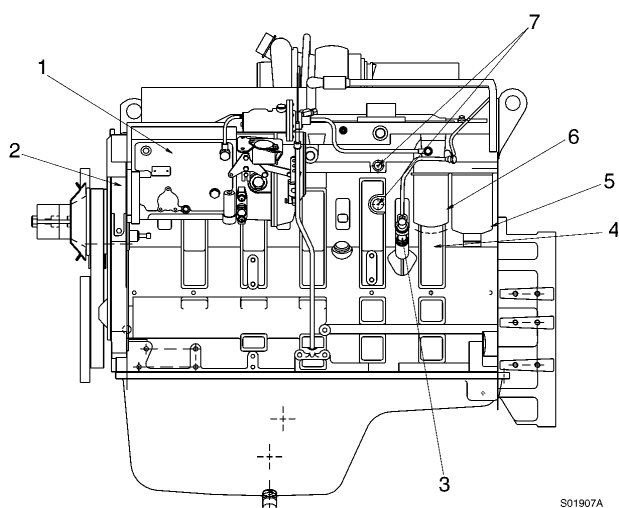


|   |                               |   |                            |
|---|-------------------------------|---|----------------------------|
| Document Title:<br><b>Engine, description</b> | Function Group:<br><b>210</b> | Information Type:<br><b>Service Information</b> | Date:<br><b>2014/11/13</b> |
| Profile:                                      |                               |   |                            |

## Engine, description

(CUMMINS C8.3-C)

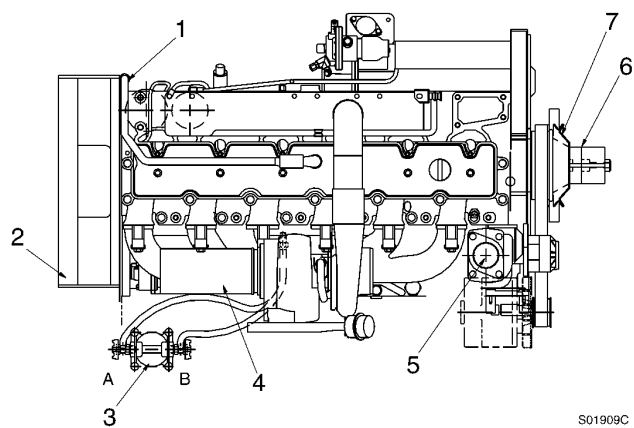
- The engine is a 6-cylinder, 4-stroke, direct injected, turbocharged, water cooled assembly with a cast iron block and cylinder head.
- Gears in the engine gear case are hardened helical type for strength and reduced noise, arranged to provide quiet, smooth transmission of power.
- The cylinder block and head are designed with internal passages formed as sets for lubrication and cooling. The water pump and oil cooler are integrally mounted.
- The fan belt is a poly type V-belt for improved performance and an auto tension adjuster maintains belt tension.



**Figure 1**

**Engine, structure**

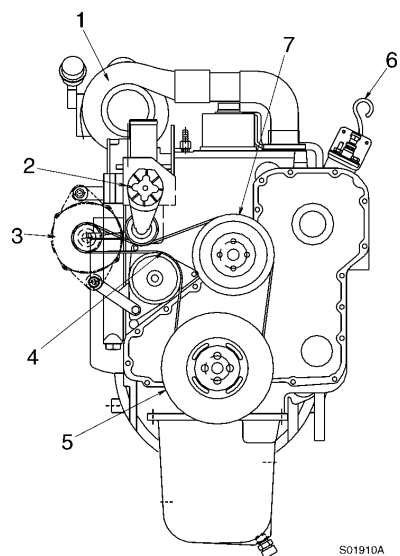
1. Fuel injection pump
2. Engine data plate
3. Fuel feed pump
4. Engine oil pressure sensor port (1/8" NPTF)
5. Fuel primary filter/water separator
6. Fuel secondary filter
7. Water inlet/outlet (1/2" NPTF)



**Figure 2**  
**Engine, top view**

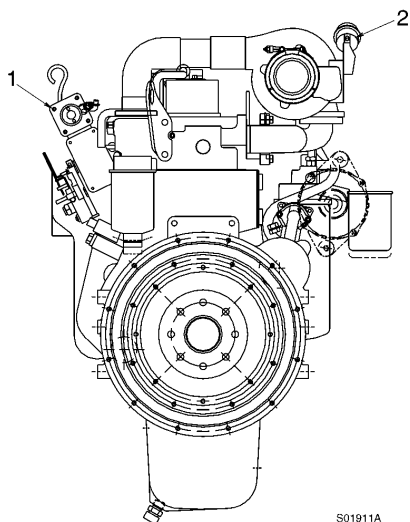
1. Breather hose
2. Flywheel housing
3. Water filter
4. Exhaust gas pipe
5. Thermostat
6. Fan spacer
7. Fan drive pulley

- A. Out
- B. In



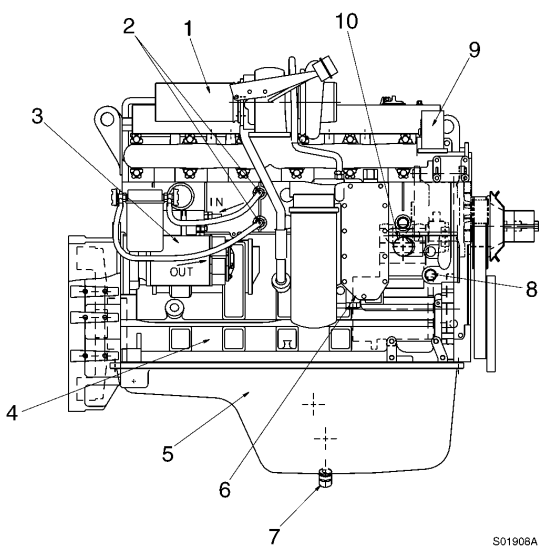
**Figure 3**  
**Engine, front view**

1. Turbocharger
2. Automatic belt tensioner
3. Alternator
4. Fan belt
5. Vibration damper
6. Dipstick gauge
7. Fan drive pulley



**Figure 4**  
**Engine, rear view**

1. Fuel shut-off solenoid
2. Turbocharger wastegate



**Figure 5**  
**Engine turbocharger, side view**

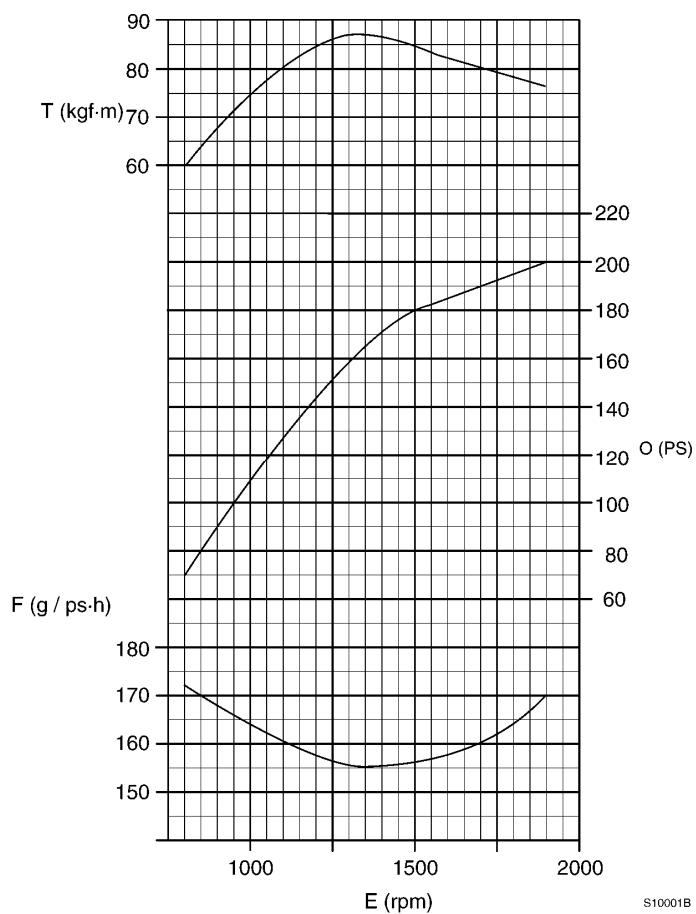
1. Exhaust gas discharge port
2. Water filter connecting port (1/2" NPTF)
3. Starter
4. Engine block
5. Oil pan
6. Engine oil cooler
7. Engine oil drain valve (M18 × 1.5P)
8. Temperature switch (for auto warm - up)
9. Water outlet
10. Water inlet

#### Engine characteristic curve

#### Engine characteristics

| Item | Specification |
|------|---------------|
|------|---------------|

|                        |  |
|------------------------|--|
| Rated output           | 200 PS / 1900 rpm                              |
| Max. torque (Net)      | 87 kgf·m / 1300 rpm<br>(629 lbf·ft / 1300 rpm) |
| Min. fuel consumption  | 155 g / ps·h                                   |
| Rated fuel consumption | 170 g / ps·h                                   |



**Figure 6**  
**Engine, characteristic curve**

- T. Torque
- F. Fuel consumption
- O. Output
- E. Engine speed

**NOTE!**  
For detailed information on the engine, consult the separate engine service manual.

|  |                               |   |                            |
|--|-------------------------------|---|----------------------------|
| Document Title:<br><b>Valve clearance adjustment</b> | Function Group:<br><b>214</b> | Information Type:<br><b>Service Information</b> | Date:<br><b>2014/11/13</b> |
| Profile:   |                               |   |                            |

## Valve clearance adjustment

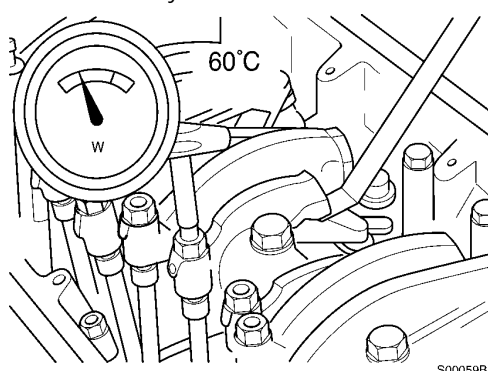
### Cummins C8.3-C

#### Valve clearance adjustment

Valves must be correctly adjusted for the engine to operate efficiently. Valve adjustment must be performed using the specified values.

Adjust the valves at each 1000 hours or 1 year maintenance interval.

All the valve adjustments must be made when the engine is cold, and stabilized coolant temperature is 60 °C or below.



**Figure 1**

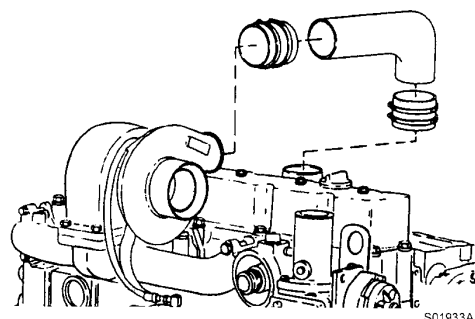
**Adjustment condition**

W. Water temperature

#### Valve clearance

|               |         |          |
|---------------|---------|----------|
| Inlet valve   | 0.30 mm | 0.012 in |
| Exhaust valve | 0.61 mm | 0.024 in |

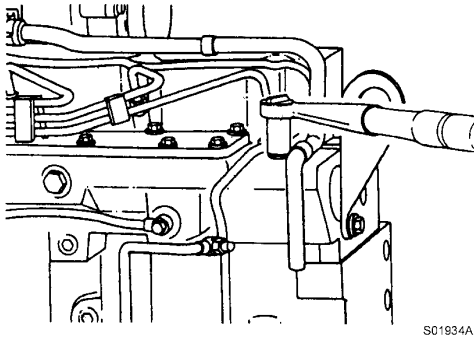
- Remove the air inlet hose.



**Figure 2**

**Removal, inlet hose**

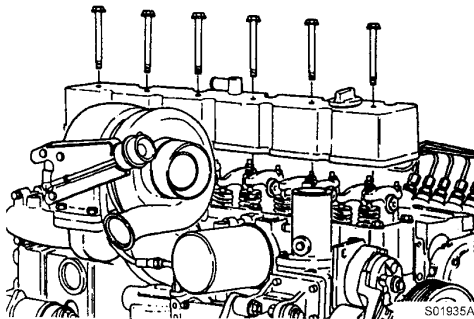
- Remove the wastegate sensing line, support clamps and crankcase vent tube.



**Figure 3**  
**Removal, crankcase vent tube**

Tools : 13, 18 mm Socket

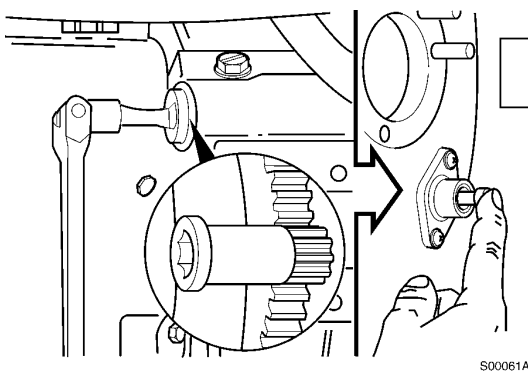
- Remove the valve cover.



**Figure 4**  
**Removal, valve cover**

Tools : 15 mm Wrench

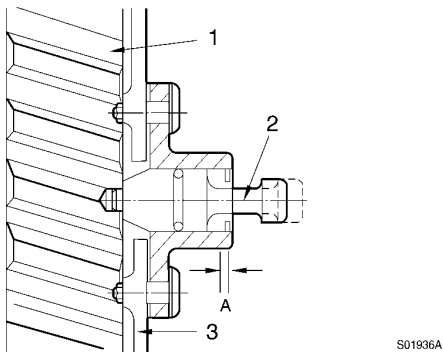
- Locate top dead center for cylinder No.1 by rotating the crankshaft slowly while pressing on the engine timing pin.



**Figure 5**  
**Rotation, camshaft gear**

Tools : 1/2" driver, Part No. 3377371 Engine Barring tool.

- When the pin engages the hole in the camshaft gear, cylinder No. 1 is at top dead center on the compression stroke.

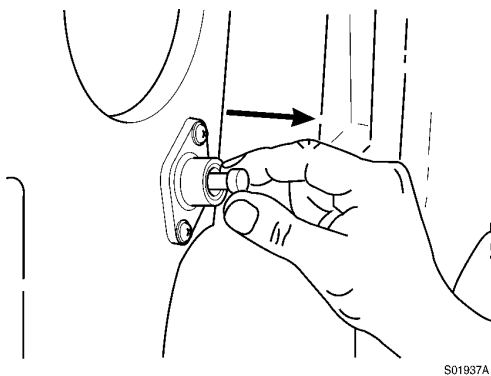


**Figure 6**  
**Position, cylinder No.1**

- 1. Camshaft gear
- 2. Engine timing pin
- 3. Gear housing
  
- A. Compression stroke

### **! CAUTION**

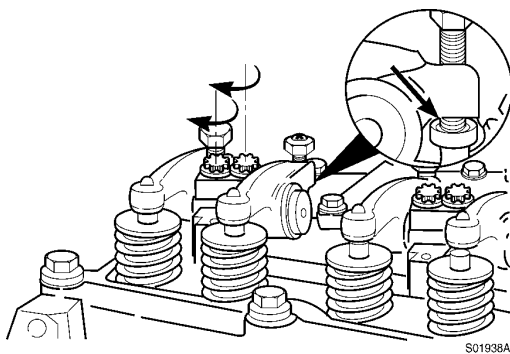
Disengage the timing pin. Engine components may be damaged if the engine is rotated with the timing pin engaged.



**Figure 7**  
**Removal, timing pin**

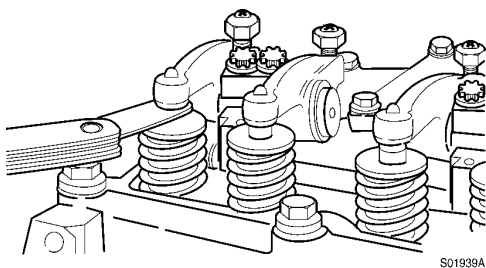
### **! CAUTION**

To prevent damage of push rod, make sure the adjusting screw ball is positioned in the socket of the push rod when tightening.



**Figure 8**  
**Position, adjusting screw ball**

- The clearance is correct when slight resistance is felt as the feeler gauge is moved between the valve stem and rocker lever.  
At that point, tighten the lock nut.



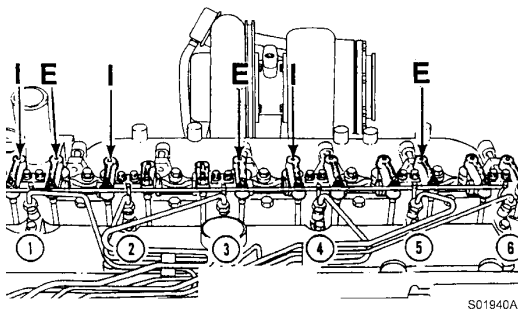
**Figure 9**  
**Checking, clearance**

Tools : Spanner 14mm, "-"- Driver, feeler gauge.

- Adjust the valves indicated (\*) in the table below.  
After tightening the lock nut, check the valve clearance again.  
If the clearance is not correct, readjust.

**Valves to be adjusted (\*)**

| Cylinder    | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------|---|---|---|---|---|---|
| Inlet (I)   | * | * |   | * |   |   |
| Exhaust (E) | * |   | * |   | * |   |



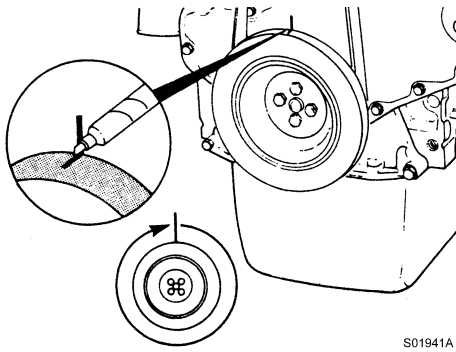
**Figure 10**  
**Valves to be adjusted**



Be sure the timing pin is disengaged.

- Mark the crankpulley and cover.
- Rotate the crankshaft 360°.



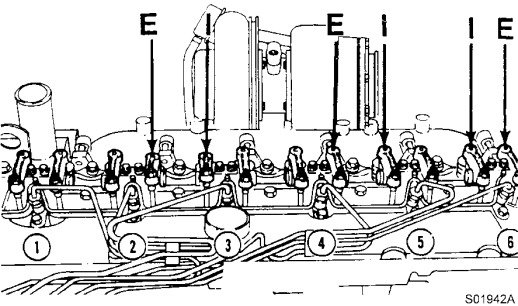


**Figure 11**  
**Marking, crankpulley**

- Adjust the valves indicated (\*) in the table below.  
After tightening the lock nut, check the valve clearance again.  
If the clearance is not correct, readjust.

**Valves to be adjusted (\*)**

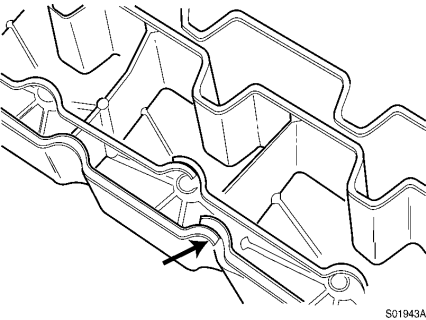
| Cylinder    | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------|---|---|---|---|---|---|
| Inlet (I)   |   | * |   | * | * |   |
| Exhaust (E) |   | * |   | * |   | * |



**Figure 12**  
**Valves to be adjusted**

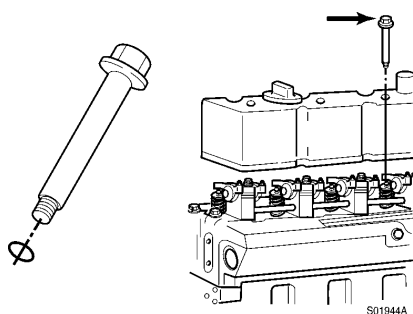
**Valve cover–installation**

- Install the rubber seal into the groove in the valve cover. Start the installation at the overlap area shown in the illustration.



**Figure 13**  
**Assembly, rubber seal**

- Do not stretch the rubber seal. If the seal has more overlap than shown in this illustration, trim the excess to provide the proper overlap.
- Install new o-rings on the valve cover screws.

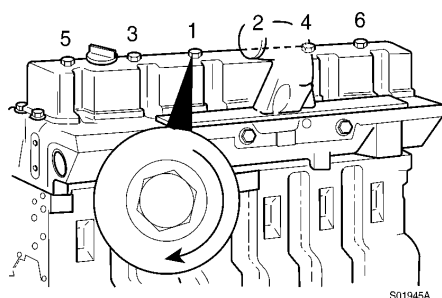


**Figure 14**  
**Assembly, o-ring**

**NOTE!**

Engines equipped with wastegate turbochargers must have a studded screw installed in the third hole from the front. This is for the wastegate actuator hose clamp.

- Install the valve cover screws and tighten in the sequence shown.

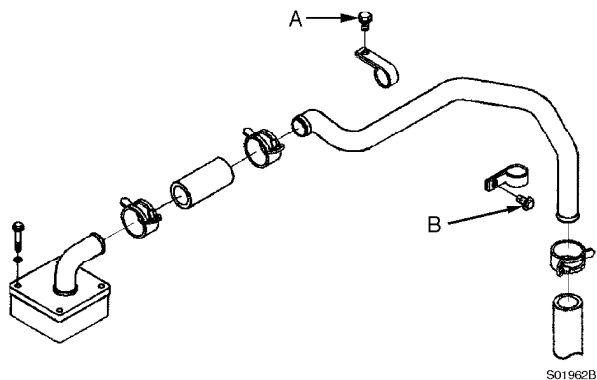


**Figure 15**  
**Screw tightening sequence**

Tools : 15 mm spanner  
Tightening torque : 24 N·m (18 lbf·ft)

**Crankcase breather tube–installation**

- Install the breather tube and hose clamps.
- Tighten the screws for the breather tube support brackets.

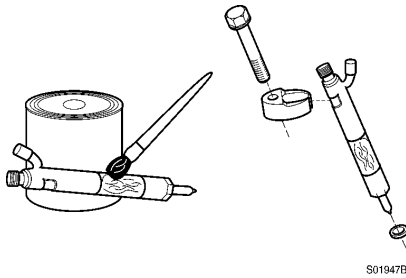


**Figure 16**  
**Assembly, breather tube**

Tightening torque : A = 24 N·m (18 lbf·ft), B = 43 N·m (32 lbf·ft)  
Tools : 13, 18 mm spanner

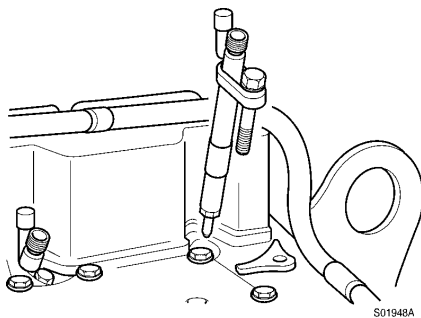
**Injection nozzles–installation**

- Lubricate the sealing lips of the sleeve with anti-seize compound. Assemble the injection nozzle, the sealing sleeve, a new copper washer and the hold-down clamp.
- Use only one washer.
- A light coat of clean 15W-40 engine oil between the washer and the injection nozzle will aid in holding the washer in place during installation.



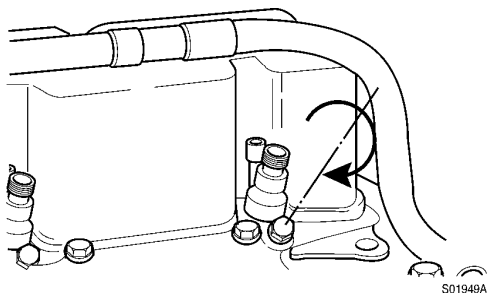
**Figure 17**  
**Apply, anti-seize compound**

- Install the hold-down injection nozzle assembly into the injection nozzle bore. The injector leak-off connection must be toward the valve cover.



**Figure 18**  
**Assembly, injection nozzle**

- Install the hold-down screw.



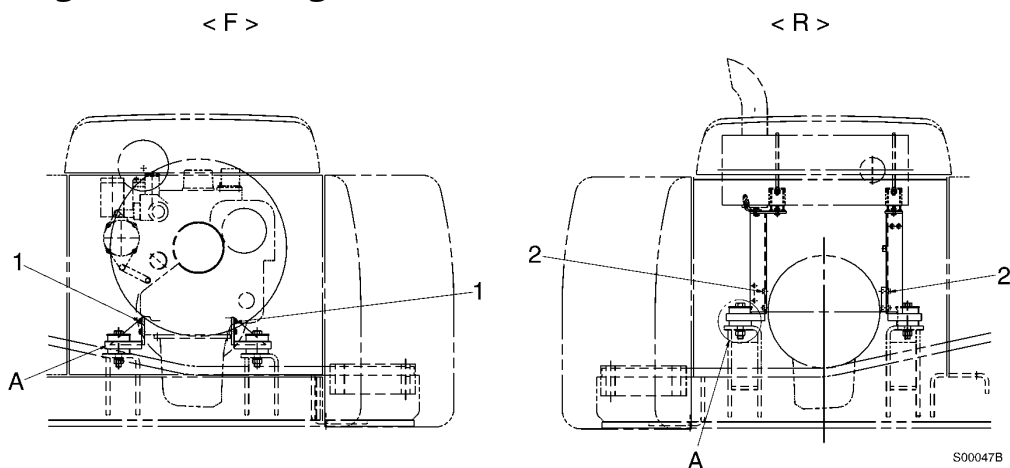
**Figure 19**  
**Screw in, hold-down screw**

Tightening torque : 24 N·m (18 lbf·ft)

Tools : 13 mm spanner

|   |                               |   |                            |
|---|-------------------------------|---|----------------------------|
| Document Title:<br><b>Engine mounting</b> | Function Group:<br><b>218</b> | Information Type:<br><b>Service Information</b> | Date:<br><b>2014/11/13</b> |
| Profile:                                  |                               |   |                            |

## Engine mounting



**Figure 1**  
**Engine mounting, side view**

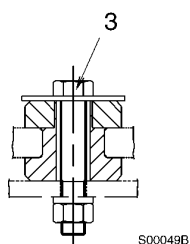
A : Cushion  
F : Front-fan side view  
R : Rear- flywheel side view

### Tightening torque, unit : kgf-m (lbf-ft)

| No. | Mounting position               | Tightening torque                       |
|-----|---------------------------------|---|
| 1   | Engine mounting bracket (front) | M12 x 1.75 x 35L<br>11 ~ 12 (79 ~ 87)   |
| 2   | Engine mounting bracket (rear)  | M12 x 1.75 x 50L<br>7.2 ~ 8.4 (52 ~ 61) |
| 3   | Engine mounting cushion         | M22 x 2.5 x 130L<br>63 ~ 77 (455 ~ 557) |

### NOTE!

Check the color markings for cushion installation.



**Figure 2**  
**Cushion (A - detail)**

- Front (fan side)—Green and white
- Rear (flywheel side)—Violet and white



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