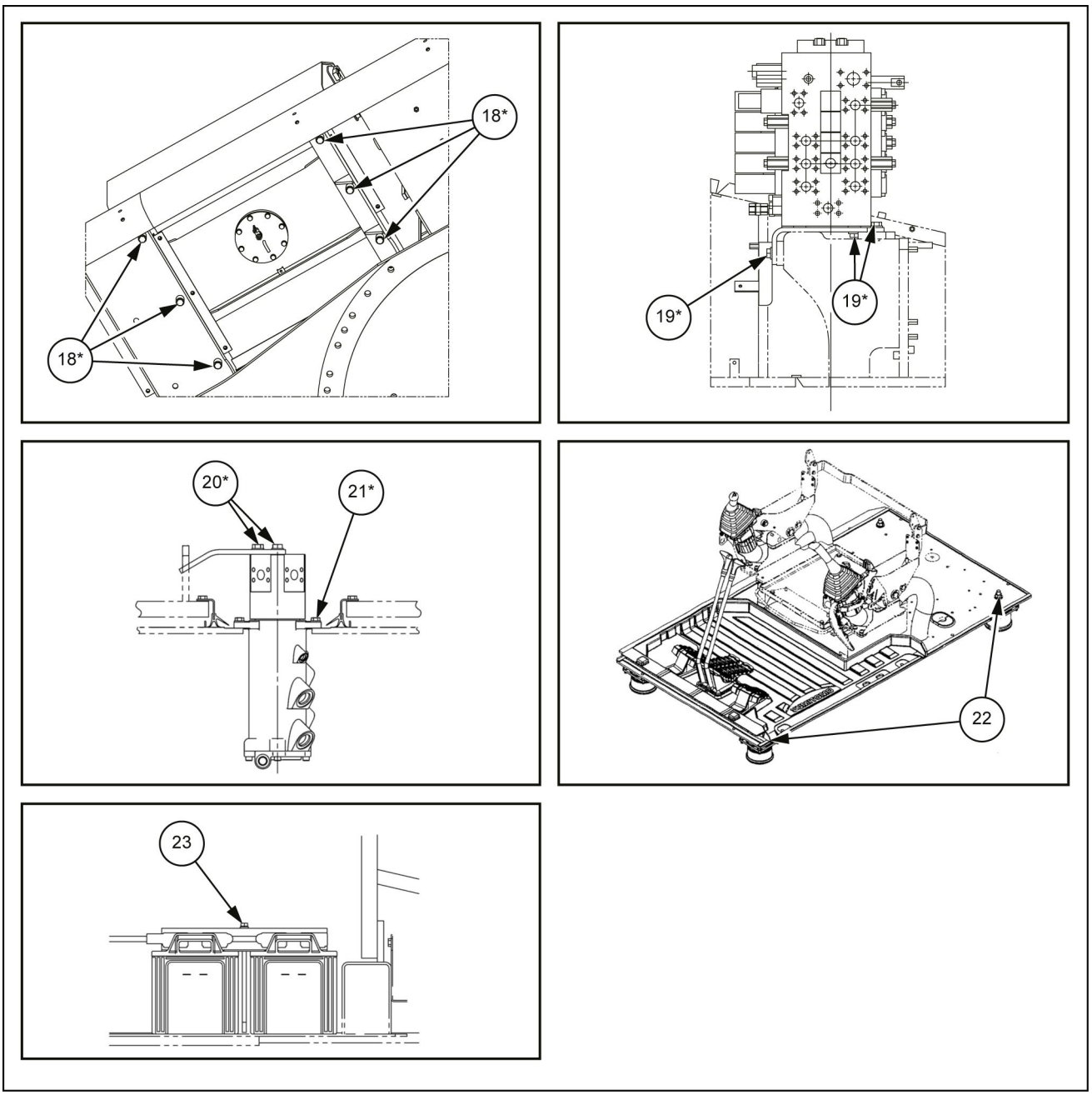
CX350C
Crawler Excavator

SERVICE MANUAL

Part number 47795406
English
October 2015

CASE
CONSTRUCTION



SMIL15CEX3371GB 3

Gallons (U.S) to liters

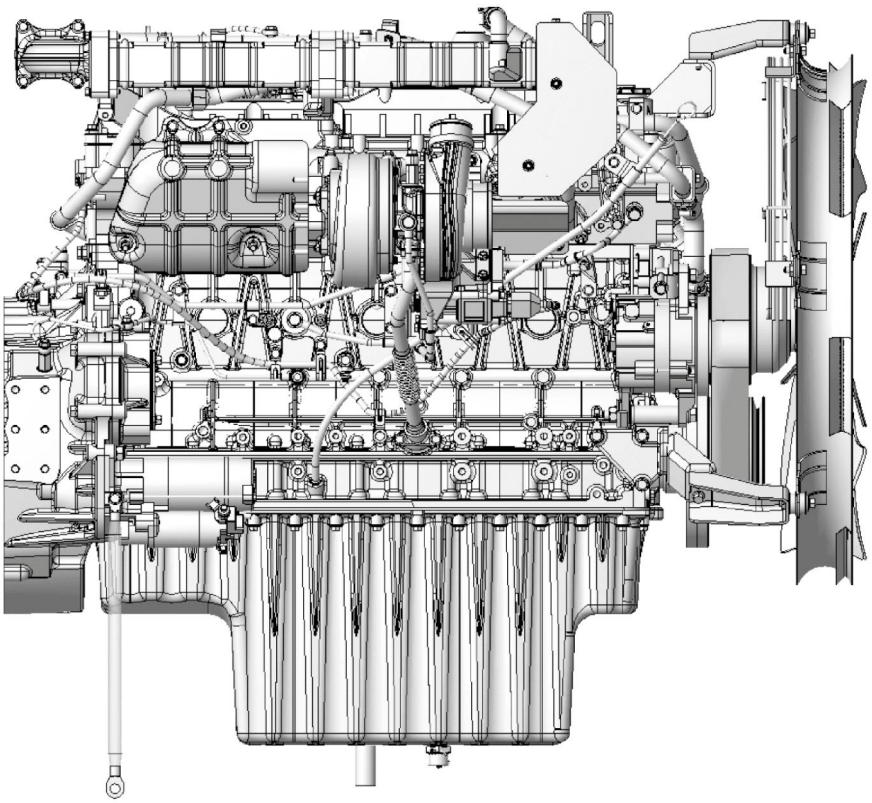
U.S-.gal.	0	1	2	3	4	5	6	7	8	9	U.S-.gal.
	liters	liters	liters	liters	liters	liters	liters	liters	liters	liters	
----		3.7853	7.5707	11.3560	15.1413	18.9266	22.7120	26.4973	30.2826	34.0680	----
10	37.8533	41.6386	45.4239	49.2093	52.9946	56.7799	60.5653	64.3506	68.1359	71.9213	10
20	75.7066	79.4919	83.2772	87.0626	90.8479	94.6332	98.4186	102.2039	105.9892	109.7745	20
30	113.5599	117.3452	121.1305	124.9159	128.7012	132.4865	136.2718	140.0572	143.8425	147.6278	30
40	151.4132	155.1985	158.9838	162.7691	166.5545	170.3398	174.1251	177.9105	181.6958	185.4811	40
50	189.2665	193.0518	196.8371	200.6224	204.4078	208.1931	211.9784	215.7638	219.5491	223.3344	50
60	227.1197	230.9051	234.6904	238.4757	242.2611	246.0464	249.8317	253.6170	257.4024	261.1877	60
70	264.9730	268.7584	272.5437	276.3290	280.1143	283.8997	287.6850	291.4703	295.2557	299.0410	70
80	302.8263	306.6116	310.3970	314.1823	317.9676	321.7530	325.5383	329.3236	333.1090	336.8943	80
90	340.6796	344.4649	348.2503	352.0356	355.8209	359.6063	363.3916	367.1769	370.9622	374.7476	90
100	378.5329	382.3182	386.1036	389.8889	393.6742	397.4595	401.2449	405.0302	408.8155	412.6009	100

Liters to gallons (U.S)

liters	0	1	2	3	4	5	6	7	8	9	liters
	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	
----		0.2642	0.5284	0.7925	1.0567	1.3209	1.5851	1.8492	2.1134	2.3776	----
10	2.6418	2.9060	3.1701	3.4343	3.6985	3.9627	4.2268	4.4910	4.7552	5.0194	10
20	5.2836	5.5477	5.8119	6.0761	6.3403	6.6044	6.8686	7.1328	7.3970	7.6612	20
30	7.9253	8.1895	8.4537	8.7179	8.9820	9.2462	9.5104	9.7746	10.0388	10.3029	30
40	10.5671	10.8313	11.0955	11.3596	11.6238	11.8880	12.1522	12.4164	12.6805	12.9447	40
50	13.2089	13.4731	13.7372	14.0014	14.2656	14.5298	14.7940	15.0581	15.3223	15.5865	50
60	15.8507	16.1148	16.3790	16.6432	16.9074	17.1716	17.4357	17.6999	17.9641	18.2283	60
70	18.4924	18.7566	19.0208	19.2850	19.5492	19.8133	20.0775	20.3417	20.6059	20.8700	70
80	21.1342	21.3984	21.6626	21.9268	22.1909	22.4551	22.7193	22.9835	23.2476	23.5118	80
90	23.7760	24.0402	24.3044	24.5685	24.8327	25.0969	25.3611	25.6252	25.8894	26.1536	90
100	26.4178	26.6820	26.9461	27.2103	27.4745	27.7387	28.0028	28.2670	28.5312	28.7954	100

Engine - External view

Engine structural diagram



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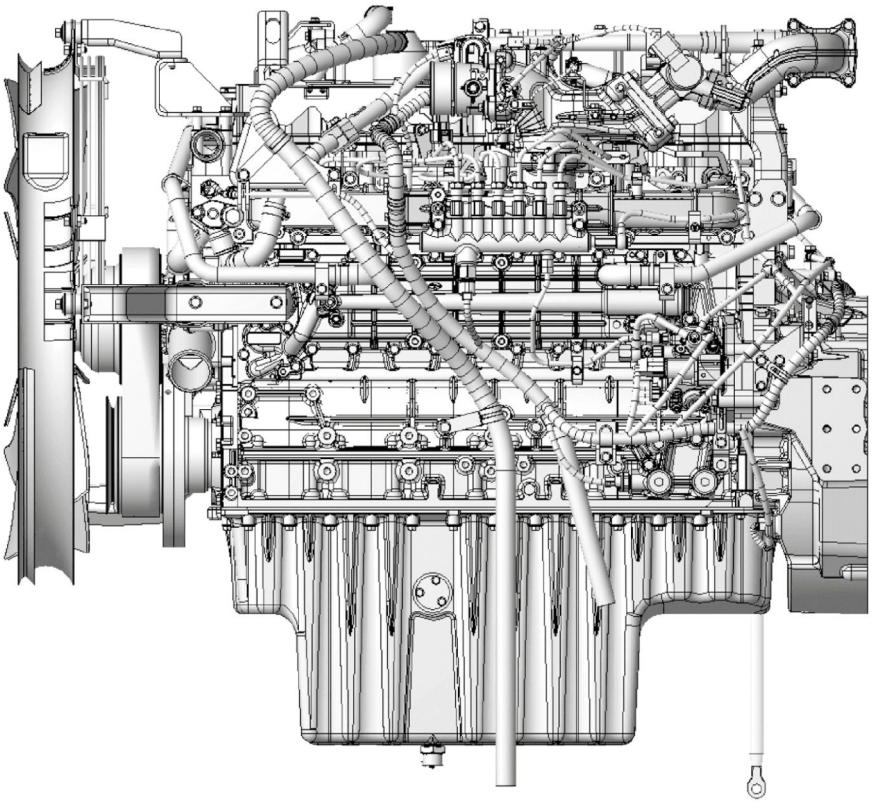
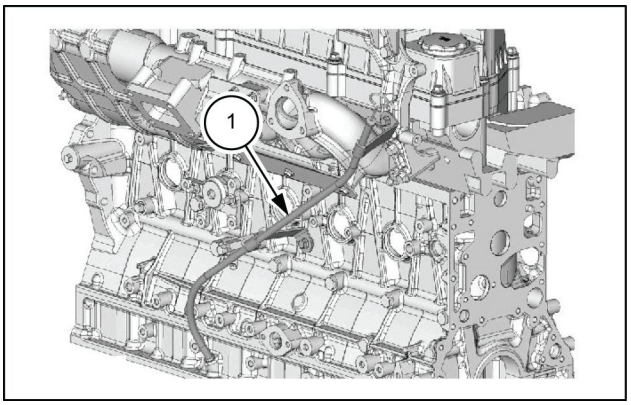


SMIL15CEX3464FA 2

Oil level gauge guide tube removal

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



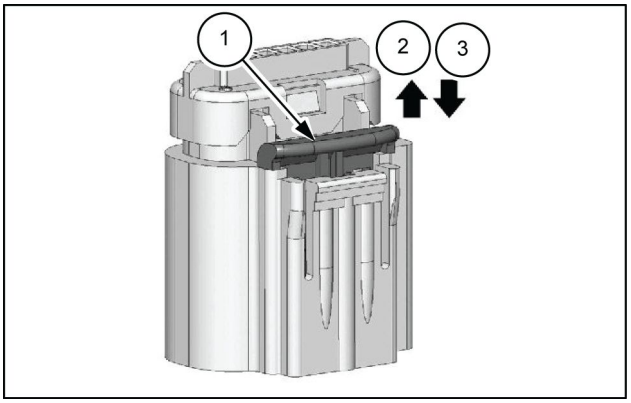
LPIL12CX03619AB 19

Intake throttle valve removal

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

NOTE: *Pull the lock operation portion **(1)** to release the lock **(3)**.*

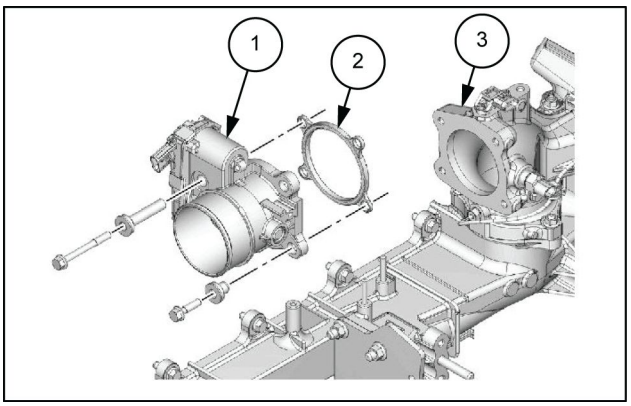
2. Lock release



SMIL13CEX1482AB 20

3. Remove the intake throttle valve **(1)** from the inlet pipe **(3)**.

2. Gasket



LPIL12CX03621AB 21

4. Install the idle gear B to the cylinder block.

   Tightening torque: **95 N·m** (**70 lb ft**)

> ⚠ CAUTION: Confirm that the idle gear B turns smoothly after installing.

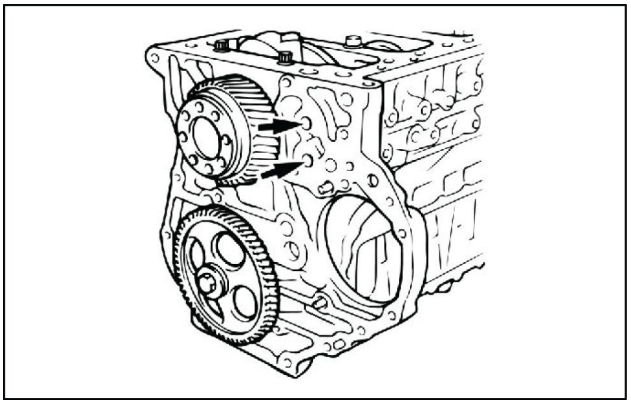
Oil pump assembly installation

1. Clean the cylinder block using the scraper.

NOTE: *Remove grime and oil from the oil pump installation area.*

2. Apply the engine oil to the cylinder block.

> ⚠ CAUTION: Do not allow engine oil to adhere on the oil pump installation surface.

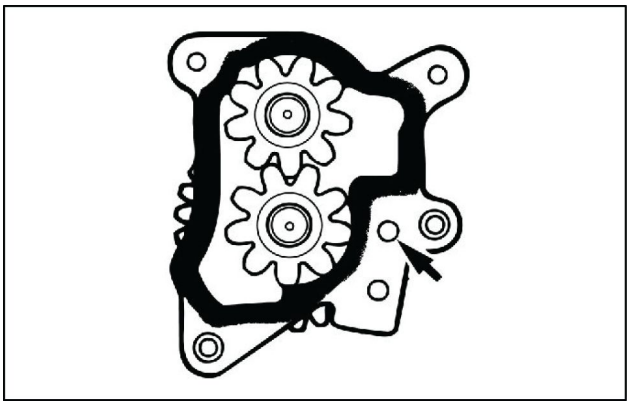


LPIL12CX03691AA 25

3. Apply the liquid gasket to the oil pump.

NOTE: *Refer to the diagram and apply the ThreeBond 1207C to the oil pump.*

> ⚠ CAUTION:
>
> - Do not allow the liquid gasket to adhere to the locations indicated by arrows in the diagram.
> - After applying the liquid gasket, install the oil pump within **5 min**.



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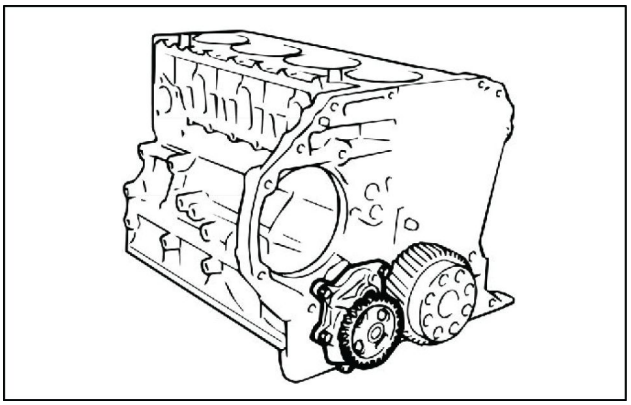
4. Install the oil pump to the cylinder block.

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

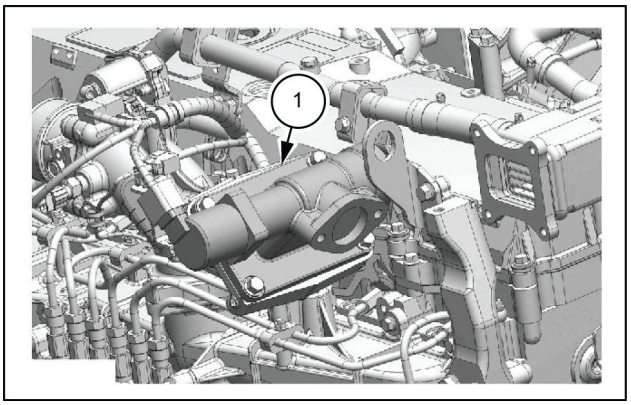


LPIL12CX03693AA 27

EGR valve installation

1. Install the EGR valve **(1)** to the inlet pipe.

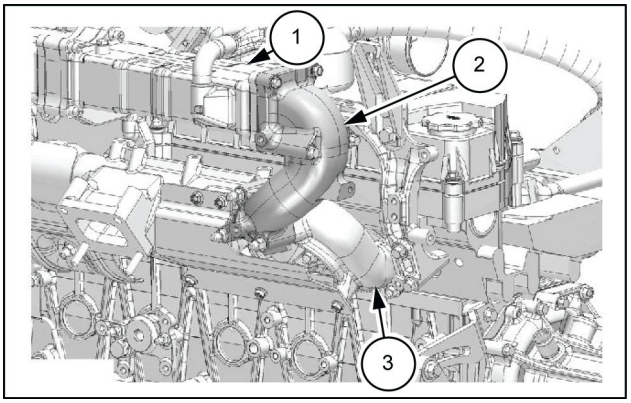
   Tightening torque: **46 N·m** (**34 lb ft**)



LPIL12CX03869AB 104

EGR cooler installation

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



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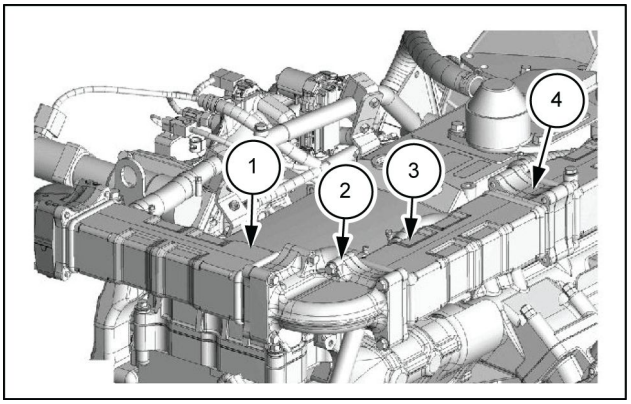
3. Temporarily tighten the EGR cooler bracket A **(4)** to the EGR cooler A.
4. Temporarily tighten the EGR cooler B **(3)** to the EGR cooler A.
5. Temporarily tighten the EGR bracket C to the EGR cooler B **(3)**.
6. Temporarily tighten the EGR cooler C **(1)** to the EGR bracket C.

   2. EGR cooler bracket C



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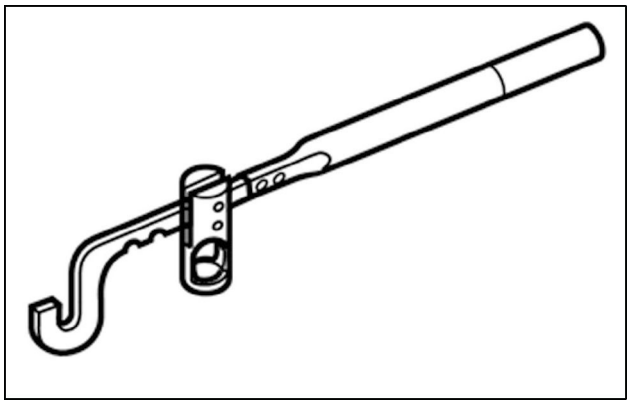
Valves - Special tools

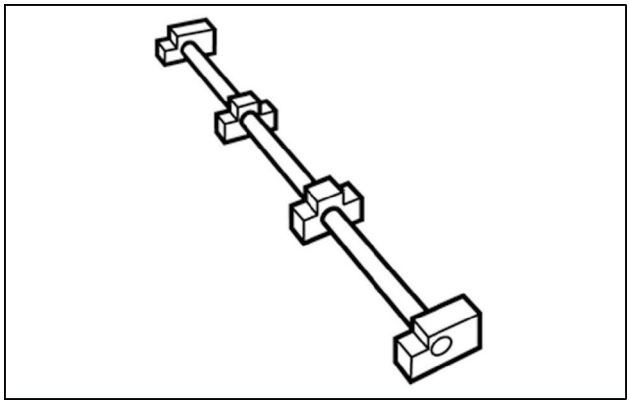
Valve spring

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



SMIL14CEX2699AA 1

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



SMIL14CEX2700AA 2

5. Inspect the exhaust valve using the red lead primer.

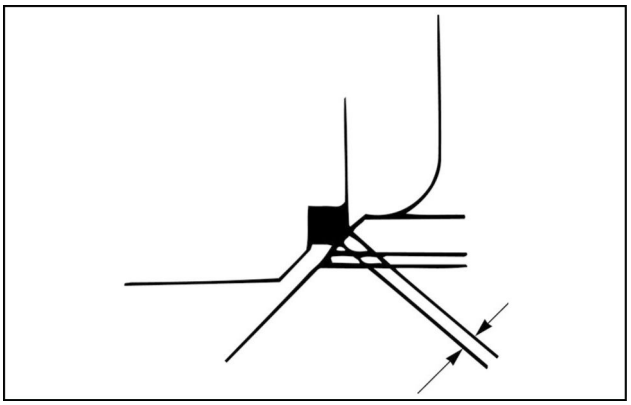
NOTE: *Inspect the contact surface of the exhaust valve and valve seat.*

Specified value: **2.7 mm** (**0.1063 in**) Contact width

Limit: **3.0 mm** (**0.1181 in**) Contact width

⚠ CAUTION:

- If the measured value exceeds the limit value, fix the contact surface of the valve seat using a sheet cutter.
- If the contact position is not in the center of the valve seat, fix the contact surface of the valve seat using a sheet cutter.
- If the contact surface is not smooth, fix the contact surface of the valve seat using a sheet cutter.



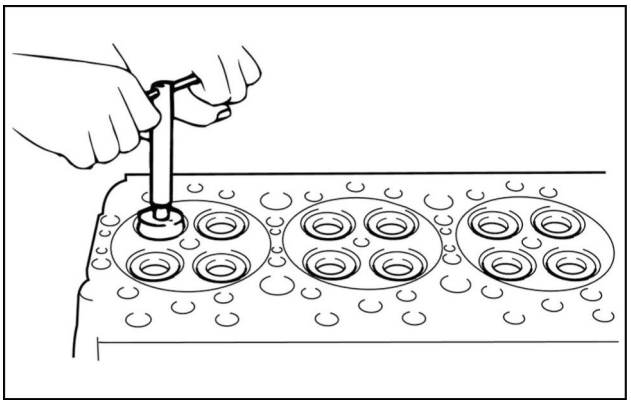
SMIL14CEX3114AA 7

6. Adjust the valve seat to standard value using the valve seat cutter.

⚠ CAUTION: Use a seat cutter suitable for the valve seat angle and valve stem diameter.

Valve seat angle: **30 °**

External diameter of the valve stem: **8.0 mm** (**0.3150 in**) Diameter

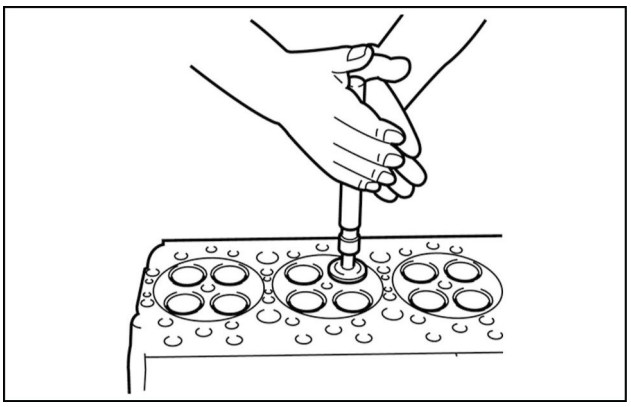


SMIL14CEX3115AA 8

7. Apply the compound to the valve seat.
8. Install the inlet valve to the valve guide.
9. Adjust contact surface to standard value using the valve lapper.

NOTE: *Lightly tap the inlet valve on the valve seat while turning it.*

⚠ CAUTION: After fixing the valve, remove all compounds.



SMIL14CEX3116AA 9

1. Apply the engine oil to the bolt **(2)**.
2. Temporarily tighten the injector **(1)** to the cylinder head assembly.

   ⚠ CAUTION: Be extremely careful not to damage the injector nozzle.

3. Temporarily tighten the injection pipe to the injector **(1)**.

   ⚠ CAUTION: Use new injection pipes.

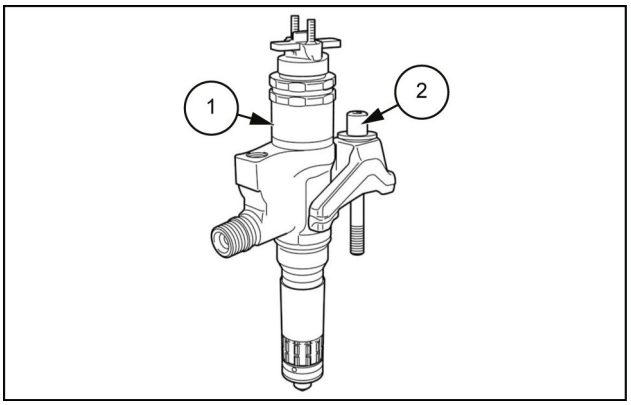
4. Temporarily tighten the injection pipe to the common rail assembly.
5. Securely tighten the injector **(1)** to the cylinder head assembly.

   Tightening torque: **30 N·m** (**22 lb ft**)

6. Install the injector leak-off pipe to the injector **(1)**.

   ⚠ CAUTION: Use new gaskets.

   Tightening torque: **14 N·m** (**126 lb in**)



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Injection pipe installation

1. Securely tighten the injection pipe to the injector.

   Tightening torque: **44 N·m** (**32.5 lb ft**)

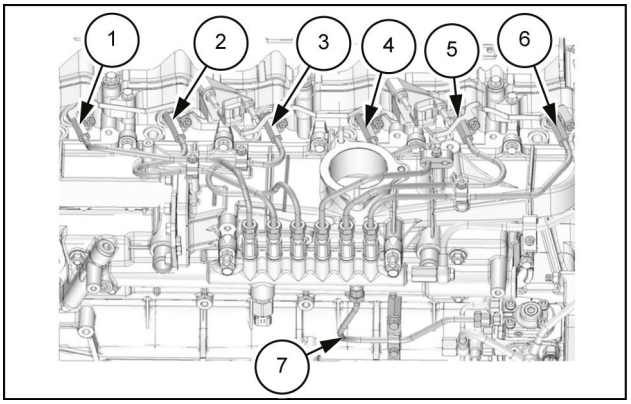
2. Securely tighten the injection pipe to the common rail assembly.

   Tightening torque: **44 N·m** (**32.5 lb ft**)

3. Install the clip to the inlet cover.

   Tightening torque: **6 N·m** (**53.1 lb in**)

   1. No.1 injection pipe
   2. No.2 injection pipe
   3. No.3 injection pipe
   4. No.4 injection pipe
   5. No.5 injection pipe
   6. No.6 injection pipe
   7. Fuel pipe



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Items to prepare:

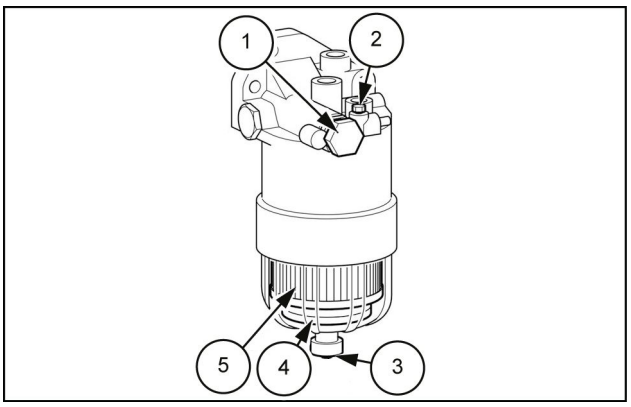
- Wrenches [**19 mm**, **24 mm**]
- Eyebolts (M12 x 4)
- Shackle (with the required lifting capacity) x 4
- Wire rope (with the required breaking load)
- Lifting equipment (with the required lifting capacity)
- Cap
- Plug
- Drum can (for draining fuel)
- Rag
- Cleaning fluid
- Wood planks, etc.
- Marking pen

Fuel injection system - Bleed

Fuel air bleed (with element replaceable specification)

NOTICE: *To prevent engine failure, be sure to perform air removal after the installation or removal of fuel system parts.*

1. Priming pump
2. Air bleeding plug
3. Drain plug
4. Case
5. Fuel filter element



SMIL14CEX3106AB 1

1. Prepare the pan.
2. Turn ON the ignition switch.
3. Loosen the air bleeding plug **(2)** using a wrench.
4. Operate the priming pump **(1)**.

NOTE: *Operate the priming pump **(1)** until fuel comes out from around the plug **(2)**.*

5. Tighten the air bleeding plug **(2)** using a wrench.
6. Operate the priming pump **(1)**.
   Number of times: 10 count(s) or more

NOTE: *Wait for approximately **1 min** after operating the priming pump **(1)**.*

7. Loosen the air bleeding plug **(2)** using a wrench.

NOTE: *Remove the air in the fuel filter element **(5)**.*
*Repeat steps 3 to 7 until air no longer bleeds from the air bleeding plug **(2)**.*

NOTE: *Perform at least 3 times.*

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Engine cooling system - Inspect

⚠ WARNING

Hazardous chemicals!
Coolant can be toxic. Avoid contact with skin, eyes, and clothing. Antidotes:
EXTERNAL - Rinse thoroughly with water. Remove soiled clothing.
INTERNAL - Rinse the mouth with water. DO NOT induce vomiting. Seek immediate medical attention.
EYES - Flush with water. Seek immediate medical attention.
Failure to comply could result in death or serious injury.

W0282A

⚠ WARNING

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 death or serious injury.

W0367A

Coolant inspection

NOTICE: *If the coolant temperature is high, do not perform the inspection.*

NOTICE: *Be sure to use long life coolant which is specified or recommended. Using at an unspecified concentration may result in freezing due to decreased anti-freezing performance. Use a coolant concentration appropriate for the usage environment.*

NOTE: *Before using, dilute the specified long life coolant to the specified concentration with soft tap water.*

Area where the equipment is used	LLC concentration
General area; Area where the lowest temperature is higher than **-12 °**	**30 %**
Cold area; Area where the lowest temperature is **-30 °**	**50 %**
Area where temperature drop to **-30 °**	**55 %**

1. Inspect the radiator reverse tank.

   Volume of coolant: **16.0 L** (**4.2 US gal**)

NOTE: *If coolant level is MIN or less, add it until it reaches MAX.*

NOTICE: *When adding coolant, use coolant appropriate for the usage environment.*

2. Inspect the water leak using the radiator cap tester.

   Inspection pressure: **200 kPa** (**29 psi**)

   Inspection locations:

   - Radiator assembly
   - Water pump assembly
   - Radiator hose
   - Heater hose

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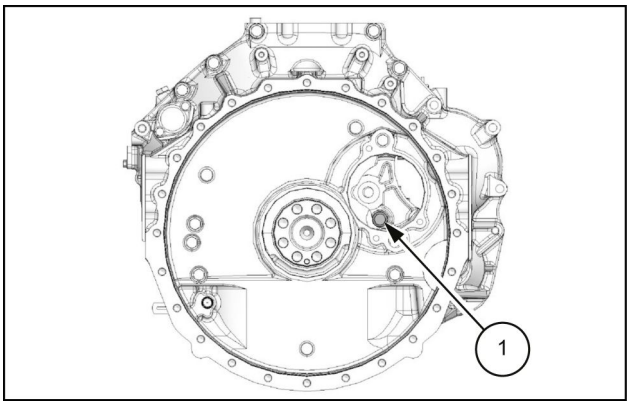
4. Remove the PTO idle gear from the cylinder block.
5. Remove the flywheel housing from the cylinder block and the crankcase.

> ⚠ CAUTION: Do not forget to remove the bolt **(1)** shown in the diagram.



SMIL14CEX3137AB 43

Idle gear measurement

1. Align the dial gauge to the idle gear.

NOTE: *Attach the dial gauge to the idle gear tooth to be measured.*

2. Inspect the backlash.

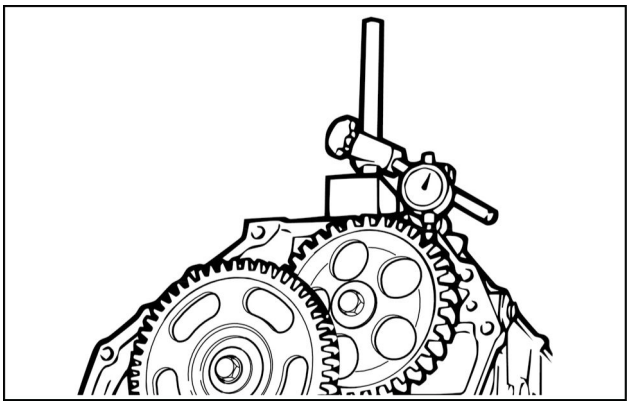
NOTE: *Gently move the gear right and left to read the inconsistency on the dial gauge.*

> ⚠ CAUTION: Measure the idle gear backlash before removing the idle gear A.

Specified value : **0.10 - 0.17 mm** (**0.0039 - 0.0067 in**)

Limit : **0.30 mm** (**0.0118 in**)

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



SMIL14CEX3138AA 44

3. Measure the clearance using the feeler gauge.

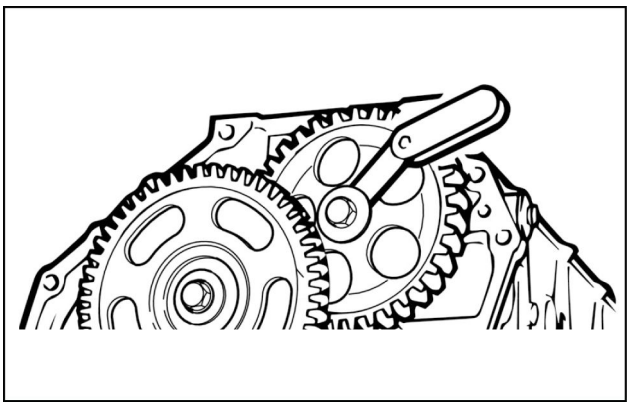
NOTE: *Measure the clearance between the idle gear and the thrust collar.*

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

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

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

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



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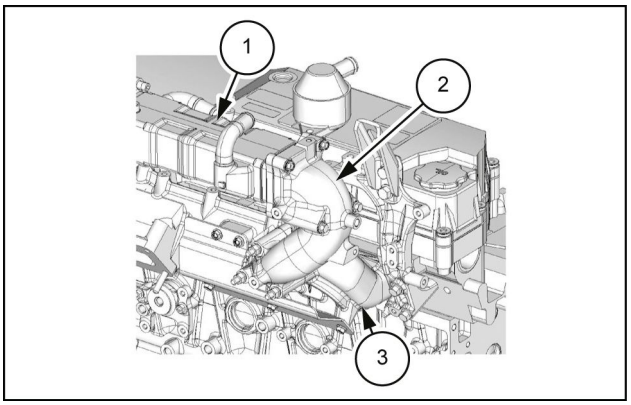
Idle gear A removal

1. Remove the idle gear A from the idle gear A shaft.

EGR cooler installation

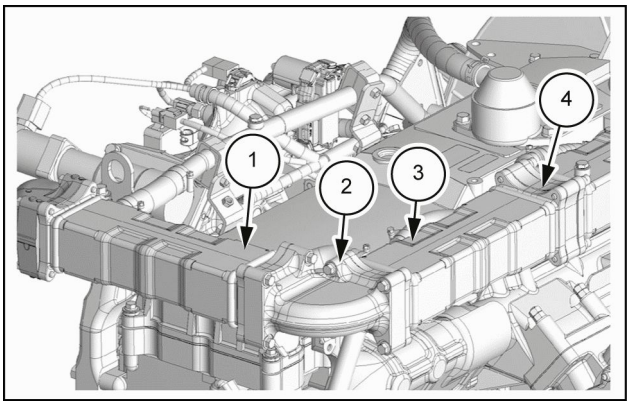
1. Temporarily tighten the EGR pipe A **(2)** to the exhaust manifold **(3)**.
2. Temporarily tighten the EGR cooler A **(1)** to the EGR pipe A **(2)**.



SMIL14CEX2986AB 63

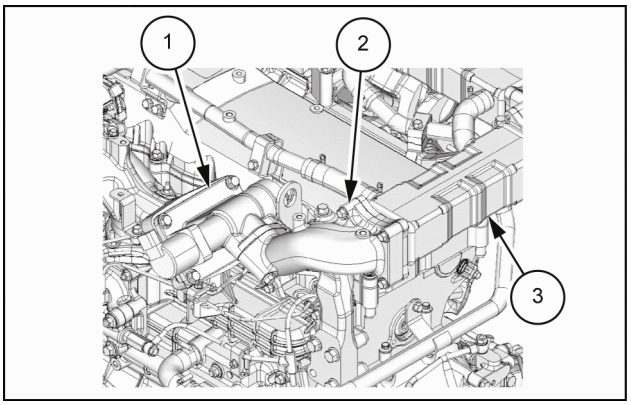
3. Temporarily tighten the EGR cooler bracket A **(4)** to the EGR cooler A.
4. Temporarily tighten the EGR cooler B **(3)** to the EGR cooler A.
5. Temporarily tighten the EGR bracket C to the EGR cooler B **(3)**.
6. Temporarily tighten the EGR cooler C **(1)** to the EGR bracket C.

   2. EGR cooler bracket C



SMIL14CEX3104AB 64

7. Temporarily tighten the EGR pipe B **(2)** to the EGR cooler C **(3)** and the EGR valve **(1)**.



SMIL14CEX2983AB 65

8. Securely tighten the EGR pipe A to the exhaust manifold.

   Tightening torque : **67 N·m** (**49 lb ft**)

9. Securely tighten the EGR cooler A to the EGR pipe A.

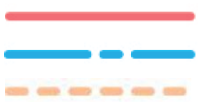
   Tightening torque : **31 N·m** (**23 lb ft**)

10. Securely tighten the EGR cooler B to the EGR cooler A.

    Tightening torque : **25 N·m** (**18 lb ft**)

11. Securely tighten the EGR cooler bracket C to the EGR cooler B.

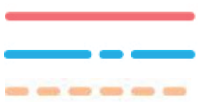
    Tightening torque : **25 N·m** (**18 lb ft**)



Pressure line
Tank line
Pilot pressure line

Pilot tank line
Electric line

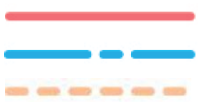
1. Travel motor
2. Travel high-speed select switch
3. Computer A
4. Control valve
5. Travel (left)
6. Travel (right)
7. Travel high speed
8. Lever lock
9. 4 stack solenoid valve
10. Console lever lock switch
11. Hydraulic pump
12. Travel remote control valve
13. Check valve
14. Oil cooler
15. Backward left
16. Forward left
17. Forward right
18. Backward right
19. Computer B



Pressure line
Tank line
Pilot pressure line

Pilot tank line
Electric line

1. Arm cylinder
2. Arm (in)
3. Arm (out)
4. Boom (up)
5. Boom (down)
6. Cushion valve
7. Remote control valve (boom, bucket)
8. Remote control valve (arm, swing)
9. Lever lock
10. Pressure boost relief
11. 4 stack solenoid valve
12. Arm **(1)**
13. Boom (up)
14. Arm load holding valve spool
15. Load holding valve check valve
16. Forced regeneration release valve
17. Control valve
18. Swing priority variable orifice
19. Arm **(2)**
20. Boom load holding valve check valve
21. Boom cylinder
22. Travel pilot pressure sensor
23. Upper pilot pressure sensor
24. Console lever lock switch
25. Monitor display
26. Computer A
27. P1 pressure sensor
28. P2 pressure sensor
29. Hydraulic pump
30. Hydraulic pump
31. Oil cooler



Pressure line
Tank line
Pilot pressure line

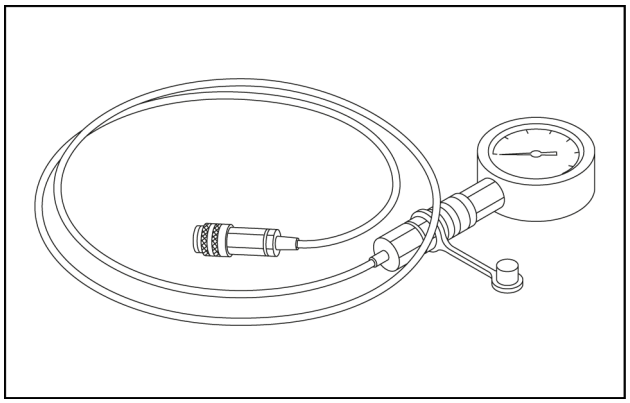
Pilot tank line
Electric line

1. Load holding valve spool
2. Load holding valve check valve
3. Oil cooler
4. Arm (in)
5. Arm (out)
6. Cushion valve
7. Remote control valve (arm, swing)
8. Lever lock
9. Boost pressure relief
10. 4 stack solenoid valve
11. Control valve
12. Arm cylinder
13. Arm **(1)**
14. Arm **(2)**
15. Travel pilot pressure sensor
16. Upper pilot pressure sensor
17. Console lever lock switch
18. Monitor display
19. Computer A
20. P1 pressure sensor
21. P2 pressure sensor
22. Hydraulic pump
23. Check valve
24. Arm HBCV check valve
25. Arm HBCV

Pressure line
Tank line
Pilot pressure line
Pilot tank line
Electric line

1. Control valve
2. 3-direction valve
3. Shut-off valve
4. Breaker
5. Option remote control valve
6. Option pilot pressure switch
7. ATT select switch
8. Computer A
9. Monitor display
10. Option switchover solenoid valve
11. Console lever lock switch
12. Lever lock
13. 4 stack solenoid valve
14. Horsepower control proportional valve
15. P1 pressure sensor
16. P2 pressure sensor
17. N2 negative control pressure sensor
18. P1 flow control proportional valve
19. Hydraulic pump
20. Check valve
21. Oil cooler

Pressure gauge port size: G1/4 for **10 MPa** (**1450 psi**)



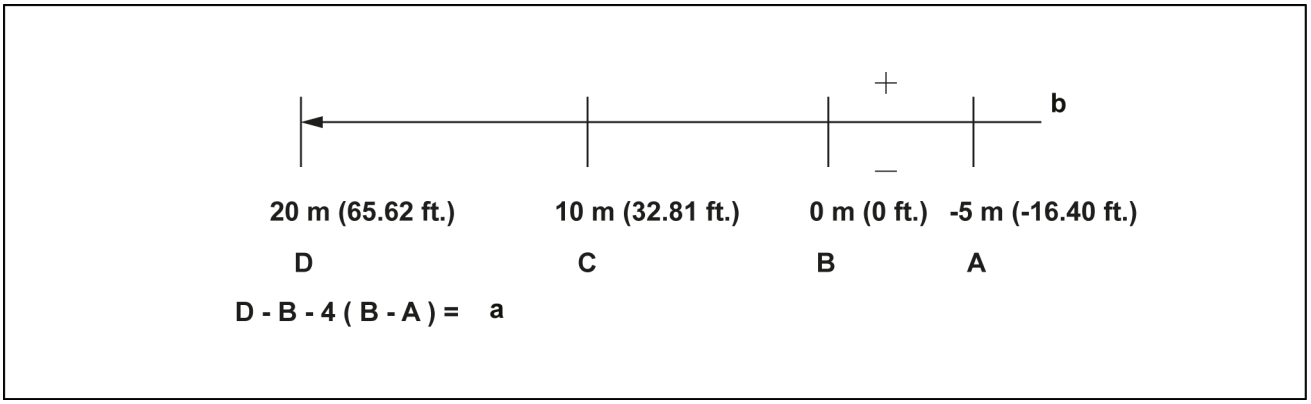
SMIL14CEX2098AA 32

Off travel amount

Measurement method

1. Engine high idle and oil temperature is **45 - 55 °C** (**113 - 131 °F**) with no load.
2. Measure the required time to travel **20 m** (**65.62 ft**) after a **4 - 5 m** (**13.12 - 16.40 ft**) running start.
3. Shoe tension amount should be standard.
4. Measure for both forward and backward traveling.
5. Measure for both high-speed and low-speed traveling.

Main unit posture: Same as with travel speed measurement.



SMIL14CEX0754EB 9

a. Off travel amount

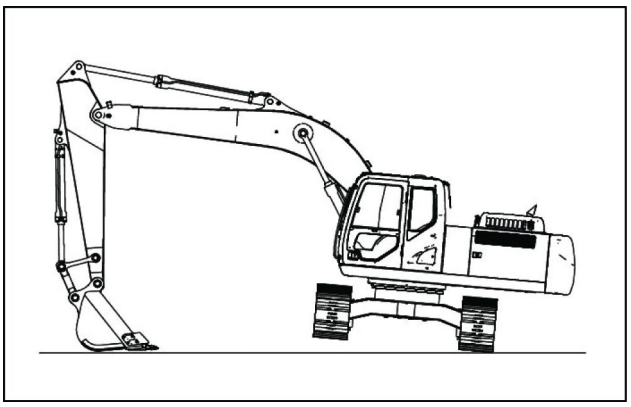
b. Reference line

Travel sprocket speed

Measurement method

1. Engine high idle.
2. Oil temperature is **45 - 55 °C** (**113 - 131 °F**).
3. Raise a shoe, and after achieving a constant speed, measure the time required for the sprocket to rotate 10 times both forwards and backwards.
4. Measure for both high-speed and low-speed traveling.

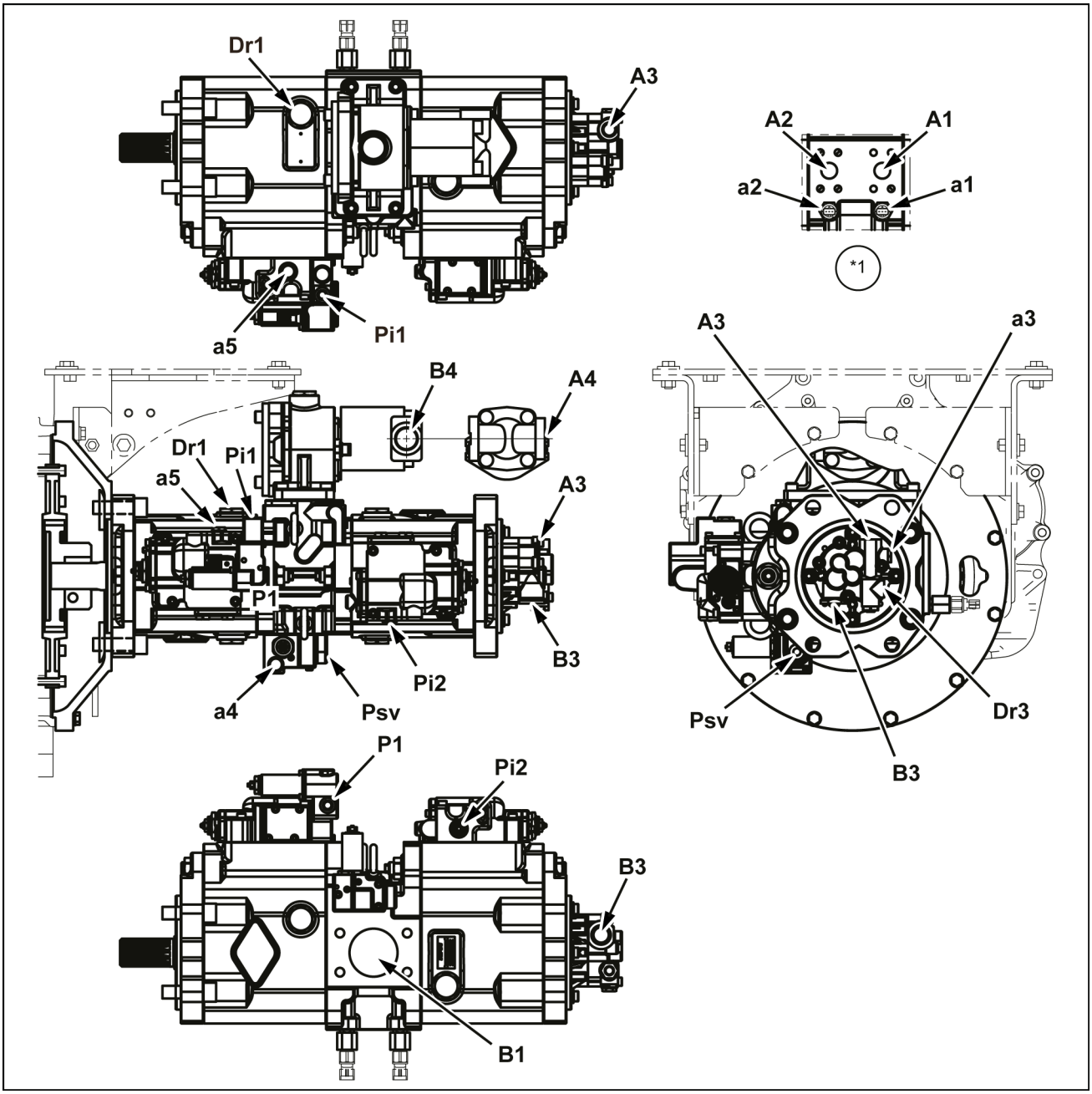
Main unit posture: **90 °** swing, shoe raised.



LPIL12CX00051AA 10

Pump - Overview

Port diagram



SMIL14CEX3564GB 1

Standard model

(*1) Discharge port

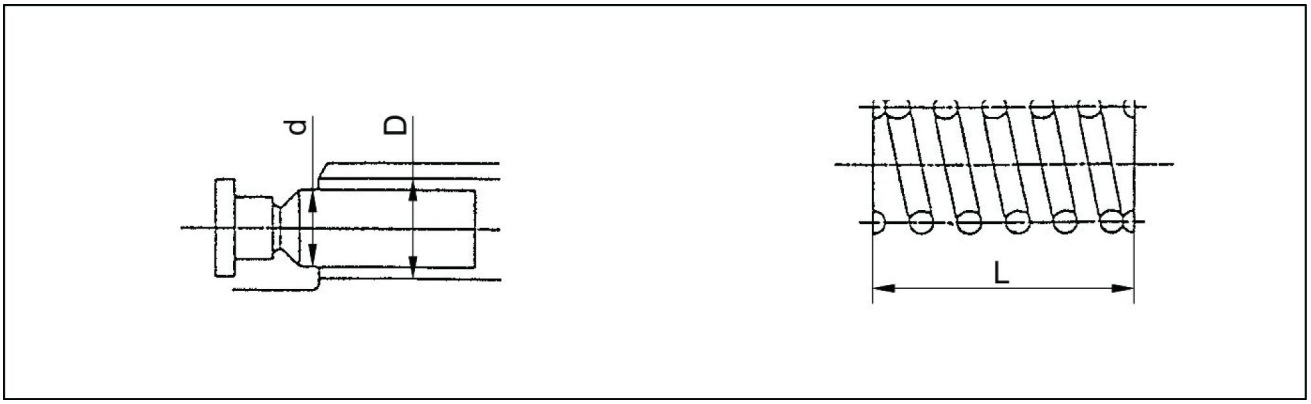
Port	Port name	Port size
A1, A2	Discharge port	*SAE6000psi 1
B1	Suction port	*SAE2000psi 3
Dr1	Drain port	G3/4-23
P1	Proportional valve primary pressure port	G1/4-13
Psv	Servo assist port	G1/4-15
Pi1, Pi2	Negative control port	G1/4-13
a1, a2, a4, a5, a6	Gauge port	G1/4-15
A3	Gear pump discharge port	G1/2-19

Pump - Inspect

Replacement standards for worn parts

If wear on any part exceeds the standard values below, replace or readjust that part.
If, however, the appearance of the part shows significant damage, replace that part.

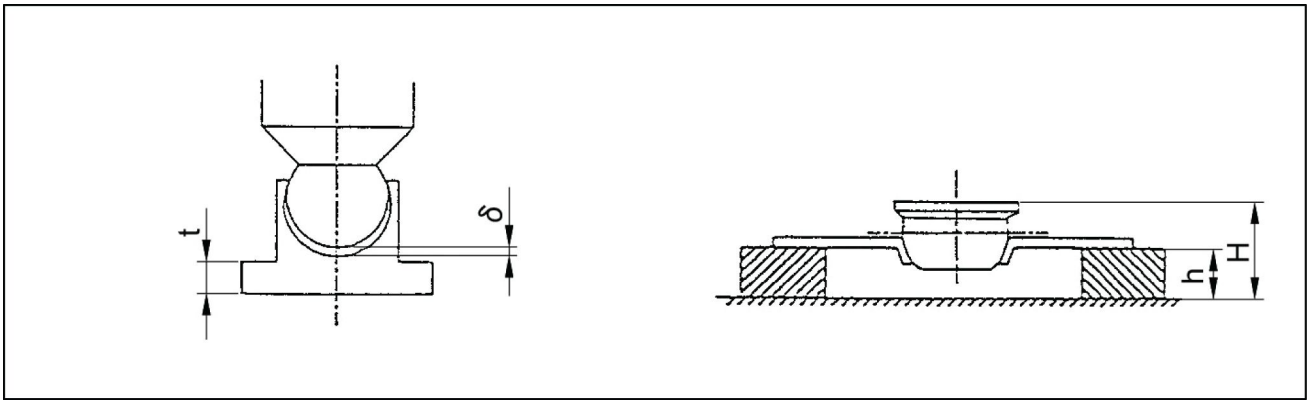
Part name and inspection item	Reference dimensions	Recommended replacement value	Solution
Piston and cylinder bore clearance (D - d)	**0.038 mm** (**0.001496 in**)	**0.065 mm** (**0.002559 in**)	Replace piston or cylinder
Piston and shoe caulking section backlash (δ)	**0 - 0.1 mm** (**0 - 0.0039 in**)	**0.3 mm** (**0.0118 in**)	Replace piston and shoe assembly
Shoe thickness (t)	**5.4 mm** (**0.2126 in**)	**5.0 mm** (**0.1969 in**)	Replace piston and shoe assembly
Free height of cylinder spring (L)	**40.9 mm** (**1.6102 in**)	**40.1 mm** (**1.5787 in**)	Replace cylinder spring
Assembled height of holder plate and spherical bushing (H - h)	**23.8 mm** (**0.9370 in**)	**22.8 mm** (**0.8976 in**)	Replace holder plate or spherical bushing
Cylinder opening diameter (spline in cylinder) Spherical bushing spline	**35.17 mm** (**1.3846 in**)	**35.57 mm** (**1.4004 in**)	Replace cylinder and spherical bushing



LPIL12CX01967EA 1

Clearance between the piston and cylinder bore: D-d

Free height of cylinder spring: L



LPIL12CX01968EA 2

Loseness of piston, shoe, and caulking: δ
Thickness of shoe: t

Combined height of pressure plate and spherical bush: H-h

Contents

Hydraulic systems - 35

Main control valve - 359

3. Compound operation

1. Travel compound operation

Under the conditions below when the travel left/right and the front system are operated at the same time, the straight travel spool is switched, and the straight travel characteristic is maintained.

1. When the front is operated during travel left/right simultaneous operation (forward, backward, or pivot turn)
2. When the left/right travel operations are performed simultaneously during front system operation

Front system operation is not affected by the switchover section or quantity of switchovers.

a. Signal circuit

A. When the [Travel 1] side lever is operated, the pressure branched off from the valve main unit pilot port passes through the filter and the shuttle, then switches the switchover valve [V1] .

B. When the [Travel 2] side lever is operated, the pressure branched off from the valve main unit pilot port passes through the filter and the shuttle, then if the switchover valve [V1] is switched, it switches the switchover valve [V2] through the path.On the other hand, if the switchover valve [V1] is in the neutral state, the path is cut off by the switchover valve [V1]. Therefore, if both **(A)** and **(B)** are established at the same time, continuity from the straight travel spool internal path (Pst) to the PA is established. Also, if either **(A)** or **(B)** are established, the travel signal (PT) pressure rises.

C. If at least one of the front systems is switched, the highest pressure of all the pilot pressures in the front system is selected and continuity with the front signal port (PA) is established. Therefore, if **(A)**, **(B)**, and **(C)** are established at the same time, the straight travel spool switchover quantity is determined proportional to the front signal (PA) pressure through the internal straight travel signal path (Pst). [Fig. 19] shows the example of a case of travel left/right forward + boom up.

Main control valve - Prepare

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

⚠ 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

⚠ 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

⚠ WARNING

Crushing hazard!
The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches.
Failure to comply could result in death or serious injury.

W0256A

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

4. Screw the plug (67-14) into the body (67-1) and tighten it.

   Tightening torque: **78 - 88 N·m** (**57.53 - 64.91 lb ft**)

5. Assemble the spring (67-6) and piston (67-3) on the plug (67-14).

6. Tighten the plug assembly (67-12) with O-ring mounted to the body (67-1).

   Tightening torque: **147 - 157 N·m** (**108.42 - 115.80 lb ft**)

Relief valve

⚠ CAUTION:

- When installing the relief valve, be sure to tighten the main unit installation section plug.
- Do not tighten the set pressure adjustment plug or lock nut.
- Doing so would be dangerous because the set pressure changes if the set pressure adjustment plug turns.

1. Screw in and tighten the main relief valve **(68)**.

   Tightening torque: **78 - 88 N·m** (**57.53 - 64.91 lb ft**)

2. Screw in and tighten the 6 overload relief valves **(69)** at each section.

   Tightening torque: **78 - 88 N·m** (**57.53 - 64.91 lb ft**)

3. Screw in and tighten the 2 relief valve assemblies with O-rings mounted **(70)**.

   Tightening torque: **103 - 113 N·m** (**75.97 - 83.34 lb ft**)

Load check valve assembly

1. Mount the O-rings **(36)** in the arm 1 section (E-E cross section), Boom 1 and 2 sections (F-F cross sections), swing section, and bucket section (G-G cross sections) and assemble the poppets **(34)** and springs **(35)**.

   Mount the flanges **(37)** and tighten with the hexagon socket head bolts **(75)**.

   Tightening torque: **58 - 64 N·m** (**42.78 - 47.20 lb ft**)

   For the arm 2 section (E-E cross section), assemble the sleeve **(58)**, poppet **(59)** and spring **(60)**, mount the flange **(61)**, and tighten with the hexagon socket head bolts **(75)**.

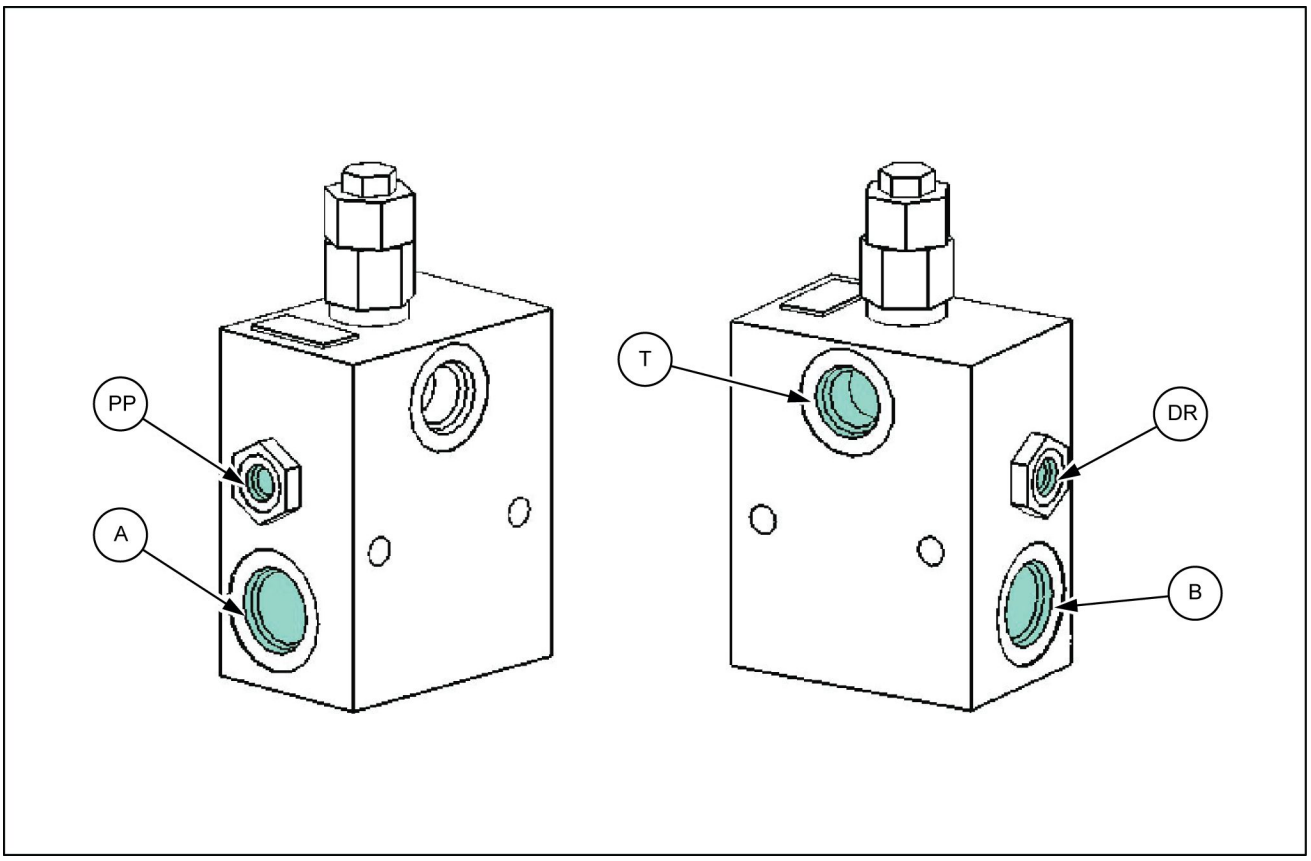
   Tightening torque: **58 - 64 N·m** (**42.78 - 47.20 lb ft**)

2. Mount the O-ring **(36)** in the travel section (I-I cross section) and assemble the poppet **(51)** and spring **(35)**.

   Tighten the flange **(37)** with the hexagon socket head bolt **(75)**.

   Tightening torque: **58 - 64 N·m** (**42.78 - 47.20 lb ft**)

Pressure-reducing valve - Overview – Shut-off valve

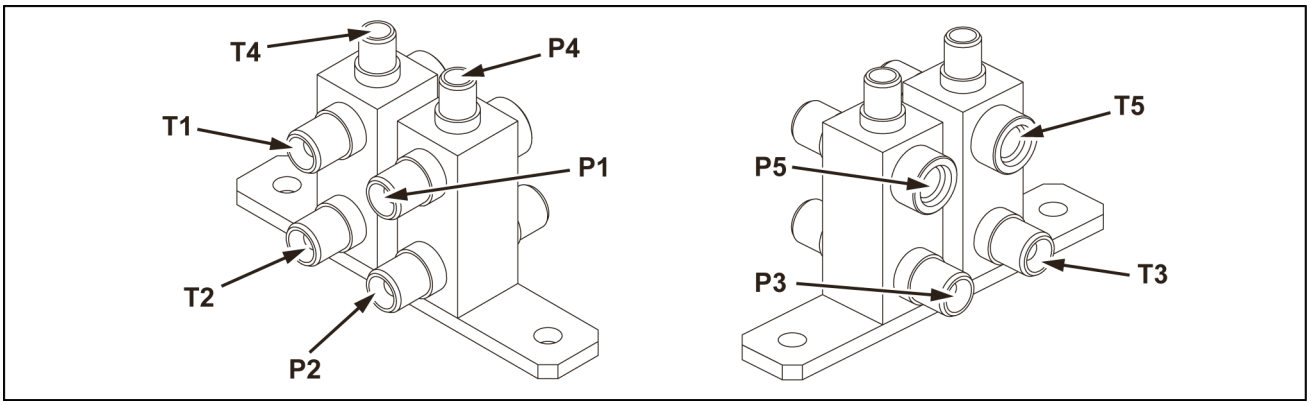


LPIL12CX02925FB 1

Port	Port size
A	G1
B	G1
T	G3/4
PP	G1/4
DR	G1/4

Drainage block - Overview

Manifold under cab

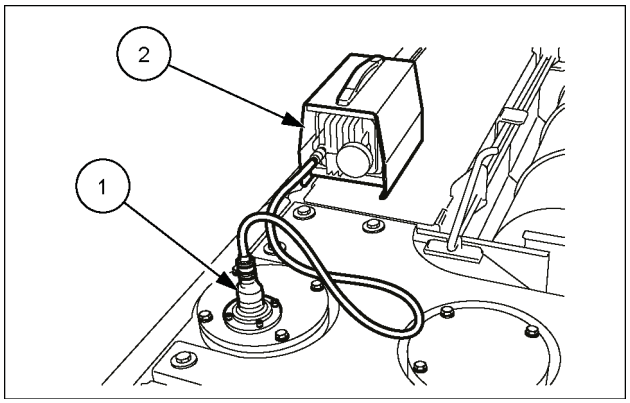


SMIL14CEX3580EA 1

Port	Port size	Port	Port size
P1	**G3/8**	T1	**G3/8**
P2	**G3/8**	T2	**G3/8**
P3	**G3/8**	T3	**G3/8**
P4	**G1/4**	T4	**G1/4**
P5	**G1/4**	T5	**G1/4**

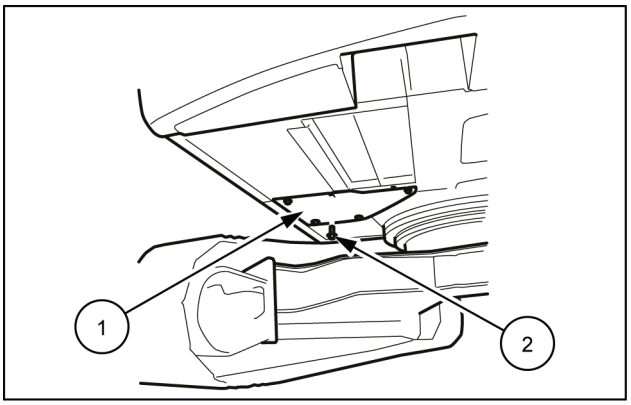
Cushion valve - Remove

1. Install the specialty adapter **(1)** to the area where the air breather is removed, and set the vacuum pump **(2)**. Create negative pressure in the hydraulic tank using the vacuum pump.



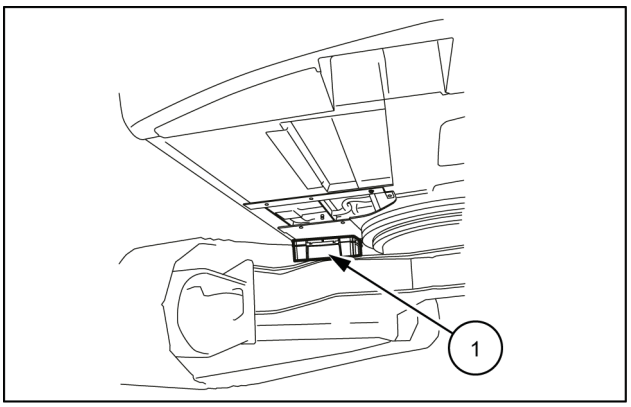
SMIL14CEX1545AB-01 1

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



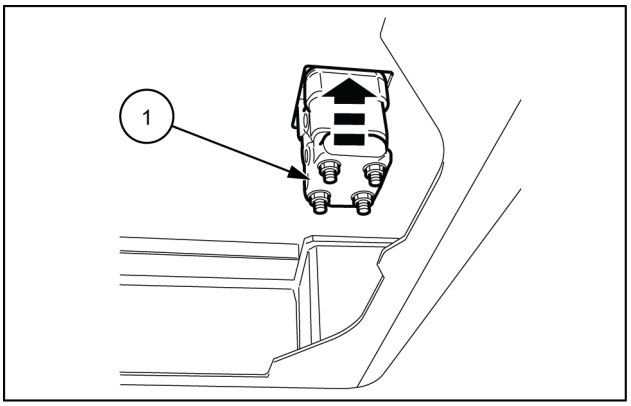
SMIL14CEX1546AB 2

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



SMIL14CEX1547AB 3

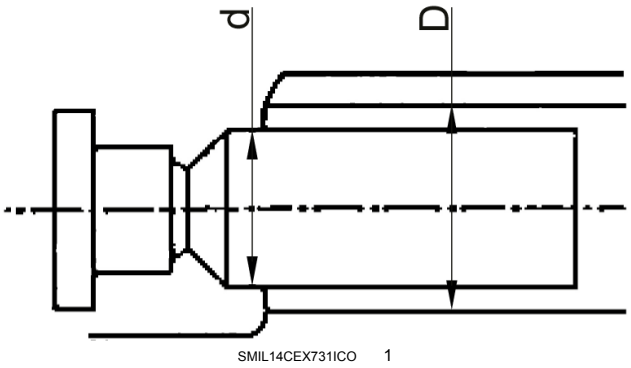
9. Pull up the travel remote control valve **(1)** into the cab to remove the travel remote control valve.



SMIL14CEX1534AB 9

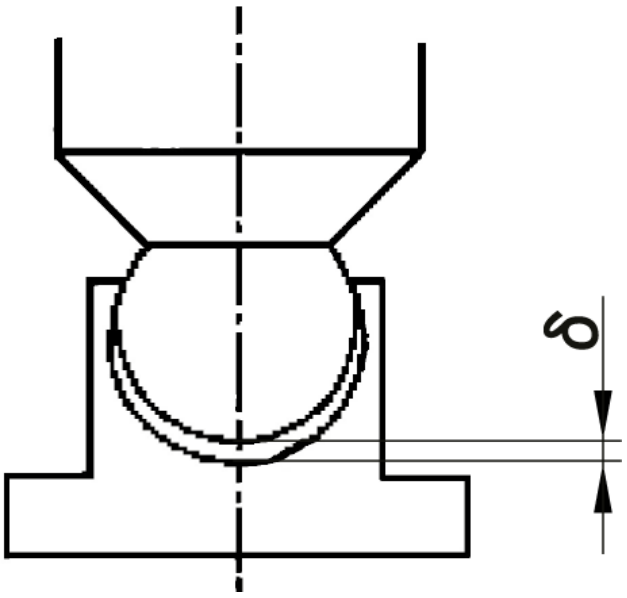
Part replacement standards

Item	Standard dimensions	Recommended replacement value	Solution
Clearances between piston and cylinder bore (D-d)	**0.028 mm** (**0.001102 in**)	**0.058 mm** (**0.002283 in**)	Replace the piston or cylinder.
Piston and shoe caulking section backlash (δ)	0	**0.3 mm** (**0.0118 in**)	Replace the piston and shoe assembly.
Shoe thickness (t)	**5.5 mm** (**0.2165 in**)	**5.3 mm** (**0.2087 in**)	Replace the piston and shoe assembly.
Friction plate thickness	**2.0 mm** (**0.0787 in**)	**1.6 mm** (**0.0630 in**)	Replace



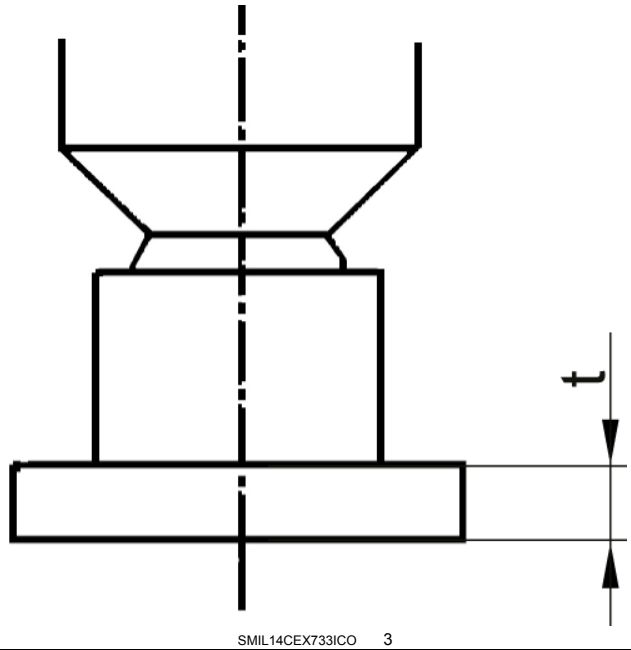
SMIL14CEX731ICO 1

Clearance (D-d)



SMIL14CEX732ICO 2

Piston and shoe backlash (δ)



SMIL14CEX733ICO 3

Shoe thickness (t)

Swing reduction motor - Drain fluid

Preparations

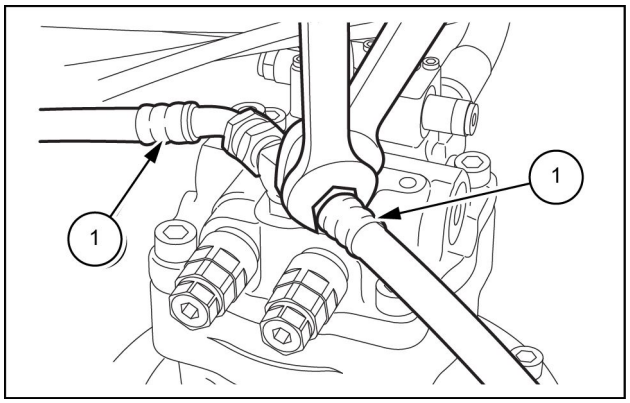
Measuring condition

Engine speed	**1900 RPM**
Mode	SP mode
Oil temperature	About **50 °C**

NOTE: *be aware that the drain volume varies greatly depending on the oil temperature.*

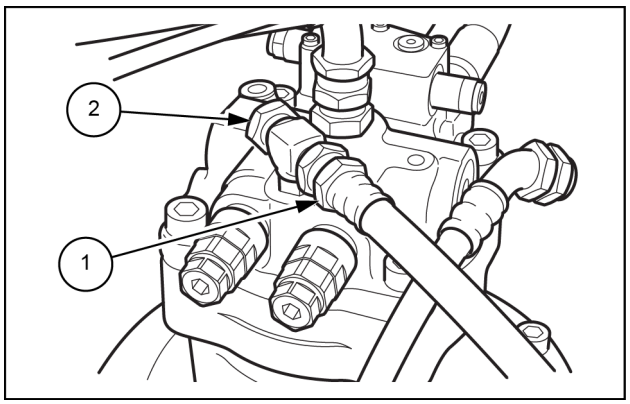
Swing motor drain volume measurement

1. Remove the 2 drain hoses **(1)** and install plugs on the hose side of each. (wrench size: **27 mm** (**1.063 in**), clamp **22 mm** (**0.866 in**) (hose side))



SMIL14CEX2218AB 1

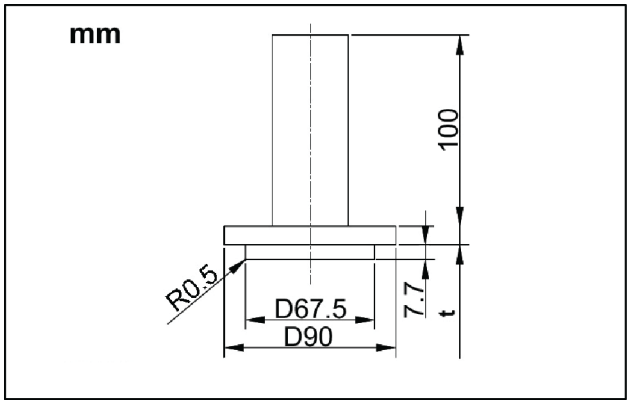
2. Install the extension hose **(1)** for measuring the drain volume on one side of the T nipple.
   Install the hose facing in a direction that makes measurement easy and install a plug **(2)** on the other side.



SMIL14CEX2219AB 2

Tool name: Oil seal insertion jig

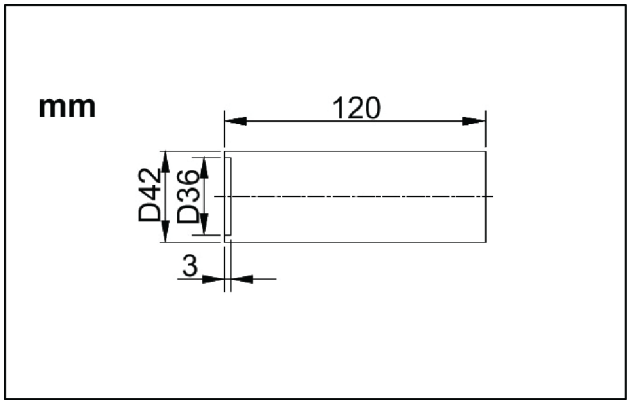
Usage target part: 3



LPIL12CX03371AA 5

Tool name: Rear bearing insertion jig

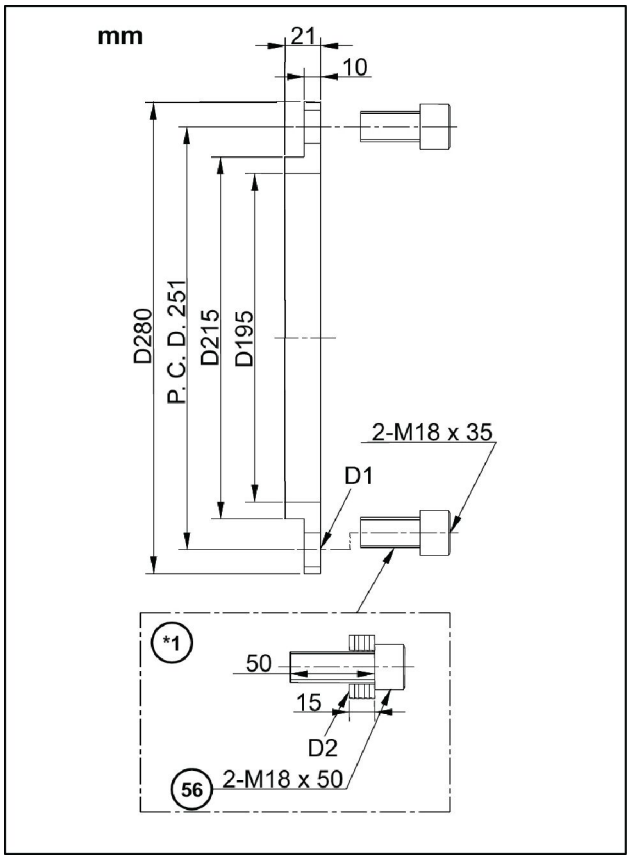
Usage target part: 51



LPIL12CX03372AA 6

Tool name: Brake piston insertion jig

Usage target part: 21



LPIL12CX03373BA 7

Travel motor - Prepare

⚠ 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

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.
The grease in the cylinder is under high pressure. Never loosen the grease fitting adaptor completely in order to speed up the flow of grease.
Failure to comply could result in death or serious injury.

W0261A

⚠ WARNING

Crushing hazard!
The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches.
Failure to comply could result in death or serious injury.

W0256A

⚠ WARNING

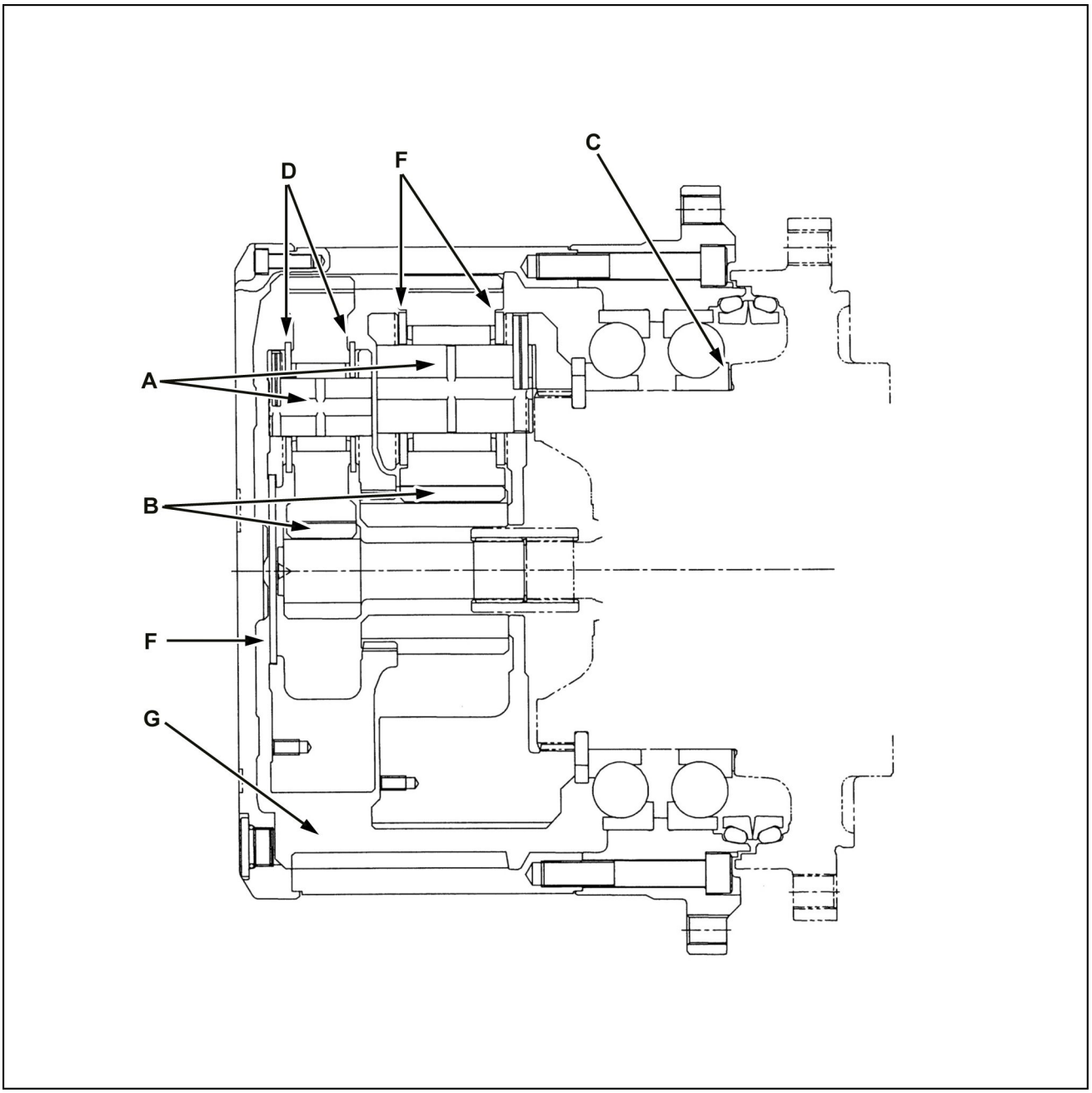
Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

Items to prepare:

- Box wrenches [**19 mm**, **36 mm**]
- Wrenches [**19 mm**, **27 mm**, **41 mm**]
- Hammer (to remove the master pin)
- Striking jig (to remove the master pin)
- Lifting equipment (with the required lifting capacity)
- Wire rope (with the required breaking load)
- **LOCTITE® 262™**
- Wood planks, etc.
- Rag
- Cleaning fluid

Parts with specified maintenance standards



SMIL15CEX3540GB 3

Code	Item	Standard value	Permissible limit value	Solution
A	Planetary shaft wear	Smooth with no abnormal wear or seizing	←	Replace using a set of 3 parts.
B	Tooth surface and tooth base condition	Smooth with no abnormal wear or seizing	No pitching of D **1.6 mm** (**0.06 in**) or more, or no cracks in the tooth base.	Replace (Replace using a set of 3 planetary gears.)
C	Angular bearing **(2)** Inner race; thrust gap	**-0.08 mm** (**-0.003 in**) or more **0.02 mm** (**0.001 in**) or less	←	Shim adjustment
D	Thrust washer 1 **(18)** thickness	**3.3 - 3.7 mm** (**0.13 - 0.15 in**)	Wear of **0.1 mm** (**0.004 in**)	Replacement
E	Thrust washer 2 **(11)** thickness	**5.3 - 5.7 mm** (**0.21 - 0.22 in**)	Wear of **0.1 mm** (**0.004 in**)	Replacement
F	Thrust plate **(23)** thickness	**4.34 - 4.66 mm** (**0.17 - 0.18 in**)	Wear of **0.15 mm** (**0.01 in**)	Replacement
G	Gear oil	Initial **250 h 2000 h**. operating (hour meter)		Replacement

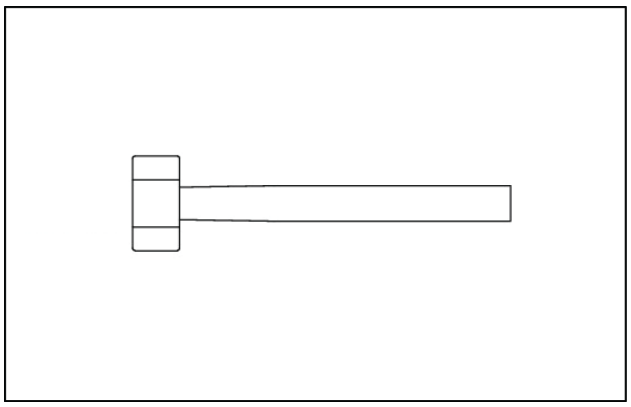
*1. Maximum gap **10 mm** (**0.39 in**)
Minimum gap **8.5 mm** (**0.33 in**)

*2. Maximum gap **0.7 mm** (**0.03 in**)
Minimum gap **0.3 mm** (**0.01 in**)

*3. 4 x 4 - **M10**, screw depth **16.0 mm** (**0.6 in**), bottom hole depth **18.0 mm** (**0.7 in**)

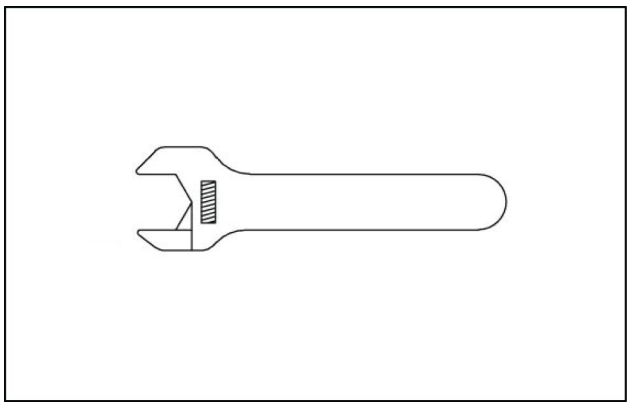
*4. 3 - **M16**, screw depth **22 mm** (**0.9 in**), bottom hole depth **27 mm** (**1.1 in**)

7. Hammer (plastic hammer) (Qty. 1)



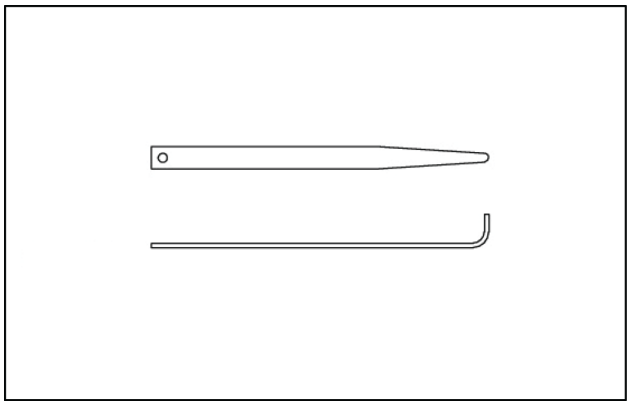
LPIL12CX02042AA 8

8. Monkey wrench (Qty. 1)



LPIL12CX02043AA 9

9. Scoop (Qty. 1 set)



LPIL12CX02044AA 10

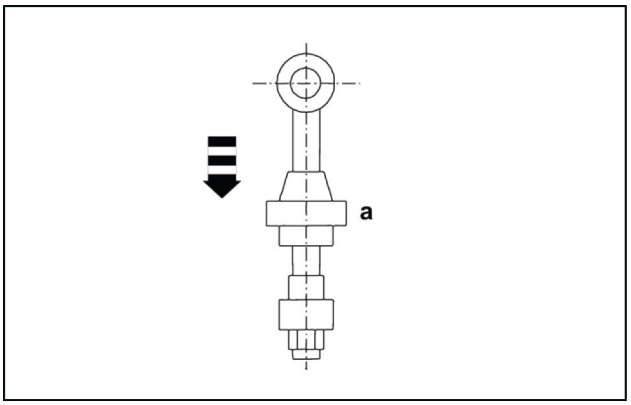
Wrench assembly (U1)

Part number: KRV10620

Application: Use for removal and installation of screw-type piston.

CAUTION:

- When assembling and disassembling with the cylinder secured vertically, work paying particular attention to the following points.
- In the work of removing the piston rod, the cylinder head may come out of the cylinder tube ahead of the piston due to friction with the packing, creating a condition in which there is space between the cylinder head and the piston.
- If the work is done in that state, the cylinder head may suddenly slip out and injure the operator.
- Always work with the cylinder head touching the piston.

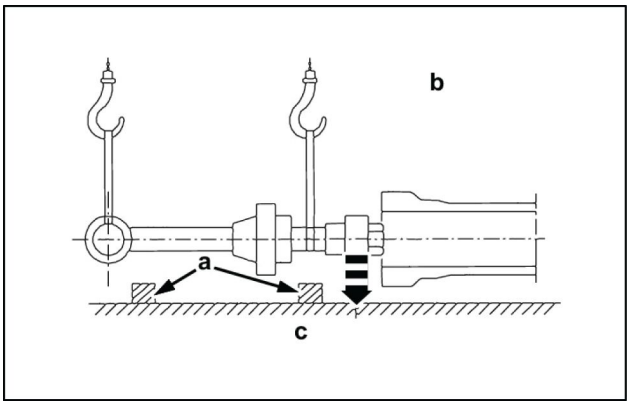


LPIL12CX02053AA 2

A. Beware of falling

CAUTION:

- When assembling and disassembling with the cylinder secured horizontally, work paying particular attention to the following points.
- In the work of removing the piston rod, there is a danger of the piston rod falling and damaging parts right after it is removed.
- Work carefully while holding the rod horizontal and in contact with the crossties.

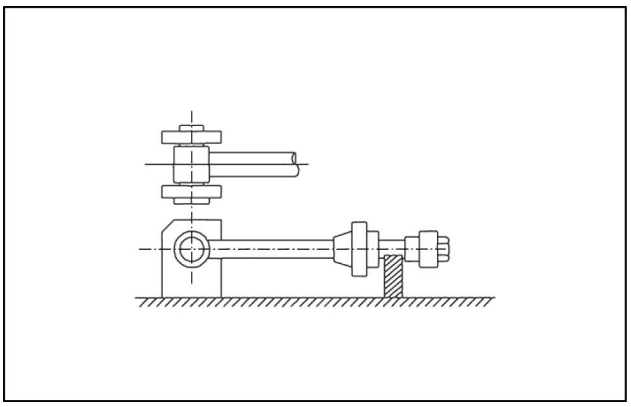


LPIL12CX02054AA 3

A. Crosstie
B. Working in the horizontal state
C. Beware of falling

Fasten the piston rod

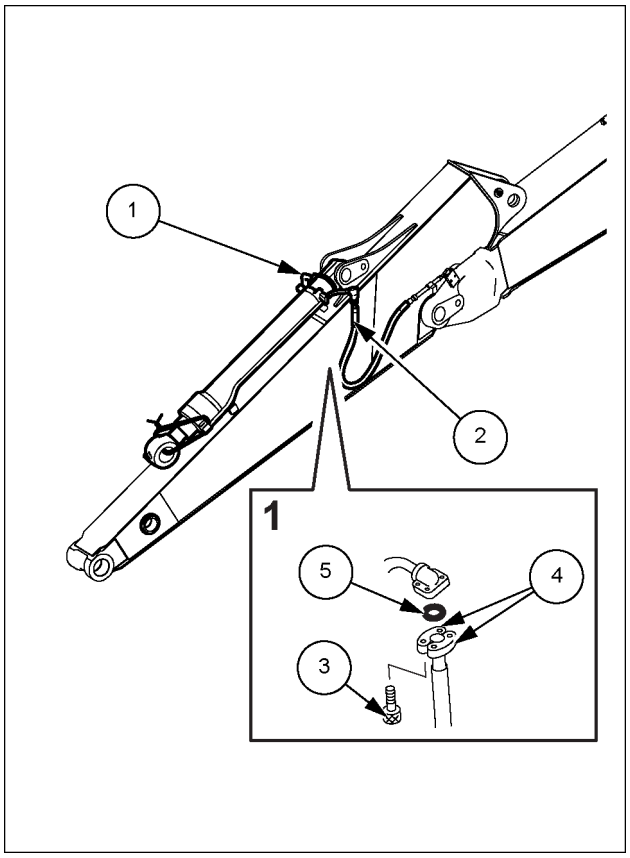
Use the rod head bolt width or pin hole to set up a rotation stopper.



LPIL12CX02055AA 4

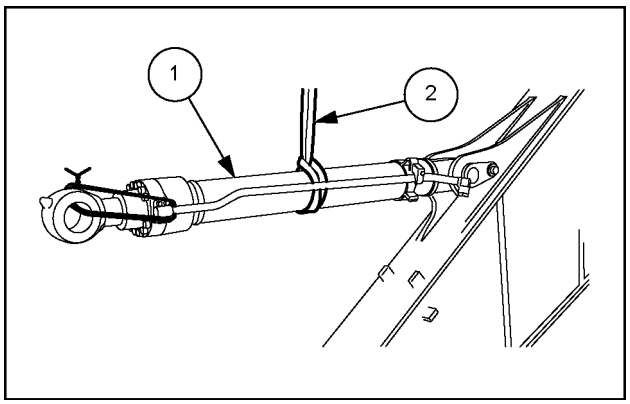
Problem	Possible Cause	Correction
Operation is unsteady	Air: There is air remaining in the cylinder	Perform air bleeding operation A. Cylinder with no air bleeding Bleed out the air by moving the cylinder back and forth a few times at low pressure and low speed B. Cylinder with air bleeding (air breather) After securing the machine so that the cylinder does not move, bleed the air from the air breather Reference The cylinder may extend or retract somewhat when the cylinder stops suddenly. This phenomenon occurs due to the compressibility of the hydraulic oil. This occurs particularly easily for cylinders with long strokes
The impact is high when switching over between extension and retraction	Pin bushing Pin: The gap between the installation section and the pin bushing is enlarged	Measure the pin and pin bushing dimensions and replace any part that exceeds its specified dimension
Cylinder sliding operations make sounds	Pin bushing Pin: The oil or grease feed is inadequate	Apply oil or grease
	Pin bushing Pin: There is seizing at matching section	Replace with a new part and apply oil or grease

7. Use a hexagon wrench [**8 mm**] to remove the 4 hexagon socket head bolts **(3)** from the hose **(2)**, and then remove the 2 split flanges **(4)** and O-ring **(5)**. Remove the hose **(1)** in the same way.
   - Use caps or plugs to cover the hoses and lines to prevent any entry of water, dust or dirt.
   - Clean the hoses and lines by spraying them with a parts cleaner to prevent scratches and prevent dirt from accumulating on the connectors.



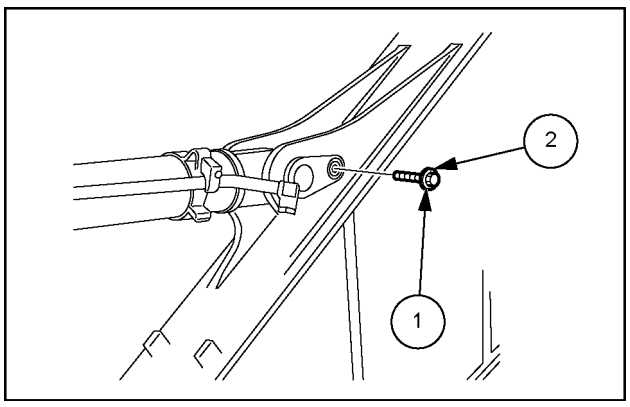
SMIL14CEX2145BB 7

8. Use a liftcrane and nylon sling **(2)** to fasten the bucket cylinder **(1)**.
   - Wrap the nylon sling to the inside of the line so that it is not crushed.



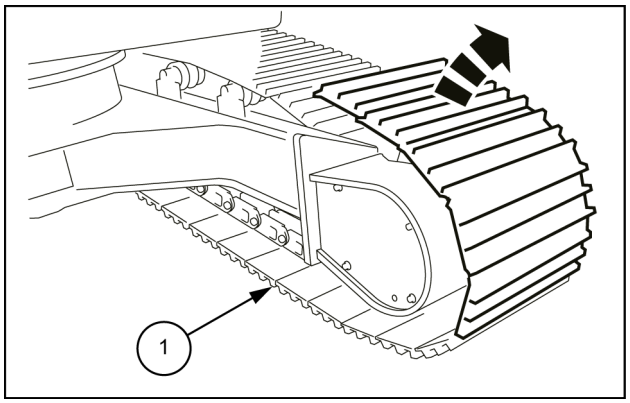
SMIL14CEX2146AB 8

9. Use a wrench [**30 mm**] to remove the bolt **(1)** and spacer **(2)**.



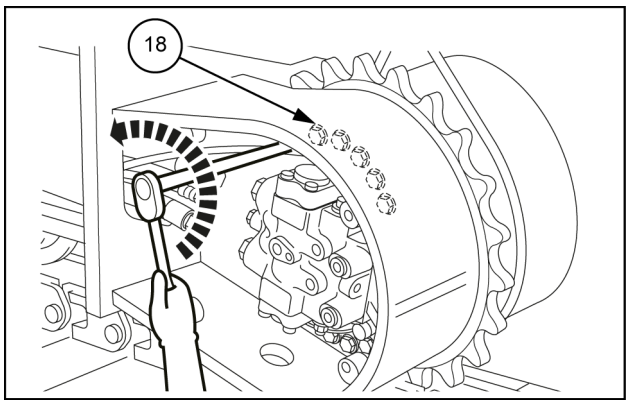
SMIL14CEX2147AB 9

6. Open the shoe **(1)** to the rear.



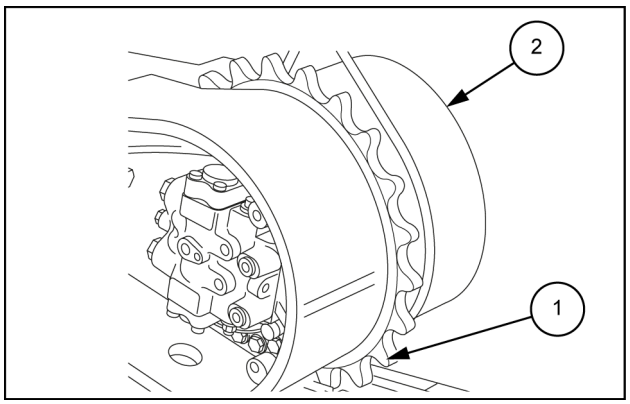
SMIL14CEX1308AB 6

7. Use a wrench [**30 mm**] to remove the 26 bolts **(18)**.



SMIL14CEX1309AB 7

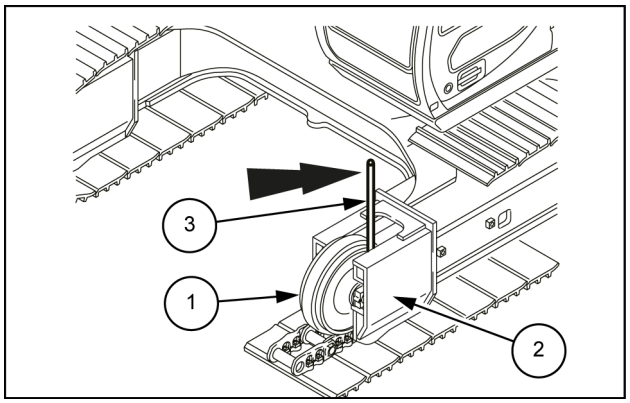
8. Remove the drive sprocket **(1)** from the travel motor **(2)** using a wire rope.



SMIL14CEX1310AB 8

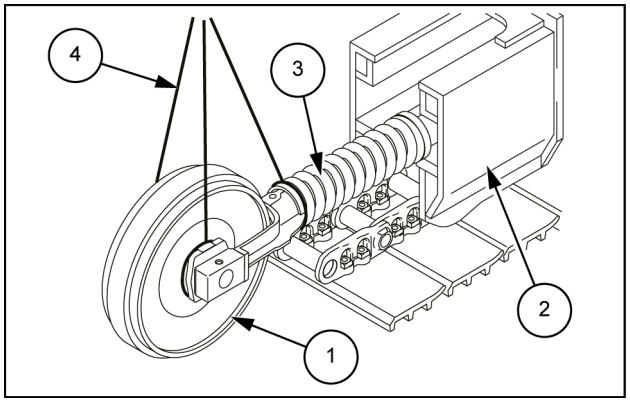
Track tension units - Remove

1. Remove the shoe assembly. See **Track chain - Remove (48.100)**.
2. Use a crowbar **(3)** to pull off the take-up roller **(1)** and recoil spring assembly from the side frame **(2)**.



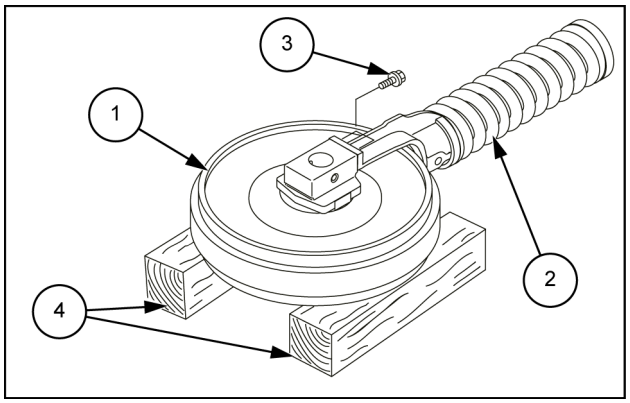
SMIL14CEX1311AB 1

3. Install the lifting equipment **(4)** on the take-up roller **(1)** and recoil spring assembly **(3)** and hang them from the side frame **(2)** with the lifting equipment.



SMIL14CEX1312AB 2

4. Place the take-up roller **(1)** and recoil spring assembly **(2)** onto wood planks **(4)** as in the diagram.
   Use a wrench [**24 mm**] to remove the take-up roller bolt **(3)** and separate the roller and the recoil spring assembly.

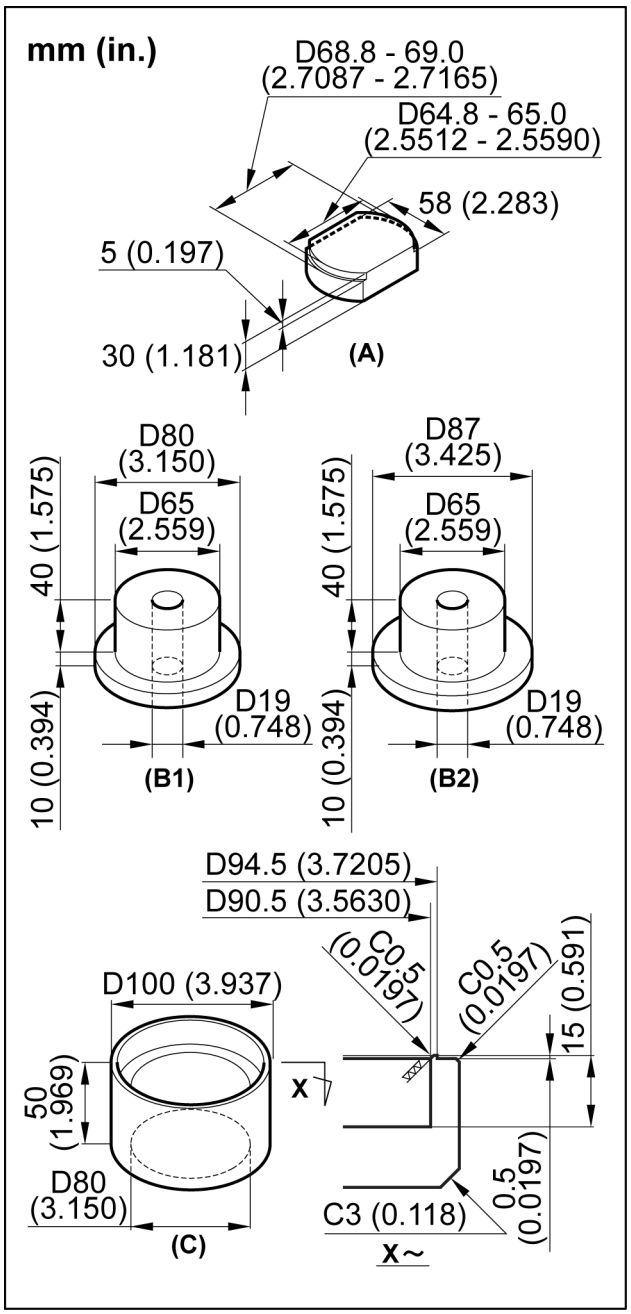


SMIL14CEX1313AB 3

Track support roller - Special tools

A. Bushing removal jig
B1. For bushing **(9)** press-fit jig
B2. For bushing **(7)** press-fit jig
C. Floating seal installation jig

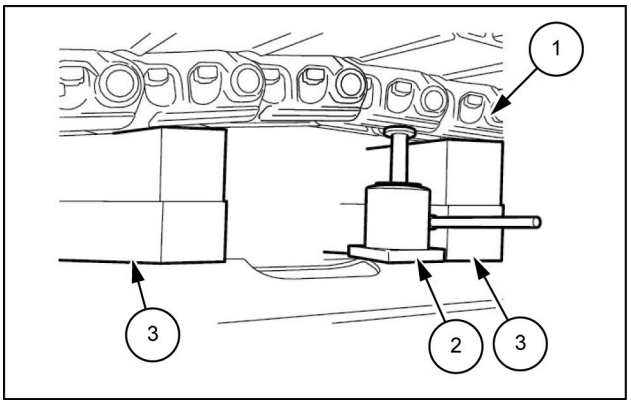
NOTE: *All the dimensions in figure are in mm (in).*



SMIL14CEX1258CA 1

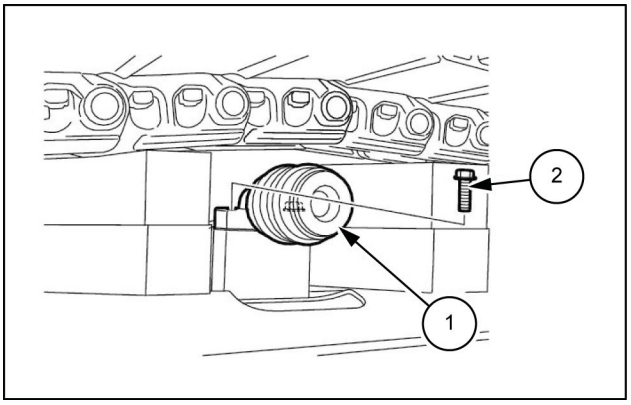
Track support roller - Install

1. Use a jack **(2)** to lift the top of the shoe **(1)**, and then insert wood planks **(3)**.



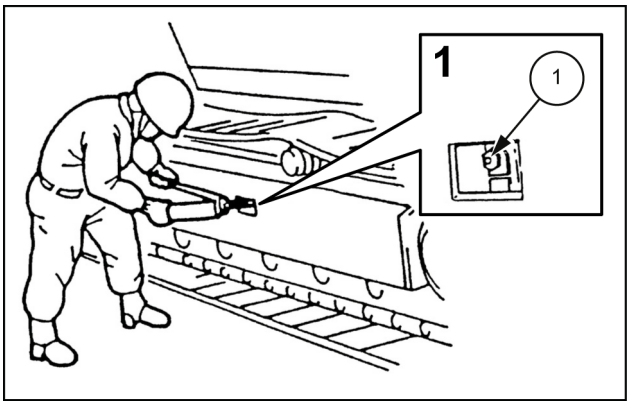
LPIL12CX01240AB 1

2. Use a box wrench [**30 mm**] to install the 4 bolts **(2)**, and then install the upper roller **(1)**.
   - Apply **LOCTITE®**.
   - Bolt **(2)** tightening torque: **521 - 608 N·m** (**384.27 - 448.44 lb ft**)



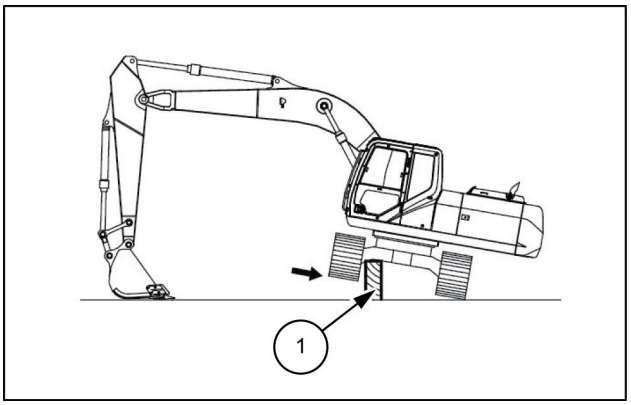
LPIL12CX01239AB 2

3. Tighten the check valve **(1)**.
   While monitoring the track shoe tension, inject grease into the grease cylinder.



SMIL15CEX3626AB 3

4. To adjust the track shoe tension, raise the lower side frame as shown in the diagram.
   Place a wood plank **(1)** or the like under the lower frame to prevent falling.



LPIL12CX03703AB 4

Air conditioning - Service instruction - Work procedures

Air conditioner refrigerant filling

The air conditioner refrigerant filling is divided into the “vacuum operation" and the "gas filling operation".

1. The "vacuum operation" consists of eliminating moisture in the air conditioner circuit.
   If there is any moisture left inside the air conditioner circuit, various problems may occur during operation such as freezing in the small hole of the expansion valve causing the circuit to clog and rust developing in the circuit.
   For this reason, perform vacuuming before filling the circuit with refrigerant. This operation consists of eliminating moisture inside the circuit through boiling and evaporation.
2. The "gas filling operation" consists of filling the circuit with refrigerant after the vacuum operation.
   Gas filling does not only affect the cooling capabilities of the air conditioner, it also affects the life of the parts which make up the circuit.
   Severely overfilling the circuit will cause pressure inside the circuit to be abnormally high, and this will cause reductions in the cooling ability of the air conditioner.
   Additionally, if pressure is extremely low, the circulation of lubricating oil within the compressor will be poor and this will cause seizing with sliding parts of the compressor.
   Because the gas filling operation itself involves handling high-pressure gas, performing the operation using an incorrect procedure is very dangerous.
   Follow the operation and observe all precautions indicated in this text to correctly perform refrigerant filling.

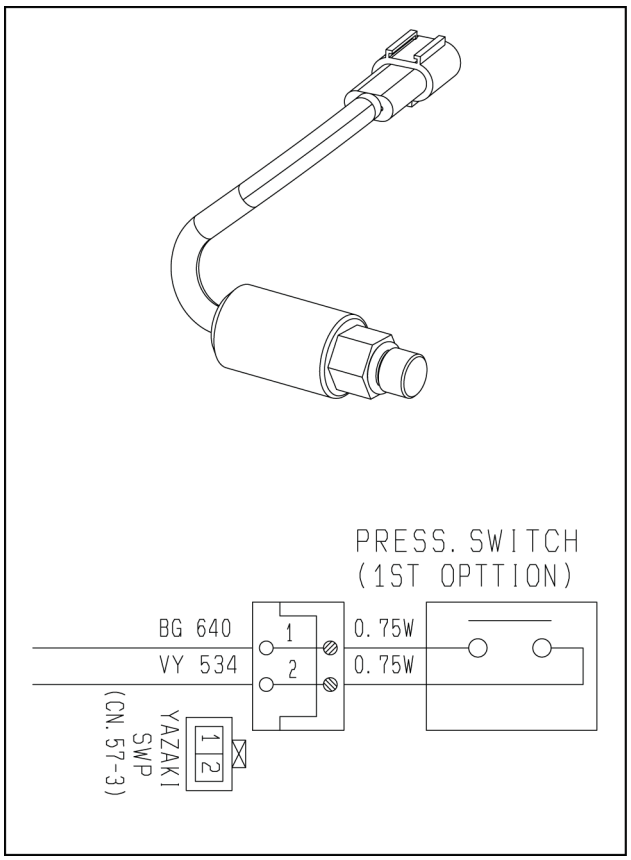
Operation chart

Vacuuming operation	Vacuuming start	**30 min** or longer (**750 mm Hg** (**29.5 in Hg**) or less)
	↓	
	Vacuuming stop	Let sit for **5 min**
	↓	
	Airtightness check	Gauge display abnormality (connectors check and repair)
	↓	
Refrigerant filling operation	Refrigerant filling	Fill with refrigerant gas up to a gauge pressure of **0.098 MPa** (**14.215 psi**).
	↓	
	Gas leak check	
	↓	
	Refrigerant filling	

Pressure switch (option) (2nd option)

Specification: **0.49 MPa** (**71.07 psi**)

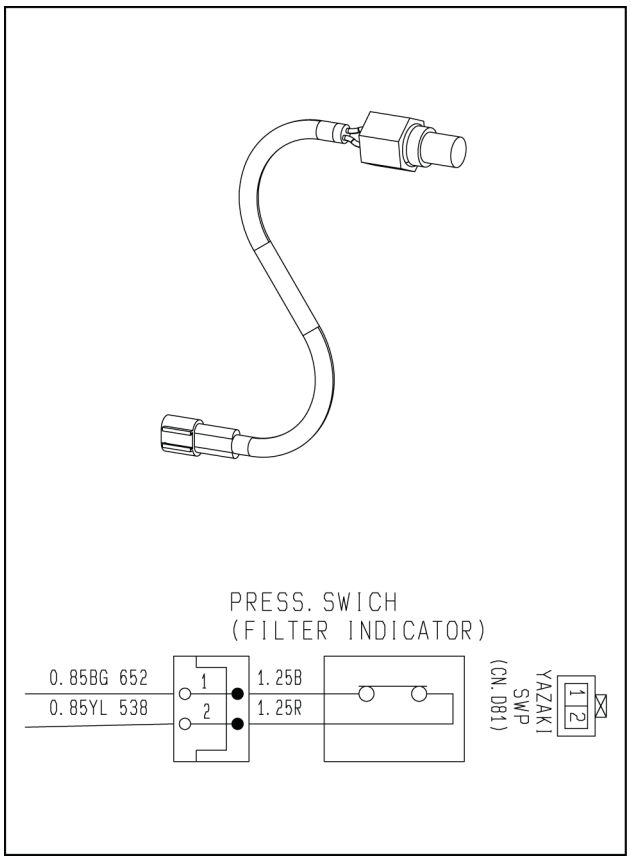
Part No.: KHR21490



SMIL15CEX3761BA 45

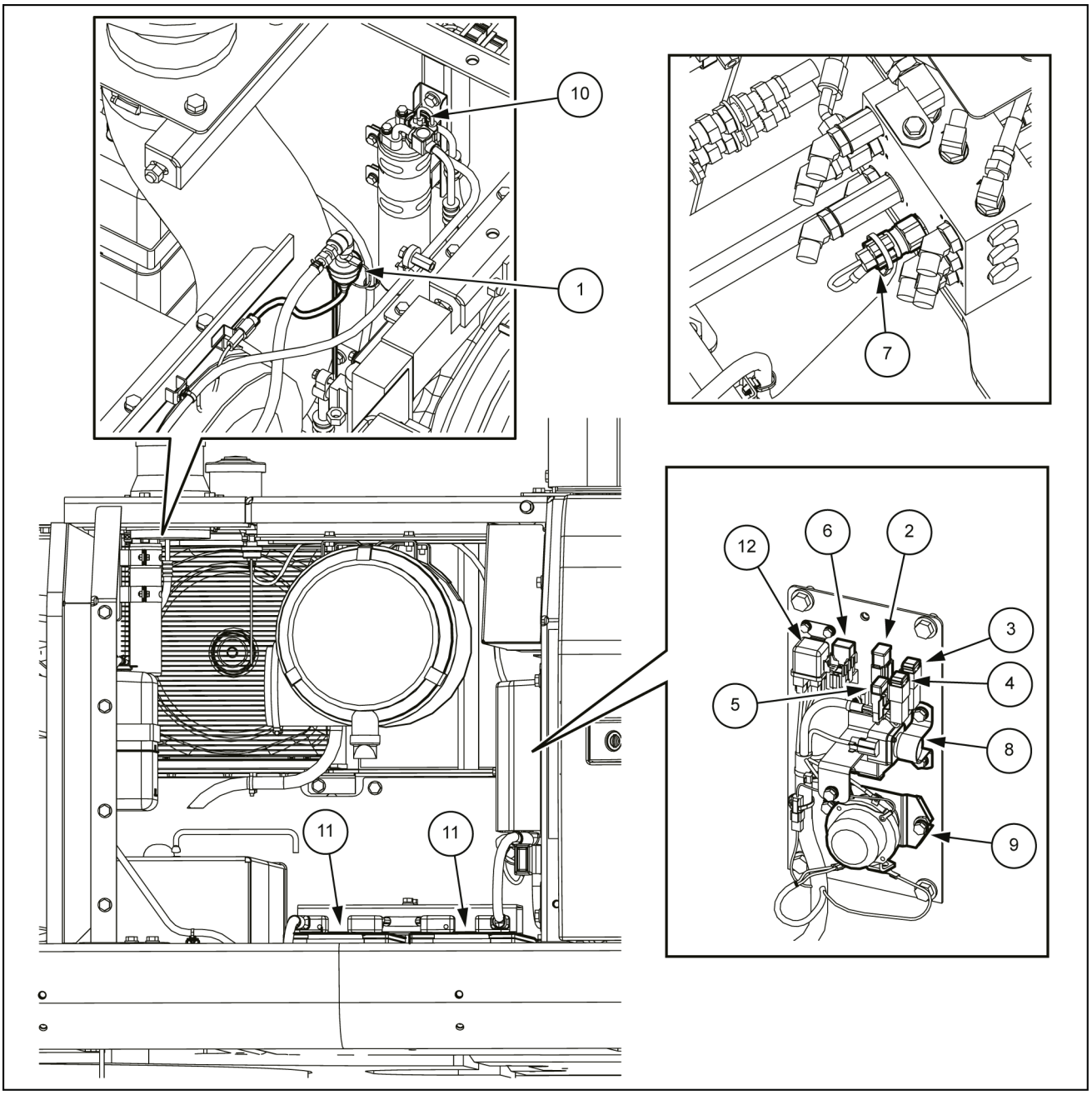
Pressure switch (filter)

Part No.: KHR14470



SMIL15CEX3762BA 46

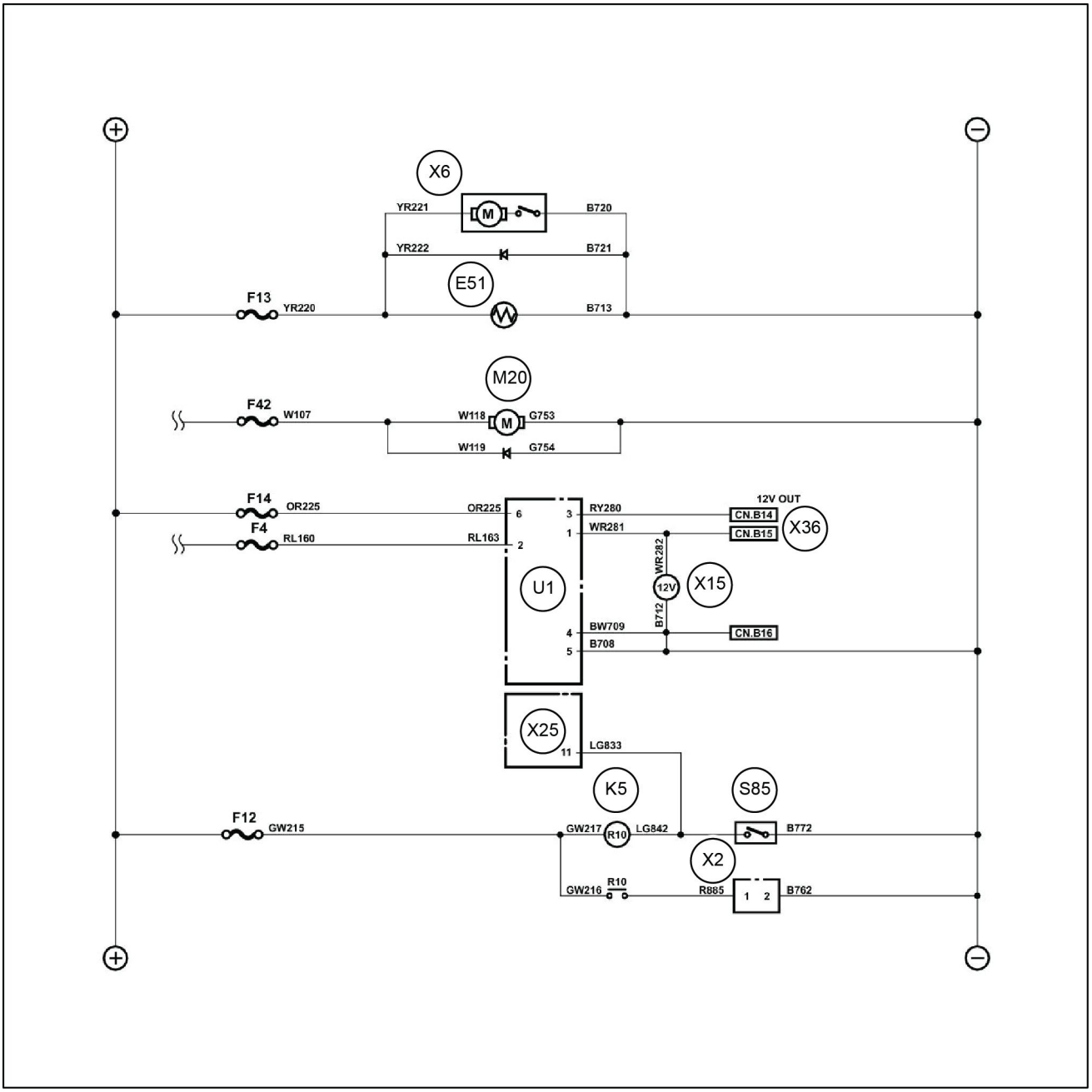
Main unit left side layout diagram (radiator chamber)



SMIL15CEX3498GB 2

1. Air cleaner sensor
2. Fusible link: Fuse box **65 A**
3. Fusible link: Safety relay **60 A**
4. Fusible link: Backup **50 A**
5. Fuse: Computer **15 A**
6. Changeover relay
7. Swing pilot pressure sensor
8. Starter relay
9. Battery relay
10. Receiver dryer sensor
11. Battery
12. Glow relay

Other



LPIL12CX04878GB 10

Wiring harnesses - Electrical schematic sheet 02 - Starting circuit

Type	Component	Connector / Link	Description
Voltage source	G1		Battery
Voltage source	G1A		Battery
Voltage source	G2		Alternator
Relay	K2		Glow plug relay
Relay	K7		Battery relay
Relay	K69		Starter relay
Motor	M1		Starter motor
Solenoid	R1		Glow plug
Switch	S94		Battery switch
Connector	CN.D11	**CN.D11**	Engine harness H
Connector	CN.D13	**CN.D13**	Alternator B
Connector	CN.D14	**CN.D14**	Alternator L/R
Connector	CN.D15	**CN.D15**	Alternator E
Connector	CN.D16	**CN.D16**	Alternator ground
Connector	CN.D18	**CN.D18**	Battery relay IGN
Connector	CN.D19	**CN.D19**	Battery relay IGN
Connector	CN.D20	**CN.D20**	Battery relay coil 1
Connector	CN.D21	**CN.D21**	Battery relay coil 2
Connector	CN.D22	**CN.D22**	Battery relay ground
Connector	CN.D27	**CN.D27**	Starter relay
Connector	CN.D28	**CN.D28**	Starter relay
Connector	CN.D29	**CN.D29**	Glow plug relay
Connector	CN.D30	**CN.D30**	Glow plug relay
Connector	CN.D31	**CN.D31**	Glow plug relay

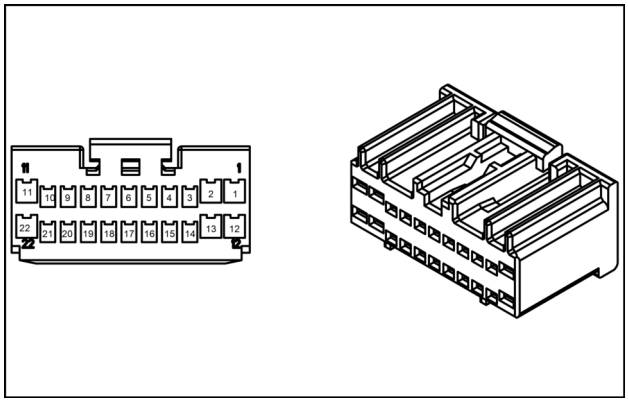
Wiring harnesses - Electrical schematic sheet 15 - Engine-sensors

Type	Component	Connector / Link	Description
Sensor	B2		Hydraulic oil temperature sensor
Switch	B22		Swing pilot pressure switch
Sensor	B26		Upper pilot pressure sensor
Sensor	B27		Travel pilot pressure sensor
Sensor	B40		Pump pressure sensor (Nega-Cont.2)
Sensor	B42		Pump pressure sensor (P1)
Sensor	B43		Pump pressure sensor (Nega-Cont.1)
Sensor	B44		Pump pressure sensor (P2)
Sensor	B45		HBCV pressure sensor
Sensor	B83		Pressure sensor (pilot arm close)
Sensor	R5		Fuel level sensor
Connector	CN.D45	**CN.D45**	Pressure sensor P1
Connector	CN.D46	**CN.D46**	Pressure sensor P2
Connector	CN.D47	**CN.D47**	Pressure sensor N1
Connector	CN.D48	**CN.D48**	Pressure sensor N2
Connector	CN.D49	**CN.D49**	Swing pilot pressure switch
Connector	CN.D50	**CN.D50**	Upper pilot pressure sensor
Connector	CN.D51	**CN.D51**	Travel pilot pressure sensor
Connector	CN.D52	**CN.D52**	HBCV Harness
Connector	CN.D54	**CN.D54**	Pilot arm close pressure sensor
Connector	CN.D56	**CN.D56**	Hydraulic oil temperature sensor
Connector	CN.D57	**CN.D57**	Fuel level sensor
Connector	CN.G6	**CN.G6**	HBCV pressure sensor

Wiring harnesses - Electrical schematic sheet 28 - Main cab-ECM inter connector

Type	Component	Connector / Link	Description
Connector	CN.A23	**CN.A23**	To controller C
Connector	CN.A38	**CN.A38**	ECM joint connector
Connector	CN.A39	**CN.A39**	Joint computer
Connector	CN.A40	**CN.A40**	Joint ground
Connector	CN.A51	**CN.A51**	Cab main harness B
Connector	CN.A52	**CN.A52**	Cab main harness C
Connector	CN.A53	**CN.A53**	Cab main harness D

CONNECTOR CN.A4 – COMPUTER A 4 (22-PIN) (Male)



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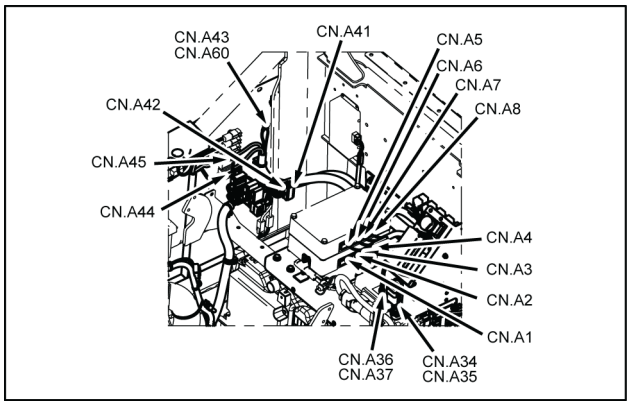
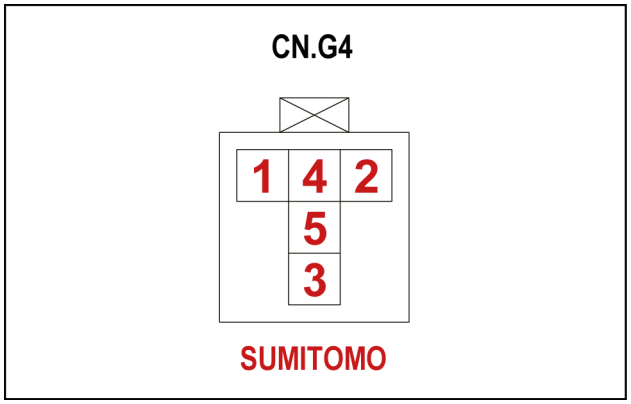


SMIL14CEX4436AA 8

Pin	From	Wire	Description	Color-Size	Frame
1	SP-108-P-X	108		W - 1.25	**SHEET 19**
2	SP-601-P-X	601		BG - 1.25	
3	SP-803-P-X	803		Br - 0.85	
4	CN.A55-P-3	801		L - 0.75	
5	SP-701-P-X	701		B - 0.85	
6	CN.A55-P-2	800		W - 0.75	
7	CN.A55-P-4	802		Y - 0.75	
8	CN.A11-P-2	804		O - 0.85	**SHEET 32**
12	SP-108-P-X	108A		W - 1.25	**SHEET 19**
13	SP-601-P-X	601A		BG - 1.25	
14	CN.A57-P-3	805		YR - 0.75	**SHEET 17**
15	CN.A57-P-2	806		LY - 0.75	**SHEET 19**
16	SP-701-P-X	701A		B - 0.85	
17	CN.A10-P-2	808		YL - 0.85	**SHEET 29**
18	CN.A55-P-8	807		WL - 0.85	**SHEET 19**
19	CN.A44-M-P-6	809		V	

Pin	From	Wire	Description	Color-Size	Frame
55	CN.D7-M-P-2	366		GW - 0.75	**SHEET 09**
56	CN.D10-P-18	317		L - 0.75	
57	CN.D7-M-P-6	311		R - 0.75	**SHEET 08**
58	CN.D7-M-P-14	691a		BW - 0.85	
60	SP-396-P-X	397		RW - 0.75	**SHEET 09**

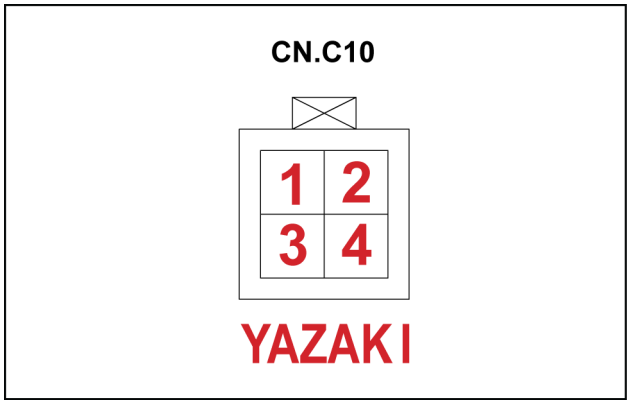
CONNECTOR CN.G4 – RELAY PUMP (Male)



SMIL15CEXY814AA 77

Pin	From	Wire	Description	Color-Size	Frame
1	SP-847-P-X	866		VR - 0.85	**SHEET 16**
2	SP-764-P-X	758C		B - 0.85	
3	SP-250-P-X	215D		GW - 1.25	
5	CN.G7-P-2	915		LR - 1.25	

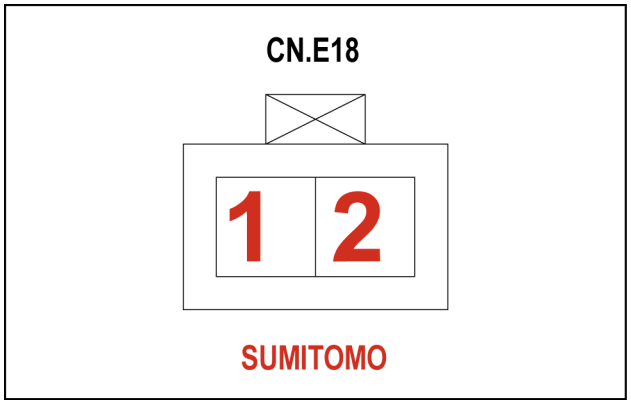
CONNECTOR CN.C10 (Female)



SMIL14CEX4222AA 37

Pin	From	Wire	Description	Color-Size	Frame
1	CN.C24-P-2	984		YB - 0.85	**SHEET 26**
2	CN.C25-P-2	985		LB - 0.85	
3	CN.C24-P-1	982		BY - 0.85	
4	CN.C25-P-1	983		BL - 0.85	

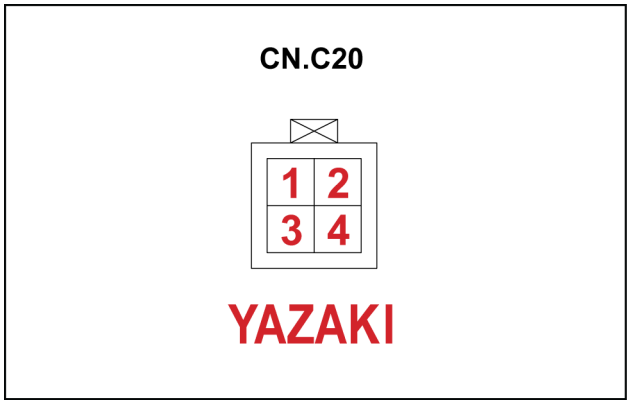
CONNECTOR CN.E18 – INJECTOR 6 (NO. 4) (Female)



SMIL15CEX5309AA 60

Pin	From	Wire	Description	Color-Size	Frame
1	SP-499-P-X	376D		B – 1.25	**SHEET 10**
2	CN.E21M-P-10	385B		P – 1.25	

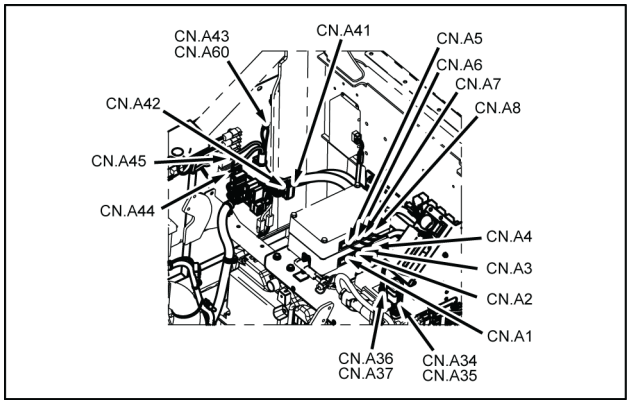
CONNECTOR CN.C20 – TO CAMERA 3: (4-PIN) (Male)



SMIL14CEX4227AA 30

Pin	From	Wire	Description	Color-Size	Frame
1	SP-960A-P-X	970		R	**SHEET 37**
2	SP-961A-P-X	971		B	
3	CN.C4-P-3	972A		YR	**SHEET 24**
4	CN.C4-P-13	973A		WR	

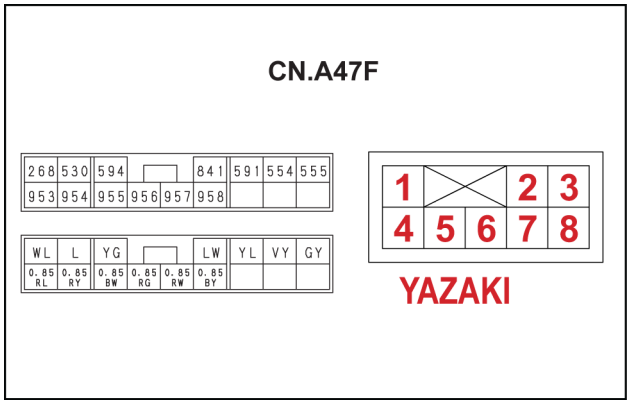
CONNECTOR CN.A34F – CAN-H: (1-PIN) (Female)



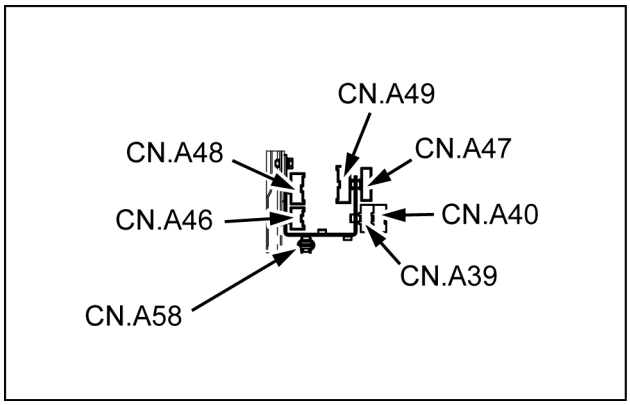
SMIL14CEX4436AA 4

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A41-M-P-10	040K		P	**SHEET 23**

CONNECTOR CN.A47 – CONSOLE HARNESS B: (8-PIN) (Female)



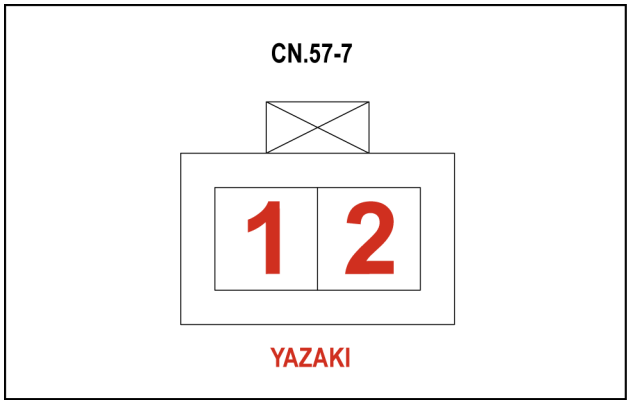
SMIL14CEX4426AA 14



SMIL14CEX4437AA 15

Pin	From	Wire	Description	Color-Size	Frame
1	CN.A2-P-15	530		L - 0.85	**SHEET 20**
2	CN.A45-M-P-14	594B		YG - 0.85	**SHEET 24**
3	CN.A57-P-6	850		G - 0.85	**SHEET 17**
4	CN.A57-P-7	851		O - 0.85	
5	CN.A16-P-2	841		LW - 0.85	**SHEET 30**
6	CN.A45-M-P-12	591B		YL - 0.85	**SHEET 24**
7	CN.A57-P-8	852		GL - 0.85	**SHEET 17**
8	CN.A57-P-9	853		OL - 0.85	

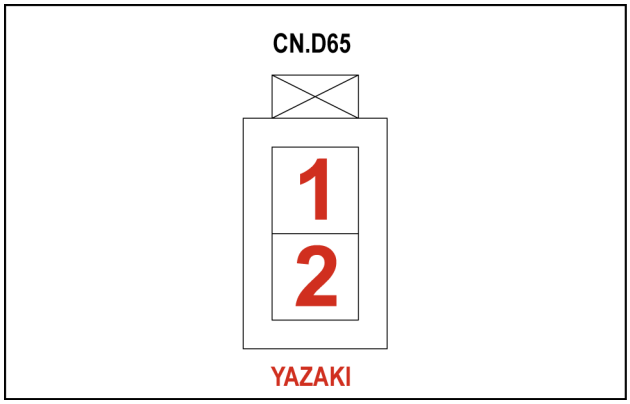
CONNECTOR CN.57-7 – OPTION 2 KNOB (L) -R SOLENOID VALVE: (2-PIN) (Female)



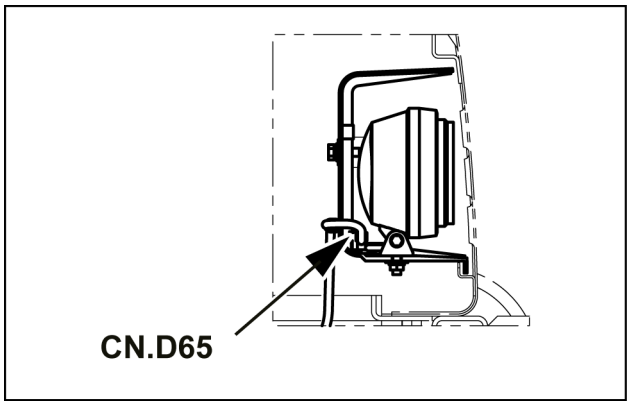
SMIL15CEX9451AA 12

Pin	From	Wire	Description	Color-Size	Frame
1	SP446-P-X	264A		R - 0.75	**SHEET 17**
2	SP447-P-X	852D		B - 0.75	

CONNECTOR CN.D65 – LAMP (HOUSING): (2-PIN) (Female)

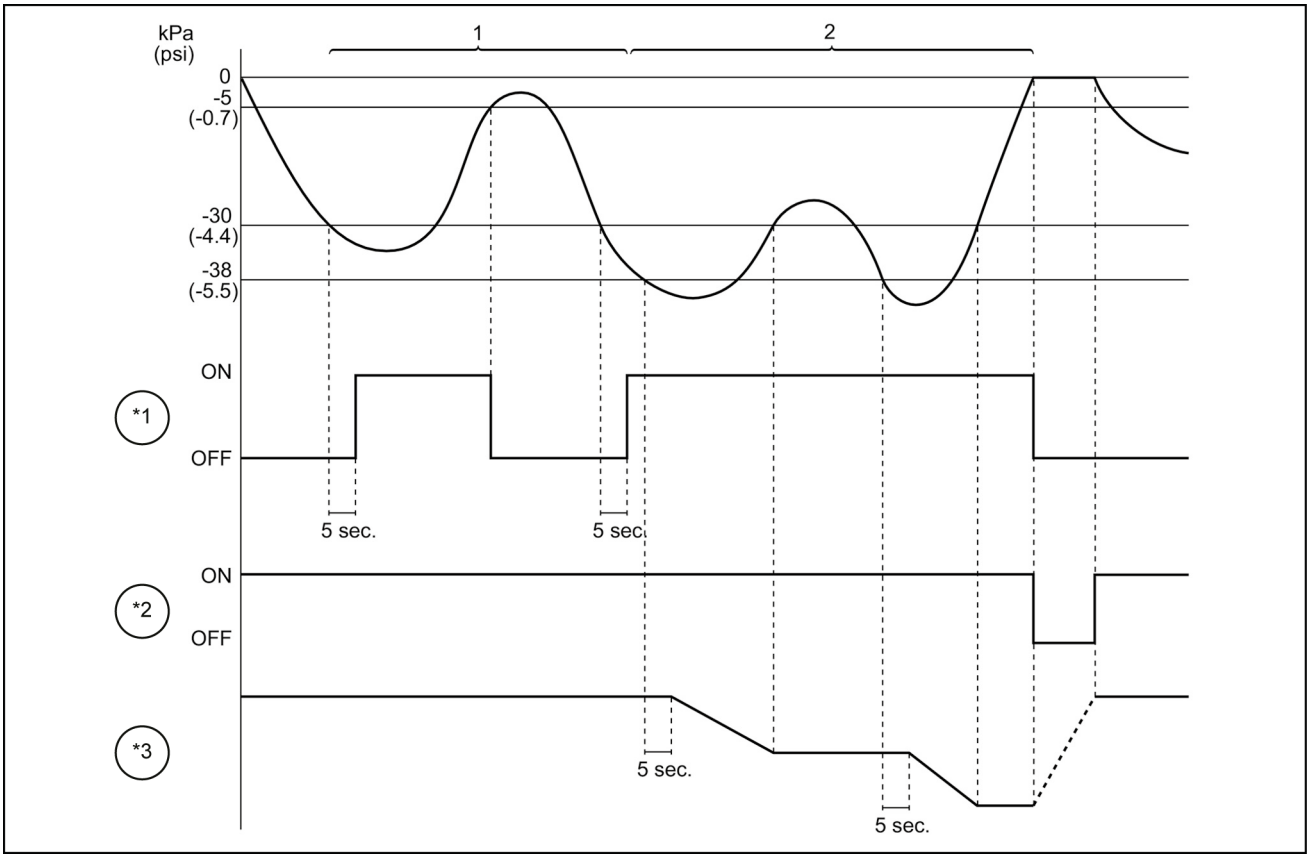


SMIL15CEX9383AA 9



SMIL15CEXY764AA 10

Pin	From	Wire	Description	Color-Size	Frame
1	SP-870-P-X	870C		Y - 1.25	**SHEET 12**
2	SP-700E-P-X	757		B - 1.25	



SMIL15CEX3475FB 10

*1 Warning
*2 Starter switch
*3 Engine speed (min-1)

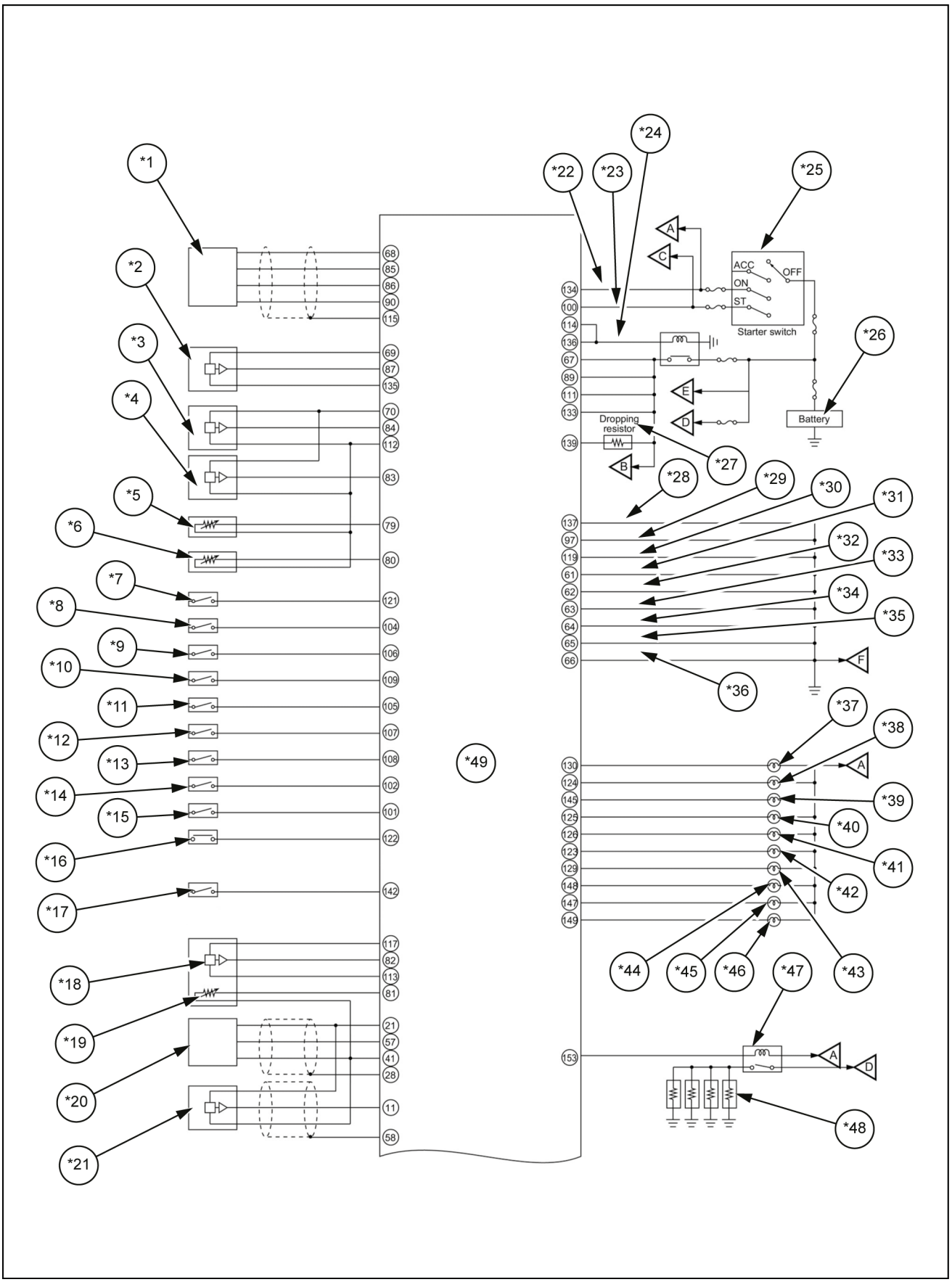
1. 1st stage
2. 2nd stage

Fuel system air bleeding

Place a suitable drip pan under the air bleed plug.
Turn the starter switch “ON” to operate the charge fuel pump.
Sufficiently loosen the fuel filter air bleed plug and operate the priming pump at least 20 times until fuel begins to spill out from near the plug.
Tighten the plug and operate the priming pump at least 10 times until fuel is fully filled.

Wait for approx. **1 min**, and then loosen the plug to remove the air in the fuel filter.
This should be repeated at least 3 times until no air comes out from the plugs.

Securely tighten each plug, and wipe up any fuel spilled in the vicinity.
Operate the priming pump 10 - 15 timesuntil the fuel permeates and then is fed to the engine.



SMIL15CEX3494HB 1

*1. Throttle position sensor
*2. Barometric pressure sensor
*3. DPD differential pressure sensor
*26. Battery
*27. Dropping register
*28. Case ground

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FUNCTIONAL DATA

SERVICE

Also, perform functional diagnosis inspection, check operations and control in each area, and repair any abnormalities.

Engine stalling - Symptoms

The engine cranks but does not start for a long time.

The engine starts after a while or it starts but stops immediately.

Engine stalling - Diagnosis

Preliminary inspection

Before using this section, perform a functional inspection and OBD system check to check all of the following items.

Check whether there is an excessive load on the actual machine.

The ECM and monitor are operating correctly.

CKP sensor abnormalities are not diagnosed unless the crank rotates at least 14 times. Crank the engine for **14 s**. or more at **60 RPM**.

Check DTCs.

CKP sensor diagnostic trouble codes may not be detected for CKP sensor problems during low rotation of the engine.

For intermittent trouble, increase the engine speed to the maximum with no load and check whether a CKP sensor related diagnostic trouble code is detected.

The scan tool data is within the normal operation range. Check the condition of the actual machine and find applicable symptoms.

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

Check whether there is any fuel.

Visual inspection

Some symptoms detection procedures require careful visual inspection.

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

The following items are included in this inspection.

Check for connector connection problems.

Especially important for CKP and CMP sensors.

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

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

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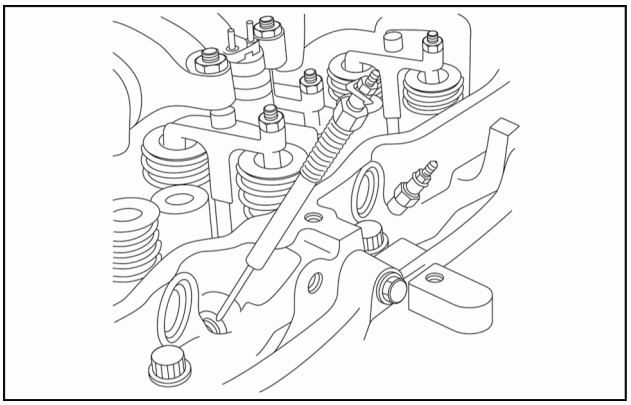
Alternator - 301

Glow plug system - Install

1. Install the glow plug on the cylinder head assembly.

   Tightening torque: **20 N·m** (**14.75 lb ft**)

   ⚠ CAUTION: Be careful not to tighten beyond the specified torque.

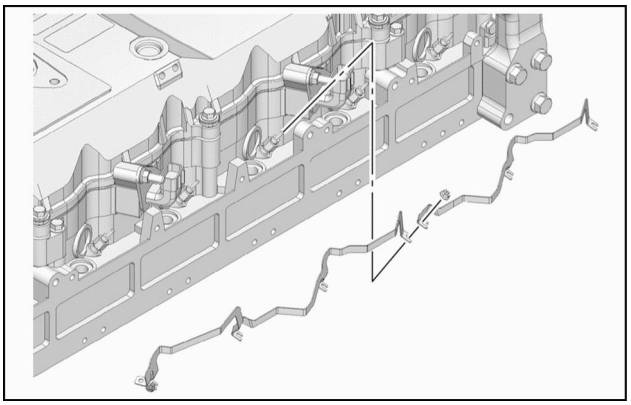


SMIL14CEX2998AA 1

2. Install the glow plug connector on the glow plug.

   Tightening torque: **1 N·m** (**0.74 lb ft**)

   ⚠ CAUTION: Check that the glow plug connector is not interfering with peripheral parts.



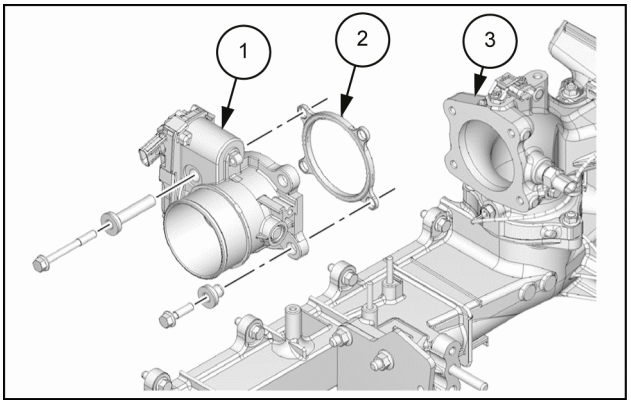
SMIL14CEX2997AA 2

Installing the intake throttle valve

1. Install the gasket **(2)** and the intake throttle valve **(1)** on the inlet pipe **(3)**.

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

2. Install the air duct on the intake throttle valve **(1)**.

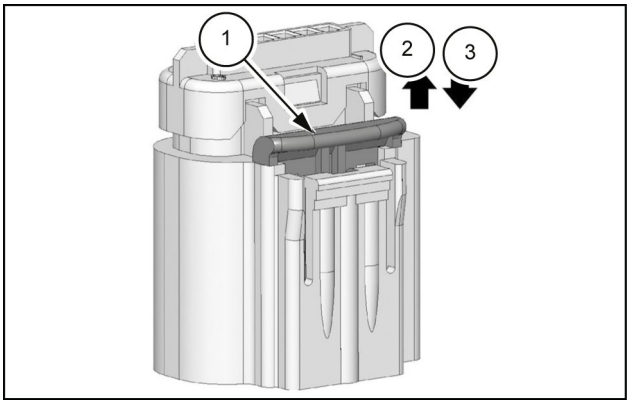


SMIL14CEX2994AB 3

3. Connect the harness connector to the intake throttle valve.

NOTE: *Connect the harness connector, and then push in the lock operation section **(1)** to lock.*

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



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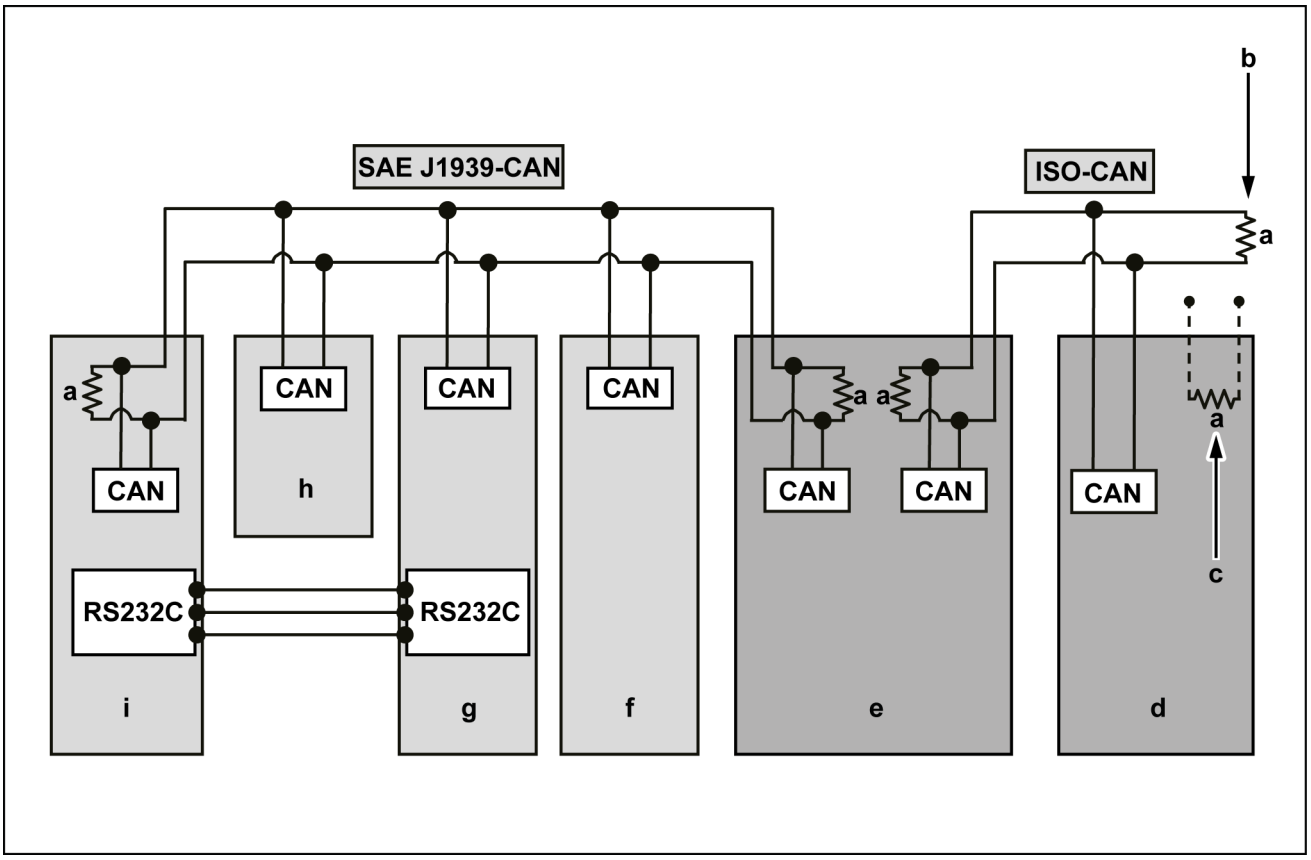
Exhaust Gas Recirculation (EGR) electrical system - 989

Electrical component connection

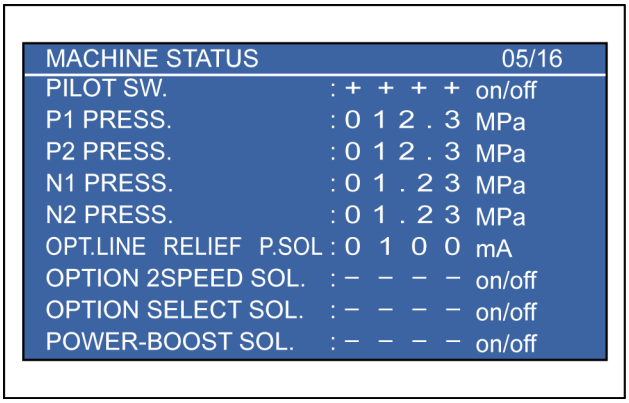


SMIL15CEX3454FA 2

a. Terminator
b. CX250C: The terminator is located near the VGT computer
c. CX300C/CX350C: The terminator is located near the VGT computer
d. VGT computer
e. ECM
f. Computer A
g. Computer B
h. AC computer
i. Monitor

5. Pressure and solenoid

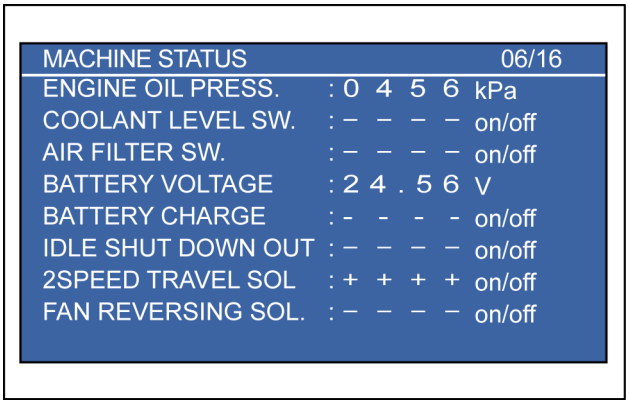
PILOT SW.	on/off	Pilot operation switch
P1 PRESS.	MPa (psi)	P1 pressure
P2 PRESS.	MPa (psi)	P2 pressure
N1 PRESS.	MPa (psi)	N1 pressure
N2 PRESS.	MPa (psi)	N2 pressure
OPT.LINE RELIEF P.SOL.	mA	Actual milli-amp for option relief pressure proportional valve
OPTION 2SPEED SOL.	on/off	2 pumps flow solenoid
OPTION SELECT SOL	on/off	Option line attachment switchover solenoid
POWER-BOOST SOL	on/off	Pressure boost solenoid



SMIL14CEX0454AA 6

6. Engine

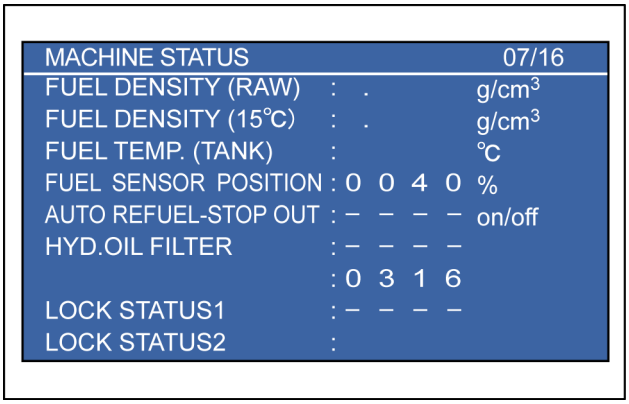
ENGINE OIL PRESS.	kPa (psi)	Engine oil pressure
COOLANT LEVEL SW.	on/off	Coolant level switch
AIR FILTER SW.	on/off	Air filter switch
BATTERY VOLTAGE	V	Battery voltage
BATTERY CHARGE	on/off	Battery charge
IDLE SHUT DOWN OUT	on/off	Idle shutdown output
2SPEED TRAVEL SOL.	on/off	Travel 2nd speed solenoid
FAN REVERSING SOL.	on/off	Fan reverse solenoid



SMIL14CEX0455AA 7

7. Fuel

FUEL DENSITY (RAW)	g/cm3	Fuel density (raw)
FUEL DENSITY (**15 °C** (**59 °F**))	g/cm3	Fuel density [**15 °C** (**59 °F**)) converted value]
FUEL TEMP. (TANK)	°C (°F)	Fuel temperature (inside tank)
FUEL SENSOR POSITION	%	Fuel level sensor
AUTO REFUEL-STOP OUT	on/off	Feed pump automatic stop output
HYD.OIL FILTER	on/off	Hydraulic oil filter switch
	MPa (psi)	Hydraulic oil filter return chamber side pressure
LOCK STATUS1	-	Password lock status 1
LOCK STATUS2	-	Password lock status 2



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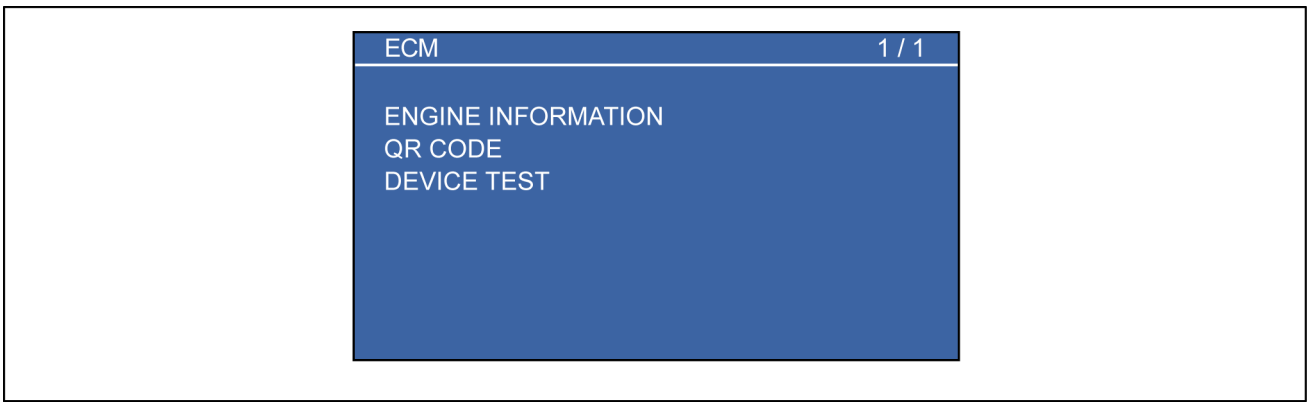
D-IN2 (Mute)	Radio mute switch
D-IN3 (Cam. Sel.)	-
D-IN4 (Door)	Door limit switch
D-IN5 (O-T Wiper)	One time wiper switch
D-IN6 (Spare1)	-
D-IN7 (Spare2)	-
D-IN8 (B.Charge)	-

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

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

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

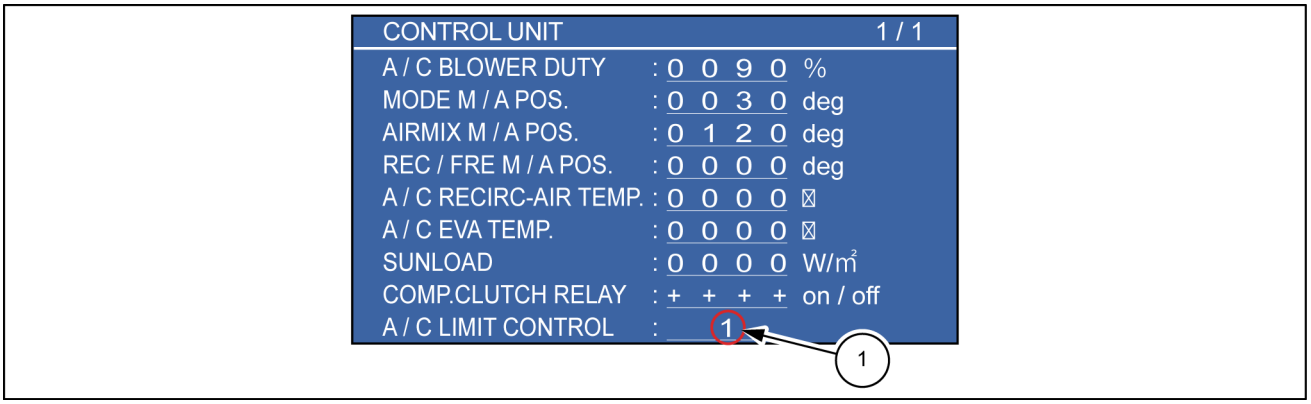
ECM



SMIL14CEX0543EA 12

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

Air-conditioner



SMIL14CEX0544EB 13

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

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

Operation explanation

1. When the key is turned “ON”, the coolant temperature gauge indicates the position of the coolant temperature range.
2. When the camera screen select switch is pressed to switch to the camera screen, the coolant temperature bar graph is displayed on the left side.
3. The meter and bar graph are not displayed if coolant temperature sensor trouble is detected.

Remarks

The coolant temperature ranges are shown in the table below.

Temperature	Meter indicator angle	Remarks
:	**180 °**	Red zone
107 °C (**224.6 °F**)	**180 °**	Red zone
106 °C (**222.8 °F**)	**175 °**	Red zone
105 °C (**221.0 °F**)	**166 °**	Red zone
100 °C (**212.0 °F**)	**135 °**	
94 °C (**201.2 °F**)	**90 °**	
73 °C (**163.4 °F**)	**45 °**	
50 °C (**122.0 °F**)	**16 °**	
38 °C (**100.4 °F**)	**0 °**	Blue zone
:	**0 °**	Blue zone

Instrument cluster - Install

To install, perform the reverse of the removal procedure.

Tighten bolts being installed to the specified torque.

For bolts for which the torque is not specified, refer to **Cab glazing - Torque (90.156)**.

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2. Refresh mode

In recirculate mode, when it is recognized that the refresh/recirculate select switch on the operation panel has been closed, the system goes into refresh mode. At this time, the display switches to refresh and the refresh/recirculate switch motor actuator operates to the refresh angle.

A. Refresh mode I.
When blow mode control is manual and is set to B/L or FOOT, the set temperature is set to **32 °C** (**89.6 °F**) (HOTMAX), and air flow control is manual and is set to Hi, the refresh angle (damper angle) operates to **67 °** (motor actuator angle **48 °**).

B. Refresh mode II.
When in a mode other than refresh mode I, the refresh angle (damper angle) operates to **30 °** (motor actuator angle **0 °**).

3. Operation stop judgment

A. The operation motor actuator stops when the current position comes within the target position range.

B. The stopped motor actuator operates when the current position goes beyond the target position range.

Refresh/recirculate mode and refresh/ recirculate display		
Refresh/ recirculate mode	Recirculate	Outside air
Panel display		

Blower amp control

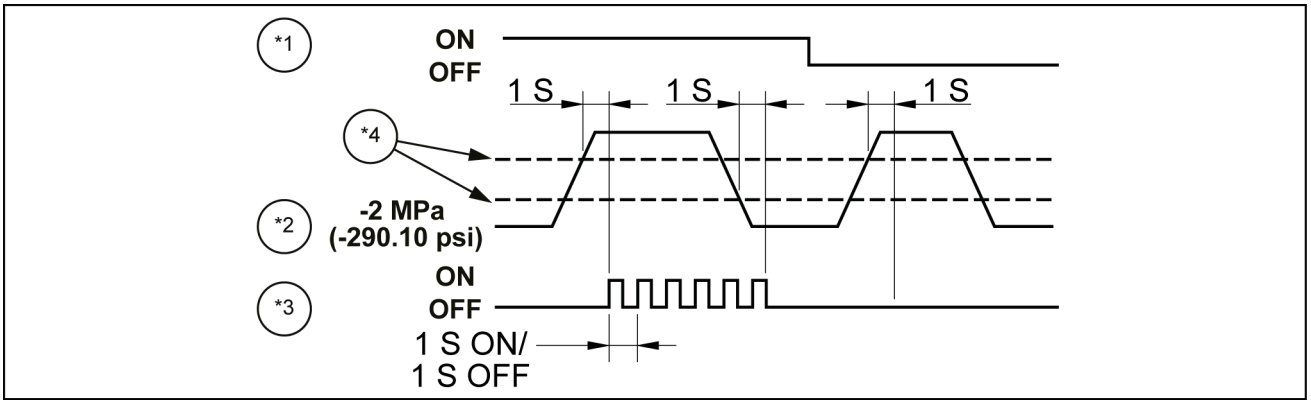
1. Summary explanation

The air flow is controlled by outputting to the blower amp connected in series with the blower motor.
The air flow is switched by varying the analog voltage output by changing the PWM output duty ratio and increasing or decreasing the blower motor speed.
There are 2 types of air flow control: auto air flow control and manual air flow control.
Also, in auto air flow control, the air flow is restricted by the cold blast prevention control etc.

2. Manual air flow control

Each time it is recognized that the air flow UP switch has been closed, the air flow is fixed to the next higher level of air flow from Lo → M1 → M2 → M3 → M4 → Hi.
When Hi is already displayed, the air flow is not changed.
In the same way, each time it is recognized that the air flow DOWN switch has been closed, the air flow is fixed to the next lower level of air flow from Hi → M4 → M3 → M2 → M1 → Lo. When Lo is already displayed, the air flow is not changed.
The same is true when air flow control is switched from auto to manual. For example, when AUTO M1 is displayed, if it is recognized that the air flow DOWN switch has been closed, the display becomes Lo and AUTO is no longer displayed.
Also, the change speed for air flow output switchover is the same as discussed for auto below.

Relationship between air flow and display during manual operation						
Air flow	Lo (minimum air flow)	M1	M2	M3	M4	Hi (maximum air flow)
Blower air flow %	40 %	46 %	54 %	64 %	80 %	100 %



SMIL15CEX3512EB 2

*1. Overload switch
*2. Boom bottom pressure
*3. Monitor buzzer
*4. Set pressure

3. "OVER LOAD" is displayed on the monitor.
The lamps etc. do not illuminate.

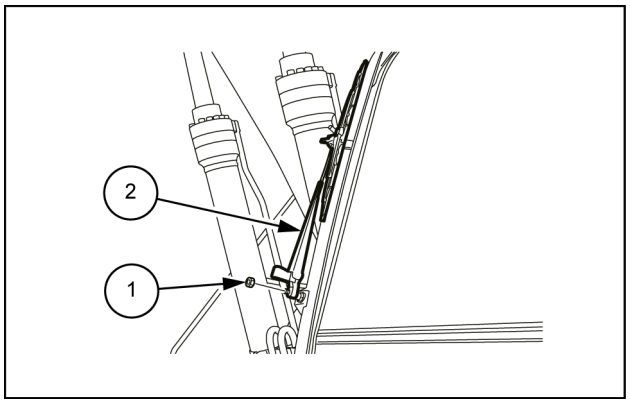
Boom bottom set pressure table

	Model	120 MPa (17406 psi)	150 MPa (21758 psi)	180 MPa (26109 psi)	200 MPa (29010 psi)	240 MPa (34812 psi)	290 MPa (42064 psi)	330 MPa (47867 psi)	450 MPa (65273 psi)	75 MPa (10879 psi)	125 MPa (18131 psi)	225 MPa (32636 psi)
ATT	STD	18.2 MPa (2640 psi)	16.6 MPa (2408 psi)	19.3 MPa (2799 psi)	19.6 MPa (2843 psi)	20.0 MPa (2901 psi)	20.6 MPa (2988 psi)	20.5 MPa (2974 psi)	21.5 MPa (3119 psi)	20.0 MPa (2901 psi)	16.5 MPa (2393 psi)	20.0 MPa (2901 psi)
	Rein-forced STD	18.2 MPa (2640 psi)	16.6 MPa (2408 psi)	19.3 MPa (2799 psi)	19.6 MPa (2843 psi)	20.0 MPa (2901 psi)	20.6 MPa (2988 psi)	20.5 MPa (2974 psi)	21.5 MPa (3119 psi)	20.0 MPa (2901 psi)	16.5 MPa (2393 psi)	20.0 MPa (2901 psi)
	LR	21.4 MPa (3104 psi)	16.6 MPa (2408 psi)	19.3 MPa (2799 psi)	22.7 MPa (3293 psi)	25.5 MPa (3699 psi)	20.6 MPa (2988 psi)	20.5 MPa (2974 psi)	21.5 MPa (3119 psi)	20.0 MPa (2901 psi)	16.5 MPa (2393 psi)	20.0 MPa (2901 psi)
	LONG	18.2 MPa (2640 psi)	16.6 MPa (2408 psi)	19.3 MPa (2799 psi)	19.6 MPa (2843 psi)	20.0 MPa (2901 psi)	20.6 MPa (2988 psi)	20.5 MPa (2974 psi)	21.5 MPa (3119 psi)	20.0 MPa (2901 psi)	16.5 MPa (2393 psi)	20.0 MPa (2901 psi)
	Rein-forced LONG	18.2 MPa (2640 psi)	16.6 MPa (2408 psi)	19.3 MPa (2799 psi)	19.6 MPa (2843 psi)	20.0 MPa (2901 psi)	20.6 MPa (2988 psi)	20.5 MPa (2974 psi)	21.5 MPa (3119 psi)	20.0 MPa (2901 psi)	16.5 MPa (2393 psi)	20.0 MPa (2901 psi)

Windshield wiper arm - Remove

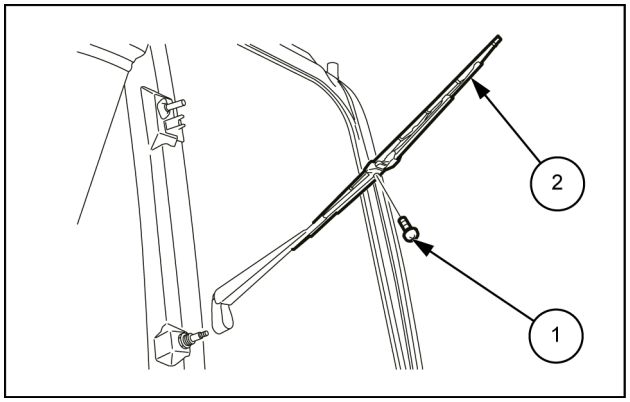
1. Use a wrench [**17 mm**] to remove the 1 nut **(1)**, and then remove the wiper arm **(2)**.

   Nut **(1)** tightening torque: **12 - 16 N·m** (**8.85 - 11.80 lb ft**)



SMIL14CEX1887AB 1

2. Use the Phillips screwdriver to remove the 2 screws **(1)**, and then remove the wiper **(2)**.



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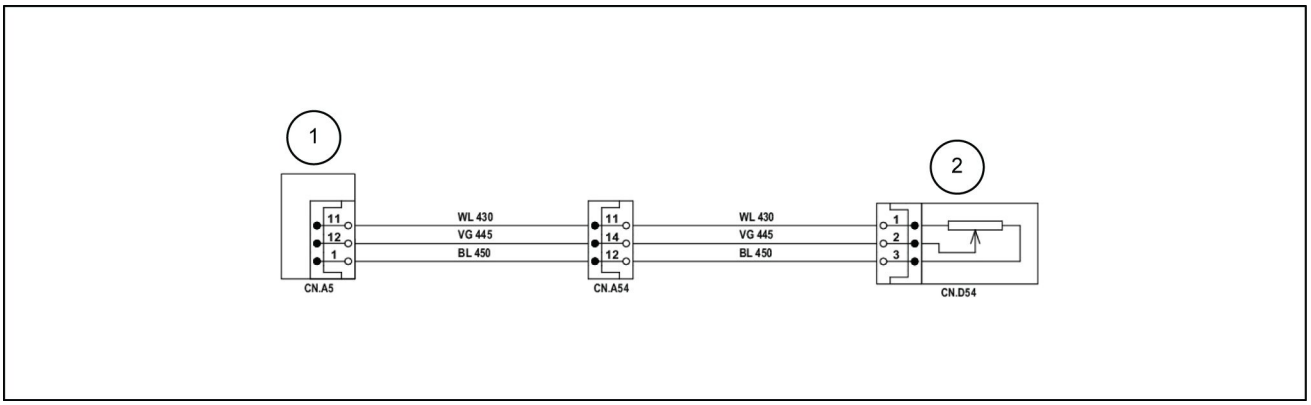
Warning indicators, alarms, and instruments - 408

7023-Arm-in pressure sensor signal abnormality

Control Module : MCM

Solution:

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



LPIL12CX02640EB 1

1. Computer B
2. Pilot arm close pressure sensor

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 7023 is displayed, proceed to Step **2**.

2. Check the pilot arm close 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 pilot arm close pressure sensor connector **CN.D54**.

Turn the key switch ON.

Measure the voltage between the ground and terminal 1 of the pilot arm close pressure sensor connector **CN.D54** harness side.

A. If the voltage is not about **5 V**, find and replace the short circuit on the wire ID WL430.

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

4. Measure the voltage between the ground and terminal 2 of the pilot arm close pressure sensor connector **CN.D54** harness side.

A. If the voltage is more than **4.75 V**, find and replace the short circuit on the wire ID VG445.

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 pilot arm close pressure sensor connector **CN.D54** harness side.

A. If the voltage is more than **0.25 V**, find and replace the short circuit on the wire ID BL450.

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

6. Inspect the arm-in pressure sensor **(2)**.

Turn the key switch OFF.

B. If there is no continuity, proceed to Step **6**.

6. Inspect for continuity between the ground and terminal 2 of the lever lock solenoid valve connector **CN.D59** harness side.

   A. If there is no continuity, repair or replace the wire B752.

   B. If there is continuity, proceed to Step **7**.

7. Turn the key switch ON.

   Measure the voltage between the ground and terminal 1 of the lever lock solenoid valve connector **CN.D59** harness side.

   A. If the voltage is not **24 V**, find and repair or replace the open circuit on the wire RY840 or VW170.

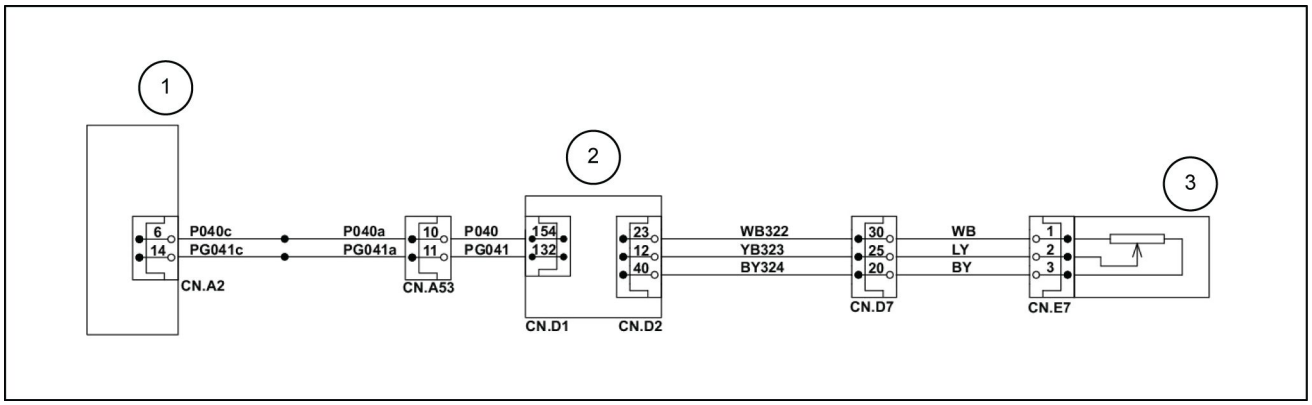
   B. If the voltage is **24 V**, replace computer C **(5)**.

7422-Abnormally low engine oil pressure

Control Module : MCM

Solution:

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



LPIL12CX02660EB 1

1. Computer A
2. Engine computer
3. Oil pressure sensor

Start the engine and wait for **30 s**.

Check the diagnostic trouble code 7422 (●) on the service support DIAG screen.

A. If diagnostic trouble code 7422 (●) is displayed, proceed to Step **2**.

2. Inspect the engine unit.

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

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

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

17. Inspect the ECM harness connector **CN.D2** for a poor connection.

A. If a problem is found, repair the harness connector **CN.D2**.

B. If there are no problems, proceed to Step **18**.

18. Inspect each circuit for high resistance.

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

B. If there are no problems, proceed to Step **19**.

19. If the suction control valve harness connector **CN.E13** and the ECM harness connector **CN.D2** are normal and there is no high resistance in each circuit, replace the fuel supply pump and the fuel filter element. (Refer to " **High pressure pump - Remove (10.218)**" and " **High pressure pump - Install (10.218)**")

When replacing the fuel supply pump, it is required to also replace the fuel filter element at the same time.

Perform the unit difference learning of the fuel supply pump to the ECM.

20. Confirm resolution:

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

2. Turn the starter switch OFF for **30 s** or longer.

3. Start the engine.

4. Perform a test-run.

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

Wiring harnesses - Electrical schematic sheet 08 (55.100) Wiring harnesses - Electrical schematic sheet 10 (55.100) Wiring harnesses - Electrical schematic sheet 11 (55.100)

P0182-Fuel temperature sensor, low input

Control Module : ECM

Solution:

1. Check and diagnose the below fault code before you proceed with the diagnostics of 0182

   Diagnostic trouble code 1655

2. Turn OFF the starter switch.

   Disconnect the harness connector **CN.E8** from the fuel temperature sensor.

   Check the fuel temperature sensor display with the trouble diagnosis scan tool.

   If the voltage is more than or equal to **4.5 V**, replace the fuel temperature sensor.

   Do not replace the fuel temperature sensor separately.

   A. If a problem is found, replace the fuel supply pump.(Refer to **High pressure pump - Remove (10.218)** and **High pressure pump - Install (10.218)**)

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

3. Inspect to see if there is a short circuit to the GND with the signal circuit between the ECM and fuel temperature sensor.

   Do not replace the fuel temperature sensor separately.

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

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

4. Inspect the ECM harness connector **CN.D2** for poor connections.

   A. If a problem is discovered, repair the harness connector **CN.D2**.

   B. If the harness connector **CN.D2** is normal, replace the ECM.

5. Set the injector ID code on the ECM.

   Perform the unit difference learning of the fuel supply pump to the ECM.

6. Confirm resolution:

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

   2. Turn the starter switch OFF for **30 s** or longer.

   3. Start the engine.

   4. Perform a test-run.

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

Wiring harnesses - Electrical schematic sheet 11 (55.100)

Make sure that there is no short to GND between ECM and EGR position sensor.

A. If a problem is found, repair the EGR position sensor circuit.

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

6. Inspect the EGR valve harness connector **CN.E3** for poor connections.

   A. If a problem is found, repair the harness connector **CN.E3**.

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

7. In the EGR solenoid circuit between the ECM and EGR valve, inspect to see if there is a short circuit with the EGR position sensor.

   A. If a problem is found, repair the harness connector **CN.E3**.

   B. If the EGR solenoid circuit is normal, replace the EGR valve . (Refer to " **Exhaust Gas Recirculation (EGR) valve - Remove (10.501)** and **Exhaust Gas Recirculation (EGR) valve - Install (10.501)**")

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

8. Inspect the ECM harness connector **CN.D2** for poor connections.

   A. If a problem is found, repair the harness connector **CN.D2**.

   B. If the harness connector **CN.D2** replace the ECM.

9. Set the injector ID code on the ECM (A2).

   Perform the unit difference learning of the fuel supply pump to the ECM.

10. Confirm resolution:

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

    2. Turn the starter switch OFF for **30 s** or longer.

    3. Start the engine.

    4. Perform a test-run.

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

Wiring harnesses - Electrical schematic sheet 11 (55.100)

P0641-Sensor reference voltage 1 circuit

Control Module : ECM

Solution:

1. 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 terminal and GND of the accelerator position sensor harness connector **CN.B2**.

   If it is greater than or equal to **5.5 V**, inspect to see if there is a short circuit to the battery or ignition power supply with the accelerator position sensor **5 V** power supply circuit between the ECM and the accelerator position sensor.

   A. If a problem is discovered, repair the accelerator position sensor **5 V** power supply circuit.

   B. If there are no problem discovered, proceed to Step **2**.
2. Inspect to see if there is a short circuit to the battery or ignition power supply with the crankshaft position sensor **5 V** power supply circuit between the ECM and the crankshaft position sensor.

   A. If a problem is discovered, repair the crankshaft position sensor **5 V** power supply circuit between the ECM and the crankshaft position sensor.

   B. If there are no problem discovered, proceed to Step **3**.
3. Inspect to see if there is a short circuit to the battery or ignition power supply with the fuel pressure sensor **5 V** power supply circuit between the ECM and the fuel pressure sensor.

   A. If a problem is discovered, repair the fuel pressure sensor **5 V** power supply circuit.

   B. If there are no problem discovered, proceed to Step **4**
4. If the voltage between the accelerator position sensor **5 V**power supply circuit and GND of the accelerator position sensor harness connector **CN.B2** is less than or equal to **5.5 V**, measure the voltage between the **5 V** power supply circuit and GND of the accelerator position sensor harness connector **CN.B2**.

   A. If it is greater than or equal to **4.5 V**, replace the accelerator position sensor.

   B. If it is less than or equal to **4.5 V**, turn the starter switch OFF.
5. Disconnect the harness connector **CN.E4** from the crankshaft position sensor.

   Turn ON the starter switch.

   Measure the voltage between the accelerator position sensor **5 V** power supply circuit and GND of the accelerator position sensor harness connector **CN.B2**.

   A. If it is greater than or equal to **4.5 V**, replace the crankshaft position sensor. (Refer to " **Engine speed/RPM sensor - Remove (55.015)**" nd " **Engine speed/RPM sensor - Inspect (55.015)**")

   B. If it is less than or equal to **4.5 V**, turn the starter switch OFF.
6. Disconnect the harness connector **CN.E5** from the fuel pressure sensor.

   Turn ON the starter switch.

   Measure the voltage between the accelerator position sensor **5 V** power supply circuit and GND of the accelerator position sensor harness connector **CN.B2**.

P1471-DPD insufficient regeneration

Control Module : ECM

Solution:

1. Inspect the DPD differential pressure sensor hose.

   Make sure that there should be no incorrect piping or disconnection.

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

   B. If there are no problems, proceed to Step **2**.
2. Inspect the DPD differential pressure sensor.

   DPD differential pressure sensor unit should not be damaged.

   Make sure that there should be no dirt or foreign matter blocking the DPD differential pressure sensor entrance.

   Make sure that there should be no detection error or slow response from the DPD differential pressure sensor.

   A. If a problem is found, replace the DPD differential pressure sensor and perform the 0-point correction. (Refer to " **Differential pressure sensor - Remove (55.989)**", " **Differential pressure sensor - Install (55.989)**" and " **Differential pressure sensor - Inspect (55.989)**")

   B. If there are no problems, proceed to Step **3**.
3. Inspect the exhaust system.

   Make sure that there should be no absence or damage of the exhaust pipe gasket.

   Make sure that there should be no exhaust gas leak from the exhaust system.

   Make sure that the exhaust system should not be modified.

   A. If a problem is found, repair or replace the exhaust system.

   B. If there are no problems, proceed to Step **4**.
4. Inspect the exhaust gas temperature sensor. (Refer to " **Exhaust Gas Recirculation (EGR) temperature sensors - Inspect (55.989)**")

   A. If a problem is found, replace the exhaust gas temperature sensor. (Refer to " **Exhaust Gas Recirculation (EGR) temperature sensors - Remove (55.989)**" and " **Exhaust Gas Recirculation (EGR) temperature sensors - Install (55.989)**")

   B. If there are no problems, proceed to Step **5**.
5. Inspect the air cleaner element. (Refer to "Air cleaner element inspection")

   A. If a problem is found, replace the air cleaner element.

   B. If there are no problems, proceed to Step **6**.
6. Inspect the air intake system.

   Make sure that there should be no crush, limited flow, or damage of the duct between the air cleaner and intake manifold.

   Make sure that the intake system should not be modified

   Make sure that there should be no air leak with the intake system.

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

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

U0110-Lost communication with VNT system

Control Module : ECM

Solution:

1. Check and diagnose the below fault code before you proceed with the diagnostics of 0110

   Diagnostic trouble code 0045
   Diagnostic trouble code 0001

2. Turn OFF the starter switch.

   Remove the harness connector **CN.E1** from the turbo control unit.

   Measure the voltage between the ISO CAN-Low circuit and GND of the turbo control unit harness connector **CN.E1**.

   Measure the voltage between the ISO CAN-High circuit and GND of the turbo control unit harness connector **CN.E1**.

   If it is not within **1.5 - 3.5 V** , inspect to see if there is an open circuit or high resistance with the ISO CAN-High circuit between the turbo control unit and the ECM.

   A. If a problem is discovered, repair the ISO CAN-High circuit.

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

3. Inspect to see if there is an open circuit or high resistance with the ISO CAN-Low circuit between the turbo control unit and the ECM.

   A. If a problem is discovered, repair the ISO CAN-Low circuit.

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

4. Inspect the turbo control unit harness connector **CN.E1** for a poor connection.

   A. If a problem is discovered, repair the harness connector **CN.E1**.

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

5. Confirm resolution:

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

   2. Turn the starter switch OFF for **30 s** or longer.

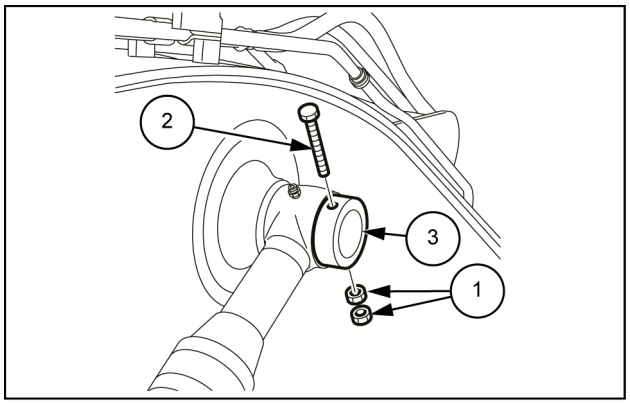
   3. Start the engine.

   4. Perform a test-run.

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

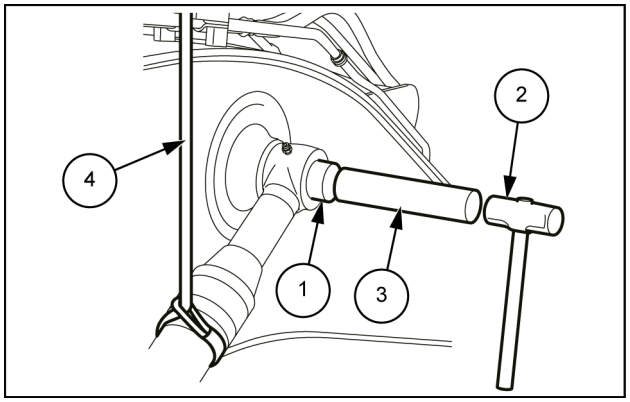
Wiring harnesses - Electrical schematic sheet 11 (55.100)

3. Use a wrench [**36 mm**] to remove the double nuts **(1)** and bolt **(2)**, and then remove the fastening ring **(3)**. Also, remove the cab side in the same way.



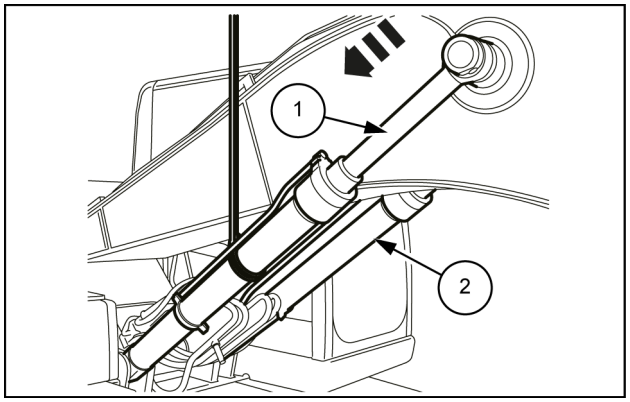
SMIL14CEX1391AB 3

4. Use a hammer **(2)** and striking rod **(3)** to push the pin **(1)** out.
   Use a lifting equipment and nylon sling **(4)** to hold the boom cylinders (right) (left) so that they do not fall.



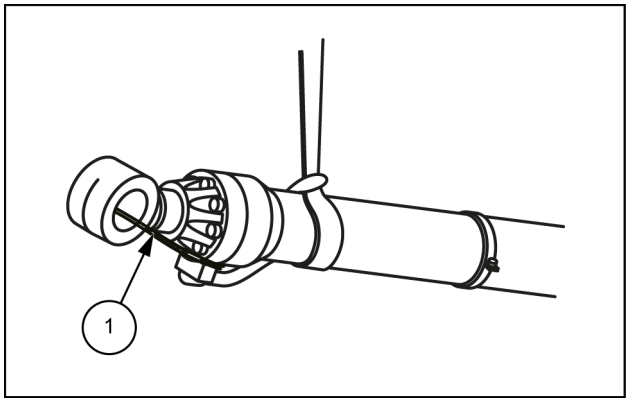
SMIL14CEX1392AB 4

5. Start the engine, move the boom down at idle, and retract the boom cylinder **(1)** and **(2)** rods.



SMIL14CEX1393AB 5

6. Tie the cylinder rods on the left and right sides with wire **(1)** so that they cannot come out.

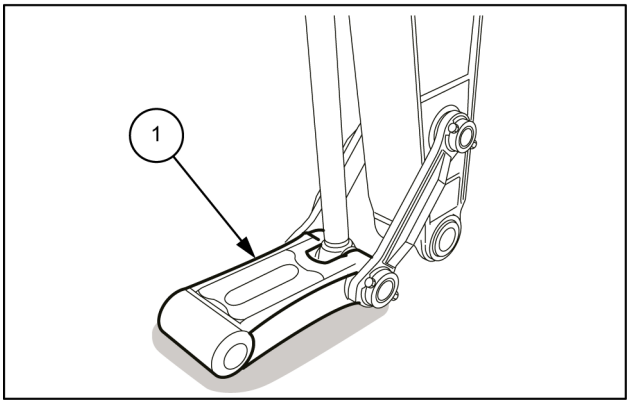


SMIL14CEX1394AB 6

Link and rod - Remove

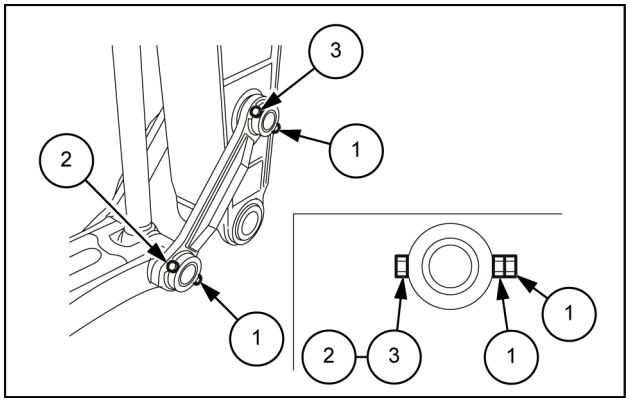
Remove the bucket. (For details, see **Bucket - Remove (84.100)**)

1. Place the bucket link **(1)** parallel to the ground.



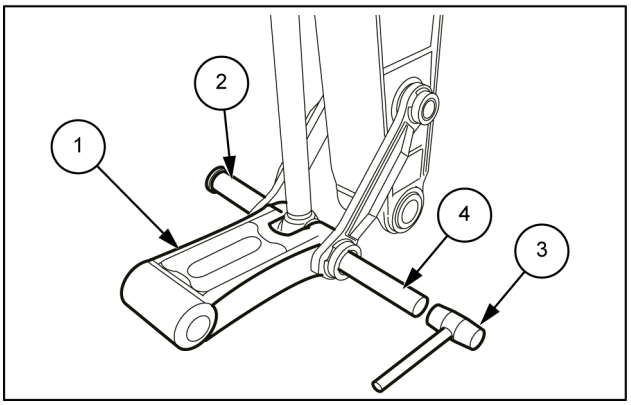
SMIL14CEX1374AB 1

2. Use 2 wrenches [**36 mm**] to remove the double nuts **(1)**, and then pull out the bolts **(2)** and **(3)**.



SMIL14CEX1375AB 2

3. Use a hammer **(3)** and striking rod **(4)** to push the pin **(2)** out and remove the bucket link **(1)**.



SMIL14CEX1376AB 3