CX300C
Crawler Excavator

SERVICE MANUAL

Part number 48063130
English
October 2016

CASE
CONSTRUCTION

Air cleaner (double element)

Manufacturer	Nippon Donaldson, Ltd.
Element (outer)	
Element (inner)	
Weight	**13 kg** (**28.6601 lb**)

Radiator

Manufacturer		T.Rad Co., Ltd.
Oil cooler	Weight	**34 kg** (**74.9572 lb**)
	Oil volume	**16 L** (**4.23 US gal**)
Radiator	Weight	**21.1 kg** (**46.5175 lb**)
	Coolant capacity	**9.4 l** (**9.400 US gal**)
Air cooler	Weight	**18.1 kg** (**39.9037 lb**)
	Capacity	-
Fuel cooler	Weight	**6 kg** (**13.2277 lb**)
	Capacity	**2.1 L** (**0.555 US gal**)
Total weight		**155 kg** (**341.7165 lb**)

Hydraulic device

Hydraulic pump

Manufacturer			Kawasaki Heavy Industries, Ltd.
Main pump			
	Pump type		Double variable displacement piston pump
	Displacement capacity		**136.7 cm³/rev** (**8.342 in³/rev**) x 2
	Operating pressure	Rated	**34.3 MPa** (**4975 psi**)
		Maximum	**37.3 MPa** (**5337.84 psi**)
	Input revolution speed		**1800 RPM**
	Maximum discharge flow		**246 L/min** (**65 US gpm**) x 2 (at Pd = **3.0 MPa** (**435.2 psi**) **1800 RPM**) **243 L/min** (**64.2 US gpm**) x 2 (at Pd = **8.0 MPa** (**1160.4 psi**) **1800 RPM**)
Pilot pump			
	Pump type		Gear pump
	Displacement capacity		**15 cm³/rev** (**0.92 in³/rev**)
	Operating pressure		**3.92 MPa** (**568.596 psi**)
	Maximum discharge flow		**27 L/min** (**7.1 US gpm**) (at **1800 RPM**)
Control method			Hydraulic simultaneous constant output control
			Maximum flow adjustment control through external commands (negative control)
			Maximum flow adjustment control through external command milli-amp (negative control, front side)
			Setting horsepower adjustment control through external command milli-amp
Dry weight			**130 kg** (**286.6009 lb**)

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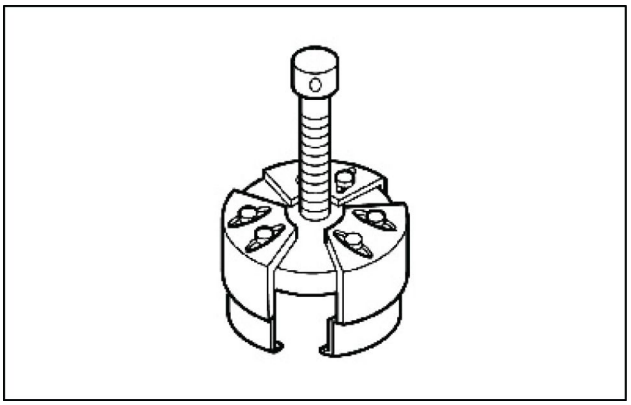
2. Remove the slinger from the crankshaft using the special tool.

   Special tool: Rear oil seal remover (refer to **Crankshaft - Special tools (10.103)**)

   ⚠ CAUTION: When replacing the oil seal, replace the slinger.



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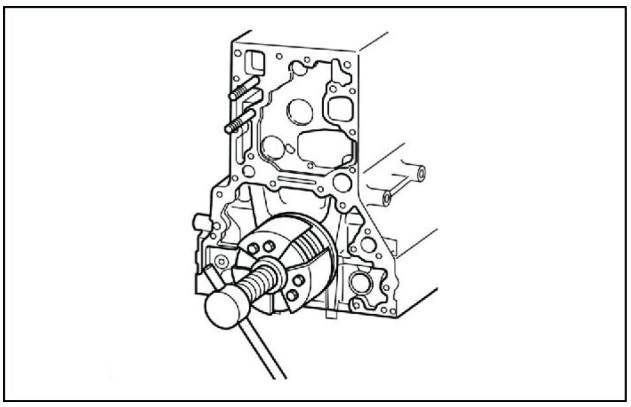

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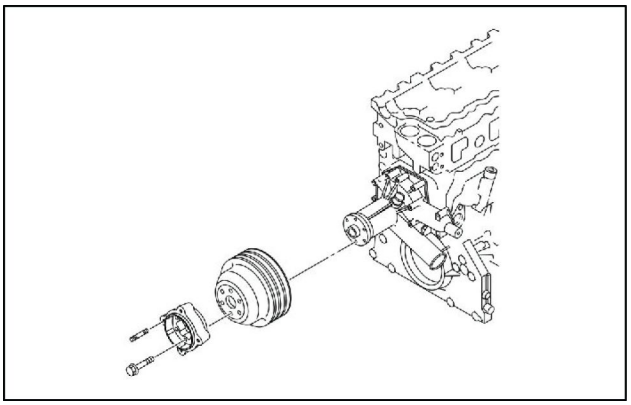
Water pump assembly removal

1. Remove the fan pulley from the water pump assembly.



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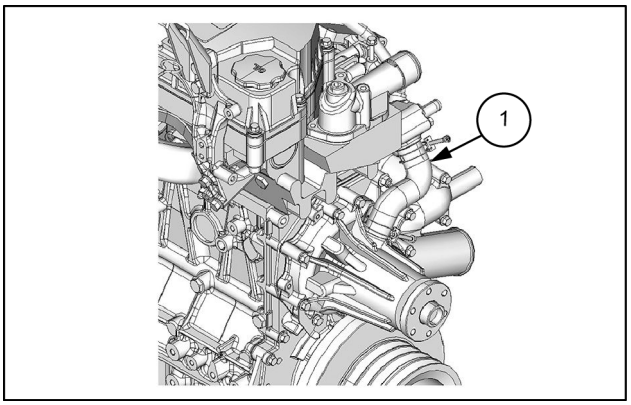
2. Remove the water bypass hose **(1)** from the water pump assembly and the water duct.
3. Remove the water pump assembly from the front cover.



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3. Install the flywheel housing to the cylinder block.

NOTE: *Install the flywheel housing after aligning with the knock pin position of the cylinder block.*

Tightening torque

No.1 bolt: **96 N·m** (**71 lb ft**)

No.2 bolt: **119 N·m** (**88 lb ft**)

No.3 bolt: **86 N·m** (**63 lb ft**)

No.4 bolt: **53 N·m** (**39 lb ft**)

4. Apply engine oil to the PTO gear shaft.

NOTE: *Apply to the sliding surfaces.*

5. Install the washer onto the PTO idle gear shaft.

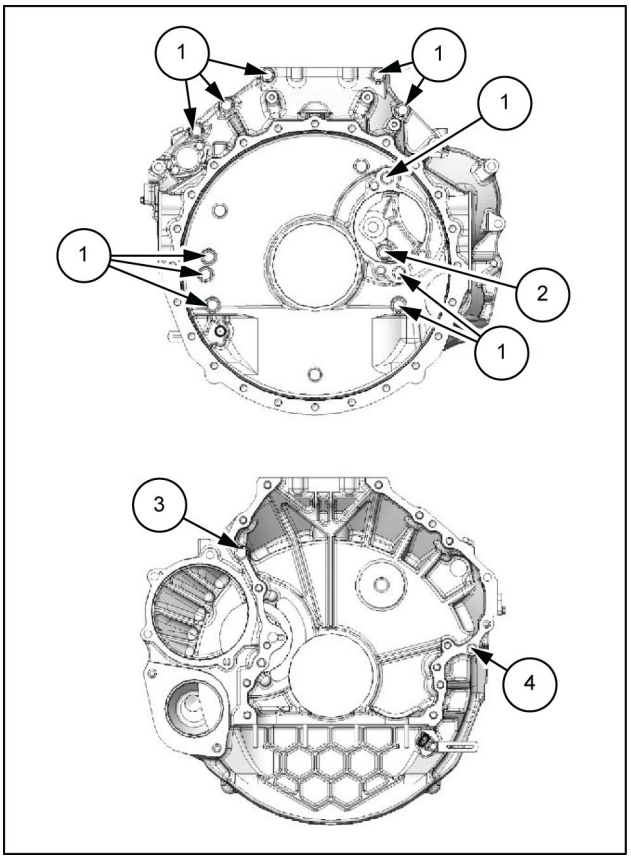
NOTICE: *Install the washer with its oil groove facing the gear side.*

6. Apply engine oil to the washers.

NOTE: *Apply to the oil grooves on the washers.*

7. Install the PTO idle gear onto the PTO idle gear shaft.

NOTICE: *Install the gear with its convex surface facing the front side.*



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8. Apply engine oil to the PTO idle gear.
   1. 30°
   2. Painted section
   3. Notch
   4. PTO idle gear shaft
   5. Thrust collar

9. Install the washer onto the PTO idle gear shaft.

NOTICE: *Install the washer with its oil groove facing the gear side.*

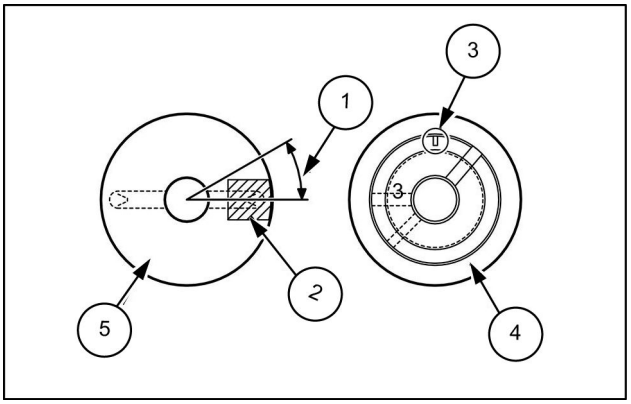
NOTE: *Rotate the gear shaft so that the oil is applied evenly.*

10. Install the PTO idle gear on the flywheel housing. Tightening torque: **119 N·m** (**87.77 lb ft**).

NOTE: *Install the thrust collar on the installation bolt,apply engine oil, and then install the gear.*

NOTICE: *Install the thrust collar with its oil groove facing the gear side. For oil lubrication, install the shaft with its notch facing up and install the thrust collar so that the painted section is within the range shown in the diagram.*

NOTE: *Rotate the gear shaft so that the oil is applied evenly.*



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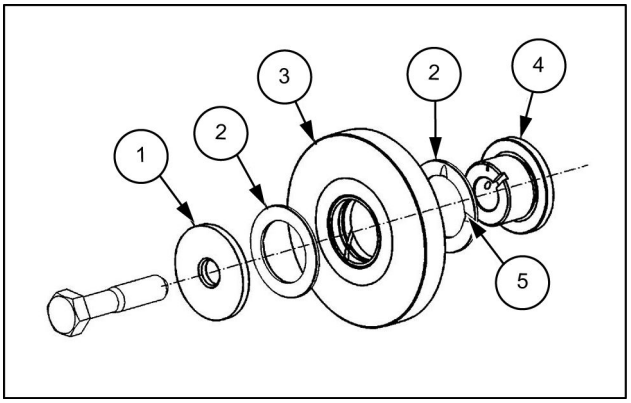

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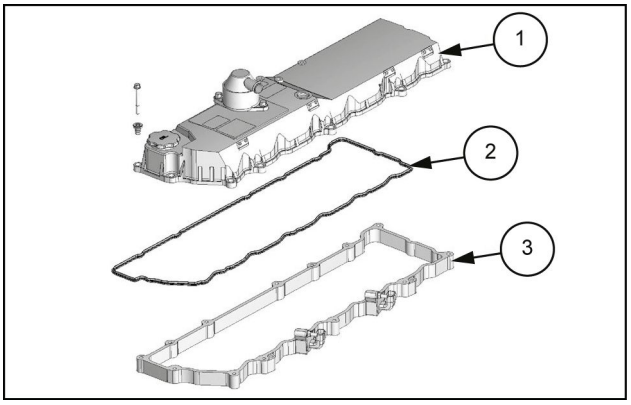
Cylinder head cover installation

1. Align the head cover gasket **(2)** to the cylinder head cover **(1)**.
   1. Cylinder head cover
   2. Head cover gasket
   3. Lower cover



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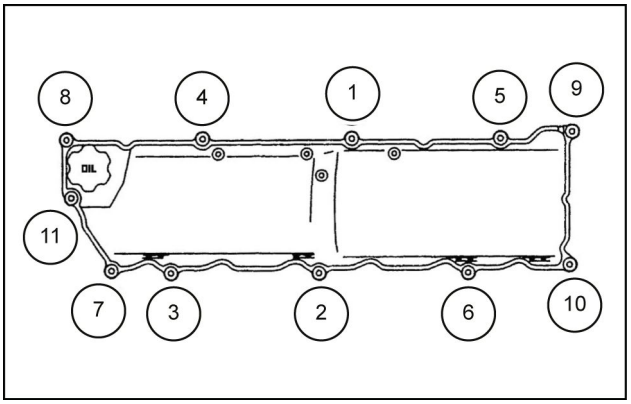
2. Install the cylinder head cover **(1)** to the lower cover **(3)**.

   Tightening torque: **13 N·m** (**115 lb in**)

NOTE: *Referring to the tightening order in the diagram, temporarily tighten all bolts and then completely tighten them.*



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Ventilation hose installation

1. Connect the ventilation hose to the air breather.
2. Connect the water pipe bracket to the cylinder head cover.

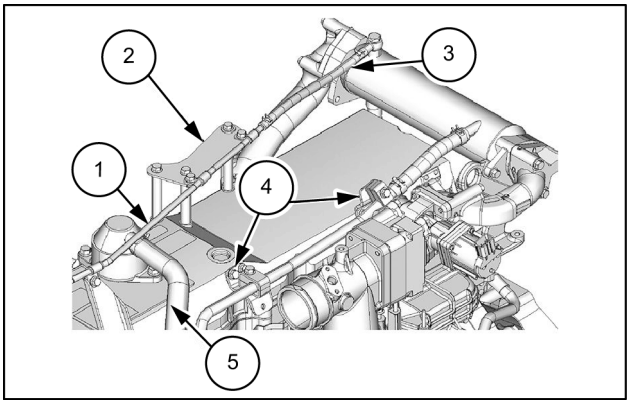
   Tightening torque: **20 N·m** (**15 lb ft**)
3. Install the bracket on the cylinder head cover.

   Tightening torque: **24 N·m** (**18 lb ft**)
4. Connect the air leak pipe to the EGR cooler.

NOTE: *The machines from some manufacturers do not have this installed.*

Tightening torque: **22 N·m** (**16 lb ft**)

1. Air leak pipe
2. Bracket
3. Air hose
4. Water pipe bracket
5. Ventilation hose



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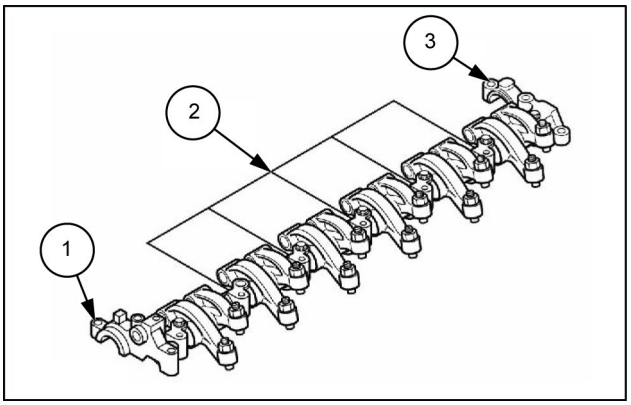
Rocker arm shaft installation

1. Apply the engine oil to the bracket.

NOTE: *Apply to each sliding surface.*

2. Apply the engine oil to the rocker arm **(2)**.
   1. Front side camshaft bracket
   3. Rear side camshaft bracket

NOTE: *Confirm that the adjust screw is fully loosened.*



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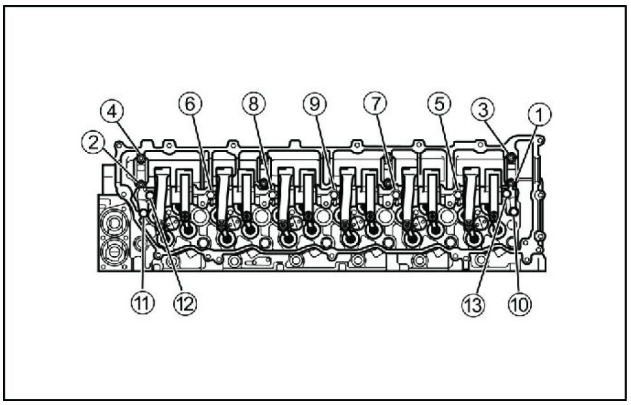
3. Install the rocker arm shaft to the cylinder head assembly.

NOTE: *On the camshaft bearing assembly section only, apply oil to the threaded portion of the stud bolts and the seat surface/threaded portion of the nuts, then tighten them. Tightening order*

Rocker arm shaft tightening torque	
Parts	**Tightening torque**
Front side camshaft bearing cap	**28 N·m** (**21 lb ft**)
Rear side camshaft bearing cap	
Rocker arm bracket	**56 N·m** (**41 lb ft**)



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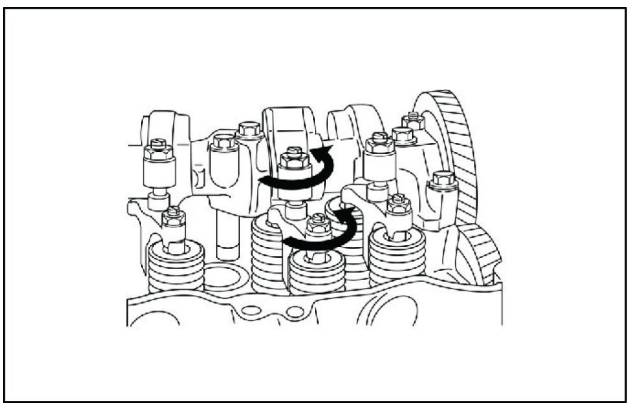
Rocker arm shaft adjustment

NOTICE: *Adjust the valve clearance while cool. Loosen all adjust screws before adjustment.*

NOTE: *Valve clearance adjustment*



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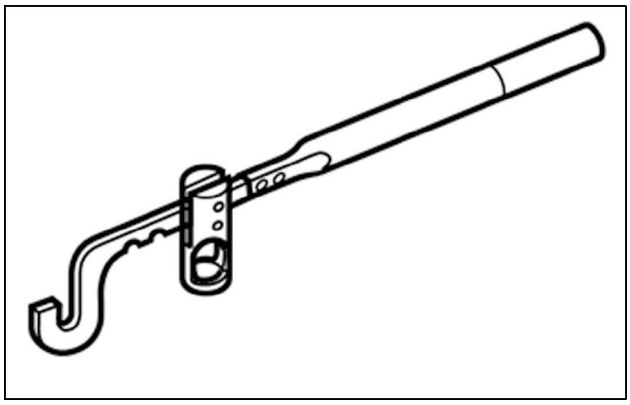
Valves - Special tools

Valve spring

Isuzu reference	5-8840-2621-0
CASE CONSTRUCTION tool number	Common tool
Description	Valve spring replacer



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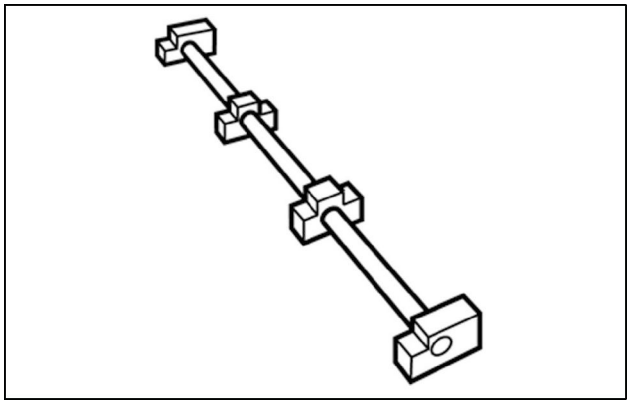
Isuzu reference	8-9439-6862-0
CASE CONSTRUCTION tool number	Not needed
Description	Pivot ASM



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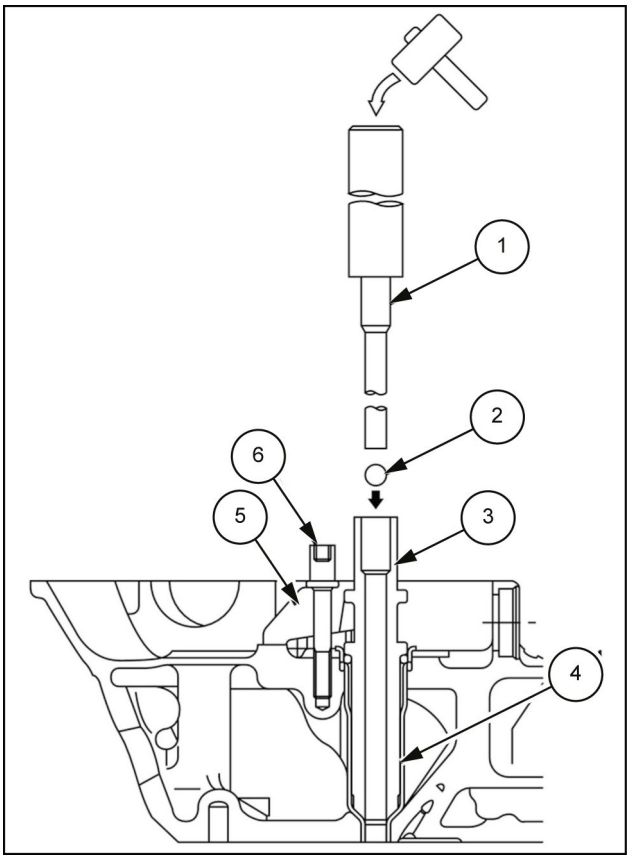
Special tool: Nozzle sleeve installer (Refer to **Cylinder head - Special tools (10.101)**)

1. Punch bar
2. Ball
3. Guide sleeve
4. Injector sleeve
5. Clamp
6. Bolt

CAUTION: Allow the cylinder head to float so that the ball comes out from the bottom surface.



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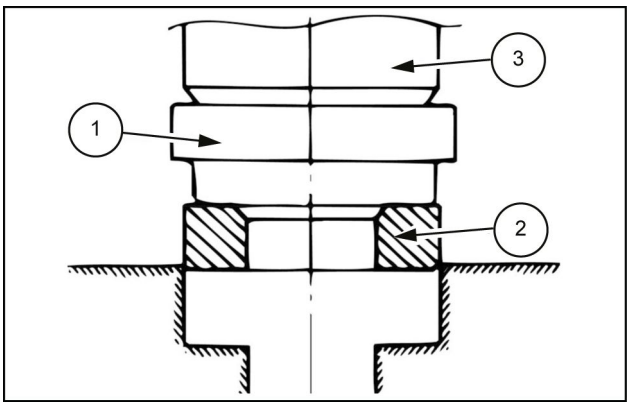
Valve seat insert installation

1. Prepare the dolly block **(1)**.

NOTE: *Prepare the one which has smaller outer diameter than the valve seat insert.*

2. Align the valve seat insert to the cylinder head.
3. Align the dolly block to the valve seat insert.
4. Install the valve seat insert **(2)** to the cylinder head assembly using the press **(3)**.



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Valve guide installation

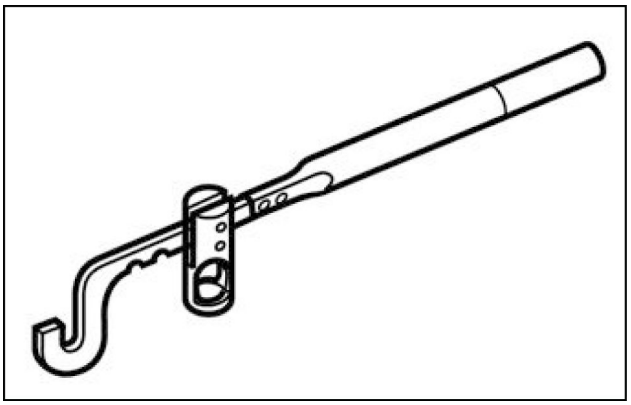
1. Apply the engine oil to the valve guide.

3. Install the spring seat to the valve spring.
4. Secure the valve using air.

NOTE: *Secure the valve on the closed position by blowing the compressed air into the cylinder from the glow plug hole.*

5. Press the valve spring using the special tool.

   Special tool: Valve spring replacer (Refer to **Valves - Special tools (10.101)**)



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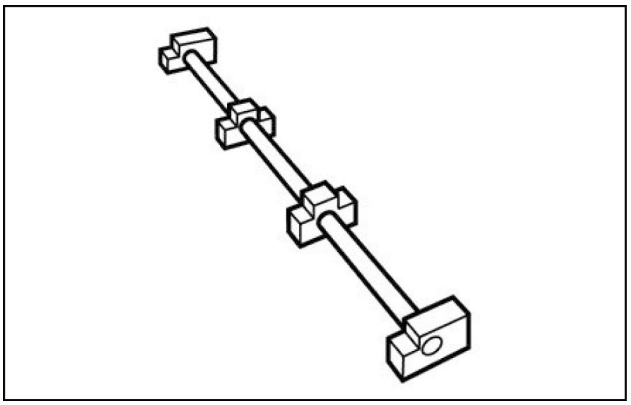
   Special tool: Pivot ASM (Refer to **Valves - Special tools (10.101)**)



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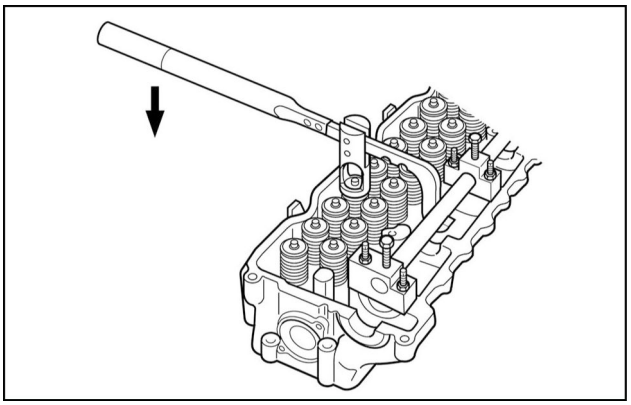
6. Install the split collar to the spring seat.

NOTE: *Lightly tap the valve stem head to stabilize the split collar.*

7. Confirm that the split collar is in the valve stem groove.



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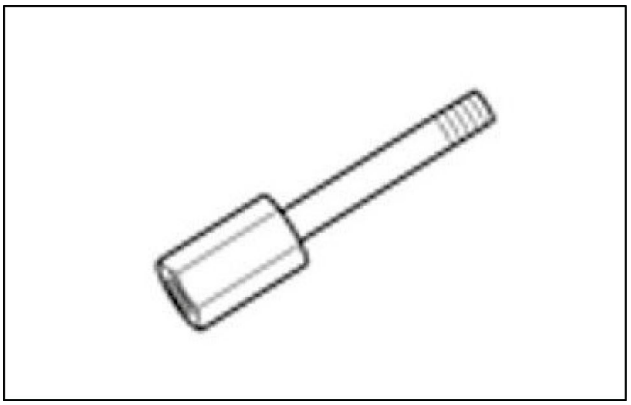
Injector removal

1. Remove the injector leak-off pipe from the injector **(3)**.
2. Remove the injector from the cylinder head assembly.

NOTE: *When it is difficult to remove the injector, use a special tool.*

Special tool: Injector remover (refer to **Fuel injectors - Special tools (10.218)**)



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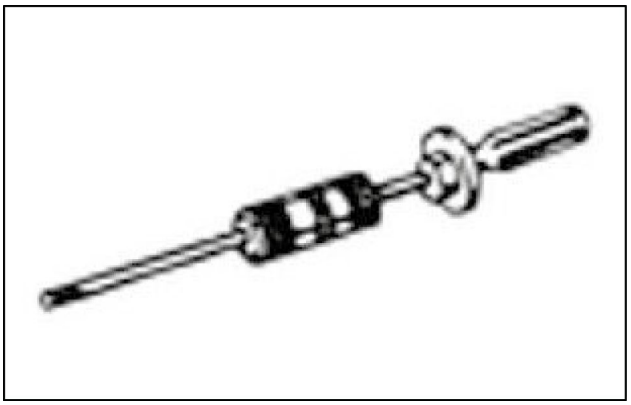
Special tool: Sliding hammer (refer to **Fuel injectors - Special tools (10.218)**)



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Oil level gauge guide tube installation

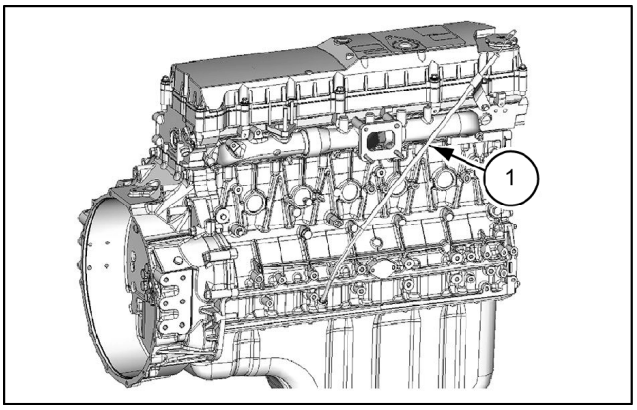
1. Install the oil level gauge guide tube **(1)** on the cylinder block.

   Tightening torque: **24 N·m** (**17.70 lb ft**)

2. Connect the oil level gauge guide tube **(1)** to the cylinder head assembly.

   Tightening torque: **24 N·m** (**17.70 lb ft**)

3. Install the oil level gauge on the oil level gauge guide tube **(1)**.



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Turbocharger assembly installation

1. Replenish the turbocharger assembly with the engine oil.
2. Align the gasket to the turbocharger assembly.

NOTICE: *Use a new gasket.*

3. Install the turbocharger assembly to the exhaust manifold.

   Tightening torque: **52 N·m** (**38 lb ft**)

NOTE: *Inject clean engine oil (about 15 - 20 cc) through the oil feed port.*

4. Install the exhaust pipe adapter on the turbocharger assembly.

NOTICE: *Use a new gasket.*

5. Tightening torque: **32 N·m** (**23.60 lb ft**)
   1. Exhaust manifold
   2. Turbocharger assembly
   3. Exhaust pipe adapter
6. Connect the oil return pipe **(4)** to the turbocharger assembly **(3)**.

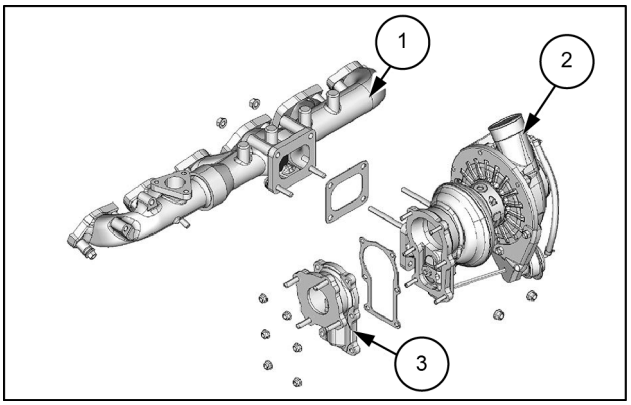
   Tightening torque: **24 N·m** (**17.70 lb ft**)

NOTICE: *Use a new gasket.*

7. Connect the oil feed pipe **(1)** to the turbocharger assembly **(3)**.

   Tightening torque: **34 N·m** (**25.08 lb ft**)

   Tightening torque: **24 N·m** (**17.70 lb ft**) Clip
   1. Oil feed pipe
   2. Exhaust pipe adapter
   3. Turbocharger assembly
   4. Oil return pipe
8. Install the exhaust pipe on the turbocharger assembly **(3)**.



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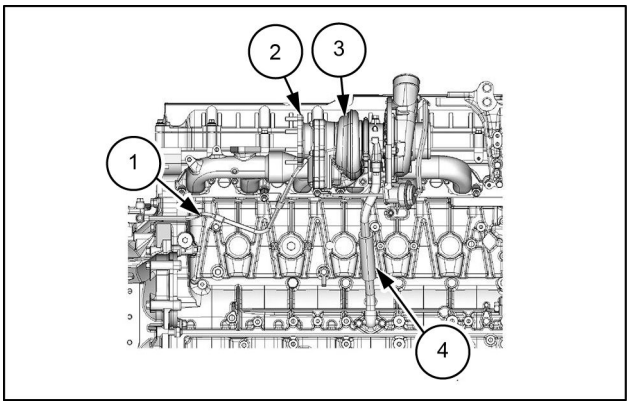

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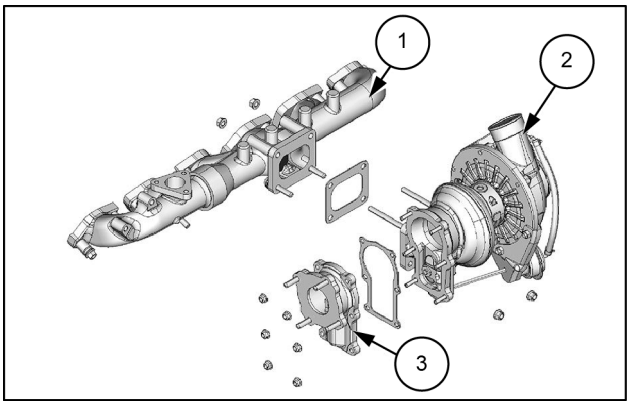
9. Remove the turbocharger assembly from the exhaust manifold.
    1. Exhaust manifold
    2. Turbocharger assembly
    3. Exhaust pipe adapter



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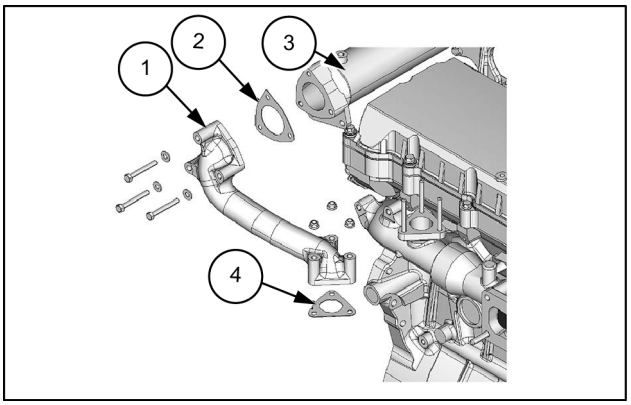
EGR cooler removal

1. Disconnect the air leak pipe from the EGR cooler.

NOTE: *The machines from some manufacturers do not have this installed.*

1. EGR pipe A
2. Gasket
3. EGR cooler
4. Gasket



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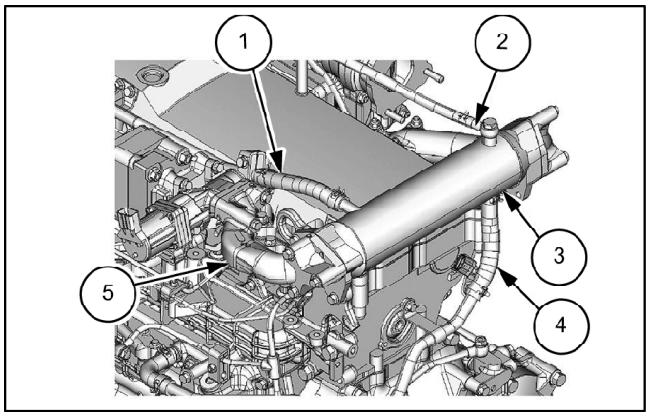
2. Remove EGR pipe A from the exhaust manifold and EGR cooler.

NOTICE: *After removing the EGR pipe, apply sealing to prevent entry of foreign matter.*

3. Disconnect the rubber water hose **(1)** from the EGR cooler **(3)**.
    1. Rubber water hose
    2. Air leak pipe
    3. EGR cooler
    4. Rubber water hose
    5. EGR pipe B
4. Disconnect the EGR cooler from EGR pipe B **(5)**.
5. Remove the EGR cooler **(3)** from the EGR cooler bracket.



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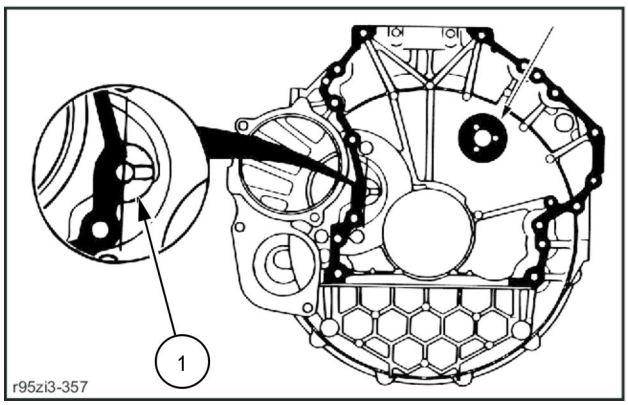
Flywheel housing installation

1. Clean the cylinder block using the scraper.
   - Remove dust and oil from the flywheel housing installation area.

NOTICE: *Do not apply liquid gasket to the section* ***(1)*** *in the diagram.*
Install the flywheel housing within ***5 min*** *of applying the liquid gasket.*



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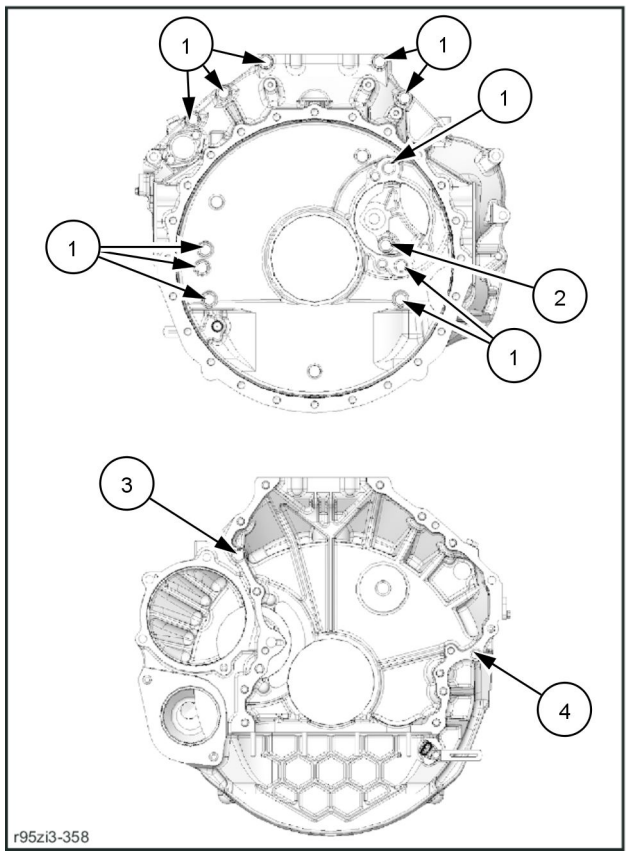
Install the flywheel housing on the cylinder block.

- Install the flywheel housing after aligning with the knock pin position of the cylinder block.

1. bolt **96 N·m** (**70.81 lb ft**)
2. bolt **119 N·m** (**87.77 lb ft**)
3. bolt **86 N·m** (**63.43 lb ft**)
4. bolt **53 N·m** (**39.09 lb ft**)

2. Apply engine oil to the PTO idle gear shaft.

NOTE: *Apply to the sliding surfaces.*



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SERVICE

12. Stop the engine.

NOTICE: *The procedure below is for a model without a priming pump.*

1. Air bleed plug
2. Fuel filter element

13. Prepare the drain pan.
14. Turn the starter switch ON.
15. Use a wrench to loosen the air bleed plug.

NOTICE: *Check that fuel comes out from around the plug.*

16. Tighten the plug **(2)** using the wrench.

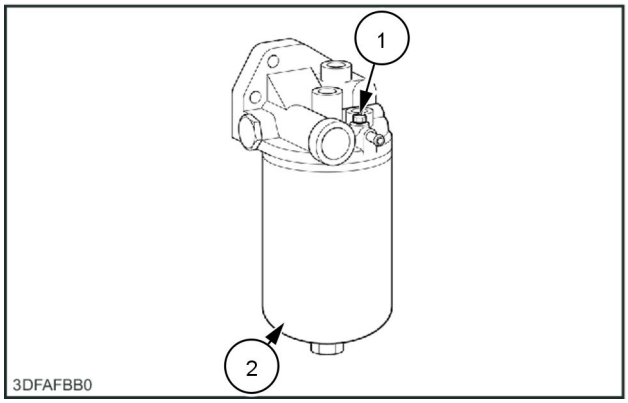
NOTICE: *After tightening the plug, be sure to clean away the fuel from the surroundings.*

17. Start the engine.

NOTICE: *Keep the speed at idle for **5 s**.*
Do not control the engine speed when starting the engine.
If the engine does not start, repeat the steps.

NOTICE: *Slowly raise the engine speed and keep it for **3 min***
Raise the engine speed to the maximum.

18. Stop the engine.



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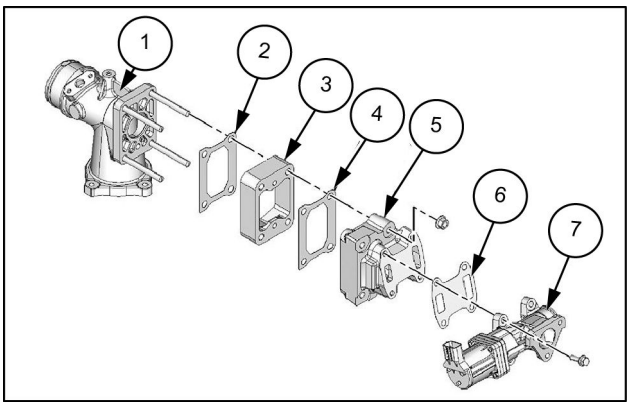
Removing the EGR valve

1. Remove EGR pipe B from the EGR valve.
2. Disconnect the harness connector from the EGR valve.
3. Remove the EGR valve from the reed valve duct.

> ⚠ CAUTION: After removing the EGR valve, apply sealing to prevent entry of foreign matter.

4. Remove the reed valve duct from the case and inlet pipe.
   1. Inlet pipe
   2. Gasket
   3. Case
   4. Gasket
   5. Reed valve duct
   6. Gasket
   7. EGR valve



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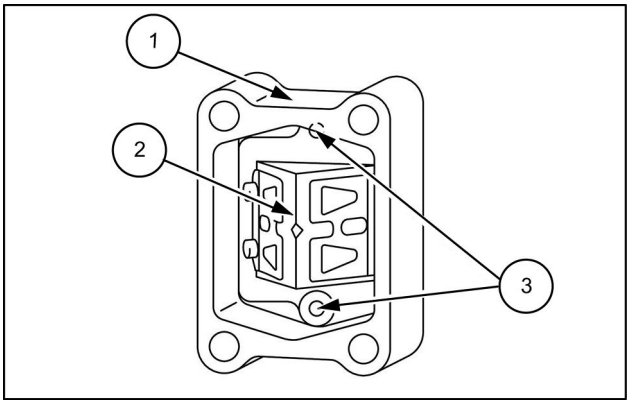
5. Remove the reed valve from the reed valve duct.

NOTE: *The machines from some manufacturers do not have this installed.*

   1. Reed valve duct
   2. Reed valve
   3. Bolt

6. Disconnect the harness connector from the boost pressure/boost temperature sensor.
7. Remove the harness clip from the inlet pipe.

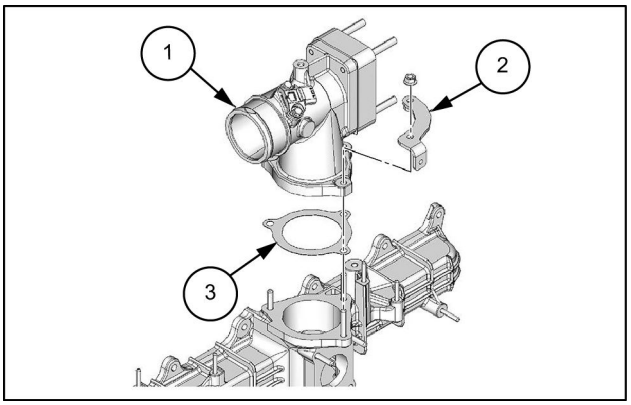


SMIL15CEX6581AB 4

8. Remove the inlet pipe from the inlet cover.

NOTE: *Remove the inlet pipe and injection pipe bracket.*

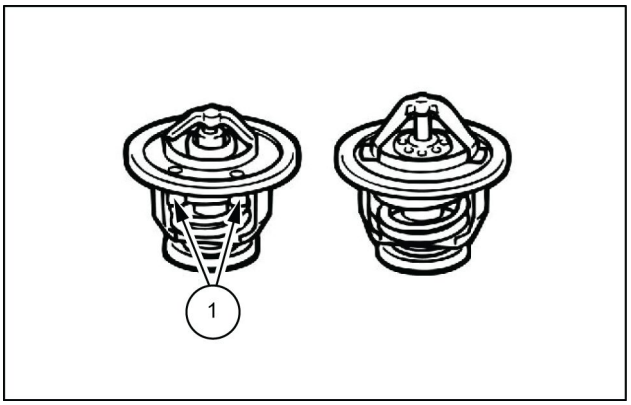
   1. Inlet pipe
   2. Injection pipe bracket
   3. Gasket



SMIL15CEX6558AB 5

Coolant thermostat - Inspect

1. Inspect the thermostat.
   - Inspect the pellet, spring, shaft, jiggle valve **(1)**, and crimped sections for damage.
2. Prepare the container.
   - Put water and the thermostat into a heatable container.

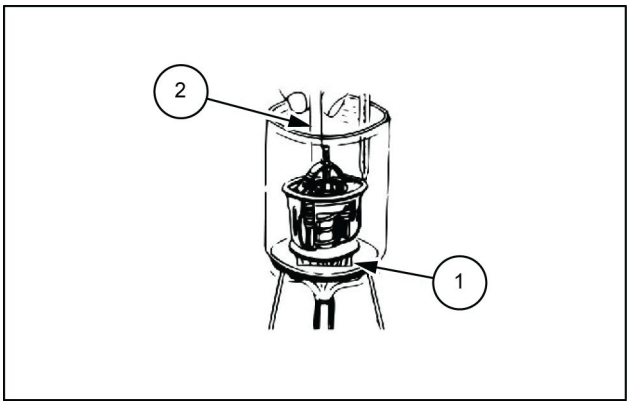


SMIL13CEX1327AB 1

3. Raise the water temperature.
   - In order to equalize the water temperature in the container, stir well.

   ⚠ CAUTION:

   Do not heat the thermostat directly.
4. Measure the water temperature using the thermometer.
   - Measure open valve temperature of the thermostat.



SMIL13CEX1328AB 2

Valve opening temperature without jiggle valve: **76.5 °C** (**169.70 °F**)

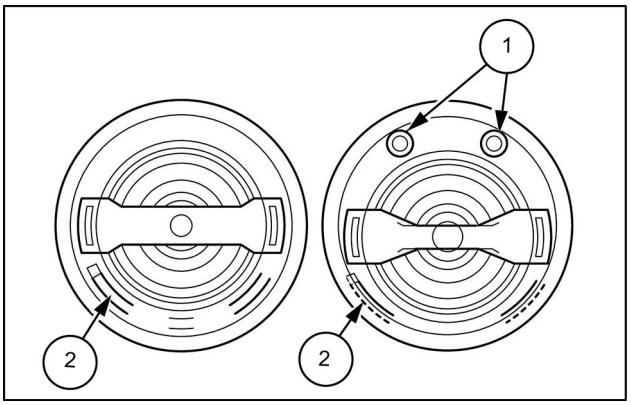
Valve opening temperature with jiggle valve: **82 °C** (**179.6 °F**)

Temperature when fully open without jiggle valve: **90 °C** (**194.0 °F**)

Temperature when fully open with jiggle valve: **95 °C** (**203.0 °F**)

Lift amount: **8.0 mm** (**0.3150 in**)

1. Piece of wood
2. Stirring rod

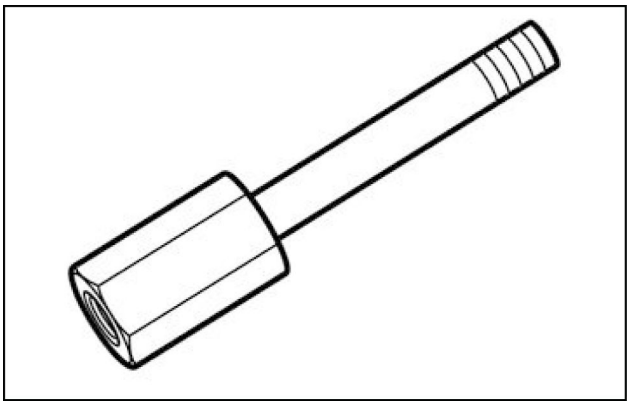


SMIL15CEX6582AB 3

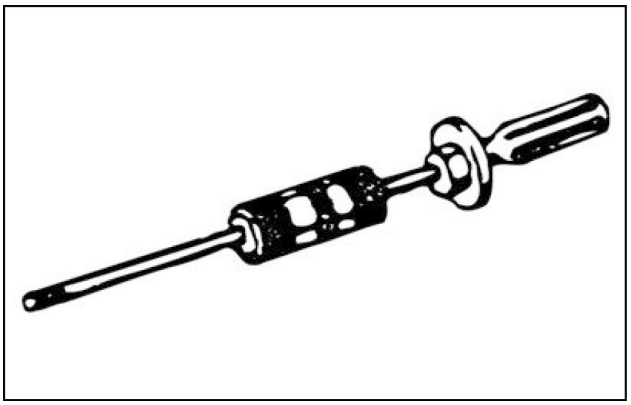
Removing the injector

1. Remove the injector leak-off pipe from the injector.
2. Remove the injector from the cylinder head assembly.

NOTE: *If it is difficult to remove the injector, use the special tool.*

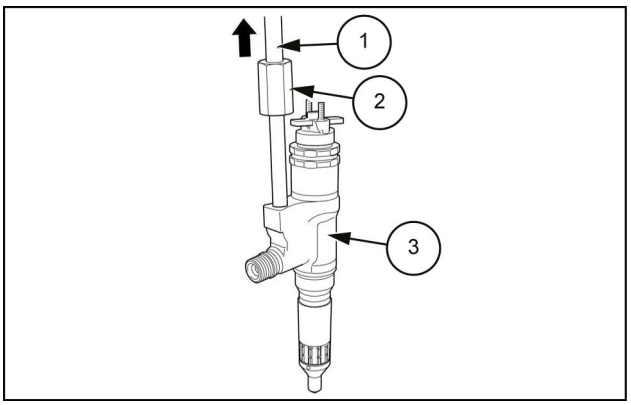


SMIL14CEX3005AA 21



SMIL14CEX3006AA 22

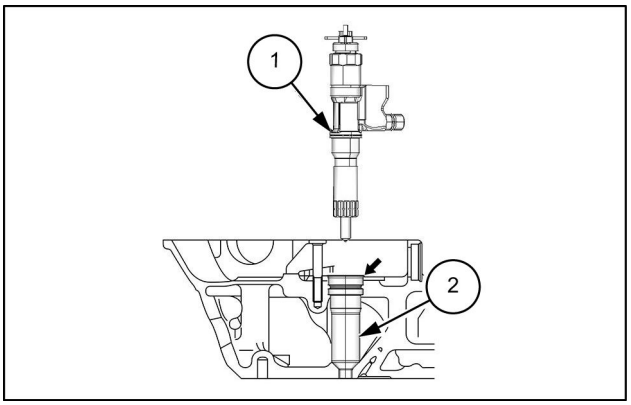
1. Sliding hammer
2. Fuel injector remover
3. Injector



SMIL14CEX3007AB 23

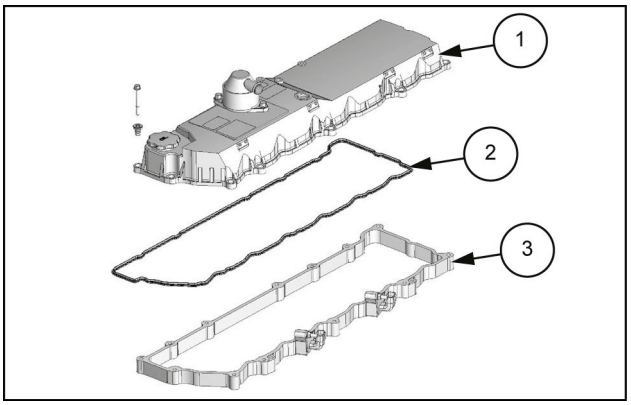
⚠ CAUTION: When using the special tool to remove the injector, check that the injector sleeve does not come off with it.

1. Injector
2. Injector sleeve



SMIL15CEX6564AB 24

1. Cylinder head cover
2. Head cover gasket
3. Lower cover

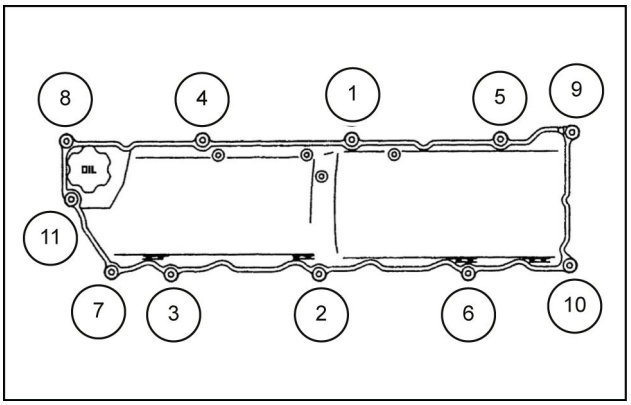


SMIL14CEX2970AB 48

2. Install the cylinder head cover **(1)** to the lower cover **(3)**.

   Tightening torque: **13 N·m** (**115 lb in**)

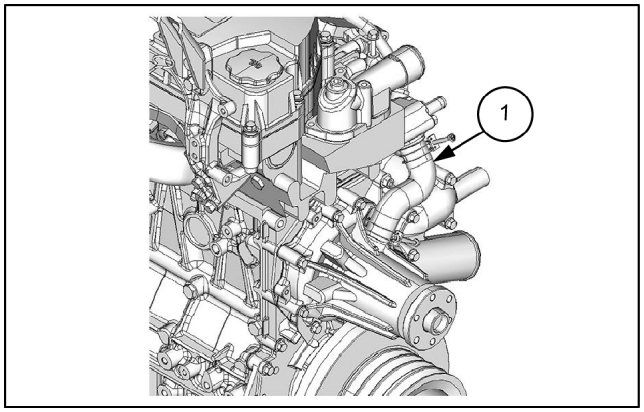
NOTE: *Referring to the tightening order in the diagram, temporarily tighten all bolts and then completely tighten them.*



SMIL14CEX3096AB 49

EGR cooler water pipe installation

1. Connect the water bypass hose **(1)** on the water pump assembly and water duct.

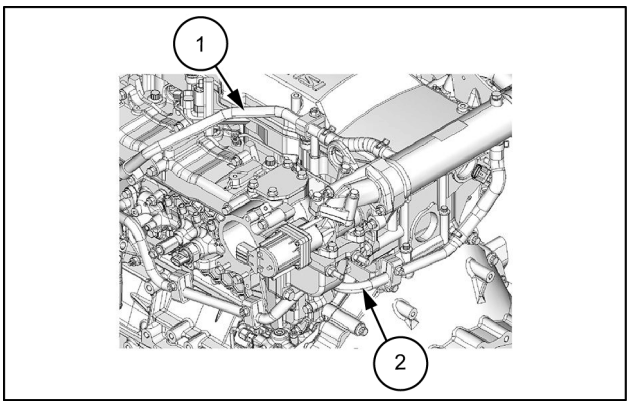


SMIL15CEX6560AB 50

2. Install the EGR cooler water pipe on the engine assembly.

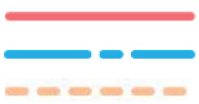
   Clamp tightening torque: **20 N·m** (**15 lb ft**)

   1. EGR cooler water pipe
   2. EGR cooler water pipe



SMIL15CEX6559AB 51

1. Housing left side
2. Swing body center section
3. Pump chamber
4. Hydraulic oil tank
5. Fuel tank



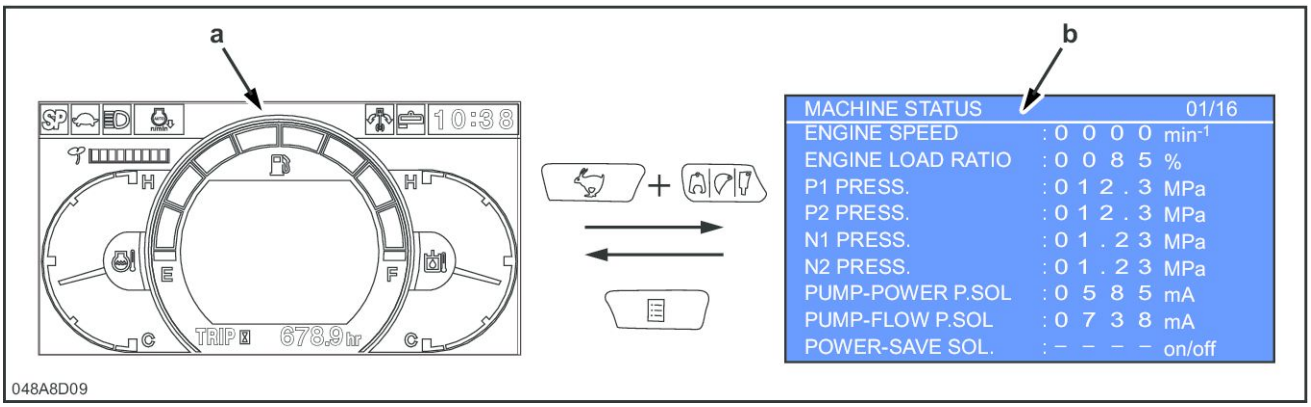
Pressure line
Tank line
Pilot pressure line

Pilot tank line
Electric line

1. Swing motor
2. Arm (in)
3. Arm (out)
4. Right swing
5. Left swing
6. Cushion valve
7. Swing pilot pressure sensor
8. Shuttle valve
9. Computer A
10. Remote control valve (arm, swing)
11. Lever lock
12. Swing brake
13. 5 stack solenoid valve
14. Console lever lock switch
15. Arm cylinder
16. Arm **(1)**
17. Swing
18. Arm load holding valve spool
19. Arm load holding valve check valve
20. Regeneration release valve
21. Control valve
22. Swing priority variable orifice spool
23. Arm **(2)**
24. Upper pilot pressure sensor
25. Hydraulic pump
26. Check valve
27. Oil cooler

- Pressure line
- Tank line
- Pilot pressure line
- Pilot tank line
- Electric line
- Negative control line

1. P1 negative control relief valve
2. P2 negative control relief valve
3. Control valve
4. Travel pilot pressure sensor
5. Upper pilot pressure sensor
6. Computer A
7. Console lever lock switch
8. Lever lock
9. Power save
10. 4 stack solenoid valve
11. P1 pressure sensor
12. P2 pressure sensor
13. N2 negative control pressure sensor
14. Horsepower control proportional valve
15. P1 flow control proportional valve
16. Hydraulic pump
17. Check valve
18. Oil cooler



048A8D09 2

a. Normal screen

b. Service support screen

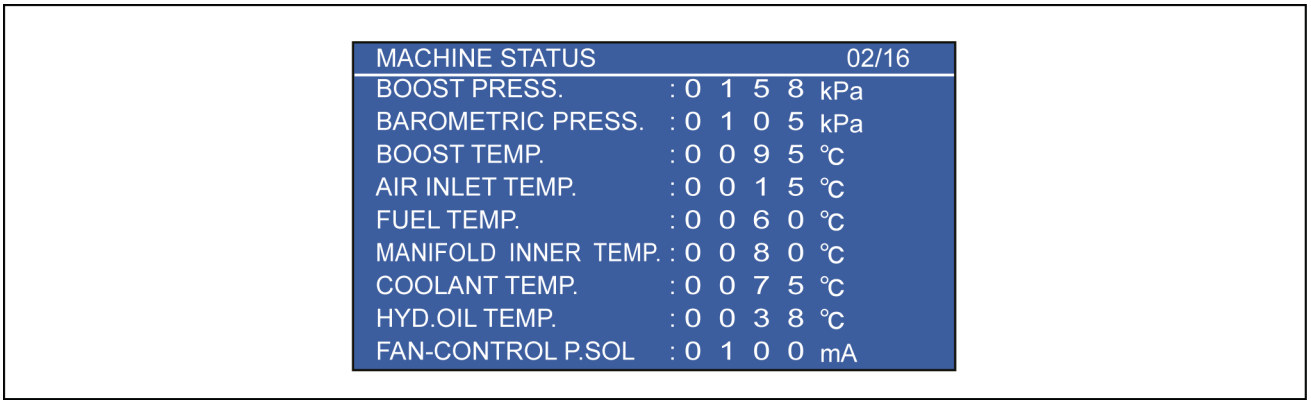
PROCEDURES FOR MEASURING HYDRAULIC OIL TEMPERATURE FROM THE MONITOR DISPLAY

Hydraulic oil temperature measurement method

The hydraulic oil temperature can be measured from the monitor display.

Operating method

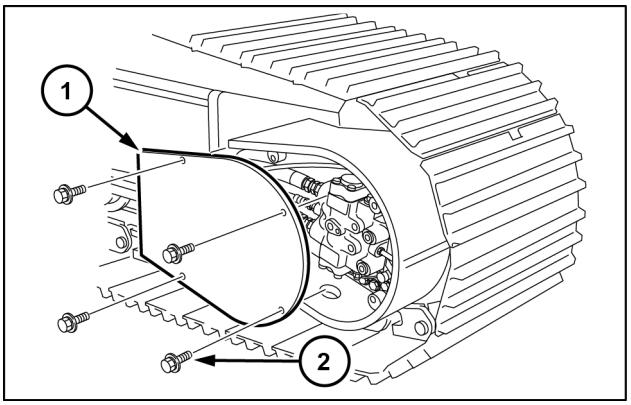
1. If both the travel speed select switch and the attachment select switch on the switch panel are held down at the same time, the display switches to the service support screen.
2. Select “CHECK” on the service support screen.
3. Select “MACHINE STATUS” on the service support screen.
4. The hydraulic oil temperature is displayed in the "HYD.OIL TEMP" column.



SMIL15CEX3557EA 3

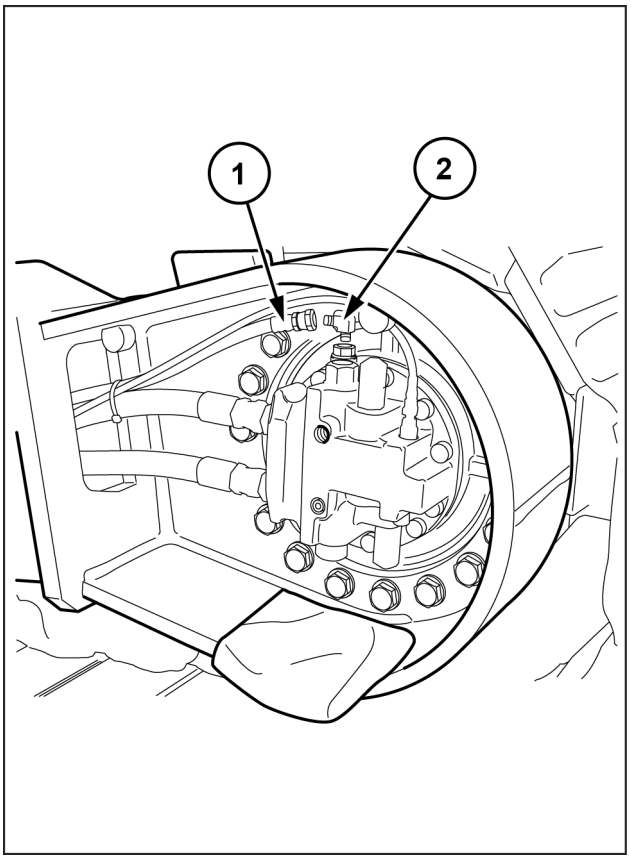
Travel motor

1. Remove the bolts **(2)**, then remove the cover **(1)**.



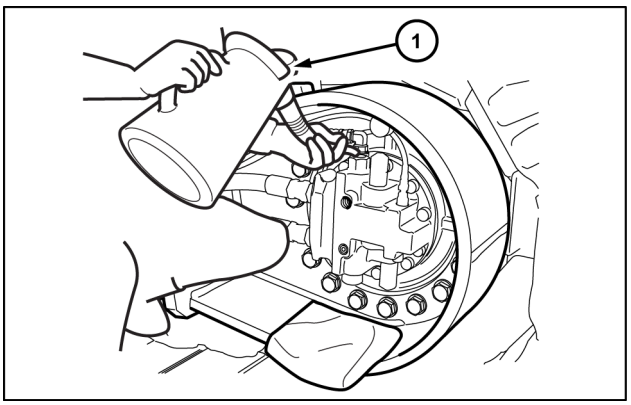
SMIL15CEX6591AB 2

2. Remove the hose **(1)** of drain port and elbow **(2)**.



SMIL15CEX6592BB 3

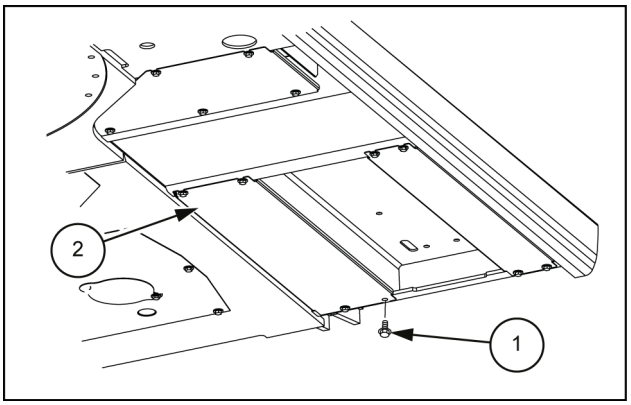
3. Pour in about hydraulic oil **(1)** from the air bleed port.
4. When inside the motor is filled with hydraulic oil **(1)**, tighten the elbow and hose.
5. Start the engine and execute a slow travel operation.
6. Repeatedly travelling forward and backward bleeds off the air.



SMIL15CEX6593AB 4

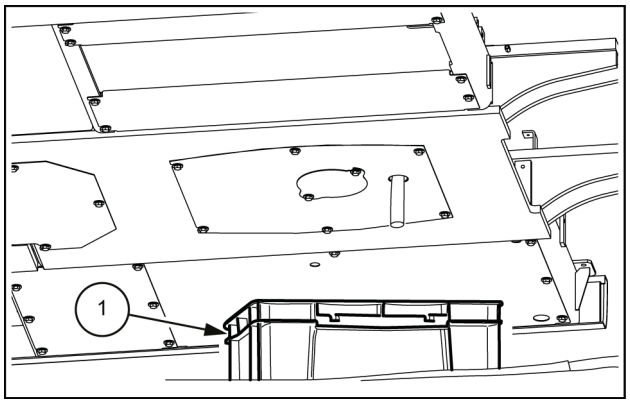
Oil cooler/Heat exchanger - Remove

1. Drain the hydraulic oil from the hydraulic tank.
2. Use a wrench [**19 mm**] to remove the 4 bolts **(1)**, and then remove the under cover **(2)**.



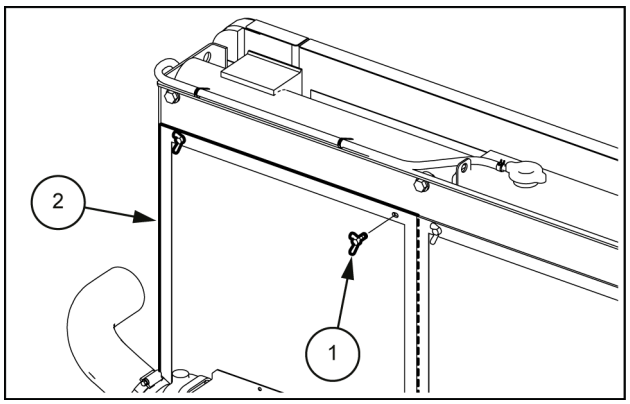
SMIL15CEX5493AB 1

3. Prepare the waste oil can **(1)**.



SMIL15CEX5494AB 2

4. Remove the 4 butterfly bolts **(1)**, and then remove the anti-insect net **(2)**.



SMIL15CEX5495AB 3

Pump - Disassemble

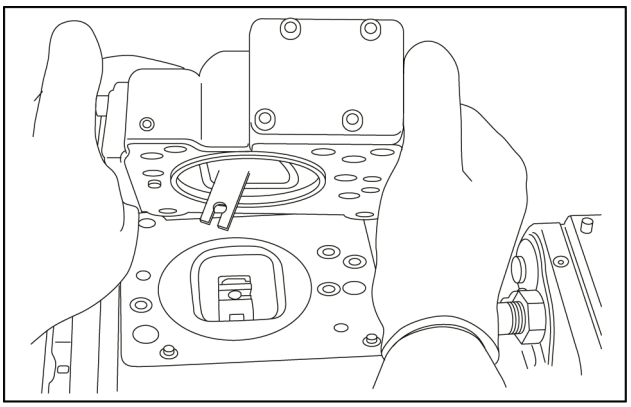
When disassembling the pump, read the disassembly procedures all the way to the end before disassembling according to the sequence below.

The numbers in the parentheses after the part names indicate part numbers in the pump structural diagram.

This manual lists the disassembly procedures for the tandem pump. Perform disassembly using the type column as reference.

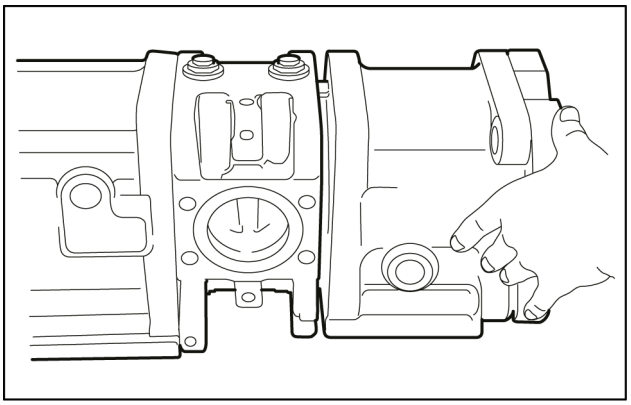
Also, be careful that parts from the front pump and rear pump do not get mixed together.

1. Select a location for disassembly.
   - Select a clean location.
   - Place a rubber plate or cloth on the work platform so as not to damage the parts.
2. Use cleaning oil to remove any dirt or rust from the surface of the pump.
3. Remove the drain port plug **(468)** and drain the oil from the pump casing.
   - Remove the plugs from both the front and rear pumps and drain the oil.
4. Remove the hexagon socket head bolts **(412)** and **(413)**, and remove the regulator.
   - See "Procedures for Assembly and Disassembly of Regulator" in the manual for the regulator for how to disassemble the regulator.
5. Loosen the hexagon socket head bolts **(401)** that fasten together the swash plate support boards **(251)**, pump casings **(271)**, and valve block **(312)**.
   - When a gear pump, etc. is attached to the pump rear surface, remove the gear pump, etc. first before performing work.



SMIL14CEX1556AA 1

6. Face down the pump regulator installation surface horizontally on the work platform, and separate the pump casing **(271)** and valve block **(312)**.
   - When placing the regulator installation surface face-down, be sure to place a rubber plate or similar material on the work platform so as not to damage the regulator installation surface.
   - When separating the pump casings and valve block, remove the 1st gear at the same time.



SMIL14CEX1555AA 2

Pump control valve - Dynamic description

Regulator operation explanation

Flow control

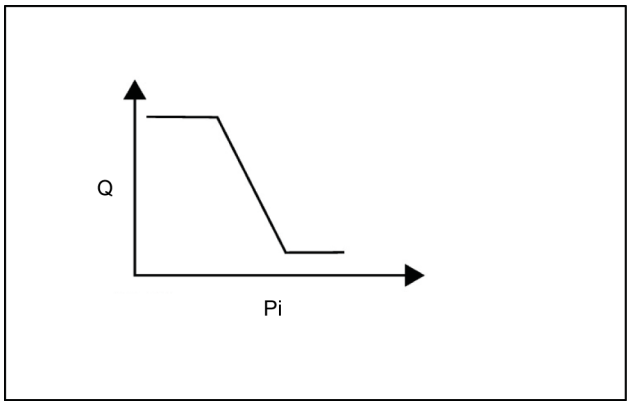
Operation explanation (see “ **Pump control valve - Hydraulic schema (35.102)**”).

Flow control

The pump discharge flow is controlled as desired with the pilot pressure Pi as in the diagram below.

Q - Discharge flow amount

Pi - Pilot pressure



LPIL12CX01754AA 1

Flow reduction operation

When the pilot pressure Pi increases, the pilot piston **(643)** moves to the right and stops at the location where the pilot spring **(646)** force and hydraulic pressure balance each other. The pin **(875)** fixed to lever 2 **(613)** fits into the grooved section of the pilot piston **(643)**, so, through the movement of the pilot piston **(643)**, lever 2 rotates with the B section (fastened by the fulcrum plug **(614)** and pin **(876)**) as the fulcrum. The pin **(897)** fixed to the feedback lever **(611)** projects into the large opening (C section) of lever 2 **(613)**, so as lever 2 **(613)** rotates, the pin **(897)** moves to the right. The pin **(548)** fixed to the tilting pin **(531)** that shakes the swash plate **(212)** is bonded to the bolt width section (D section) of the feedback lever **(611)**. Therefore, as the pin **(897)** moves, the feedback lever **(611)** rotates with D section as the fulcrum. Since the spool **(652)** is linked to the feedback lever **(611)** via the pin **(874)**, the spool **(652)** moves to the right.

When the spool **(652)** moves, the discharge pressure Pd1 is led to the servo piston large-diameter chamber via the spool and CI port. The discharge pressure Pd1 is always led to the servo piston small-diameter chamber. As a result, the servo piston is moved to the right due to the surface area difference and reduces the flow.

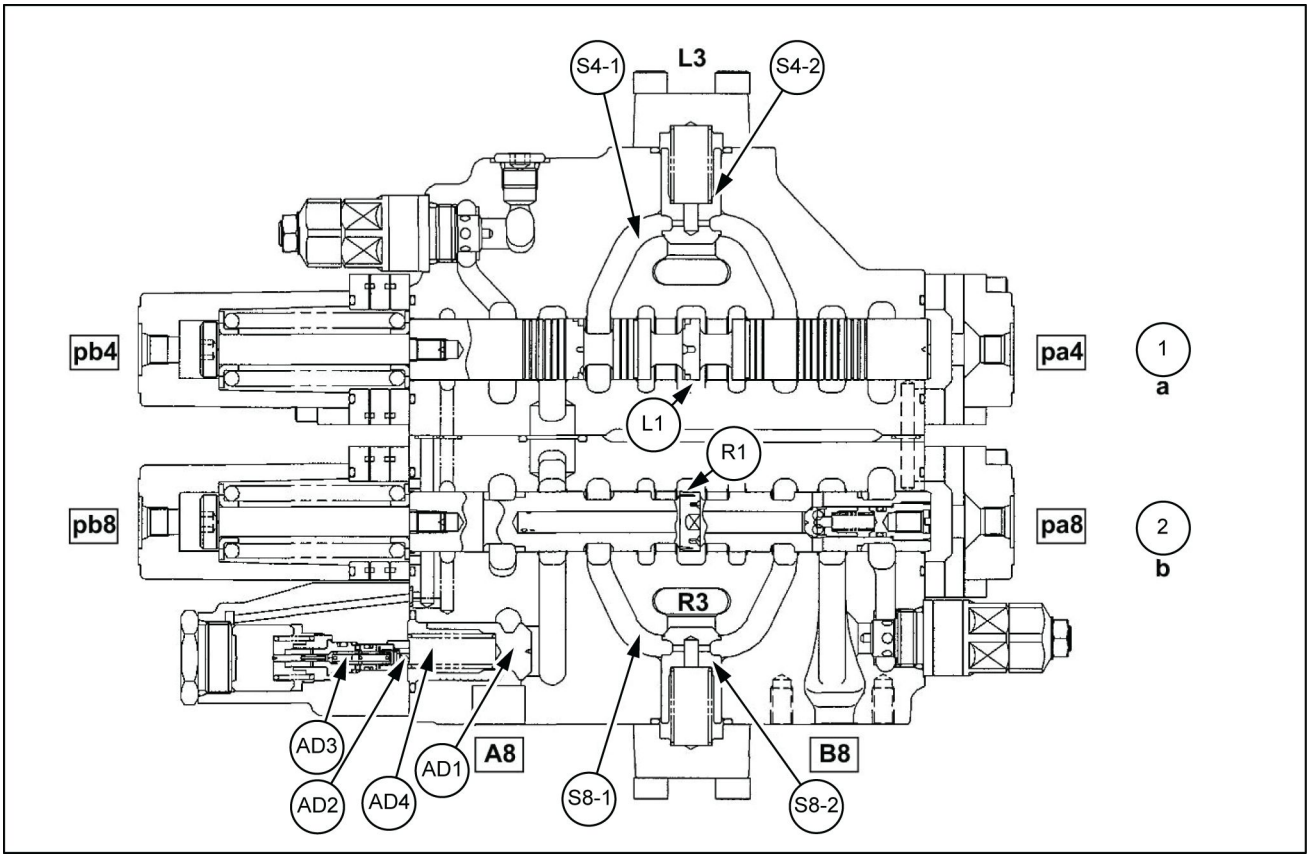
When the servo piston **(532)** moves to the right, the D section also moves to the right. The return spring **(654)** is mounted on the spool **(652)**. Since force pulling the spool to the left is always operating, the pin **(897)** is pressed into the large opening (C section) of lever 2 **(613)**. Therefore, accompanying the D section movement, the feedback lever **(611)** rotates around the C section as the fulcrum and the spool **(652)** moves to the left. This movement causes the open section between the sleeve **(651)** and the spool **(652)** to begin to close, and the servo piston **(532)** stops at the point the open section fully closes.

Flow increase operation

When the pilot pressure Pi decreases, the pilot piston **(643)** is moved to the left by the pilot spring **(646)** force and lever 2 **(613)** rotates with the B section as the fulcrum. The pin **(897)** is pressed in the large opening (C section) of lever 2 **(613)** by the return spring **(654)** via the spool **(652)**, pin **(874)**, and feedback lever **(611)**, so accompanying rotation of lever 2 **(613)**, the feedback lever **(611)** rotates with the D section as the fulcrum and the spool **(652)** moves to the left.

When the spool **(652)** moves, the CI port opens to the tank port, so the pressure in the large-diameter chamber of the servo piston drains out, the servo piston **(532)** is moved to the left by the discharge pressure Pd1 of the small-diameter section and the flow increases.

Accompanying the movement of the servo piston **(532)**, the D section moves to the left, the feedback lever **(611)** rotates with the C section as the fulcrum and the spool **(652)** moves to the right. This operation continues until the



SMIL13CEX1030FB 13

Neutral

1. Boom 2
2. Boom 1

B. Boom up (2 pumps flow) [Fig. **14**]
When the boom 1 spool is switched by pressurizing from the boom 1 (section 8) pilot port Pa8, the neutral path (R1) is closed. The oil fed from the P2 port flows through the parallel path (R3), the load check valve (S8-2), and the spool neck section and into the A8 port.
When the boom 2 spool is switched by pressurizing from the boom 2 (section 4) pilot port Pa4, the neutral path (L1) is closed. The oil fed from the P1 port flows through the parallel path (L3), the load check valve (S4-2), the spool neck section, and path **(4)** and merges into the A8 port. The return oil returns to the tank path (Ta) from the B8 port through the spool neck section.

Part list

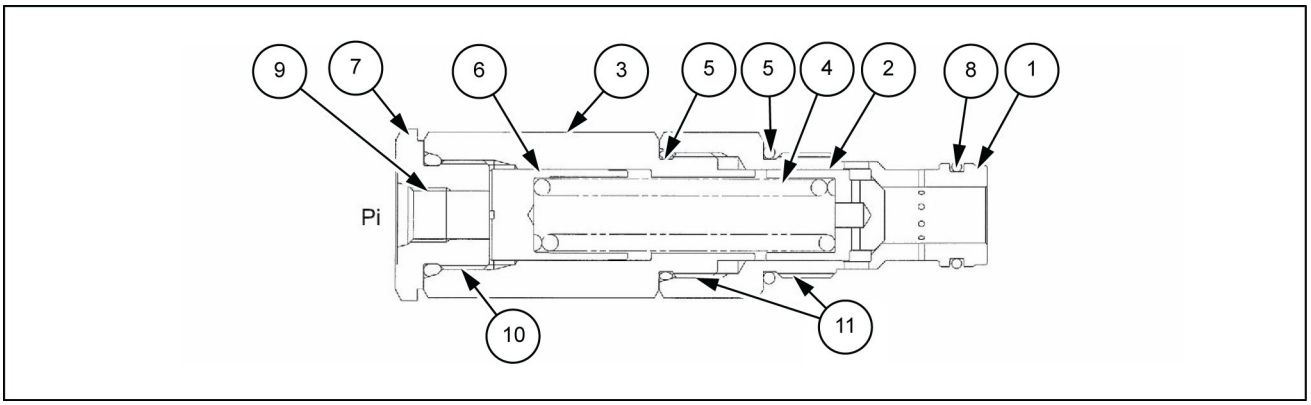
1. Valve housing (Quantity 1)
2. Spool assembly (Quantity 1)
3. Spool assembly (Quantity 1)
4. Spool assembly (Quantity 1)
5. Spool assembly (Quantity 2)
6. Spool assembly (Quantity 1)
7. O-ring (Quantity 20)
8. Cap (Quantity 9)
9. Cap (Quantity 1)
10. Plate assembly (Quantity 1)
11. Plate assembly (Quantity 1)
13. Valve housing (Quantity 1)
14. Spool assembly (Quantity 1)
15. Spool assembly (Quantity 1)
16. Spool assembly (Quantity 1)
17. Spool assembly (Quantity 1)
18. Cap (Quantity 1)
19. Spool (Quantity 1)
20. Spring seat (Quantity 2)
21. Spring (Quantity 1)
22. Spool end (Quantity 1)
23. O-ring (Quantity 1)
24. Plug (Quantity 1)
25. O-ring (Quantity 1)
26. Spring (Quantity 1)
27. Spool assembly (Quantity 1)
28. Plate assembly (Quantity 1)
29. Plate assembly (Quantity 1)
30. O-ring (Quantity 1)
31. Backup ring (Quantity 2)
32. Poppet (Quantity 2)
33. Spring (Quantity 2)
34. Poppet (Quantity 7)
35. Spring (Quantity 8)
36. O-ring (Quantity 10)
37. Flange (Quantity 6)
38. Poppet (Quantity 2)
39. Spring (Quantity 2)
40. Orifice plug (Quantity 1)
41. O-ring (Quantity 17)
42. Body assembly (Quantity 1)
43. Flange (Quantity 1)
44. Poppet (Quantity 1)
45. Spring (Quantity 1)
46. Plug (Quantity 1)
47. O-ring (Quantity 1)
48. Spring (Quantity 1)
49. Poppet (Quantity 1)
51. Poppet (Quantity 1)
52. Flange (Quantity 2)
53. Spacer (Quantity 2)
54. O-ring (Quantity 2)
55. Backup ring (Quantity 2)
56. O-ring (Quantity 1)
57. Spacer (Quantity 1)
58. Sleeve (Quantity 1)
59. Poppet (Quantity 1)
60. Spring (Quantity 1)
61. Flange (Quantity 1)
64. O-ring (Quantity 3)
65. O-ring (Quantity 14)
66. O-ring (Quantity 12)
67. Antidrift valve assembly (Quantity 2)
68. Relief valve kit (Quantity 1)

69-1. Relief valve kit (Quantity 5)

69-2. Relief valve kit (Quantity 1)

70. Relief valve assembly (Quantity 2)
71. Plug assembly (Quantity 3)
72. Plug assembly (Quantity 10)
73. Plug assembly (Quantity 3)
74. Socket head bolt (Quantity 32)
75. Socket head bolt (Quantity 66)
77. Socket head bolt (Quantity 8)
78. Socket head bolt (Quantity 4)
79. Name plate (Quantity 1)
80. Drive screw (Quantity 2)
82. Metal plug (Quantity 4)
83. Socket head bolt (Quantity 4)
84. Spool assembly (Quantity 1)
86. Cap (Quantity 1)
88. Cap (Quantity 2)
89. O-ring (Quantity 2)
90. O-ring (Quantity 2)
91. Plug (Quantity 2)
92. Plug assembly (Quantity 2)
93. Plug assembly (Quantity 2)
94. Socket head bolt (Quantity 2)
95. Outlet housing (Quantity 1)
96. Tie rod (Quantity 4)
97. Nut (Quantity 4)
110. Plug assembly (Quantity 1)

Low-pressure relief valve



SMIL13CEX0994EB 3

1. Plug
2. Poppet
3. Plug
4. Spring
5. O-ring
6. Piston
7. Plug
8. O-ring
9. **PF 1/4**
10. **PF 3/4**
11. 1 3/16-12UN-2A

1. Fasten the assembly with a vise, loosen the plug, and remove the piston **(6)**, spring **(4)**, and poppet **(2)**.
2. Then loosen the plug and take out the O-rings **(5)** and **(8)** from each part.

- The hose connections are as follows.

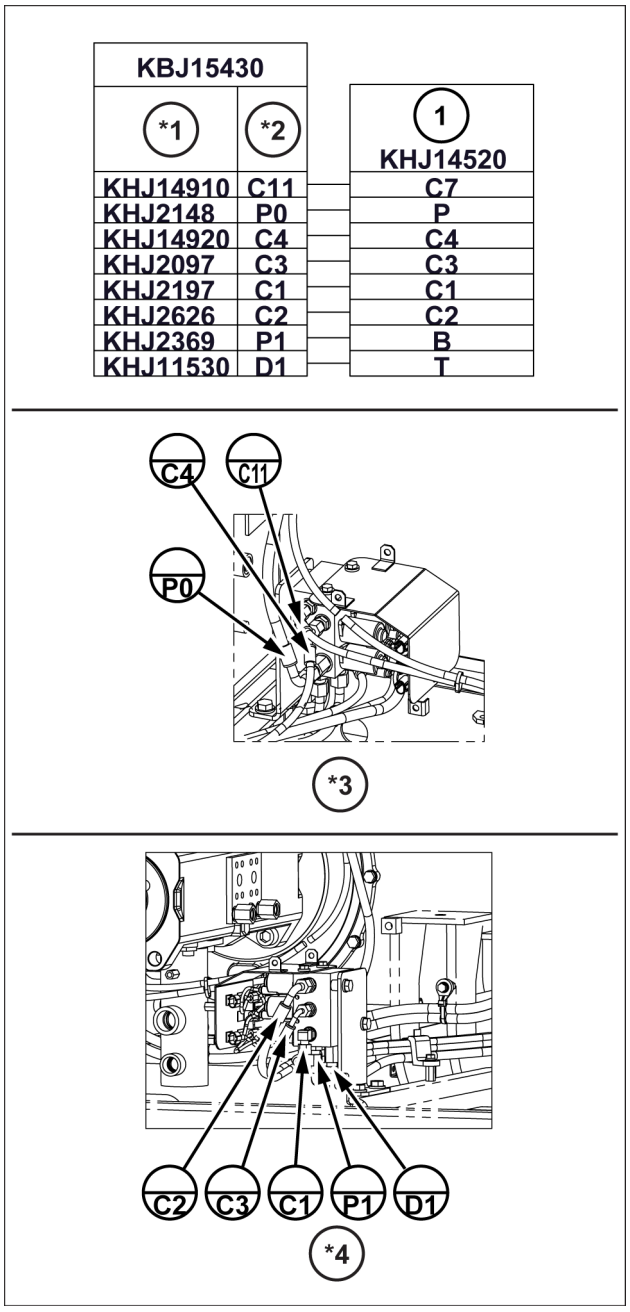
  1. Solenoid valve

  *1. Hose assembly

  *2. Code

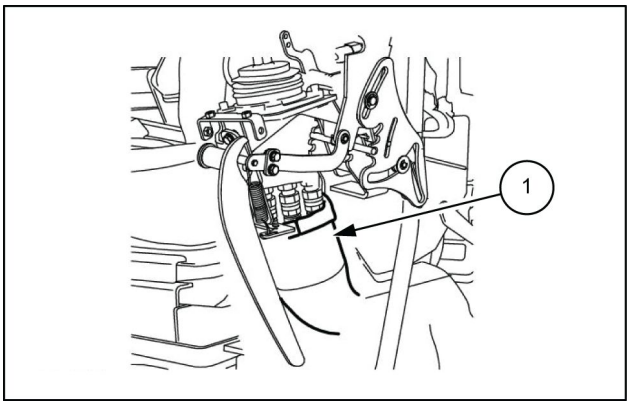
  *3. Solenoid valve (left side) details

  *4. Solenoid valve (right side) details



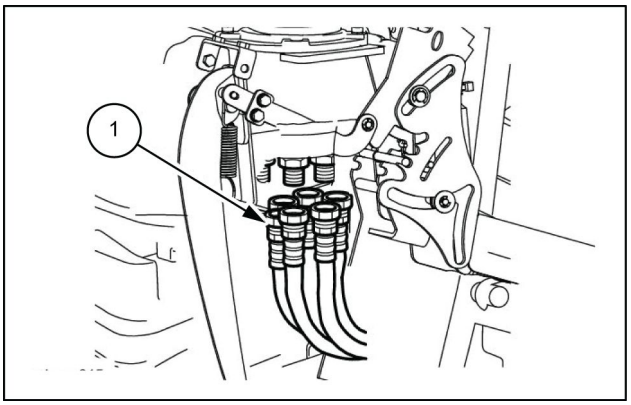
SMIL15CEX1754CB 3

9. Roll back the hose cover **(1)**.



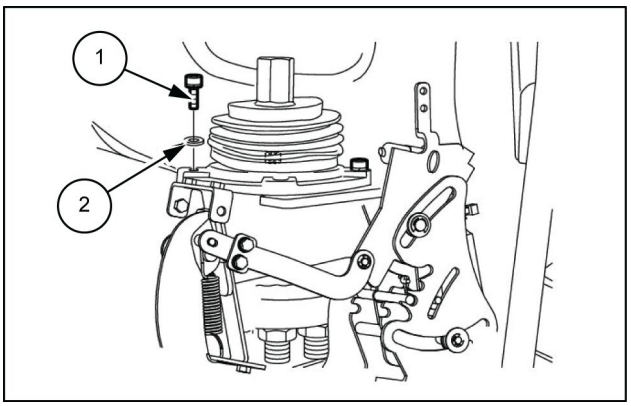
LPIL12CX01913AB 9

10. Use a wrench [**19 mm**] to remove the 6 hoses **(1)**.
    - Mark the joystick remote control valve and hoses so that the connectors match at the time of assembly.
    - Use caps and plugs to cover the joystick remote control valve and hoses to prevent any entry of water, dust or dirt.
    - Clean the joystick remote control valve and hoses by spraying them with a parts cleaner to prevent scratches and prevent dirt from accumulating on the connectors.



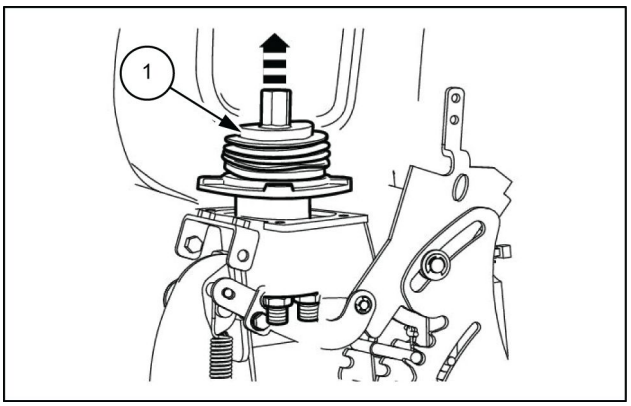
LPIL12CX01914AB 10

11. Use the hexagon wrench [**5 mm**] to remove the 3 bolts **(1)** and 3 washers **(2)**.



LPIL12CX01915AB 11

12. Remove the joystick remote control valve **(1)**.



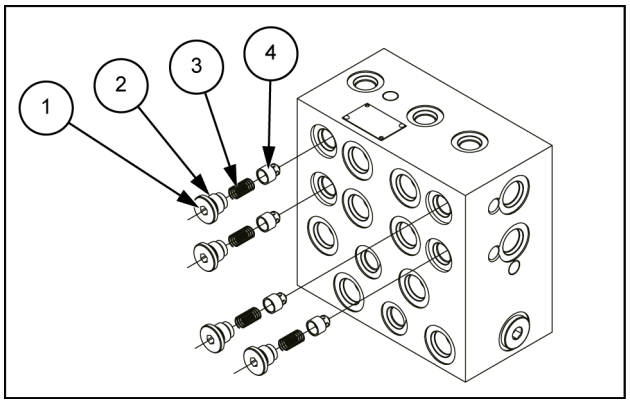
LPIL12CX01916AB 12

Check plunger section with throttle

1. Remove the plugs **(1)** and O-rings **(2)**.

   Remove the springs **(3)** and remove the check plungers **(4)**.

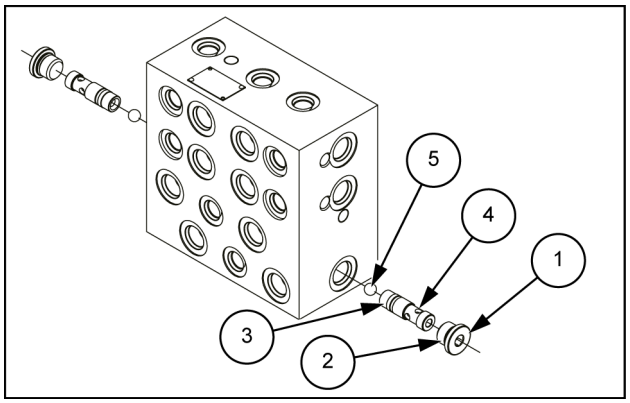
NOTE: *The check plungers have similar shapes, so identify them in such a way that no one will mix them up with each other.*



SMIL14CEX1328AB 3

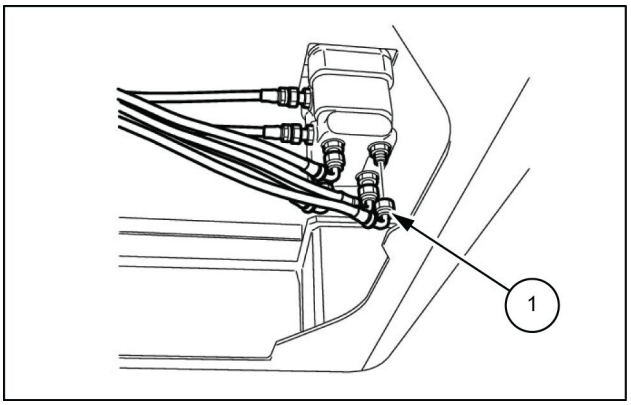
Shuttle valve section

1. Remove the plugs **(1)** and O-ring **(2)**, and then remove the seat **(4)** and O-ring **(3)**.
   1. Remove the steel balls **(5)**.



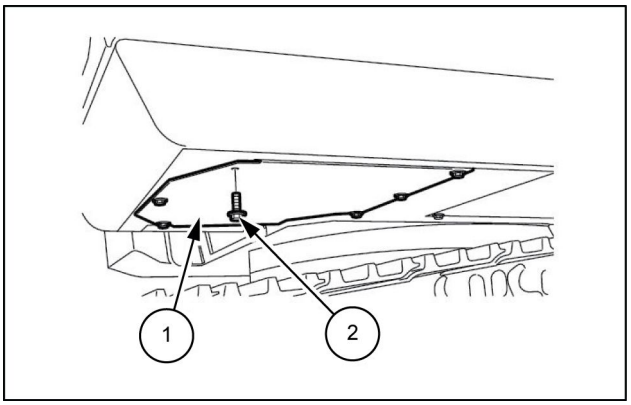
SMIL14CEX1329AB 4

4. Use a wrench [**19 mm**] to install the 6 hoses **(1)**. Tightening torque: **25.4 - 31.4 N·m** (**18.734 - 23.159 lb ft**)/ **44.0 - 54.0 N·m** (**32.453 - 39.828 lb ft**)



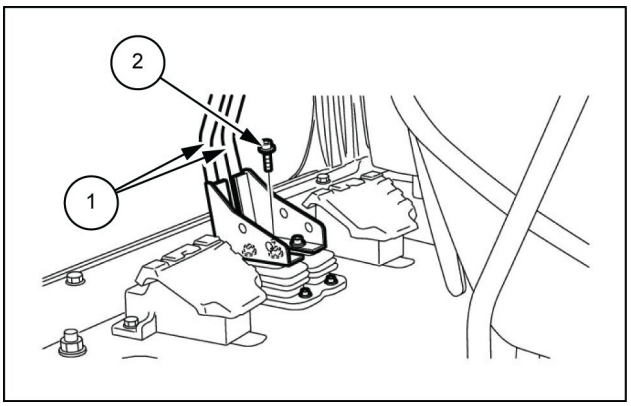
LPIL12CX01600AB 4

5. Use a wrench [**19 mm**] to install the 6 bolts **(2)** and install the under cover **(1)**.



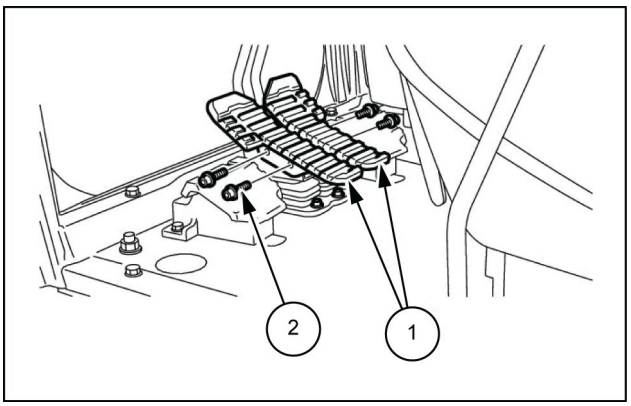
SMIL13CEX0944AB 5

6. Use a hexagon wrench [**8 mm**] to install the 2 bolts **(2)** on both the left and right sides of the lever, then install the levers **(1)**.



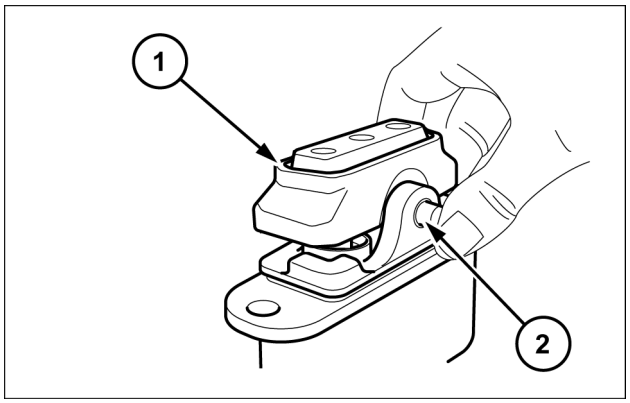
LPIL12CX01598AB 6

7. Use a hexagon wrench [**8 mm**] to install the 2 bolts **(2)** on both the left and right sides, then install the left and right travel pedals **(1)**.



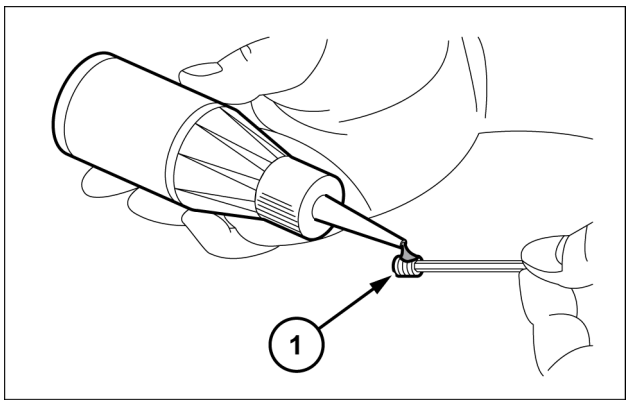
LPIL12CX01597AB 7

9. While holding the cam **(1)** , insert the cam shaft **(2)** from the outside.



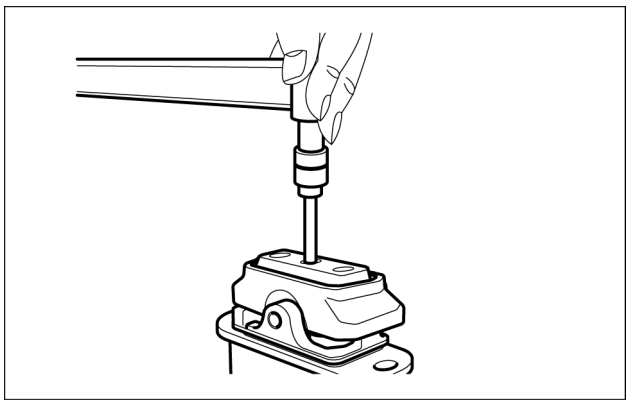
SMIL15CEX3782AB 9

10. Apply **LOCTITE® 241** or the equivalent to the surface of the hexagon socket head locking screw **(1)**.



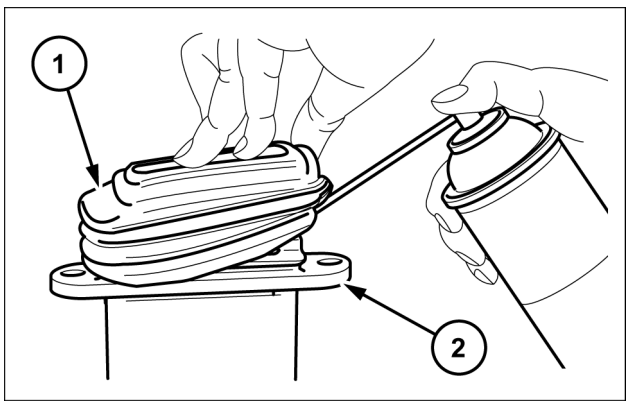
SMIL15CEX3783AB 10

11. Tighten the hexagon socket head locking screw to the specified torque.
Tightening torque: **13.3 - 16.1 N·m** (**9.810 - 11.875 lb ft**)

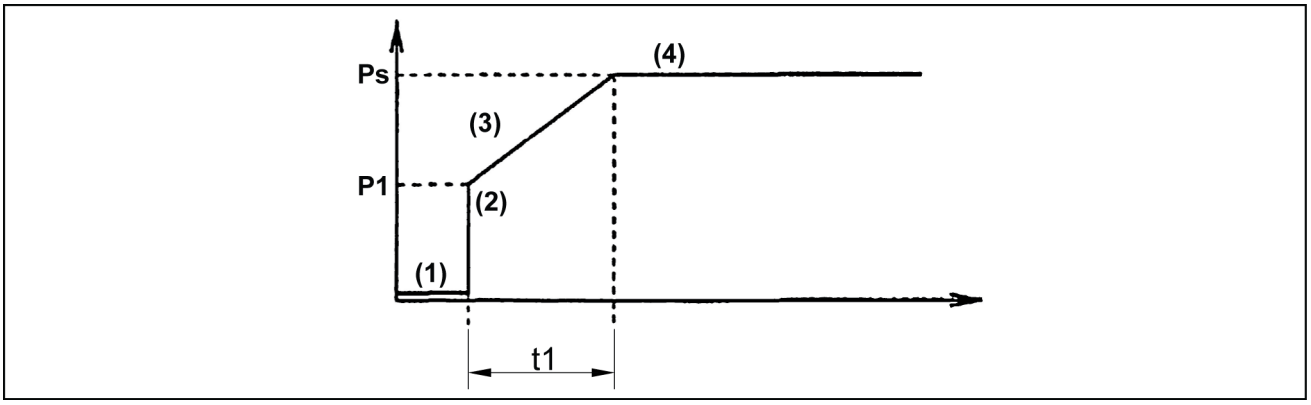


SMIL15CEX3784AB 11

12. After mounting the top end of the bellows **(1)** on the cam, mount the bottom end into the groove on the cover **(2)** .
Before mounting the bottom end of the bellows into the groove of the cover, spray anti-rust oil on the parts inside the bellows.



SMIL15CEX3785AB 12

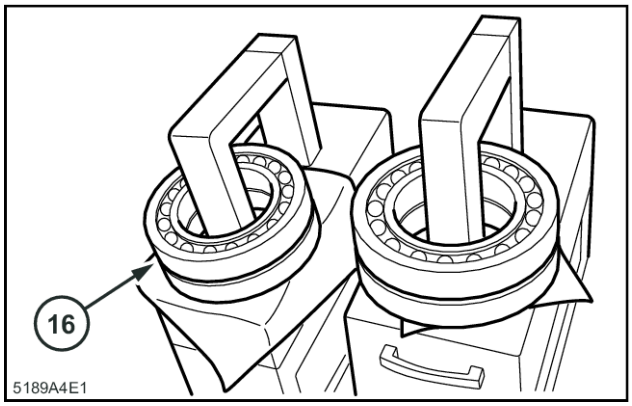


SMIL14CEX3959EA 4

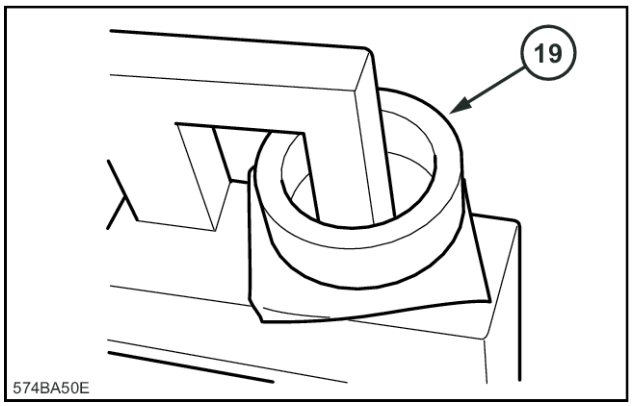
Pressure boost characteristics

3. Assembly of shaft subassembly This describes how to assemble the subassembly of this part by shrink fitting it.

   A. Use a roller bearing **(16)** and pipe spacer **(19)** to warm up to a temperature about **50 °C** (**122.0 °F**) warmer than the outside air. The roller bearing **(16)** retainer is made of plastic, so be careful not to deform the part with excessive temperature. [Less than the maximum temperature of **120 °C** (**248.0 °F**)]



5189A4E1 12

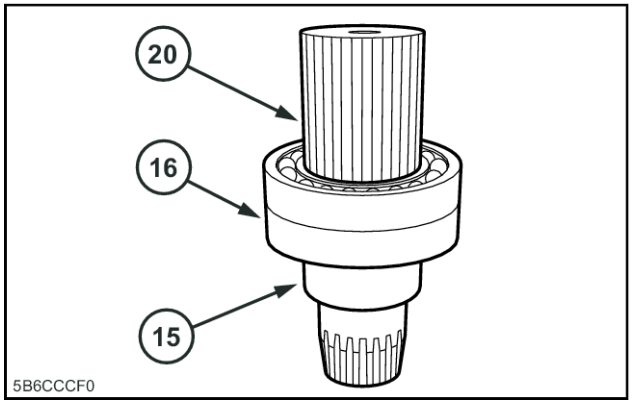


574BA50E 13

   B. Place the gear shaft **(20)** on the platform with the 2 end surfaces with tapping facing up.

   C. Be careful to insert the pipe spacer **(15)** in the correct up-down direction.

   D. Remove the roller bearing **(16)** from the bearing heater and insert.

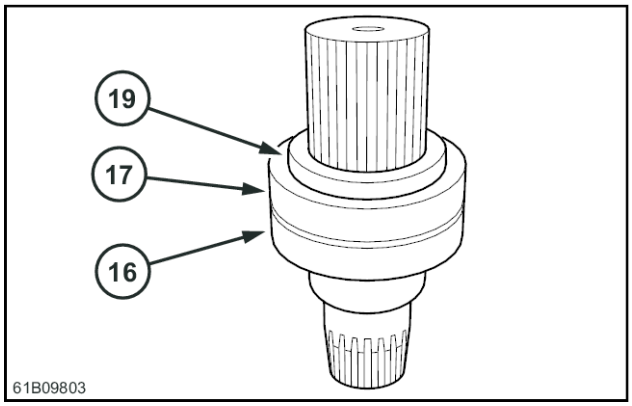


5B6CCCF0 14

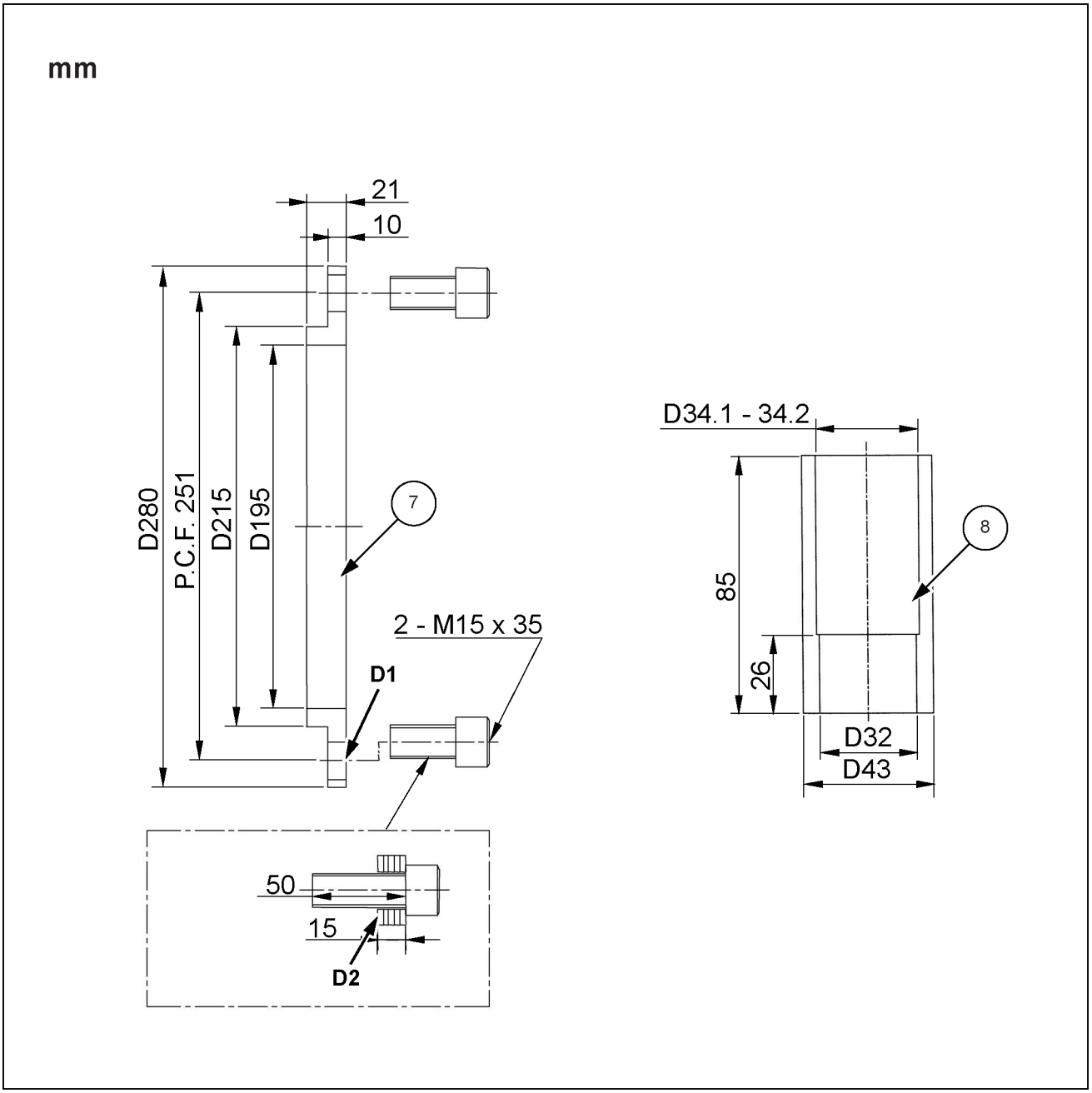
   E. When the temperature of the roller bearing **(16)** reaches to about the temperature of the outside air, grease up the inside of the roller bearing **(16)**.

   F. Be careful to insert the bearing cover **(17)** in the correct up-down direction.

   G. Remove the pipe spacer **(19)** from the bearing heater, and be careful to insert the pipe spacer **(19)**in the correct up-down direction.



61B09803 15

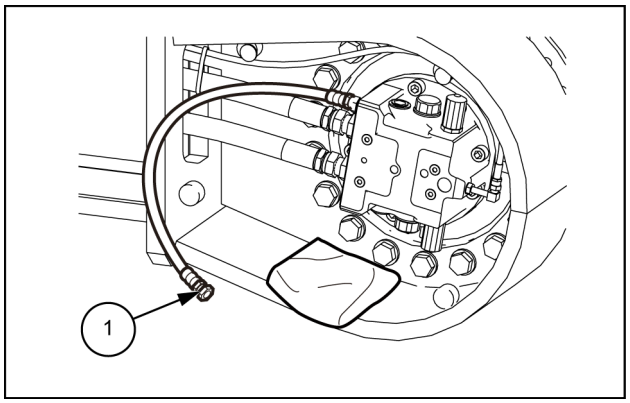


SMIL14CEX2936GB 2

NOTE: *All the dimensions in figure are in mm.*

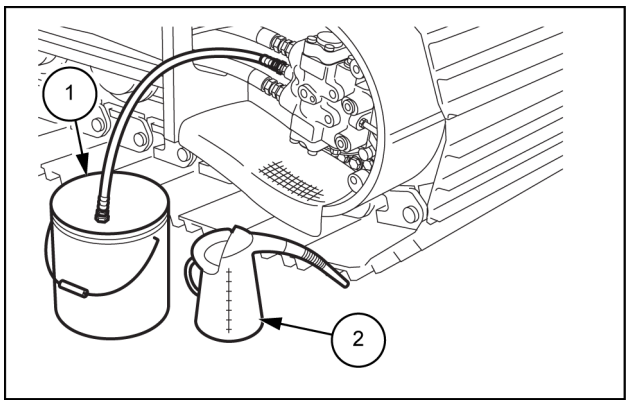
Code	Jig name	Remarks
7	Brake piston insertion jig	
8	Piston and shoe measurement jig	When the rear cover bolts are used as is: D1: 2-20 drill, D2: 10 - Plain flat washer with rounded finish **18 mm**

5. Install the extension hose for measurement **(1)** on the side of the motor from which the drain hose was removed.



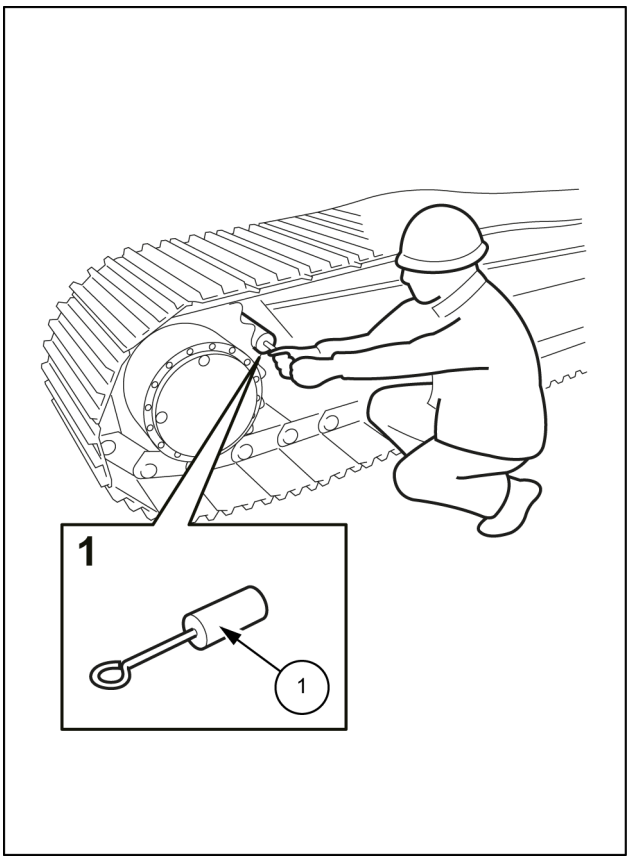
SMIL14CEX2125AB 4

6. Prepare a waste oil can **(1)** and measuring container **(2)** and set them as in the diagram on the right.



SMIL14CEX2126AB 5

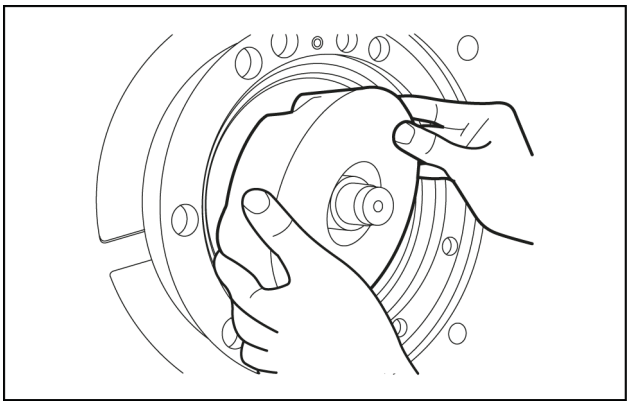
7. Catch the stopper **(1)** between the sprocket section and the frame to lock the travel motor.



SMIL14CEX2185BB 6

4. Fit the swash plate **(103)** into the spindle **(101)**.

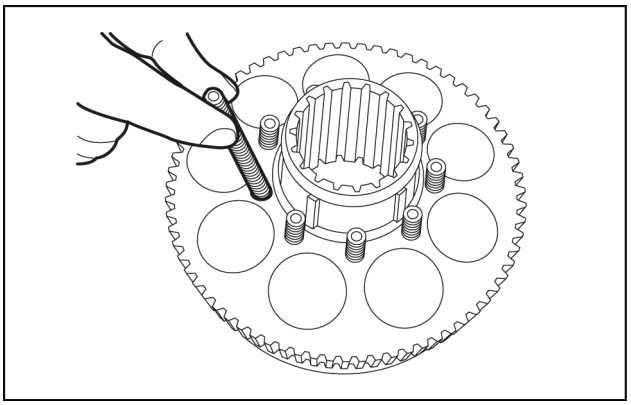
NOTE: *Apply grease to the mating surface of swash plate **(103)** against the spindle **(101)**. When inserting the swash plate **(103)** into the spindle **(101)**, align the pivot mounting holes in swash plate **(103)** with the pivots **(176)** (2 pieces) inserted in the spindle **(101)**.*



SMIL14CEX3345AA 6

Assembly of inside of cylinder block

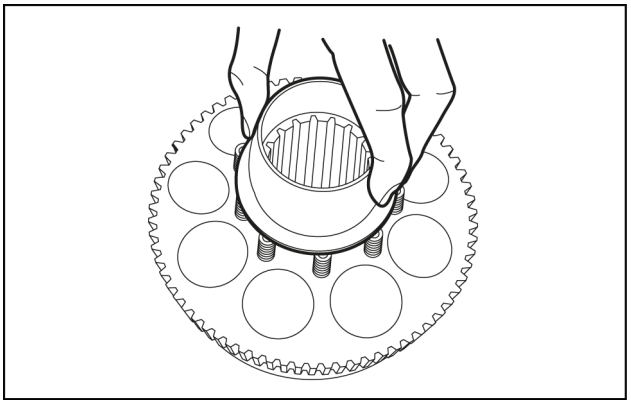
1. Put the cylinder springs **(114)** (9 pieces) into the cylinder block **(104)**.



SMIL14CEX3346AA 7

2. Attach the thrust ball **(108)** to the cylinder block **(104)**.

NOTE: *Be careful not to incline the thrust ball **(108)** during insertion. If it is left inclined during assembly, this may cause damage to the motor components.*



SMIL14CEX3347AA 8

3. Insert 9 pieces of piston assemblies into the retainer plate **(107)**.

NOTE: *After assembly, soak the whole in hydraulic fluid. Make sure that the pre-disassembly combination of the hole in retainer plate **(107)** and the piston assembly can be recovered.*

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Nominal diameter	Standard thickness	Minimum thickness	Solution
95 - 160 mm (**3.74 - 6.30 in**)	t **2.42 - 2.48 mm** (**0.095276 - 0.097638 in**)	t **2.37 mm** (**0.093307 in**)	Replace the slide ring
165 - 250 mm (**6.50 - 9.84 in**)	t **2.92 - 2.98 mm** (**0.114961 - 0.117323 in**)	t **2.87 mm** (**0.112992 in**)	Replace the slide ring

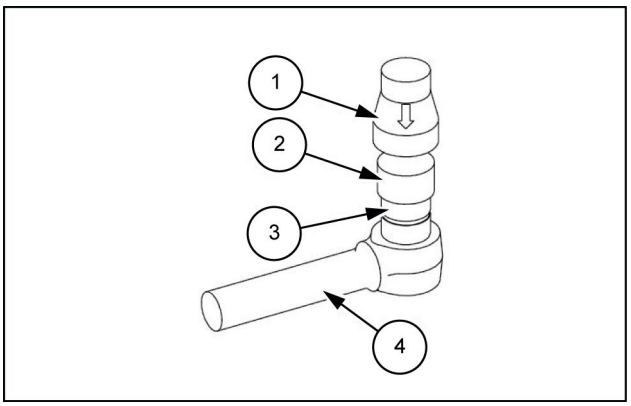
Boom cylinder - Assemble

CAUTION:

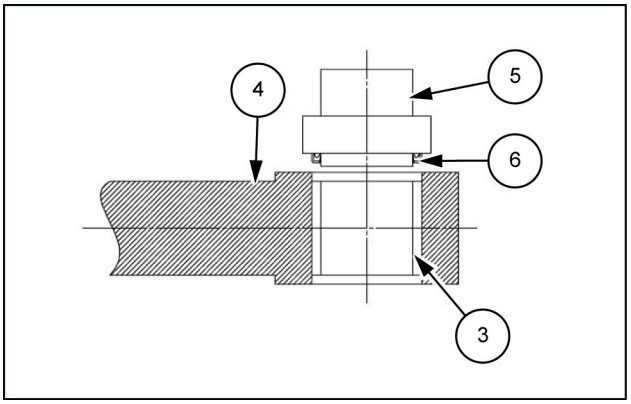
If a part with peeling paint is assembled, the peeled off paint can get inside the cylinder. This causes oil leaks, so work being very careful to prevent this.

Installation of pin bushing

1. Use the installation jig to press fit onto the piston rod **(4)** and into the tube.
   (apply hydraulic oil in advance)
2. Use the metal block **(5)** to install the wiper ring **(6)**.
   1. Press
   2. Installation jig
   3. Pin bushing



LPIL12CX02938AB 1

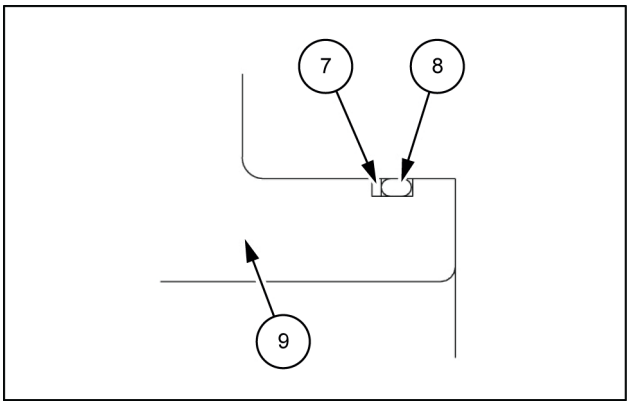


LPIL12CX02939AB 2

Replacement of seals

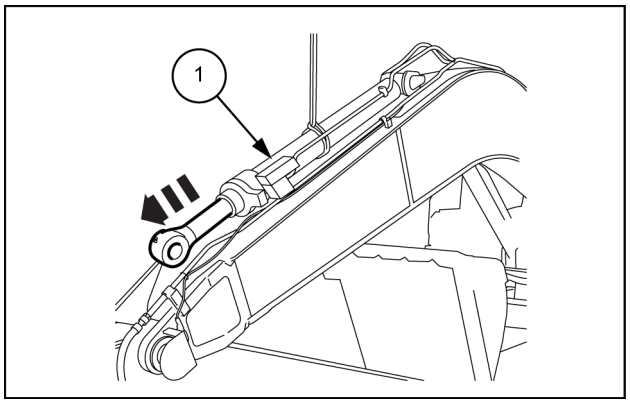
1. When disassembling the cylinder, replace all the seals.
2. O-rings
   - Clean the mounting groove well, and then mount the backup ring **(7)** and O-ring **(8)**.
     Foreign matter in the groove section would cause an oil leak.
   - Be careful about the location of the backup ring.
   - Apply grease or hydraulic oil to the backup ring and O-ring so that they slide easily, and then assemble them. If they are sliding poorly, O-ring may become twisted during assembly, which causes oil leaks.

   9. Cylinder head



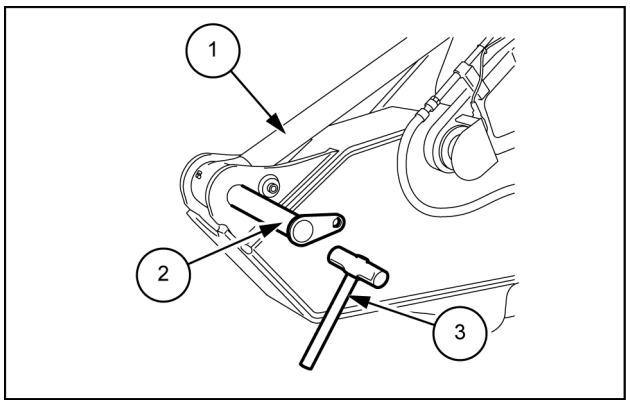
LPIL12CX02940AB 3

8. Start the engine, move the arm in at idle, and extend the arm cylinder **(1)** rod.



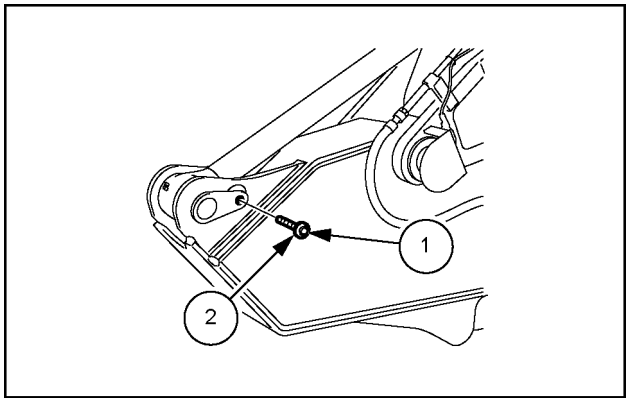
SMIL14CEX2170AB 8

9. Align the arm cylinder **(1)** with the arm pin hole and use a hammer **(3)** to insert the pin **(2)**.
   Be careful. The arm and arm cylinder rod may come out of place at this time.



SMIL14CEX2171AB 9

10. Use a wrench [**19 mm**] to tighten the bolt **(1)** and washer **(2)**.
    - Grease up.



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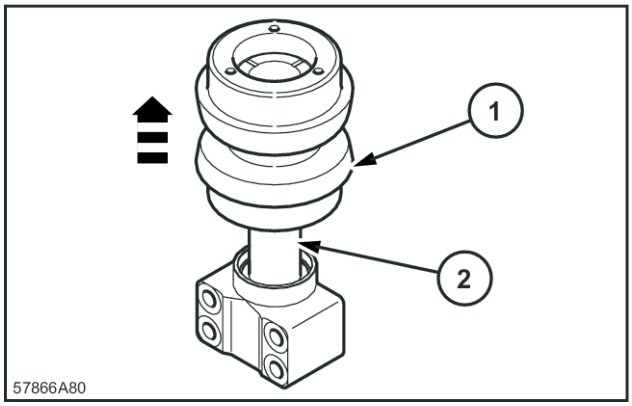
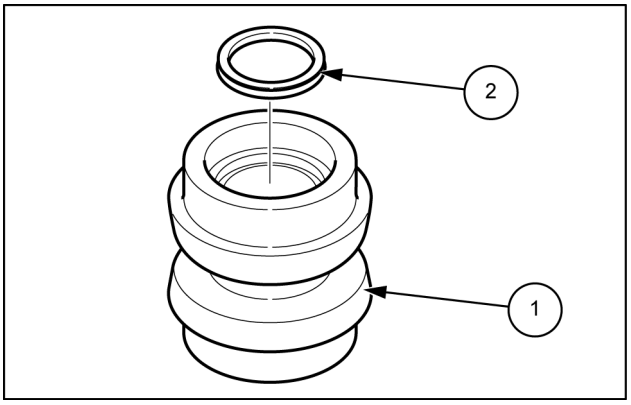
5. Lift the roller **(1)** and remove the shaft **(2)**.



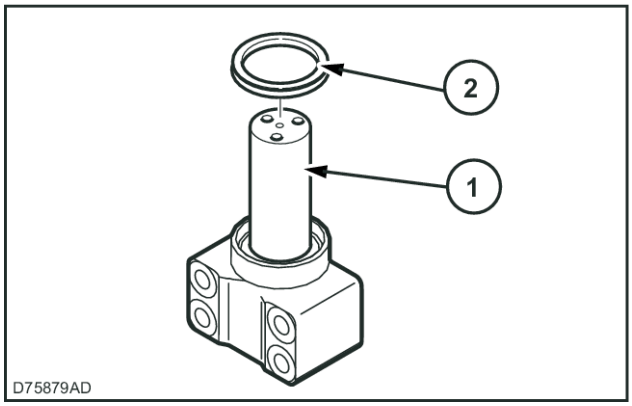
57866A80 5

6. Remove the floating seal **(2)** on the roller **(1)** side. Check for any rust or any damage on the slide way.



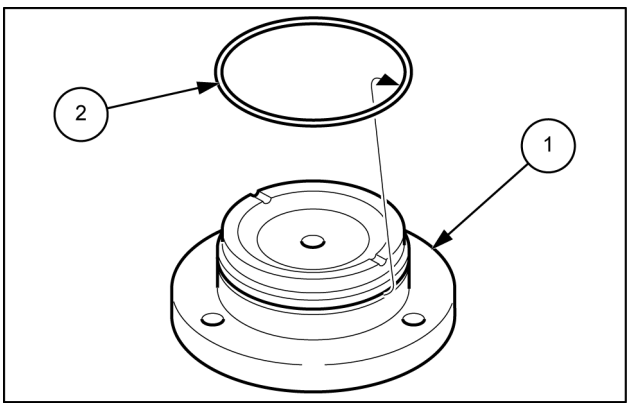
SMIL14CEX1264AB 6

7. Remove the floating seal **(2)** attached on the shaft **(1)**.



D75879AD 7

8. Remove the O-ring **(2)** on the cover **(1)** side.
   - Check whether the O-ring is twisted. If it is twisted, replace it with a new one.



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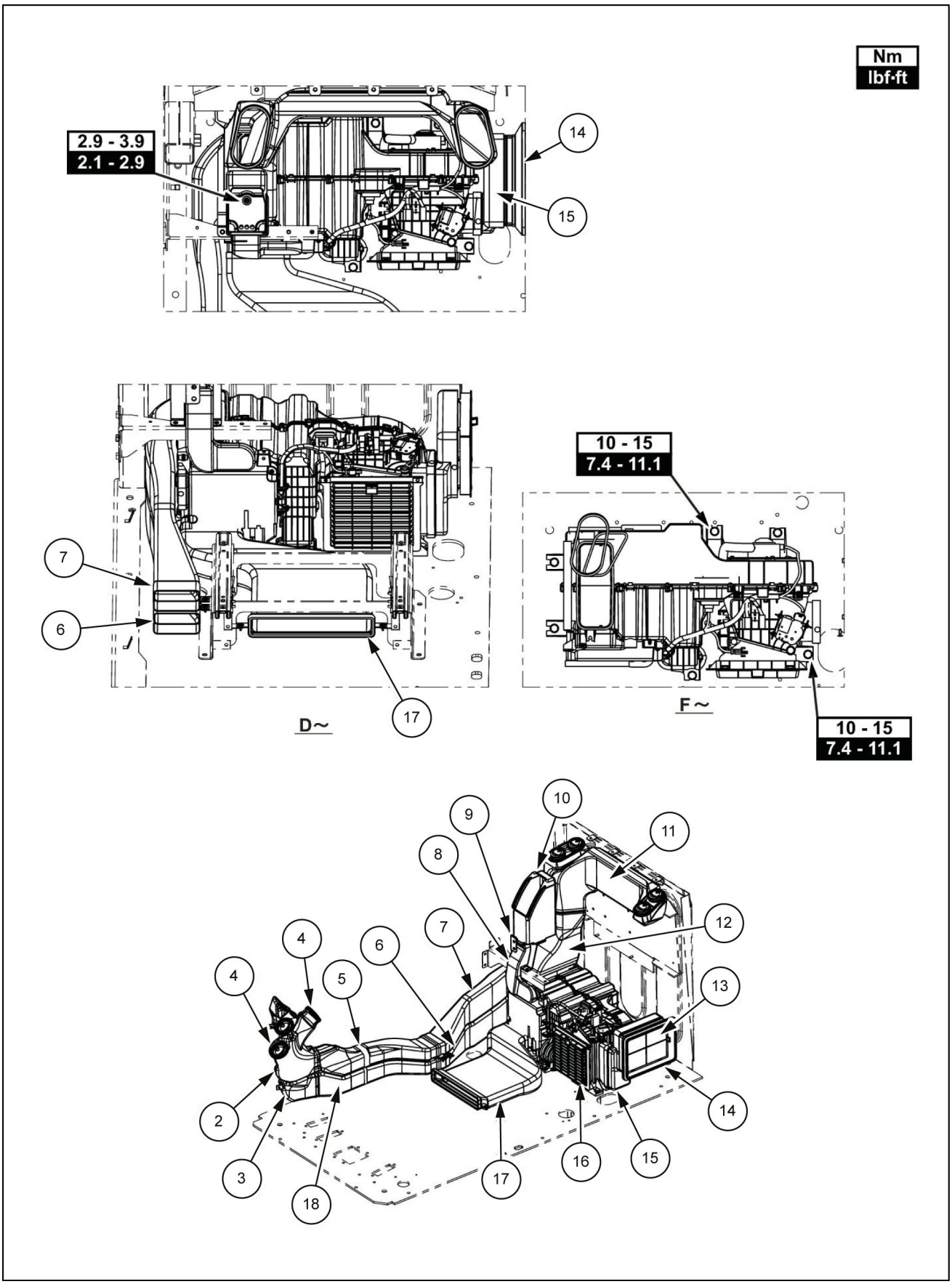

LPIL12CX02269HB 2

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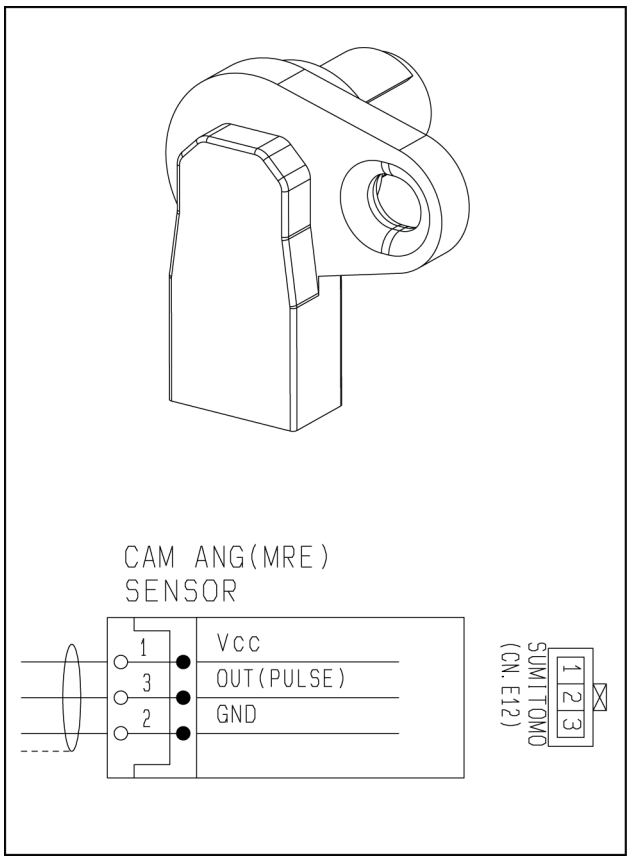
Cam angle sensor

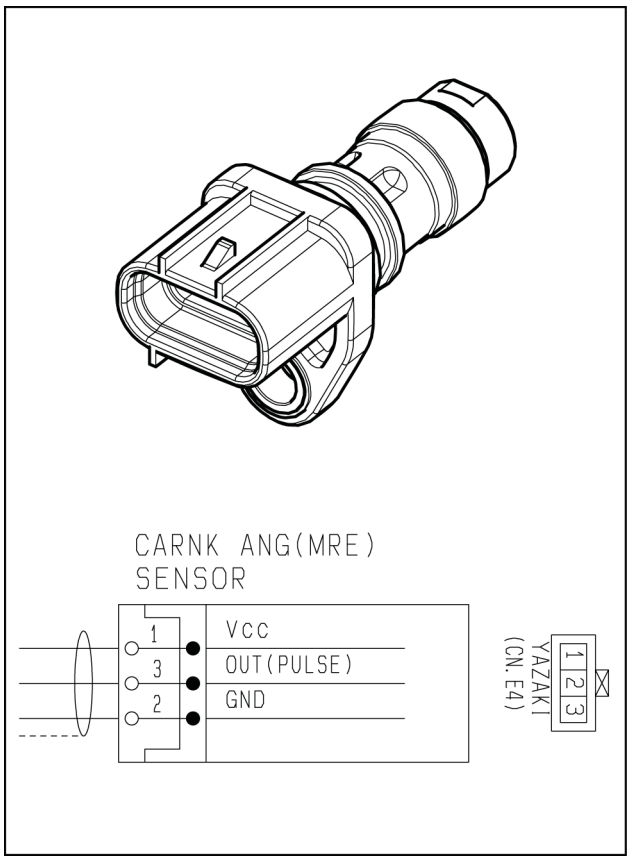
Isuzu part No.: 898019-0240



SMIL15CEX3737BA 21

Crank angle sensor

Isuzu part No.: 897606-9430

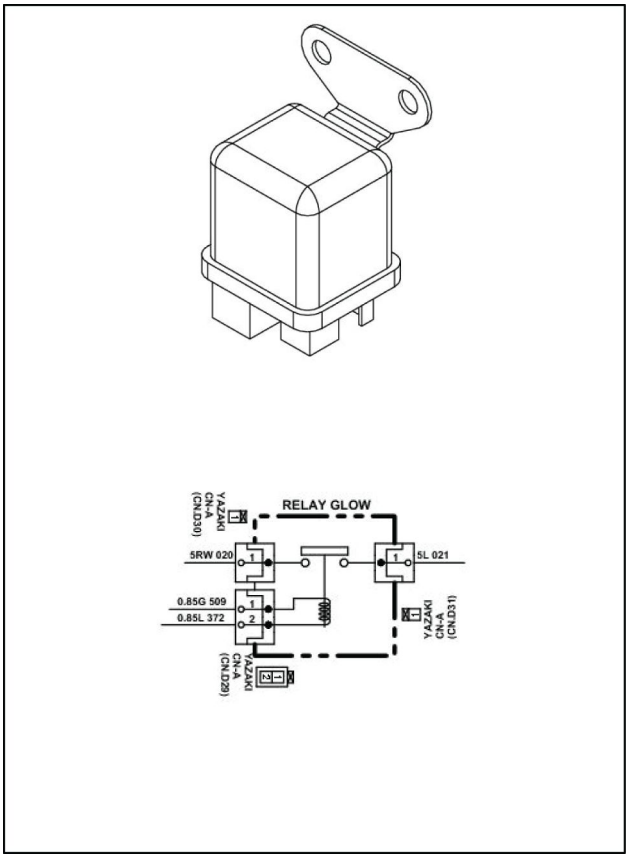


SMIL15CEX3738BA 22

Glow relay

Isuzu part No.: 894460-7061

Part No.: KHH13260



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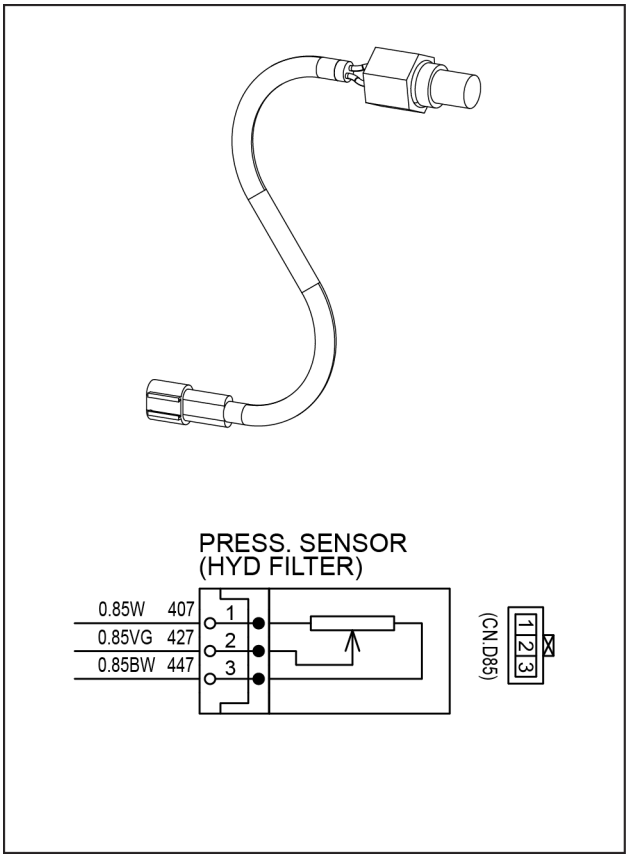
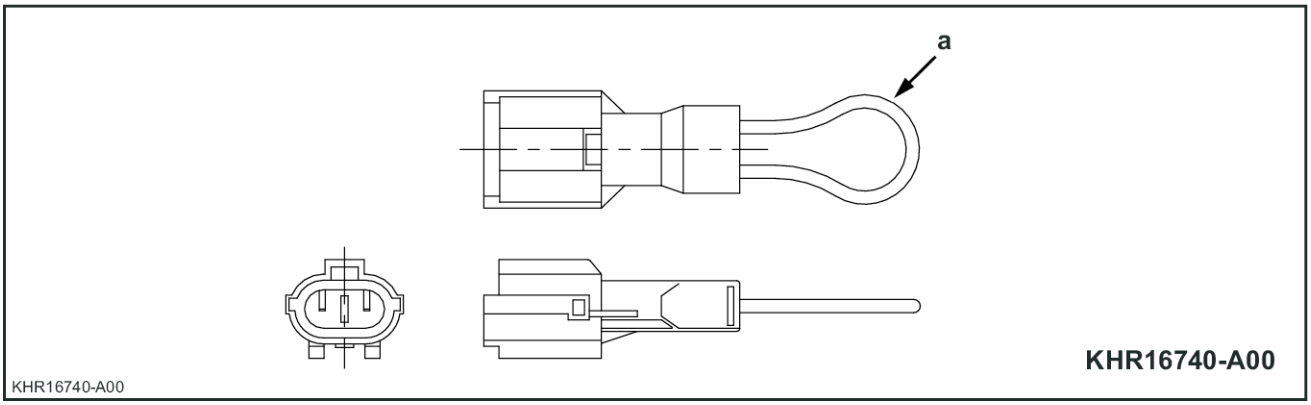
Pressure sensor (filter)

Part No.: KHR32870



SMIL15CEX6619BA 82

Indicator Jumper

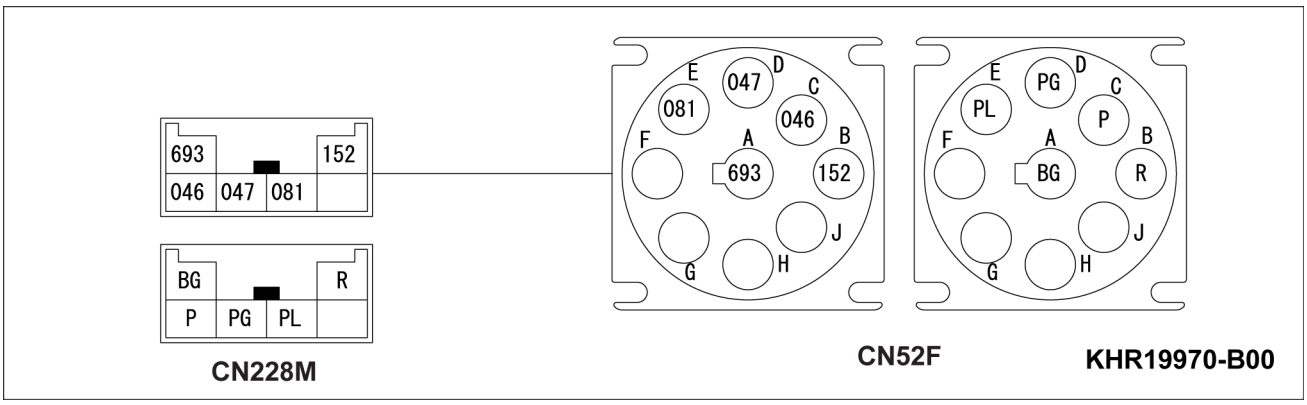


KHR16740-A00 6

a. Wire color: Black

EST-A Harness

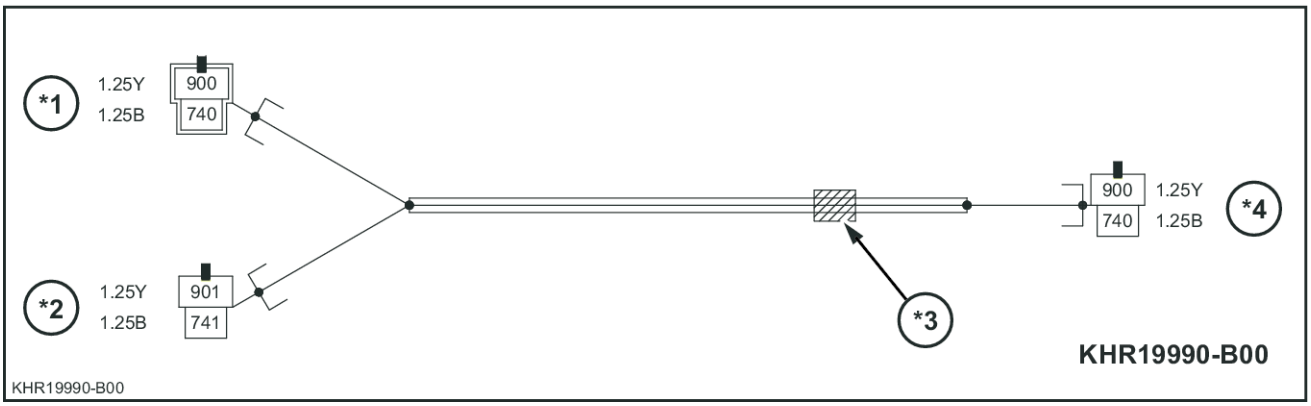
CN.52F	Cab main harness
CN.228M	EST connector: A



SMIL15CEX4075EA 7

ATT Harness (light)

*1 Frame harness
*2 Boom (left) working light
*3 Plate
*4 Boom (right) working light



KHR19990-B00 8

Wiring harnesses - Electrical schematic sheet 01 - Starting circuit

Type	Components	Connectors/link	Description
Battery	G1		Battery
Battery	G1-A		Battery
Alternator	G2		Alternator
Relay	K2		Relay glow
Relay	K7		Relay battery
Relay	K69		Relay starter
Motor	M1		Starter motor
Plug	R1		Glow plug
Switch	S94		Battery switch
Connector	CN.D11	**CN.D11**	Glow plug
Connector	CN.D12	**CN.D12**	Starter motor
Connector	CN.D13	**CN.D13**	Alternator
Connector	CN.D14	**CN.D14**	Alternator
Connector	CN.D15	**CN.D15**	Alternator
Connector	CN.D16	**CN.D16**	Ground 11
Connector	CN.D17	**CN.D17**	Relay battery
Connector	CN.D18	**CN.D18**	Relay battery
Connector	CN.D19	**CN.D19**	Relay battery
Connector	CN.D20	**CN.D20**	Relay battery
Connector	CN.D21	**CN.D21**	Relay battery
Connector	CN.D22	**CN.D22**	Relay battery
Connector	CN.D27	**CN.D27**	Relay starter
Connector	CN.D28	**CN.D28**	Relay starter
Connector	CN.D29	**CN.D29**	Relay glow
Connector	CN.D30	**CN.D30**	Relay glow
Connector	CN.D31	**CN.D31**	Relay glow
Connector	CN.D83	**CN.D83**	Relay starter
Connector	CN.D90	**CN.D90**	Starter motor
Connector	CN.D91	**CN.D91**	Battery switch
Connector	CN.D92	**CN.D92**	Battery switch
Connector	CN.D93	**CN.D93**	Battery
Connector	CN.D94	**CN.D94**	Battery
Connector	CN.D95	**CN.D95**	Battery
Connector	CN.D96	**CN.D96**	Battery
Connector	CN.D97	**CN.D97**	Relay battery
Connector	CN.D98	**CN.D98**	Relay battery

Wiring harnesses - Electrical schematic sheet 16 - Engine-refuel pump

Type	Components	Connectors/link	Description
Alarm	H9		Alarm **24 V**, **107 dB**
Sensor	B84		Pressure sensor pilot bucket close
Sensor	B85		Pressure sensor pilot boom up
Relay	K30		Relay pump
Relay	K31		Relay stop
Motor	M14		Refuel pump
Switch	S61		Manual/Auto
Connector	CN.D53	**CN.D53**	Pressure sensor pilot boom up
Connector	CN.D55	**CN.D55**	Pressure sensor pilot bucket close
Connector	CN.D76	**CN.D76**	Refuel pump
Connector	CN.D81-1	**CN.D81-1**	Relay pump
Connector	CN.D81-2	**CN.D81-2**	Relay stop
Connector	CN.D81-3	**CN.D81-3**	Refuel pump
Connector	CN.D81-4	**CN.D81-4**	Manual/Auto
Connector	CN.D81-5	**CN.D81-5**	PN diode
Connector	CN.D81-6	**CN.D81-6**	Alarm **24 V**, **107 dB**
Connector	CN.D81-7	**CN.D81-7**	Alarm **24 V**, **107 dB**

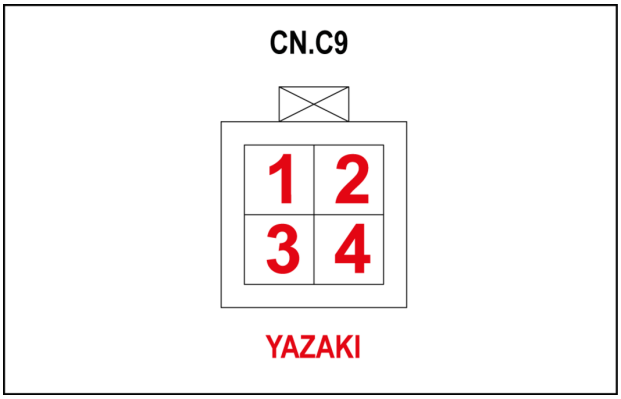
Wiring harnesses - Electrical schematic sheet 31 - Main cab-relays

Type	Components	Connectors/link	Description
Relay	K3		Relay horn
Relay	K10		Relay lamp upper
Relay	K11		Relay lamp cab
Relay	K35		Relay room lamp
Relay	K36		Relay speaker left
Relay	K37		Relay speaker right
Relay	K77		Relay beacon
Connector	CN.A16	**CN.A16**	Relay horn
Connector	CN.A17	**CN.A17**	Relay lamp upper
Connector	CN.A18	**CN.A18**	Relay lamp cab
Connector	CN.A19	**CN.A19**	Relay beacon
Connector	CN.A20	**CN.A20**	Relay room lamp
Connector	CN.A21	**CN.A21**	Relay speaker right
Connector	CN.A22	**CN.A22**	Relay speaker left
Connector	CN.A23	**CN.A23**	To controller C
Connector	CN.A51	**CN.A51**	
Connector	CN.A55	**CN.A55**	

Wiring harnesses - Electrical schematic sheet 46 - Option circuit pedal/proportional lever type

Type	Components	Connectors/link	Description
Solenoid	Y9		Option 2 speed
Solenoid	Y27		Option select
Solenoid	Y86		Option 2 lever up
Solenoid	Y87		Option 2 lever down
Solenoid	S100		Press. switch-option 1 (lever up)
Solenoid	S102		Press. switch-option 2 (lever up)
Solenoid	S103		Press. switch-option 2 (lever down)
Connector	CN.57-1D	**CN.57-1D**	Option select
Connector	CN.57-2D	**CN.57-2D**	Option 2 speed
Connector	CN.57-5B	**CN.57-5B**	Press. switch-option 1 (lever up)
Connector	CN.57-7C	**CN.57-7C**	Option 2 lever up
Connector	CN.57-8C	**CN.57-8C**	Option 2 lever down
Connector	CN.57-9B	**CN.57-9B**	Press. switch-option 2 (lever up)
Connector	CN.57-10B	**CN.57-10B**	Press. switch-option 2 (lever down)
Connector	CN.A57D-M	**CN.A57 (Male)**	

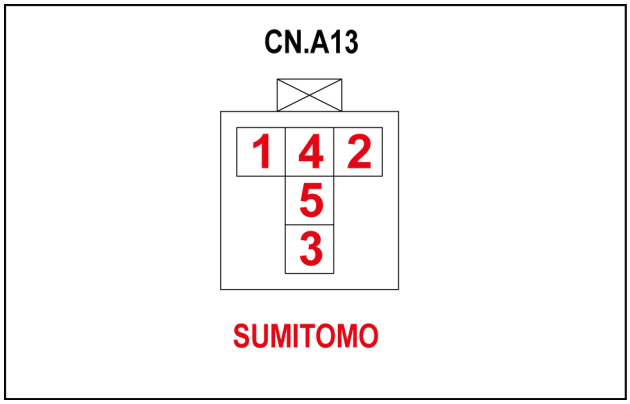
CONNECTOR CN.C9 - LIMIT SWITCH (DOOR) (Female)



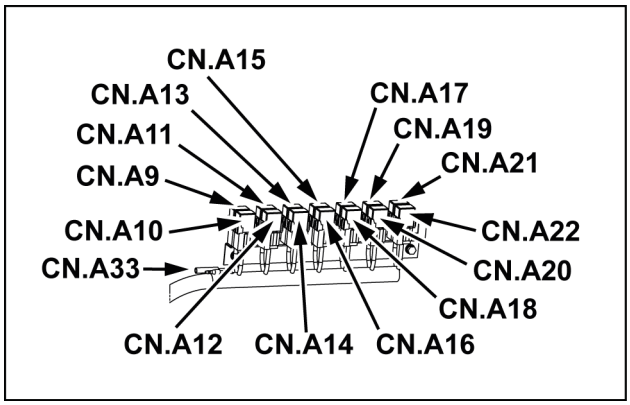
SMIL15CEX3878AA 45

Pin	From	Wire	Description	Color-Size	Frame
1	CN.C23-P-3	613A		BG	**SHEET 27**
2	CN.C23-P-1	593B		OL	
4	CN.C23-P-2	843		Y	

CONNECTOR CN.A13 - RELAY KEY ON (Male)



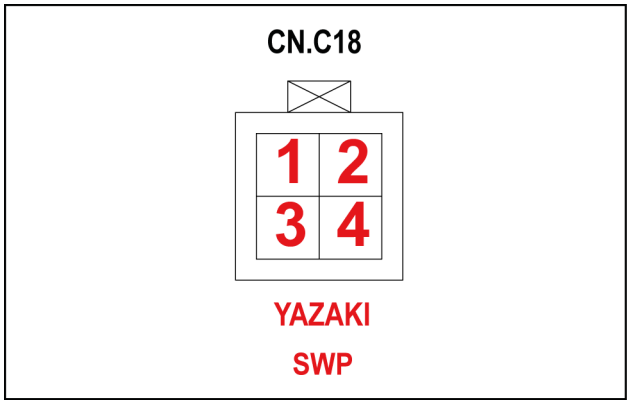
SMIL15CEX3910AA 7



SMIL15CEX3909AA 8

Pin	From	Wire	Description	Color-Size	Frame
1	SP-890-P-X	890		LR-0.85	**SHEET 30**
2	SP-706-P-X	705A		B-0.85	
3	CN.A46-F-P-4	500		LgR-0.85	**SHEET 32**
4	SP-501-P-X	501		G-0.85	**SHEET 30**
5	SP-890-P-X	891		LR-0.85	

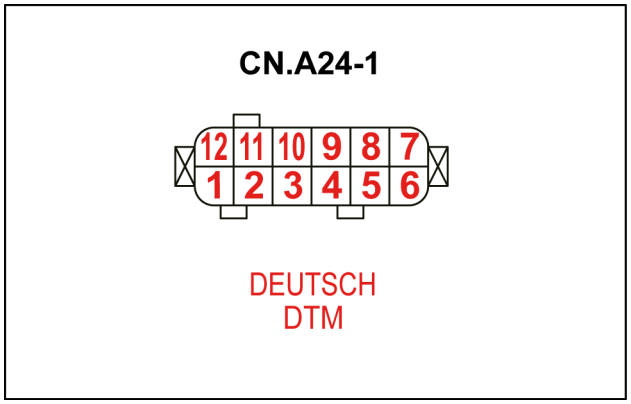
CONNECTOR CN.C18 - TO CAB HARNESS (NO TAPE) (Female)



SMIL15CEX4041AA 45

Pin	From	Wire	Description	Color-Size	Frame
1	SP-960B-P-X	960C		R	**SHEET 39**
2	SP-961B-P-X	961C		B	
3	CN.C4-F-P-1	962A		Y	**SHEET 25**
4	CN.C4-F-P-11	963A		W	

CONNECTOR CN.A24-1 - CONTROLLER UNIT (Male)



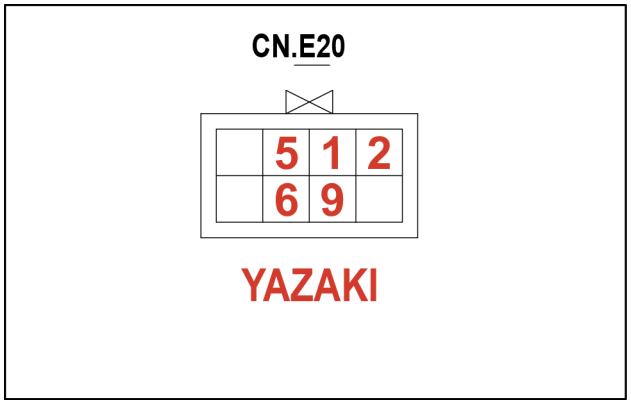
SMIL16CEX1335AA 12

Pin	From	Wire	Description	Color-Size	Frame
1	SP-740-P-X	740B		B-0.85	**SHEET 43**
2	CN.A24-F-P-2	506B		G-0.85	**SHEET 24**
3	CN.A24-F-P-7	040Q		P	**SHEET 28**
4	CN.A24-F-P-8	041Q		PG	
5	CN.A24-F-P-6	837A		LR-0.85	
6	CN.A24-3-M-P-3	058		YR	**SHEET 43**
7	CN.A24-3-M-P-2	057		Y	
8	CN.A24-F-P-3	517A		Br-0.85	**SHEET 24**
11	CN.A24-F-P-5	819A		WL-0.85	**SHEET 22**
12	CN.A24-2-P-2	150B		R-0.85	**SHEET 43**

CONNECTOR CN.B22 – GROUND (Male)

Pin	From	Wire	Description	Color-Size	Frame
M8	SP-730-P-X	730		B-1.25	**SHEET 37**

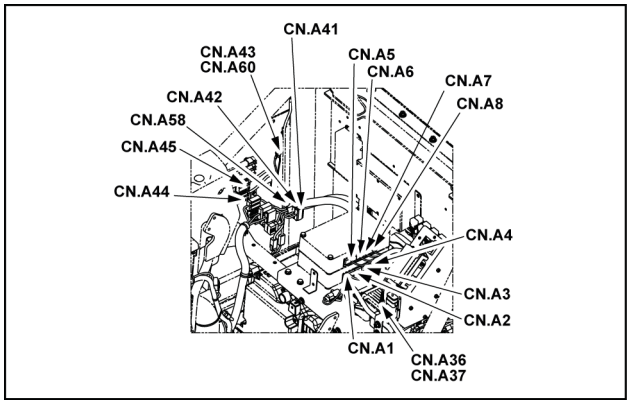
CONNECTOR CN.E20 (Male)



SMIL16CEX0420AA 66

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D8-F-P-1	374A		R-1.25	**SHEET 07**
2	SP-378A-P-X	378A		BW-125	
5	CN.D8-F-P-5	375A		L-1.25	
6	CN.D8-F-P-6	379A		WB-1.25	
9	CN.D8-F-P-9	383A		G-1.25	

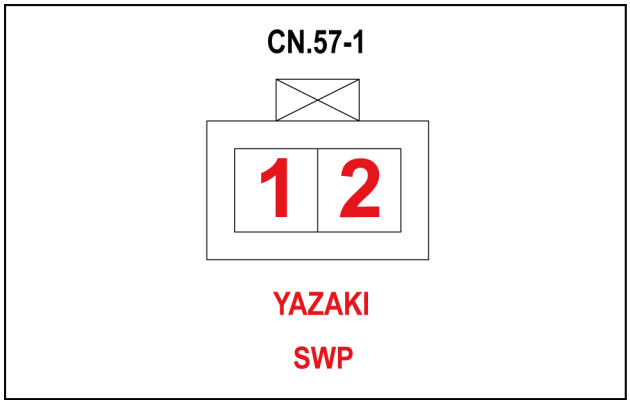
CONNECTOR CN.A43 - GROUND (Male)



SMIL15CEX3855AA 7

Pin	From	Wire	Description	Color-Size	Frame
M8	CN.A24-M-P-10	740		B-1.25	**SHEET 28**

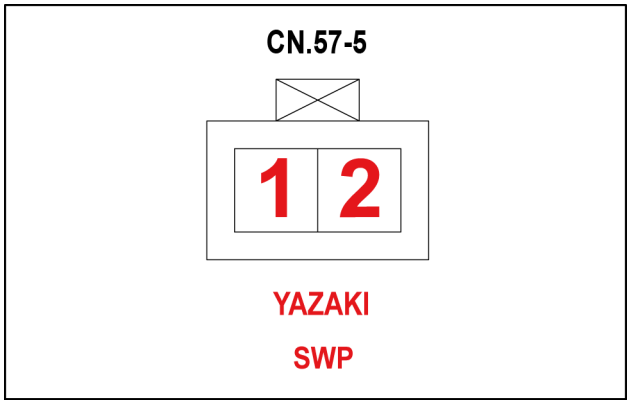
CONNECTOR CN.57-1B - OPTION SELECT SOLENOID VALVE (Male)



SMIL15CEX4164AA 6

Pin	From	Wire	Description	Color-Size	Frame
1	SP-260F-P-X	260M		WL-0.75	**SHEET 44**
2	CN.A57B-M-P-2	806E		LY-0.75	

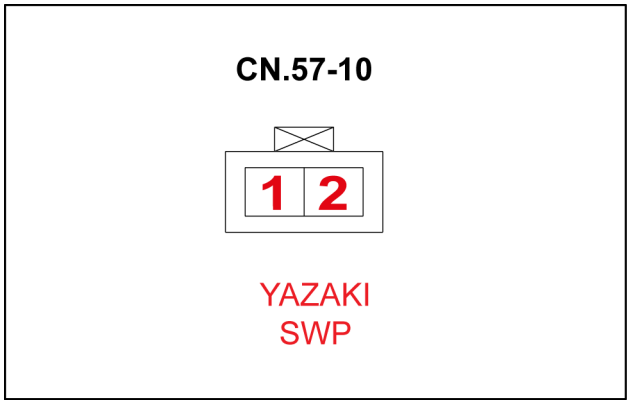
CONNECTOR CN.57-5B - PRESSURE SWITCH (OPTION 1 LEVER UP) (Male)



SMIL16CEX0249AA 36

Pin	From	Wire	Description	Color-Size	Frame
1	SP-640G-P-X	640W		BG-0.75	**SHEET 46**
2	CN.A57D-M-P-4	534M		VY-0.75	

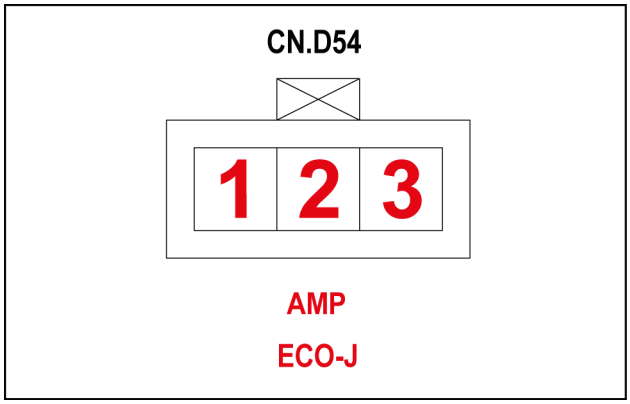
CONNECTOR CN.57-10B - PRESSURE SWITCH (OPTION 2 LEVER DOWN) (Male)



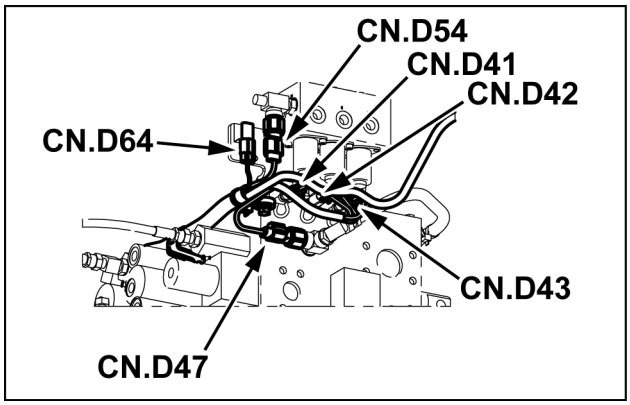
SMIL16CEX1447AA 66

Pin	From	Wire	Description	Color-Size	Frame
1	SP-640H-P-X	640AB		BG-0.85	**SHEET 46**
2	SP-535B-P-X	535Q		GY-0.85	

CONNECTOR CN.D54 - PRESSURE SENSOR (PILOT ARM CLOSE) (Male)



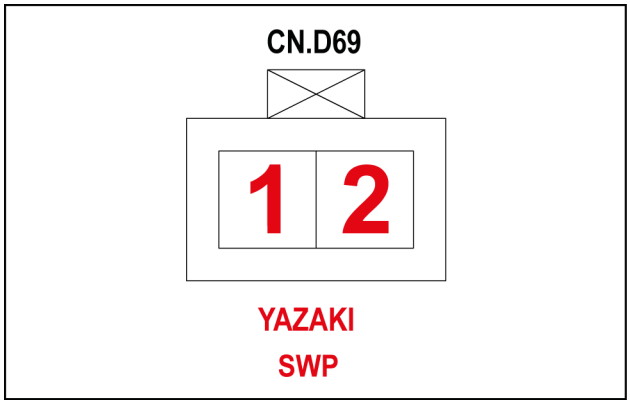
SMIL15CEX3986AA 108



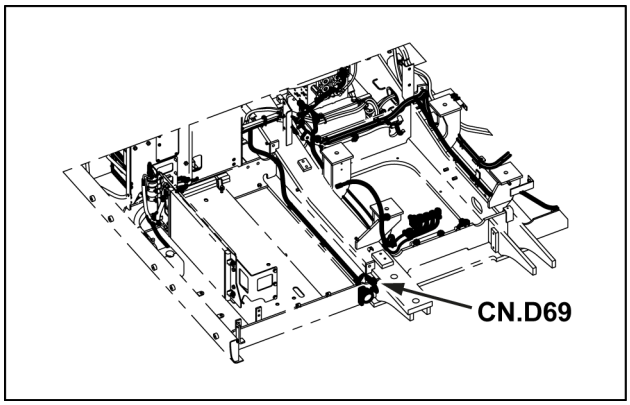
SMIL15CEX7255AA 109

Pin	From	Wire	Description	Color-Size	Frame
1	SP-430A-P-X	430B		WL-0.85	**SHEET 14**
2	CN.A54-M-P-14	445A		VG-0.85	**SHEET 23**
3	SP-450A-P-X	450B		BL-0.85	**SHEET 14**

CONNECTOR CN.D69 - TRAVEL ALARM (Male)



SMIL15CEX3999AA 33



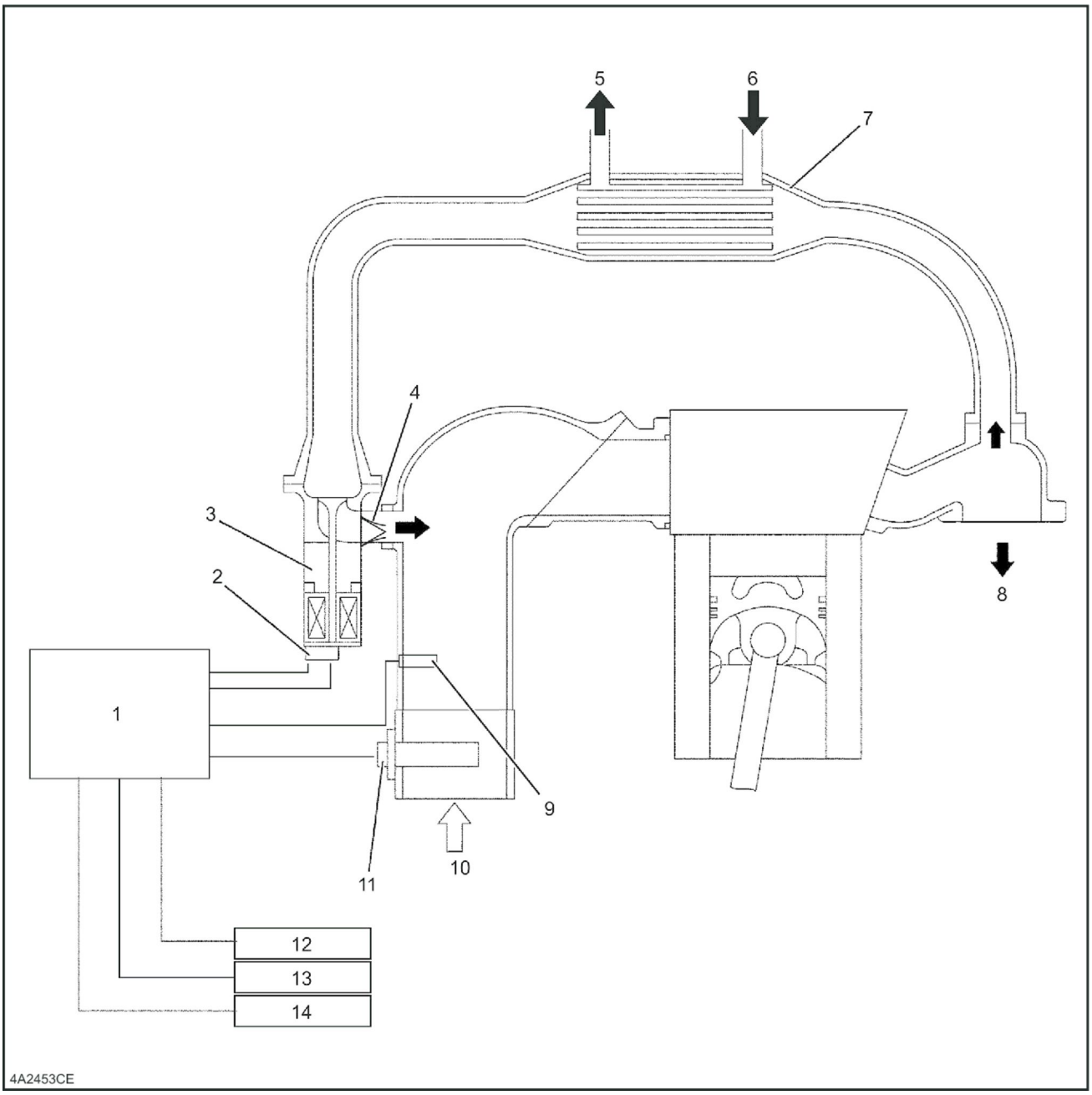
SMIL15CEX7279AA 34

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A55-M-P-8	807A		WL-0.85	**SHEET 20**
2	CN.A51-M-P-2	215B		GW-0.85	**SHEET 03**

CONNECTOR CN.D94 - BATTERY (Male)

Pin	From	Wire	Description	Color-Size	Frame
M10	CN.D95-P-M10	100		R-60.0	**SHEET 01**

EGR system schematic diagram



4A2453CE 8

1. ECM
2. EGR position sensor
3. EGR valve
4. Reed valve*
5. Coolant outlet
6. Coolant inlet
7. EGR cooler
8. Exhaust gas
9. Boost pressure/boost temperature sensor
10. Intake air
11. Intake air temperature sensor
12. Engine speed
13. Coolant temperature sensor
14. Barometric pressure sensor

NOTE: ** The machines from some manufacturers do not have this installed.*

EGR and turbine noise

Some engines generate a high-frequency noise that is dependent on the turbine speed. This high-frequency noise can be silenced by mounting an appropriate silencer. This high-frequency noise tends to become smaller during EGR control and to return to its original noise level while EGR control is stopped.

Engine speed/RPM sensor - Remove

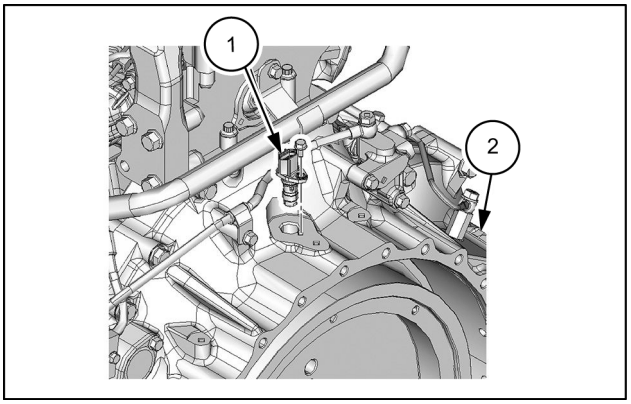
Battery ground cable disconnect

1. Disengage the battery ground cable from the battery.

Crankshaft position sensor removal

2. Disconnect the harness connector from the crankshaft position sensor **(1)** .
3. Remove the crankshaft position sensor **(1)** from the flywheel housing **(2)** .

NOTICE: *Be careful not to subject the sensor to shock.*



SMIL15CEX6565AB 1

Engine starter - Dynamic description

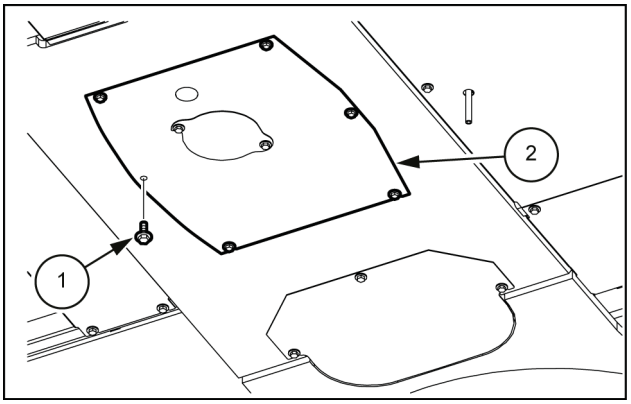
The starter is a magnetic-shift-type, outer gearing mesh method reduction starter.

When the key switch is turned ON, the plunger is attracted, the magnetic switch contacts close, and the armature rotates. At the same time, the pinion is pushed forward via the shift lever to mesh with the ring gear, and the ring gear rotates to rotate the crankshaft and start the engine. When the engine starts and the starter switch is turned OFF, the plunger returns and the pinion separates from the ring gear. Then the armature stops rotating. Partway through this, if the engine speed becomes faster than the pinion, the pinion attempts to turn in reverse. However, the action of the one-way clutch makes the pinion idle and keeps the armature from being driven.

Engine starter - Remove

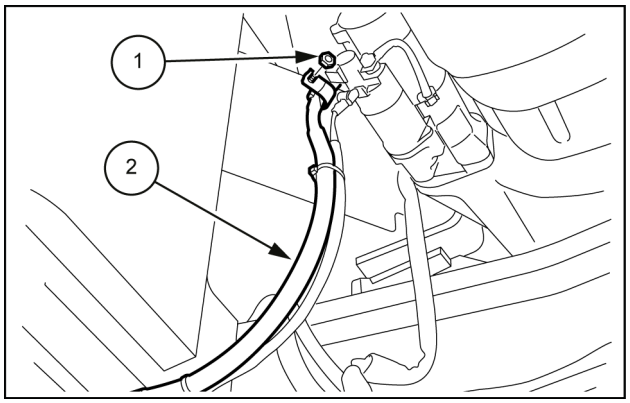
1. Turn OFF the battery disconnect switch or disconnect the negative terminal of the battery.
   - After disconnecting terminals or harnesses, fasten them so that they do not interfere with the frame. Also, cover with a rubber cap to protect against sparks.
2. Use a wrench [**19 mm**] to remove the 6 bolts **(1)**, and then remove the under cover **(2)**.

   Tightening torque for bolt installation: **63.7 - 73.5 N·m** (**46.983 - 54.211 lb ft**)



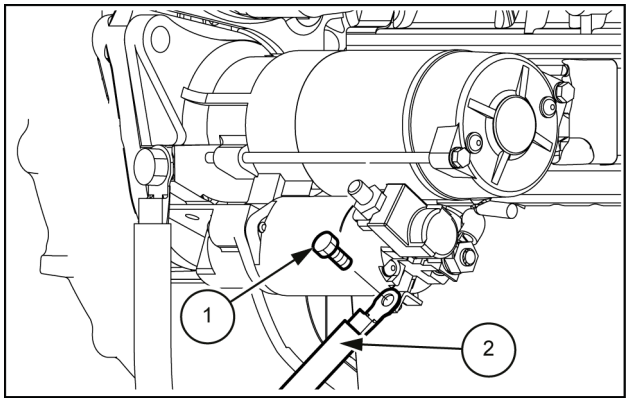
SMIL15CEX5646AB 1

3. Use a wrench [**8 mm**] to remove the nut **(1)**, and then remove the wiring **(2)**.



SMIL15CEX5647AB 2

4. Use a wrench [**8 mm**] to remove the bolt **(1)**, and then remove the wiring **(2)**.



SMIL15CEX5648AB 3

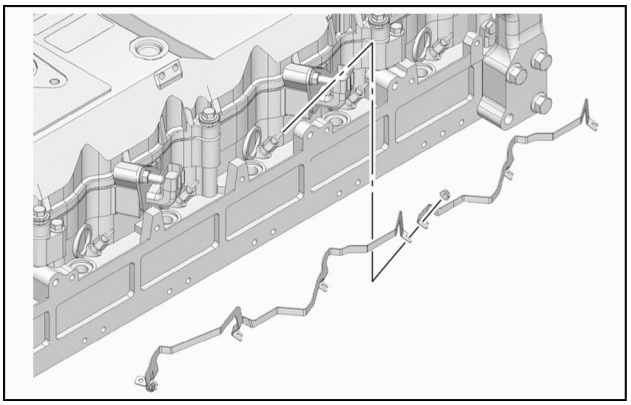
Glow plug system - Remove

Disconnecting the battery ground cable

1. Disconnect the battery ground cable from the battery.

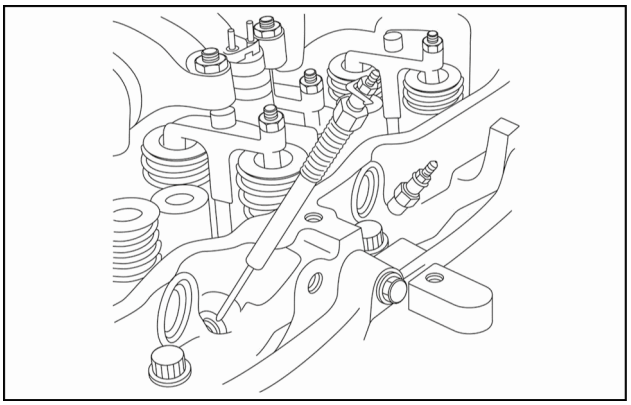
Removing the glow plug

1. Remove the glow plug connector from the glow plug.



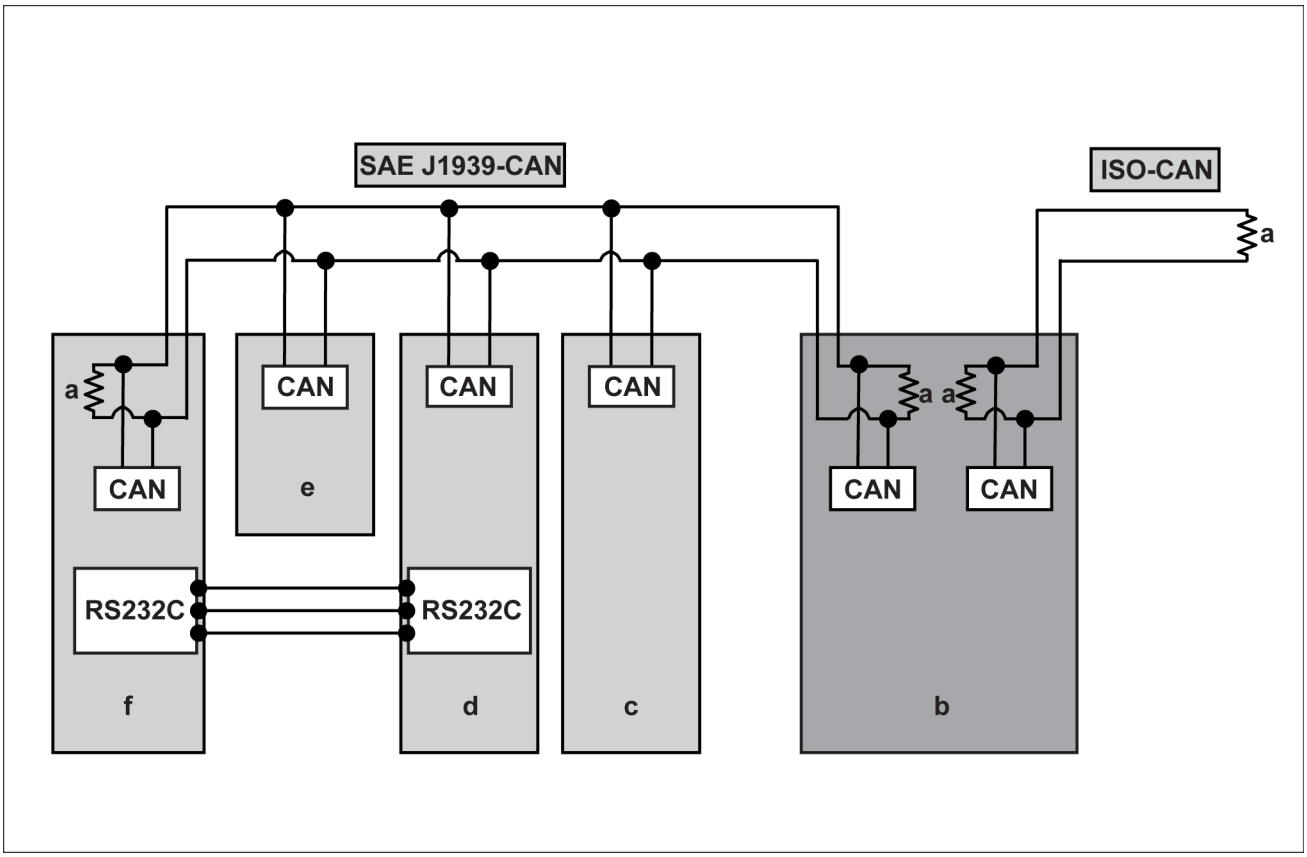
SMIL14CEX2997AA 1

2. Remove the glow plug from the cylinder head assembly.



SMIL14CEX2998AA 2

Electrical component connection



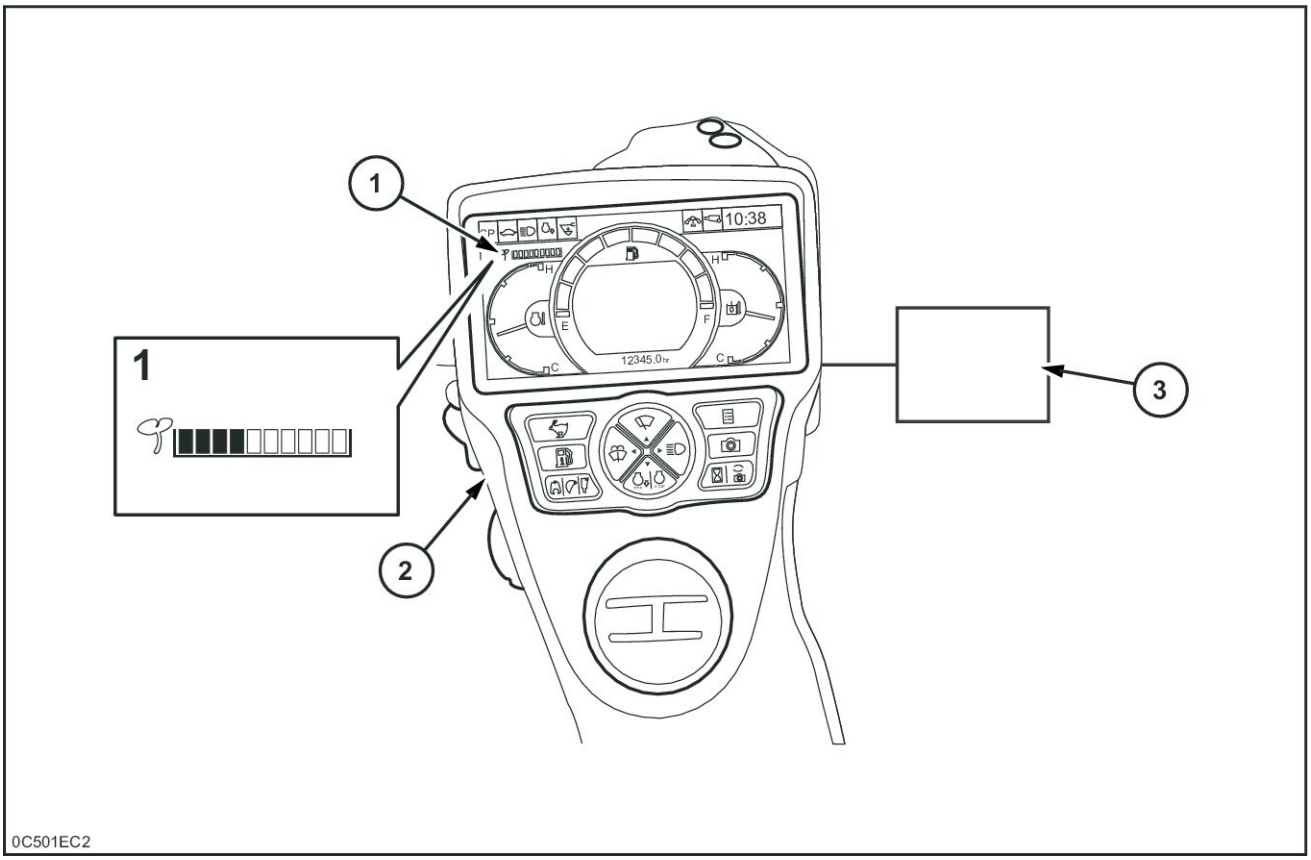
SMIL15CEX1693FA 2

a. Terminator
b. ECM
c. Computer A
d. Computer B
e. AC computer
f. Monitor

Instrument cluster - Dynamic description - ECO gauge

Purpose

Displays on the monitor whether energy-saving operation is being performed. (Eco function)



0C501EC2 1

1. ECO gauge
2. Monitor
3. Computer A

Operation explanation

1. The ECO gauge is displayed on the monitor.
2. The ECO-saving performance is judged in levels from 0 to 9. (The higher the number, the better the ECO performance).
   In SP mode, 0 to 9.
   In H mode, 2 to 9.
   In A mode, 4 to 9.
3. Leaving it idle for **3 min**. or more makes the gauge drop.

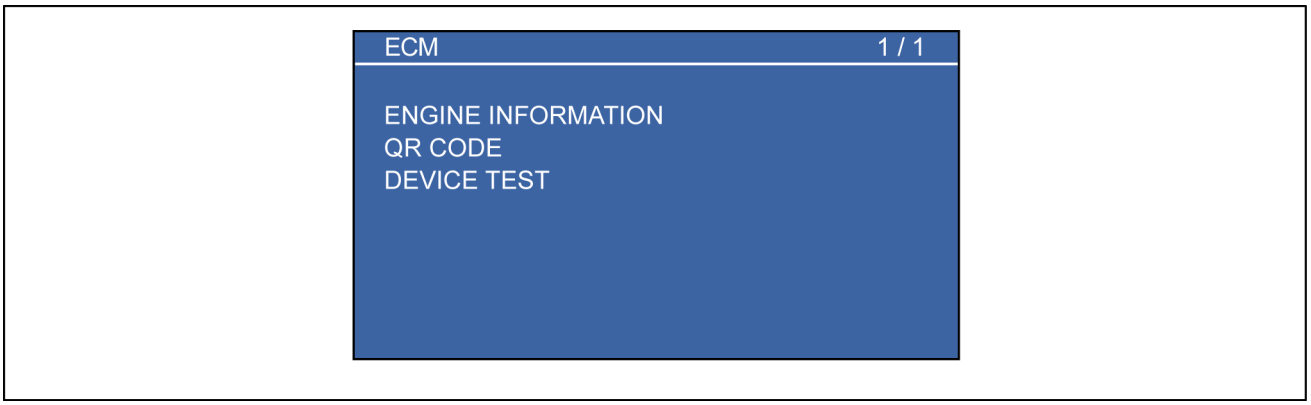
D-IN3 (Cam. Sel.)	-
D-IN4 (Door)	Door limit switch
D-IN5 (O-T Wiper)	One time wiper switch
D-IN6 (Spare1)	-
D-IN7 (Spare2)	-
D-IN8 (B.Charge)	-

* Monitor input voltage is displayed in A/D-IN.

When you press the switch and "ON" is highlighted, that means the switch is operating normally.

Press the menu switch for **3 s** to close the SWITCH CHECK screen.

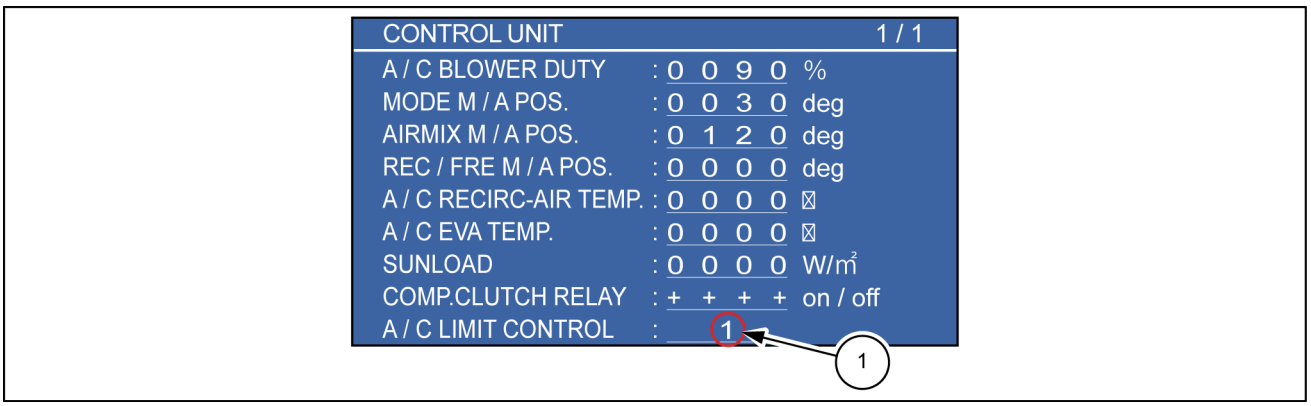
ECM



SMIL14CEX0543EA 12

ENGINE INFORMATION	Moves to the engine information screen. Refer to "Engine Information".
QR CODE	Moves to the QR code information screen. Refer to "QR (injector) Code".
DEVICE TEST	Moves to the device test screen. Refer to "Device Test".

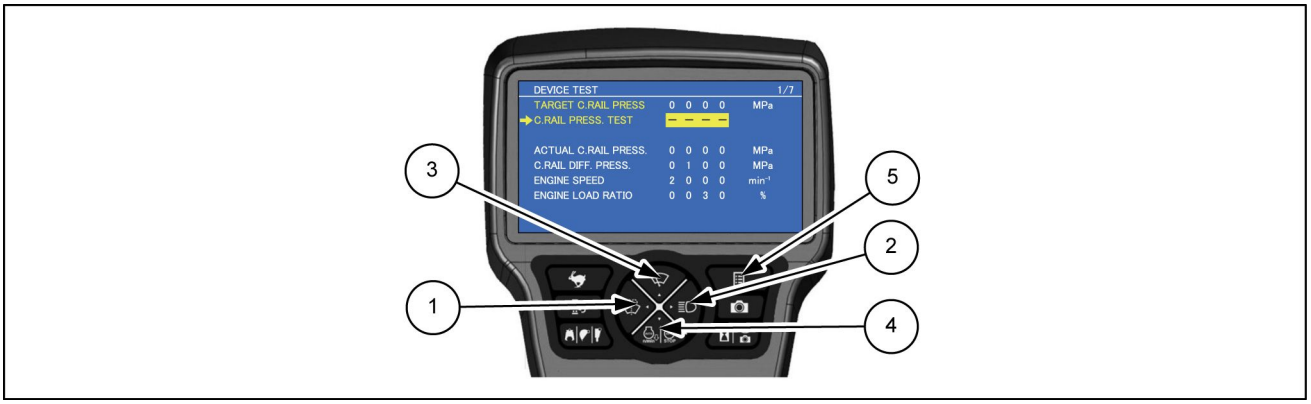
Air-conditioner



SMIL14CEX0544EB 13

1	1	No control
	2	Cold blast prevention during heating (no wind)
	3	Cold blast prevention during heating (weak wind)
	4	Door open restriction

A/C BLOWER DUTY	%	AC blow
MODE M/A POS.	deg	Mode motor actuator position
AIRMIX M/A POS.	deg	Air mix motor actuator position



SMIL14CEX0519EB 13

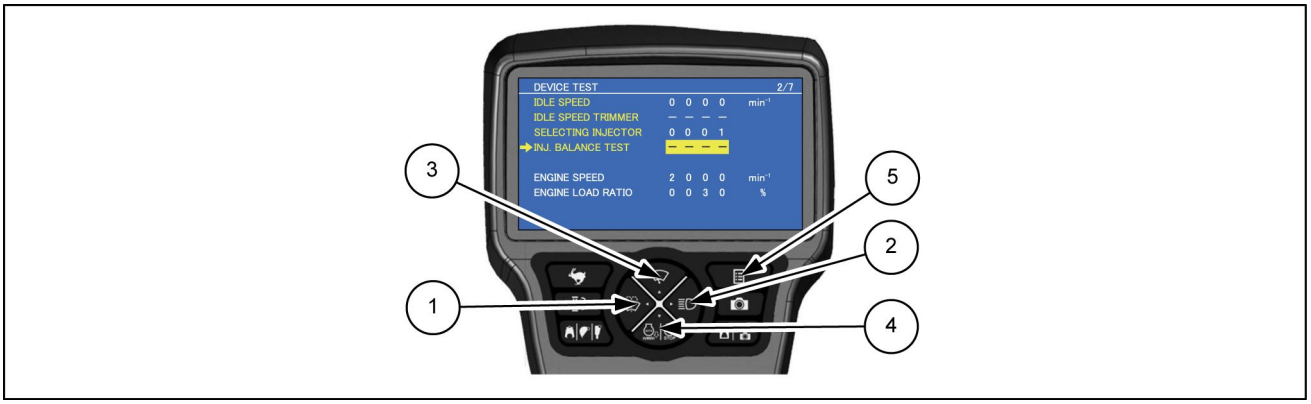
Procedure

Condition for the test
The engine is running.

1. Setting target common rail pressure
   Select “TARGET C.RAIL PRESS” (target common rail pressure) with switches **(3)** and **(4)**.
   Press switches **(1)** and **(2)** to set the target test pressure.
   Available set range: **40.0 - 80.0 MPa** (**5802.0 - 11604.0 psi**).
2. Test execution
   Select “C.RAIL PRESS. TEST” (common rail pressure test) with switches **(3)** and **(4)**.
   Hold down switch **(2)** for **2 s**., then “- - - -” changes to “+ + + +” and the test starts.
   The test will be continued for **10 s**.
3. Test finish
   After **10 s**, the engine automatically returns to normal state and start.

Injector balance test

Purpose: To check the injector status by stopping one injector when the engine speed is low.



SMIL14CEX0520EB 14

Procedure

Condition for the test
The engine is running.

1. Setting the engine speed to low idle and stopping the injector
   Select “IDLE SPEED” (idling speed) with switches **(3)** and **(4)**.
   Press switches **(1)** and **(2)** to set the engine speed to low idle.
   Available set range: **-500 - +500 RPM**
   Select “SELECTING INGECTOR” (injector select) with switches **(3)** and **(4)**.
   Press switches **(1)** and **(2)** to set the injector number to stop.
2. Test execution

Air conditioner troubleshooting

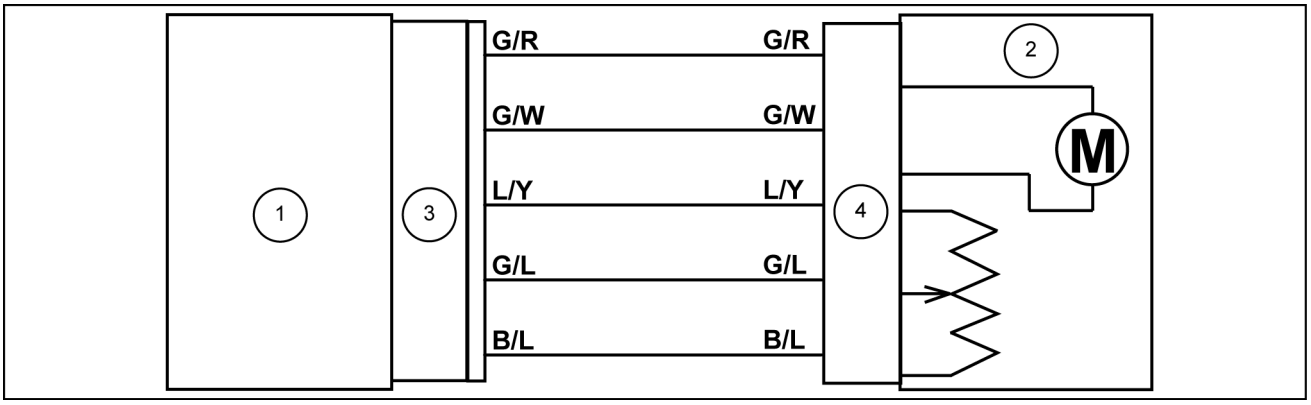
The blow temperature does not go down.

* M/A means motor actuator.

Step	Action	Standard value	Yes	No
1	When the AUTO switch or AC switch is pressed, HL. E is displayed in the panel set temperature display section		• The air mix motor actuator connector is disconnected or has a contact defect. • Air mix motor actuator defect • Main harness continuity defect Inspect and repair or replace part	Go to Step 2
2	HL. * is displayed on the panel set temperature display section. * is No. 0 to 9		Go to Step 3	Go to Step 4
3	The panel snow mark flashes		• Inside air sensor and evaporator sensor simultaneous disconnection or short • Computer breakdown See the Monitor Mode section too	• Inside air sensor or harness disconnection or short • The inside air sensor connector is disconnected or has a contact defect See the Monitor Mode section too. Inspect and repair or replace part
4	The panel snow mark flashes		• The evaporator sensor connector is disconnected or there is a contact defect • Evaporator sensor simultaneous disconnection or short See the Monitor Mode section too. Inspect and repair or replace part	Go to Step 5
5	When the set temperature is 18.0 and the blow mode is set to vent mode, the blow temperature drops	**18.0 °C** (**64.4 °F**)	Go to Step 6	Go to Step 7
6	Cool air is flowing into the inside air sensor section		Inspect the duct or eliminate the cause of the cool air infiltration	Computer breakdown or inside air sensor defect Inspect and replace
7	The air mix damper is at the COOLMAX position		Switch compressor clutch ON/OFF and inspect and repair the power supply circuit. See the cooling cycle troubleshooting	Go to Step 8
8	If motor actuator operation stops midway, remove the cause or correct the problem, and then measure the operating force. Is it **1.5 kgf** or less?	**1.5 kgf** or less	Motor actuator breakdown or controller breakdown Replace	• Inspect, repair, or replace the motor actuator lever link section. • Clean the lever link section, and then apply grease

Heating, Ventilation, and Air-Conditioning (HVAC) control system - Inspect

Air mix motor actuator inspection



SMIL14CEX1950EB 1

1.	Control panel	3.	Connector 1
2.	Air mix motor actuator	4.	Connector 9

Step	Action	Standard value	Yes	No
1	Press the temperature setting switches and set to COOLMAX **18 °C** (**64.4 °F**) Does the actuator operate at all?		Go to Step 2	Go to Step 3
2	Is an error displayed?		Go to Step 6	Damper lock or link defect
3	Press the temperature setting switches and set to HOTMAX **32 °C** (**89.6 °F**)Does the actuator operate at all?		Go to Step 2	Go to Step 4
4	Is an error displayed?		Go to Step 5	Control panel defect
5	Is there continuity in harness between the actuator and control panel?		Actuator defect or damper lock or link defect	Harness defect
6	Remove the actuator connector **(9)**.Is the resistance between L/Y and B/L of the actuator about **4.7 kΩ**?	About **4.7 kΩ**	Go to Step 7	Actuator defect
7	Is there continuity between the G/L and L/Y and between G/L and B/L of the actuator?		Control panel defect	Actuator defect

Set temperature	Air mix motor actuator position
COOLMAX **18 °C** (**64.4 °F**)	**0 °**
HOTMAX **32 °C** (**89.6 °F**)	**90 °**

Contents

Electrical systems - 55

Wiper and washer system - 518

Warning indicators, alarms, and instruments - Inspect - Scan tool power circuit system

Description of function

The Electronic Control Module (ECM) and other Electronic Control Unit (ECU) communicate with the trouble diagnosis scan tool via the Data Link Connector (DLC).

The power voltage of the trouble diagnosis scan tool is supplied by the battery or AC power.

NOTICE: *Draw power for the trouble diagnosis scan tool from the battery or AC power.*
The power supply voltage is the same as the battery voltage of the actual unit.

Inspection

Inspection when the trouble diagnosis scan tool does not power on.

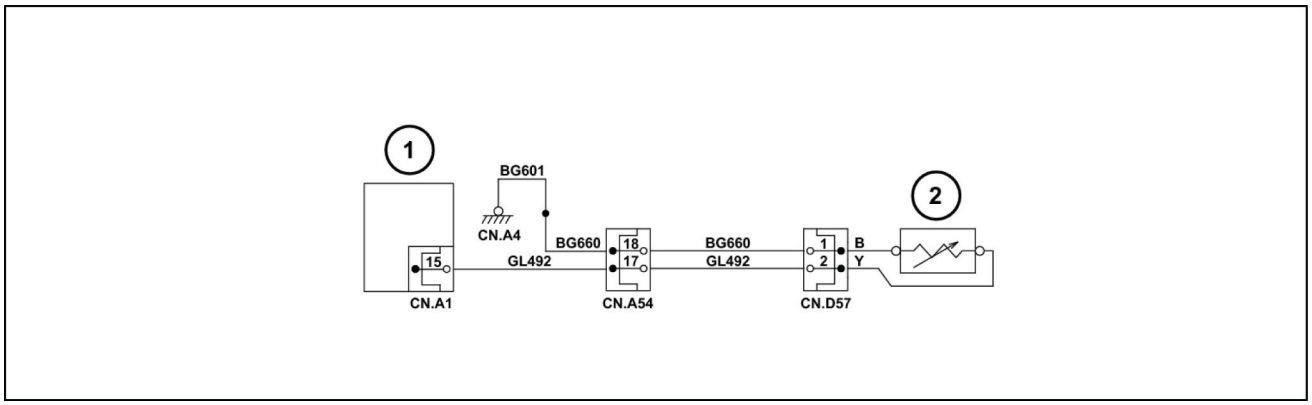
1. Inspect the battery voltage of the actual unit using the Digital Multi-Meter (DMM).
   Standard value: **18 V**
2. Charge or replace the battery if it is below the standard value.
3. Check that the battery cable of the trouble diagnosis scan tool does not have a defective connection.
4. Repair the connection if a problem is discovered.
5. Check that the battery cable of the trouble diagnosis scan tool does not have an open or short circuit.
6. Request repair of the battery cable if a problem is discovered.

7040-Fuel level sensor signal abnormality

Control Module : MCM

Solution:

1. Use the below image for the fault code resolution process:



LPIL12CX00892EB 1

1. Computer A
2. Fuel level sensor

Float position and resistance

Float position	Full	Half	Empty
Resistance (Ω)	10 (Tolerance 0 - 4)	38	80 (Tolerance 0 - 10)

* Temperature conditions: **5 - 35 °C** (**41 - 95 °F**)

Turn ON the key switch.

Inspect the connection status of each connector and ground. Make sure that all the connectors are secured.

A. If diagnostic trouble code 7040 is displayed, proceed to Step **2**.

2. Check the fuel level sensor **(2)** resistance on the service support screen.

A. If the resistance is more than or equal to **100 Ω**, proceed to Step **3**

B. If the resistance is equal or lesser than **2 Ω**, proceed to Step **6**.

3. Turn OFF the key switch and disconnect the fuel level sensor connector **CN.D57**.

Measure the resistance between the terminal 1 and terminal 2 of the fuel level sensor connector **CN.D57** sensor side (see the float position and resistance table).

A. If the resistance is not a standard value, replace the fuel level sensor **(2)**.

B. If the resistance is within standard value, proceed to Step **4**.

4. Inspect for continuity between the ground and terminal 1 of the fuel level sensor connector **CN.D57** harness side.

A. If there is no continuity, find and repair or replace the open circuit on the wire ID BG660 or BG601.

B. If there is continuity, proceed to Step **5**.

5. Turn ON the key switch.

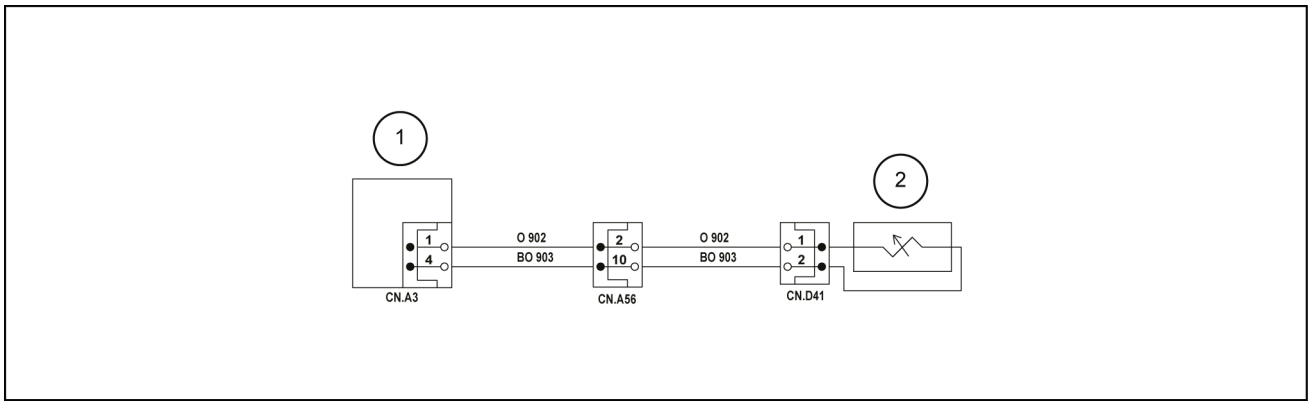
Measure the voltage between the ground and terminal 2 of the fuel level sensor connector **CN.D57** harness side.

7247-Boom-down proportional valve signal abnormality

Control Module : MCM

Solution:

1. Use the below image for the fault code resolution process:



SMIL15CEX3286EB 1

1. Computer A
2. Boom down electromagnetic proportional valve

Turn ON the key switch.

Inspect the connection status of each connector. Make sure that all the connectors are secured.

A. If Diagnostic Trouble Code 7247 is displayed, proceed to Step **2**.

2. Reset the diagnostic trouble code on the service support DIAG screen.

A. If Diagnostic Trouble Code 7247 is not displayed, proceed to Step **4**.

B. If Diagnostic Trouble Code 7247 is displayed, proceed to Step **3**.

3. Turn OFF the key switch and disconnect the boom-down proportional solenoid connector **CN.D41**.

Inspect for continuity between the ground and terminal 1 of the boom-down proportional solenoid connector **CN.D41** harness side.

A. If there is no continuity, replace computer A **(1)**.

B. If there is continuity, find and replace the wire ID O902.

4. Turn OFF the key switch.

Inspect for continuity between the terminals 1 and 2 of the boom-down proportional solenoid connector **CN.D41** solenoid side.

A. If there is no continuity, replace boom-down proportional solenoid **(2)**.

B. If there is continuity, proceed to Step **5**.

5. Disconnect the cab main harness connector **CN.A56**.

Inspect for continuity between the terminal 1 of the boom-down proportional solenoid connector **CN.D41** female side and terminal 2 of the cab main harness connector **CN.A56** female side.

A. If there is no continuity, find and repair and replace the open circuit on the wire ID O902 between cab main harness connector **CN.A56** and boom-down proportional solenoid connector **CN.D41**.

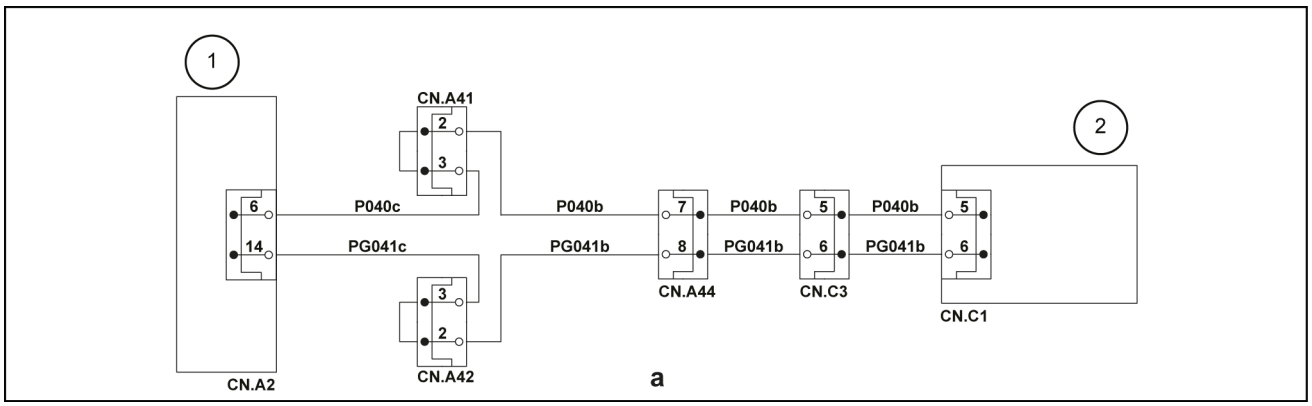
B. If there is continuity, proceed to Step **6**.

7613-Monitor communication CAN abnormality

Control Module : MCM

Solution:

1. Use the below image for the fault code resolution process:



SMIL15CEX3300EB 1

1. Computer A
2. Monitor

a. CAN communication

2. Turn ON the key switch.

   Inspect the connection status of each connector. Make sure that all the connectors are secured.

   A. If Diagnostic Trouble Code 7613 is displayed, inspect the connection status of computer A **(1)**.

   B. If Diagnostic Trouble Code 7613 is not displayed, proceed to Step **3**.

3. Turn OFF the key switch.

   Disconnect the computer A connector **CN.A2** and the monitor display connector **CN.C1**.

   Inspect for continuity between terminal 6 of the computer A connector **CN.A2** harness side and terminal 5 of the monitor display connector **CN.C1** harness side

   A. If there is no continuity, find and repair or replace the open circuit on the wire ID P040.

   B. If there is continuity, proceed to Step **4**.

4. Inspect for continuity between terminal 14 of the computer A connector **CN.A2** harness side and terminal 6 of the monitor display connector **CN.C1** harness side.

   A. If there is no continuity, find and repair or replace the open circuit on the wire ID PG041.

   B. If there is continuity, proceed to Step **5**.

5. Turn ON the key switch.

   A. If Diagnostic Trouble Code 7613 is displayed, replace the monitor **(2)**.

Wiring harnesses - Electrical schematic sheet 21 (55.100) Wiring harnesses - Electrical schematic sheet 25 (55.100)

A. If a problem is found, repair the control circuit.

B. If there are no problems, proceed to Step **7**.

7. Disconnect the harness connector **CN.D1-02** from the ECM.

   Inspect the ECM harness connector **CN.D1-02** for a poor connection.

   A. If a problem is found, repair the harness connector **CN.D1-02**.

   B. If the harness connector **CN.D1-02** is normal, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)**" and " **Engine Control Unit (ECU) - Install (55.015)**").
   Set the injector ID code and the engine serial number on the ECM.

8. Confirm resolution:

   1. Display RESET on the service support screen on the monitor and reset FAULTY HISTORY. See "Service Support - RESET Screen List".

   NOTE: *All the generated Diagnostic Trouble Codes will be cleared.*

   2. Turn OFF the starter switch and keep it OFF for **1 min** or longer.

   3. Start the engine.

   4. Perform a test-run under the conditions for running the Diagnostic Trouble Code.

   5. Display FAULTY HISTORY on the service support screen on the monitor and check that no Diagnostic Trouble Code has been detected. See "Service Support - FAULTY HISTORY".
   Conditions for setting the Diagnostic Trouble Codes such as engine run time or coolant temperature, etc., vary depending on the Diagnostic Trouble Codes.

Wiring harnesses - Electrical schematic sheet 08 (55.100)

P0409-Exhaust gas recirculation 1 sensor circuit

Control Module : ECM

Solution:

1. Check the trouble code setting conditions before you proceed with the diagnostics code P0409.
   - Diagnostic trouble codes P060B and P0651 are not detected.
   - The ECM detects that the signal from the EGR valve position sensor is fixed to low or high status for **5 s** or longer.
2. Check and diagnose the below fault codes before you proceed with the diagnostics code P0409.

   Diagnostic trouble code P1655
3. Turn OFF the starter switch.

   Disconnect the harness connector **CN.E3** from the EGR valve.

   Turn ON the starter switch.

   Check if any of the EGR position 1, EGR position 2 and EGR position 3 data displays shows ON with the trouble diagnosis scan tool.

   If there is a data display showing ON, inspect the signal circuit between the ECM and EGR valve of the EGR showing ON.

   Make sure that there is no short circuit to the battery or the ignition power supply.

   Make sure that there is no short circuit to the **5 V** power supply circuit.

   A. If a problem is found, repair the signal circuit.

   B. If there are no problems, proceed to Step **4**.
4. Measure the voltage between the EGR position sensor **5 V** power supply circuit and a normal ground.

   If the reading is equal or lesser than **4.5 V**, inspect to see if there is an open circuit or high resistance with the **5 V** power supply circuit between the ECM and the EGR position sensor.

   NOTE:
   *• The EGR position sensor shares the **5 V** power supply circuit with other sensors.*
   • The Diagnostic Trouble Code set on a sensor which shares this circuit may be detected.

   A. If a problem is found, repair the **5 V** power supply circuit.

   B. If there are no problems, proceed to Step **5**.
5. Measure the voltage between the EGR position sensor **5 V** power supply circuit and the ground circuit.

   If the reading is equal or lesser than **4.5 V**, inspect to see if there is an open circuit or high resistance with the ground circuit between the ECM and EGR position sensor.

   NOTE:
   • The EGR position sensor shares the ground circuit with other sensors.
   • The Diagnostic Trouble Code set on a sensor which shares this circuit may be detected.

   A. If a problem is found, repair the ground circuit.

   B. If there are no problems, proceed to Step **6**.
6. Use a test cable with fuse to short circuit the EGR position sensor 1 signal circuit and the **5 V** power supply circuit momentarily and check the indicated EGR position 1 with the trouble diagnosis scan tool.

A. If a problem is found, repair the fuel system.

B. If there are no problems, proceed to Step **11**.

11. Inspect the fuel tank vent hose.

A. If a problem is found, repair the vent hose.

B. If there are no problems, proceed to Step **12**.

12. Check to see if there is any foreign matter in the fuel tank or any foreign matter which can cause fuel clogging.

A. If a problem is found, repair it.

B. If there are no problems, proceed to Step **13**.

13. Replace the fuel filter element. (Refer to " **Fuel filters - Remove (10.206)**" and " **Fuel filters - Install (10.206)**").

NOTE: *The fuel pipe can be disconnected and clogged with a plug.*

If the negative pressure is less than **17.0 kPa** (**2.5 psi**), pinch the fuel hose at a position as close as possible to the fuel tank, so that the fuel does not flow.

Start the engine and move the idling control switch to the maximum position to increase the speed.

Check the pressure gauge.

NOTE:
• If there is a possibility that the pressure gauge indicates a value that exceeds the standard value, release the fuel.
• This is to check whether any air has mixed in based on the amount of negative pressure with the fuel flow blocked.

Inspect the fuel hose for cuts and cracks if the **27.0 kPa** (**3.9 psi**) negative pressure value cannot be attained.

A. If a problem is found, replace the fuel hose.

B. If there are no problems, proceed to Step **14**.

14. Inspect to see if appropriate clamp is used.

A. If a problem is found, replace with the correct clamp.

B. If there are no problems, proceed to Step **15**.

15. Turn OFF the starter switch.

Inspect the suction control valve harness connector **CN.E13** for a poor connection.

A. If a problem is found, repair the harness connector **CN.E13**.

B. If there are no problems, proceed to Step **16**.

16. Inspect the ECM harness connector **CN.D1-02** for a poor connection.

A. If a problem is found, repair the harness connector **CN.D1-02**.

B. If there are no problems, proceed to Step **17**.

17. Inspect each circuit for high resistance.

A. If a problem is found, repair the circuit.

B. If the suction control valve harness connector **CN.E13** and the ECM harness connector **CN.D1-02** are normal and there is no high resistance in each circuits, replace the fuel supply pump and the fuel filter element and then proceed to Step **18**. (Refer to " **High pressure pump - Remove (10.218)**" and " **High pressure pump - Install (10.218)**"), (Refer to " **Fuel filters - Remove (10.206)**" and " **Fuel filters - Install (10.206)**").

NOTE: *When the fuel supply pump is replaced, the fuel filter element must be replaced at the same time.*

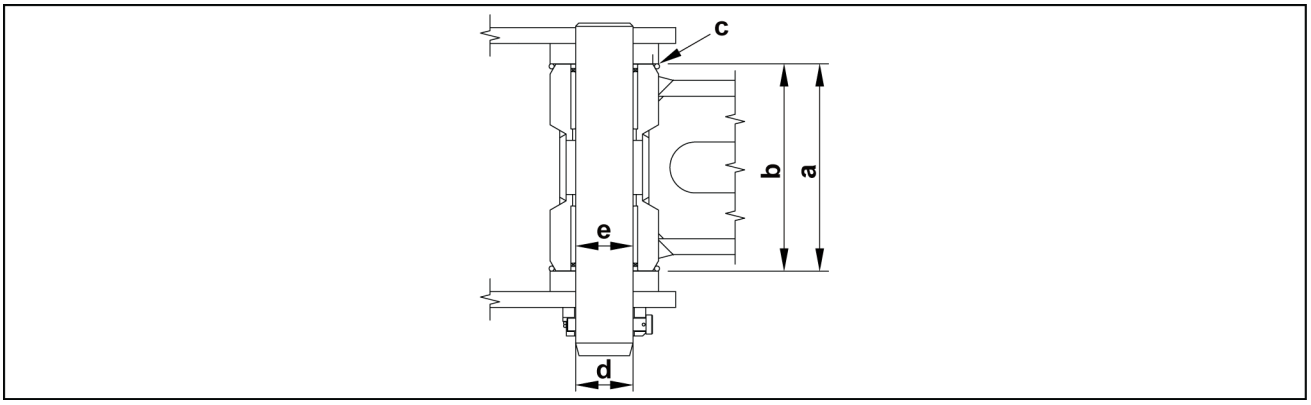
3. Start the engine.

4. Perform a test-run under the conditions for running the Diagnostic Trouble Code.

5. Display FAULTY HISTORY on the service support screen on the monitor and check that no Diagnostic Trouble Code has been detected. See "Service Support - FAULTY HISTORY".
Conditions for setting the Diagnostic Trouble Codes such as engine run time or coolant temperature, etc., vary depending on the Diagnostic Trouble Codes.

Wiring harnesses - Electrical schematic sheet 04 (55.100) Wiring harnesses - Electrical schematic sheet 05 (55.100)

9. Bucket and bucket link installation section



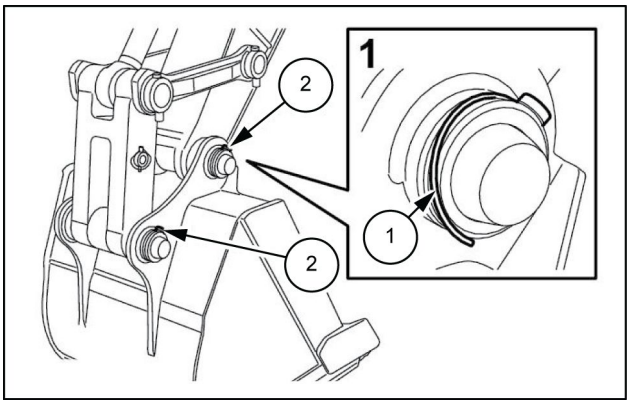
SMIL15CEX5467EA 10

Part name	Code	Standard value	Usage limit	Judgment	Solution
Bucket	a	**326 mm** (**12.835 in**)	**331 mm** (**13.031 in**)	Acceptable/ Unacceptable	Replacement
Bucket link	b	**325 mm** (**12.795 in**)	**323 mm** (**12.717 in**)	Acceptable/ Unacceptable	Replacement
Clearance	c	**1.0 - 3.5 mm** (**0.0 - 0.1 in**)	Shim adjustment	Acceptable/ Unacceptable	Adjustment with shims
Pin	d	**Ø 90 mm** (**3.543 in**)	**Ø 89 mm** (**3.504 in**)	Acceptable/ Unacceptable	Replacement
Bushing (bucket link)	e	**Ø 90 mm** (**3.543 in**)	**Ø 91.5 mm** (**3.602 in**)	Acceptable/ Unacceptable	Replacement

Bucket - Remove

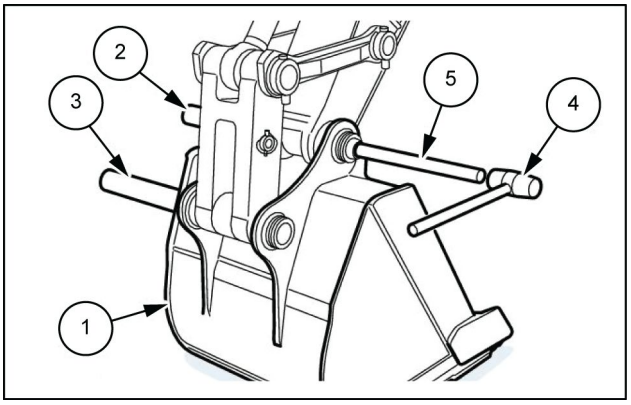
Place the back of the bucket parallel to the ground.

1. Use a screwdriver to remove the pin **(2)** rings **(1)**, and then remove the bucket side and arm side pins.



LPIL12CX02842AB 1

2. Use a hammer **(4)** and striking rod **(5)** to push the bucket side pin **(3)** and arm side pin **(2)** out, and then remove the bucket **(1)**.
   - When removing the pin, be careful not to damage the installed O-rings or dust seals.



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