CX300D
Crawler Excavator

SERVICE MANUAL

Part number 47899899
English
June 2015

CASE
CONSTRUCTION

Engine-related

Engine

Engine model name	Isuzu 6HK1X diesel engine
Engine type	4-cycle, water-cooled, overhead camshaft, vertical in-line, direct injection type (electronics control type)
Number of cylinders - diameter - stroke	6 - Æ**115 mm** (**4.53 in**) - **125 mm** (**4.92 in**)
Total displacement	**7.79 l** (**7.790 US gal**)
Compression ratio	16.5
Rated output	(SAE J 1349, ISO 9249) **154 kW** (**209.38 Hp**) / **1800 RPM** – (ISO 14396) **161 kW** (**218.90 Hp**) / **1800 RPM**
Maximum torque	(SAE J 1349, ISO 9249) **849 N·m** (**626.19 lb ft**) / **1500 RPM** – (ISO 14396) **880 N·m** (**649.05 lb ft**) / **1500 RPM**
Engine dry weight	About **710 kg** (**1565.282 lb**)
Engine dimension	L **1388 mm** (**54.646 in**) - W **1047 mm** (**41.220 in**) - H **1195 mm** (**47.047 in**)
Cooling fan	**850 mm** (**33.465 in**) - suction type - 6 blades resin and steel
	With bell mouth-type fan guide
Pulley ratio	0.8 (reduction)
Charging generator	**24 V 50 A** AC type
Starter motor	**24 V 5 kW** (**6.8 Hp**) reduction type
Coolant capacity	**16 L** (**4.227 US gal**)
Oil pan capacity	Max: **36 L** (**9.510 US gal**) Min: **26 L** (**6.868 US gal**) (excluding remote oil filter)
Direction of rotation	Right (viewed from fan side)
	Compliant with JISD0006-2010

Air cleaner (double element)

Manufacturer		Nippon Donaldson, Ltd.
Element (outer)	Filtering area size	**12.70 m²** (**136.70 ft²**)
Element (inner)	Filtering area size	**1.74 m²** (**18.73 ft²**)
Weight		**13 kg** (**28.660 lb**)

Radiator

Manufacturer		Tokyo Radiator MFG. Co.,Ltd.
Oil cooler	Weight	**34.0 kg** (**74.957 lb**)
	Oil volume	**16.0 L** (**4.227 US gal**)
Radiator	Weight	**21.1 kg** (**46.518 lb**)
	Coolant capacity	**9.4 L** (**2.483 US gal**)
Air cooler	Weight	**18.1 kg** (**39.904 lb**)
	Capacity	-
Fuel cooler	Weight	**1.1 kg** (**2.425 lb**) x 2, dry weight (excluding frame)
	Capacity	**0.44 L** (**0.116 US gal**) x 2
Total weight		**187 kg** (**412.264 lb**)

SCR

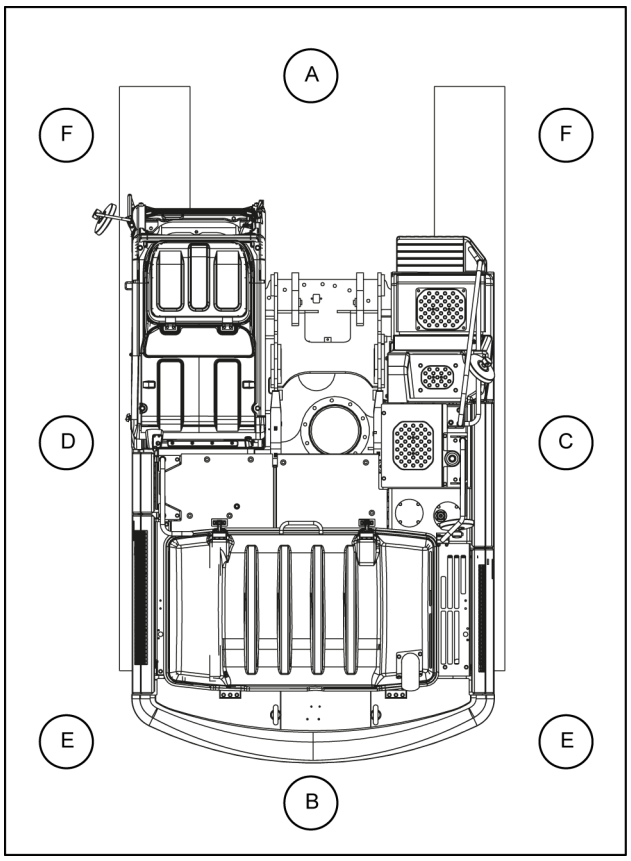
Manufacturer	Tokyo Radiator MFG. Co.,Ltd.
Urea capacity	**138.1 L** (**36.482 US gal**)
Weight	**13.6 kg** (**29.983 lb**)

Product identification - Machine orientation

The terms "Right-hand", "Left-hand", "Front" and "Rear" are used in this manual to indicate the sides as they are seen from the operator's seat when the cab is over the idler wheels.

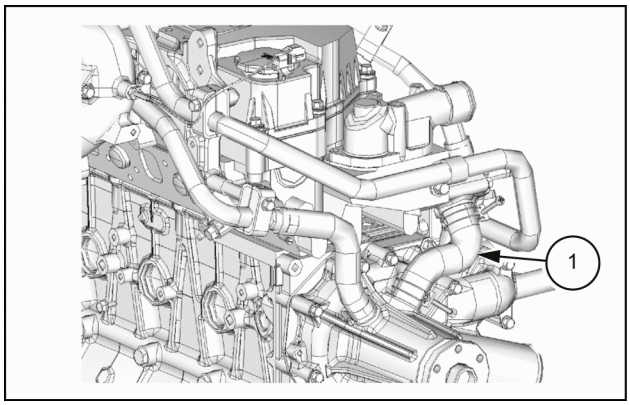
NOTE: *the illustration shows the machine in normal travel position. In normal travel position, the cab is over the idler wheels. The travel reduction gears are at the rear of the upperstructure. This manual uses the terms “right”, “left”, “front” and “rear” to show the side viewed from the operator's seat when the cab is located above the idler wheel.*

A. Front
B. Rear
C. Right side
D. Left side
E. Travel motor
F. Idler wheel



SMIL14CEX1611BB 1

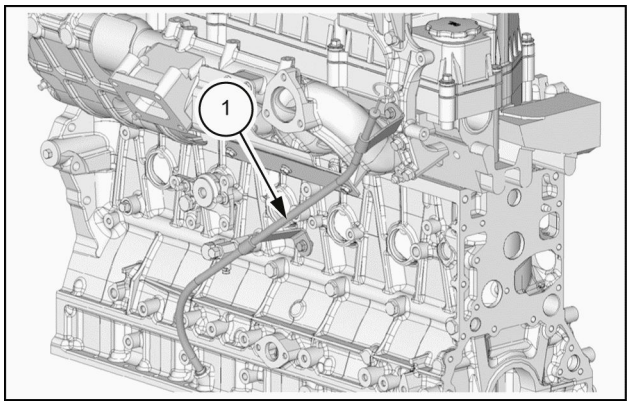
3. Remove the water bypass hose **(1)** from the water pump assembly and the water duct.



SMIL14CEX2991AB 22

Oil level gauge guide tube removal

1. Remove the oil level gauge from the oil level gauge guide tube **(1)**.
2. Disconnect the oil level gauge guide tube **(1)** from the front engine hanger bracket.
3. Remove the oil level gauge guide tube **(1)** from the cylinder block.



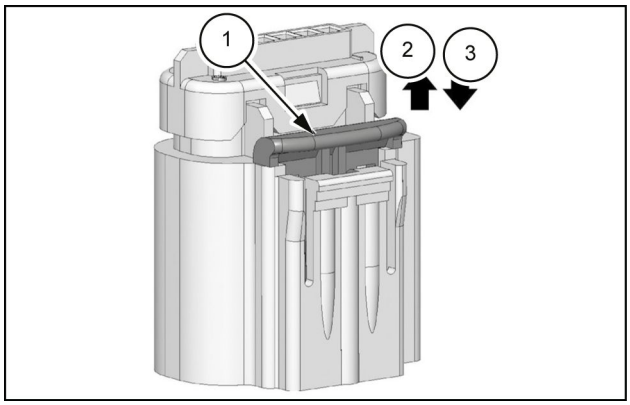
SMIL14CEX2992AB 23

Intake throttle valve removal

1. Remove the air duct from the intake throttle valve.
2. Disconnect the harness connector from the intake throttle valve.

NOTE: *Pull the lock operation portion to release the lock.*

1. Lock operation section
2. Lock release
3. Lock



SMIL14CEX2993AB 24

13. Install the oil pipe **(1)** to the pipe bracket **(2)**and the oil port cover.

    Tightening torque: **34 N·m** (**25 lb ft**)

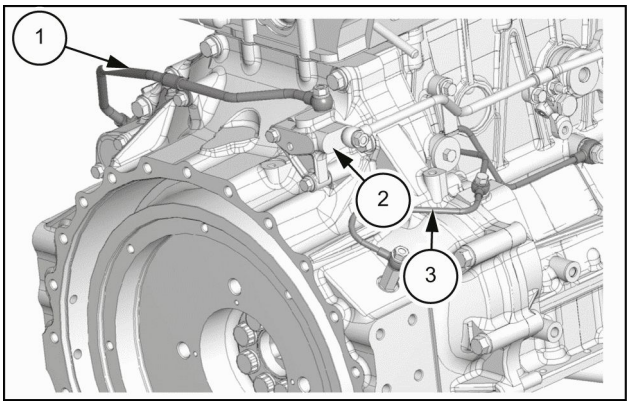
    Pipe bracket side

    Tightening torque: **28 N·m** (**21 lb ft**)

    Oil port cover side

    Tightening torque: **24 N·m** (**18 lb ft**)

    Clip



SMIL14CEX3135AB 34

14. Install the PTO oil pipe **(3)** to the flywheel housing and the cylinder block.

    Tightening torque: **34 N·m** (**25 lb ft**)

    Flywheel housing side

    Tightening torque: **15 N·m** (**11 lb ft**)

    PTO side

    Tightening torque: **41 N·m** (**30 lb ft**)

    Cylinder block side

    Tightening torque: **24 N·m** (**18 lb ft**)

    Clip

10. Install the oil feed pipe to the pipe bracket.

    Tightening torque: **34 N·m** (**25 lb ft**)

    Tightening torque: **24 N·m** (**18 lb ft**)

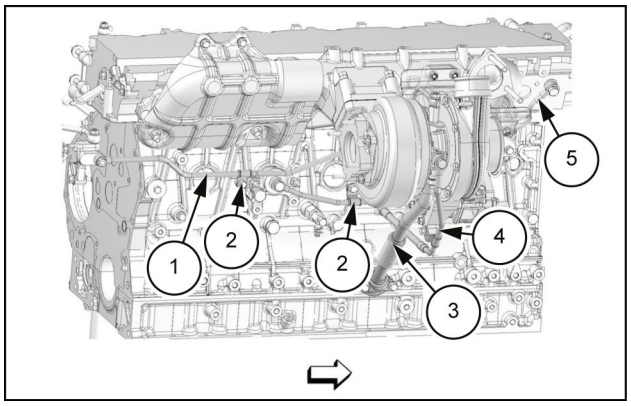
    CAUTION: Use a new gasket.

11. Connect the oil feed pipe to the turbocharger assembly.

    Tightening torque: **34 N·m** (**25 lb ft**)

    Tightening torque: **24 N·m** (**18 lb ft**)

    CAUTION: Use a new gasket.



SMIL14CEX2954AB 111

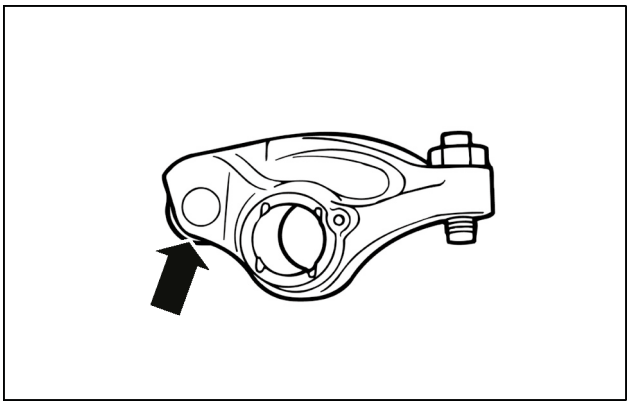
1. Oil feed pipe
2. Clip
3. Oil return pipe
4. Water feed pipe
5. Water return pipe

12. Install the exhaust pipe to the turbocharger assembly.
13. Install the air intake hose to the turbocharger assembly and the intercooler.
14. Install the air cleaner duct to the air cleaner assembly and the turbocharger assembly.

Rocker shaft - Inspect

1. Inspect the rocker arm.

NOTE: *Confirm that the roller surface is not damaged.*



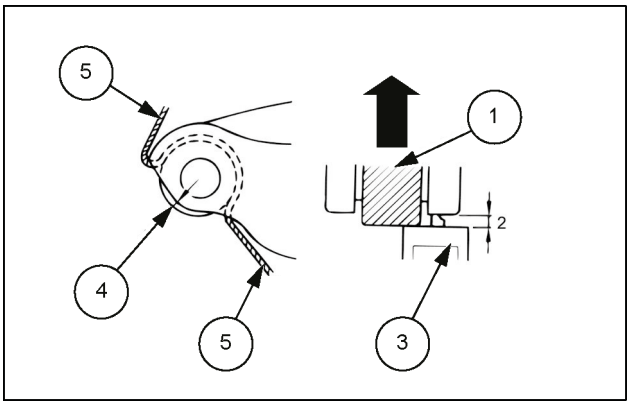
SMIL14CEX3405AA 1

2. Measure the rocker arm using the vernier caliper.

NOTE: *Measure the clearance between the outer diameter of the roller pin and the inner diameter of the roller **(1)**.*

2. Dimension B
3. Calipers
4. Dimension A
5. Direction for pulling the string
6. Direction for pushing the roller

NOTE: *Place a string between the rocker arm and roller to measure dimension A.*



SMIL14CEX3406AB 2

3. Calculate the clearance from the measured value.

NOTE: *Calculate the clearance between the outer diameter of the roller pin and inner diameter of the roller by subtracting dimension B from A.*

Specified value: **0.068 - 0.100 mm** (**0.0027 - 0.0039 in**)

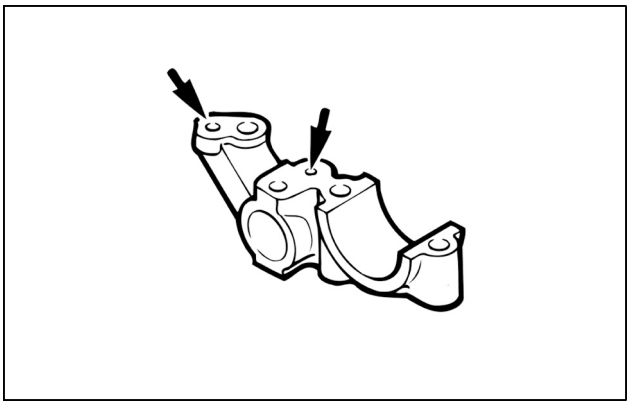
Limit: **0.2 mm** (**0.0079 in**)

⚠ CAUTION: Replace the rocker arm if the clearance exceeds the limit value.

Rocker arm shaft inspection

1. Inspect the camshaft bearing cap.

NOTE: *Inspect the oil hole for clogging.*

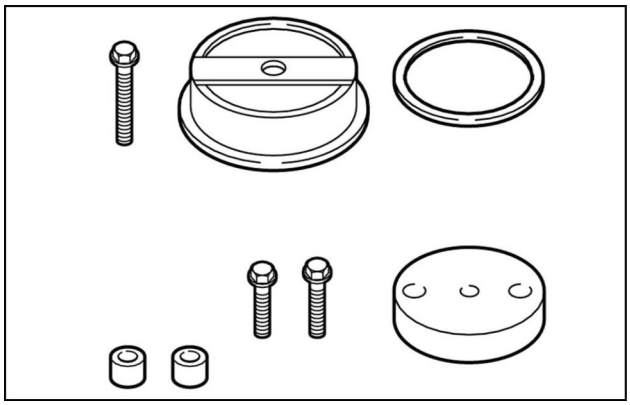


SMIL14CEX3407AA 3

Crankshaft rear oil seal installation

1. Prepare the special tool.

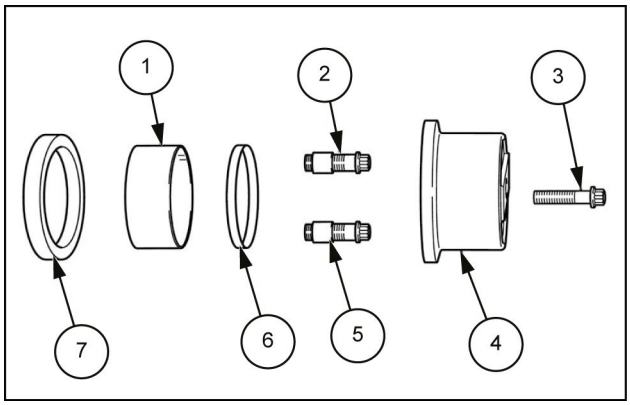
   Special tool: Oil seal installer kit (Refer to **Crankshaft - Special tools (10.103)**)



SMIL14CEX3185AA 14

Name		Part number
1	Adapter	5-8840-2709-0
2	Adapter tightening bolt	5-8840-2714-0
3	Center bolt	5-8840-2713-0
4	Sleeve	5-8840-9063-0
5	Collar	5-8840-2710-0
6	Adapter ring	5-8840-2711-0
7	Crankshaft rear oil seal	-

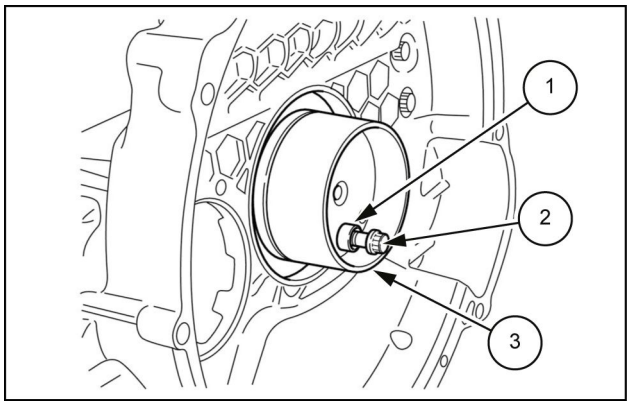
NOTE: *In order to install the crankshaft rear oil seal, use the one(s) in the following table from among the parts included in the kit.*



SMIL14CEX3186AB 15

2. Apply the engine oil to the crankshaft rear oil seal.
   1. Collar
   2. Adapter tightening bolts

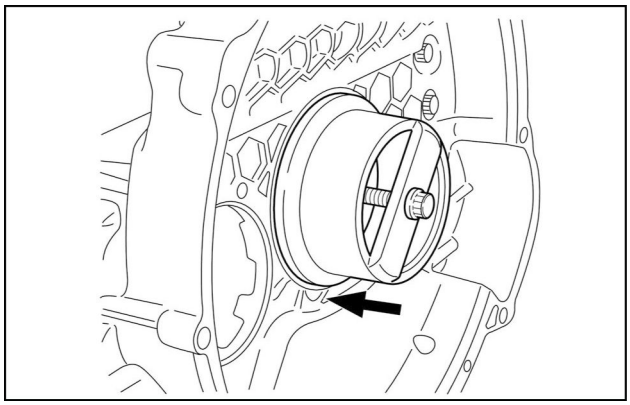
   ⚠ CAUTION: Apply only to the lip section of the oil seal.



SMIL14CEX3187AB 16

3. Install the crankshaft rear oil seal to the adapter.
4. Install the adapter **(3)** to the crankshaft.
5. Install the adapter ring to the sleeve.
6. Install the sleeve to the adapter.
7. Install the center bolt to the sleeve.
8. Tighten the center bolt using the wrench.

NOTE: *Tighten the center bolt until the sleeve touches the adapter.*

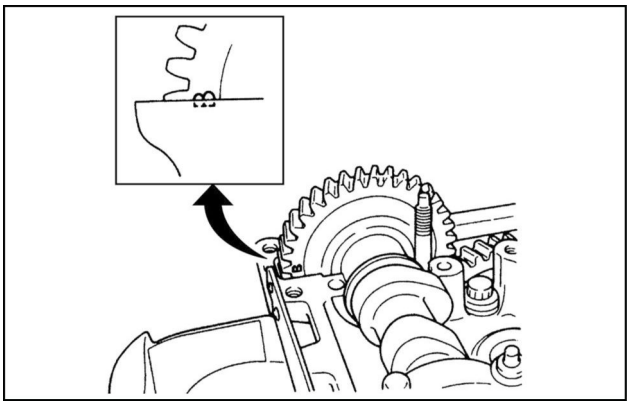


SMIL14CEX3189AA 17

5. Install the camshaft to the cylinder head assembly.

NOTE: *Mesh together the idle gear C and the camshaft gear so that the alignment mark on the camshaft gear matches the top surface of the cylinder head, and gently install the camshaft.*

> ⚠ CAUTION: Align the alignment marks of the sub gear side.



SMIL14CEX3078AA 4

6. Check alignment mark of the camshaft gear.

> ⚠ CAUTION:
>
> - Confirm that the alignment mark is not misaligned before installing the camshaft bearing cap.
> - If the alignment mark is not at the correct position, reinstall the camshaft.

7. Apply the engine oil to the camshaft bearing.

NOTE: *Apply engine oil to the sliding surface of the bearing.*

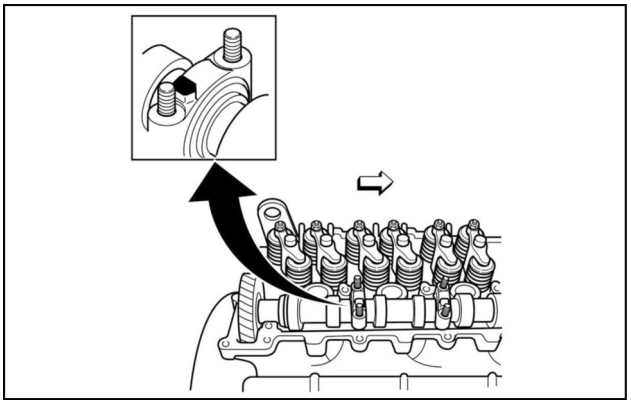
> ⚠ CAUTION: Apply engine oil after cleaning the bearing installation sections of the camshaft bearing and camshaft bearing cap.

8. Install the camshaft bearing to the camshaft bearing cap.
9. Install the camshaft bearing cap to the cylinder head assembly.

NOTE: *Turn the camshaft bearing cap so that the arrow mark on the top surface faces the engine front side, and assemble in numerical order.*

Tightening torque: **28 N·m** (**21 lb ft**)

Engine oil application

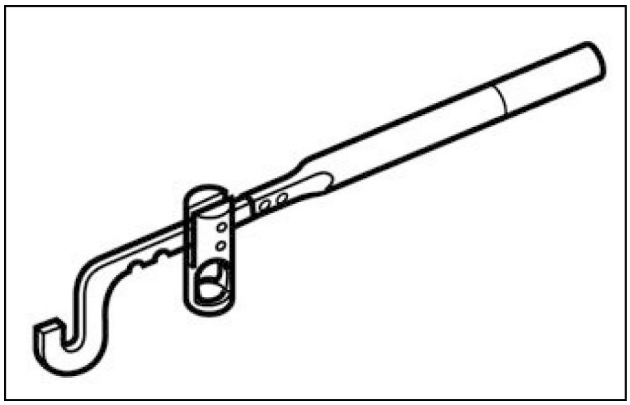


SMIL14CEX3079AA 5

Valve spring removal

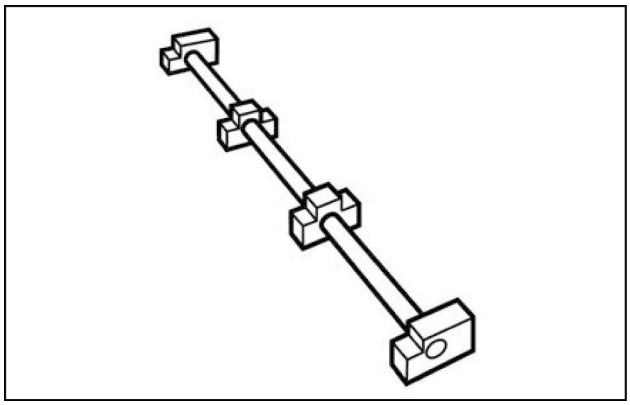
1. Press the valve spring using the special tool.

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



SMIL14CEX3027AA 13

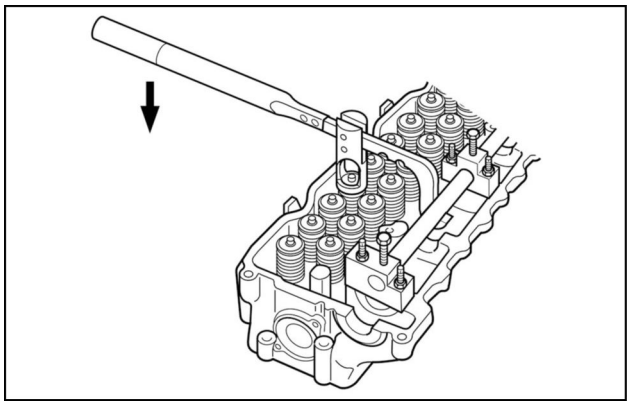
   Special tool: Pivot ASM (Refer to **Valves - Special tools (10.101)**)



SMIL14CEX3028AA 14

2. Remove the split collar from the spring seat.
3. Remove the special tool from the cylinder head assembly.
4. Remove the valve spring seat from the valve spring.
5. Remove the valve spring from the cylinder head assembly.

NOTE: *Store the removed valve springs according to the cylinders.*



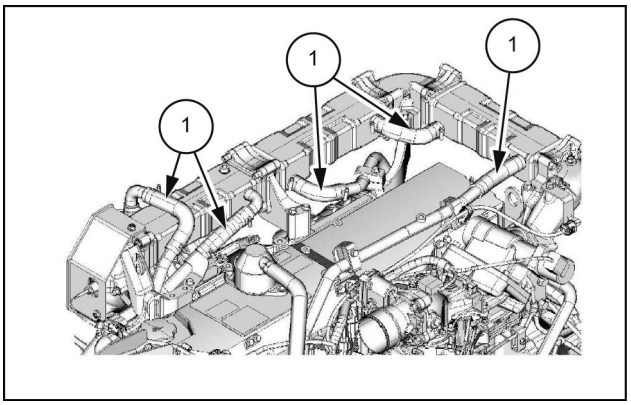
SMIL14CEX3029AA 15

Inlet valve removal

1. Remove the inlet valve from the cylinder head assembly.

NOTE: *Organize the removed valve according to the cylinders.*

19. Connect the water rubber hose **(1)** to the EGR cooler.



SMIL14CEX2982AB 44

EGR gas temperature sensor 2 installation

⚠ CAUTION:

- check the EGR gas temperature sensor 2 connector color, and take care not to assemble incorrectly.
- Because the connector color cannot be identified using the outer surface if the exterior is painted, remove the connector and identify it using the connector interior color.
- If it is difficult to determine the color, remove the connectors of EGR gas temperature sensor 2 and the IMT sensor, and determine the color using the connector interior color.

Sensor name	Connector color
EGR gas temperature sensor 2	Light gray
IMT Sensor	Gray

⚠ CAUTION:

- Do not subject the tip of the sensor to impact when installing the EGR gas temperature sensor.
- Do not reuse an EGR gas temperature sensor that has been subjected to impact due to being dropped, etc.

1. Apply anti-seize lubricant to EGR gas temperature sensor 2.

NOTE: *Apply High Temperature Stainless Never- Seez: 5-87411-039-0, manufactured by Bostik in the U.S., etc. to the threaded portion of EGR gas temperature sensor 2.*

2. Install EGR gas temperature sensor 2 to EGR pipe B.

   Tightening torque: **19.6 N·m** (**14 lb ft**)

3. Install the harness bracket to EGR pipe B.

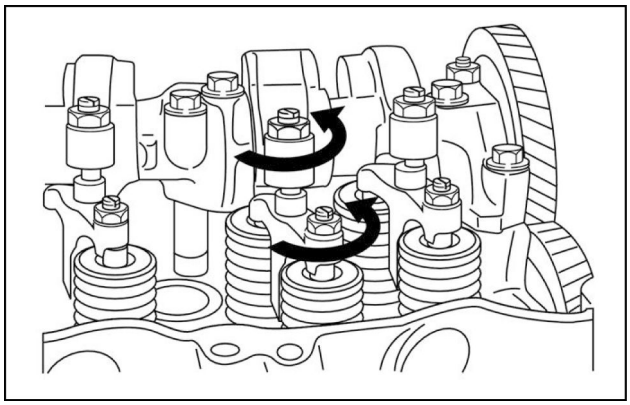
   Tightening torque: **23.5 N·m** (**17 lb ft**)

4. Connect the harness connector to EGR gas temperature sensor 2.

Rocker arm shaft adjustment

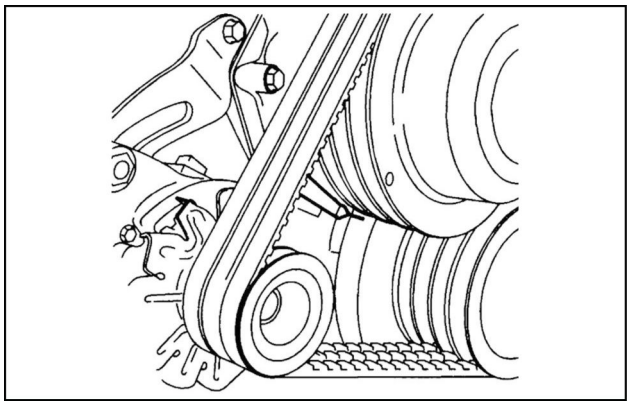
NOTE: *Valve clearance adjustment*

> ⚠ CAUTION:
>
> - Adjust the valve clearance while cool.
> - Loosen all adjust screws before adjustment.



SMIL14CEX3082AA 13

1. Align No.1 cylinder to the compression top dead center.



SMIL14CEX3075AA 14

2. Prepare the feeler gauge.

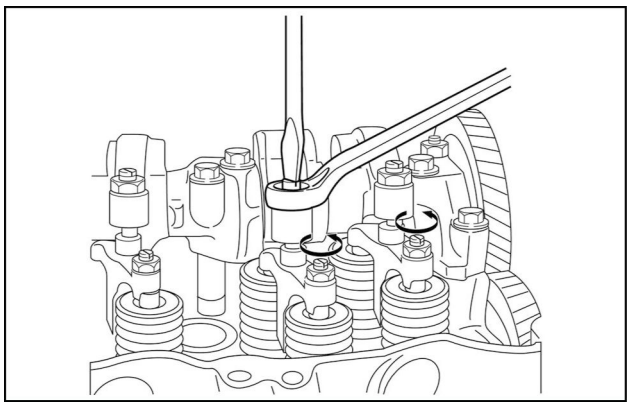
   Thickness : **0.4 mm** (**0.0157 in**)

NOTE: *Insert the thickness gauge between the rocker arm and bridge cap.*

3. Turn the adjust screw.

NOTE: *When the movement of the thickness gauge becomes stiff, secure the adjust screw nut of the rocker arm.*

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

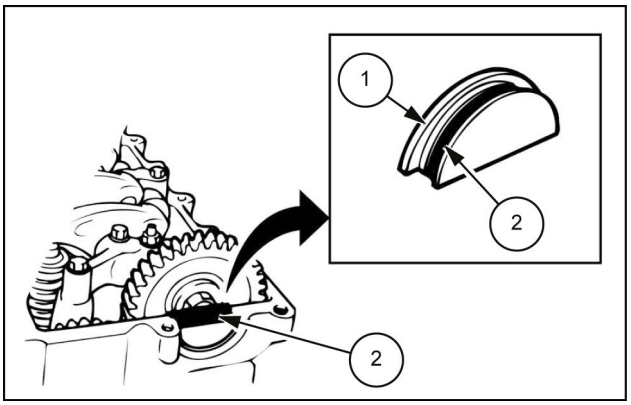


SMIL14CEX3083AA 15

Lower cover installation

1. Apply the liquid gasket **(2)** to the rubber plug **(1)**.

NOTE: *Apply ThreeBond 1207B*



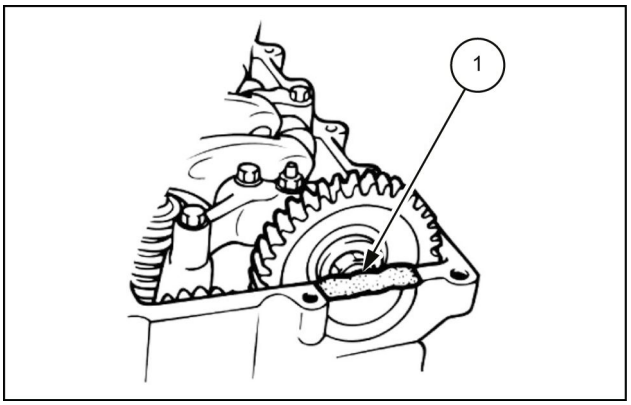
SMIL14CEX3084AB 24

2. Install the rubber plug to the cylinder head.
3. Apply the liquid gasket to the rubber plug in the application area **(1)**.

NOTE: *Apply ThreeBond 1207B to the rubber plug and cylinder head mating surfaces.*

> ⚠ CAUTION: After applying the liquid gasket **(2)**, install the lower cover within **5 min**.

4. Install the gasket to the lower cover.

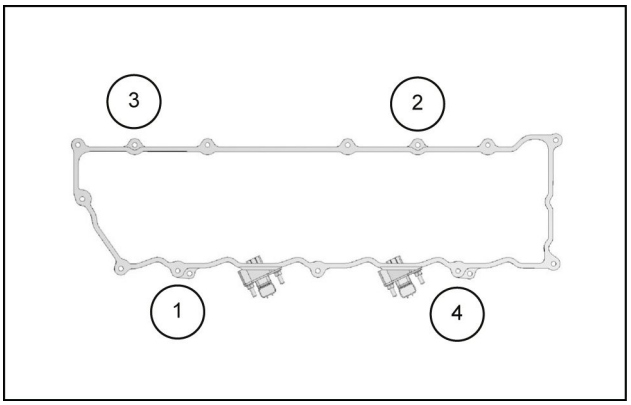


SMIL14CEX3086AB 25

5. Install the lower cover to the cylinder head.

   Tightening torque: **13 N·m** (**112 lb in**)

NOTE: *Tightening order*



SMIL14CEX3087AB 26

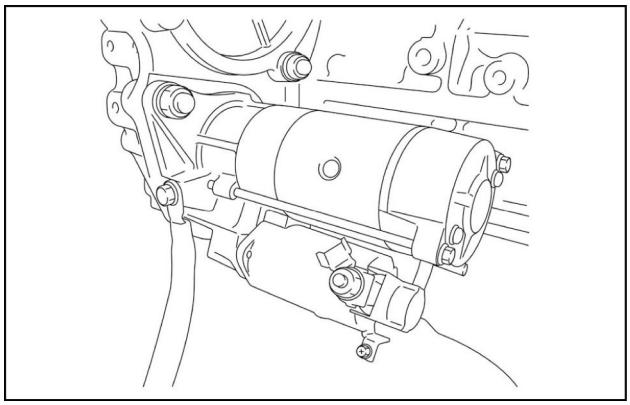
Engine flywheel - Remove

Battery ground cable disconnect

1. Disconnect the battery ground cable from the battery.

Starter assembly removal

1. Disconnect the earth cable from the starter assembly.
2. Remove the starter assembly from the flywheel housing.

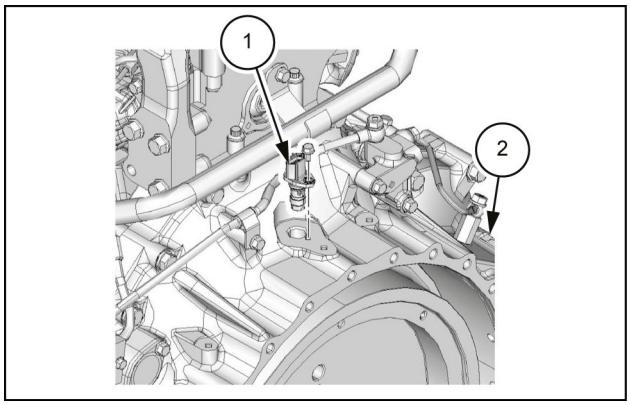


SMIL14CEX3130AA 1

CKP sensor removal

1. Disconnect the harness connector from the CKP sensor **(1)**.
2. Remove the CKP sensor from the flywheel housing **(2)**.

> ⚠ CAUTION: Be careful not to subject the sensor to shock.



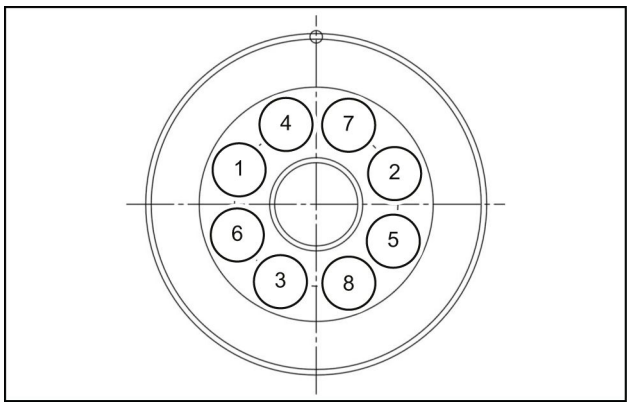
SMIL14CEX3131AB 2

Flywheel removal

1. Remove the flywheel from the crankshaft.

NOTE: *Gradually loosen the flywheel installation bolts in the order shown in the diagram.*

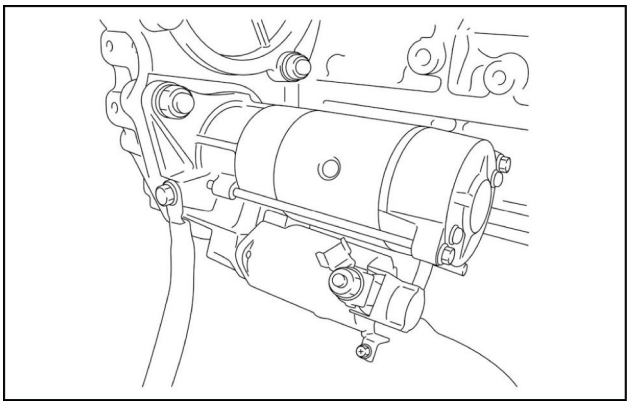
> ⚠ CAUTION: Fix the flywheel firmly so that it will not rotate.



SMIL14CEX3132AB 3

Starter assembly removal

1. Disconnect the earth cable from the starter assembly.
2. Remove the starter assembly from the flywheel housing.

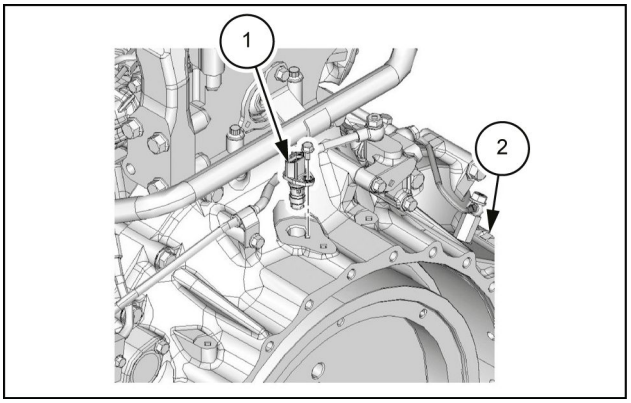


SMIL14CEX3130AA 48

CKP sensor removal

1. Disconnect the harness connector from the CKP sensor **(1)**.
2. Remove the CKP sensor **(1)** from the flywheel housing **(2)**.

> ⚠ CAUTION: Be careful not to subject the sensor to shock.



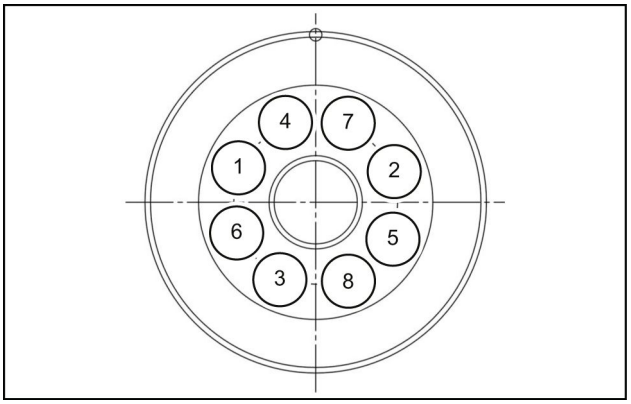
SMIL14CEX3131AB 49

Flywheel removal

1. Remove the flywheel from the crankshaft.

NOTE: *Gradually loosen the flywheel installation bolts in the order shown in the diagram.*

> ⚠ CAUTION: Fix the flywheel firmly so that it will not rotate.

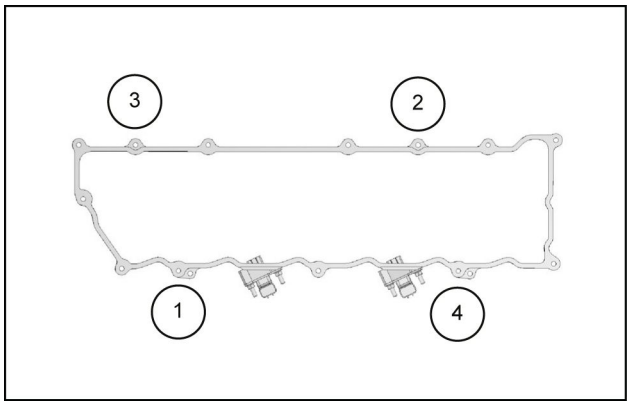


SMIL14CEX3132AB 50

4. Install the gasket to the lower cover.
5. Install the lower cover to the cylinder head.

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

NOTE: *Tightening order.*



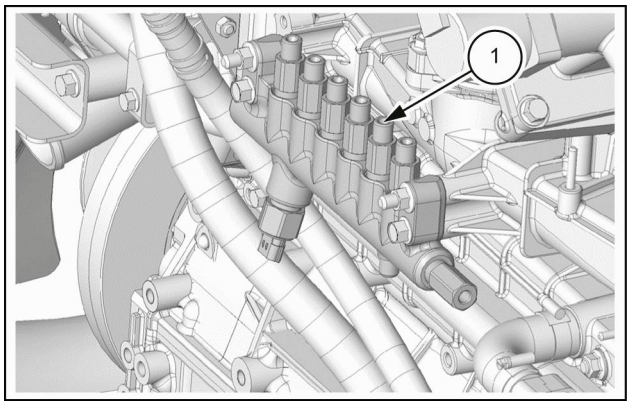
SMIL14CEX3087AB 77

Common rail assembly installation

1. Align the common rail assembly **(1)** to the inlet cover.
2. Temporarily tighten the bolt to the common rail assembly **(1)**.
3. Temporarily tighten the nut to the common rail assembly **(1)**.
4. Securely tighten the bolt to the common rail assembly **(1)**.

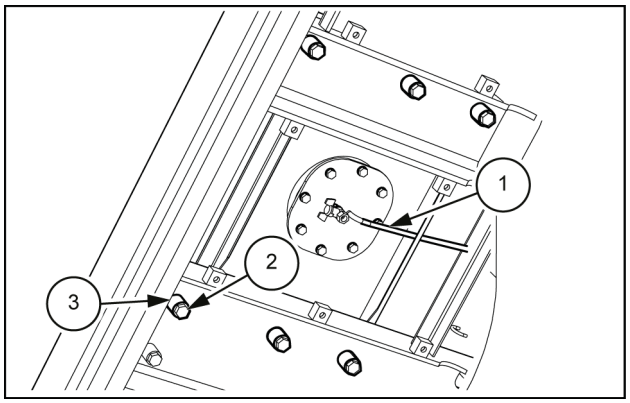
   Tightening torque: **25 N·m** (**18.4 lb ft**)
5. Securely tighten the nut to the common rail assembly **(1)**.

   Tightening torque: **25 N·m** (**18.4 lb ft**)
6. Connect the harness connector to the fuel pressure sensor.



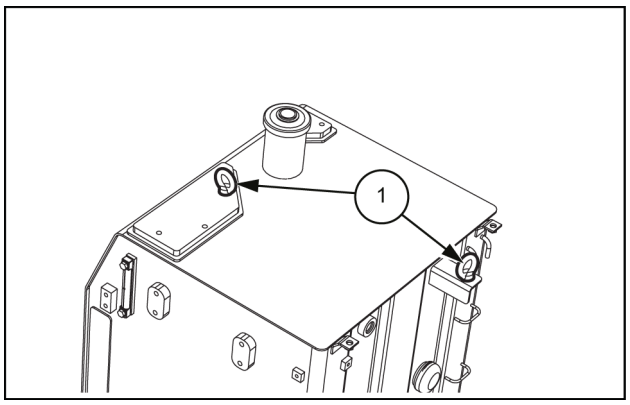
SMIL14CEX3088AB 78

16. Loosen the hose band to disconnect the hose **(1)**.
    - Attach caps and plugs at each location of the fuel tank and hose so as to prevent invasion of water, dust and dirt.
      Remove the 6 bolts **(2)** and the 6 spacers **(3)** at bottom of the fuel tank with a wrench [**24 mm**].
    - Do not lose a shim which may be inserted between the reservoir and the frame in order to adjust height depending on machine.
      Also, note inserted section and quantity.
    - Bolt tightening torque: **232.4 - 276.0 N·m** (**171.41 - 203.57 lb ft**)



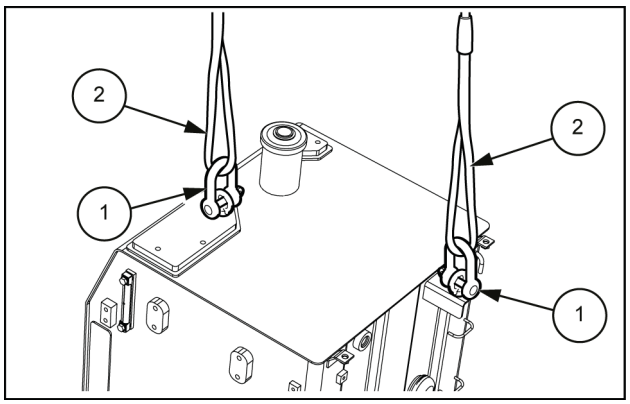
SMIL14CEX6954AB 16

17. Attach the 2 eyebolts (**M12**) **(1)** on top of the fuel tank.
    - Tighten up the eyebolt all the way and then loosen it for a half turn.



SMIL14CEX6955AB 17

18. Attach the 2 shackles **(1)** to the eyebolt and then lift it with a wire rope **(2)** and a lifting equipment.
    Make sure that you have a safe site, and then settle the fuel tank on a wood plank or other block.
    Make sure to secure the fuel tank so as to prevent it from falling.

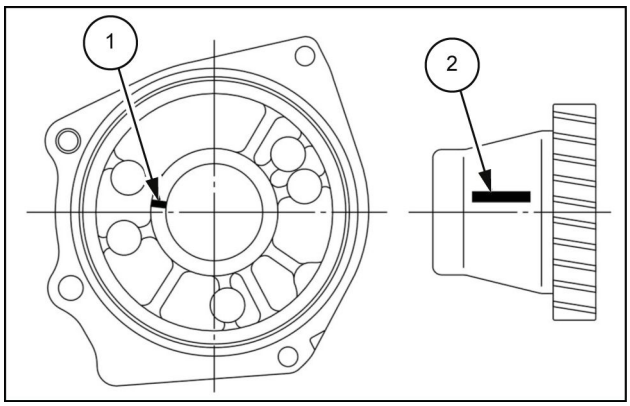


SMIL14CEX6956AB 18

High pressure pump - Install

Fuel supply pump installation

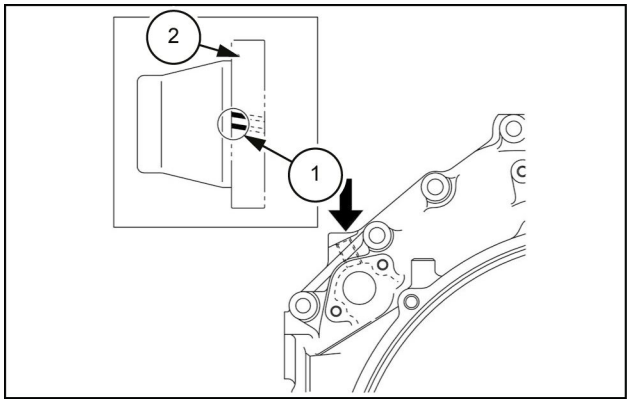
1. Align 1st cylinder to the compression top dead center.
2. Align alignment mark to the bracket.
   1. Supply pump bracket side slit
   2. Supply pump gear side alignment mark



SMIL14CEX3242AB 1

3. Align the fuel supply pump to the cylinder block. Check alignment mark of the supply pump gear **(2)**.

NOTE: *Confirm that the white paint can be seen through the timing confirmation hole **(1)** on the top surface of the flywheel housing.*



SMIL14CEX3243AB 2

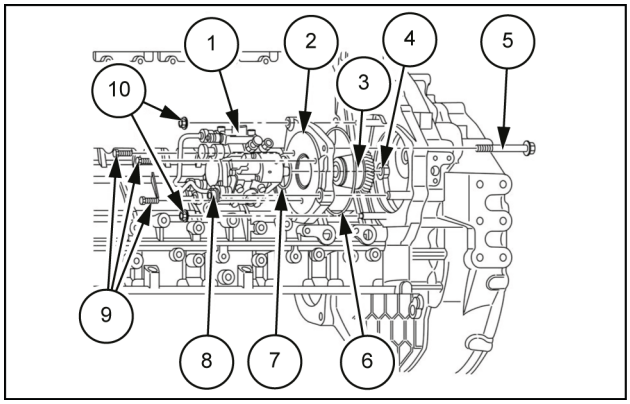
4. Install the fuel supply pump **(1)** to the cylinder block.

   Tightening torque: **75 N·m** (**55 lb ft**) Bolt **(5)**

   Tightening torque: **75 N·m** (**55 lb ft**) Nut **(8)**

   Tightening torque: **51 N·m** (**38 lb ft**) Nut **(10)**

   1. Fuel supply pump
   2. Bracket
   3. Gear
   4. Nut
   5. Bolt
   6. O-ring
   7. O-ring
   8. Nut
   9. Bolt
   10. Nut



SMIL14CEX3129AB 3

5. Connect the harness connector to the fuel supply pump.

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Engine - 10

Air cleaners and lines - 202

Exhaust manifold - Remove

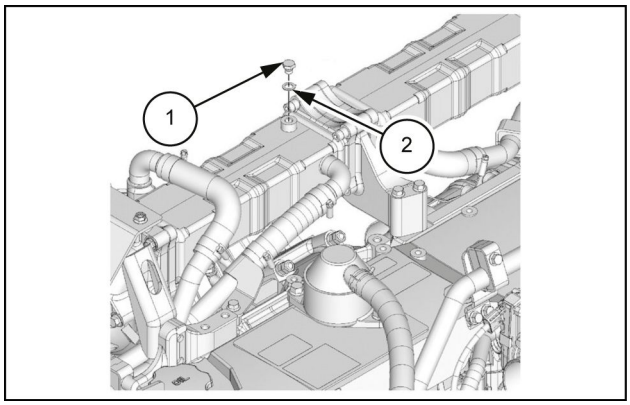
Battery ground cable disconnect

1. Disconnect the battery ground cable from the battery.

Coolant drain

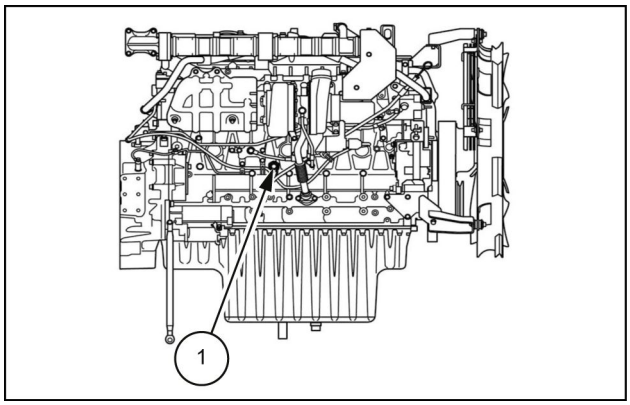
1. Remove the radiator cap from the radiator.
   - Do not loosen the radiator cap or sub-tank cap when the coolant temperature is high.
   - Because steam and boiling water can burst out from the radiator and possibly cause burns, check that the engine has cooled.
2. Remove the drain plug from the radiator.
3. Drain coolant from the radiator.

NOTE: *If the EGR cooler has an air bleeding plug* ***(1)****, loosen the plug and remove it with the gasket* ***(2)****.*
With the pressurized reserve tank specification, it is not necessary to bleed the air.



SMIL14CEX2956AB 1

4. Remove the drain plug **(1)** from the cylinder block.
5. Discharge coolant from the engine.
6. Install the drain plug **(1)** to the cylinder block.
7. Install the drain plug to the radiator.



SMIL14CEX2973AB 2

Coolant control valve - Remove

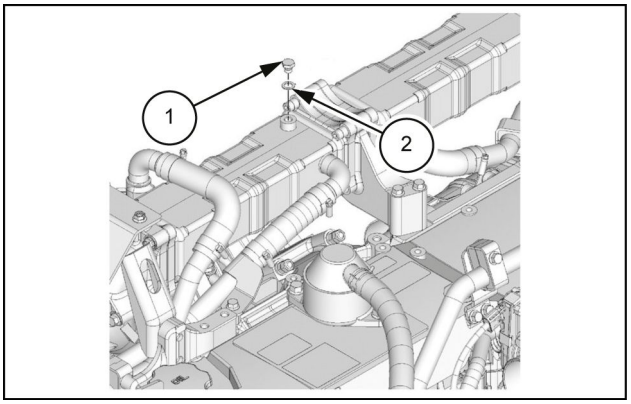
Coolant drain

1. Remove the radiator cap from the radiator.

> ⚠ CAUTION:
>
> - Do not loosen the radiator cap or sub-tank cap when the coolant temperature is high.
> - Because steam and boiling water can burst out from the radiator and possibly cause burns, check that the engine has cooled.

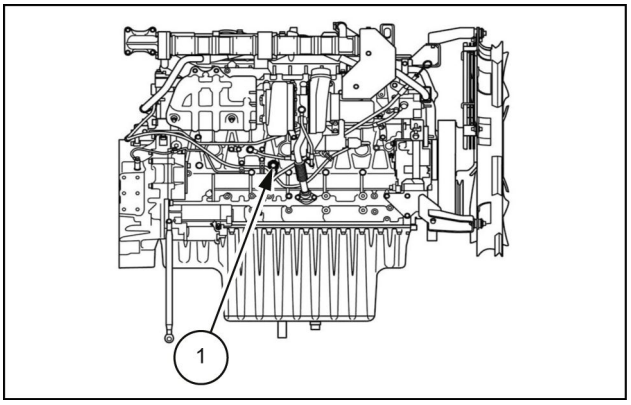
2. Remove the drain plug from the radiator.
3. Drain coolant from the radiator.

NOTE: *If the EGR cooler has an air bleeding plug* ***(1)****, loosen the plug and remove it with the gasket* ***(2)*** *.*
With the pressurized reserve tank specification, it is not necessary to bleed the air.



SMIL14CEX2956AB 1

4. Remove the drain plug **(1)** from the cylinder block.
5. Discharge coolant from the engine.
6. Install the drain plug **(1)** to the cylinder block.
7. Install the drain plug to the radiator.



SMIL14CEX2973AB 2

Coolant control valve removal

1. Disconnect the harness connector from the coolant control valve.
2. Disconnect the coolant piping from the coolant control valve.
3. Remove the coolant control valve from the machine.

7. A. Start the engine.
   B. In order to bleed the urea SCR dosing module coolant piping of air, choose the CCV (coolant control valve) operation test in the device test from the service support screen.

NOTE: *Repeat the operation test several times.*
Idle the engine for ***5 min****.*

8. Stop the engine
9. Remove the radiator cap from the radiator.

⚠ CAUTION:

- Do not loosen the radiator cap or sub-tank cap when the coolant temperature is high.
- Because steam and boiling water can burst out from the radiator and possibly cause burns, check that the engine has cooled.

10. Replenish the radiator with coolant.

NOTE: *Add an amount of coolant equal to the difference between the remaining coolant level and the radiator cap mouth.*

NOTICE: *If the coolant amount is excessively low, inspect for coolant leakage.*

11. Install the radiator cap to the radiator.

NOTICE: *Securely attach the radiator cap.*

12. A. Start the engine.
    B. In order to bleed the urea SCR dosing module coolant piping of air, choose the CCV (coolant control valve) operation test in the device test from the service support screen.

NOTE: *Repeat the operation test several times.*
For models with heaters, the set temperature and blower speed are set to the maximum, and warm up the engine at approximately ***1500 - 2000 RPM****.*
Touch the radiator upper hose, and confirm that it has become warm.

NOTICE: *If the upper hose is not warm, perform step 12 again.*

NOTE: *Idle the engine for* ***5 min****.*

13. Stop the engine.
14. Remove the radiator cap from the radiator.

NOTICE: *Confirm that the engine has cooled.*

15. Replenish the radiator with coolant.

NOTE: *Add an amount of coolant equal to the difference between the remaining coolant level and the radiator cap mouth.*

NOTICE: *If the coolant amount is excessively low, inspect for coolant leakage.*

16. Install the radiator cap to the radiator.

NOTICE: *Securely attach the radiator cap.*

Index

Engine - 10

Fan and drive - 414

3. Measure the clearance using the feeler gauge.

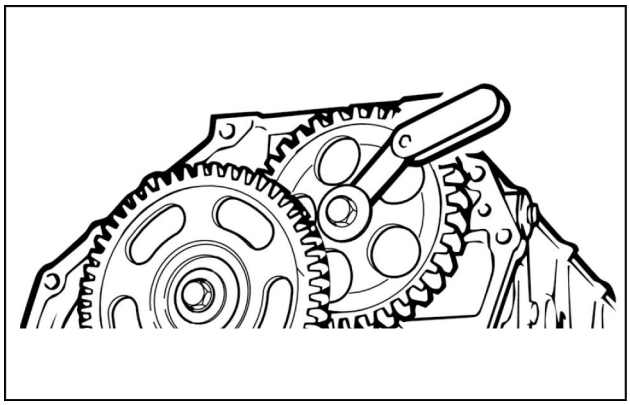
NOTE: *Measure the clearance between the idle gear and the thrust collar.*

> ⚠ CAUTION: Measure the play of the idle gear in the axis direction before removing the idle gear B.

Specified value: **0.080 - 0.1550 mm** (**0.0031 - 0.0061 in**)

Limit: **0.20 mm** (**0.0079 in**)

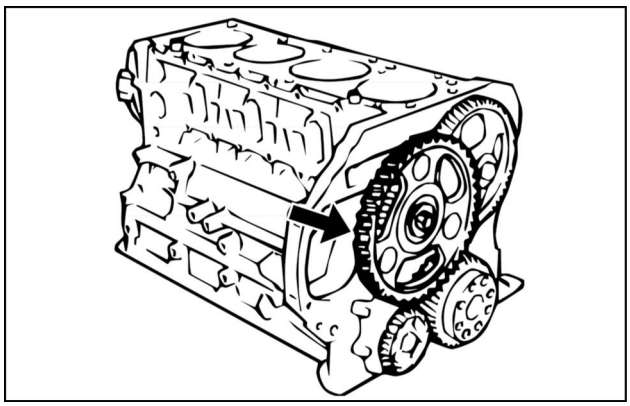
> ⚠ CAUTION: Replace the idle gear if the measured value exceeds the limit value.



SMIL14CEX3139AA 50

Idle gear A removal

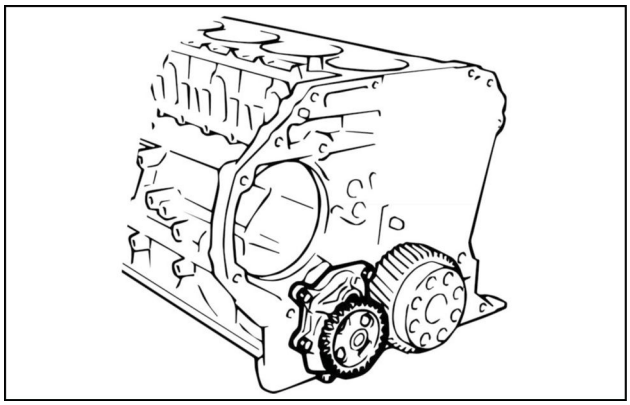
1. Remove the idle gear A from the idle gear A shaft.
2. Remove the idle gear A shaft from the cylinder block.



SMIL14CEX3140AA 51

Oil pump assembly removal

1. Remove the oil pump assembly from the cylinder block.



SMIL14CEX3141AA 52

12. Install the exhaust pipe to the turbocharger assembly.
13. Install the air intake hose to the turbocharger assembly and the intercooler.
14. Install the air cleaner duct to the air cleaner assembly and the turbocharger assembly.

Engine oil filling

1. Replenish the engine assembly with the engine oil.

NOTE: *Add engine oil up to the MAX position of the oil level gauge.*

> ⚠ CAUTION: Check the tightening of the drain plug before adding engine oil.

Engine harness connect

1. Connect the engine harness to the engine assembly.

NOTE: *Connect each connector.*

Battery ground cable connect

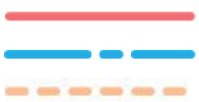
1. Connect the battery ground cable to the battery.

Coolant filling

> ⚠ CAUTION:
>
> - Work while taking care to prevent excess coolant from splashing onto the exhaust system parts.
> - Wipe off any excess coolant.

SWING RELIEF CUT CONTROL CIRCUIT

This control aims for an energy-saving effect by controlling the pump in such a way as to minimize the excess oil drained from the swing motor relief valve for the starting pressure boost during an independent sharp swing operation.
When a swing operation starts, due to the swing pilot pressure sensor and P1 pressure sensor input electrical signals, the main computer outputs a signal to the P1 flow control proportional valve.
The discharge oil from the hydraulic pump A3 is fed to the P1 flow control proportional valve.
The output signal from the main computer to the P1 flow control proportional valve controls the pilot pressure to reduce the hydraulic pump A1 side discharge flow.
The output signal from the main computer to the P1 flow control proportional valve controls the pilot pressure to reduce the hydraulic pump A1 side discharge flow.
The control is canceled when a compound operation is performed.



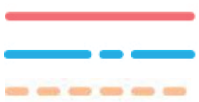
Pressure line
Tank line
Pilot pressure line

Pilot tank line
Electric line

1. Load holding valve check valve
2. Check valve
3. Oil cooler
4. Bleed-off
5. Cushion valve
6. Boom (up)
7. Boom (down)
8. Remote control valve (boom, bucket)
9. Lever lock
10. Boost pressure relief
11. 5 stack solenoid valve
12. Control valve
13. P2 pressure sensor
14. Hydraulic pump
15. Boom cylinder
16. Boom **(1)**
17. Boom-down pilot pressure sensor
18. Console lever lock switch
19. Monitor display
20. Main computer
21. P1 pressure sensor
22. Boom HBCV check valve
23. Orifice
24. Negative control sensor

BUCKET-CLOSE REGENERATIVE CIRCUIT

By moving the remote control valve to the bucket-close side, the pilot pressure oil is fed via the cushion valve to the electromagnetic inversely proportional valve.
The oil is fed from the electromagnetic inversely proportional valve to the control valve pb7 port and switches the bucket spool to the close side.
The discharge oil from hydraulic pump A2 enters the control valve P2 port and is fed from the parallel oil path to the bucket spool. Switching the spool lets the oil flow into the bucket cylinder bottom side and the bucketclose operation is carried out.
The bucket cylinder rod side pressure oil is metered by the bucket spool regeneration orifice.
Through this, the return oil pushes open the check valve in the spool and is regenerated on the cylinder rod side.
The lower the cylinder rod side load pressure, the greater the volume of regeneration.
When the cylinder bottom side load pressure becomes high, the check valve is closed and the cylinder rod side return oil goes through the bucket spool without regeneration and returns to the hydraulic tank.



Pressure line
Tank line
Pilot pressure line

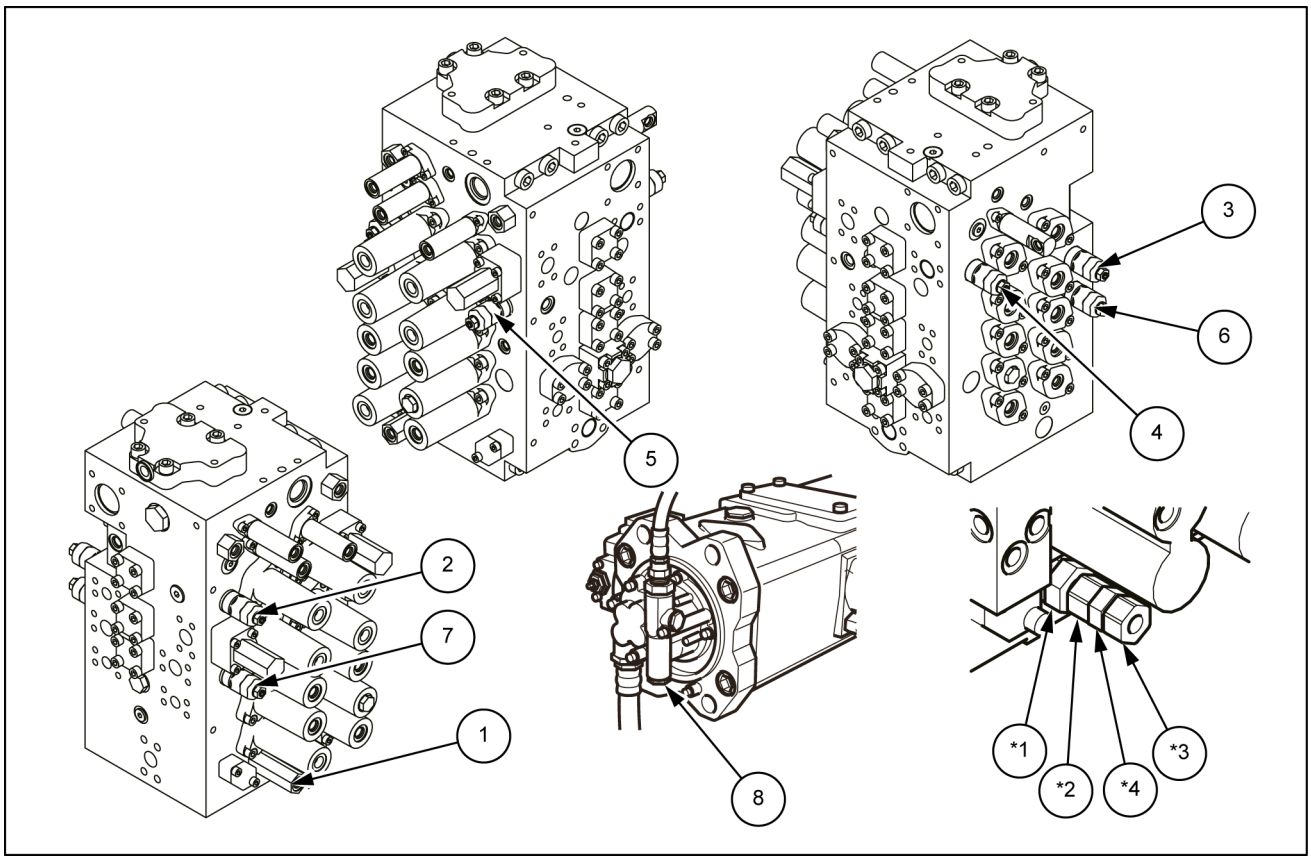
Pilot tank line
Electric line

1. Control valve
2. Manifold
3. Relief valve
4. Breaker
5. Main computer
6. Monitor display
7. ATT select switch
8. Option remote control valve
9. Option pilot pressure sensor
10. Console lever lock switch
11. Lever lock
12. 5 stack solenoid valve
13. P1 pressure sensor
14. P2 pressure sensor
15. P2 flow control proportional valve
16. P1 flow control proportional valve
17. Hydraulic pump
18. Check valve
19. Oil cooler

CONTROL VALVE

Location of relief valves

Part			Tool		Set pressure MPa (psi)	Adjusting screw Per revolution MPa (psi)	Measuring port
			Lock nut	Adjusting screw			
1	a	Main (normal use)	Hexagon diameter **30 mm** (**1.2 in**)	Hexagon diameter **27 mm** (**1.1 in**)	**34.3 MPa** (**4975.2 psi**)	**21.3 MPa** (**3089.6 psi**)	Monitor P1
	b	Main (pressure boost)	Hexagon diameter **36 mm** (**1.4 in**)	Hexagon diameter **27 mm** (**1.1 in**)	**37.3 MPa** (**5410 psi**)	**28.4 MPa** (**4119 psi**)	Monitor P1
2		boom up	Hexagon diameter **17 mm** (**0.7 in**)	Hexagon diameter **6 mm** (**0.2 in**)	**39.2 MPa** (**5686 psi**)	**21.2 MPa** (**3075 psi**)	Monitor P2
3		boom down			**29.4 MPa** (**4264 psi**)	**21.2 MPa** (**3075 psi**)	Monitor P2
4		arm in			**39.2 MPa** (**5686.0 psi**)	**21.2 MPa** (**3075.1 psi**)	Monitor P1
5		arm out			**39.2 MPa** (**5686 psi**)	**21.2 MPa** (**3075 psi**)	Monitor P1
6		Bucket close			**39.2 MPa** (**5686.0 psi**)	**21.2 MPa** (**3075.1 psi**)	Monitor P2
7		Bucket open			**39.2 MPa** (**5686 psi**)	**21.2 MPa** (**3075 psi**)	Monitor P2
8		pilot	Hexagon diameter **24 mm** (**0.9 in**)		**3.92 MPa** (**568 psi**)	**2 MPa** (**290 psi**)	



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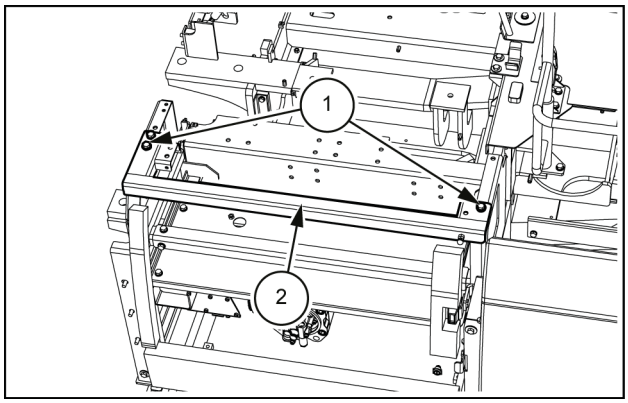
Detailed diagram of main relief valve adjustment locations

Hydraulic systems - Troubleshooting

Problem	Possible Cause	Correction
Hydraulic system faulty operation or no operation at all	Malfunction of pump	Check pressure or replace pump
	Malfunction of relief valve	Replace relief valve
	Malfunction of cylinders	Repair or replace
	Too much pump load pressure	Check circuit pressure
	Crack on valve	Replace as a valve assembly
	No stroke of spool	Check movement on spool
	Too low tank oil level	Add hydraulic fluid
	Clogged filter in circuit	Clean or replace filter
	Flow reduction in circuit piping	Check piping

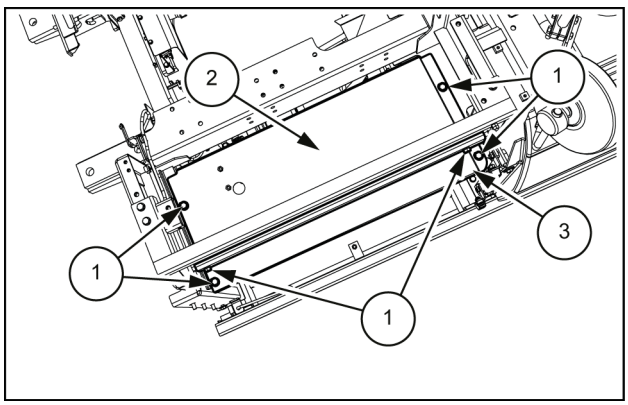
Pump - Remove

1. Remove the engine hood.
   Refer to the " **Hood - Remove (90.100)**" for detail.
2. Remove the muffler.
   Refer to the "Removal and Installation of Muffler" for detail.
3. Open the right door in the rear.
4. Remove the 3 bolts **(1)** with a wrench [**19 mm**] to remove the house frame **(2)**.



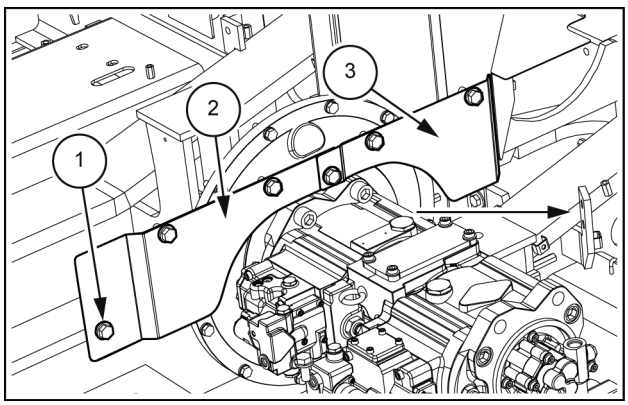
SMIL15CEX0424AB 1

5. Remove the 6 bolts **(1)** with a wrench [**19 mm**] to remove the cover **(2)** and the house frame **(3)**.



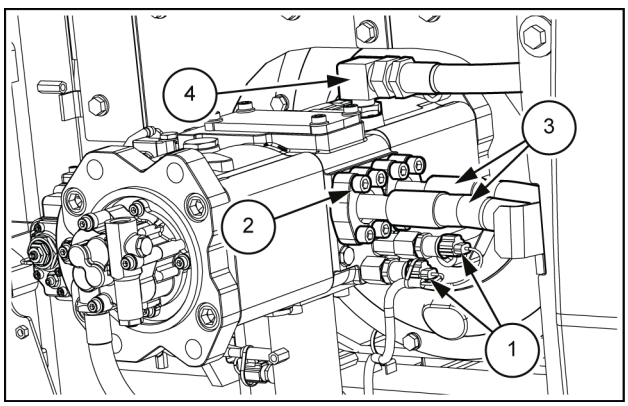
SMIL15CEX0425AB 2

6. Remove the 6 bolts **(1)** with a wrench [**19 mm**] to remove the cover **(2)** and **(3)**.



SMIL15CEX0426AB 3

7. Remove the 2 connectors **(1)**.
   Remove the 8 bolts **(2)** with a hexagon wrench [**10 mm**] to remove the 2 hydraulic hoses **(3)**.
   Remove the hydraulic hose **(4)** with a wrench [**36 mm**].
   - Apply marking to the pump and the hoses so as to match connections at assembling.
   - Attach caps and plugs at each location of the pump and hoses so as to prevent invasion of water, dust and dirt.
   - Wash each location of the pump and the hoses by blowing parts cleaner so as to prevent adhering dirt at connections and not to damage them.

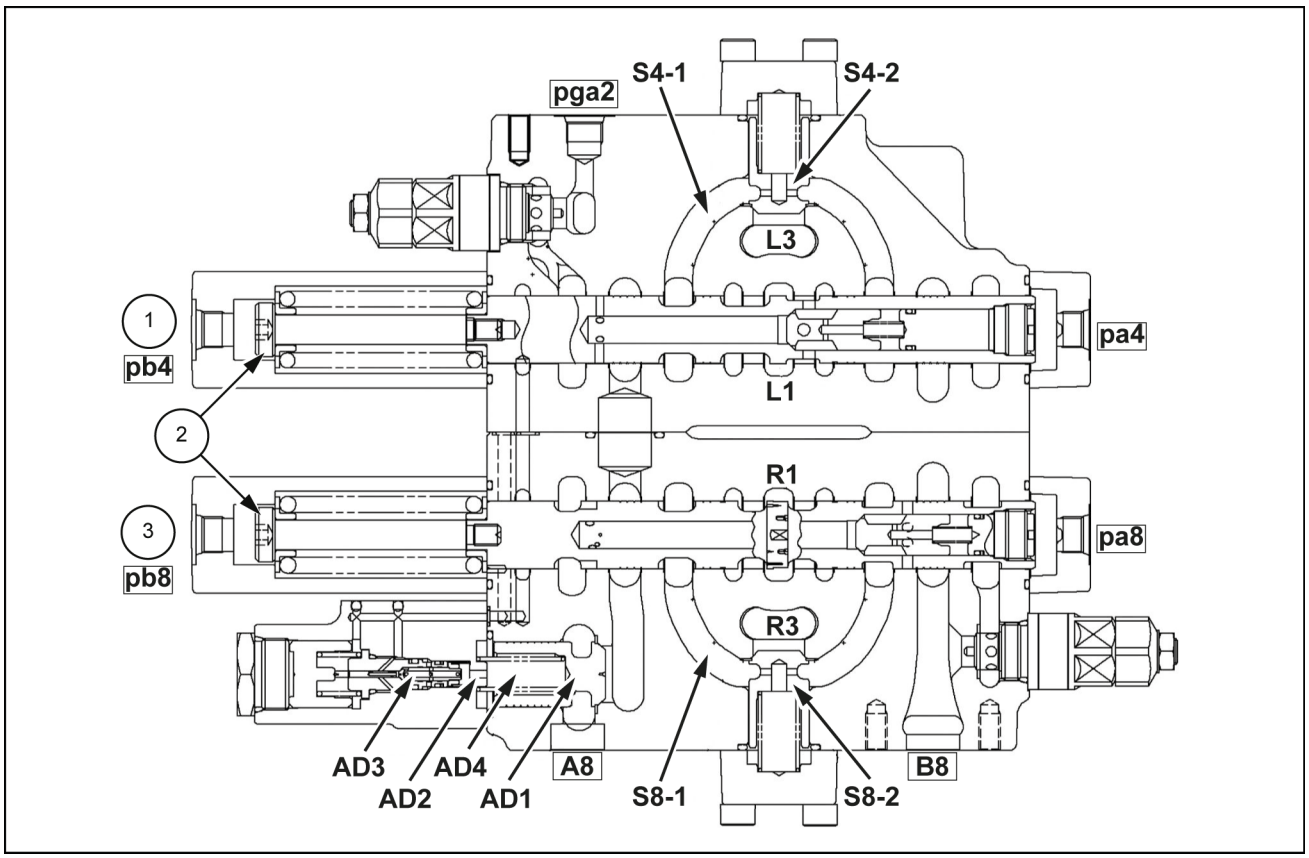


SMIL15CEX0427AB 4

Pump control valve - Tool description

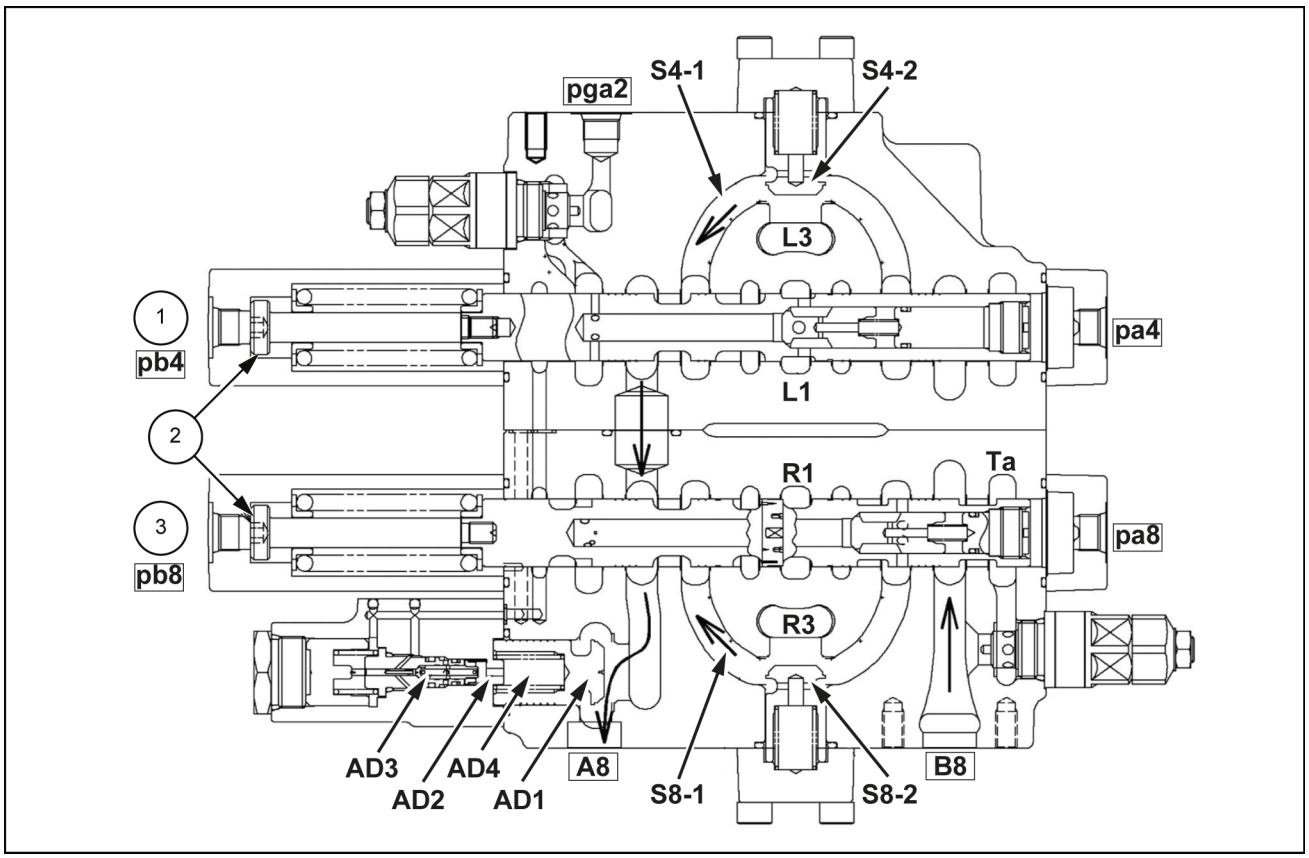
Tools

Tool name	Tool type
Hexagon wrench	**4 mm**, **5 mm**, **6 mm** [dimension B]
Monkey wrench	Medium type (quantity 1)
Screwdriver	Medium-sized flathead screwdriver (quantity 1)
Snap ring pliers	Stop ring TSR-150
	Locking ring TRR-150
Torque wrench	Ones tightening to the specific torques are possible.
Steel rod	φ4 or less in diameter, L = **100 mm** (**3.937 in**)
Hexagon socket head bolt	For removal of the adjusting ring **M4**, L = **50 mm** (**1.969 in**) or equivalent



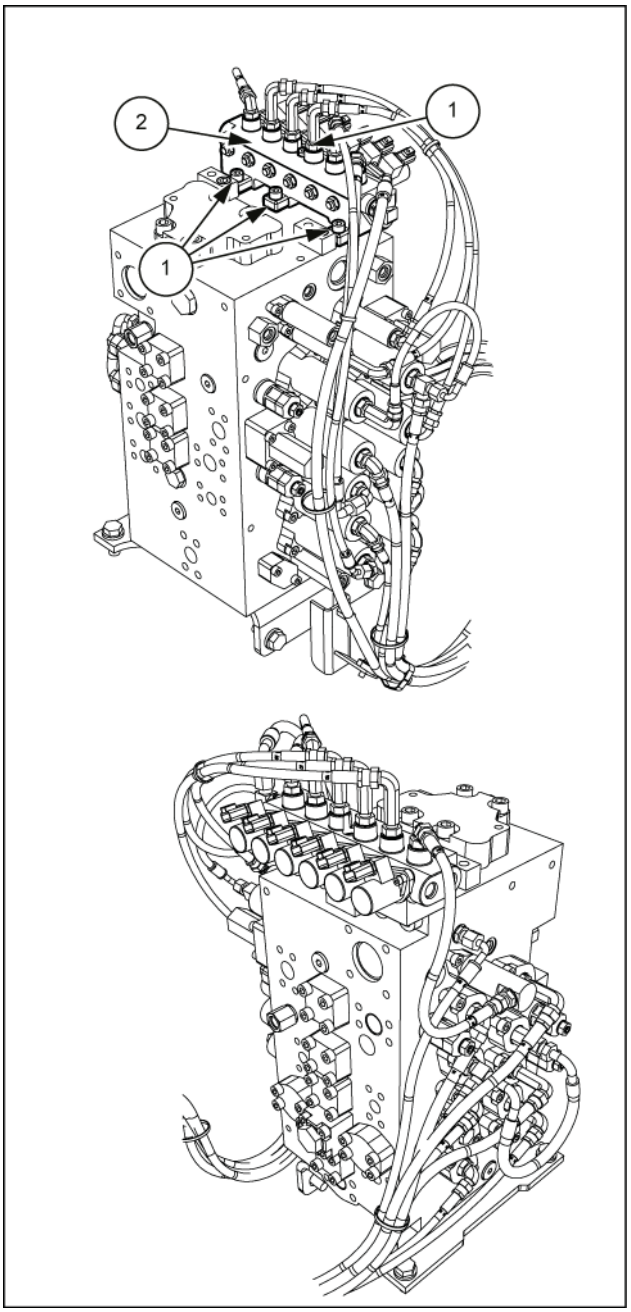
SMIL14CEX3812FB 10

1. Boom 2 (section 4)
2. Neutral state
3. Boom 1 (section 8)



SMIL14CEX3813FB 11

7. Remove the hoses of pilot line from the control valve with a wrench [**19 mm**, **22 mm**].
   Remove the 4 bolts **(1)** with a hexagon wrench [**8 mm**] to remove the 6 stack reducing valve **(2)**.



SMIL15CEX0460CB 6

Relief valve - Troubleshooting

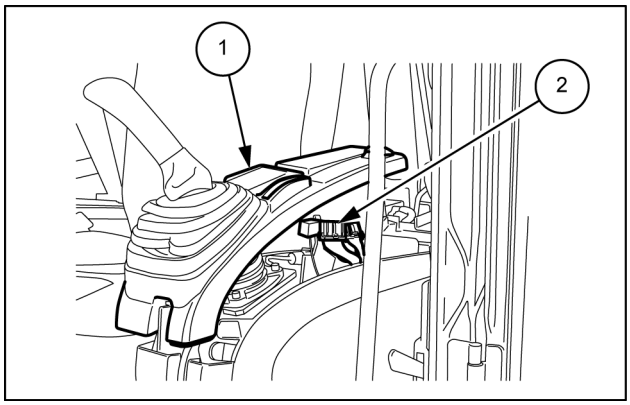
Problem	Possible Cause	Correction
No pressure increase at all	Sticking and no closure of main poppet, sleeve or pilot poppet, or dust at seat section of valve	Replace relief valve
Unstable relief pressure	Damaged seat of pilot poppet	Replace relief valve
	Sticking of piston or main poppet	Replace relief valve
Wrong relief pressure	Wear of seat section due to dust	Replace relief valve
	Loose in lock nut and adjuster	Reset pressure and tighten lock nut at specified torque
Oil leak	Damage on relief valve seat section	Replace relief valve
	Sticking of each component due to dust	Replace relief valve
	Wear on O-ring	Replace O-ring of adjuster or mounting section

Contents

Hydraulic systems - 35

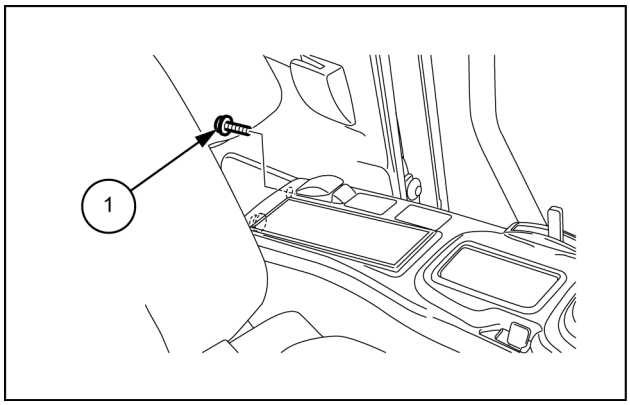
Hydraulic hand control - 355

9. Install the 3 connectors **(2)** and install the console top cover **(1)**.



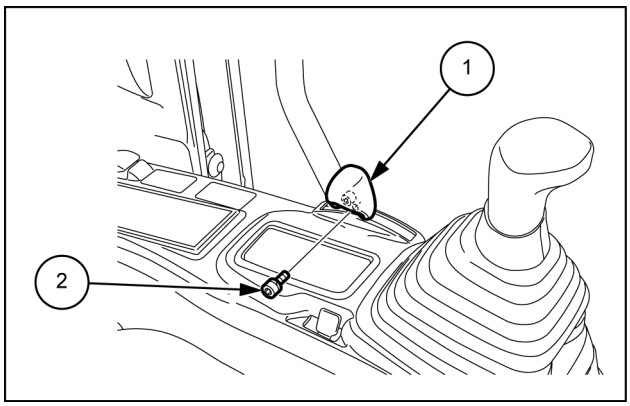
SMIL14CEX1410AB 9

10. Use a Phillips screwdriver to install the 2 screws **(1)** on the console top cover.



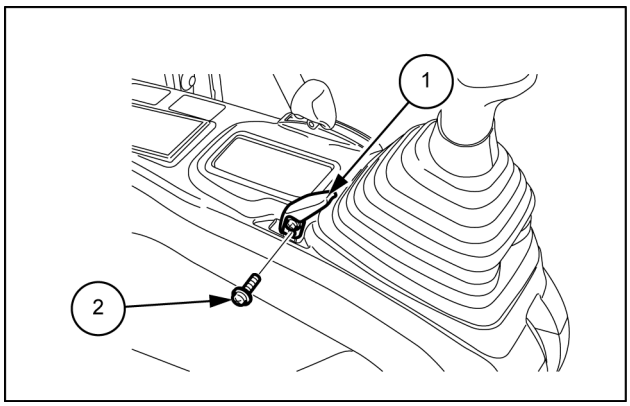
SMIL14CEX1411AB 10

11. Use a hexagon wrench [**5 mm**] to install the 2 bolts **(2)**, and install the grip **(1)** of the gate lock lever.



SMIL14CEX1412AB 11

12. Use a Phillips screwdriver to install the 2 screws **(2)**, and then install the handle of the tilt lever **(1)**.



SMIL14CEX1413AB 12

1. Hydraulic symbols
2. Cross section B-B

NOTE: *Since hydraulic equipment is crucial to safety, we cannot guarantee performance and functions if disassembly and reassembly are performed.*

A. Apply grease to the top

B. Fill grease cup with grease

Code	Part name	Code	Part name
101	Casing (Qty. 1)	271	Hexagon socket head bolt (Qty. 2)
102	Casing (damper) (Qty. 1)	301	Spool (Qty. 4)
201	Cover (Qty. 2)	311	Spring seating (Qty. 4)
202	Plug (Qty. 4)	313	Washer 3 (Qty. 4)
203	Grease cup (Qty. 4)	324	Spring (Qty. 4)
210	NHU packing (Qty. 4)	335	Spring (Qty. 4)
211	O-ring (Qty. 2)	336	Spring (Qty. 4)
212	O-ring (Qty. 4)	337	Spring (Qty. 4)
213	O-ring (Qty. 4)	412	Bushing (Qty. 4)
214	Push rod (Qty. 4)	413	Cam shaft (Qty. 2)
245	Washer 1 (Qty. 8)	420	Cam (Qty. 2)
217	Washer 2 (Qty. 4)	423	Hexagon socket head locking screw (Qty. 2)
218	Spring seating (Qty. 4)	471	Locking screw (Qty. 4)
220	Hexagon socket head bolt (Qty. 2)	472	Lock nut (Qty. 4)
224	Piston 2D085 (Qty. 4)	501	Bellows (Qty. 2)
225	Steel ball (Qty. 2)		

Tightening torque list

Code	Screw size	Tightening torque
220	**M6**	**7.8 - 9.8 N·m** (**5.753 - 7.228 lb ft**)
271	**M12**	**45.2 - 64.8 N·m** (**33.338 - 47.794 lb ft**)
423	**M6**	**5.9 - 7.9 N·m** (**4.352 - 5.827 lb ft**) (**LOCTITE®** coating)
472	**M10**	**29.9 - 36.7 N·m** (**22.053 - 27.069 lb ft**)

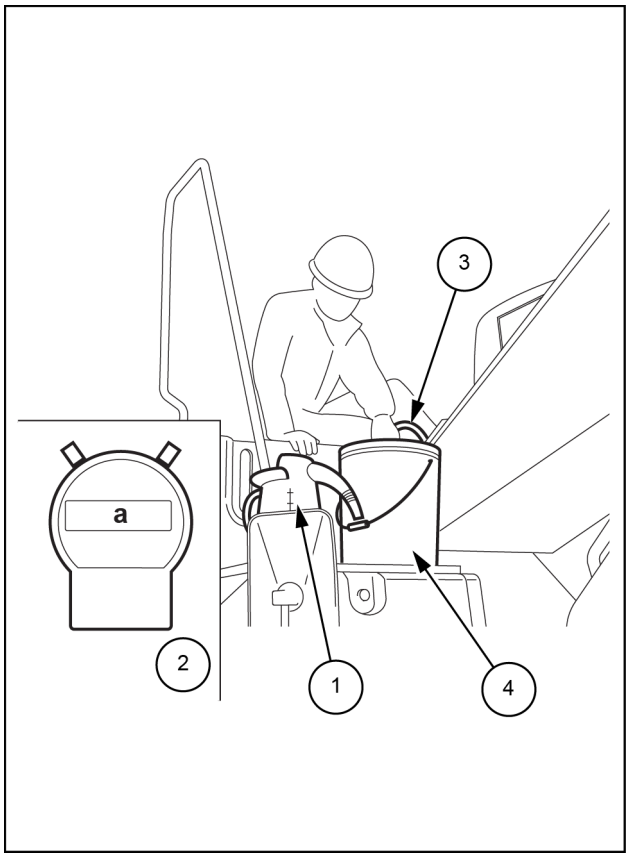
Hydraulic systems - 35

Hydraulic swing system - 352

CX300D Crawler excavators LC version (TIER4 FINAL) - MEA Market

3. Prepare a waste oil receiver and measuring container **(1)** and set them as in the diagram on the right.
   For details on the method for locking the swing motor, see "Swing Relief Pressure Adjustment".
4. In SP mode, relieve the swing operation and move the extension hose to the measuring container **(1)** at the same time the motor starts. (At starting, start measurement with a stop watch **(2)**).
5. After **60 s**, move the extension hose **(3)** to the waste oil can **(4)**.
6. Measure the volume of oil in the measuring container **(1)** as the drain volume for **60 s (a)**.
   Measure at least 3 times each for left and right.

Right	Left



SMIL14CEX2220BB 3

Travel motor

1. Function

Function of hydraulic motor

This hydraulic motor is called the swash plate-type axial piston motor, which converts force of the pressure oil from pump into rotational motion.

Function of brake valve

A. It controls the inertial force that makes the travel motor rotate by the inertia of the main unit when the travel motor stops, and applies the brake smoothly to make a stop.
B. It has a check valve function for preventing cavitation when the hydraulic motor stops.
C. It opens the port that releases parking brake force when the travel motor is working, and closes the port when the motor stops.

Function of parking brake

The parking brake prevents a runaway or a slip when the power shovel is parked or stopped on a slope by using the friction plate-type brake mechanism, and is integral with the hydraulic motor section.

Function of 2-speed switchover mechanism

Function of the switchover valve and the control piston changes the tilting angle of swash plate **(103)** to change the piston stroke volume of hydraulic motor, thereby allowing 2-step switchover between high-speed low torque rotation and low-speed high torque rotation.

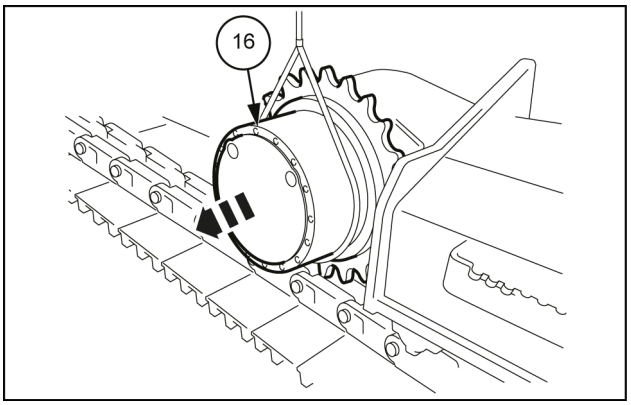
2. Operation principle and operation explanation

Hydraulic motor

The pressure oil from hydraulic motor enters the rear flange **(301)** of travel motor, passes through the brake valve mechanism, and is led from the valve plate **(109)** into the cylinder block **(104)**. This pressure oil will be led only to one side of **(Y1)** - **(Y2)** connecting the top and the bottom dead center of piston **(105)** stroke. The pressure oil that has entered one side in the cylinder block **(104)** pushes each piston **(105)** (4 or 5 pieces) to generate force (F (N) = P (MPa) x A (mm2)). This force acts on the swash plate **(103)**; however, since the swash plate **(103)** is fixed at an angle (α°) with the axis of motor shaft **(102)**, it is divided into components (**(F2)** and **(F3)**).

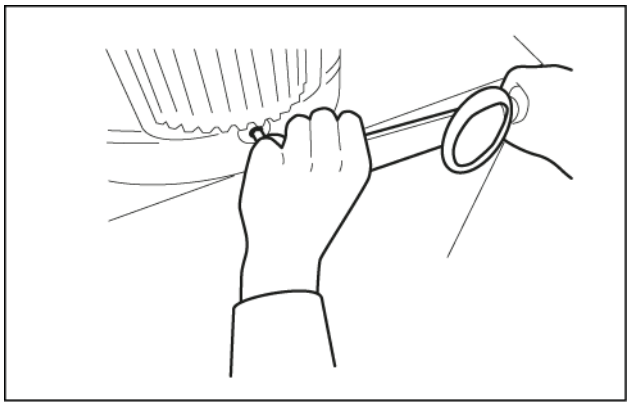
Among these components, the radial component **(F3)** generates each torque (T = F3 x ri) for **(Y1)**- **(Y2)**. This torque resultant {T = Σ (F3 x ri)} works as turning force to rotate the cylinder block **(104)** via the piston **(105)**. Since this cylinder block **(104)** is splined to the motor shaft **(102)**, the motor shaft **(102)** rotates to transmit torque.

14. Remove the travel motor **(16)**.



SMIL14CEX3276AB 12

5. Fit the sun gears **(2)** and **(8)** into the carriers **(2)** and **(7)**.

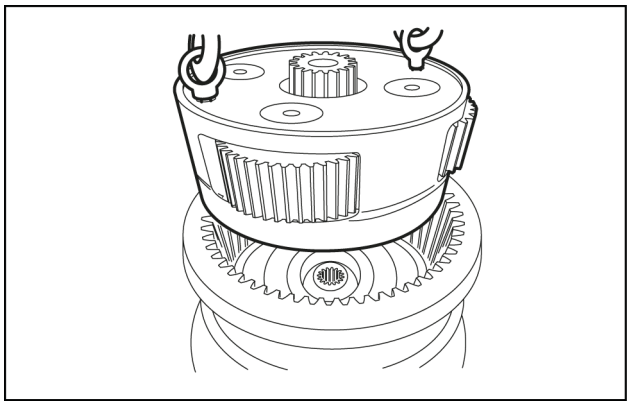


SMIL14CEX3532AA 44

19. Fitting of carrier (2) assembly

1. Attach 2 eyebolts **M10** to the carriers **(2)** and **(7)**, and fit the carrier **(2)** assembly with a lifting equipment.

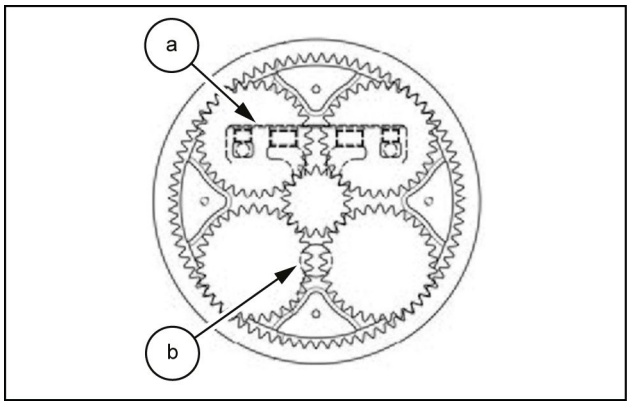
NOTE: *Make sure that the carrier **(2)** assembly is fit slowly with the center axes of ring gear **(1)** and carriers **(2)** and **(7)** aligned so that the internal teeth of ring gear **(1)** may not get damaged at the end face.*



SMIL14CEX3533AA 45

2. Make sure that the carrier **(2)** assembly is splined to the spindle **(101)** with the hydraulic line port surface **(a)** and the carrier **(2)** assembly located as shown in the below figure.

    b. 2-speed piston hole



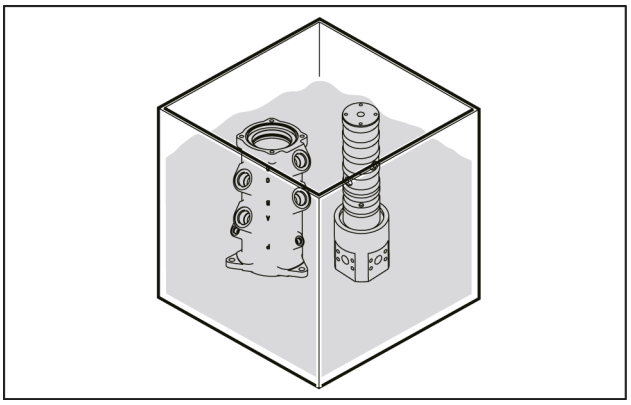
SMIL14CEX3534AB 46

20. Assembly of 1st-stage gear

1. Attach 3 eyebolts **M10** to the carriers **(1)** and **(3)**, and fit the carriers **(1)** and **(3)** with a lifting equipment while aligning the splines of sun gears **(2)** and **(8)**.

Hydraulic swivel - Assemble

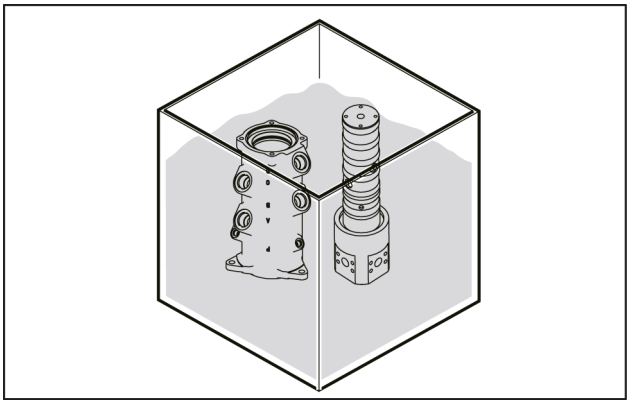
1. Place parts in a rough cleaning container filled with kerosene to clean off any adhered matter that can form sharp points and cause scratches.
   - Immerse in kerosene until dust, grease, and other adhered matter comes off and floats to the surface.



SMIL14CEX1358AA 1

2. Place parts in a finish cleaning container filled with kerosene and clean while gently moving the parts.

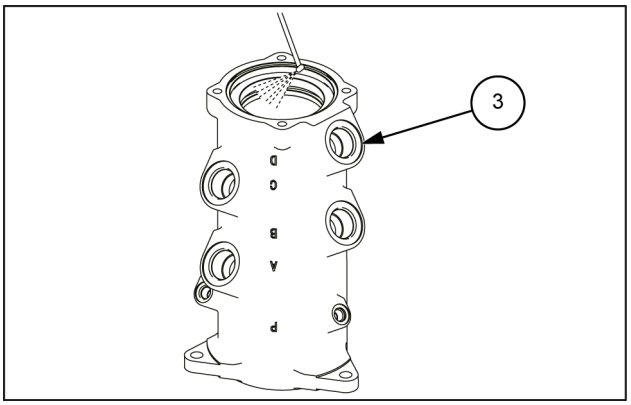
   After cleaning, wipe away the kerosene with a clean rag.
   - Place the parts in a location free of dust and moisture and use compressed air to dry the parts.
     After drying, coat parts with engine oil.
   - Polish away burrs, barbs, and scratches with a whetstone.



SMIL14CEX1359AA 2

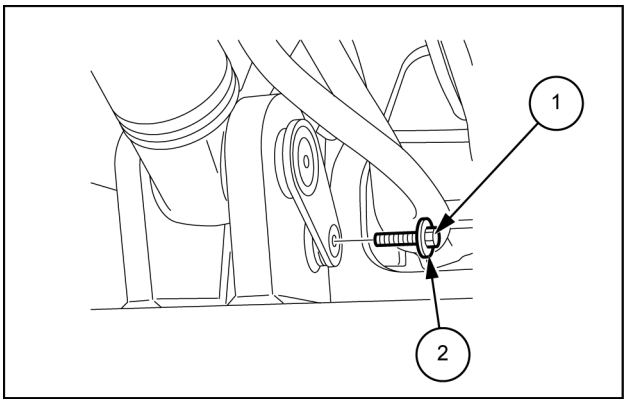
3. Use cleaning fluid or compressed air to clean the rotor **(3)**.

   After cleaning, check inside the rotor and in the groove sections for burrs, barbs and scratches and for scratches caused by striking.



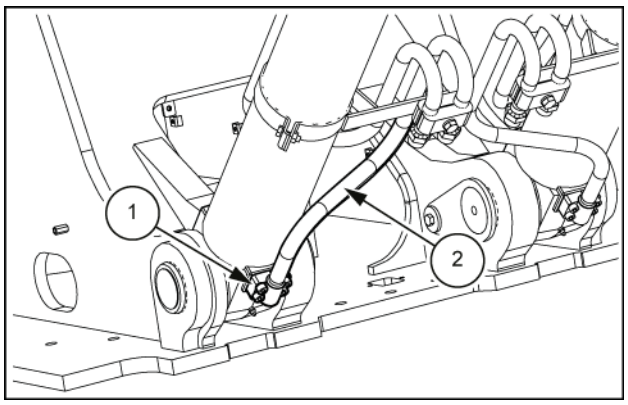
SMIL14CEX1360AB 3

5. Tighten the bolt **(1)** and the washer **(2)** with a wrench [**19 mm**].
   Also perform the same installation step on the cab side.



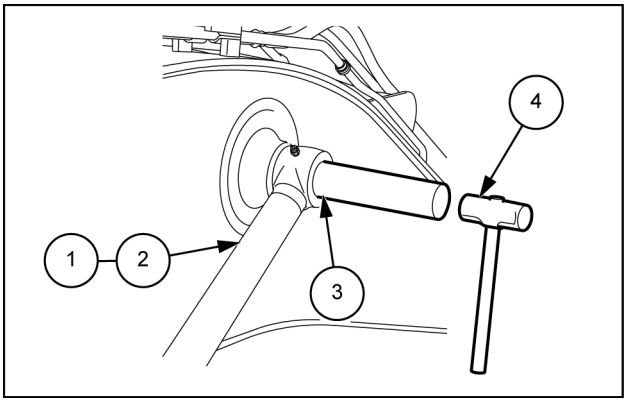
SMIL14CEX2183AB 5

6. Tighten the 4 hexagon bolts **(1)** with a hexagon wrench [**8 mm**] to mount the hose **(2)**.
   Attach the hose on the cab side in the same manner.



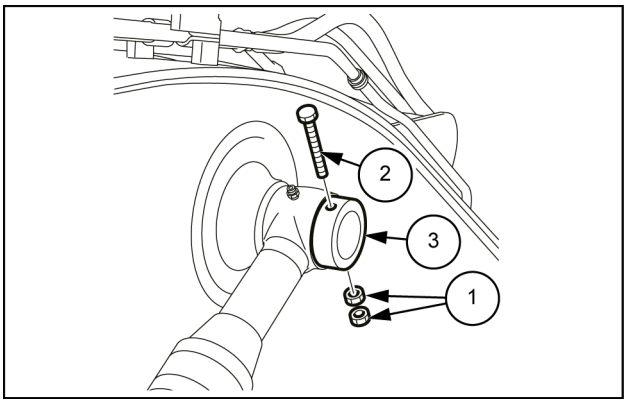
SMIL15CEX0477AB 6

7. Start the engine and then drive the boomup operation at idling speed to extend the rods of the boom cylinders (right) (left) **(1)** and **(2)**.
   Align holes in the boom cylinders (right) (left) **(1)** and **(2)** with those in the boom, and use a hammer **(4)** to push the pin **(3)** in.
   - If insertion of a shim is possible according to the tolerance, adjust the shim.



SMIL14CEX2184AB 7

8. Tighten the 2 double nuts **(1)** and the bolt **(2)** with 2 wrenches [**30 mm**] to attach the fixation ring **(3)**.
   Attach them in the cab side in the same manner.



SMIL14CEX1854AB 8

b. **125 mm** (**4.921 in**)

b. **6.5 mm** (**0.256 in**)

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

*1. After tightening, crimp two locations around the perimeter by punching.
*2. Hexagon bolt width: **115 mm** (**4.528 in**)
*3. Outer periphery knurling processing
*4. Cushion stroke
*5. To the bottom pin center
*6. Pay attention to orientation of semicircle during assembly.
*7. Slit direction is as indicated in the diagram.
*8. Serial No. stamping position
*9. Female screw effective depth: **21 mm**
*10. **112 mm** (**4.409 in**) or more (for both sides)
*11. With poly-cap

L1. Maximum retracted length: **2286 mm** (**90 in**)
L2. Stroke: **1650 mm** (**64.961 in**)

1. Tube subassembly (Quantity 1)
2. Rod subassembly (Quantity 1)
3. Cylinder head (Quantity 1)
4. Bushing (Quantity 1)
5. Snap ring (Quantity 1)
6. Buffer ring (Quantity 1)
7. U-ring (Quantity 1)
8. Backup ring (Quantity 1)
9. Wiper ring (Quantity 1)
10. O-ring (Quantity 1)
11. Backup ring (Quantity 1)
12. Hexagon socket head bolt (Quantity 12)
13. Cushion ring (Quantity 1)
14. Cushion seal (Quantity 1)
15. Piston (Quantity 1)
16. Seal ring assembly (Quantity 1)
17. Backup ring (Quantity 2)
18. Slide ring (Quantity 2)
19. Slide ring (Quantity 2)
20. Shim (Quantity 1)
21. Nut (Quantity 1)
22. Retaining screw (Quantity 1)
23. Steel ball (Quantity 1)
24. Cushion ring (Quantity 1)
25. Cushion seal (Quantity 1)
26. Stopper (Quantity 2)
27. Snap ring (Quantity 1)
28. Pin bushing (Quantity 1)
29. Wiper ring (Quantity 4)
30. Pin bushing (Quantity 1)
31. Pipe subassembly (Quantity 1)
32. O-ring (Quantity 1)
33. Hexagon socket head bolt (Quantity 4)
34. Band subassembly (Quantity 1)
35. Band (Quantity 1)
36. Bolt (Quantity 2)
37. Washer (Quantity 2)
38. Pipe holder (Quantity 1)
39. Bolt (Quantity 1)
40. Spring washer (Quantity 1)
41. Grease nipple (Quantity 1)

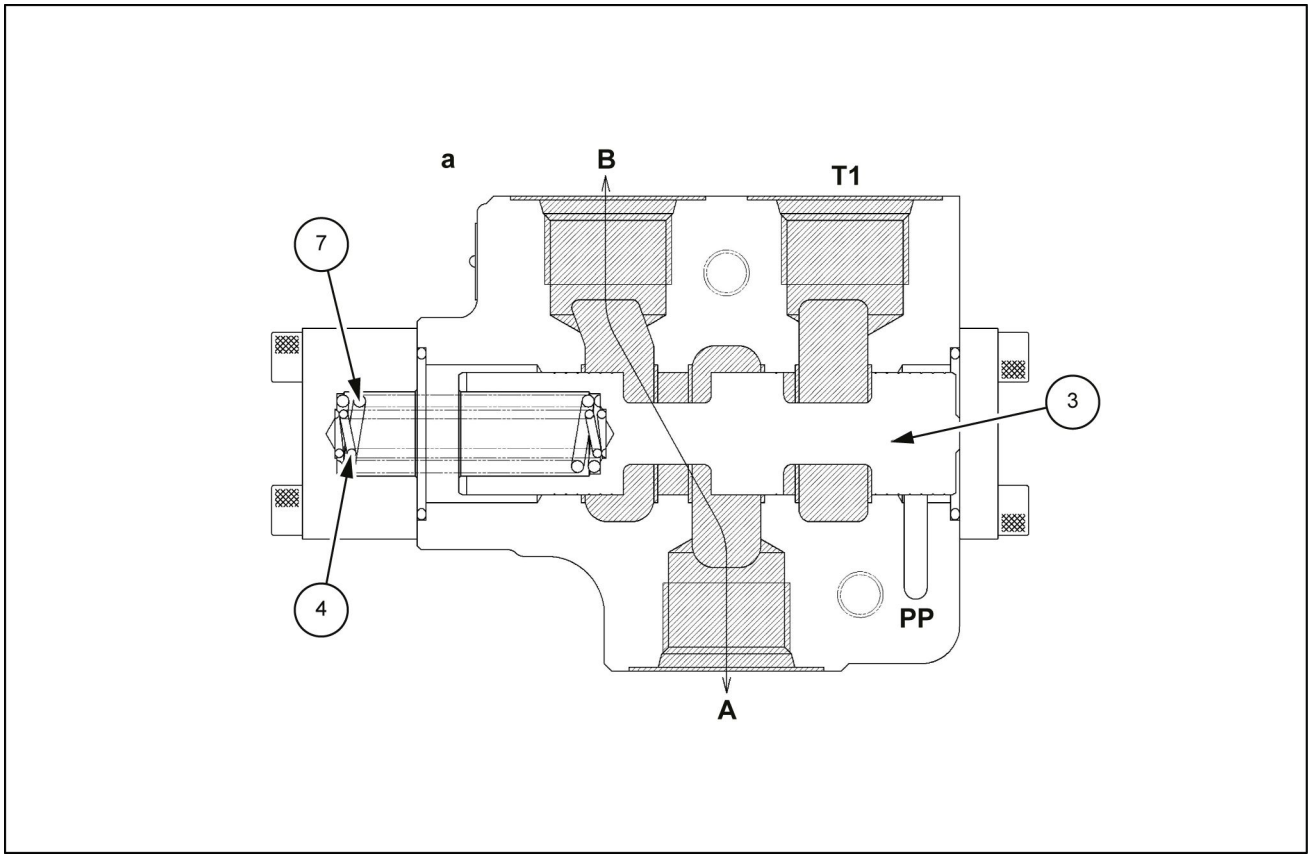
Hammer shears selection valve - Dynamic description

Direction valve (3 direction)

This valve switches the direction with the pilot pressure.

1. When the spool is in neutral (PP port no load) Double-acting circuit, 2 pumps flow circuit selected

When the pilot pressure is not fed to the PP port, the spool **(3)** is held in the neutral position by the springs **(4) (7)**.Continuity is established with the A port and B port and the T1 and T2 port pressure oil are cut off by the spool **(3)**. (See Diagram **1**)



SMIL14CEX3868FB 1

(a) To control valve

Track chain - Prepare

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.
The grease in the track tensioning mechanism is under high pressure. Keep face and body away from grease nipple. Never loosen the grease nipple more than one complete turn.
Failure to comply could result in death or serious injury.

W0959A

⚠ WARNING

Avoid injury!
Shut off the engine, remove the key, and make sure all motion is stopped before servicing the machine.
Failure to comply could result in death or serious injury.

W1128A

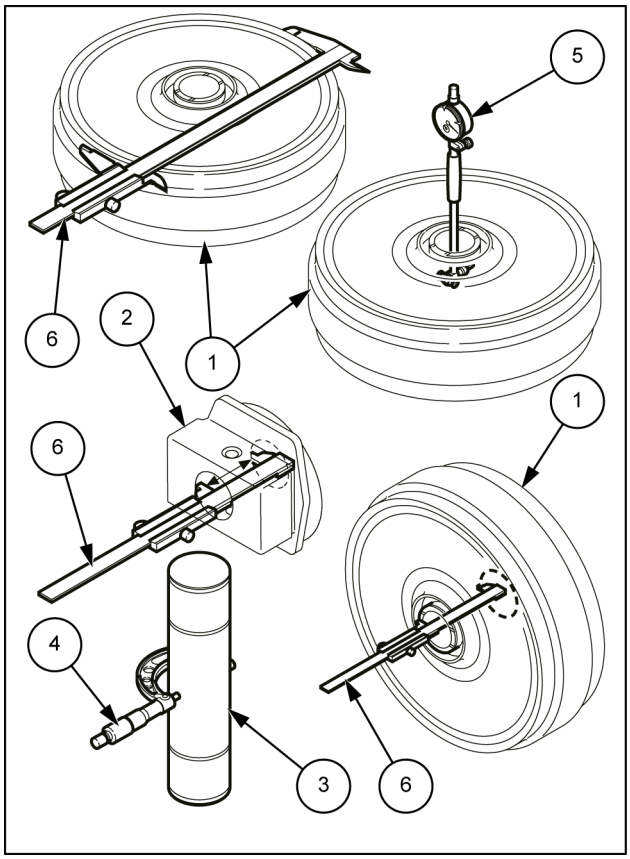
NOTICE: *The check valve adjustment procedure should not be done in front of the check valve.*

NOTICE: *Do not get under the main unit when it is jacked up. Make sure to place the main unit on crossties to prevent falling.*

Items to prepare:

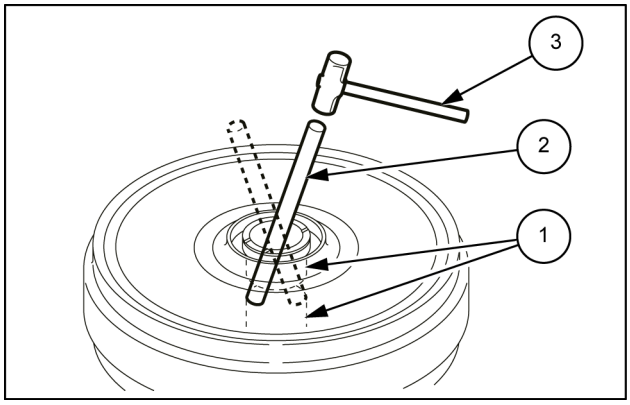
- Wrench [**19 mm**]
- Box wrench [**19 mm**]
- Hammer
- Wood planks, etc.
- Striking jig
- Crowbar
- Rag
- Lifting equipment (with the required breaking load)
- Lifting equipment (with the required lifting capacity)

8. Use a micrometer caliper **(4)**, cylinder gauge **(5)**, and caliper **(6)** to measure the roller (with bushing) **(1)**, hub **(2)**, and shaft **(3)** for wear and deformation. Replace with new parts as necessary.



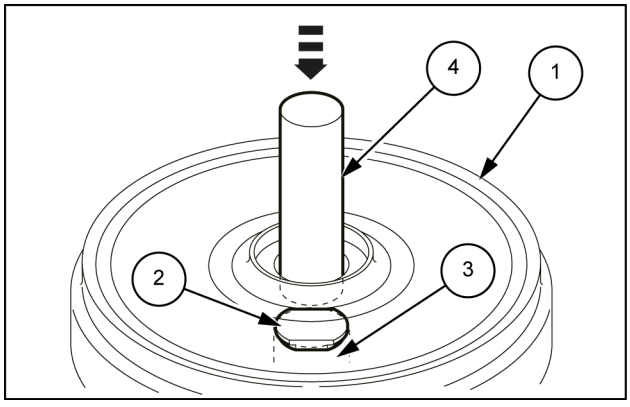
SMIL14CEX1136BB 8

9. When replacing the bushing **(1)**, remove it by placing a striking rod **(2)** against the end surface and striking that with a hammer **(3)** uniformly left and right as in the diagram.
   - Do not disassemble the bushing **(1)** unless it has become unusable due to wear, etc.
   - Be careful not to scratch the inside of the roller when striking the end of the bushing.



SMIL14CEX1137AB 9

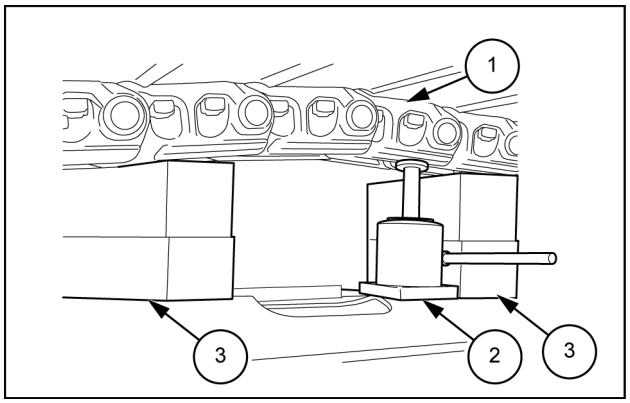
10. Invert the roller **(1)**, use jig A **(2)** to push up against the bushing **(3)**, and press with a rod-shaped object **(4)** (such as a shaft).
    The bushing comes off.



SMIL14CEX1138AB 10

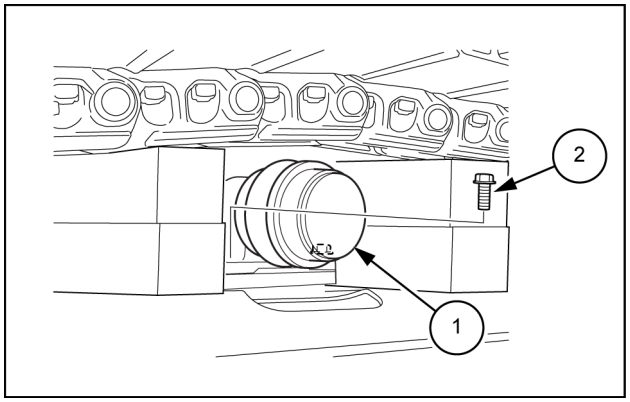
Track support roller - Install

1. Use a jack **(2)** to raise the upper part of the shoes **(1)**, and insert wood planks **(3)**.



SMIL14CEX2061AB 1

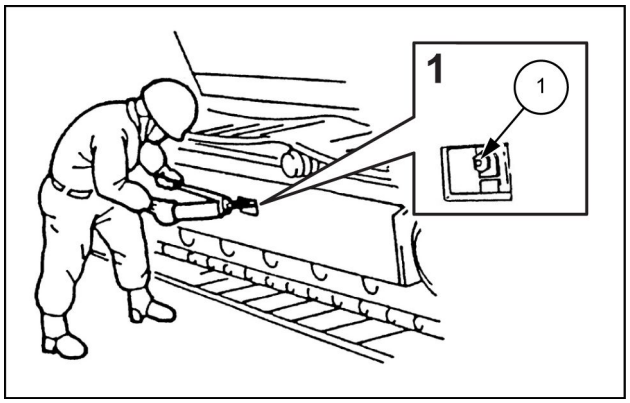
2. Tighten the 4 bolts **(2)** with a box wrench [**30 mm**] to install the upper roller **(1)**.
   - **LOCTITE®** shall be applied.
   - Bolt **(2)** tightening torque: **521 - 608 N·m** (**384.3 - 448.4 lb ft**).



SMIL14CEX2060AB 2

3. Tighten the check valve **(1)**.

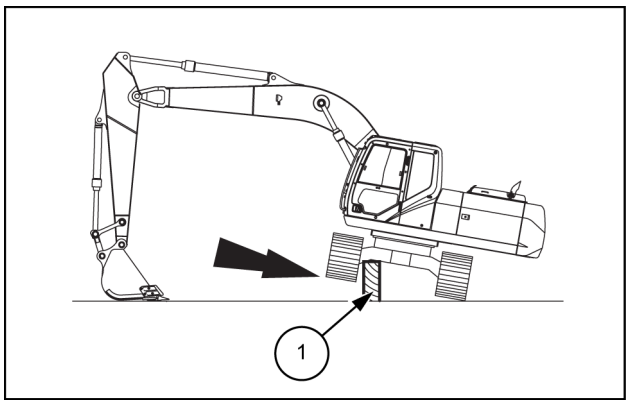
   Fill grease to the grease cylinder while checking tension of the track shoe.



SMIL14CEX2062AB 3

4. Raise the lower side frame while checking tension of the track shoe as shown in the figure.

   Put wood planks **(1)** under the lower frame to prevent falling.



SMIL14CEX2063AB 4

Air conditioning - Service instruction - Work precautions

⚠ WARNING

Pressurized system!
Refrigerant under pressure. Service, repair, or recharging must be performed only by trained service technician.
Failure to comply could result in death or serious injury.

W1180A

⚠ WARNING

Escaping refrigerant may cause frostbite!
Always wear protective goggles when handling refrigerant. If you get refrigerant in your eye, immediately flush your eyes with water for 15 minutes. Seek medical assistance immediately.
Failure to comply could result in death or serious injury.

W0339A

⚠ WARNING

Explosion hazard!
Air-conditioning refrigerant boils at -12 °C (10 °F)!
-NEVER expose any part of the air-conditioning system to a direct flame or excessive heat.
-NEVER disconnect or disassemble any part of the air-conditioning system.
Discharging refrigerant gas into the atmosphere is illegal in many countries.
Failure to comply could result in death or serious injury.

W0340A

⚠ WARNING

Escaping refrigerant may cause frostbite!
If you get refrigerant on your skin:
-Warm the area with your hand or lukewarm water, 32 - 38 °C (90 - 100 °F).
-Cover the area loosely with a bandage to protect the area and the prevent infection.
-Seek medical assistance immediately.
Failure to comply could result in death or serious injury.

W0341A

NOTICE: *Refrigerant in the liquid state is very cold [about **-26 °C (-14.8 °F**)], so be very careful during handling.*

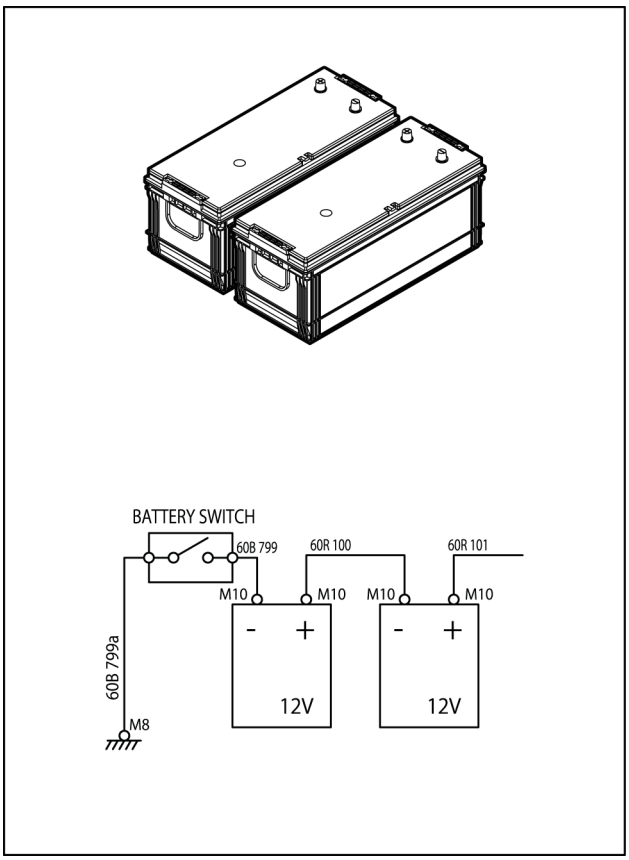
Always use **R134A** refrigerant.

- Storage
  Keep service cans (hereinafter, cans) with refrigerant in them at **40 °C** (**104.0 °F**) or below.
  The insides of the cans are highly pressurized and filled with refrigerant, so if the temperature rises there is the danger of internal pressure rising sharply and an explosion occurring.
  Never store in direct sunlight, in a closed vehicle, or near open flames.
  Be careful not to drop cans or have them collide with other objects.

Battery

Model: 180G51

Part No.: KHR4197X-A

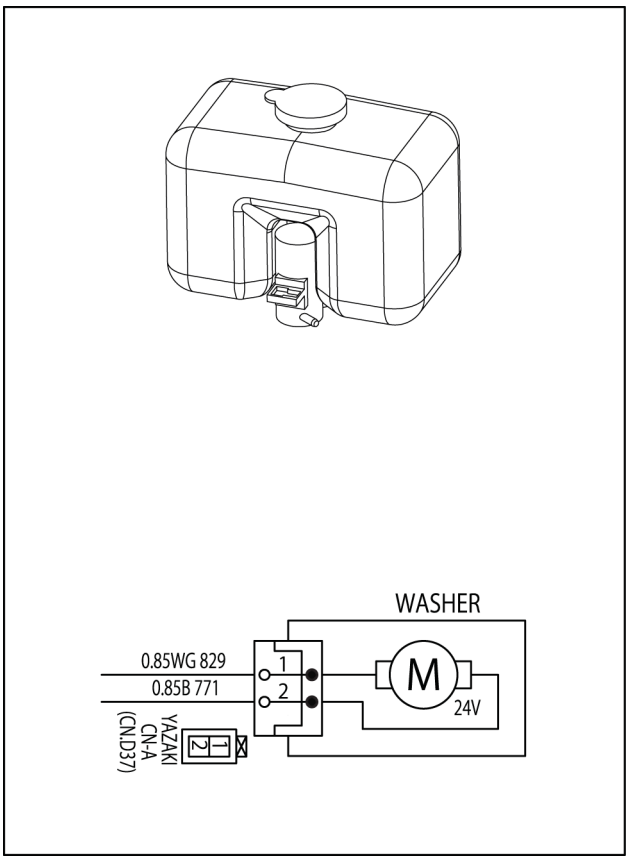


SMIL14CEX4084BA 5

Washer motor

(tank + motor)

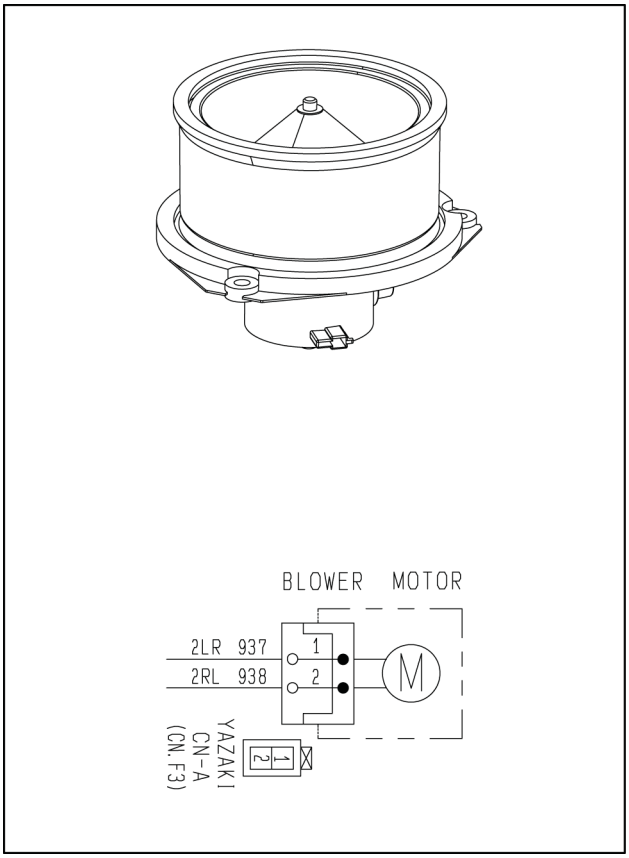
Part No.: KHR2261X-A



SMIL14CEX4085BA 6

Blower motor

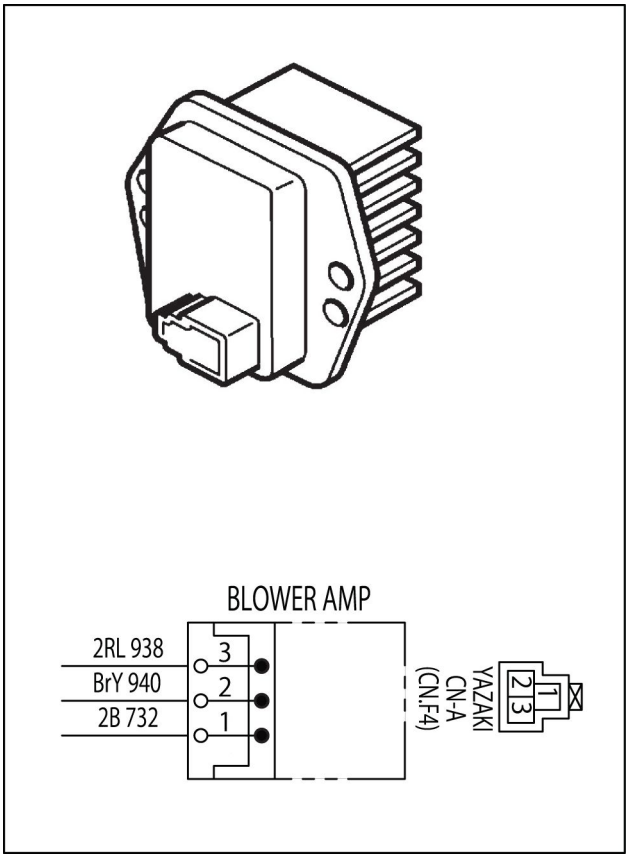
Part No.: KHR27850



SMIL14CEX4162BA 70

Blower amp

Part No.: KHR27840



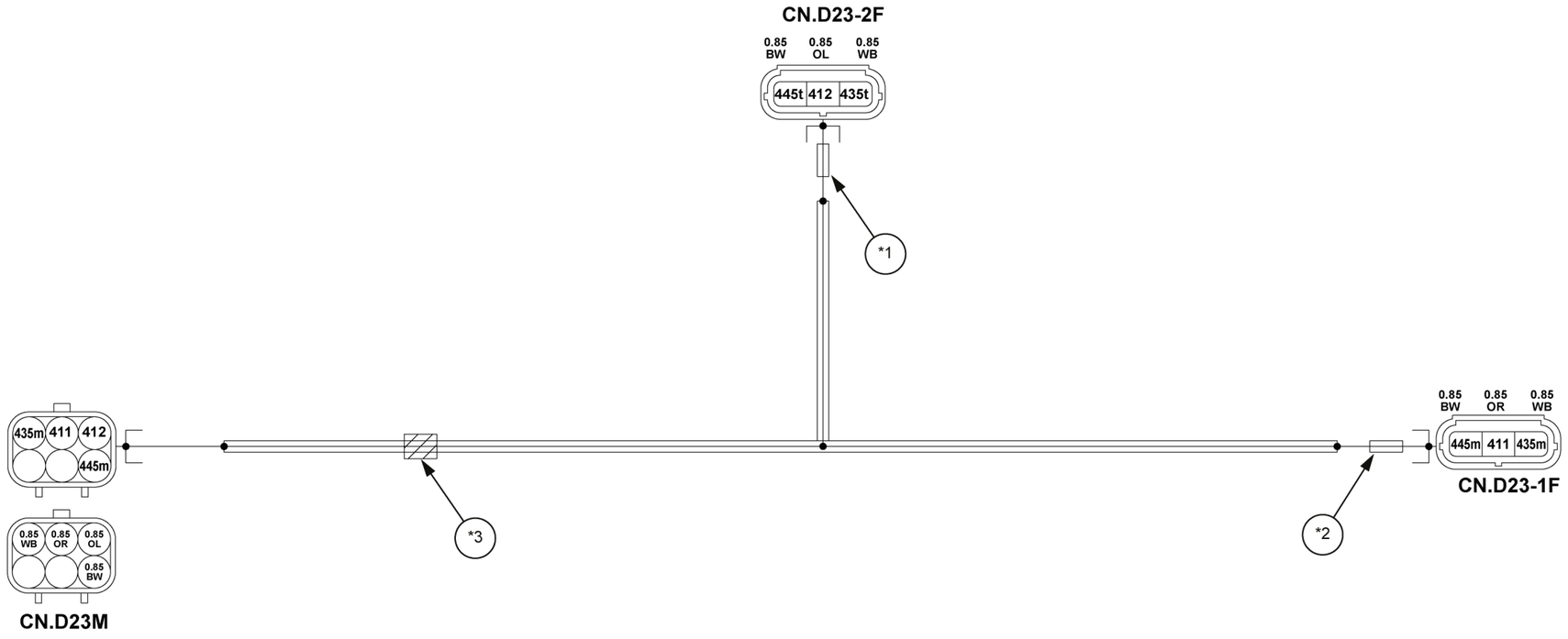
SMIL14CEX4163BA 71

Fuse box 1

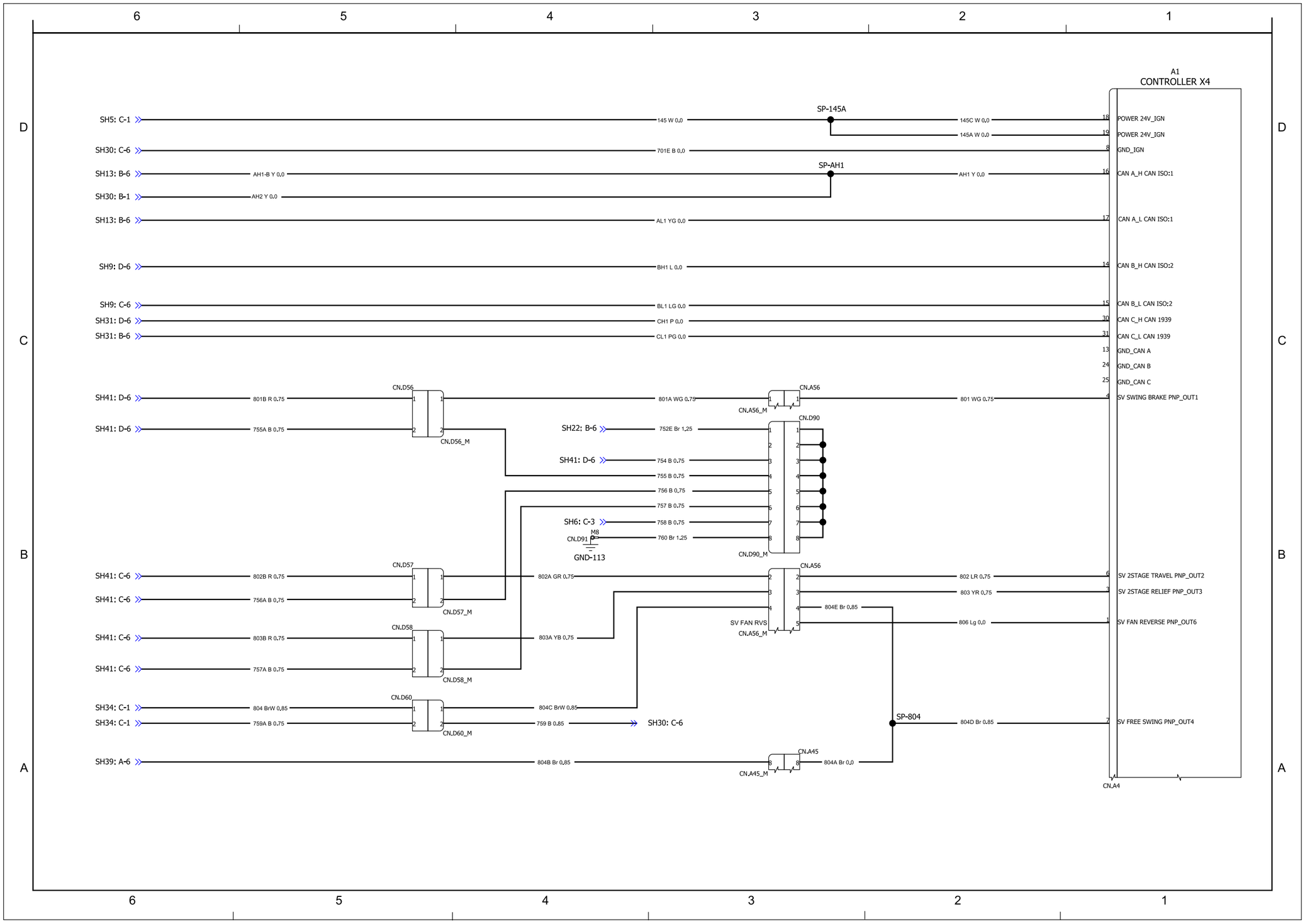
No.	Name		No.	Name	
F1	Key switch	**10 A**	F9	Air-conditioner compressor	**5 A**
F2	Accessories	**10 A**	F10	Engine controller	**20 A**
F3	GPS controller	**10 A**	F11	Monitor (back-up)	**10 A**
F4	Monitor	**10 A**	F12	Back-up	**10 A**
F5	Controller	**10 A**	F13	Solenoid	**15 A**
F6	Lever lock	**10 A**	F14	Proportional solenoid	**15 A**
F7	Air-conditioner unit	**5 A**	F15	Horn	**15 A**
F8	Air-conditioner blower motor	**15 A**			

Fuse box 2

No.	Name		No.	Name	
F1	Seat suspension, heater	**10 A**	F7	Beacon	**10 A**
F2	Wiper, washer	**15 A**	F8	Lamp (cab)	**15 A**
F3	Cigar lighter	**10 A**	F9	Lamp (boom, housing)	**15 A**
F4	DC/DC converter	**10 A**	F10	Options	**10 A**
F5	FVM	**10 A**	F11	Spare 2	**10 A**
F6	Spare 1	**10 A**	F12	Spare 3	**15 A**



SMIL15CEX1544JB 5


6
5
4
3
2
1
D
C
B
A
A1
CONTROLLER X4
SH5: C-1
145 W 0,0
SP-145A
145C W 0,0
145A W 0,0
18 POWER 24V_IGN
19 POWER 24V_IGN
SH30: C-6
701E B 0,0
8 GND_IGN
SH13: B-6
AH1-B Y 0,0
SP-AH1
AH1 Y 0,0
16 CAN A_H CAN ISO:1
SH30: B-1
AH2 Y 0,0
SH13: B-6
AL1 YG 0,0
17 CAN A_L CAN ISO:1
SH9: D-6
BH1 L 0,0
14 CAN B_H CAN ISO:2
SH9: C-6
BL1 LG 0,0
15 CAN B_L CAN ISO:2
SH31: D-6
CH1 P 0,0
30 CAN C_H CAN 1939
SH31: B-6
CL1 PG 0,0
31 CAN C_L CAN 1939
13 GND_CAN A
24 GND_CAN B
25 GND_CAN C
SH41: D-6
801B R 0.75
CN.D56
801A WG 0.75
CN.A56
CN.A56_M
801 WG 0.75
4 SV SWING BRAKE PNP_OUT1
SH41: D-6
755A B 0.75
CN.D56_M
SH22: B-6
752E Br 1,25
CN.D90
SH41: D-6
754 B 0.75
755 B 0.75
756 B 0.75
757 B 0.75
SH6: C-3
758 B 0.75
CN.D91
M8
760 Br 1.25
GND-113
CN.D90_M
SH41: C-6
802B R 0.75
CN.D57
802A GR 0.75
CN.A56
802 LR 0.75
6 SV 2STAGE TRAVEL PNP_OUT2
SH41: C-6
756A B 0.75
CN.D57_M
803 YR 0,75
3 SV 2STAGE RELIEF PNP_OUT3
804E Br 0.85
SV FAN RVS
CN.A56_M
806 Lg 0.0
1 SV FAN REVERSE PNP_OUT6
SH41: C-6
803B R 0.75
CN.D58
803A YB 0.75
SH41: C-6
757A B 0.75
CN.D58_M
SH34: C-1
804 BrW 0,85
CN.D60
804C BrW 0.85
SH34: C-1
759A B 0.75
CN.D60_M
759 B 0.85
SH30: C-6
SP-804
804D Br 0.85
7 SV FREE SWING PNP_OUT4
SH39: A-6
804B Br 0,85
CN.A45
804A Br 0,0
CN.A45_M
CN.A4

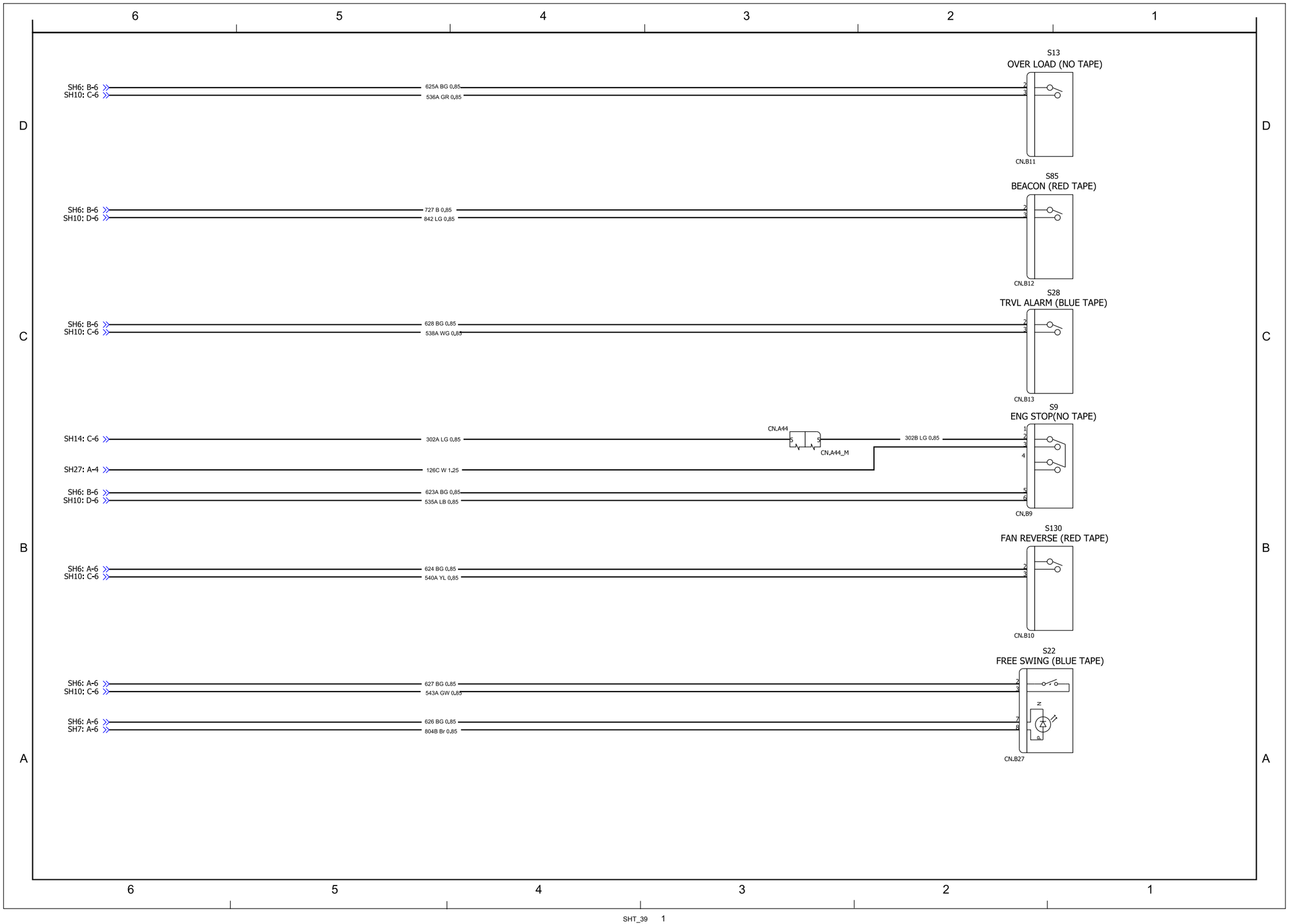
SHT_7 1

Wiring harnesses - Electrical schematic sheet 22 - OPTION PEDAL, SOLENOID, PROPORTIONAL CIRCUIT

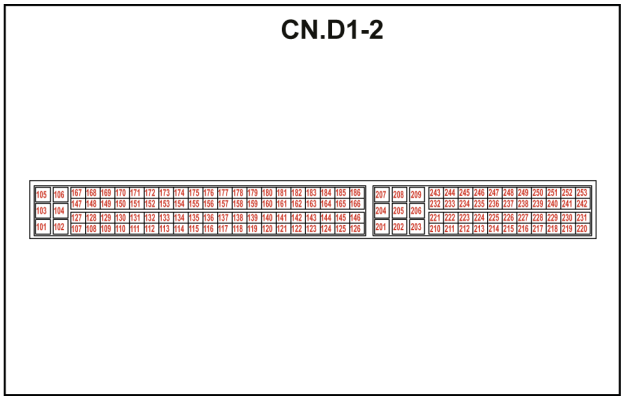
Type	Component	Connector	Description
Sensor	B110		Press. Sensor (pilot option)
Solenoid	Y24 (S2)		Option 1 solenoid valve (red tape)
Solenoid	Y25 (S2)		Option 2 solenoid valve (red band)
Solenoid	Y26 (S1)		Option 2 solenoid valve (blue band)
Solenoid	Y26-A (S1)		Option 2 solenoid valve (blue band)
Solenoid	Y27		Option select solenoid valve
Connector	CN.B19	**CN.B19**	Option harness
Connector	CN.D24	**CN.D24**	Floor harness
Connector	CN.G1	**CN.G01**	Option 1 solenoid valve (red tape) connector
Connector	CN.G2	**CN.G02**	Option 1 solenoid valve (red tape) connector
Connector	CN.G4	**CN.G4**	Option 2 solenoid valve (red tape) connector
Connector	CN.G7	**CN.G7**	Option 1 solenoid valve (red tape) connector
Connector	CN.G8	**CN.G8**	Option 1 solenoid valve (red tape) connector
Connector	CN.G11	**CN.G11**	Press. Sensor (pilot option) connector
Connector	CN.G16		Option 2 solenoid valve (blue band) connector
Connector	CN.G17		Option 2 solenoid valve (blue band) connector

Wire Break

Component	Connector / Link	Description
WB-038	**Wiring harnesses - Electrical schematic sheet 24 - KNOB-RIGHT (55.100)**	
WB-077	**Wiring harnesses - Electrical schematic sheet 11 - MAIN CONTROLLER A1 (55.100)**	
WB-080	**Wiring harnesses - Electrical schematic sheet 05 - MAIN CONTROLLER A1 (55.100)**	
WB-1135	**Wiring harnesses - Electrical schematic sheet 05 - MAIN CONTROLLER A1 (55.100)**	
WB-1150	**Wiring harnesses - Electrical schematic sheet 17 - SENSORS (55.100)**	
WB-1212	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-1233	**Wiring harnesses - Electrical schematic sheet 25 - KNOB LEFT (55.100)**	
WB-1248	**Wiring harnesses - Electrical schematic sheet 25 - KNOB LEFT (55.100)**	
WB-1269	**Wiring harnesses - Electrical schematic sheet 03 - POWER DISTRIBUTION (55.100)**	
WB-1317	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-1404	**Wiring harnesses - Electrical schematic sheet 16 - SENSORS (55.100)**	
WB-141	**Wiring harnesses - Electrical schematic sheet 25 - KNOB LEFT (55.100)**	
WB-1437	**Wiring harnesses - Electrical schematic sheet 40 - SOLENOID VALVE, MAGNET CLUTCH, RECEIVER DRYER (55.100)**	
WB-144	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-1488	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-1554	**Wiring harnesses - Electrical schematic sheet 24 - KNOB-RIGHT (55.100)**	
WB-180	**Wiring harnesses - Electrical schematic sheet 24 - KNOB-RIGHT (55.100)**	
WB-294	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-480	**Wiring harnesses - Electrical schematic sheet 29 - MAIN CAB-ECM INTER CONNECTOR (55.100)**	
WB-513	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-545	**Wiring harnesses - Electrical schematic sheet 16 - SENSORS (55.100)**	
WB-563	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-634	**Wiring harnesses - Electrical schematic sheet 24 - KNOB-RIGHT (55.100)**	
WB-658	**Wiring harnesses - Electrical schematic sheet 25 - KNOB LEFT (55.100)**	
WB-670	**Wiring harnesses - Electrical schematic sheet 10 - MAIN CONTROLLER A1 (55.100)**	
WB-679	**Wiring harnesses - Electrical schematic sheet 30 - MAIN CAB-INTER CONNECTOR (55.100)**	
WB-694	**Wiring harnesses - Electrical schematic sheet 05 - MAIN CONTROLLER A1 (55.100)**	
WB-718	**Wiring harnesses - Electrical schematic sheet 24 - KNOB-RIGHT (55.100)**	
WB-807	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-828	**Wiring harnesses - Electrical schematic sheet 17 - SENSORS (55.100)**	
WB-855	**Wiring harnesses - Electrical schematic sheet 25 - KNOB LEFT (55.100)**	
WB-867	**Wiring harnesses - Electrical schematic sheet 24 - KNOB-RIGHT (55.100)**	
WB-930	**Wiring harnesses - Electrical schematic sheet 23 - OPTION PROPORTIONAL SOLENOID CIRCUIT (55.100)**	
WB-968	**Wiring harnesses - Electrical schematic sheet 09 - MAIN CONTROLLER A1 (55.100)**	
WB-977	**Wiring harnesses - Electrical schematic sheet 25 - KNOB LEFT (55.100)**	
WB-995	**Wiring harnesses - Electrical schematic sheet 10 - MAIN CONTROLLER A1 (55.100)**	


6
5
4
3
2
1
D
C
B
A
S13
OVER LOAD (NO TAPE)
SH6: B-6
SH10: C-6
625A BG 0,85
536A GR 0,85
2
3
CN.B11
S85
BEACON (RED TAPE)
SH6: B-6
SH10: D-6
727 B 0,85
842 LG 0,85
2
3
CN.B12
S28
TRVL ALARM (BLUE TAPE)
SH6: B-6
SH10: C-6
628 BG 0,85
538A WG 0,85
2
3
CN.B13
S9
ENG STOP(NO TAPE)
SH14: C-6
302A LG 0,85
CN.A44
5
3
CN.A44_M
302B LG 0,85
SH27: A-4
126C W 1,25
SH6: B-6
SH10: D-6
623A BG 0,85
535A LB 0,85
1
2
3
4
5
6
CN.B9
S130
FAN REVERSE (RED TAPE)
SH6: A-6
SH10: C-6
624 BG 0,85
540A YL 0,85
2
3
CN.B10
S22
FREE SWING (BLUE TAPE)
SH6: A-6
SH10: C-6
627 BG 0,85
543A GW 0,85
2
3
SH6: A-6
SH7: A-6
626 BG 0,85
804B Br 0,85
7
8
N
P
CN.B27
SHT_39 1

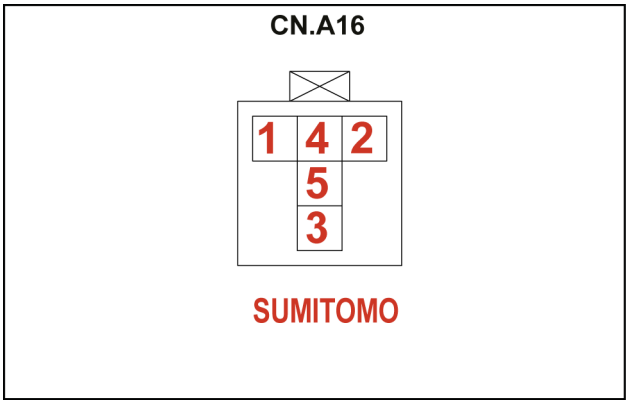
CONNECTOR CN.D1-2 – DCU 1 (23-PIN) (Male)



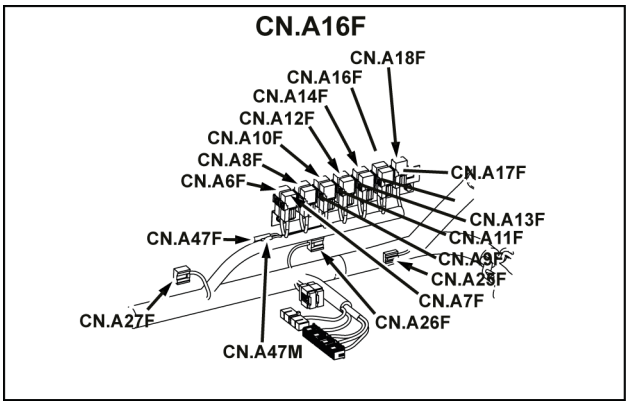
SMIL14CEX5881AA 46

Pin	From	Wire	Description	Color-Size	Frame
108	CN.D19 pin 1	578		W - 1.25	**SHEET 19**
112	CN.D17 pin 6	581A		BY - 0.75	**SHEET 15**
117	CN.D18 pin 3	577		Gr - 0.85	
118	CN.D18 pin 4	575		BW - 0.85	
119	CN.D18 pin 2	576		WG - 0.85	
124	CN.D18 pin 10	572		LR - 0.85	
126	CN.D18 pin 8	571		B - 1.25	
132	CN.D17 pin 5	580A		Y - 0.75	
133	CN.D17 pin 7	582		L - 0.75	
134	CN.D17 pin 8	583		GB - 0.75	
146	CN.D18 pin 9	570		R - 1.25	
165	CN.D18 pin 12	574		LB - 1.25	
185	CN.D19 pin 2	579		RB - 1.25	**SHEET 19**
186	CN.D18 pin 11	573		YR - 1.25	**SHEET 15**
201	SP-785A pin-X	785		B - 2.0	
203	SP-785A pin-X	785A		B - 2.0	
204	SP-785B pin-X	785B		B - 2.0	
207	SP-105A pin-X	105		R - 2.0	
209	SP-105A pin-X	105A		R - 2.0	
211	SP-AH3 pin-X	AH3		Y	**SHEET 12**
212	SP-AL3 pin-X	AL3		YG	
214	SP-DH1 pin-X	DH1		W - 0.75	**SHEET 15**
215	SP-DL1 pin-X	DL1		WG - 0.75	
246	CN.D1-2 pin 247	DH0		W - 0.75	
247	CN.D1-2 pin 246	DH0		W - 0.75	
248	CN.D1-2 pin 249	DL0		WG - 0.75	
249	CN.D1-2 pin 248	DL0		WG - 0.75	
252	SP-501 pin-X	501Q		G - 0.85	

CONNECTOR CN.A16 – SPEAKER (LEFT) (5-PIN) (Female)



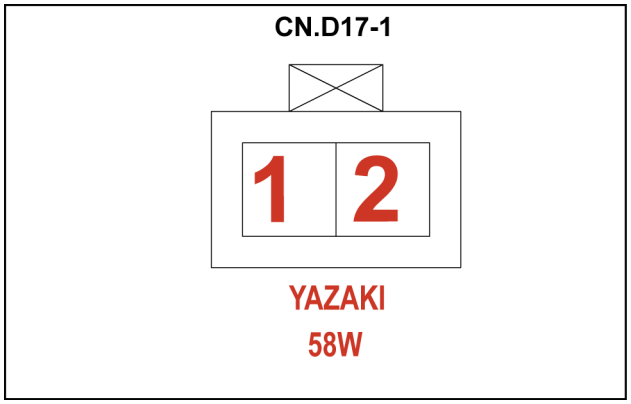
SMIL14CEX5262AA 13



SMIL14CEX5263AA 14

Pin	From	Wire	Description	Color-Size	Frame
1	SP-185C pin X	185D		LW	**SHEET 31**
2	SP-825A pin X	825C		LG	
3	CN.A45_M pin 11	981B		L - 0.85	**SHEET 09**
4	CN.A41_M pin 16	985		LB - 0.85	**SHEET 15**

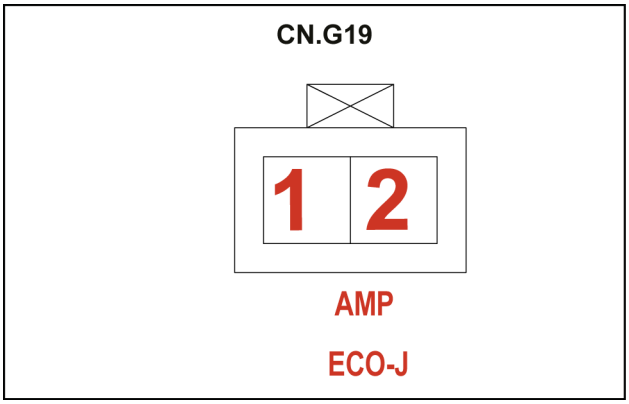
CONNECTOR CN.D17-1 – FUEL PUMP (2-PIN) (Female)



SMIL14CEX6498AA 56

Pin	From	Wire	Description	Color-Size	Frame
1	SP-250A pin X	250E		BY - 2.0	**SHEET 21**
2	SP-752A pin X	752F		Br - 1.25	

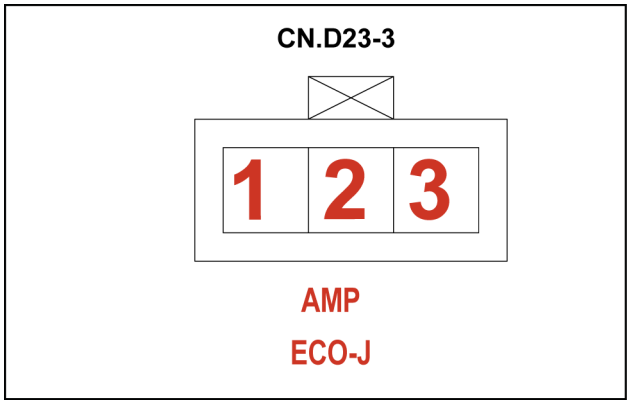
CONNECTOR CN.G19 - OPTION 2 PROPORTIONAL SOLENOID (LEVER DOWN) (2-PIN) (Male)



SMIL14CEX5948AA 99

Pin	From	Wire	Description	Color-Size	Frame
1	CN.G4.pin 3	957A		RW 0.85	**SHEET 23**
1	SP-958A pin X	958A		BY 0.85	

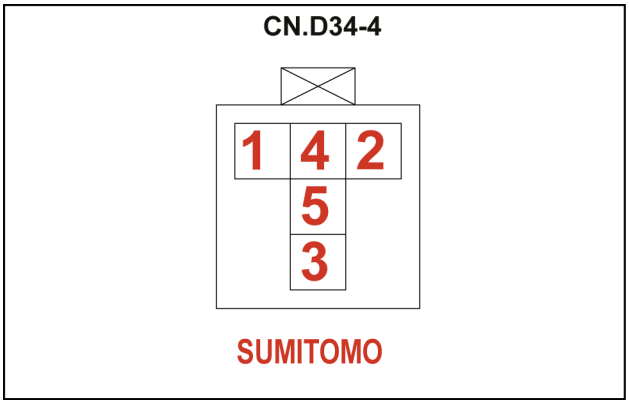
CONNECTOR CN.D23-3 – PRESSURE SENSOR (PILOT TRAVEL ONE PEDAL) (3-PIN) (Male)



SMIL14CEX6523AA 47

Pin	From	Wire	Description	Color-Size	Frame
1	SP-435U pin X	435U		WL - 0.85	**SHEET 17**
2	CN.D23 pin 4	413B		OW - 0.85	
3	SP-445U pin X	445U		BW - 0.85	

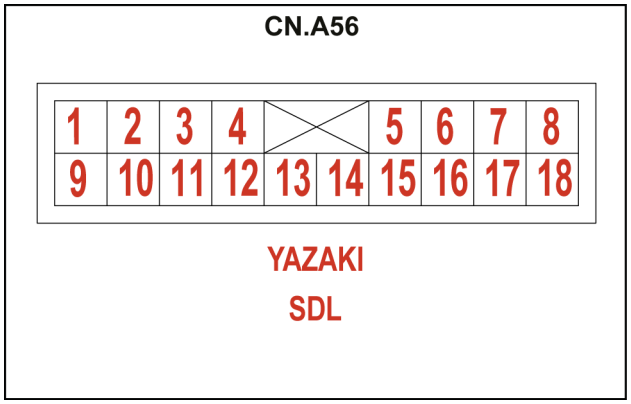
CONNECTOR CN.D34-4 - RELAY STOP (5-PIN) (Male)



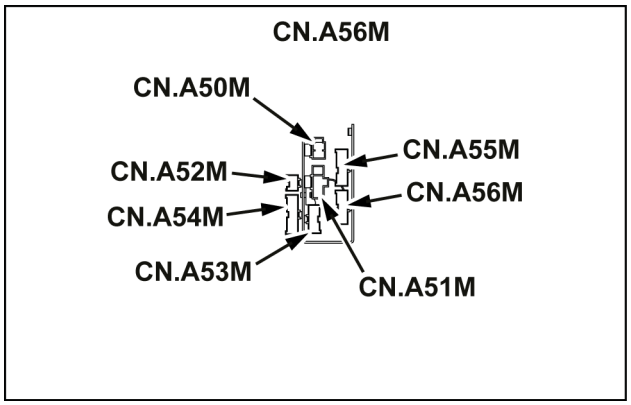
SMIL14CEX6475AA 31

Pin	From	Wire	Description	Color-Size	Frame
1	SP-847-P-X	847		L - 0.85	**SHEET 27**
2	SP-765-P-X	822		YL - 0.85	
3	SP-847-P-X	846A		L - 0.85	
4	CN.D34-7-P-2	894		WR - 0.85	
5	CN.D34-5-P-1	893		BrR - 0.85	

CONNECTOR CN.A56 – CAB MAIN HARNESS G (18-PIN) (Male)



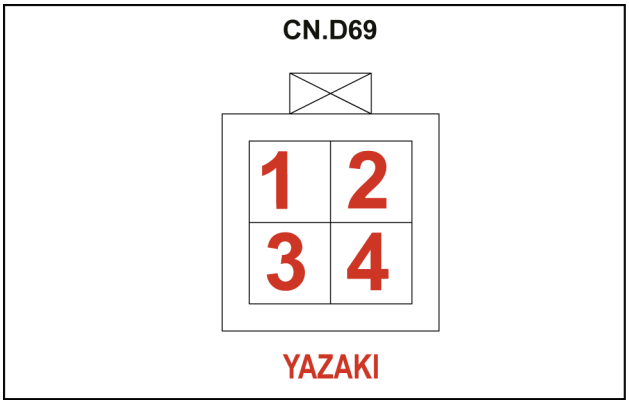
SMIL14CEX5224AA 13



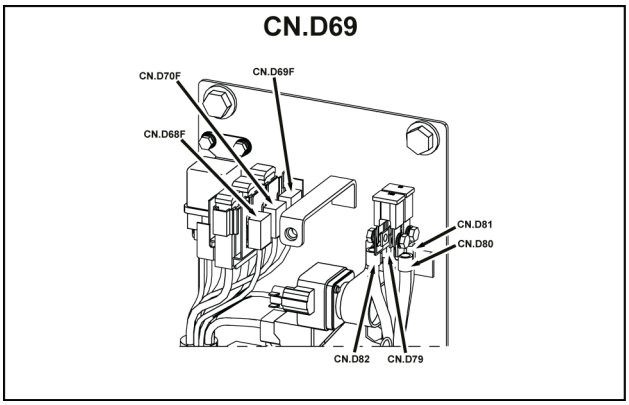
SMIL14CEX5226AA 14

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A4 pin 4	801		WG - 0.75	**SHEET 06**
2	CN.A4 pin 6	802		LR - 0.75	
3	CN.A4 pin 3	803		YR - 0.75	
4	SP-804 pin X	804E		Br - 0.85	
5	CN.A4 pin 1	806		Lg	
6	CN.A4 pin 5	807		RY - 0.75	**SHEET 07**
7	SP-808 pin X	808B		GW - 0.75	**SHEET 05**
8	CN.A5 pin 15	815		VG - 0.85	
9	CN.A5 pin 5	817		YG - 0.85	
10	CN.A3 pin 12	533		GrR - 0.85	**SHEET 08**
11	CN.A3 pin 32	534		LW	**SHEET 09**
12	CN.A2 pin 29	539		GY - 0.85	**SHEET 10**
13	SP-430B pin X	430A		W - 0.85	**SHEET 11**
14	SP-440 pin X	440		BL - 0.85	
15	CN.A1 pin 26	417		Y	
16	CN.A1 pin 16	418		L	
17	CN.A1 pin 25	419		R	
18	CN.A1 pin 33	420		G	

CONNECTOR CN.D69 – FUSIBLE 20 A: UREA PUMP (4-PIN) (Male)



SMIL14CEX5335AA 39



SMIL14CEX5334AA 40

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D32 P1	260		YR - 0.85	**SHEET 39**
2	SP-106C pin X	106C		R - 3.0	**SHEET 02**
3	CN.D89 P1	265		R - 1.25	
4	SP-106C pin X	106		R - 3.0	

- The counterweight removal/installation mode is established.
- The lifting magnet is attracting something.
- Inducement (Final) has occurred.
- The ECM has generated a diagnostic trouble code. (Except some SCR-related DTCs)
- Lever operation. (Either one of the following pressure sensors is ON; upper, swing, travel, option 1, option 2)
- Throttle volume operation.
- The one-touch idle switch is pressed.
- Oil temperature sensor trouble (DTC: 7041) has occurred.
- Oil temperature $\geqq$ **90 °C** (**194 °F**).
- SCR CLEANING is started.
- Auto calibration is started.

Operation (urea thawing, heat insulating and warm-up)

In order to maintain the target coolant temperature, thawing, heat insulating and warm-up operation is carried out. The target coolant temperature is maintained by applying the hydraulic pressure load with the engine speed maintained.
In case of low coolant temperature, it will take a long time for the coolant temperature to become stable after the load is applied.

Controls (urea thawing, heat insulating and warm-up)

When all the following conditions are fulfilled, the machine starts urea thawing, heat insulating and warm-up operation and displays the icon on the monitor.
While the engine is running

- Lever operation is not performed. (All the following pressure sensors are OFF; upper, swing, travel, option 1, option 2)
- The throttle volume is not operated.
- The one-touch idle switch is not pressed.

In these situations, **2 min** or more have passed. (If the auto warm-up has been carried out for **2 min** or more, the urea thawing, heat insulating and warm-up starts immediately.)

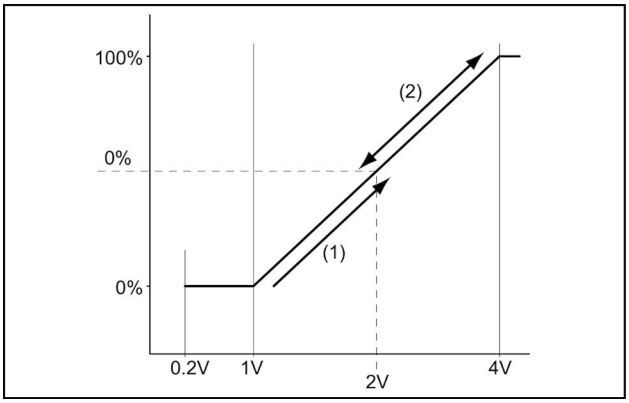
- Outside air temperature $\leqq$ **-10 °C** (**14 °F**).
- The actual coolant temperature is less than or equal to the target coolant temperature for urea thawing, heat insulating and warm-up.
- The fan is not reversing.
- The counterweight removal/installation mode is not established.
- The lifting magnet is attracting nothing.
- Not during inducement (Final).
- The ECM has not generated a diagnostic trouble code. (Except some SCR-related DTCs)
- Oil temperature sensor trouble (DTC: 7041) has not occurred.
- Oil temperature $\leqq$ **70 °C** (**158 °F**).
- Not during SCR CLEANING.
- Not during auto calibration.

When one of the following conditions is fulfilled, the machine ends urea thawing, heat insulating and warm-up operation and hides the icon on the monitor.

- Outside air temperature $\geqq$ **-8 °C** (**18 °F**). (For initial judgment, outside temperature **>** **-10 °C** (**14 °F**))
- Engine OFF.
- The fan is reversing.

Accelerator position switch, with APS learning control

If APS learning control is available, when the ignition cycle ends with the accelerator position at **2 V**, for example **(1)**, the accelerator position learning causes the **2 V** status to be recognized as the opening position **0 %**, and the control range changes from **2 - 4 V (2)**.



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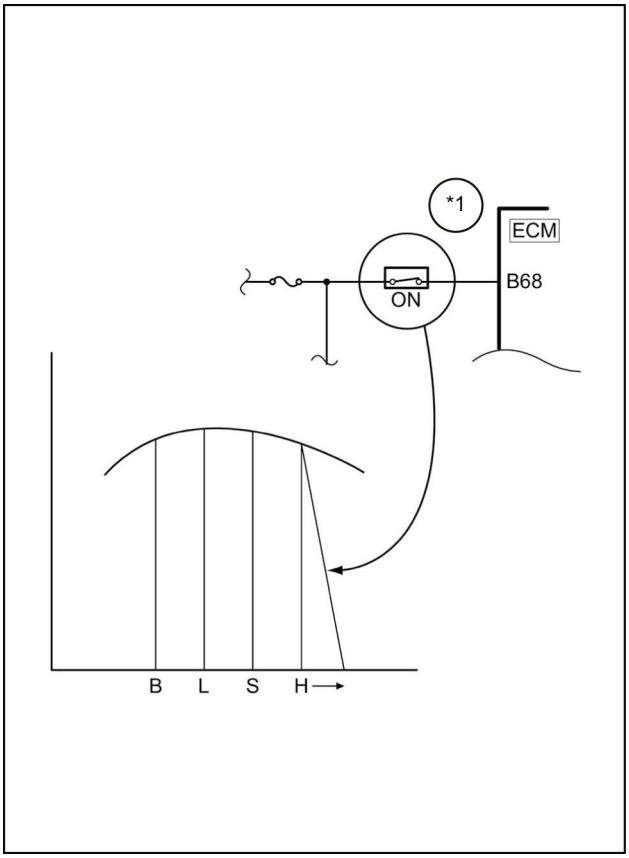
Regulation mode switch

When there is input from the regulation mode switch, the engine speed will change to the following.

*1. Regulation mode switch



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Idling control

By operating the idling control change switch during the warm-up operation, the minimum idling speed can be adjusted. In addition, by operating the idling control change switch, the minimum idling speed can be automatically set to the optimum value in accordance with the engine coolant temperature.

NOTE: *The specifications vary depending on the machine, so availability of functions also differ.*

Idling control change switch

By operating the idling control change switch, the idling control functions can be switched.

Engine Control Unit (ECU) - Install

1. Mount the ECM in the reversed order of the procedure for removal.

Engine hunting, rough idling - Diagnosis

Preliminary inspection

Before using this section, perform a functional inspection and OBD system check to check all of the following items. The ECM and monitor are operating correctly.

Check DTCs. The scan tool data is within the normal operation range.

Check the condition of the actual machine and find applicable symptoms.

Confirm with the customer that the stipulated engine oil and fuel are being used.

Visual inspection

Some symptoms detection procedures require careful visual inspection.

This allows for problems to be repaired without performing further inspection, which saves valuable time.

The following items are included in this inspection.

Check for connector connection problems.

Check whether the battery terminal voltage is low.

Check for correct wiring connections, tightness, and disconnections, and then check whether the power supply for commercially-available accessories is being diverged from the ECM power supply.

Check whether the ECM ground is dirty and check that it is securely installed in the correct location.

Check that pipes and hoses for fuel, air, and oil are not broken or twisted and that they are correctly connected.

Thoroughly check for any leaking or clogging.

Check for fuel leaks and damage and denting on pipes in the fuel system.

Check whether the layout of the fuel filter, pre-filter and charge fuel pump makes it easy for air pockets to form.

Isuzu genuine pre-filter does not have an air-bleed plug. Check that parts are arranged so as to prevent the formation of air pockets.

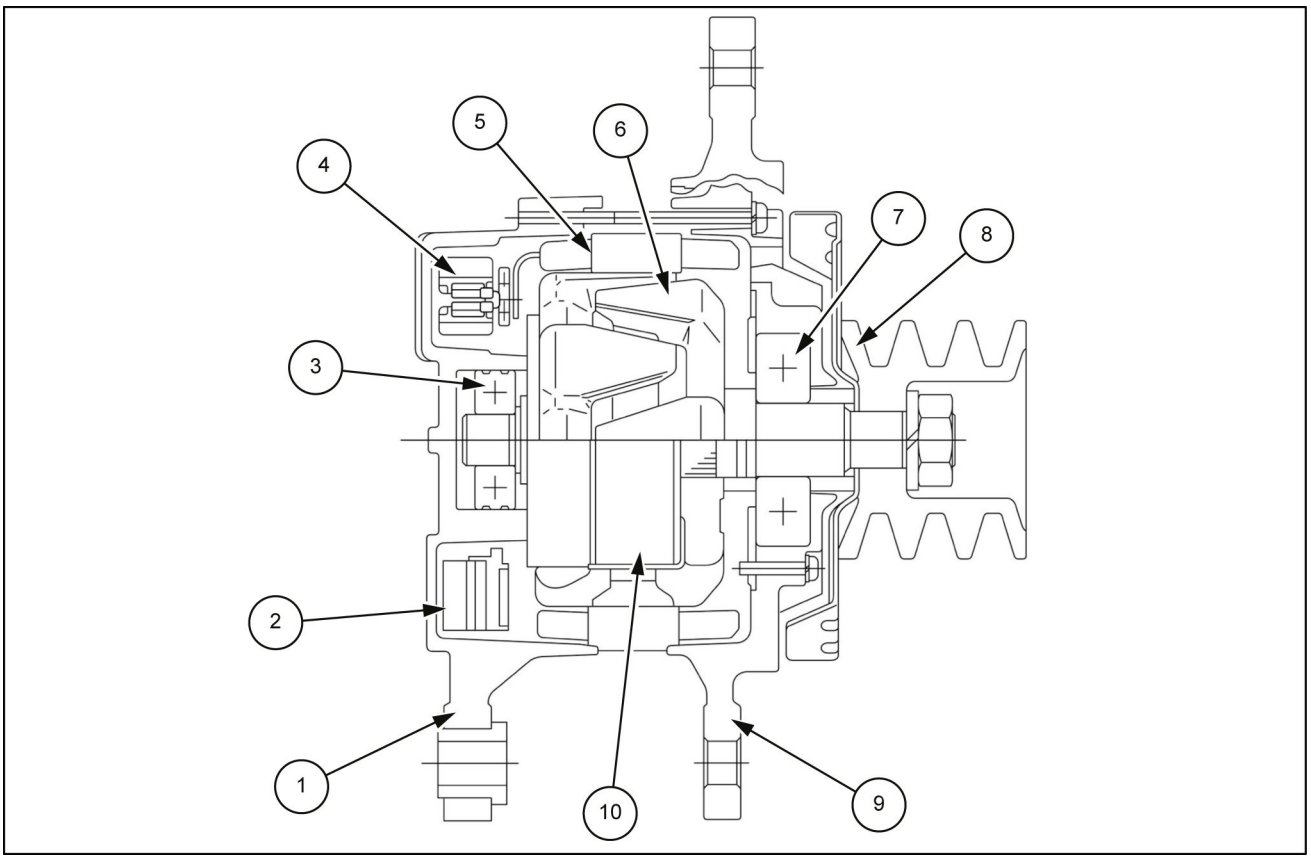
Also, check that the layout of the charge fuel pump suction and discharge ports is appropriate.

Correct layouts where the suction port of the charge fuel pump is on the upper side or the discharge port faces in the moving direction of the actual machine.

Check for fuel leaks and damage and denting on pipes in the fuel system.

Suction air system parts abnormality and exhaust system parts abnormality

Alternator - Component identification



SMIL14CEX3889FA 1

1. Rear bracket
2. Regulator
3. Bearing
4. Rectifier
5. Stator
6. Rotor
7. Bearing
8. Pulley
9. Front bracket
10. Field coil

Electrical systems - 55

Fuel tank system - 011

CX300D Crawler excavators LC version (TIER4 FINAL) - MEA Market

Contents

Electrical systems - 55

Selective Catalytic Reduction (SCR) electrical system - 988

FUNCTIONAL DATA

SERVICE

Control

Overview of control

1. Inducement control logic consists of the three blocks:
    1. Inducement operation start condition
    2. Inducement judgment
    3. Communication with excavator/engine output limit
2. Control details
    a. Inducement operation start condition

			Inducement start time			
			First time		Repeated	
Operation condition	Trouble diagnosis name	DTC	Early	Final	Early	Final
Remaining urea level	Inducement (urea level low)	7428 7429 7430	In-stantly	Instantly	Instantly	Instantly
Urea solution quality	Urea quality abnormality	P207F	**3 h**	**3.5 h**	Instantly	**30 min**
Urea injection stop / SCR system failure	SCR system abnormality (with inducement)	P20C9				
	(Dosing valve disconnected or shorted)	P2048 P2049				
NCD-target component failure	Suction air temperature sensor abnormally high voltage	P0113				
	Suction air temperature sensor abnormally low voltage	P0112	**3 h**	**3.5 h**	Instantly	**30 min**
	Coolant temperature sensor abnormally high voltage	P0118				
	Coolant temperature sensor abnormally low voltage	P0117				
	Boost pressure sensor abnormally high voltage	P0238				
	Boost pressure sensor abnormally low voltage	P0237				
	Common rail pressure sensor abnormally high voltage	P0193				
	Common rail pressure sensor abnormally low voltage	P0192				
	Airflow sensor abnormally high voltage	P0103				
	Airflow sensor abnormally low voltage	P0102				
	Airflow sensor flow abnormality	P0101				
	DCU communication abnormality	U010E				
EGR system failure	EGR position sensor abnormality	P0409	**36 h**	**100 h**	Instantly	**5 h**
	EGR2 position sensor abnormality	P140B				
	EGR valve control abnormality	P0404				
	EGR2 valve control abnormality	P045B				
	EGR 0-point learning abnormality	P1404				
	EGR2 0-point learning abnormality	P140C				
	EGR flow abnormality	P0401				

b. Inducement judgment

Inducement judgment differs between the “remaining urea level” and the “trouble diagnosis (including others)”.

Remaining urea level: Inducement level is determined by the remaining level.

Diesel Exhaust Fluid (DEF)/AdBlue® dosing module - Assemble

1. Install the connector to the dosing module.

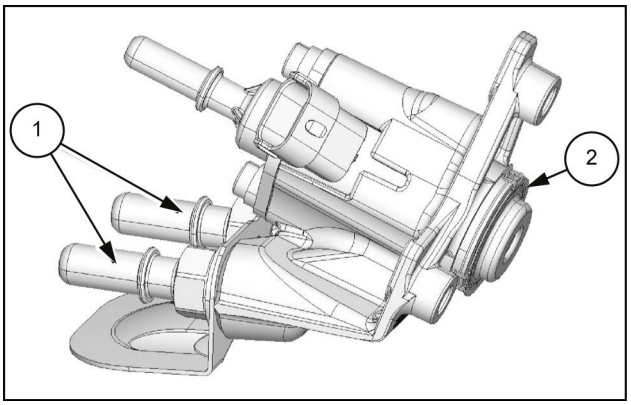
   Tightening torque: **6 N·m** (**49 lb in**)

NOTE: *Install the coolant piping connector **(1)** to the dosing module.*

> ⚠ CAUTION: Do not pinch the O-ring.

2. Install the gasket **(2)** to the dosing module.

> ⚠ CAUTION: Do not reuse the removed gasket **(2)**.



SMIL14CEX3234AB 1

Index

Electrical systems - 55

Engine cooling system - 012

a. Hold down for **3 s**.
1. Travel speed select switch
2. Attachment selection switch
3. Menu switch
4. Light switch
5. Wiper switch
6. Auto idle switch

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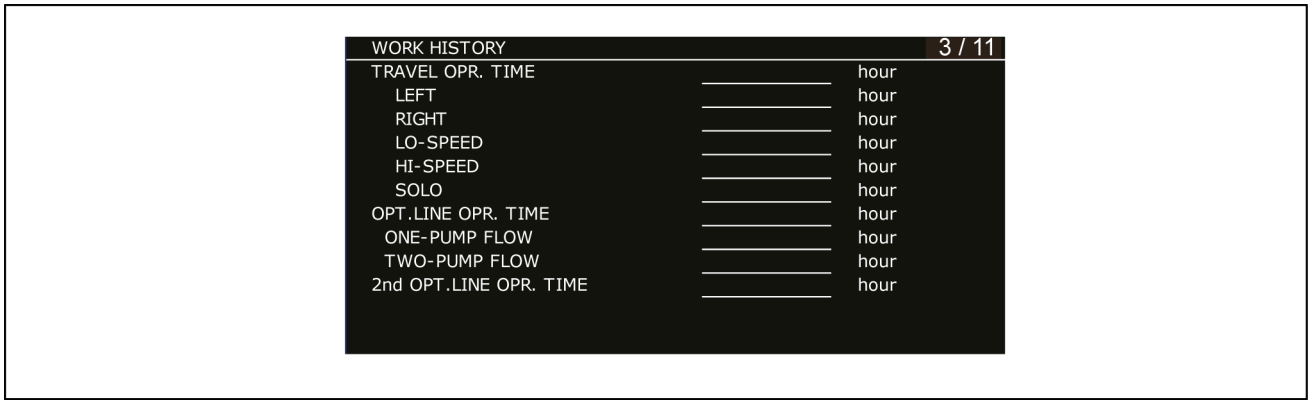

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Display	Explanation	Unit	Judgment condition	Judgment start condition
TRAVEL OPR. TIME	Travel operation time (both right and left)	hour	Travel operation judgment = ON	Engine in operation
LEFT	Left travel operation time	hour	Left travel operation judgment = ON	Engine in operation
RIGHT	Right travel operation time	hour	Right travel operation judgment = ON	Engine in operation
LO-SPEED	1st speed travel time	hour	(Travel operation judgment = ON) + (2nd speed travel SOL = OFF)	Engine in operation
HI-SPEED	2nd speed travel time	hour	(Travel operation judgment = ON) + (2nd speed travel SOL = ON)	Engine in operation
SOLO	Independent travel time	hour	(Travel judgment = ON) + (Upper judgment = OFF)	Engine in operation
OPT.LINE OPR. TIME	1st (both with and without 2 pumps flow) option operation time	hour	1st option operation judgment = ON	Engine in operation
ONE-PUMP FLOW	1st option operation (without 2 pumps flow) time	hour	(1st option operation judgment = ON) + (2 pumps flow SOL = OFF)	Engine in operation
TWO-PUMP FLOW	1st option operation (with 2 pumps flow) time	hour	(1st option operation judgment = ON) + (2 pumps flow SOL = ON)	Engine in operation
2nd OPT.LINE OPR. TIME	2nd option operation time	hour	2nd option operation judgment = ON	Engine in operation

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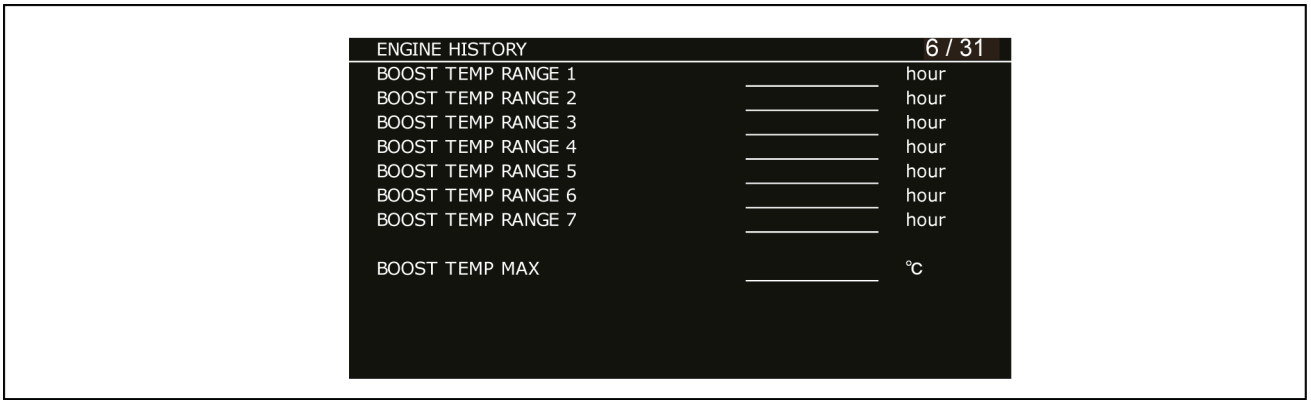
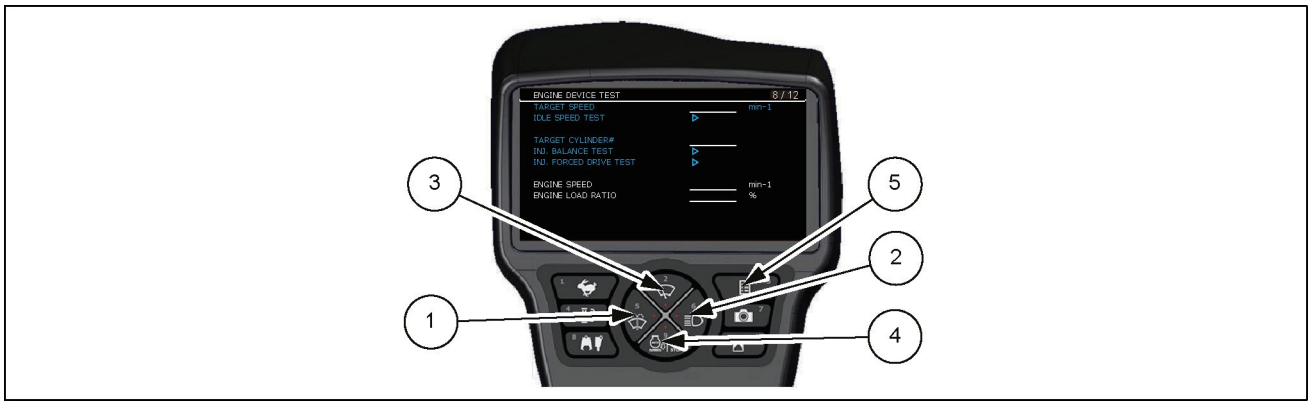


SMIL14CEX0978EA 65

Display	Explanation	Unit	Judgment condition	Judgment start condition
BOOST TEMP RANGE 1	Boost temperature; time distribution	hour	Less than **0 °C**	In **10 s** after the engine starts
BOOST TEMP RANGE 2	Boost temperature; time distribution	hour	Less than **20 °C**	In **10 s** after the engine starts
BOOST TEMP RANGE 3	Boost temperature; time distribution	hour	Less than **35 °C**	In **10 s** after the engine starts
BOOST TEMP RANGE 4	Boost temperature; time distribution	hour	Less than **50 °C**	In **10 s** after the engine starts
BOOST TEMP RANGE 5	Boost temperature; time distribution	hour	Less than **65 °C**	In **10 s** after the engine starts
BOOST TEMP RANGE 6	Boost temperature; time distribution	hour	Less than **80 °C**	In **10 s** after the engine starts
BOOST TEMP RANGE 7	Boost temperature; time distribution	hour	**80 °C** or more	In **10 s** after the engine starts
BOOST TEMP MAX	Maximum value of boost temperature	°C (°F)	–	In **10 s** after the engine starts

Idle Speed Test / Injector Test



SMIL14CEX1107EB 98

Display	Explanation	Unit	Remarks
TARGET SPEED	target engine speed	min-1 (rpm)	Items selectable. The engine speed can be increased or decreased from the current one.*
IDLE SPEED TEST	Idle speed test	–	The engine is driven at the specified idle speed (for **100 s**).
TARGET CYLINDER#	Injector selection	–	Items selectable. The injector to test can be selected. (Selectable up to 4 and 6 for the 4-cylindered and the 6-cylindered one respectively.)
INJ. BALANCE TEST	Injector balance test	–	The selected injector is stopped (for **10 s**).
INJ. FORCED DRIVE TEST	Injector forced drive	–	The selected injector is driven (for **10 s**).
ENGINE SPEED	Actual engine speed	min-1 (rpm)	
ENGINE LOAD RATIO	Engine torque (load ratio)	%	

1. Idle speed test

Purpose

- The desired engine speed can be attained.

NOTE: *For example, when the current engine speed is* ***1000 RPM*** *, selecting -200 can attain* ***800 RPM****.*

Condition for the test

- The engine is running [**300 - 1500 RPM**].

Setting of target engine speed (RPM)

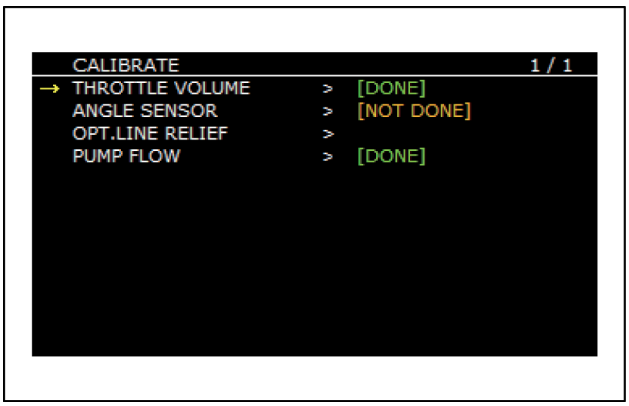
- Select "TARGET SPEED" (idle speed) using SW **(3)** and **(4)**.
- Press SW **(1)** and **(2)** to specify the target idle speed.
- Available set range: **-500 RPM** (low idle speed) to **+500 RPM**
- After the setting is completed, press SW **(5)**.

Test execution

- Select "IDLE SPEED TEST" (idle speed test) using SW **(3)** and **(4)**.
- Hold down SW **(2)** for **3 s**, then "▷" changes to "▶". Then, the set engine speed is attained and maintained for **100 s**.

Instrument cluster - Overview - CALIBRATE screen list

In the CALIBRATE mode, you can adjust the throttle volume, the angle sensor, the option line relief pressure and the electronically-controlled pump.
It is necessary to perform a calibration setup in order to adjust the individual difference (tolerance) of the machine (component) after replacement of the applicable component.



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The calibration setup is performed for the following components.

1. Throttle volume

   The calibration setup is required when the throttle volume is replaced.

2. Electronically-controlled pump

   The calibration setup is required when the electronically-controlled pump is replaced.

3. Option relief pressure control

   If the option electromagnetic relief proportional valve is installed, the calibration setup is required when the relief valve is replaced or added, or when the hydraulic pump is replaced. The calibration setup is not required if it is not installed or "NO ELECTROMAGNETIC RELIEF" is set in Model Setting.

4. Attachment angle sensor

   Vehicles equipped with the angle sensor (when the following are set on the model selection screen)

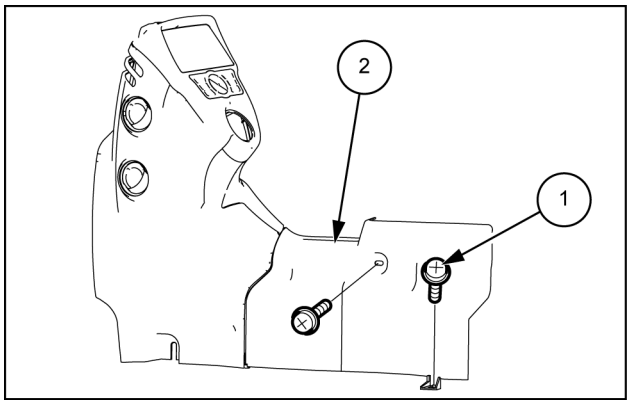
- OVER LOAD WARNINNG: 1 (Liftcrane)
- ANTI-INTFERENCE: 1 (Anti-interference is enabled)

   The calibration setup is required when the angle sensor is replaced.

By pressing and on the monitor, THROTTLE VOLUME, ANGLE SENSOR, etc. can be selected. Detailed data for the selected item can be seen by pressing .

Instrument cluster - Remove

1. Remove the 2 bolts **(1)** with a Phillips screwdriver or a box wrench [**10 mm**] to remove the side front lower trim **(2)**.
   - Bolt **(1)** tightening torque: **5.9 - 7.8 N·m** (**4.352 - 5.753 lb ft**)



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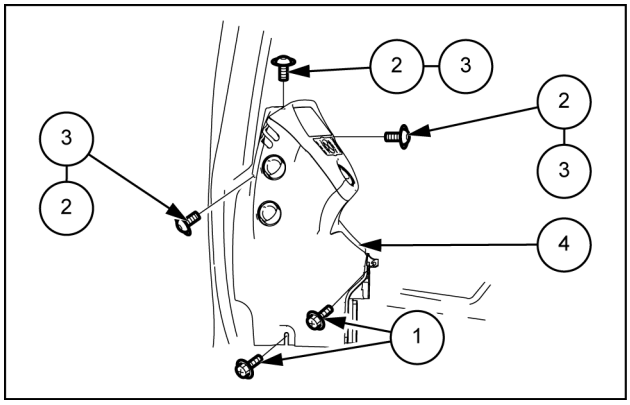
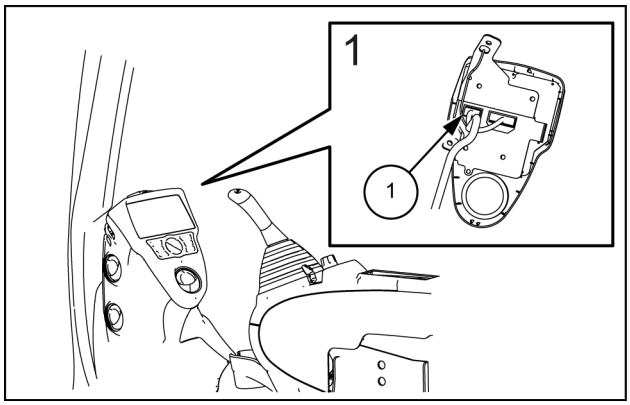
2. Remove the 2 bolts **(1)** with a Phillips screwdriver or a box wrench [**10 mm**], and remove the 3 bolts **(2)** and the 3 washers **(3)** with a hexagon wrench [**6 mm**] to remove the front upper trim assembly **(4)**.
   - Bolt **(1)** tightening torque: **5.9 - 7.8 N·m** (**4.352 - 5.753 lb ft**)



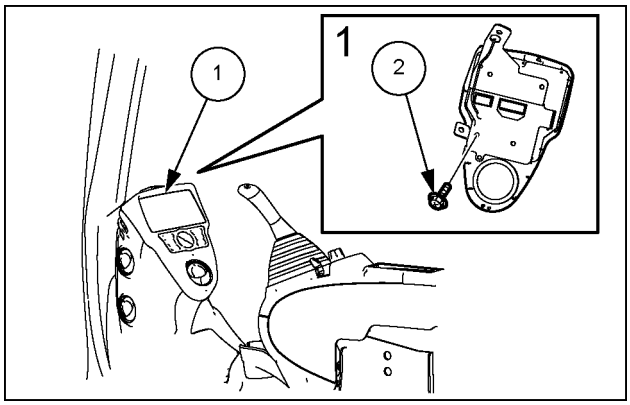
SMIL14CEX1929AB 2

3. Remove the connector **(1)**.



SMIL14CEX1932AB 3

4. Remove the 4 bolts **(2)** with a wrench [**10 mm**] to remove the monitor **(1)**.



SMIL14CEX1933AB 4

Air conditioner troubleshooting

The blow temperature does not go down.

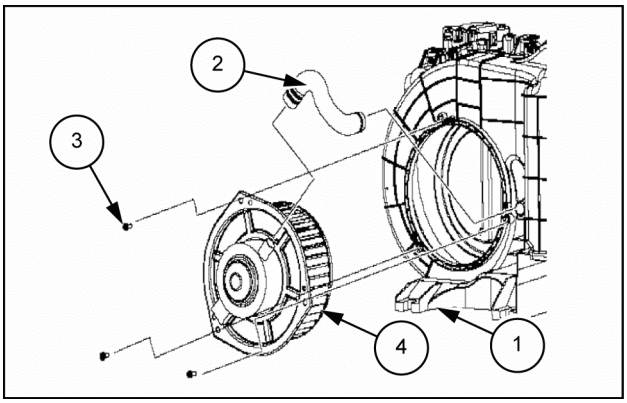
* M/A means motor actuator.

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

Blower motor - Replace

CAUTION: Do not remove the fan from the blower motor.

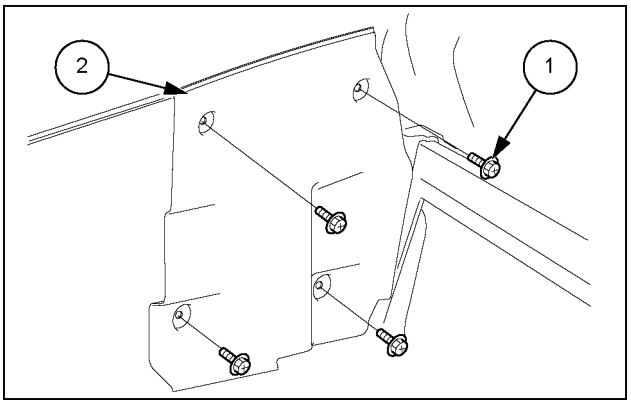
1. Remove the cooling hose **(2)** from the air conditioner unit **(1)**.
   - Remove the 3 Phillips screws **(3)** M5x14 and remove the blower motor **(4)**.
   - To install, perform the reverse of the removal procedure.



SMIL14CEX1810AB 1

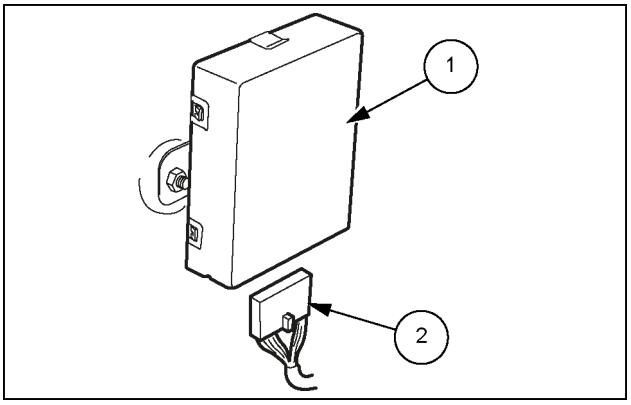
Wiper relays - Remove

1. Use a Phillips screwdriver or box wrench [**10 mm**] to remove the 4 bolts **(1)**, and then remove the side rear B trim **(2)**.



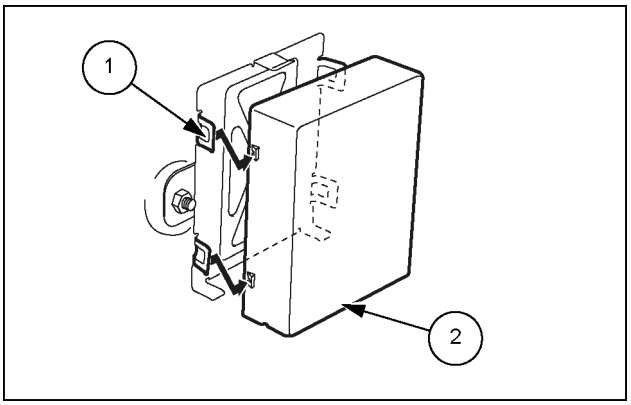
SMIL14CEX1918AB 1

2. Remove the connector **(2)** from the wiper controller **(1)**.



SMIL14CEX1919AB 2

3. Use a flathead screwdriver to slightly bend the 4 installation clips **(1)**, and then remove the wiper controller **(2)**.



SMIL14CEX1920AB 3

NOTE:
• Make sure that there should be no intermittent conditions, poor connections, or corrosion.
• Make sure that there should be no water intrusion or adhering foreign material.

A. If a problem is found, repair the connector **CN.D18**.

B. If there are no problems, proceed to Step **6**

6. Disconnect the DCU harness connector **CN.D1-2**.

Inspect each circuit between the DCU and the urea fluid supply module

NOTE:
• Make sure that there should be no open circuit or high resistance
• Make sure that there should be no short circuit or improper modification.

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

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

7. Inspect the DCU harness connector **CN.D1-2**.

NOTE:
• Make sure that there should be no intermittent conditions, poor connections, or corrosion.
• Make sure that there should be no water intrusion or adhering foreign material.

A. If a problem is found, repair the connector **CN.D1-2**.

B. If there are no problems, proceed to Step **8**

8. Turn ON the ignition switch.

Perform Urea Fluid Reverting Valve on the trouble diagnosis scan tool and inspect for sticking of the reverting valve.

A. If a problem is found, replace the urea fluid supply module. (Refer to " **Diesel Exhaust Fluid (DEF)/AdBlue® supply module - Remove (55.988)** and **Diesel Exhaust Fluid (DEF)/AdBlue® supply module - Install (55.988)**")

9. Confirm resolution:

1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.

2. Turn OFF the ignition switch until communication with the trouble diagnosis scan tool is discontinued.

3. Turn ON the ignition switch without starting the engine.

4. Perform the leak test with the trouble diagnosis scan tool.

⚠ CAUTION:

Do not perform the leak test when the urea fluid is frozen.

NOTE: *Verify that the urea fluid tank temperature and outside air temperature are **5 °C (41 °F)** or more when the leak test is performed.*

5. Turn OFF the ignition switch until communication with the trouble diagnosis scan tool is discontinued.

6. Turn ON the ignition switch without starting the engine.

7. Observe the diagnostic trouble code information with the trouble diagnosis scan tool. A diagnostic trouble code should not be set.

Wiring harnesses - Electrical schematic sheet 15 (55.100)

208B-Urea fluid pump performance

Control Module : DCU

Solution:

1. Check and diagnose the below fault codes before you proceed with the diagnostics code 208B.

   Diagnostic trouble code 208A
   Diagnostic trouble code 208C
   Diagnostic trouble code 208D

2. Turn OFF the ignition switch.

   Disconnect the urea fluid supply module harness connector **CN.D18**.

   Inspect the urea fluid supply module harness connector **CN.D18**.

   NOTE:
   • Make sure that there is no intermittent conditions, poor connections, or corrosion for any of the terminals.
   • Make sure that there is no open circuit, high resistance, or short to any of the circuits.
   • Make sure that there is no water intrusion or adhering foreign material.

   A. If a problem is found, repair the connector **CN.D18**.

   B. If there are no problems, proceed to Step **3**

3. Disconnect the DCU harness connector **CN.D1-2**.

   Inspect the DCU harness connector **CN.D1-2**.

   NOTE:
   • Make sure that there is no intermittent conditions, poor connections, or corrosion.
   • Make sure that there is no water intrusion or adhering foreign material.

   A. If a problem is found, repair the connector **CN.D1-2**.

   B. If there are no problems, proceed to Step **4**

4. Inspect the urea fluid pump power supply circuit between the DCU and the urea fluid supply module for an open circuit or high resistance.

   A. If a problem is found, repair the pump power supply circuit.

   B. If there are no problems, proceed to Step **5**

5. Inspect the GND circuit between the DCU and the urea fluid supply module harness connector **CN.D18** for an open circuit or high resistance.

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

   B. If there are no problems, proceed to Step **6**

   NOTE: *Perform the following inspection only when it is cold, such as in winter.*

6. Turn ON the Urea Fluid Tank Heater Coolant Control Valve under Actuator Test on the trouble diagnosis scan tool.

   NOTE: *The engine coolant should flow into the supply module.*

   A. If a problem is found, repair or replace the urea fluid heater control system.

   B. If there are no problems, replace the urea fluid supply module. (Refer to " **Diesel Exhaust Fluid (DEF)/Ad-Blue® supply module - Remove (55.988)** and **Diesel Exhaust Fluid (DEF)/AdBlue® supply module - Install (55.988)**")

   NOTE: *The engine coolant should flow into the supply module.*

2201-Upstream NOx sensor performance

Control Module : DCU

Solution:

1. Check and diagnose the below fault code before you proceed with the diagnostic code 2201.

   Diagnostic trouble code 2206
   Diagnostic trouble code 2207

2. Inspect the NOx sensor.

   Make sure that there should be no improper installation of the NOx sensor.

   Make sure that there should be no damage to or clogging of the NOx sensor.

   Make sure that there should be no exhaust gas leakage from the exhaust pipe.

   Make sure that there should be no damage caused by crushing of the exhaust system.

   A. If a problem is found, replace the NOx sensor. (Refer to " **Nitrogen Oxides (NOx) sensor - Remove (55.988)** and **Nitrogen Oxides (NOx) sensor - Install (55.988)**")

   NOTE: *If the NOx sensor is replaced, perform NOx sensor data reset with the trouble diagnosis scan tool.*

3. Confirm resolution:

   1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.

   NOTE:
   • After clearing the DCU diagnostic trouble code, observe whether ECM diagnostic trouble code P20C9 is set.
   • If diagnostic trouble code P20C9 is set, clear it.

   2. Turn OFF the ignition switch until communication with the trouble diagnosis scan tool is discontinued.

   3. Turn ON the ignition switch without starting the engine.

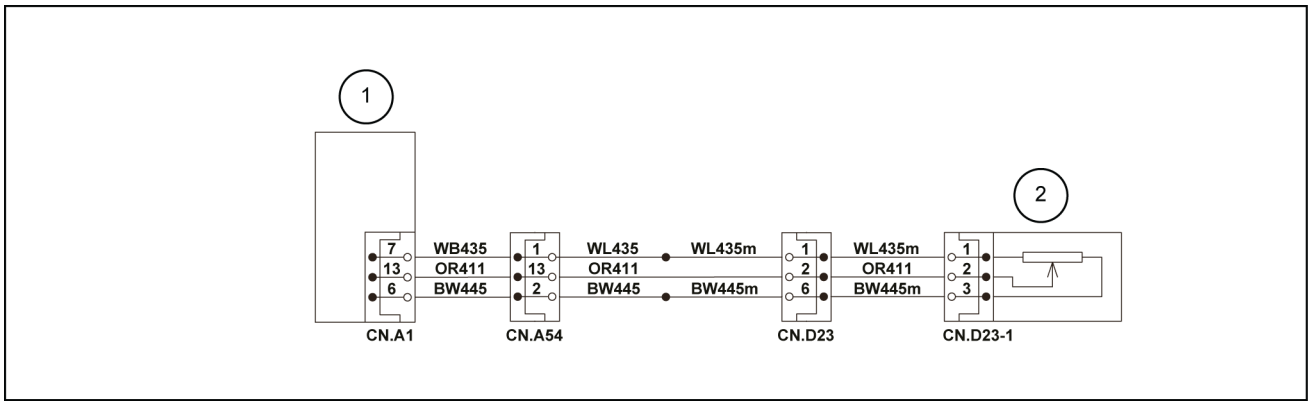
   4. Observe the diagnostic trouble code information with the trouble diagnosis scan tool. A diagnostic trouble code should not be set.

7071-Pressure sensor travel right pilot abnormality

Control Module : MCM

Solution:

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



SMIL14CEX3604EB 1

1. Main controller
2. Pressure sensor (travel right pilot)

Turn the key switch ON.

A. If diagnostic trouble code 7071 is displayed, proceed to Step **2**.

2. Turn the key switch OFF.

Inspect the connectivity of each connector for poor insertion and wiring terminal disconnection

Disconnect each connector, and check for any wiring terminal abnormality. If there is no abnormality, reconnect the connectors.

Turn the key switch ON.

A. If diagnostic trouble code 7071 is displayed, proceed to Step **3**.

3. Check the travel right pilot pressure sensor voltage **(2)** on the service support screen.

A. If the voltage is more than or equal to **4.75 V**, proceed to Step **4**.

B. If the voltage is less than or equal to **0.25 V**, proceed to Step **7**.

4. Turn the key switch OFF and disconnect the travel right pilot pressure sensor **(2)** connector **CN.D23-1**.

Turn the key switch ON.

Measure the voltage between the ground and terminal 1 of the travel right pilot pressure sensor **(2) CN.D23-1** (harness side).

A. If the voltage is not about **5 V**, find and replace the short circuit on the wire ID WL435m, WL435 and WB435.

B. If the voltage is about **5 V**, proceed to Step **5**.

5. Measure the voltage between the ground and terminal 2 of the travel right pilot pressure sensor **(2) CN.D23-1** (harness side).

A. If the voltage is more than **4.75 V**, find and replace the short circuit on the wire ID OR411.

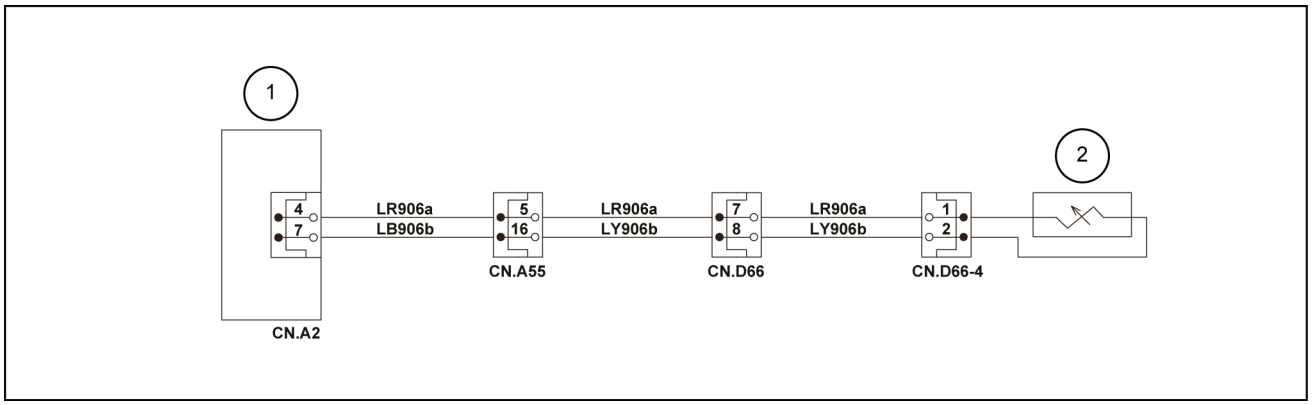
B. If the voltage is less than or equal to **4.75 V**, proceed to Step **6**.

7267-Arm 1 Regeneration Release Proportional Valve Abnormality

Control Module : MCM

Solution:

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



SMIL14CEX3623EB 1

1. Main controller
2. Proportional valve (arm 1 regeneration release)

Turn the key switch ON.

A. If diagnostic trouble code 7267 is displayed, proceed to Step **3**.

2. Turn the key switch OFF.

Inspect the connectivity of each connector for poor insertion and wiring terminal disconnection.

Disconnect each connector, and check for any wiring terminal abnormality. If there is no abnormality, reconnect the connectors.

Turn ON the key switch, and check whether the diagnostic trouble code: 7267 is displayed.

A. If diagnostic trouble code 7267 is displayed, proceed to Step **3**.

3. Reset the diagnostic trouble code on the service support screen.

A. If diagnostic trouble code 7267 is displayed, proceed to Step **4**.

B. If diagnostic trouble code 7267 is not displayed, proceed to Step **5**.

4. Turn the key switch OFF.

Remove the **CN.D66-4**.

Inspect for continuity between the ground and terminal 1 of the connector **CN.D66-4** harness side.

A. If there is continuity, replace or repair the LR906a harness.

B. If there is no continuity, replace the main controller **(1)**.

5. Turn the key switch OFF.

Remove the **CN.D66-4**.

Inspect for continuity between the terminals 1 and 2 of the connector **CN.D66-4** proportional valve side.

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

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

5. Turn the key switch ON.

   A. If diagnostic trouble code 7621 is not displayed, replace the air conditioner panel **(2)**.

   B. If diagnostic trouble code 7621 is displayed, replace the main controller **(1)**.

P0118-Coolant temperature sensor signal - Shorted to high source

Control Module : ECU

Solution:

1. Check and diagnose the below fault codes before you proceed with the diagnostics code P0118.

   Diagnostic trouble code P06A8

2. Turn OFF the ignition switch.

   Disconnect the harness connector **CN.E11** from the engine coolant temperature sensor.

   Turn ON the ignition switch.

   Measure the voltage between the engine coolant temperature sensor signal circuit and normal GND.

   A. If the reading is more than or equal to **5.5 V**, inspect to see if there is a short circuit to the battery or ignition power supply with the signal circuit between the ECM and the engine coolant temperature sensor.

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

   C. If there are no problems, proceed to Step **3**

3. Connect the test cable with fuse between the engine coolant temperature sensor signal circuit and GND circuit.

   Observe the engine coolant temperature sensor display on a trouble diagnosis scan tool.

   A. If the reading is less than or equal to **0.1 V**, inspect to see if there is a short circuit to the **5 V** power supply circuit with the signal circuit between the ECM and the engine coolant temperature sensor.

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

   C. If there are no problems, proceed to Step **4**

4. Inspect to see if there is a poor connection with the engine coolant temperature sensor harness connector **CN.D4**.

   A. If a problem is found, repair the harness connector **CN.D4**.

   B. If the harness connector **CN.D4** is normal, replace the engine coolant temperature sensor. (Refer to “Engine coolant temperature sensor removal and Engine coolant temperature sensor installation”)

   C. If there are no problems, proceed to Step **5**

5. Connect the test cable with fuse between the engine coolant temperature sensor signal circuit and normal GND.

   Observe the engine coolant temperature sensor display on a trouble diagnosis scan tool.

   A. If the reading is less than or equal to **0.1 V**, inspect to see if there is an open circuit or high resistance with the engine coolant temperature sensor GND circuit.

   B. If a problem is found, repair the GND circuit.

   C. If there are no problems, proceed to Step **6**

   NOTE:
   • *The engine coolant temperature sensor shares the GND circuit with other sensors.*
   • *The diagnostic trouble code set on a sensor which shares this circuit may be detected.*

6. Inspect to see if there is a breakage or high resistance in the signal circuit of the engine coolant temperature sensor.

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

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

B. If a problem is found, repair the harness connector **CN.E12**.

C. If the harness connector **CN.E12** is normal, inspect the CMP sensor. (Refer to " **Engine timing sensors Camshaft sensor - Inspect (55.015)**")

D. If a problem is found, replace the CMP sensor. (Refer to " **Engine timing sensors Camshaft sensor - Remove (55.015)** and **Engine timing sensors Camshaft sensor - Install (55.015)**")

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

7. Inspect the camshaft gear.

• Make sure that camshaft gear is not damaged.

• Make sure that camshaft gear is installed correctly.

A. If a problem is found, repair the camshaft gear.

B. If there are no problems, proceed to Step **8**

8. Inspect the GND circuit between the ECM and the CMP sensor for an open circuit and high resistance.

NOTE:
• The CMP sensor shares the GND 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 GND circuit.

B. If there are no problems, proceed to Step **9**

9. Inspect the ECM harness connector **CN.D4** for a poor connection.

A. If a problem is found, repair the harness connector **CN.D4**.

B. If the harness connector **CN.D4** is normal, replace the ECM .(Refer to " **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.640)**")

10. Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.

11. Confirm resolution:

1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.

2. Turn OFF the ignition switch for at least **30 s**.

3. Start the engine.

4. Perform a test-run under the conditions for running the diagnostic trouble code.

NOTE:
• Conditions for setting engine run time or coolant temperature vary depending on the diagnostic trouble codes.
• For the conditions for setting the diagnostic trouble code, refer to the applicable code listed in 15E diagnostic trouble code information.

5. Use the trouble diagnosis scan tool to confirm that a diagnostic trouble code has not been detected.

Wiring harnesses - Electrical schematic sheet 19 (55.100) Wiring harnesses - Electrical schematic sheet 14 (55.100)

P0685-ECM power relay control circuit open

Control Module : ECM

Solution:

1. Turn OFF the ignition switch for at least **30 s**.

   Replace the main relay with a glow relay or normal relay.

   Turn ON the ignition switch.

   Use the trouble diagnosis scan tool to check if a diagnostic trouble code is detected.

   A. If a diagnostic trouble code has not been detected, replace the main relay.

   B. If a diagnostic trouble code has been detected, proceed to Step **2**.
2. Inspect the body grounding terminal for a poor connection.

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

   B. If there are no problems, proceed to Step **3**.
3. Inspect the slow blow fuse.

   A. If a problem is found, replace the slow blow fuse.

   B. If there are no problems, proceed to Step **4**.

   NOTE: *When the fuse is blown again, repair the cause of slow-blow fuse blowout.*
4. Turn OFF the ignition switch.

   Disconnect the harness connector **CN.D3** from the ECM.

   Inspect the ECM harness connector **CN.D3** for a poor connection.

   A. If a problem is found, repair the harness connector **CN.D3**.

   B. If the harness connector **CN.D3** is normal, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.640)**")
5. Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.
6. Confirm resolution:

   1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.

   2. Turn OFF the ignition switch for at least **30 s**.

   3. Turn ON the ignition switch.

   4. Use the trouble diagnosis scan tool to confirm that a diagnostic trouble code has not been detected.

Wiring harnesses - Electrical schematic sheet 12 (55.100)

P1621-Control Module Long Term Memory Performance

Control Module : ECM

Solution:

1. Confirm that the connecting sections of all tools are securely connected.

   Confirm that the programming device is operating normally.

   Turn OFF the ignition switch, and wait for **30 s**.

   Turn ON the ignition switch.

   Use the trouble diagnosis scan tool to check if a diagnostic trouble code has been detected.

   A. If a diagnostic trouble code has been detected, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.640)**")
2. Set the Injector ID Code, fuel delivery rate, and engine No. for the ECM.
3. Confirm resolution:

   1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.

   2. Turn OFF the ignition switch for at least **30 s**.

   3. Perform a test-run under the conditions for running the diagnostic trouble code.

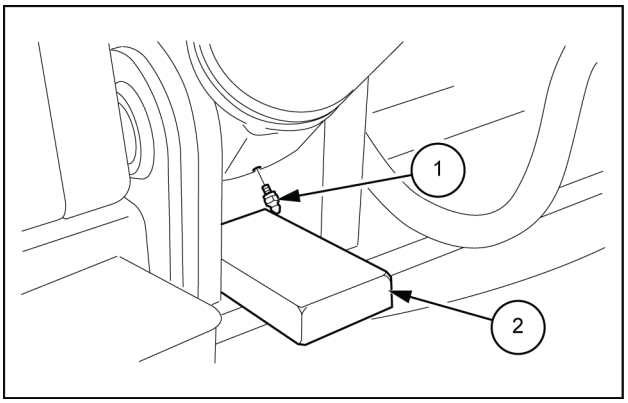
   NOTE:
   • Conditions for setting engine run time or coolant temperature vary depending on the diagnostic trouble codes.
   • For the conditions for setting the diagnostic trouble code, refer to the applicable code listed in 15E diagnostic trouble code information.

   4. Observe the diagnostic trouble code information with the trouble diagnosis scan tool. A diagnostic trouble code should not be set.

NOTE:
• Conditions for setting engine run time or coolant temperature vary depending on the diagnostic trouble codes.
• For the conditions for setting the diagnostic trouble code, refer to the applicable code listed in 15E diagnostic trouble code information.

5. Use the trouble diagnosis scan tool to confirm that a diagnostic trouble code has not been detected.

7. Remove the grease nipple **(1)** with a wrench [**10 mm**], and hold the roots of the boom cylinders (right) (left) with a striking wood plank **(2)**.



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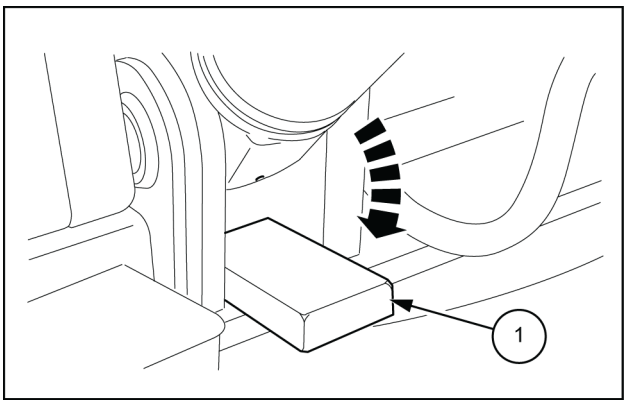
8. Lower the boom cylinders (right) (left) to rest them on the striking wood plank **(1)**.



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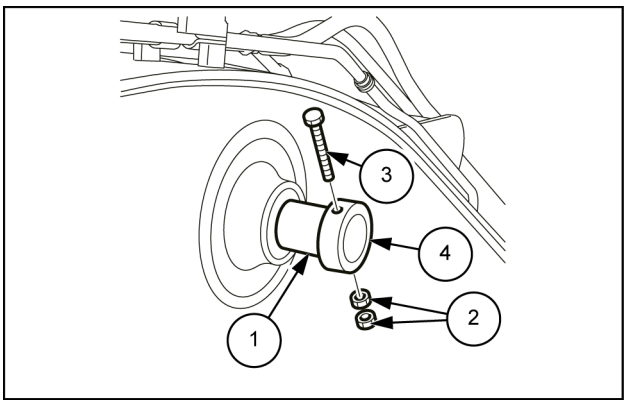
9. Attach the pin **(1)** that has been pulled out in the Step **4**.
   Tighten the bolt **(3)** by the 2 double nuts **(2)** with a wrench [**30 mm**] to attach the fixation ring **(4)**.
   Attach them in the cab side in the same manner.



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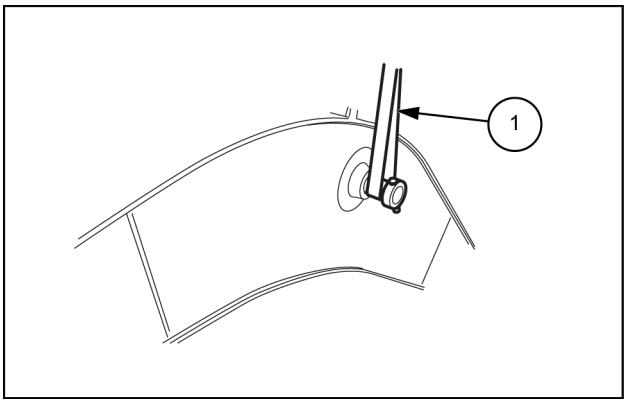
10. Wind nylon slings **(1)** around the pins in left and right that have been attached in the step **9** to secure with lifting equipment.



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