CX290D
Crawler Excavator

SERVICE MANUAL

Part number 48155069
English
February 2018

CASE
CONSTRUCTION

3	Secondary pressure [MPa (psi)]	6	Independent operating torque

Cushion valve (heat circuit, with shuttle valve)

Manufacturer	KYB-YS Corporation		
Operating pressure	**4.41 MPa** (**639.67 psi**)		
Check valve orifice diameter	For arm	A - B side (Close)	∅ **0.7 mm** (**0.028 in**)
		C - D side (Open)	∅ **0.8 mm** (**0.031 in**)
	For boom	E - F side (Up)	∅ **0.7 mm** (**0.028 in**)
		G - H side (Down)	∅ **0.7 mm** (**0.028 in**)
	For swing	I - J side	∅ **0.9 mm** (**0.035 in**)
		K - L side	∅ **0.9 mm** (**0.035 in**)
	For heat circuit	R - T	∅ **0.6 mm** (**0.024 in**)
Port size	A - P ports		**G3/8**
	Q - V ports		**G1/4**
Check valve cracking pressure	A - L ports		**0.62 MPa** (**89.93 psi**) [stroke: **1 mm** (**0.039 in**)]
Weight	**14.5 kg** (**31.9670 lb**)		

Selector valve

2WAY	
Manufacturer	Nishina Industrial Co., Ltd.
Rated flow rate	**25 l/min** (**6.604 US gpm**)
Operating method	ISO
Port size	**G3/8**
Weight	**4 kg** (**8.8185 lb**)

Center joint

Operating pressure	High-pressure passage (ABCD)	**34.3 MPa** (**4975 psi**)
	Drain port (E)	**0.5 MPa** (**72.52 psi**)
	Pilot port (F)	**3.9 MPa** (**566 psi**)
Flow amount	High-pressure passage (ABCD)	**234 L/min** (**61.816 US gpm**)
	Drain port (E)	**10 L/min** (**2.642 US gpm**)
	Pilot port (F)	**21 L/min** (**5.548 US gpm**)
Port A	Forward right	G3/4
Port B	Forward left	G3/4
Port C	Backward right	G3/4
Port D	Backward left	G3/4
Port E	Drain port	G1/2
Port F	Pilot port	G1/4
Weight	**29 kg** (**63.9341 lb**)	

Reducing valve (6 stack proportional valve)

Manufacturer			Yuken Kogyo Co., Ltd.
Valve			
	Rated pressure		**4.5 MPa** (**652 psi**)
	Rated flow rate		**30 L/min** (**7.93 US gpm**)
	Maximum flow	P1	**30 L/min** (**7.93 US gpm**)
		S1 - S6	**10 L/min** (**2.64 US gpm**)
	Allowable back pressure		**1 MPa** (**145 psi**)
	Pressure control range		**0.5 – 3.0 MPa** (**72.52 – 435.15 psi**)
Proportional solenoid			
	Rated voltage		**24 V**DC
	Allowable voltage range		**20 – 32 V**DC
	Input current value range		**50 – 740 mA**
Weight			**6.2 kg** (**13.669 lb**)

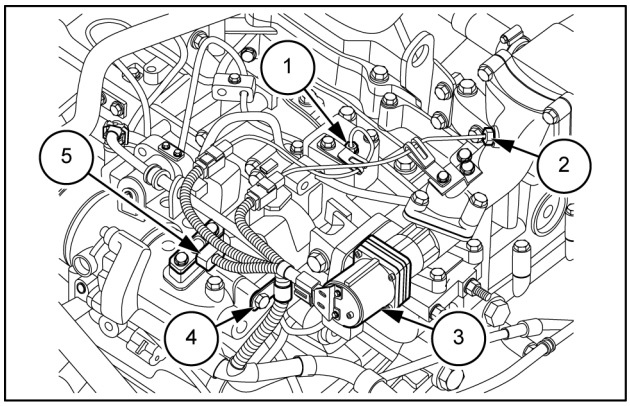
Contents

Engine - 10

Inlet pipe removal

1. Disconnect the harness connector from the boost pressure sensor/boost temperature sensor **(5)**.
2. Disconnect the harness connector from the EGR valve **(3)**.
3. Disconnect the harness connector from the IMT sensor **(1)**.
4. Remove the harness clip **(4)** from the inlet pipe.

   2. EGR gas temperature sensor 2



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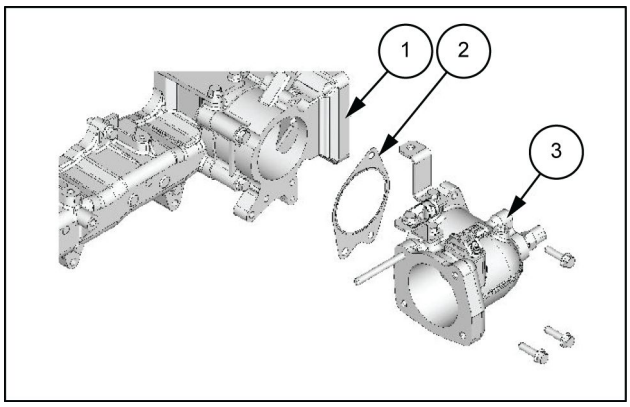
5. Remove the inlet pipe **(3)** and the gasket **(2)** from the case **(1)**.



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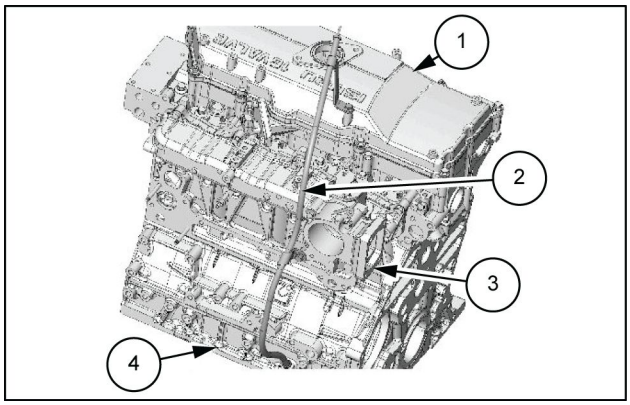
Oil level gauge guide tube removal

1. Remove the oil level gauge from the oil level gauge guide tube **(2)**.
2. Disconnect the oil level gauge guide tube **(2)** from the cylinder head cover **(1)**.
3. Disconnect the oil level gauge guide tube **(2)** from the case **(3)**.
4. Remove the oil level gauge guide tube **(2)** from the cylinder block **(4)**.



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Rocker arm shaft installation

1. Apply the engine oil to the bracket.

NOTE: *Apply to each sliding surface.*

2. Apply the engine oil to the rocker arm.

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

1. Nut
2. Bolt
3. Bolt
4. Bolt

3. Temporarily tighten the bolt to the cylinder head assembly.

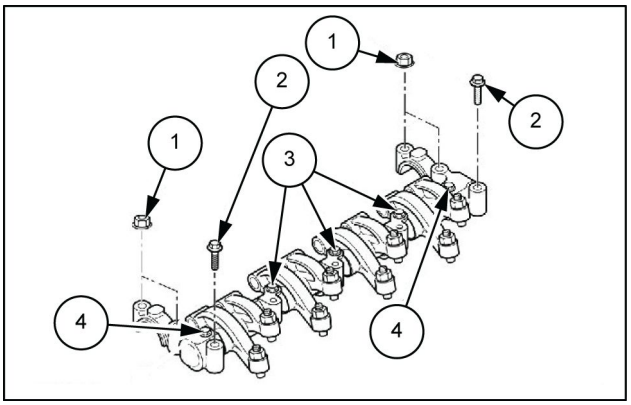
NOTE: *Apply engine oil to the threaded portion of the bolts.*

4. Temporarily tighten the nut to the cylinder head assembly.

NOTE: *Apply engine oil to the threaded portion of the nuts.*

5. Securely tighten the rocker arm shaft to the cylinder head assembly.

NOTE: *Hold the entire rocker arm shaft horizontally and gradually tighten it.*



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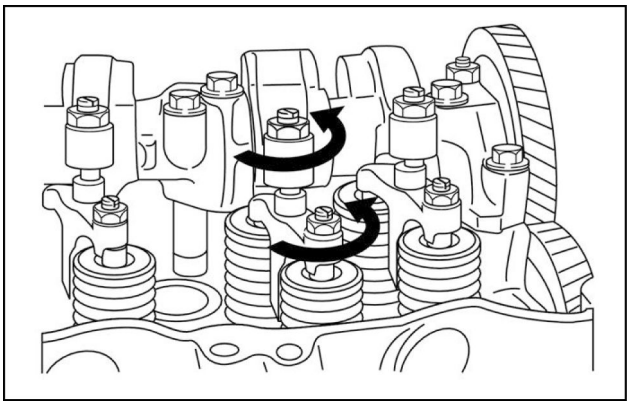
Rocker arm shaft tightening torque

Parts	Description	Tightening torque
No.1	Nut	**21 N·m** (**15 lb ft**)
No.2	Bolt	**27 N·m** (**20 lb ft**)
No.3	Bolt	**56 N·m** (**41 lb ft**)
No.4	Bolt	**27 N·m** (**20 lb ft**)

Rocker arm shaft adjustment

Valve clearance adjustment

1. Adjust the valve clearance while cool.



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2. Loosen all adjust screws before adjustment.

Engine - 10

Valve drive and gears - 106

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CX290D Crawler excavators LC Scrap Loader (TIER4 FINAL) - EU Market

Flywheel installation

1. Apply the disulfide molybdenum grease to the bolt.

NOTE: *Apply to the seat surface and threaded portion on the flywheel installation bolts.*

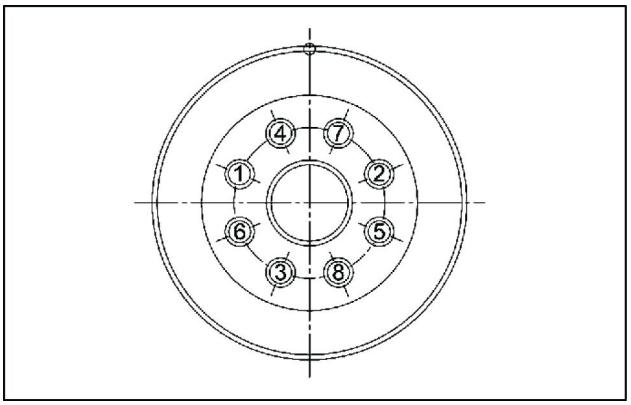
2. Install the flywheel to the crankshaft.

NOTE: *Tightening order.*

NOTE: *Pay attention to the knock pin position of the crankshaft.*

3. Tighten the bolt using the torque wrench.

   Tightening torque: **78 N·m** (**58 lb ft**)



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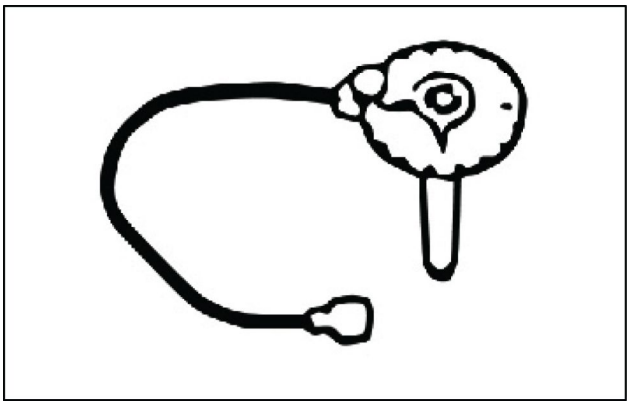
4. Tighten the bolt using the special tool.
   Special tool: Angle gauge (Refer to **Cylinder heads - Special tools (10.101)**)

   Tightening angle: **120°**



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CKP sensor installation

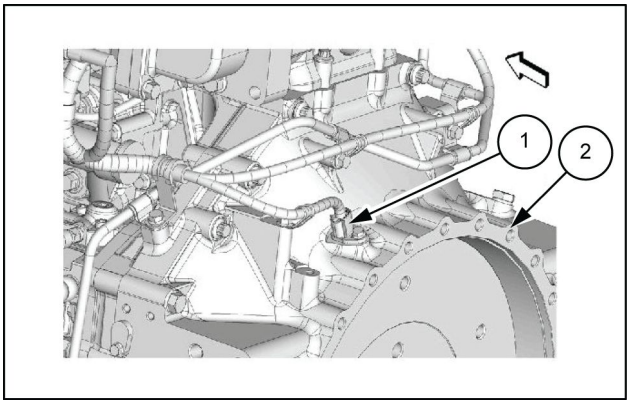
1. Install the CKP sensor **(1)** to the flywheel housing **(2)**.

NOTE: *Tighten together with the clip.*

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

   Tightening torque: **6 N·m** (**4.43 lb ft**)

2. Connect the harness connector to the CKP sensor **(1)**.



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Engine - 10

Cylinder heads - 101

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Valve spring installation

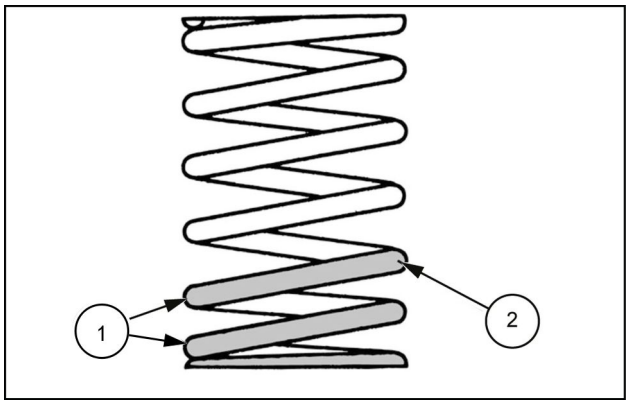
1. Check the identification paint **(2)** of the valve spring.

   Valve spring identification paint

   Inlet: light blue

   Exhaust: white

   1. Spring pitch (small)



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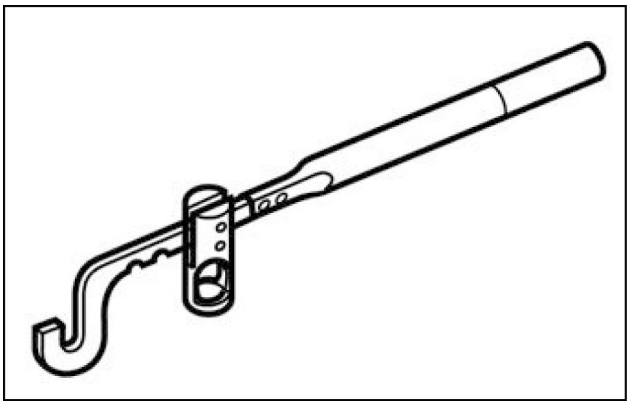
2. Install the valve spring to the cylinder head assembly.

NOTE: *Turn the valve spring to face the identification paint* ***(2)*** *application area towards the cylinder head assembly.*

3. Install the spring seat to the valve spring.
4. Press the valve spring using the special tool.

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



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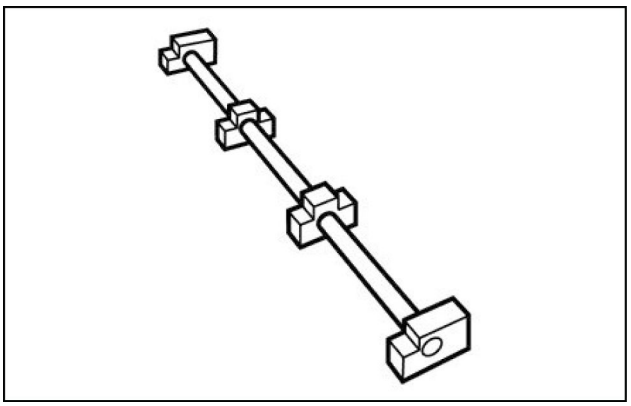
Special tool: Pivot ASM (Refer to **Valves - Special tools (10.101)**)



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Lower cover removal

1. Remove the connector **(2)** from the lower cover **(1)**.

NOTICE: *Do not pull the wire, or pry the connector **(2)** with a screwdriver.*

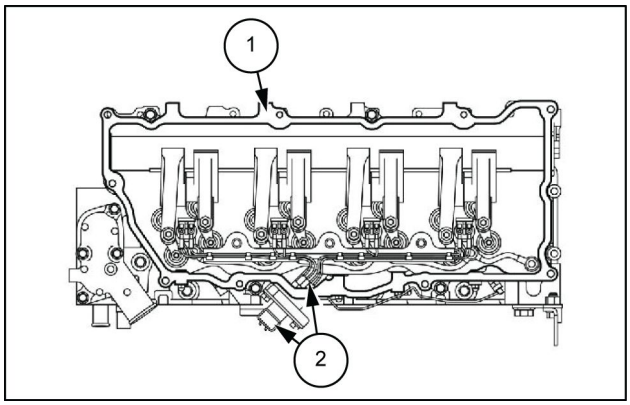
2. Disconnect the injector harness from the injector.

NOTICE: *Be careful not to damage the injector side stud bolts.*

3. Remove the injector harness from the cylinder head assembly.

NOTE: *Remove the bracket tightening bolts and then remove the injector harness together with the bracket.*

4. Remove the lower cover **(1)** from the cylinder head assembly.
5. Remove the gasket from the lower cover **(1)**.
6. Remove the rubber plug from the cylinder head assembly.



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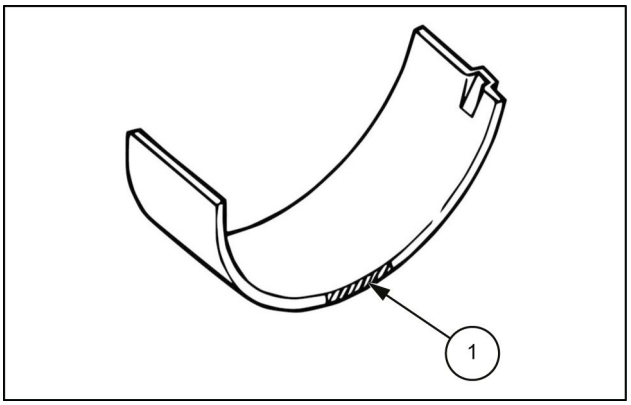
32. Select the connecting rod bearing.

Bearing selection table		
Large end hole diameter grade of the connecting rod	**Bearing identification color (1)**	**Oil clearance**
A	Green	**0.0370 – 0.0760 mm** (**0.0015 – 0.0030 in**)
B	Yellow	



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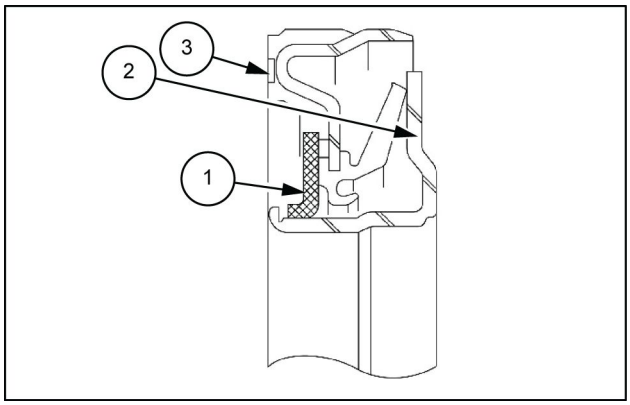
Crankshaft front oil seal removal

1. Remove the crankshaft front oil seal **(3)** from the crankshaft using the special tool.

NOTICE: *Be careful not to damage the oil seal press-fitting surface.*

1. Felt
2. Slinger



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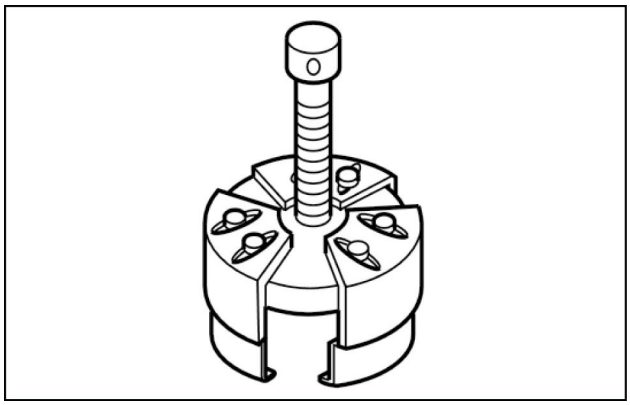
Special tool: Slinger puller (Refer to **Crankshaft - Special tools (10.103)**)



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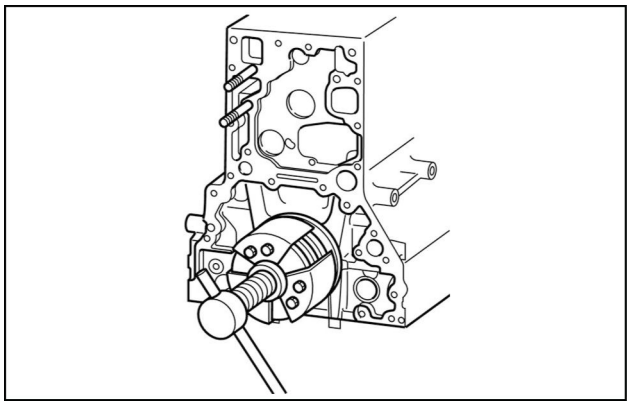
2. Remove the slinger and oil seal together.
3. If the slinger of the remover is easy to come off, the outer circumference of the jig can be tightened using a clip band to improve the workability.



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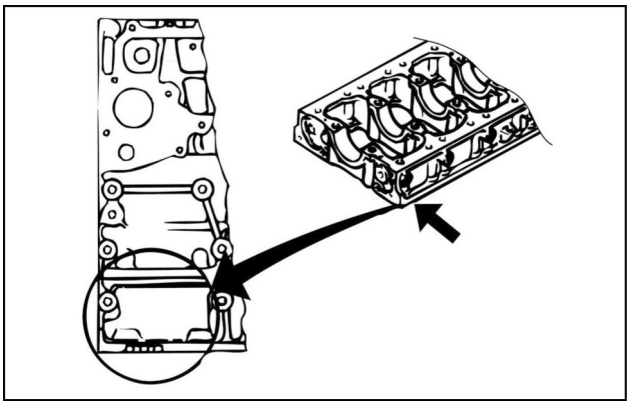
Crankshaft - Install

Crankshaft bearing preparation

NOTE: *When replacing the crankshaft bearing, select the crankshaft bearing following the procedure below.*

1. Check marking of the crankcase.

NOTE: *The marking on the crankcase indicates the inner diameter grade of the cylinder block journal section.*
Grade indications are lined up as No.1, 2, 3, 4, 5 from the left when looking at the marking section from the front side.



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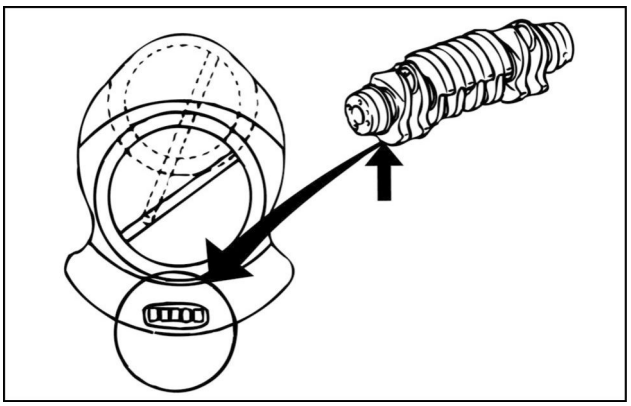
2. Check the marking on the crankshaft.

NOTE: *The marking on the crankshaft indicates the outer diameter grade of the journal section.*
Grade indications are lined up as No.1, 2, 3, 4, 5 from the left when looking at the marking section from the front side.



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3. Select the crankshaft bearing.

NOTE: *Refer to the bearing selection table.*

Bearing selection table			
Grade combination		Oil clearance	
Cylinder block grade	Crank journal grade	No.1, 2, 4, 5	No.3
1	1	**0.041 – 0.068 mm (0.0016 – 0.0027 in)**	**0.055 – 0.082 mm (0.0022 – 0.0032 in)**
1	2	**0.039 – 0.065 mm (0.0015 – 0.0026 in)**	**0.053 – 0.079 mm (0.0021 – 0.0031 in)**
2	1	**0.043 – 0.070 mm (0.0017 – 0.0028 in)**	**0.0570 – 0.084 mm (0.0022 – 0.0033 in)**
2	2	**0.0410 – 0.067 mm (0.0016 – 0.0026 in)**	**0.055 – 0.081 mm (0.0022 – 0.0032 in)**

3. Tighten the air bleeding plug **(1)** using a wrench.

NOTE: *Check that the coolant has overflowed.*
With the pressurized reserve tank specification, it is not necessary to bleed the air.

NOTE: *Do not reuse the gasket.*

Tightening torque: **27 N·m** (**20 lb ft**)

4. Replenish the radiator with coolant.

NOTE: *While manually pressing the upper hose several times to bleed the air in the hose, add an amount of coolant equal to the difference between the remaining coolant level and the radiator cap mouth.*
Repeat until the coolant level no longer decreases.

5. Install the radiator cap to the radiator.

NOTICE: *Securely attach the radiator cap.*

6. Add coolant to the radiator reserve tank.

NOTE: *Add up to the MAX line of the radiator reserve tank.*
With the pressurized reserve tank specification, it is not necessary to bleed the air.

NOTICE: *Wipe off any excess coolant.*

7. Start the engine.

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

8. Stop the engine.

9. Remove the radiator cap from the radiator.

⚠ CAUTION

Burn hazard!
Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.
Failure to comply could result in minor or moderate injury.

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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.

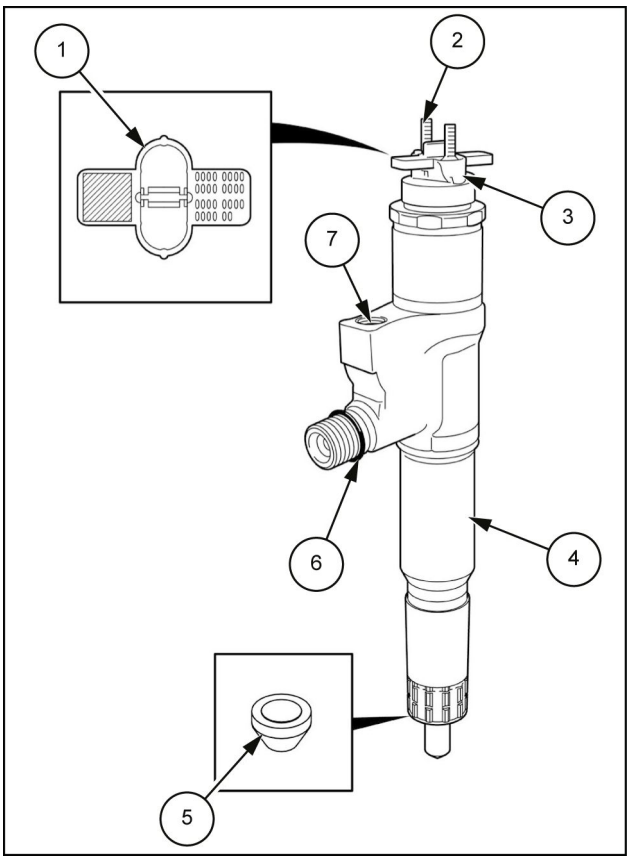
NOTICE: *Securely attach the radiator cap.*

12. Start the engine.

NOTE: *For models with heaters, the set temperature and blower speed are set to the maximum, and earm up the engine at approximately **1500 – 2000 RPM**.*
Touch the radiator upper hose, and confirm that is has become warm.

Fuel injectors - Component identification

1. ID plate
2. Terminal stud
3. Injector drive section
4. Injector
5. Gasket
6. O-ring
7. Leak-off pipe installation section



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Turbocharger - Remove

Battery ground cable disconnect

1. Disconnect the battery ground cable from the battery.

Coolant drain

1. Remove the radiator cap from the radiator.

⚠ CAUTION

Burn hazard!
Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.
Failure to comply could result in minor or moderate injury.

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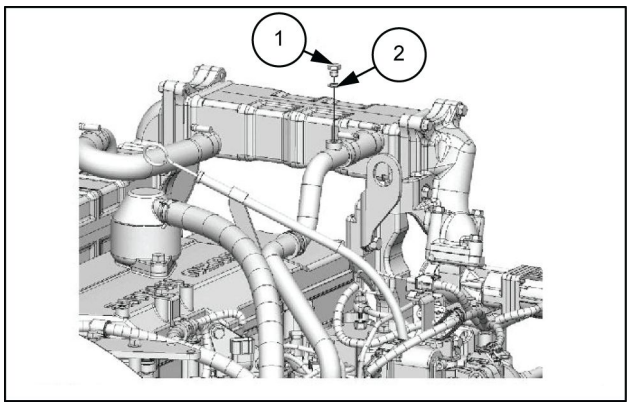
2. Remove the drain plug from the radiator.
3. Drain coolant from the radiator.
4. Loosen the air bleeding plug **(1)** using a wrench.

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.



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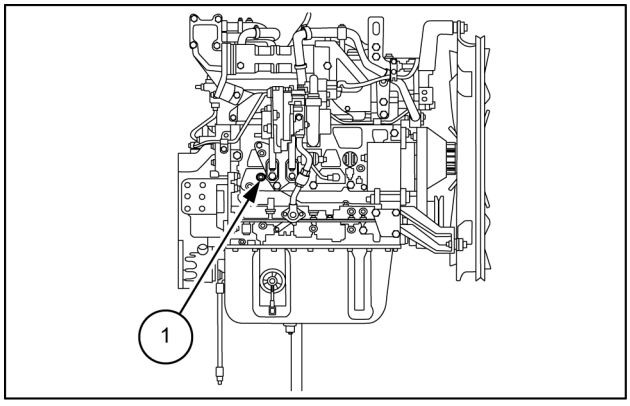
5. Remove the drain plug **(1)** from the cylinder block.
6. Discharge coolant from the engine.
7. Install the drain plug **(1)** to the cylinder block.
8. Install the drain plug to the radiator.



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EGR gas temperature sensor 1 installation

1. Apply anti-seize lubricant 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 1.*

2. Install EGR gas temperature sensor 1 to EGR pipe B.

   Tightening torque: **44 N·m** (**32 lb ft**)

NOTICE: *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.*

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 1.

Exhaust gas temperature (EGT) sensor installation

1. Clean the old anti-seize lubricant on the sleeve nut, and apply new anti-seize lubricant to the threaded portion of the sleeve nut.
2. Apply anti-seize lubricant to the EGT sensor.

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

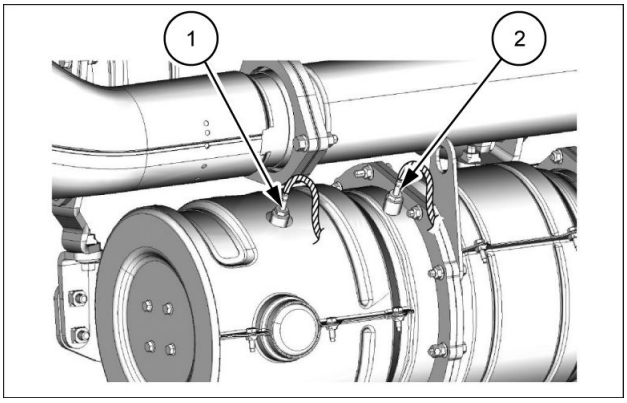
3. Temporarily tighten the EGT sensor to the oxidation catalyst assembly.

NOTICE: *Do not subject the tip of the exhaust gas temperature sensor to shock when installing. Replace the oxidation catalyst assembly if damage has been found in the sensor installation section of the oxidation catalyst assembly.*

NOTICE: *To avoid damaging the sensor installation sections due to sensor incorrect assembly, tighten it by hand.*

Exhaust gas temperature sensor identification		
Sensor type	**Screw size**	**Connector color**
Exhaust gas temperature sensor 2	M12 x 1.75	Dark gray
Exhaust gas temperature sensor 1	M12 x 1.25	Light gray

4. 1. EGT sensor 2
   2. EGT sensor 1



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5. Final tighten the EGT sensor to the oxidation catalyst assembly.

   Tightening torque: **30 N·m** (**22.1 lb ft**)

6. Connect the harness connector to the exhaust gas temperature sensor.

NOTICE: *Be careful not to twist the harness.*

7. Start the engine after assembling each part, and check for gas leaks from each joint and for vibration.

Battery ground cable connect

1. Connect the battery ground cable to the battery.

Radiator - Install

Install the radiator in the reversed order of the procedure of removal.

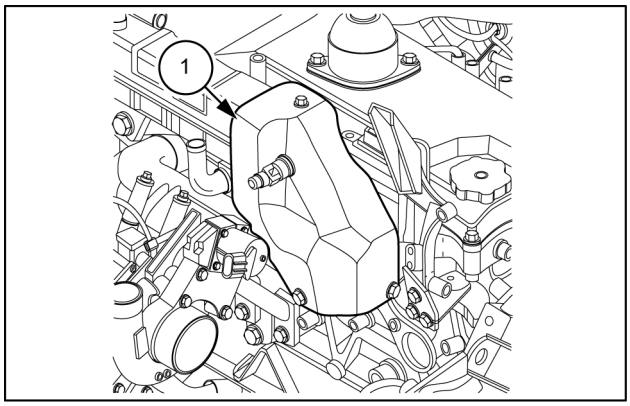
Each bolt has to be tightened in the specific torque.

If the torque is not specified, see the **Torque - Bolt and nut ()** .

Coolant capacity is **31.4 L** (**8.30 US gal**).

At least, check that it is in proper level.

2. Remove the EGR heat protector **(1)** from the EGR pipe A.



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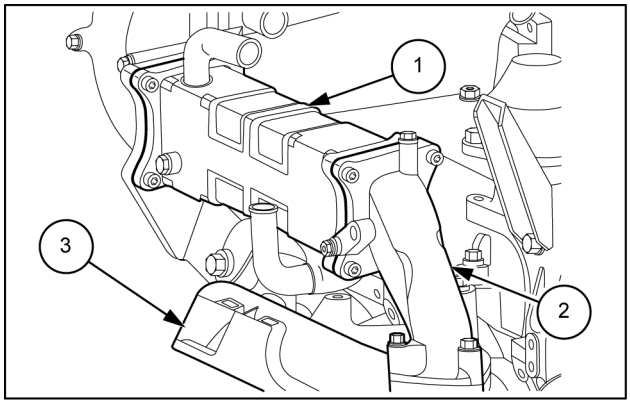
3. Remove the EGR pipe A **(2)** from the exhaust manifold **(3)**.



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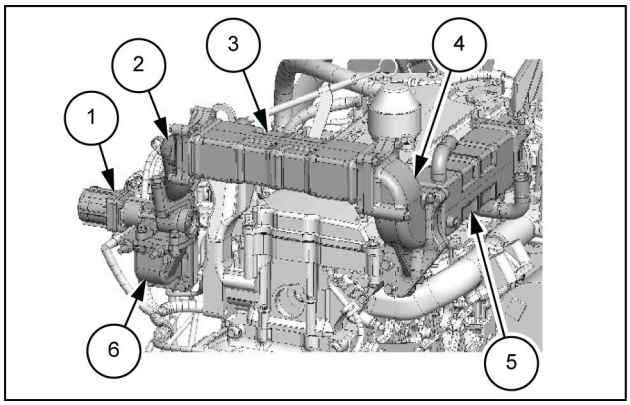
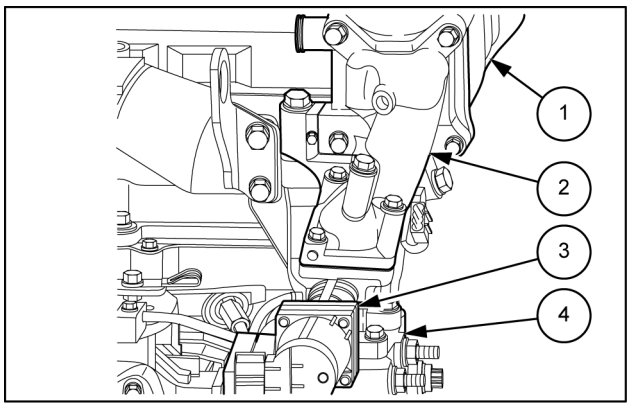
4. Remove the EGR cooler A **(5)** from the EGR pipe B **(4)**.
5. Remove the EGR pipe B **(4)** from the EGR cooler B **(3)**.
6. Remove the EGR cooler B **(3)** from the EGR pipe C **(2)**.
7. Remove the EGR pipe C **(2)** from the EGR valve **(1)**.



SMIL13CEX1479AB 12

EGR valve removal

1. Disconnect the harness connector from the EGR valve **(3)**.
2. Remove the EGR valve **(3)** from the EGR pipe **(4)**.
   1. EGR cooler C
   2. EGR pipe C



SMIL14CEX5656AB 13

EGR valve installation

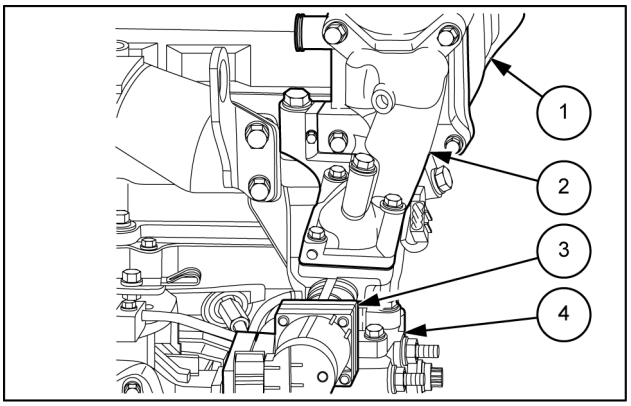
1. Install the EGR valve **(3)** to the EGR pipe D **(4)**.

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

   1. EGR cooler C
   2. EGR pipe C

NOTE: *Use new gaskets.*

2. Connect the harness connector to the EGR valve **(3)**.

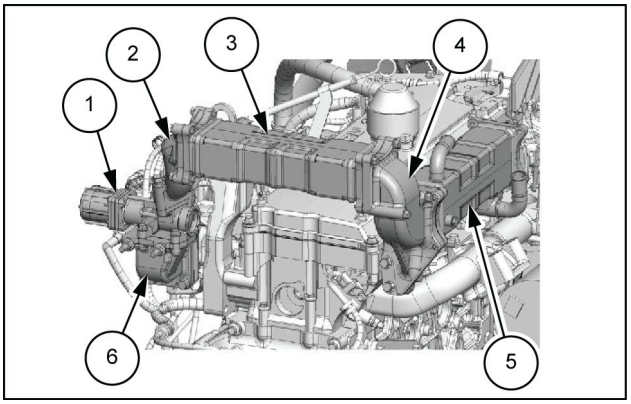


SMIL14CEX5656AB 54

EGR cooler assembly installation

1. Temporarily tighten the EGR pipe C **(2)** to the EGR valve **(1)**.
2. Temporarily tighten the EGR cooler B **(3)** to the EGR pipe C **(2)**.
3. Temporarily tighten the EGR pipe B **(4)** to the EGR cooler B **(3)**.
4. Temporarily tighten the EGR cooler A **(5)** to the EGR pipe B **(4)**.

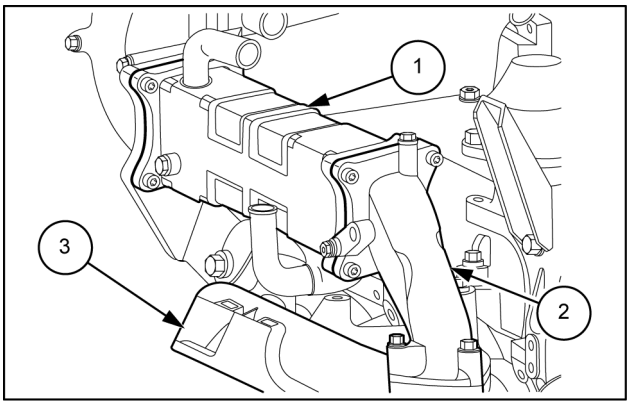
   6. EGR pipe D



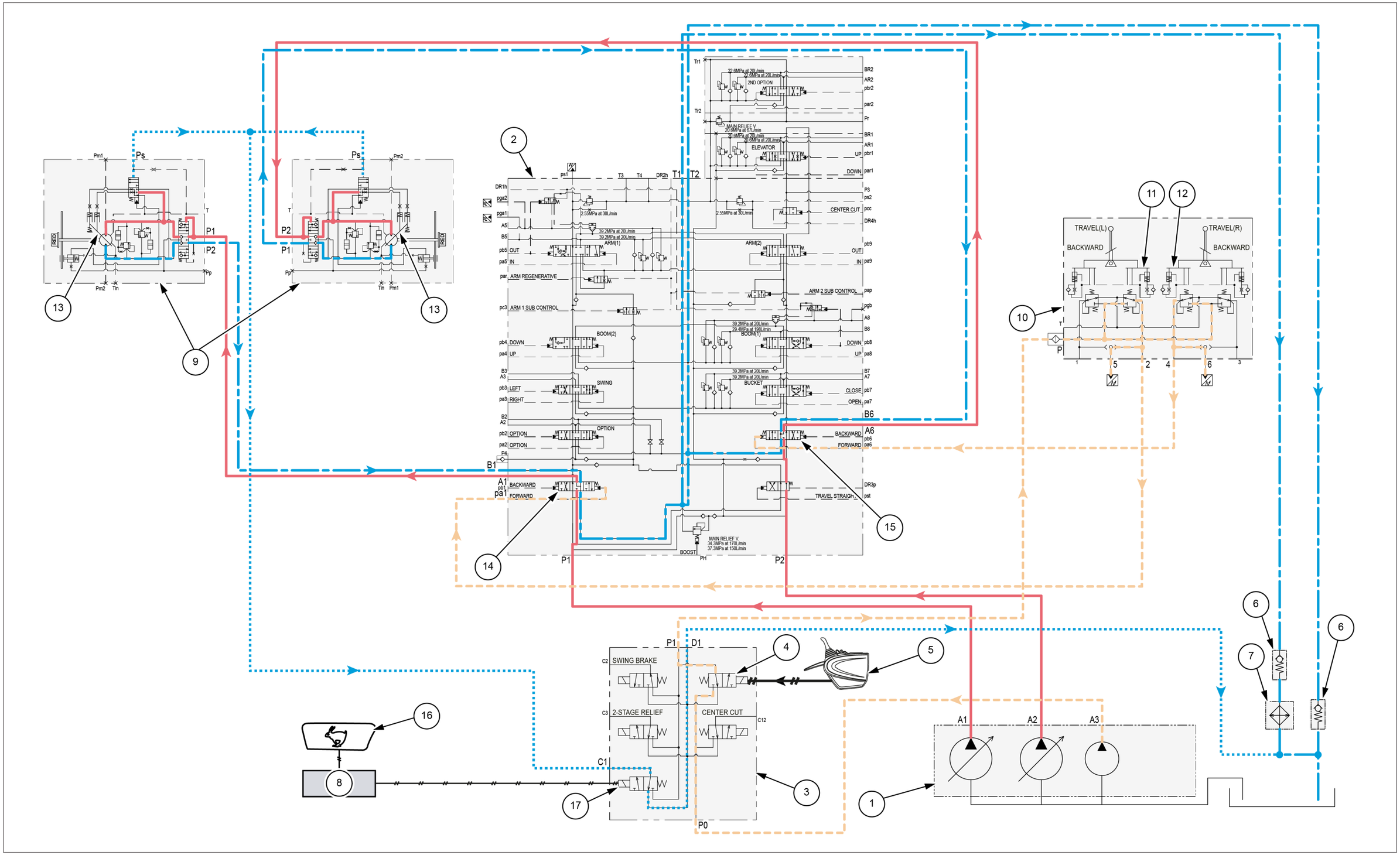
SMIL13CEX1812AB 55

5. Temporarily tighten the EGR pipe A **(2)** to the EGR cooler A **(1)** and the exhaust manifold **(3)**.

NOTE: *After temporarily tightening all the components, final tighten in the numerical order shown in the diagram.*



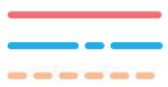
SMIL14CEX5657AB 56



SMIL17CEX0436JB 1

ARM-SEMI–PARALLEL 2 CIRCUIT(FOR COMPOUND OPERATION) (EX.:ARM-OUT+BOOM-UP OPERATIONS)(WITH HBCV)

Purpose
Reduces the pressure drops while the oil flows into the arm via the P2 parallel path (mainly during a compound operation).
Secures pressure for arm + boom compound operation.
Compound operation (ex.: boom-up + arm-out operations)
When the remote control valve **(12)** is operated to the arm-out side, the pilot pressure oil is fed to Port pb5 and Port pb9 of the control valve **(2)** and switches the arm [1] spool **(17)** and arm [2] spool **(18)** . When the remote control valve **(26)** is operated to the boom-up side, the pilot pressure oil is fed to Port pa8 and Port pa4 of the control valve **(2)** and switches the boom [1] spool **(31)** and boom [2] spool **(32)** . The discharge oil from A1 of the hydraulic pump **(1)** flows into Port P1 of the control valve **(2)** and is fed to the boom [2] spool **(32)** and arm [1] spool **(17)** via the parallel oil path.
The discharge oil from A2 of the hydraulic pump **(1)** flows into Port P2 of the control valve **(2)** and is fed to the boom [1] spool **(31)** and arm [2] spool **(18)** via the parallel oil path.
The pressure oil fed to the arm [1] spool **(17)** merges with the pressure oil from the arm [2] spool **(18)** and flows into the arm cylinder **(19)** bottom side, and the arm-out operation is carried out. The pressure oil fed to the boom [1] spool **(31)** merges with the pressure oil from the boom [2] spool **(32)** and flows into the boom cylinder **(33)** bottom side, and the boom-up operation is carried out.
The main computer **(8)** sends an electrical signal to the arm semi-parallel [2] spool control **(24)** and changes the opening of the arm semi-parallel [2] spool **(25)** according to the pilot pressure during an arm operation to control the flow volume to the arm [2] spool **(18)**.
When a boom-up operation is carried out, the arm semi-parallel [2] spool **(25)** opening is metered to increase the flow to the boom cylinder **(33)** for the smooth operation of the boom.



Pressure line
Tank line
Pilot pressure line

Pilot tank line
Electric line

1. Hydraulic pump
2. Control valve
3. 5 stack solenoid valve
4. Lever lock solenoid valve
5. Console lever lock switch
6. Check valve
7. Oil cooler
8. Main computer
9. Cushion valve
10. P1 pressure sensor
11. P2 pressure sensor
12. Remote control valve (arm, swing)
13. Arm (in)
14. Arm (out)
15. Arm-in pilot pressure sensor
16. Arm-out pilot pressure sensor
17. Arm [1] spool
18. Arm [2] spool
19. Arm cylinder
20. Arm load holding valve check valve
21. Arm-out pressure sensor
22. 3 stack proportional valve
23. 6 stack proportional valve
24. Arm semi-parallel [2] spool control
25. Arm semi-parallel [2] spool
26. Remote control valve (boom, bucket)
27. Boom (up)
28. Boom (down)
29. Boom-up pilot pressure sensor
30. Boom-down pilot pressure sensor
31. Boom [1] spool
32. Boom [2] spool
33. Boom cylinder

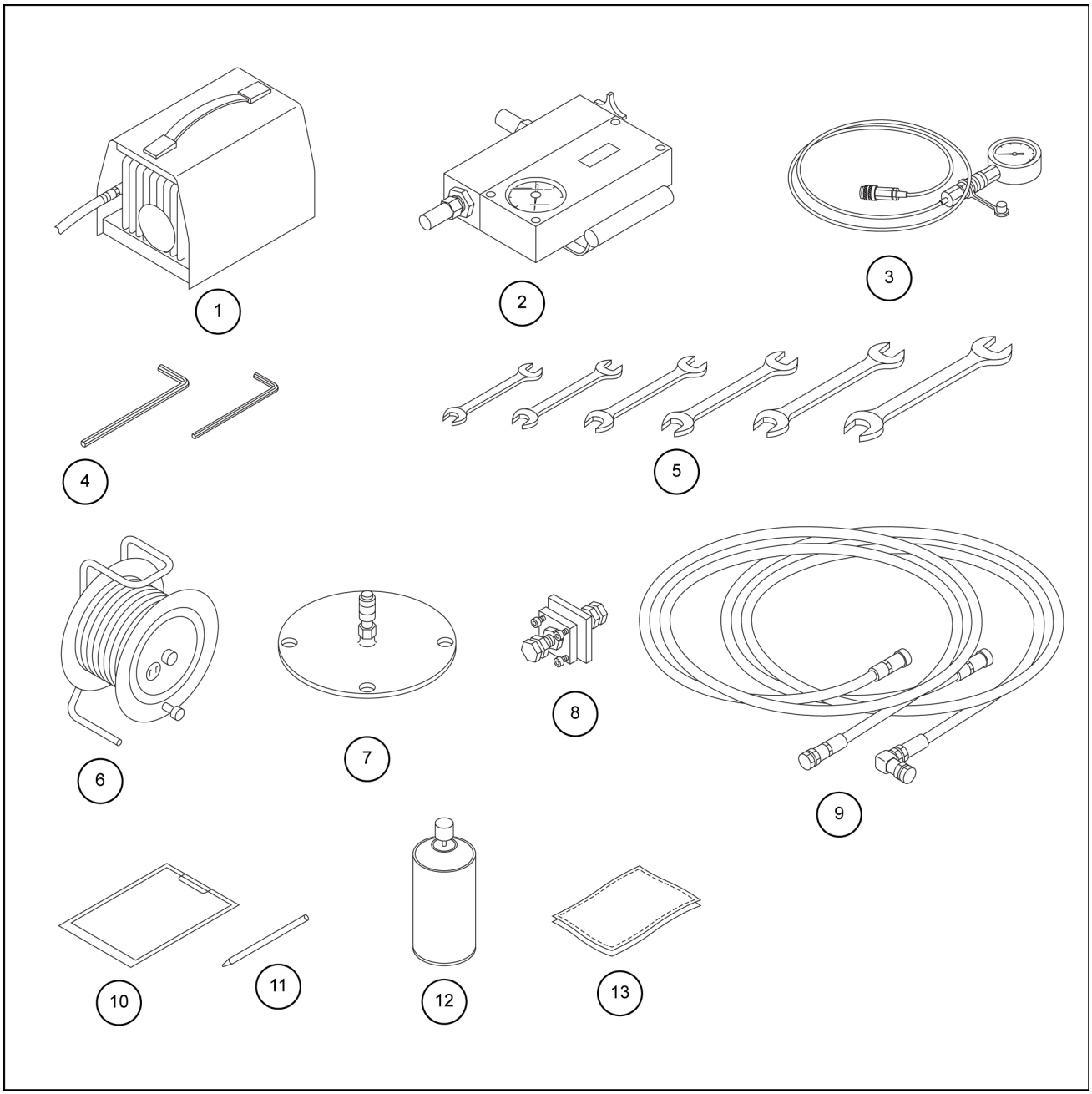
Hydraulic systems - Flow test

CX290D Crawler excavators LC Scrap Loader (TIER4 FINAL) - EU Market	WE

Preparations

3 Workers: Role worker 1: work supervisor, pressure adjustment
Role worker 2: operator
Role worker 3: flow, pressure measurement, recording

Items to prepare

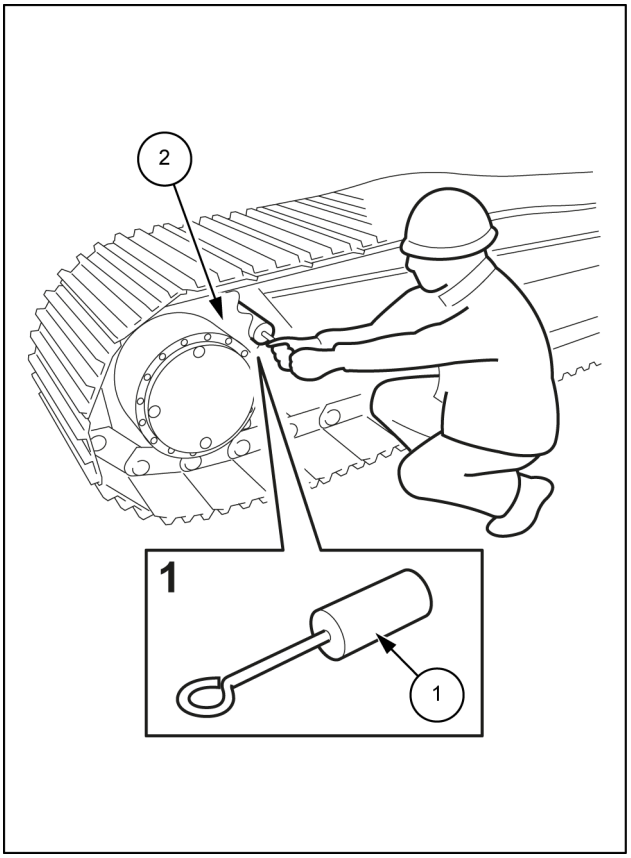


SMIL14CEX2109GB 1

B. Travel pressure measurement

1. Install the stopper **(1)** on the crawler sprocket section **(2)** and lock the travel motor.
2. Measure with the following operations.

Engine speed	**2000 RPM**
Work mode	SP mode (first speed)
Lever operation	Travel relief
Oil temperature	**45 – 55 °C** (**113.0 – 131.0 °F**)
Measuring port	Left travel: P1 port
	Right travel: P2 port
Set pressure	**34.3 MPa** (**5410 psi**)



SMIL14CEX2088BB 21

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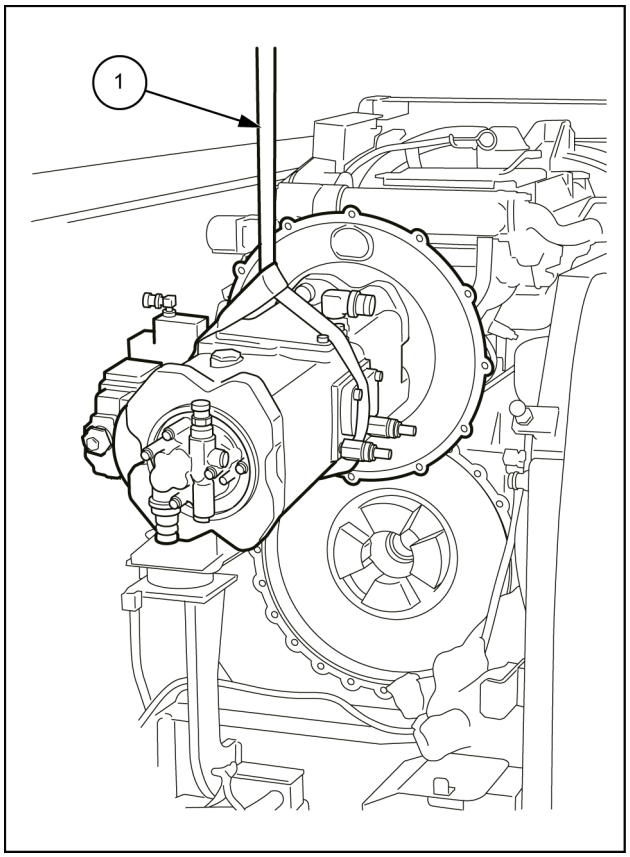
Hydraulic systems - 000

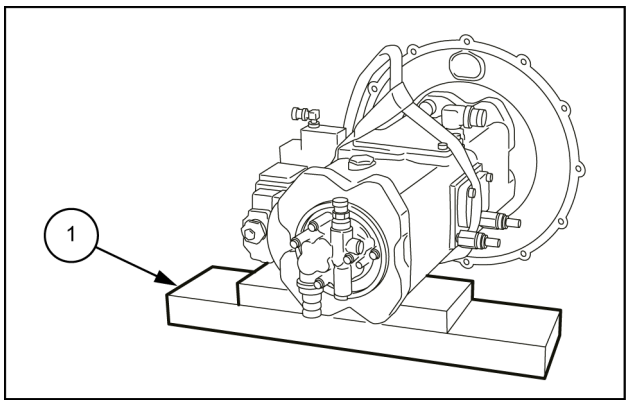
(*) See content for specific models

13. Pull out the pump outward in axial direction with a lifting equipment and nylon sling **(1)** and then lift the pump.



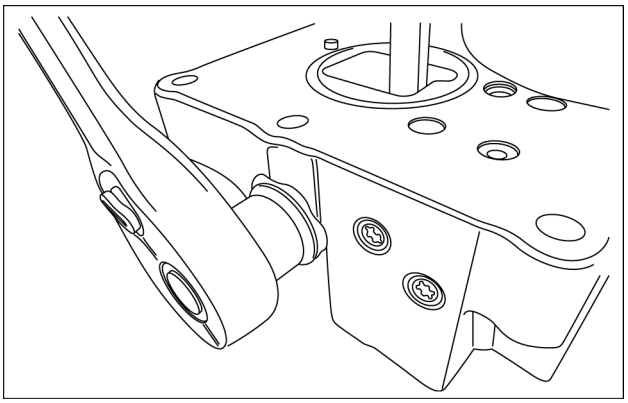
SMIL14CEX1324BB 10

14. Make sure that you have a safe site, and then settle the pump on a wood plank **(1)** or other block.
    - Make sure to secure the pump so as to prevent it from falling.

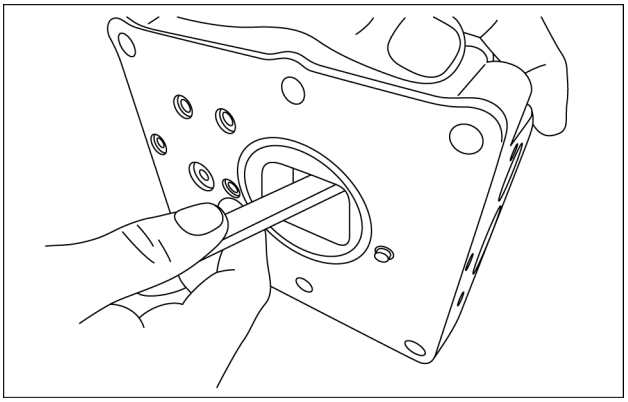


SMIL14CEX1325AB 11

8. Remove the adjusting plug **(614)** and the feedback lever **(611)**.
   - The tightening torque of the adjusting plug **(614)** is high. Therefore, pay attention to falling or other accident of the work during loosening of the plug.
   - Do not remove the pin **(876)** that is pressed into the feedback lever **(611)**.

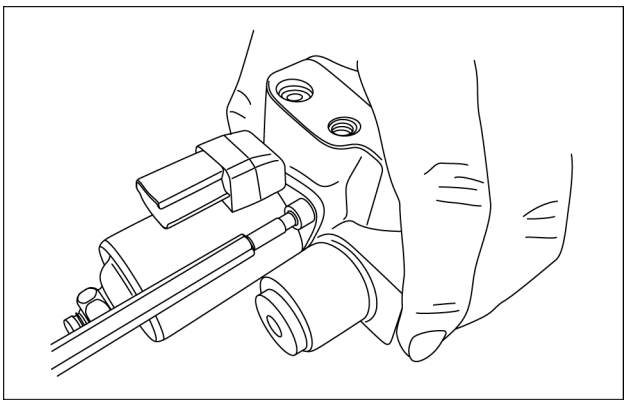


SMIL14CEX6598AB 7



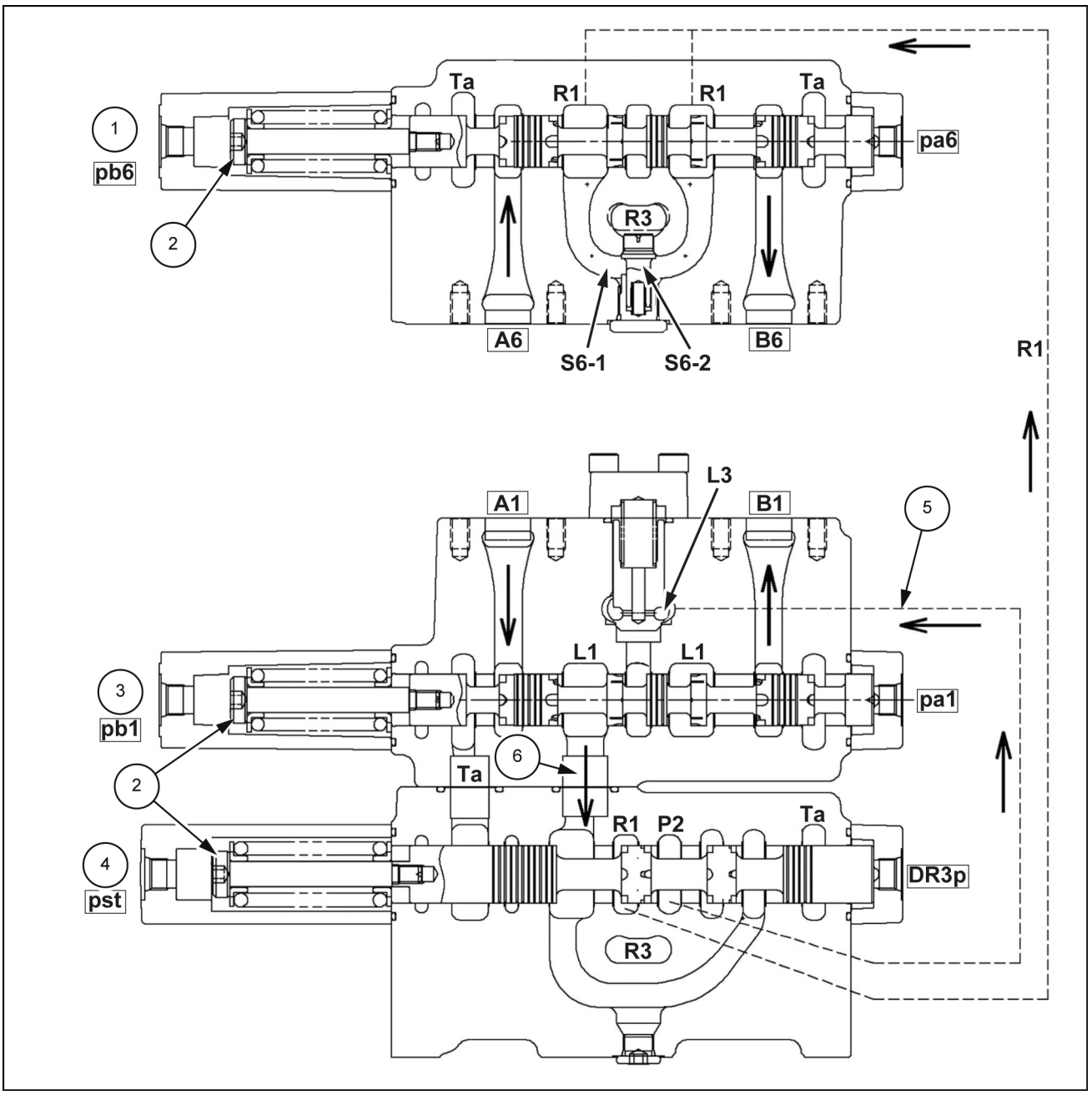
SMIL14CEX6599AB 8

9. Remove the compensation sleeve **(622)** and the pilot sleeve **(643)** from the casing **(601)**.
10. Remove the hexagon socket head bolt **(418)** and the electromagnetic proportional pressure reducing valve **(079)** from the valve casing **(660)**.
    - Pay attention to the damage at the connector section of the electromagnetic proportional pressure reducing valve **(079)**.



SMIL14CEX6600AB 9

11. Remove the ROH plug **(466)** and the spool **(665)** and the spring **(666)**.



SMIL14CEX3823GB 21

1. Travel (section 6)
2. Switchover state
3. Travel (section 1)
4. Travel straight (section ST)
5. Path 1
6. Path 3

4. Antidrift valve [Fig. 22 - 24]

The antidrift valve is installed at the cylinder port of the arm rod (boom head) side in order to prevent self-dropping of the arm (boom) cylinder.

It is also activated by leading relief signal from the pilot signal via the internal path. (Arm side **(A5)** is shown as representative example)

3. Install the O-ring to the plug (56-1), the sleeve (56-4) of the low-pressure relief valve and then tighten them.

   Torque: **103 – 113 N·m** (**75.97 – 83.34 lb ft**)

4. Screw in and tighten the main relief valve **(80)** for add-on.

   Torque: **49 – 59 N·m** (**36.14 – 43.52 lb ft**)

Assembly of load check valve

1. Attach the O-ring **(25)** to the arm 1 (cross-section E-E), the boom 1, 2 (cross-section F-F), the swing and the bucket (cross-section G-G) sections, and then assemble the poppet **(23)** and the spring **(24)**.
   Cap the flange **(26)** to tighten with the socket head bolt **(61)**.

   Torque **58 – 64 N·m** (**42.78 – 47.20 lb ft**)

2. Attach the O-ring **(25)** to the arm 2 (cross-section E-E) section and assemble the sleeve **(47)**, the poppet **(48)** and the spring **(49)**, and then cap the flange **(50)** to tighten with the socket head bolt **(61)**.

   Torque **58 – 64 N·m** (**42.78 – 47.20 lb ft**)

3. Assemble the poppet **(37)** and the spring **(36)** to the travel (cross-section H-H) section, and tighten with the plug **(34)** to which the O-ring **(35)** is attached.

   Torque: **103 – 113 N·m** (**75.97 – 83.34 lb ft**)

4. Attach the O-ring **(25)** to the travel (cross-section I-I) section, and then assemble the poppet **(38)** and the spring **(24)**.
   Cap the flange **(26)** to tighten with the socket head bolt **(61)**.

   Torque: **103 – 113 N·m** (**75.97 – 83.34 lb ft**)

5. Attach the O-ring **(25)** to the option section (cross-section H-H), and then assemble the poppet **(32)** and the spring **(33)**.
   Cap the flange **(31)** to tighten with the socket head bolt **(60)**.

   Torque: **58 – 64 N·m** (**42.78 – 47.20 lb ft**)

6. Assemble the poppet **(23)** and the spring **(24)** to the common check section (cross-section J-J), and then insert the spacer **(40)** to which the O-ring **(41)** and the backup ring **(42)** are attached.
   Tighten the flange **(39)** with the socket head bolt **(61)**.

   Torque: **39 – 44 N·m** (**28.76 – 32.45 lb ft**)

NOTICE: *Pay attention to assemble the O-ring and the backup ring to the correct assembling position. Reversing the position may cause damage to the O-ring, which may cause external leakage.*

7. Assemble the poppet **(21)** and the spring **(22)** to the arm 1 parallel-tandem section (cross-section D-D).
   Screw in and tighten the plug assembly **(57)** to which the O-ring is attached.

   Torque **116 – 128 N·m** (**85.56 – 94.41 lb ft**)

Pilot solenoid valve block - Install

5 Stack solenoid valve

Mount the valve in the reversed order of the procedure for removal.

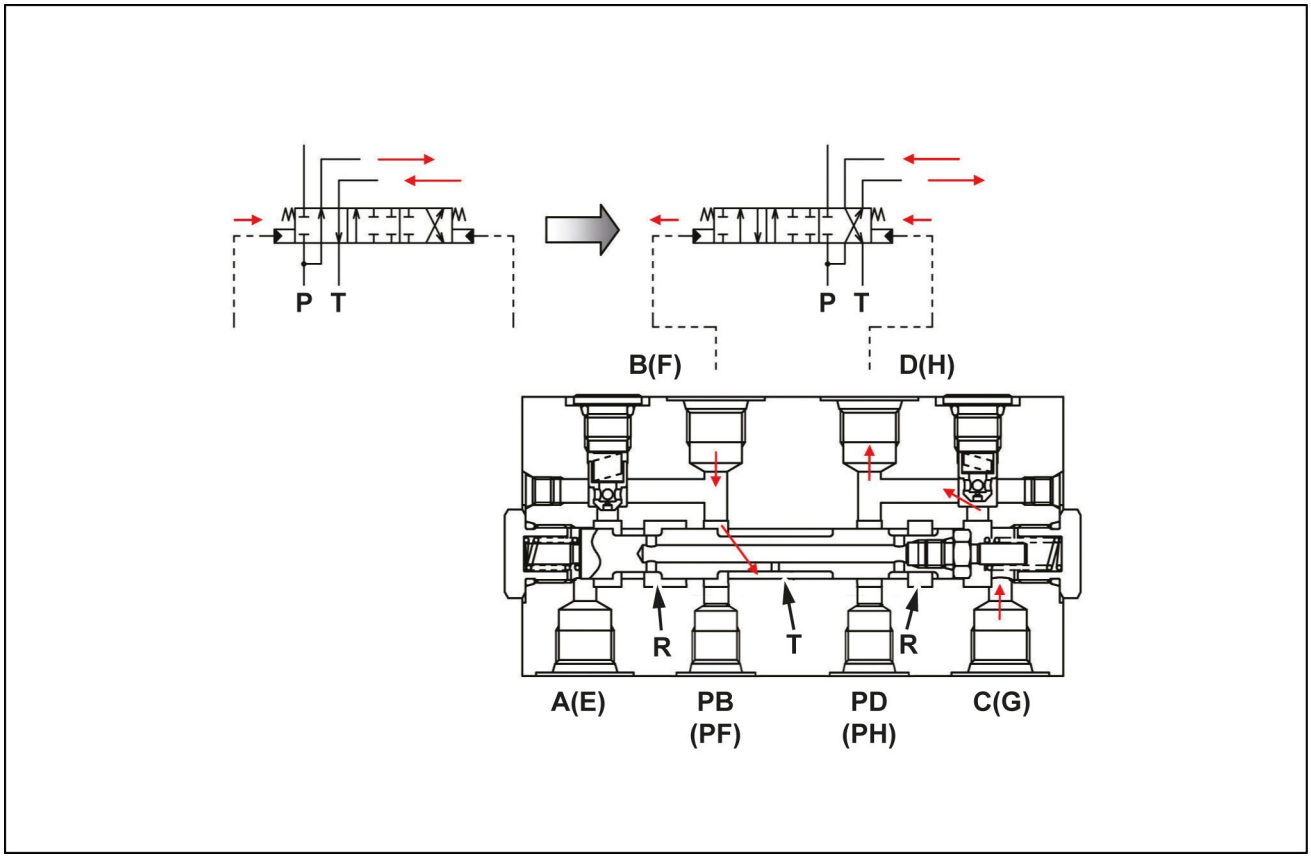
Each bolt has to be tightened in the specified torque.

Refer to the **Torque - Bolt and nut ()** for those without specified torque.

Reverse operation

When the pressure oil being supplied from the pilot operation valve to the port A (or the port C, E, G) is switched to the port C (or the port A, E, G), the pressure oil acting on the spool of the control valve will be pushed back to the port B.

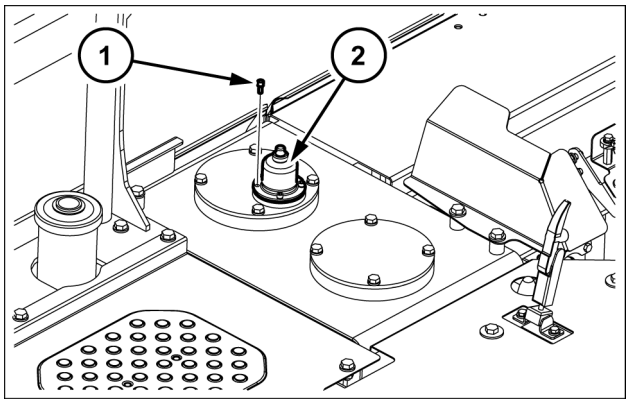
Since the oil pushed back flows into the port T without passing through the orifice in the check plunger, the spool speed of the control valve is not controlled, and the cushion function is not activated.



SMIL14CEX3859FA 4

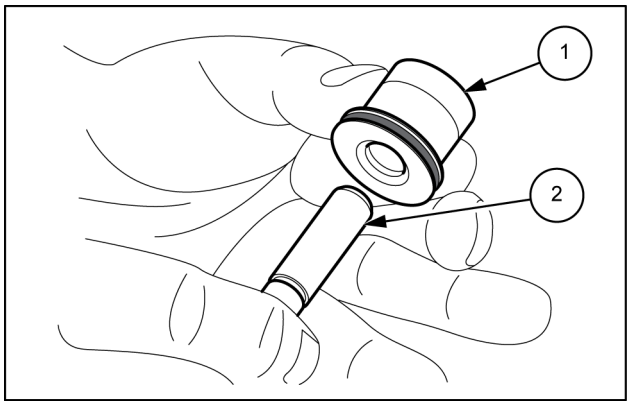
4. Tighten the 4 bolts **(1)** with a hexagon wrench [**5 mm**] to mount the air breather **(2)** of the hydraulic tank.

   Tightening torque: **2.94 – 4.90 N·m** (**2.1684 – 3.6141 lb ft**) bolt **(1)**



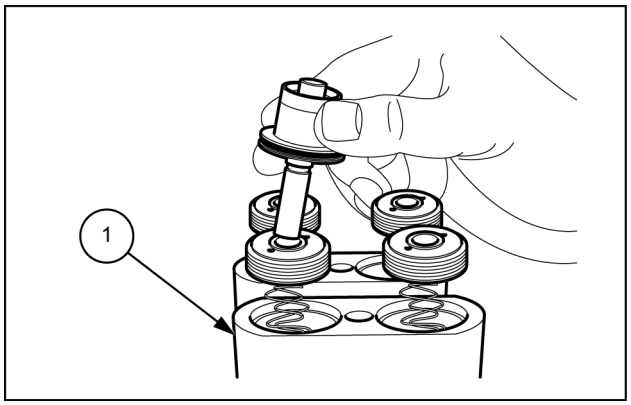
SMIL14CEX6580AB 5

14. Install the push rod **(2)** on the plug **(1)**.
    - Before installing the push rod, apply hydraulic oil to the rod surface.
      Do not press the rod in strongly, as this may damage the NHU packing lip section.



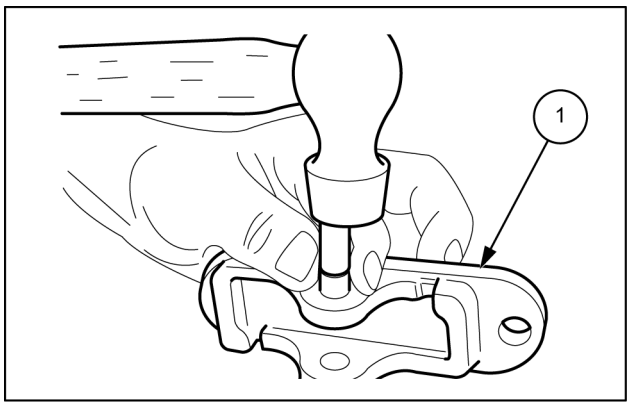
SMIL14CEX1485AB 17

15. Install the push rod subassemblies assembled in Steps **11**, **12**, **13**and **14** above into the casing **(1)**.



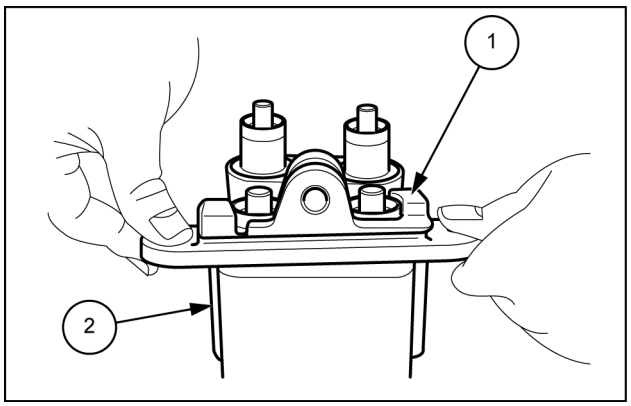
SMIL14CEX1486AB 18

16. Use special tool 1 on the covers **(1)** to press down the bushings, and lightly strike the bushings with a hammer to press fit them.
    - Be careful that the ends of the bushings do not stick out from within the cover.



SMIL14CEX1487AB 19

17. Install the cover **(1)** on the casing **(2)**.
    - Install them in the positions they were in before disassembly.
    - Be careful of the cover rising up due to the damping springs.



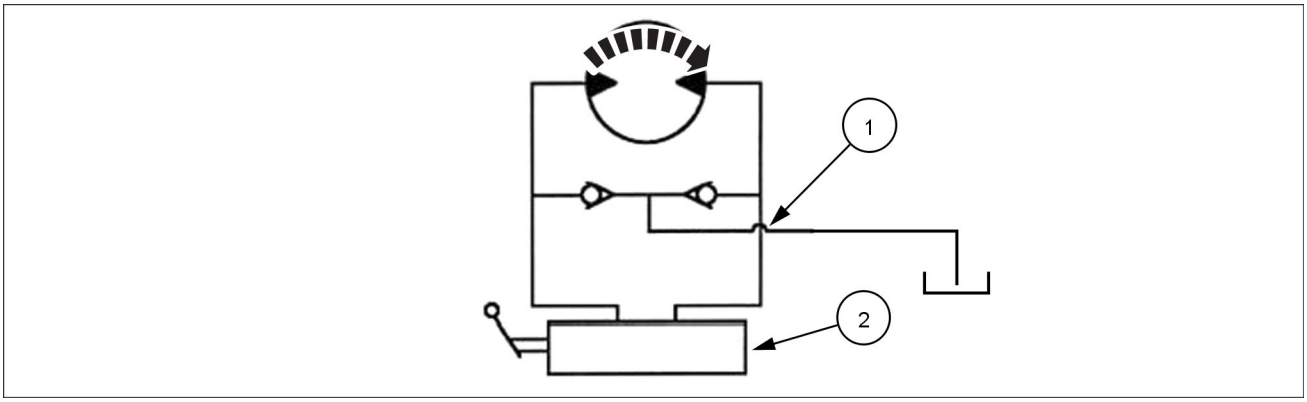
SMIL14CEX1488AB 20

Valve Casing Section

Anti-cavitation check section

Because the system using this type of motor does not have a valve with a counter-balance function, the motor sometimes rotates more than the quantity of oil fed.

In order to prevent cavitation due to insufficient oil, there is a check valve to take in the oil shortfall.



SMIL17CEX1050EB 2

Hydraulic circuit diagram

1. M port
2. Control valve

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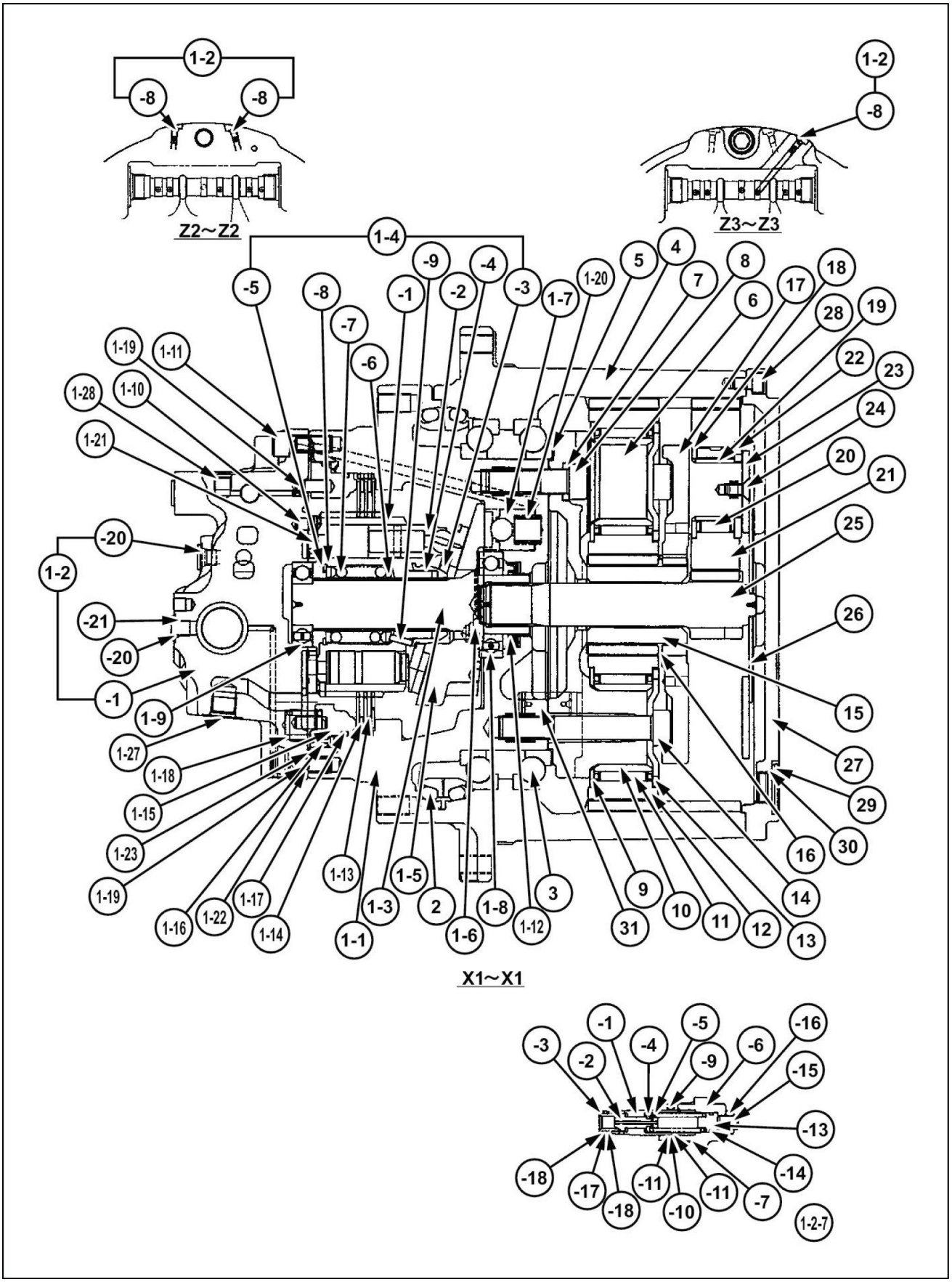
CX290D Crawler excavators LC Material Handling (TIER4 FINAL) - EU Market
CX290D Crawler excavators LC Scrap Loader (TIER4 FINAL) - EU Market



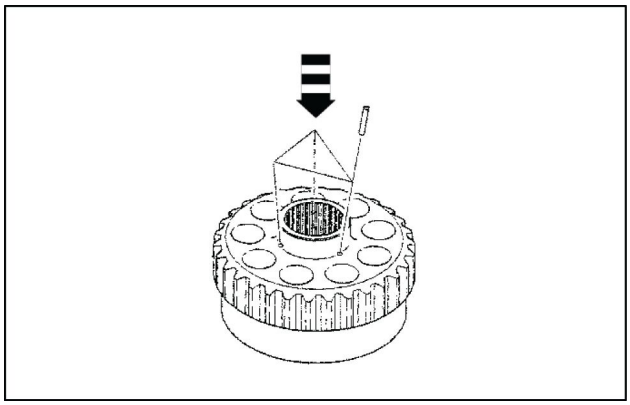
LPIL12CX01424HA 2

7. Point the surface of the cylinder block (1-4-1) that slides against the valve plate (1-21) down and place the cylinder block on the work platform.
   Insert the 3 pins (1-4-9) into the diagonal holes of the cylinder block (1-4-1).

NOTICE: *When placing the cylinder block on top of the work platform, check that there is no foreign matter on top of the work platform.*

NOTICE: *Be careful not to scratch the surface of the cylinder block that slides against the valve plate. Scratching may cause a reduction in motor performance and early damage to the motor.*

NOTICE: *Apply grease to the pin holes before attaching the pins.*



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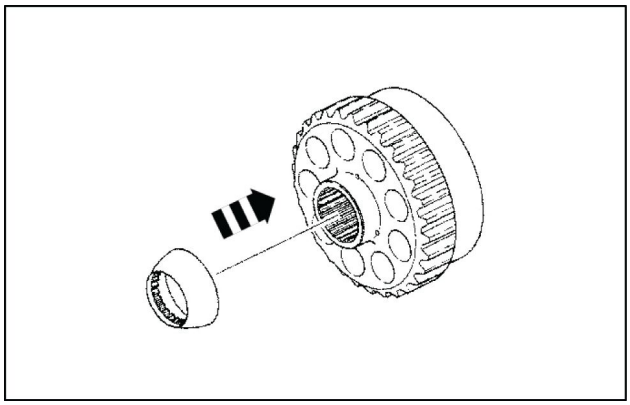
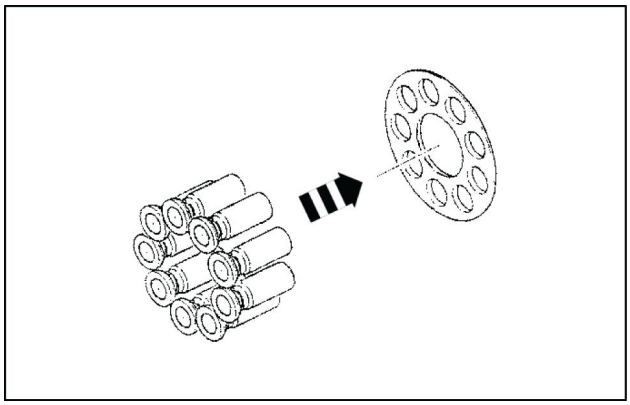
8. Attach the retainer holder (1-4-4) to the cylinder block (1-4-1).



LPIL12CX01501AA 33

9. Place the side of the retainer plate (1-4-3) with a taper on the outer circumference down, and attach the 9 piston assemblies (1-4-2) to the retainer plate.

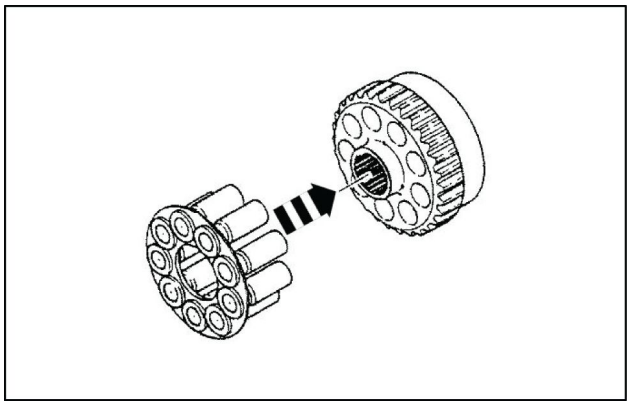


LPIL12CX01502AA 34

10. Attach the piston assemblies (1-4-2) to the cylinder block (1-4-1).

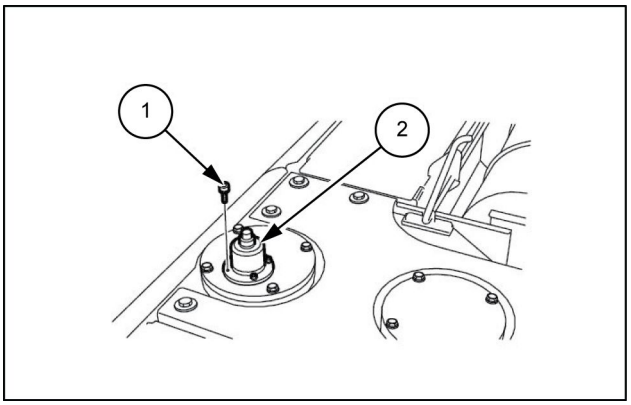
NOTICE: *Apply hydraulic oil to the 9 cylinder block piston attachment holes before attaching the piston assemblies.*

NOTICE: *Apply hydraulic oil to the spherical surface of the retainer holder (1-4-4) before attaching it.*



LPIL12CX01503AA 35

8. Use a hexagon wrench [**5 mm**] to install the 4 bolts **(1)**, then install the air breather **(2)** on the hydraulic oil tank to the location from which the specialty adapter for the vacuum pump was removed.

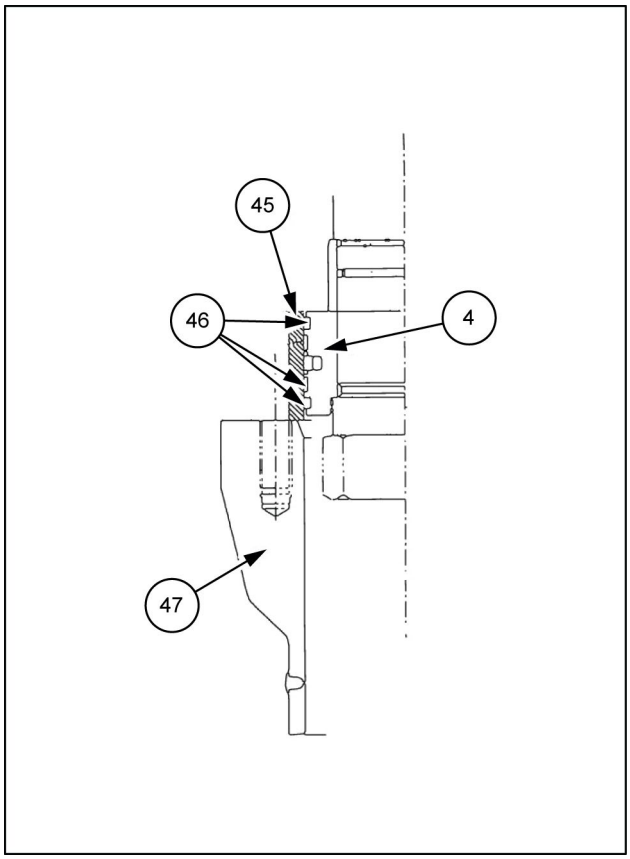


SMIL13CEX0942AB 8

Insertion of piston rod into the tube

1. Secure the tube **(47)** vertically or horizontally.
2. Insert the piston rod **(4)** into the tube **(47)**.
   - If the tube is secured vertically, the piston rod enters the tube due to its own weight.
   - When the piston section is entering the tube, be careful that the slide rings **(46)** do not fall out.

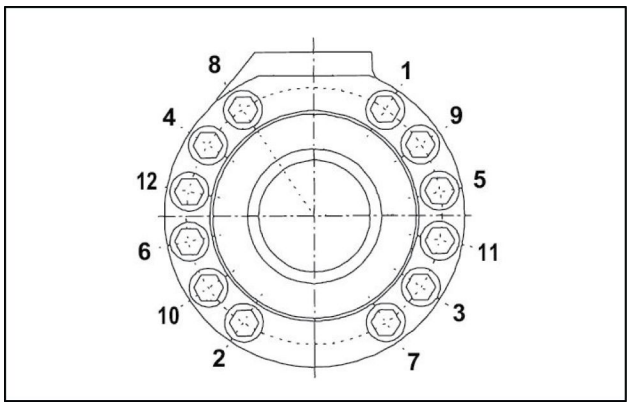
   45. Jig, Nylon pipe (split in two)
   46. Slide ring (shift the abutment phase 180° from one ring to the next.)



LPIL12CX02948BB 11

Cylinder head tightening

Align the cylinder head with the position on the assembly diagram, and then tighten the bolts to the specified torque given on the assembly diagram in the order shown in the diagram right.
Bolt tightening order



LPIL12CX02949AA 12

Arm cylinder holding valve - Prepare

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Raised equipment or machine movement without an operator can cause serious injury. Always do the following before performing any maintenance:
Park the machine on flat, level ground.
Lower the attachment to the ground.
Shut down the engine and remove the ignition key.
Lock the tracks.
Failure to comply could result in death or serious injury.

W0944D

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Assign a supervisor to direct worksite operations. Agree on all safety measures, procedures, and suitable hand signals.
Failure to comply could result in death or serious injury.

W0287A

⚠ WARNING

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

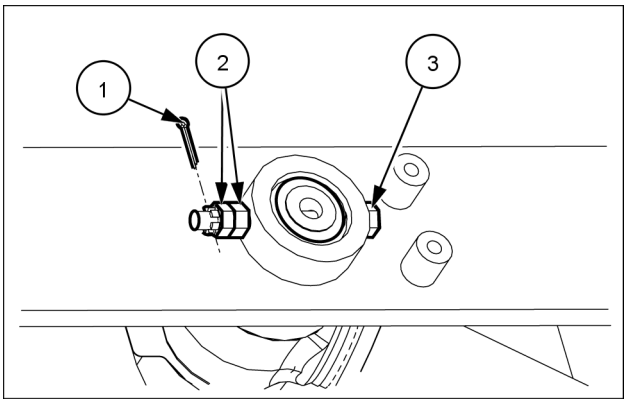
W0178A

NOTICE: *When working together with others, always be sure to exchange signals and pay adequate attention to safety.*

Items to prepare:

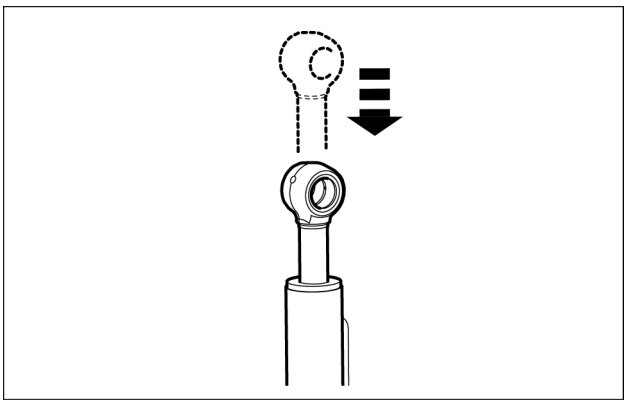
- Wrench [**19 mm**, **22 mm**]
- Hexagon wrench [**10 mm**]
- Marking pen
- Cap
- Plug
- Rag
- Cleaning fluid

9. Pull out the split pin **(1)**, remove the bolt **(3)** and the nut **(2)** with a wrench [**19 mm**], and remove the cylinder top pin with a hammer and a striking rod.



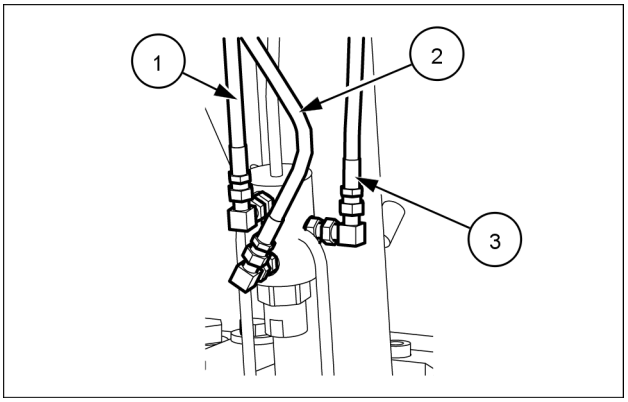
SMIL17CEX1667AA 9

10. Retract the cylinder.



SMIL17CEX1668AA 10

11. Remove the hoses **(1)**, **(2)**, **(3)** with a wrench [**19 mm**].
    - Attach caps and plugs to the hoses and piping to prevent the entry of water, dust, and dirt.
    - Wash each location of the hoses and piping by blowing parts cleaner so as to prevent adhering dirt at connections and not to damage them.



SMIL17CEX1669AA 11

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

Tip-over hazard!
Only raise the track as little as necessary.
Failure to comply could result in death or serious injury.

W0276A

⚠ 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: *Be sure to adjust the shoe tension appropriately. If the shoe tension is insufficient, the shoe may come off when the machine enters on a bad road and it is very dangerous.*

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

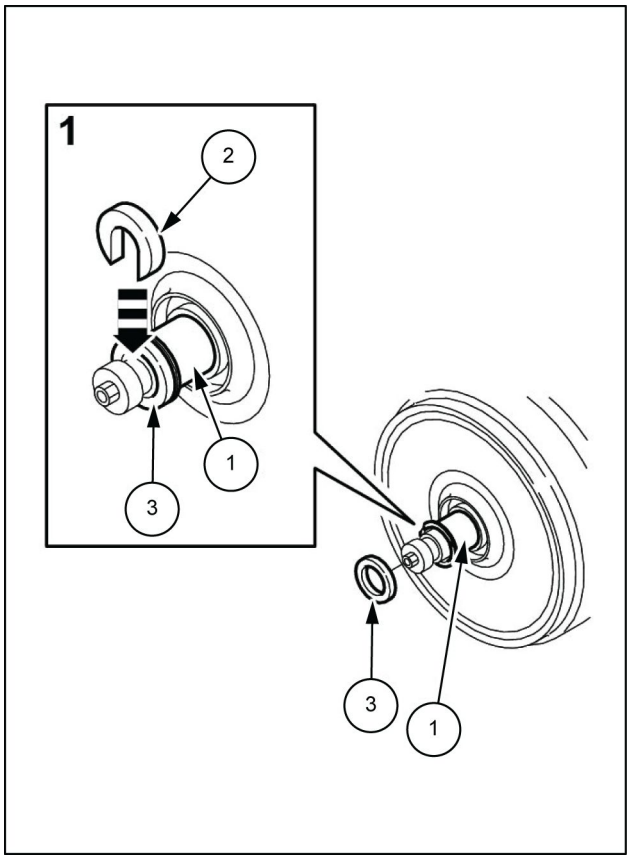
NOTICE: *Do not get under the main unit when it is jacked up. Make sure to place the main unit on crossties to prevent falling.*

NOTICE: *Before installing the shoe, always remove any dirt, gravel, etc. stuck to the travel unit.*

Items to prepare:

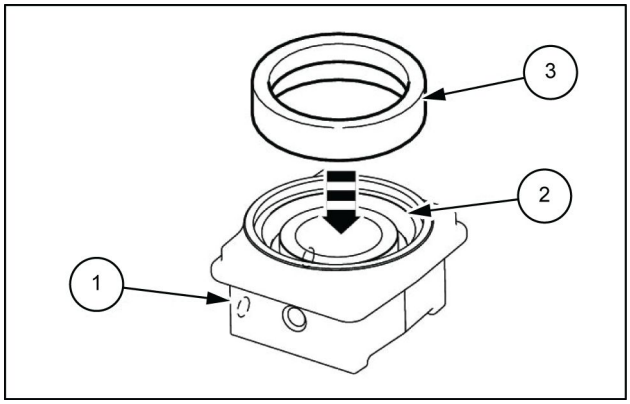
- Wrench [**17 mm**, **19 mm**]
- Box wrench [**19 mm**]
- Hammer
- Wood planks, etc.
- Striking jig
- Crowbar
- Rag
- Lifting equipment (with the required breaking load)
- Lifting equipment (with the required lifting capacity)

4. Use the jigs **(2)** and **(3)** attached to the pressing machine to attach the bushing **(1)**. Use the pressing machine to press from the opposite side. Next, use a special fiber cloth to remove all dust and debris.



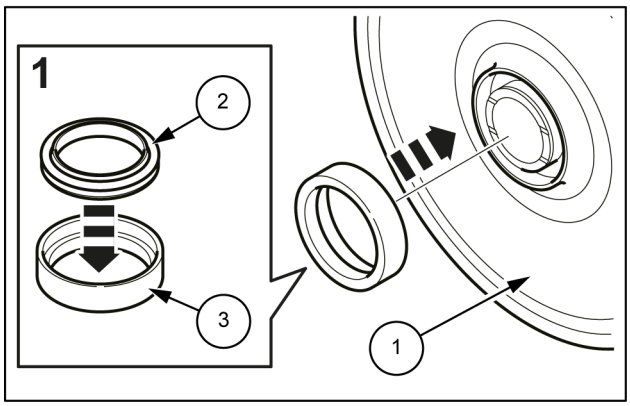
LPIL12CX01186BB 4

5. Attach the floating seal **(2)** to the hub **(1)**. Use jig C **(3)** to press it into position.



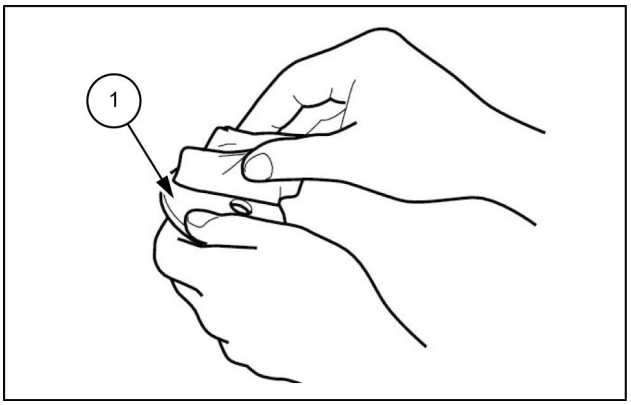
LPIL12CX01187AB 5

6. Use jig C **(3)** to attach the floating seal **(2)** to the roller **(1)** side.



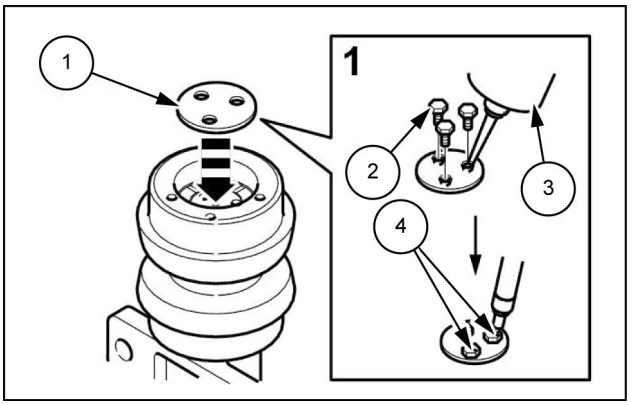
SMIL14CEX1144AB 6

9. Use a special fiber cloth to thoroughly wipe the surface of the thrust plate **(1)** to prevent any dust or scratches.



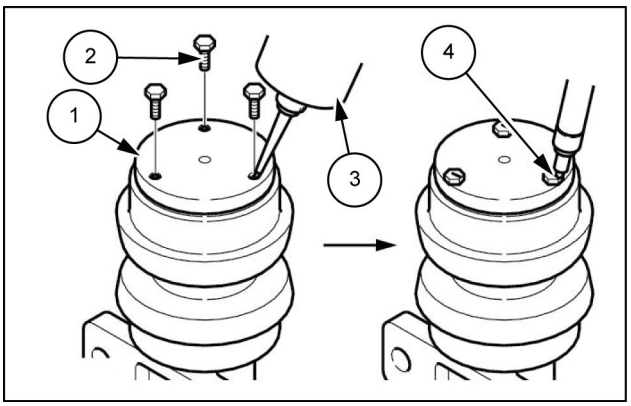
LPIL12CX01266AB 9

10. Install the thrust plate **(1)** with 2 bolts **(2)**.
Degrease the bolts well, apply **LOCTITE® (3)** to the bolt openings, and tighten the bolts.
After tightening the bolts, mark them **(4)**.
Bolt **(2)** tightening torque: **62.8 – 72.6 N·m** (**46.319 – 53.547 lb ft**)



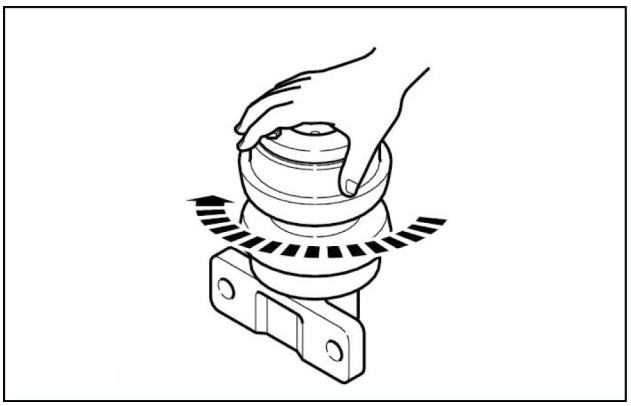
LPIL12CX01267AB 10

11. Install the cover **(1)** with 3 bolts **(2)**.
Degrease the bolts, apply **LOCTITE® (3)** to the bolt openings, and tighten the bolts.
After tightening the bolts, mark them **(4)**.
Bolt **(2)** tightening torque: **31.4 – 37.2 N·m** (**23.159 – 27.437 lb ft**)



LPIL12CX01268AB 11

12. Rotate the roller in the direction of the arrow and check that it rotates smoothly.



LPIL12CX01269AA 12

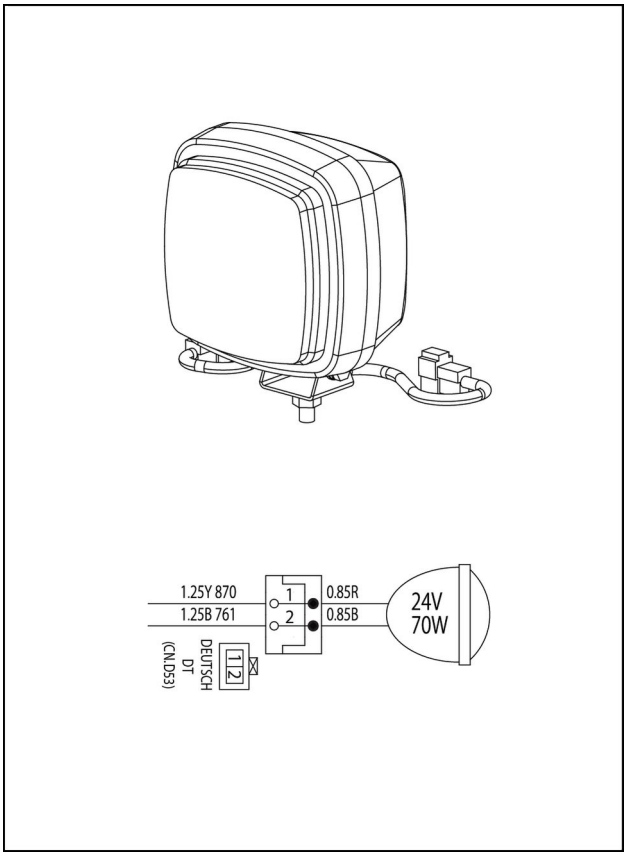
6. Upon completion of filling refrigerant, close the low pressure valve **(11)** of the gauge manifold **(13)** and the service can valve **(17)**, and then stop the engine.
   - Operating the air conditioner with very low volume of refrigerant (**R134A**) causes bad effect on the compressor.
   - Filling excessive volume of refrigerant (over charge) may cause insufficient cooling on the contrary, and it is also dangerous to cause abnormally high pressure in the circuit.
     Keep adequate volume.
   - Never open the high pressure valve **(12)** of the gauge manifold.
   - Never let the service can fall upside down. (It causes suction in liquid state which may damage the compressor valve).
7. Remove the gauge manifold and hose after filling refrigerant and inspection.
   Remove the low pressure side charge hose (blue) **(15)** quicker than the low pressure side (SUC) service valve.
   Leave the high pressure side until indication of the high pressure gauge drops to **0.098 MPa** (**14.215 psi**) or less.
   Confirm that it has dropped, and then remove the high pressure side charge hose (red) **(14)** quicker than the high pressure side (DIS) service valve.

Lamp (housing)

Code: E72

Specification: **24 V**, **70 W**

Part No.: KHR50310



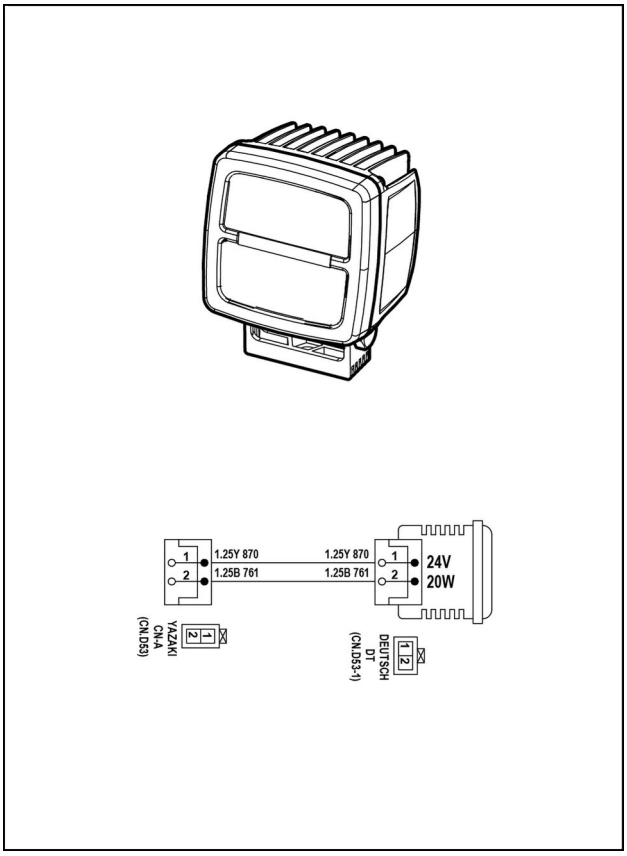
SMIL17CEX1434BA 37

Lamp (housing, boom) (LED)

Code: E74

Specification: **24 V**, **20 W**

Part No.: KHR49790-B



SMIL17CEX1435BA 38

6 stack proportional valve

Code: Y61 (Packet close)

Code: Y74 (Straight travel)

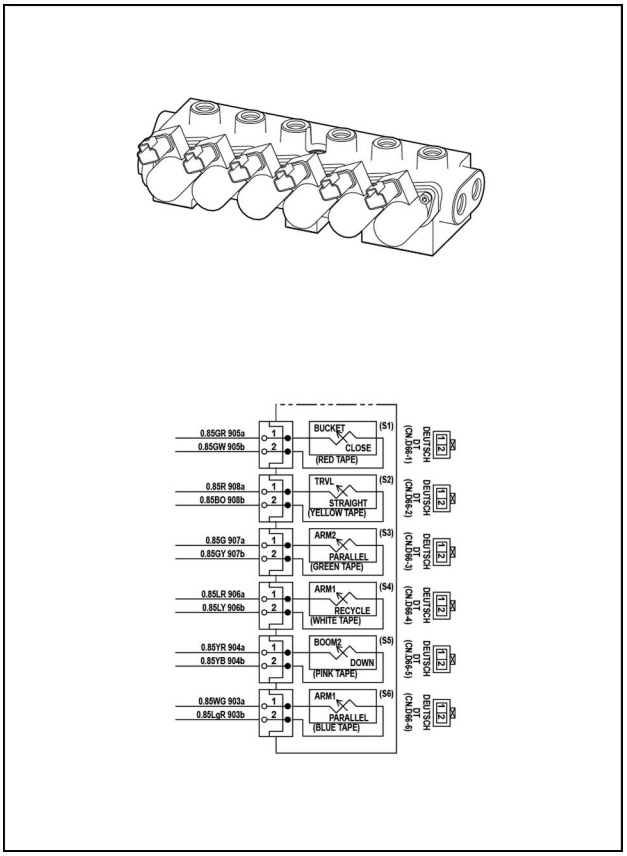
Code: Y125 (Arm 2 parallel)

Code: Y126 (Arm 1 regeneration)

Code: Y127 (Boom 2 down)

Code: Y128 (Arm 1 parallel)

Part No.: KHJ28520-B



SMIL17CEX1511BA 115

Injector

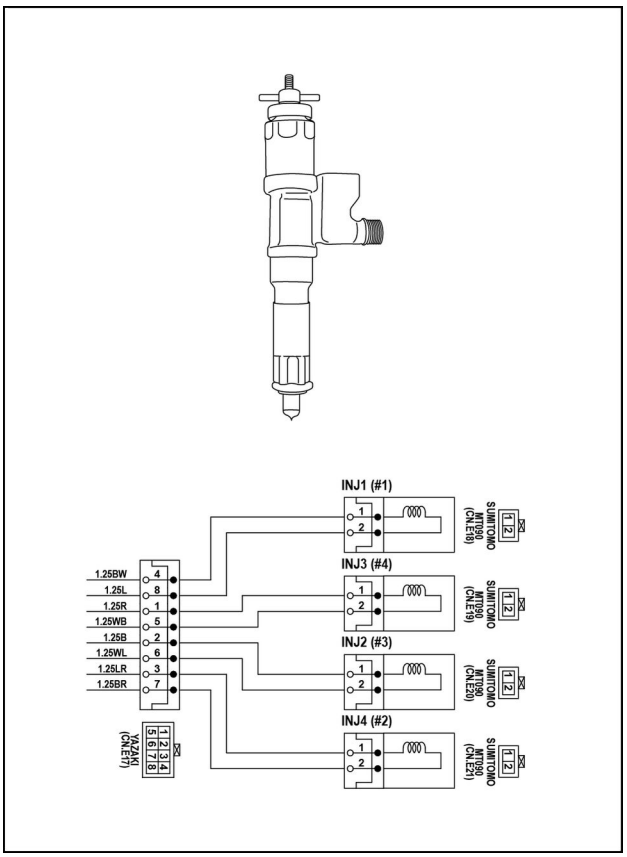
Code: Y63 (Injector 1 (#1))

Code: Y64 (Injector 2 (#3))

Code: Y65 (Injector 3 (#4))

Code: Y66 (Injector 4 (#2))

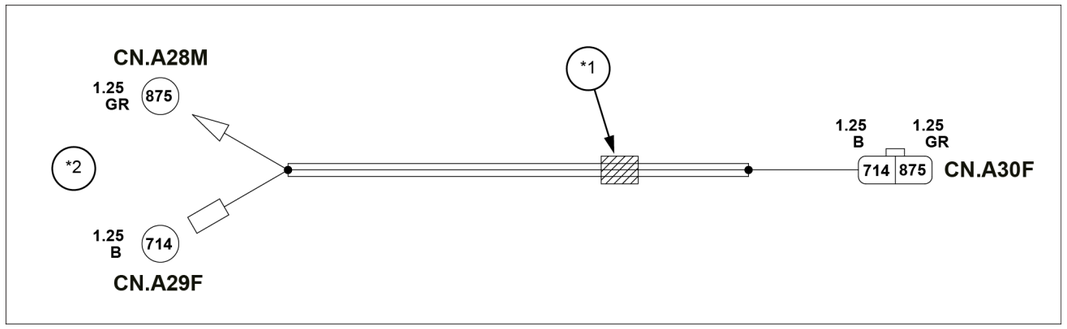
Part No.: 8982384630



SMIL17CEX1512BA 116

1. Arm-out pressure sensor
2. Arm-in pressure sensor
3. N2 pressure sensor
4. N1 pressure sensor
5. 6 stack proportional valve
6. Bucket (close) solenoid valve
7. Straight travel control proportional valve
8. Arm 2 variable parameter control proportional valve
9. Arm regeneration release control proportional valve
10. Boom down regeneration control proportion valve
11. Arm variable parameter control proportional valve
12. Solenoid valve (2 stack) for elevator
13. Reducing valve (3-line) for interference prevention
14. Grapple close main pressure sensor

Light harness (cab light)



SMIL17CEX0474EB 5

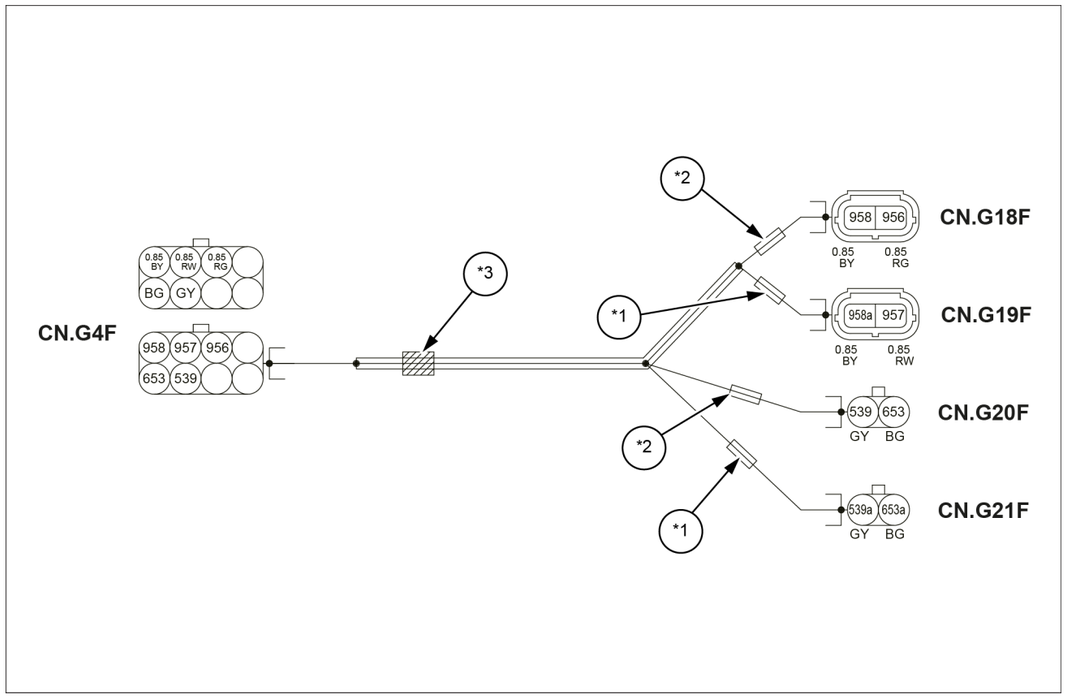
*1. Plate
*2. Cab harness

CN.A28M	Cab lamp
CN.A29F	Cab lamp
CN.A30F	Cab lamp

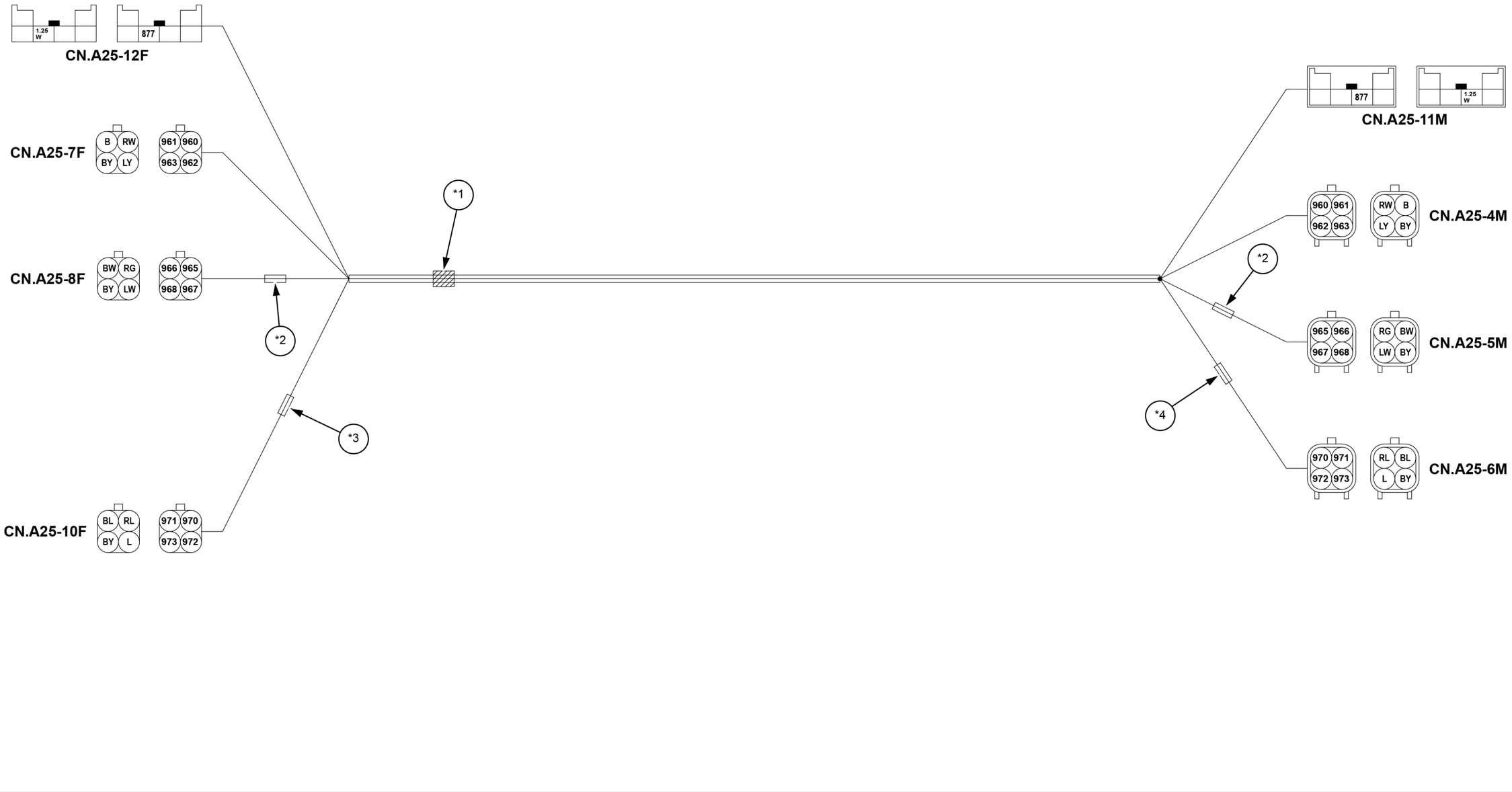
Option harness (proportional control)

*1. Blue adhesive tape
*2. Red adhesive tape
*3. Plate position

CN.G4F	Option 1 harness	CN.G20F	Pressure switch option 2 up
CN.G18F	P-SV option 2 lever up	CN.G21F	Pressure switch option 2 down
CN.G19F	P-SV option 2 lever down		

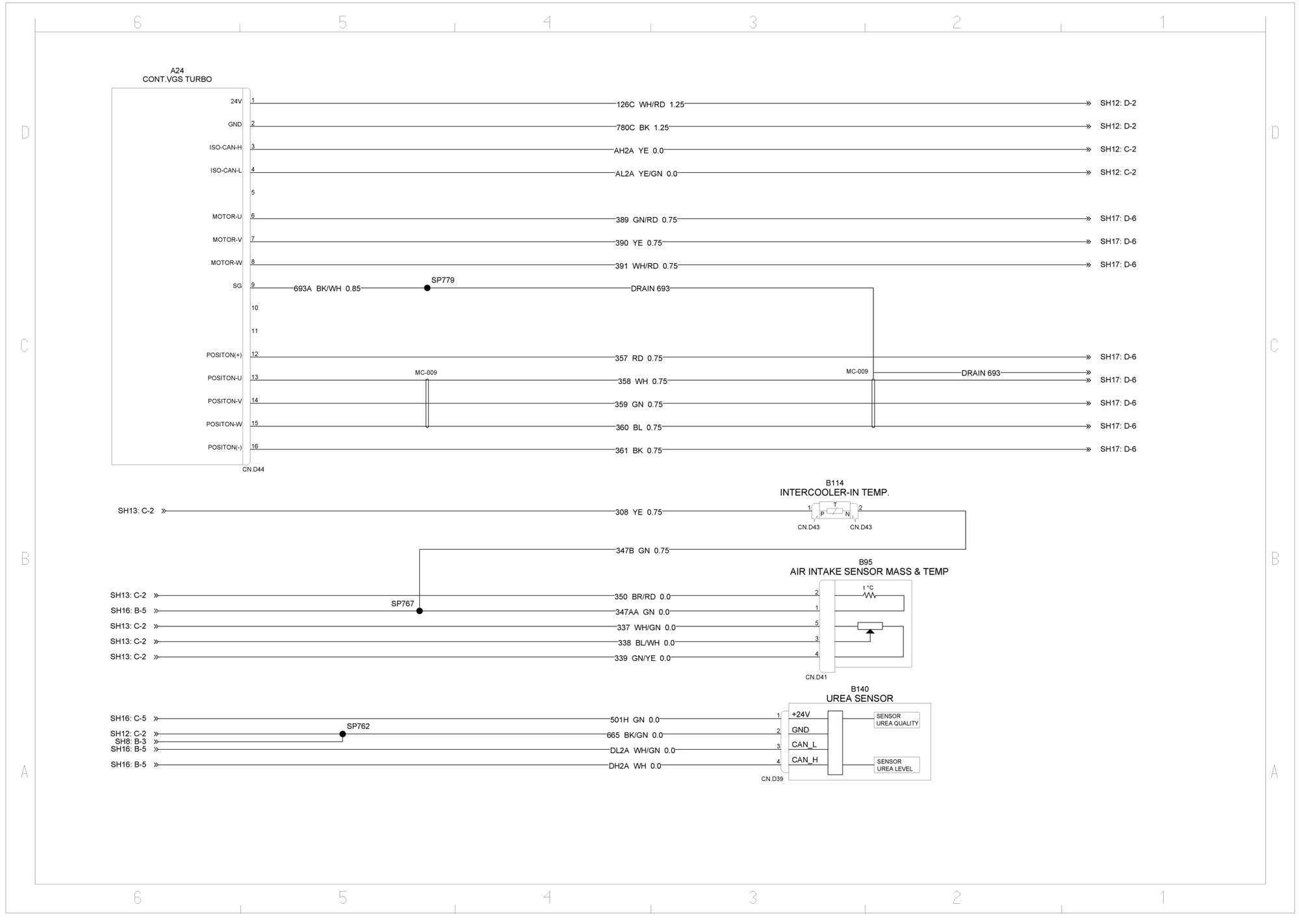


SMIL17CEX1294FB 28


1.25 W
877
CN.A25-12F
CN.A25-7F
B
RW
BY
LY
961
960
963
962
CN.A25-8F
BW
RG
BY
LW
966
965
968
967
CN.A25-10F
BL
RL
BY
L
971
970
973
972
*1
*2
*3
*4
877
1.25 W
CN.A25-11M
960
961
962
963
RW
B
LY
BY
CN.A25-4M
965
966
967
968
RG
BW
LW
BY
CN.A25-5M
970
971
972
973
RL
BL
L
BY
CN.A25-6M

Wiring harnesses - Electrical schematic sheet 02 - Power distribution_starting and charging circuit

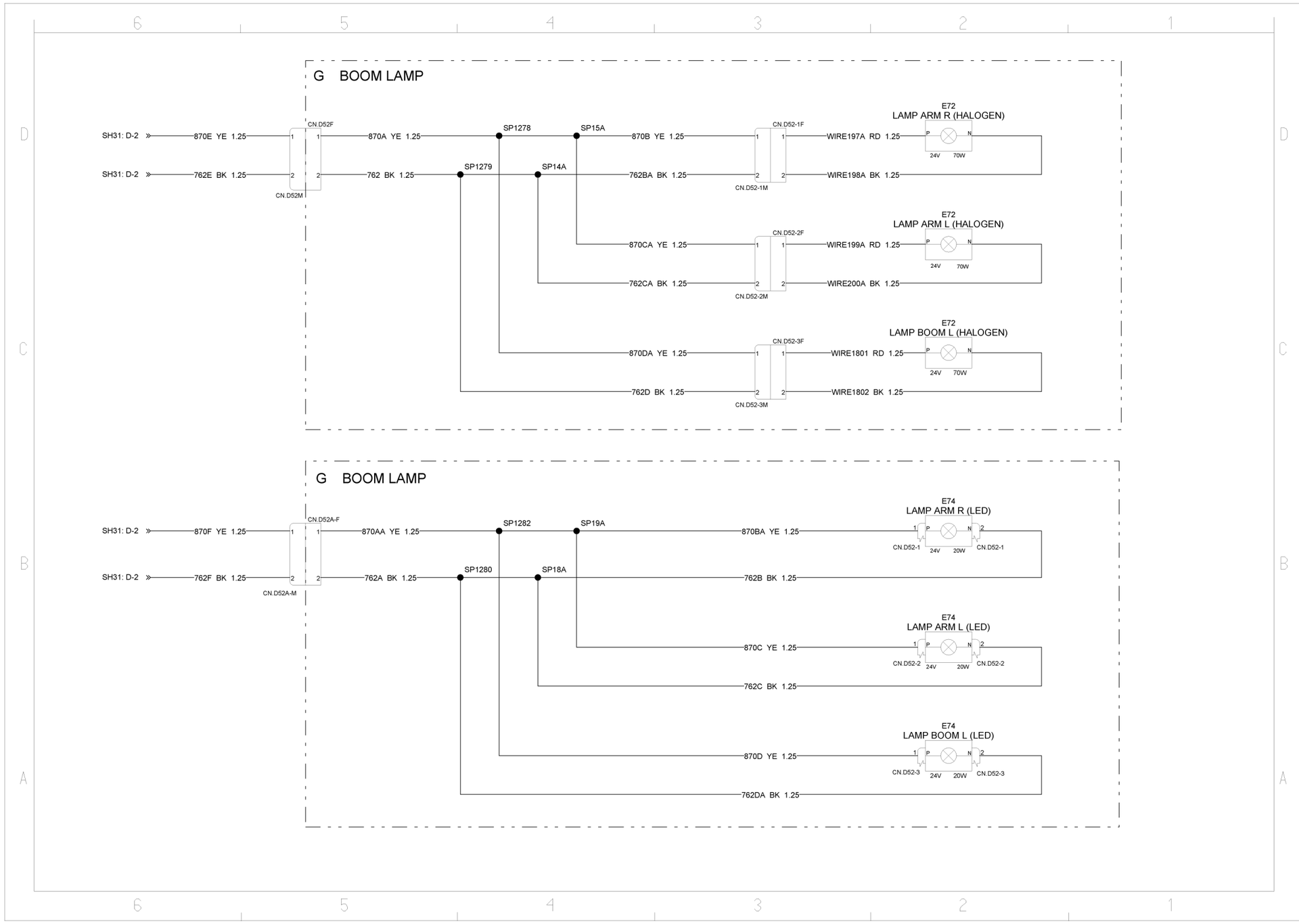
Type	Component	Connector/link	Description
Fuse	F75		Fusible link
Fuse	F76		Fusible link
Battery	G1		Battery
Alternator	G2		Alternator
Relay	K2		Glow relay
Relay	K7		Battery relay
Relay	K69		Starter relay
Motor	M1		Starter motor
Plug	R1		Glow plug
Switch	S1		Key switch
Switch	S94		Battery switch
Connector	CN.B1	**CN.B1**	Key switch
Connector	CN.D9	**CN.D9**	
Connector	CN.D10	**CN.D10**	Starter motor
Connector	CN.D11	**CN.D11**	Alternator
Connector	CN.D12	**CN.D12**	
Connector	CN.D13	**CN.D13**	Alternator
Connector	CN.D15	**CN.D15**	Fusible link
Connector	CN.D16	**CN.D16**	Fusible link
Connector	CN.D17	**CN.D17**	Fusible link
Connector	CN.D18	**CN.D18**	Fusible link
Connector	CN.D24	**CN.D24**	Battery relay
Connector	CN.D25	**CN.D25**	Battery relay
Connector	CN.D26	**CN.D26**	Battery relay
Connector	CN.D27	**CN.D27**	Battery relay
Connector	CN.D28	**CN.D28**	Battery relay
Connector	CN.D29	**CN.D29**	
Connector	CN.D30	**CN.D30**	Starter relay
Connector	CN.D31	**CN.D31**	Starter relay
Connector	CN.D32	**CN.D32**	Diode
Connector	CN.D33	**CN.D33**	Glow relay
Connector	CN.D34	**CN.D34**	Glow relay
Connector	CN.D35	**CN.D35**	Glow relay



SMIL17CEX3594JA 1

Wiring harnesses - Electrical schematic sheet 41 - Interconnectors

Type	Component	Connector/link	Description
Connector	CN.A51	**CN.A51**	
Connector	CN.A52	**CN.A52**	
Connector	CN.A54	**CN.A54**	



SMIL17CEX3633JA 1

CONNECTOR CN.C4: CN.C4 (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A25-7A-F-P-3	962F		YE-0.0	**SHEET 53**
1	CN.A25-7F-P-3	962E		YE-0.0	**SHEET 52**
2	CN.A25-8F-P-3	967F		YE/BK-0.0	
2	CN.A25-8A-F-P-3	967G		YE/BK-0.0	**SHEET 53**
3	CN.A25-10F-P-3	972E		YE/RD-0.0	**SHEET 52**
3	CN.A25-9F-P-3	972F		YE/RD-0.0	**SHEET 53**
4	CN.C11M-P-6	590B		OR-0.0	**SHEET 34**
5	CN.A41F-P-12	591		YE/BL-0.0	**SHEET 39**
6	CN.A41F-P-13	592		VT-0.0	
7	CN.C9M-P-2	593B		OR/BL-0.0	**SHEET 34**
8	CN.A41F-P-14	594		YE/GN-0.0	**SHEET 39**
9	CN.C14-P-3	595B		VT/RD-0.0	**SHEET 49**
10	CN.C14-P-1	596B		BR-0.0	
11	CN.A40F-P-12	949		WH/BK-0.0	**SHEET 46**
12	CN.A25-7A-F-P-4	963D		WH-0.0	**SHEET 53**
12	CN.A25-7F-P-4	963E		WH-0.0	**SHEET 52**
13	CN.A25-8F-P-4	968E		WH/BK-0.0	
13	CN.A25-8A-F-P-4	968F		WH/BK-0.0	**SHEET 53**
14	CN.A25-10F-P-4	973E		WH/RD-0.0	**SHEET 52**
14	CN.A25-9F-P-4	973F		WH/RD-0.0	**SHEET 53**
15	CN.C6-P-11	820		GN/RD-0.0	**SHEET 30**
16	CN.C6-P-12	821		LG-0.0	
17	CN.C6-P-13	822		VT/GN-0.0	
18	CN.A41F-P-7	823		WH/GN-0.0	**SHEET 39**
19	CN.A41F-P-8	824		BL/YE-0.0	
20	CN.A41F-P-9	825		BL/GN-0.0	
21	CN.A41F-P-10	826		OR/RD-0.0	
22	CN.A40F-P-13	950		BK/WH-0.0	**SHEET 46**

CONNECTOR CN.E8: COOLANT TEMPERATURE SENSOR (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D5F-P-3	WIRE3704		RD/BK-0.75	**SHEET 18**
2	CN.D5F-P-16	WIRE3705		BK/YE-0.75	
3	CN.D5F-P-8	WIRE3706		RD-0.75	

CONNECTOR CN.B17: AIR CONDITIONER UNIT (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.B15-P-15	942		BR/WH-0.0	**SHEET 54**
2	CN.B15-P-16	936		VT/WH-0.0	
3	CN.B15-P-14	940		BR/YE-0.0	
4	CN.B15-P-1	939		RD/BL-0.0	
8	CN.B14-P-19	945		SB-0.0	
9	CN.B14-P-18	947		BL-0.0	
10	CN.B14-P-12	946		BK/WH-0.0	
11	CN.B14-P-7	920		GN/RD-0.0	
12	CN.B14-P-6	921		GN/WH-0.0	
13	CN.B14-P-5	922		YE/RD-0.0	
14	CN.B14-P-4	923		YE/WH-0.0	
15	CN.B14-P-3	924		BL/RD-0.0	
16	CN.B14-P-2	925		BL/WH-0.0	
18	CN.B14-P-15	926		BL/YE-0.0	
19	CN.B15-P-4	929		GN/BL-0.0	
20	CN.B15-P-3	930		YE/BL-0.0	
21	CN.B15-P-2	931		BL/GN-0.0	
22	CN.B14-P-13	932		BK/BL-0.0	

CONNECTOR CN.E14: EGR COOLER-IN TEMPERATURE SENSOR (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D6M-P-12	WIRE3185		RD/WH-0.75	**SHEET 17**
2	CN.D6M-P-11	WIRE3184		BK/WH-0.75	

CONNECTOR CN.A23-17: REDUCING VALVE (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D81M-P-11	914A		OR-0.85	**SHEET 47**
2	CN.D81M-P-12	915A		BK/OR-0.85	

CONNECTOR CN.A25-12A: CN.A25-12A (Male)

Pin	From	Wire	Description	Color-Size	Frame
1	SP405-P-X	965H		RD-0.0	**SHEET 53**
2	SP406-P-X	966H		BK-0.0	
3	SP407-P-X	967H		YE-0.0	
4	SP408-P-X	963C		WH-0.0	

CONNECTOR CN.B20B: CN.B20B (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	M33	WIRE1397		RD-0.0	**SHEET 56**
2	M33	WIRE1398		BK-0.0	

CONNECTOR CN.A30M: CN.A30M (Male)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A28FF-P-PIN1	875T		GN/RD-1.25	**SHEET 57**

CONNECTOR CN.A43: CN.A43 (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A3-P-22	531		BL/RD-0.0	**SHEET 10**
2	CN.A41M-P-14	594D		YE/GN-0.0	**SHEET 39**
3	CN.A18-P-2	841		BL/WH-0.0	**SHEET 06**
4	CN.A2-P-30	L837		YE/BL-0.0	**SHEET 10**
5	SP40-P-X	808AC		GN/WH-0.0	**SHEET 09**
6	CN.A5-P-1	809C		VT-0.0	
7	CN.A33M-P-6	701		BK-1.25	**SHEET 43**
8	SP990-P-X	601G		BK/GN-1.25	**SHEET 40**

CONNECTOR CN.A56: CN.A56 (Male)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D46M-P-1	801		WH/GN-0.75	**SHEET 27**
2	CN.D47M-P-1	802		GN/RD-0.75	
3	CN.D48M-P-1	803A		YE/BK-0.75	
4	CN.D79M-P-1	804A		BR/WH-0.85	
5	CN.D101-P-1	806A		PK-0.75	**SHEET 43**
6	CN.D51M-P-2	807		RD/YE-0.75	**SHEET 33**
7	CN.D49M-P-1	808		GN/WH-0.75	**SHEET 27**
8	CN.D54M-P-3	815A		VT/GN-0.85	**SHEET 63**
9	CN.D50-P-2	817A		YE/GN-0.85	**SHEET 27**
10	CN.D84M-P-2	533A		GY/RD-0.85	**SHEET 33**
11	CN.D85F-P-2	534A		BL/WH-0.85	
12	CN.D83M-P-5	539K		GN/YE-0.85	**SHEET 47**
13	SP136-P-X	430D		WH-0.75	
14	SP137-P-X	440D		BK/BL-0.75	
15	CN.D67-P-2	417A		YE-0.75	**SHEET 24**
16	CN.D68-P-2	418A		BL-0.75	
17	CN.D81F-P-3	419B		RD-0.85	**SHEET 47**
18	CN.D81F-P-4	420B		GN-0.85	

Wire connectors - Component diagram 06

CONNECTOR CN.D60: DIODE (Male)

Pin	From	Wire	Description	Color-Size	Frame
1	SP91-P-X	829A		WH/GN-0.85	**SHEET 30**
2	SP92-P-X	776		BK-0.85	

CONNECTOR CN.D83: CN.D83 (Female)

Pin	From	Wire	Description	Color-Size	Frame
1	CN.D83A-M-P-1	435B		WH/BK-0.85	**SHEET 59**
1	CN.D83B-M-P-1	435NA		WH/BK-0.85	**SHEET 58**
2	CN.D83A-M-P-2	401B		YE/GN-0.85	**SHEET 59**
2	CN.D83B-M-P-2	401C		YE/GN-0.85	**SHEET 58**
3	CN.D83A-M-P-3	415B		WH/BL-0.85	**SHEET 59**
3	CN.D83B-M-P-3	415C		WH/BL-0.85	**SHEET 58**
4	CN.D83A-M-P-4	445L		BK/WH-0.85	**SHEET 59**
4	CN.D83B-M-P-4	445NA		BK/WH-0.85	**SHEET 58**
5	CN.D83A-M-P-5	539D		GN/YE-0.85	**SHEET 59**
5	CN.D83B-M-P-5	539E		GN/YE-0.85	**SHEET 58**
6	CN.D83A-M-P-6	L26C		WH-0.85	**SHEET 59**
6	CN.D83B-M-P-6	L26AA		WH-0.85	**SHEET 58**
7	CN.D83A-M-P-7	L26D		PK/BL-0.85	**SHEET 59**
7	CN.D83B-M-P-7	L26BA		PK/BL-0.85	**SHEET 58**
8	CN.D83A-M-P-8	653D		BK/GN-0.85	**SHEET 59**
8	CN.D83B-M-P-8	653		BK/GN-0.85	**SHEET 58**

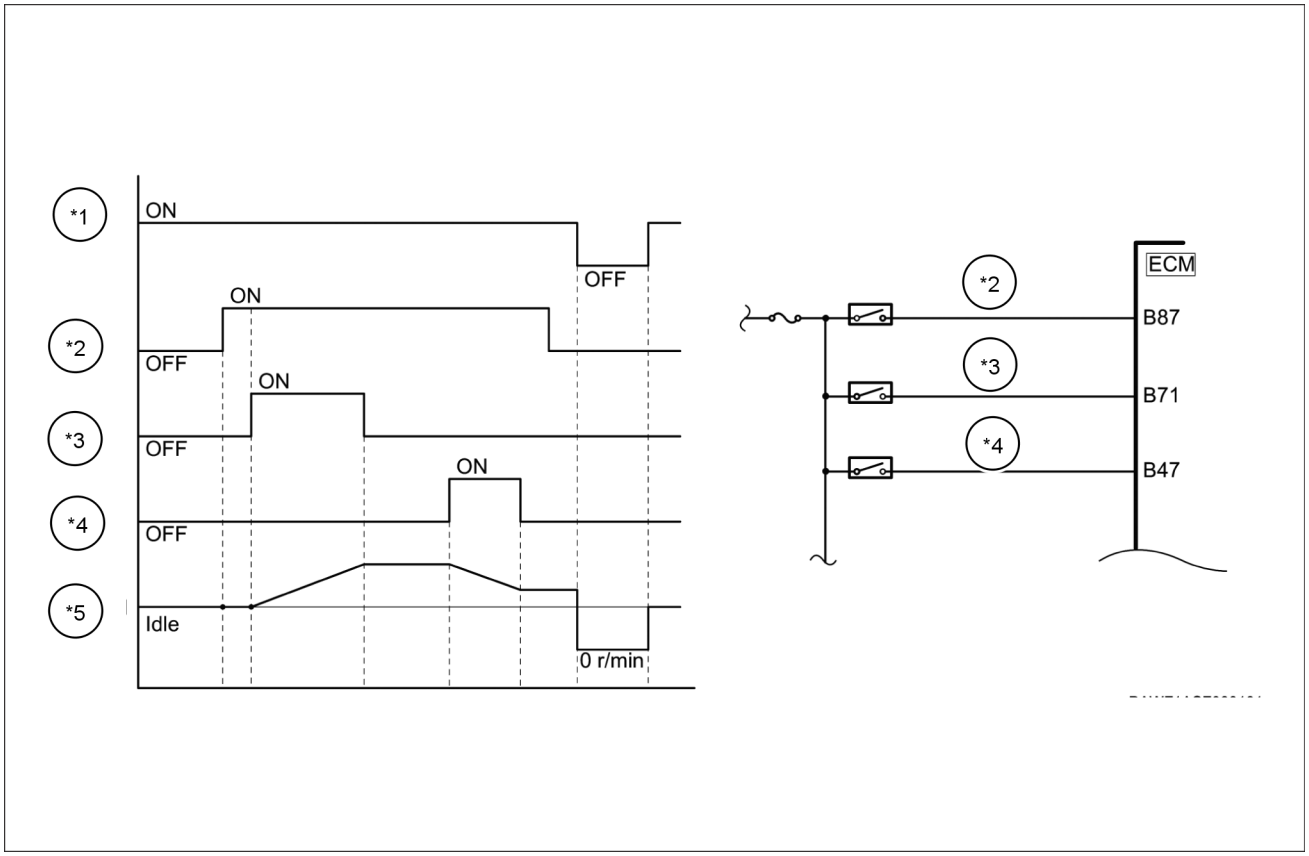
Control during ignition switch OFF state

There are 2 types of controls provided when the ignition switch is turned OFF after the idling control switch is operated, and either one of them is performed dependingon the specification.The engine speed adjusted by the idling control switch is recorded in the ECM, and the next time the vehicle is operated, the engine speed is set to the speed it was atwhen the ignition switch was turned OFF.

The engine speed adjusted by the idling control switch is not recorded in the ECM, and the next time the vehicle is operated, the engine speed is set to the default speed.

For verification and questions regarding the specifications, contact an Isuzu service representative.

Idle manual control



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*1. Starter switch
*2. Manual mode switch
*3. Idle up switch
*4. Idle down switch
*5 Engine speed

Engine speed output to tachometer

The ECM outputs the engine speed pulse to the tachometer as a tachometer output. The tachometer displays the engine speed based on the engine speed pulse sent from the ECM.

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Engine starter - Prepare

⚠ WARNING

Battery gas can explode!
To prevent an explosion: 1. Always disconnect the negative (-) battery cable first. 2. Always connect the negative (-) battery cable last. 3. Do not short circuit the battery posts with metal objects. 4. Do not weld, grind, or smoke near a battery.
Failure to comply could result in death or serious injury.

W0011A

⚠ 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

Items to prepare:

- Wrenches [**8 mm**, **14 mm**, **17 mm**]
- Rag
- Cleaning fluid

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The brief concept of judgment flow is as follows. Since this is just a concept, the actual control logic differs a little. Conditions also differ according to the operation requirement.

Urea solution quality / Urea injection stop / SCR system failure / NCD-target component failure.

Step	Judgment condition in normal mode	Yes	No
1.	Since the key was ON, **60 s** has passed, and also DCU-ECM communication is normal.	To step 2	Status quo maintained
2.	The abnormality detection state remains for **30 min**.	Final inducement triggered	To step 3
3.	The abnormality detection state remains for **10 s**	Early inducement triggered	Put into the normal state

EGR system failure

Step	Judgment condition in normal mode	Yes	No
1.	An EGR system-related error code occurred.	To step 2	Put into the normal state.
2.	An EGR system failure remains for **5 h**.	Final inducement triggered	Put into the early inducement state simultaneously with the EGR system failure.

Output reduction cancel function

- This is a function to cancel the fuel injection quantity and speed limits due to inducement within only the predetermined time.
- A request for output reduction cancel is only accepted in the early or the final inducement state. It is not accepted in the normal or the warning state. The output reduction cancel starts simultaneously with acceptance of the request.
- The output reduction cancel function lasts for **30 min** per request. Once the emergency override is triggered, it will last for **30 min** and cannot be interrupted.
- If the key is turned OFF during output reduction cancel, it will resume for the remaining time when the key is turned ON next time.
- The inducement level at the end of output reduction cancel is determined according to [1] Judgment in normal mode.
- The output reduction cancel method differs according to the inducement level. (Refer to the table below.)

Inducement level	Target	Method
Early inducement	Customer	USER INFORMATION MODE SCREEN-SCR CONFIGURATION-OUTPUT REDUCTION CANCEL ON (Press the → button.)
Final inducement	Service engineer	With the above output reduction cancel display grayed out, holding down the → button for **10 s** will establish normal mode and start output reduction cancel. (The cancel is allowed only once.)

c. Communication with excavator body / engine output limit

Communication with the excavator body is carried out via CAN communication between DCU and ECM. An icon turns on or blinks and a message appears according to the situation. (Refer to Types of inducement)

The following limit is triggered according to the inducement level.

Inducement level	Fuel injection quantity limit	Speed limit
Early inducement	Drop by **30%**	None
Final inducement	Drop by **40%**	Idle speed

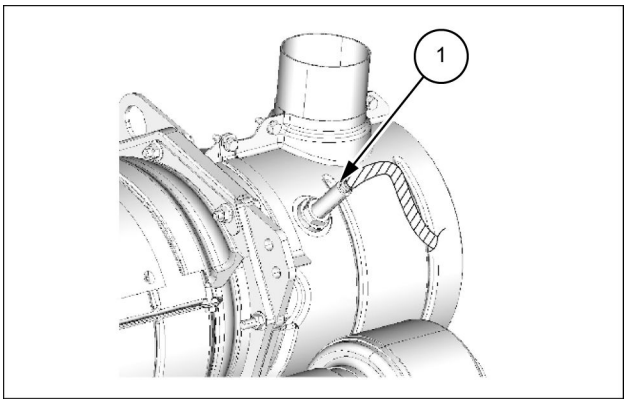
4. Apply anti-seize lubricant to the NOx sensor 2 **(1)**.

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

5. Install the NOx sensor 2 **(1)** to the mixer chamber.

   Tightening torque: **50 N·m** (**37 lb ft**) Sleeve nut

   Tightening torque: **8.5 N·m** (**6.3 lb ft**) Sensor controller



SMIL17CEX0359AB 2

6. Connect the connector to the NOx sensor 2 controller.

Battery ground cable connect

1. Connect the battery ground cable to the battery.

NOx sensor setting

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

1. Connect the trouble diagnosis scan tool to the DLC.
2. Turn ON the ignition switch.
3. Select Search.

NOTE: *Input the engine No. and select search.*

4. Select diagnosis.
5. Select the engine.
6. Select urea SCR.
7. Select data reset.
8. Select NOx sensor data 1 reset.

NOTE: *Reset the data by following the on-screen instructions.*

Diagnostic trouble code	Diagnostic trouble mode
7429	Inducement (remaining urea level low) - Early
7430	Inducement (remaining urea level low) - Final
7243	Boom proportional valve signal abnormality (interference prevention)
7244	Arm proportional valve signal abnormality (interference prevention)
7245	Offset proportional valve signal abnormality (interference prevention)
7274	Lift cut relay abnormality
7275	GCHC Proportional Valve Abnormality
7602	ECM communication abnormality
7603	Computer S communication abnormality
7605	ECM not matched
7606	EEPROM abnormality
7608	Camera abnormality
7612	Air conditioner communication abnormality
7613	Monitor communication (CAN) abnormality
7615	Sub-Controller Communication Abnormality
7618	DCU communication abnormality

HYDRAULIC STATUS

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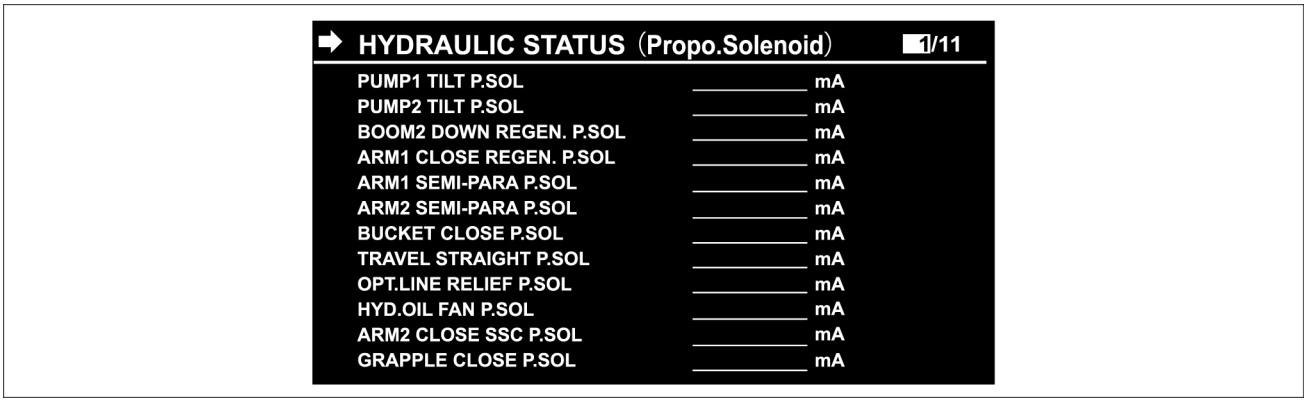

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Display	Explanation	Range
PUMP1 TILT P.SOL	Pump 1 tilting proportional valve	**0 – 1000 mA**
PUMP2 TILT P.SOL	Pump 2 tilting proportional valve	**0 – 1000 mA**
BOOM2 DOWN REGEN. P.SOL	Boom 2-down pilot pressure proportional valve	**0 – 1000 mA**
ARM1 CLOSE REGEN. P.SOL	Arm 1 regeneration release proportional valve	**0 – 1000 mA**
ARM1 SEMI-PARA P.SOL	Arm 1 semi-parallel proportional valve	**0 – 1000 mA**
ARM2 SEMI-PARA P.SOL	Arm 2 semi-parallel proportional valve	**0 – 1000 mA**
BUCKET CLOSE P.SOL	Bucket-close pilot pressure proportional valve	**0 – 1000 mA**
TRAVEL STRAIGHT P.SOL	Straight travel proportional valve	**0 – 1000 mA**
OPT.LINE RELIEF P.SOL	Option line relief pressure proportional valve	**0 – 1000 mA**
HYD.OIL FAN P.SOL	Hydraulically-operated fan proportional valve · 450 or later models only	**0 – 1000 mA**
ARM2 CLOSE SSC P.SOL	Arm-2–in SSC proportional valve	**0 – 1000 mA**
GRAPPLE CLOSE P.SOL	Grapple-close pilot pressure proportional valve	**0 – 1000 mA**

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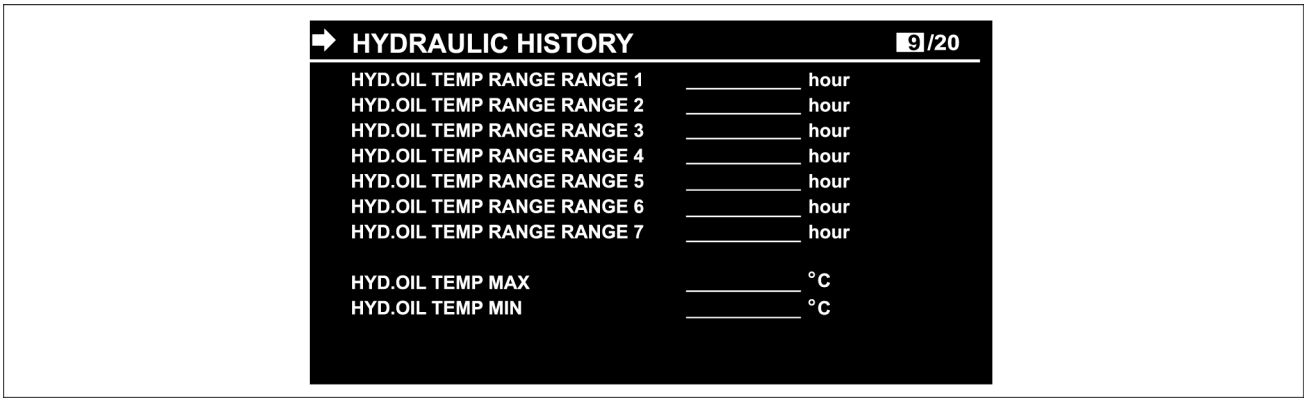

SMIL17CEX1747EA 52

Display	Explanation	Unit	Judgment condition	Judgment start condition
HYD.OIL TEMP RANGE 1	Oil temperature; time distribution 1	hour	Less than **45 °C** (**113 °F**)	In **10 s** after the engine starts
HYD.OIL TEMP RANGE 2	Oil temperature; time distribution 2	hour	Less than **60 °C** (**140 °F**)	In **10 s** after the engine starts
HYD.OIL TEMP RANGE 3	Oil temperature; time distribution 3	hour	Less than **80 °C** (**176 °F**)	In **10 s** after the engine starts
HYD.OIL TEMP RANGE 4	Oil temperature; time distribution 4	hour	Less than **88 °C** (**190 °F**)	In **10 s** after the engine starts
HYD.OIL TEMP RANGE 5	Oil temperature; time distribution 5	hour	Less than **95 °C** (**203 °F**)	In **10 s** after the engine starts
HYD.OIL TEMP RANGE 6	Oil temperature; time distribution 6	hour	Less than **98 °C** (**208 °F**)	In **10 s** after the engine starts
HYD.OIL TEMP RANGE 7	Oil temperature; time distribution 7	hour	**98 °C** (**208 °F**) or more	In **10 s** after the engine starts
HYD.OIL TEMP MAX	Highest oil temperature in the past	°C (°F)	–	In **10 s** after the engine starts
HYD.OIL TEMP MIN	Lowest oil temperature in the past	°C (°F)	–	In **10 s** after the engine starts

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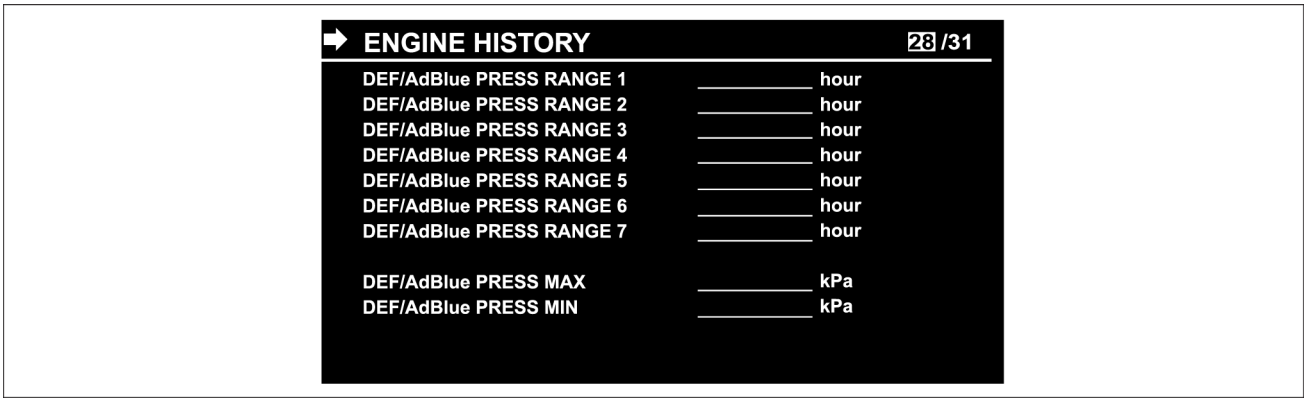


SMIL17CEX1794EA 91

Display	Explanation	Unit	Judgment condition	Judgment start condition
DEF/AdBLUE PRESS RANGE 1	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	Less than **200 kPa**	In **10 s** after the engine starts
DEF/AdBLUE PRESS RANGE 2	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	Less than **400 kPa**	In **10 s** after the engine starts
DEF/AdBLUE PRESS RANGE 3	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	Less than **600 kPa**	In **10 s** after the engine starts
DEF/AdBLUE PRESS RANGE 4	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	Less than **800 kPa**	In **10 s** after the engine starts
DEF/AdBLUE PRESS RANGE 5	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	Less than **1000 kPa**	In **10 s** after the engine starts
DEF/AdBLUE PRESS RANGE 6	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	Less than **1200 kPa**	In **10 s** after the engine starts
DEF/AdBLUE PRESS RANGE 7	Urea solution (**DEF/ADBLUE®**) concentration; time distribution	hour	**1200 kPa** or more	In **10 s** after the engine starts
DEF/AdBLUE PRESS MAX	Maximum value of urea solution (**DEF/ADBLUE®**) pressure	kPa (psi)	–	In **10 s** after the engine starts
DEF/AdBLUE PRESS MIN	Minimum value of urea solution (**DEF/ADBLUE®**) pressure	kPa (psi)	–	In **10 s** after the engine starts

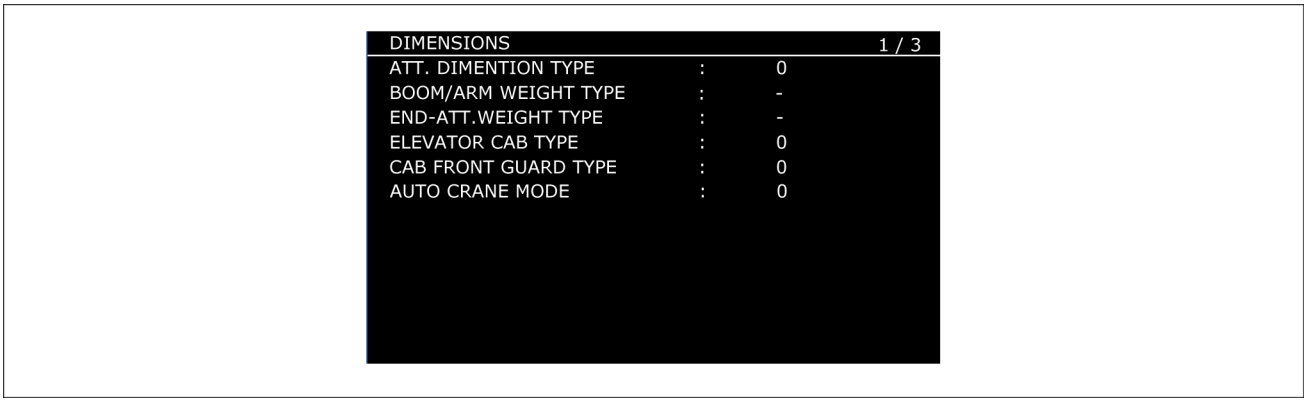
DIMENSIONS [1/3]

- Transition to this screen is enabled only with the following settings in the model selection screen.

OVERLOAD-WARNING	2: Yes (Japan Type/EU Type)
ANTI-INTERFERENCE	1: Yes

- Items that can be specified vary with the following combination.

OVERLOAD-WARNING	2: Yes (Japan Type/EU Type)
ANTI-INTERFERENCE	1: Yes
ELEVATOR CAB	0: None, 1: Yes
LIFTING MAGNET	0: None, 1: SPS, 2: Outside articles
BUCKET CYLINDER SENSOR	0: None, 1: Angle sensor



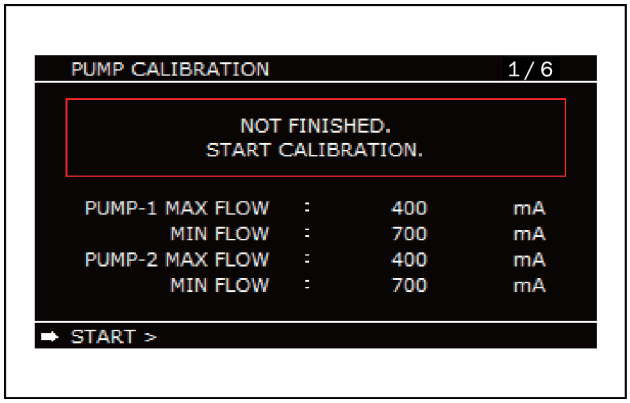
SMIL17CEX0339EA 4

Item	Available option	Display
ATT DIMENTION TYPE	• 0: STD • 1: LONG • 2: SHORT • 3: SUPER_LONG • 4: SUPER_SHORT • 5: STD_HL • 6: AMLONG_HL • 7: SHORT_HL • 8: MF_STD • 9: MF_AMLONG • 10: MF_SHORT • 11: MF_STD_HL • 12: MF_AMLONG_HL • 13: MF_SHORT_HL • 14: MH_1 • 15: MH_2 • 16: SL_1 • 17: SL_2	"?" appears in white initially. Fixed at SUPER_LONG, for LR machine.
BOOM/ARM WEIGHT TYPE	• 0: STD • 1: HEAVY	"?" appears in white initially.
END-ATT.1 WEIGHT TYPE	• 0: STD • 1: HEAVY	"?" appears in white initially.

Pump flow

Adjust proportional valves of the electronically-controlled pump.
The calibration setup is required when the electronically-controlled pump is replaced.
In this case, the message "INITIAL SETTING INCOMPLETE" does not appear.

1. If an adjustment of the electronically controlled pump is not finished, the (red) initial screen is displayed.



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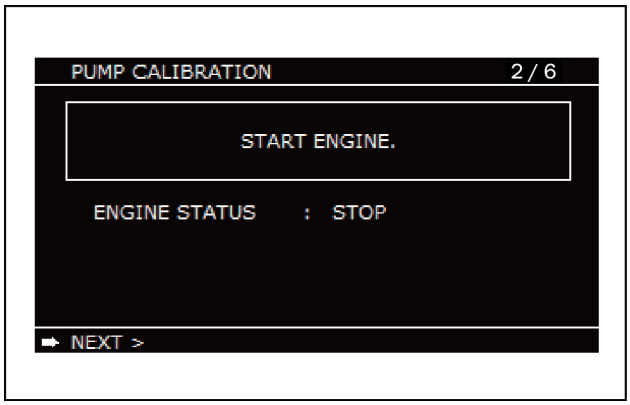
2. Press , and the system will display the engine start screen. The (red) initial screen is displayed.



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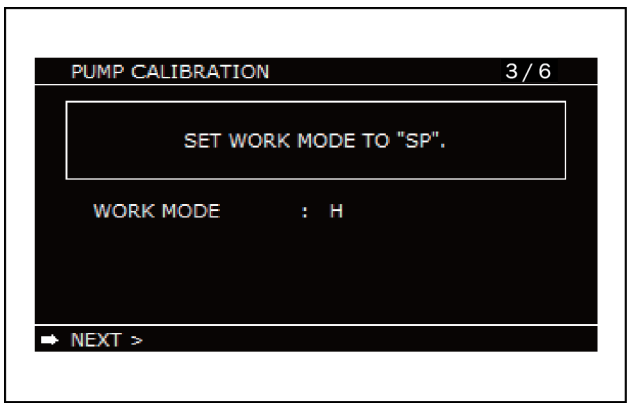
3. When the engine is started and is pressed, the system displays the SP mode screen.



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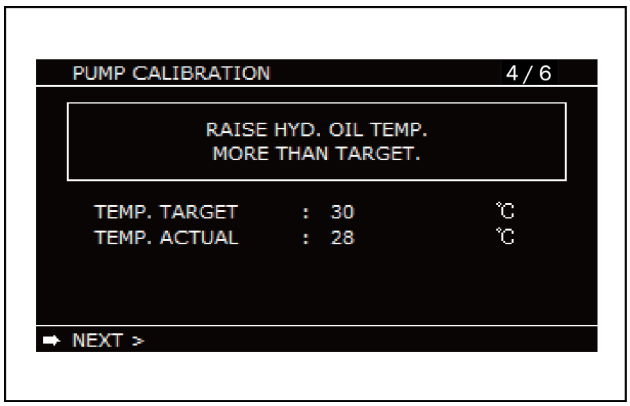
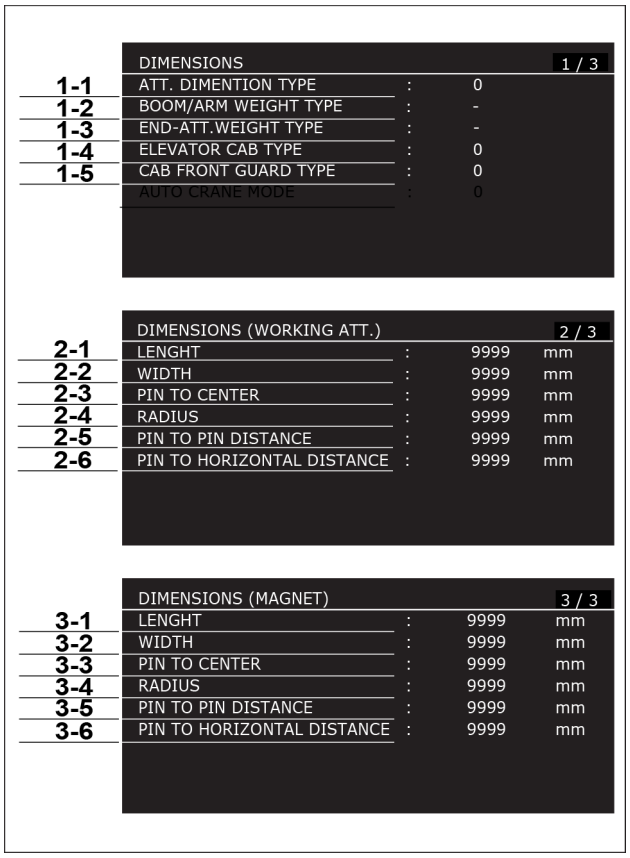
4. When the work mode is turned to the SP mode and is pressed, the system displays the oil temperature raise screen.



SMIL14CEX6801AA 19



SMIL17CEX7249BA 2

[MACHINE SELECT] - selected option	CX290D MH
Liftcrane	None
Interference prevention	Yes
Elevator cab	Yes
Lifting magnet	None
Bucket cylinder sensor	Yes

1-1	Display
1-2	Appears in gray
1-3	Appears in gray
1-4	Display
1-5	Display

2-1	Appears in gray
2-2	Appears in gray
2-3	Display
2-4	Display
2-5	Display
2-6	Display

3-1	Appears in gray
3-2	Appears in gray
3-3	Appears in gray
3-4	Appears in gray
3-5	Appears in gray
3-6	Appears in gray

Operation condition:

The system starts control under the following conditions.

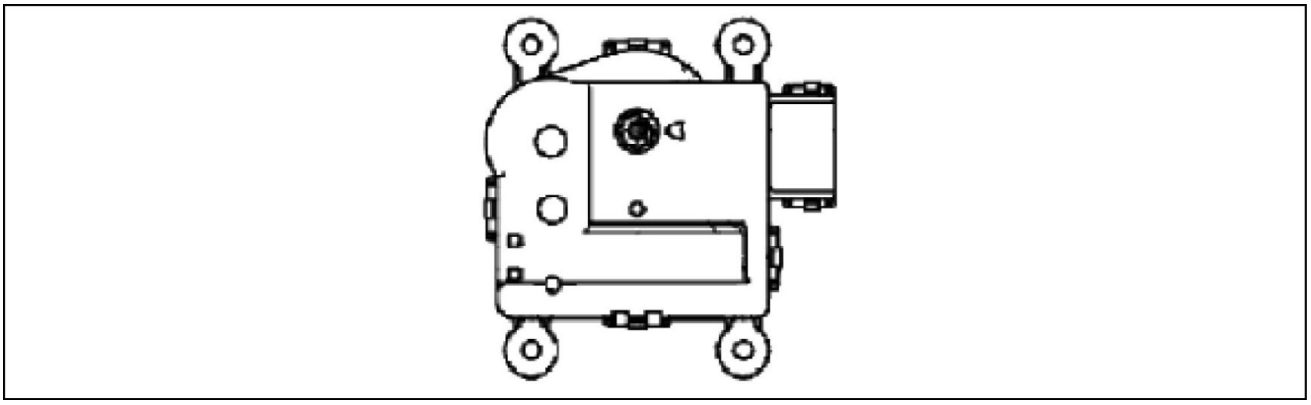
- Swing starts (swing pressure sensor ON)
- P1 pressure reaches at or above P1 pressure of starting swing (control starts).

Stop condition:

The system stops control under the following conditions.

- Swing stops (swing pressure sensor OFF).
- P1 pressure drops.
- Function relating to P1 other than swing (travel, arm, boom UP or option 1) is operated.

Refresh/recirculate actuator

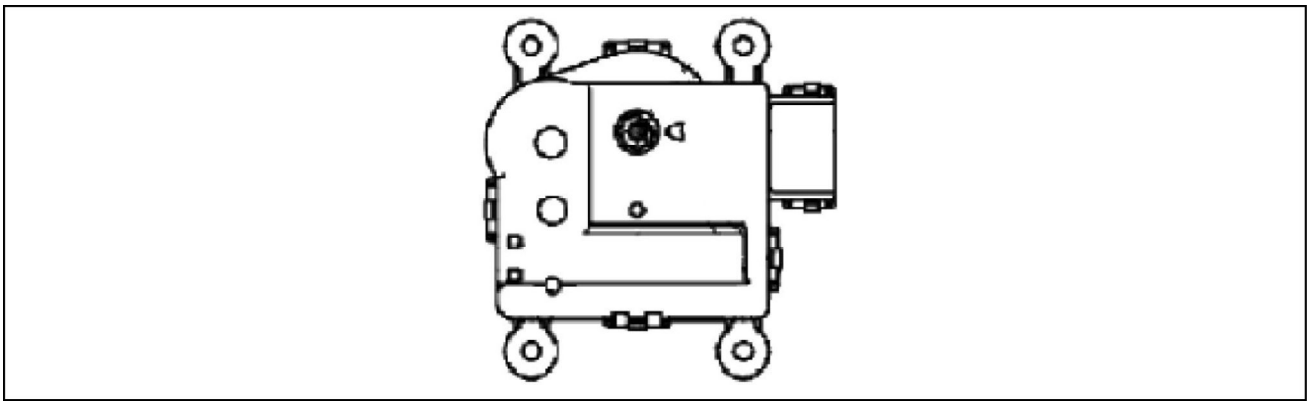


SMIL14CEX1972EA 6

NOTICE: *The air conditioning system voltage specifications are* ***24 V****, but the motor actuator has* ***12 V*** *specifications.*

The refresh/recirculate switch actuator is installed on the blower intake unit. It opens and closes the refresh/recirculate door via the link.
Built into the refresh/recirculate switch actuator is the potentiometer that switches linked with the actuator shaft.
When the refresh/recirculate door position is determined by the refresh/recirculate switch on the control panel, the control unit reads in the signal of the potentiometer in the actuator and determines whether the motor turns forward or reverse.
The position detection switch also rotates linked with the motor and stops the refresh/recirculate door at the set position.

Blow mode actuator



SMIL14CEX1973EA 7

NOTICE: *The air conditioning system voltage specifications are* ***24 V****, but the motor actuator has* ***12 V*** *specifications.*

The blow mode actuator is installed at the center of the air conditioner unit contained behind the link cover. It opens and closes the mode door via the link.
Built into the blow mode actuator is the potentiometer which switches linked with the actuator shaft.
When blow mode is determined by the temperature control switch, the control unit reads in the potentiometer position in the actuator and determines whether the motor turns forward or in reverse.
The contacts move linked with the motor. When the contacts move open or the control unit output signal goes OFF, the motor stops.

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Camera - 530

CX290D Crawler excavators LC Material Handling (TIER4 FINAL) - EU Market
CX290D Crawler excavators LC Scrap Loader (TIER4 FINAL) - EU Market

Contents

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Cab interference prevention system - 054

(*) See content for specific models

Anti-theft system - Dynamic description

Purpose/overview

In order to prevent theft and tampering,

- Manual lock
- Geofence / curfew / remote lock
- Service support screen lock are available with a password on the monitor. For each of them, you can turn ON/OFF the password function and change the number of digits of or the number settings of a password at the service support screen.

As the other anti-theft measure, an immobilizer key is provided.

The following screens also have a function that allows the car-rental agency to lock these screens when renting the system to the customers so that they may view but not change the settings.

- Customer-specific system information screen
- Maintenance information screen
- Option line setting screen

For each of them, you can turn ON/OFF the lock function at the service support screen.

Manual lock

The manual lock is a function that puts the system into an immobilized state if a wrong password is entered on the monitor after the key is turned ON to start operation.

In the immobilized state:

- A travel alarm sounds.
- Swing is locked.
- A monitor buzzer sounds continuously.
- The started engine is fixed at a low idle.
- Operating the lever stops the engine running at a low idle.
- You will be alerted via the GPS simultaneously with the engine stop (for the system with GPS device only).

Includes the actions above.

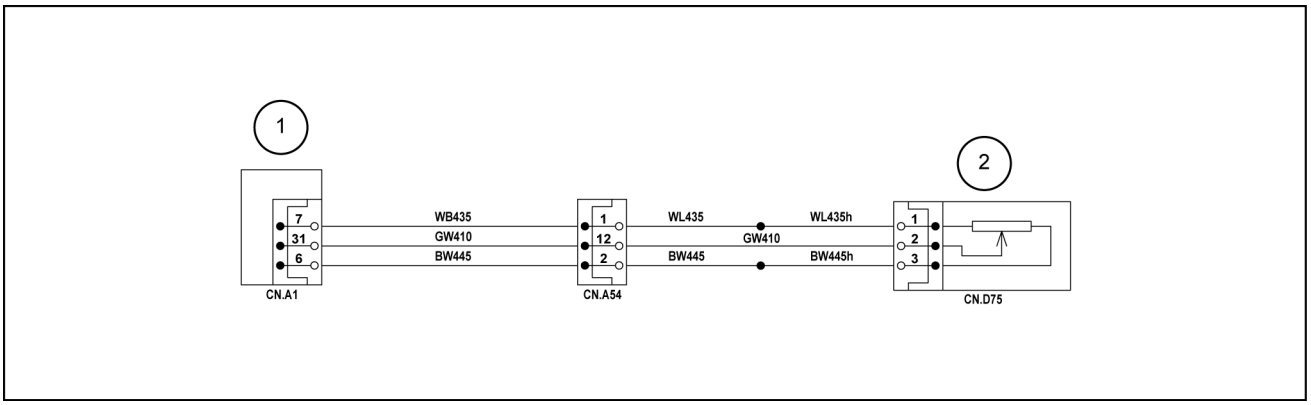
When you start the engine before entering the password, these limits will also be imposed. If authentication fails a total of three times including the first entry, the controller will no longer accept any input. In this case, turn OFF the key and start all over again.

7067 - Bucket-close pilot pressure sensor signal abnormality

Control Module: MCM

Solution:

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



SMIL17CEX3999EA 1

1. Main controller
2. Pressure sensor (bucket close)

Turn the key switch ON.

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

A. If diagnostic trouble code 7067 is displayed, proceed to Step **2**.

2. Check the bucket close pilot pressure sensor **(2)** voltage on the service support screen.

A. If the voltage is more than or equal to **4.75 V**, proceed to Step **3**.

B. If the voltage is less than or equal to **0.25 V**, proceed to Step **6**.

3. Turn the key switch OFF and disconnect the bucket close pilot pressure sensor **(2)** connector **CN.D75**.

Turn the key switch ON.

Measure the voltage between the ground and terminal 1 of the bucket close pilot pressure sensor **(2)** connector **CN.D75** (harness side).

A. If the voltage is not about **5 V**, find and replace the short circuit on the wire ID WL435h, WL435, and WB435.

B. If the voltage is about **5 V**, proceed to Step **4**.

4. Measure the voltage between the ground and terminal 2 of the bucket close pilot pressure sensor **(2)** connector **CN.D75** (harness side).

A. If the voltage is more than **4.75 V**, find and replace the short circuit on the wire ID GW410.

B. If the voltage is less than or equal to **4.75 V**, proceed to Step **5**.

5. Measure the voltage between the ground and terminal 3 of the bucket close pilot pressure sensor **(2)** connector **CN.D75** (harness side).

A. If the voltage is more than **0.25 V**, find and replace the short circuit on the wire ID BW445h and BW445.

B. If the voltage is less than or equal to **0.25 V**, replace the main controller **(1)**.

6. Inspect the bucket-close pilot pressure sensor **(2)**.

Turn the key switch OFF.

6. Inspect the continuity between terminal 2 of the connector **CN.D66-5** harness side and terminal 9 of the connector **CN.A3** harness side.

   A. If there is no continuity, repair or replace the YB904b harness.

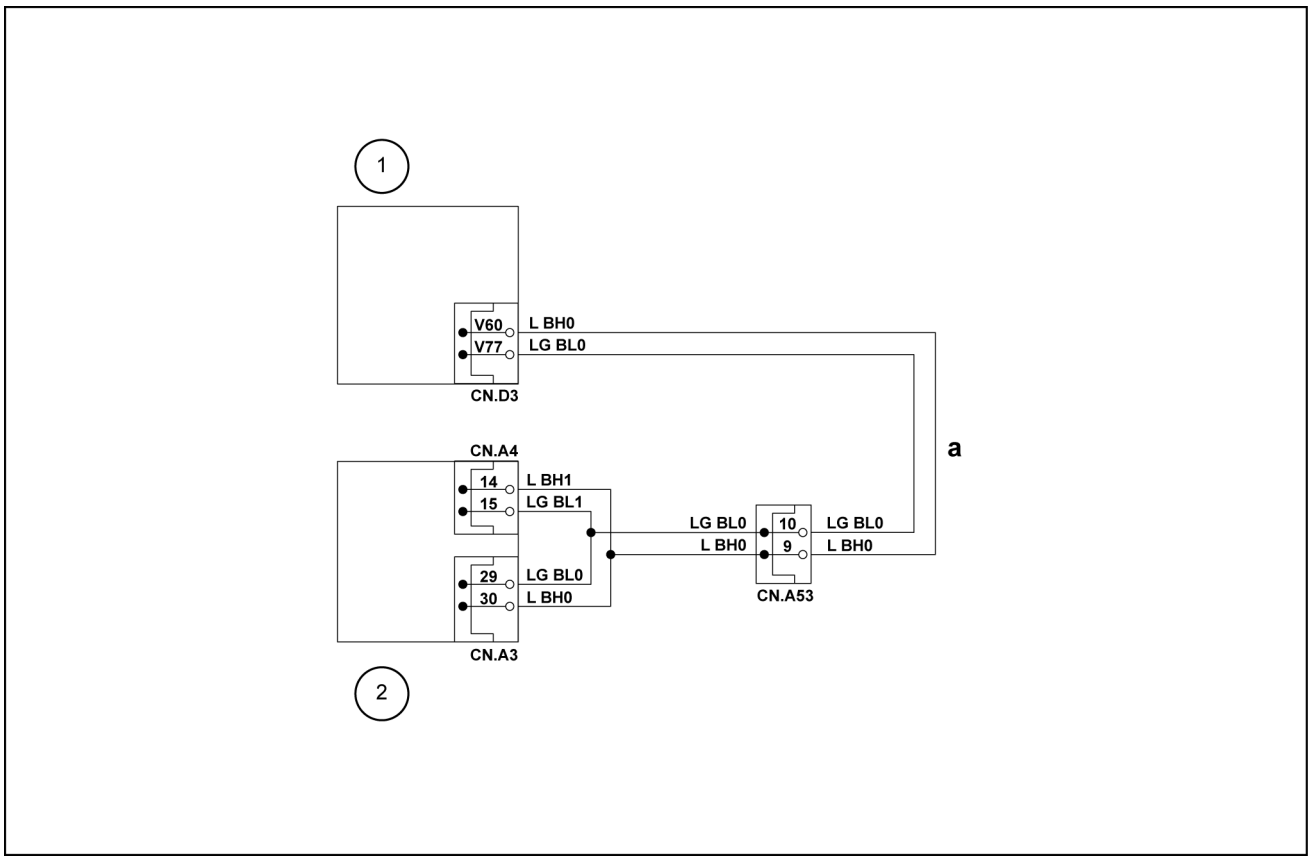
   B. If there is continuity, replace the faulty main controller **(1)**.

7605 - ECM mismatch

Control Module: MCM

Solution:

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



SMIL17CEX4015FA 1

1. Engine controller
2. Main controller

a. CAN communication

2. Turn the key switch ON.

   A. If diagnostic trouble code 7605 is displayed, proceed to Step.**3**.

3. From the service support screen, display the model select screen and check that the correct model is selected.

   A. If the model selection screen is not correct, correctly set the model selection.

   B. If the model selection screen is correct, proceed to Step**4**.

4. Check that the ECM which matches the model is installed.

   A. If the ECM does not match the model, replace it with the ECM that matches with the model.

   B. If the ECM match the model, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.015)**")

7. 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 (55.015)**")

8. Set the Injector ID Code, fuel delivery rate and engine number for the ECM.

   Use the device test on the service monitor to perform SCR purging. Refer to "Service Monitor - Device Test - SCR RE-GEN".

9. Confirm resolution:

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

   2. Turn OFF the starter switch for at least **60 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.*

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

Wiring harnesses - Electrical schematic sheet 18 (55.100)
Wiring harnesses - Electrical schematic sheet 13 (55.100)

P0409 - EGR sensor circuit

Control Module: ECM

Solution:

1. Check and diagnose the below fault codes before you proceed with the diagnostics code P0409.

   Diagnostic trouble code P06A9

2. Turn OFF the ignition switch.

   Disconnect the harness connector **CN.E12** from the EGR valve.

   Turn ON the ignition switch.

   Use the trouble diagnosis scan tool to check if any of the EGR position 1, EGR position 2, and EGR position 3 shows ON.

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

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

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

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

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

3. Measure the voltage between the EGR position sensor **5 V** power supply circuit and a normal GND.

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

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

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

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

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

4. Measure the voltage between the EGR position sensor **5 V** power supply circuit and the GND circuit.

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

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

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

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

5. While momentarily disconnecting the test cable with fuse from the EGR position sensor 1 signal circuit and **5 V** power supply circuit, check the EGR position 1 display with the trouble diagnosis scan tool.

   While momentarily disconnecting the test cable with fuse from the EGR position sensor 2 signal circuit and **5 V** power supply circuit, check the EGR position 2 display with the trouble diagnosis scan tool.

   While momentarily disconnecting the test cable with fuse from the EGR position sensor 3 signal circuit and **5 V** power supply circuit, check the EGR position 3 display with the trouble diagnosis scan tool.

P0685 - ECM power relay control circuit open

Control Module: ECM

Solution:

1. Turn OFF the ignition switch for at least **60 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 (55.015)**")
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 **60 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)

P1606 - SW-IC 1 internal failure

Control Module: ECM

Solution:

1. Replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.015)**")

   Set the Injector ID Code and engine No. for the ECM.
2. Confirm resolution:

   1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.
   2. Turn OFF the ignition switch for at least **60 s**.
   3. Start the engine.
   4. Perform a test-run under the conditions for running the diagnostic trouble code.

      NOTE:
      • Conditions for setting the DTCs such as engine run time or coolant temperature vary depending on the diagnostic trouble codes.

   5. Observe the diagnostic trouble code information with the trouble diagnosis scan tool.

P207F - Urea fluid concentration too low

Control Module: DCU

Solution:

1. Inspect the concentration of the urea fluid.

   A. If a problem is found, add the specified urea fluid after cleaning the inside of the urea fluid tank.

   B. If there are no problems, proceed to Step **2**

2. Inspect the urea fluid tank.

   NOTE: *Make sure that there is no water intrusion caused by cracking or damage.*

   A. If a problem is found, replace the urea fluid tank.

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

3. Inspect the urea fluid sensor.

   NOTE:
   • Make sure that there is no coolant intrusion caused by cracking or damage of the coolant passages.
   • Make sure that there is no water intrusion from the urea fluid sensor installation area or seal area.

   Clear the diagnostic trouble code with the trouble diagnosis scan tool.

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

   Turn ON the ignition switch without starting the engine.

   Observe the diagnostic trouble code information with a trouble diagnosis scan tool. diagnostic trouble code P207F should not be set.

   A. If diagnostic trouble code P207F is set, replace the urea fluid sensor.

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

P2122 - Pedal position sensor 1 circuit low input

Control Module: ECM

Solution:

1. Check and diagnose the below fault codes before you proceed with the diagnostics code P2122.

   Diagnostic trouble code P06A6

2. Turn OFF the starter switch.

   Disconnect the harness connector **CN.B2** from the accelerator position sensor.

   Turn ON the starter switch.

   Measure the voltage between the **5 V** power supply circuit and GND of the accelerator position sensor.

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

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

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

3. Connect the test cable with fuse between the **5 V** power supply circuit and sensor 1 signal circuit of the accelerator position sensor.

   Observe the accelerator pedal sensor 1 display on the trouble diagnosis scan tool.

   A. If the reading is more than or equal to the **4.5 V**, inspect to see if there is a poor connection with the accelerator position sensor harness connector **CN.B2**.

   B. If a problem is found, repair the harness connector **CN.B2**.

   C. If the harness connector **CN.B2** is normal, replace the accelerator position sensor.

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

4. If the reading is less than or equal to the **4.5 V**, inspect the sensor 1 signal circuit between the ECM and accelerator position sensor.

   Make sure that there should be no open circuit or high resistance.

   Make sure that there should be no short to GND.

   A. If a problem is found, repair the sensor 1 signal circuit.

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

5. Inspect the ECM harness connector **CN.A1** for a poor connection.

   A. If a problem is found, repair the harness connector **CN.A1**.

   B. If the harness connector **CN.A1**.is normal, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.640)**")

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

   Use the device test on the service monitor to perform SCR purging. Refer to "Service Monitor - Device Test - SCR RE-GEN".

7. Confirm resolution:

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

   2. Turn OFF the starter switch for at least **60 s**.

U0002 - CAN Bus off

Control Module: DCU

Solution:

1. ***NOTE:*** *The applicable diagnostic trouble code may be set after CSP work. If the applicable diagnostic trouble code is set after CSP work, simply clear the diagnostic trouble code because it is not a malfunction of the machine.*

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

   Inspect the ECM harness connector **CN.D3**.

   Turn ON the ignition switch.

   Observe the diagnostic trouble code information with the trouble diagnosis scan tool.

   A. If a diagnostic trouble code is not set, replace the ECM. (Refer to **Engine Control Unit (ECU) - Remove (55.015)** and **Engine Control Unit (ECU) - Install (55.015)**)
   Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.

   B. If there are no problems, proceed to Step **2**
2. Turn OFF the ignition switch.

   Connect the harness connector **CN.D3** to the ECM.

   Disconnect the harness connector **CN.A4** from the control unit of the machine.

   Inspect the machine control unit harness connector **CN.A4**.

   Turn ON the ignition switch.

   Observe the diagnostic trouble code information with the trouble diagnosis scan tool.

   A. If a diagnostic trouble code is not set, replace the control unit of the machine.

   B. If there are no problems, proceed to Step **3**
3. Connect the harness connector **CN.A4** to the control unit of the machine.

   Turn OFF the ignition switch.

   Turn ON the ignition switch.

   Observe the diagnostic trouble code information with a trouble diagnosis scan tool.

   Disconnect the harness connector from the termination resistor if a diagnostic trouble code is set.

   Inspect the terminal resistor harness connector.

   Measure the resistance of the termination resistor.

   A. If the resistance of the termination resistor exceeds the **115 – 125 Ω**, replace the termination resistor.

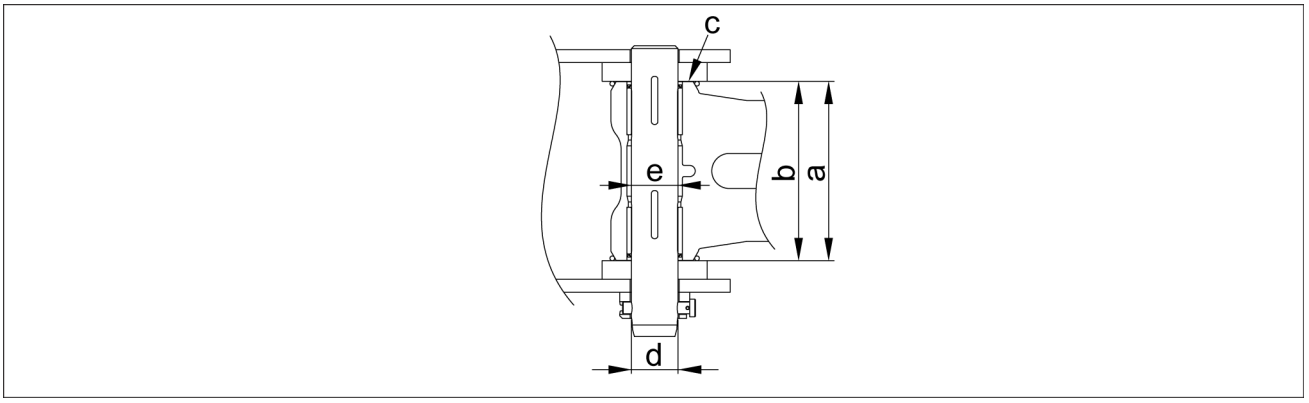
   B. If a diagnostic trouble code is set, inspect the CAN Low and CAN High circuits.

   C. If a problem is found, repair the CAN circuit.

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

   NOTE:
   • Make sure that there should be no short to the battery power supply or ignition power supply circuit.
   • Make sure that there should be no high resistance.
   • Make sure that there should be no short together between CAN circuits.

9. Bucket and bucket link installation section



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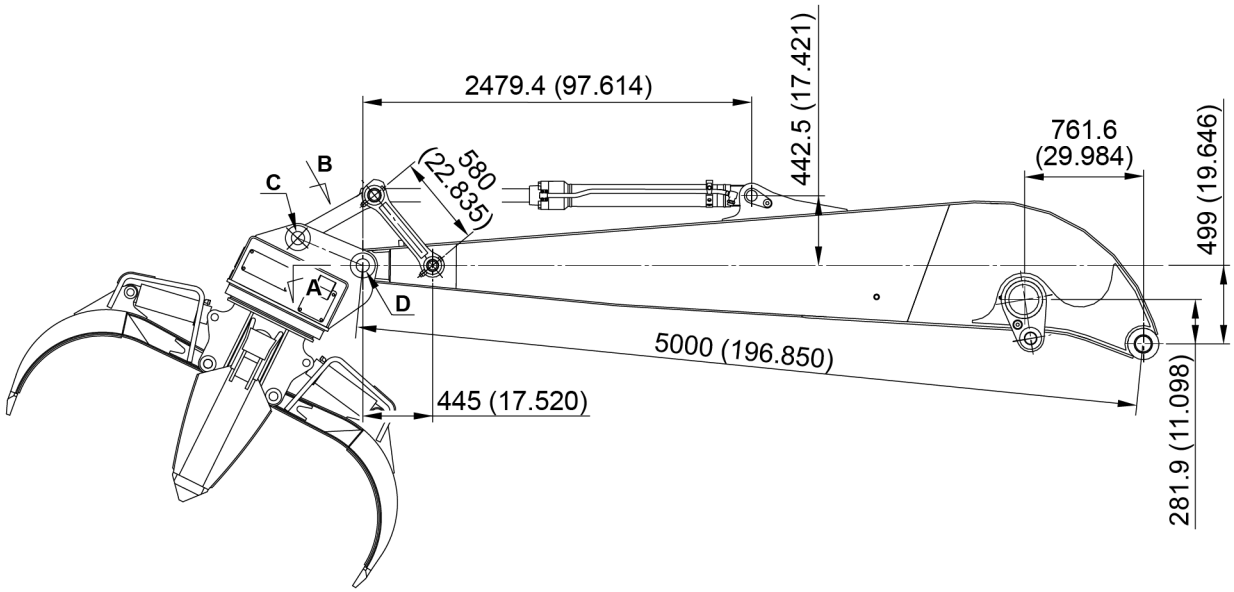
Part name	Code	Standard value	Usage limits	Judgment	Solution
Bucket	a	**307 mm** (**12.09 in**)	**303 mm** (**11.93 in**)	Acceptable/ Unacceptable	Replacement
Bucket link	b	**306 mm** (**12.05 in**)	**304 mm** (**11.97 in**)	Acceptable/ Unacceptable	Replacement
Clearance	c	**1.0 – 3.5 mm** (**0.04 – 0.14 in**)	Shim adjustment	Acceptable/ Unacceptable	Adjustment with shims
Pin	d	**Ø 80 mm** (**3.15 in**)	**Ø 79 mm** (**3.11 in**)	Acceptable/ Unacceptable	Replacement
Bushing (bucket link)	e	**Ø 80 mm** (**3.15 in**)	**Ø 81.5 mm** (**3.21 in**)	Acceptable/ Unacceptable	Replacement

Dipper arm - Dimension - Long arm

CX290D Crawler excavators LC Material Handling (TIER4 FINAL) - EU Market	WE

Arm

mm (in.)



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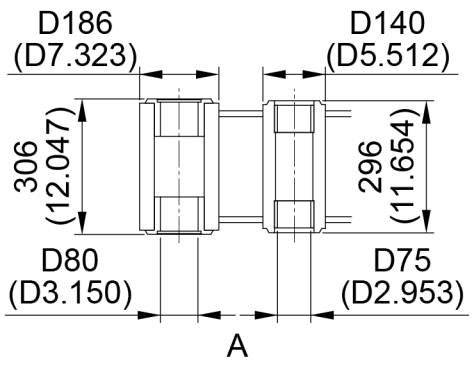
Bucket cylinder

Part	Maximum retracted length	Stroke	Cylinder top width
Dimension	**1565 mm** (**61.614 in**)	**1010 mm** (**39.764 in**)	**95 mm** (**3.740 in**)

Arm boss

mm (in.)



SMIL17CEX7286EA 2