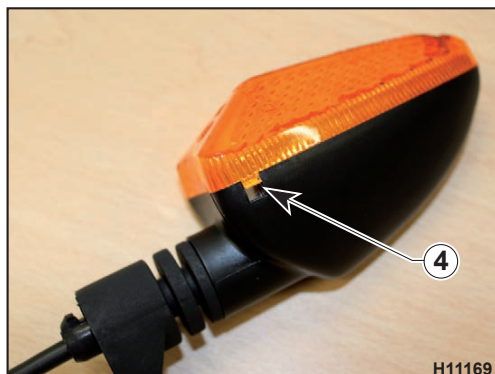


Rear turning indicator removal

- Disconnect the connectors (1).
- Loosen the screws (2) and remove the turning indicators (3).



When reassembling, check that the water drainage hole (4) is placed underneath.

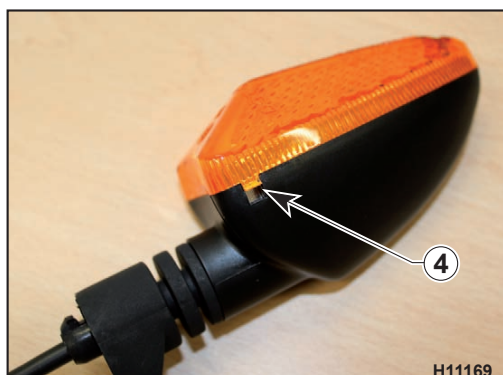


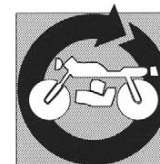
Front turn indicator removal

- Disconnect the connectors (1)
- Loosen the screws (2) and remove the turning indicators (3).



When reassembling, check that the water drainage hole (4) is placed underneath.



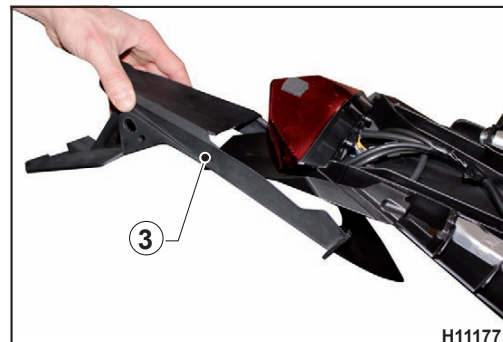
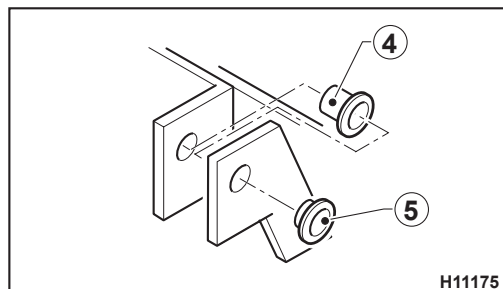


Number plate holder removal (TE MY12)

- Remove the tail section and the rear turning indicators as described in the relevant paragraphs.
- Loosen the two screws (1).
- Disconnect the number plate light cable (2).
- Slide the number plate holder (3) down and remove it.

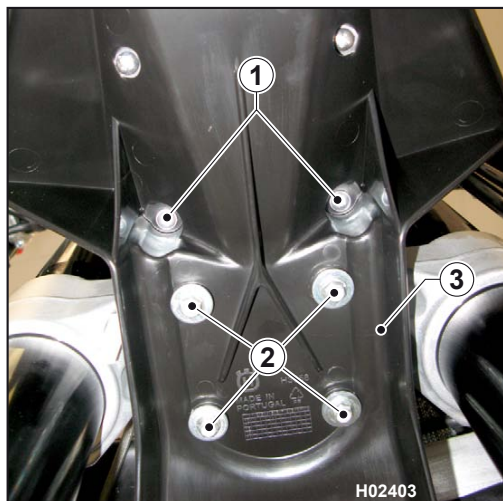


When reassembling, check that the longest bushings (4) are placed on the mudguard and the shortest ones (5) are placed on the number plate holder.



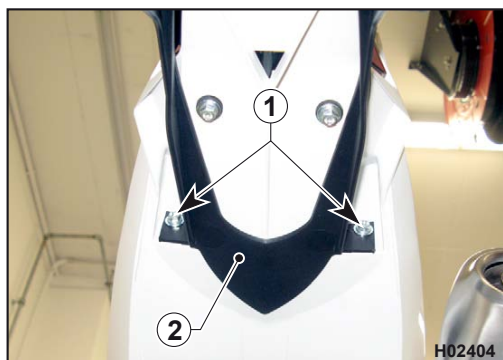


GENERAL PROCEDURES
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



Front Mudguard Removal

- Loosen the two screws (1) securing headlamp fairing/number plate holder and mudguard.
- Loosen the four screws (2) with a 8 mm wrench, and remove front mudguard (3).

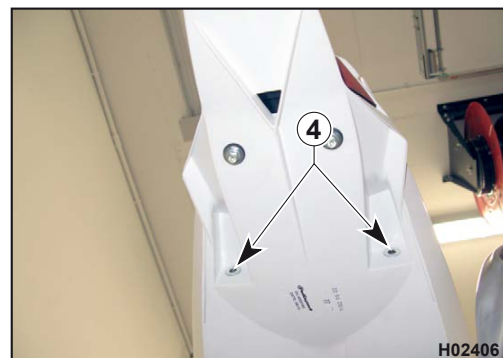


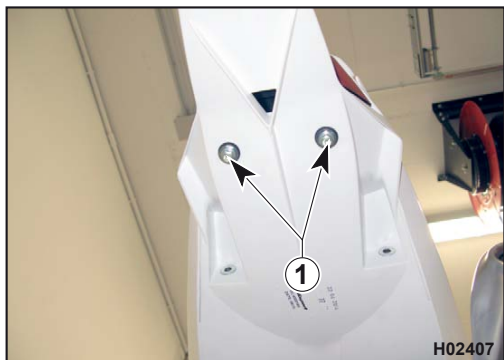
Number plate holder removal (TE MY11 - SMR MY11 / MY12)

- Remove rear turning indicators, as described in the relevant section.
- Using a 8 mm wrench, loosen the two screws (1), disconnect number plate bulb (3) and remove number plate holder (2).



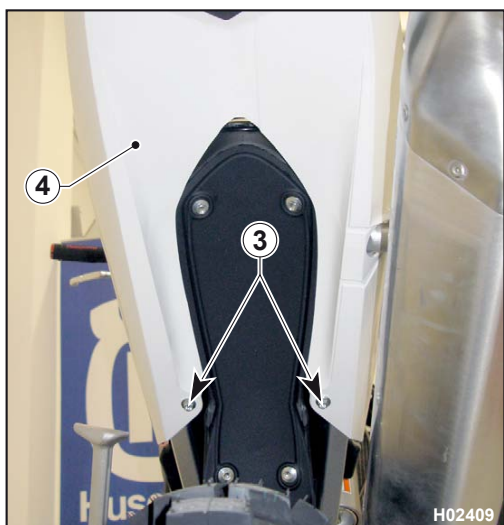
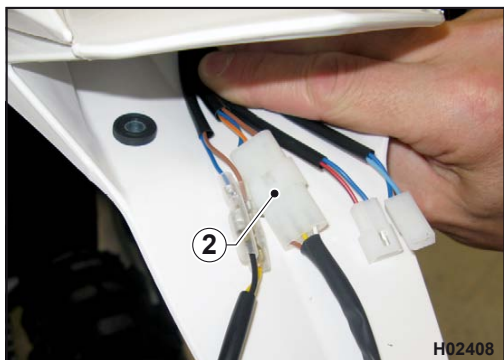
On reassembly, check the correct positioning of the two bushings (4).



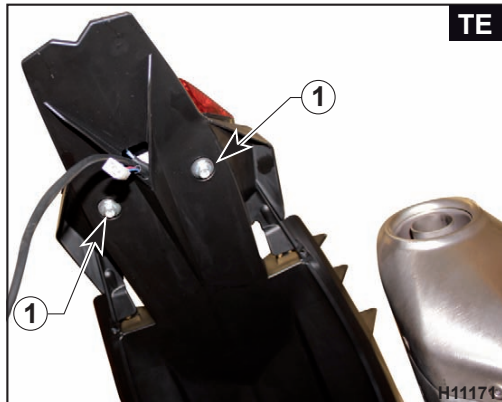
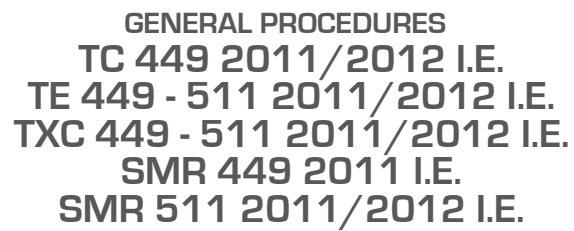


Rear mudguard removal (SMR MY11 / MY 12 - TE-TXC-TC MY11)

- Remove the saddle, the two side panels and the number plate holder (TE - SMR) as described in the relevant paragraphs.
- Using a 8 mm wrench, loosen the two screws (1) positioned under rear mudguard, disconnect connector (2) (TE - SMR), and remove tail light.

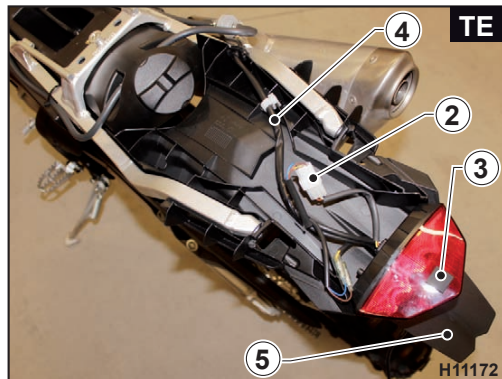


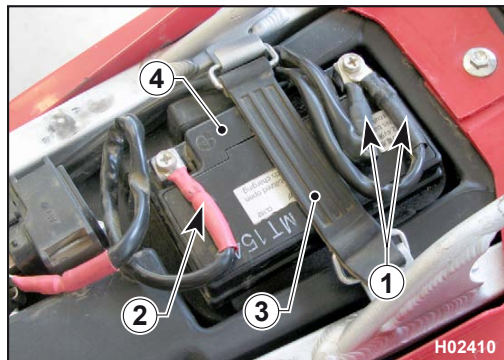
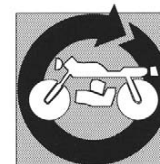
- Using a 8 mm wrench, loosen the two front retaining screws (3), and remove the complete mudguard (4).



Rear mudguard removal (TE - TXC - TC MY12)

- Remove the saddle, the side panels, the tail section and the number plate holder (TE) and the turning indicators (TE), as described in the relevant paragraphs.
- (TE) Loosen the two screws (1), disconnect the connector (2) and remove the light (3).
- (TE) Remove the wiring harness (4) from the mudguard (5).
- Loosen the two screws (6) and remove the mudguard (5).





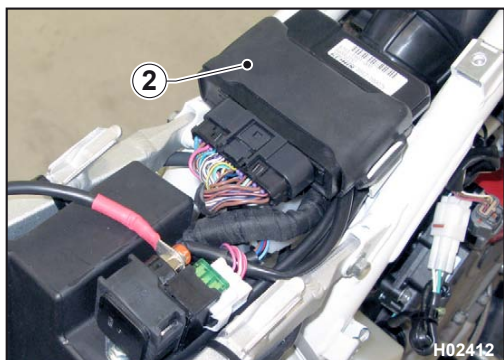
Battery removal

- Remove the saddle as described in the relevant paragraph.
- First remove the BLACK negative cable (1), then the RED positive cable (2) (when reassembling, first connect the RED positive cable, then the BLACK negative cable); release retaining elastic strap (3), and remove battery (4) from its compartment.

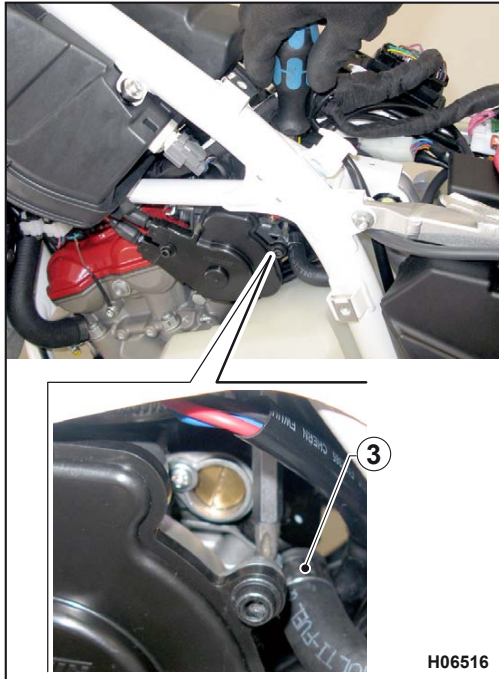
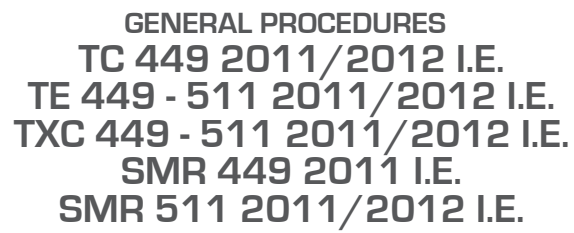


Tank Removal

- Close both fuel cocks (1).
- Remove the saddle and the two side panels, as described in the relevant paragraphs.



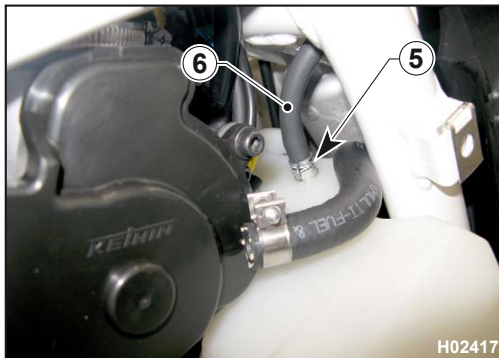
- Release the electronic control unit (2) off its mounts, and move it aside.



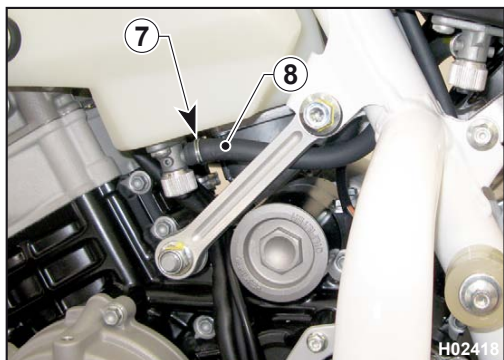
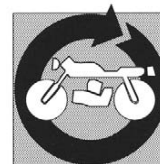
- Undo the upper clamp (3) connecting fuel pump to throttle body.



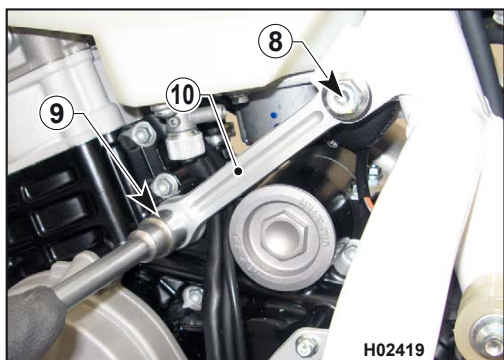
- Disconnect pump supply connector (4).



- Slacken clamp (5) with long nose pliers, and disconnect breather hose (6) from tank.



- Slacken clamp (7) with long nose pliers, and disconnect hose (8) between the two tanks.



- Loosen upper screw (8) using a 14 mm wrench; undo and remove lower bolt (9) with two 14 mm wrenches, then remove engine left connecting rod (10).



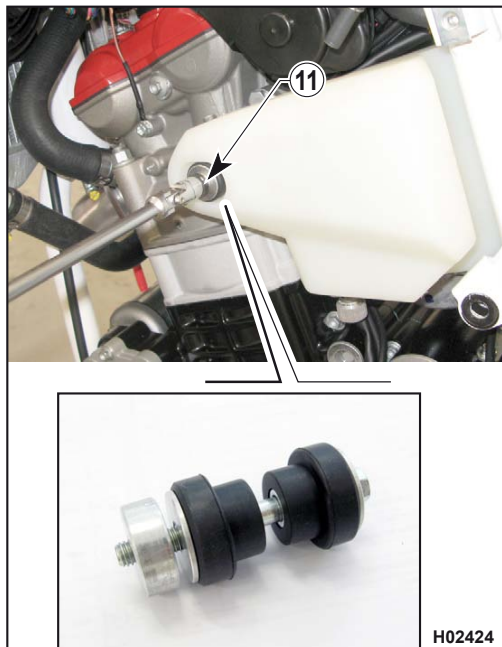
As for TC model, remove exhaust manifold as described in the relevant paragraph to undo bolt (9).



On reassembly, position connecting rod (10) with the written side facing the inner part of the bike, to a tightening torque of 50 Nm - 5.0 Kgm - 36.88 ft/lb + loctite 243.



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- With a 8 mm socket wrench, undo screw (11), and remove the screw with rubbers and spacers.

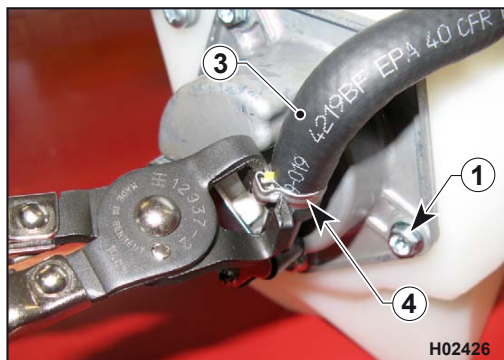
On reassembly, tighten screw (11) to 10 Nm - 1.0 Kgm - 7.38 ft/lb.



- Remove tank (12) and drain any residual fuel through cock.

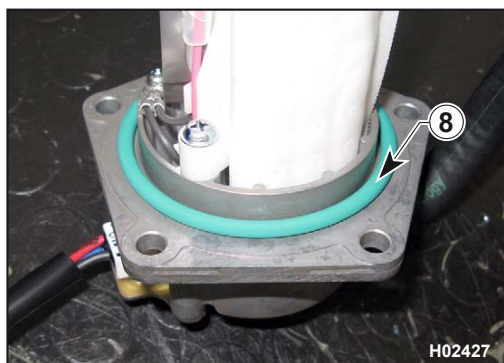


For upper tank removal, refer to the rear chassis removal paragraph.



Fuel Pump Removal

- Remove lower fuel tank as described in the relevant paragraph.
- Using a 8 mm Allen wrench, loosen the five screws (1) securing pump (2) to tank.
- To replace throttle body supply hose (3), open metal clamp (4) and then, after hose replacement, close clamp again using the special pliers.

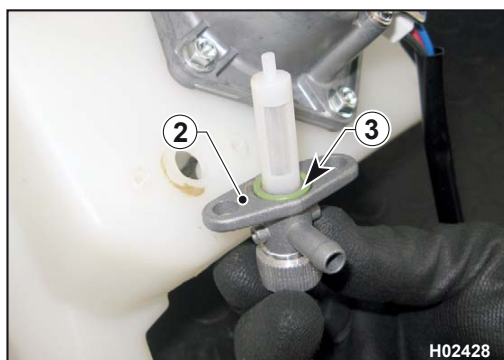


On reassembly, tighten screws (1) to a torque of 7 Nm - 0.7 Kgm - 5.16 ft/lb checking that the O-ring (8) is correctly positioned in its seat and it is not damaged.



Cock Removal

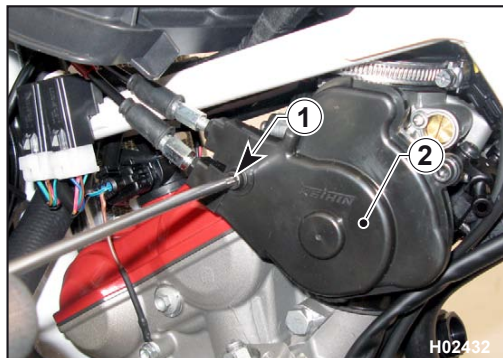
- Remove lower fuel tank as described in the relevant paragraph.
- Using a Phillips screwdriver, loosen screws (1), then remove cock (2).



On reassembly, check O-ring (3) correct positioning.

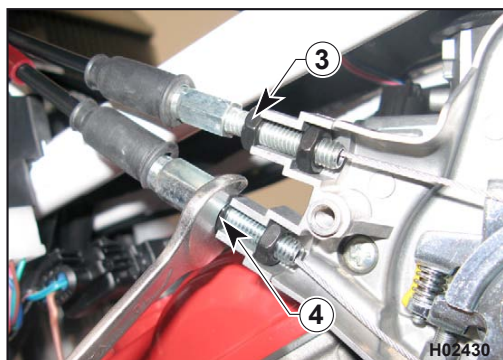


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Throttle body removal

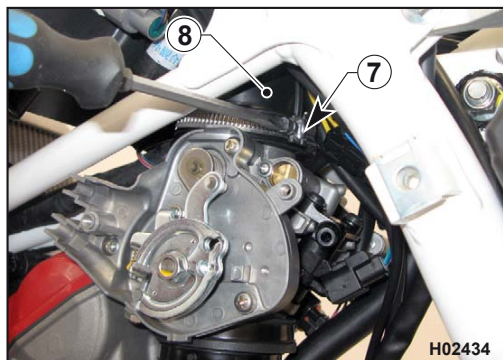
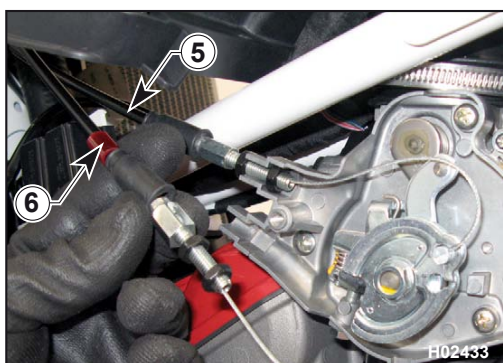
- Remove lower fuel tank as described in the relevant paragraph.
- Remove the air filter as described in the relevant paragraph.
- Use a 4 mm Allen wrench to loosen the screw (1) and remove the cover (2) of the throttle body.



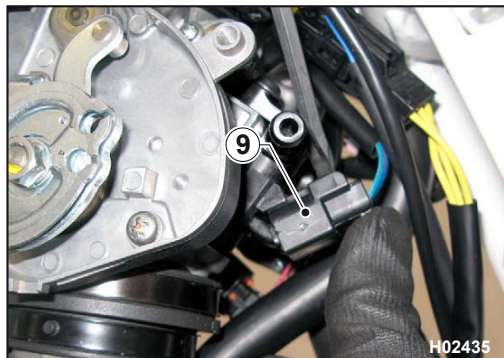
- Using a 10 mm Allen wrench, loosen nuts (3) and (4) and remove cables (5) and (6).



On reassembly, cable (6) with the RED ring shall be fitted onto throttle body lower side.



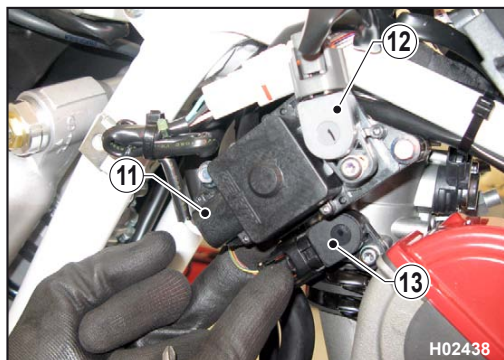
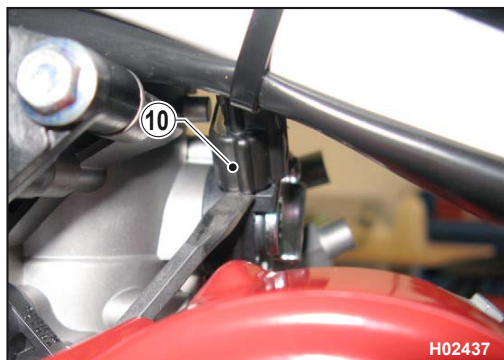
- Loosen clamp (7) of intake coupling (8), squeeze hose coupling on the inner side (filter box side) until it comes out of its seat. Using a screwdriver, prise until it is removed from throttle body.



- Disconnect injector connector (9).



- Detach the pressure sensor (10).



- From the right side:
 TE - TXC - SMR;
 remove second throttle connector (11), second throttle TPS connector (12),
 and TPS connector (13).

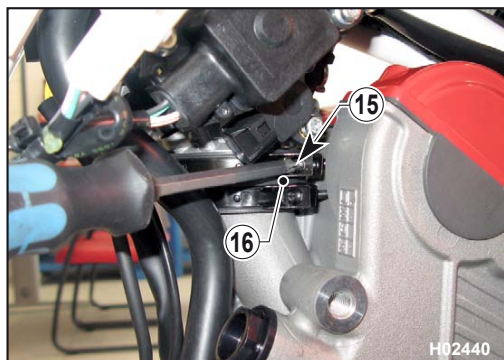


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TC;

- disconnect TPS connector (14).



- Loosen intake manifold (16) upper screw (15).

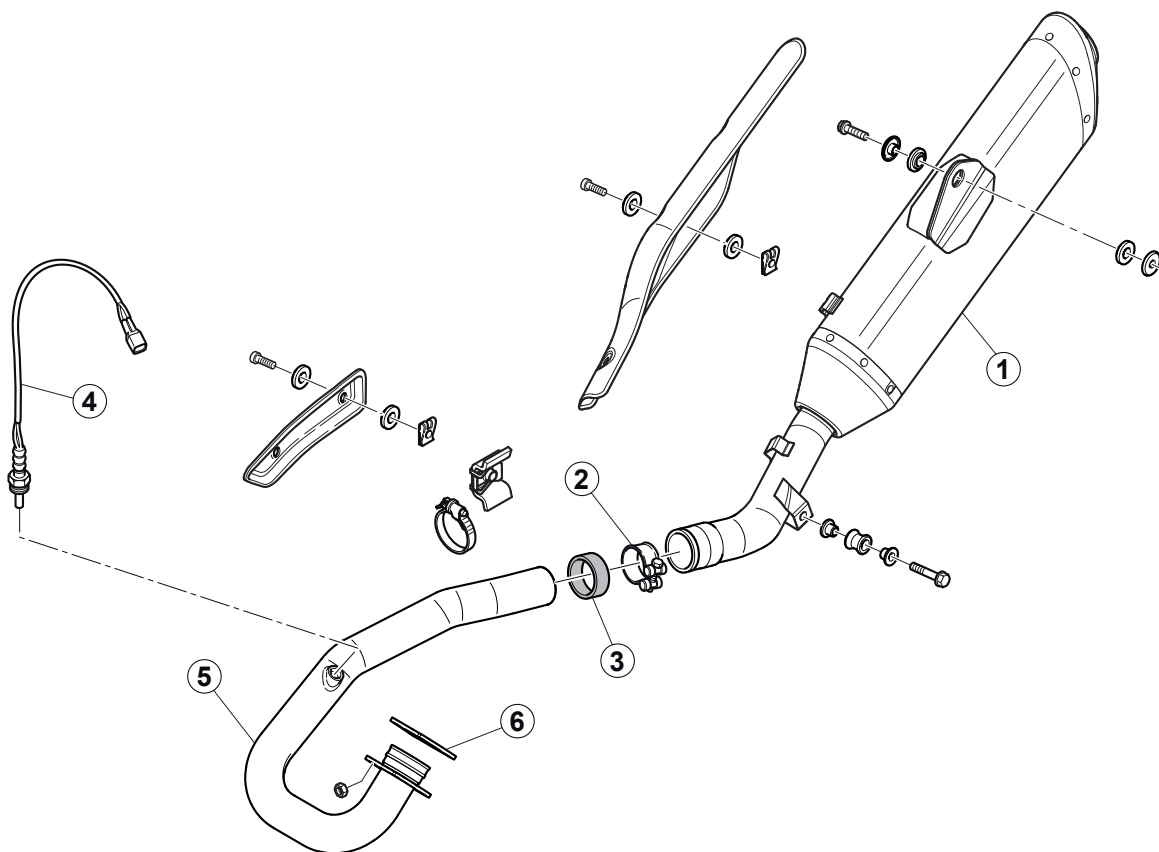


- Working on bike right side, slightly lift throttle body and turn it clockwise by 90°, then remove it from bike left side.



Exhaust System Removal (SMR)

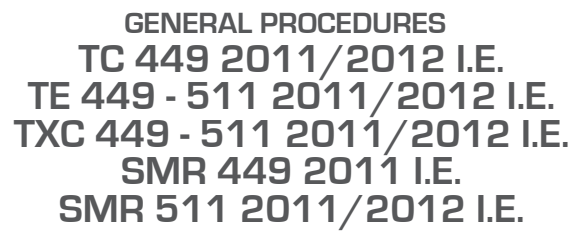
SMR



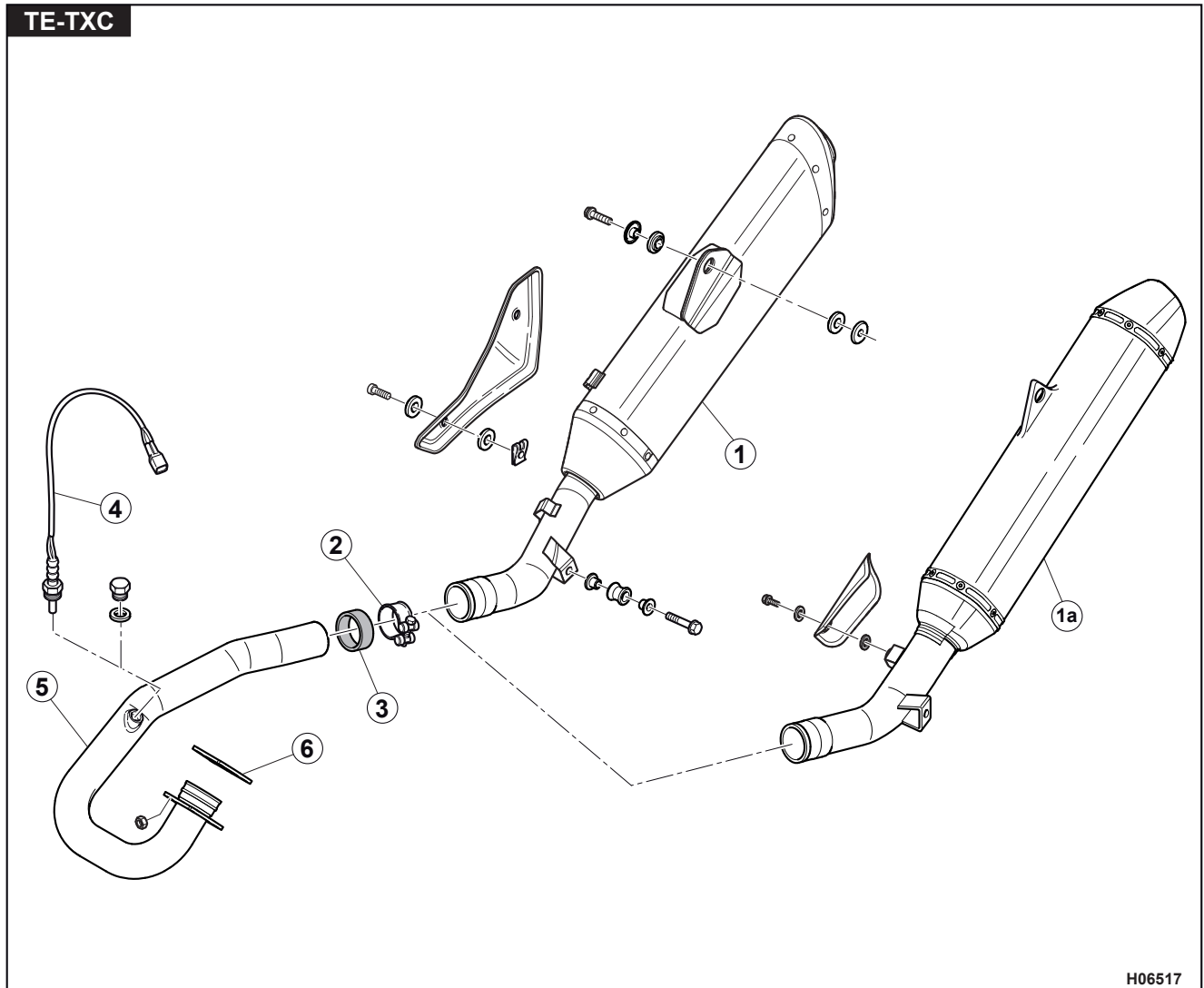
H06518

Key (SMR)

1. Silencer
2. Clamp
3. Seal
4. Lambda sensor
5. Manifold
6. Seal

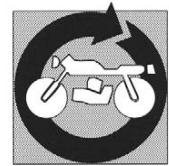


Exhaust System Removal (TE - TXC)

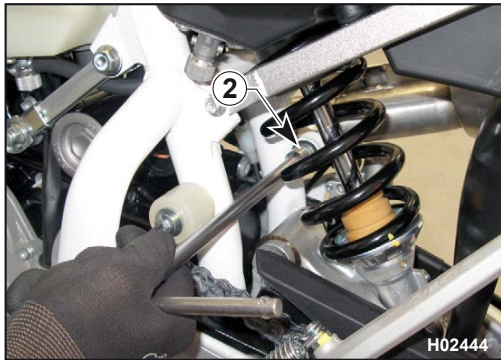


Key (TE - TXC)

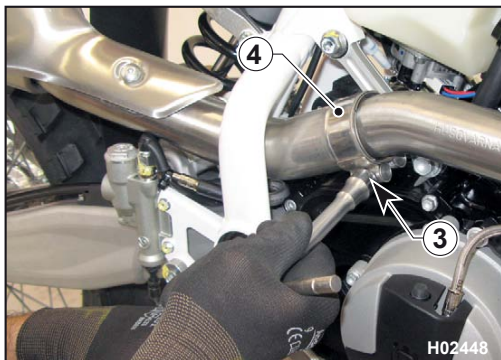
1. Silencer (Lanfranconi)
- 1a. Silencer (Krapovic)
2. Clamp
3. Seal
4. Lambda sensor
5. Manifold
6. Seal



- Working on the right side, loosen upper screw (1) using a 12 mm T-wrench.



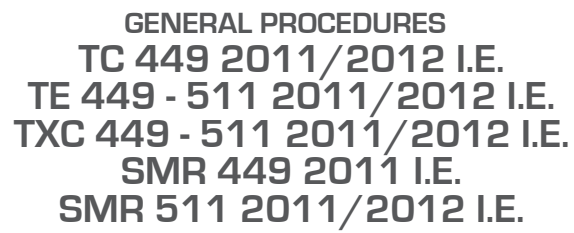
- Working on the left side, loosen screw (2) using a 12 mm T-wrench.



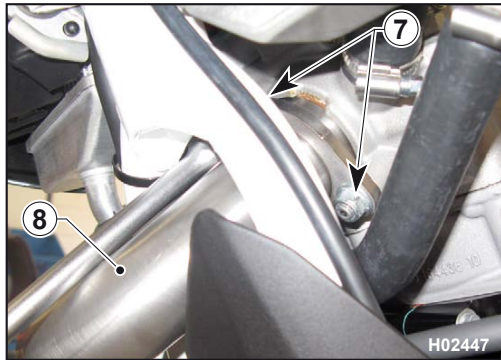
- Loosen clamp (4) screw (3) (with a 13 mm wrench), and move it onto the exhaust manifold.



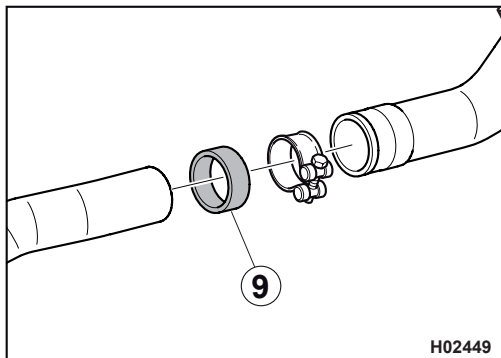
- Remove silencer (5).



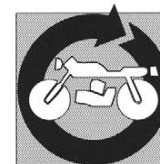
- Cut Lambda sensor cable clamps, and remove connector (6).



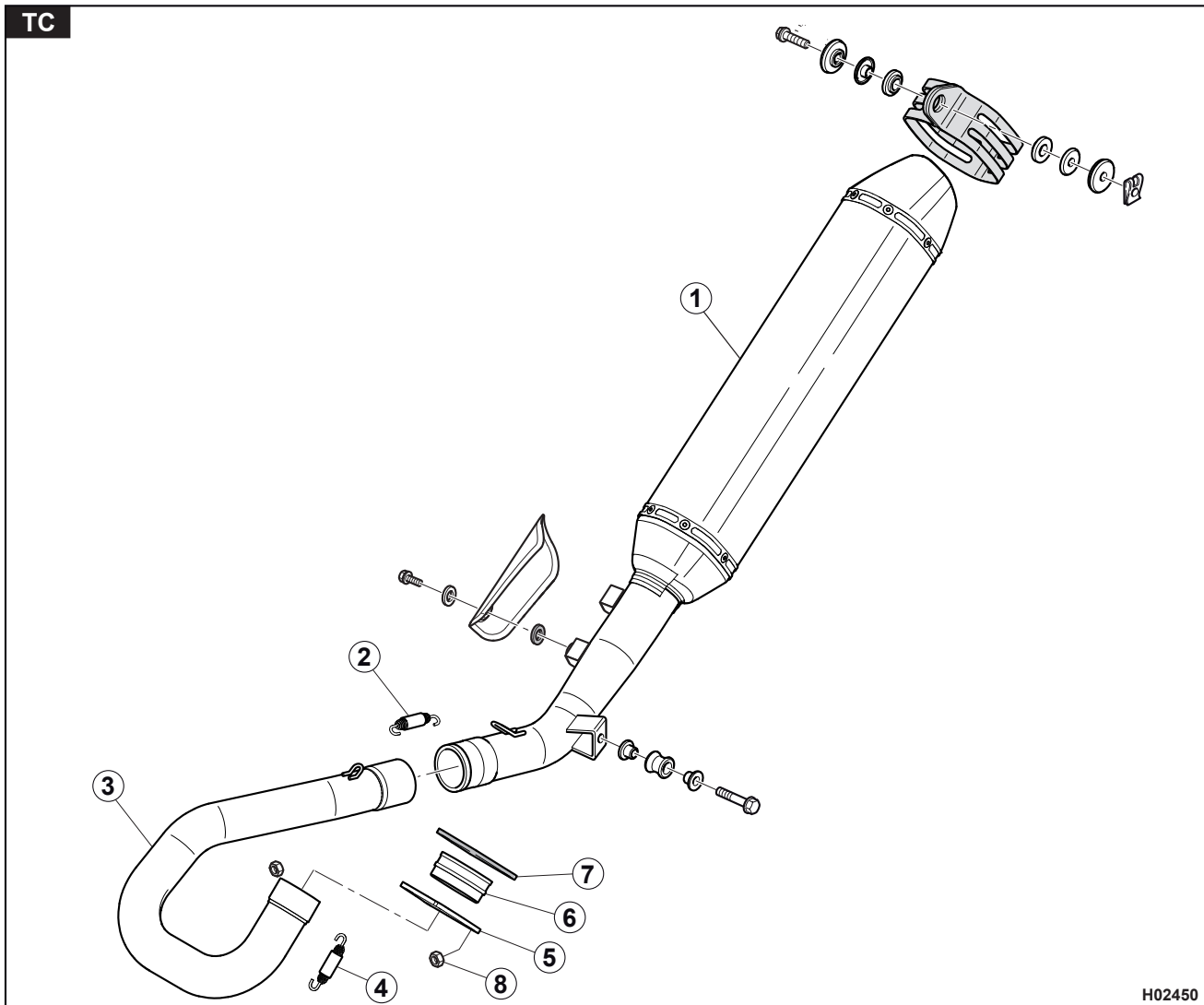
- Loosen the two screws (7) using a 12 mm Allen wrench, then remove manifold (8)



- On reassembly, replace seal (9)



Exhaust system removal (TC)



Key

1. Silencer
2. Spring
3. Manifold
4. Spring
5. Flange
6. Bushing
7. Seal
8. Nut



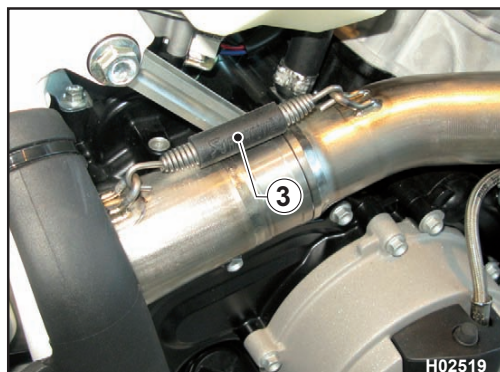
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- Working on the right side, loosen support clamp upper screw (1) using a 12 mm T-wrench.



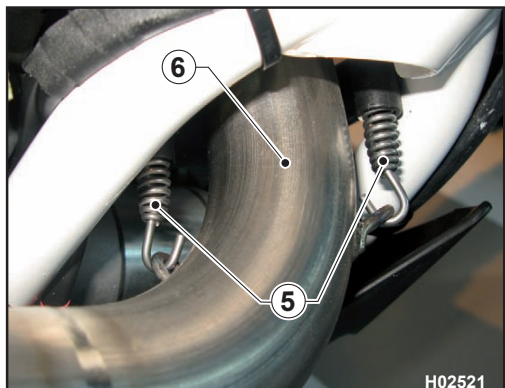
- Working on the left side, loosen screw (2) using a 12 mm T-wrench.



- Release spring (3).



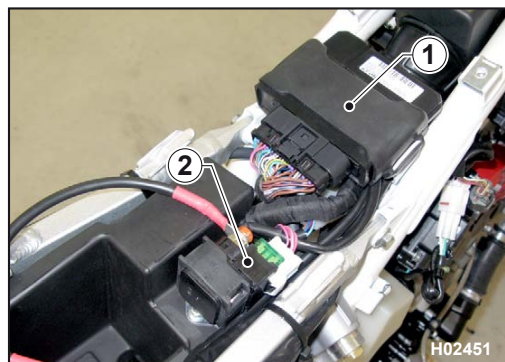
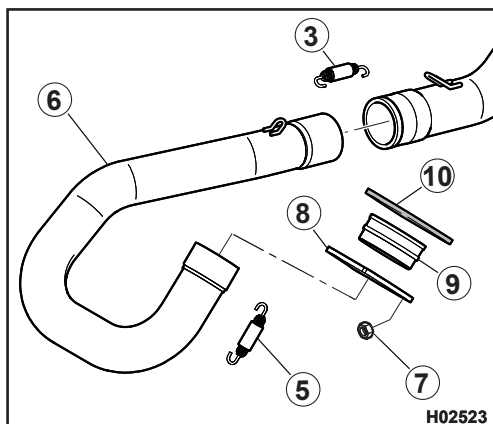
- Remove silencer (4).



- Release springs (5), and remove manifold (6).

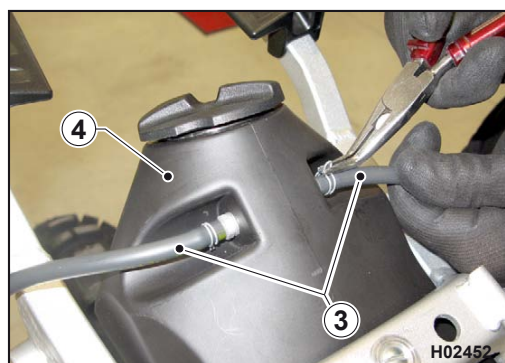


- Using a 12 mm Allen wrench, loosen the two nuts (7), then remove flange (8), bushing (9), and gasket (10).
 On reassembly, screw nuts (7) to a torque of 26 Nm - 2.65 Kgm - 19.18 ft/lb

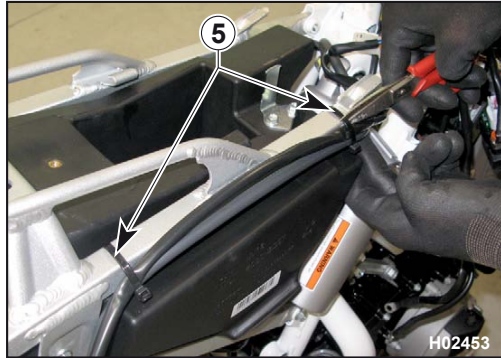
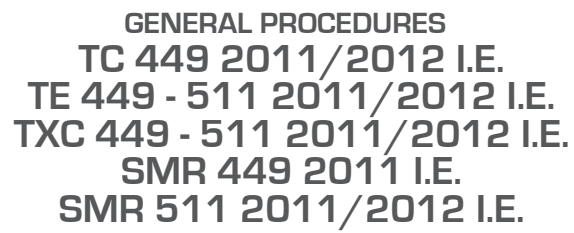


Rear chassis removal

- Remove saddle, side panels, number plate holder, rear mudguard, exhaust silencer, and battery, as described in the relevant paragraphs.
- Disconnect control unit (1) and solenoid starter (2) from their mounts.



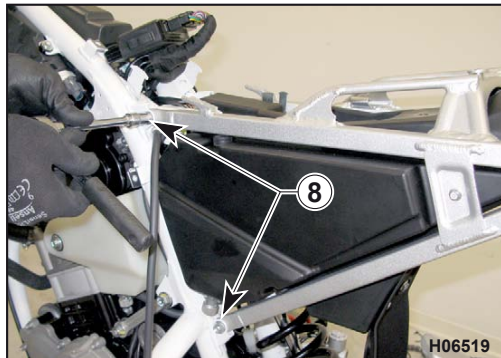
- Detach tank breather hoses (3) from tank (4).



- Cut clamps (5) of the rear wiring harness.

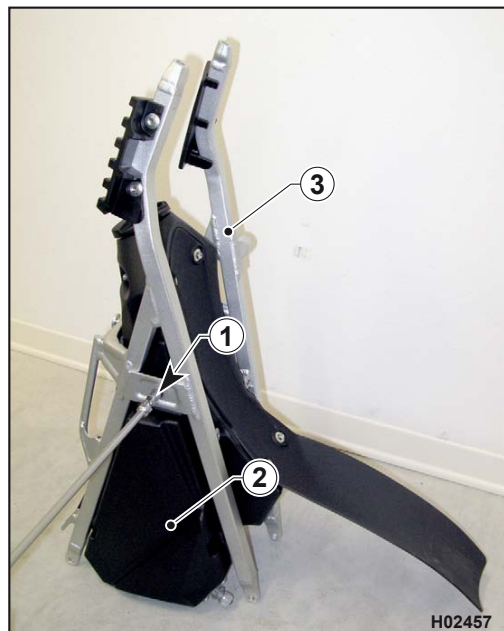
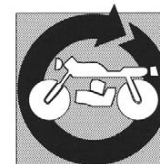


- Make sure that fuel tank cocks are closed, then disconnect hose (6) from rear tank cock (7).



- Using a 10 mm wrench, loosen the four screws (8), and remove the chassis (9) with tank (10).



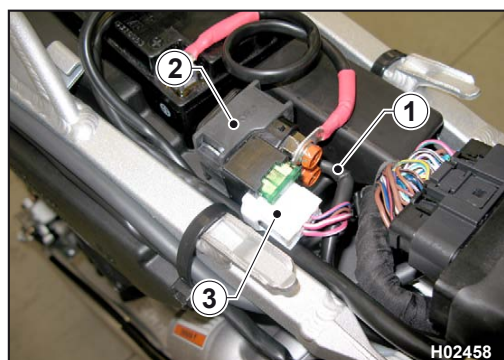


Rear tank removal

- Remove the rear chassis, as described in the relevant paragraph.
- Loosen the two screws (1) securing tank (2) to rear chassis (3), and remove tank.



On reassembly, check the correct positioning of the bushings.

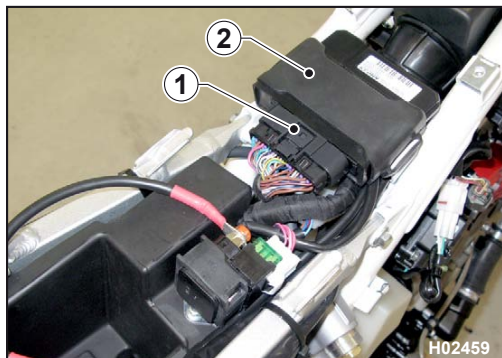


Solenoid starter removal

- Remove the saddle as described in the relevant paragraph.
- Disconnect the negative and positive cables of the battery.
- Disconnect the starter motor positive cable (1) from the solenoid starter (2).
- Disconnect the connector (3) and remove the solenoid starter (2) from its mount.



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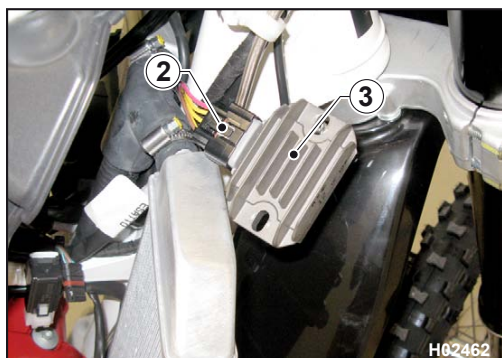
CDI electronic control unit removal

- Remove the saddle as described in the relevant paragraph.
- Remove the connector (1) from the CDI electronic control unit (2) and take the control unit together with its anti-vibration mount out of the chassis.



Voltage regulator removal

- Remove the saddle as described in the relevant paragraph.
- Loosen the screws (1) using a 8 mm wrench.



- Disconnect the connector (2), and remove voltage regulator (3).



Coil removal and spark plug check

Spark plug electrodes gap shall be 0.7 - 0.8 mm (0.028 ÷ 0.031 in).

A wider gap may cause difficulties in starting the engine and overload the coil.
 A gap that is too narrow may cause difficulties when accelerating, when idling or poor performance at low speed.

Clean off any dirt around spark plug base before removing the spark plug.

It is very useful to examine the state of the spark plug just after it has been removed from the engine since the scale deposits on the plug and the colour of the insulator provide useful indications.

Correct heat rating:

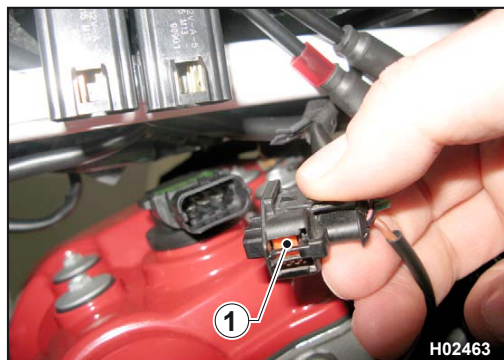
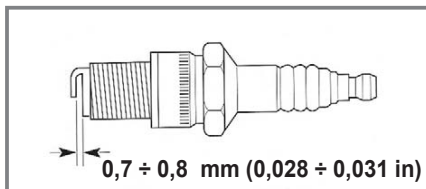
The tip of the insulator should be dry and the colour should be light brown or grey.

High heat rating:

In this case, the insulator tip is dry and covered with dark deposits.

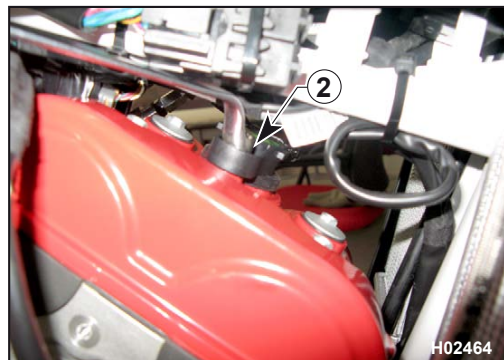
Low heat rating:

In this case, the spark plug has overheated and insulator tip is vitrified (glazed), white or grey in colour.



To remove spark plug, proceed as follows:

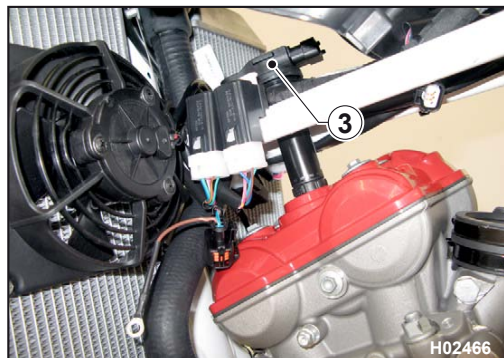
- remove air filter cover as described in the relevant paragraph;
- disconnect connector (1) on engine left side;



- on engine right side, undo screw (2) using an 8 mm wrench;



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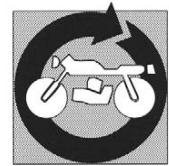
- turn spark plug cap (3) complete with coil through 90° and lift it to remove it; then remove spark plug.



Carefully change the spark plug, if necessary, using one having the same rating.

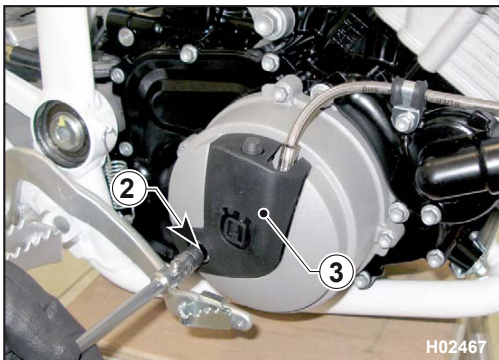
Before refitting the plug, thoroughly clean the electrodes and the insulator using a metal brush. Apply graphitised grease on spark plug thread, screw it by hand all the way down, then tighten it to the torque of $10 \div 12$ Nm ($7.38 \div 8.85$ ft-lb). Loosen spark plug and tighten it again to $10 \div 12$ Nm ($7.38 \div 8.85$ ft-lb).

Spark plugs which have cracked insulators or corroded electrodes should be replaced.

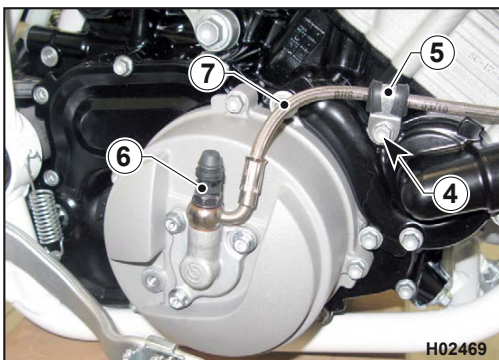


Clutch hose removal

- Loosen screw (1) (with a 8 mm wrench), and move number plate holder or headlamp fairing.



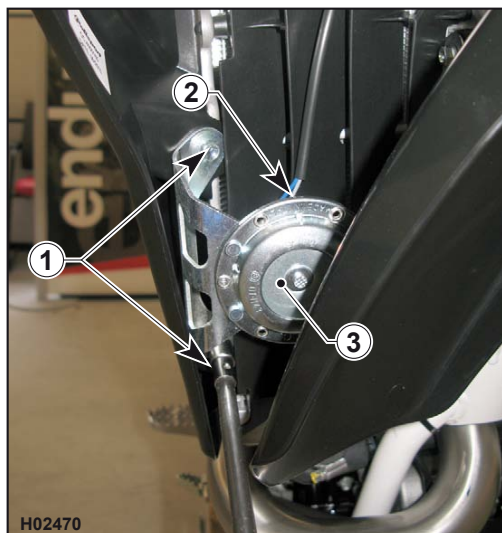
- Loosen screw (2) (with a 8 mm wrench), and remove the cover (3).



- Loosen screw (4) (with a 8 mm wrench), and disconnect clamp (5) from engine.
- Loosen clutch hose (7) union (6), and drain all oil out of hose. On reassembly, bleed the clutch system as described in Section "P".

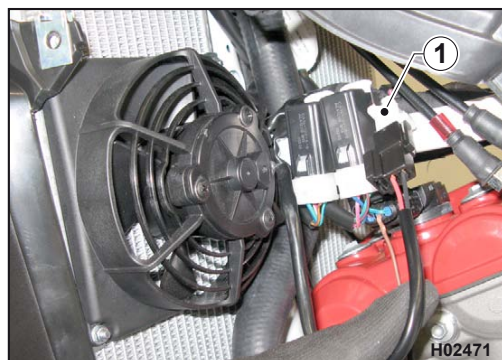


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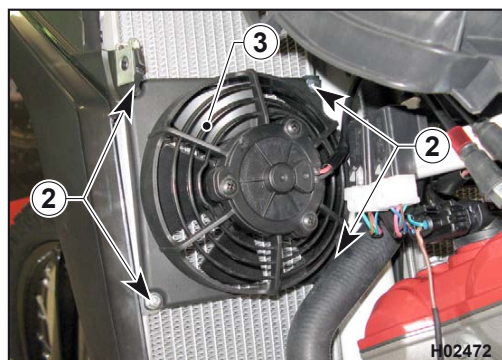
Horn removal (TE - SMR)

- Loosen the two screws (1) (using a 8 mm wrench)
- Disconnect connector (2) and remove horn (3).

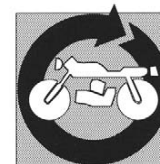


Electric cooling fan removal (TE - TXC - SMR)

- Remove saddle first, and then the left side panel.
- Disconnect the connector (1).

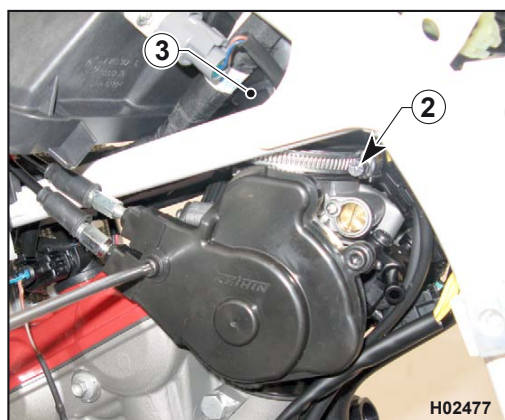


- Loosen the four screws (2) (with a 7 mm wrench), and remove electric fan (3).

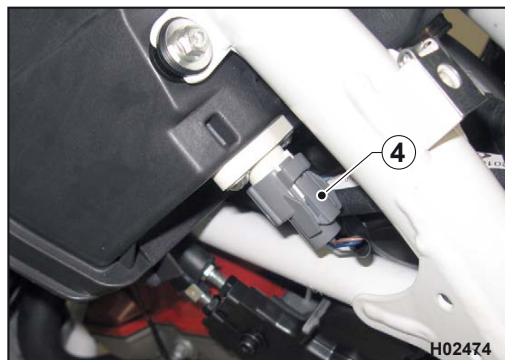


Air filter box removal

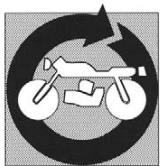
- Remove saddle, left and right side panels, filter, and voltage regulator, as indicated in the relevant paragraphs.
- Loosen screw (1) (with a 8 mm wrench) securing left scoop.



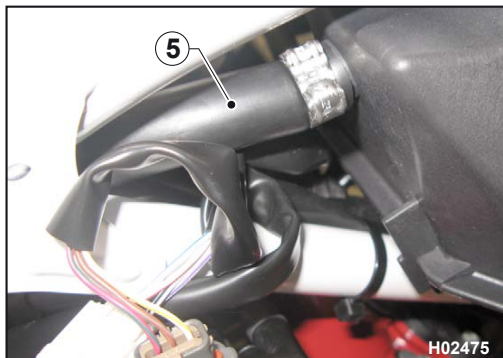
- Loosen intake coupling (3) clamp (2), and slide coupling out from the front side.



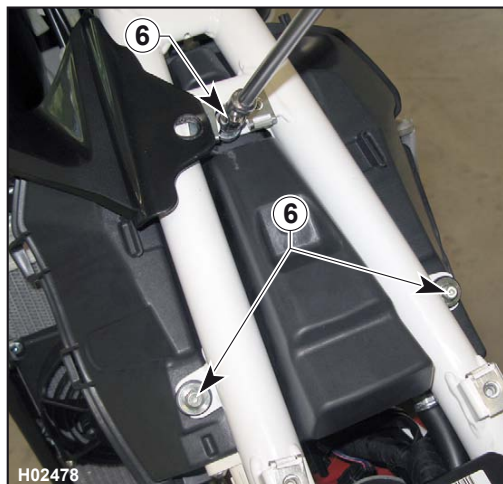
- Disconnect air temperature sensor connector (4).



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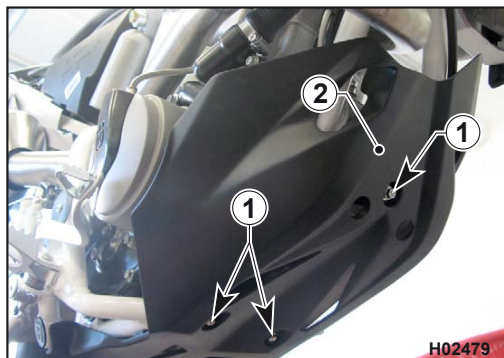
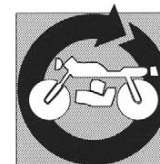
- Disconnect Blow-by hose (5).



- Loosen the three screws (6) (with a 8 mm wrench)

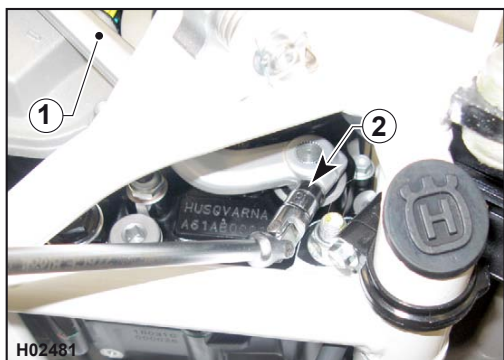


- Lower filter box (7), and remove it from the bike right side.



Engine guard removal

- Using a 8 mm socket wrench, loosen the three screws (1), and remove engine guard (2).

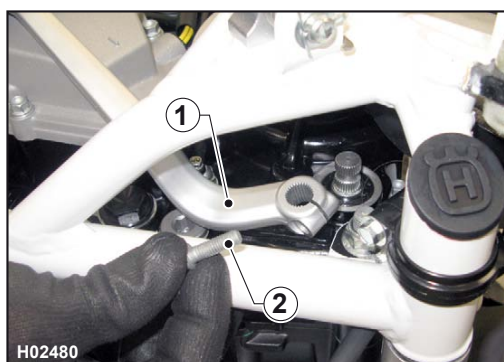


Gear shift pedal removal

- Remove chain and engine guard as indicated in the relevant paragraph.
- Engage the 2nd gear with the gear shift pedal (1)
- Using a 8 mm socket wrench, loosen screw (2), and remove gear shift pedal (1).



On reassembly, tighten screw (2) to 10 Nm - 1.02 Kgm - 7.38 ft/lb.



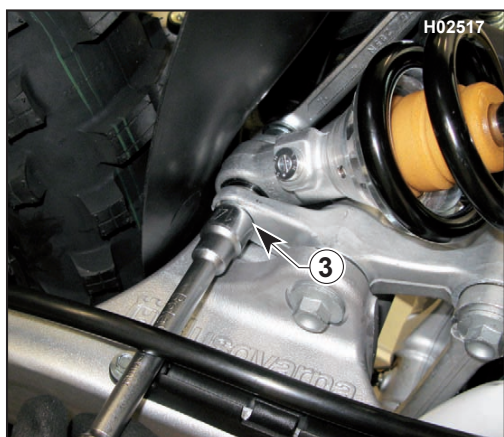


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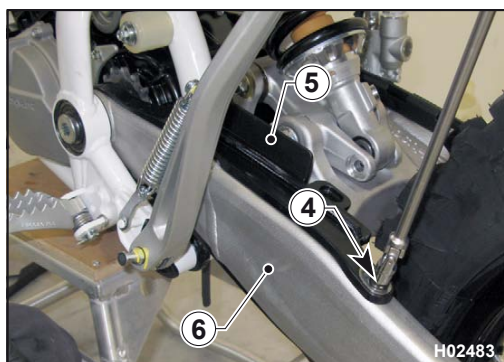


Chain slider removal

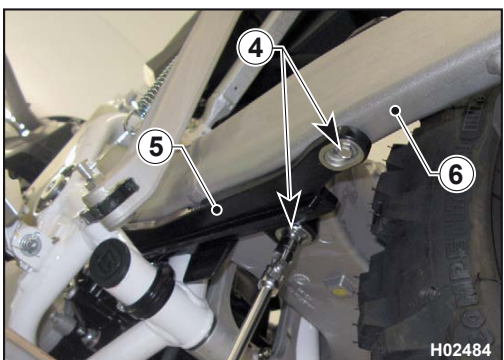
- Remove chain and gear shift pedal as indicated in the relevant paragraphs.
- Loosen screw (2), and remove chain guard (1).
- Fit a support under the engine so that the rear wheel is raised off the ground.

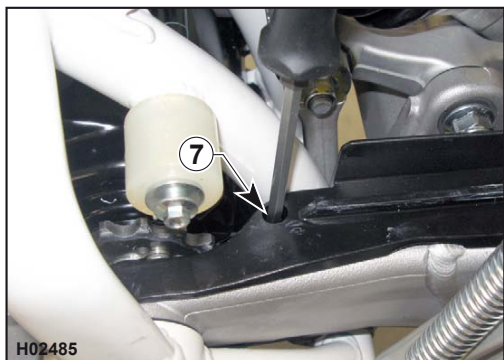


- Loosen lower screw (3) using two 14 mm wrenches.

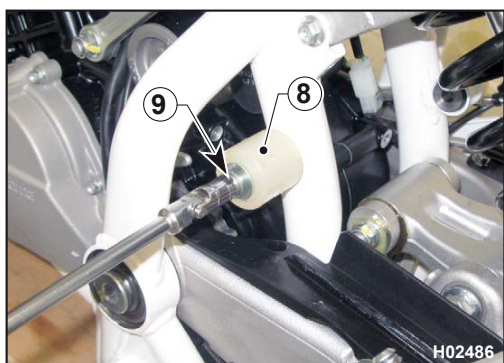


- Loosen the three screws (4) (with a 8 mm wrench) securing chain slider (5) to swinging arm (6).

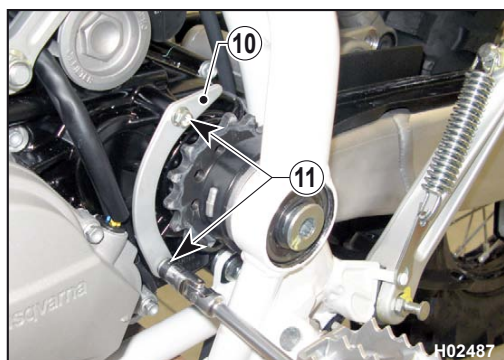




- Loosen screw (7) with a Phillips screwdriver.



- Loosen screw (9) (with a 8 mm wrench) and remove chain roller (8).



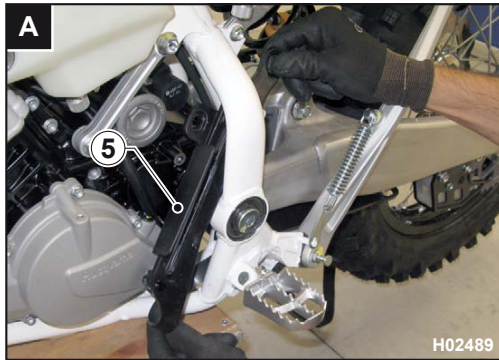
- Loosen screws (11) (with a 8 mm wrench) and remove sprocket guard (10).



- Raise rear wheel (12) and keep it raised off the ground with a belt.

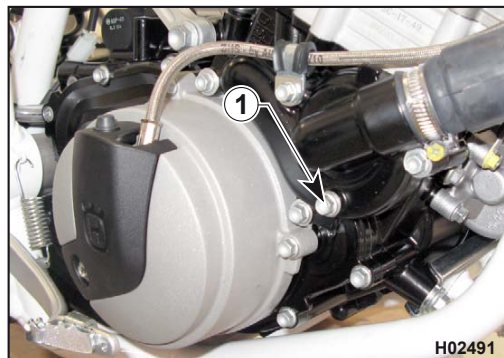


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TXC 449 - 511 2011/2012 I.E.
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SMR 511 2011/2012 I.E.



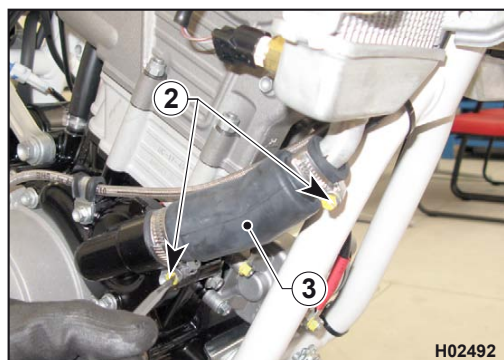
- Slide out the chain slider (5) as shown in figures "A" and "B".



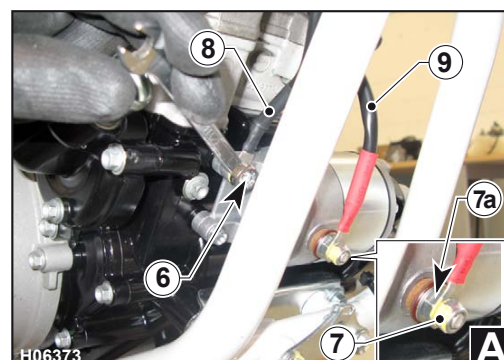
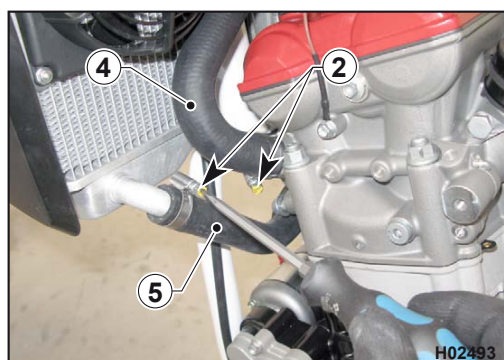


Engine removal

- Remove lower tank, throttle body, chain, and exhaust system as described in the relevant paragraphs.
- Loosen screw (1) positioned onto pump body, and drain off cooling system.



- Loosen clamps (2), and remove engine cooling hoses (3), (4) and (5).



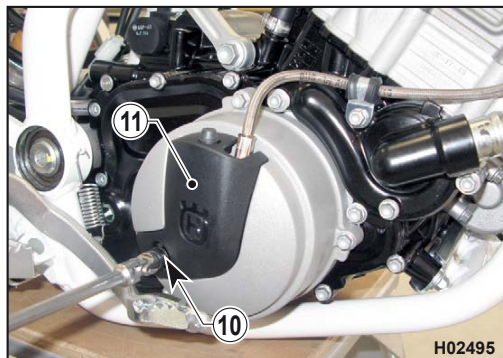
- Loosen screw (6) (with an 8 mm wrench), and detach ground cable (8).



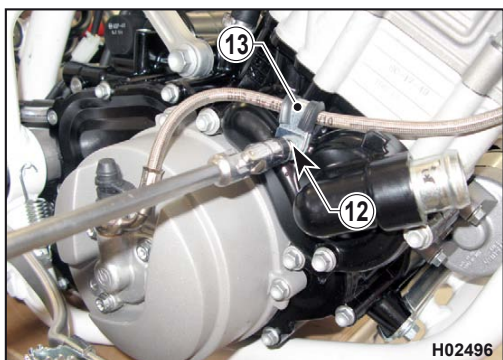
To loosen the nut (7) retaining the "Motor positive" cable (9), it is necessary to use two 8 mm wrenches: one to hold the lock nut (7a) and the other to loose the nut (7) retaining the cable. This operation is required to prevent stud bolt removal.



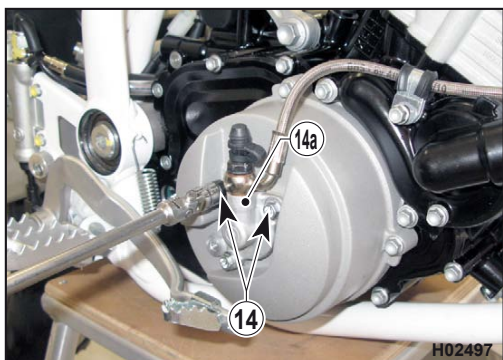
GENERAL PROCEDURES
TC 449 2011/2012 I.E.
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TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



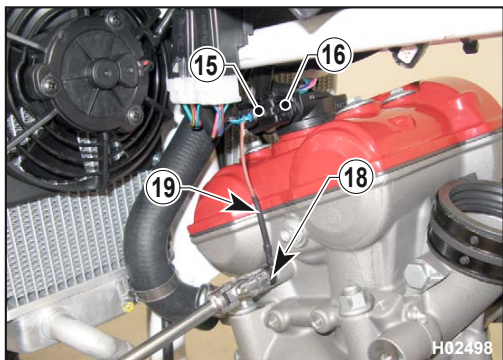
- Loosen screw (10) (with a 8 mm wrench), and remove cover (11).



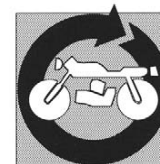
- Loosen screw (12) (with a 8 mm wrench), and disconnect clamp (13) from engine.



- Loosen the three screws (14) (with a 8 mm wrench), and disconnect clutch actuator (14a).



- Disconnect spark plug cap/coil (16) connector (15), loosen screw (18) (with a 8 mm wrench), and disconnect ground cable (19).



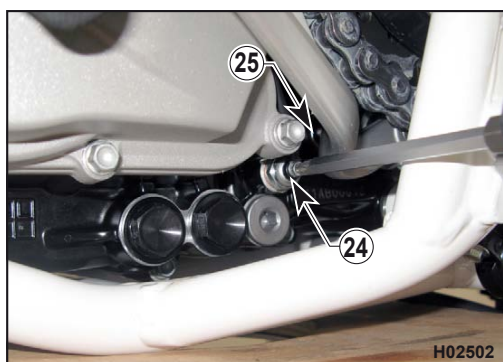
- Turn coil (16) by 90° so that connector is pointing to bike rear end, then remove it.



- Disconnect Blow-by hose (20).



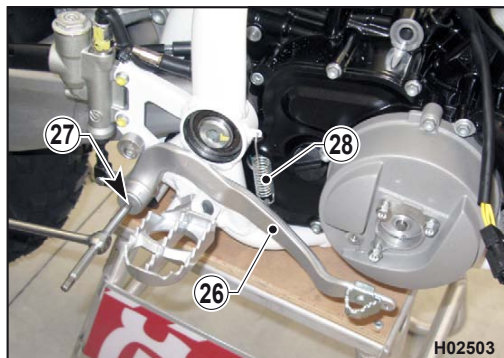
- Loosen screw (21) and screw (22) (with a 14 mm wrench), and remove right connecting rod (23).
- Disconnect all engine wiring harnesses.



- Loosen screw (24) and remove neutral sensor wiring harness (25).



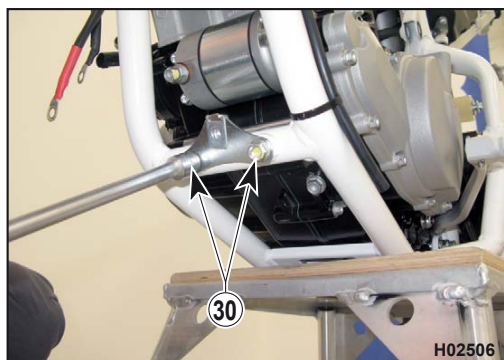
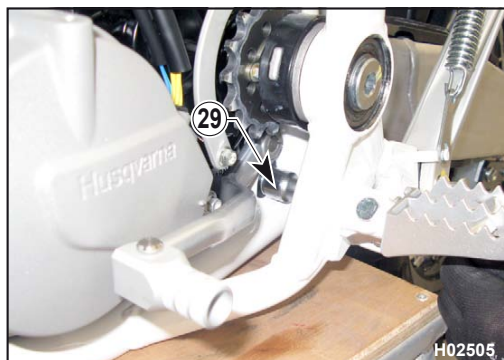
GENERAL PROCEDURES
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SMR 511 2011/2012 I.E.

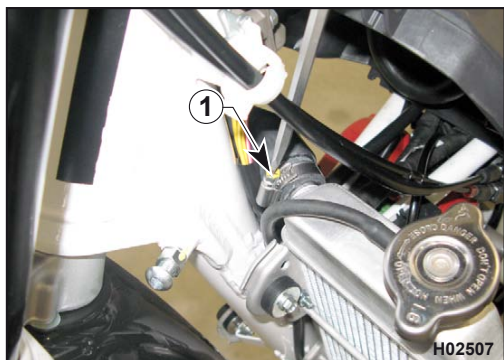
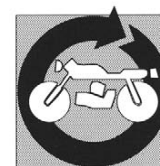


- Remove rear brake pedal (26) by loosening screw (27) (with a 6 mm Allen wrench), and releasing spring (28).



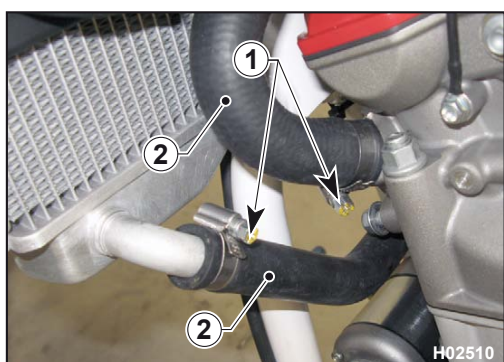
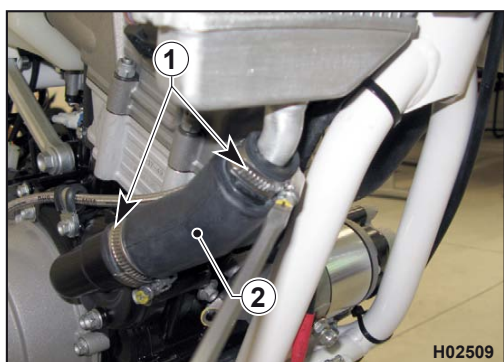
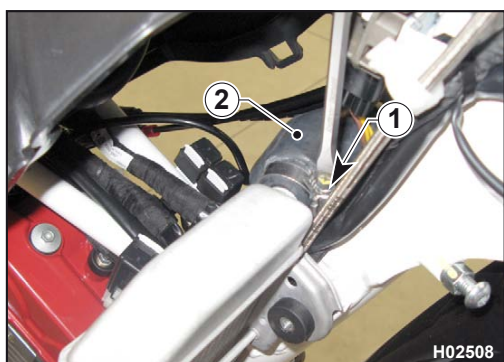
- Loosen rear engine mounting bolt (29) (with two 14 mm wrenches) and the two front screws (30) (with a 12 mm wrench); engine will rest on chassis cradle.
- Remove engine from chassis right side.





Radiator Removal

- Remove saddle, side panels, scoops, and radiator grids as described in the relevant paragraphs.
- Drain off all coolant as indicated in the relevant paragraph.
- Loosen clamps (1) and remove hoses (2).

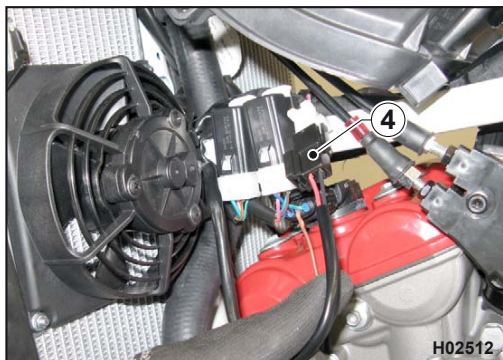




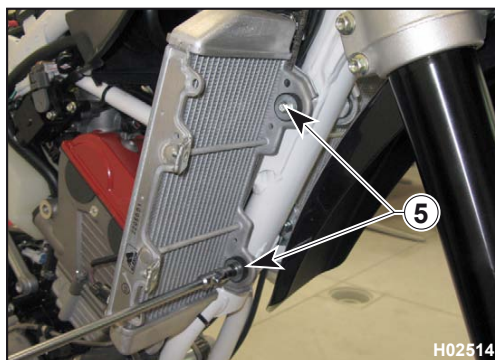
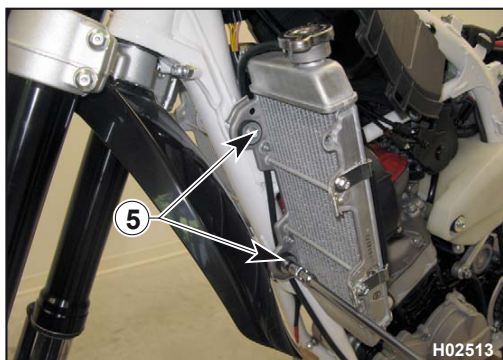
GENERAL PROCEDURES
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



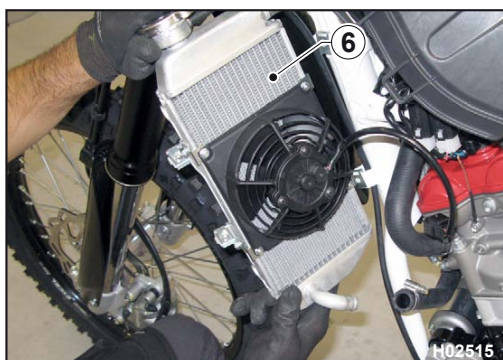
- Disconnect temperature sensor connector (3).

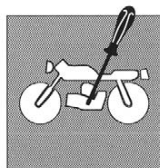


- Disconnect electric fan connector (4) (TE - TXC - SMR).



- Loosen the four screws (5) (with a 8 mm wrench), and remove left-hand radiator (6) complete with fan (TE - TXC - SMR), and right-hand radiator (7).



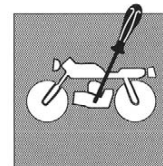
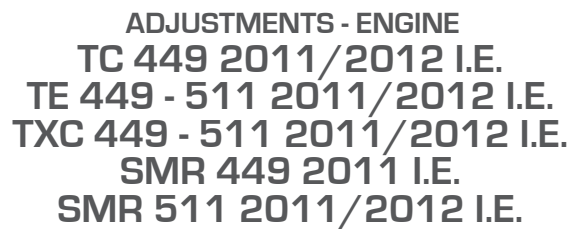


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TC 449 2011/2012 I.E.
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SMR 511 2011/2012 I.E.

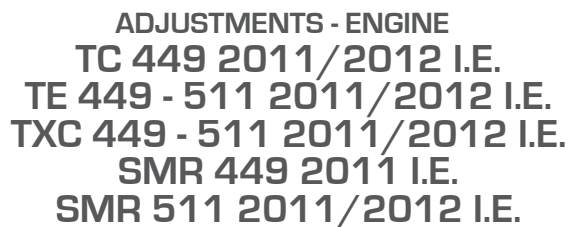


Section

F



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Remove head cover as described in section F1

- Check valve clearance using a feeler gauge (1).



Technical specifications

Intake valve clearance	with cold engine Max. 35 °C	0,71...15,65 in (0,05...0,10 mm)	TE - TXC - SMR
Intake valve clearance	with cold engine Max. 35 °C	2,84...3,56 in (0,20...0,25 mm)	TC
Exhaust valve clearance	with cold engine Max. 35 °C	3,56...4,27 in (0,25...0,30 mm)	TE - TXC - SMR
Exhaust valve clearance	with cold engine Max. 35 °C	4,27...4,98 in (0,30...0,35 mm)	TC

Typ:	Fgnt.-Nr.:	km-Stand:	Datum:
		Name:	

Zylinder 1	
Auslassventil	
Schwert [mm]	
Messwert [mm]	
Vorhandenes	
Ersetzelement	
Benötigtes	
Ersetzelement	
Einlassventil	
Schwert [mm]	
Messwert [mm]	
Vorhandenes	
Ersetzelement	
Benötigtes	
Ersetzelement	

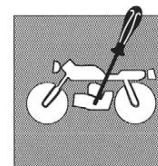
Result: Valve clearance outside tolerance values.

Action:

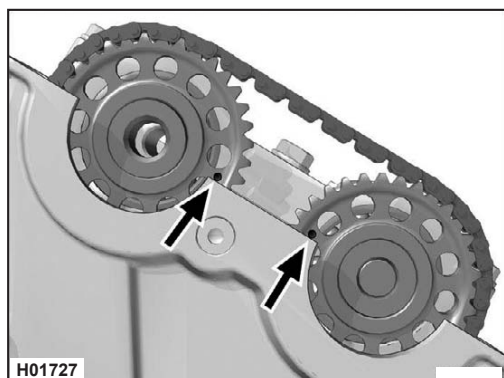
- When assembling, use adjuster plates, and the correct half-balls.

Take note of readings.

- Take note of readings on a measurement card.

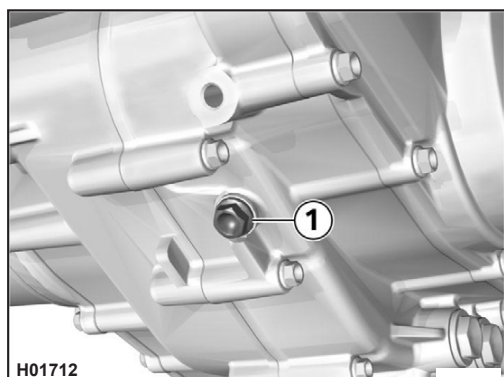


Set valve clearance (cylinder head cover removed)



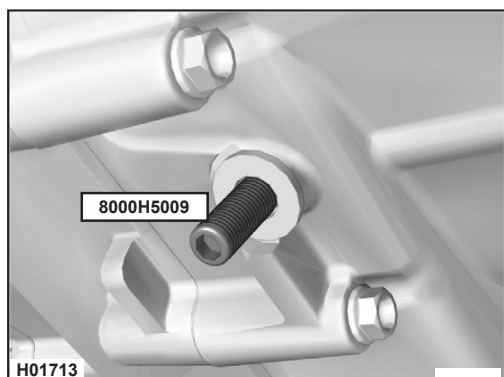
Engine positioning at ignition TDC

- Turn engine until reaching TDC.
- Reference marks (arrows) parallel with cylinder head.

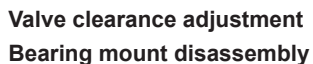
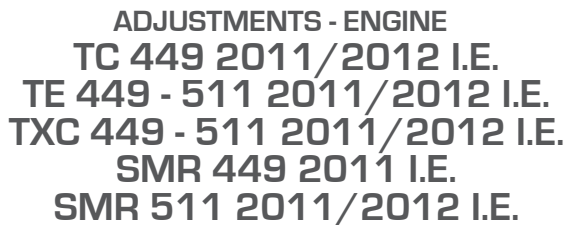


Securing crankshaft at TDC

- Remove screw (1) with sealing ring.



- Lock crankshaft at TDC using special tool (8000H5009).



- Remove screws (1, 2).
- Disassemble bearing mount (3).
- Remove guide sleeves (4).



- Take special care to camshaft position: both shaft gears reference marks (arrows) shall be aligned with sealing surface.
- Remove intake (2) and exhaust (3) camshaft stop washers (1), and release shafts with a suitable tool.
- Remove timing chain (4) at first from intake shaft (2) sprocket, then from exhaust shaft (3), and lay it in a safe position, to prevent it from falling to the ground.
- Remove intake camshaft (2).
- Remove exhaust camshaft (3).

- Mark bucket-type tappet.
- Take out bucket-type tappets, overturn rocker arms.
- Before fitting shims and new half-balls, measure the thickness using a micrometer calliper.
- Replace shims and half-balls, making sure they are correctly positioned.
- Take rocker arms to basic position, and fit bucket-type tappets by paying special attention to the reference mark.

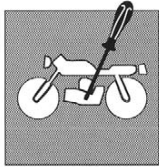


- Make sure that crankshaft is well secured at TDC.
- Lubricate all bearing surfaces.



Consumables

Molykote D Paste	Consumables Clear solid lubricant for metal part assembling and settling	
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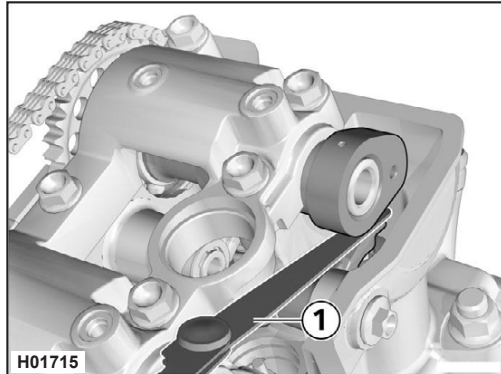
ADJUSTMENTS - ENGINE
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



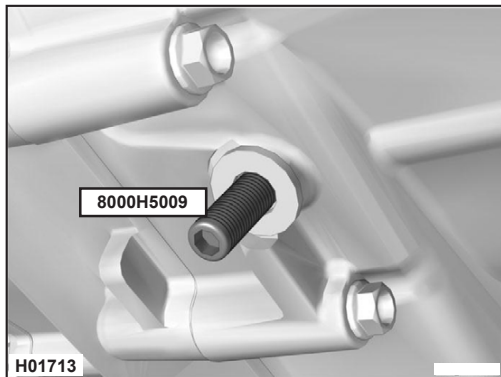
Valve clearance check

Check

- Check valve clearance using a feeler gauge (1).



 Technical specifications			
Intake valve clearance	with cold engine Max. 35 °C	0,71...15,65 in (0,05...0,10 mm)	TE - TXC - SMR
Intake valve clearance	with cold engine Max. 35 °C	2,84...3,56 in (0,20...0,25 mm)	TC
Exhaust valve clearance	with cold engine Max. 35 °C	3,56...4,27 in (0,25...0,30 mm)	TE - TXC - SMR
Exhaust valve clearance	with cold engine Max. 35 °C	4,27...4,98 in (0,30...0,35 mm)	TC



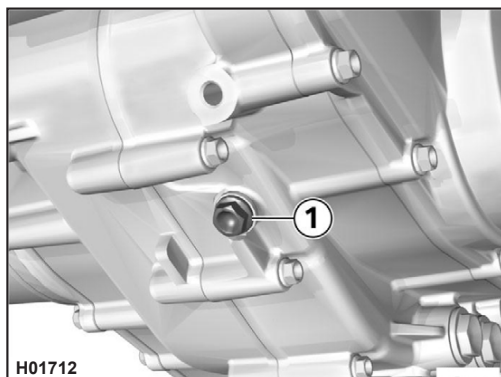
Result: Valve clearance outside tolerance values.

Action:

- Valve clearance adjustment

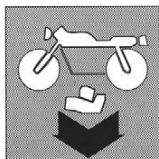
Crankshaft disconnection

- Remove special tool (N. 8000H5009).



- Fit screw (1) with new sealing ring.

 Tightening torque figures		
Retaining screw on crankcase		
M8 x 16	15 Nm / 1,5 Kgm / 11,06 ft/lb	

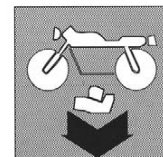
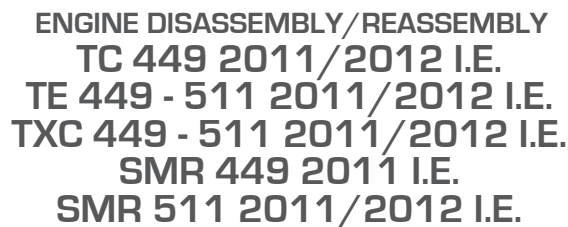


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TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

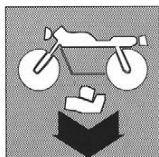


Section

F1



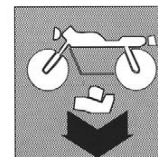
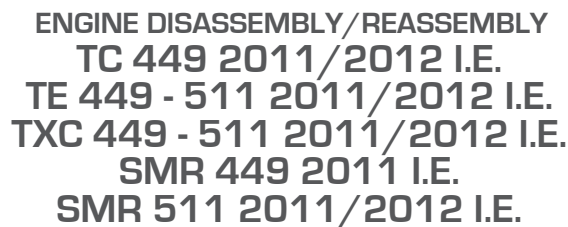
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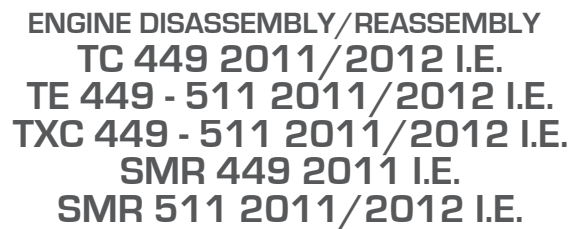
ENGINE DISASSEMBLY/REASSEMBLY
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
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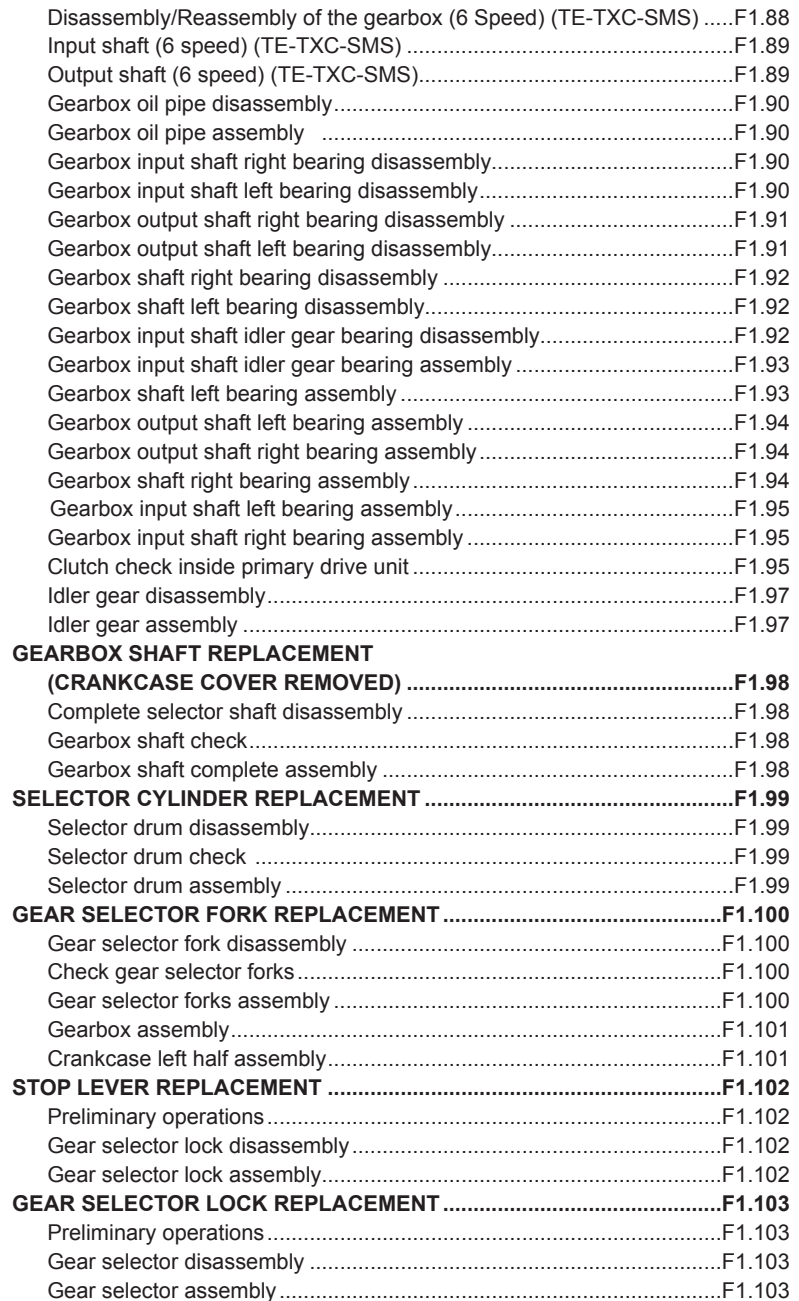
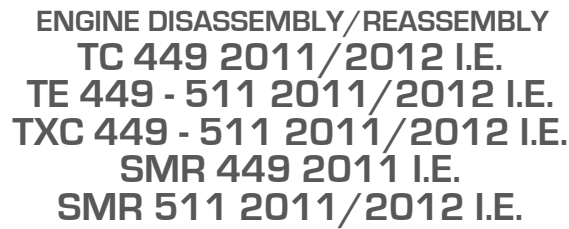
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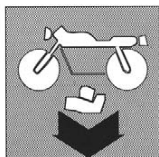


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Input shaft (6 speed) (TC)	F1.87
Output shaft (6 speed) (TC)	F1.87

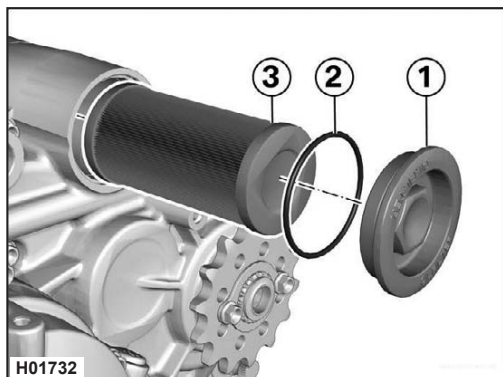




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OIL FILTER REPLACEMENT



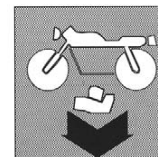
Oil filter disassembly

- Remove plug (1) with O-Ring (2).
- Disassemble oil filter (3).

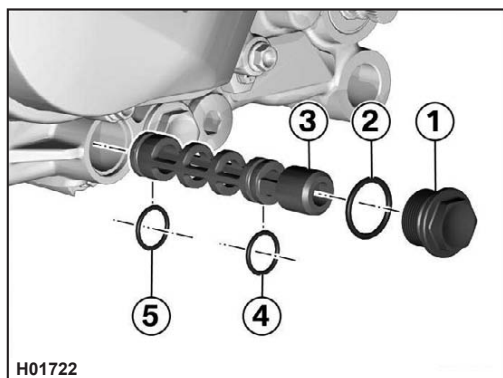
Oil filter assembly

- Assemble oil filter (3).
- Assemble screw (1) with the O-Ring (2) slightly greased.

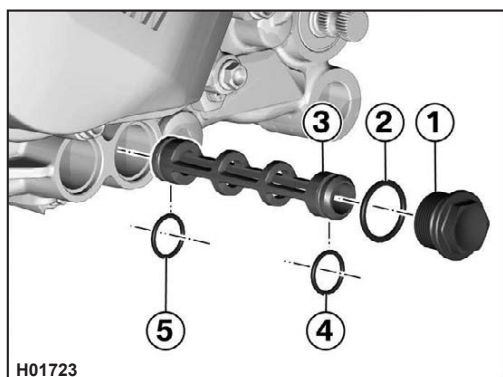
 Tightening torque figures		
Oil filter cover on crankcase		
M45 x 1.5, with O-Ring Grease thread	15 Nm / 1,5 Kgm / 11,06 ft/lb	



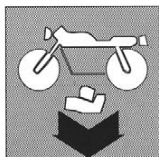
Engine oil filter disassembly



- Disassemble front oil mesh filter.
- Disassemble the following parts:
 - screw (1)
 - Filter (3)
 - O-Rings (2, 4, 5)



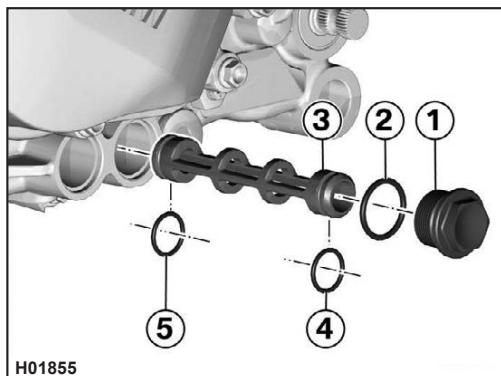
- Disassemble rear oil mesh filter.
- Disassemble the following parts:
 - screw (1)
 - Filter (3)
 - O-Rings (2, 4, 5)



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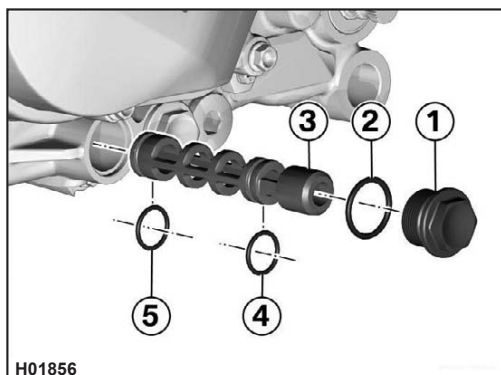


Engine oil filter assembly



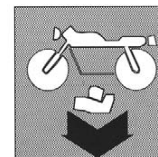
- Assemble rear oil mesh filter.
- Assemble the following parts:
 - O-Rings (5, 4, 2)
 - Filter (3)
- Fit screw (1).

 Tightening torque figures		
Oil mesh filter screw plug on crankcase		
M20 x 1.5, with O-Ring Grease thread	10 Nm / 1 Kgm / 7,38 ft/lb	



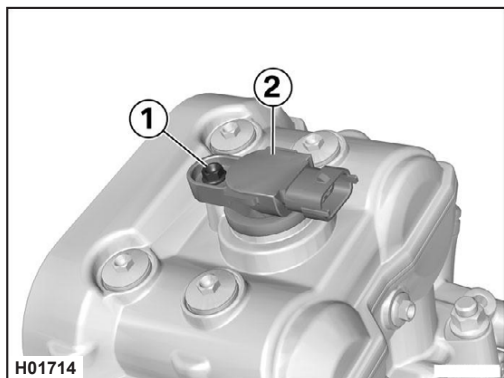
- Assemble front oil mesh filter.
- Assemble the following parts:
 - O-Rings (5, 4, 2)
 - Filter (3)
- Fit screw (1).

 Tightening torque figures		
Oil mesh filter screw plug on crankcase		
M20 x 1.5, with O-Ring Grease thread	10 Nm / 1 Kgm / 7,38 ft/lb	



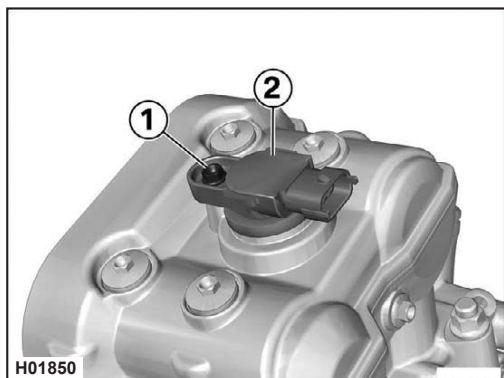
SPARK PLUG RECESS IGNITION COIL

Spark plug recess ignition coil disassembly



- Disassemble the following parts:
- Screw (1)
- Spark plug recess ignition coil (2)

Spark plug recess ignition coil assembly



- Fit spark plug recess ignition coil (2).
- Fit screw (1).

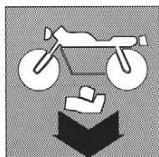


Tightening torque figures

Ignition coil inside engine

M5 x 16 - 10.9

6 Nm / 0,6 Kgm / 4,43 ft/lb



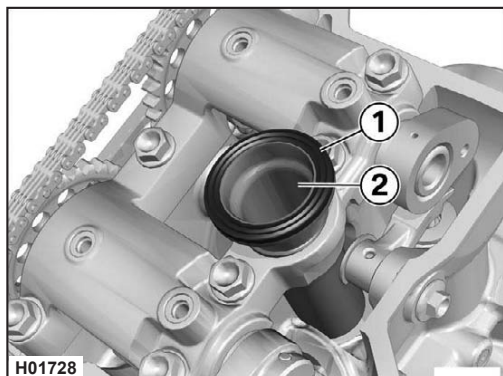
ENGINE DISASSEMBLY/REASSEMBLY
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SPARK PLUG RECESS

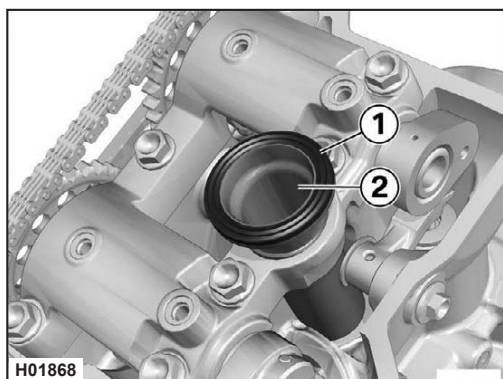
Spark plug recess disassembly

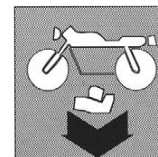
- Remove seal (1) and spark plug recess (2).



Spark plug recess assembly

- Check lower O-Ring inside cylinder head recess for damages.
- Assemble spark plug recess (2), and seal (1).

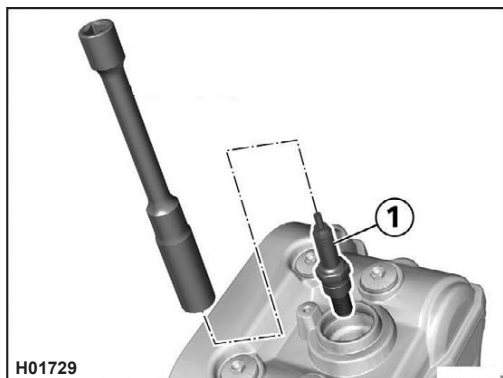




SPARK PLUG

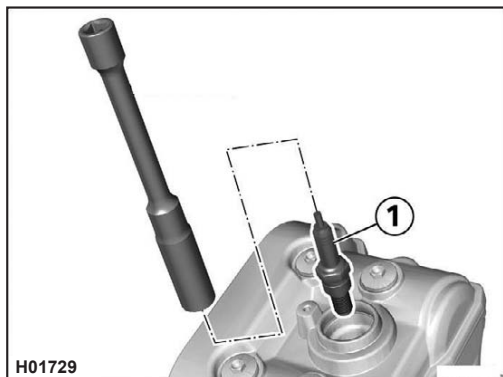
Spark plug disassembly

- Disassemble spark plug using a wrench / suitable tool

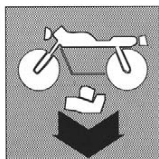


Spark plug assembly

- Fit spark plug (1) using the 16 mm spark plug bushing



 Tightening torque figures		
Spark plug inside cylinder head		
M10 Lubrication, Copper paste	12 Nm / 1,2 Kgm / 8,85 ft/lb	

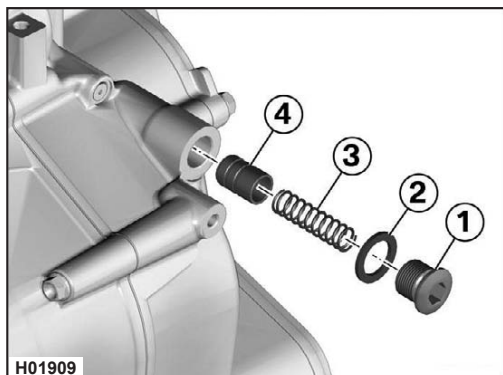


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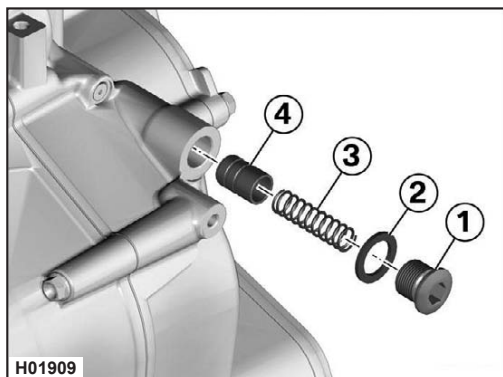


OIL PRESSURE ADJUSTMENT VALVE REPLACEMENT

Oil pressure adjustment valve disassembly



- Disassemble the following parts:
 - screw (1)
 - Seal (2)
 - Spring (3)
 - Adjuster piston (1)



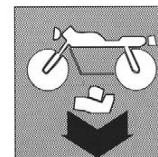
Oil pressure adjustment valve assembly

- Grease adjuster piston and spring

 Consumables		
Castrol GPS SAE 10W-40	Engine oil	

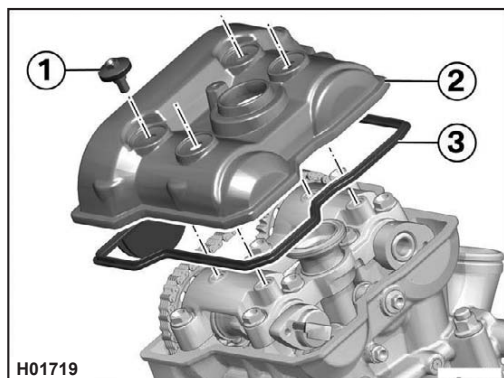
- Assemble the following parts:
 - Adjuster piston (4)
 - Spring (3)
 - Seal (2)
 - Fit screw (1).

 Tightening torque figures		
Oil adjustment valve screw plug onto crankcase		
M14 x 1, with sealing ring Grease thread	15 Nm / 1,5 Kgm / 11,06 ft/lb	

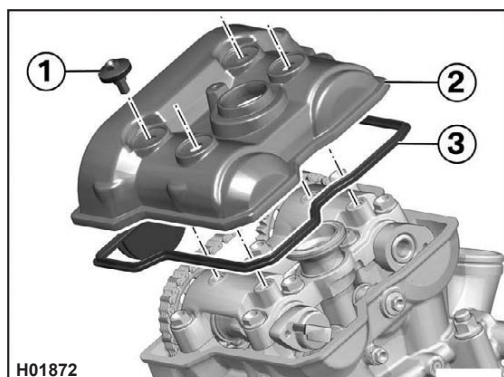


CYLINDER HEAD COVER

Removing cylinder head cover



- Remove screws with seal (1), and washers.
- Remove cylinder head cover (2) with gasket (3).



Fitting cylinder head cover

- Clean gasket (3) and cylinder head and cylinder head cover (2) sealing surface.
- Apply sealant onto gasket.



Consumables

3 - Bond 1209	Surface sealer	
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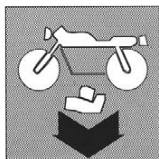
- Assemble cylinder head cover (2) with gasket (3).
- Fit screws with seal (1).



Tightening torque figures

Cylinder head cover on cylinder head

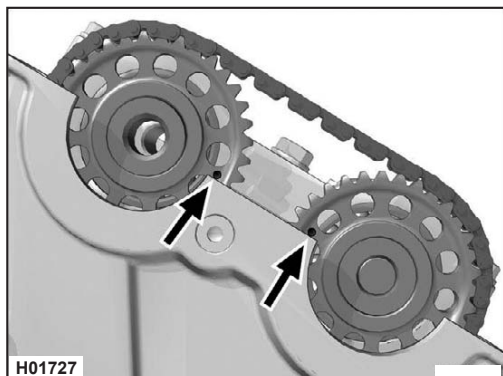
M6 Grease thread	7 Nm / 0,7 Kgm / 5,16 ft/lb	
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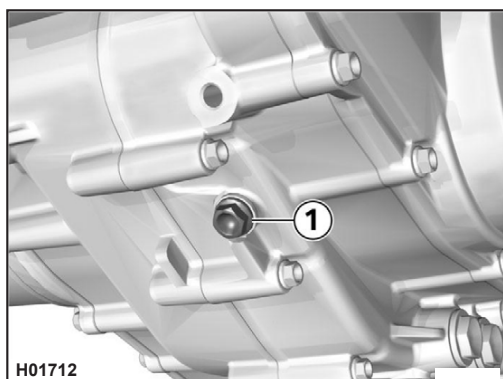


ENGINE POSITIONING AT IGNITION TDC



H01727

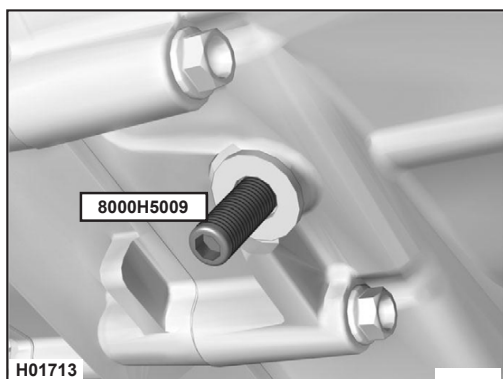
- Turn engine until reaching TDC.
- Reference marks (arrows) parallel with cylinder head.



H01712

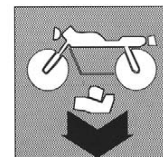
Securing crankshaft at TDC

- Remove screw (1) with sealing ring.

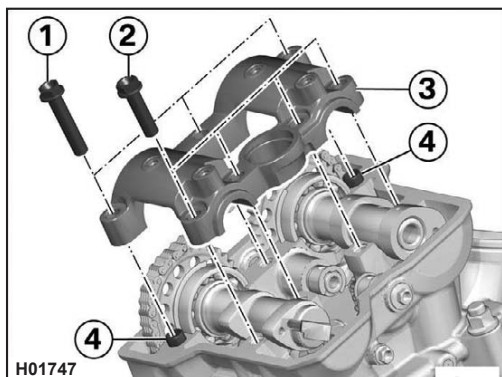


H01713

- Lock crankshaft at TDC using special tool (8000H5009).

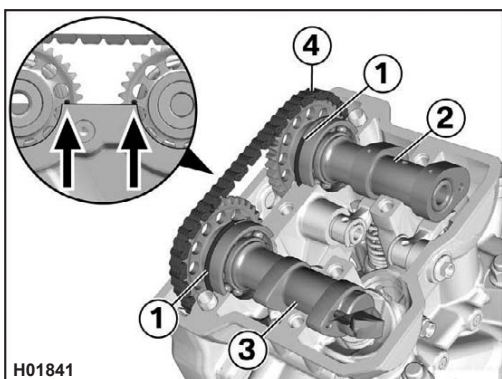


CAMSHAFT REMOVAL



Bearing mount disassembly

- Remove screws (1, 2).
- Disassemble bearing mount (3).
- Remove guide sleeves (4).



- Take special care to camshaft position: both shaft gears reference marks (arrows) shall be aligned with sealing surface.
- Remove intake (2) and exhaust (3) camshaft stop washers (1), and release shafts with a suitable tool.
- Remove timing chain (4) at first from intake shaft (2) sprocket, then from exhaust shaft (3), and lay it in a safe position, to prevent it from falling to the ground.
- Remove intake camshaft (2).
- Remove exhaust camshaft (3).

Camshaft check

Check

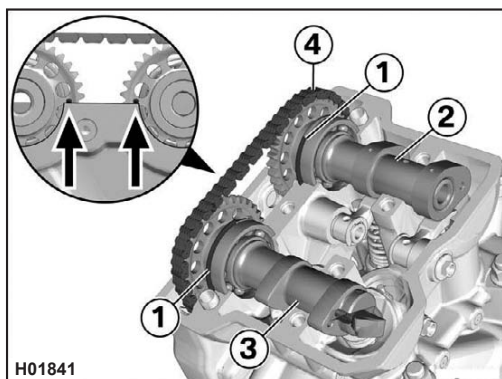
- Check camshafts and bearings for wear and damages.

Result: Camshaft with worn or damaged bearing.

Action:

- Replace camshaft.

Camshaft assembly



- Make sure that crankshaft is well secured at TDC.
- Lubricate all bearing surfaces.

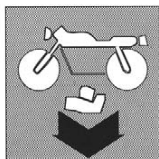


Consumables

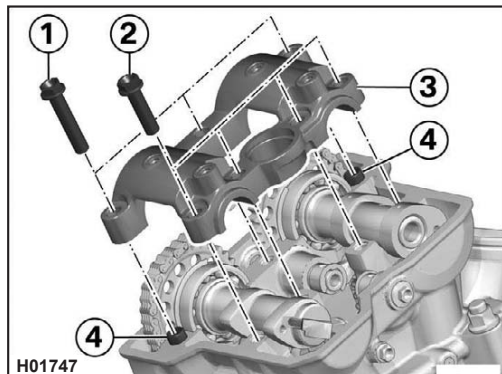
Molykote D Paste

Clear solid lubricant for metal part assembling and settling

- Take special care to camshaft position: both shaft gears reference marks (arrows) shall be aligned with sealing surface.
- Fit exhaust camshaft (3) taking special care that timing chain (4) is well tensioned between camshaft and crankshaft.
- Fit intake camshaft (2) taking special care that timing chain (4) is well tensioned.
- Fit camshafts (2) and (3) stop washers (1).



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Bearing mount assembly

- Assemble guide sleeves (4).
- Lubricate mount (3) at camshaft sliding surfaces, then assemble it.

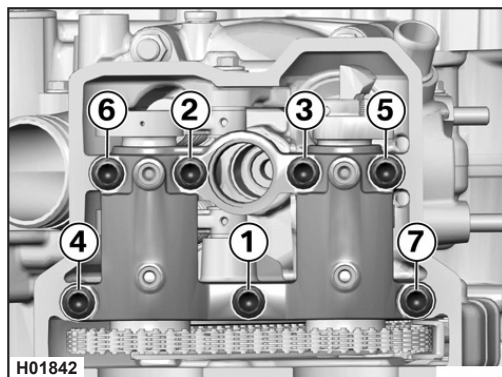


Consumables

Molykote D Paste

Clear solid lubricant for metal part assembling and settling

- Fit long (1) and short (2) screws, tightening them by hand.



Bearing mount securing

- Tighten screws according to the indicated sequence.



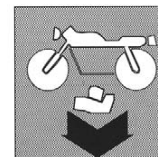
Tightening torque figures

Camshaft mount on cylinder head

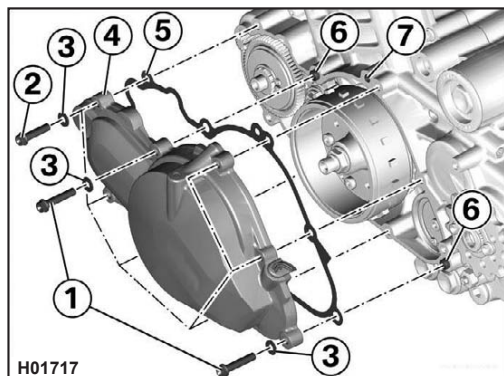
M8 x 30 Grease thread	Pre-tightening torque, 10 Nm / 1 Kgm / 7,38 ft/lb	
	Final tightening torque, 20 Nm / 2 Kgm / 14,75 ft/lb	
M8 x 40 Grease thread	Pre-tightening torque, 10 Nm / 1 Kgm / 7,38 ft/lb	
	Final tightening torque, 20 Nm / 2 Kgm / 14,75 ft/lb	

Subsequent actions

Valve clearance check

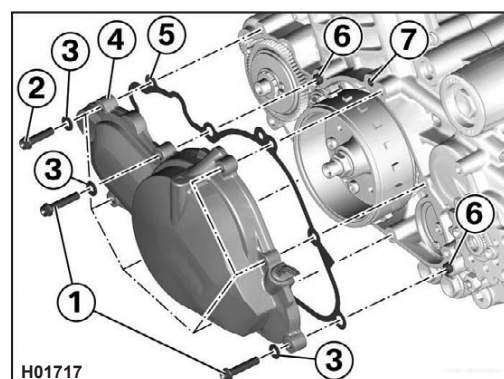


ENGINE LEFT CRANKCASE



Engine left crankcase cover disassembly

- Disassemble the following parts:
 - Screws (1) and (2) with sealing rings (3)
 - Cover (4)
 - Gasket (5)
 - Guide sleeves (6)
 - Oil spraying nozzle (7)



Engine left crankcase cover assembly

- Clean sealing surface.
- Assemble the following parts:
 - Oil spraying nozzle (7)
 - Guide sleeves (6)
 - Gasket (5)
 - Cover (4)
- Fit screws (2) with new washers (3).



Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 25

11 Nm / 1,1 Kgm / 8,11 ft/lb

- Fit screws (1) with new **sealing rings** (3).



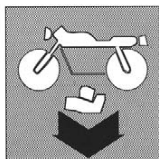
Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 30

11 Nm / 1,1 Kgm / 8,11 ft/lb

- Tighten screws (1) and (2) all the way down, working crossways.



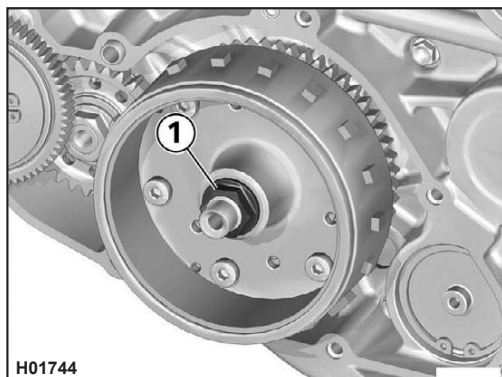
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ALTERNATOR REPLACEMENT

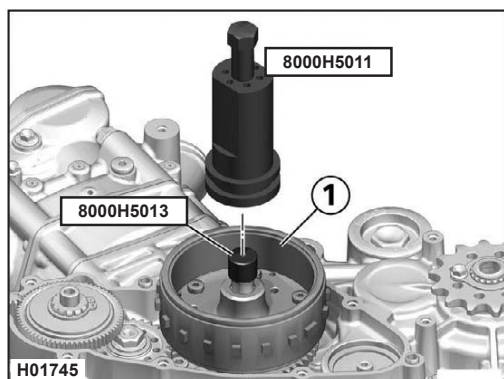
Preliminary operations

- Engine oil drainage
- Engine positioning at ignition TDC
- Securing crankshaft at TDC
- Engine left crankcase cover disassembly



Flywheel disassembly

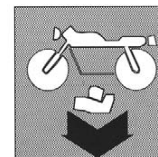
- Remove nut (1).



- Heat flywheel (1).

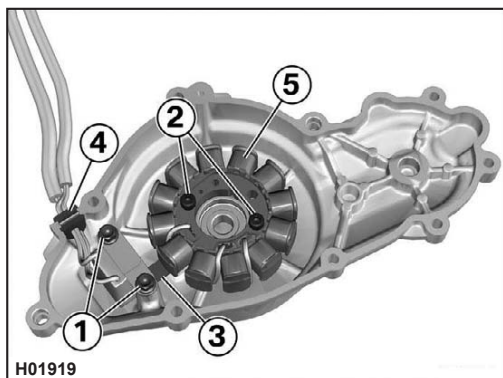
 Technical specifications			
Release/connection temperature		80 °C	

- Remove flywheel (1) using puller (N. 8000H5011) and presser (N. 8000H5013).



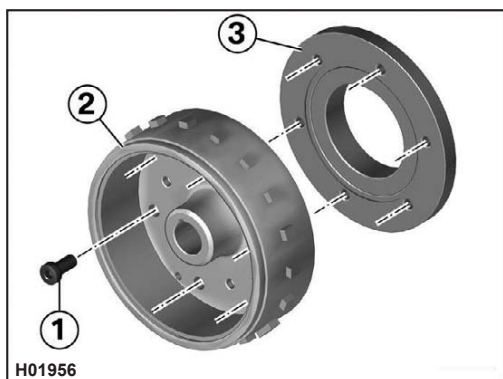
Stator disassembly

- Disassemble the following parts:
 - Screws (1) and (2)
 - Cable retaining plate (3)
 - Rubber sheath (4)
 - Stator (5)



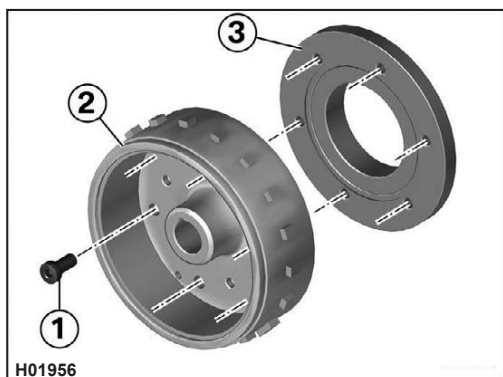
Freewheel disassembly

- Disassemble the following parts:
 - Screws (1)
 - Flywheel (2)
 - Freewheel (3)



Freewheel assembly

- Clean freewheel (3) threaded holes.
- Position flywheel (2) onto freewheel (3).
- Fit screws (1).



Tightening torque figures

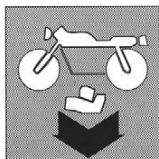
Freewheel body onto flywheel

M6 x 12 - 10.9, Cross-head microincapsulated screw

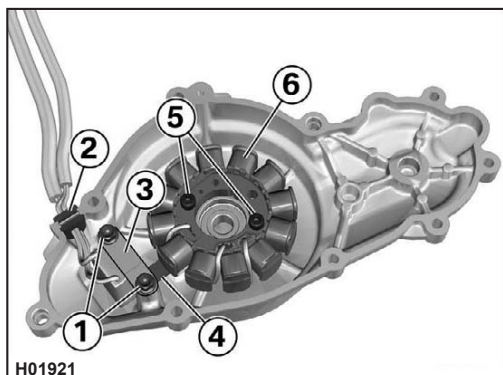
replacement

Pre-tightening torque, 3 Nm

Final tightening torque, 25 Nm



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Stator assembly

- Clean screw (1) and (5) threaded holes.
- Position stator (6).
- Tighten screws (5).



Tightening torque figures

Stator onto engine left crankcase cover

M5 x 20, Microincapsulated
screw replacement

6 Nm

- Apply a layer of sealant onto rubber sheath (2) sealing surfaces.



Consumables

3 - Bond 1209

Surface sealer

- Position retaining plate (4), and pulse transducer (3).
- Insert rubber sleeve (2)
- Tighten screws (1).

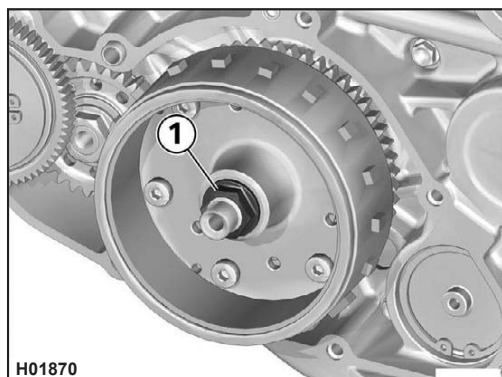


Tightening torque figures

Pulse transducer onto engine left crankcase cover

M5 x 12 - 10.9, Microincapsulated
screw replacement

6 Nm



Flywheel assembly

- Clean flywheel and crankshaft cone, as well as thread.
- Apply a thin layer of sealant onto flywheel cone.



Consumables

Loctite 638

Sealant

- Fit flywheel onto crankshaft.
>> Tab and groove are aligned.
- Fit nut (1).

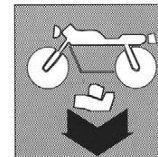


Tightening torque figures

Flywheel onto crankshaft

Collar nut, M14 x 1 Replace
microincapsulated screw nut

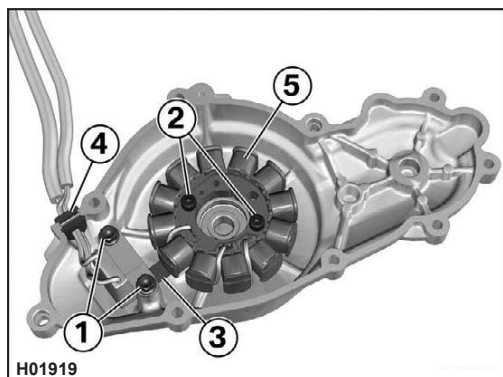
90 Nm



CRANKCASE LEFT COVER REPLACEMENT

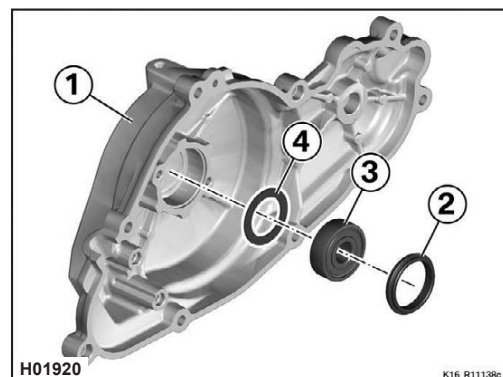
Preliminary operations

Engine oil drainage
Engine left crankcase cover disassembly



Stator disassembly

- Disassemble the following parts:
 - Screws (1) and (2)
 - Cable retaining plate (3)
 - Rubber sheath (4)
 - Stator (5)



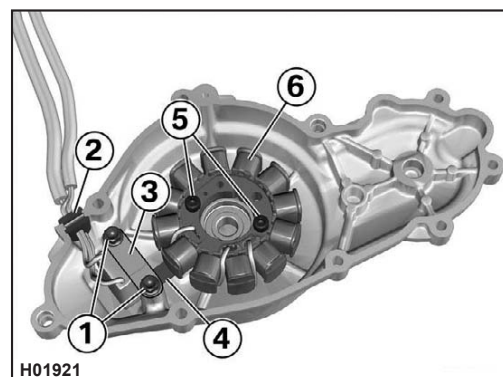
- Arrange the following new parts:
 - Crankcase cover (1)
 - Centring ring (2)
 - Bearing (3)
 - Washer (4)
- Lay crankcase cover (1) onto a suitable base, and **protect it against scratches**.
- Insert washer (4) inside crankcase cover (1).
- Heat crankcase cover (1) at the bearing (3).



Technical specifications

Release/connection temperature		80 °C	
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- Fit bearing (3) and centring ring (2) all the way down using a suitable tool.



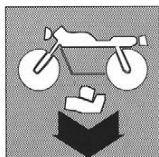
Stator assembly

- Clean screw (1) and (5) threaded holes.
- Position stator (6).
- Tighten screws (5).



Tightening torque figures

Stator onto engine left crankcase cover		
M5 x 20, Microincapsulated screw replacement	6 Nm	



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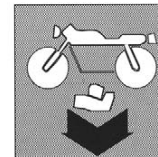


- Apply a layer of sealant onto rubber sheath (2) sealing surfaces.

 Consumables		
3 - Bond 1209	Surface sealer	

- Position retaining plate (4), and pulse transducer (3).
- Insert rubber sleeve (2)
- Tighten screws (1).

 Tightening torque figures		
Pulse transducer onto engine left crankcase cover		
M5 x 12 - 10.9, Microincapsulated screw replacement	6 Nm	



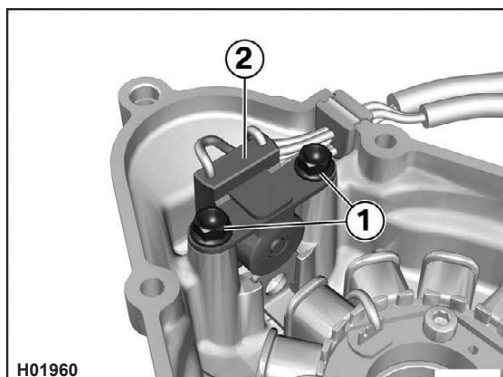
CRANKSHAFT SENSOR REPLACEMENT

Preliminary operations

Engine oil drainage
 Engine left crankcase cover disassembly

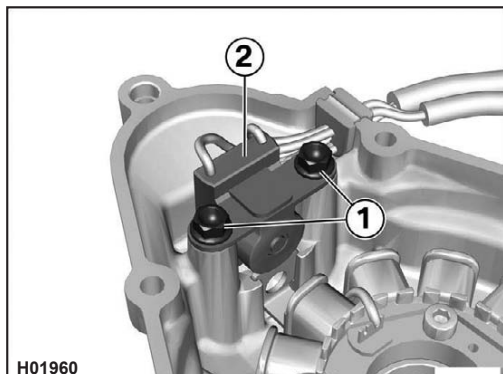
Crankshaft sensor disassembly

- Remove screws (1).
- Remove crankcase sensor (2).



Crankshaft sensor assembly

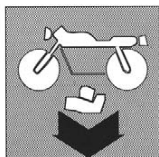
- Assemble crankcase sensor (2).
- Fit new screws (1).



Tightening torque figures

Pulse transducer onto engine left crankcase cover

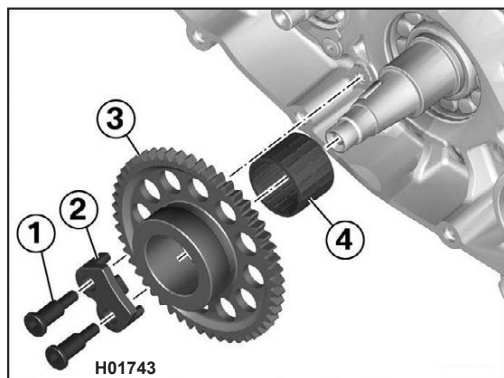
M5 x 12 - 10.9, Microincapsulated screw replacement	6 Nm
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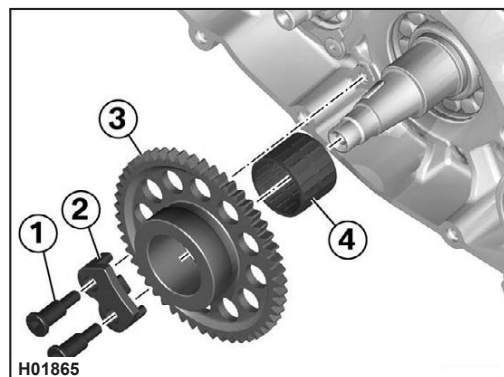


FREEWHEEL GEAR REPLACEMENT



Freewheel gear disassembly

- Disassemble the following parts:
 - Screws (1)
 - Guide (2)
 - Gear (3)
 - Needle roller bearing (4)



Freewheel gear assembly

- Lubricate needle roller bearing (4) and gear (3), then fit them.



Consumables

Molykote D Paste

Clear solid lubricant for metal part assembling and settling

- Fit guide (2) with screws (1).

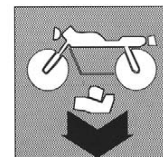


Tightening torque figures

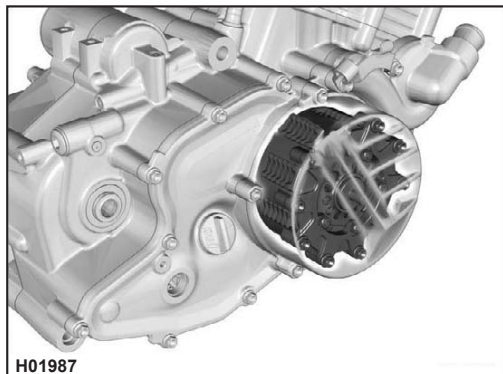
Starter motor freewheel retainer onto crankcase

M5, Microincapsulated screw replacement

6 Nm



CLUTCH DISASSEMBLY AND REASSEMBLY OR REPLACEMENT

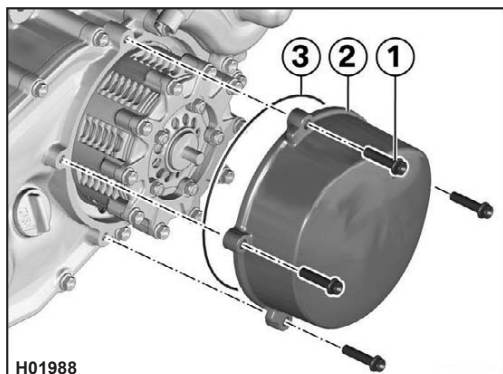


Preliminary operations

- Engine oil drainage
- Securing crankshaft at TDC
- Brake pedal release
- Clutch actuator disassembly

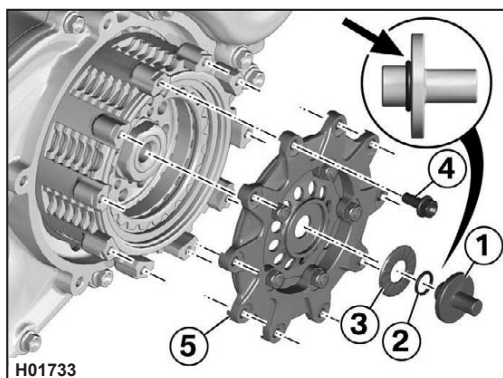
Clutch cover disassembly

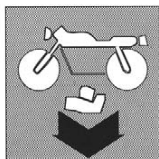
- Remove screws (1).
- Remove clutch cover (2) with gasket (3).



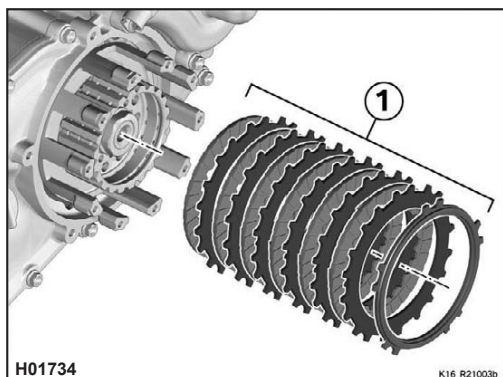
Removing clutch pressure plate

- Disassemble the following parts:
 - Presser (1)
 - O-Ring (2)
 - Bearing (3)
 - Screws (4)
 - Pressure plate (5)





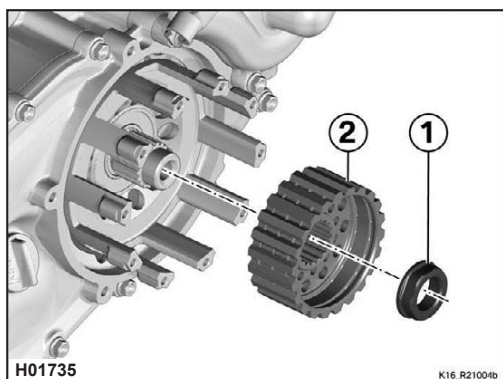
ENGINE DISASSEMBLY/REASSEMBLY
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Removing clutch plates

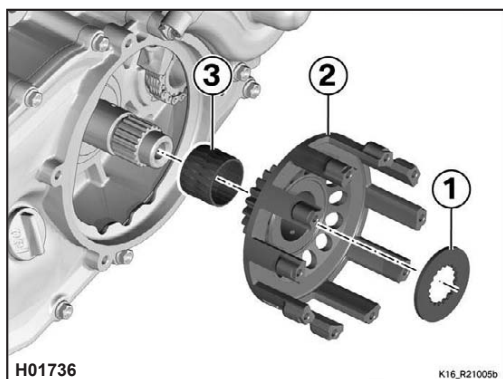
- Remove clutch plates pack (1).

 Technical specifications			
Clutch plates number		6 steel plates 6 lined plates	



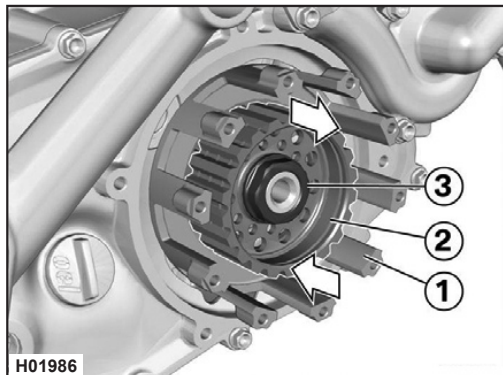
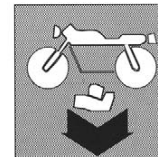
Clutch hub disassembly

- Remove nut (1).
- Remove hub (2).



Clutch housing disassembly

- Disassemble the following parts:
- Thrust washer (1)
- Clutch housing (2)
- Bearing (3)



Clutch housing clearance check

- Fit clutch housing (1) with needle roller bearing cage and hub (2).
- Fit nut (3).



Tightening torque figures

Clutch hub on crankshaft

Collar nut, M20 x 1.5 - 10.9,
Replace microencapsulated
screw nut

120 Nm

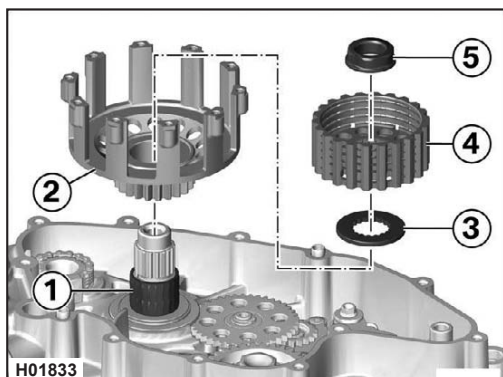
Check

- Try to overturn clutch housing in the direction of the arrow.

Result: Perceptible clearance.

Action:

=> Replace clutch housing seat (crankcase cover removed)



Clutch housing clearance reading

- Fit needle roller bearing cage (1), clutch housing (2), thrust washer (3), and hub (4).
- Fit nut (5).

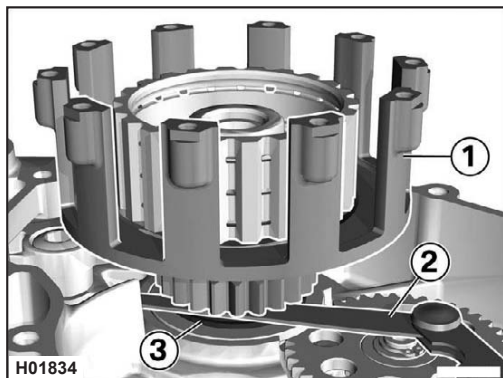


Tightening torque figures

Clutch hub on crankshaft

Collar nut, M20 x 1.5 - 10.9, Replace
microencapsulated screw nut

120 Nm



Check

- using a feeler gauge (2), read the axial clearance between clutch housing (1), and axial needle roller bearing (3).



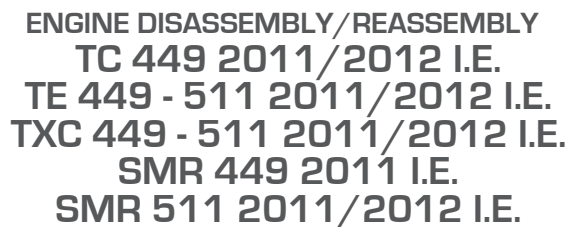
Technical specifications

Axial clearance
between clutch cage
and crankshaft

Crankshaft rests
onto alternator
side

0.3 $\begin{smallmatrix} +0.05 \\ -0.05 \end{smallmatrix}$ mm

Result: Clearance outside tolerance values.



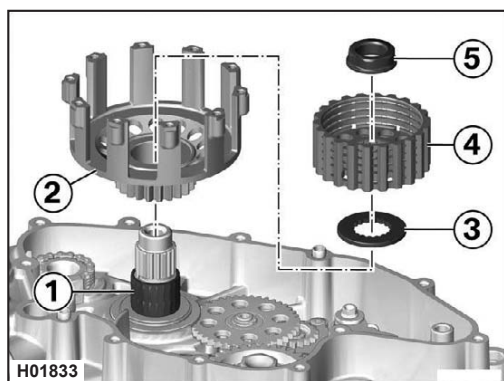
Action:

- Replace clutch thrust washer. If needed, repeat the procedure.

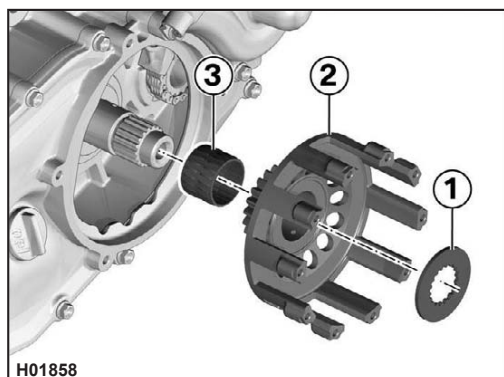
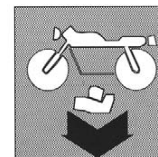


Technical specifications

Space washers thickness for clutch cage distance adjustment		2.200 mm	
		2.250 mm	
		2.300 mm	
		2.350 mm	
		2.400 mm	
		2.450 mm	
		2.500 mm	
		2.550 mm	
	2.600 mm		



- Disassemble the following parts:
 - Hub (4)
 - Thrust washer (3)
 - Clutch housing (2)
 - Needle roller bearing cage (1)



Clutch housing assembly

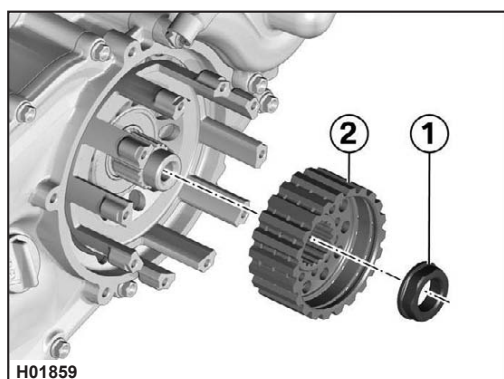
- Lubricate bearing (3), and assemble it.



Consumables

Molykote D Paste	Clear solid lubricant for metal part assembling and settling	
------------------	--	--

- Assemble clutch housing (2).
- Fit thrust washer (1).



Clutch hub assembly

- Lubricate hub (2) inner toothing, and fit it.



Consumables

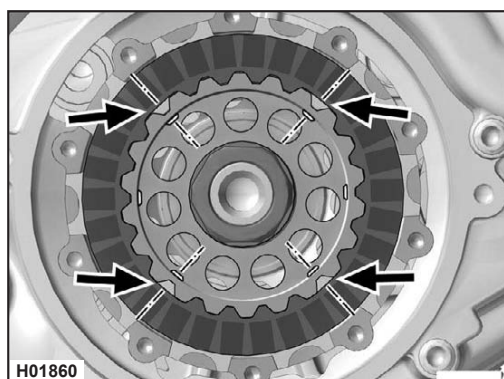
MP 3 paste	High-performance lubricating grease	
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- Clean crankshaft thread, and nut (1).
- Fit nut (1).



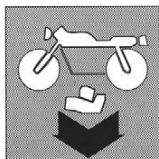
Tightening torque figures

Clutch hub on crankshaft		
Collar nut, M20 x 1.5 - 10.9, Replace microincapsulated screw nut	120 Nm	

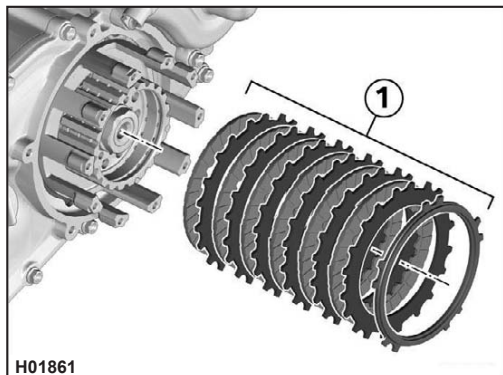


Fit clutch plates

- Take special care that inner line plate cavities (arrows) 2 and 3 are aligned with clutch hub oil holes.



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- Make sure that the relief on the last steel washer is pointing outwards.
- Fit greased clutch plate pack (1).



Technical specifications

Clutch plates number		6 steel plates 6 lined plates	
----------------------	--	----------------------------------	--



Consumables

Castrol GPS SAE 10W-40	Engine oil	
------------------------	------------	--

Pressure plate assembly

- Fit pressure plate (5).
- Fit screws (4) working crossways.

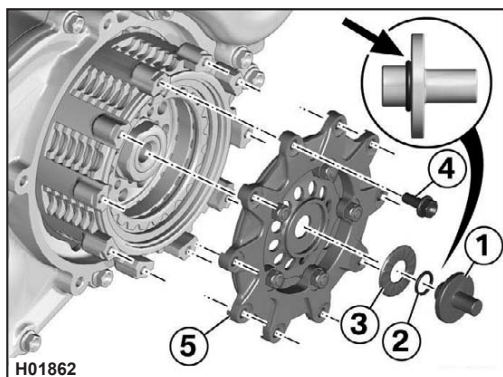


Tightening torque figures

Pressure plate on clutch case

M5 x 12 - 10.9, Microincapsulated screw replacement	6 Nm	
---	------	--

- Fit bearing (3).
- Fit presser (1) with O-Ring (2).



Clutch cover assembly

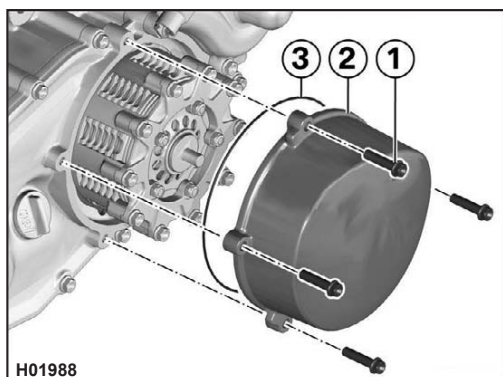
- Clean gasket groove and bearing surface, check gasket and, if needed, replace it.
- Fit clutch cover (2) with gasket (3).
- Fit screws (1).

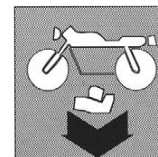


Tightening torque figures

Clutch cover on engine left crankcase cover

M6 x 25	11 Nm	
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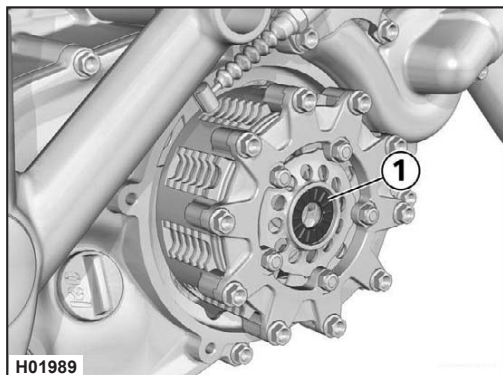
REPLACING CLUTCH DISENGAGEMENT BEARING

Preliminary operations

- Engine oil drainage
- Clutch cover disassembly
- Mushroom-type disengagement element disassembly

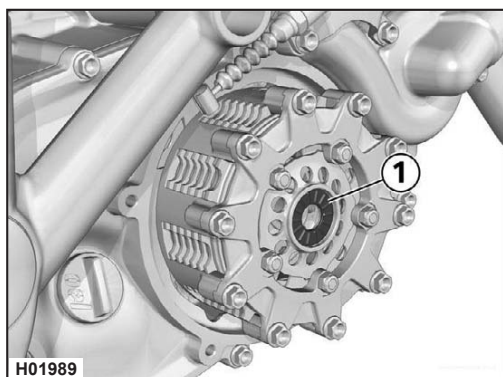
Clutch disengagement bearing disassembly

- Remove disengagement bearing (1).



Clutch disengagement bearing assembly

- Lubricate disengagement bearing (1), and assemble it.



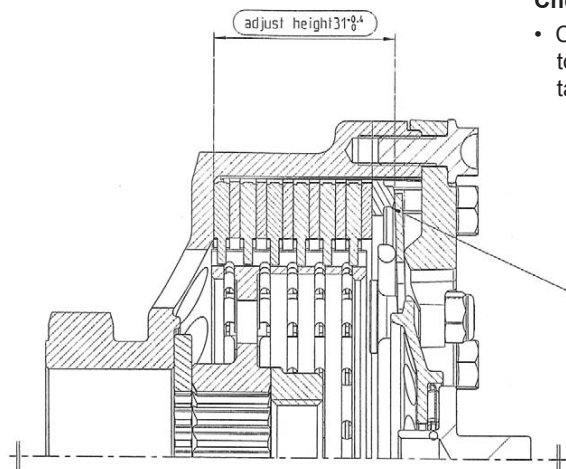
Consumables

Castrol GPS SAE 10W-40

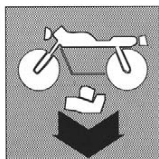
Engine oil

Checking the clutch pack thickness

- Clutch plates pack thickness must be $L=31 \pm 0.4/-0$; if this size is reduced due to wear and tear, it is possible to restore it using the shims indicated in the table.



spacer disk		
S	Code Number	color mark
3.9	7 706 893	red
4.1	7 706 073	blue
4.3	7 707 033	yellow
4.5	7 719 121	white
4.7	7 706 891	green



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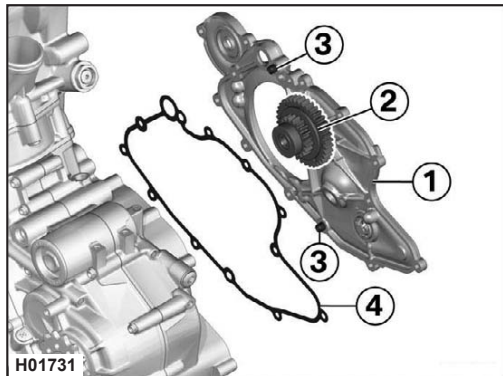
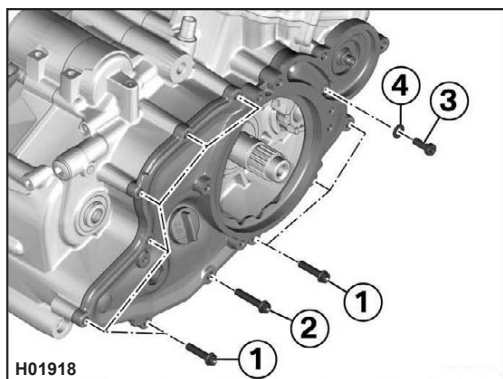
ENGINE RIGHT CRANKCASE

Preliminary operations

Clutch cover disassembly
Removing clutch pressure plate
Removing clutch plates
Clutch hub disassembly
Clutch housing disassembly
Coolant pump cover disassembly
Coolant pump rotor disassembly

Engine right crankcase cover disassembly

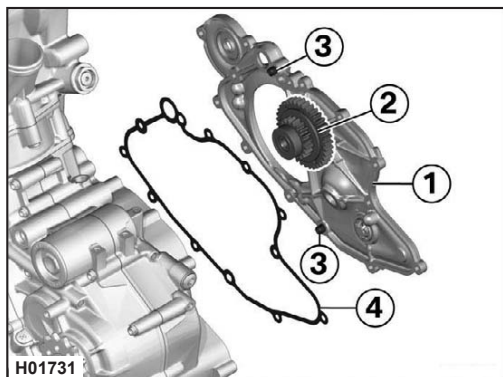
- Disassemble the following parts:
 - Screws (1, 2, 3)
 - Washer (4)



- Disassemble the following parts:
 - Cover (1) with idler gear (2)
 - Guide sleeves (3)
 - Gasket (4)

Engine right crankcase assembly

- Clean sealing surface.
- Assemble the following parts:
 - Gasket (4)
 - Guide sleeves (3)
 - Cover (1) with idler gear (2)





- 

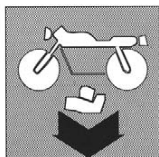
11 Nm

- 

11 Nm

- 

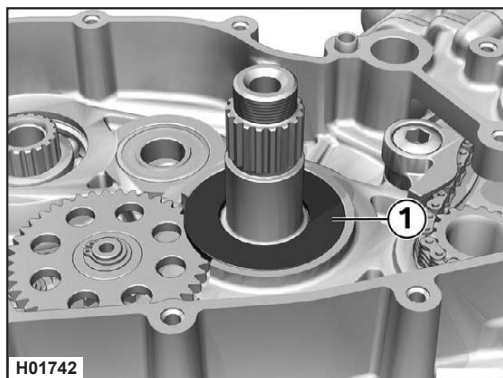
11 Nm



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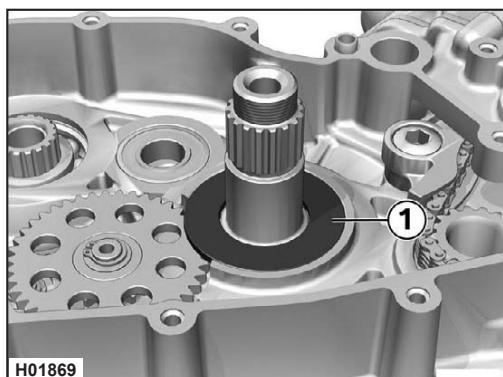


CLUTCH THRUST WASHER



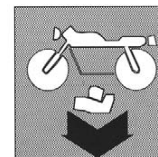
Clutch thrust washer disassembly

- Remove washer (1).



Clutch thrust washer assembly

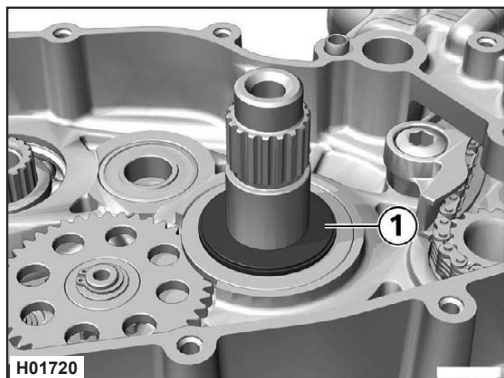
- Fit washer (1).



CLUTCH HOUSING AXIAL BEARING

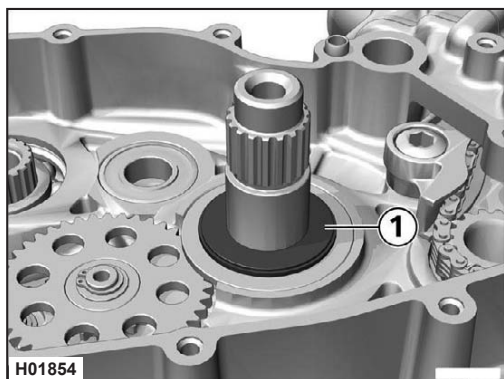
Clutch housing axial bearing disassembly

- Remove bearing (1).



Clutch housing axial bearing assembly

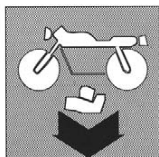
- Lubricate bearing (1), and assemble it.



Consumables

Molykote D Paste

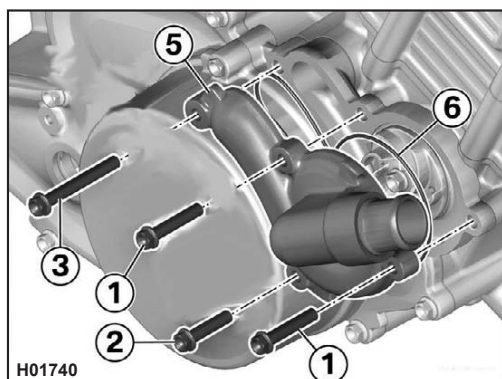
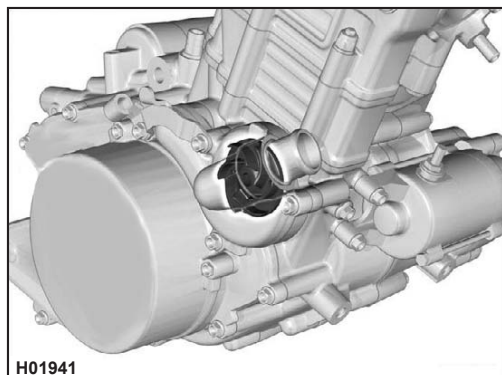
Clear solid lubricant for metal part assembling and settling



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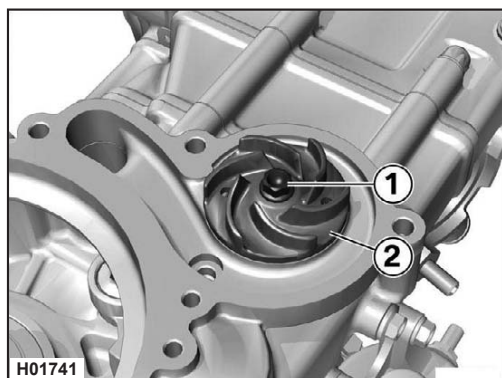


COOLANT PUMP DISASSEMBLY AND ASSEMBLY



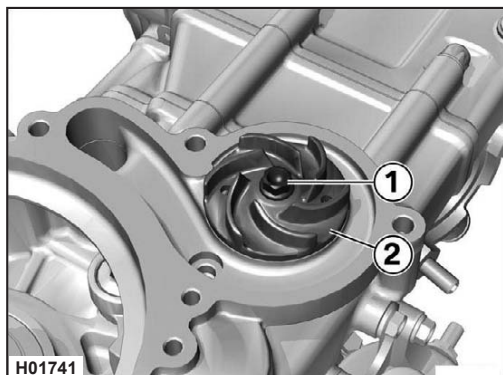
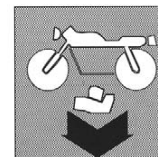
Coolant pump cover disassembly

- Disassemble the following parts:
 - Screws (1, 2, 3)
 - Cover (5)
 - Seal (6)



Coolant pump rotor disassembly

- Disassemble the following parts:
 - screw (1)
 - Rotor (2)



Coolant pump rotor assembly

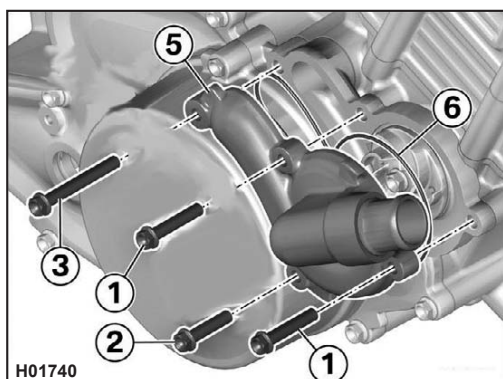
- Fit rotor (2).
- Fit screw (1).



Tightening torque figures

Coolant pump gear on pump shaft

M5 x 10 - 10.9, Microincapsulated screw replacement	6 Nm	
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Coolant pump cover assembly

- Clean seal groove and bearing surface, check seal (6) and, if needed, replace it.
- Fit pump cover (5) with seal (6).
- Fit screw (3).



Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 45	11 Nm	
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- Fit screw (2).



Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 25	11 Nm	
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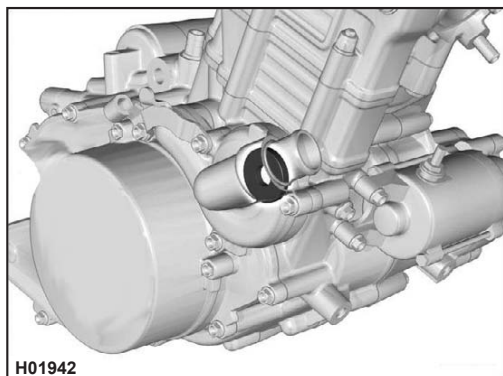
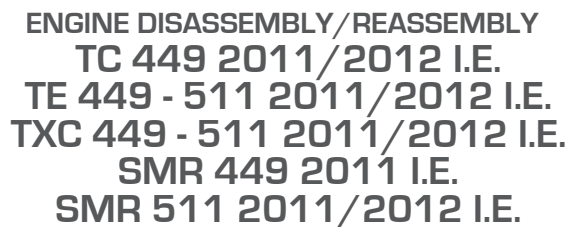
- Fit screws (1).



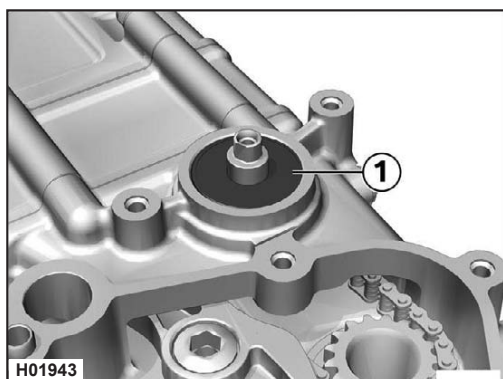
Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 30	11 Nm	
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COOLANT PUMP INSIDE CRANKCASE OIL SEAL REPLACEMENT (CRANKCASE COVER REMOVED)



Coolant pump control rear oil seal disassembly

- Remove oil seal (1).

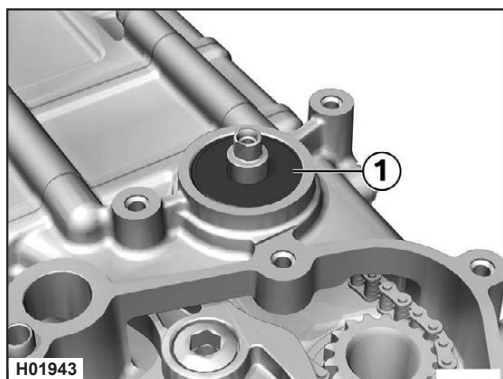
Coolant pump control shaft check

Check

Result: Damaged or worn shaft

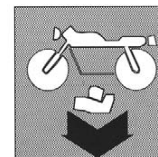
Action:

Replace coolant pump drive (crankcase cover removed)

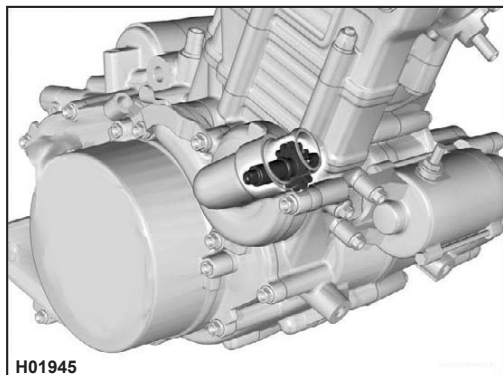


Coolant pump control rear oil seal assembly

- Clean oil seal seat.
- Fit oil seal (1) using a suitable tool.

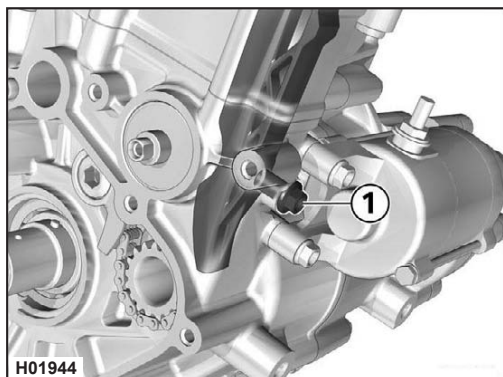


COOLANT PUMP DRIVE REPLACEMENT (CRANKCASE COVER REMOVED)



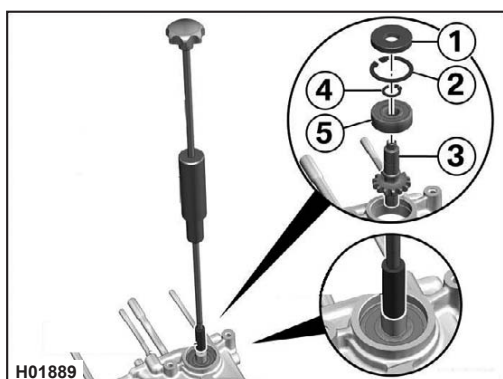
Slider loosening in the lower area

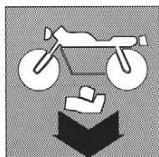
- Remove screw with O-Ring (1).



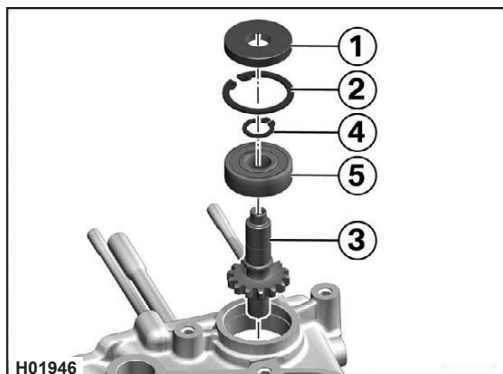
Coolant pump shaft disassembly

- Disassemble the following parts:
 - Oil seal (1)
 - Stop ring (2)
- Take special care not to let timing chain touch coolant pump gear.
- Remove shaft (3) and front bearing (5) using a suitable sliding hammer puller.
- Remove stop ring (4) and bearing (5) from shaft (3).





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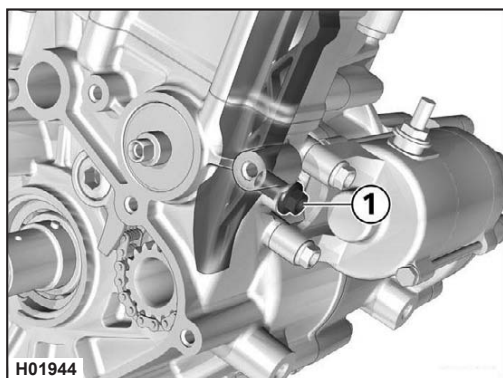


Coolant pump shaft assembly

- Lubricate bearing (5), and shaft (3).

 Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	

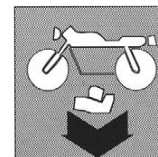
- Assemble bearing (5) and stop ring (4) onto shaft (3).
- When fitting the shaft, take special care to the timing chain.
- Fit shaft (3) with front bearing (5).
- Assemble the following parts:
 - Stop ring (2)
 - Oil seal (1)



Slider assembly in the lower area

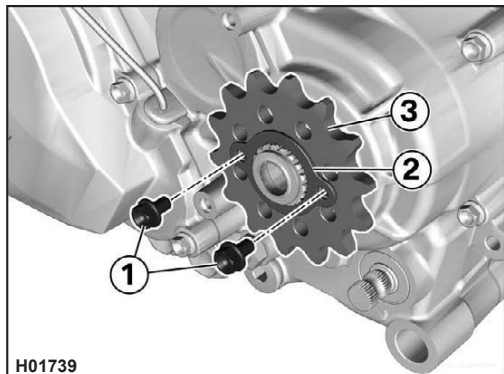
- Fit screw with O-Ring (1).

 Tightening torque figures		
Front slider at crankcase lower part		
M8	15 Nm	



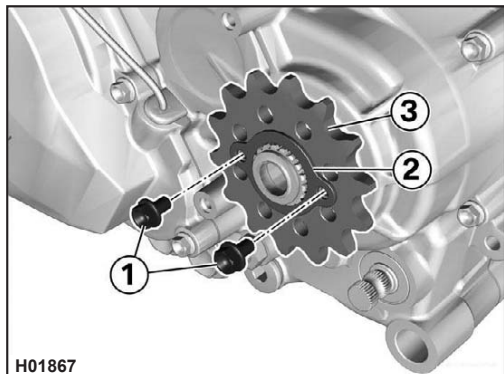
CHAIN SPROCKET

Chain sprocket removal



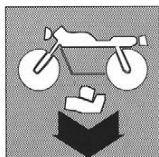
- Remove screws (1), and stop washer (2).
- Remove chain sprocket (3).

Sprocket assembly



- Assemble chain sprocket (3).
- Fit stop washer (2), and new screws (1).

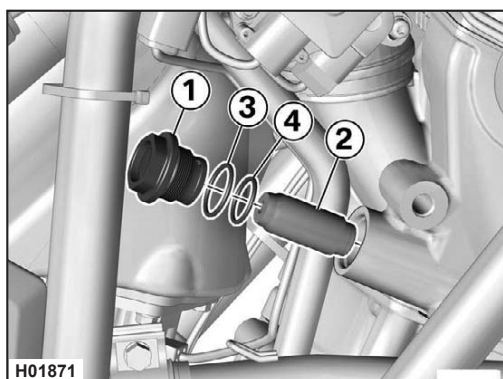
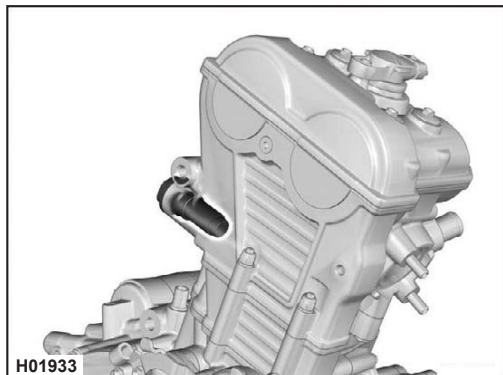
 Tightening torque figures		
Sprocket on gearbox output shaft		
M5 x 8 - 10.9, Microincapsulated screw replacement	6 Nm	



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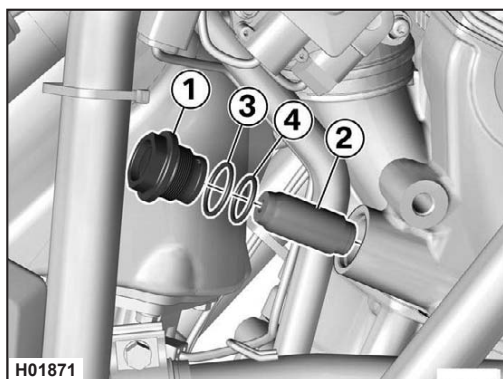


CHAIN TENSIONER DISASSEMBLY AND REASSEMBLY OR REPLACEMENT



Chain tensioner disassembly

- Disassemble the following parts:
 - screw (1)
 - Chain tensioner (2)
 - O-Rings (3, 4)



Chain tensioner assembly

- Assemble the following parts:
 - O-Rings (4, 3)
 - Chain tensioner (2)
 - Fit screw (1).

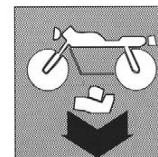


Tightening torque figures

Chain tensioner screw cap

M24 x 1.5, with O-Ring Grease thread

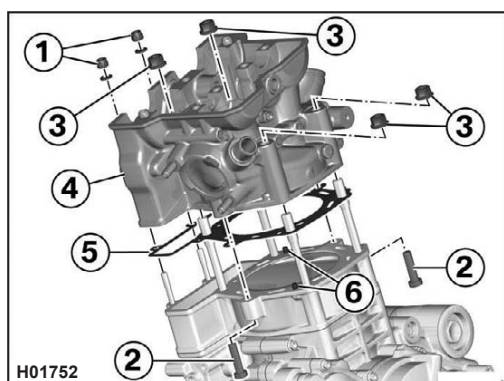
20 Nm



CYLINDER HEAD DISASSEMBLY AND REASSEMBLY/HEAD GASKET REPLACEMENT

Preliminary operations

Spark plug recess ignition coil disassembly
 Spark plug disassembly
 Removing cylinder head cover
 Spark plug recess disassembly
 Chain tensioner disassembly
 Camshaft removal
 Slider disassembly



Cylinder head disassembly

Disassemble the following parts:

Nuts (1)
 Screws (2)
 Nuts (3)
 Cylinder head (4)
 Cylinder head gasket (5)
 Guide sleeves (6)

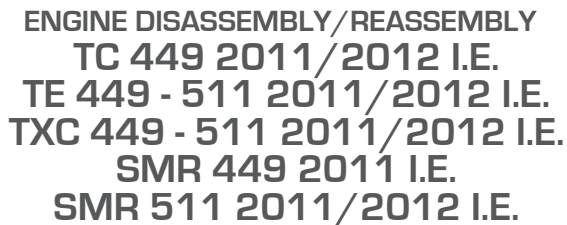
Cylinder head assembly

- Clean sealing surfaces.
- Apply reference pins (6), and a new head gasket (5).
- Pull timing chain through the recess.
- Fit nuts (3, 1), and cylinder head screws (2) without tightening them.
- Secure nuts (3) working crossways, then secure nuts (1).

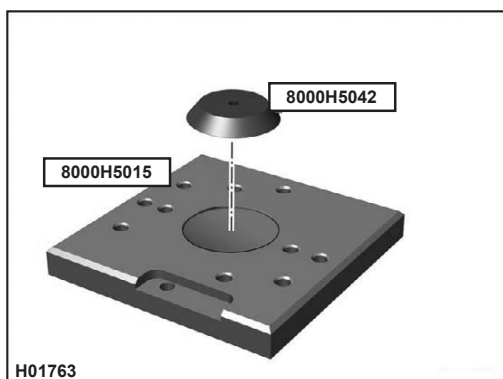
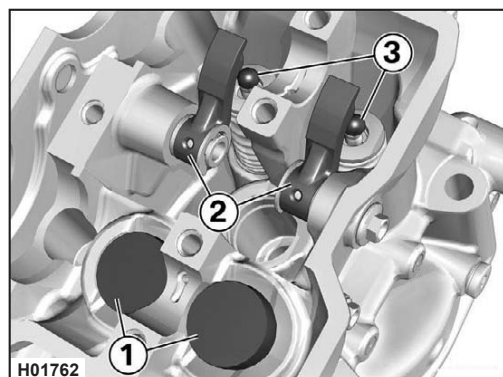
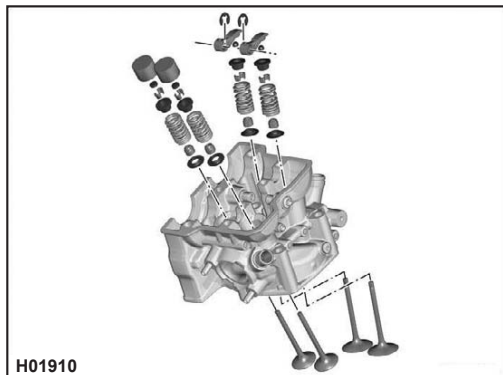
 Tightening torque figures		
Cylinder head with cylinder on engine		
Nut, M10 - 10.9 Grease thread	Pre-tightening torque, 35 Nm	
	Final tightening torque, 50 Nm	
Nut, M6 - 10.9 Grease thread	11 Nm	

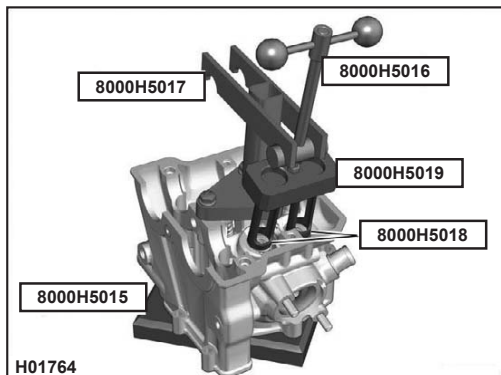
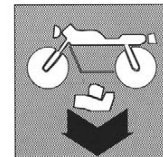
- Tighten screws (2).

 Tightening torque figures		
Cylinder head on cylinder		
M8 x 30 Grease thread	15 Nm	

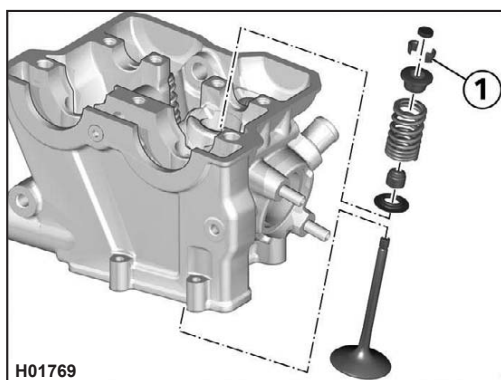


CYLINDER HEAD REPLACEMENT (CYLINDER HEAD REMOVED)

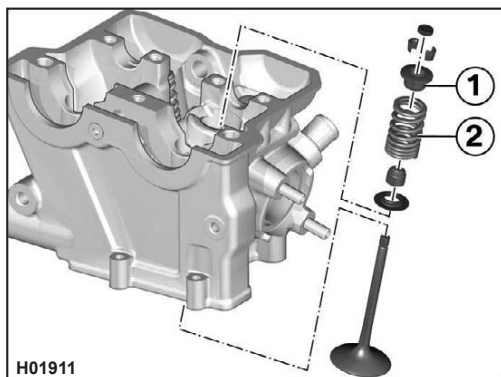




- Assemble cylinder head onto support plate (N. 8000H5015).
- Fit supporting bracket (N. 8000H5017), spindle with handle (N.8000H5016), connector (N. 8000H5018), and compression plate (N.8000H5019).
- Precharge springs using the compression plate (N. 8000H5019).

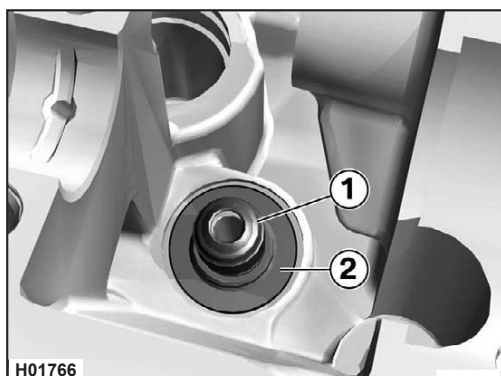


- Remove valve collets (1).
- Remove supporting bracket (N. 8000H5017), spindle with handle (N.8000H5016), connector (N. 8000H5018), and compression plate (N.8000H5019).
- Remove support plate (N. 8000H5015).
- Take out valves downward



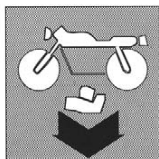
Removing valve spring

- Take upper retainer (1), and valve spring (2) out of cylinder head.



Removing valve stem seal

- Remove valve stem seal (1) with a suitable auxiliary tool.
- Remove spring (2) lower retainer.

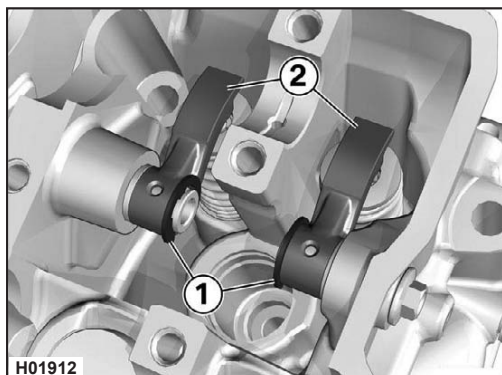


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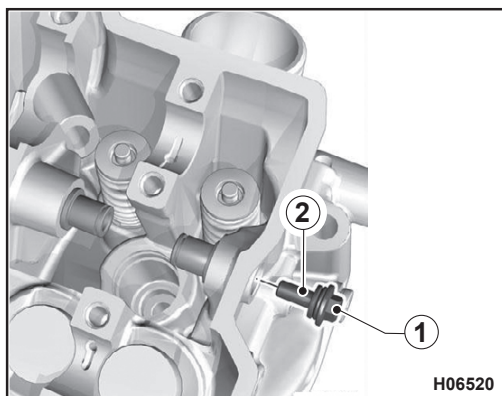
Rocker arm disassembly

- Remove stop rings (1) and rocker arms (2).

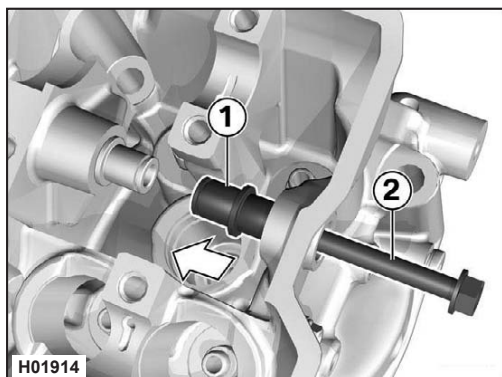


Rocker arm shaft disassembly

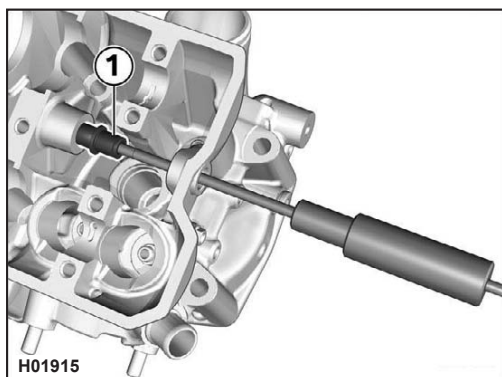
- Remove the screw (1) with the O-ring (2).

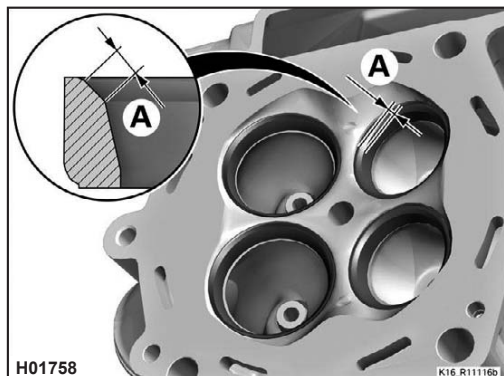
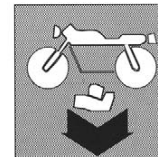


- Remove left rocker arm shaft (1) with a suitable tool (2).



- Remove right rocker arm shaft (1) using a suitable sliding hammer puller.





Valve seat width check

- Check that valve seat contact surface is neither damaged nor worn.

Check

- Measure valve seat width (A) (contact surface without soot deposits).

 Technical specifications			
Intake valve seat width	New	1.3 mm	
	Wear limit	Max. 1.95 mm	
	New	1.6 mm	
	Wear limit	Max. 2.4 mm	

Result: Valve seat outside tolerance values.

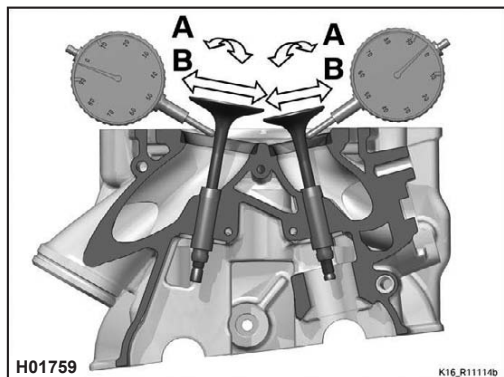
Action:

- Grind or replace valve seat.

Valve guide clearance check

Check

- Apply a dial gauge at right angles with valve stem, preferably close to cylinder head bearing point.
- Measure valve clearance by moving it. Repeat this procedure by moving dial gauge by 90° (A, B).



 Technical specifications			
Intake valve clearance inside corresponding guide	New, with 15 mm valve lift	0.01 mm	
	Wear limit, with 15 mm valve lift	Max. 0.25 mm	
Exhaust valve clearance inside corresponding guide	New, with 15 mm valve lift	0.02 mm	
	Wear limit, with 15 mm valve lift	Max. 0.25 mm	

Result: Stem clearance outside tolerance values, even with new valve.

Action:

- Replace valve guide

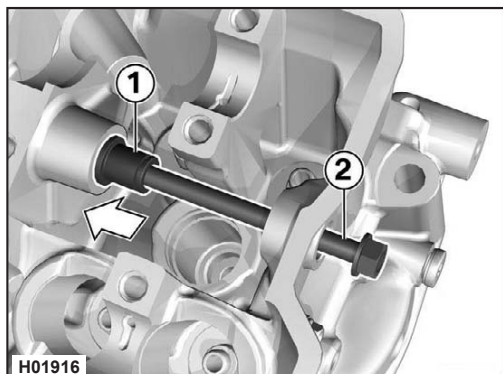
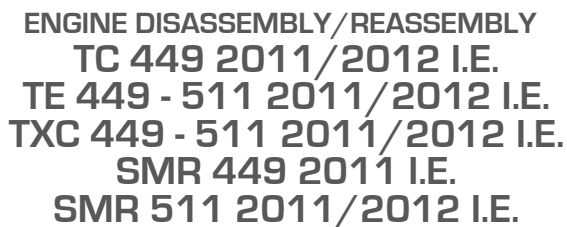
Check

- Check valve spring for damages and wear

Result: Worn or damaged springs

Action:

- Valve spring replacement



Rocker arms shaft assembly

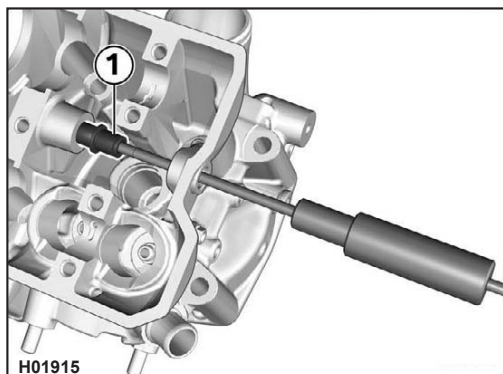
- Lubricate rocker arm shafts.



Consumables

Molykote D Paste	Clear solid lubricant for metal part assembling and settling	
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- Assemble right rocker arm shaft (1) with a suitable tool (2).



- Assemble left rocker arm shaft (1) with a suitable tool.

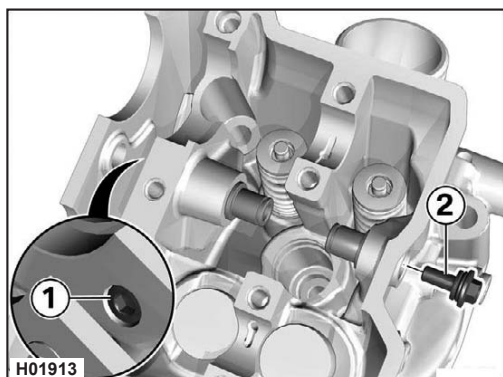
- Fit screw (1), and screw with the O-Ring (2).

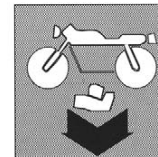


Tightening torque figures

Rocker arm shafts onto cylinder head

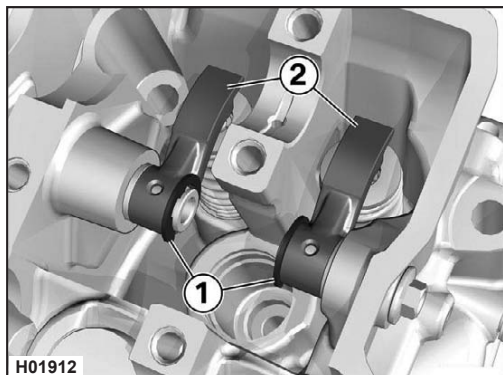
M6, Microincapsulated screw replacement	11 Nm	
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Rocker arm assembly

- Lubricate rocker arm shafts.



Consumables

Molykote D Paste

Clear solid lubricant
for metal part
assembling and
settling

- Fit tappet roller (2).



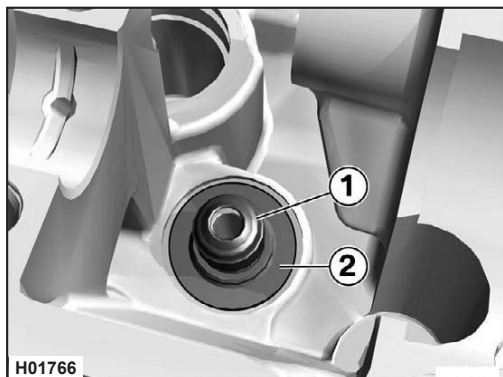
Caution

Rocker arm correct operation will be impaired if clips are reused.
 Always change safety clips.

- Fit safety fasteners (1).

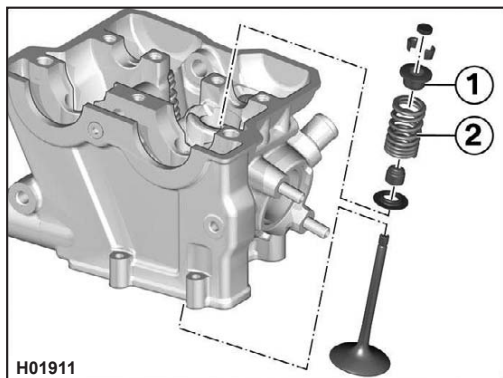
Fitting valve stem seal

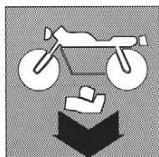
- Install valve
- Fit spring (2) lower retainer.
- Install valve stem seal (1).



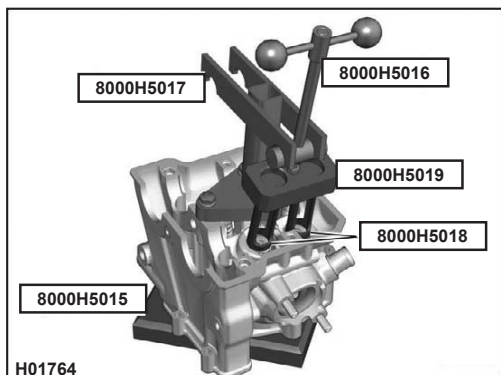
Valve spring assembly

- Fit valve spring (2) with the thicker side pointing down.
- Fit upper spring retainer (1).



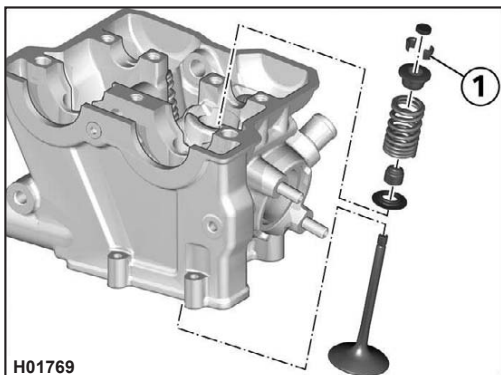


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Valve assembly

- Assemble cylinder head onto support plate (N. 8000H5015).
- Fit supporting bracket (N. 8000H5017), spindle with handle (N.8000H5016), connector (N. 8000H5018), and compression plate (N.8000H5019).
- Precharge springs using the compression plate (N. 8000H5019).



- Lubricate and assemble valve collets (1).

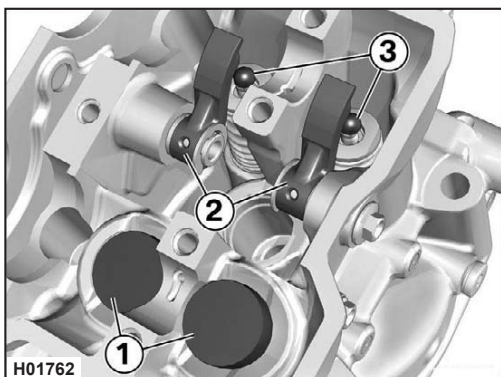
Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	

- Remove supporting plate (N. 8000H5015), supporting bracket (N. 8000H5017), spindle with handle (N. 8000H5016), connector (N. 8000H5018), and compression plate (N. 8000H5019).

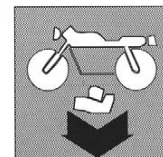


Caution

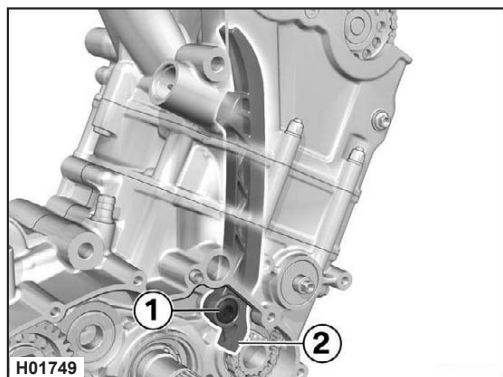
Half balls can fall inside cylinder head oil ducts.
Plug ducts with a cloth.



- Assemble half ball (3) on the relevant valve, and overturn rocker arm (2).
- Assemble plate on the relevant valve.
- Assemble bucket type tappet (1) on the relevant valve.

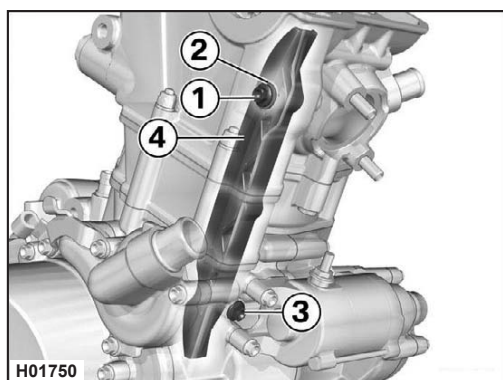


CHAIN SLIDER



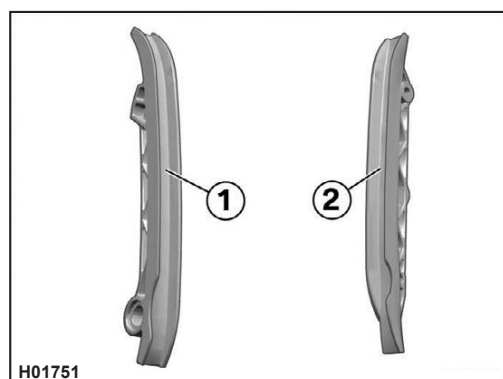
Chain tensioning slider disassembly

- Remove screw (1).
- Remove chain tensioning slider (2).



Slider disassembly

- Disassemble the following parts:
 - screw (1)
 - Washer (2)
 - Screw with O-Ring (3)
 - Slider (4)



Chain sliding and tensioning sliders check

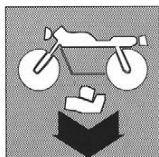
Check

- Check chain tensioning (1) and sliding (2) sliders sliding surfaces.

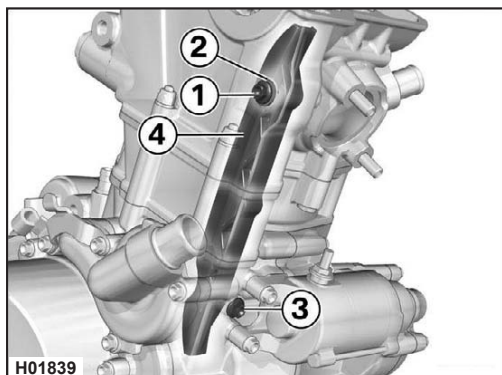
Result: Sliding surfaces are damaged or worn.

Action:

- Change sliders.



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Slider assembly

- Assemble the following parts:
 - Slider (4)
 - Washer (2)
- Fit screw (1).



Tightening torque figures

Slider onto cylinder head

Calibrated screw, M8	15 Nm	
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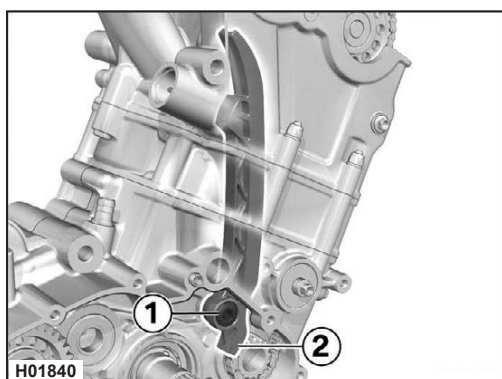
- Fit screw with O-Ring (3).



Tightening torque figures

Front slider at crankcase lower part

M8	15 Nm	
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Chain tensioner assembly

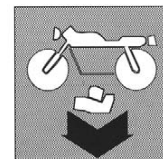
- Fit chain tensioner (2).
- Fit screw (1).



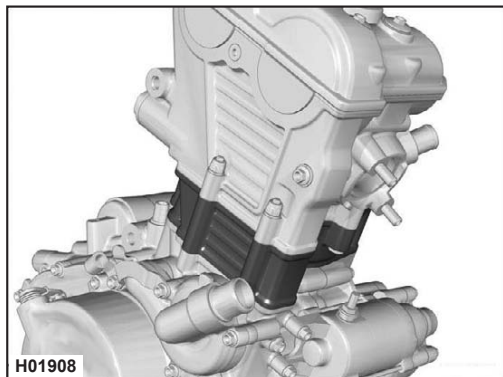
Tightening torque figures

Chain tensioner on crankcase

M8, Microincapsulated screw replacement	15 Nm	
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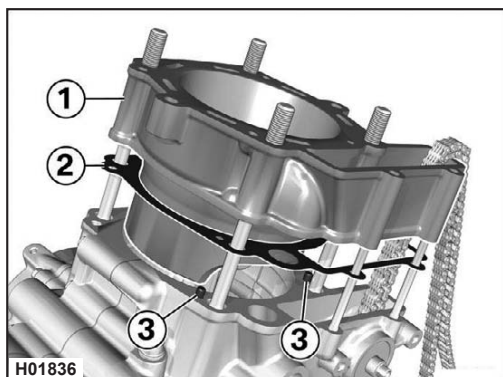


CYLINDER DISASSEMBLY AND REASSEMBLY OR REPLACEMENT



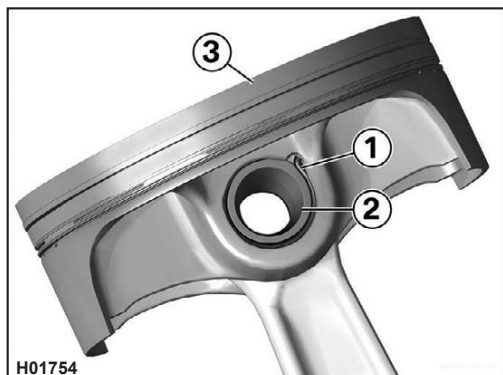
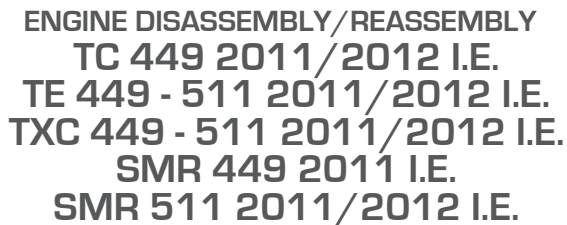
Preliminary operations

- Spark plug recess ignition coil disassembly
- Spark plug disassembly
- Removing cylinder head cover
- Spark plug recess disassembly
- Bearing mount disassembly
- Camshaft removal
- Slider disassembly
- Cylinder head disassembly



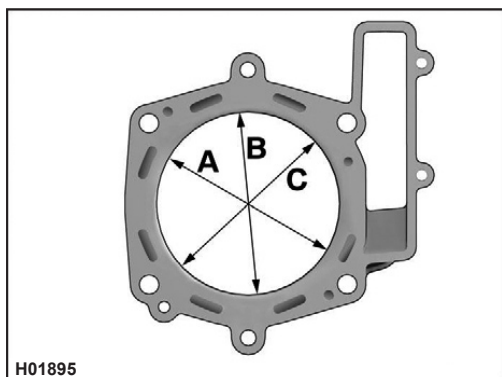
Cylinder disassembly

- Remove cylinder (1) taking special care not to let screws fall down.
- Remove gasket (2), and centring pins (3).



Piston disassembly

- Watch stop rings correct position: ring opening shall be pointing up (arrow).
- Disassemble the following parts:
 - Left and right stop rings (1).
 - Piston pin (2)
 - Piston (3)



Cylinder check

Check

- Check cylinder liner and sealing surface for damages.
- Measure bore using an inside micrometer gauge in three points (A, B, C).



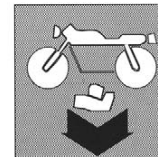
Technical specifications

Cylinder bore diameter Tolerance group 1	New, 40 mm from upper edge	450 cc $98.000^{+0.012}_{-0}$ mm 480 cc $101.000^{+0.012}_{-0}$ mm	
Cylinder bore diameter Tolerance group 2	New, 40 mm from upper edge	450 cc $98.012^{+0.012}_{-0}$ mm 480 cc $101.012^{+0.012}_{-0}$ mm	

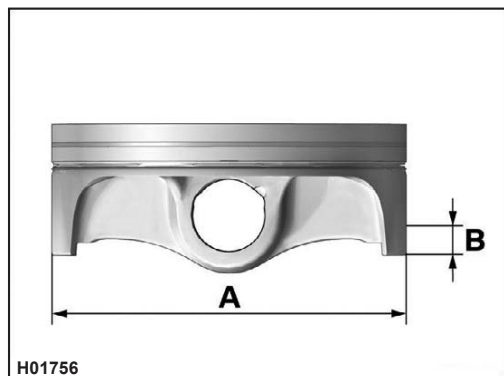
Result: Damaged cylinder or outside tolerance values

Action:

- Replace cylinder.



Piston diameter check



Check

- Measure piston diameter (A) crosswise to piston pin axis.
- Size (B) defines the reading beyond piston pin lower edge.

 Technical specifications			
Piston diameter Tolerance group 1	New, transverse to piston pin axis, above piston lower edge by 4 mm	450 97.925 ^{+0.005} - 0.005 mm	
		480 100.925 ^{+/- 0.005} mm	
Piston diameter Tolerance group 2	New, transverse to piston pin axis, above piston lower edge by 4 mm	450 97.935 ^{+0.005} - 0.005 mm	
		480 100.935 ^{+/- 0.005} mm	

Result: Piston diameter is outside tolerance values

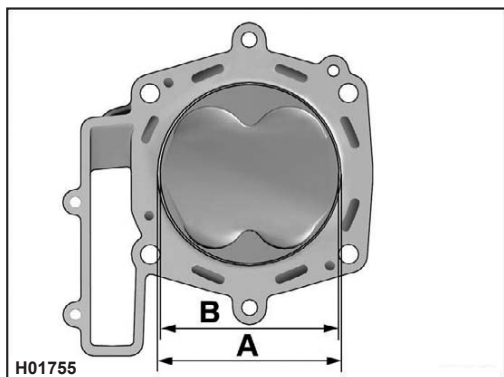
Action:

Replace piston.

Piston stroke clearance definition

Check

- Piston diameter (B) less cylinder diameter (A) = piston clearance.



 Technical specifications			
Piston installation clearance		0.06...0.08 mm	

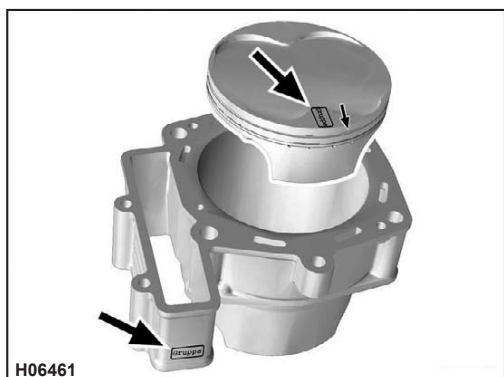
Result: Piston stroke clearance is outside tolerance values.

Action:

Replace piston and cylinder.

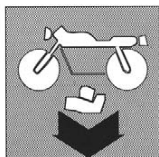
Piston assembly

- Fit piston with the arrow pointing to exhaust side.

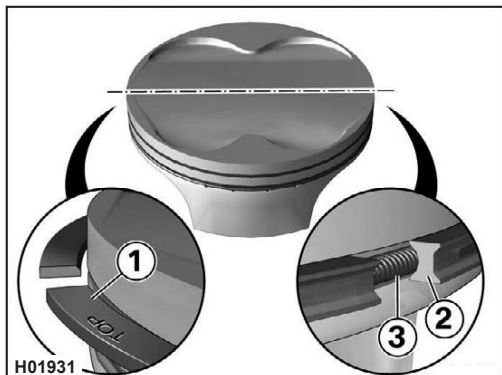


Caution

Comply with the markings for cylinders and pistons unit.
The marks denoting cylinder and piston groups must match.



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Piston ring assembly

- Fit piston ring and scraper ring inside annular grooves, offset by 180°.



Warning

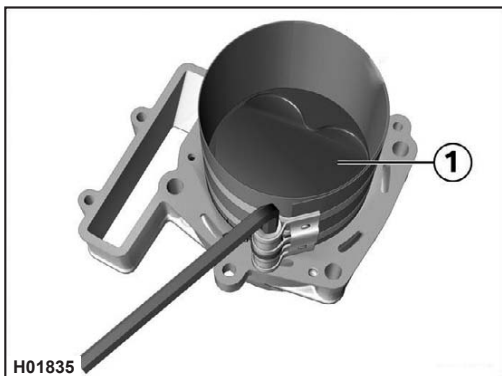
Offset garter spring port by approx. 180° compared to scraper ring port. The "TOP" wording shall be pointing up.



Technical specifications

Piston ring assembly direction		"Top" mark pointing up	
--------------------------------	--	------------------------	--

- Assemble the following parts using a gripper for piston rings:
 - Lower scraper ring spring (3)
 - Lower scraper ring (2) with the "EK" wording pointing up
 - Upper piston ring (1) with the "TOP" wording pointing up



Piston with cylinder assembly

- Position piston ring and scraper ring inside annular grooves, offset by 180°.



Warning

Offset garter spring port by approx. 180° compared to scraper ring port. The "TOP" wording shall be pointing up.



Technical specifications

Piston ring assembly direction		"Top" mark pointing up	
--------------------------------	--	------------------------	--

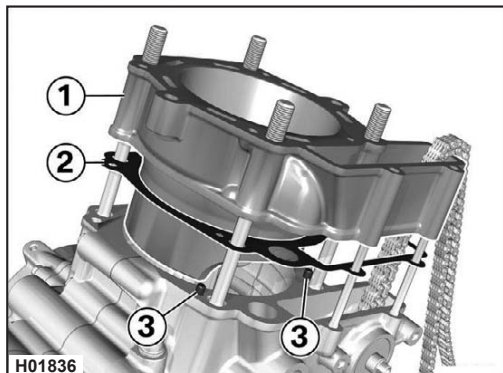
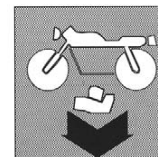
- Grease piston ring with piston sides, and insert piston rod inside cylinder.



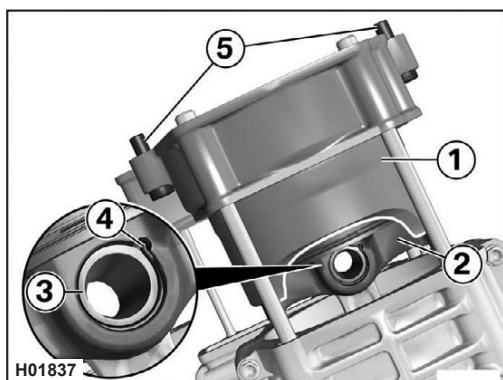
Consumables

Castrol GPS SAE 10W-40	Engine oil	
------------------------	------------	--

- Apply a 57-125 mm tightening belt onto piston rings, then tighten belt.
- Assemble piston (1) while 57-125 mm tightening belt is still inside cylinder.



- Remove the gasket protruding out of the flange used for cylinder connection.
- Apply reference pins (3), and a new gasket (2).
- Insert timing chain inside recess, fit cylinders (1) with piston until connecting rod small end.



- Keep cylinder (1) with piston (2) at the height of connecting rod small end.
- Lubricate piston pin (3), and assemble it.



Consumables

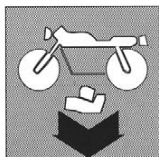
Molykote D Paste

Clear solid lubricant for metal part assembling and settling

- Fit the new stop rings (4).
Make sure to respect correct assembly position.
- Fit the screws at cylinder (5) bottom.
- Fit cylinder.

Subsequent actions

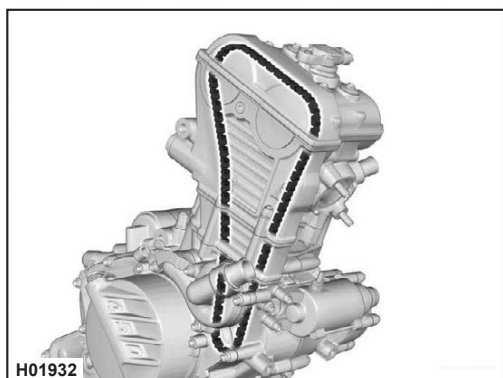
Valve clearance check



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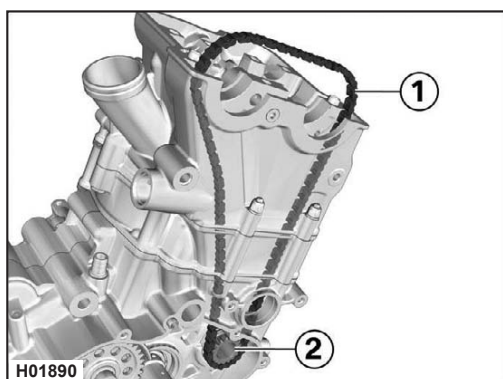


TIMING CHAIN DISASSEMBLY AND REASSEMBLY OR REPLACEMENT



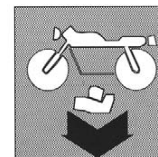
Preliminary operations

Clutch cover disassembly
Spark plug recess ignition coil disassembly
Removing cylinder head cover
Spark plug recess disassembly
Engine positioning at ignition TDC
Securing crankshaft at TDC
Chain tensioner disassembly
Bearing mount disassembly
Camshaft removal
Clutch disassembly
Coolant pump disassembly
Engine right crankcase cover disassembly
Chain tensioning slider disassembly
Slider disassembly
Coolant pump shaft disassembly



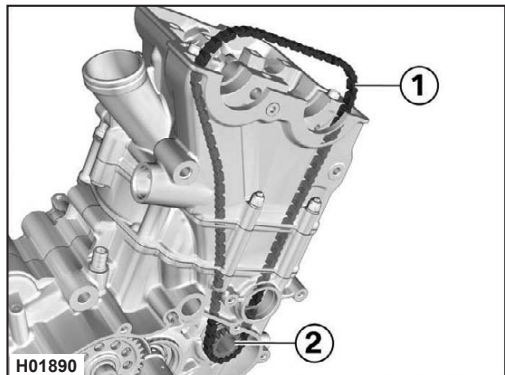
Timing chain disassembly

- Slide timing chain (1) out of countershaft gear (2), and remove it upward.



Timing chain assembly

- Lubricate timing chain (1), and fit it onto countershaft gear (2) working through crankcase from top.



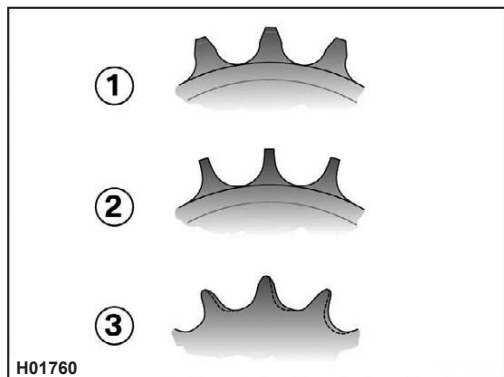
Consumables

Molykote D Paste

Clear solid lubricant
for metal part
assembling and
settling

Subsequent actions

Valve clearance check



Chain, chain sprocket check

Check

- Check timing chain for damages and wear.

Result: Worn or damaged timing chain.

Action:

- Replace timing chain.

Check

- Check gear and chain sprocket for damages and wear.

Result: Figure 1: no distortion or min. teeth distortion.

Action:

- Wheel, chain and sprocket are in good conditions.

Result: Figure 2: teeth distortion.

Action:

- Change chain and gear.

Result: Figure 3: heavily worn teeth.

Action:

- Change chain and gear.

Check

- Check camshaft for damages and wear.

Result: Worn or damaged camshaft.

Action:

- Replace camshaft.

Timing chain check

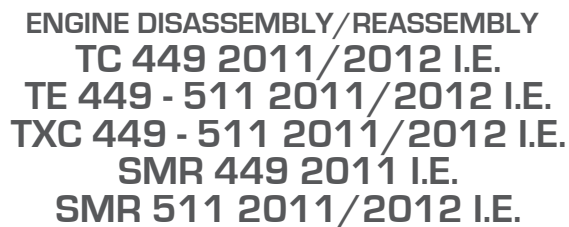
Check

- Check timing chain for damages and link smoothness.

Result: Damaged timing chain or with hard links.

Action:

- Replace timing chain.

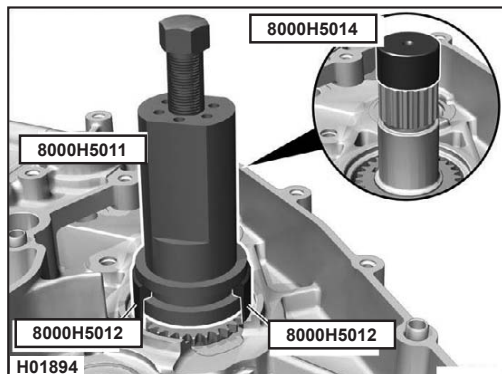
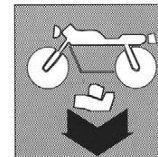


H01937

Idler gear disassembly
 Clutch housing axial bearing disassembly
 Clutch thrust washer disassembly

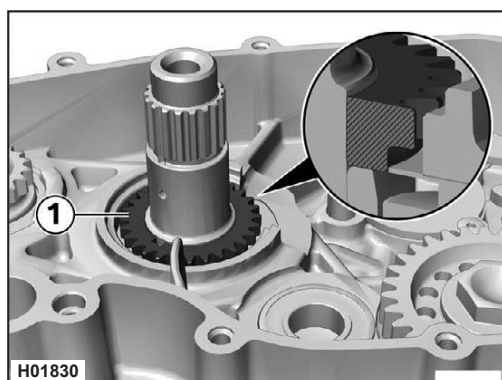
- Disassemble the following parts:
 - Stop ring (1)
 - Washer (2)
 - Gear (3)
 - Bearing (4)

- Disassemble the following parts:
 - Stop ring (1)
 - Washer (2)
 - Gear (3)
 - Needle roller (4)



Disassembly of crankshaft gear pointing to oil pump idler gear

- Fit presser (N. 8000H5014) onto crankshaft.
Remove gear using puller (N.8000H5011), and jaws (N. 8000H5012)



Assembly of crankshaft gear pointing oil pump idler gear

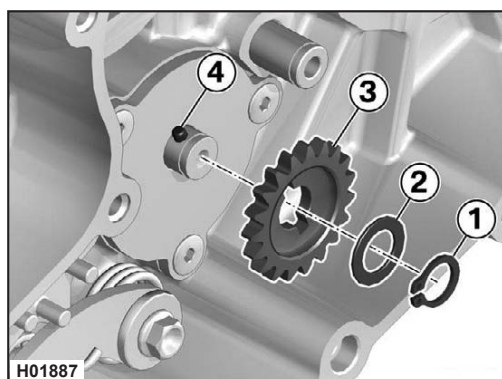
- Heat gear (1).



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit gear (1) with the dowel protruding towards crankcase.



Oil pump control gear assembly

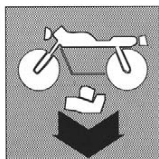
- Lubricate needle roller (4) and gear (3).



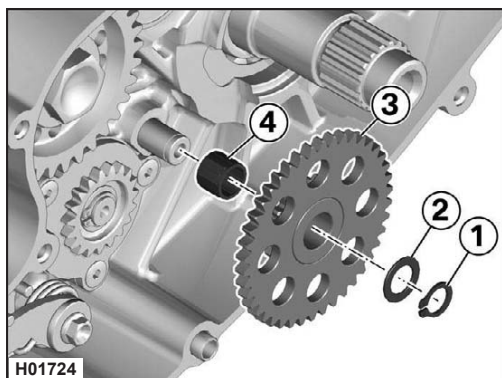
Consumables

Molykote D Paste	Clear solid lubricant for metal part assembling and settling	
------------------	--	--

- Assemble the following parts:
 - Needle roller (4)
 - Gear (3)
 - Washer (2)
 - Stop ring (1)



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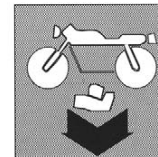
Oil pump idler gear assembly

- Lubricate bearing (4), and gear (3).

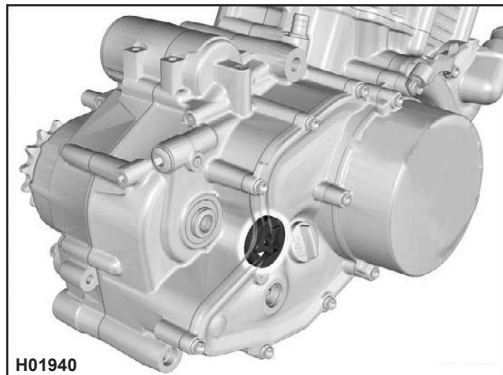
 Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	

- Assemble the following parts:

- Bearing (4)
- Gear (3)
- Washer (2)
- Stop ring (1)

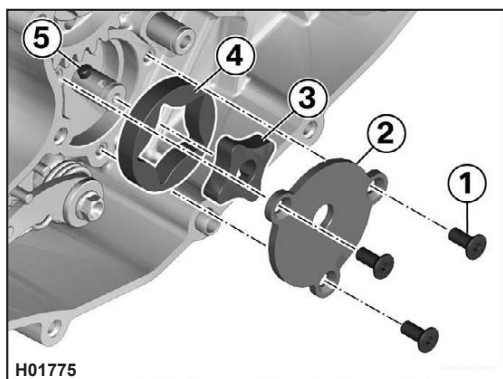


OIL INTAKE PUMP REPLACEMENT (CRANKCASE COVER REMOVED)



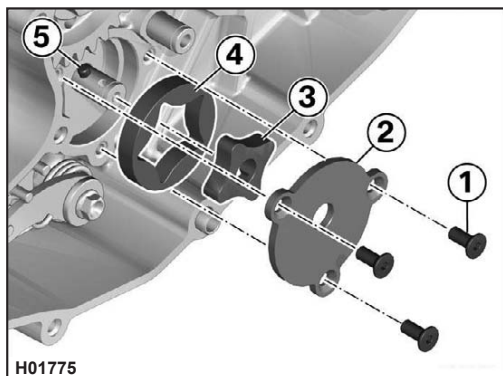
Preliminary operations

- Clutch housing axial bearing disassembly
- Clutch thrust washer disassembly
- Oil pump idler gear disassembly
- Oil pump control gear disassembly



Oil intake pump disassembly

- Disassemble the following parts:
 - Screws (1)
 - Cover (2)
 - Inner rotor (3)
 - Outer rotor (4)
 - Needle roller (5)



Fit oil intake pump

- Lubricate needle roller (5), outer rotor (4), and inner rotor (3).



Consumables

Molykote D Paste

Clear solid lubricant for metal part assembling and settling

- Assemble the following parts:
 - Needle roller (5)
 - Outer rotor (4), and inner rotor (3) with reference mark pointing out
 - Cover (2)
- Fit screws (1).

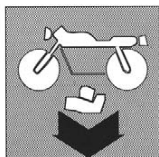


Tightening torque figures

Pump cover on crankcase

M5 x 12, Microincapsulated screw replacement

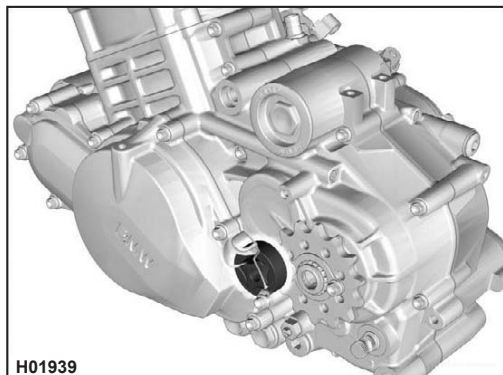
6 Nm



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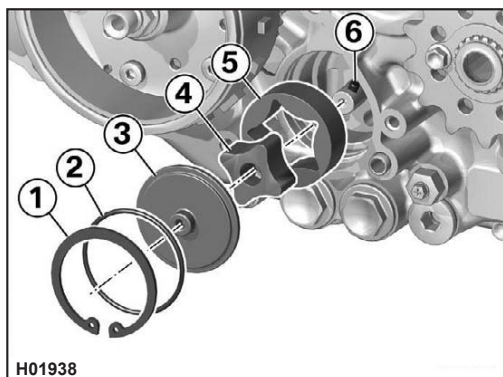


REMOVING AND ASSEMBLING OR REPLACING PRESSURE OIL PUMP



Preliminary operations

Engine oil drainage
Gear lever disassembly
Engine left crankcase cover disassembly



Oil force pump disassembly

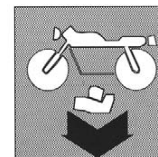
- Disassemble the following parts:
 - Stop ring (1)
 - Cover (3) with seal (2)
 - Inner rotor (4)
 - Outer rotor (5)
 - Needle roller (6)

Oil force pump assembly

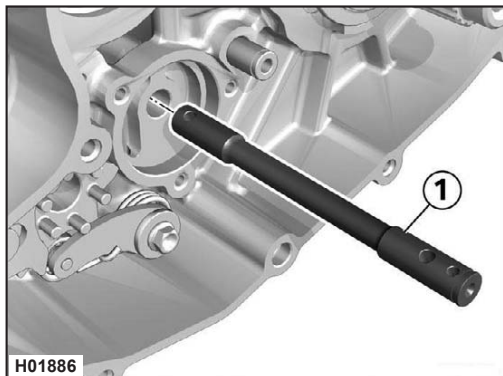
- Lubricate needle roller (6), outer rotor (5), and inner rotor (4).

		
Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	

- Assemble the following parts:
 - Needle roller (6)
 - Outer rotor (5), and inner rotor (4) with reference mark pointing out
 - Cover (3) with seal (2)
 - Stop ring (1)



OIL PUMPS SHAFT



Oil pumps shaft disassembly

- Remove shaft (1) from crankcase.

Oil pumps shaft assembly

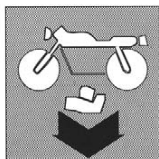
- Lubricate shaft (1), and assemble it inside crankcase. Shaft side with two holes shall be positioned on engine right side.



Consumables

Molykote D Paste

Clear solid lubricant for metal parts assembling and settling



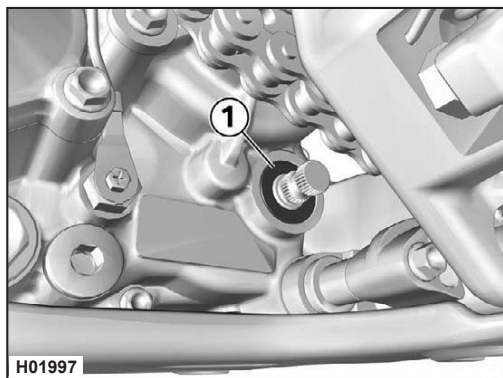
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REPLACE GEARBOX CONTROL SHAFT RADIAL SEALING RING

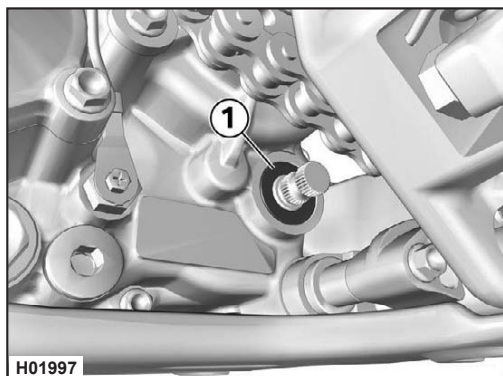
Preliminary operations

Gear lever disassembly



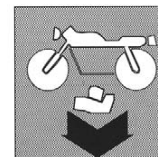
Removing oil seal from gearbox shaft

- Using a suitable tool, remove oil seal (1) with the utmost care.

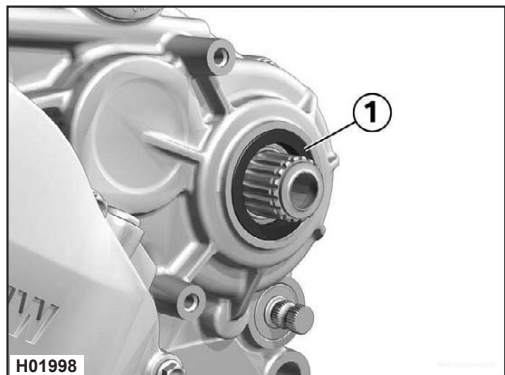


Fitting gearbox shaft oil seal

- Fit oil seal (1) using a suitable tool.

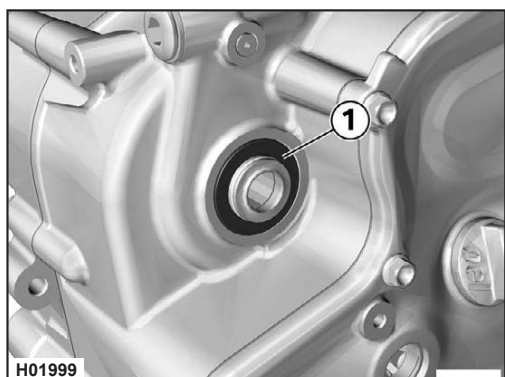


REPLACING OUTPUT SHAFT OIL SEAL



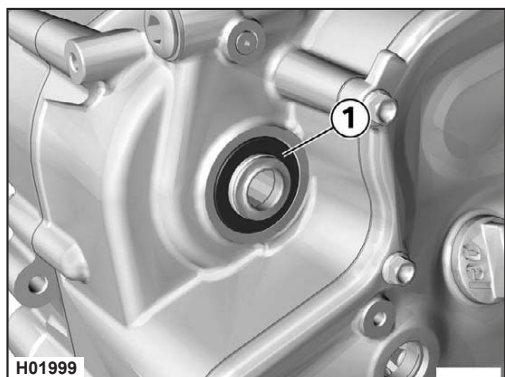
Gearbox output shaft left oil seal disassembly

- Remove oil seal (1).



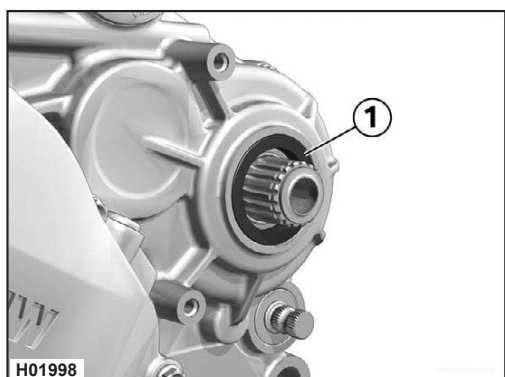
Gearbox output shaft right oil seal disassembly

- Remove oil seal (1).



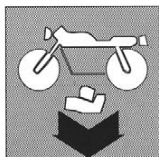
Gearbox output shaft right oil seal assembly

- Fit the new oil seal (1) using a suitable tool.



Gearbox output shaft left oil seal assembly

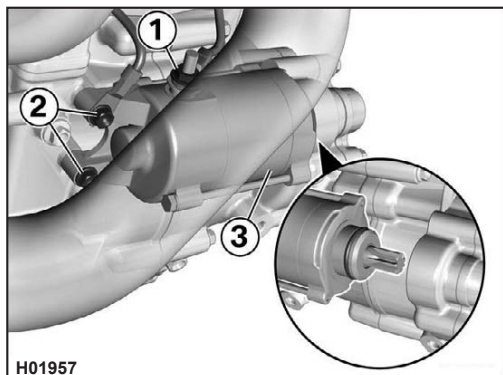
- Fit oil seal (1) using a suitable tool.



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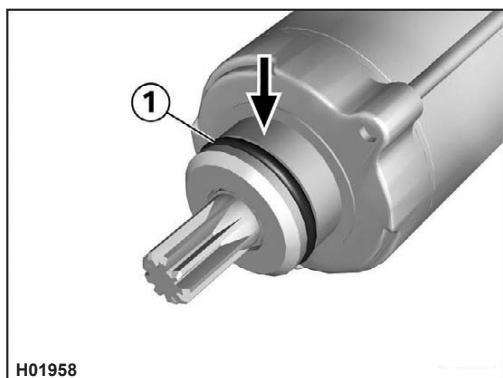


DISASSEMBLING/ASSEMBLING STARTER MOTOR



Removing starter motor

- Disconnect positive cable (1).
- Remove screws (2).
- Remove starter motor (3).



Starter motor assembly

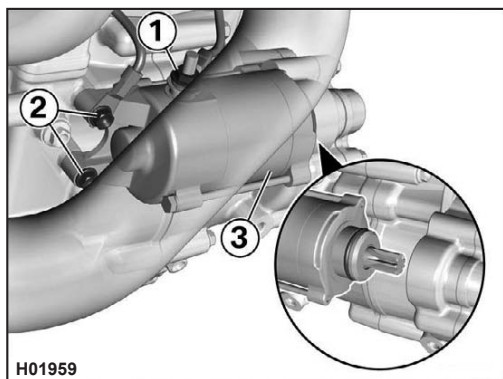
- Check sealing ring (1) for damages. Replace it, if necessary.
- Lubricate contact surface (arrow).



Consumables

Molykote D Paste

Clear solid lubricant for metal part assembling and settling



- Fit starter motor, taking special care to sealing ring (3).
- Fit screws (2) with the ground cable pointing up.



Tightening torque figures

Starter motor onto crankcase

M6 x 25
Grease thread

11 Nm

- Fit positive cable (1).

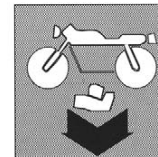


Tightening torque figures

Wiring harness on starter motor

M6

8 Nm



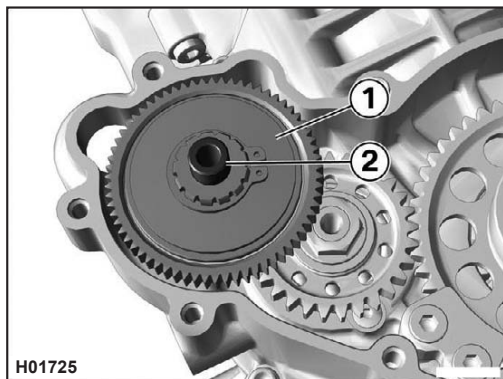
STARTER IDLE GEAR REPLACEMENT

Preliminary operations

- Engine oil drainage
- Gear lever disassembly
- Engine left crankcase cover disassembly
- Securing crankshaft at TDC
- Starter motor idle gear disengagement
- Flywheel disassembly

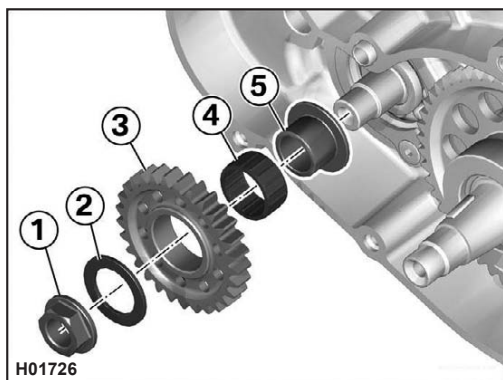
Gear disassembly with starter motor protected against overload

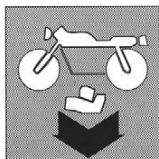
- Remove gear (1) with shaft (2).



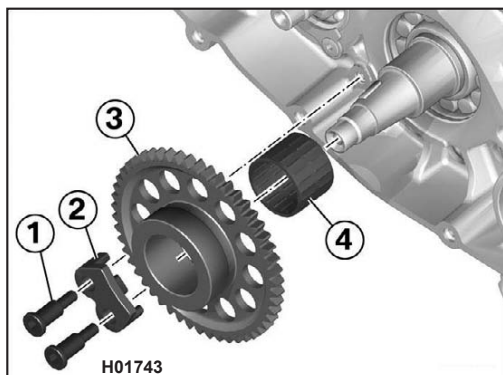
Starter motor idle gear disassembly

- Disassemble the following parts:
 - Nut (1)
 - Washer (2)
 - Gear (3)
 - Needle roller bearing (4)
 - Bushing (5)



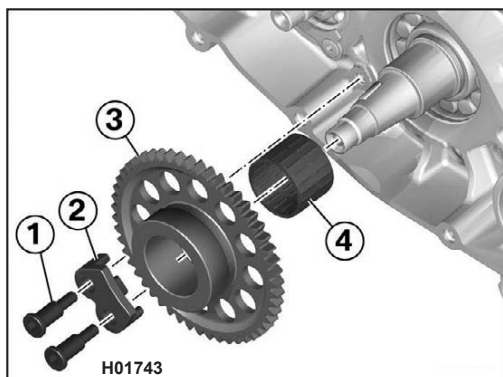


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Freewheel gear disassembly

- Disassemble the following parts:
 - Screws (1)
 - Guide (2)
 - Gear (3)
 - Needle roller bearing (4)



Freewheel gear assembly

- Lubricate needle roller bearing (4) and gear (3), then fit them.



Consumables

Molykote D Paste

Clear solid lubricant for metal
part assembling and settling

- Fit guide (2) with screws (1).

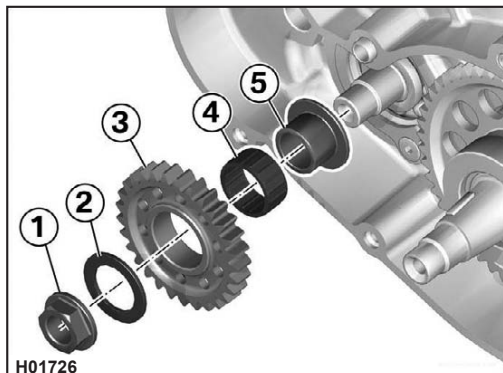
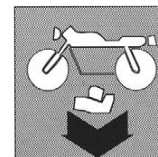


Tightening torque figures

Starter motor freewheel retainer onto crankcase

M5, Microincapsulated screw
replacement

6 Nm



Starter motor idle gear fitting

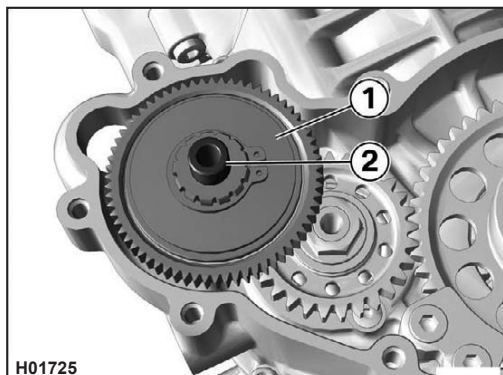
- Lubricate bushing (5), and needle roller bearing (4), then assemble them.

 Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	

- Lubricate gear (3), and assemble it with the dowel pointing towards counter-shaft.

 Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	

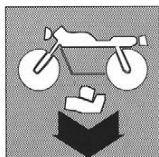
- Fit washer (2) with nut (1), but do not tighten them.



Gear assembly with starter motor protected against overload

- Lubricate shaft (2) with gear (1), and assemble them.

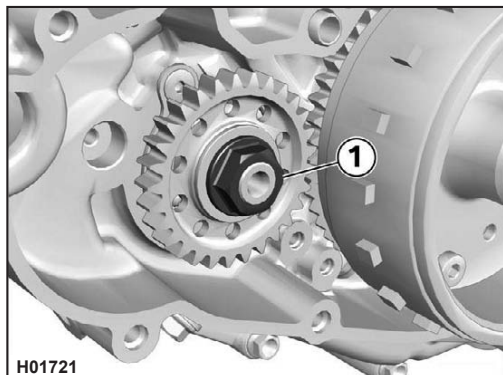
 Consumables		
Molykote D Paste	Clear solid lubricant for metal part assembling and settling	



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STARTER MOTOR IDLE GEAR



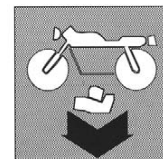
Starter motor idle gear disengagement

- Loosen nut (1).

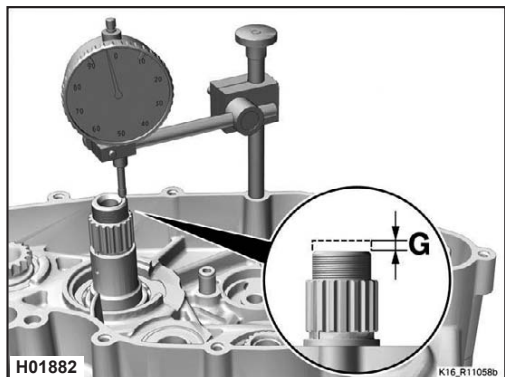
Starter motor idle gear fitting

- Tighten nut (1) all the way down.

 Tightening torque figures		
Engine and crankcase fairing, screw connections		
M12 x 1, Replace microincapsulated screw nut	50 Nm	



CRANKSHAFT AXIAL CLEARANCE CHECK



Check

- Measure crankshaft axial clearance (G) using a dial gauge.
- Read axial clearance moving shaft up and down.



Warning

To get correct values, exert a greater force.



Technical specifications

Crankshaft axial clearance		0.30...0.50 mm	
----------------------------	--	----------------	--

Result: Read value outside tolerance values.

Action:

Crankshaft axial clearance adjustment (with engine removed)

CRANKSHAFT, COUNTERSHAFT, AND RELEVANT BEARINGS

Preliminary operations

- Engine oil drainage
- Head disassembly
- Gear lever disassembly
- Engine left crankcase cover disassembly
- Securing crankshaft at TDC
- Starter motor idle gear disengagement
- Flywheel disassembly

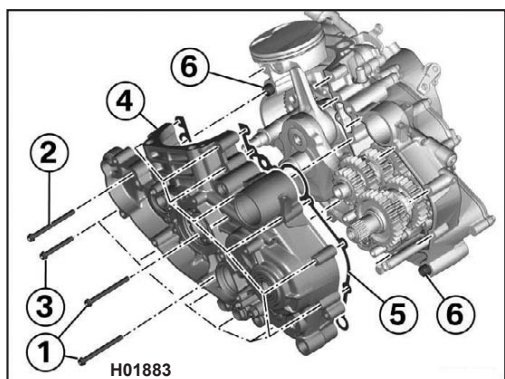
Crankcase left half disassembly

- Remove screws (1, 2, 3).
- Disassemble crankcase left half (4).

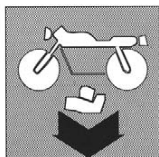


Warning

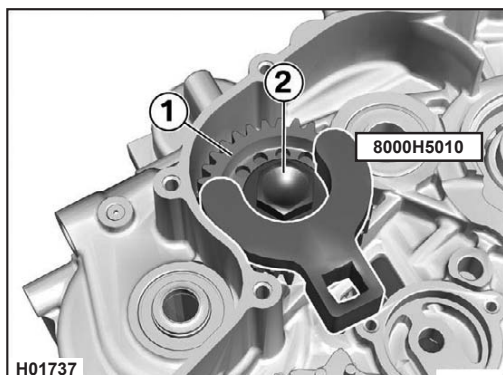
Due to sealant high adhesion, some engine parts could prove hard to disassemble. Disengage these parts by gently tapping them with a rubber hammer, taking care not to damage cooling fins or other crankcase parts.



- Remove gasket (5), and centring pins (6).

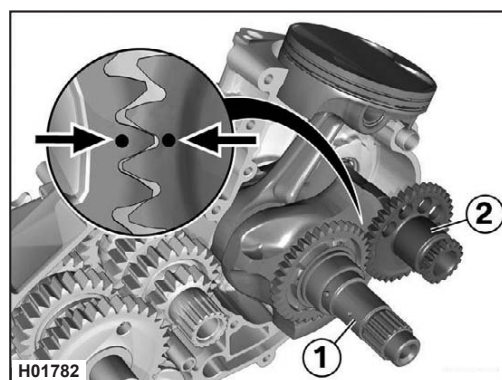


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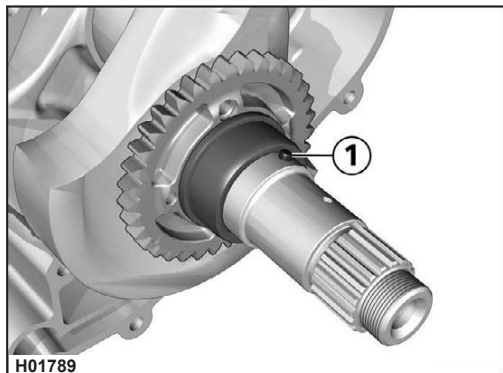
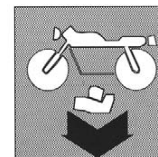
Control gear disassembly

- Lock control gear (1) using tool (N. 8000H5010) to prevent it from moving.
- Remove screw. Caution: **LH thread** (2).
- Remove control gear (1).



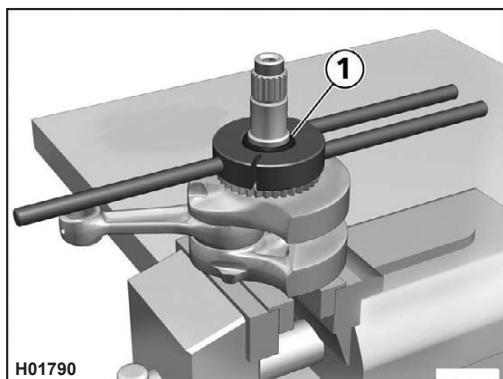
Remove crankshaft and countershaft

- Move crankshaft (1) and countershaft (2) reference marks (arrows) so as to make them match.
- Remove countershaft and crankshaft at the same time.



Crankshaft right bearing bushing disassembly

- Remove roller (1).



Warning

Burn hazard in case of contact with hot/heated parts.
 Should you have to touch hot parts, wear protective gloves.

- Remove bushing (1) using a suitable pre-heated puller.

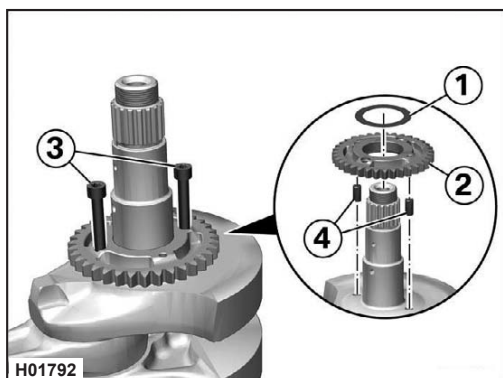


Technical specifications

Pre-heating temperature of puller for main bearing inner rings

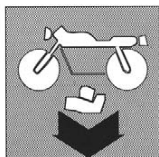
300 °C

- Apply puller around the bushing (1).
 After a reduced heating phase, remove bushing



Crankshaft for countershaft gear disassembly

- Remove space washer (1), if any.
- Mark assembly position on gear (2), and on crankshaft.
- Remove gear (2) with M6 screws (3).
- Remove reference pins (4).



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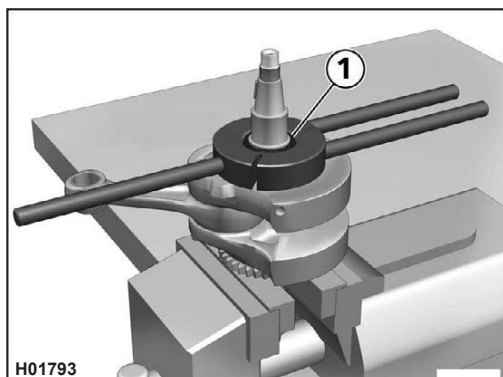


Crankshaft left bearing bushing disassembly



Warning

Burn hazard in case of contact with hot/heated parts.
Should you have to touch hot parts, wear protective gloves.



- Remove bushing (1) using a suitable pre-heated puller.



Technical specifications

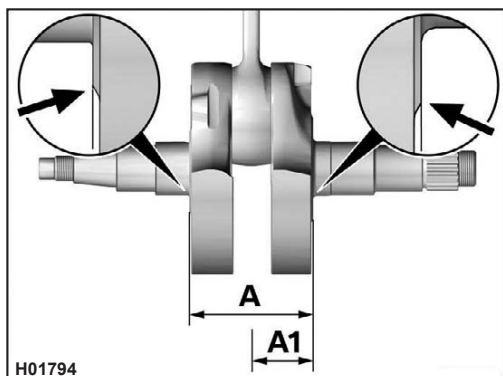
Pre-heating
temperature of puller
for main bearing inner
rings

300 °C

- Apply puller around the bushing (1).
After a reduced heating phase, remove bushing

Crankshaft axial clearance adjustment

- Measure crankshaft at the bearing seats (arrows), and divide the read value (A) by 2 (A1).



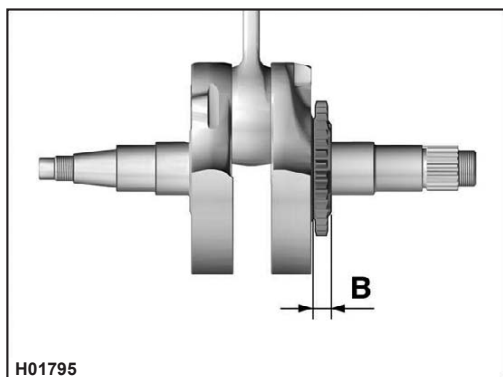
Technical specifications

Crankshaft reference
block

Dimension at

34.55 $^{+0.05}_{0}$ mm

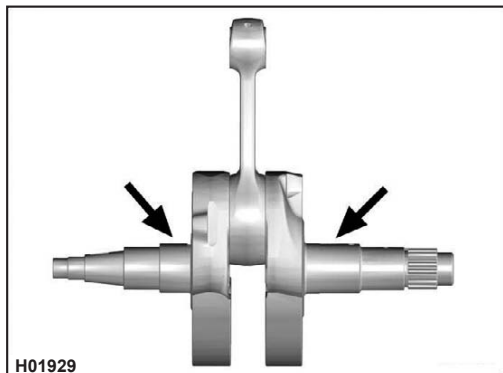
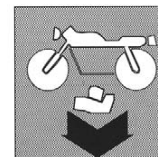
- Add to A1 the value read (B) by timing chain gear.



Technical specifications

Timing chain control
gear width

9.2 mm



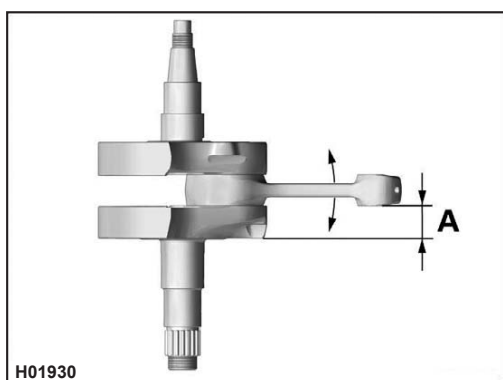
Crankshaft wear check

- Check crankshaft support pin (arrows).

Result: Support pins are damaged or worn.

Action:

- Replace crankshaft with connecting rod.



Connecting rod wear check

- Check connecting rod for damages and wear
- Measure connecting rod bearing clearance. Lock crankshaft in vertical position and, using a dial gauge, read the max. possible bearing clearance (A).



Technical specifications

Connecting rod axial clearance		0.80...0.90 mm	
--------------------------------	--	----------------	--

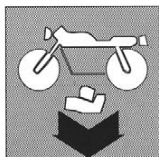
Result: Damaged connecting rod or bearing clearance outside tolerance values.

Action:

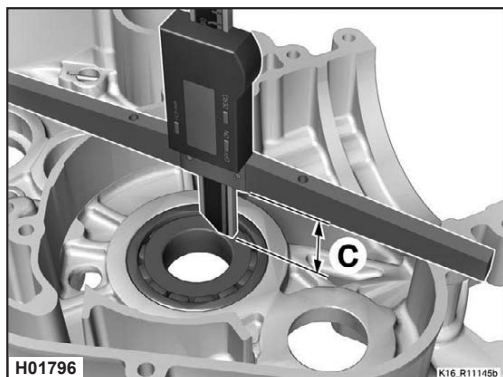
- Replace crankshaft with connecting rod.

Crankshaft replacement

- Always replace crankshaft as any microcracks could not be detected.



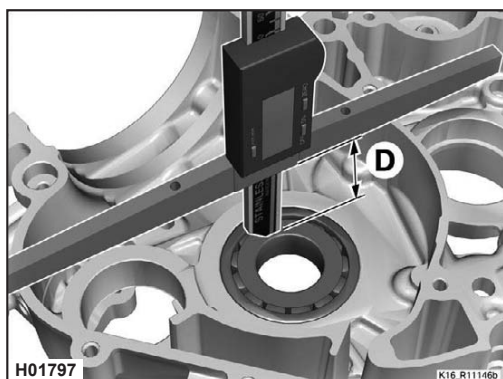
ENGINE DISASSEMBLY/REASSEMBLY
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Crankshaft axial clearance adjustment, left side

- Measure left bearing (C) seat depth using a depth gauge.
- Add to this value half of crankcase gasket value.
- The value measured on left crankshaft (A1) is deducted from the measured left bearing seat depth (C + half gasket value). If needed, adjust axial clearance using a thrust washer.

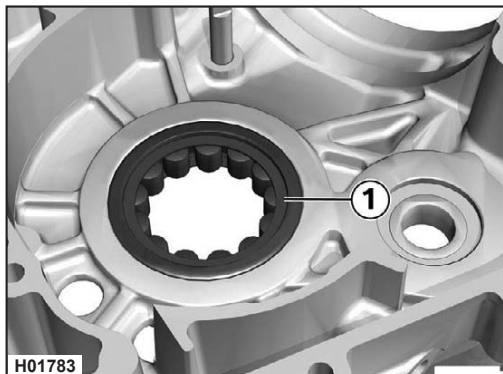
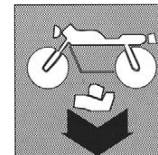
 Technical specifications			
Crankcase gasket thickness		0.5 mm	
Crankshaft space washer thickness		0.1 mm 0.15 mm 0.2 mm 0.25 mm 0.3 mm	



Crankshaft axial clearance adjustment, right side

- Measure right bearing (D) seat depth using a depth gauge.
- Add to this value half of crankcase gasket value.
- The value measured on right crankshaft (A1 + B) is deducted from the measured right bearing seat depth (C + half gasket value). If needed, adjust axial clearance using a thrust washer.

 Technical specifications			
Crankcase gasket thickness		0.5 mm	
Crankshaft space washer thickness		0.1 mm 0.15 mm 0.2 mm 0.25 mm 0.3 mm	



Crankshaft left bearing disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

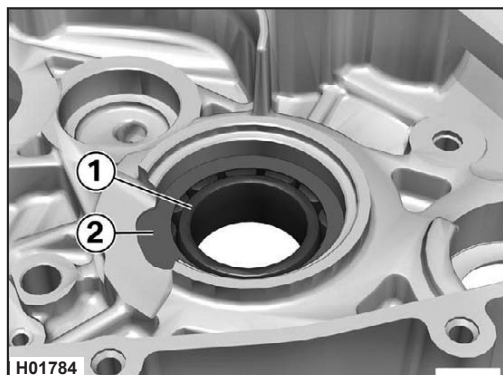
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (1).



Crankshaft right bearing disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

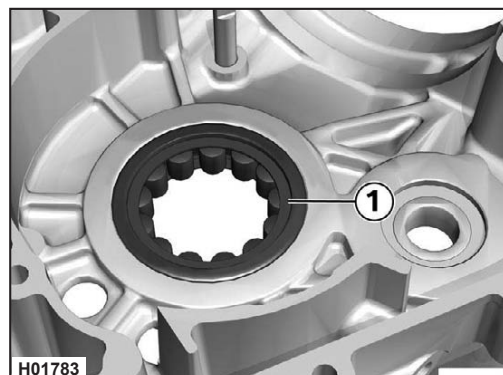
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (1).
- Remove ring (2).



Crankshaft left bearing assembly



Caution

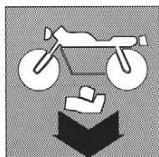
Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat crankcase.

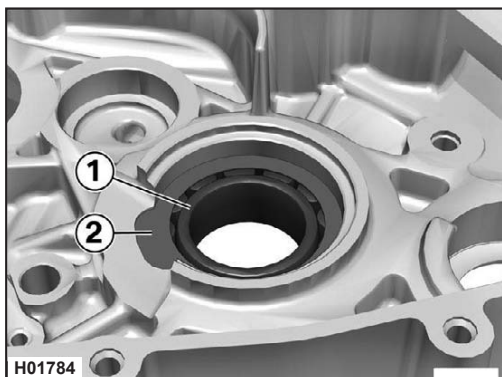


Technical specifications

Release/connection temperature		180 °C	
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Crankshaft right bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

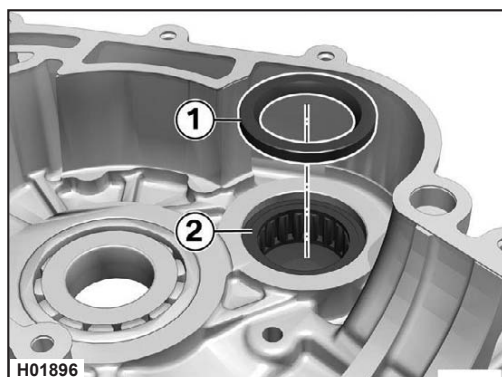
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Assemble bearing (1) using a suitable tool, and ring (2).



Countershaft right bearing disassembly

- Remove oil seal (1).



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

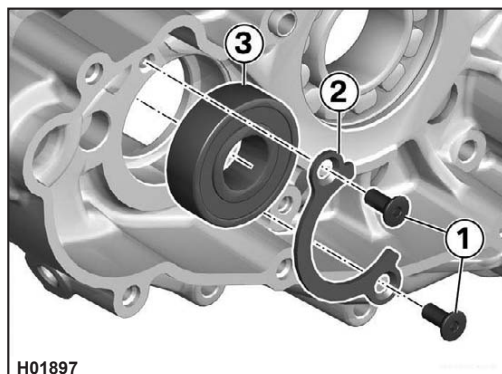
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (2).



Countershaft left bearing disassembly

- Remove screws (1).
- Remove stop striker (2).



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

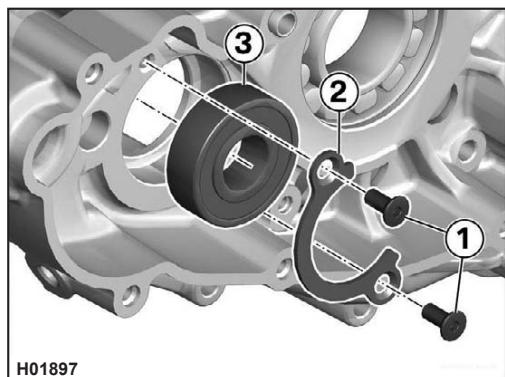
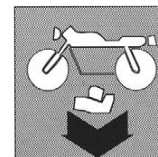
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (3).



Countershaft left bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
 Evenly heat casing, making sure not to exceed the recommended value.

- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

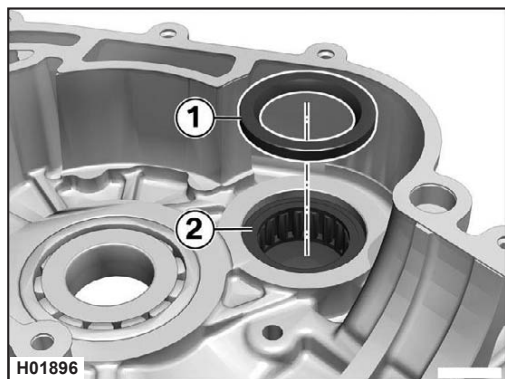
- Fit bearing (3) using a suitable tool.
- Fit stop striker (2) with new screws (1).



Tightening torque figures

Countershaft retainer onto crankcase

M5 x 12, Microincapsulated screw replacement	6 Nm	
--	------	--



Countershaft right bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
 Evenly heat casing, making sure not to exceed the recommended value.

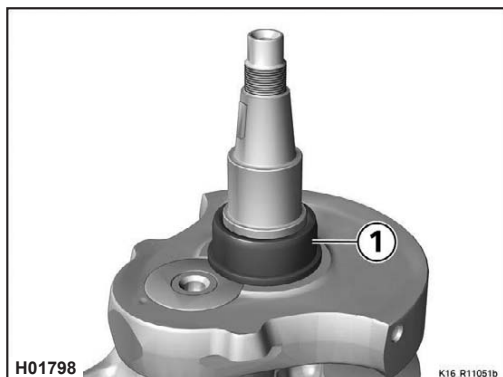
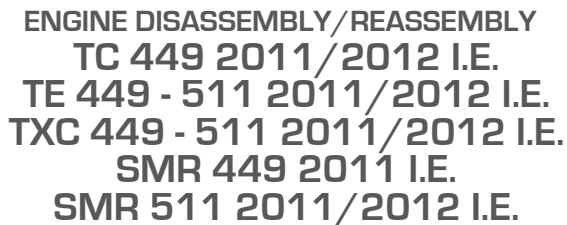
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit bearing (2) using a suitable tool.
- Fit oil seal (1) using a suitable tool.



Crankshaft left bearing bushing assembly

- If necessary, fit space washer.



Warning

**Burn hazard in case of contact with hot/heated parts.
Should you have to touch hot parts, wear protective gloves.**

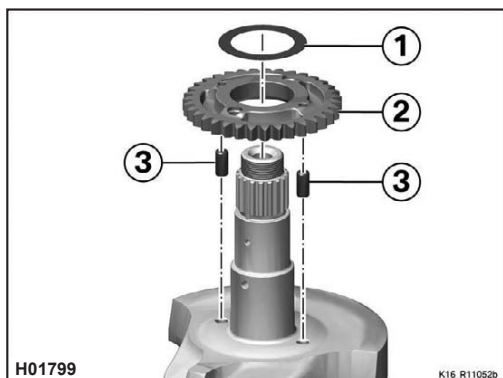
- Heat bearing bushing (1).



Technical specifications

Pre-heating temperature of puller for main bearing inner rings		300 °C	
--	--	--------	--

- Spray crankshaft with cooling fluid.
- Fit bearing bushing (1) using a suitable tool.



Oil pump gear assembly onto crankshaft

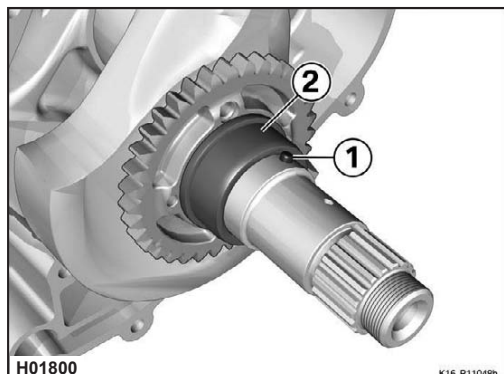
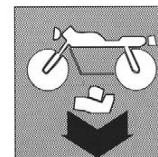
- Fit reference pins (3).
- Heat gear (2).



Technical specifications

Release/connection temperature		80 °C	
--------------------------------	--	-------	--

- For installation, refer to the reference marks.
- Spray crankshaft with cooling fluid.
- Fit gear (2) using a suitable tool.
- If necessary, fit thrust washer (1).



Crankshaft right bearing bushing assembly



Warning

Burn hazard in case of contact with hot/heated parts.
Should you have to touch hot parts, wear protective gloves.

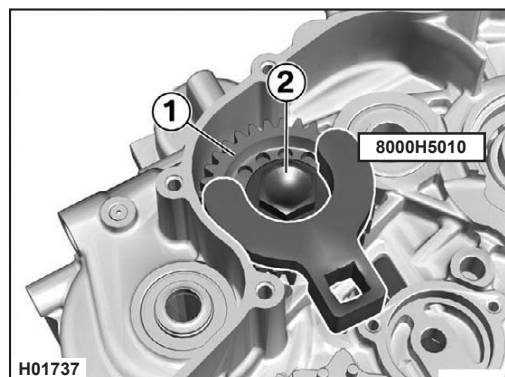
- Heat bearing bushing (2).



Technical specifications

Pre-heating temperature of puller for main bearing inner rings		300 °C	
--	--	--------	--

- Spray crankshaft with cooling fluid.
- Fit bearing bushing (2) using a suitable tool.
- Fit roller cage (1).



Control gear assembly

- Fit control gear (1), holding it in place with a tool (N. 8000H5010) to prevent it from turning.
- Fit screw (2).

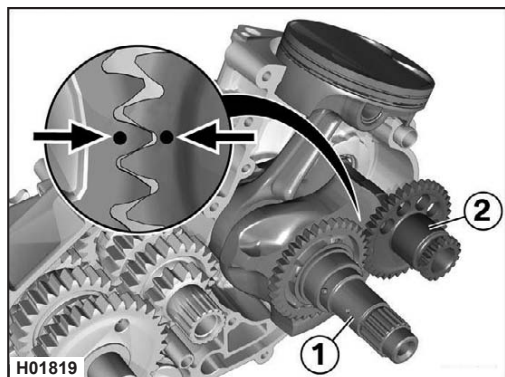


Tightening torque figures

Engine and crankcase fairing, screw connections		
Left-hand thread, M16 x1, Microencapsulated screw replacement	140 Nm	

Assemble crankshaft and countershaft

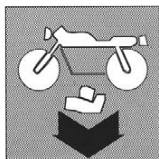
- Lubricate shafts bearing points.



Consumables

Molykote D Paste	Clear solid lubricant for metal parts assembling and settling	
------------------	---	--

- Assemble countershaft (2) with crankshaft (1).
- Respect the reference mark (arrows).



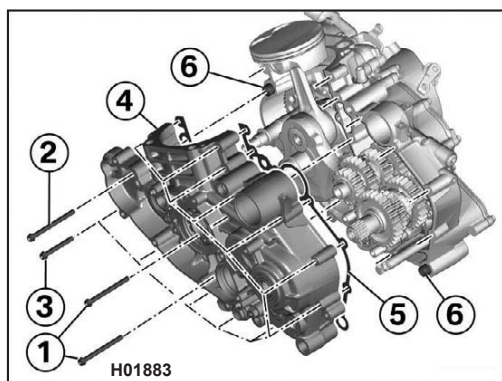
ENGINE DISASSEMBLY/REASSEMBLY
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GEARBOX UNIT - DISASSEMBLY / ASSEMBLY

Preliminary operations

- Engine oil drainage
- Head disassembly
- Gear lever disassembly
- Engine left crankcase cover disassembly
- Engine right crankcase cover disassembly
- Securing crankshaft at TDC
- Starter motor idle gear disengagement
- Flywheel disassembly
- Clutch unit disassembly



Crankcase left half disassembly

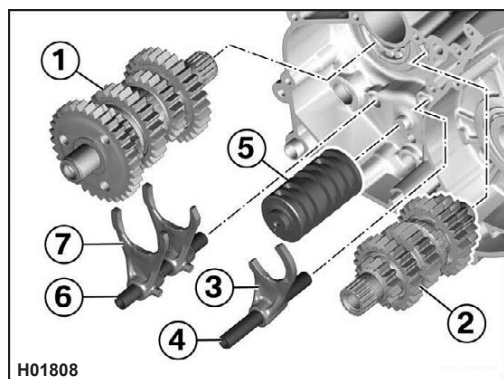
- Remove screws (1, 2, 3).
- Disassemble crankcase left half (4).



Warning

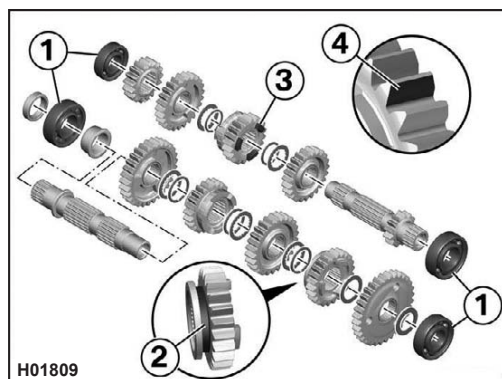
Due to sealant high adhesion, some engine parts could prove hard to disassemble. Disengage these parts by gently tapping them with a rubber hammer, taking care not to damage cooling fins or other crankcase parts.

- Remove gasket (5), and guide sleeves (6).



Gearbox disassembly

- Disassemble the following parts:
 - Gearbox output shaft (1)
 - Gearbox input shaft (2)
 - Gearbox input shaft fork (3)
 - Gearbox input shaft guide (4)
 - Selector drum (5)
 - Gearbox output shaft guide (6)
 - Gearbox output shaft fork (7)

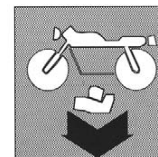


Gearbox check

- Transmission shaft check

Check

- Check gearbox bearings (1).



Result: Bearings do not move properly or they have increased clearance.

Action:

Replace primary shaft (removed shaft) bearings

Replace output shaft (removed shaft) bearings

- Replace gearbox bearings.

Check

- Check shaft grooves (2).

Result: Damaged or discoloured grooves.

Action:

- Replace engagement gear.

Check

- Check coupling teeth (3).

Result: Coupling teeth damaged or worn.

Action:

- Replace gear.

Check

- Check if teeth sides (4) show pitting or wear signs.

Result: Teeth sides worn or pitted.

Action:

- Replace gear.

Disassembly/Reassembly of the gearbox (5 Speed) (TC)



Caution

During operation, gear wheel sets slide one towards the other. If just one coupling gear is replaced, the load bearing capacity on gears may become significantly worse.

Replace gear wheels together with the coupled wheels, only.



Caution

Reinstall the input shaft and output shaft as indicated in the figure, paying attention not to damage the roller cages, the washers and snap rings.

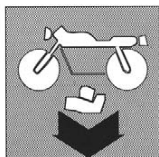
- Upon reassembly, always use new snap rings.
- Lubricate bearing, shaft and gears.



Consumables

Molykote D Paste

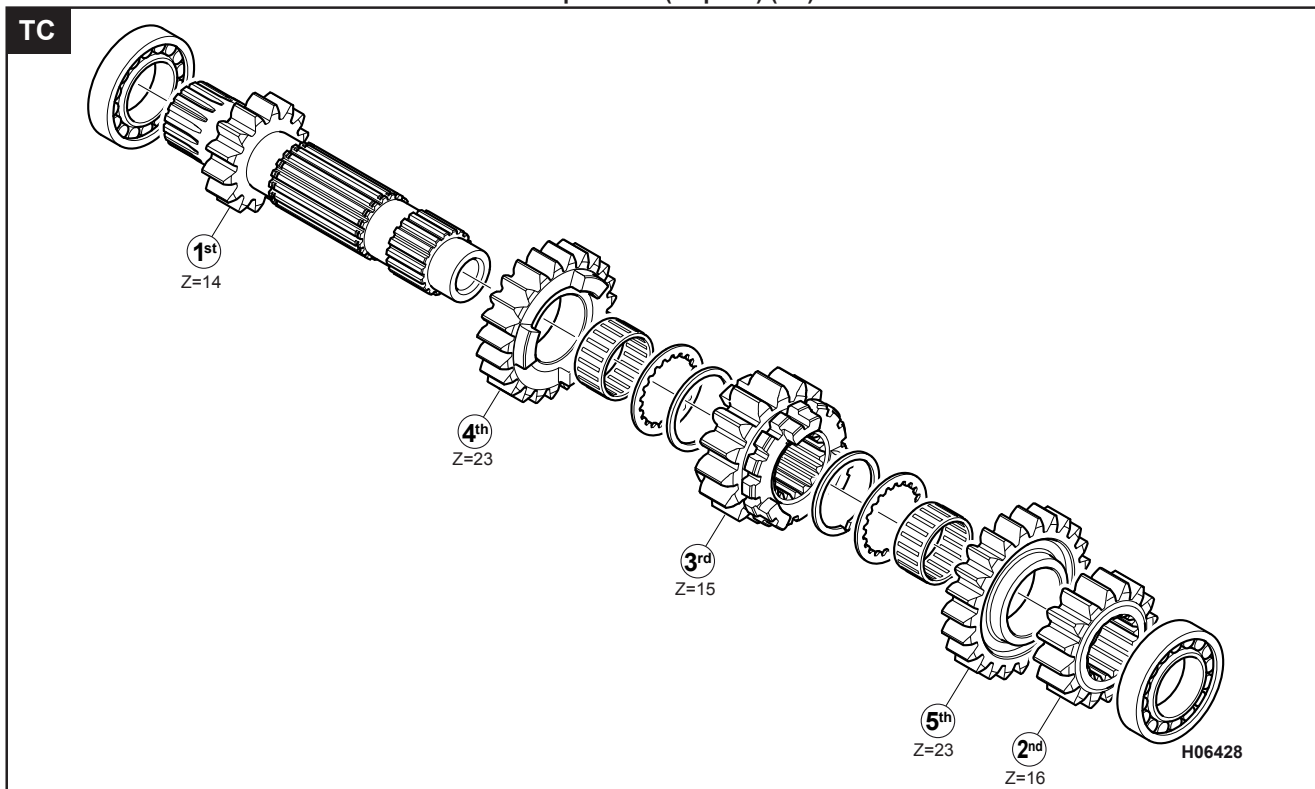
Clear solid lubricant for metal part assembling and settling



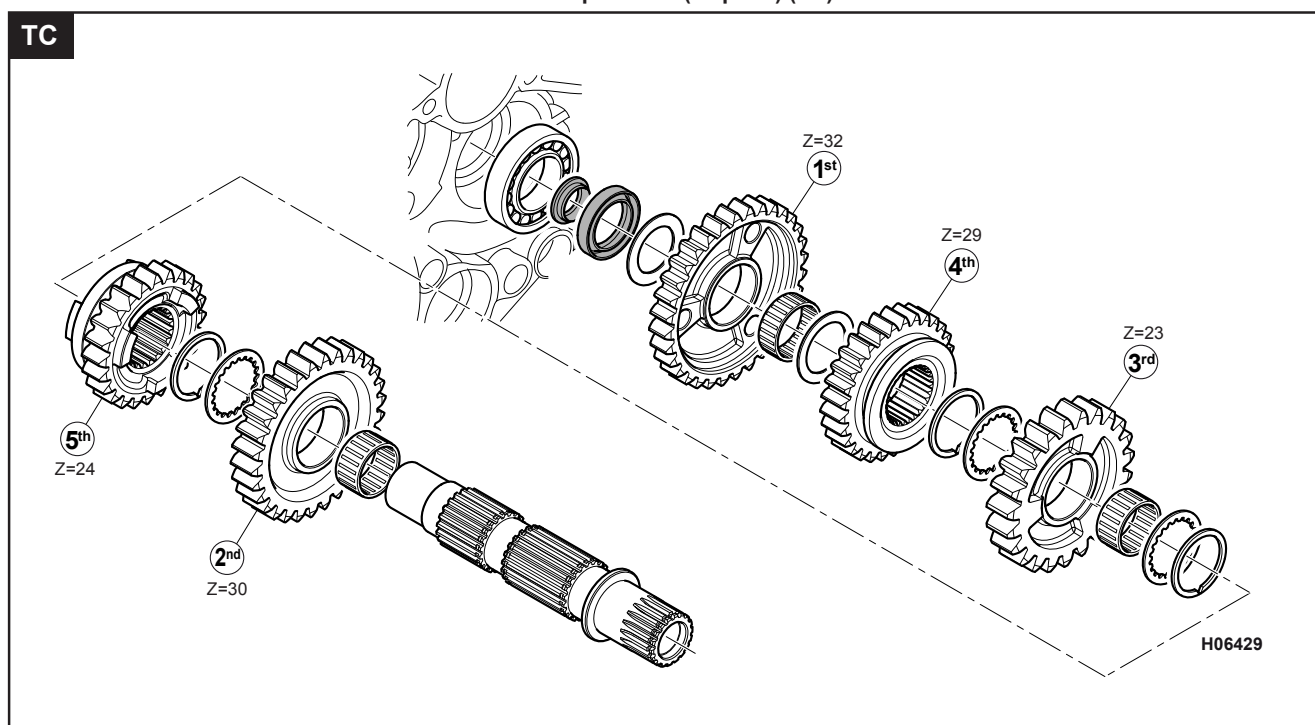
ENGINE DISASSEMBLY/REASSEMBLY
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SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

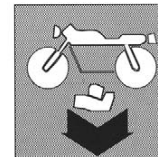


Input shaft (6 speed) (TC)



Output shaft (6 speed) (TC)





Disassembly/Reassembly of the gearbox (6 Speed) (TE-TXC-SMS)



Caution

During operation, gear wheel sets slide one towards the other. If just one coupling gear is replaced, the load bearing capacity on gears may become significantly worse.

Replace gear wheels together with the coupled wheels, only.



Caution

Reinstall the input shaft and output shaft as indicated in the figure, paying attention not to damage the roller cages, the washers and snap rings.

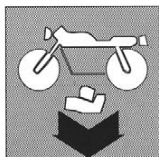
- Upon reassembly, always use new snap rings.
- Lubricate bearing, shaft and gears.



Consumables

Molykote D Paste

Clear solid lubricant for metal part assembling and settling

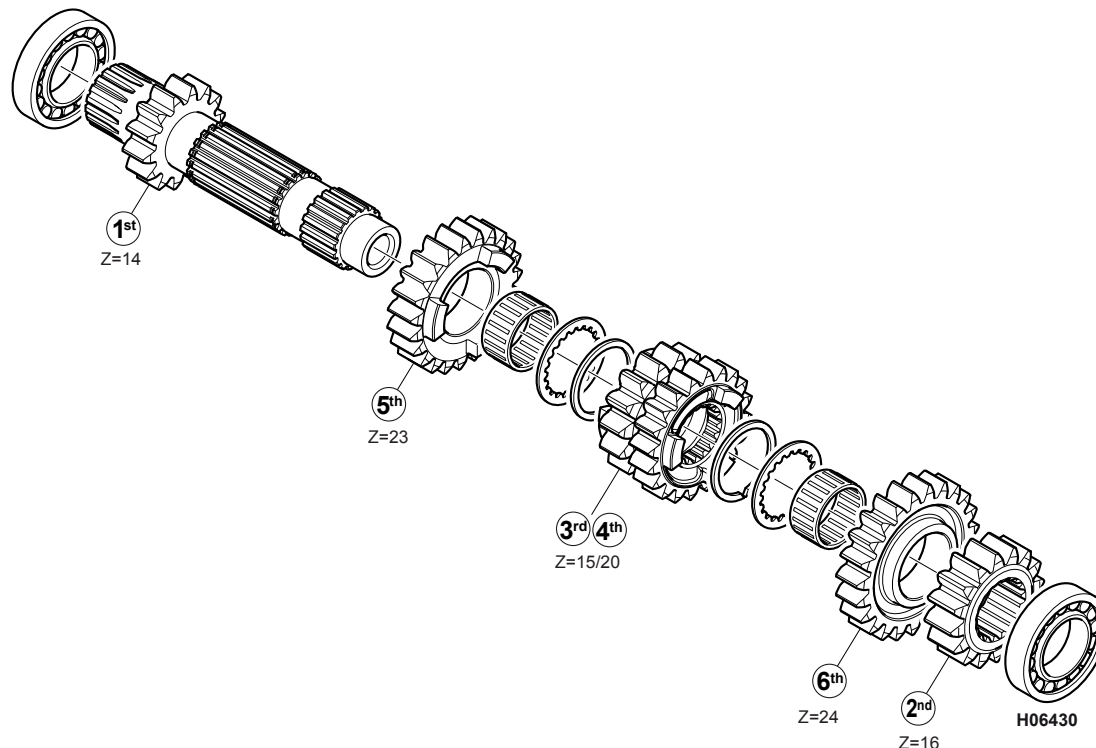


ENGINE DISASSEMBLY/REASSEMBLY
TC 449 2011/2012 I.E.
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TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



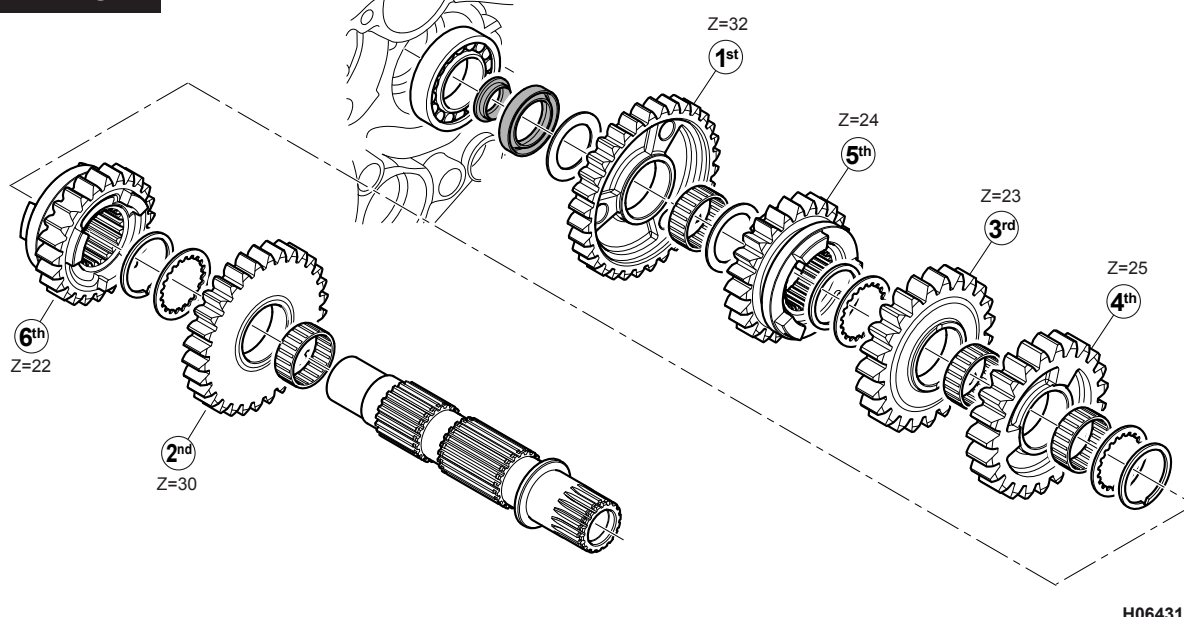
Input shaft (6 speed) (TE-TXC-SMS)

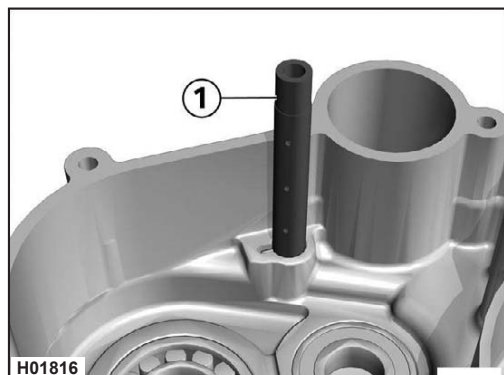
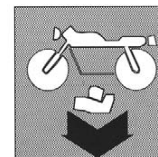
TE - TXC - SMR



Output shaft (6 speed) (TE-TXC-SMS)

TE - TXC - SMR



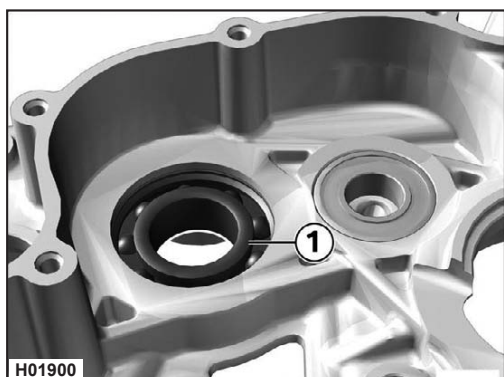


Gearbox oil pipe disassembly

- Remove oil pipe (1)

Gearbox oil pipe assembly

- Fit oil pipe (1)



Gearbox input shaft right bearing disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
 Evenly heat casing, making sure not to exceed the recommended value.

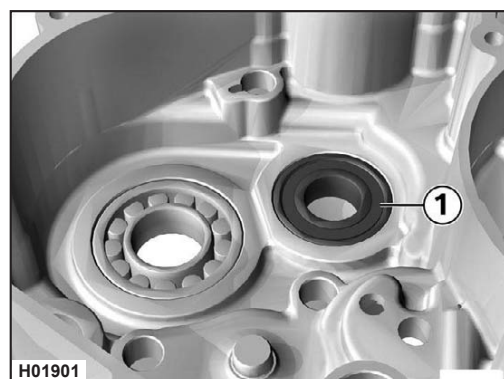
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (1).



Gearbox input shaft left bearing disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
 Evenly heat casing, making sure not to exceed the recommended value.

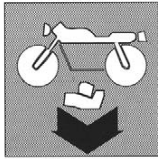
- Heat crankcase.



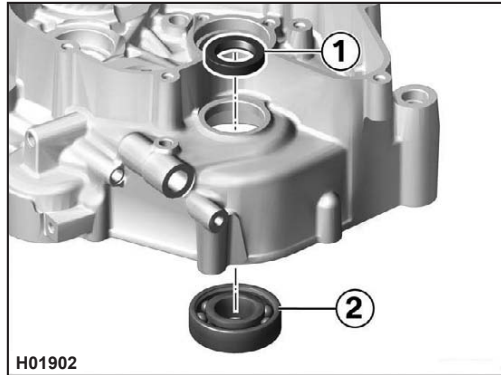
Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (1).



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Gearbox output shaft right bearing disassembly

- Remove oil seal (1).



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

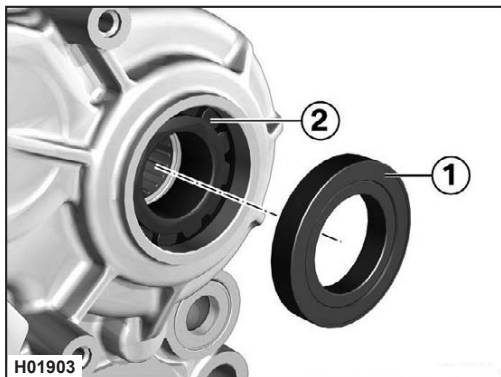
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (2).



Gearbox output shaft left bearing disassembly

- Remove oil seal (1).



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

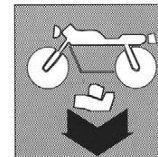
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (2).



Gearbox shaft right bearing disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

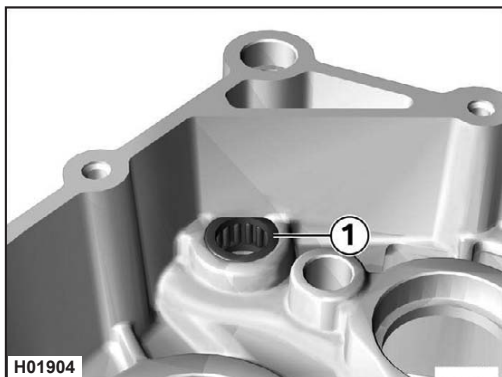
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (1).



Gearbox shaft left bearing disassembly

- Remove oil seal (1).



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

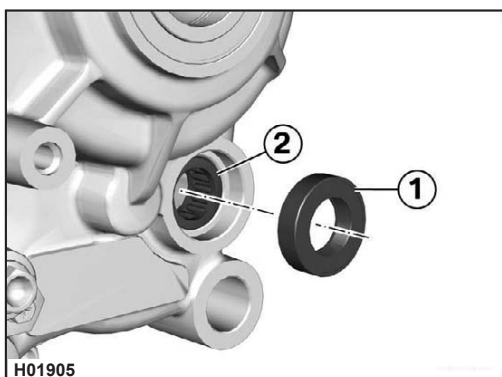
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Remove bearing (2).



Gearbox input shaft idler gear bearing disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

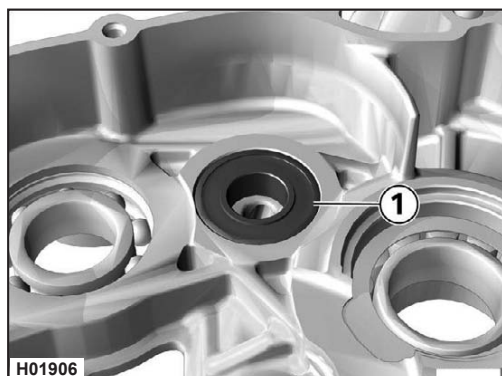
- Heat crankcase.

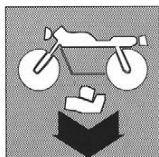


Technical specifications

Release/connection temperature		180 °C	
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- Remove bearing (1).





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Gearbox input shaft idler gear bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

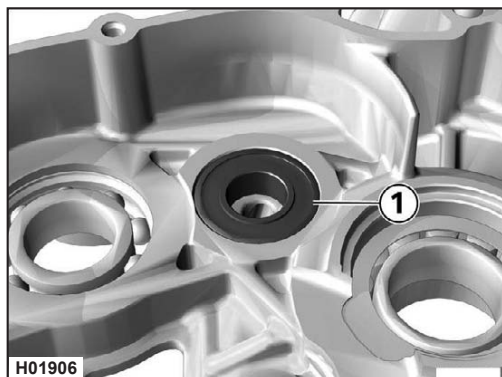
- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit bearing (1) using a suitable tool.



Gearbox shaft left bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

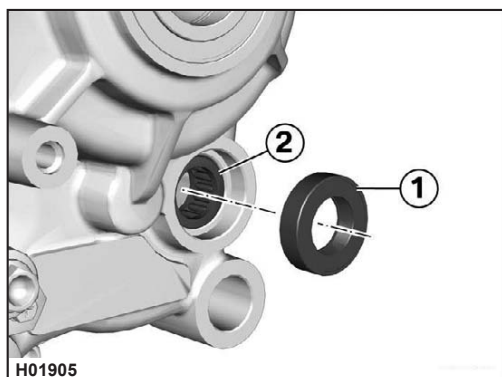
- Heat crankcase.

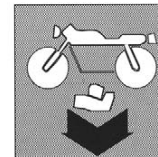


Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit bearing (2) using a suitable tool.
- Fit oil seal (1) using a suitable tool.





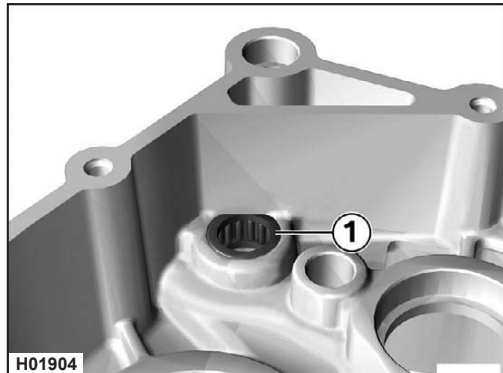
Gearbox shaft right bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit bearing (1) using a suitable tool.

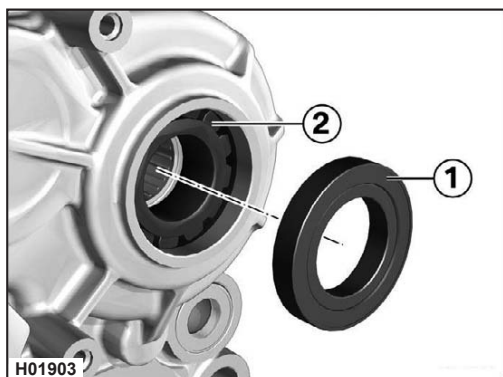
Gearbox output shaft left bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat crankcase.



Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit bearing (2) using a suitable tool.
- Fit the new oil seal (1) using a suitable tool.

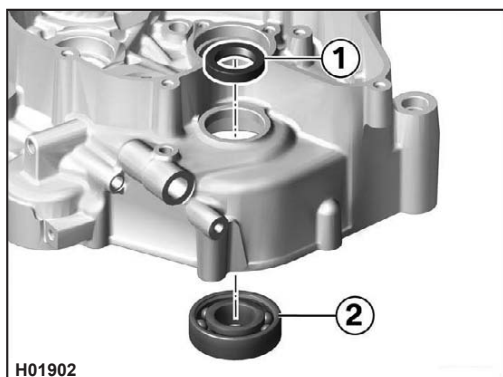
Gearbox output shaft right bearing assembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

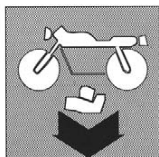
- Heat crankcase.



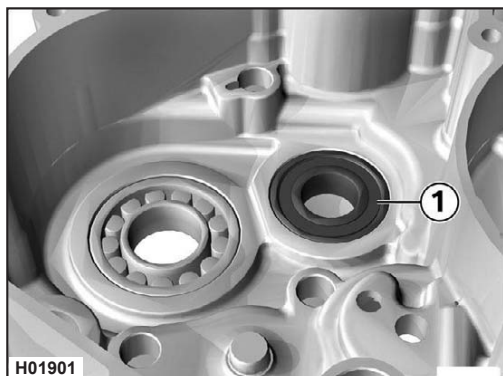
Technical specifications

Release/connection temperature		180 °C	
--------------------------------	--	--------	--

- Fit bearing (2) using a suitable tool.
- Fit oil seal (1) using a suitable tool.



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Gearbox input shaft left bearing assembly



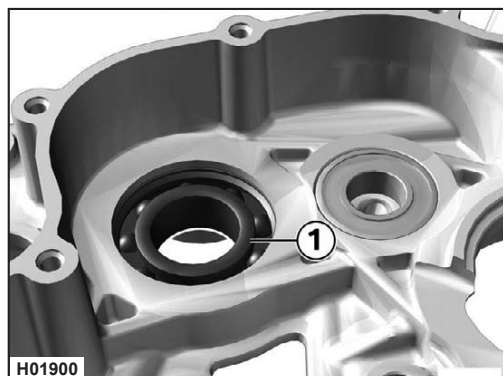
Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat crankcase.

 Technical specifications			
Release/connection temperature		180 °C	

- Fit bearing (1) - open side facing the crankcase - with a suitable tool.



Gearbox input shaft right bearing assembly



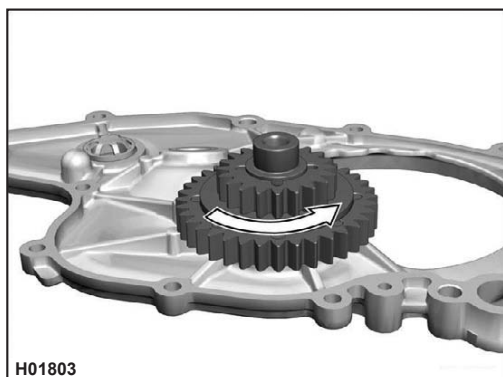
Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat crankcase.

 Technical specifications			
Release/connection temperature		180 °C	

- Fit bearing (1) using a suitable tool.



Clutch check inside primary drive unit

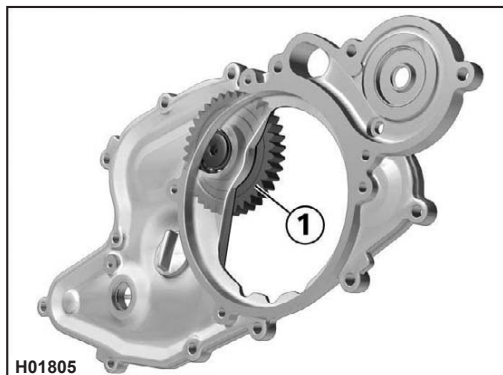
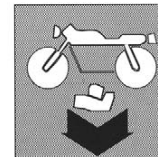
Check

- Check idler gear

Result: Idler gear swings.

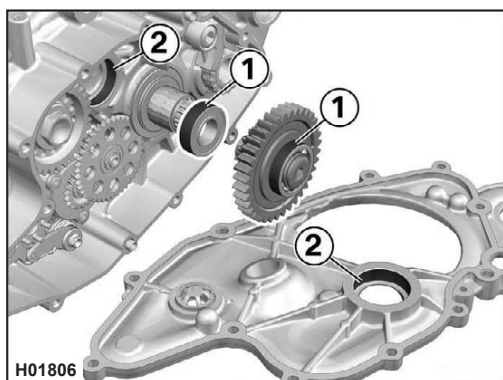
Action:

Replace idler gear (crankcase cover removed)



- Remove idler gear (1) using a suitable tool.

 Technical specifications			
Release/connection temperature		80 °C	



Check

- Check bearing (1).

Result: Bearings do not move properly or they have increased clearance.

Action:

- Replace bearings.

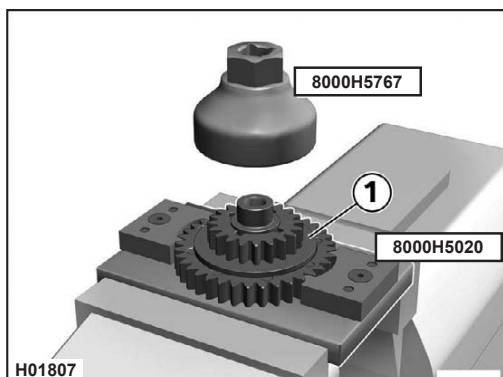
Check

- Check bearing points (2).

Result: Damaged or widened bearing points.

Action:

- Replace crankcase cover.
- Replace crankcase
- Insert idler gear (1) inside locking tool (N. 8000H5020).
- Apply an insert for socket wrench (N. 8000H5767) onto clutch.



Check

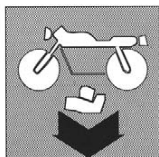
- Check starting torque.

 Technical specifications			
Clutch check torque inside primary drive unit	New	190...250 Nm	
	Wear limit	Min. 140 Nm	

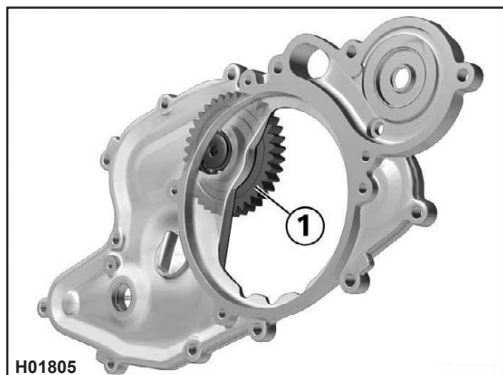
Result: Clutch does not reach nominal value.

Action:

Replace idler gear (crankcase cover removed)



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Idler gear disassembly



Caution

Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat gear (1), and remove it using a suitable tool.



Technical specifications

Release/connection temperature		80 °C	
--------------------------------	--	-------	--

Idler gear assembly



Caution

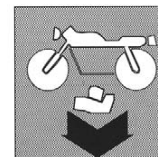
Temperature differences as well as casing overheating may lead to structure changes and to cracks due to internal stresses.
Evenly heat casing, making sure not to exceed the recommended value.

- Heat idler gear (1) and assemble it.

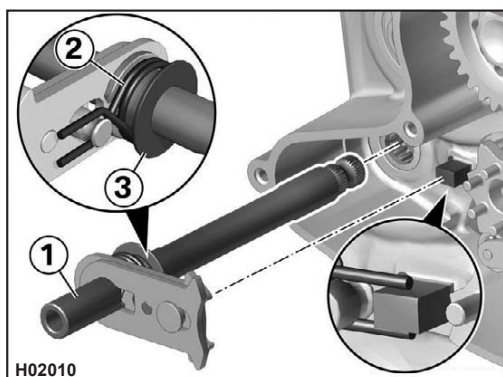
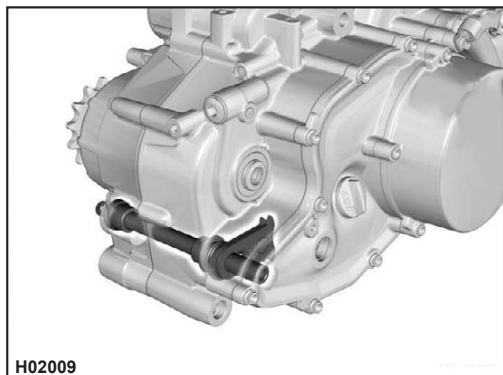


Technical specifications

Release/connection temperature		80 °C	
--------------------------------	--	-------	--

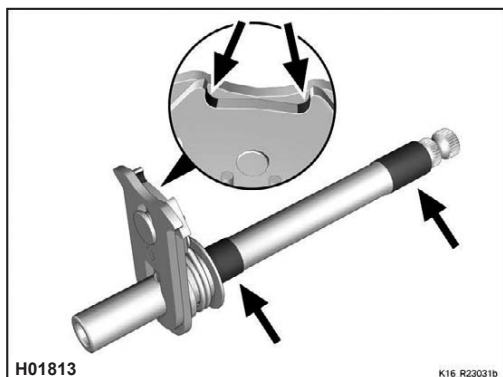


GEARBOX SHAFT REPLACEMENT (CRANKCASE COVER REMOVED)



Complete selector shaft disassembly

- Remove gearbox shaft (1) with spring (2), and washer (3).



Gearbox shaft check

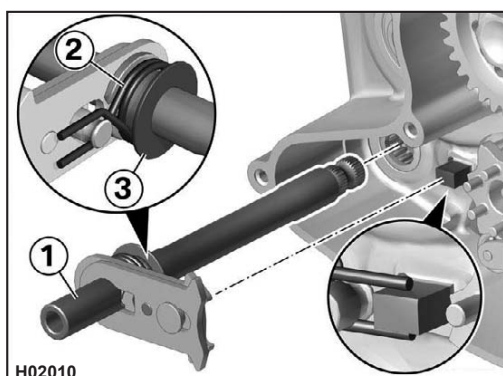
Check

- Check gearbox shaft for damages.

Result: Damaged gearbox shaft.

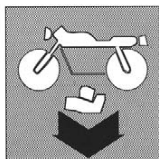
Action:

Replace gearbox shaft (crankcase cover removed)



Gearbox shaft complete assembly

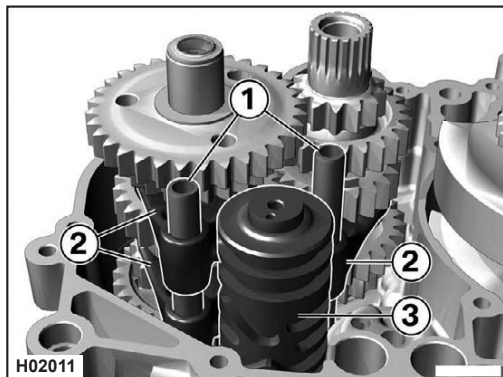
- Fit gearbox shaft (1) with spring (2), and washer (3).
- Take special care to correct spring (2) positioning.



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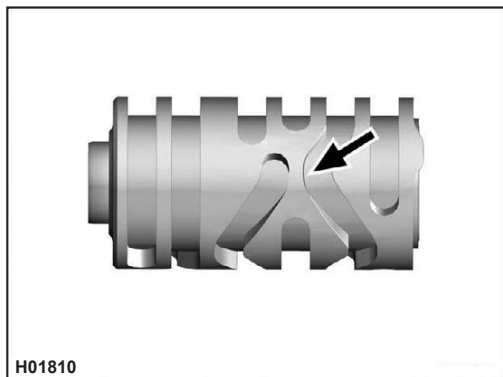


SELECTOR CYLINDER REPLACEMENT



Selector drum disassembly

- Remove gearbox guides (1).
- Turn forks (2) from selector cylinder (3).
- Remove selector drum (3).



Selector drum check

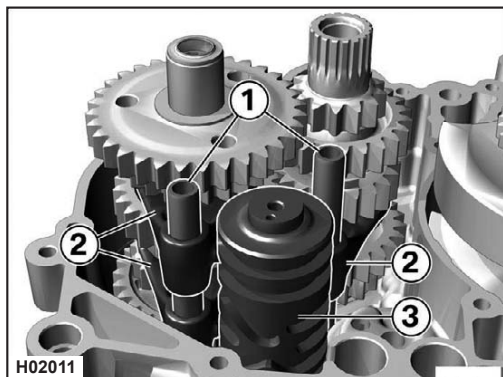
Check

- Check drum grooves for wear, at curved sections in particular (arrow).

Result: Worn grooves.

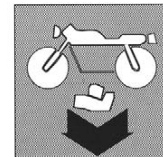
Action:

- Replace selector drum.

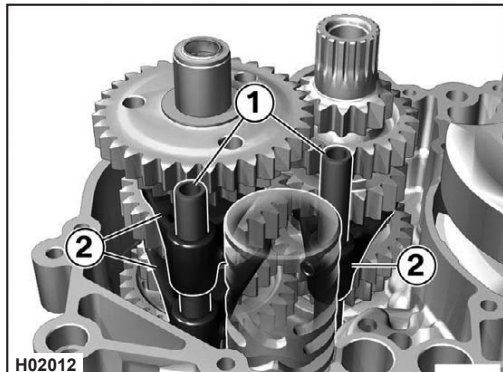


Selector drum assembly

- Fit selector drum (3).
- Turn forks (2) inside selector drum (3).
- Fit gearbox guides (1).

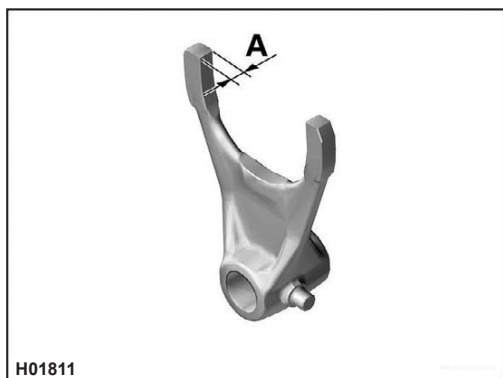


GEAR SELECTOR FORK REPLACEMENT



Gear selector fork disassembly

- Remove gearbox guides (1).
- Remove gear selector forks (2).



Check gear selector forks

Check

- Check forks (A) bearing surfaces for wear.



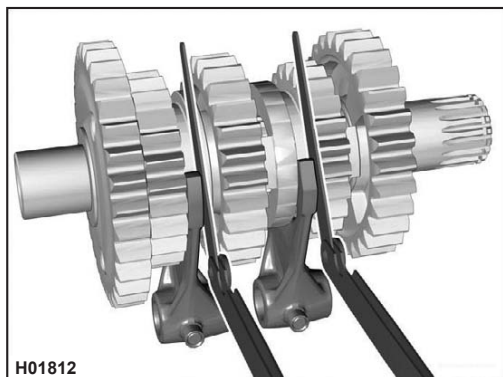
Technical specifications

Gear selector fork rib width on contact surfaces	New	4.9 ^{+0.05} _{-0.05} mm
	Wear limit	Min. 4.6 Nm

Result: Dimension A outside tolerance values.

Action:

- Replace forks.



Check

- Measure clearance between fork and engagement gear using a feeler gauge.



Technical specifications

Gear selector fork axial clearance inside engagement gear groove	Wear limit	Max. 0.5 mm
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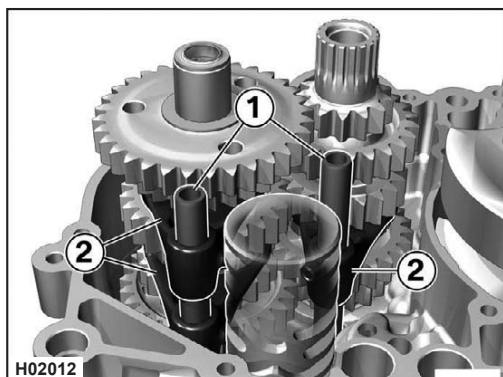
Result: Dimension exceeding max. limit.

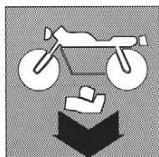
Action:

- Replace engagement gear.

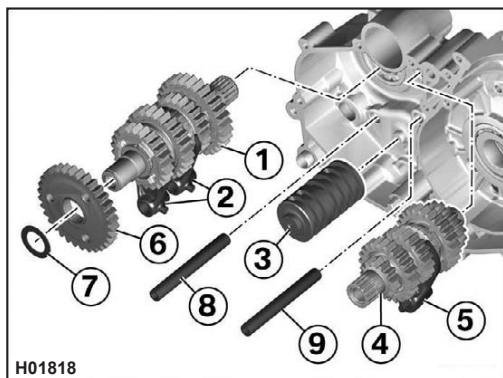
Gear selector forks assembly

- Fit forks (2).
- Fit gearbox guides (1).





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Gearbox assembly

- Lubricate shafts, selector drum and forks.



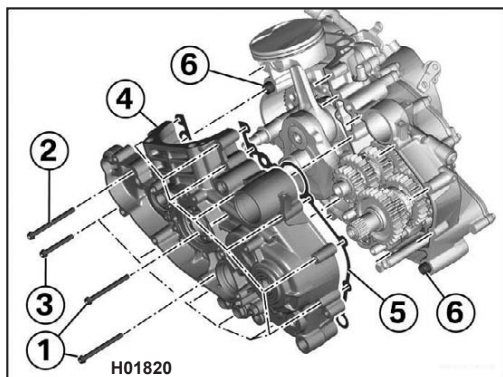
Consumables

Molykote D Paste	Clear solid lubricant for metal parts assembling and settling	
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- Assemble the following parts:
 - Gearbox output shaft (1) with forks (2)
 - Selector drum (3)
 - Gearbox control shaft (4) with fork (5)
 - 32-tooth 1st gear (6)
 - Space washer (7)
 - Gearbox output shaft guide (8)
 - Gearbox input shaft guide (9)

Crankcase left half assembly

- Clean sealing surfaces, and apply a new gasket (5).
- Fit guide sleeves (6).
- Fit crankcase left half (4).
- Fit screws (1, 2, 3), but do not tighten them.
- Fit screws (1).



Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 70	11 Nm	
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- Fit screw (2).



Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 75	11 Nm	
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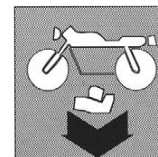
- Fit screws (3) working crossways.



Tightening torque figures

Engine and crankcase fairing, screw connections

M6 x 50	11 Nm	
---------	-------	--



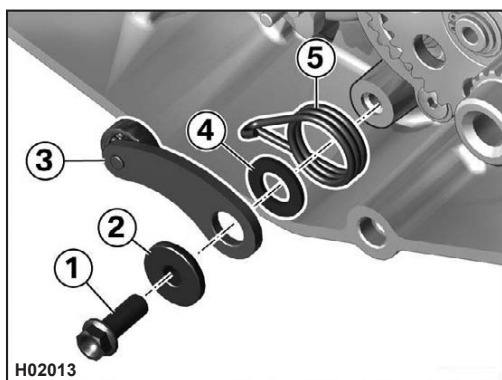
STOP LEVER REPLACEMENT

Preliminary operations

Clutch cover disassembly
 Removing clutch pressure plate
 Removing clutch plates
 Clutch hub disassembly
 Clutch housing disassembly
 Coolant pump cover disassembly
 Coolant pump rotor disassembly
 Engine right crankcase cover disassembly

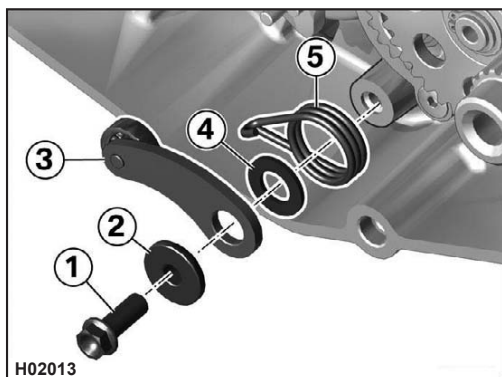
Gear selector lock disassembly

- Disassemble the following parts:
 - screw (1)
 - Bushing (2)
 - Stop element (3)
 - Washer (4)
 - Spring (5)



Gear selector lock assembly

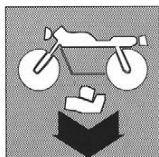
- Assemble the following parts:
 - Spring (5)
 - Washer (4)
 - Stop element (3)
 - Bushing (2)
- Fit new screw (1).



Tightening torque figures

Stop lever on crankcase lower side

M6 x 16 Microincapsulated screw replacement	11 Nm
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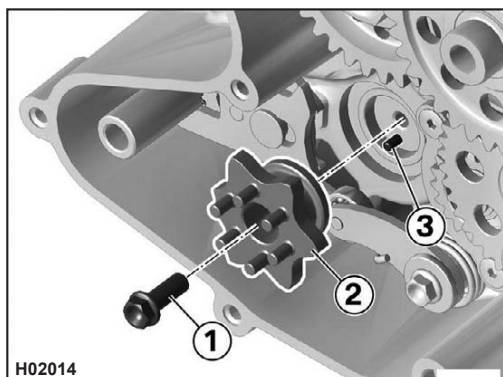
GEAR SELECTOR LOCK REPLACEMENT

Preliminary operations

- Clutch cover disassembly
- Removing clutch pressure plate
- Removing clutch plates
- Clutch hub disassembly
- Clutch housing disassembly
- Coolant pump cover disassembly
- Coolant pump rotor disassembly
- Engine right crankcase cover disassembly

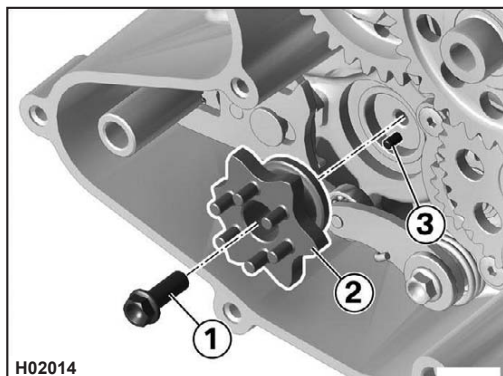
Gear selector disassembly

- Remove gear selector lock, and secure it using a suitable auxiliary tool.
- Remove screw (1).
- Remove gear selector (2) with reference pin (3).
- Remove gear selector lock retainer.



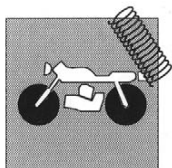
Gear selector assembly

- Remove gear selector lock, and secure it using a suitable auxiliary tool.
- Fit gear selector (2) with reference pin (3).
- Fit screw (1).



Tightening torque figures		
Gear selector on selector drum		
M6 x 16, Microincapsulated screw replacement	11 Nm	

- Remove gear selector lock retainer.

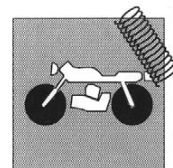


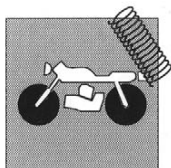
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Section



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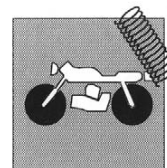


Front fork removal

Measure height "A" (it will need to be restored to original value on assembly). Set a block under the engine and see that the front wheel is lifted from the ground and then proceed as follows:



- remove the screws (1) and the brake line clamp on the left-hand side;

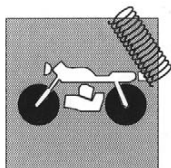


- remove the six screws (2) and the fork leg guards;
- remove the brake calliper from the L.H. fork leg loosening the two retaining screws (3);
- remove the front wheel as described in Section "Y";



- loosen the bolts (4) that secure the fork legs to steering head and bottom yoke;
- remove the fork legs.

Refit fork legs and front wheel as described in Section "Y".



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TXC 449 - 511 2011/2012 I.E.
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Front suspension

Service instructions for Ø48USD Kayaba fork

GENERAL

The fork uses a multi-valve damping system with rebound and compression adjustment and spring preload adjustment for static load.

Compression damping is controlled by a special valve located at the top of each fork leg. Rebound damping is controlled by a sealed cartridge located inside each inner tube.

Each fork leg has outer adjusters for compression and rebound damping.

Both fork legs have bleed valves to bleed air from the outer tube and drain screws to drain cartridge oil.

INNER TUBES: Special high-strength steel, chrome-plated and TIN-coated.

OUTER TUBES: CNC-machined aluminium alloy, anodised and polished inside.

SLIDING BUSHES: Teflon®-coated, stiction-free.

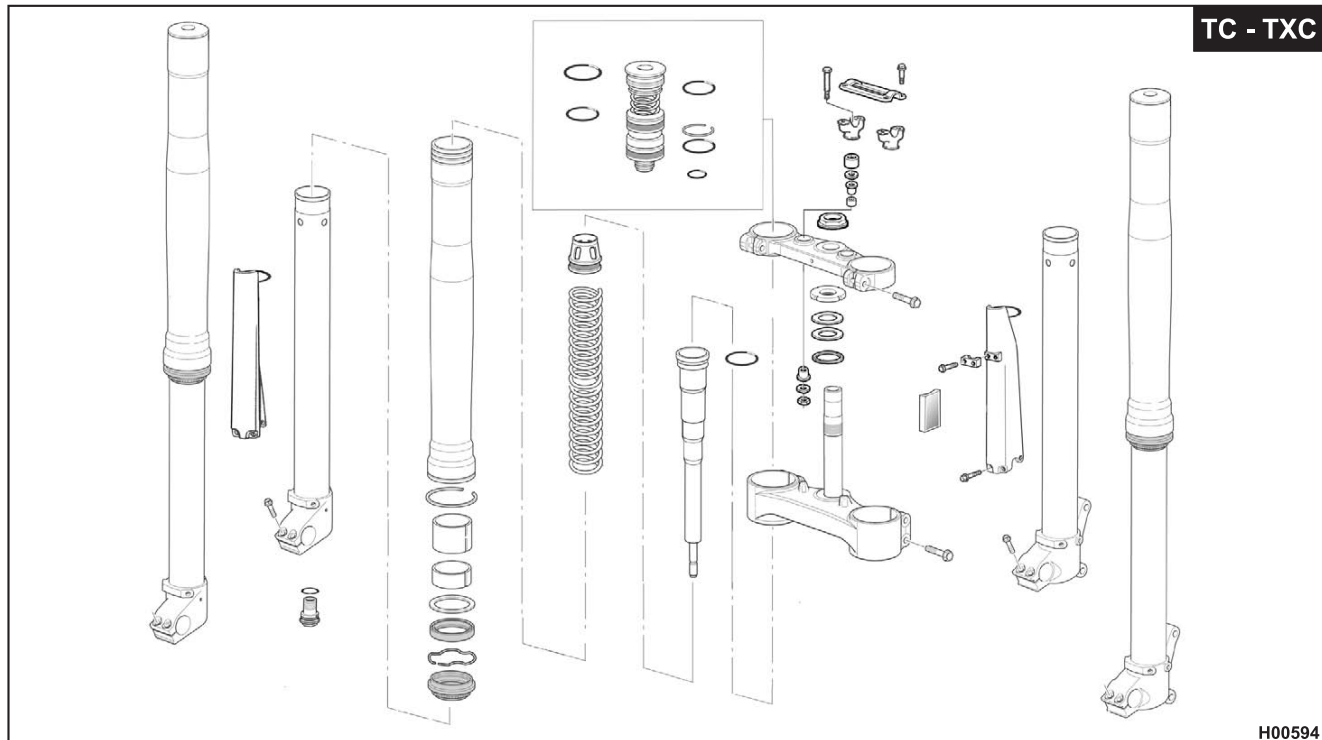
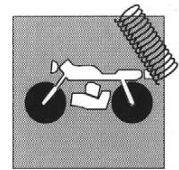
SEALS: Computer-designed sealing rings ensure maximum sealing on compression and minimal friction on rebound.

SPRINGS: Steel springs, different spring rates (K) available. (See Table for more detailed information).

OIL: Special KAYABA formulation prevents foaming and retains same viscosity under any operating conditions; stiction-free. Use SAE 5 oil for extremely cold weather.

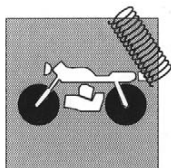
SPRING TABLE

Fork static load is determined by the spring contained in each upper leg: suspension response may be changed by changing the spring or the tube spacer that determines its preload, with no need to alter fork settings.

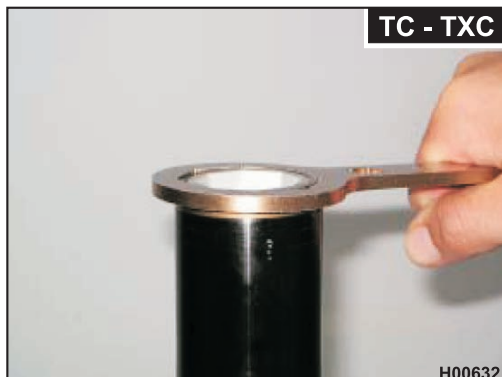


Front suspension (TC - TXC)

Front suspension is handled by a KAYABA upside-down telescopic hydraulic fork with advanced axle and 48 mm legs. Wheel travel is 300 mm.



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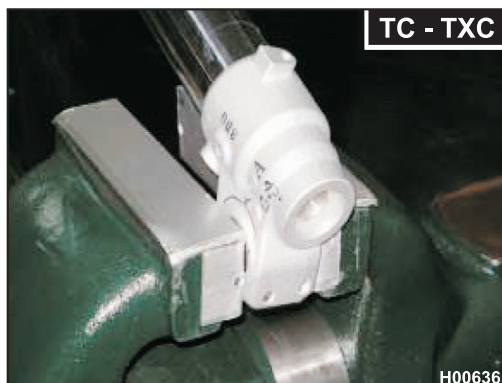


Front fork disassembly (TC - TXC)

Loosen the cap nut at the top of each outer tube.
 (Note: it is good practice to moderately slacken the cap nuts before removing the fork legs from the motorcycle).



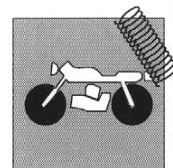
Drain oil from the damper unit.



Clamp the wheel axle carrier in a vice and loosen the adjuster screw.



Push down the inner tube.
 Slip the tool shown in the figure between wheel axle carrier and cartridge nut.
 Hold the nut with a wrench and remove the adjuster screw.
 Be careful not to hurt your fingers.



TC - TXC

Take the cartridge out of the outer tube.



TC - TXC

Do not remove the nut at the bottom end of the cartridge.



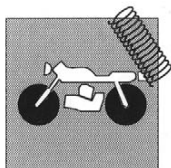
TC - TXC

Remove the bottom valve assembly from the cartridge.
 Hold the cartridge octagonal nut with the suitable tool to prevent rotation.
 Use a similar tool in the octagonal recess of the bottom valve assembly.
 Use a key to slacken the bottom valve assembly.



TC - TXC

Check the O-rings on the bottom valve assembly for damage.
 Replace as required.



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TC - TXC

If outer tube and inner tube are still assembled together, place the fork leg upside down and allow at least 20 minutes for oil to drain.



TC - TXC

Remove the dust seal using a flat head screwdriver.



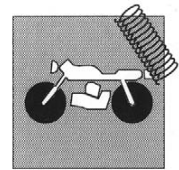
TC - TXC

Remove the retaining ring using a flat head screwdriver.



TC - TXC

Pull the inner tube until separating it from the outer tube.
 Note: to facilitate removal, quickly (but carefully) pump the tubes back and forth until separating them.



TC - TXC

Remove the sealing rings and the metal rings mounted on the inner tube.
 Do not reuse any metal parts after removal.
 Replace them with new components.
 Replace damaged sealing rings.
 Washer and retaining ring may be reused if they are not damaged.



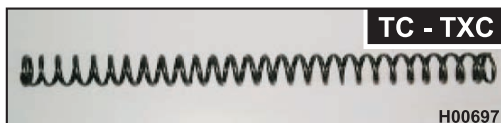
TC - TXC

Check the rebound adjuster rod for distortion or damage.
 Replace as required.



TC - TXC

Check the rebound adjuster.
 Replace damaged O-rings.
 Replace the complete assembly (do not reuse it).



TC - TXC

Check the spring.
 Replace it if:
 outside diameter is damaged or exceedingly worn.
 Free length is 449 mm (17.7 in.) or less.



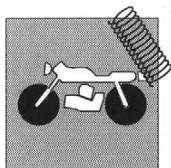
TC - TXC

Check the inner tube.
 Replace if distorted.
 (Never attempt to repair or reuse a distorted fork tube).
 If the tube shows surface defects, sand the surface.
 If repair is not possible, replace the tube.
 (Never reuse an inner tube if scored or showing bulges on the outer surface).

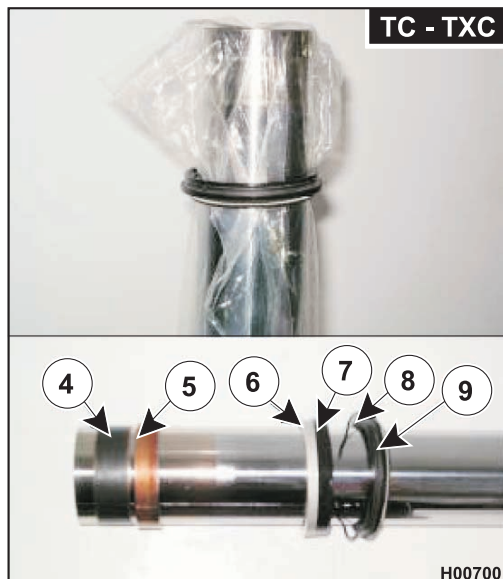


TC - TXC

Check the outer tube.
 Replace the tube if any distortion is detected or if the sliding surface is damaged.



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Mount sealing rings and metal parts on the inner tube.
 See the figure below for the installation sequence.

Note 1: Grease the edge of the sealing ring.

Note 2: Before sliding the sealing ring over the inner tube, cover tube edge with plastic as shown in the figure.

This will avoid damage to the oil seal lip.



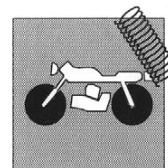
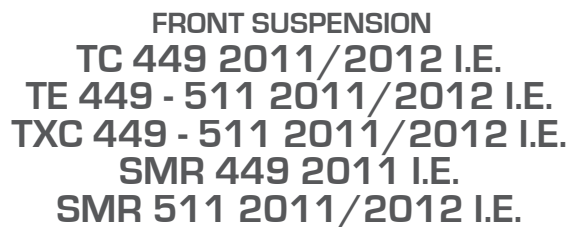
Fit metal bushing and washer to outer tube using an appropriate installer.
 Fit the oil seal to the outer tube and push it home using an appropriate installer.

Make sure that the retaining ring groove inside the outer tube is fully visible.



Install the retaining ring.

Make sure that the retaining ring is fully seated in the groove inside the outer tube.



Fit the dust seal to the outer tube.
Make sure that there is not play between dust seal and outer tube.



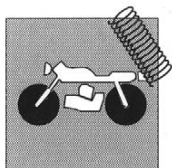
Refit the cartridge.
Tighten the nut all the way onto the rebound adjuster rod.
Make sure rebound adjuster rod thread length is at least 15 mm (0.6 in.).



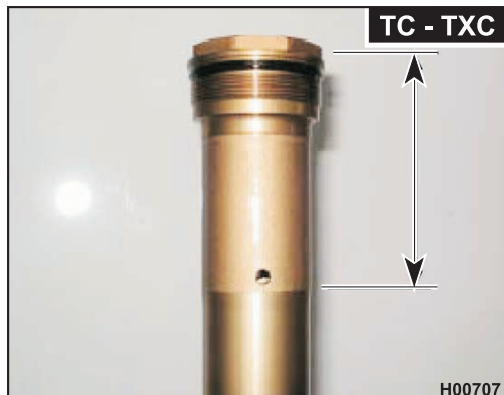
Fill the cartridge with the specified oil.



Pump the piston rod up and down repeatedly to remove any air from the cylinder.



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Pull the piston rod until fully extended.
 Check oil level. It should be about 145 mm (5.7 in.).



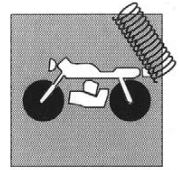
Push the piston rod all the way down and install the bottom valve assembly.
 With the bottom valve assembly installed, check that the piston rod is fully extended.



Hold the cartridge octagonal nut to prevent rotation.
 Use a similar tool in the octagonal recess of the bottom valve assembly.
 Tighten the bottom valve assembly to 29 Nm (21.4 ft/lb) using a wrench.



Hold the cartridge with the piston rod end pointing downwards as shown in the figure.
 Pump the piston rod up and down a dozen times to help oil reach all points of the unit.



Drain excess oil from the cartridge pushing the damper unit all the way home. Be careful not to distort or damage the piston rod or any other parts. Please note that excess oil may flow out from the hole located before the reservoir.

If you see no oil flowing out, it means that there isn't enough oil in the cartridge.

Add oil to the cartridge before refitting it.



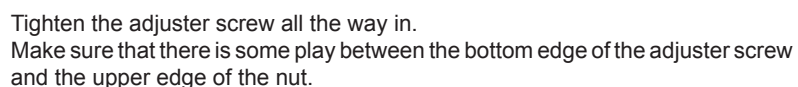
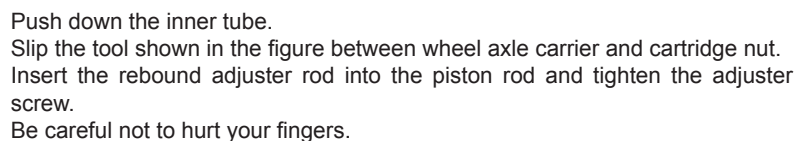
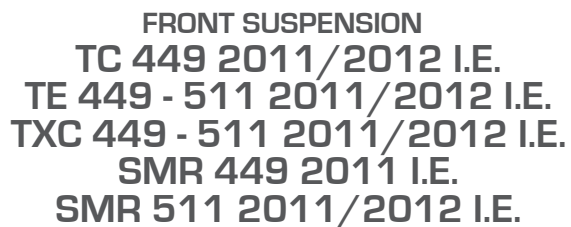
Drain excess oil from the reservoir.

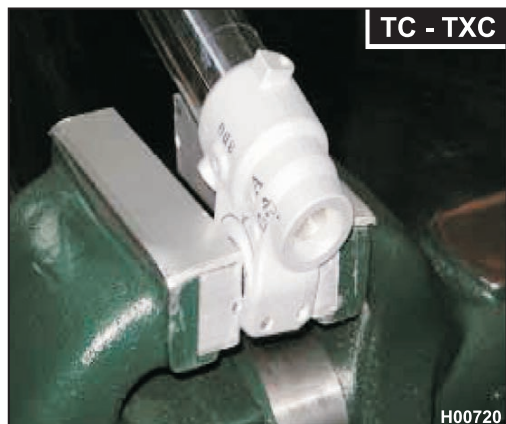
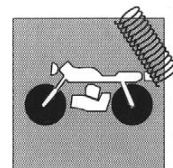


Clean off any excess oil from the cartridge.
Install spring guide and spring on the cartridge.



Insert the cartridge into the inner tube.





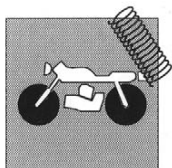
Clamp the wheel axle carrier in a vice and tighten the adjuster screw onto the carrier to 55 Nm (40.5 ft/lb).



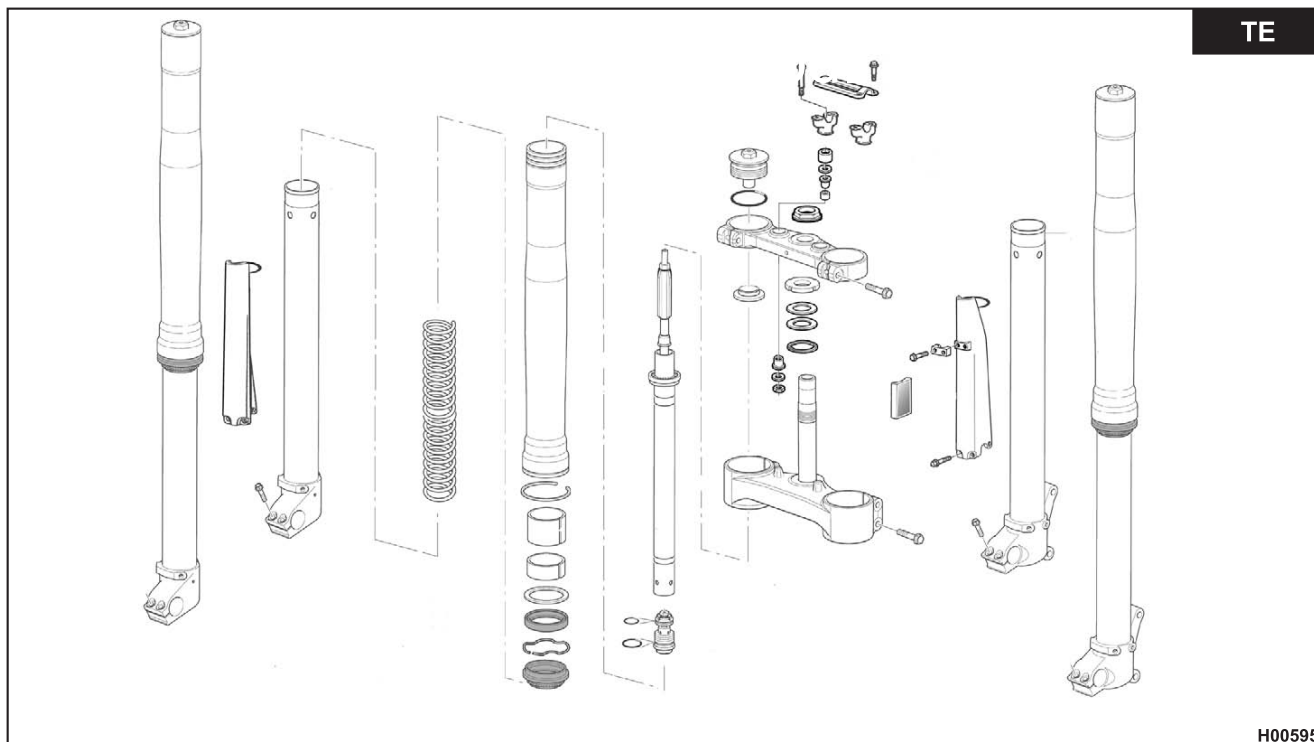
Fill the outer tube with the specified quantity of oil.



Tighten the cylinder onto the outer tube to 29 Nm (21.4 ft/lb).

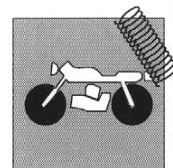


FRONT SUSPENSION
TC 449 2011/2012 I.E.
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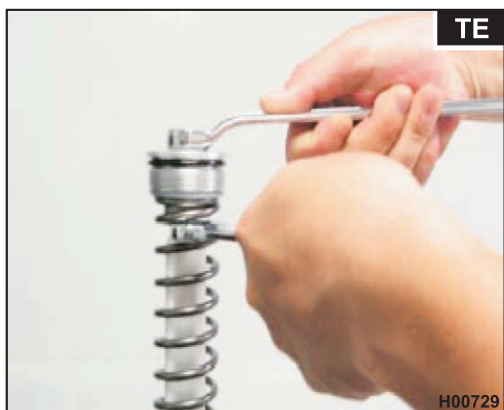
Front suspension (TE)

Front suspension is handled by a KAYABA upside-down telescopic hydraulic fork with advanced axle and 48 mm legs. Wheel travel is 300 mm.



Front fork disassembly (TE)

Loosen the cap nut at the top of each outer tube.
 (Note: it is good practice to moderately slacken the cap nuts before removing the fork legs from the motorcycle).



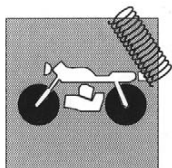
Loosen the fork cap nut and the nut with a wrench.



Remove top cap nut, spring retainer, spring and rebound adjuster rod.



Drain the oil.
 Pump the piston rod up and down to drain oil from the cylinder.



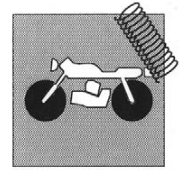
FRONT SUSPENSION
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Remove nut, spring guide, O-ring and collar bushing.



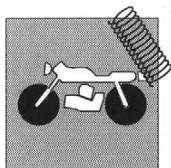
Hold the cartridge top end steady.
Loosen and remove the bottom valve assembly.



Take the cartridge out of the outer tube.



Remove the dust seal using a flat head screwdriver.



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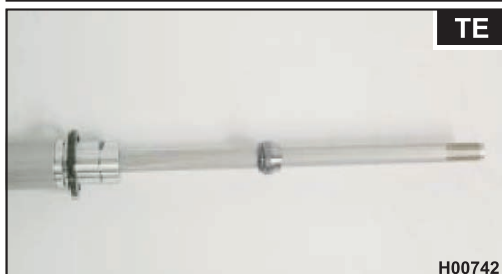
Remove the retaining ring using a flat head screwdriver.



Pull the inner tube until separating it from the outer tube.
Note: to facilitate removal, quickly (but carefully) pump the tubes back and forth until separating them.



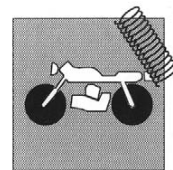
Remove the sealing rings and the metal rings mounted on the inner tube.
Do not reuse any metal parts after removal.
Replace them with new components.
Replace damaged sealing rings.
Washer and retaining ring may be reused if they are not damaged.



Check the rebound adjuster rod for distortion or damage.
Replace as required.



Loosen and remove the bottom valve assembly.
Replace damaged O-rings.
Replace the complete assembly (do not reuse it).



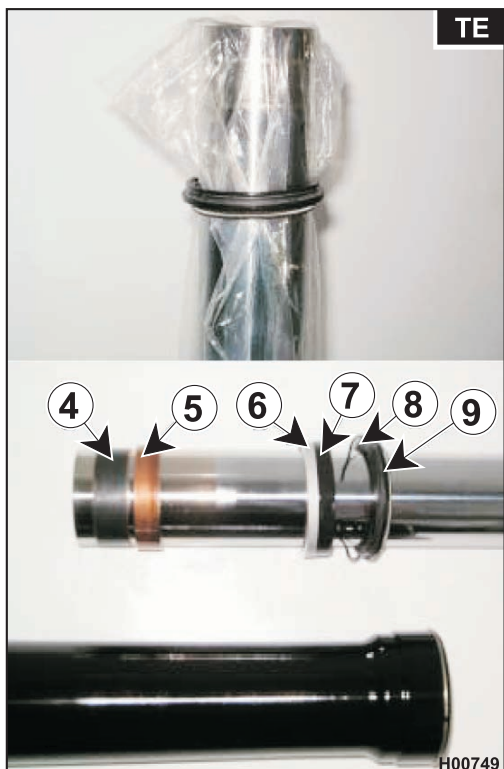
Check the spring.
 Replace it if:
 outside diameter is damaged or exceedingly worn.
 Free length is 457 mm (18 in.) or less.



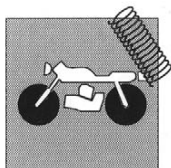
Check the inner tube.
 Replace if distorted.
 (Never attempt to repair or reuse a distorted fork tube).
 If the tube shows surface defects, sand the surface.
 If repair is not possible, replace the tube.
 (Never reuse an inner tube if scored or showing bulges on the outer surface).



Check the outer tube.
 Replace the tube if any distortion is detected or if the sliding surface is damaged.



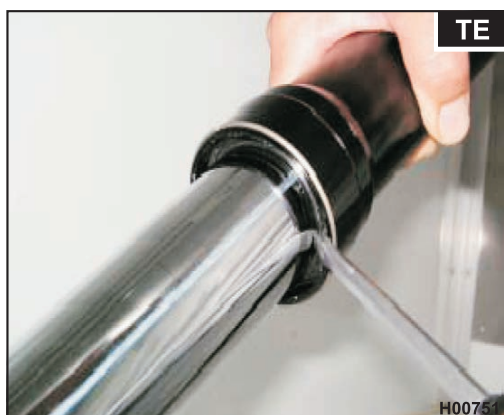
Mount sealing rings and metal parts on the inner tube.
 See the figure below for the installation sequence.
 Note 1: Grease the edge of the sealing ring.
 Note 2: Before sliding the sealing ring over the inner tube, cover tube edge with plastic as shown in the figure.
 This will avoid damage to the oil seal lip.



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TC 449 2011/2012 I.E.
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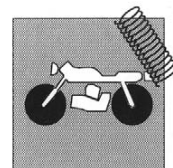
Fit metal bushing and washer to outer tube using an appropriate installer.
Fit the oil seal to the outer tube and push it home using an appropriate installer.
Make sure that the retaining ring groove inside the outer tube is fully visible.



Install the retaining ring.
Make sure that the retaining ring is fully seated in the groove inside the outer tube.



Fit the dust seal to the outer tube.
Make sure that there is not play between dust seal and outer tube.



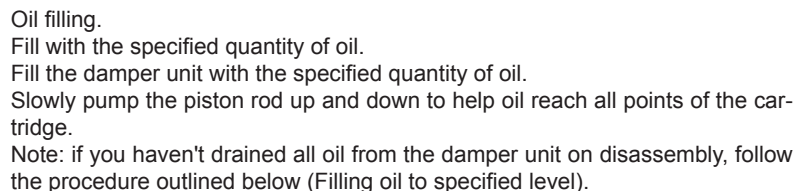
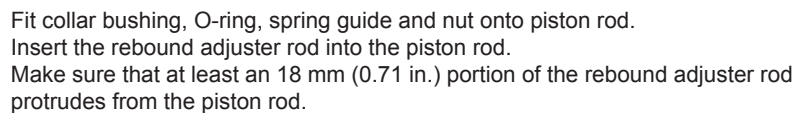
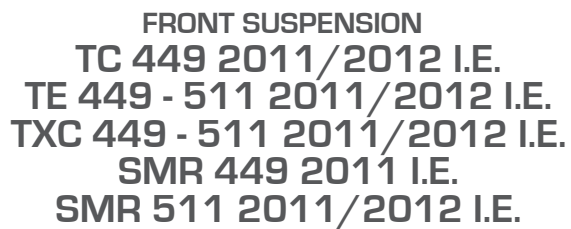
Insert the cartridge into the outer tube.

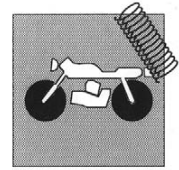
H00754



Hold the cartridge top end into place.
 Tighten the bottom valve assembly to 55 Nm (40.5 ft/lb).

H00755





Filling oil to specific level

Fill the damper unit with oil up to the top edge of the outer tube.

Slowly pump the outer tube up and down to help oil flow equally into both inner and outer tube.

Now slowly pump the piston rod up and down to help oil reach all points of the cartridge.

(Note: add oil if level in the damper unit is too low).

Finally top up to the upper edge of the outer tube.

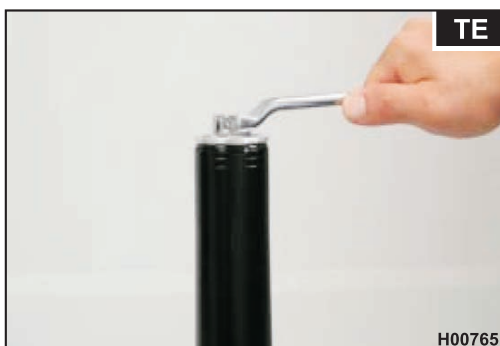
Allow the fork leg to rest until no more air bubbles can be seen, then top up oil to specified level.

Insert the rebound adjuster rod into the piston rod.

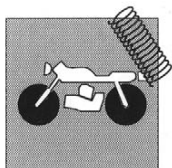
Insert spring and spring guide retainer and tighten the cap nut.



Tighten fork cap nut and nut to 28 Nm (20.6 ft/lb).



Tighten cap nut onto outer tube to 30 Nm (22 ft/lb).



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Instructions for use of ø50USD fork (SMR)

GENERAL

Telehydraulic upside down fork, with advanced axle.

This fork is based on a multivalve damping system and spring for static load. The compression hydraulic damping is made through a special valve located in each fork's leg lower area, whereas the rebound hydraulic damping is made through a cartridge located inside each stanchion. Each fork's leg is provided with external adjusters for the compression and extension adjustment. On both fork's legs upper cap you can find a screw for the slider inner air bleed.

STANCHION TUBES: Made of special, chromed, high- resistance steel, with a special hardening surface treatment (TIN).

SLIDERS: Made of CNC aluminium alloy, anodised and polished inside.

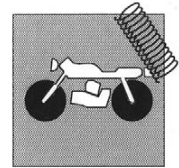
SLIDING BUSHINGS: With Teflon facing, free from static friction.

SEALS: Computer designed seal rings guarantee the best seal under compression and the minimum friction during rebound.

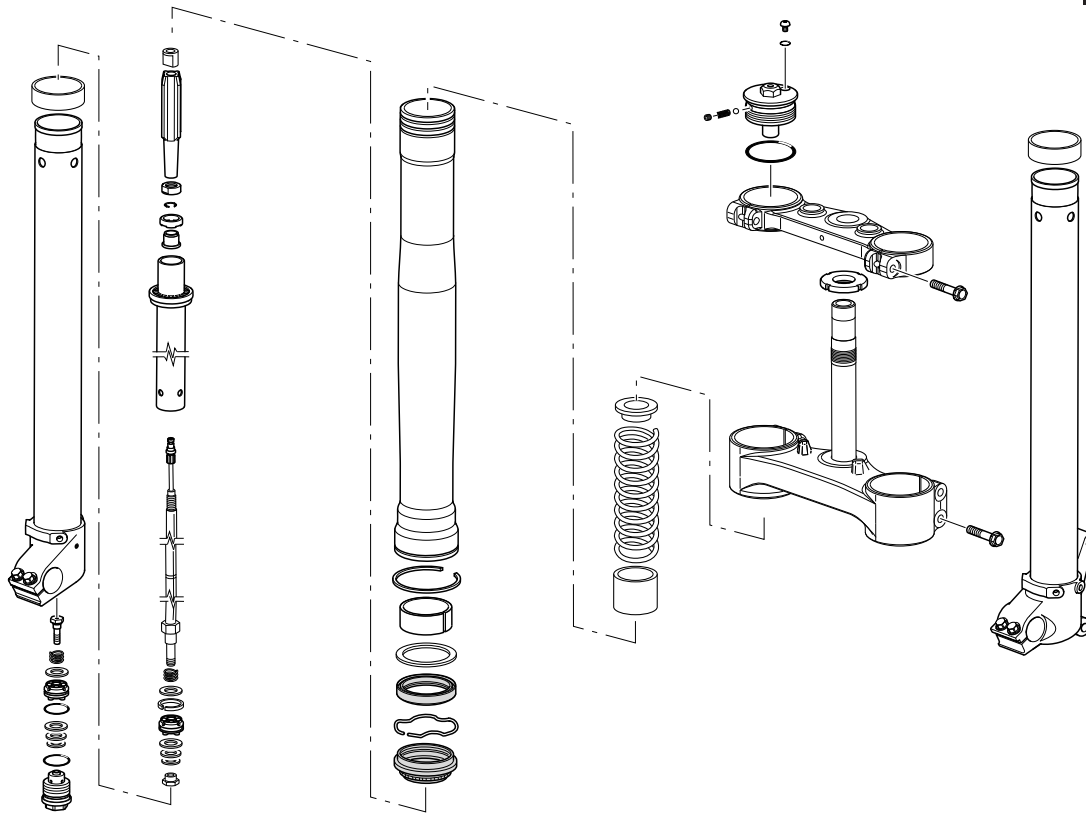
SPRINGS: Made of steel, they are available in different stiffness (K).

SPRING TABLE

The static load of the fork is determined by the spring, positioned at the top of each leg: by changing either spring features or pre-load sleeve length a different suspension behavior is obtained without changing the hydraulic features.

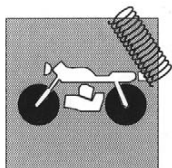


SMR

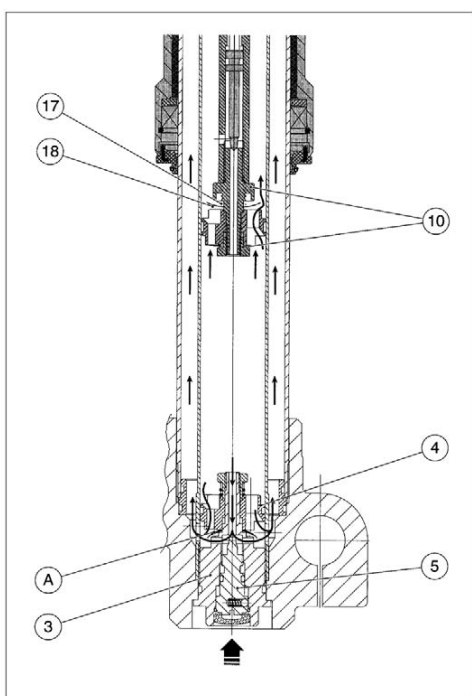
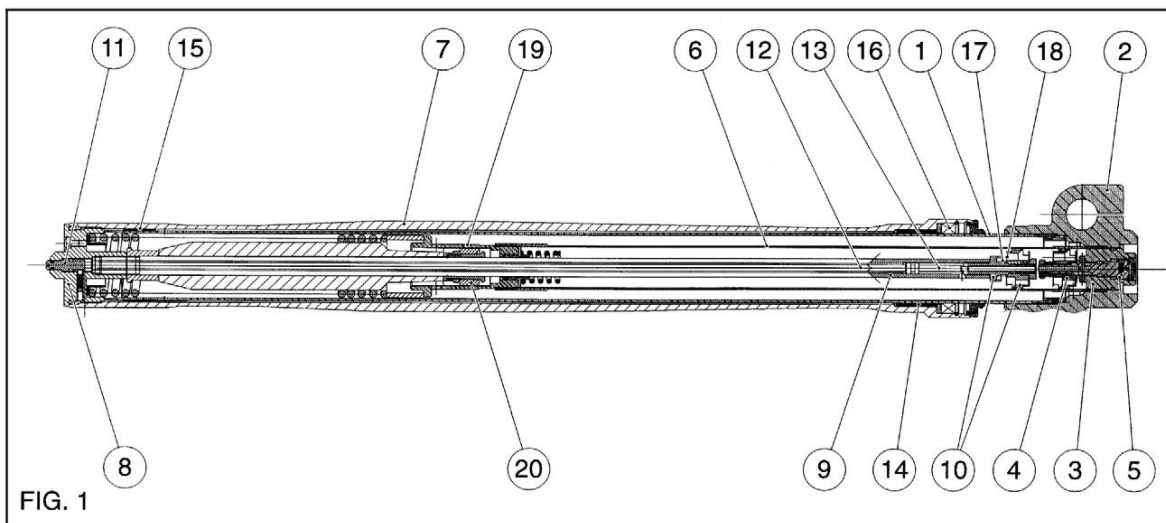


Front suspension (SMR)

Front suspension is handled by a MARZOCCHI "U.S.D." upside-down telescopic hydraulic fork with advanced axle and 50 mm legs. Wheel travel is 258 mm.



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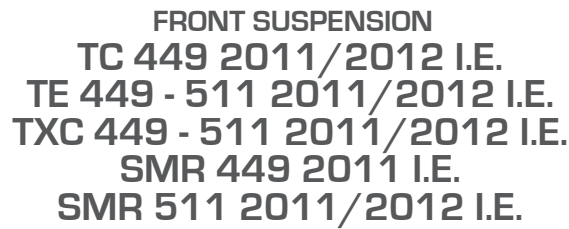


Components of the fork

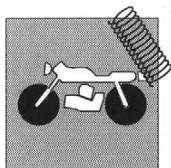
The fork is based on a multivalve damping system that is exactly the same on both fork's legs. Each fork's leg is therefore a complete suspension system which you must refer to when adjusting any part of the fork.

- 5) Stanchi on tube
- 8) Lower sliding bushing
- 9) Spring cup
- 10) Oil seal
- 12) Dust seal
- 13) Outer slider
- 19) Compression adjustment screw
- 21) Spring
- 24) Spring guide
- 25) Pre-load tube
- 28) Foot buffer
- 30) Cartridge body
- 31) Inner rod
- 32) Pumping element rod
- 33) Washers recall spring
- 34) Rebound piston washer
- 36) Pumping element piston
- 37) Rebound damping piston washers stack
- 39) Upper sliding bushing
- 41) Bottom valve
- 43) Compression valve washer
- 45) Bottom valve piston
- 46) Compression damping piston washers' stack
- 48) Cap
- 70) Wheel axle clamp
- 71) Rebound adjustment screw
- 72) Conic pin
- 73) Body cap

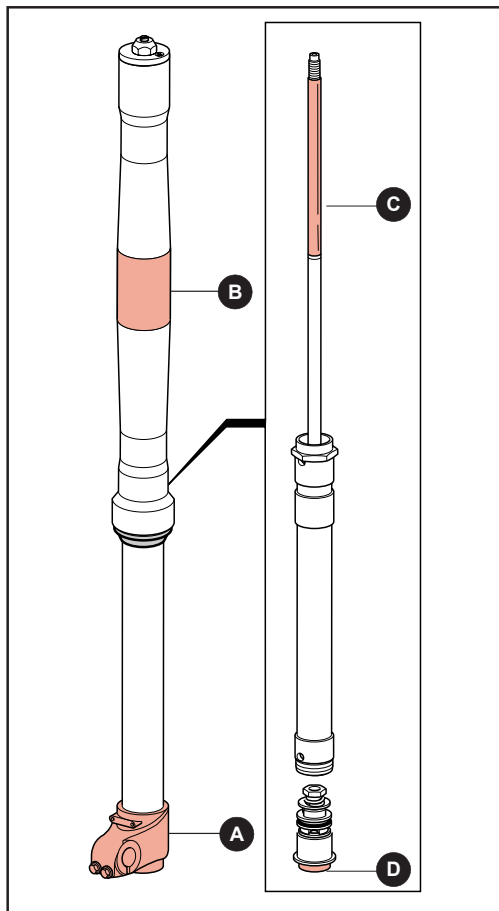
In order to better understand how the fork works, in the figure here beside the moving parts holding the wheel are indicated with different colours (background highlighted) from those that remain fixed to the motorcycle frame (light background).



- After a complete breakdown, always use new, original Marzocchi seals when reassembling.
- To tighten two bolts or nuts that are near each other, always follow the sequence 1- 2- 1 using a torque wrench; respect the indicated tightening torques (see Table 1 - Tightening Torques).
- Never use flammable or corrosive solvents to clean the parts, as these could damage the seals. If necessary use specific detergents that are not corrosive not flammable or have a high flash point, compatible with the seals materials and preferably biodegradable.
- Before reassembling, always lubricate the parts of the fork in contact.
- If you are planning not to use your fork for a long time, always lubricate the forks components that are in contact with some fork's oil.
- Never pour lubricants, solvents or detergents which are not completely biodegradable in the environment; these must be collected and kept in the relevant special containers, then disposed of according to the regulations in force.
- Always grease the seals lips before reassembling.
- Use only metric spanners, not imperial spanners, which may have similar sizes, but can damage the bolts and make it impossible to unscrew them.
- Use the correct size and sort of screwdriver to unscrew slotted or crosshead screws.
- When using a screwdriver to assemble or disassemble metal stop rings, o-rings, sliding bushings or seal segments, avoid scratching or cutting the components with the screwdriver tip.
- Only proceed to maintenance/ overhaul operations if you are sure you are able to do it and you have got the right tools to do so. If this is not the case, or if you are unsure, please contact an authorized service center, where specialized technicians with the right tools and original spare parts will service and overhaul your fork, putting it back into its original working conditions.
- Only use original spare parts.
- Before servicing/ overhauling make sure you have all the spare parts you need for the complete overhaul of both the fork legs (n° 2 oil seals, n° 2 dust seals, n° 2 piston segments).
- Work in a clean, ordered and well- lit place; if possible, avoid servicing outdoors.
- Before servicing the fork, we recommend washing the motorcycle thoroughly and in particular washing the fork well.
- Carefully check there are no metal shavings or dust in the work area.
- We recommend overhauling one fork leg at a time.
- Do not modify the components of the fork.



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Instructions for clamping in the vice

For some maintenance procedures you may have to use the vice to clamp some components of the fork.



The incorrect use of the vice can cause irreparable damage to the fork.

Scrupulously follow the instructions below:

- Limit the use of the vice to those operations where the use of the same is absolutely necessary;
- Use a vice with padded jaws;
- Avoid over tightening the vice;
- Avoid clamping parts of the fork where even slight ovalization could damage the part;

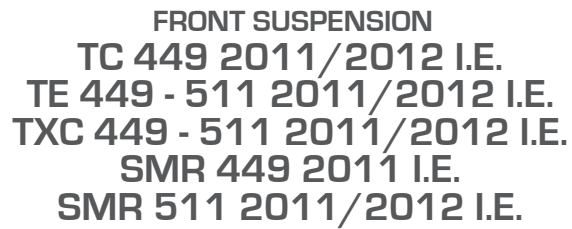
The figure shows the zones recommended for fixing the fork in the vice.

A - Wheel axle clamp

B - Slider in the steering crown fixing zone

C - Top part of pumping element rod above the seat of the spring guide stop ring.

D - Bottom valve spanner seizing



This paragraph indicates some of the problems which may arise during the working life of the fork, as well as the possible causes of these problems and any solutions to the same. Always consult this Table before working on the fork.

INCONVENIENTE	CAUSA	RIMEDIO
Oil leaking from the oil seal	1. Worn oil seal 2. Scratched stanchion tube 3. Dirty oil seal	1. Replace the oil seal 2. Replace the stanchion tube and the oil seal 3. Replace the oil seal, the dust seal and the oil
Oil leaking from the bottom of the fork leg	1. Damaged bottom valve O- ring 2. Bottom valve loose	1. Replace O- ring 2. Tighten bottom valve
Loss of sensitivity	1. Worn sliding bushings 2. Old oil	1. Replace the sliding bushings 2. Change the oil
Fork legs not sliding properly	1. Fork legs not aligned correctly	1. Loosen the wheel axle and align the fork correctly (see Par. 4. 2)
The fork does not react to adjustment variations	1. The pin inside the rod is stuck 2. The adjustment screw is stuck 3. Impurities in the oil 4. Valves are blocked with impurities	1. Clean or replace rod 2. Take off and clean adjustment screw 3. Change the oil making sure the forks' inside components are properly cleaned 4. Change the oil making sure the forks' inside components are properly cleaned
Fork is too smooth with any adjustment	1. Oil level too low 2. Too soft or damaged spring 3. Oil viscosity too low	1. Re- establish correct oil level 2. Replace the spring 3. Re- establish correct oil level
Fork is too stiff with any adjustment	1. Oil level too high 2. Oil viscosity too high 3. Too hard spring	1. Re- establish correct oil level 2. Replace the oil with a lower viscosity one 3. Replace the spring



You can find the reference numbers of this chapter about the explored view of the fork on pag. 6.

Cleaning the dust seal (FIG. 5)



This operation can be carried out with the fork installed on the motorcycle.

No need special tools.

Use silicone grease spray.

Dismantling

- Carefully clean the stanchion tube (6) before carrying out this operation.
- With a small screwdriver prize the dust seal (12) off the slider (13), without scratching the stanchion tube.
- Slide the dust seal along the stanchion tube and clean inside the dust seal and its seat on the slider with a jet of compressed air.



Never use metal tools to clean any particles of dirt.

- Compress the fork legs slightly and remove any traces of dirt from the stanchion tubes.
- Lubricate the dust seal and the visible surface of the oil seal with silicon grease.

Re- assembly

- Re- assemble the dust seal (12) in its seat, pressing it home with your hands.



This operation must be carried out with the fork assembled on the motorcycle and with the fork's legs fully extended (front wheel off the ground).

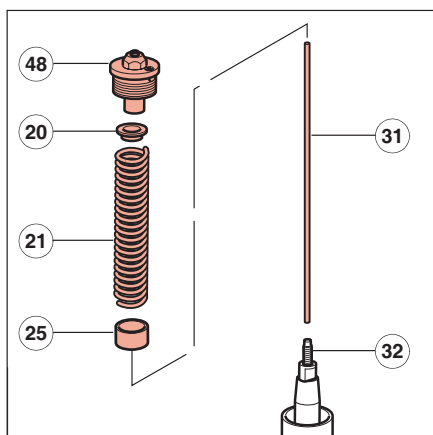
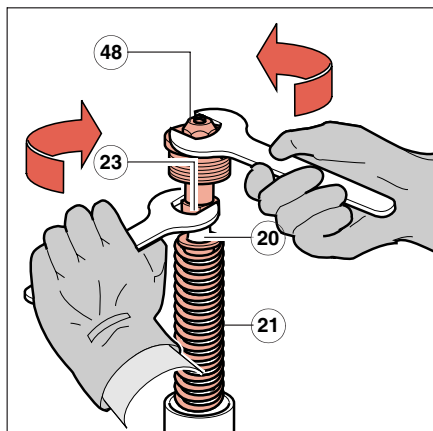
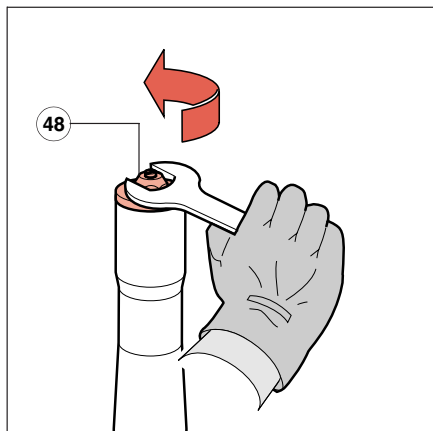
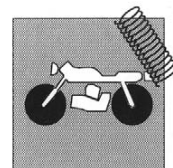
The pressure generated by the air that can get into the fork legs while the motorcycle is being used and which, due to the special shape of the oil seals remains trapped inside, can cause the fork to malfunction.

Dismantling

- Monthly or after every race use a crosshead screwdriver to unscrew the air bleed screw (14) in both the fork legs on the top part of the slider, to drain the pressure that can build up inside.
- Check the state of the oil seal (50); replace if necessary.

Re- assembly

- Tighten the air bleed screw (20) to the recommended torque (see Table 1 -Tightening torques), being careful not to damage the oil seal (50).



Draining the oil



This operation cannot be carried out with the fork installed on the motorcycle.



We recommend loosening the fork cap a little before removing the fork leg from the fork yokes.

- Remove the fork leg from the fork yokes according to the procedure in the motorcycle owner's manual.
- Clamp the fork leg in the vice.
- Remove the fork cap (48) with the 19 mm spanner.
- Slowly lower the slider on the stanchion tube.

- Push the guide spring cap (20) and the spring (21) downwards, so that you can reach the locknut (23) with the 19 mm spanner.
- Holding the locknut (23) with A 19 mm spanner, use another 19 mm spanner to unscrew the fork cap (48) completely.

- Remove the fork cap (48), the guide spring cap (20), the spring (21) and the preload tube (25).
- Remove from the rod's edge (32), the adjustment return inner rod (31).
- Free the fork leg (5) from the vice and tip it into a container of a suitable size to drain the oil; pump the fork to help the oil flow out.



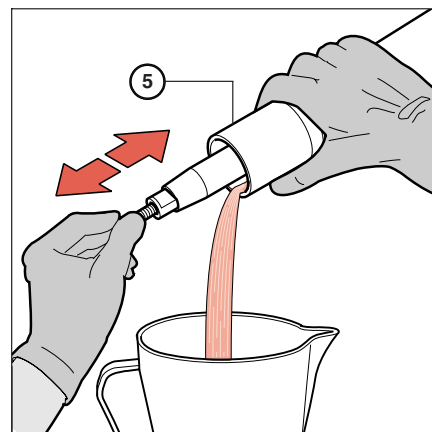
The R5051AC is available as spare part: if you tighten it on the rod's edge, you can make the rod extraction from the inner part of the slider easier.

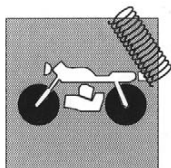


Check appearance, density and quality of the old oil to get an idea of the oil seal and guiding elements condition. If the oil is dense and dark with solid particles in it, you will have to replace the guide bushings and the sealing elements.

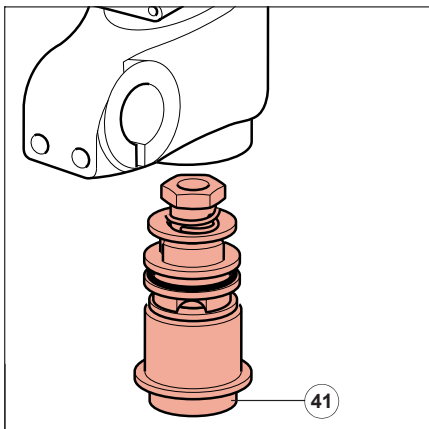


Paragraph 4.11 describes the procedure for assembling and filling with oil.





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Braking down the pumping element and the bottom valve

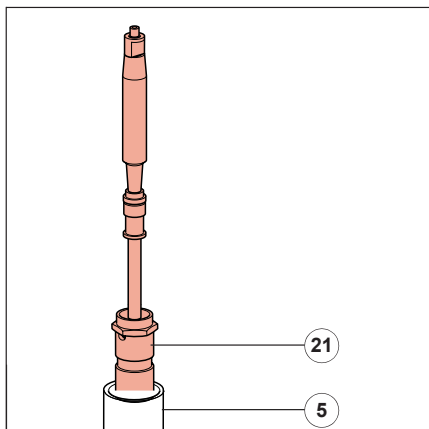


This operation must be done only after having drained all of the oil out of the fork leg.

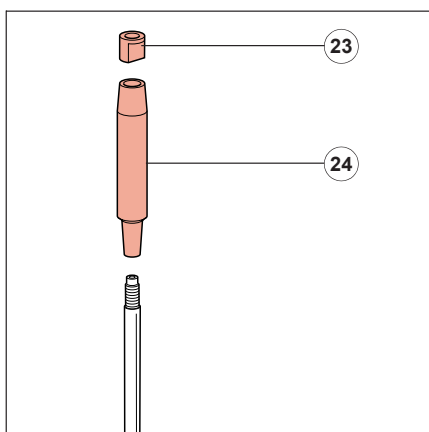
- Clamp the wheel axle clamp in the vice.
- Insert the R5081AA tooling inside the fork leg in a way that you can block the body rotation; to do so, the slot obtained at the tooling lower edge must be perfectly inserted into the body hexagon.



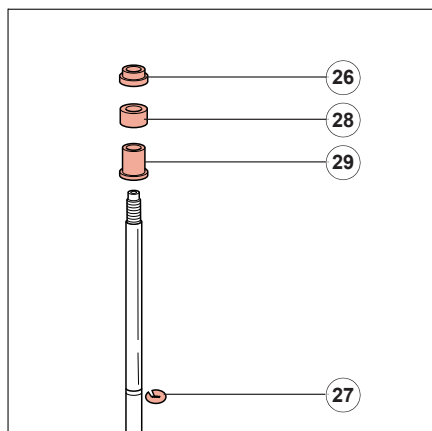
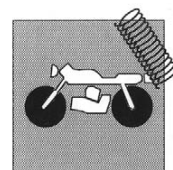
In the tooling upper part there are two opposite holes where you can insert an axle to make the blocking easier. However, the tooling must not be rotated in any case, but only used to hold the fork leg inner parts.



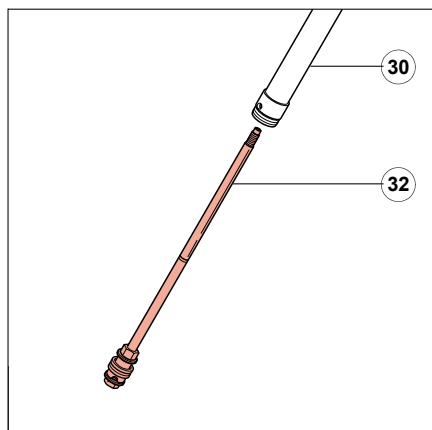
- Using the 21 mm tube wrench unscrew the bottom valve (41).
- Remove the bottom valve set (41).
- Take off the damping set (21) from the stanchion tube (5).



- Unscrew and remove the locknut (23) and take off the guide spring (24).



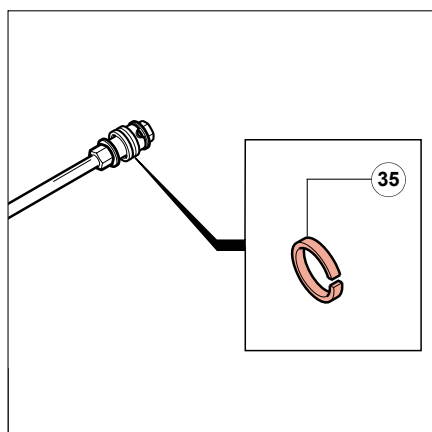
- In order to be able to act on the pumping element you will need to remove the foot buffer components: hold the foot buffer nut (26) using a 18 mm spanner and unscrew the push rod (29) with a 17 mm hexagonal spanner.
- Remove the upper nut (26) and the foot buffer (28).
- Using a small screwdriver prize the stop ring (27) off the rod.
- Remove the stop ring (27) and the push rod (29) off the rod.



- Push the rod (32) towards the inside area of the body (30) to be able to slide the complete pumping element out, starting from the bottom.



The pumping element can be completely overhauled and adjusted. Paragraph 4.8 shows how to overhaul and modify the pumping element setting.



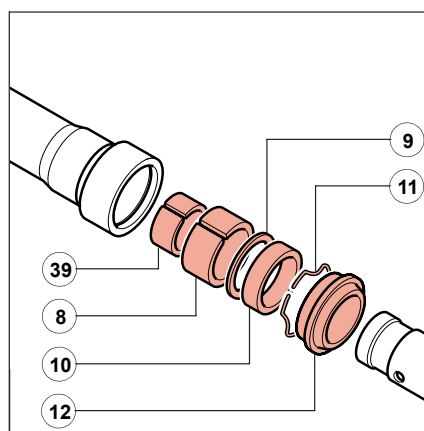
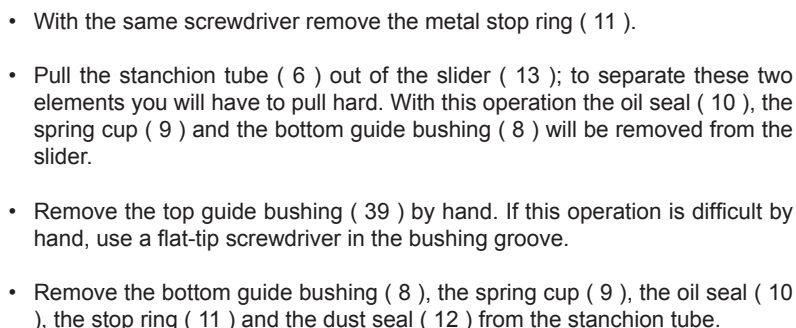
- Verify the segment (35) wear.

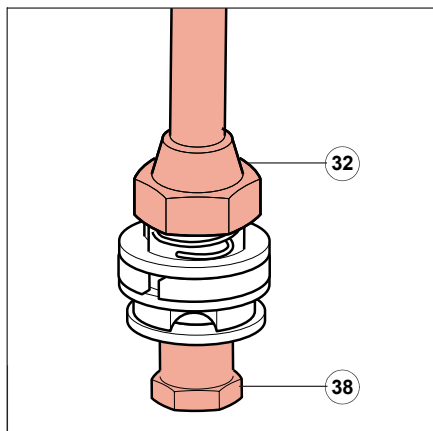
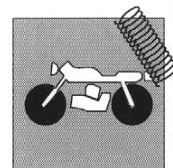


Paragraph 4.10 shows how to re- assemble the pumping element and the bottom.



- Remove the dust seal (12) from its seat, using a small flat- tip screwdriver.



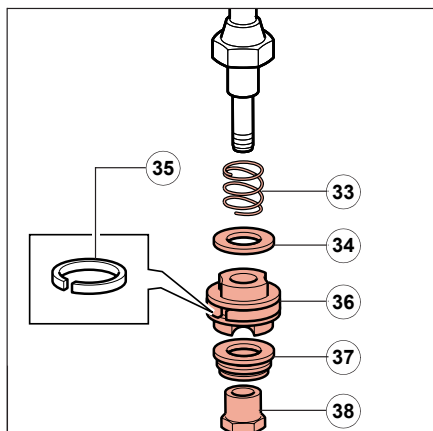


Overhauling and modifying the cartridge and bottom valve setting

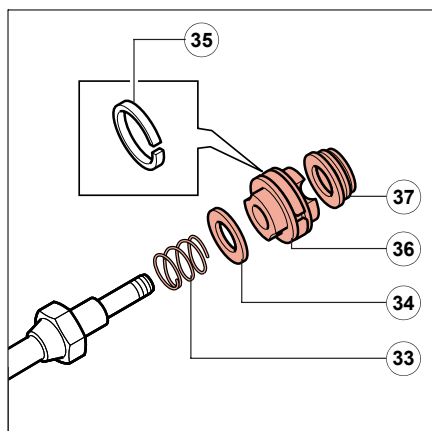
Cartridge overhauling (rebound braking)

Dismantling

- Clamp in the vice the rod (32) milled area.
- Unscrew the nut (38) using a 12 or 13 mm spanner, according to the mounted nut.



- Remove the nut (38), the washer or the washers' stack regulating the rebound (37), the piston (36) complete with the segment (35), the washer (34) and the spring (33), following this order.



Assembling:

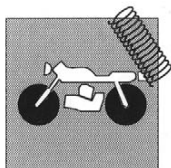


The washers (37) and the piston (36) are the ones causing the rebound braking. It is possible, if needed, to modify the fork's behaviour during the rebound phase, by replacing the washers (37) and the piston (36) with other components having different characteristics.

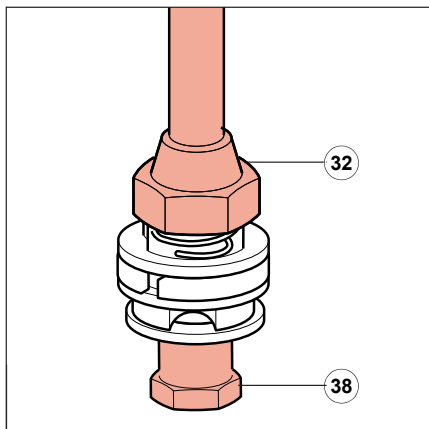


Only use original Marzocchi washers and pistons, do not modify the components.

- Replace the piston segment (35) if needed.
- Insert on the rod edge the spring (33), the washer (34), the piston (36) complete with the segment (35), the washer or the washers stack regulating the rebound (37), following this order.

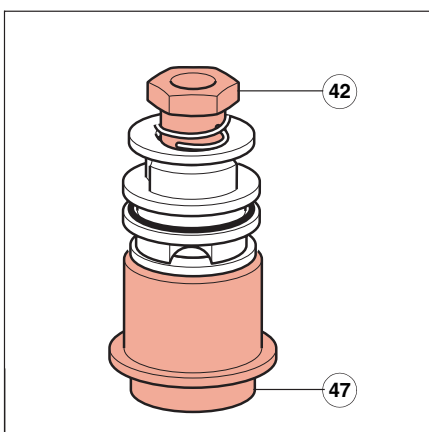


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The piston must be oriented in a way that the holes having smaller diameter are placed towards the setting washers (37).

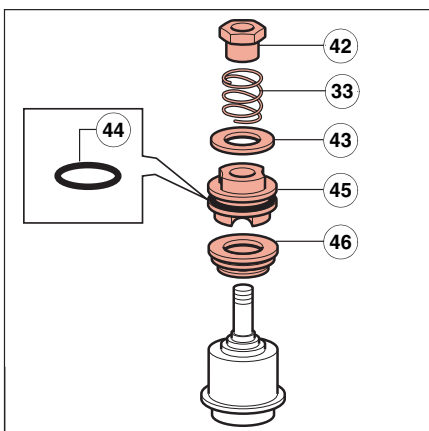
- Tighten the nut (38) manually.
- Clamp in the vice the damping rod (32) milled area.
- Using a proper spanner (12 or 13 mm according to the installed nut) tighten the nut (38) up to the required torque (see Table 1 – Tightening torques).



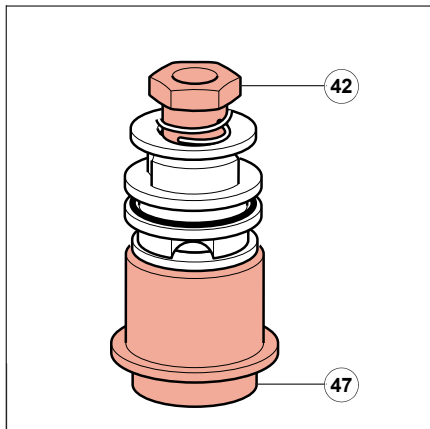
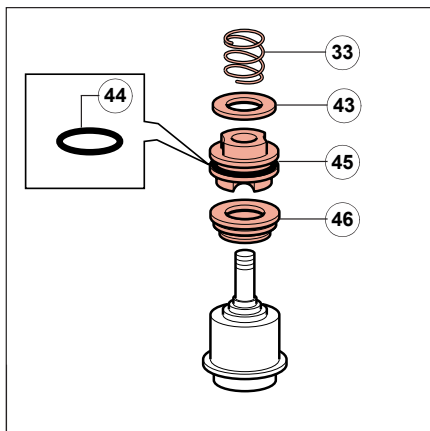
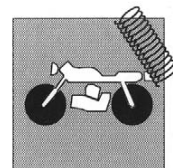
Bottom valve overhauling (compression braking)

Dismantling:

- Clamp in the vice the bottom screw through the spanner seizing (47).
- Using a 13 mm spanner unscrew the nut (42).



- Remove the nut (42), the spring (33), the washer (43), the piston (45) complete with the o- ring (44), the washer or the washers' stack regulating the compression (46), following this order.



Assembling:



The washers (46) and the piston (45) are the ones causing the compression braking. It is possible, if needed, to modify the fork's behaviour during the compression phase, by replacing the washers (46) and the piston (45) with other components having different characteristics.



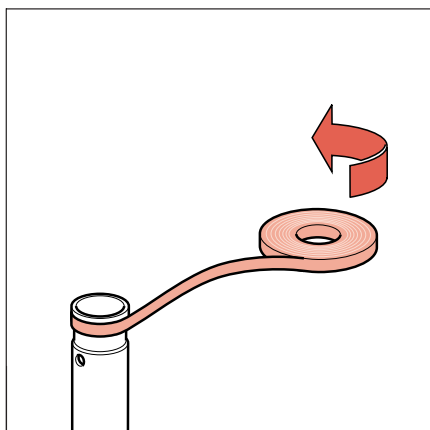
Only use original Marzocchi washers and pistons, do not modify the components.

- Replace the piston o- ring (44) if needed.
- Insert in the bottom valve the washer or the washers' stack regulating the compression (46), the piston (45), complete with the o- ring (44), the washer (43) and the spring (33), following this order.



The piston must be oriented in a way that the holes having smaller diameter are placed towards the setting washers (46).

- Tighten the nut (42) by hand.
- Lock the bottom screw in the vice through the spanner seizing (47).
- Using a 13 mm spanner tighten the nut (42) up to the required torque (see Table 1 - Tightening torques).

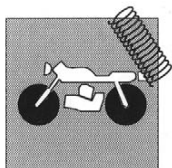


Re- assembling the fork leg – slider and oil seals

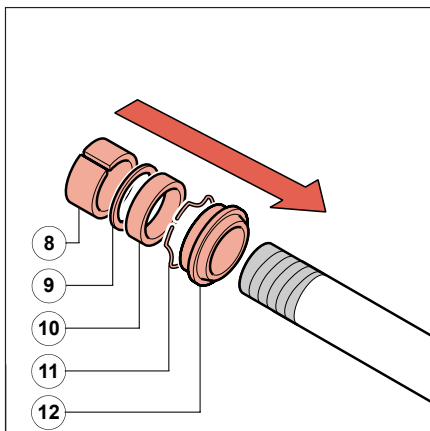


The old oil seals and dust seals must not be used again. Before re-assembling, check the conditions of the guide bushings; replace them if they are scratched or grooved. Check the Teflon coating of the guide bushings which must be in a good condition.

- Apply some adhesive tape to the end of the stanchion tube so that it covers the seat of the top bushing.
- Smear the dust seal and the oil seal with some grease.



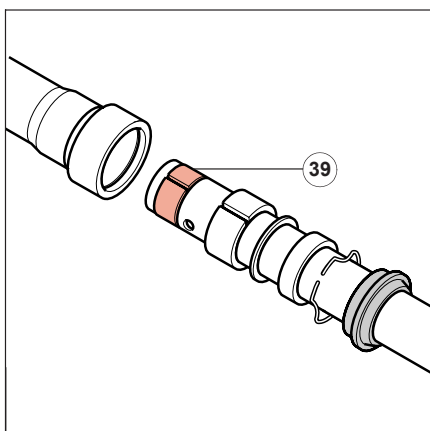
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- Insert the following components in the stanchion tube in this order: dust seal (12), stop ring (11), oil seal (10), spring cup (9) and bottom guide bushing (8).



Make sure the oil seal (10) is correctly oriented in a way that the hollow side is turned towards the spring cup (9).

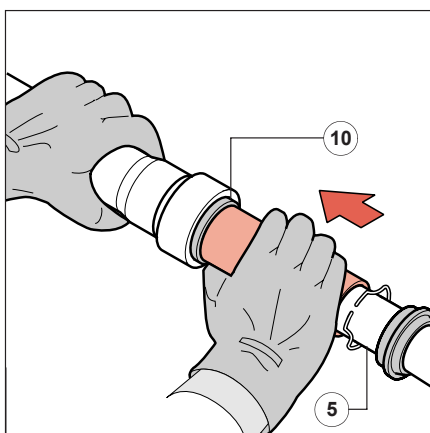


- Remove the adhesive tape from the end of the stanchion tube, cleaning any traces of adhesive left on the fork.
- Insert the top guide bushing (39) by hand.

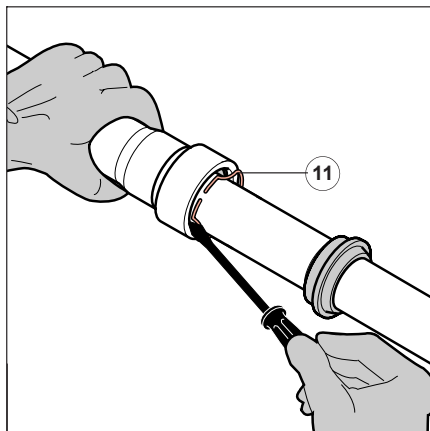
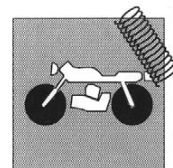


If this operation is difficult by hand, use a flat- tip screwdriver in the bushing groove.

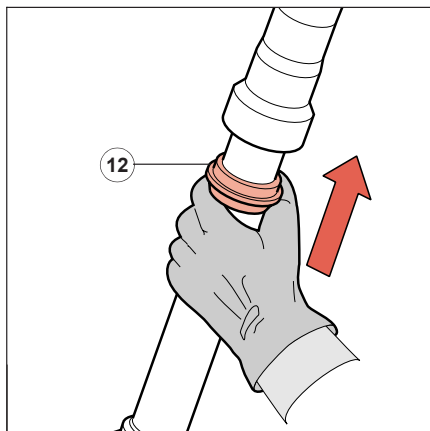
- Delicately introduce the stanchion tube into the slider, being very careful not to damage the top guide bushing.



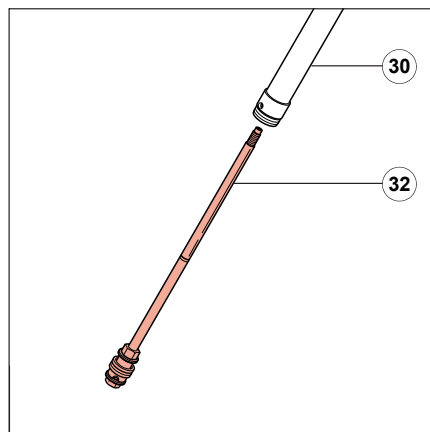
- Guide the bottom guide bushing until it comes into contact with the slider, the spring cup and the oil seal.
- Mount the special introducer on the stanchion tube (5) and use this, by pushing on the oil seal (10), to insert the bottom guide bushing, the spring cup and the oil seal.



- Mount the stop ring (11) using a small flat- tip screwdriver, checking it fits perfectly into its groove and being very careful not to scratch the stanchion tube.



- Re- assemble the dust seal (12) in its seat, pressing it home with your hands.

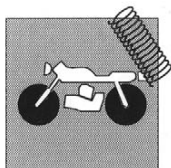


Re- assembling the pumping element unit and the bottom valve

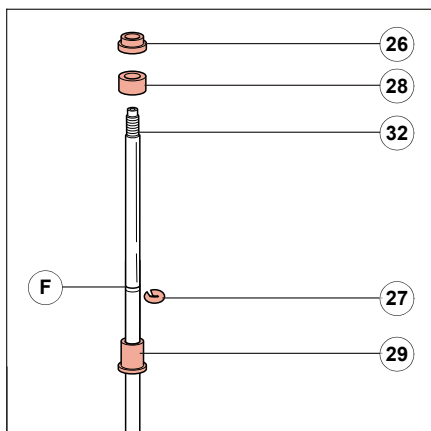
- Insert the pumping element rod (32) into the body (30).



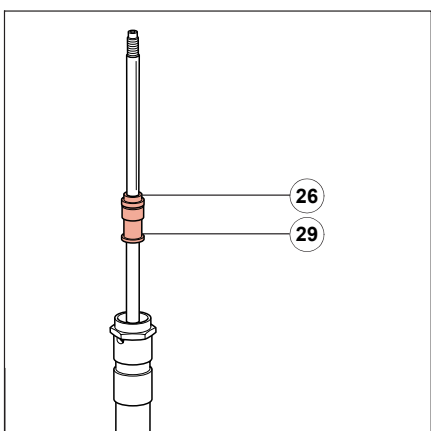
In both pumping elements there is a sealing segment; before the assembling make sure that it is not worn or damaged. Replace if necessary. Take great care and if necessary use a small flat- tip screwdriver to help the pumping element piston into the sleeve. Insert the piston without any interference.



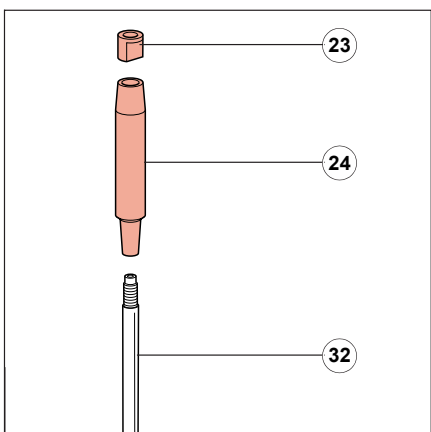
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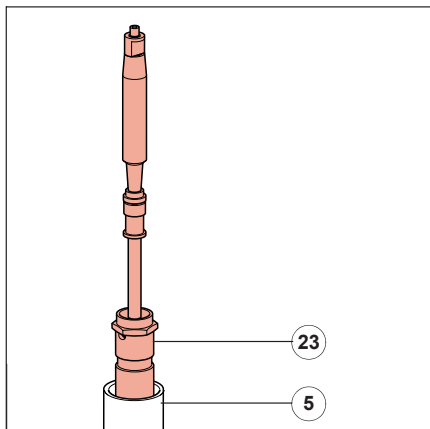
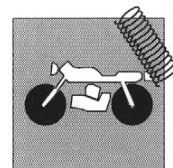
- Insert the tip (29) of stop buffer onto rod (32); it must be inserted so that the side with the flat is facing the case (30) and that you overcome the housing of the wire (F).
- Insert the metal ring (27) into the proper seat(F)
- Bring the push rod (29) into contact with the stop ring.
- Insert the foot buffer (28); this must be inserted keeping the oil flow slots towards the push rod.
- Insert the upper nut (26) and tighten it on the push rod (29).



- Hold the nut (26) with a 18 mm spanner and tighten the push rod (29) up to the required torque (see Table 1 - Tightening Torques), using a 17 mm spanner.



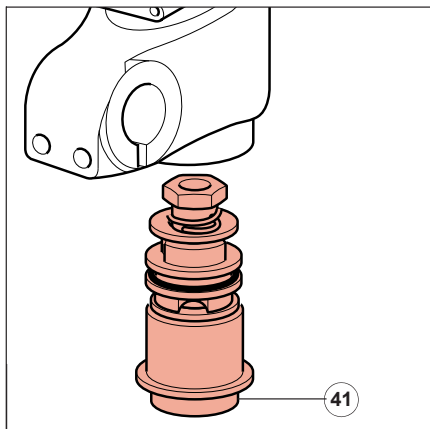
- Insert the guide spring (24) in the pumping element rod (32); the guide spring must have the smaller diameter side towards the foot buffer.
- Screw the locknut (23) till the end without tightening.



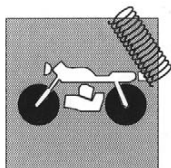
- Push the pre- assembled pumping element (23) until it is in contact with the stanchion tube (5).
- Tighten the bottom valve by hand.
- Insert the R5081AA tooling inside the fork leg in a way that you can block the body rotation; to do so, the slot obtained at the tooling bottom edge must be perfectly inserted into the body hexagon.



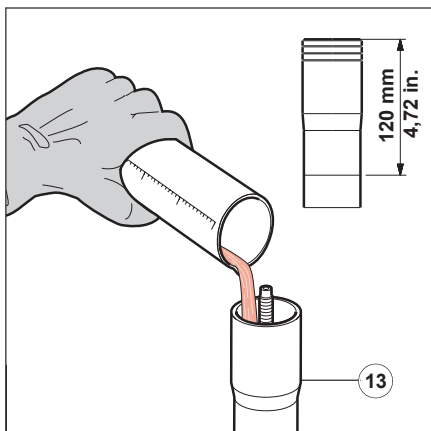
In the tooling upper part there are two opposite holes where you can insert an axle to make blocking easier. However, the tooling must not be rotated in any case, but only used to hold the fork leg inner parts.



- Using a 21 mm tube wrench tighten the bottom valve (41) up to the required torque (see Table 1 - Tightening Torques).



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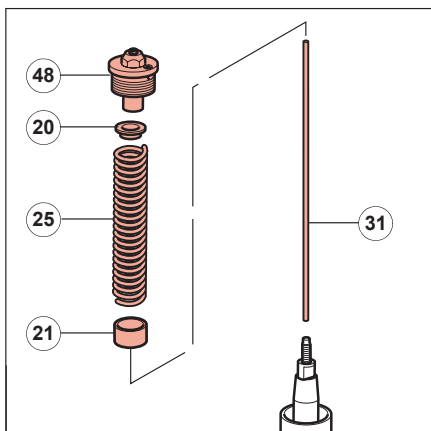
Filling with oil

- Lift the slider completely on the stanchion tube.
- Prepare the quantity of oil to pour into the fork leg (see Table 2 – Oil and quantity).

OIL AMOUNT FOR EACH STEM:

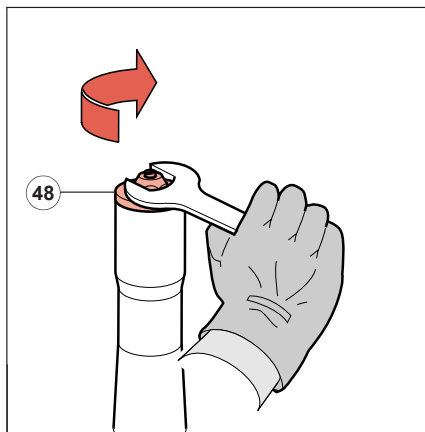
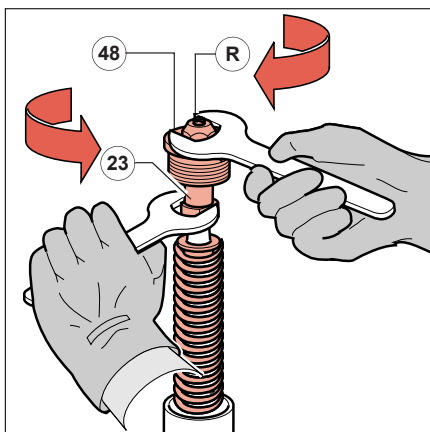
SMR: 720cm³ (43,94 in³)

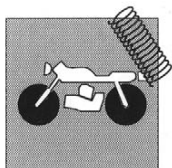
- Pour roughly 2/ 3 of the required oil into the slider (13), then pump the fork a few times to remove any traces of air.
- Pour the rest of the oil in.
- Lower the slider on the stanchion tube until it reaches the dust seal stop on the wheel axle clamp.
- Wait a few minutes and check the air volume (see Table 2 - Oil and quantity) and if necessary refill to the right level.



A lower or higher volume of air, or a type of oil other than the recommended type can change the behaviour of the fork in every phase.

- Lift the slider (13) on the stanchion tube (5).
- Insert the adjustment return inner rod (31).
- Insert the preload tube (21), the spring (25) and the guide spring cup (20).
- Screw the fork cap (48) down.
- Fully unscrew the adjustment screw (R), which corresponds to the open adjuster.
- Using two 19 mm spanners tighten locknut (23) on the cap (48) up to the required torque (see Table 1 - Tightening torques).
- Lift the slider on the stanchion tube.
- Tighten fork cap (48) on the slider with the 19 mm spanner to the recommended torque (see Table 1 - Tightening torques).
- Re- establish the correct setting by turning the adjustment screw (R) (see paragraph 5).



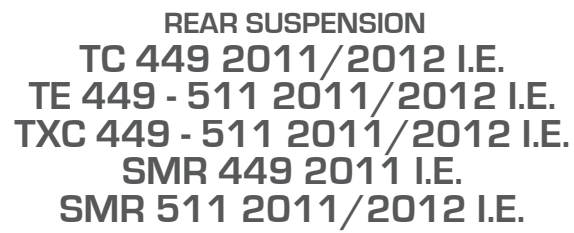


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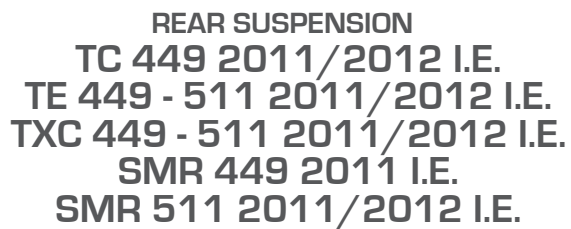


Section

J

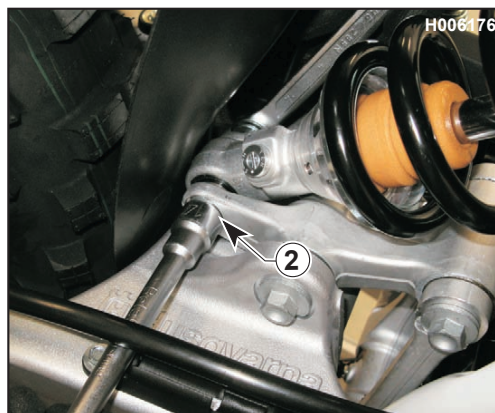
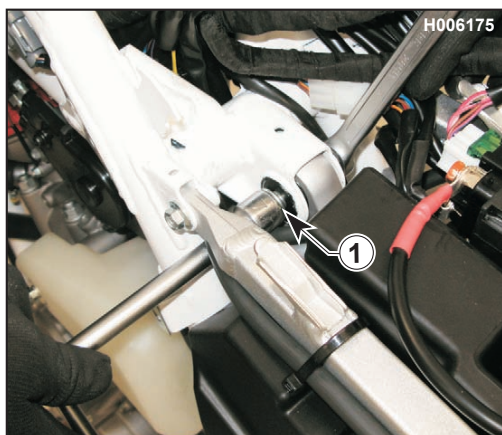


Rear shock absorber	J.3
Tightening torque.....	J.3
Lubrication points (grease).....	J.3
Rear suspension.....	J.4
Rear shock absorber removal	J.5
Disassembling and servicing the swinging arm.....	J.6
Linkage disassembly	J.8
Chain roller, chain guide, chain slider	J.9
Chain sprocket removal.....	J.9

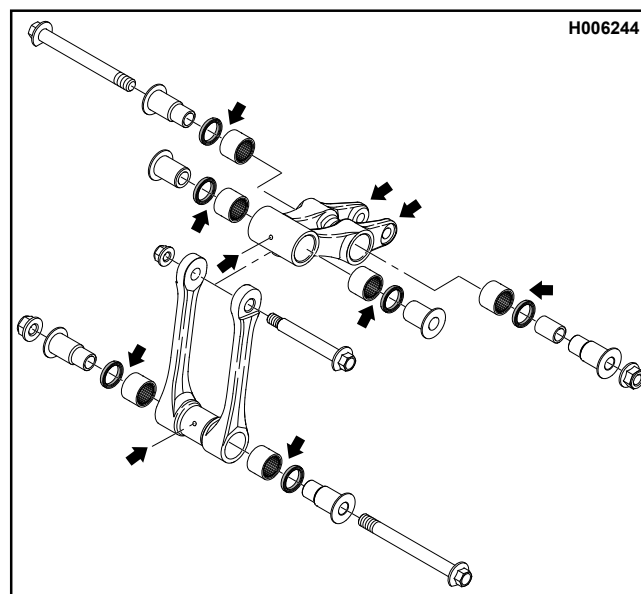
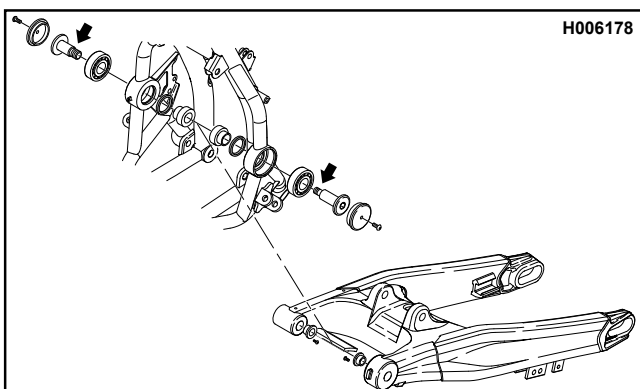


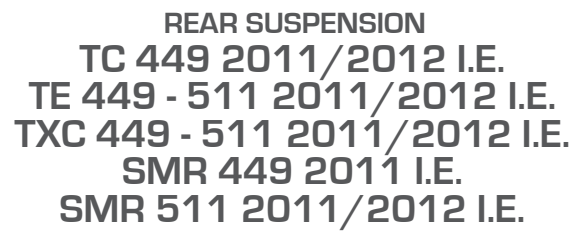
Rear shock absorber

Tightening torque figures
1, 2 = 50 Nm/ 5.0 Kgm/ 36.88 ft-lb

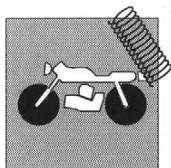


Lubrication points (grease)

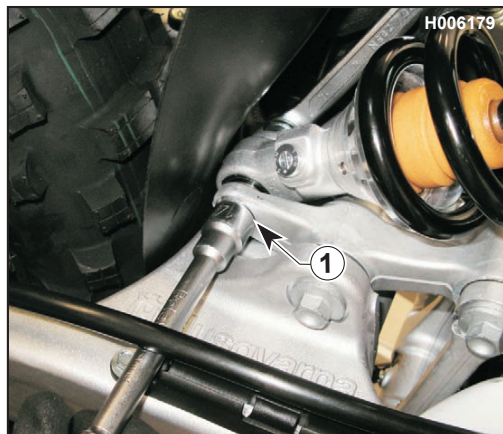




The rising-rate rear suspension is made up of a shock absorber, a linkage system and a swinging arm. The spring preload of the shock absorber can be adjusted to suit riding and terrain conditions. Hydraulic damping is also adjustable using outer adjuster screws. Periodically check all components for wear.

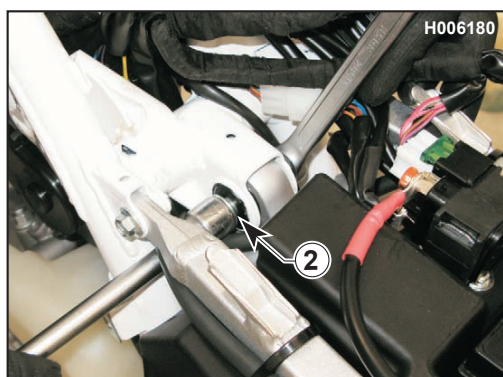


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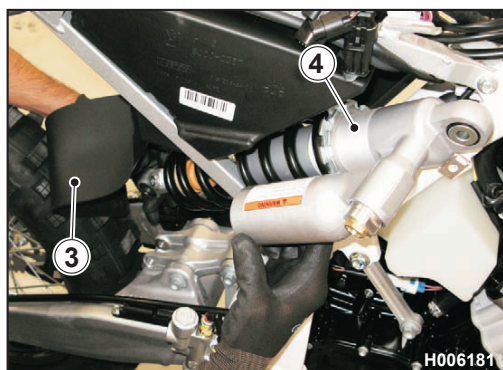


Rear shock absorber removal

- Fit a support under the engine so that the rear wheel is raised off the ground.
- Remove the saddle, the side panels and control unit as described in the corresponding chapters.
- Remove wiring from the top mounting point.
- Loosen lower screw (1) using two 14 mm wrenches.



- Loosen upper screw (2) using two 14 mm wrenches.

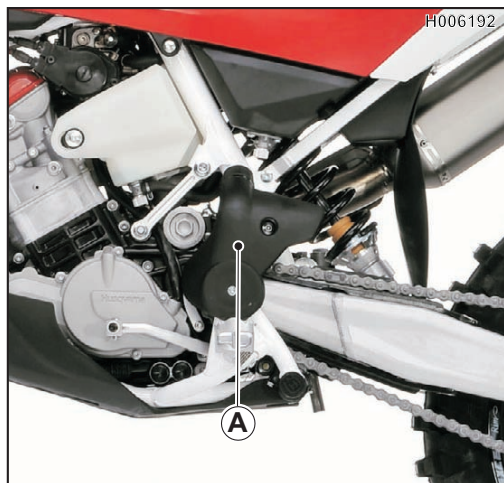
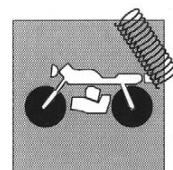


- Shift the rear cover (3) and take out the rear shock absorber (4) from the rear right-hand side of the bike.



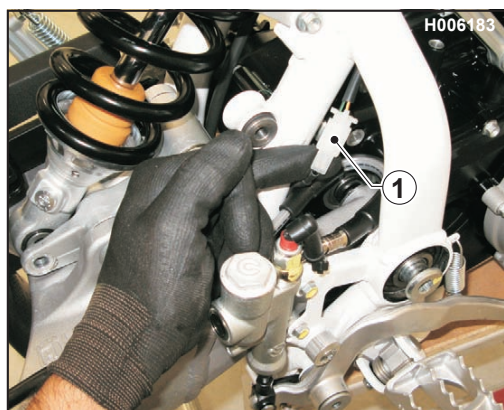
Upon reassembly, remove rear brake hose support (5) to insert the torque wrench.

Tightening torque of shock absorber nuts 50 Nm - 5 Kgm - 36.88 ft-lb.

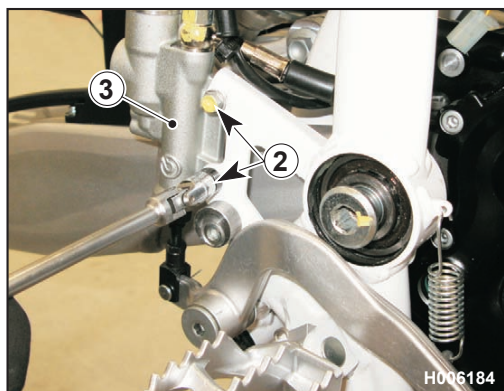


Disassembling and servicing the swinging arm

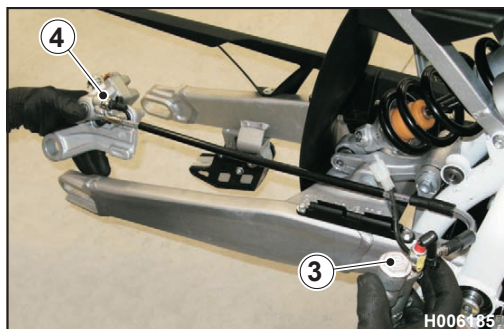
- Remove the chain and rear wheel, as described in the relevant chapters.
- Remove the two side protections (A) from the chassis.

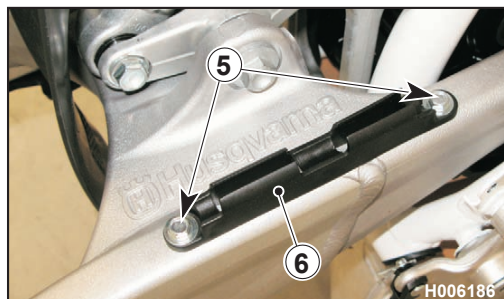
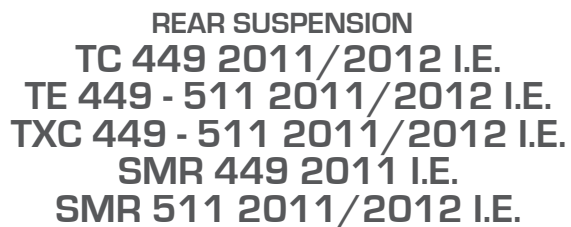


- Disconnect the rear stop connector (1).

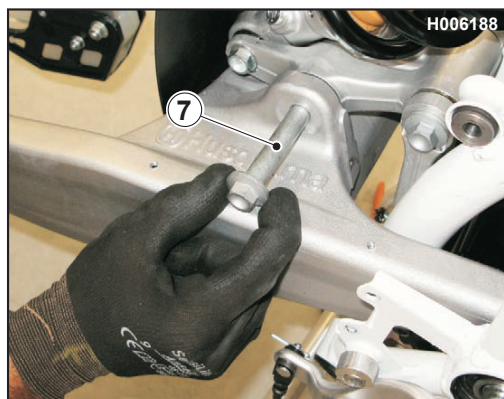


- Loosen the two screws (2) and remove the brake master cylinder (3) complete with tube and calliper (4).

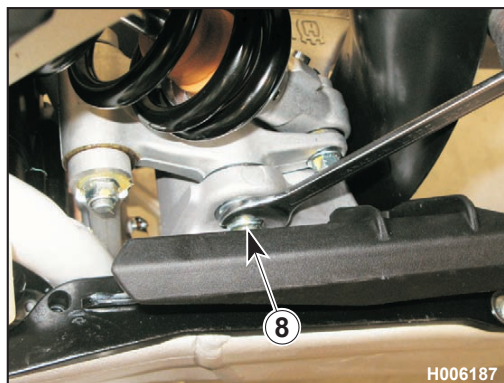




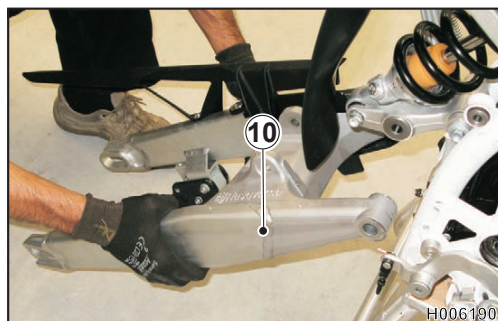
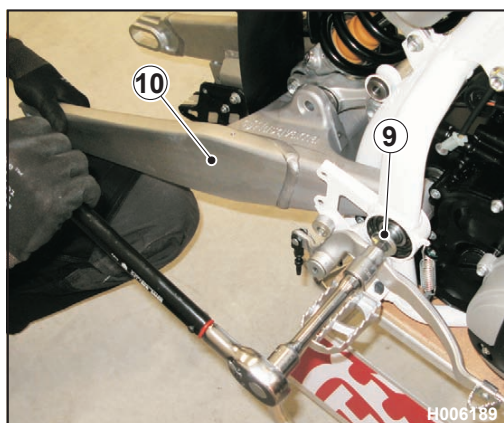
- Loosen the two screws (5) using an 8 mm wrench, and remove rear brake hose support (6) to slide out the pin (7).

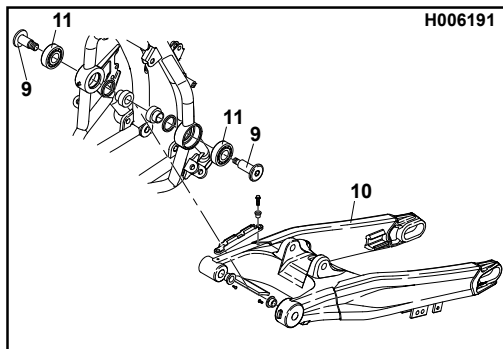
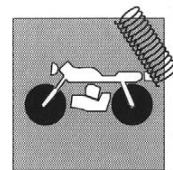


- Using a 17 mm wrench, loosen nut (8) and remove pin (7) on the other side.



- Using a 10 mm Allen wrench, loosen pins (9) and remove swinging arm (10).

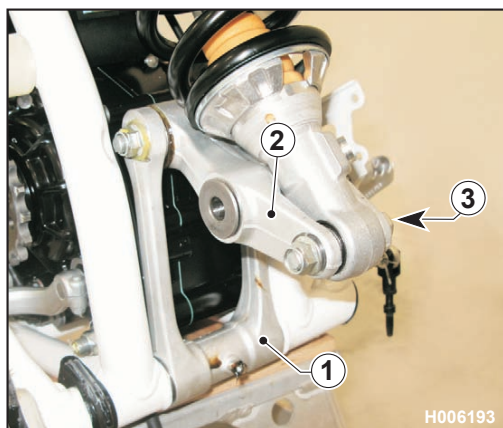




- Check bearings (11), seals and bushings for wear.
- Upon reassembly, tighten nut (8) to 80 Nm - 8 Kgm - 59.00 ft-lb and pins (9) to 100 Nm - 10 Kgm - 73.76 ft-lb.



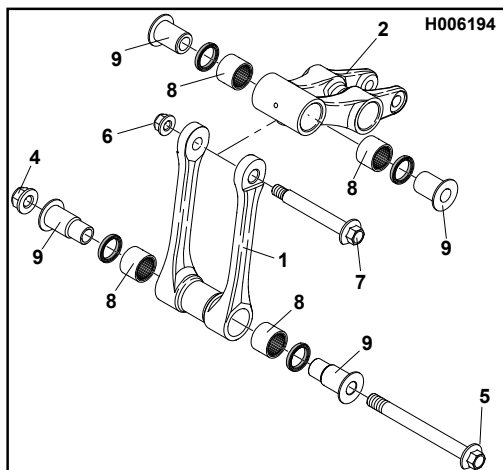
Grease the inner race of the bearings before refitting them.



Linkage disassembly

To remove drag link (1) and drop link (2), proceed as follows:

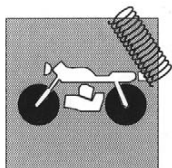
- Using a 14 mm wrench, remove the screw (3) retaining shock absorber drop link (2).



- Using a 17 mm wrench, remove nut (4) and remove pin (5) on the other side.
- Using a 14 mm wrench, remove nut (6) and screw (7) on the other side.
- Ensure that needle roller bearings (8) and bushes (9) are not worn and replace them, if necessary.



Upon reassembly, grease both bearings and bushes and tighten nut (6) to 73 Nm - 7.3 Kgm - 53.84 ft-lb and nut (4) to 80 Nm - 8.0 Kgm - 59.00 ft-lb.



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Chain roller, chain guide, chain slider

Check the wear of the above-mentioned elements and replace them when necessary.

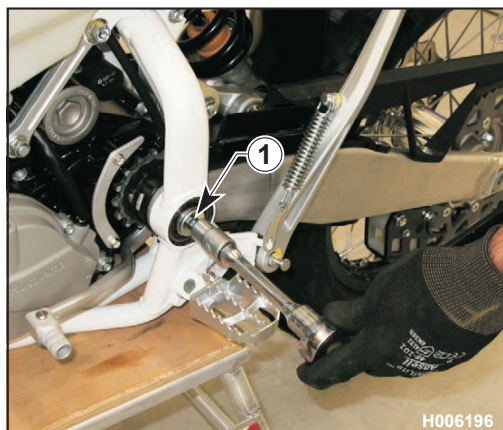


Check the chain guide alignment, and remember that a bent element can cause chain early wear. The chain could also drop out of the sprocket.

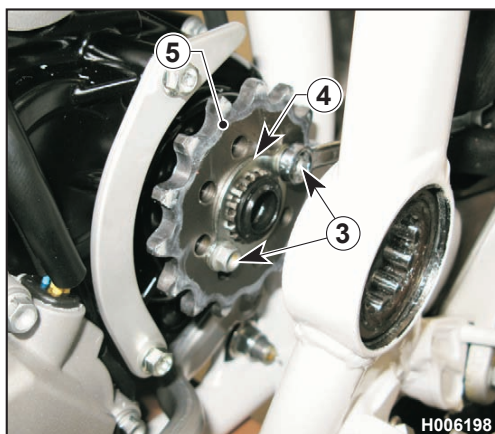
- 1 Chain roller
- 2 Chain guide
- 3 Chain slider
- a Master link clip

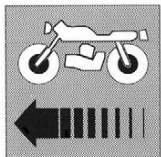
Chain sprocket removal

- Fit a support under the engine so that the rear wheel is raised off the ground.
- Remove chain, chassis side protections, rear shock absorber lower screw, as indicated in the relevant paragraphs/chapters.
- Using a 10 mm Allen wrench, loosen pins (1) fastening swinging arm to chassis.
- Shift swinging arm (2) toward the bike rear end.
- Manually engage the first gear.
- Using an 8 mm wrench, loosen the two screws (3), turn flange (4) and remove sprocket (5).
- On reassembly, tighten screws (3) to a torque of 8 Nm - 0.8 Kgm - 5.90 ft-lb.



Grease the inner race of the bearings before refitting them.



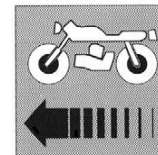
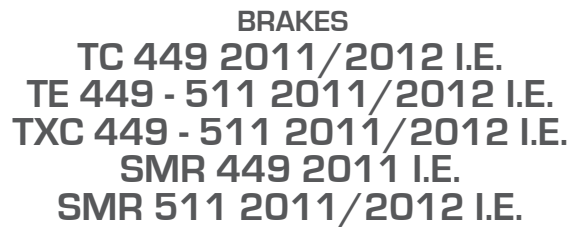


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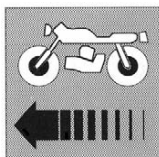


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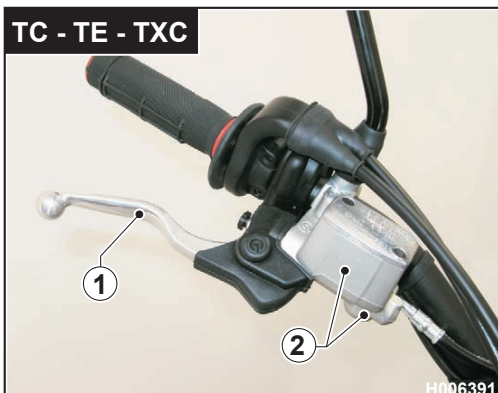
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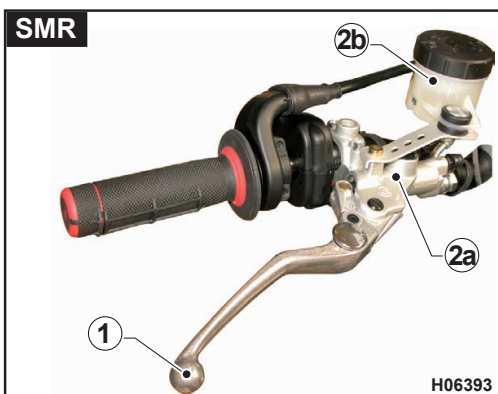
H006391

Braking system

The braking system uses two independent circuits. Each system is equipped with a brake calliper connected to a master cylinder with a fluid reservoir.

1. Front brake lever
2. Front brake master cylinder with fluid reservoir
- 2a. Brake master cylinder
- 2b. Brake fluid reservoir
3. Front brake line
4. Front brake calliper
5. Front brake disc

SMR



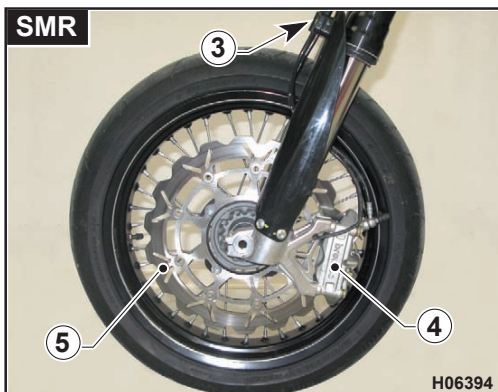
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TC - TE - TXC

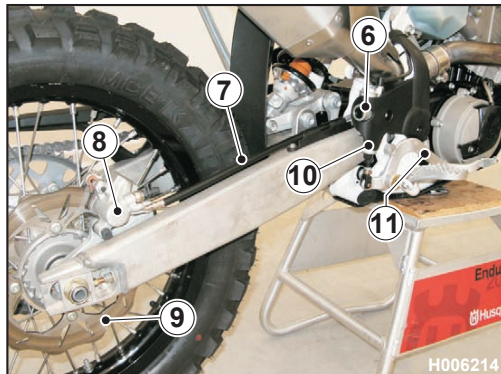
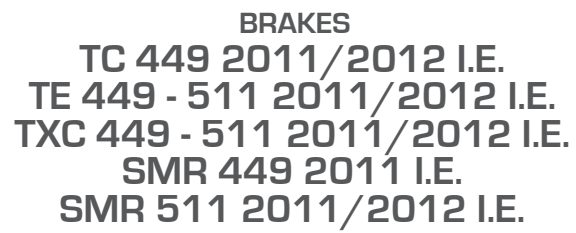


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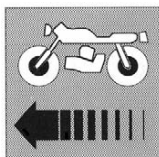
SMR



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Brake disc

Checking the brake disc is an important safety procedure; the disc must be spotless, i.e. free from corrosion, oil or other dirt or deep scoring.

Front brake disc diameter:

260 mm (10.24 in) (TC-TE-TXC)

320 mm (12.6 in) (SMR)

Front brake disc thickness (when new):

3.0 mm (0.12 in) (TC-TE-TXC)

5.0 mm (0.2 in) (SMR)

Wear limit:

2.5 mm (0.1 in) (TC-TE-TXC)

4.5 mm (0.18 in) (SMR)

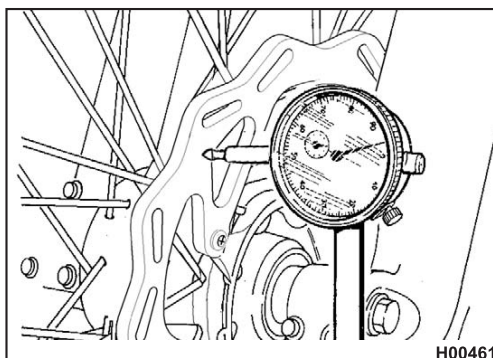
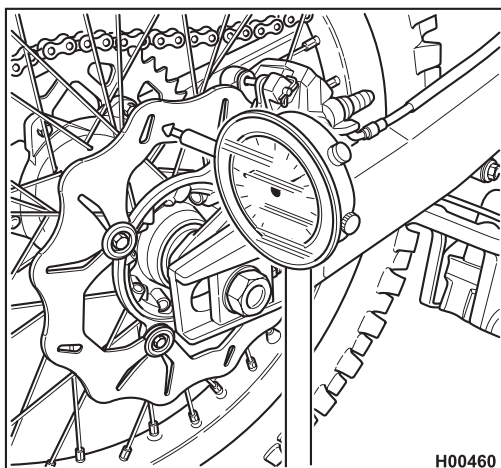
Rear brake disc diameter: 240 mm (9.45 in)

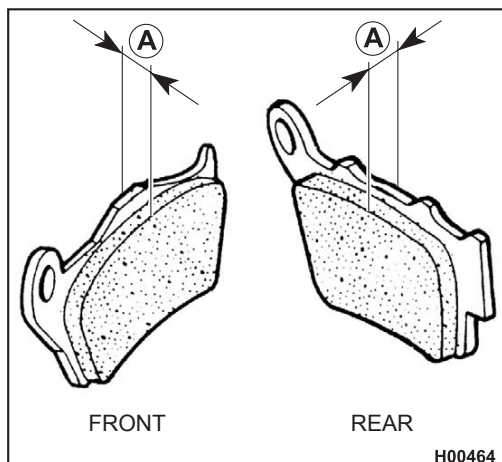
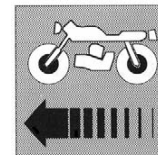
Rear brake disc thickness (when new): 4.0 mm (0.16 in)

Wear limit: 3.5 mm (0.14 in)

Disc warpage must not exceed 0.15 mm (0.015 in) (check disc mounted on the rim with a dial gauge).

To remove the disc from the wheel rim, you need to loosen the four retaining screws. On assembly, clean all mating surfaces thoroughly and tighten the screws to the specified torque.





Checking brake pads for wear / replacing the pads (TC-TE-TXC)

Check brake pad wear.

Service limit "A"

- 3.8 mm (0,15 in) (front and rear pads)

If service limit is exceeded, always replace the pads in pairs.

Be careful that no brake fluid or any oil gets on brake pads or discs. Clean off with alcohol any fluid or oil that inadvertently gets on the pads or disc.

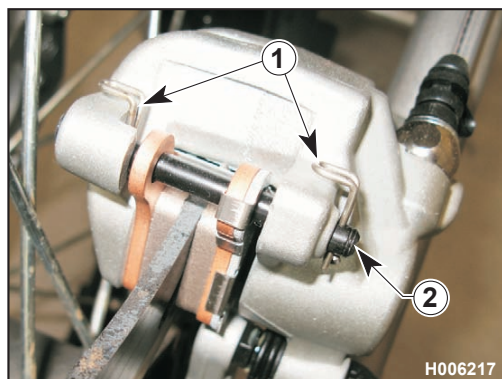
Replace the pads with new ones if they cannot be cleaned satisfactorily.

PADS REMOVAL

- Remove clips (1).
- Slide out pins (2).
- Remove pads.



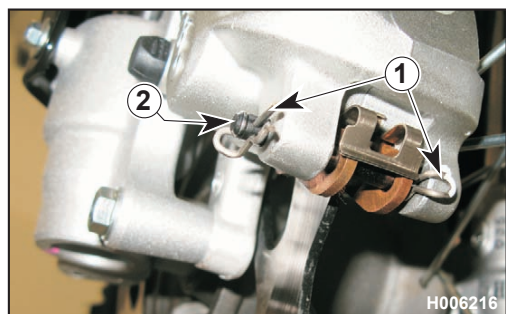
Do not work the brake lever or pedal while removing the pads.

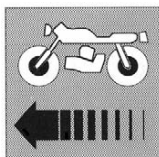


PADS INSTALLATION

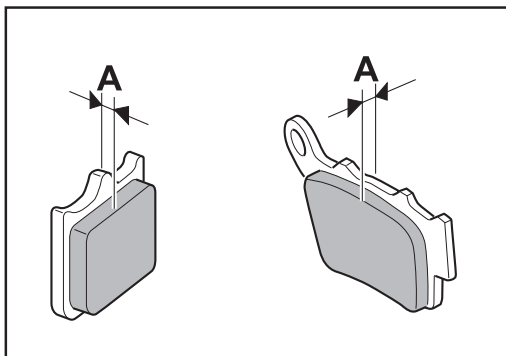
- Install new brake pads.
- Reassemble the two pins (2) and the clips (1).

The above procedure eliminates the need to bleed the braking system after replacing the pads. Simply operate the control lever several times until bringing the pistons back to their normal position.





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Checking brake pads for wear / replacing the pads (SMR)

Check brake pad wear.

Service limit "A"

- 3.8 mm (0,15 in) (front and rear pads)

If service limit is exceeded, always replace the pads in pairs.

Be careful that no brake fluid or any oil gets on brake pads or discs. Clean off with alcohol any fluid or oil that inadvertently gets on the pads or disc. Replace the pads with new ones if they cannot be cleaned satisfactorily.

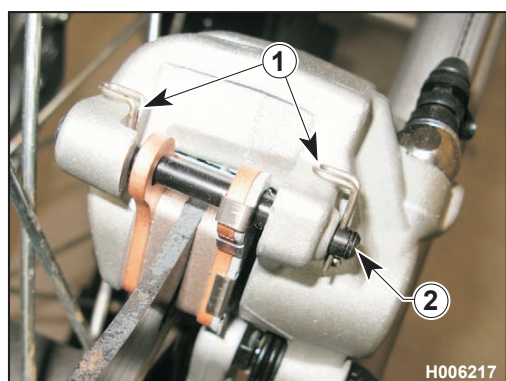
PADS REMOVAL

REAR

- Remove clips (1).
- Slide out pin (2).
- Remove pads.

FRONT

- Press on clips (3).
- Slide out pins (4).
- Remove clips (3).
- Remove pads.



Do not work the brake lever or pedal while removing the pads.

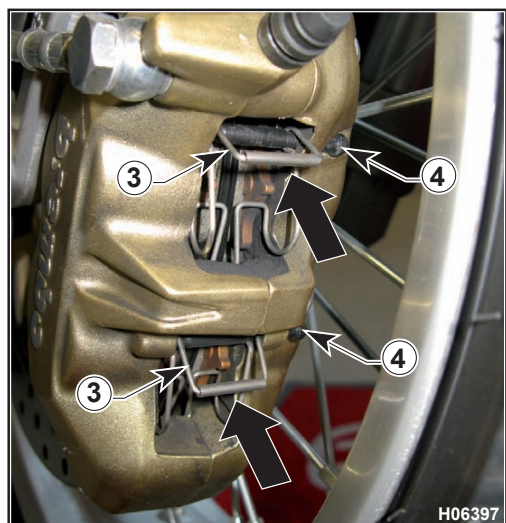
PADS INSTALLATION

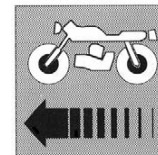
REAR

- Install new brake pads.
- Reassemble the two pins (2) and the clips (1).

FRONT

- Install new brake pads.
- Install clips (3) by pushing them toward the calliper.
- Install the pins (4).
- Pull clips (3) out, to make sure they are engaged on pins (4)



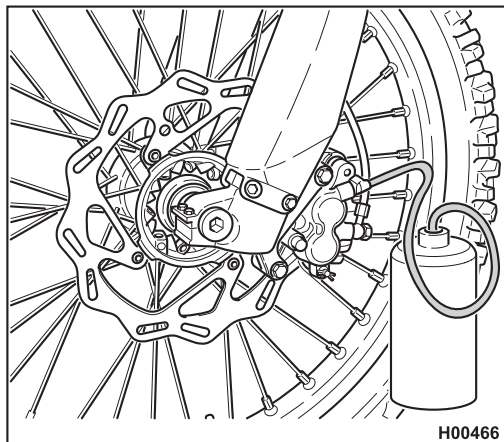


Bleeding the front braking system (TC-TE-TXC)

A long travel and mushy feel of the brake lever indicate that there is air in the system and the brake needs bleeding.

Bleeding procedure is as follows:

- Take the rubber cap off the bleed valve (1).
- Attach a clear plastic hose to the calliper bleed valve and place the other end of the hose in a vessel (make sure the hose end stays dipped in the fluid throughout the procedure).
- Remove the reservoir plug (2) and the rubber gaiter and fill fresh fluid into the reservoir.
- Pull the lever (3) of the brake and keep it pulled so that the system remains under pressure, loosen the valve (1), tighten the valve (1) always with the lever pulled, then release the lever.
- Top up the fluid level, wait a few seconds, then repeat a few times the procedure described in the line above until the liquid comes out of the transparent hose without bubbles.
- Tighten the bleed valve to the indicated torque, restore the fluid level (A) and refit the rubber gaiter and cover (2) of the tank.



Fluid level inside the reservoir shall never drop below the minimum notch during the bleeding procedure.



Brake fluid is corrosive. In the event of contact with eyes, rinse with abundant water.



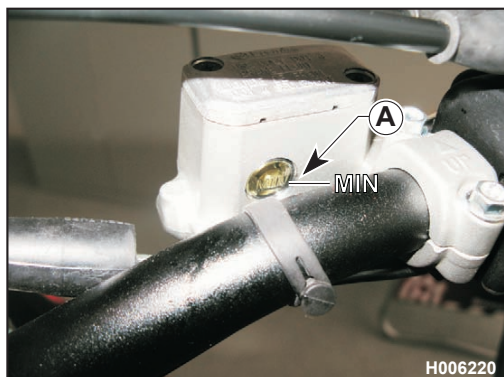
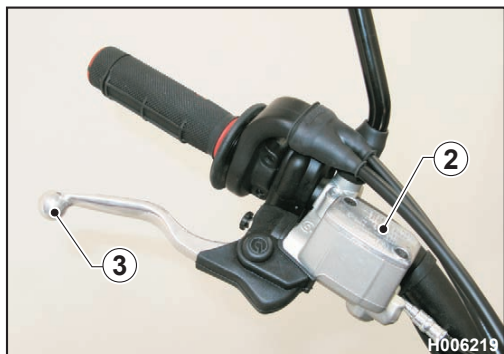
Motorcycle handlebar must be turned to the left during the bleeding procedure. This will keep the master cylinder reservoir higher, making bleeding easier.

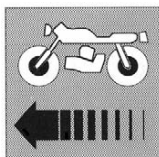


If brake lever or brake pedal feel mush after a fall or a repair resulting in loss of braking, bleed the circuit as described above.

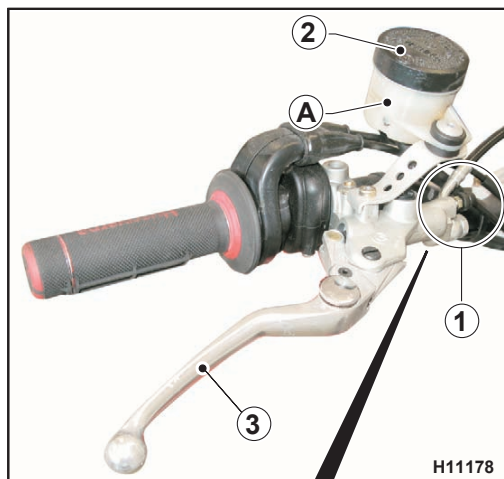


Bleed valve tightening torque: 12-16 Nm, 1.2-1.6 Kgm, 8.8-11.8 ft/lb.





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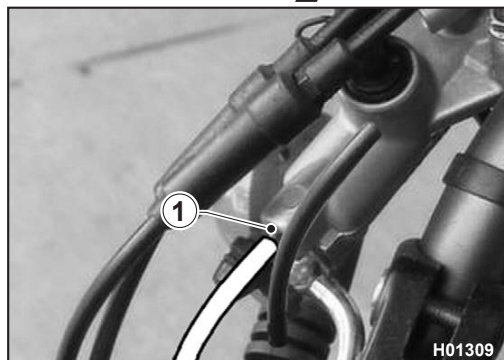
Bleeding the front braking system (SMR)

A long travel and mushy feel of the brake lever indicate that there is air in the system and the brake needs bleeding. Bleeding is also required after changing brake fluid.

To bleed the front brake, begin with the control on the handlebar and then bleed the calliper: the procedure is the same.

Proceed as follows.

- Take the rubber cover off the bleed valve (1) or (1A).
- Insert the end of a transparent hose in the valve (1) or (1A) and the other end in a container with fluid (make sure that the hose is constantly immersed in the fluid).
- Remove the reservoir cover (2) and the rubber gaiter and fill the reservoir with fresh fluid.
- Pull the lever (3) of the brake and keep it pulled so that the system remains under pressure, loosen the valve (1), tighten the valve (1) always with the lever pulled, then release the lever.
- Top up the fluid level (A), wait a few seconds, then repeat a few times the procedure described in the line above until the liquid comes out of the transparent hose without bubbles.
- Lock the bleed valves to the specified torques.
- Top up the fluid level and refit the rubber gaiter and the cover (2) of the reservoir (A).



Fluid level inside the reservoir shall never drop below the minimum notch during the bleeding procedure.



Brake fluid is corrosive. In the event of contact with eyes, rinse with abundant water.



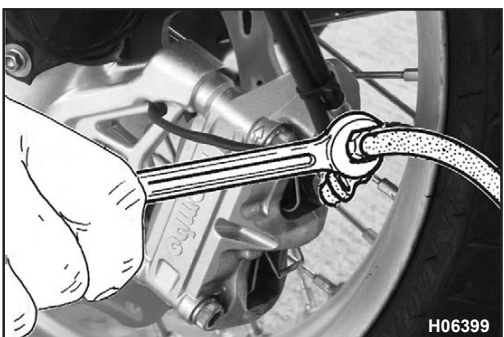
Motorcycle handlebar must be turned to the left during the bleeding procedure. This will keep the master cylinder reservoir higher, making bleeding easier.

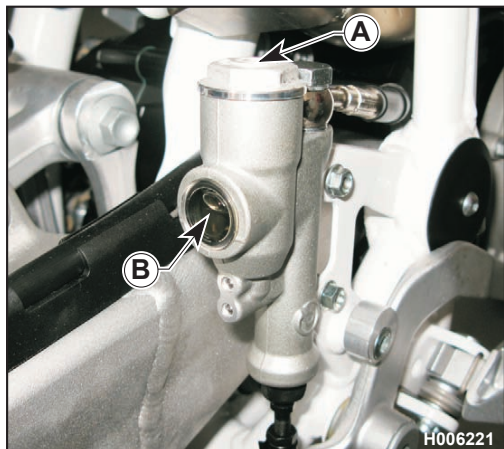
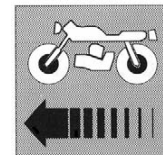


If brake lever or brake pedal feel mush after a fall or a repair resulting in loss of braking, bleed the circuit as described above.



Bleed valve tightening torque: 12-16 Nm, 1.2-1.6 Kgm, 8.8-11.8 ft/lb.





Bleeding the rear braking system

A long travel and mushy feel of the brake pedal indicate that there is air in the system and the brake needs bleeding.

Bleeding procedure is as follows:

- Remove reservoir cap (A) (21 mm wrench) and diaphragm and fill with fluid (DOT 4).
- Attach a clear plastic hose to the calliper bleed valve (1) and place the other end of the hose in a vessel.
- Press the pedal (2) fully down.
- With the lowered pedal (2), loosen the bleed valve (1) so the fluid can come out of the small tube (initially only air will come out), then close the valve (1) always keeping the pedal lowered, then release the pedal.
- Top up the fluid level, wait a few seconds, then repeat a few times the procedure described in the line above until the liquid comes out of the transparent hose without bubbles.
- Tighten the bleed valve to the specified torque and check fluid level (B) in the reservoir before refitting the cap (A). If the bleeding procedure was performed correctly, the pedal will no longer have that mushy feel. If not so, repeat the procedure.



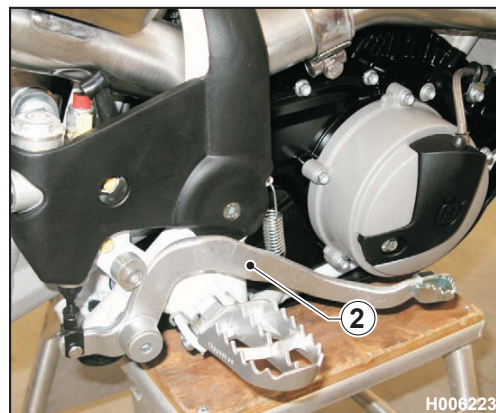
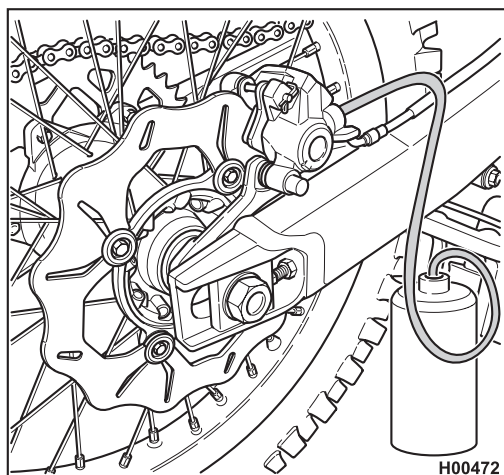
Fluid level inside the reservoir shall never drop below the minimum notch during the bleeding procedure.

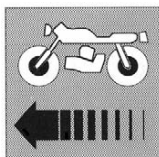


If brake lever or brake pedal feel mush after a fall or a repair resulting in loss of braking, bleed the circuit as described above.



Bleed valve tightening torque: 12-16 Nm, 1.2-1.6 Kgm, 8.8-11.8 ft/lb.





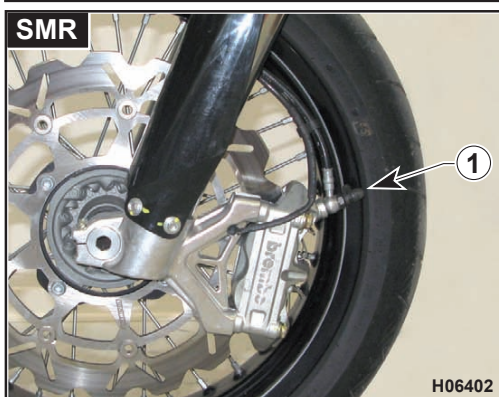
BRAKES TC 449 2011/2012 I.E. TE 449 - 511 2011/2012 I.E. TXC 449 - 511 2011/2012 I.E. SMR 449 2011 I.E. SMR 511 2011/2012 I.E.



TC - TE - TXC



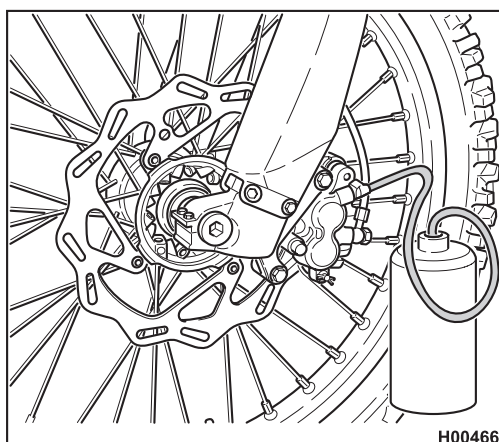
H06401



H06402



H06403



H00466

Changing the fluid

Brake fluid should be checked and changed as per the "Maintenance Chart" (see Section B), or earlier if contaminated with debris or water.



Do not change brake fluid in the rain or with a strong wind.



Use only fluid taken from a sealed container (DOT 4). Never reuse brake fluid.



Avoid the ingress of contaminants such as dirt, water, etc. into the reservoir.



Do not keep the reservoir open without its cover longer than necessary; this would increase the risk of contamination.



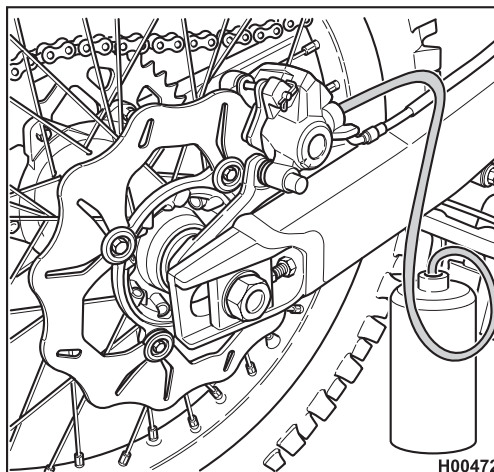
Handle the fluid with care to avoid damage to painted parts.



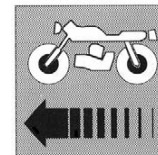
Do not mix two brands of fluid. This would reduce boil-over point, leading to loss of braking efficiency or degrading of rubber parts.

Replacement procedure is as follows:

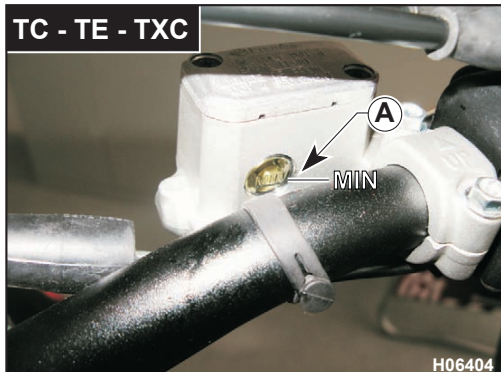
- Take the rubber cap off the bleed valve (1) or (1A).
- Attach a clear plastic hose to the calliper bleed valve and place the other end of the hose in a vessel.



H00472

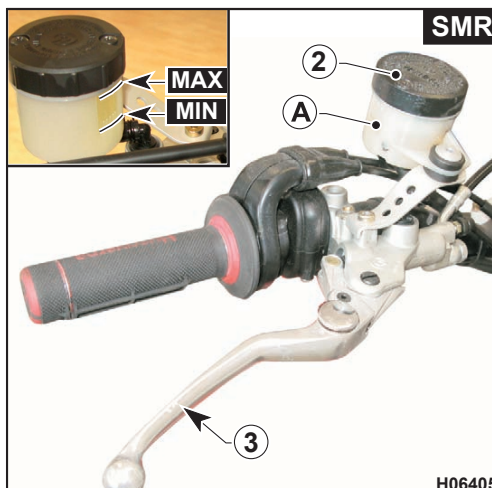
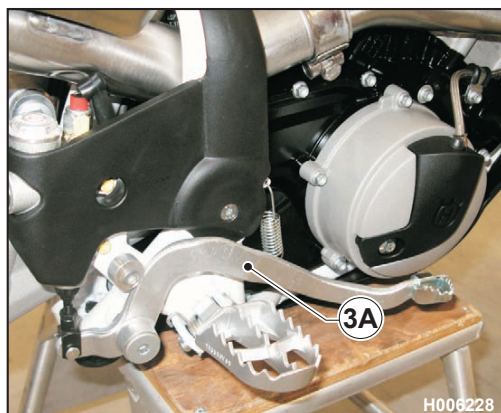
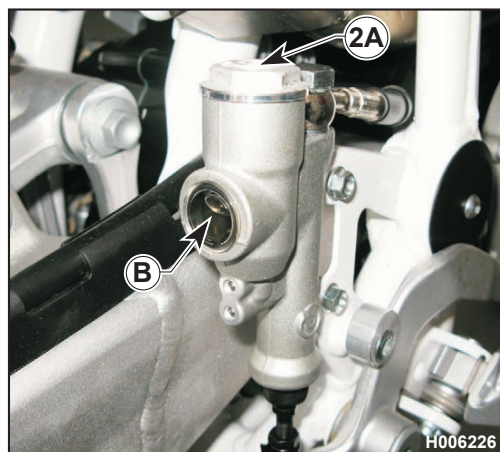
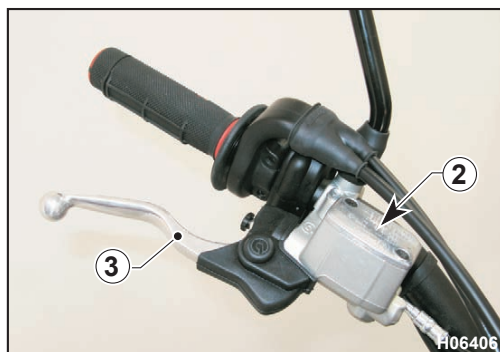


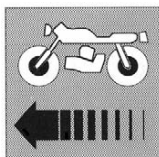
TC - TE - TXC



- Remove the reservoir cap (2) or (2A) 21 mm wrench and the rubber gaiter.
- Pull the lever (3) and hold it pulled, or press the pedal (3A) and hold it pressed so that the system is under pressure.
- Loosen the valve (1) or (1A) and wait for the oil to come out, then tighten the valve (1) or (1A) and release the lever or the pedal.
- Repeat this operation a few times until the oil is completely drained.
- Fill the reservoir (2) or (2A) with the new fluid.
- Pull and hold the lever (3), or press and hold the pedal (3A) so that the system is under pressure; loosen the valve (1) or (1A) tighten the valve (1) or (1A) always holding the lever pulled or the pedal pressed, then release.
- Top up with fluid up to level (A) or (B) and refit rubber gaiter and reservoir cover.

After changing the fluid, you will need to bleed air from the circuit.





BRAKES
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

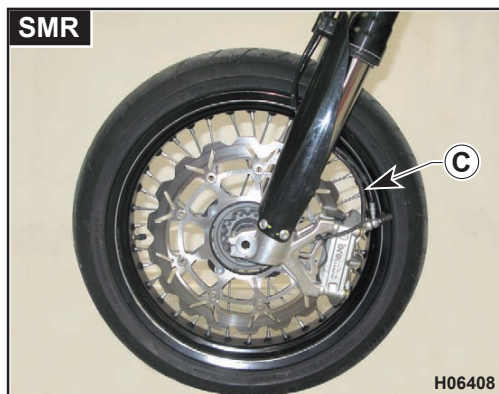


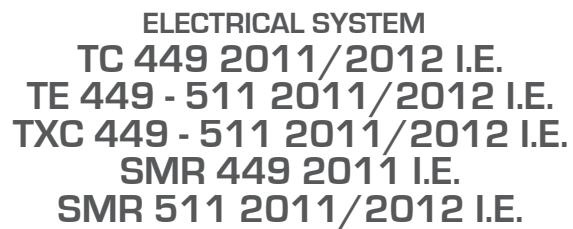
TC - TE - TXC

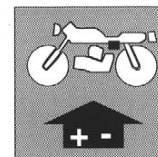
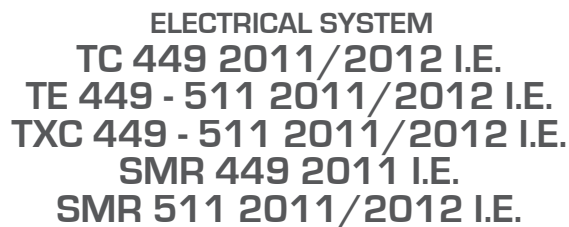


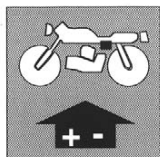
Periodically check the connecting hoses (C) and (D) (see Scheduled Maintenance Chart, Section B): replace worn or cracked hoses.

SMR





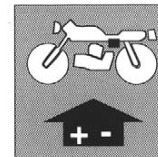
Workshop Manual Ed. 03-2012



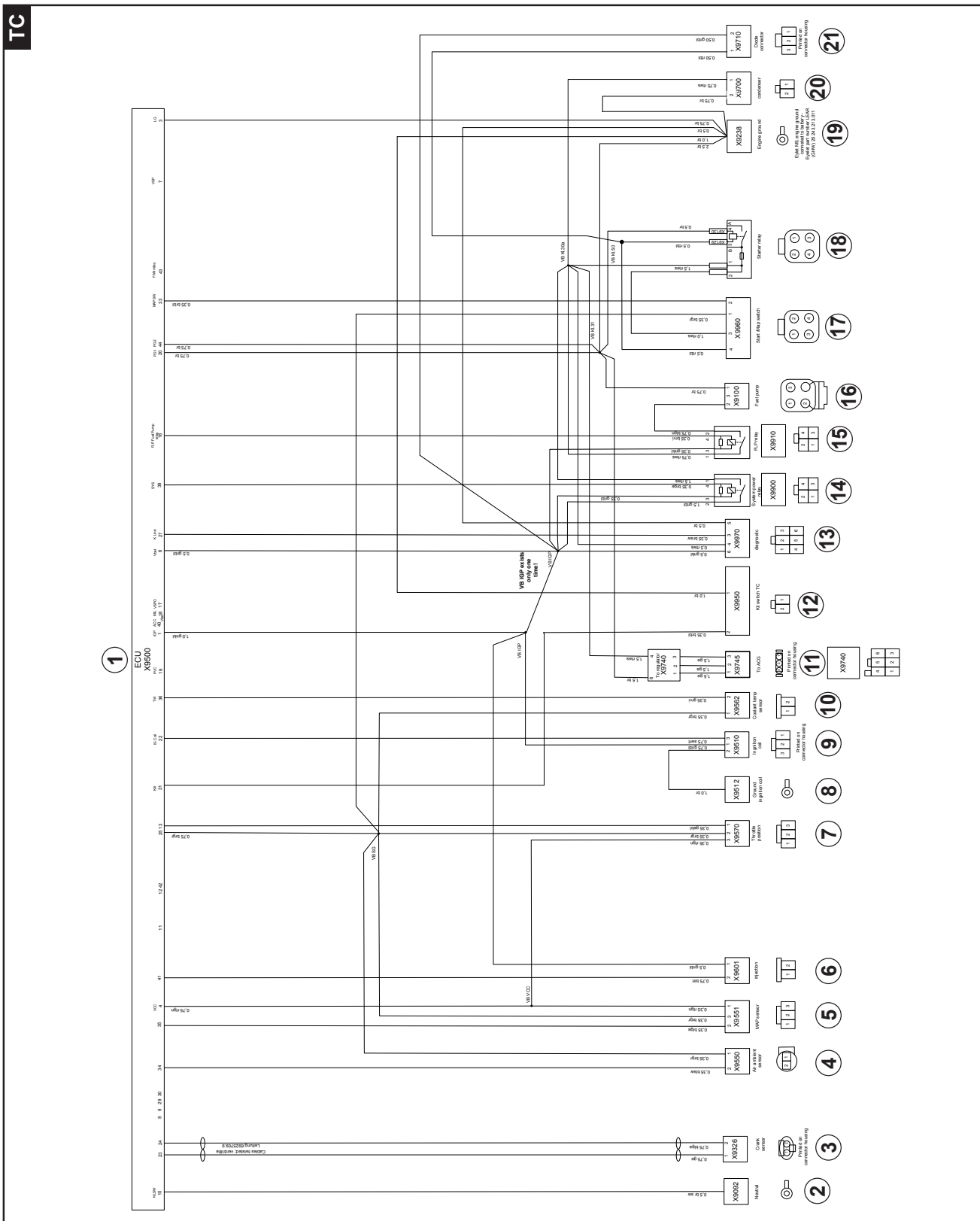
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

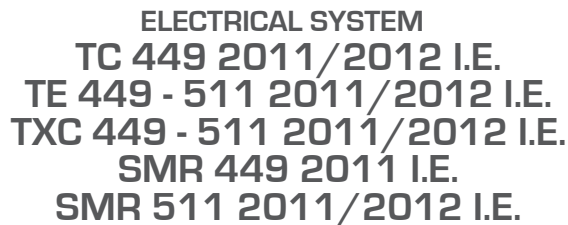


Dashboard replacement (TE - SMR)	M.58
Instructions for the instrument setting	M.59
Troubleshooting	M.59
Charging system	M.59
Starting system	M.59
Electronic ignition system	M.59
Connector position (TE - SMR)	M.60
Connector position (TC)	M.65
Connector position (TXC)	M.67
Important	M.71



Engine wiring diagram (TC MY11 - MY12)



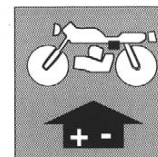
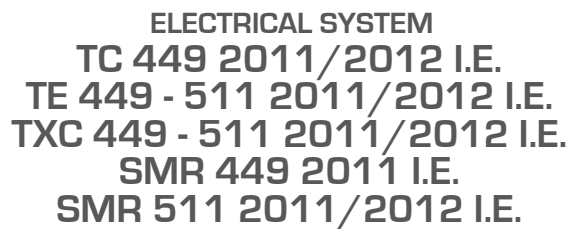


Key to wiring diagram

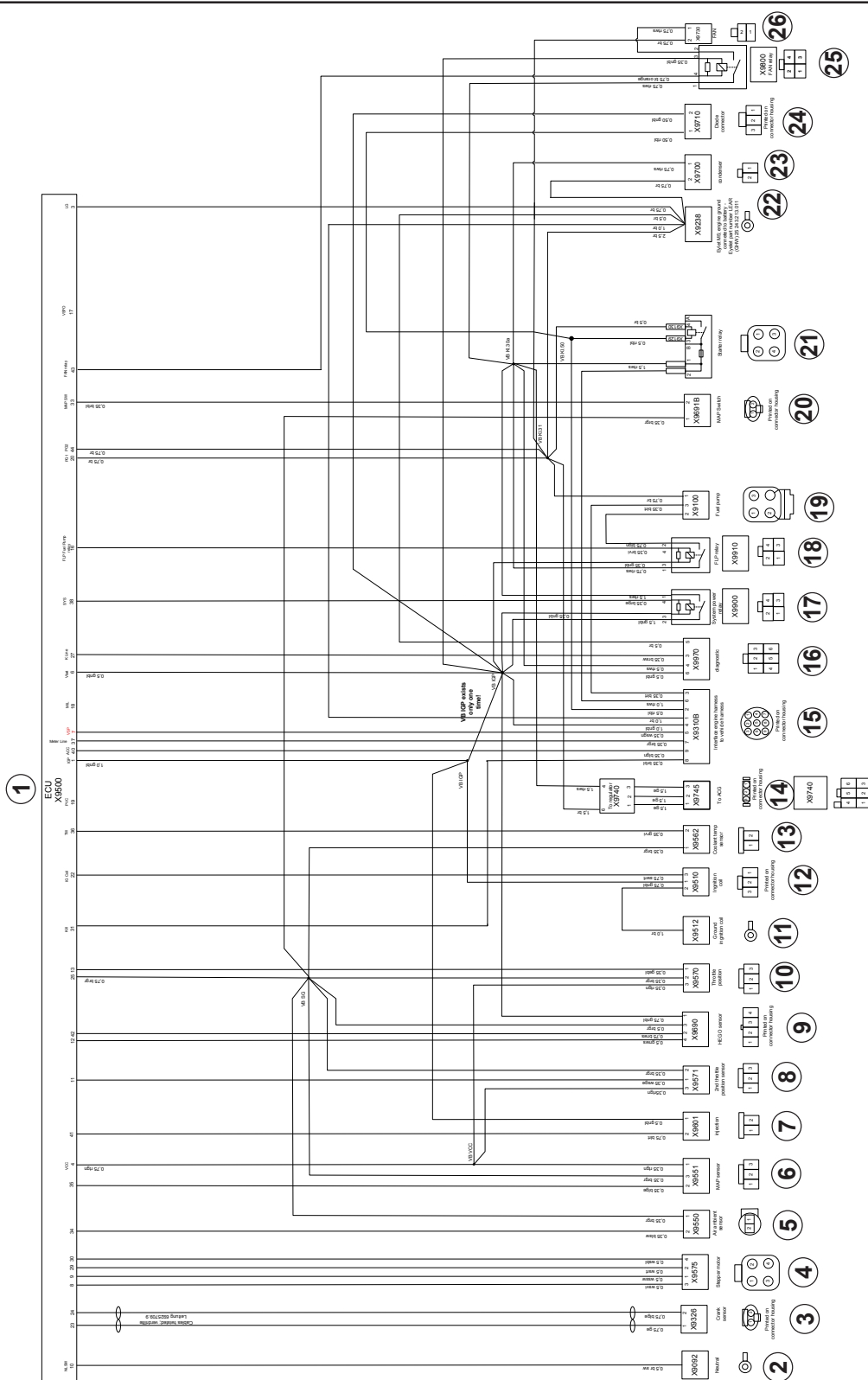
1. Control unit
2. Neutral
3. Crankshaft pick up
4. Air temperature sensor
5. MAP sensor
6. Injector
7. Throttle valve position
8. Coil ground
9. Ignition coil
10. Coolant temperature sensor
11. Generator
12. Engine stop button
13. Diagnostics
14. Power relay
15. Fuel pump relay
16. Fuel pump
17. Map change / starting connector
18. Solenoid starter
19. Engine ground
20. Condenser
21. Diode connector

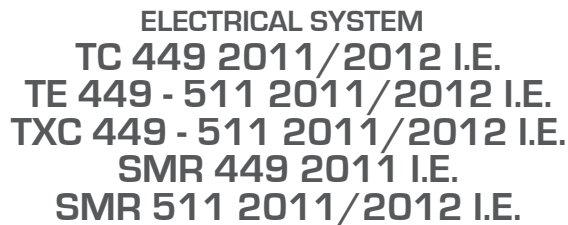
Colour coding key

blge	Blue/Yellow
blgn	Blue/Green
blrt	Blue/Red
blsw	Blue/Black
br	Brown
brbl	Brown/Blue
brge	Brown/Yellow
brgr	Brown/Grey
brsw	Brown/Black
brvi	Brown/Violet
brws	Brown/White
gebl	Yellow/Blue
gebr	Yellow/Brown
gegn	Yellow/Green
gert	Yellow/Red
gnbl	Green/Blue
gnge	Green/Yellow
ngews	Green/Yellow/White
gnsw	Green/Black
grvi	Grey/Violet
rt	Red
rtbl	Red/Blue
rtgn	Red/Green
rtws	Red/White
sw	Black
swgn	Black/Green
swrt	Black/Red
wsbl	White/Blue
wsbr	White/Brown
wsge	White/Yellow
wsgn	White/Green
wsrt	White/Red
wssw	White/Black
wsvi	White/Violet



TE - TXC - SMR



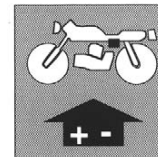


Key to wiring diagram

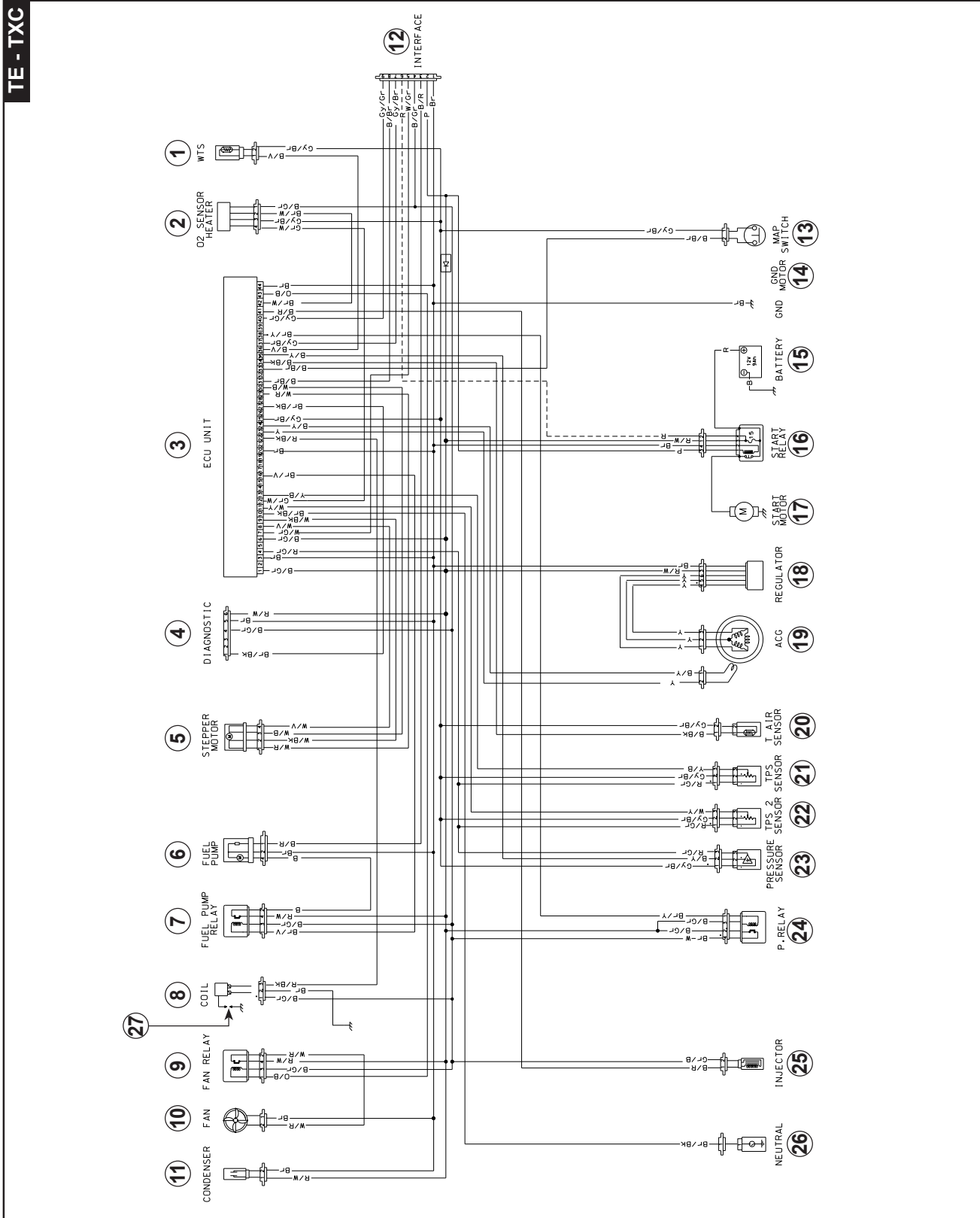
1. Control unit
2. Neutral
3. Crankshaft pick up
4. Second throttle motor
5. Air temperature sensor
6. MAP sensor
7. Injector
8. Second throttle sensor
9. Lambda sensor
10. First throttle sensor
11. Coil ground
12. Ignition coil
13. Coolant temperature sensor
14. Generator
15. Chassis wiring connector
16. Diagnostics
17. Power relay
18. Fuel pump relay
19. Fuel pump
20. Map change connector
21. Solenoid starter
22. Engine ground
23. Condenser
24. Diode connector
25. Fan relay
26. Fan

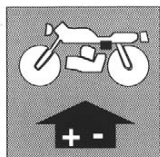
Colour coding key

blge	Blue/Yellow
blgn	Blue/Green
blrt	Blue/Red
blsw	Blue/Black
br	Brown
brbl	Brown/Blue
brge	Brown/Yellow
brgr	Brown/Grey
brsw	Brown/Black
brvi	Brown/Violet
brws	Brown/White
gebl	Yellow/Blue
gebr	Yellow/Brown
gegn	Yellow/Green
gert	Yellow/Red
gnbl	Green/Blue
gnge	Green/Yellow
ngews	Green/Yellow/White
gnsw	Green/Black
grvi	Grey/Violet
rt	Red
rtbl	Red/Blue
rtgn	Red/Green
rtws	Red/White
sw	Black
swgn	Black/Green
swrt	Black/Red
wsbl	White/Blue
wsbr	White/Brown
wsge	White/Yellow
wsgn	White/Green
wsrt	White/Red
wssw	White/Black
wsvi	White/Violet



Engine wiring diagram (TE-TXC MY12)





ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

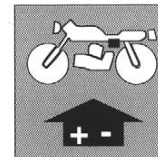


Key to wiring diagram

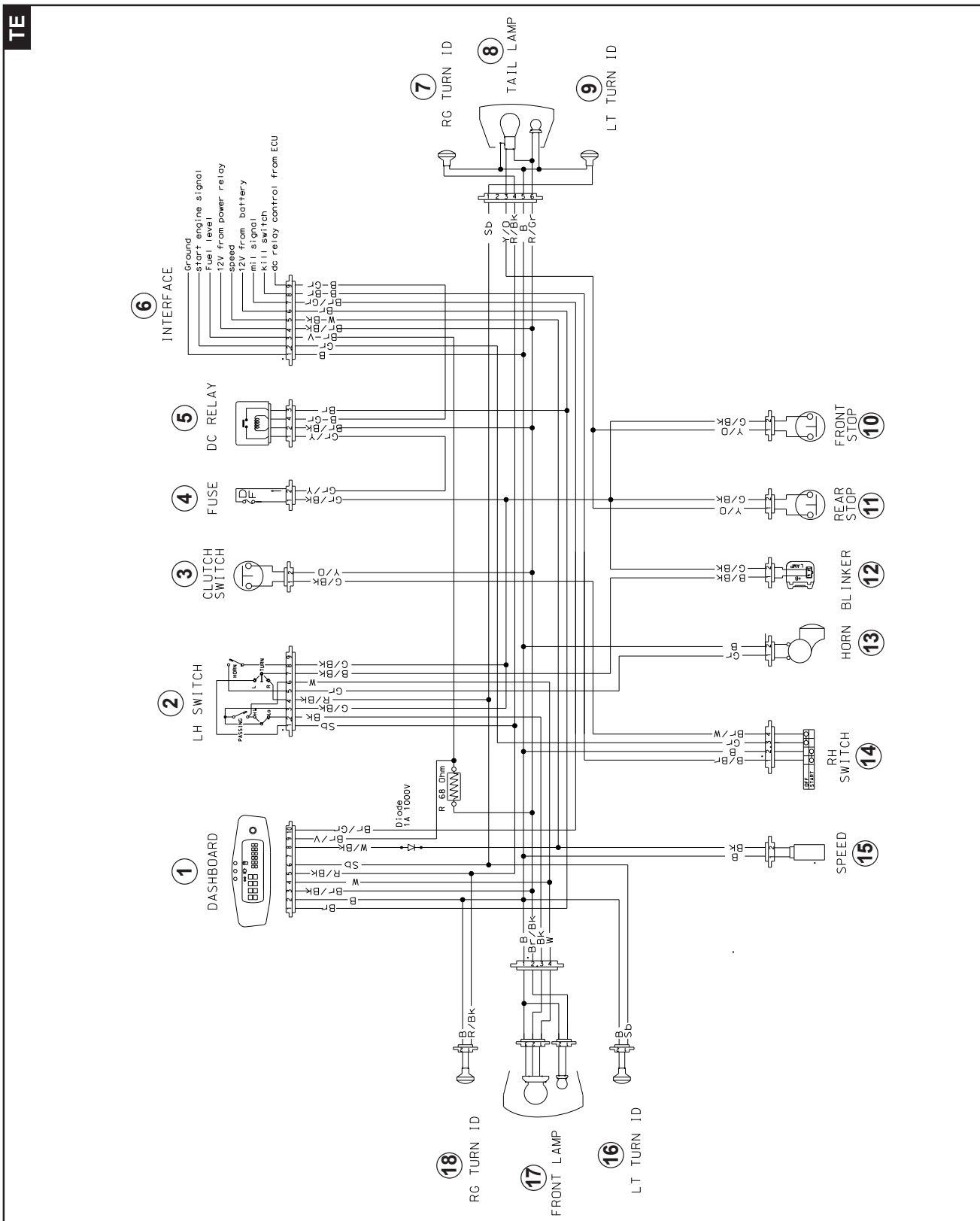
1. Coolant temperature sensor
2. Lambda sensor
3. Electronic control unit
4. Control unit interface
5. Stepper motor
6. Fuel pump
7. Fuel pump relay
8. HT coil
9. Electric fan relay
10. Cooling fan
11. Condenser
12. Interface
13. MAP change push-button
14. Engine ground
15. Battery
16. Solenoid starter
17. Starter motor
18. Voltage regulator
19. Alternator
20. Air temperature sensor
21. Throttle position sensor (1)
22. Throttle position sensor (2)
23. Pressure sensor
24. Power relay
25. Injector
26. Neutral sensor
27. Spark plug

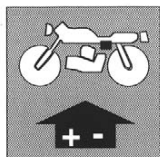
Colour coding key

- B Blue
Bk Black
Br Brown
G Green
Gy Grey
O Orange
P Pink
R Red
Sb Sky blue
V Violet
W White
Y Yellow



Vehicle wiring diagram (TE MY12)





ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

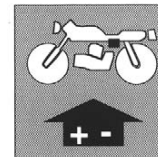


Key to wiring diagram

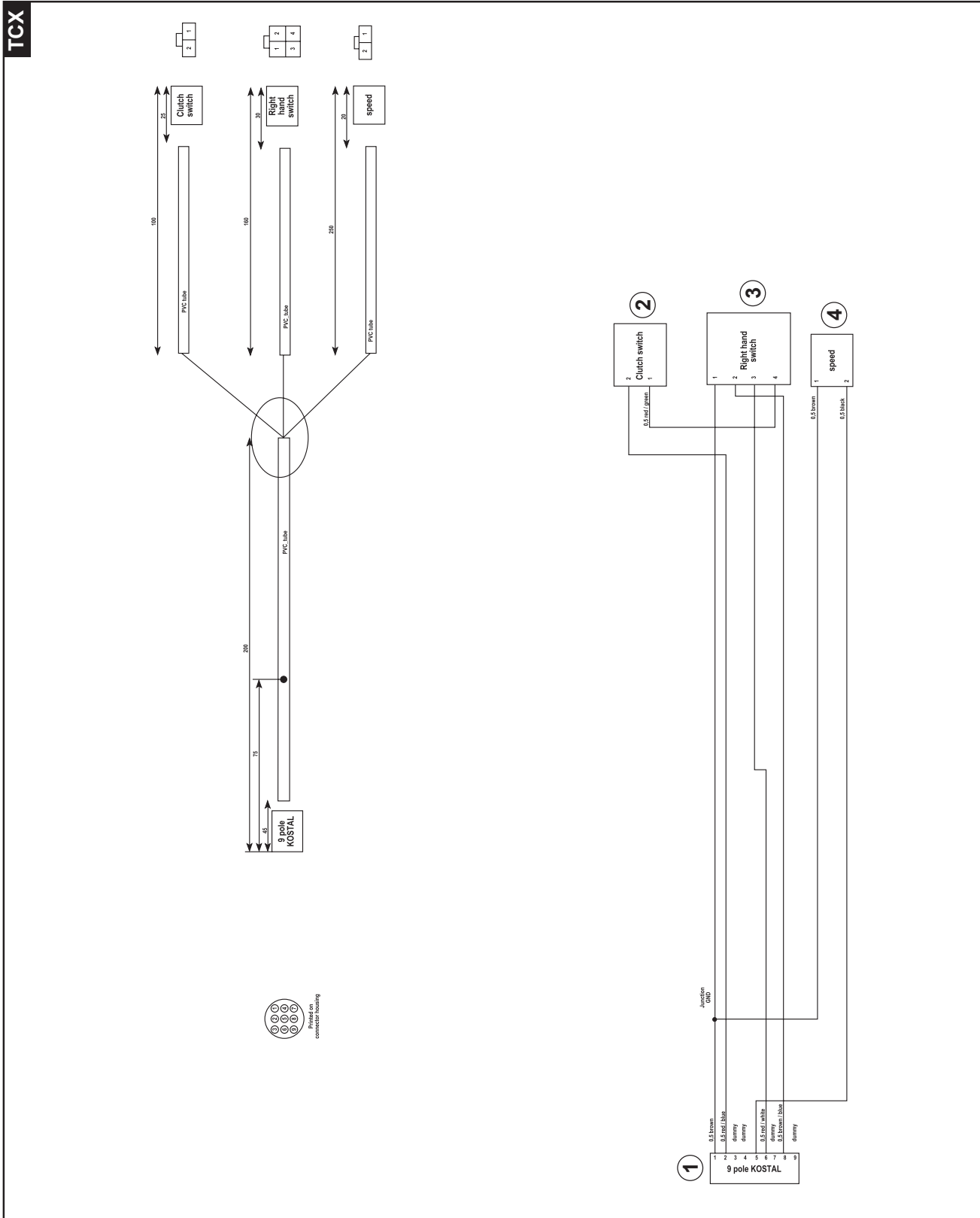
1. Dashboard
2. L.H. switch
3. Clutch sensor
4. Fuses
5. DC relay
6. Interface
7. Rear R.H. turning indicator
8. Tail light
9. Rear L.H. turning indicator
10. Front stop light switch
11. Rear stop light switch
12. Turning indicators flasher
13. Horn
14. R.H. switch
15. Speed sensor
16. Front L.H. turning indicator
17. Headlamp
18. Front R.H. turning indicator

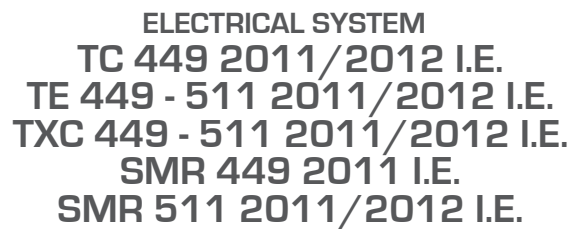
Colour coding key

B	Blue
Bk	Black
Br	Brown
Gr	Green
Gy	Grey
O	Orange
P	Pink
R	Red
Sb	Sky blue
V	Violet
W	White
Y	Yellow



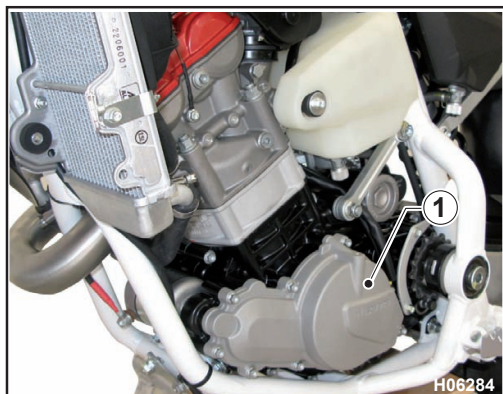
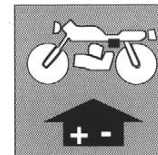
Adapter (TXC)





Key to wiring diagram

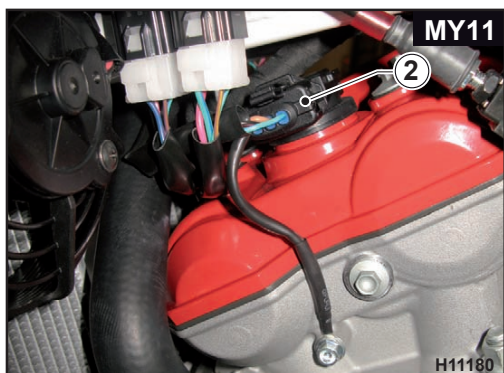
1. Adapter to engine wiring connector
2. Clutch connector
3. RH switch connector
4. Speed sensor connector



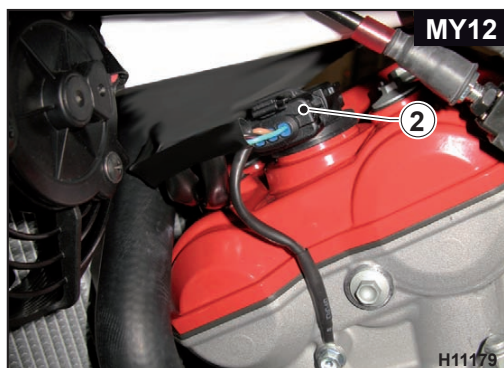
Electrical components location (TC)

The ignition system includes the following elements:

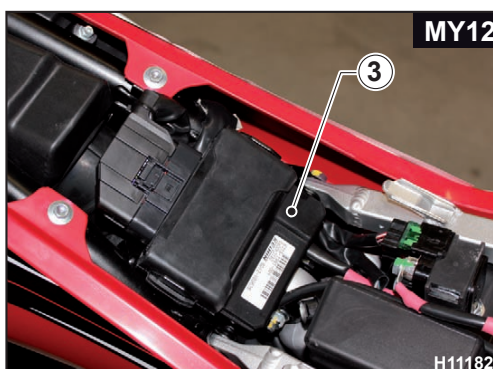
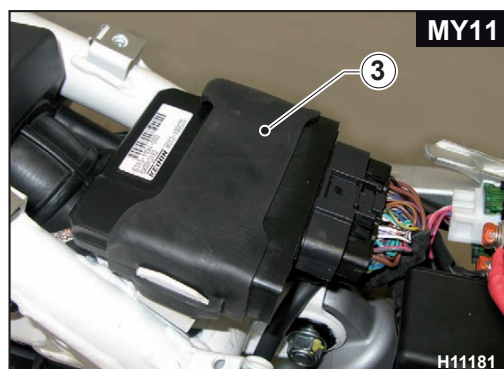
- Generator (1), on the inner side of L.H. crankcase half cover;

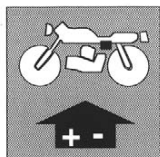


- Electronic ignition coil (2) with integrated spark plug cap positioned on cylinder head;
- Spark plug on cylinder head;

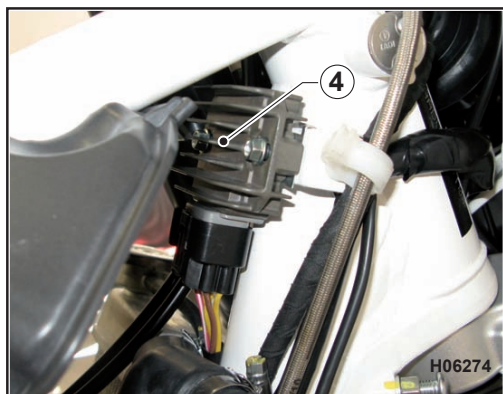


- Electronic control unit (3) under the saddle;

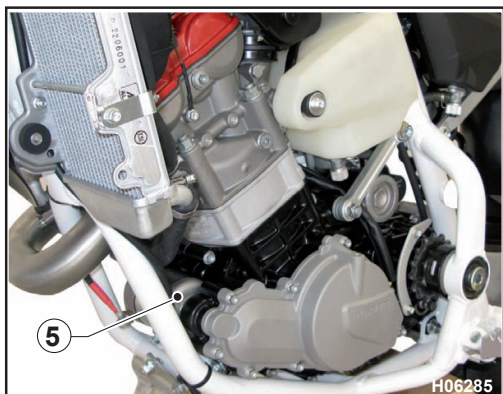




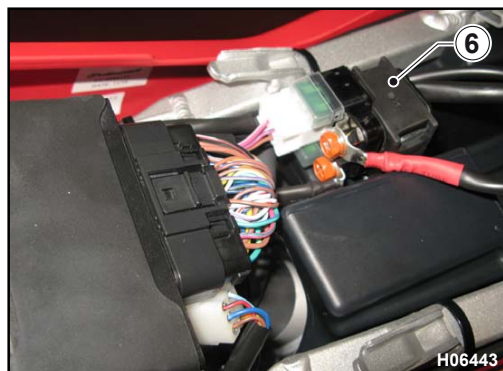
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



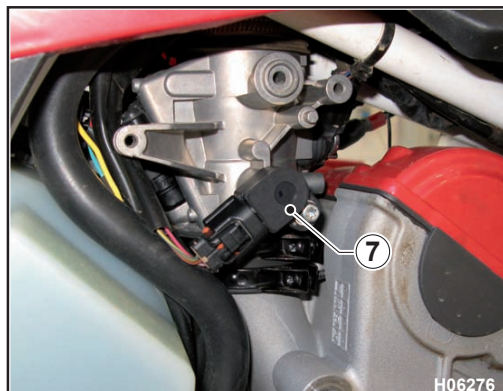
- Voltage regulator (4) located at the back of the steering tube.



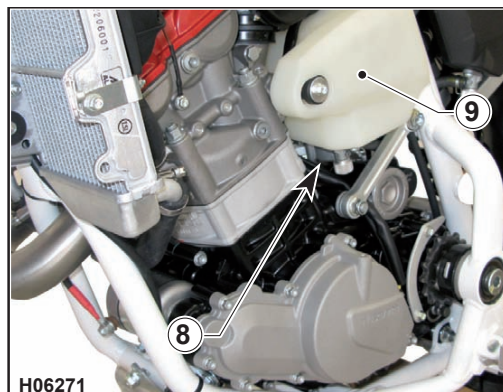
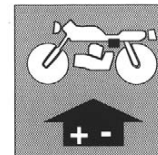
- Starter motor (5) in front of engine cylinder;



- Solenoid starter (6) positioned under saddle, on rear chassis;

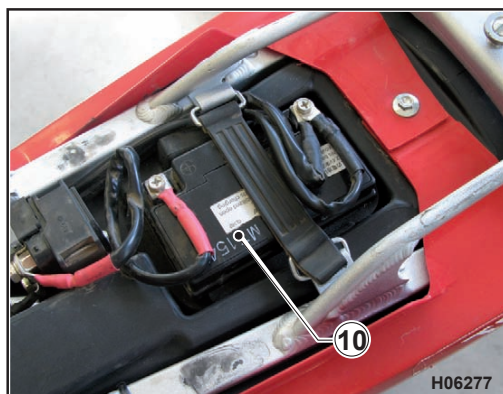


- "MAP. SENSOR" (7) sensor on throttle body;

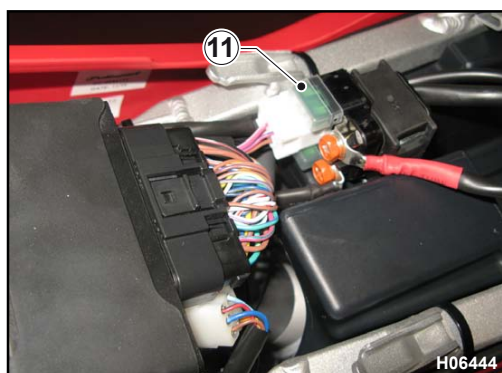


The electrical system includes the following elements:

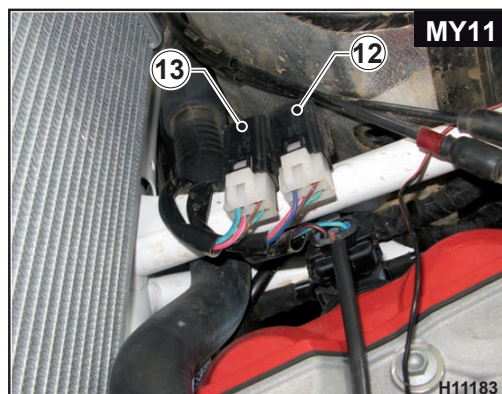
- Fuel pump (8) positioned inside the tank (9);



- 12V - 4Ah Battery (10) under the saddle;

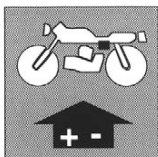


- A 30A fuse (11) positioned on the solenoid starter;

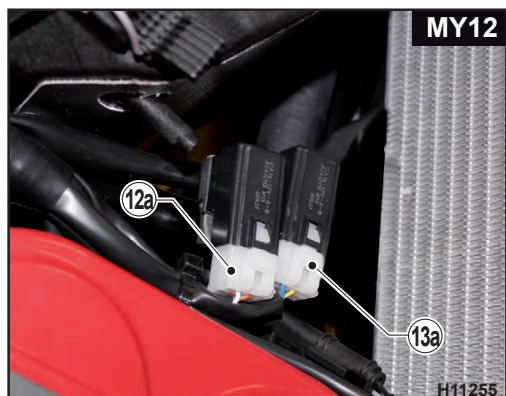


MY11:

- Fuel pump relay (12) positioned on the front left side, under the air box.
- Main starting relay (13) positioned on the front left side, under the air box.

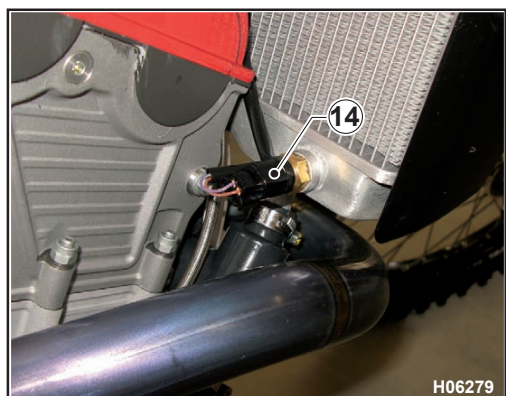


ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

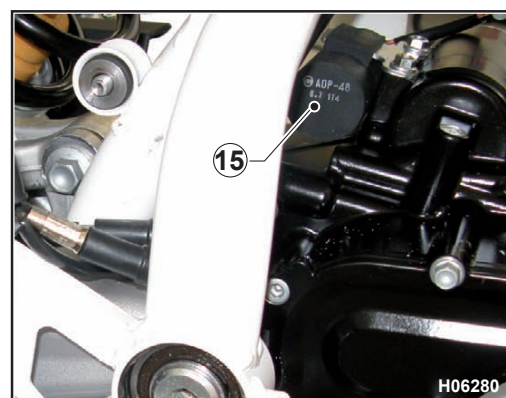


MY12:

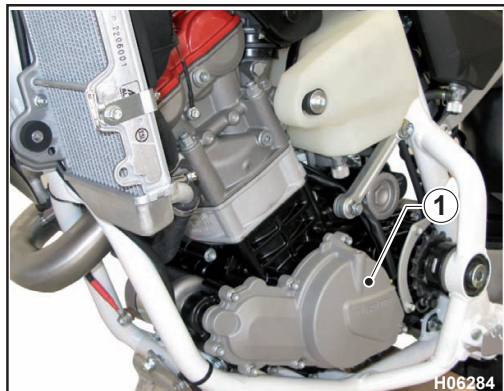
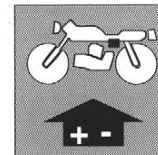
- Fuel pump relay (12a) positioned on the front right side, under the air box.
- Main starting relay (13a) positioned on the front right side, under the air box.



- Coolant temperature sensor (14);



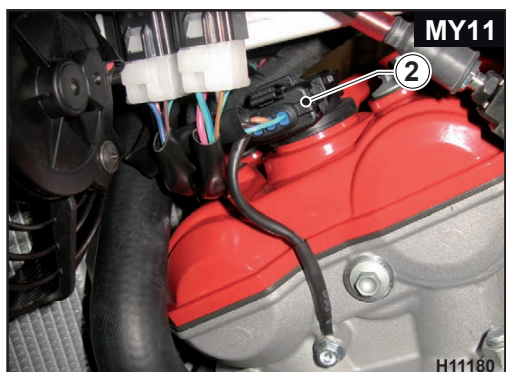
- Condenser (15) positioned on engine rear side.



Electrical components location (TE - SMR)

The ignition system includes the following elements:

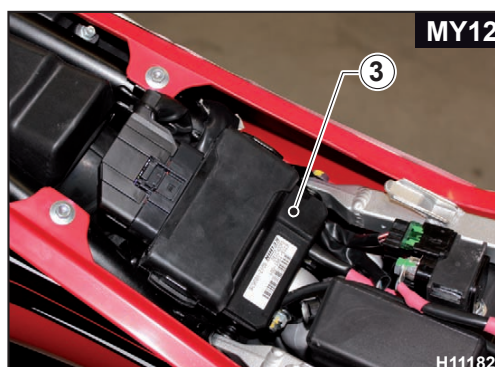
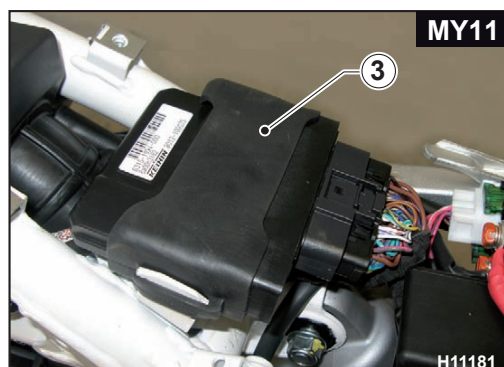
- Generator (1) on the inner side of L.H. crankcase half cover;

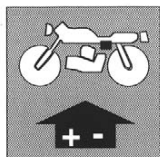


- Electronic ignition coil (2) with integrated spark plug cap positioned on cylinder head;
- Spark plug on cylinder head;

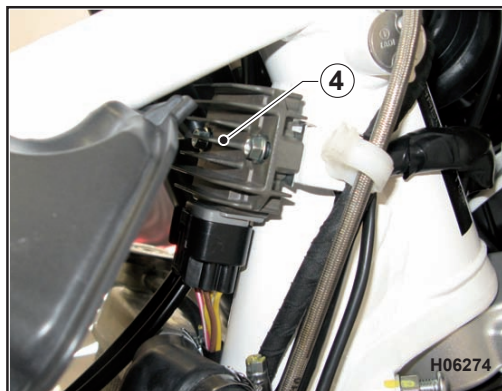


- Electronic control unit (3) under the saddle;

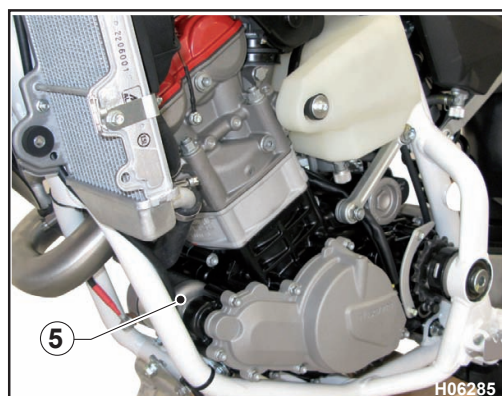




ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



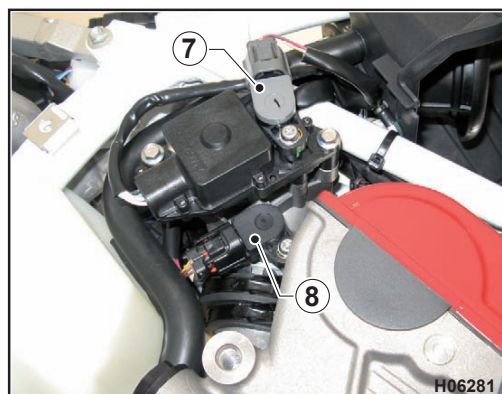
- Voltage regulator (4) located at the back of the steering tube.



- Starter motor (5) in front of engine cylinder;

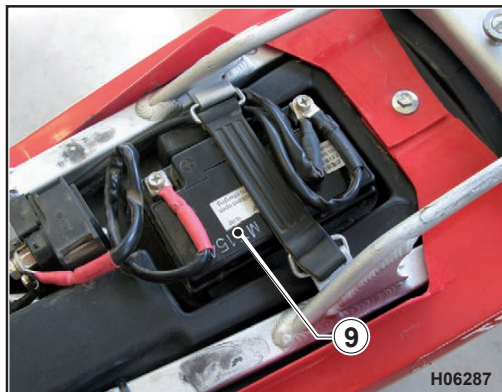
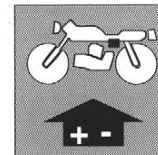


- Solenoid starter (6) positioned under saddle, on rear chassis;



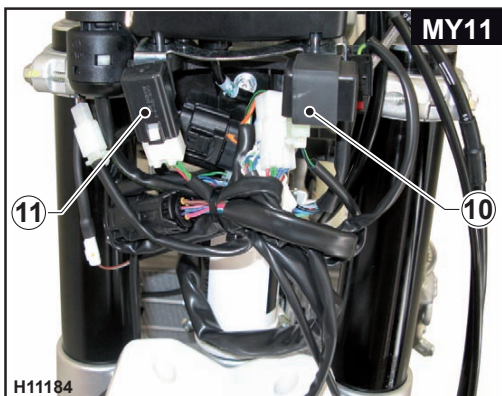
- Potentiometers (7) and (8) on throttle body;

(7) = 2nd throttle
(8) = 1st throttle

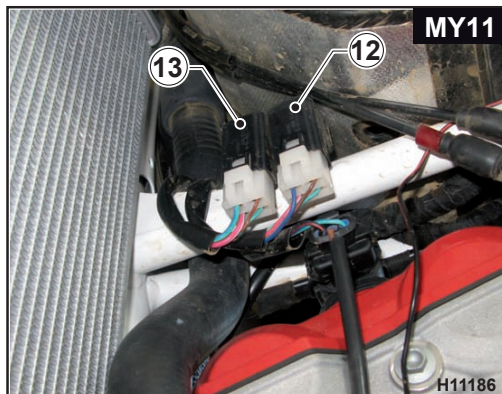
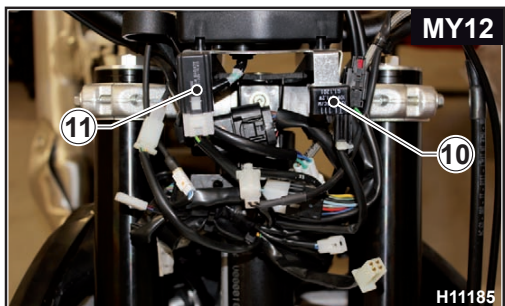


The electrical system includes the following elements:

- 12V - 6Ah Battery (9) under the saddle;

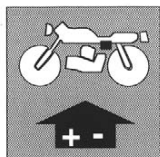


- Turning indicator flasher (10) at the front end, below the headlamp fairing;
- Light relay (11);

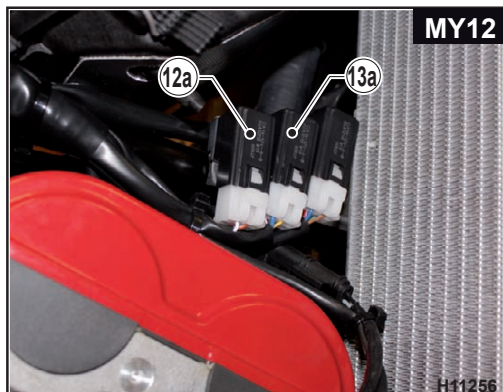


MY11:

- Fuel pump relay (12) and main relay (13) positioned on the front left side, under the air box;

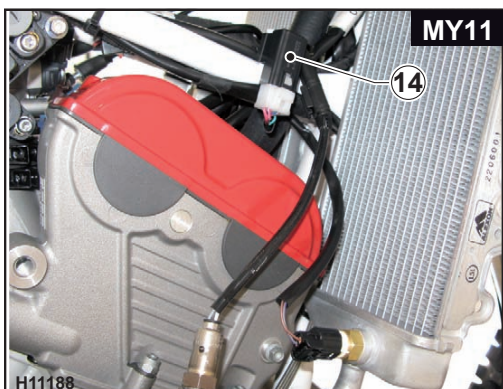


ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.

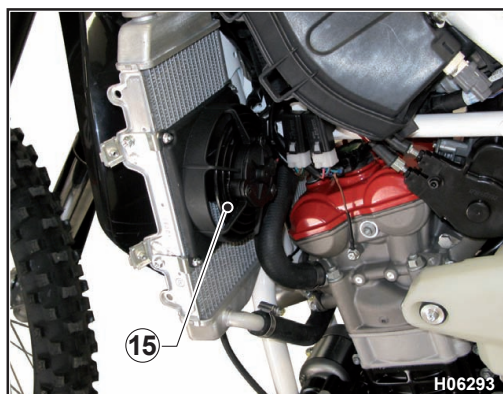
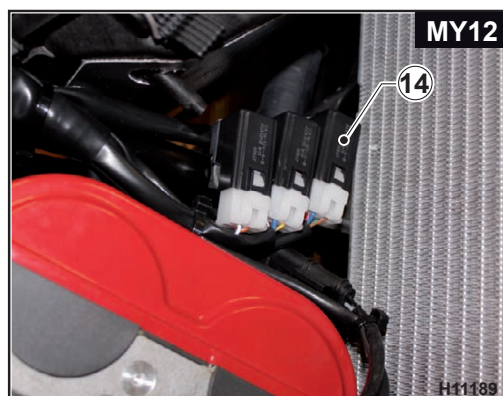


MY12:

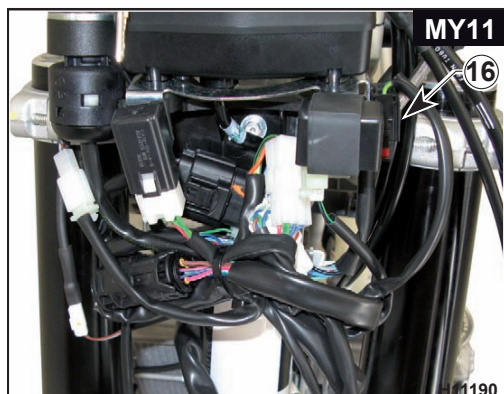
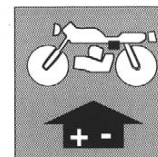
- Fuel pump relay (12a) and main relay (13a) positioned on the front right side, under the air box;



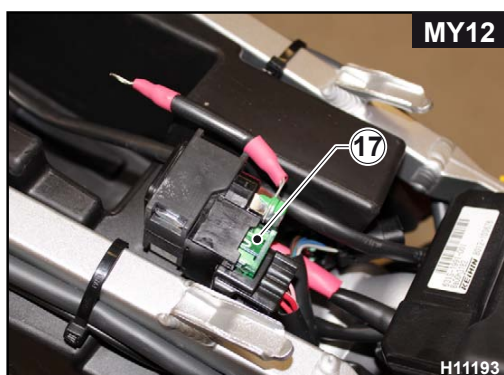
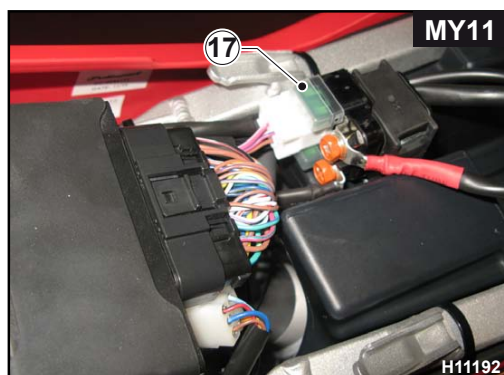
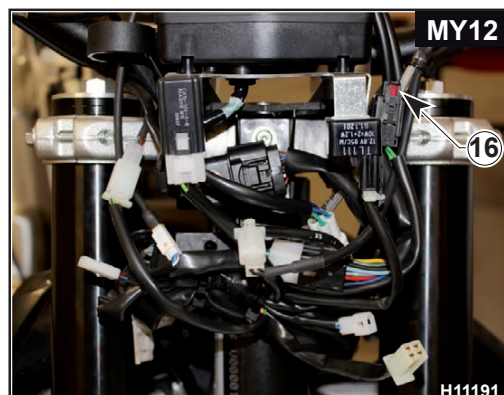
- Electric fan relay (14), on the right side, under the air box;

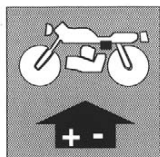


- Electric fan (15);

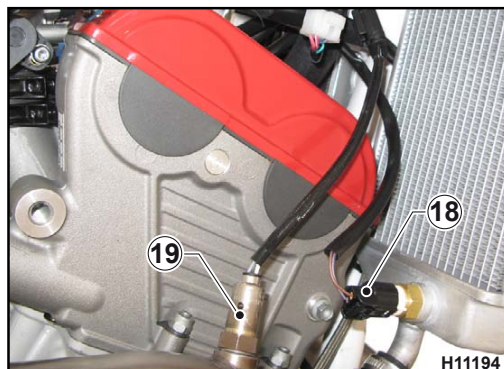


- A 10A (lights) fuse (16) positioned below the headlamp fairing and a 30A (main) fuse (17) positioned on the solenoid starter;

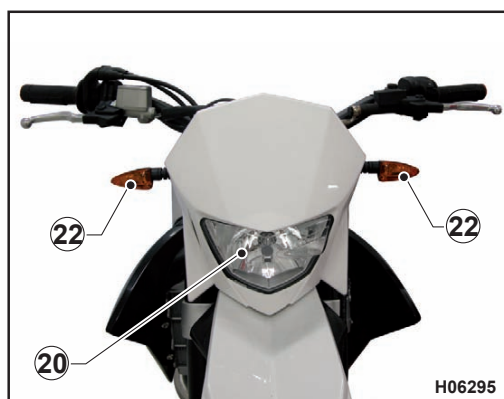




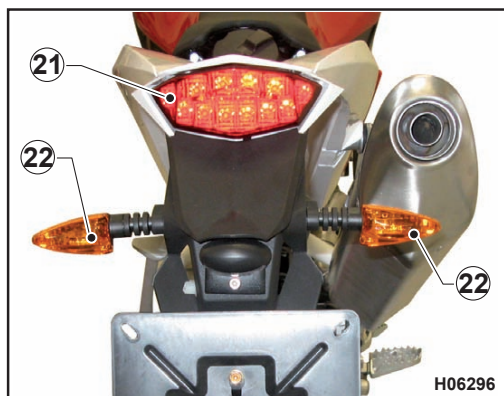
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



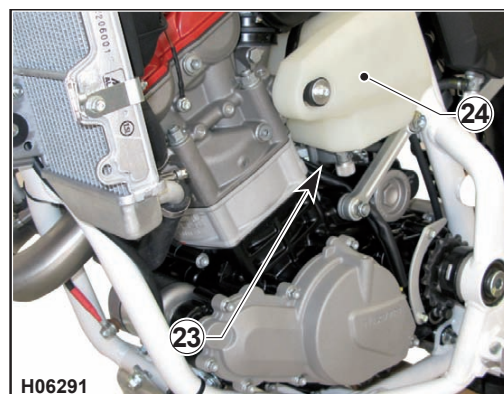
- Coolant temperature sensor (18);
- Lambda sensor (19);



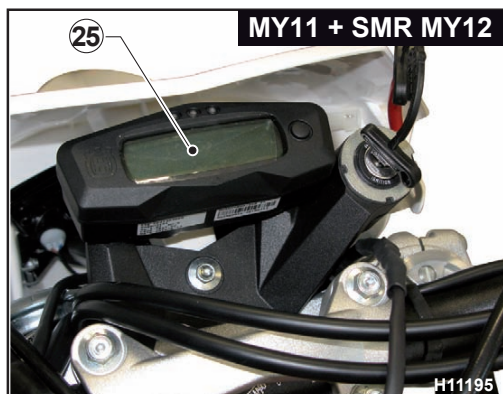
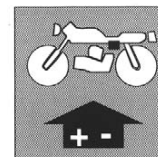
- Headlamp (20) with 12V-35W twin halogen bulb and 12V-5W parking light bulb;



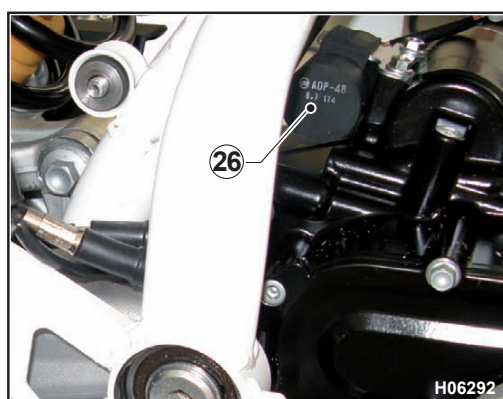
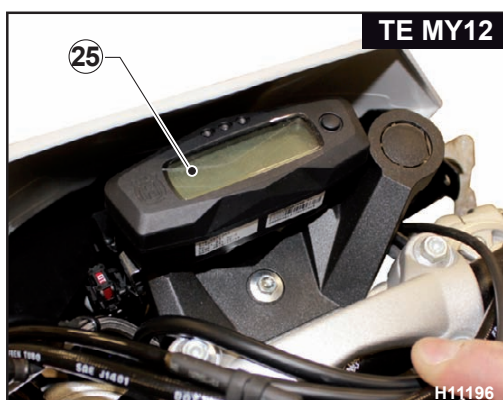
- LED tail light (21) with stop light bulb;
- Turning indicators (22), 12V-6W bulbs;



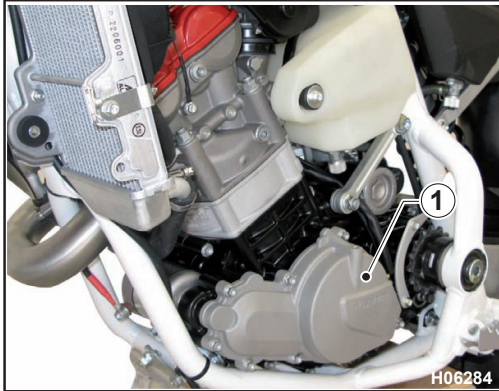
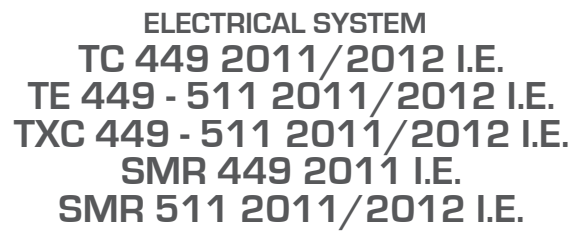
- Fuel pump (23) inside the tank (24);



- Odometer (25);



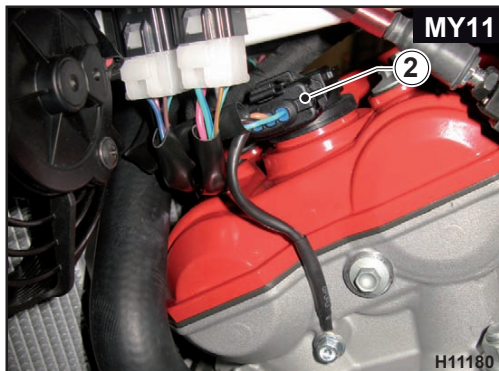
- Condenser (26) positioned on engine rear side.



Electrical components location (TXC)

The ignition system includes the following elements:

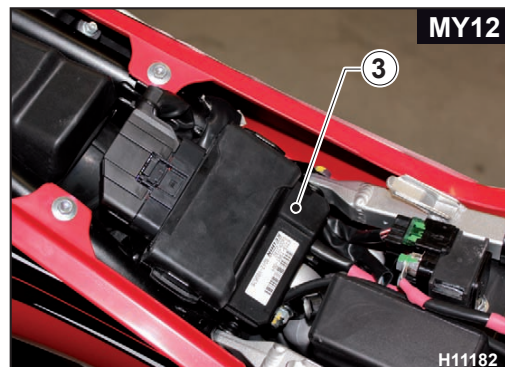
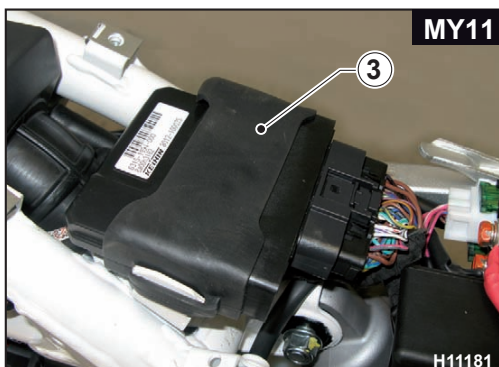
- Generator (1), on the inner side of L.H. crankcase half cover;

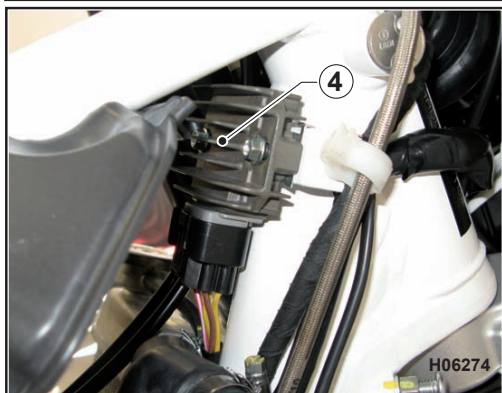
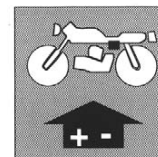


- Electronic ignition coil (2) with integrated spark plug cap positioned on cylinder head;
- Spark plug on cylinder head;

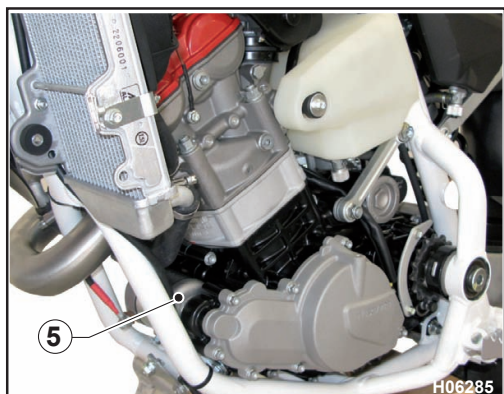


- Electronic control unit (3) under the saddle;





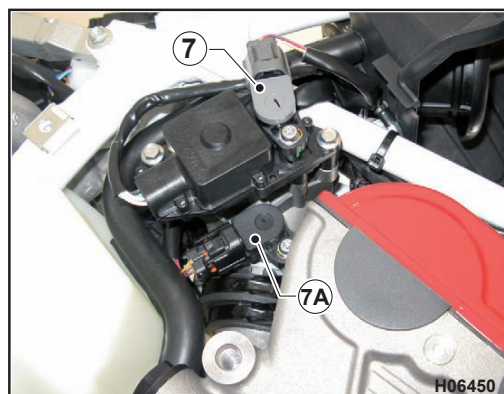
- Voltage regulator (4) located at the back of the steering tube.



- Starter motor (5) in front of engine cylinder;

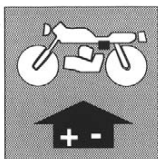


- Solenoid starter (6) positioned under saddle, on rear chassis;

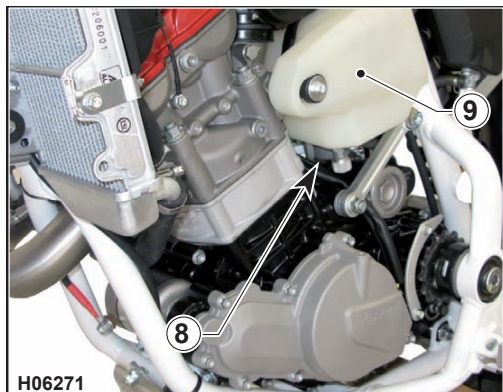


- Potentiometers (7) and (7A) on throttle body;

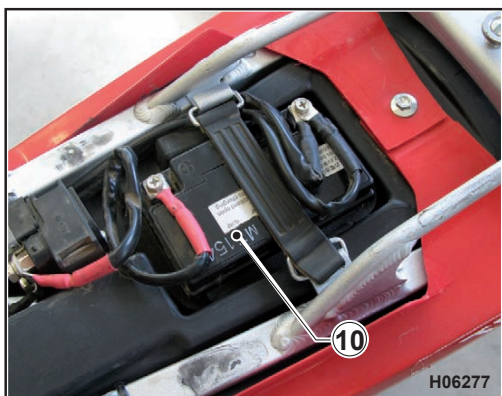
(7) = 2nd throttle
 (7A) = 1st throttle



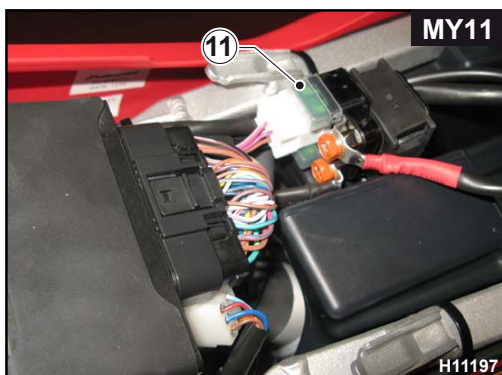
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



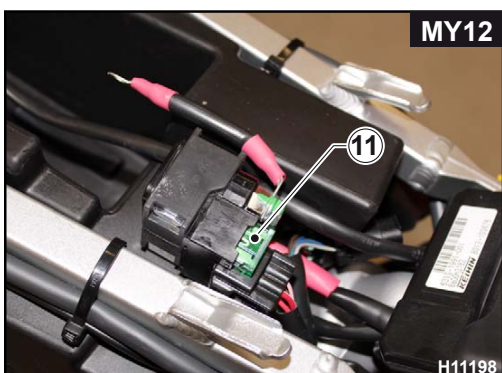
The electrical system includes the following elements:
- Fuel pump (8) positioned inside the tank (9);

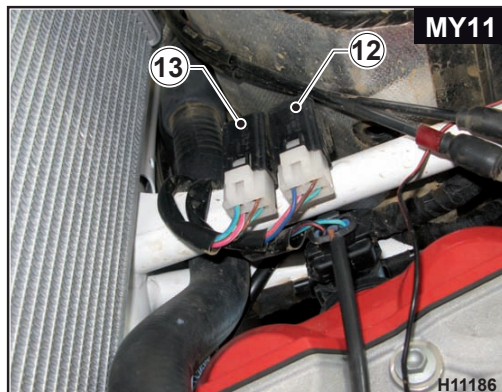
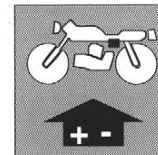


- 12V - 6Ah Battery (10) under the saddle;



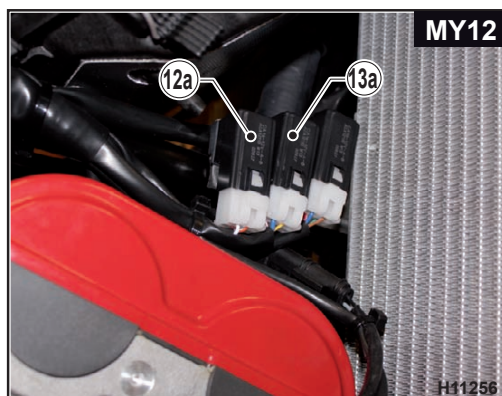
- A 30A fuse (11) positioned on the solenoid starter;





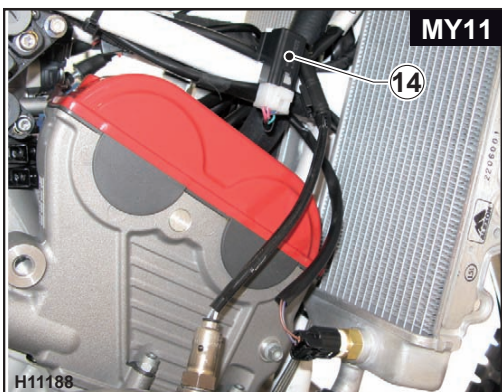
MY11:

- Fuel pump relay (12) positioned on the front left side, under the air box;
- Main starting relay (13) positioned on the front left side, under the air box.

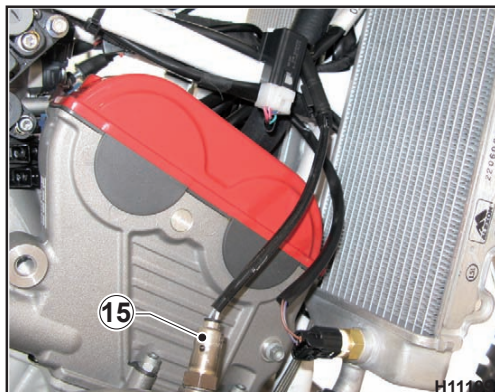
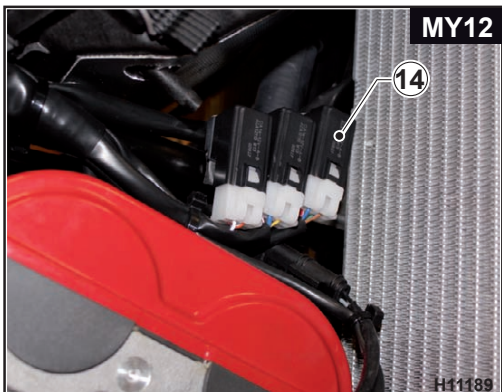


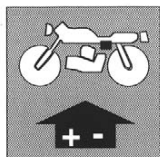
MY12:

- Fuel pump relay (12a) positioned on the front right side, under the air box;
- Main starting relay (13a) positioned on the front right side, under the air box.

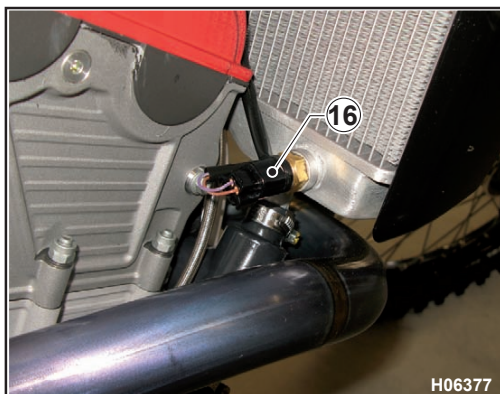


- Electric fan relay (14), on the chassis right side.
- Lambda sensor (15).

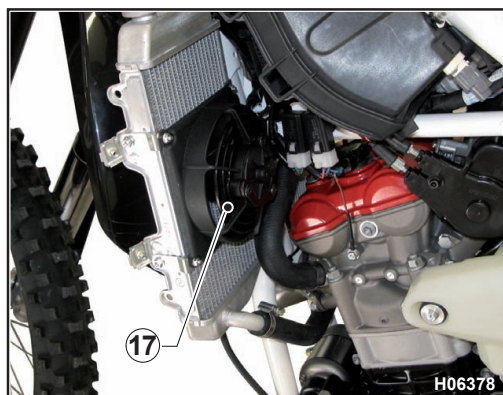




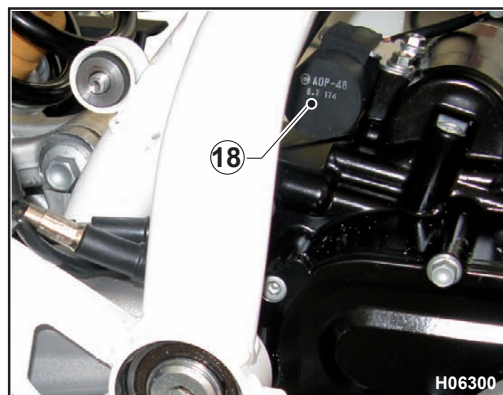
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



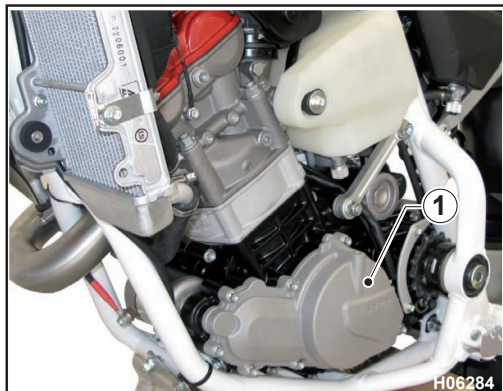
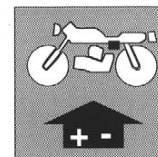
- Coolant temperature sensor (16);



- Electric fan (17);

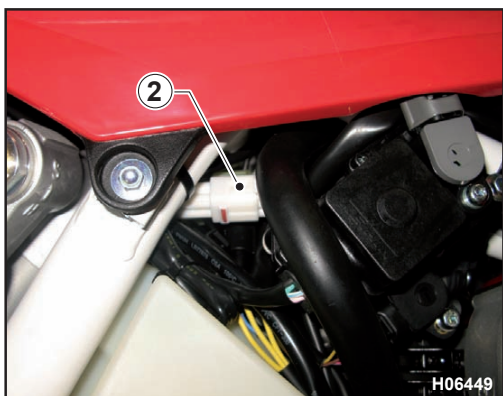


- Condenser (18) positioned on engine rear side.



Generator stator windings resistance (1) inspection

Disconnect the stator coil connector from the wiring and measure resistance with a meter.



- 1) Check that across the terminals of the connector (2), the value is about 0.8Ω .

If resistance is outside the specified limits, replace the complete generator.

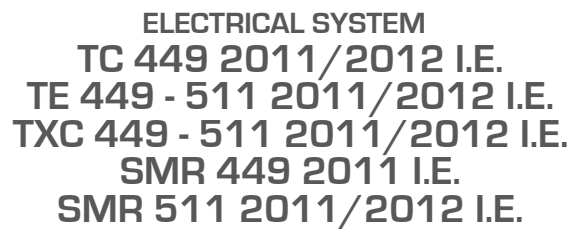
Generator no-load performance

MAX 13A at 14V.

RPM	A D.C. (typical)
1900	11A



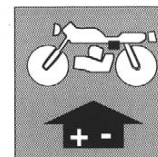
AT EACH ENGINE OVERHAUL, CLEAN FLYWHEEL ROTOR TO REMOVE ANY DEBRIS SUSPENDED IN SWIRLING OIL AND CAPTURED BY THE MAGNETS.



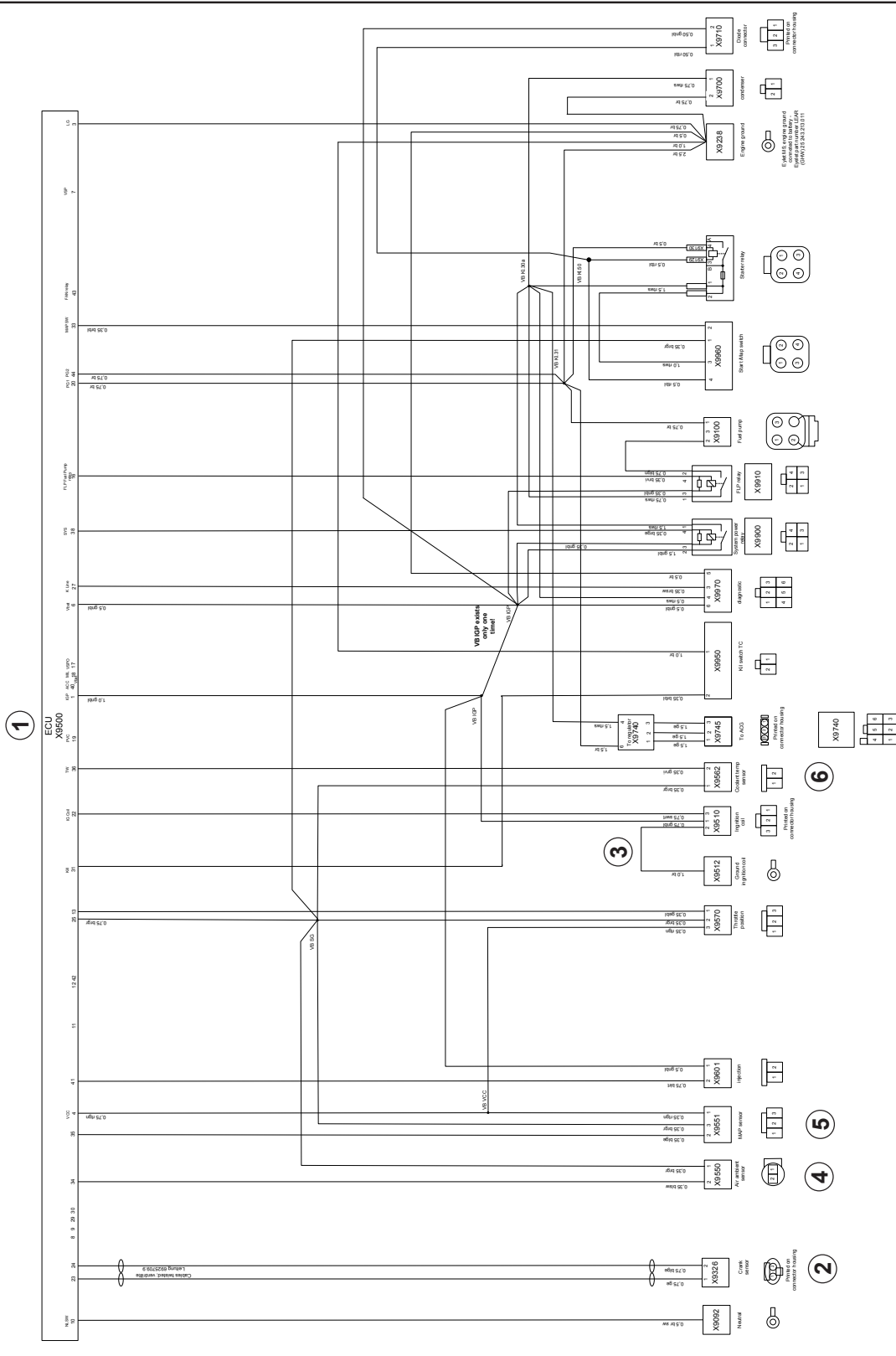
The condenser (1) keeps the bike running in case of accidental disconnection of battery (loosening of cable fastening device).

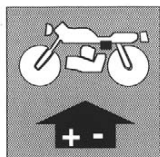
- Disconnect the condenser and check that its capacitance is 2,200 Microfarad.

In case the reading is different, it is necessary to replace it.



TC





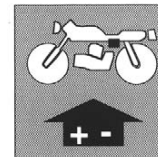
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



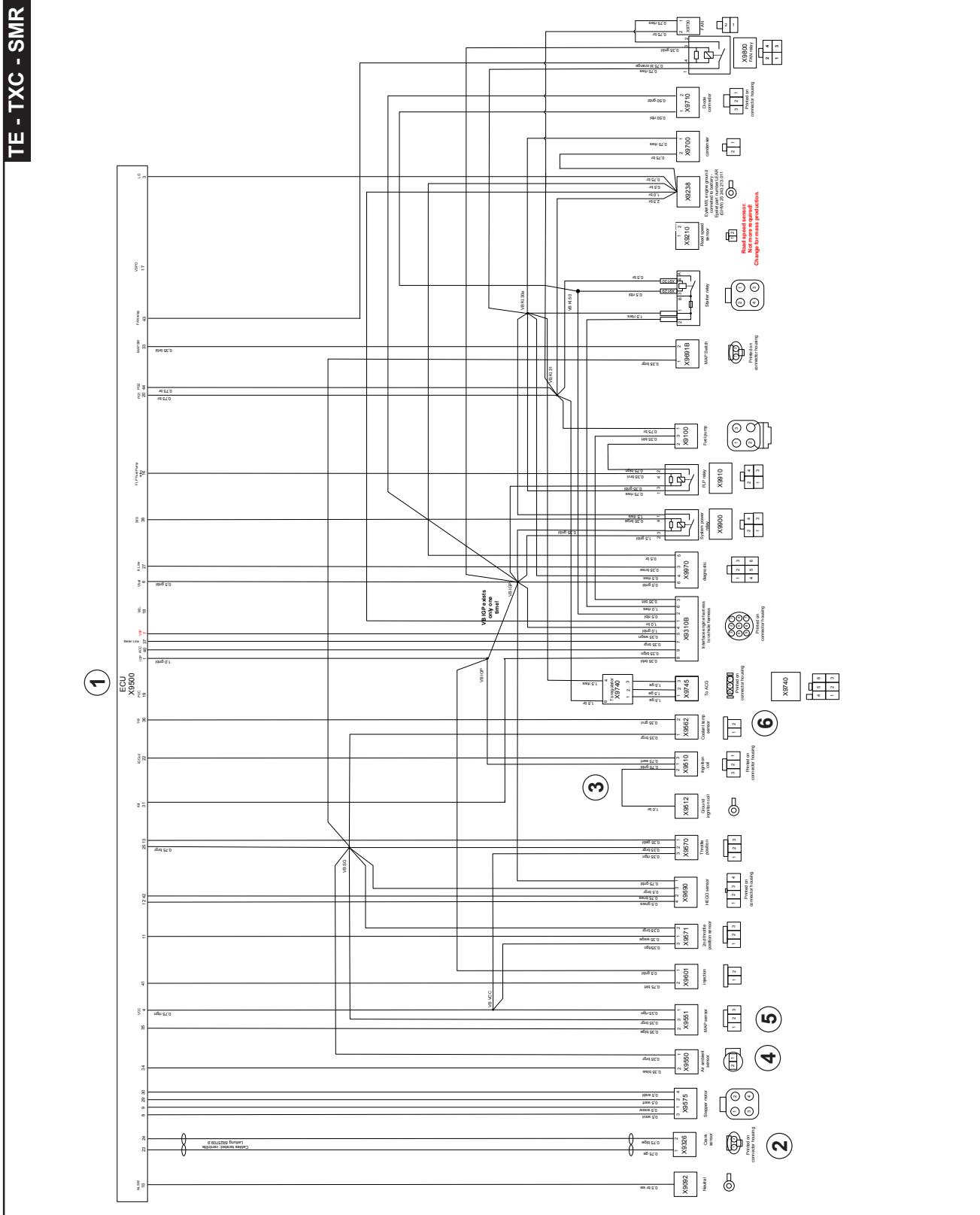
The ignition system is controlled by the ECU (1). The ignition is an integrated digital electronic ignition system with static timing and advance using intermittent sequential phased electronic injection feed. This ignition system is composed of a crankshaft position (pick-up) sensor (2), an ECU (1), an ignition coil (3) and an intake manifold pressure sensor (5). The ignition coil is fed by the battery through a power relay and is controlled by the ECU. Ignition timing is accurately determined based on engine RPM and accelerator position. In addition to these key parameters, inputs from the intake air temperature (4) and pressure (5) sensors and from the coolant temperature sensor (6) are also used to control ignition timing.

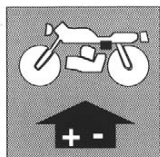
Key

1. ECU
2. Crankshaft position sensor
3. Ignition coil
4. Intake air temperature sensors
5. Pressure sensor
6. Coolant temperature sensor



Ignition system (TE - TXC - SMR MY11 + SMR MY12)





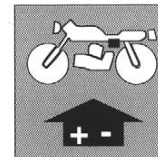
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



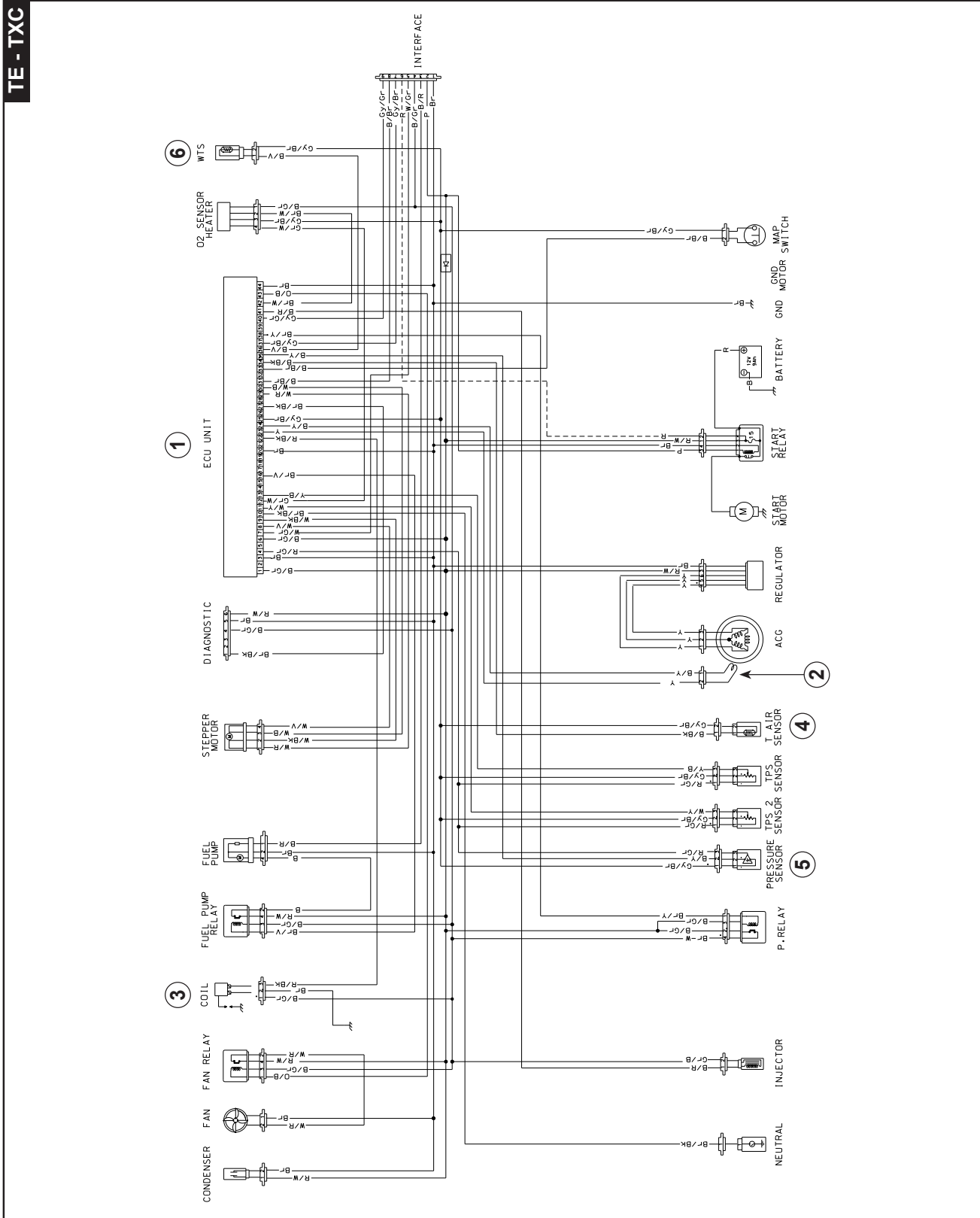
The ignition system is controlled by the ECU (1). The ignition is an integrated digital electronic ignition system with static timing and advance using intermittent sequential phased electronic injection feed. This ignition system is composed of a crankshaft position (pick-up) sensor (2), an ECU (1), an ignition coil (3) and an intake manifold pressure sensor (5). The ignition coil is fed by the battery through a power relay and is controlled by the ECU. Ignition timing is accurately determined based on engine RPM and accelerator position. In addition to these key parameters, inputs from the intake air temperature (4) and pressure (5) sensors and from the coolant temperature sensor are also used to control ignition timing.

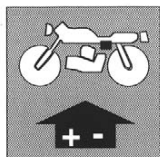
Key

1. ECU
2. Crankshaft position sensor
3. Ignition coil
4. Intake air temperature sensors
5. Pressure sensor
6. Coolant temperature sensor



Ignition system (TE - TXC MY12)





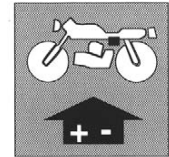
ELECTRICAL SYSTEM
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The ignition system is controlled by the ECU (1). The ignition is an integrated digital electronic ignition system with static timing and advance using intermittent sequential phased electronic injection feed. This ignition system is composed of a crankshaft position (pick-up) sensor (2), an ECU (1), an ignition coil (3) and an intake manifold pressure sensor (5). The ignition coil is fed by the battery through a power relay and is controlled by the ECU. Ignition timing is accurately determined based on engine RPM and accelerator position. In addition to these key parameters, inputs from the intake air temperature (4) and pressure (5) sensors and from the coolant temperature sensor are also used to control ignition timing.

Key

1. ECU
2. Crankshaft position sensor
3. Ignition coil
4. Intake air temperature sensors
5. Pressure sensor
6. Coolant temperature sensor



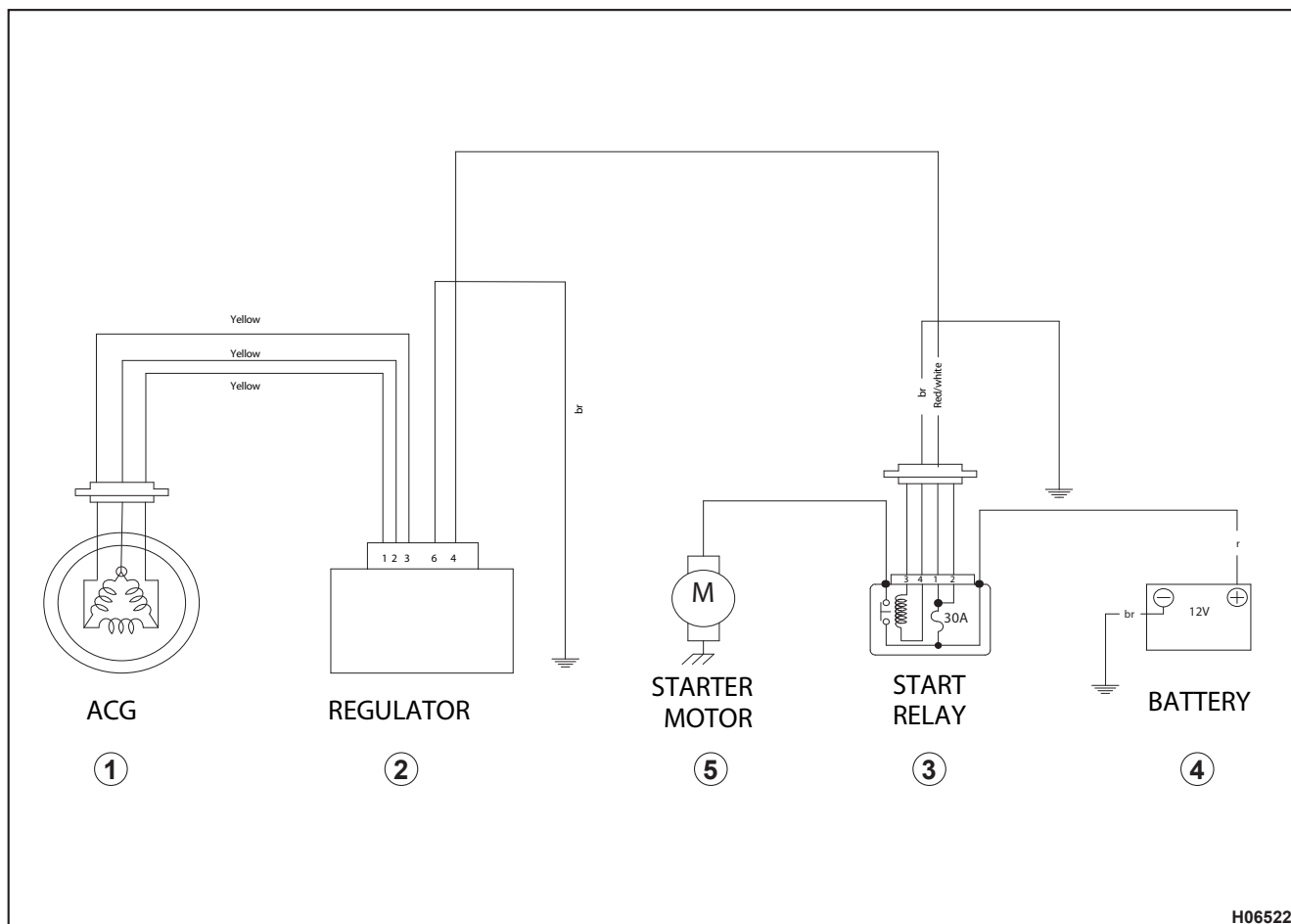
Charging system

the charging system is composed of:

- Alternator (1);
- Voltage regulator/rectifier (2);
- Solenoid starter (3);
- Battery (4).
- Starter motor (5)

The alternated current generated by the alternator is converted into direct current by the voltage regulator/rectifier. The voltage regulator/rectifier serves a dual purpose: it provides overvoltage protection for the battery and converts alternated current into direct current. All components listed above help keep voltage constant and protect the battery against overloading.

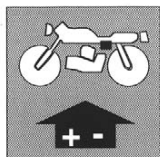
Charging system wiring diagram



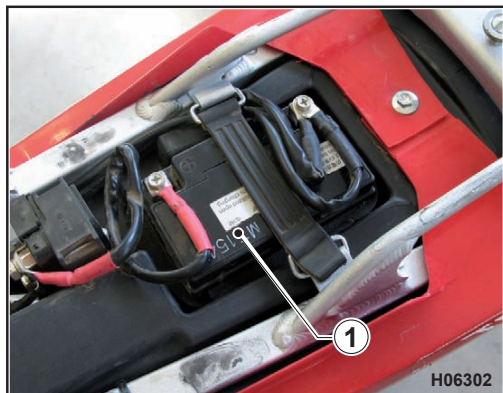
H06522

Colour coding key

Yellow
 br Brown
 Red/White
 r Red



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Charging system inspections

Battery

Remove the saddle (as described in the relevant paragraph) to gain access to the battery (1).

Disconnect the BLACK negative cable from the battery.

Measure current across the negative terminal of the battery and the negative cable using an ammeter clamp. A reading greater than 0.5 mA (TE-SMR) and 0.2 mA (TXC-TC) indicates current draw by some utility.

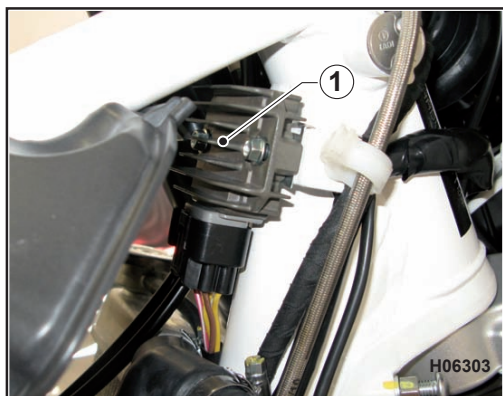


If the vehicle is not used for long periods, it is recommended to disconnect the battery from the electrical system.

Regulated voltage

Remove the saddle (as described in the relevant paragraph) to gain access to the battery.

With the engine warmed up and running at slightly above 3000 rpm, measure voltage across the positive and negative terminal of the battery using a meter (the battery must be charged when performing this test). If reading is outside a 14.0÷14.5 V range, check generator and voltage regulator/rectifier as described in the relevant paragraph.



Voltage regulator/rectifier inspection

With the ignition on and the battery charged (12.5-13 V), start the engine: if battery voltage fails to rise (14 V) within the next two minutes, change the regulator (1) as outlined in the relevant paragraph.

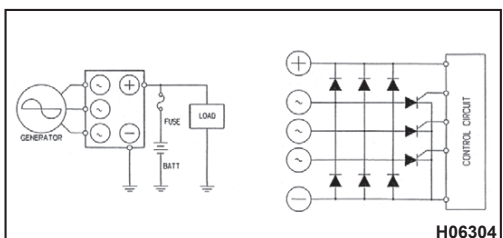
Voltage regulator

The voltage regulator (1) incorporates the diodes used to rectify the generator current output.

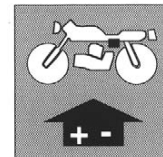
It also incorporates an electronic device that adjusts charging voltage to battery charge: if battery charge is low, charging voltage will be lower.



Do not disconnect the battery cables while the engine is running, or the regulator will suffer irreparable damage.



Voltage regulator/rectifier wiring diagram

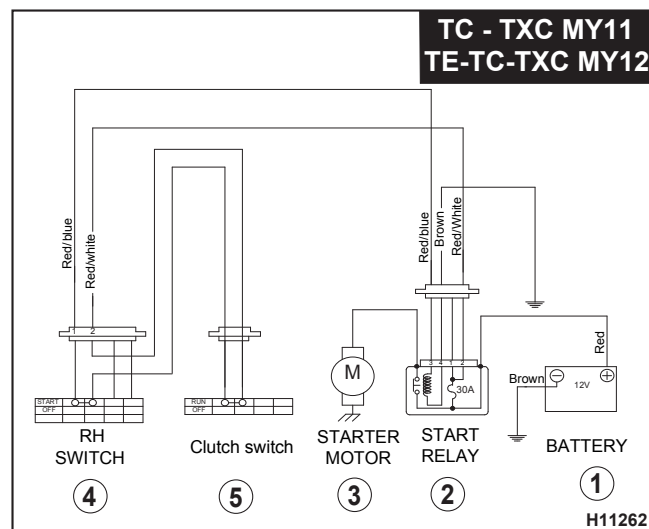
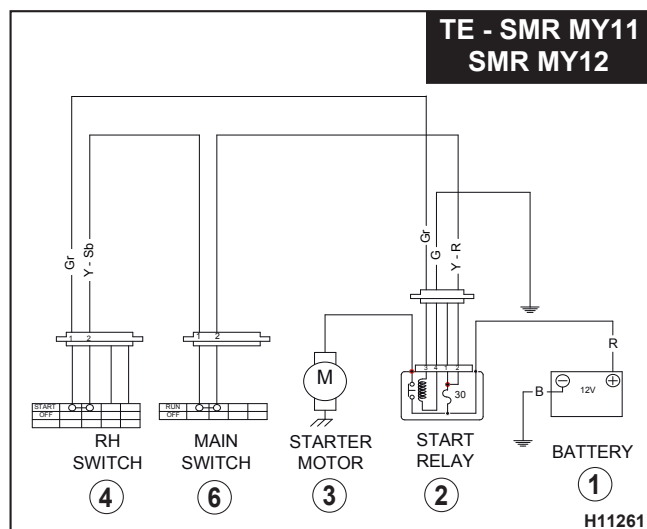


Electric starting system

the starting system is composed of:

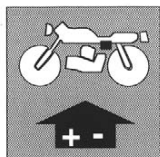
- Battery (1);
- Solenoid starter (2);
- Starter motor (3);
- R.H. switch (4);
- Clutch microswitch (5) (TC - TXC);
- Ignition switch (6) (TE - SMR);

For a description of wires and components, please see the key to the wiring diagram



Colour coding key (TE - SMR MY11 + SMR MY12)

Gr.....	Grey
Y.....	Yellow
Sb.....	Sky blue
G.....	Green
R.....	Red
B.....	Blue



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Starting system inspection

Starter motor inspection

Remove the starter motor (1) as described in the relevant paragraph.

Whenever a starter motor fault is detected, check the starter motor as follows:

- connect a meter across ground and starter motor contact.
- Check for continuity between the positive pole and motor ground. If no continuity is found, replace the starter motor. On assembly, apply a small amount of LOCTITE 243 to the starter motor retaining screws.

Starter motor

Rated voltage: 12V

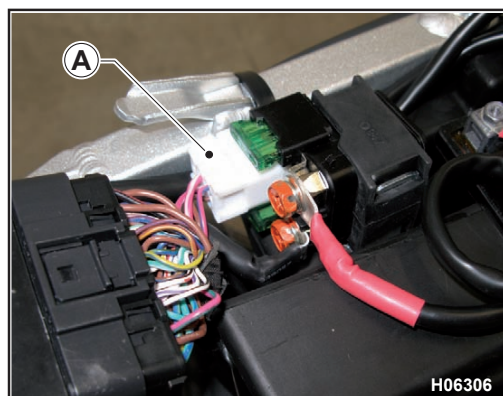
Current draw: 450 W

No-load test

Voltage: 11.25 V

Current: 30 A

Speed: 12,000 rpm



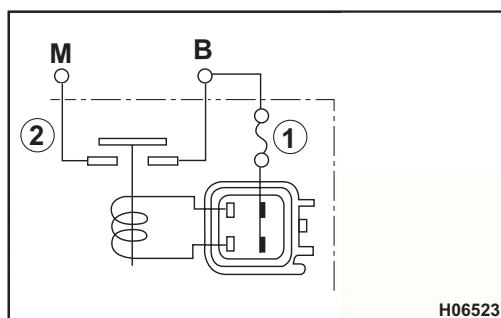
Solenoid starter inspection

Disconnect the cables at the battery negative terminal to avoid possible short circuits during disassembly. Disconnect the starter relay connector (A).

Disconnect the starter motor and battery positive cable wires at relay end. Apply 12 Volts to relay terminals (1) and (2) and check for continuity between terminals B-M. **Do not feed battery voltage to the starting relay longer than 5 seconds or the relay might overheat, leading to winding damage.** Use a multimeter to establish whether the winding is open circuit or resistance exists. A winding in good condition will give the following resistance readings.

Meter scale setting: Ohm

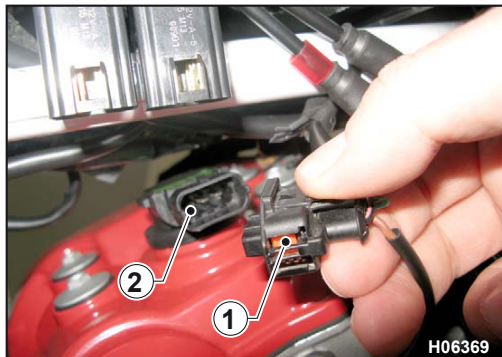
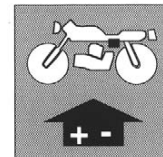
Starter relay resistance. Standard: 3-6 Ω .



Solenoid starter wiring diagram

1= 30A fuse

2= + 12V to starter motor



Coil windings resistance inspection

Disconnect the connector (1) from the coil (2).

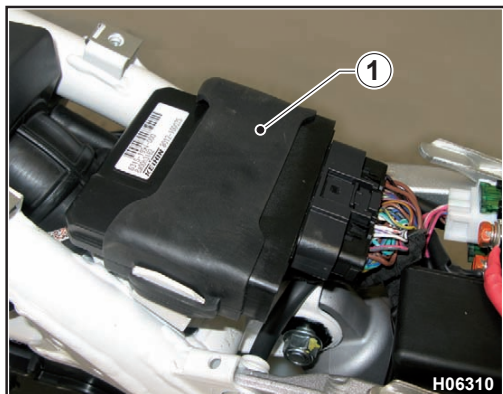
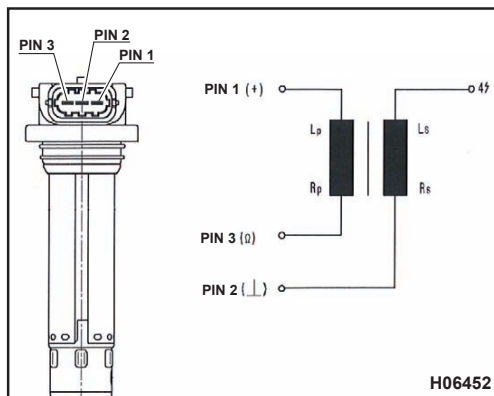
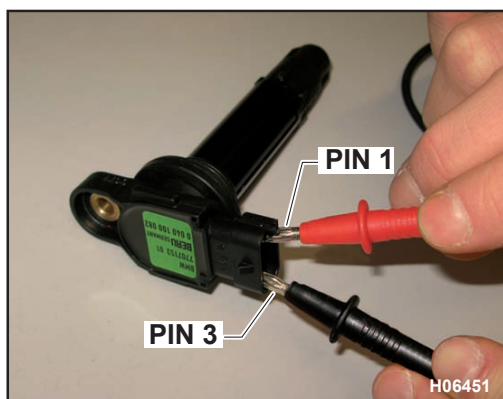
- Remove the coil (2) as described in the relevant paragraph.
- Measure primary and secondary winding resistance with a meter.

- Primary winding resistance: $0.6 \pm 0.7 \Omega \pm 15\%$ at 20°C .
- Secondary winding resistance: Open circuit.

If resistance is outside the specified limits, replace the coil.

- Terminal cap resistance: $4.5\text{--}5.5 \text{ K}\Omega \pm 5\%$ at 20°C .

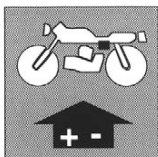
If resistance is outside the specified limits, replace the cap.



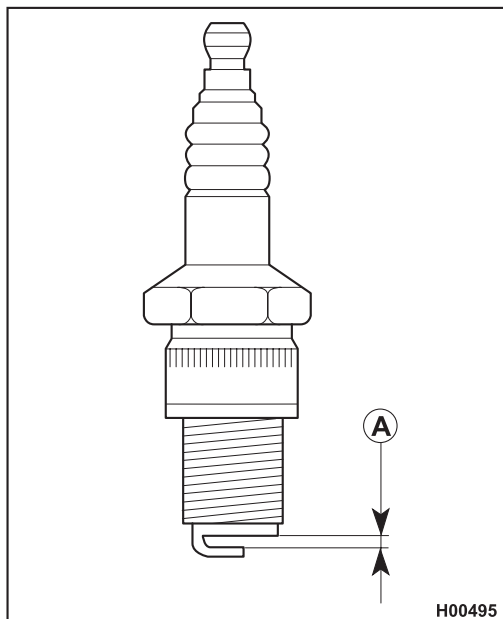
Electronic control unit (ECU)

Remove the saddle (see Section "E") to gain access to the electronic control unit (1).

It is composed of a capacitor, a rectifier circuit that handles input signals received from the pick-up sensor, a circuit that controls ignition timing advance in accordance with pick-up sensor inputs and a switching circuit for capacitor discharge.

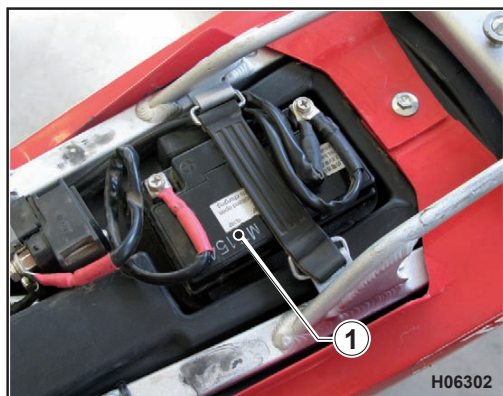


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Spark plug

Check the gap "A" (0.7 mm) between the electrodes. A wider gap may cause difficulties in starting the engine and overload the coil. A gap that is too narrow may cause difficulties when accelerating, when idling or poor performance at low speed. Clean off any dirt around spark plug base before removing the spark plug. It is good practice to closely inspect the spark plug after removal, as any deposits on it and the colour of the insulator provide useful indications on spark plug heat rating, carburetion, ignition and the general condition of the engine. Before refitting the spark plug, accurately clean the insulator with a wire brush. Smear some graphite grease on spark plug thread, do it fully home finger tight then tighten it to 10÷12 Nm torque. Loosen the spark plug then tighten it again to 10÷12 Nm. Spark plugs which have cracked insulators or corroded electrodes should be replaced.



Battery

The battery (1) is a sealed-for-life, maintenance-free battery. If the vehicle remains unused for long periods, it is recommended to disconnect the battery from the electrical system and store it in a dry place. After an intensive use of the battery, it is advisable to carry out a standard slow charging cycle (12V-6Ah battery: 0.6A for 8 hours).

Quick charging is advised only in situations of extreme necessity since the life of lead elements is drastically reduced by such cycle (12V-6Ah battery: 6A for 0.5 hours).

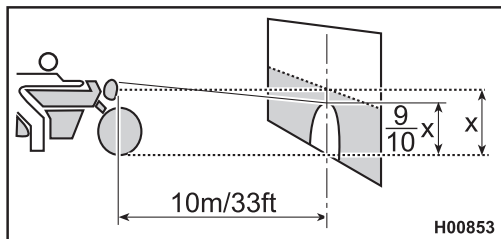
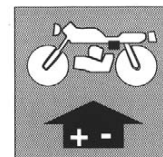
Battery charger

To gain access to the battery (1):

- remove the saddle (as outlined in the relevant paragraph);
- first remove the BLACK negative cable, then the RED positive cable (when reassembling, first connect the RED positive cable, then the BLACK negative cable);
- remove the battery (1) from its housing.

Check, using a voltmeter, that battery voltage is not less than 12.5 V. If it is not so, the battery needs to be charged. Using a battery charger with a constant voltage, first connect the RED positive cable to the battery positive terminal then the BLACK negative cable to the battery negative terminal. At a constant voltage level of 14.4 V, apply "x" Amps according the battery's charge percentage as indicated in the table below. The voltage reaches a constant value only after a few hours, therefore it is suggested NOT to measure it immediately after having charged or discharged the battery. Always check the battery charge before reinstalling it on the vehicle. The battery should be kept clean and the terminals coated with grease.

INDICATIVE CHARGE TIMES DEPENDING ON BATTERY CHARGE STATUS		
AT-REST VOLTAGE * (V)	% OF CHARGE	CHARGE TIME (RATED CURRENT IN AMPS TO BE APPLIED: 0.1x BATTERY RATED CAPACITY)
> 12.7	100	
~ 12.5	75	4h
~ 12.2	50	7h
~ 12.0	25	11h
~ 11.8	0	14h

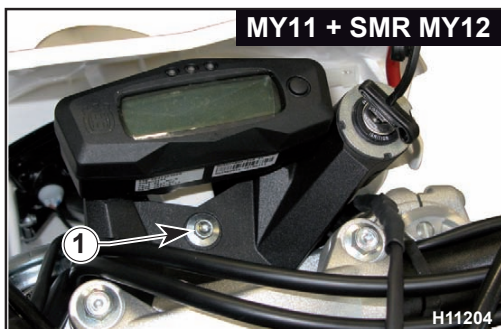
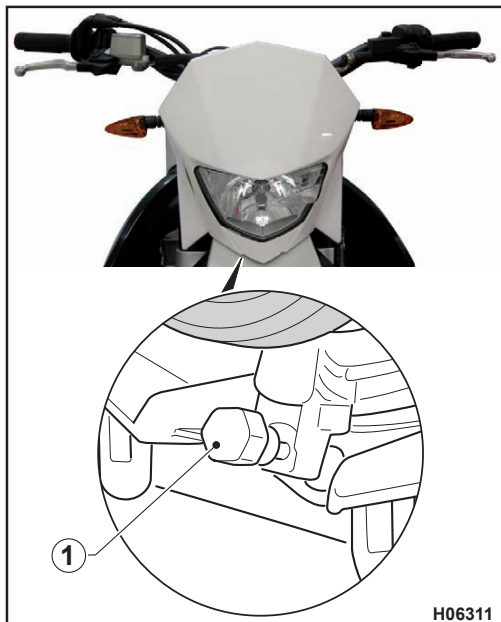


Headlamp, tail light (TE - SMR)

Headlamp adjustment

The headlamp features a twin bulb for low and high beam and a festoon bulb for the city or parking light. Beam setting needs to be performed accurately; proceed as follows:

- Place the motorcycle 10 metres (32.8 ft) away from a vertical wall;
- The motorcycle must be on level ground and the optical axis of the headlamp must be perpendicular to the wall;
- The motorcycle must be upright;
- Measure the height from the ground to the centre of the lamp and draw a cross on the wall at the same height;
- When the low beam is on, the upper edge between dark and lit zone should be at 9/10th of the height of headlamp centre from ground. Beam height can be raised or lowered turning the screw (1).

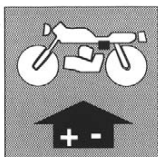


Headlamp bulb replacement (TE - SMR)

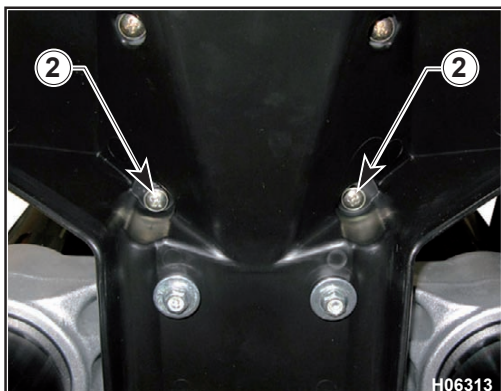
Proceed as follows to reach the headlamp bulbs:

- Loosen upper screw (1) using an 8 mm wrench;

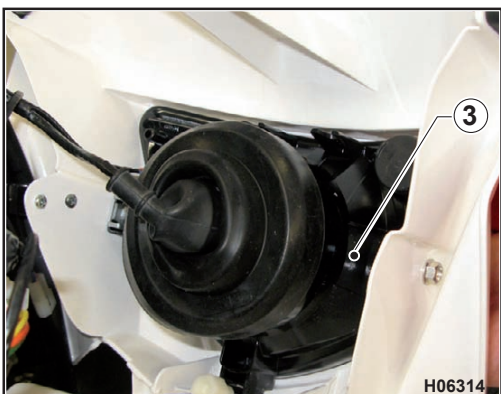




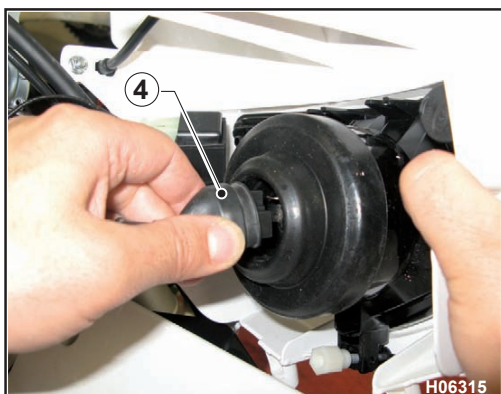
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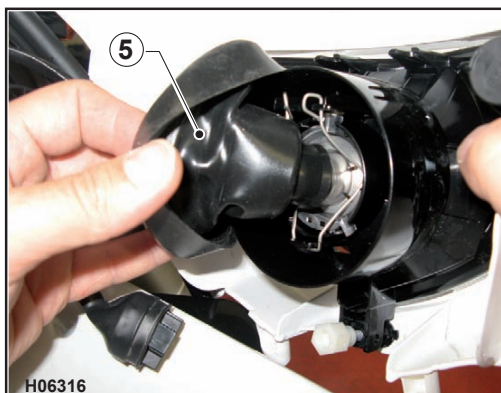
- loosen the two lower screws (2) using a Phillips screwdriver;



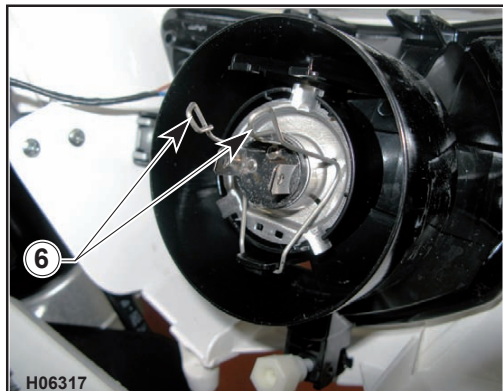
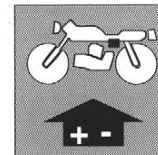
- move headlight unit (3) aside;



- release connector (4);



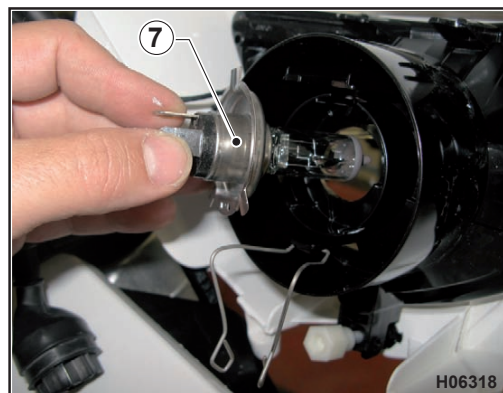
- slide off the rubber gaiter (5);



- release the bulb holder clips (6) and take out bulb (7);

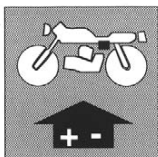
NOTE*:

Headlamp bulb (7) is of the halogen type; be careful when replacing it since the glass part shall not be touched with bare hands.
 (12V 35+35 W bulb - HS1)

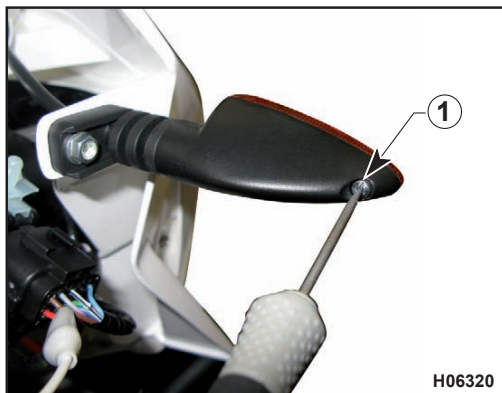


To replace the parking light bulb (8) extract it from the inside cover.

Once the bulb has been replaced, reverse the above procedure to reassemble.
 (12V 6W bulb)

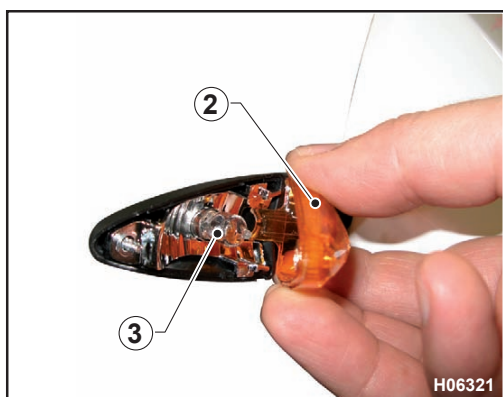


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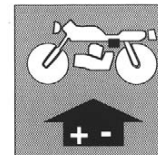
Turning indicator bulb replacement (TE - SMR)

- Loosen screw (1) using a Phillips screwdriver;



- remove lens (2) and replace bulb (3) pushing it inside, and turning it to remove it;

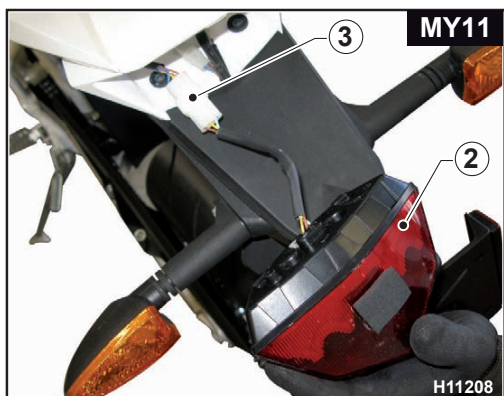
Once the bulb has been replaced, reverse the above procedure to reassemble.
(12V 6W bulb)



Tail light replacement (TE - SMR)

Remove the tail light as follows:

- Loosen the two screws (1) under the rear mudguard.



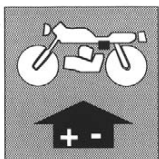
- Extract the tail light (2) and disconnect the connector (3).

Once the bulb has been replaced, reverse the above procedure to reassemble.



Make sure you do not overtighten the screws and refit the bushings correctly, if present.





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Number plate bulb replacement (TE - SMR)

- Loosen screw (1) and remove the number plate bulb (2) from the mud-guard.



- Extract the bulb holder (3) with the bulb (4) from the housing.
- Pull the bulb (4) to detach it from bulb holder.

Once the bulb has been replaced, reverse the above procedure to reassemble.
(12V 5W bulb)



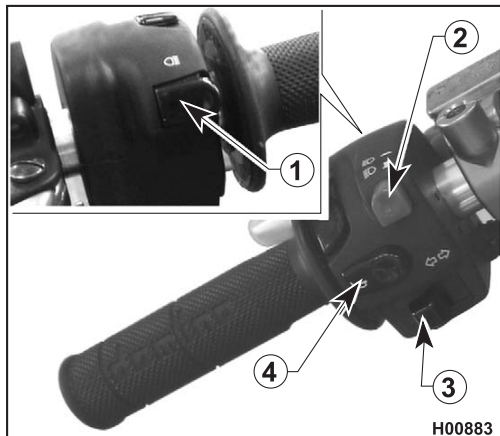
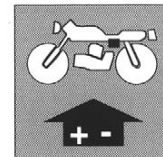
Handlebar switches

Measure continuity on the different switches using a meter. Replace any part found to be faulty.

Left-hand switch (TC)

- 1 Engine stop switch (TC)

POSITION \ COLOUR	B-W	Bk
ON		
OFF		



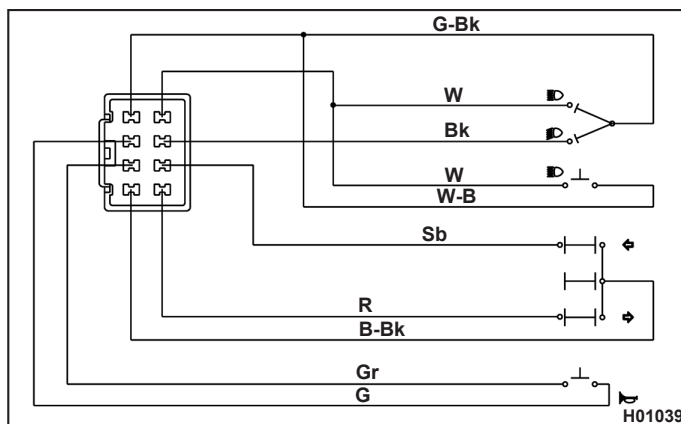
Left-hand switch (TE - SMR)

1.  High beam flasher (self-cancelling)
2.  High beam switch
 Low beam switch
3.  Left-hand turning indicators (self-cancelling)
 Right-hand turning indicators (self-cancelling)
 To deactivate the turning indicators, press the control lever after it is returned to the centre.
4.  Horn.

H00883

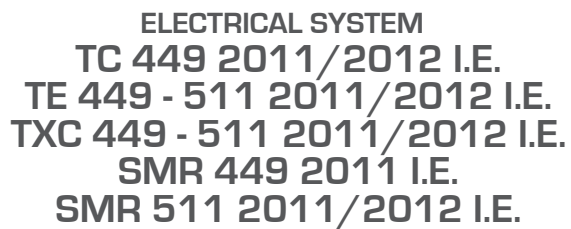
LIGHTING SWITCH						FLASHER SWITCH				HORN SWITCH			
COLORE POSIZIONE		1		2		COLORE POSIZIONE		COLORE POSIZIONE		COLORE POSIZIONE		COLORE POSIZIONE	
		G-W	W	G-Bk	Y		Sb	B-Bk	R		Gr	G	
•						N	PREMUTO (OFF)				A RIPOSO (OFF)		
											PREMUTO (On)		
													
CARICO NOMINALE-Rated load						DIMMER SWITCH				PASSING SWITCH			
• = 0 W						COLORE POSIZIONE		COLORE POSIZIONE		COLORE POSIZIONE		COLORE POSIZIONE	
 = 30 W							W	W	Bk			W	W-B
 = 30+80 W											PREMUTO (On)		

H00887

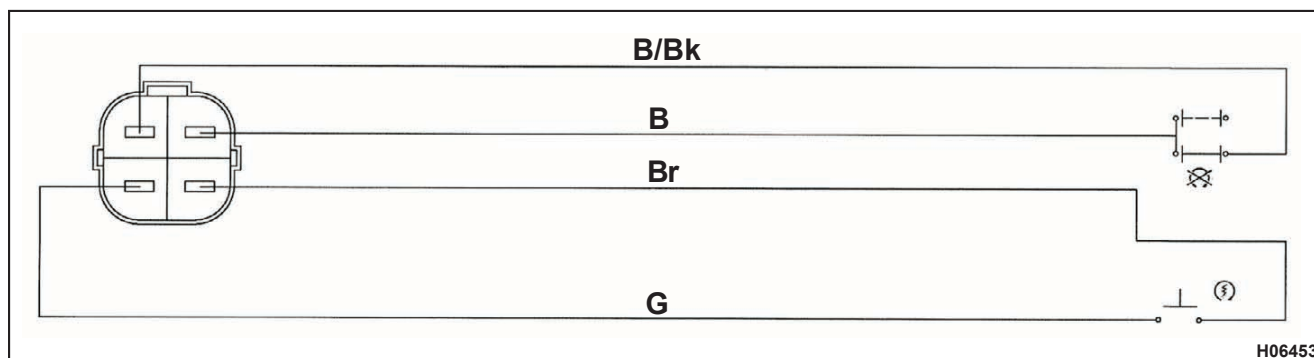


Colour coding key

B	Blue
Bk	Black
B-Bk	Blue-Black
B-W	Blue-White
G	Green
G-Bk	Green-Black
G-W	Green-White
Gr	Grey
Y	Yellow
R	Red
Sb	Sky blue
W	White
W-B	White-Blue
W-Bk	White-Black

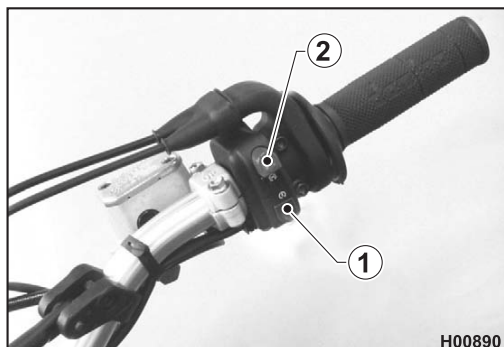
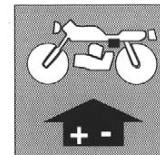


1. Engine start button
2. Engine start/stop switch



Colour coding key

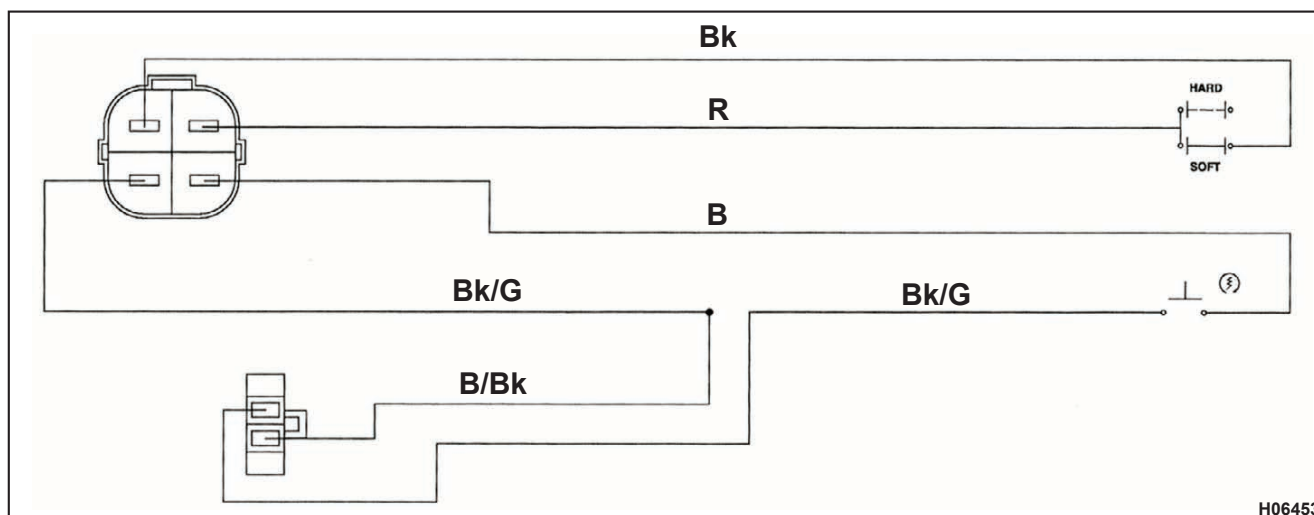
B.....	Blue
Br.....	Brown
G.....	Green
Br-Bk.....	Brown-Black



H00890

Right-hand switch (TC)

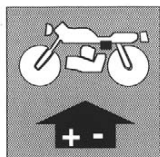
1. Engine start button
2. Double map push-button



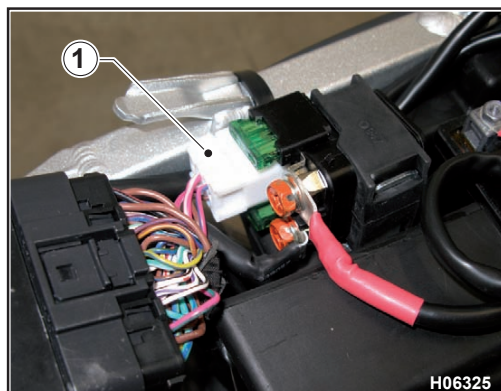
H06453

Colour coding key

Bk	Black
R	Red
B	Blue
G	Green
Br-Bk	Brown-Black
Bk-G	Black-Green
B-Bk	Blue-Black



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Fuses

- When you find a blown fuse, always investigate and eliminate the cause before replacing it.
- Never replace a fuse with another fuse with a different rating.
- Never use a wire or other makeshift repair techniques instead of installing a new fuse.

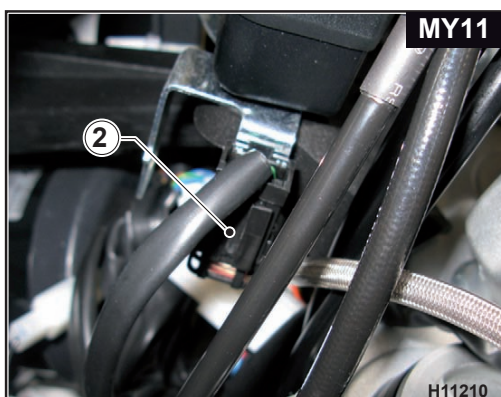
Main fuse (1) - 30A

Positioned under the saddle, on the solenoid starter.

Protection:

TC: Injector, coil, fuel pump.

TE-SMR-TXC: Injector, lambda sensor heater, coil, fuel pump, electric fan.



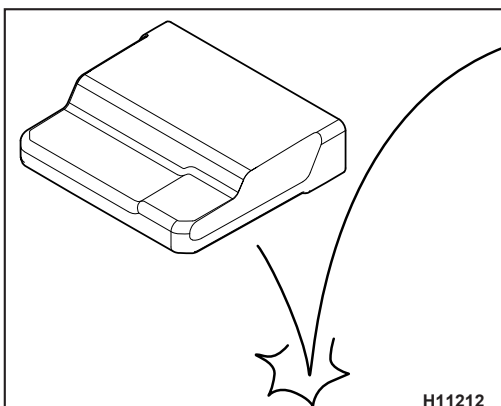
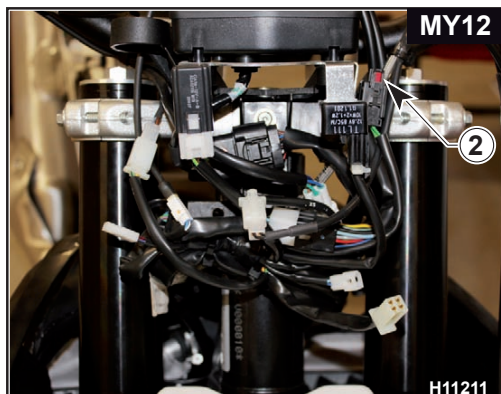
Auxiliary fuse (2) - 10A (TE - SMR)

Positioned in the bike front side, below the headlamp fairing and close to the dashboard.

Protection:

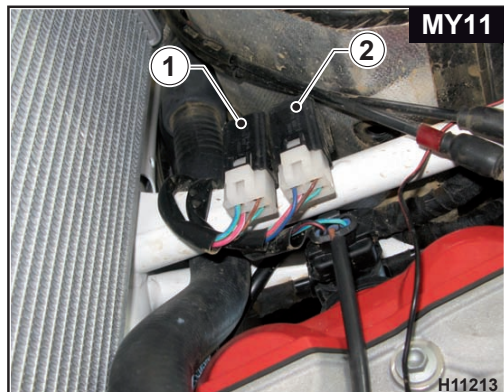
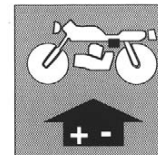
TE - SMR: Lights, horn, dashboard power supply, turning indicators.

In order to avoid short circuits on models TE-SMR, before working on fuses, turn the ignition switch to OFF.



Semiconductor parts

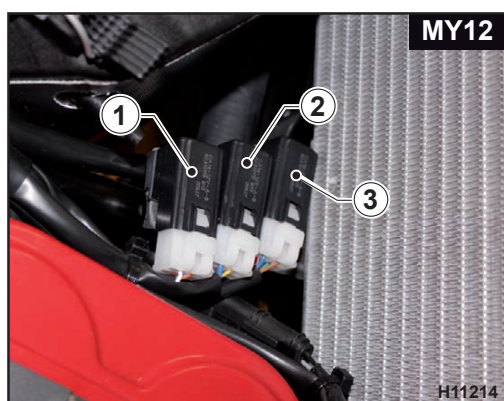
- Be careful to never drop parts that incorporate a semiconductor, such as the ECU or the voltage regulator/rectifier.
- Closely follow the relevant instructions when inspecting these parts. An improper procedure may lead to severe damage.



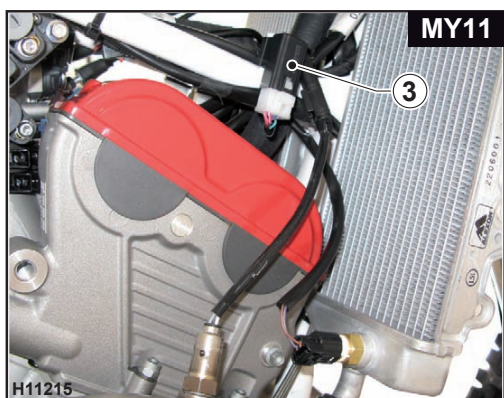
Relay test

Gain access to the relays as indicated in the relevant paragraph; then, remove them.

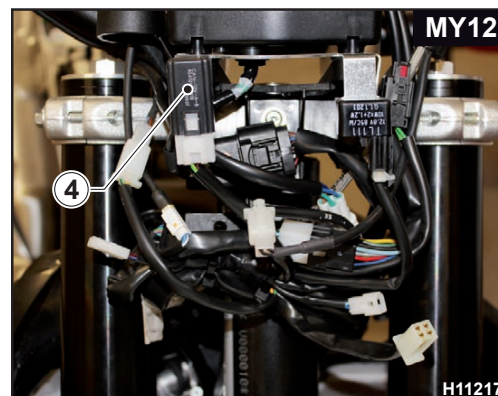
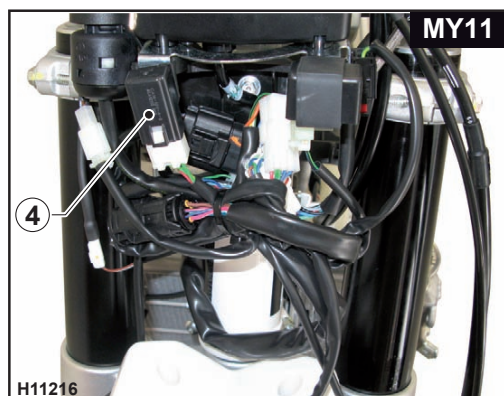
- 1) Main starting relay
- 2) Fuel pump relay

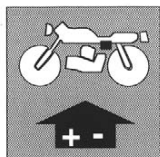


- 3) Electric fan relay (TE - TXC - SMR)

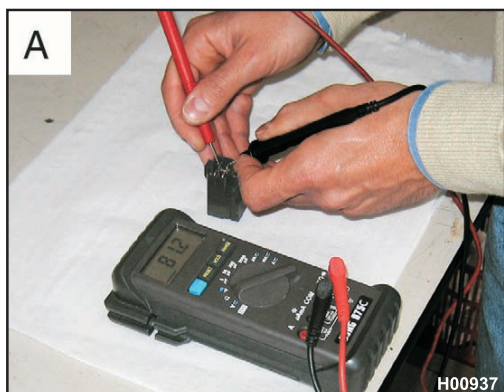


- 4) Light relay (TE - SMR)





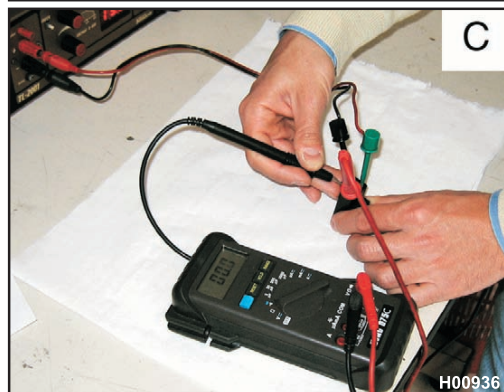
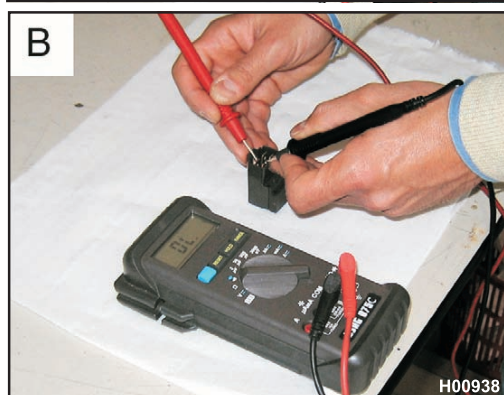
ELECTRICAL SYSTEM
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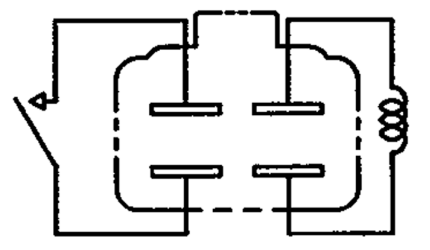
A: Set the meter to the "Impedance" scale and check the energiser coil for proper operation. Reading should be: 80 Ohm (+/- 10%) at 20 °C.

B: Set the meter to "Continuity" mode and check the circuit is open.

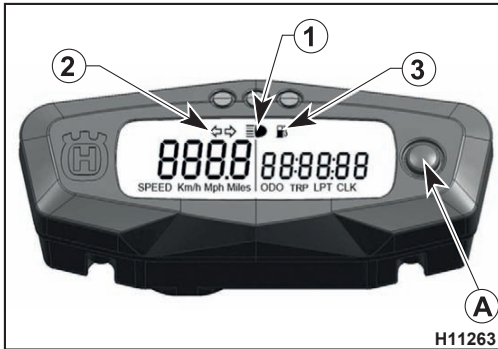
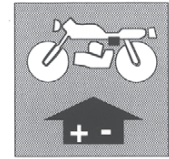
C: Feed the coil from a power supply unit with stable 12V output and make sure that the circuit closes.



SCHEMA ELETTRICO
WIRING DIAGRAM
SCHÉMA ÉLECTRIQUE
SCHALTPLAN
ESQUEMA ELÉCTRICO



(BOTTOM VIEW)



Digital dashboard, warning lights (TE - SMR)

the motorcycle is fitted with a digital dashboard on which 3 warning lights are also available: high beam, turning indicators and fuel reserve.

- 1- BLUE warning light "High beam"
- 2- GREEN warning light "Turning indicators"
- 3- ORANGE warning light "Fuel reserve"

TE - SMR MY11 / SMR MY12

When the ignition key is turned to the IGNITION position, the dashboard display lights up (amber colour).

NOTE:

- The check software version is displayed for the first 2 seconds; after the check routine, the dashboard shows the last planned function.

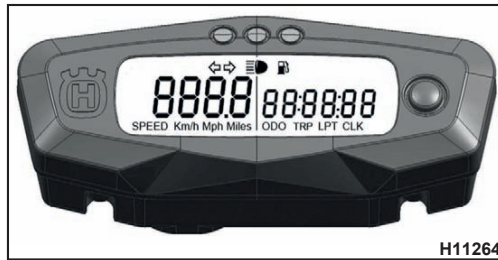
TE MY12

The dashboard is activated only after the engine has been started.

NOTE:

- Every time the engine is started, the dashboard shows the SW version for the first 2 seconds; after the check routine, the dashboard shows the last planned function.
- A few seconds after the engine has been turned off, the dashboard is deactivated.

To select the instrument functions and to set to zero the functions, use the SCROLL knob (A)



The functions, which can be selected in this sequence, are as follows:

- 1- SPEED / ODO
- 2- SPEED / CLOCK
- 3- SPEED / TRIP
- 4- SPEED / LAP TIMER
- 5- SPEED
- 1- SPEED / ODO

IMPORTANT: In the event of a FUEL INJECTION SYSTEM MALFUNCTION, the word FAIL appears on the right side of the dashboard display: **When this is the case, contact your HUSQVARNA dealer.**

1- SPEED (km/h or mph) / ODO

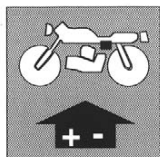
- SPEED: vehicle speed - maximum value: 299 Km/h or 299 mph;
- ODO: odometer - maximum value: 99999 Km.

TE - SMR MY11 / SMR MY12

To change unit from kilometres to miles or miles to kilometres, proceed as follows:

- 1) set to figure 1, turn the key to OFF and push SCROLL (A).
- 2) place the ignition key in the IGNITION position and hold down the SCROLL button (A) until "Km/h" is displayed.
- 3) the display will now alternate between "Km/h" and "Mph Miles", push the SCROLL button (A) again while the desired unit is displayed.





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H00897

TE MY12

To change unit from kilometres to miles or miles to kilometres, proceed as follows:

- 1) with the engine off, press and hold the "SCROLL" button (A), then start the motorcycle to switch the instrument on.
- 2) press and hold the "SCROLL" button (A) until the symbol "Km/h" or "Mph Miles" is displayed, then release.
- 3) "Km/h" and "Mph Miles" are displayed in alternation - press the "SCROLL" button (A) again while the desired unit of measurement is displayed.



H11265

2 - SPEED / CLOCK

- SPEED: speed - maximum value: 299 Km/h or 299 mph;
- CLOCK: clock - reading from 0:00 to 23:59:59.

To reset the clock, push the SCROLL button (A) and hold for more than 3 seconds in order to increase the hour value; release button and after 3 seconds the minutes can be increased;



H11266

3 - SPEED / TRIP

- SPEED: speed - maximum value: 299 Km/h or 299 mph
- TRP: distance - maximum value: 999.9 km or 621,31 mi (data will be lost after disconnecting the battery).

To reset TRIP, push the SCROLL button (A) and hold for more than 3 seconds.



H00900

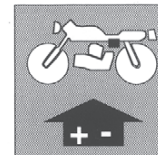
4 - SPEED / LAP TIMER (LPT)

- SPEED: speed - maximum value: 299 Km/h or 299 mph;
- LPT: miles/kilometres covered time
- Reading from 0:00 to 99:59:59 (data will be lost after disconnecting the battery).

To activate the function LPT, push the SCROLL button (A) and hold for more than 3 seconds.

- 1st step: activate function;
- 2nd step: stop counters.
- 3rd step: reset LPT;
- 4th step: activate function;
- 5th step: stop counters.

.....
and so on.



H11267

5- SPEED

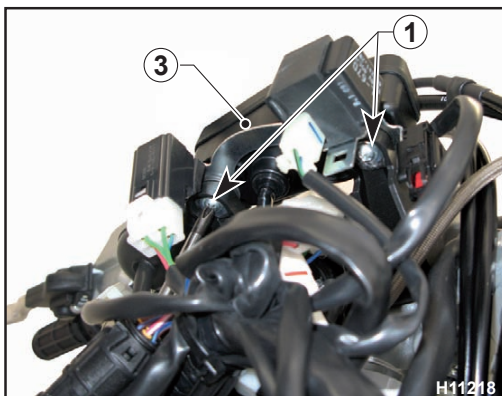
- SPEED: speed - maximum value: 299 Km/h or 299 mph

The display also provides a fuel injection system "Malfunction" indication; **the latter takes priority over any other indication.**



H02363

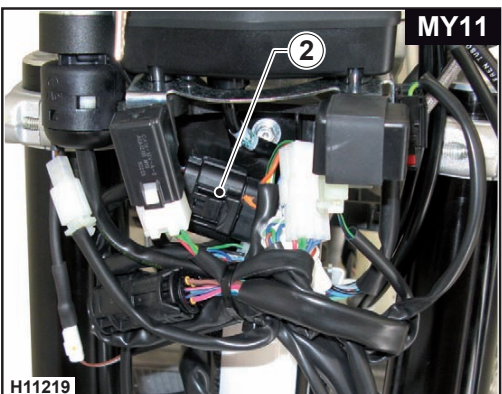
FAIL: a "FUEL INJECTION SYSTEM MALFUNCTION" indicated by the word "FAIL" appearing in the right-hand portion of the dashboard display.



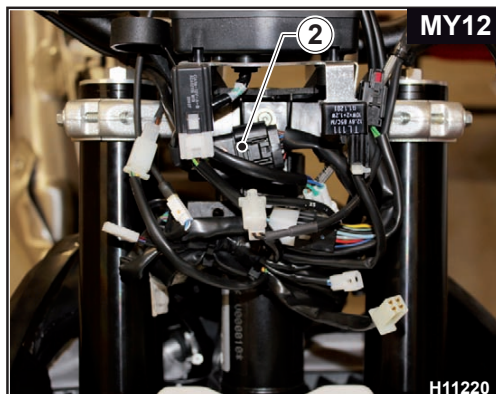
H11218

Dashboard replacement (TE - SMR)

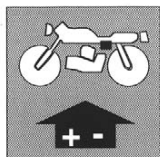
Remove the headlamp fairing as explained under "Headlamp bulb replacement". Remove the two retaining screws (1) securing the dashboard to its bracket, disconnect the connector (2) and remove the dashboard (3). To refit the dashboard, reverse the disassembly procedure.



H11219



H11220



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H11221



H11222

Instructions for the instrument setting

Upon turning on the instrument, if the operation **DID NOT** already take place, it is necessary to set the instrument associating it with the relative motorcycle by selection of the codes illustrated in the figures shown. The identification codes appear on the display of the instrument at 2 second intervals: **when the required code appears, press the button (A) on the instrument.**



BE VERY CAREFUL WHEN SELECTING. THE OPERATION CAN ONLY BE EXECUTED ONCE.



AFTER ASSOCIATING THE INSTRUMENT WITH THE MOTORCYCLE, SET THE UNIT OF MEASUREMENT FOR SPEED (Km/h or mph) AS DESCRIBED IN THE RELATIVE PARAGRAPH.

Troubleshooting

Charging system

A battery that does not hold charge might be a symptom of:

- 1) current draw (see paragraph "Battery");
- 2) incorrect voltage (see paragraph "Regulated voltage");
- 3) no continuity in generator (see paragraph "Checking generator stator windings resistance");
- 4) defective generator;
- 5) voltage regulator malfunction (see paragraph "Voltage regulator/rectifier inspection")

- a battery overload indicates:

- 1) faulty voltage regulator (see paragraph "Voltage regulator inspection");
- 2) defective battery (see paragraph "Battery").

Starting system

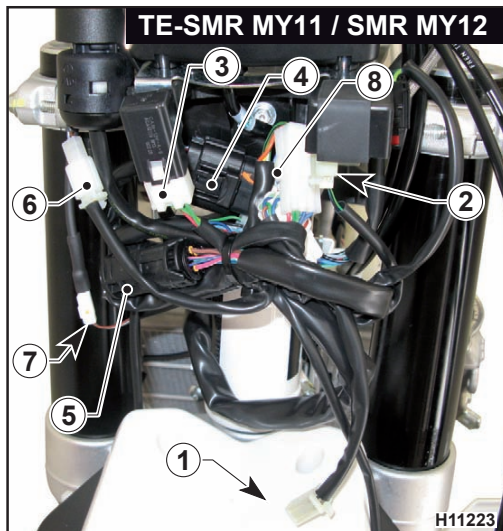
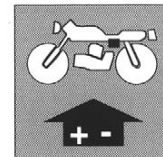
if the starter motor does not start, this might be a symptom of:

- 1) faulty solenoid starter (see paragraph "Solenoid starter inspection");
- 2) loose starter motor cable;
- 3) faulty starter motor (see paragraph "Starter motor inspection");
- 4) flat battery (see paragraph "Battery charger").

Electronic ignition system

a weak or missing spark might be a symptom of:

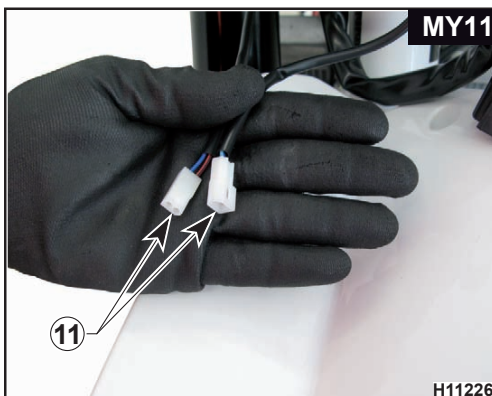
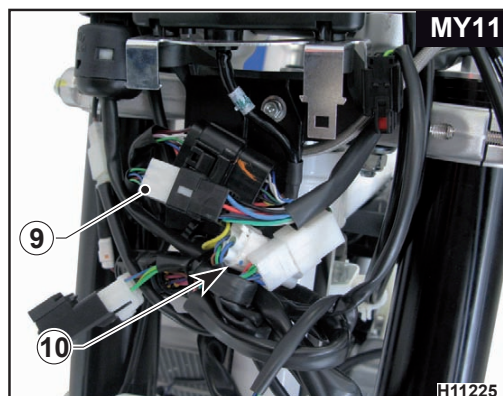
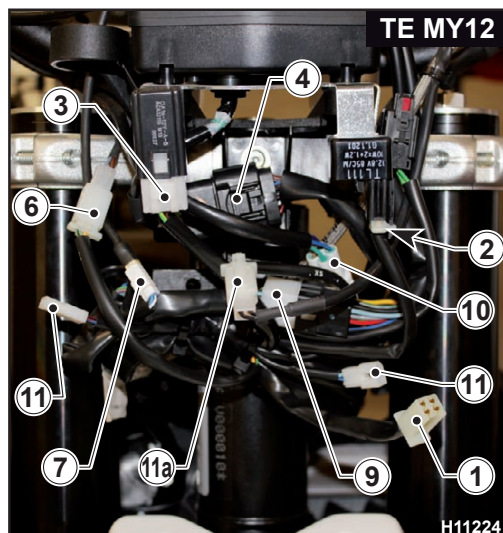
- 1) incorrect connections in the electrical system;
- 2) faulty spark plug or wrong heat rating or incorrect spark plug gap (see paragraph "Spark plug");
- 3) faulty ignition coil (see paragraph "Coil windings resistance inspection");
- 4) faulty spark plug cap (see paragraph "Coil windings resistance inspection").

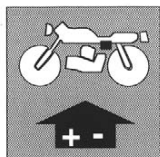


Connector position (TE - SMR)

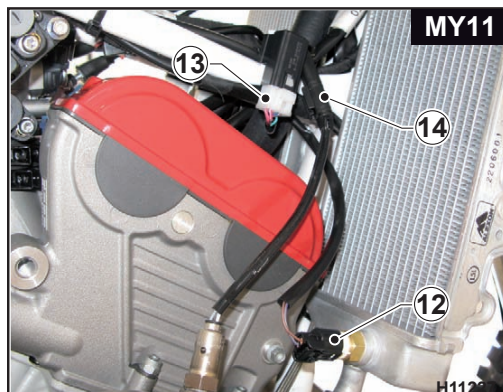
The following connectors are positioned on the front side, below the headlamp fairing:

- 1) Headlamp connector
- 2) Turning indicator flasher connector
- 3) Light relay connector
- 4) Dashboard connector
- 5) Wiring harnesses connector (MY11)
- 6) Front brake stop switch connector
- 7) Speed sensor connector
- 8) Ignition switch connector (TE-SMR MY11 / SMR MY12)
- 9) Left-hand dip switch connector
- 10) Right-hand switch connector
- 11) Front turning indicator connector
- 11a) Clutch switch connector (TE-TXC MY12)



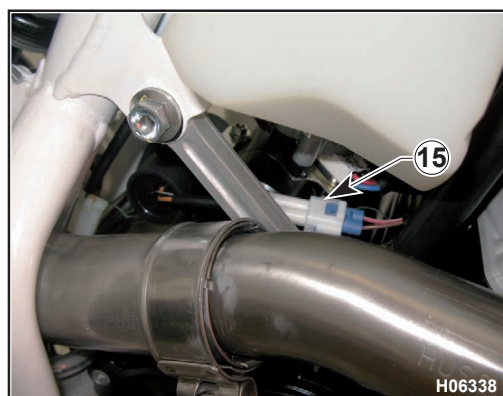
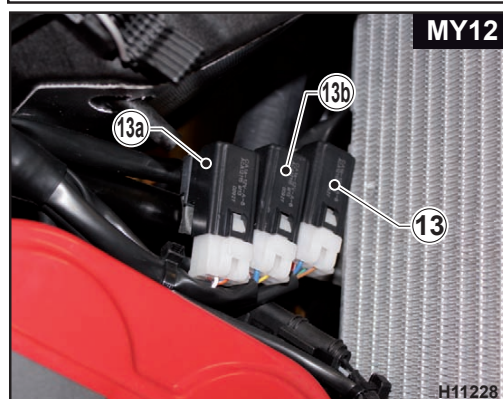


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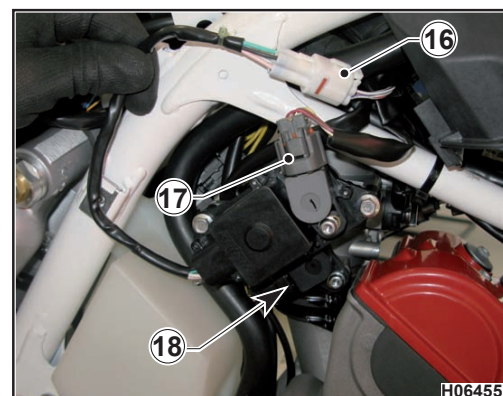


The following connectors are positioned on the bike right side:

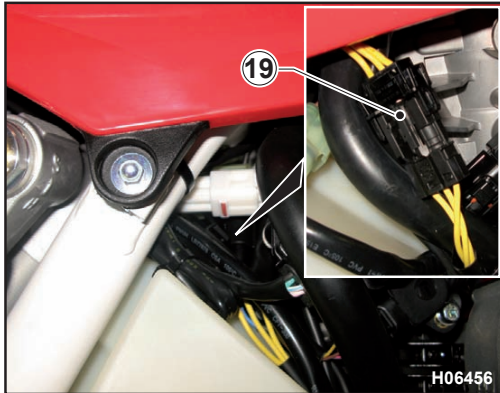
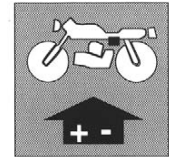
- 12) Temperature sensor connector
- 13) Electric fan relay connector
- 13a) Main starter relay connector (MY12)
- 13b) Fuel pump relay connector (MY12)
- 14) Lambda sensor connector



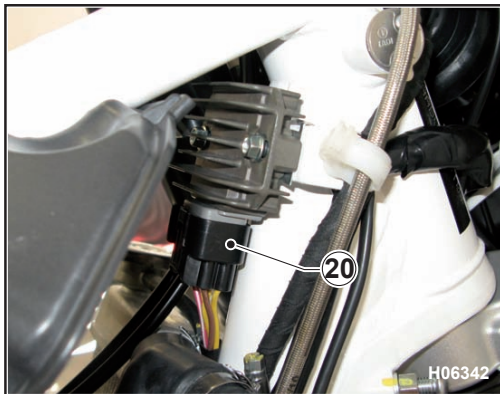
- 15) Condenser connector



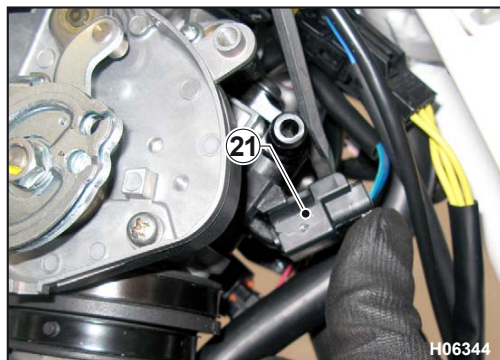
- 16) 2nd throttle connector
- 17) 1st throttle connector
- 18) Sensor connector



19) Current generator connector



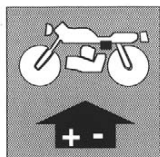
20) Voltage regulator connector



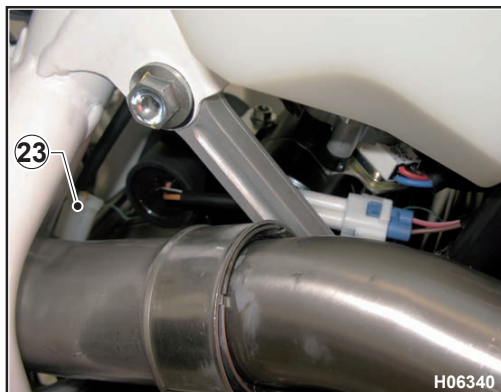
21) Injector connector



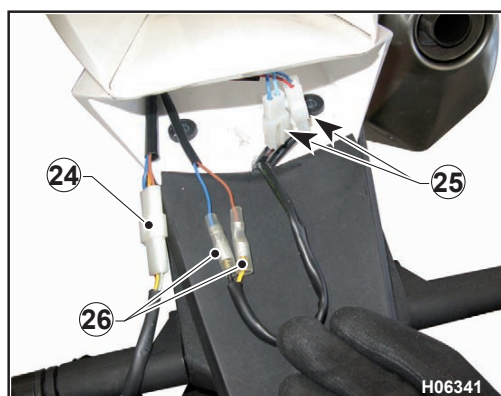
22) Pressure sensor connector



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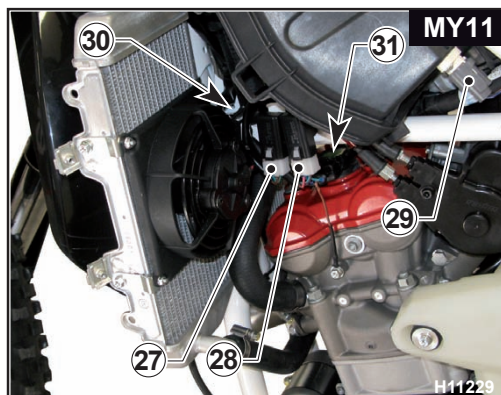


23) Rear stop (brake) connector



The following connectors are positioned on the bike rear side:

- 24) Tail light connector
- 25) Rear turning indicator connector
- 26) Number plate light connector



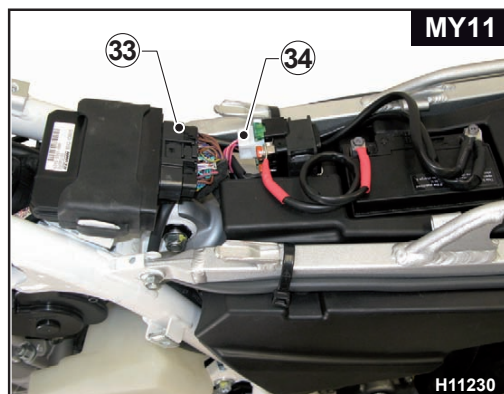
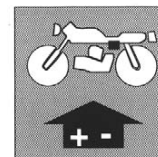
The following connectors are positioned on the bike left side:

- 27) Main starting relay connector (MY11)
- 28) Fuel pump relay connector (MY11)
- 29) Air temperature sensor connector
- 30) Electric fan connector
- 31) Coil connector

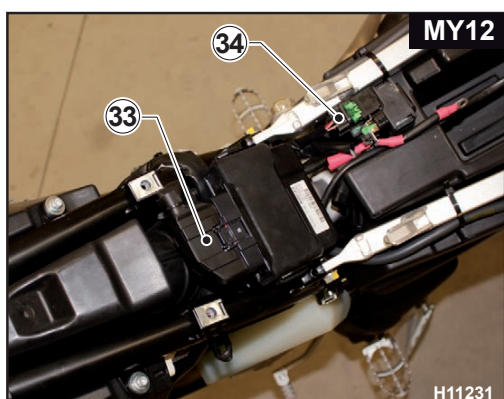


The following connectors are positioned under the saddle:

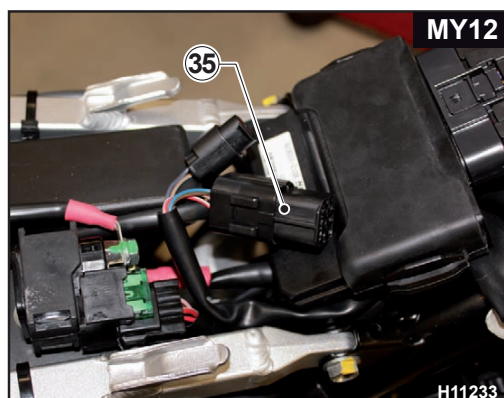
- 32) Fuel pump connector

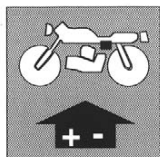


33) Electronic control unit connector
 34) Solenoid starter connector

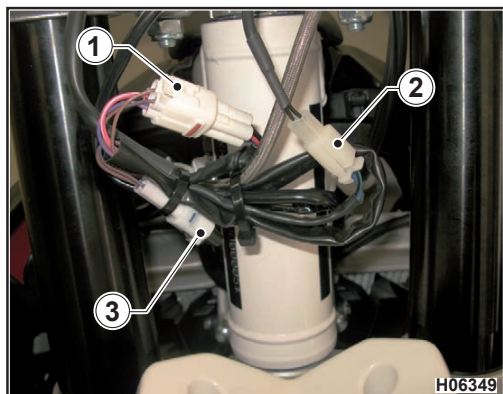


35) Diagnostics connector





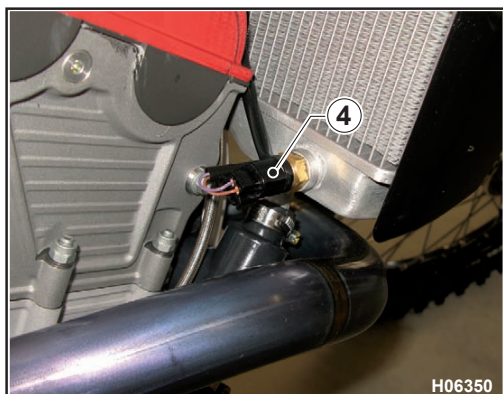
ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



Connector position (TC)

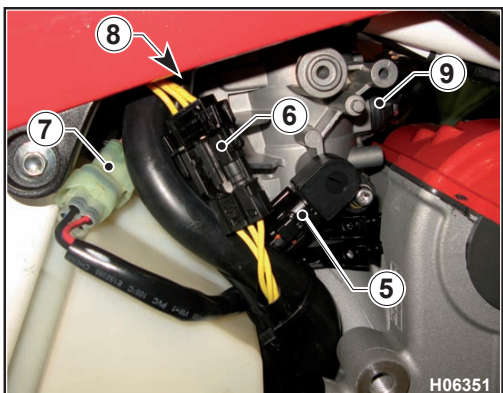
The following connectors are positioned on the front side, below the number holder:

- 1) RH switch connector
- 2) Clutch sensor connector
- 3) Engine stop connector

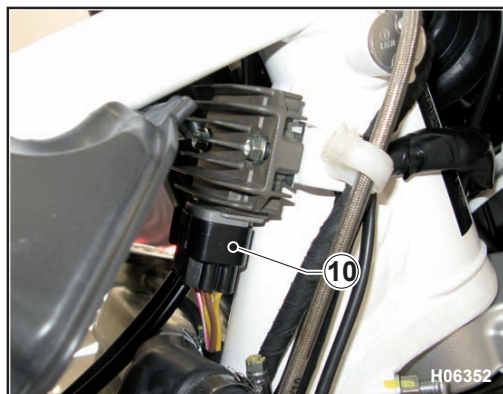


The following connectors are positioned on the bike right side:

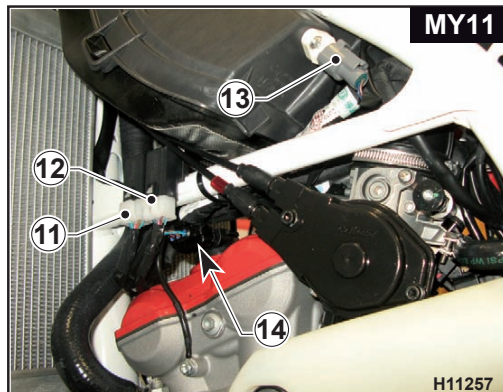
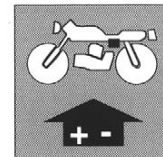
- 4) Temperature sensor connector



- 5) TPS connector
- 6) Generator connector
- 7) Fuel pump connector
- 8) Injection connector
- 9) Pressure sensor connector

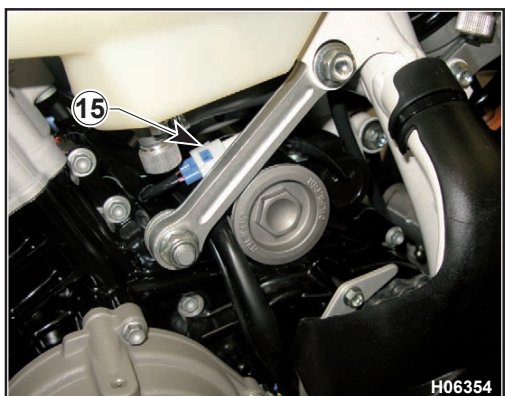
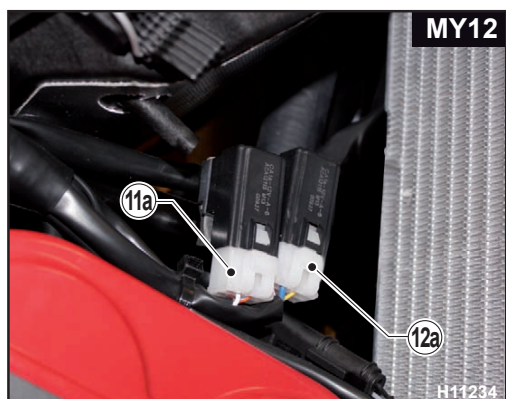


- 10) Voltage regulator connector



The following connectors are positioned on the bike left side:

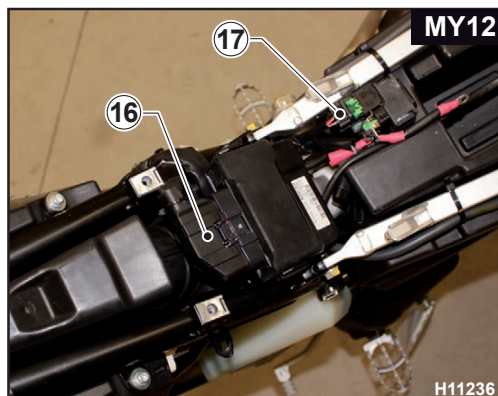
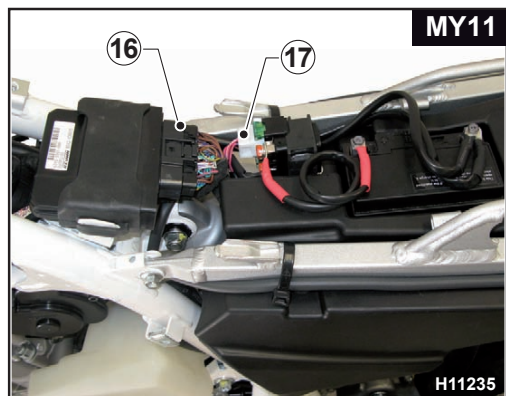
- 11) Main starting relay connector (MY11)
- 11a) Main starting relay connector (MY12) (on the right-hand side of the engine)
- 12) Fuel pump relay connector (MY11)
- 12a) Fuel pump relay connector (MY12) (on the right-hand side of the engine)
- 13) Air temperature sensor connector
- 14) Coil connector

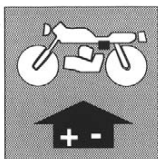


- 15) Condenser connector

The following connectors are positioned under the saddle:

- 16) Electronic control unit connector
- 17) Solenoid starter connector

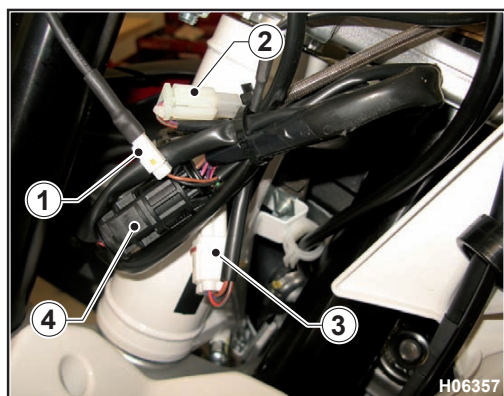
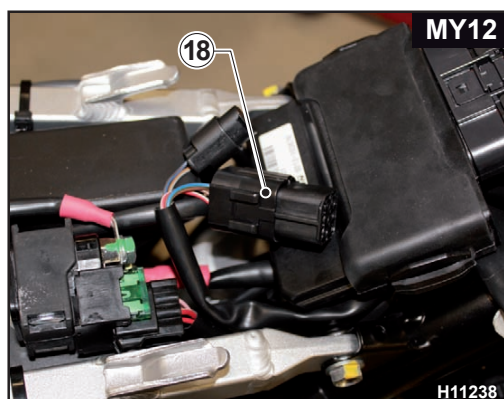




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TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
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SMR 511 2011/2012 I.E.



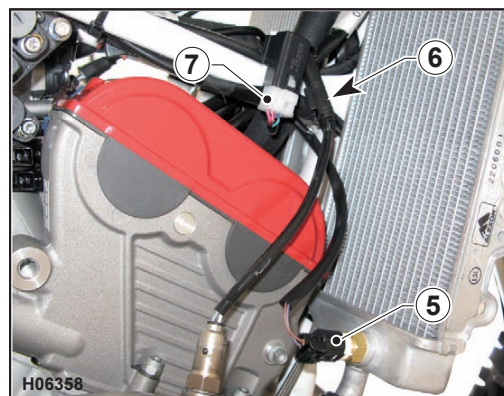
18) Diagnostics connector



Connector position (TXC)

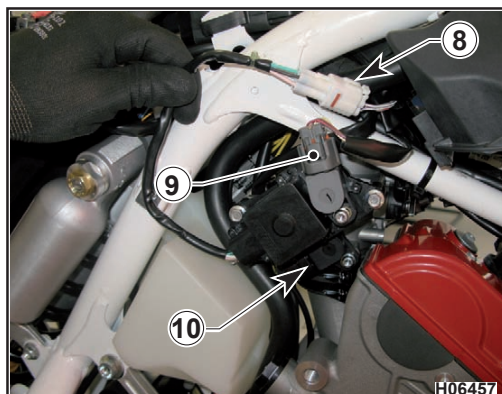
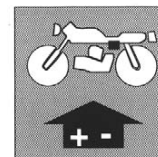
The following connectors are positioned under the number holder:

- 1) Speed sensor connector
- 2) Clutch connector
- 3) RH switch connector
- 4) Wiring harnesses connector



The following connectors are positioned on the bike right side:

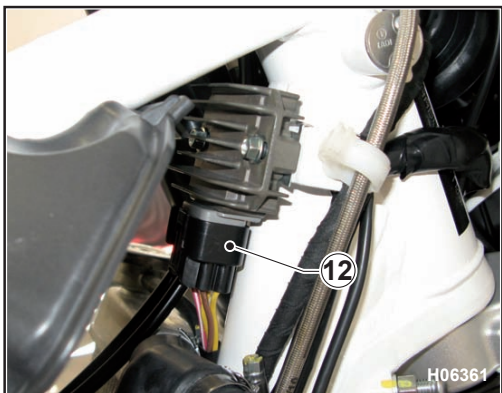
- 5) Temperature sensor connector
- 6) Lambda sensor connector
- 7) Electric fan relay connector (MY11)



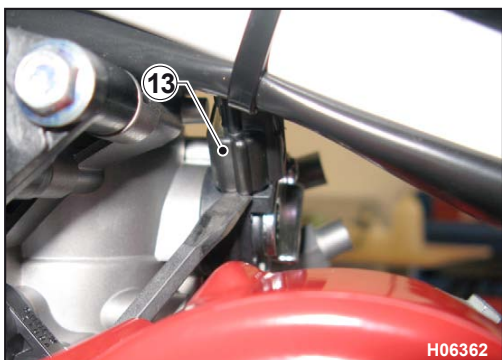
- 8) 2nd throttle connector
- 9) 2nd throttle TPS connector
- 10) TPS connector



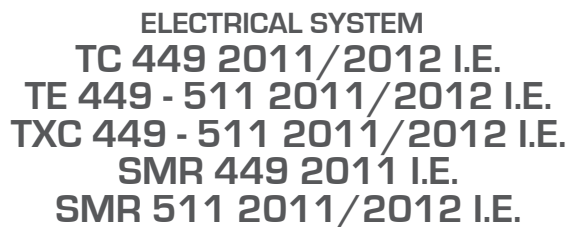
- 11) Current generator connector



- 12) Voltage regulator connector



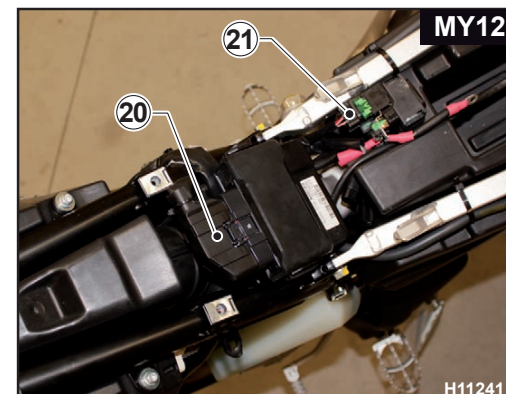
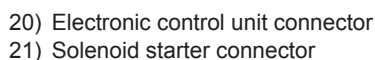
- 13) Pressure sensor connector

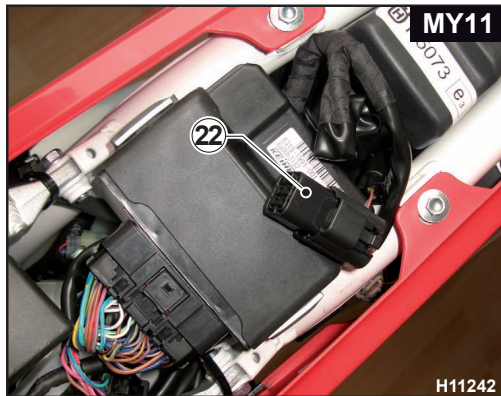
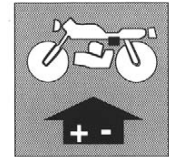
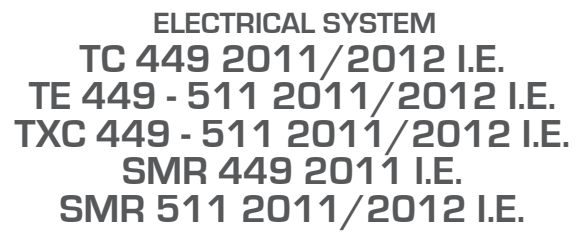


- 14) Main starting relay connector (MY11)
- 14a) Main starting relay connector (MY12)
- 15) Fuel pump relay connector (MY11)
- 15a) Fuel pump relay connector (MY12)
- 15b) Electric fan relay connector
- 16) Air temperature sensor connector
- 17) Electric fan connector
- 18) Coil connector

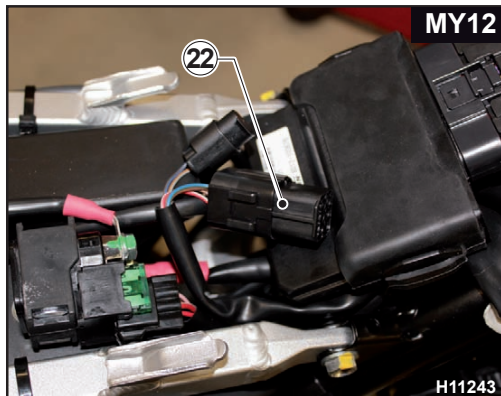


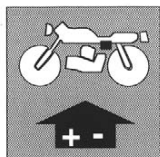
- 19) Fuel pump connector



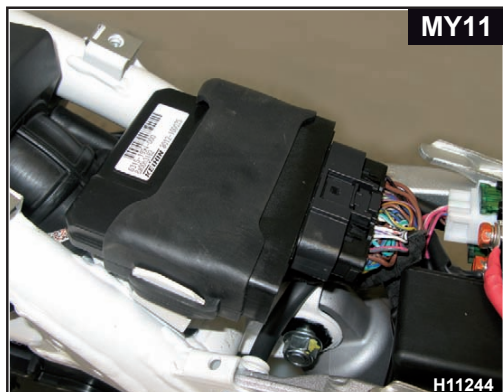


22) Diagnostics connector





ELECTRICAL SYSTEM
TC 449 2011/2012 I.E.
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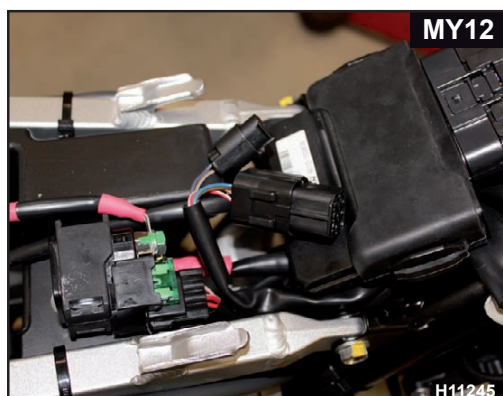


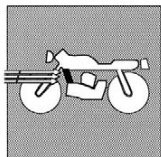
Important

Before washing the motorcycle, it is necessary to duly protect the following parts from water:

- a) Rear opening of the muffler;
- b) Clutch and front brake levers, handgrips, handlebar switches;
- c) Air filter intake;
- d) Steering head, wheel bearings;
- e) Rear suspension drag drop link.

In addition to these precautions, NEVER ALLOW HIGH-PRESSURE AIR OR WATER to get in contact with any ELECTRICAL PARTS, the FUEL INJECTION SYSTEM, and especially the electronic control unit (1) and the digital dashboard (2).



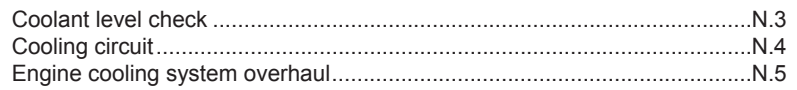
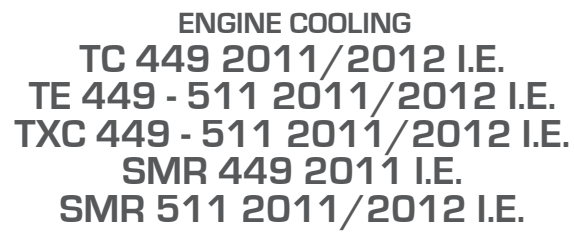


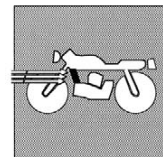
ENGINE COOLING
TC 449 2011/2012 I.E.
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TXC 449 - 511 2011/2012 I.E.
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SMR 511 2011/2012 I.E.



Section

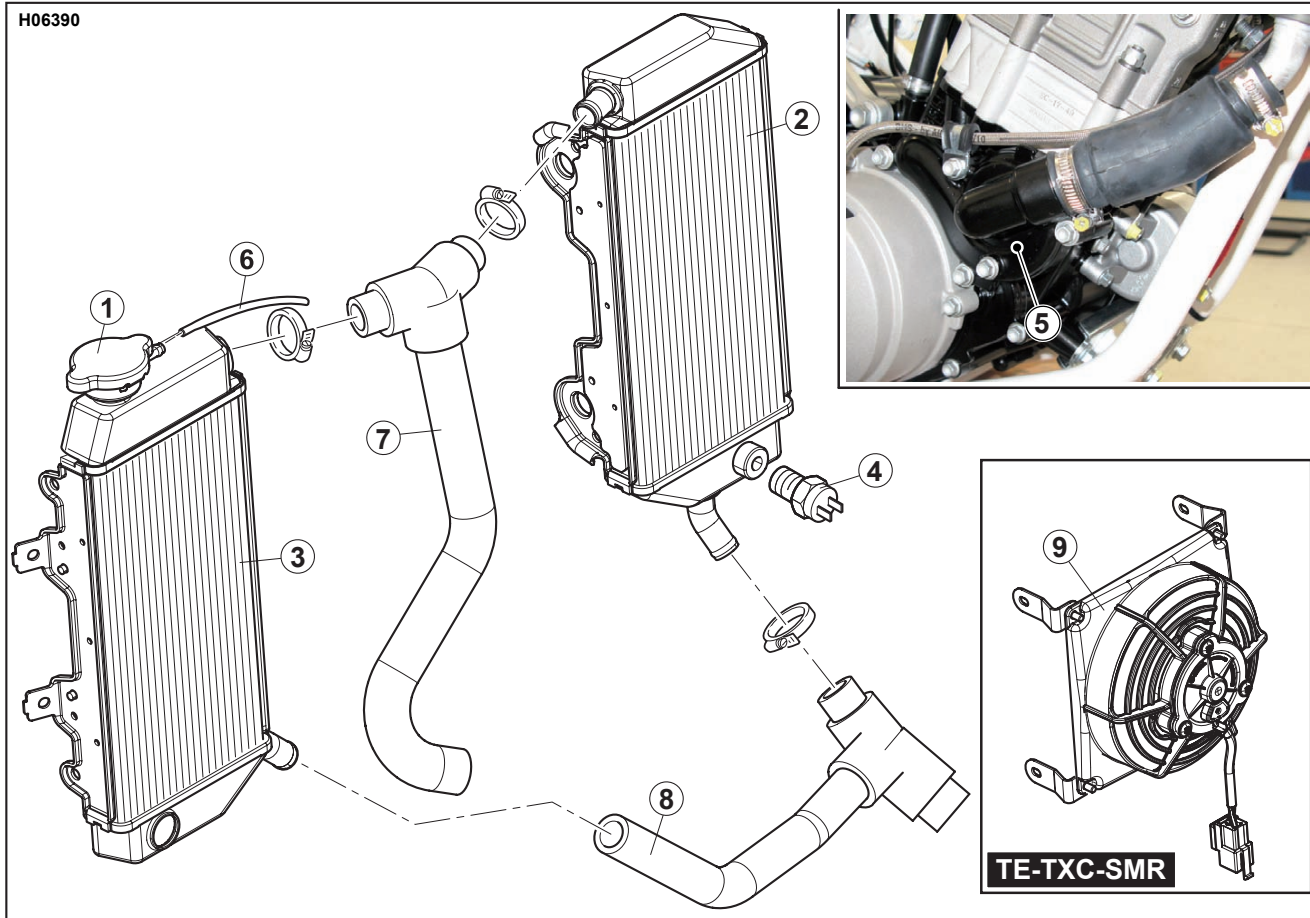
N





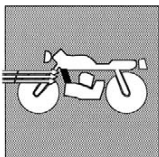
Cooling circuit

H06390

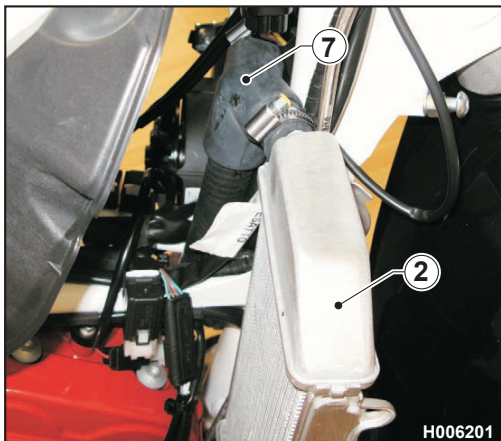


The forced circulation cooling system uses a centrifugal pump (located to the left of the head) and two down-draft radiators.

- 1 Radiator cap
- 2 Right-hand radiator
- 3 Left-hand radiator
- 4 Water temperature sensor
- 5 Water pump
- 6 Breather hose
- 7 Cylinder head / radiator connection pipe
- 8 Water pump / radiator lower pipe
- 9 Cooling fan (TE - TXC - SMR)

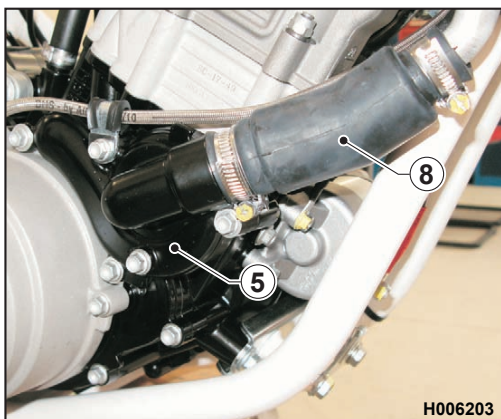
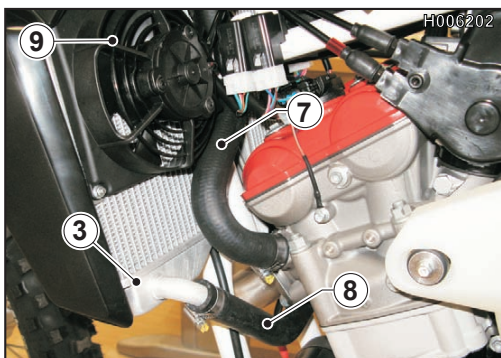


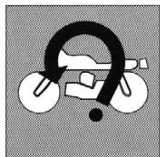
ENGINE COOLING
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Engine cooling system overhaul

If the coolant runs too hot, check the radiators. Any foreign matter trapped between the fins (such as leaves, bugs, mud, etc.) will obstruct air flow and must be removed carefully to avoid damage to radiator. Straighten any bent fins to ensure free flow of air. If the cooling mass is clogged or damaged, no more than 20% of its surface must be affected. If damage exceeds this limit, the radiator must be replaced. Periodically check the connecting hoses (see Section B, "Scheduled Maintenance Chart"); this will avoid coolant leakage and consequent engine seizure. If hoses show cracks, swelling or hardening due to sheaths desiccation, their replacement shall be advisable. Check the correct tightening of the clamps.





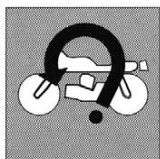
HYDRAULICALLY CONTROLLED CLUTCH
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
SMR 511 2011/2012 I.E.



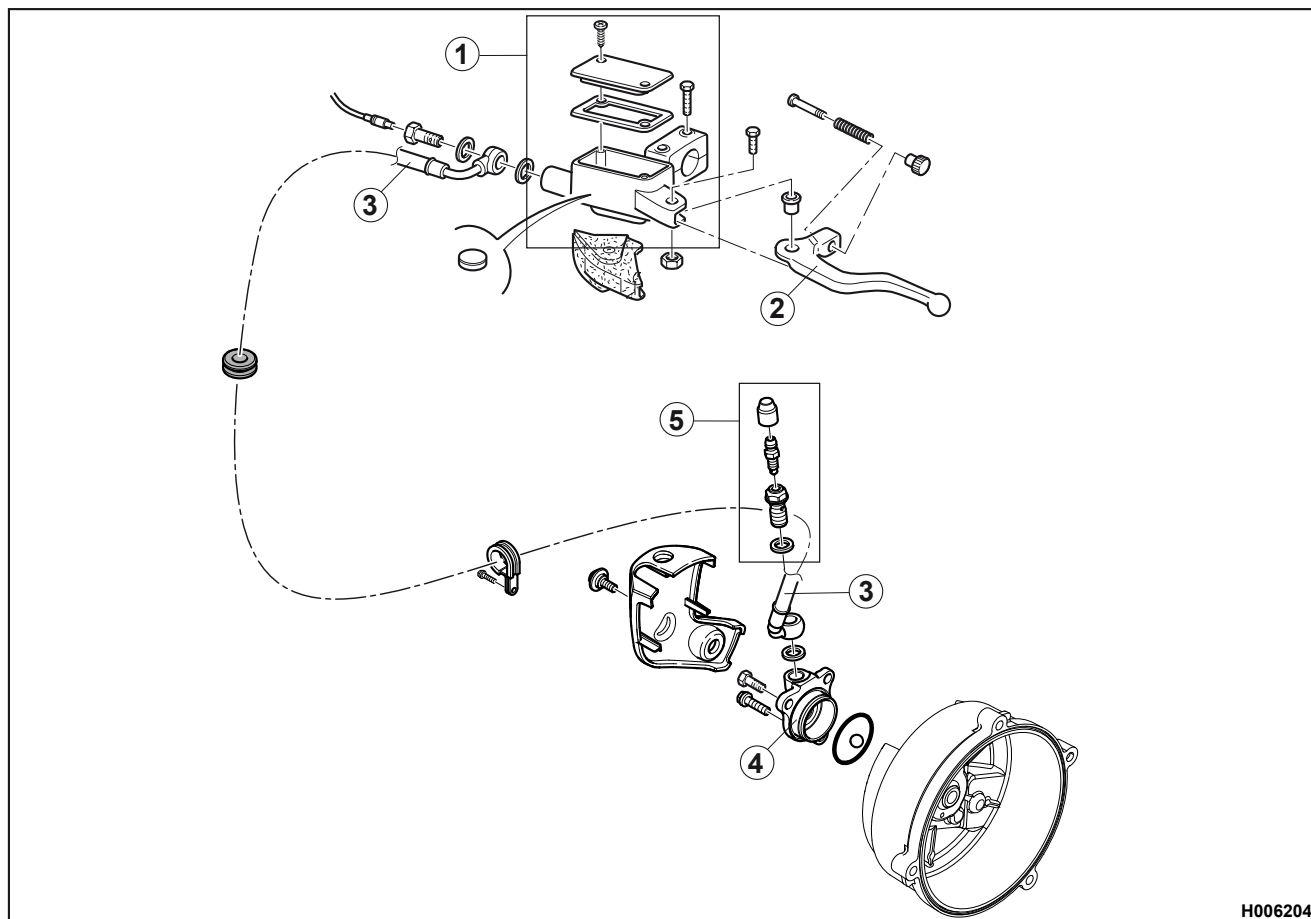
Section

P





HYDRAULICALLY CONTROLLED CLUTCH
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
TXC 449 - 511 2011/2012 I.E.
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SMR 511 2011/2012 I.E.



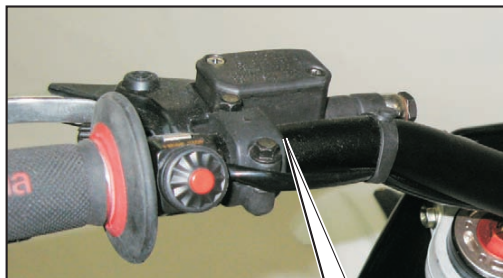
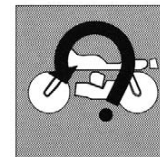
Hydraulic clutch system

The hydraulic circuit is composed of a master cylinder with its reservoir located on the left side of the handlebar, and a piston installed on the right crankcase half. Clutch is disengaged through piston (1) that works on clutch pushrod.

- 1 Clutch master cylinder
- 2 Clutch lever
- 3 Master cylinder to piston hose
- 4 Piston assembly
- 5 Bleed fitting

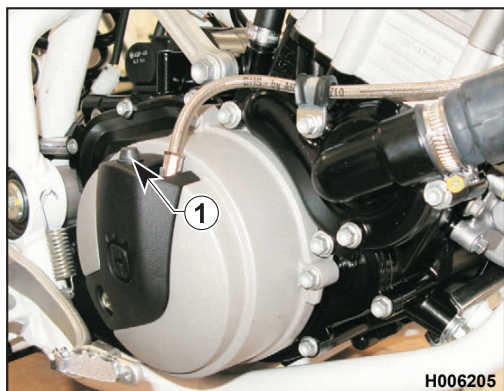
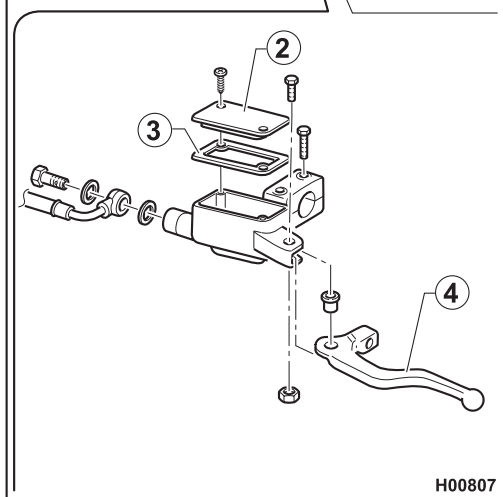


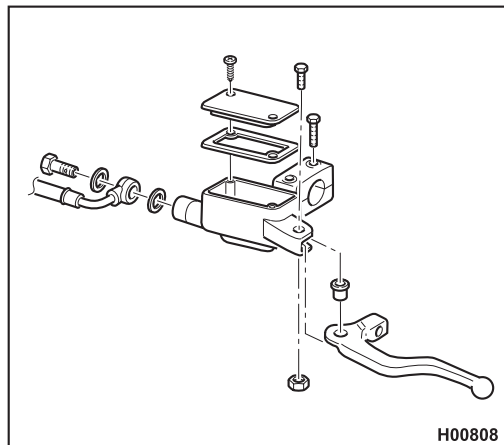
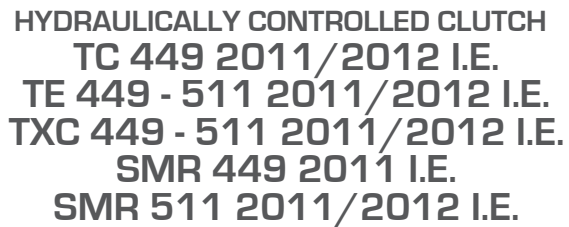
The fluid used in the hydraulic circuit will damage painted parts if spilt on them. Handle it with care when servicing the system.



Draining clutch fluid

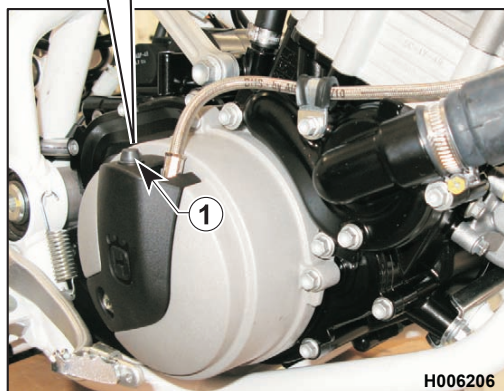
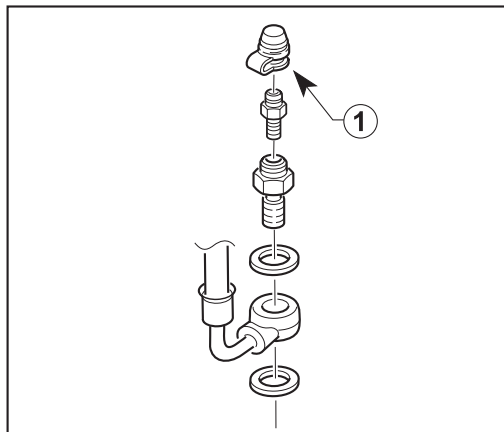
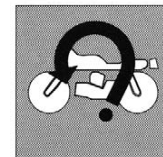
Connect a plastic hose to the bleed valve (1) and the loosen the valve turning it back 1 or 2 turns. Remove reservoir cap (2) and gasket (3) and operate the control lever (4) until draining all fluid.





Clutch master cylinder servicing

Drain the circuit, detach the master cylinder from the left side of the handlebar and take it apart. Replace all seals, reassemble the master cylinder and refit it to the handlebar. Reconnect the hose and fill fresh fluid into the reservoir; bleed the system as described in the relevant paragraph.



Bleeding the clutch system

A long travel and mushy feel of the clutch lever indicate that there is air in the system and the clutch hydraulic system needs bleeding.

Bleeding procedure is as follows:

- Take the rubber cap off the bleed valve (1).
- Attach a clear plastic hose to the bleed valve and place the other end of the hose in a vessel (make sure the hose end stays dipped in the fluid throughout the procedure).
- Remove the reservoir cover (2) and the rubber diaphragm (3) and fill fresh fluid into the reservoir. Use the fluid specified in the lubricant table (see Section A).
- Pull the lever (4) and keep it pulled so that the system remains under pressure, loosen the valve (2), tighten the valve (2) always with the lever pulled, then release the lever.
- Top up the fluid level, wait a few seconds, then repeat a few times the procedure described in the line above until the liquid comes out of the transparent hose without bubbles.
- Lock the valve (1) to the prescribed torque.
- Top up fluid level (A) and refit rubber diaphragm (3) and reservoir cover (2).



Fluid level inside the reservoir shall never drop below the minimum notch during the bleeding procedure.



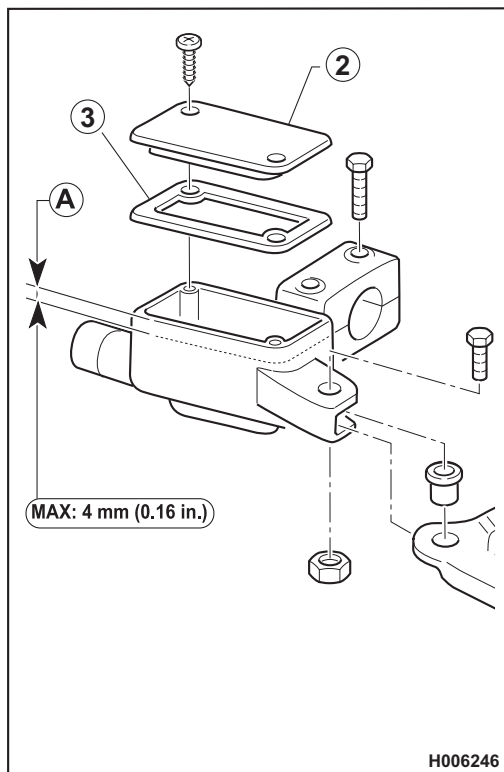
Hydraulic fluid is corrosive. In the event of contact with eyes, rinse with abundant water.

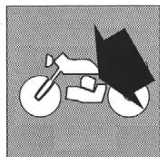


Motorcycle handlebar must be turned to the right during the bleeding procedure. This will keep the master cylinder reservoir higher, making bleeding easier.



Bleed valve tightening torque: 12-16 Nm, 1.2-1.6 Kgm, 8.7-11.6 ft/lb.



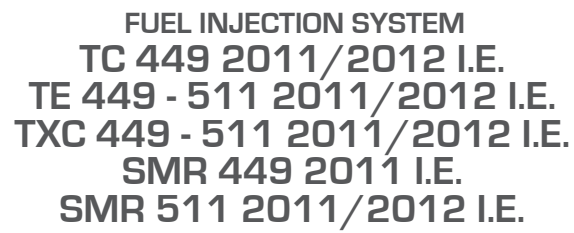


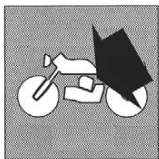
FUEL INJECTION SYSTEM
TC 449 2011/2012 I.E.
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SMR 511 2011/2012 I.E.



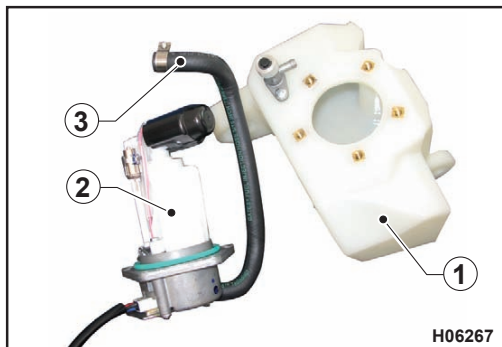
Section

S





FUEL INJECTION SYSTEM
TC 449 2011/2012 I.E.
TE 449 - 511 2011/2012 I.E.
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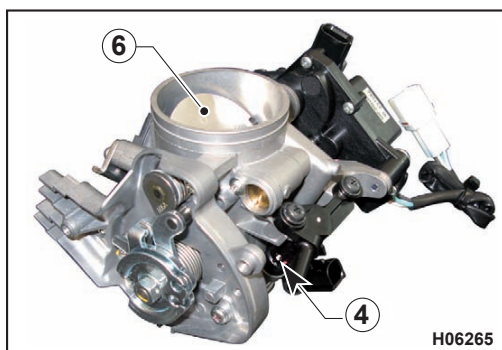
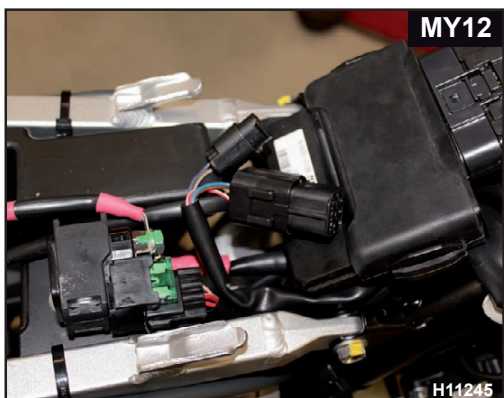
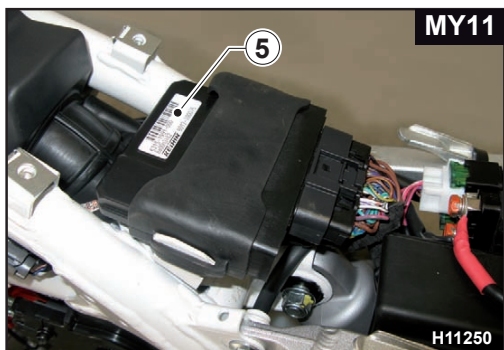
Fuel injection system

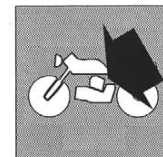
The fuel injection system is composed of fuel tank (1), electric pump (2), pipe (3) and injector (4). The fuel in the tank is pumped by the pump. The pressurised fuel flows into the injector installed on the throttle body (6). The electronic control unit (5) located under the saddle signals the injector to open and a fan-shaped spray of fuel is injected into the combustion chamber.

The parameters that play a role in determining proper fuel delivery under all operating conditions are as follows:

- Air temperature in the intake manifold;
- Engine coolant temperature;
- Atmospheric pressure in the intake manifold (in current location and at current altitude);
- Throttle opening;
- Battery voltage;
- Fuel injection pulse width;
- Ignition coil;
- Lambda sensor heater;
- Rich or lean combustion mixture (LAMBDA sensor);

"HUSQVARNA SERVICE TOOL" diagnostic software allows you to test the components listed above in the event of a fuel injection system malfunction.





Instructions for using "HUSQVARNA SERVICE TOOL" for a fuel injection system

The fuel injection system does not require any scheduled maintenance. The "HUSQVARNA SERVICE TOOL" part no. 8000 H3898 allows you to test injection system components in the event of a malfunction.

TE MY11 = A malfunction is indicated by the word "FAIL" appearing in the right-hand portion of the tool display when the ignition key is set to ON.

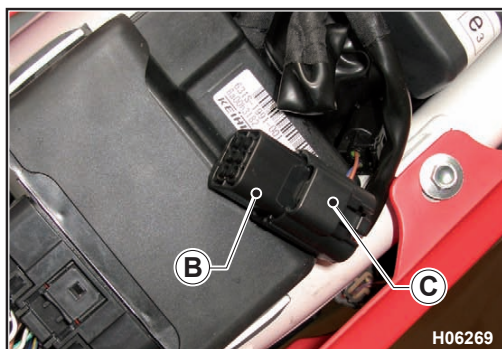
TE MY12 = A malfunction is indicated by the word "FAIL" appearing in the right-hand portion of the tool display.

"HUSQVARNA SERVICE TOOL" is composed of:

- 1) "Diagnostic Tool" Software CD, User Guide (PDF), Operation Manual (PDF);
- User Guide hard-copy;
- Operation Manual hard-copy;
- 2) Diagnosis module part no. 8000H3902
- 3) Bike-module connection cable part no. 8000 H3899 (KEIHIN, MIKUNI MY11)
- 4) Module-PC USB cable part no.8000 H3903
- 5) Do not use
- 6) Do not use

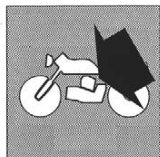
After installing the Diagnostic Tool Software according to the instructions provided in the User Guide, proceed as follows:

- remove the saddle;
- slip off the cap (B) of the ECU interface connector (C);
- connect the kit cable (3) to the connector (C);
- Connect the USB cable (4) to the PC;
- start the "Diagnostic Tool" software you have installed and perform the required tests.
- at the end of the analysis, remove the cable (3) from the connector (C). If the cable remains connected, the control unit and the users are powered.
- Remove the cable (4).



This diagnostic software can check the following injection parameters:

- 1 - AIR TEMPERATURE (air temperature in the intake manifold);
- 2 - WATER TEMPERATURE (engine coolant temperature);
- 3 - AIR PRESSURE (atmospheric pressure in current location and at current altitude);
- 4 - 1st THROTTLE POSITION (throttle opening rate);
2nd THROTTLE POSITION (TE-TXC-SMR);
- 5 - BATTERY (battery voltage);
- 6 - NEUTRAL SENSOR (indicates when the bike is in neutral position);
- 7 - INJECTOR (fuel injection pulse width);
- 8 - IGNITION COIL (device that stores energy in the reel and discharges it to the spark plug);
- 9 - OXYGEN SENSOR HEATER (TE-TXC-SMR) (heats oxygen sensor up to a temperature that will provide a stable output);
- 10 - OXYGEN SENSOR (TE-TXC-SMR) (detects lean or rich combustion mixture).
- 11 - MAPPING CONDITION (displays if the bike is in standard or racing mapping);
- 12 - OVERREV HOUR METER.

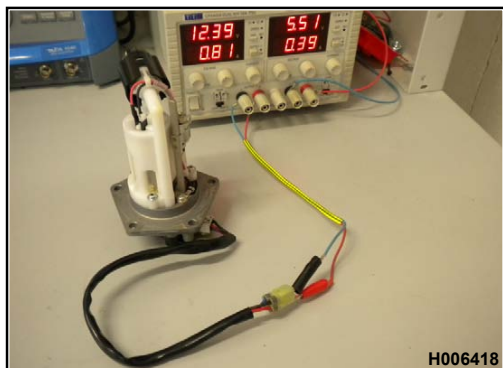
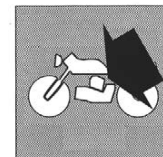


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In addition to identifying any current malfunction, the software stores past malfunctions that have been resolved: store malfunctions can be deleted following the instructions provided in the Operation Manual.

For fuel pump and relay inspections, see relevant paragraphs.



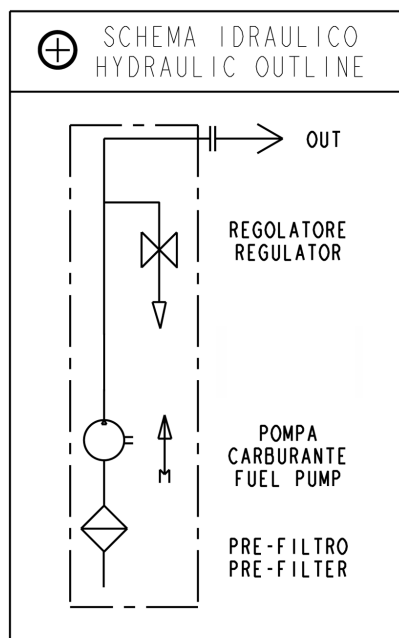
Fuel pump inspection

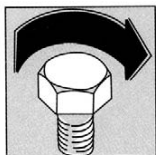
Remove the pump as described in Section "E".

- Connect the power supply unit positive pole (12V) to the red lead pin in the pump connector;
 Connect the power supply unit negative pole to the negative lead pin in the pump connector.



Never keep the pump connected to the power supply unit for more than 3 seconds in a row.





TIGHTENING TORQUE FIGURES
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TXC 449 - 511 2011/2012 I.E.
SMR 449 2011 I.E.
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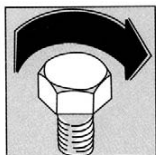
Section



Tighten all nuts and screws to the specified torque using a torque wrench. If not tightened securely, a nut or a screw might become damaged or work itself loose, causing damage to motorcycle and injury to rider. An overtightened nut or screw might become damaged, its thread might strip, or the nut/screw might fail and work itself loose. Listed in the table are the tightening torque figures for the most important nuts and screws, which have determined in accordance with thread diameter, pitch and specific application. These figures are obtained after cleaning the threads with solvent.



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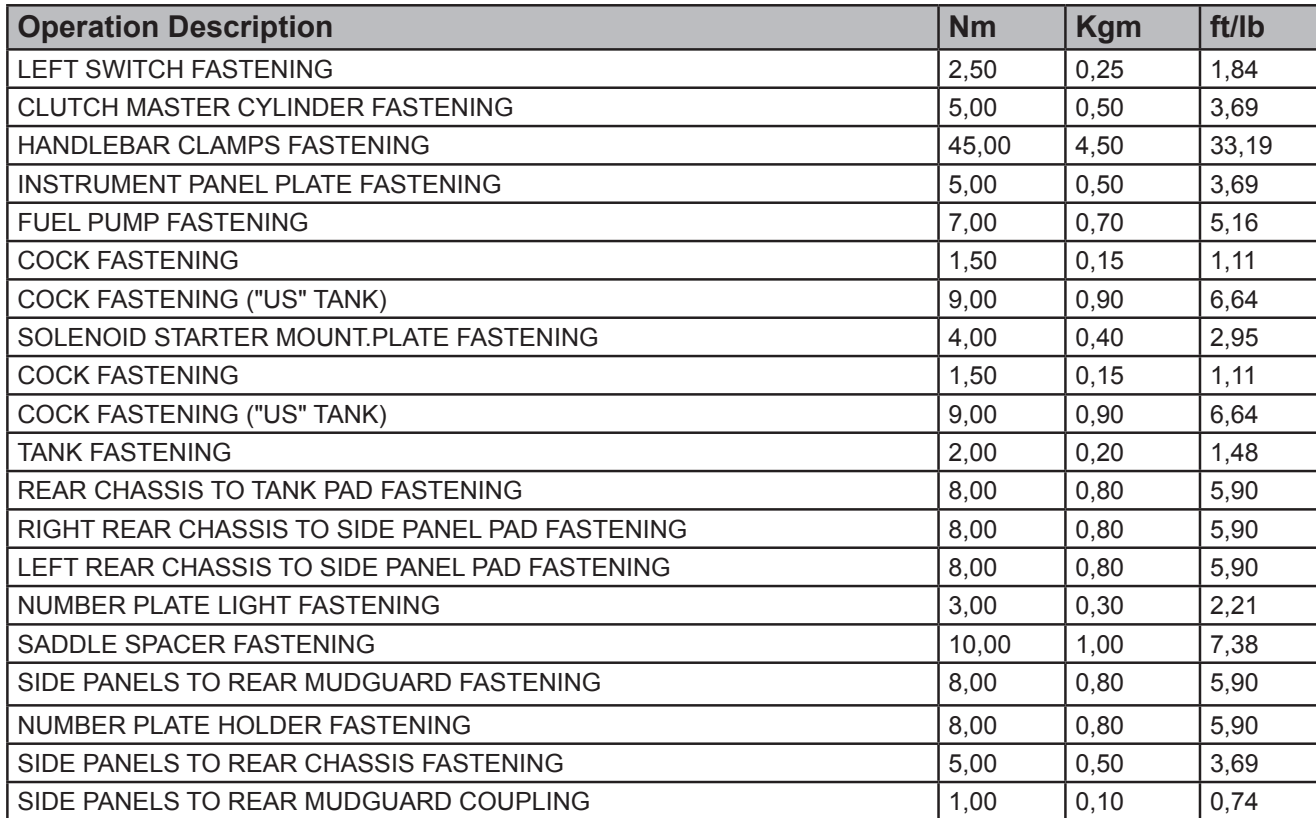
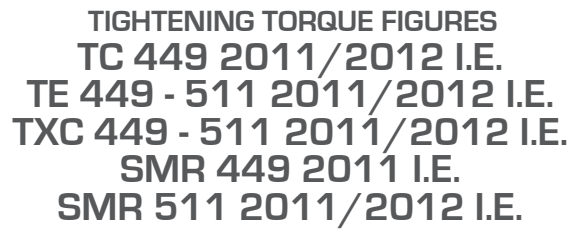


TIGHTENING TORQUE FIGURES
 TC 449 2011/2012 I.E.
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 TXC 449 - 511 2011/2012 I.E.
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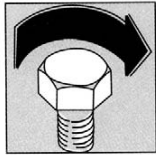


Operation Description	Nm	Kgm	ft/lb
SILENCER TO REAR CHASSIS FASTENING	25,00	2,50	18,44
MANIFOLD FLANGE NUT FASTENING	13,00	1,30	9,59
SILENCER CLAMP FASTENING	20,00	2,00	14,75
HEADLIGHT TO GRILLE FASTENING	10,00	1,00	7,38
RING TO GRILLE/NUMBER HOLDER FASTENING	0,70	0,07	0,52
PUSHROD TO MUDGUARD TAIL FASTENING	1,00	0,10	0,74
NUMBER HOLDER/GRILLE TO MUDGUARD FASTENING	1,00	0,10	0,74
MUDGUARD TO BOTTOM YOKE FASTENING	10,00	1,00	7,38
FORK LEG PROTECTION FASTENING	10,00	1,00	7,38
CABLE GUIDE PLATE TO LEFT FORK LEG PROTECTION FASTENING	1,20	0,12	0,89
TAILLIGHT TO NUMBER PLATE HOLDER FASTENING	1,50	0,15	1,11
SIDE STAND PIN FASTENING (WITH LOCTITE 243)	12,00	1,20	8,85
CHASSIS PROTECTION TO SWINGING ARM PIN FASTENING	5,00	0,50	3,69
REAR BRAKE LEVER FASTENING (WITH LOCTITE 243)	42,00	4,20	30,98
FRONT WHEEL AXLE FASTENING	52,00	5,20	38,35
FRONT BRAKE CALLIPER TO LEFT FORK LEG FASTENING	28,00	2,80	20,65
REAR SHOCK ABSORBER PROTECTION FASTENING	5,00	0,50	3,69
CLUTCH ACTUATOR COVER TO ENGINE FASTENING	5,00	0,50	3,69
REAR WHEEL AXLE FASTENING	142,00	14,20	104,73
CHASSIS PROTECTION TO CHAIN ROLLER FASTENING	10,00	1,00	7,38
HORN FASTENING	5,00	0,50	3,69
RIGHT SCOOP FASTENING	5,00	0,50	3,69
LEFT SCOOP FASTENING	5,00	0,50	3,69
LEFT SIDE PANEL FASTENING	5,00	0,50	3,69
RIGHT SIDE PANEL FASTENING	5,00	0,50	3,69
ENGINE PROTECTION TO CHASSIS FASTENING	10,00	1,00	7,38
NUMBER HOLDER/FRONT FAIRING TO INSTRUMENT PLATE FASTENING	10,00	1,00	7,38
SWINGING ARM PIN BUSHES TO SWINGING ARM FASTENING	3,00	0,30	2,21
DROP LINK TO SWINGING ARM FASTENING	80,00	8,00	59,00
DROP LINK TO DRAG LINK FASTENING	50,00	5,00	36,88
BRAKE HOSE GROMMET TO SWINGING ARM FASTENING	4,00	0,40	2,95
CHAIN SLIDER TO SWINGING ARM FASTENING	4,00	0,40	2,95
CHAIN COVER AND SLIDER TO SWINGING ARM FASTENING	4,00	0,40	2,95
NUT FOR CHAIN TENSIONER ADJUSTER FASTENING	22,00	2,20	16,23
CHAIN GUIDE TO SWINGING ARM FASTENING	11,00	1,10	8,11
BRAKE HOSES TO CYLINDERS/CALLIPERS FASTENING	19,00	1,90	14,01
BRAKE FLUID BLEEDER VALVE FASTENING	14,00	1,40	10,33
FRONT BRAKE MASTER CYLINDER FASTENING	5,00	0,50	3,69
THROTTLE CONTROL FASTENING	3,00	0,30	2,21

1 Nm = 0.73756 ft/lb



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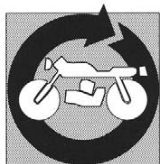
TIGHTENING TORQUE FIGURES
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NOTE: Unless otherwise specified, standard torque values for the different thread sizes are as follows (+/- 5%)

Steel screws on plastic, with metal spacers	M4	2 Nm	0.2 Kgm	1.45 ft/lb
Steel screws on brass, copper, aluminium	M4	2 Nm	0.2 Kgm	1.45 ft/lb
Steel screws on iron, steel	M4	3 Nm	0.3 Kgm	2.2 ft/lb
Steel screws on plastic, with metal spacers	M5	4 Nm	0.4 Kgm	3 ft/lb
Steel screws on brass, copper, aluminium	M5	4 Nm	0.4 Kgm	3 ft/lb
Steel screws on iron, steel	M5	6 Nm	0.6 Kgm	4.4 ft/lb
Steel screws on plastic, with metal spacers	M6	6.5 Nm	0.65 Kgm	4.8 ft/lb
Steel screws on brass, copper, aluminium	M6	6.5 Nm	0.65 Kgm	4.8 ft/lb
Steel screws on iron, steel	M6	10.5 Nm	1 Kgm	7.7 ft/lb
Steel screws on brass, copper, aluminium	M8	16 Nm	1.6 Kgm	11.8 ft/lb
Steel screws on iron, steel	M8	26 Nm	2.6 Kgm	19.1 ft/lb
Steel screws on iron, steel	M10	52 Nm	5.2 Kgm	38.3 ft/lb
Steel screws on iron, steel	M12	100 Nm	10 Kgm	73.8 ft/lb
Steel screws on iron, steel	M14	145 Nm	14.5 Kgm	107 ft/lb

1 Nm = 0.73756 ft/lb



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Section

Y



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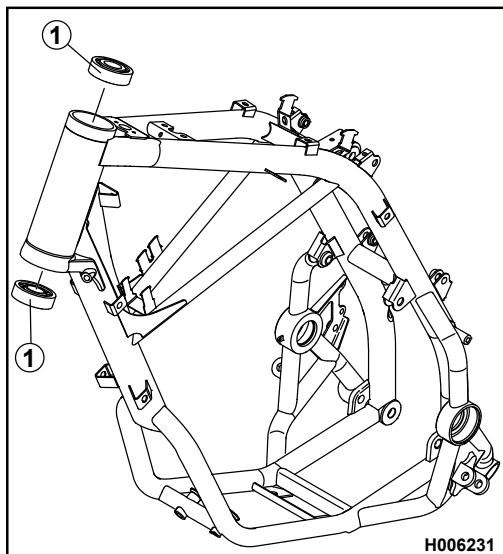


Chassis

The single frame branches off at the exhaust and is made of steel tubes with circular, rectangular and ellipsoidal section; the rear chassis is made from light alloy.

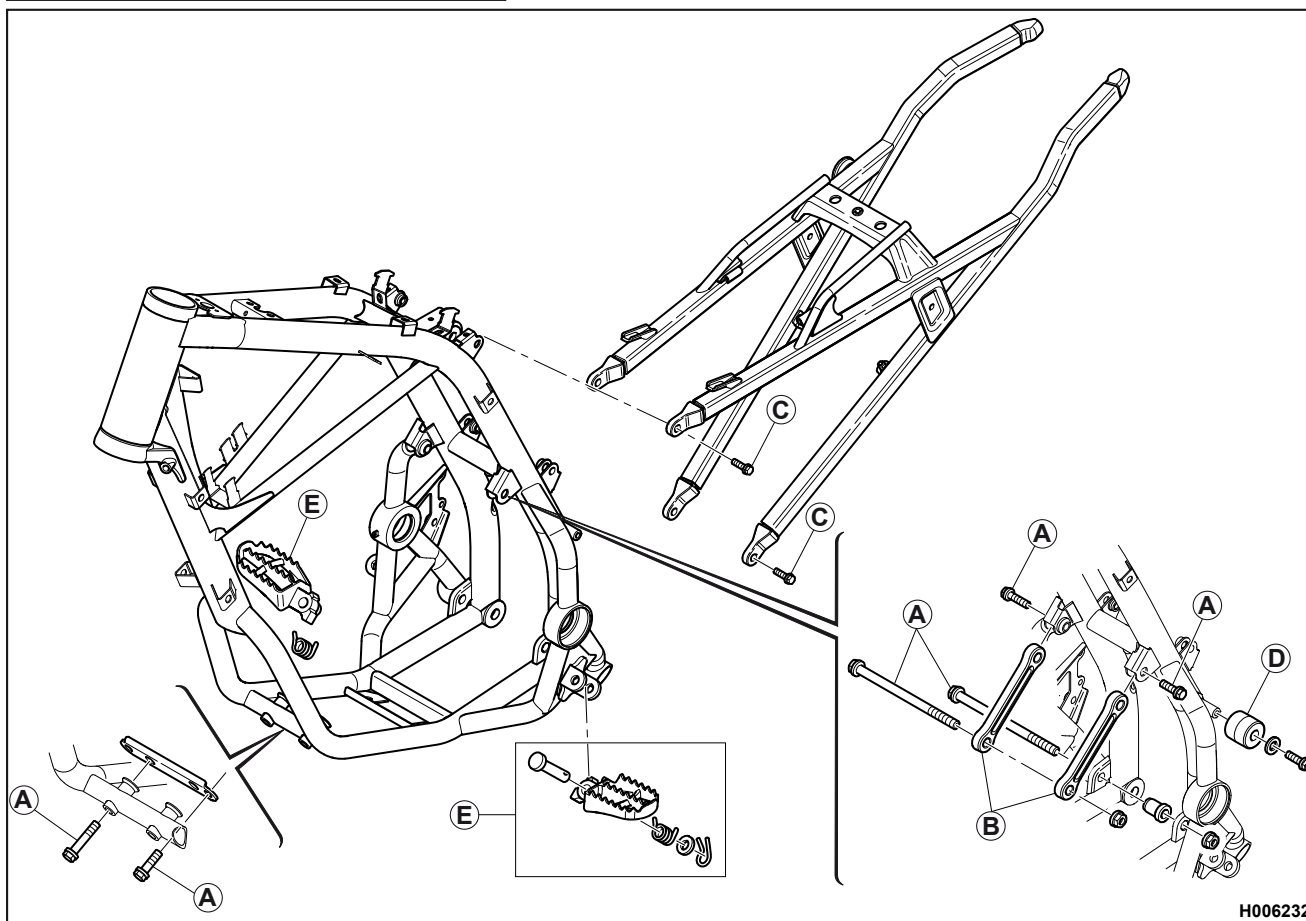


A badly damaged chassis must be replaced.



Lubrication points (lubricant)

- 1 Steering bearings (grease)

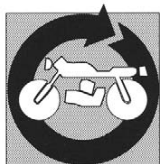


Check the assemblies shown in the figure for cracks or damage.

If any are found, replace the part.

- A ENGINE RETAINING PINS/SCREWS
 B ENGINE MOUNTING LINKS

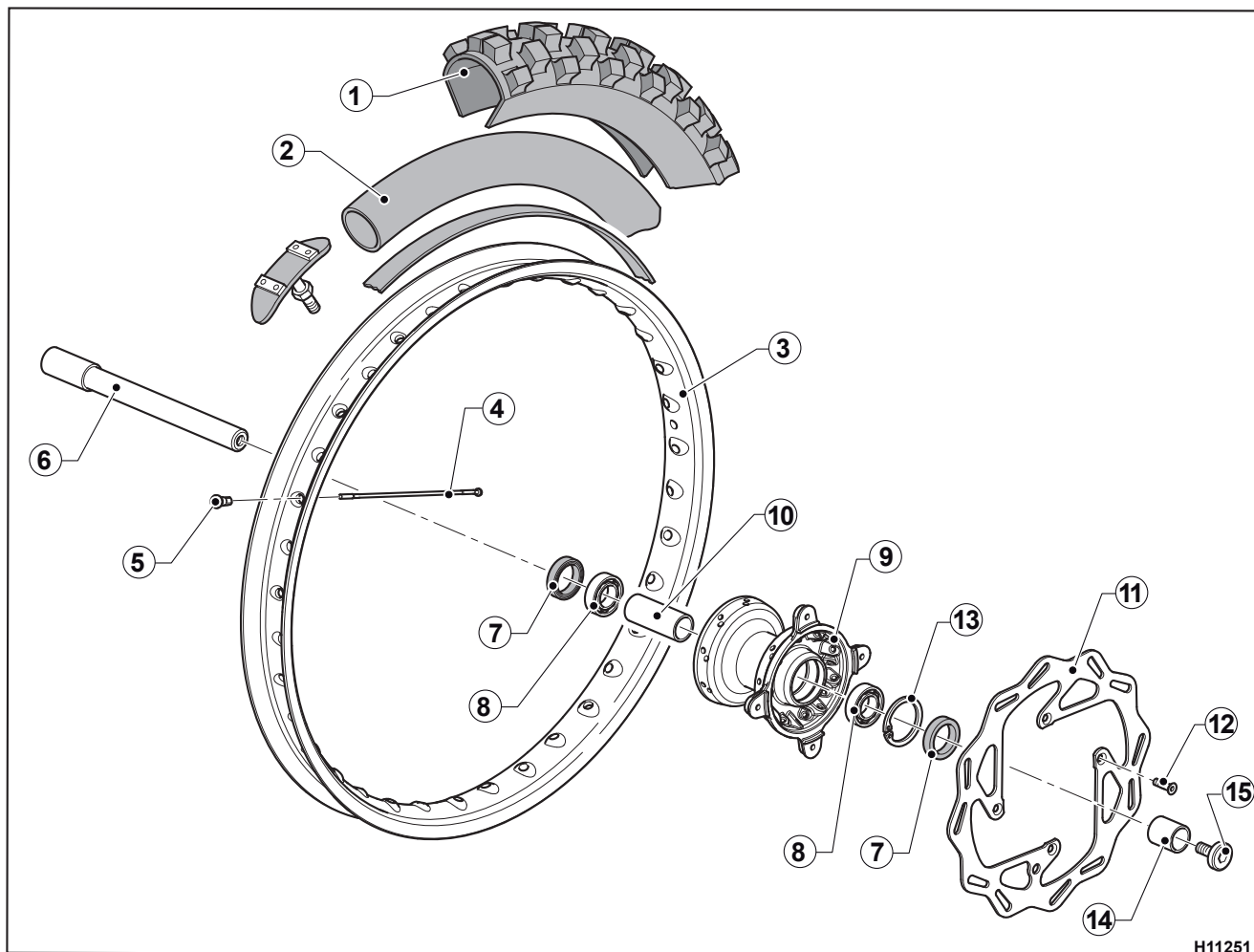
- C REAR CHASSIS MOUNTING BOLTS
 D CHAIN GUIDE ROLLER/BEARING
 E FOOTPEGS/PINS/SPRINGS



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Front wheel (TC - TE - TXC)



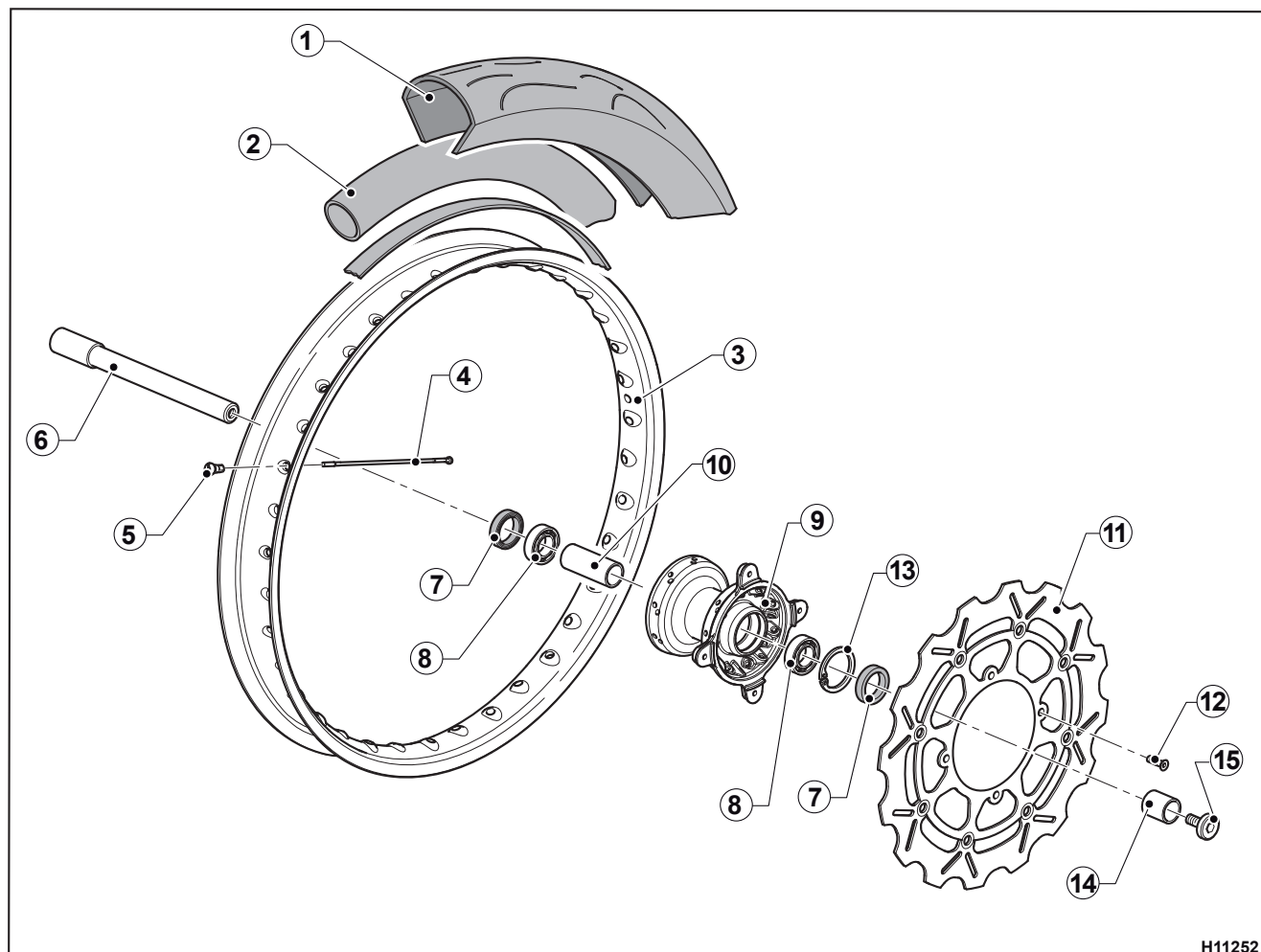
Legend

- 1) Tyre
- 2) Inner tube
- 3) Rim
- 4) Spoke
- 5) Nipple
- 6) Wheel axle
- 7) Seal
- 8) Bearings
- 9) Hub
- 10) Spacer
- 11) Brake Disc
- 12) Brake disc retaining screw
- 13) Circlip
- 14) Outer spacer
- 15) Pin retaining screw

For technical characteristics regarding the front wheel, see section "A" General Information of this manual.



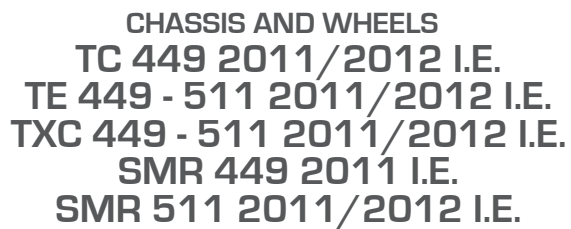
Front wheel (SMR)



Legend

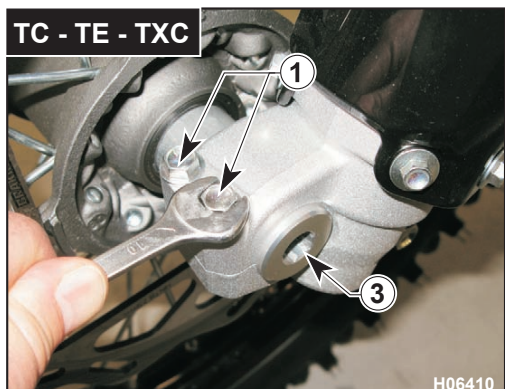
- 1) Tyre
- 2) Inner tube
- 3) Rim
- 4) Spoke
- 5) Nipple
- 6) Wheel axle
- 7) Seal
- 8) Bearings
- 9) Hub
- 10) Spacer
- 11) Brake Disc
- 12) Brake disc retaining screw
- 13) Circlip
- 14) Outer spacer
- 15) Pin retaining screw

For technical characteristics regarding the front wheel, see section “A” General Information of this manual.



Set a stand or a block under the engine and see that the front wheel is lifted from the ground.



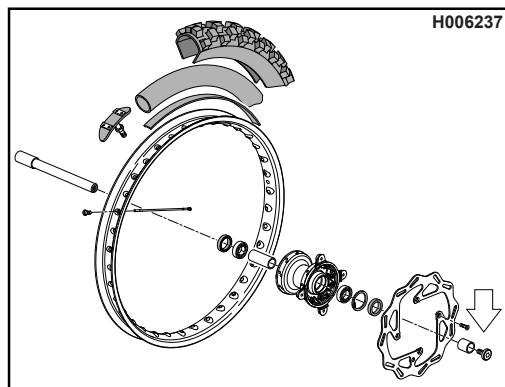
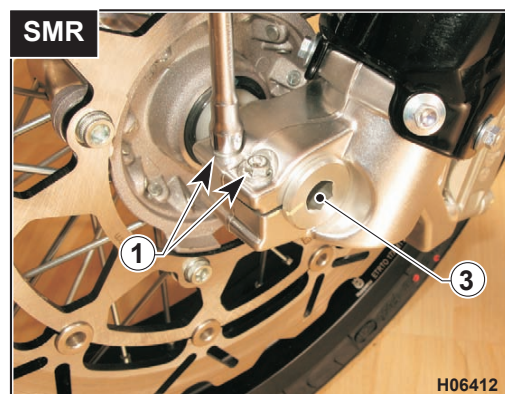


Hold the head of the wheel axle in place, and unscrew the bolt (3) on the opposite side; draw the wheel axle out.



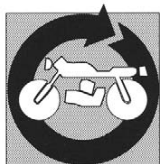
Do not operate the front brake lever when the wheel has been removed; this causes the calliper pistons to move outwards.

After removal, lay down the wheel with brake disc on top.



Reassembling the front wheel

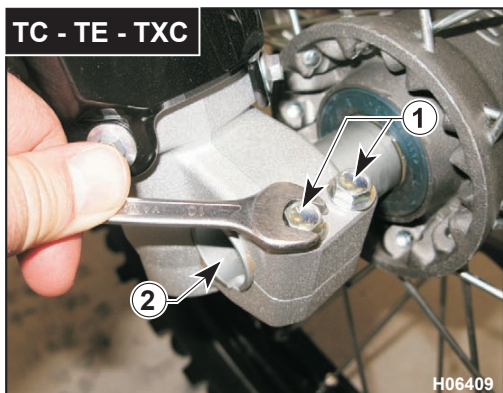
Fit the L.H. spacer on the wheel hub.



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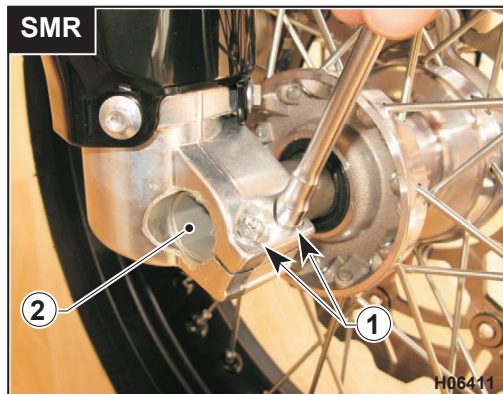
TC - TE - TXC



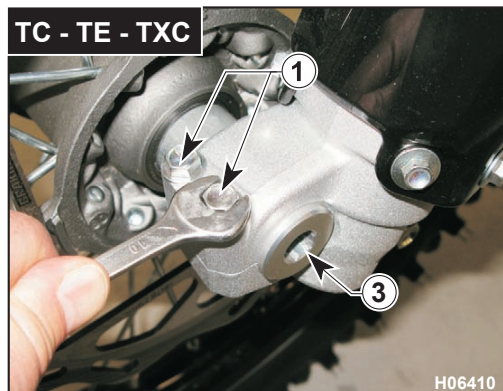
Fit the wheel between the fork legs so as to set the brake disc into the calliper.

Fit the wheel axle (2) from the R.H. side, after greasing it and push it fully home against the L.H. fork leg; during this operation, the wheel should be turned.

SMR



TC - TE - TXC

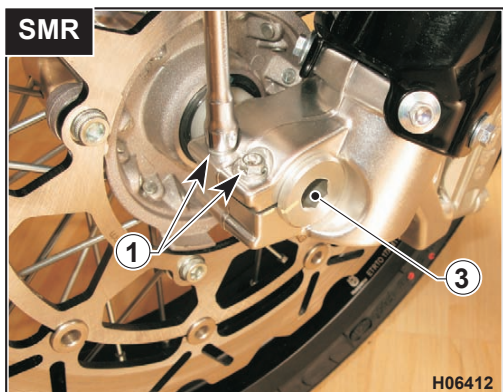


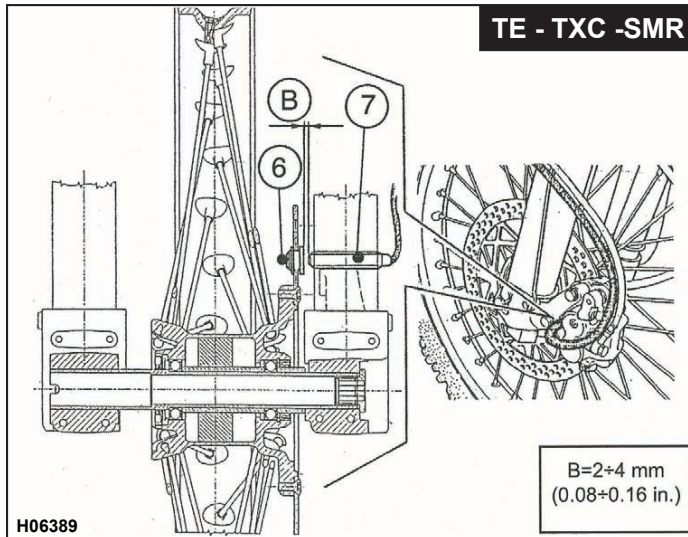
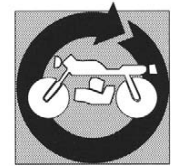
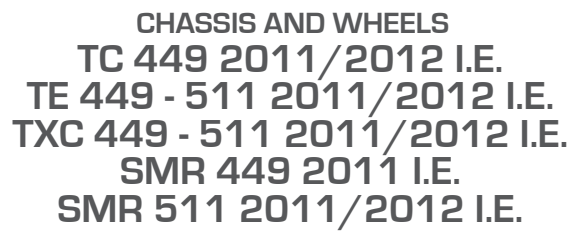
Tighten the screw (3) on the fork L.H. side but DO NOT lock it. Lock: the screws (1) on the R.H. leg (10.4 Nm, 1.05 Kgm, 7.7 ft/lb), the screw (3) on the L.H. side (51.45 Nm, 5.25 Kgm, 38 ft/lb), the screws (1) on the L.H. leg (10.4 Nm, 1.05 Kgm, 7.7 ft-lb).



After reassembly, pull the brake control lever until the pads are against the brake disc.

SMR





TE - TXC - SMR

Check the gap “B” between magnet (6) on brake disc and sensor (7) on brake calliper.

Set height "A" back to original value.

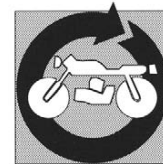


This exploded view diagram illustrates the assembly of a wheel. The components are numbered as follows:

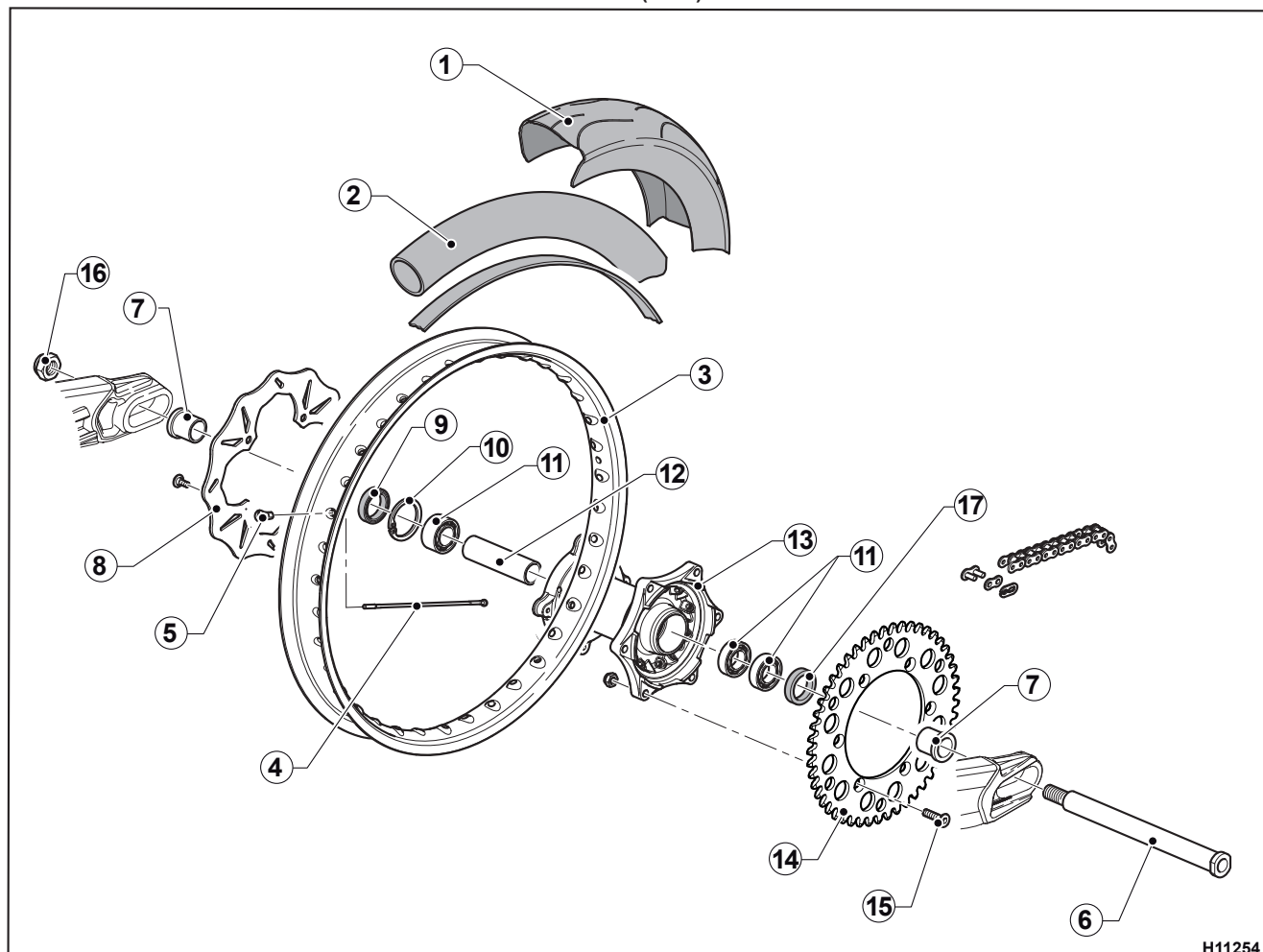
- 1**: Tire tread
- 2**: Tire rim
- 3**: Wheel hub
- 4**: Wheel rim
- 5**: Wheel flange
- 6**: Axle
- 7**: Wheel nut
- 8**: Wheel flange
- 9**: Wheel flange
- 10**: Wheel flange
- 11**: Wheel flange
- 12**: Wheel flange
- 13**: Wheel flange
- 14**: Wheel flange
- 15**: Wheel flange
- 16**: Wheel flange
- 17**: Wheel flange

- 1) Tyre
- 2) Inner tube
- 3) Rim
- 4) Spoke
- 5) Nipple
- 6) Wheel axle
- 7) Spacer
- 8) Brake Disc
- 9) Seal
- 10) Circlip
- 11) Bearings
- 12) Inner spacer
- 13) Hub
- 14) Sprocket
- 15) Sprocket retaining screw
- 16) Wheel axle locking nut
- 17) Sealing ring

For technical characteristics regarding the rear wheel, see section “A” General Information of this manual.



Rear wheel (SMR)

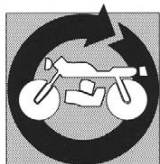


H11254

Key

- 1) Tyre
- 2) Inner tube
- 3) Rim
- 4) Spoke
- 5) Nipple
- 6) Wheel axle
- 7) Spacer
- 8) Brake Disc
- 9) Seal
- 10) Circlip
- 11) Bearings
- 12) Inner spacer
- 13) Hub
- 14) Sprocket
- 15) Sprocket retaining screw
- 16) Wheel axle locking nut
- 17) Sealing ring

For technical characteristics regarding the rear wheel, see section "A" General Information of this manual.



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Removing the rear wheel

Set a stand or a block under the engine and see that the rear wheel is lifted from the ground.



Unscrew the nut (1) of the wheel axle (3) and extract it. It is not necessary to loosen the chain tensioners (2); in this way, the chain tension will remain unchanged after reassembly. Extract the complete rear wheel, keeping the spacers located at the hub sides. To reassemble, reverse the above procedure remembering to insert the brake disc into the calliper.



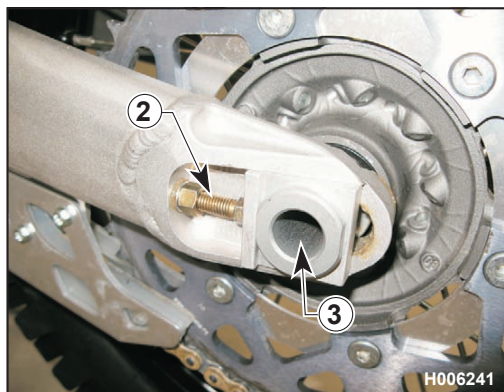
Do not operate the rear brake pedal when the wheel has been removed; this causes the calliper pistons to move outwards.



After removal, lay down the wheel with brake disc on top.

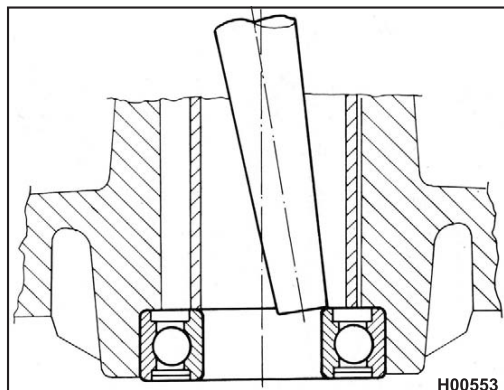


After reassembly, depress the brake pedal until the pads are against the brake disc.



Tightening torque figures

1: 142.1 Nm, 14.5 Kgm, 104.8 ft/lb



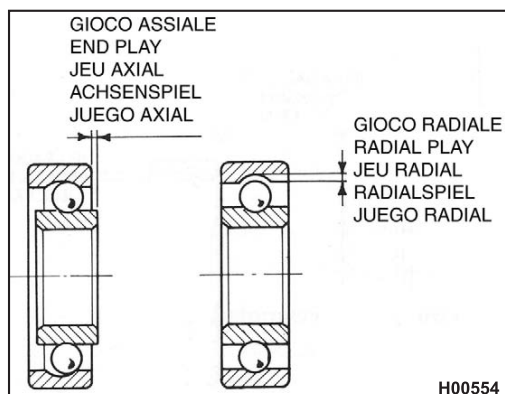
Wheel servicing

Check the wheel hub bearings for wear. If you find too much (radial or axial) clearance, replace the bearings as follows:

- place the hub on a flat surface with an appropriate hole (for when you knock out the bearing);
- use a hammer and a punch to knock out the bearing; apply pressure only on the inner race of the bearing (see figure);
- tap at different positions so as to keep the bearing square in its seat;
- remove the spacer and use the same procedure for the other bearing.



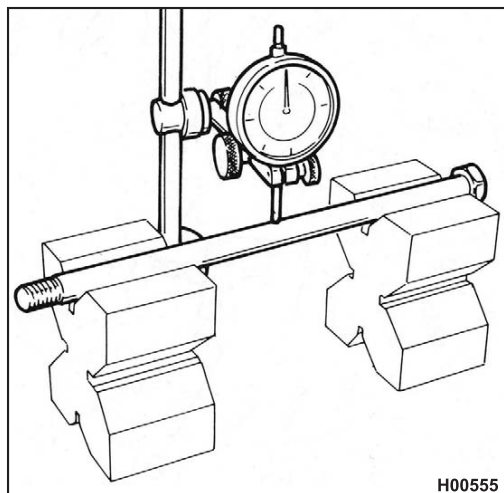
Discard the bearings after removal. Never reuse them.



Before installing the new bearings, check to ensure the seat is clean and shows no grooves or scratches. Lubricate the seat before installing the bearing. Drive the bearing into place using the special installer that only applies pressure to the outer race. Fit the spacer and the other bearing. Check for perfect alignment as you slide the axle into place.



Wheels should be balanced after each service.

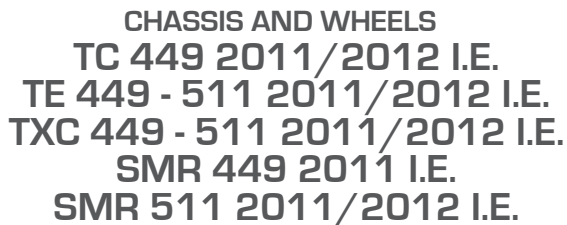


Wheel axle warpage

If warped beyond the maximum limit allowed, the axle must be straightened or replaced. Replace the axle if it cannot be straightened so as to meet the maximum limit allowed.

Axle runout over 100 mm

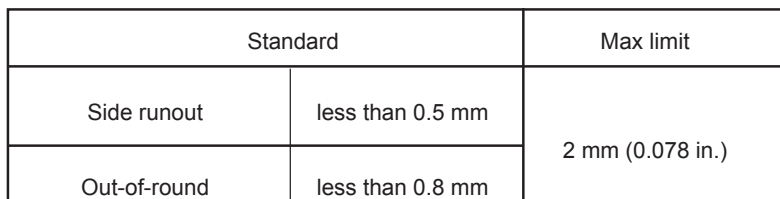
Wheel axle	Standard	Max limit
Wheel axle	less than 0.1 mm	0.2 mm (0.0078 in.)

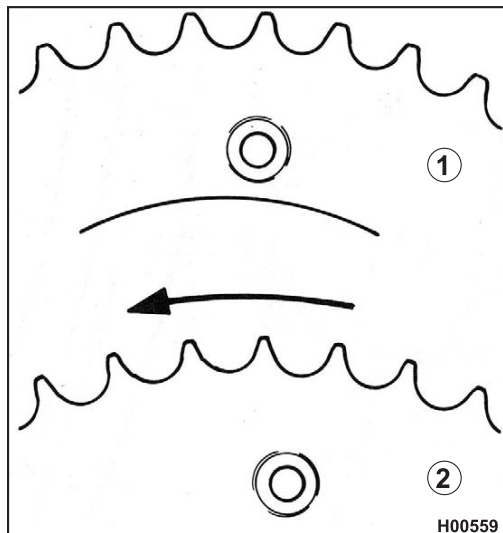
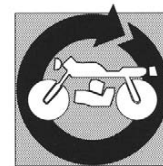


Make sure all nipples are firmly tightened (4.4 Nm, 0.45 Kgm, 3.2 ft/lb). Retighten if needed. Improper tightening will affect motorcycle stability; for a quick check, simply tap the spokes with the tip of a metal tool (such as a screwdriver): a clear, crisp sound indicates proper tightening, a dull sound means that the spokes need to be tightened.



The table below reports the allowed limits for wheel rim warpage. Exceeding runout or out-of-round are generally due to worn bearings. When this is the case, replace the bearings. If this does not solve the problem, change the wheel rim or the wheel.



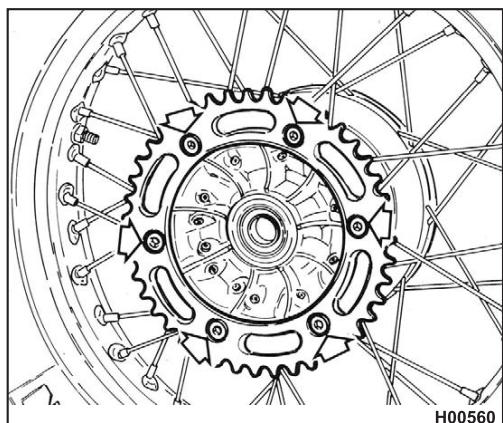


Rear chain sprocket, secondary drive sprocket and chain

The figure at the side shows the profiles of a normally worn and an exceedingly worn sprocket.

1 Normal wear

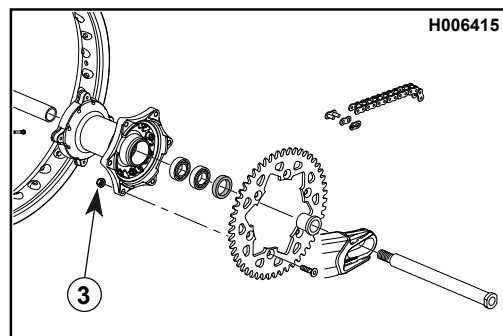
2 Exceeding wear



If the sprocket is exceedingly worn, replace it after loosening the six screws that retain it to the hub.

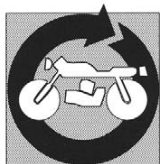


Chain and sprockets must always be replaced as a set.

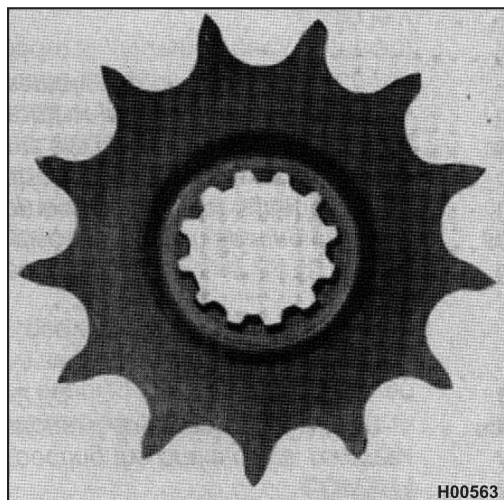


Tightening torque figures

3: 34.3 Nm, 3.5 Kgm, 25.3 ft/lb + LOCTITE 243



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Checking pinion and sprockets for wear

Check the transmission sprocket for damage or wear. When worn down like the sprocket shown in the figure, it must be replaced.



Wheel misalignment causes abnormal wear, making the motorcycle unsafe to ride.



Dirt caked on sprockets and chain collected while riding on muddy or wet terrain increases chain tension. If you expect to ride on muddy or wet terrain, slacken the chain a bit. Riding on muddy terrain significantly increases chain and sprocket wear.

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Section

Z

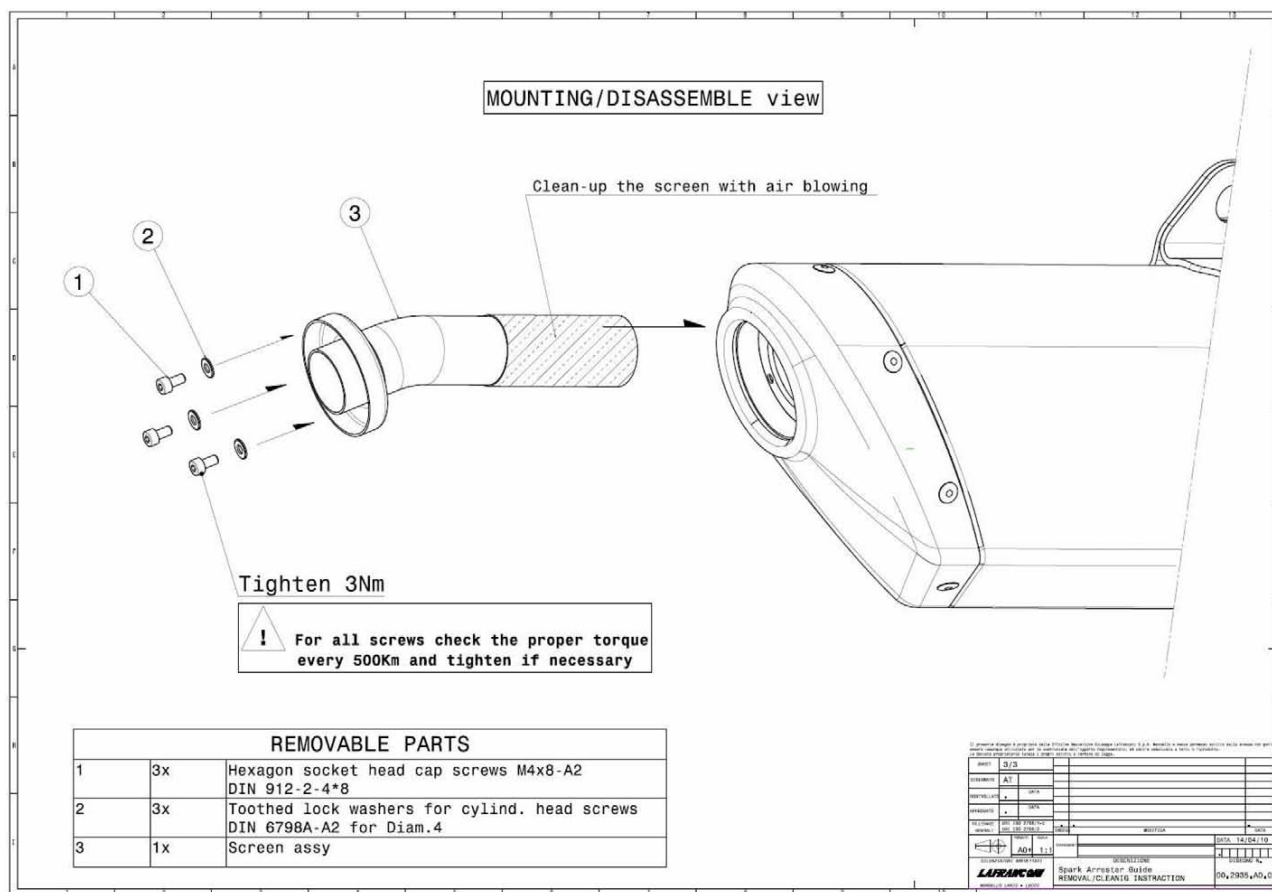
Spark arrester (TE - TXC - SMR)

The models are equipped with a U.S. Forest Service approved spark arrester for maximum efficiency and performance.

“SPARK ARRESTER” MAINTENANCE AND CLEANOUT INSTRUCTIONS

Proceed as follows:

Disassembly and cleanout (every 5000miles)



H06433



- Unscrew the screw on the end cap then pull out the screen.



- Inspect the screen and:
 - a) Cleanout the screen blowing air on the outside surface in order to remove any carbon particles.
 - b) Shake the muffler handling it vertically, with S.A. chamber toward the bottom, in order to remove any carbon particles from the chamber.
- if the screen is broken:

Replace the spark arrester unit as a whole (screen + end cap)
It is not allowed to replace the screen wire mesh alone.



Assembly

- Mount the screen matching the 3 holes.
- Tighten the screw and washer with a torque of 3Nm.



For all screws check the proper torque every 500Km and tighten if necessary.



Final assembly

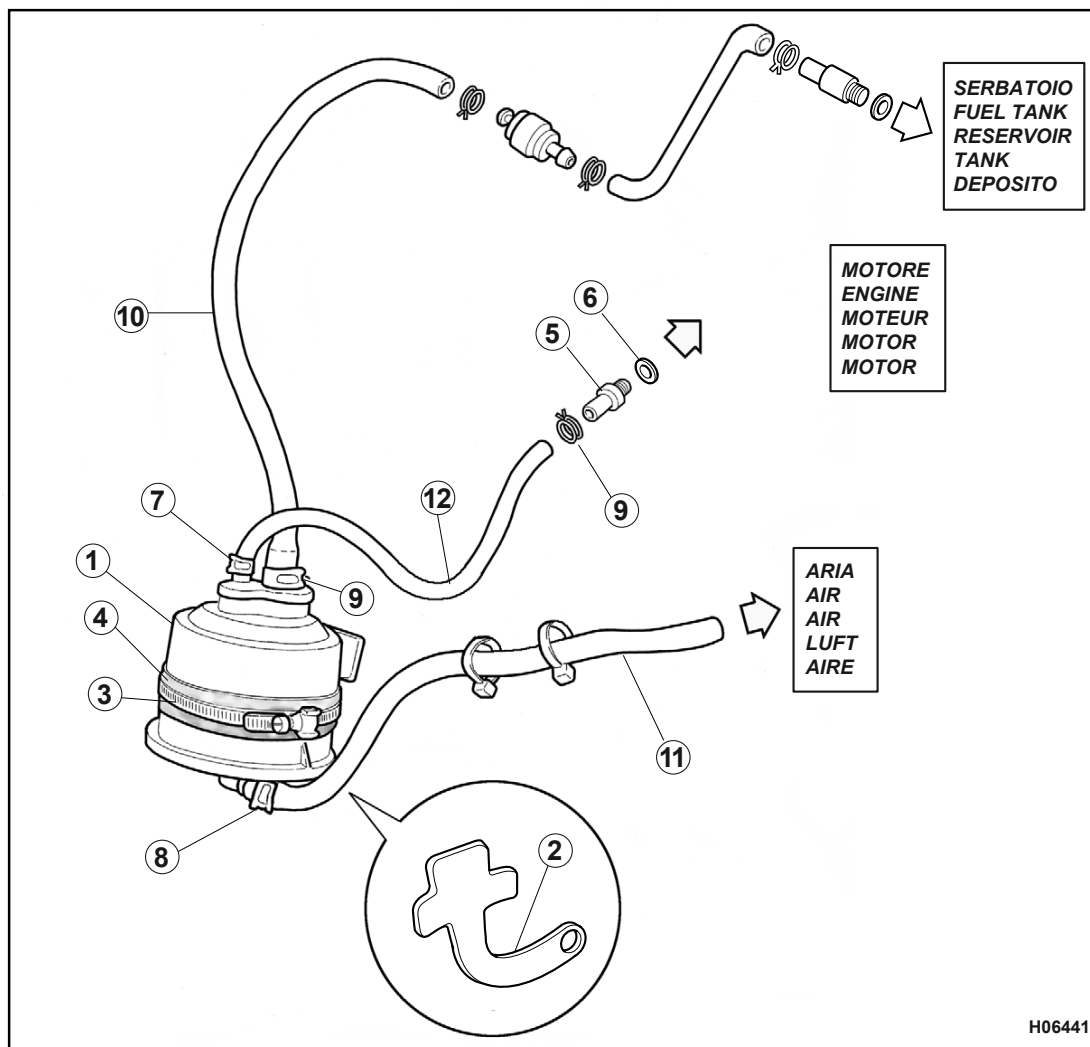


Muffler-side view



SA Homologation stamp on the opposite face

KIT Canister (TE - TXC - SMR)



- 1 Canister
- 2 Support
- 3 Clamp
- 4 Adhesive gum
- 5 Fitting
- 6 Seal washer
- 7 Clamp
- 8 Clamp
- 9 Clamp
- 10 Tube
- 11 Tube
- 12 Tube

