ELECTRICAL SYSTEMS - 55

[55.DTC] FAULT CODES - 55.29

P0182 – P3093

U0001 – U2106

BOOMS, DIPPERS, AND BUCKETS - 84

PLATFORM, CAB, BODYWORK, AND DECALS - 90

CX490D
CX500D
Tier 4B (final)
Crawler Excavator

SERVICE MANUAL

Part number 47985284

English

February 2016

CASE

3. Start the engine.

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

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

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

Wiring harnesses - Electrical schematic sheet 20 (55.100) Wiring harnesses - Electrical schematic sheet 15 (55.100)

7. Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.
8. Confirm resolution:
    1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.
    2. Turn OFF the ignition switch for at least **30 s**.
    3. Start the engine.
    4. Perform a test-run under the conditions for running the diagnostic trouble code.

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

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

P0380-Glow plug circuit

Control Module : ECM

Solution:

1. Turn OFF the ignition switch.

   Replace the glow relay with a starter relay or a known good relay.

   Perform the glow relay test with the trouble diagnosis scan tool.

   Command the glow relay ON and OFF.

   Check whether an operation sound is heard from the glow relay upon execution of each command.

   If the operating sound of the glow relay can be heard, remove the glow relay.

   Inspect for poor connections at the glow relay terminal.

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

   B. If the glow relay terminal is normal, replace the glow relay.

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

   Inspect between the ignition switch and the glow relay coil side for an open circuit or high resistance.

   A. If a problem is found, repair the circuit between the ignition switch and glow relay coil side.

   B. If there are no problems, proceed to Step **3**.
3. Inspect the control circuit between the ECM and glow relay.

   Make sure that there is no open circuit or high resistance.

   Make sure that there is no short to GND.

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

   B. If there are no problems, proceed to Step **4**.
4. Inspect for poor connections at the ECM harness connector **CN.D3-A**.

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

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

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

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

   3. Start the engine.

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

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

7. Inspect for poor connections at the ECM harness connector **CN.D4**.

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

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

8. Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.
9. Confirm resolution:

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

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

   3. Start the engine.

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

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

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

Wiring harnesses - Electrical schematic sheet 44 (55.100) Wiring harnesses - Electrical schematic sheet 15 (55.100)

NOTE:

• Conditions for setting engine run time or coolant temperature vary depending on the diagnostic trouble codes.

• For the conditions for setting the diagnostic trouble code, refer to the applicable code listed in 15E diagnostic trouble code information.

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

Wiring harnesses - Electrical schematic sheet 19 (55.100) Wiring harnesses - Electrical schematic sheet 15 (55.100)

P060A-Internal control module CPU IC error

Control Module : ECM

Solution:

1. Replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)**" and " **Engine Control Unit (ECU) - Install (55.015)**")
2. Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.
3. Confirm resolution:
    1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.
    2. Turn OFF the ignition switch for at least **30 s**.
    3. Start the engine.
    4. Perform a test-run under the conditions for running the diagnostic trouble code.

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

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

P06A8-Sensor reference voltage 3 circuit

Control Module : ECM

Solution:

1. Turn OFF the ignition switch.

   Disconnect the harness connector P275 from the boost pressure sensor.

   Turn ON the ignition switch.

   Measure the voltage between the boost pressure sensor **5 V** power supply circuit of the boost pressure sensor harness connector P275 and the GND.

   If the reading is more than or equal to **5.5 V**, inspect the boost pressure sensor **5 V** power supply circuit between the ECM and the boost pressure sensor for a short to the battery or a short to the ignition power supply.

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

   B. If there are no problems, proceed to Step **2**.
2. Inspect the intake throttle position sensor **5 V** power supply circuit between the ECM and intake throttle position sensor for a short to the battery or a short to the ignition power supply.

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

   B. If there are no problems, proceed to Step **3**.
3. If the reading is less than or equal to **5.5 V**, measure the voltage between the boost pressure sensor **5 V** power supply circuit of the boost pressure sensor harness connector P275 and the GND.

   If the reading is more than or equal to **4.5 V**, replace the boost pressure sensor. (Refer to " **Intake air pressure and temperature sensor - Remove (55.014)**" and " **Intake air pressure and temperature sensor - Install (55.014)**")

   If the reading is less than or equal to **4.5 V**, turn OFF the ignition switch.

   Disconnect the harness connector **CN.B2** from the intake throttle position sensor.

   Turn ON the ignition switch.

   Measure the voltage between the boost pressure sensor **5 V** power supply circuit of the boost pressure sensor harness connector P275 and the GND.

   If the reading is more than or equal to **4.5 V**, replace the intake throttle valve. (Refer to " **Throttle Valve Actuator (TVA) - Remove (55.014)**" and " **Throttle Valve Actuator (TVA) - Install (55.014)**")

   If the reading is less than or equal to **4.5 V**, inspect the boost pressure sensor **5 V** power supply circuit between the ECM and the boost pressure sensor for a short to GND.

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

   B. If there are no problems, proceed to Step **4**.
4. Inspect the intake throttle position sensor **5 V** power supply circuit between the ECM and intake throttle position sensor for a short to GND.

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

   B. If there are no problems, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)**" and " **Engine Control Unit (ECU) - Install (55.015)**")
5. Set the Injector ID Code, fuel delivery rate and engine No. for the ECM.
6. Confirm resolution:

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

NOTE:
• The fuel hose between the fuel tank and the fuel supply pump becomes negative pressure state when the engine is running.
• When the fuel hose is not connected securely, the air can enter.
• When the engine speed or the engine load increases while the air has intruded in the fuel system, fluctuation in the common rail pressure is caused, and diagnostic trouble code P1093 may be detected.

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

7. Check that an appropriate clamp is used between the fuel tank and the fuel supply pump.

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

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

8. Operate the priming pump until the handle becomes heavy.

   Make sure when a leak exists in the fuel system between the priming pump and the fuel supply pump, the pressing weight of the priming pump does not become heavy.

   Start the engine.

   Inspect the high-pressure side of the fuel system and check for fuel leak between the fuel supply pump and common rail.

   NOTE:
   • The fuel may leak to the bottom section of the cylinder head cover from the high pressure hose inlet.
   • The engine oil level increases when the fuel leaks to the bottom portion of the cylinder head cover.
   • Inspect for fuel leaks into the engine oil.

   A. If fuel leak if found, fix the problem.

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

9. Turn OFF the ignition switch.

   Remove the fuel hose on the fuel supply pump side from the fuel filter.

   Make sure to use a pan to catch the fuel from the removed fuel hose.

   Make sure to clean the pressure gauge and connection hose before connecting to the fuel pipe.

   Make sure the fuel supply pump may be damaged due to foreign matter that has entered in the connection hose.

   Connect the pressure gauge between the fuel filter and the removed fuel hose.

   NOTE: *Confirm that the fuel system is connected securely.*

   Remove the air using the priming pump, and crank the engine for **5 s** or shorter.

   Make sure to repeat this until the engine starts.

   Leave the engine idling for **1 min** or longer.

   While allowing the engine to keep **1 min** and the maximum engine speed, observe the pressure gauge.

   Check if the pressure gauge shows a negative pressure value at or above **-17.0 kPa** (**-2.5 psi**) during inspection.

   Make sure the fuel clogging is checked with the negative pressure amount in the fuel system.

   If the negative pressure is more than or equal to **-17.0 kPa** (**-2.5 psi**), inspect to see if there is damage or twisting with the fuel system between the fuel supply pump and the fuel tank.

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

   B. If there are no problems, proceed to Step **10**.

P1404-Exhaust gas recirculation 1 closed position performance

Control Module : ECM

Solution:

1. Check and diagnose the below fault codes before you proceed with the diagnostics code 1404.

   Diagnostic trouble code 0404
   Diagnostic trouble code 0409

2. Remove the EGR valve assembly from the engine. (Refer to " **Exhaust Gas Recirculation (EGR) valve - Remove (10.501)**")

   Inspect the EGR valve.

   There should be nothing to limit flow inside the EGR valve.

   Make sure that there is no excessive accumulates inside the EGR valve.

   Make sure that there is no bending with the valve shaft or valve itself inside the EGR valve.

   A. If a problem is found,repair or replace the EGR valve. (Refer to " **Exhaust Gas Recirculation (EGR) valve - Remove (10.501)**" and " **Exhaust Gas Recirculation (EGR) valve - Install (10.501)**")

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

3. Turn OFF the ignition switch.

   Disconnect the harness connectors **CN.E11** and **CN.E12** from the EGR valve.

   Inspect the EGR valve harness connectors **CN.E11** and **CN.E12** for a poor connection.

   A. If a problem is found, repair the harness connectors **CN.E11** and **CN.E12**.

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

4. Disconnect the harness connector **CN.D4** from the ECM.

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

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

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

5. Inspect the EGR valve circuit between the ECM and the EGR valve for an open circuit and high resistance.

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

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

6. Inspect the motor circuit between the ECM and EGR valve.

   Make sure that there is no short to GND.

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

   Make sure that there is no short to other circuits.

   Make sure that there is no short to EGR position sensor circuit.

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

   B. If the 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)**")

7. Confirm resolution:

P20C9-SCR system error

Control Module : ECM

Solution:

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

   Diagnose the applicable diagnostic trouble code if a diagnostic trouble code is set.
2. Confirm resolution:

   1. Clear the diagnostic trouble code using the trouble diagnosis scan tool.
   2. Turn OFF the ignition switch for at least **30 s**.
   3. Start the engine.
   4. Perform a test-run under the conditions for running the diagnostic trouble code.

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

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

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

3. Start the engine.

4. While checking the diagnostic trouble code information with the trouble diagnosis scan tool, fully depress and then release the accelerator pedal.

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

Wiring harnesses - Electrical schematic sheet 38 (55.100) Wiring harnesses - Electrical schematic sheet 12 (55.100)

P2BA7-Urea fluid quantity too low

Control Module : ECM

Solution:

1. Check the remaining amount of urea fluid in the urea fluid tank.

   If the urea fluid is low, add the specified urea fluid.

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

   Diagnose the applicable diagnostic trouble code if a diagnostic trouble code is set.
2. Confirm resolution:

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

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

   3. Start the engine.

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

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

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

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

   Turn ON the ignition switch.

   Measure the voltage between the CAN-High terminal of the termination resistor harness connector **CN.D3** and the GND.

   Measure the voltage between the CAN-Low terminal of the termination resistor harness connector **CN.D3** and the GND.

   If the voltage is outside the **1.5 - 3.5 V**, replace the ECM. (Refer to " **Engine Control Unit (ECU) - Remove (55.015)**" and " **Engine Control Unit (ECU) - Install (55.015)**")

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

   Turn OFF the ignition switch.

   Connect the harness connector **CN.A4** to the control unit of the machine.

   Turn ON the ignition switch.

   Measure the voltage between the CAN-High terminal of the termination resistor harness connector **CN.A4** and the GND.

   Measure the voltage between the CAN-Low terminal of the termination resistor harness connector **CN.A4** and the GND.

   A. If the voltage is outside the **1.5 - 3.5 V**, replace the control unit of the machine.

   B. If the voltage is within the **1.5 - 3.5 V**, replace the termination resistor.

6. Confirm resolution:

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

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

   3. Start the engine.

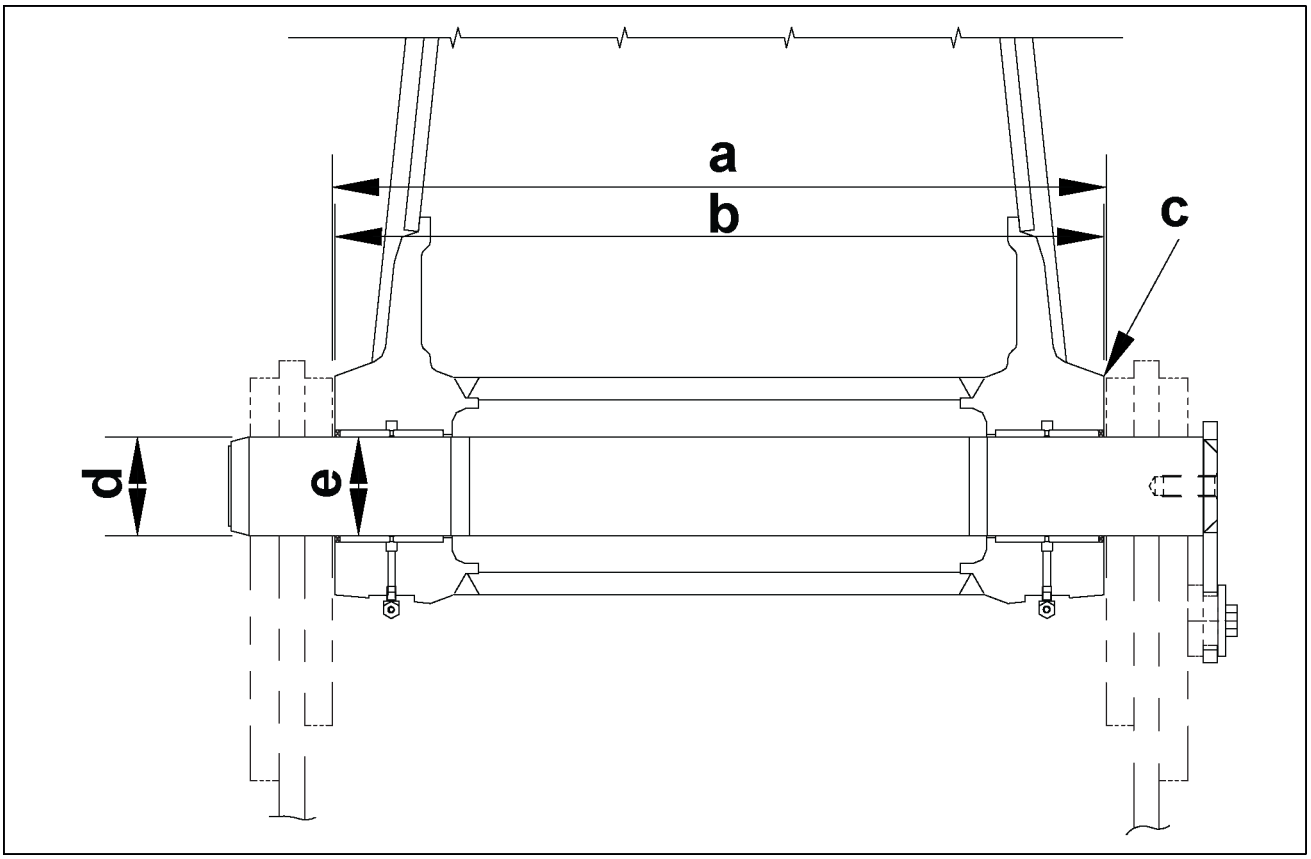
   4. Perform a test-run under the conditions for running the diagnostic trouble code.

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

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

Wiring harnesses - Electrical schematic sheet 07 (55.100) Wiring harnesses - Electrical schematic sheet 44 (55.100)

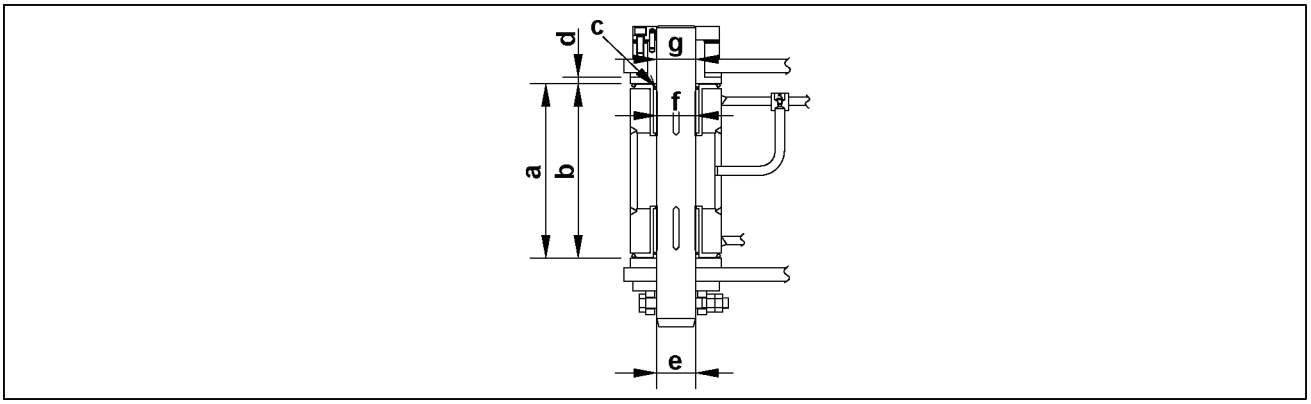
1. Boom and swing frame mounting area



SMIL14CEX2914FA 2

Part name	Code	Standard value	Operating limit	Judgment	Action
Swing frame	a	**875.5 mm** (**34.47 in**)	**883.5 mm** (**34.78 in**)	Good/Bad	-
Boom	b	**871 mm** (**34.29 in**)	**869 mm** (**34.21 in**)	Good/Bad	Replace
Clearance	c	**1 mm** (**0.04 in**) or less	Shim adjustment	Good/Bad	Adjustment by shim
Pin	d	**Ø 120 mm** (**4.72 in**)	**Ø 119 mm** (**4.69 in**)	Good/Bad	Replace
Bushing (boom)	e	**Ø 120 mm** (**4.72 in**)	**Ø 121.5 mm** (**4.78 in**)	Good/Bad	Replace

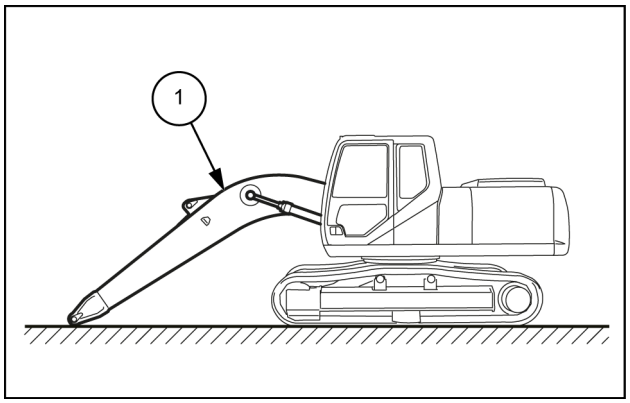
11. Bucket and arm installation section



SMIL14CEX2924EA 12

Part name	Code	Standard value	Usage limit	Judgement	Solution
Bucket	a	**480 mm** (**18.90 in**)	**485 mm** (**19.09 in**)	Acceptable/ Unacceptable	Replace
Arm	b	**479 mm** (**18.86 in**)	**477 mm** (**18.78 in**)	Acceptable/ Unacceptable	Replace
Clearance	c	**1.2 mm** (**0.0 in**) or lower	Shim adjustment	Acceptable/ Unacceptable	Adjust with shims
Bushing (bucket)	d	**16 mm** (**0.63 in**)	**7 mm** (**0.28 in**)	Acceptable/ Unacceptable	Replace
Pin	e	**Ø 100 mm** (**3.94 in**)	**Ø 99 mm** (**3.90 in**)	Acceptable/ Unacceptable	Replace
Bushing (arm)	f	**Ø 100 mm** (**3.94 in**)	**Ø 101.5 mm** (**4.00 in**)	Acceptable/ Unacceptable	Replace
Bushing (bucket)	g	**Ø 100 mm** (**3.94 in**)	**Ø 101.5 mm** (**4.00 in**)	Acceptable/ Unacceptable	Replace

12. Position the end of the boom **(1)** on the ground.
    - Install the boom cylinder. (For details, see **Boom cylinder - Install (35.736)**)
    - Install the arm. (For details, see **Dipper - Install (84.912)**.)
    - Install the arm cylinder. (For details, see **Dipper cylinder - Install (35.737)**)
    - Install the bucket cylinder. (For details, see **Bucket cylinder - Install (35.738)**)
    - Install the bucket link. (For details, see **Link and rod - Install (84.100)**)
    - Install the bucket. (For details, see **Bucket - Install (84.100)**)

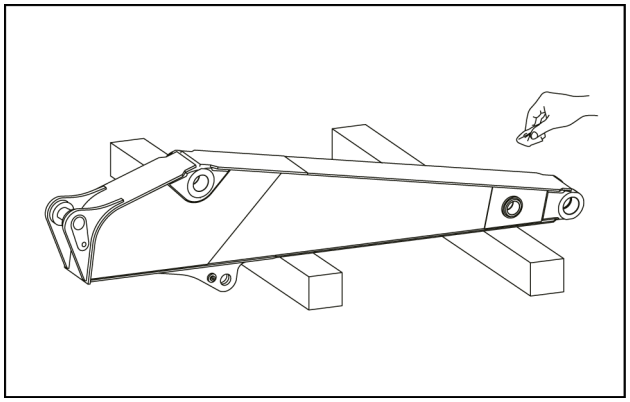


SMIL14CEX1856AB 12

Dipper - Install

- When installing the bolts, tighten them to the specified torque.
- When the torque is not specified, check the **Torque – Bolt and nut ()**.

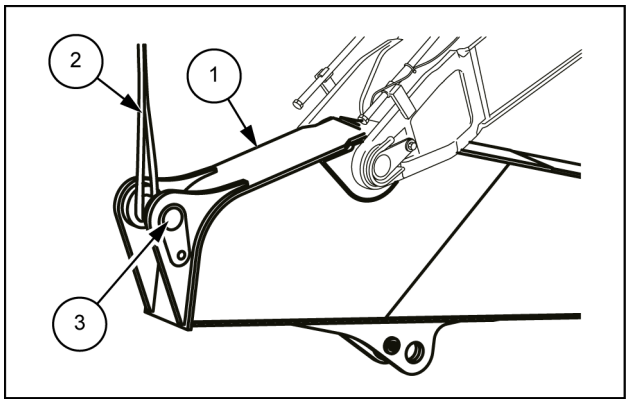
1. Clean each pin and pin hole.



SMIL14CEX1385AA 1

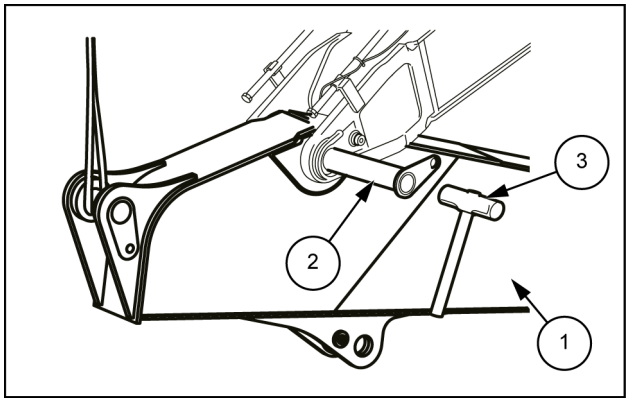
2. Bring the arm **(1)** end in contact with the ground and use a lifting equipment and nylon sling **(2)** to fasten it.

   At this time, insert the arm cylinder pin **(3)** and fasten with the nylon sling.



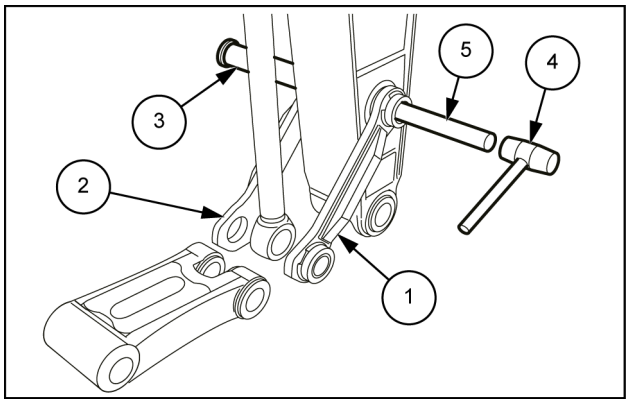
SMIL14CEX1386AB 2

3. Align the arm **(1)** with the boom, use a hammer **(3)** to push in the pin **(2)**, and then install the arm **(1)**.
   - If the pin is hard to insert, there is a load on the pin.
   - When inserting the pin, be careful not to damage the installed dust seals.



SMIL14CEX1387AB 3

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



SMIL14CEX1377AB 4

Cab and platform - Remove

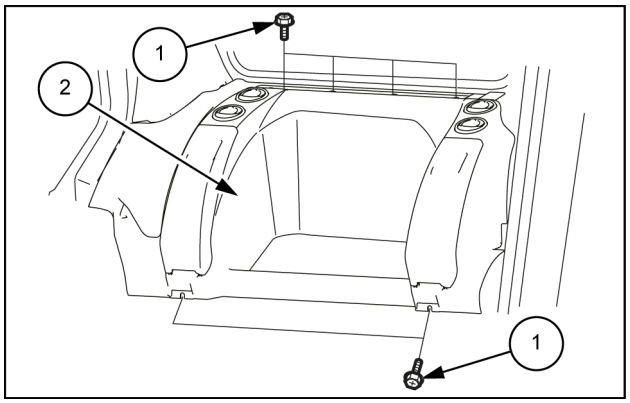
1. Disconnect the battery ground cable from the battery.

NOTICE: *While the indicator (LED) of the battery disconnect switch is lit, do not turn OFF the battery disconnect switch nor disconnect its negative cable from the battery. After turning the key OFF, the LED is lit for a maximum duration of* ***3 min****.*

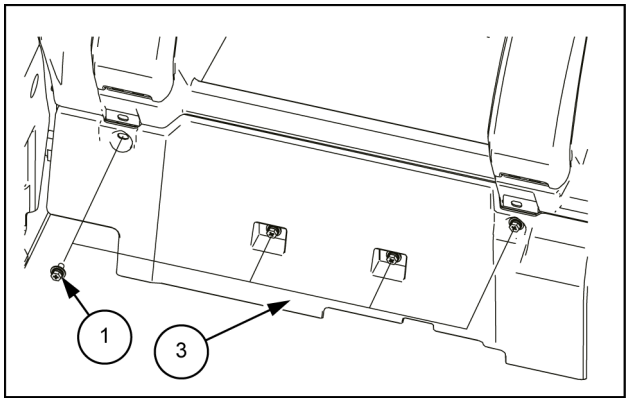
- Remove the operator's seat. (Refer to the **Operator seat - Remove (90.120)** for detail.)

2. Remove the 10 bolts **(1)** with a box wrench [**13 mm**] to remove the trim rear assembly **(2)** and the rear lower trim **(3)**.

   Bolt **(1)** tightening torque: **5.9 - 7.8 N·m** (**4.352 - 5.753 lb ft**)



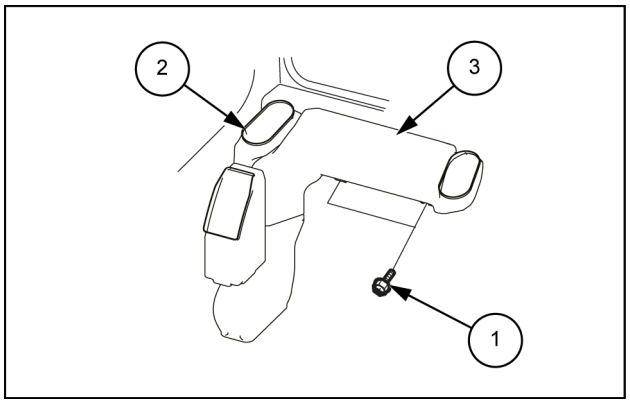
SMIL14CEX1861AB 1



SMIL14CEX1862AB 2

3. Remove the 3 bolts **(1)** with a box wrench [**10 mm**] to remove the air conditioner ducts **(2)** and **(3)** in left and right.

   Bolt **(1)** tightening torque: **2.9 - 3.9 N·m** (**2.139 - 2.876 lb ft**)



SMIL14CEX1863AB 3

Contents

Platform, cab, bodywork, and decals - 90

Cab glazing - 156

Contents

Platform, cab, bodywork, and decals - 90

Mechanically-adjusted operator seat - 120

SERVICE