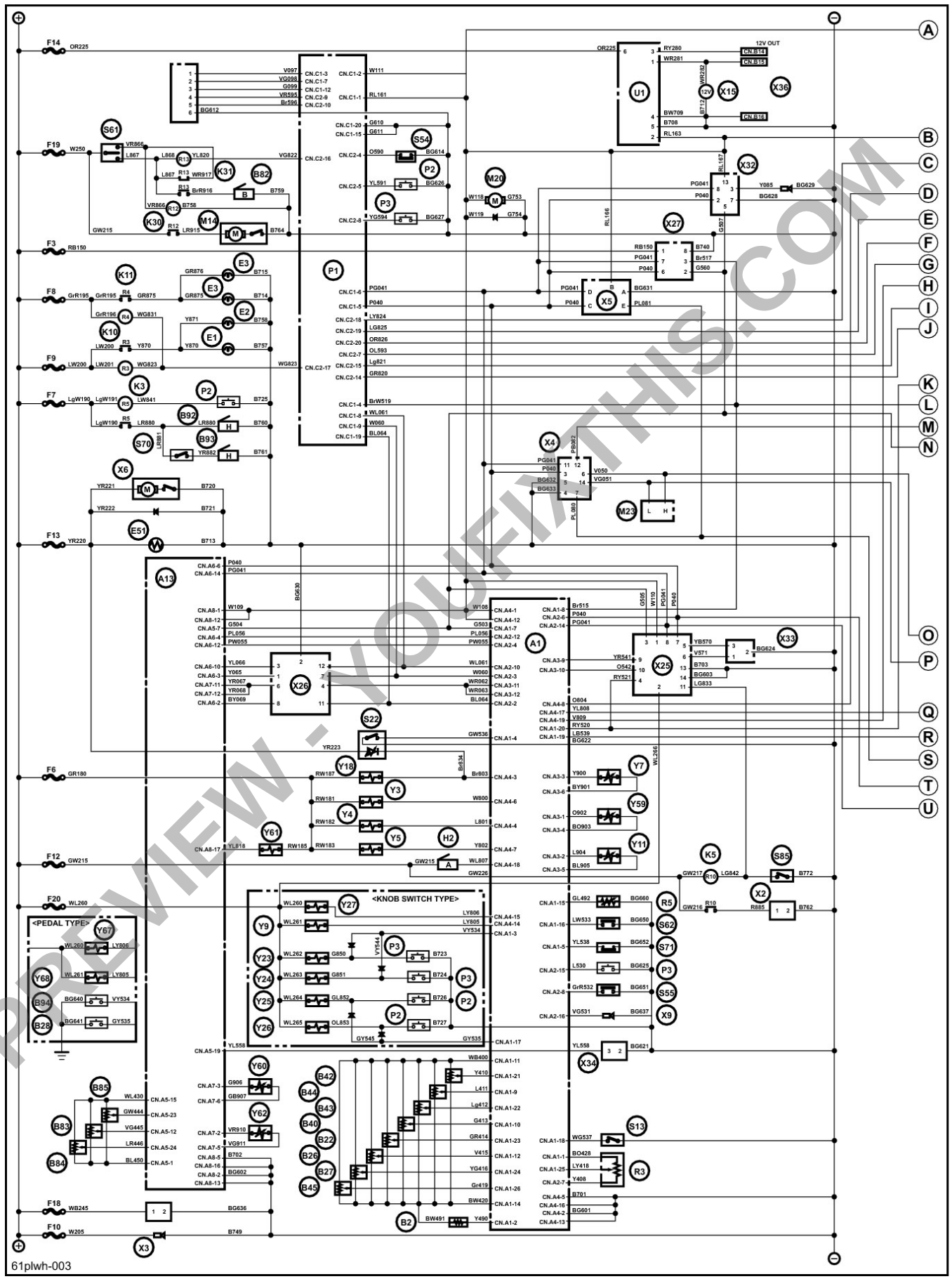
Sequence Circuit Diagram

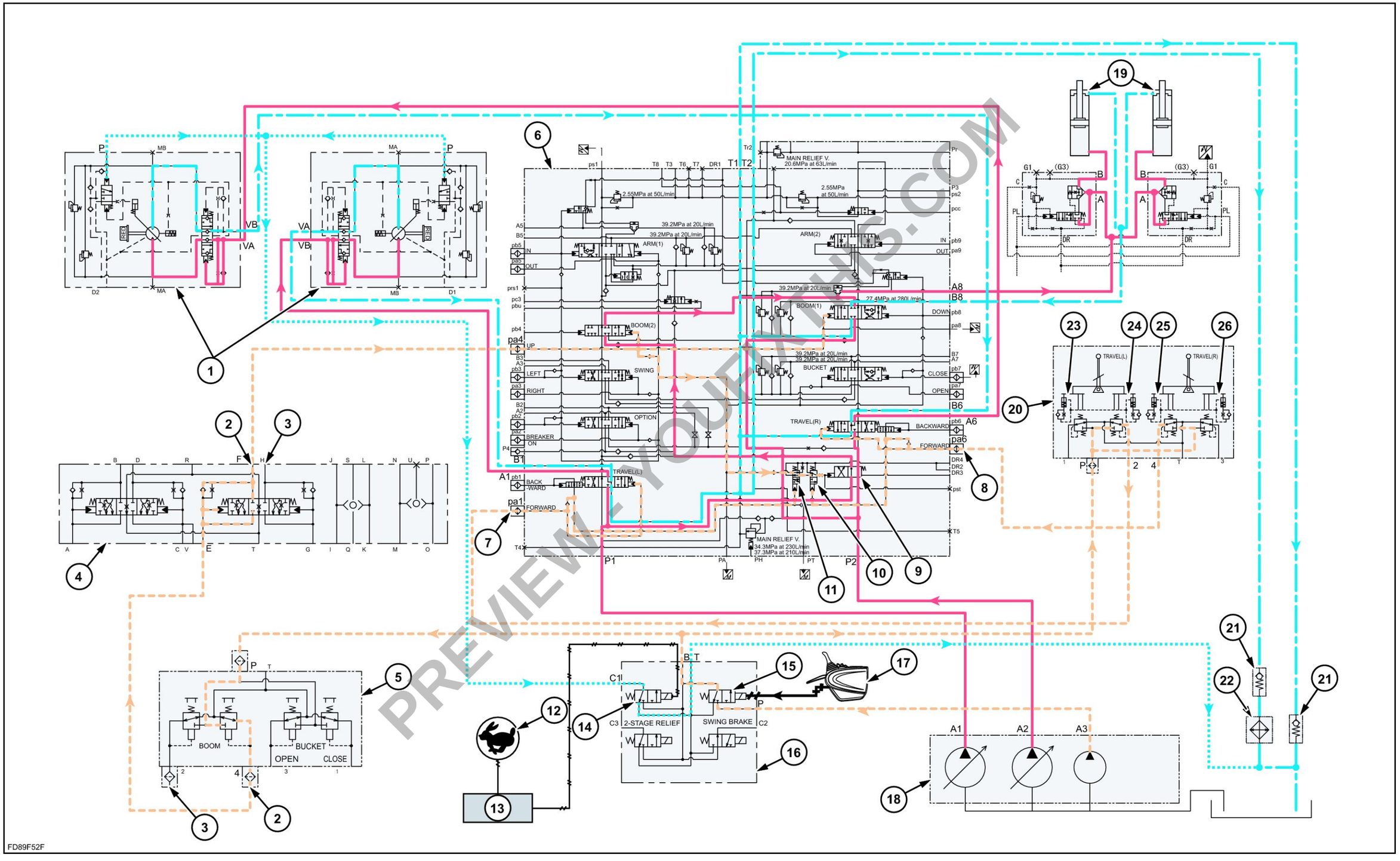
Overall



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Straight travel circuit (with HBCV)



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⚠ WARNING

- **Keep away from fire.**
- **Be sure to release hydraulic pressure before beginning work.**
- **The air conditioner circuit is filled with high-pressure gas, so there is the danger of gas spraying out when loosening lines.**
- **Do not use open flames and do not allow sparks near the battery.**

⚠ CAUTION

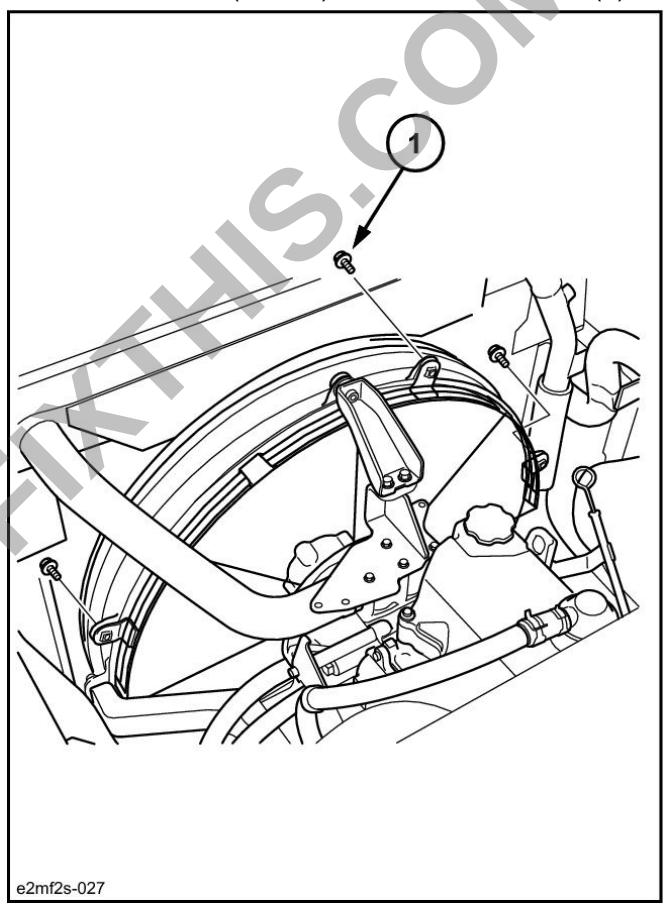
- **Be sure to stop the engine before beginning work.**
- **Be sure to inspect the wire rope and other lifting equipment before beginning work.**
- **Do not stand or pass under the suspended load.**

Items to prepare

- Wrenches (7 mm, 8 mm, 13 mm, 17 mm, 19 mm, 36 mm)
- Box wrench (30 mm)
- Shackle (with the required lifting capacity) x 2
- Wire ropes (with the required breaking load)
- Liftcrane (with the required lifting capacity)
- Marking pen
- Cap
- Plug
- Waste oil can
- Rag
- Cleaning fluid
- Wood planks, etc.

Removal of Engine Assembly

1. Drain the engine oil.(For details, see "Engine Oil Replacing".)
2. Drain the coolant from the radiator.(For details, see "Removal and Installation of Radiator".)
3. Remove the engine hood.(For details, see "Removal and Installation of Engine Hood".)
4. Remove the hydraulic pump.(For details, see "Removal and Installation of Hydraulic Pump".)
5. Use a wrench (13 mm) to remove the 3 bolts (1).

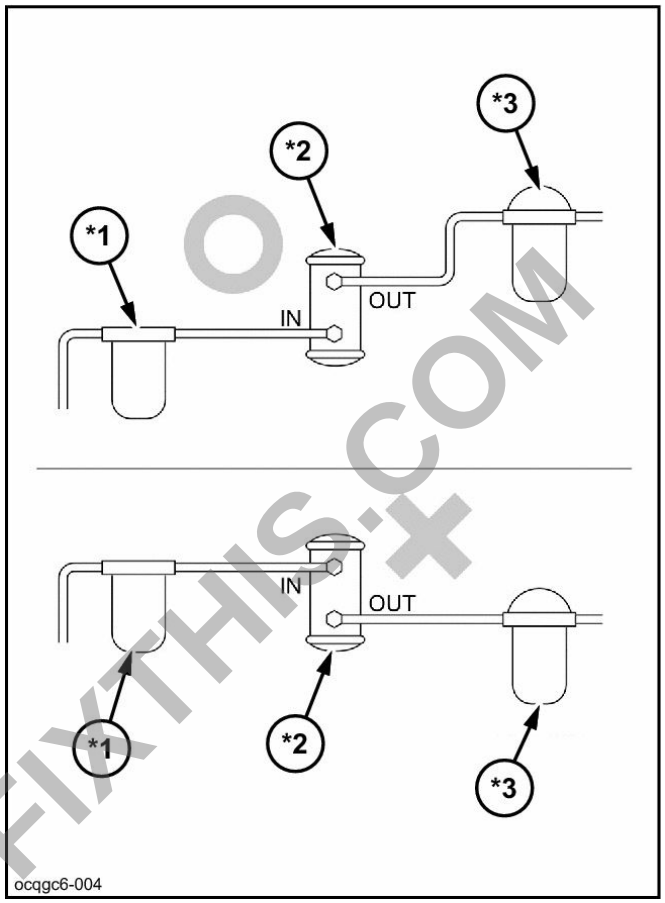


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14 revolutions, crank for more than 14 seconds at 60 r/min or more.
DTC check.
For crankshaft position sensor errors at low engine revolution speed, the crankshaft position sensor DTC may not be detected.
For intermittent failure, increase the engine revolution speed to No Load Max and check if the crankshaft position sensor related DTC is detected.
The scan tool data is within the normal operating range.
Check the condition of the actual unit, and locate the appropriate symptom.
Check with the customers whether they are using the specified engine oil and fuel.
Check whether fuel is contained.

- Visual inspection
  Careful visual inspection is required for several symptom procedures.
  This can lead to fixing a problem without further inspections, and can save valuable time.
  The inspection includes the following.
  Whether there is an improper connection of connectors.
  Particularly for the crankshaft position sensor and camshaft position sensor.
  Proper wiring connections, tightening, and disconnection
  Whether the power of any commercial accessories is being taken divergingly from the ECM power.
  Whether the ECM ground is free of dirt, etc. and securely installed in the correct location.
  Proper connections, cracks, and twists in the pipes and hoses related to fuel, air, and oil.
  Extensively check for any leaks or blockage.
  Whether there are any fuel leaks, pipe damage, or dents in the fuel system.
  Whether the layout of the fuel filter, pre-filter, and electromagnetic pump has a structure in which air accumulates easily.
  Check whether they are arranged to prevent air accumulation as Isuzu genuine pre-filters do not have any plugs for air removal.
  Also check whether the inlet and outlet of the electromagnetic pump have an appropriate layout.
  Fix layouts which have the electromagnetic pump inlet on the upper side or have an outlet toward the motion direction of the actual unit.
  Abnormalities of the air intake system parts
  Abnormalities of the exhaust system parts



*1	Pre fuel filter
*2	Electromagnetic pump
*3	Fuel filter

- Diagnostic aids
  Fuel system abnormalities such as fuel running out, fuel freezing, mixture of air into the fuel piping, filter abnormalities, piping abnormalities, fuel quality, fuel tank, etc.
  Air intake system abnormalities such as filter clogging and air intake piping abnormalities, etc.
  Abnormalities of the supply pump, non-pressure fuel supply
  The ECM determination of the supply pump non-pressure fuel supply DTC will not be detected unless a condition continues for 3 seconds or more in which the engine revolution speed is 900 r/min and the absolute pressure is below 15 MPa (2176 psi).
  Therefore, the DTC will not be detected when the engine does not start with non-pressure fuel supply due to supply pump abnormalities.

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Job code	48100AD07

⚠ WARNING

- **When loosening the grease cylinder check valve, loosen it a little at a time.**
- **The pressure inside the cylinder is very high, so there is the danger of grease being expelled and the plug flying off.**
  The check valve adjustment procedure should not be done in front of the check valve.
- **Do not get under the main unit when it is jacked up.**
  Make sure to place the main unit on crossties to prevent falling.

⚠ CAUTION

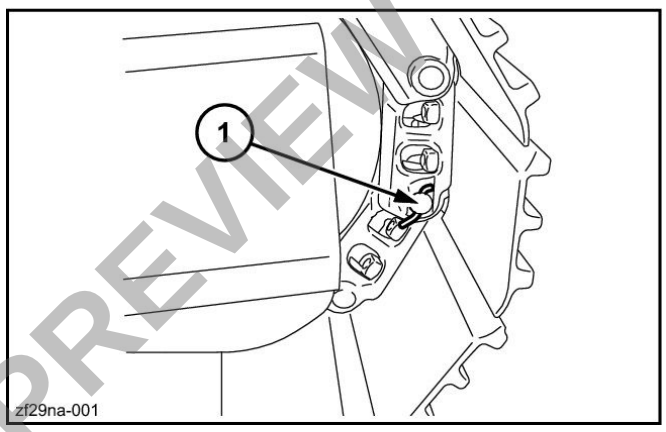
- **Make sure to stop the engine for loosening shoes and when removing master pins.**

Items to prepare

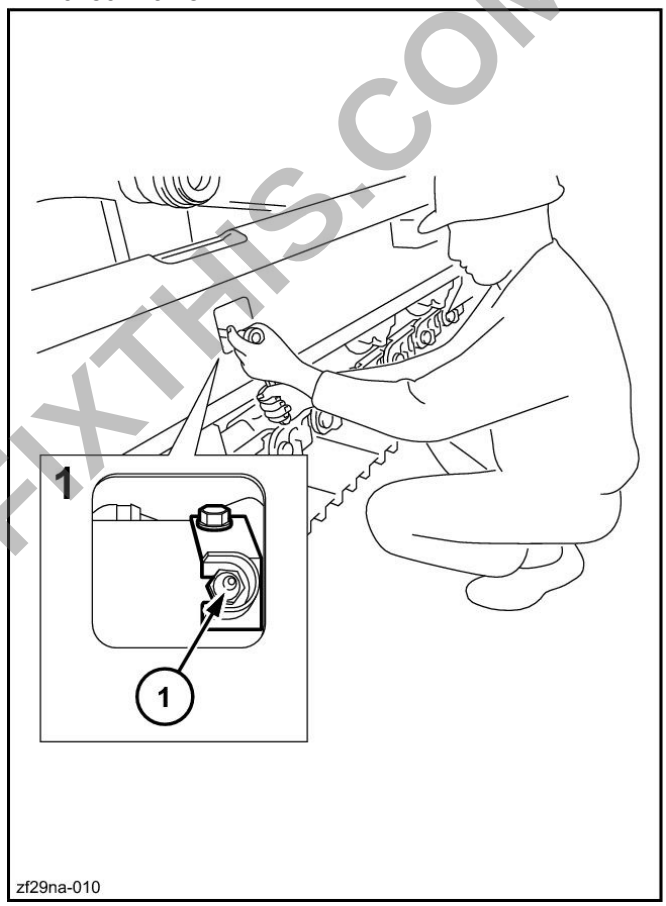
- Wrench (19 mm)
- Box wrench (19 mm)
- Hammer
- Wood planks, etc.
- Striking jig
- Crowbar
- Rag
- Lifting equipment (with the required breaking load)
- Liftcrane (with the required lifting capacity)

Removal of Shoe Assembly

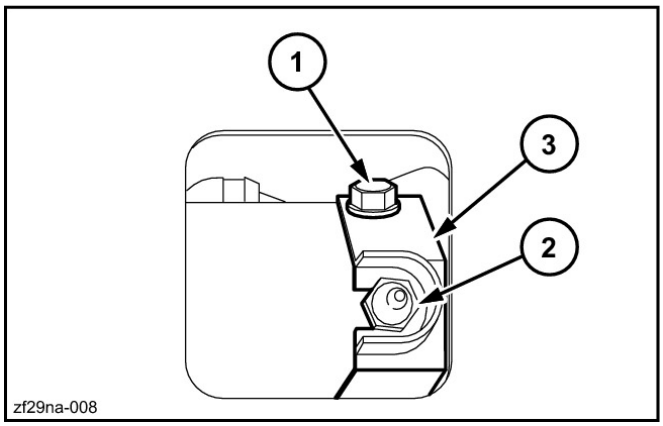
1. Rotate the shoe and align it so that the master pin (1) is next to the idler.



2. Use a box wrench (19 mm) to loosen the check valve (1) to release grease, and then loosen the track shoe tension.
   Do not loosen the check valve all at once.
   Loosen it slowly while monitoring the grease output and shoe loosening.
   Use a rag to catch grease that trickles out of the check valve.
   If the check valve is loosened too much at this time, it may fly off. Be careful not to work in front of the check valve.



3. Use a wrench (19 mm) to remove the bolt (1), and then remove the check valve (2) and stopper (3).
   - If the check valve (2) is removed, it is easier to loosen the track shoe tension.

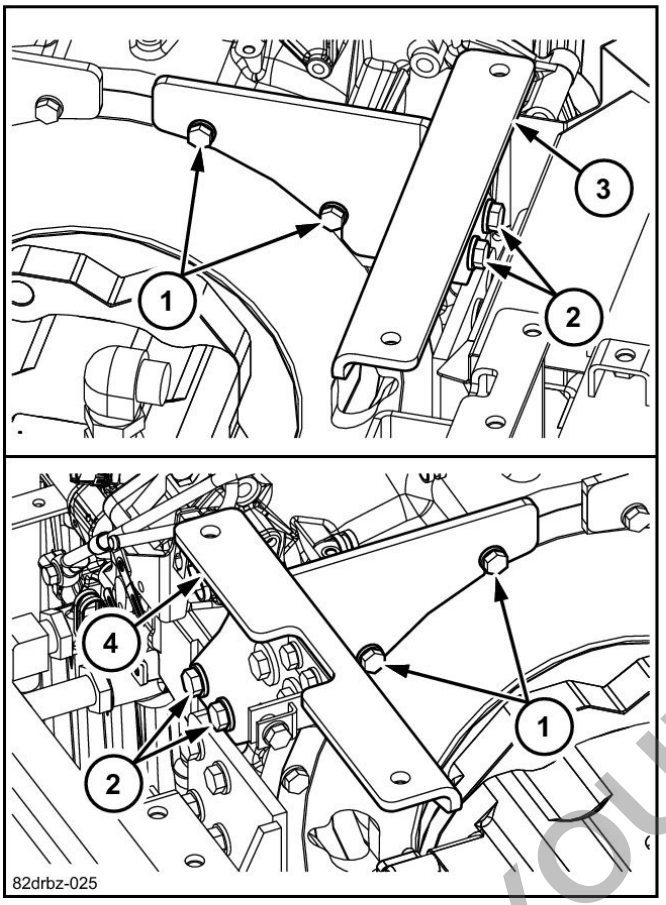


4. Straighten out the S-pin (2) attached to the master pin (1) by striking one side of it with a hammer, and use a crowbar, etc. to remove it.

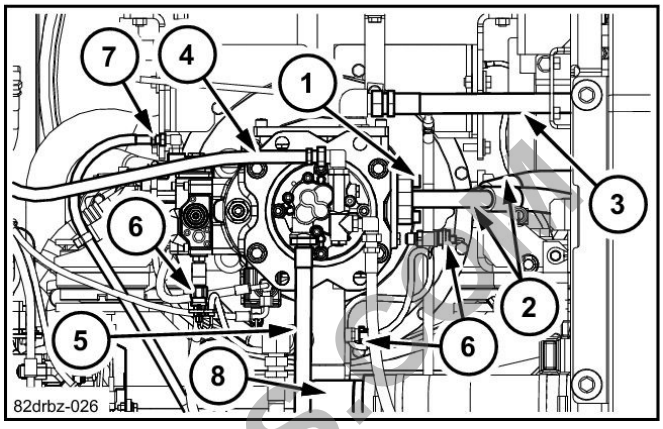
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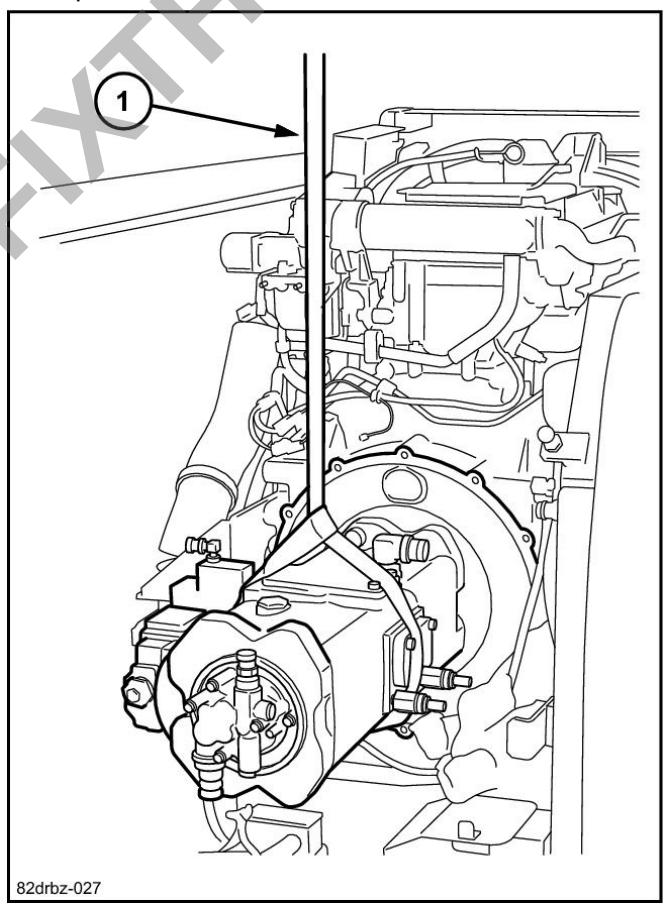
16. Use a wrench (17 mm) to remove the 4 bolts (1). Use a wrench (19 mm) to remove the 4 bolts (2), and then remove the brackets (3) (4).



17. Remove the hoses and connectors that are connected to the pump.
    - Use a hexagon wrench (10 mm) to remove the 8 hose bolts (1), and remove the pressure hoses (2).
    - Use a wrench (41 mm) to remove the drain hose (3).
    - Use a wrench (27 mm) to remove the pilot hose (4).
    - Use a wrench (36 mm) to remove the suction hose (5).
    - Remove the connectors (6).
    - Use a wrench (19 mm) to remove the hydraulic pilot hoses (7).
    - Use a hexagon wrench (14 mm) to remove the suction line 4 bolt and remove the suction line (8).
    - Mark the pump and hoses so that the connectors match at the time of assembly.
    - Attach caps or plugs to the pump and hoses to prevent any entry of water, dust or dirt.
    - Clean the pump and hoses by spraying with a parts cleaner to prevent scratches and prevent dirt from accumulating on the connectors.



18. Secure the pump with a liftcrane and nylon sling (1) so that it does not fall during removal and installation operations.



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⚠ CAUTION

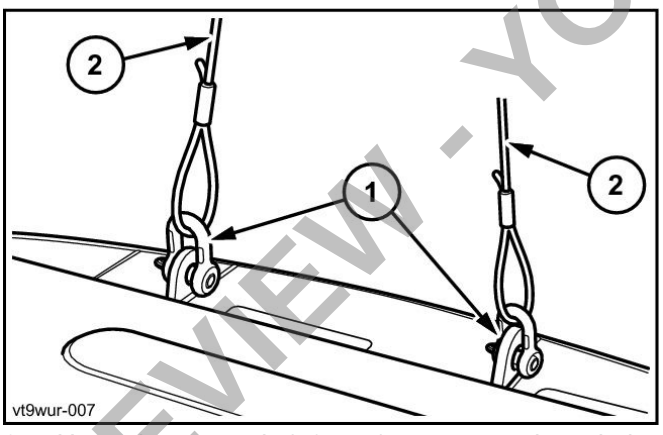
- **Be sure to stop the engine before beginning work.**
- **Be sure to inspect the wire rope and other lifting equipment before beginning work.**
- **Do not stand or pass under the suspended load.**
- **Thoroughly secure the removed counterweight with the wire ropes and liftcrane so that it does not fall over.**

Items to prepare

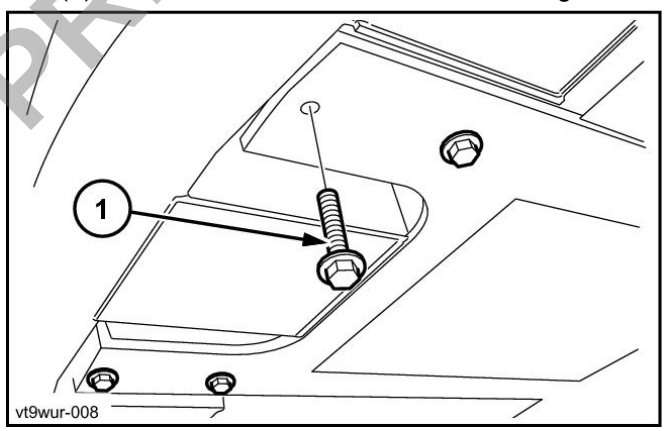
- Box wrench (50 mm)
- Balance lifting device
- Shackles (with the required lifting capacity) x 4
- Wire rope (with the required breaking load) x 4
- Liftcrane (with the required lifting capacity)
- Wood planks, etc.
- Rag
- Cleaning fluid

Removal of Counterweight

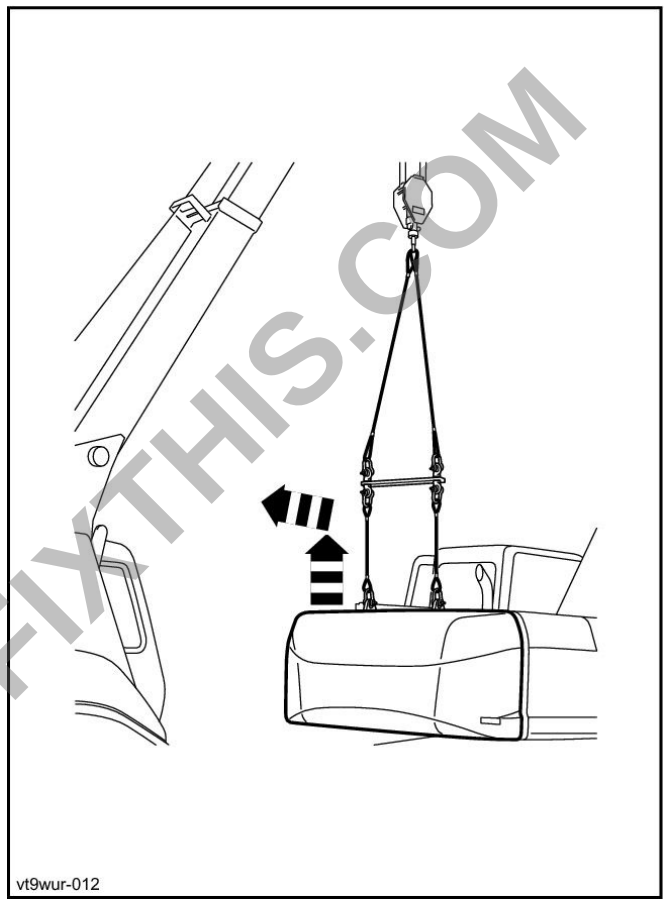
1. Remove the following before beginning work.。
   - Engine hood, gas damper and lock stay
   - Rear view camera and electrical parts bracket
2. Install the shackles (1), and then use the wire ropes (2) and liftcrane to secure the counterweight so that it does not fall during removal and installation operations.

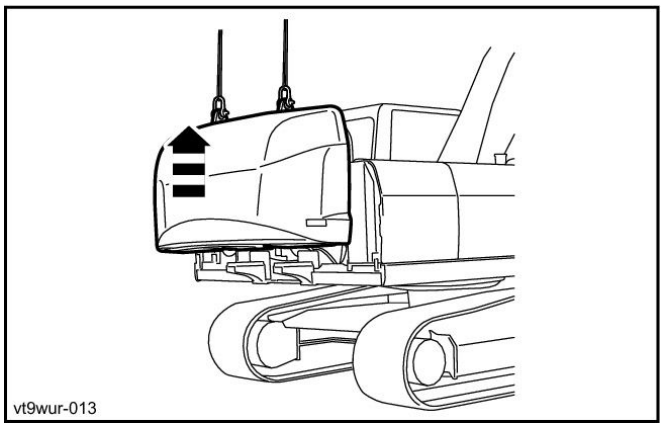


3. Use a box wrench (50 mm) to remove the 4 bolts (1) at the bottom section of the counterweight.



4. Use the wire ropes and liftcrane to lift and remove the counterweight.
   - Move the counterweight about 50 cm to the rear while lifting it so that it does not interfere with the housing, engine parts and pipes.





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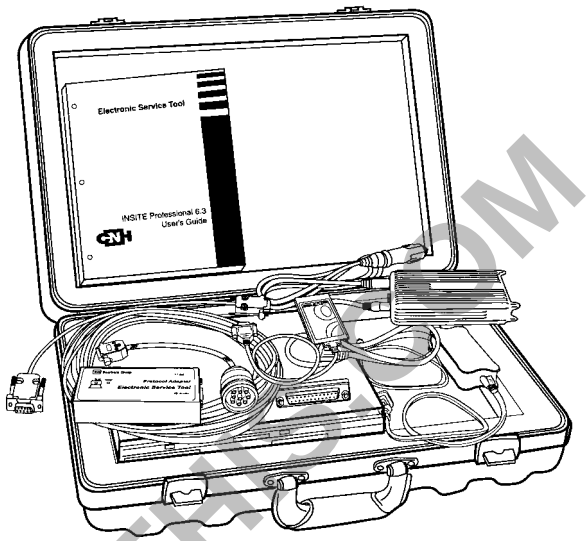
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Standard Torque Data For Cap Screws And Nuts 10

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CNH-EST DIAGNOSTIC TOOL (SCAN TOOL)

The EST (Electronic Service Tool) system allows diagnoses on machines and engines by detecting the operating parameters of electronic control components (control units, sensors etc.). It is also capable of reading fault codes.
To use this tool, please refer to the book provided during the CXC series training sessions.
Y-Cable 380060269 is required to connect the EST to the controllers.



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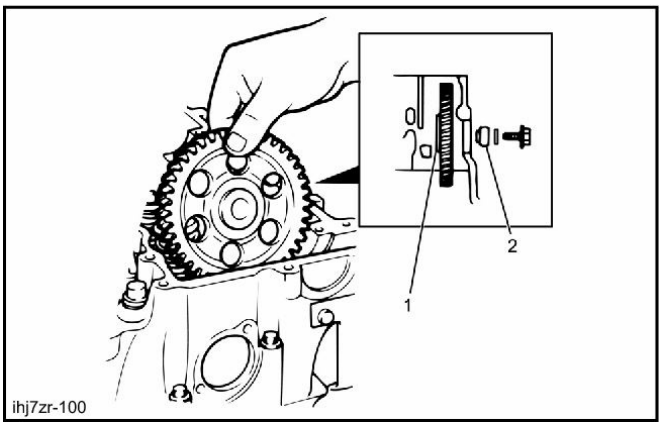
2) Apply the engine oil to the idle gear shaft.

ANNOTATION:

- *Apply engine oil to the outer circumference of the idle gear shaft.*

3) Temporarily tighten the idle gear C to the cylinder head assembly.

> ⚠ **CAUTION**
>
> - **Confirm that the spigot of the idle gear shaft is firmly installed to the cylinder head assembly.**



1	Idle gear C
2	Idle gear shaft

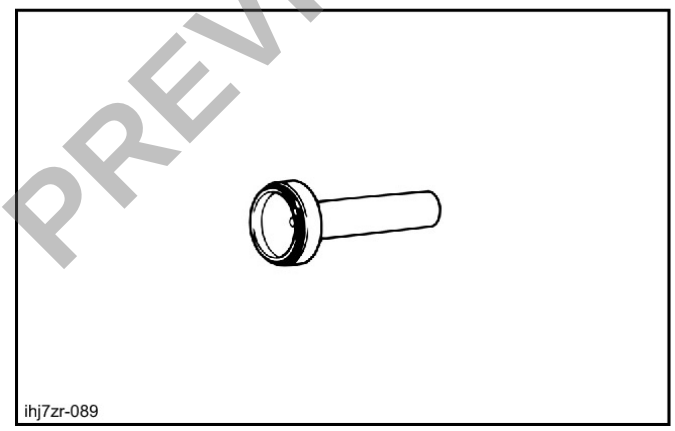
4) Securely tighten the idle gear C to the cylinder head assembly.
Tightening torque : 95 N· m { 9.7 kgf· m / 70 lb· ft }

5) Apply the cement to the idle gear C cover.

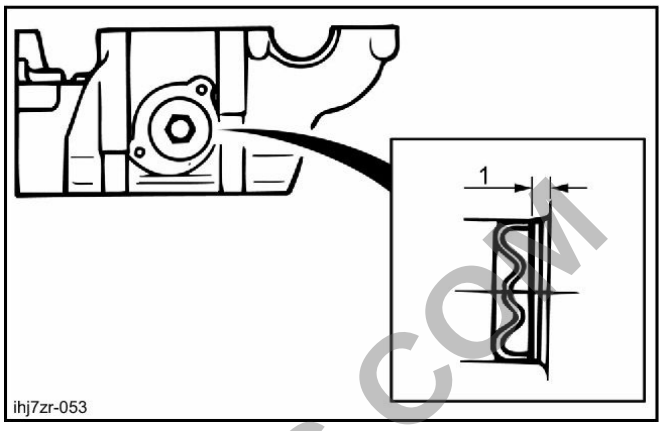
ANNOTATION:

- *Apply Loctite 962T to the outer circumference of the idle gear C cover.*

6) Install the idle gear C cover to the cylinder head assembly using the special tool.



Special tool: sealing cup installer (refer to section 1003)



1	Between the idle gear C cover end surface and cylinder head chamfered edge section

Specified length : 1.5 - 2.5 mm { 0.0591 - 0.0984 in }

11. CMP sensor Installation

1) Apply the engine oil to the O-ring.
2) Install the CMP sensor to the cylinder head assembly.

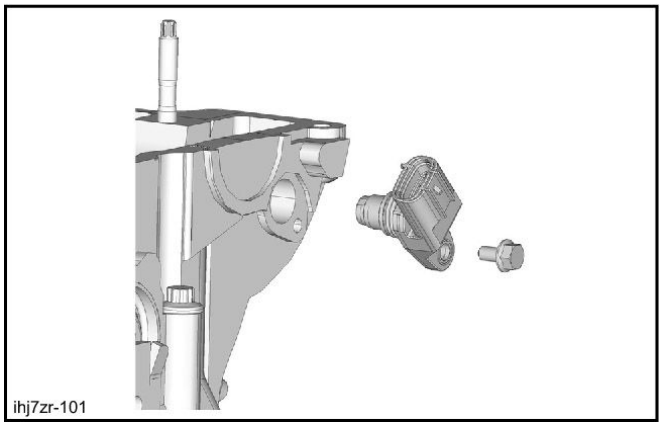
> ⚠ **CAUTION**
>
> - **Be careful not to subject the sensor to shock.**

ANNOTATION:

- *Tighten together with the clip.*

Tightening torque : 8 N· m { 0.8 kgf· m / 69 lb· in }

3) Connect the harness connector to the CMP sensor.

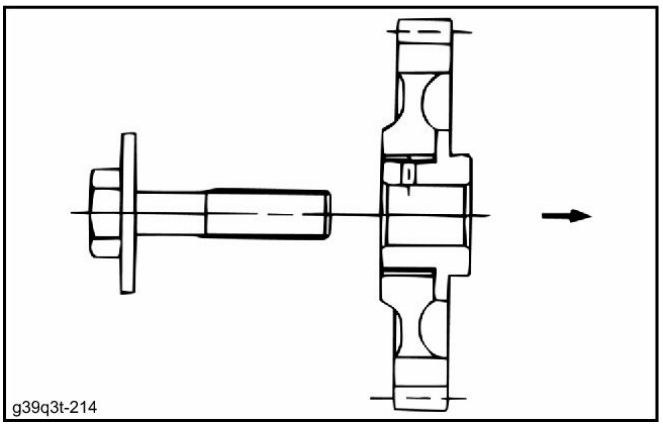


12. Engine coolant temperature sensor Installation

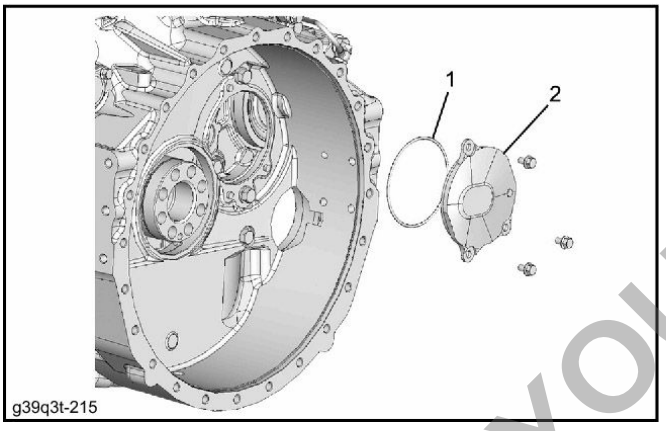
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6) Install the PTO idle gear to the cylinder block.
Tightening torque: 119 N· m {12.1 kgf· m / 88 lb· ft}



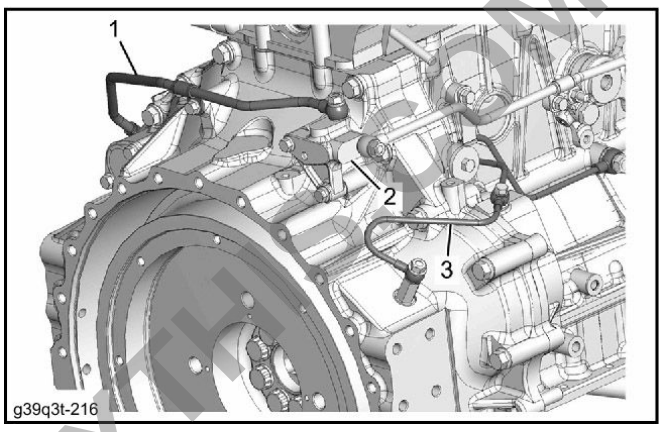
7) Install the O-ring to the cover.
8) Install the cover to the flywheel housing.



1	O-ring
2	Cover

9) Install the oil pipe to the pipe bracket and the oil port cover.
Tightening torque: 34 N· m {3.5 kgf· m / 25 lb· ft} Pipe bracket side
Tightening torque: 28 N· m {2.8 kgf· m / 20 lb· ft} Oil port cover side
Tightening torque: 24 N· m {2.4 kgf· m / 17 lb· ft} Clip

10) Install the PTO oil pipe to the flywheel housing and the cylinder block.
Tightening torque: 34 N· m {3.5 kgf· m / 25 lb· ft} Flywheel housing side
Tightening torque: 15 N· m {1.5 kgf· m / 11 lb· ft} PTO side
Tightening torque: 41 N· m {4.2 kgf· m / 30 lb· ft} Cylinder block side
Tightening torque: 24 N· m {2.4 kgf· m / 17 lb· ft} Clip



1	Oil pipe
2	Pipe bracket
3	PTO oil pipe

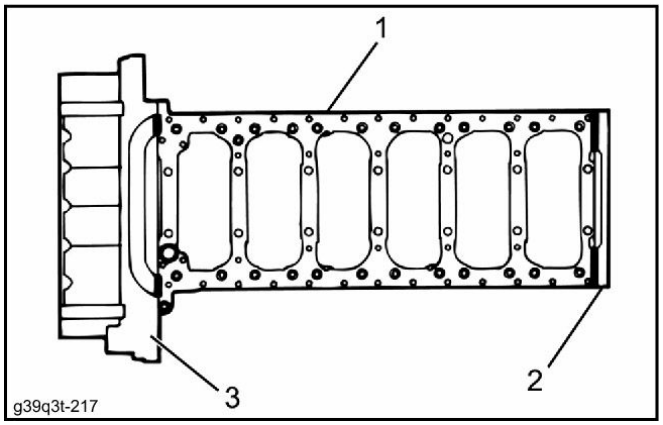
4. Oil pan Installation

1) Apply the liquid gasket to the crankcase.

ANNOTATION:

- *Apply ThreeBond 1207B to each joint of the crankcase, flywheel housing and gear case.*

Bead width: 3.0 mm {0.118 in}
Bead height: 2.0 mm {0.079 in}



1	Crankcase
2	Timing gear case
3	Flywheel housing

⚠ CAUTION

- **After applying the liquid gasket, install the oil pan within 5 minutes.**

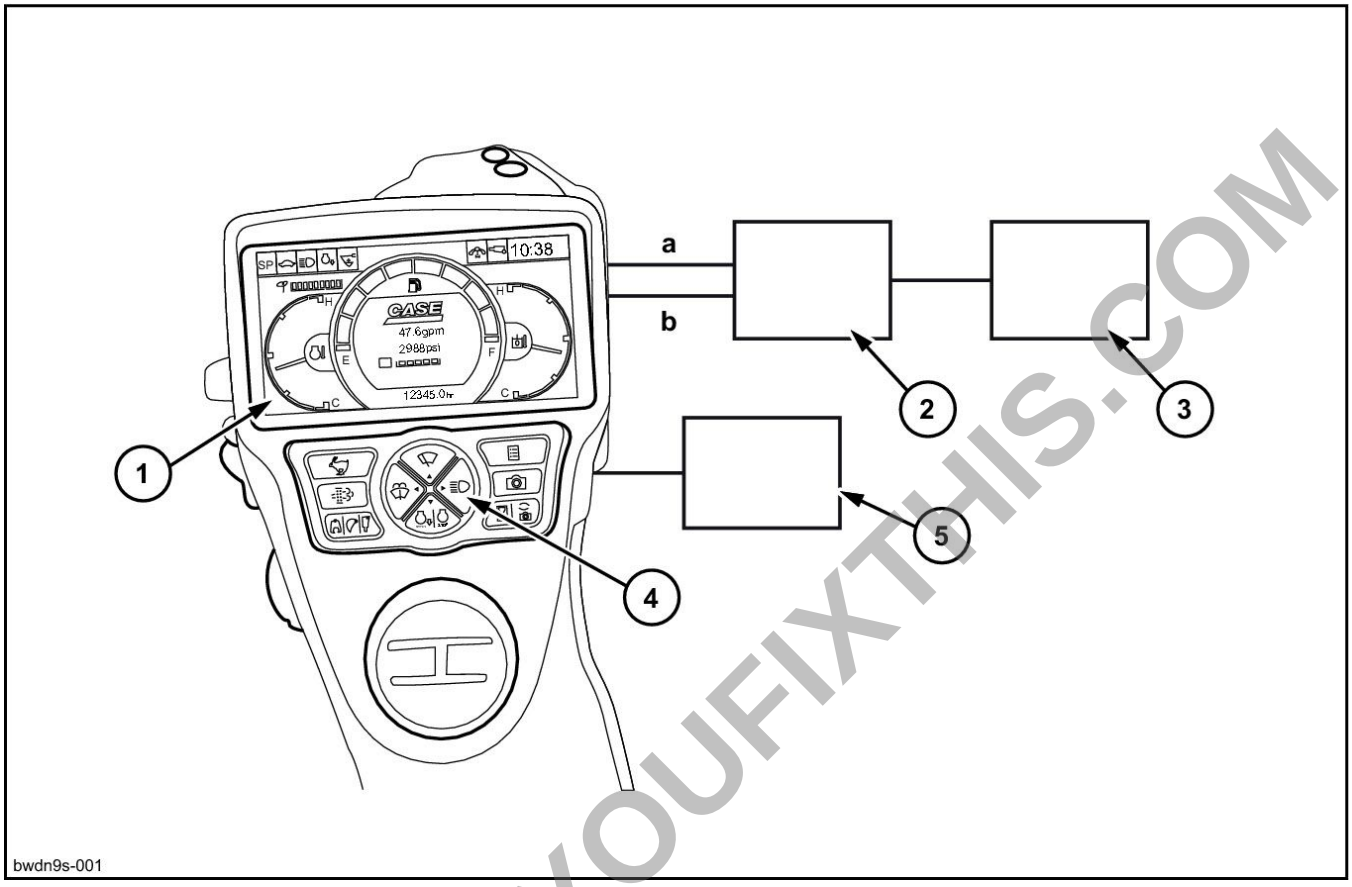
2) Install the gasket to the oil pan.

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Monitor Display Dimming

Purpose

Adjusts the brightness of the backlight through operation that is linked to the working light and solar radiation sensor.



1	Monitor	3	Solar radiation sensor	5	Working light relay
2	Computer A	4	Working light switch		

a	Dimming level automatic adjustment using the solar radiation sensor
b	Working light-linked dimming using the working light relay

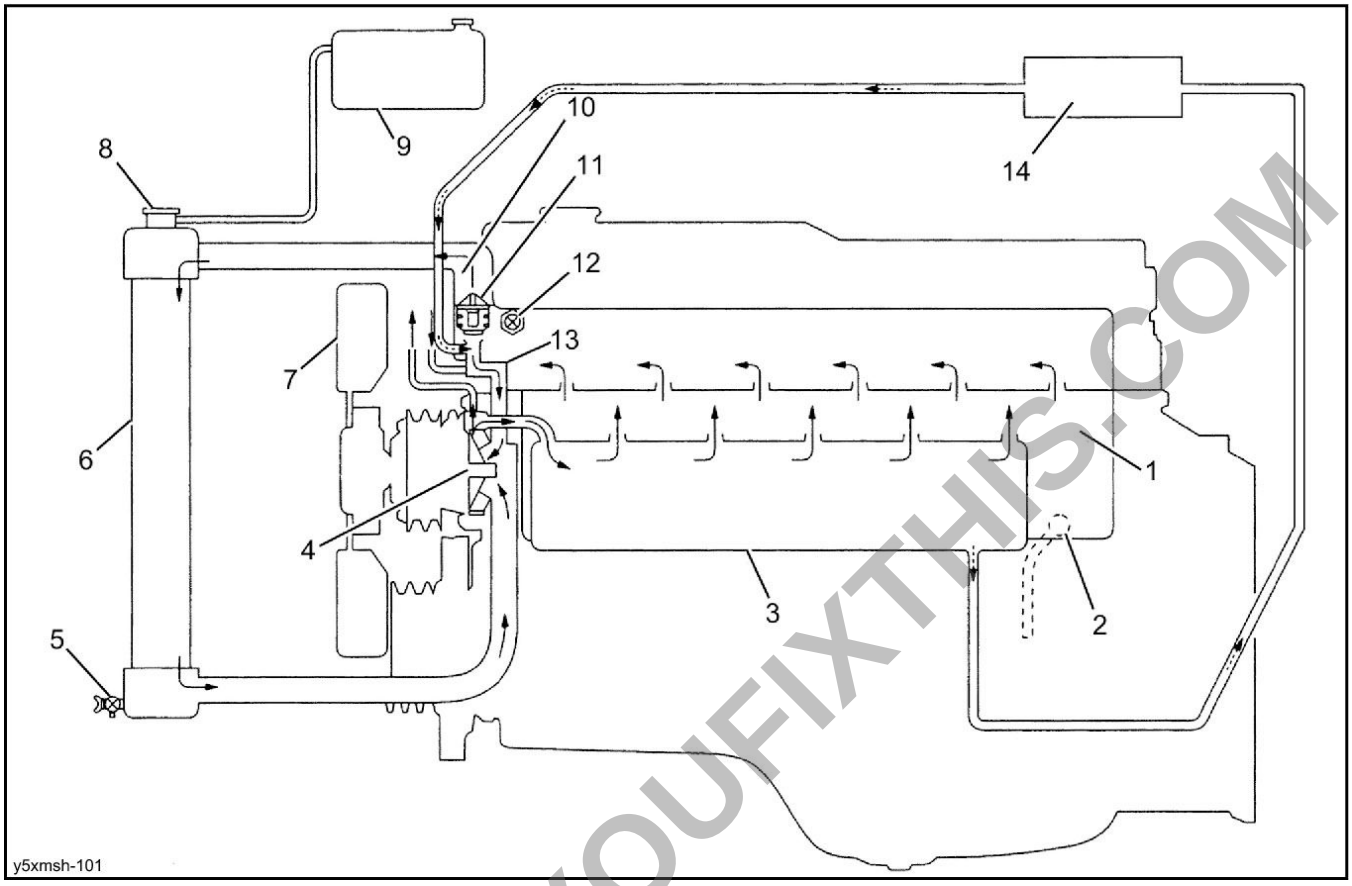
Operation explanation

1. When the operator turns the key ON, the monitor screen brightness is set to "brightness (day)".
2. When the operator turns the working light ON, the monitor screen brightness is set to "brightness (night)" (= working light-linked dimming).
   - When working light-linked dimming is set to OFF on the rear screen, instead of using "brightness (night)" to adjust the monitor screen brightness when the working light is ON, the brightness is judged using the solar radiation sensor (= dimming level automatic adjustment).
   - The brightness when the working light is OFF is set to "brightness (day)" regardless of whether working light-linked dimming is set to ON or OFF.
3. The operator can set "brightness (day)" or "brightness (night)" in the menu screen.
   - The screen brightness setting is stored inside the monitor, so the setting is saved even if a computer is replaced.

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4) Cooling system
The coolant system is the forced-circulation system, and its main components are the water pump, thermostat and radiator.



1	Water jacket	6	Radiator	11	Thermostat, 2 units
2	Drain plug	7	Cooling fan	12	Water temperature sensor
3	Oil cooler	8	Radiator cap	13	Bypass route
4	Water pump	9	Radiator reserve tank	14	EGR cooler
5	Drain cock	10	Water outlet pipe		

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Special tool: connector test adapter kit
(refer to section 1003)

Commercial electronic equipment

Commercial electronic equipment refers to commercially available electronic equipment attached to the unit after it has been shipped from the factory.

Be careful, as such accessories are not taken into particular consideration at the machine design stage.

Commercial electronic equipment may cause malfunctions in the electronic control system, even if the equipment is properly attached.

This includes equipment not connected to the electronic system of the machine, such as mobile telephones and radios.

Therefore, when diagnosing power train problems, confirm whether such commercial electronic equipment is attached first and then remove them from the machine if such equipment is attached.

If the problem has not been resolved after removing the equipment, perform the diagnosis using the regular procedure.

⚠ CAUTION

- **Make sure that commercial electronic equipment is connected to a circuit that is not involved with the circuits of the electronic control system for both power and ground.**

Welding operation for the actual unit

When performing welding to the actual unit, make sure to disconnect the battery in prior to the operation.

Current that occurred during welding may lead to failure and/or damage to the electronic control system.

Damage caused by electrostatic discharge

As the electronic components used in the electronic control system are designed to operate at extremely low voltages, they can be easily damaged by electrostatic discharge, and some types of electronic components can be damaged by static electricity of 100 V or less, which cannot be felt by a person.

Note that a voltage of 4000 V is required for a person to be able to detect electrostatic discharge.

There are various ways a person can build up an electrostatic charge.

The most common way to build up an electrostatic charge is through methods based on friction or induction.

An example of when a person builds an electrostatic charge by friction is when he/she slides across the seat of the machine.

A person wearing insulated shoes can build an electrostatic charge by induction if he/she momentarily touches the ground while standing near a highly charged object. A charge of the same polarity flows out, and with a highly opposing polarity, that person becomes charged.

As static electricity causes damage, be cautious when handling or testing electronic components.

⚠ CAUTION

- **To prevent damage due to electrostatic discharge, do not touch the connector pins of the ECM or the electronic components soldered onto the circuit board of the ECM.**
- **To prevent damage due to electrostatic discharge, do not open the packaging of a replacement part until installation preparation for the replacement part is completed.**
- **To prevent damage due to electrostatic discharge, connect the part packaging to a properly working ground connection of the actual unit before removing the part from its packaging.**
- **To prevent damage due to electrostatic discharge, when handling a part while sliding across the seat, sitting down from a standing position, or walking a certain distance, touch a properly working ground connection before attaching the part.**

Fuel injection system

Fuel piping

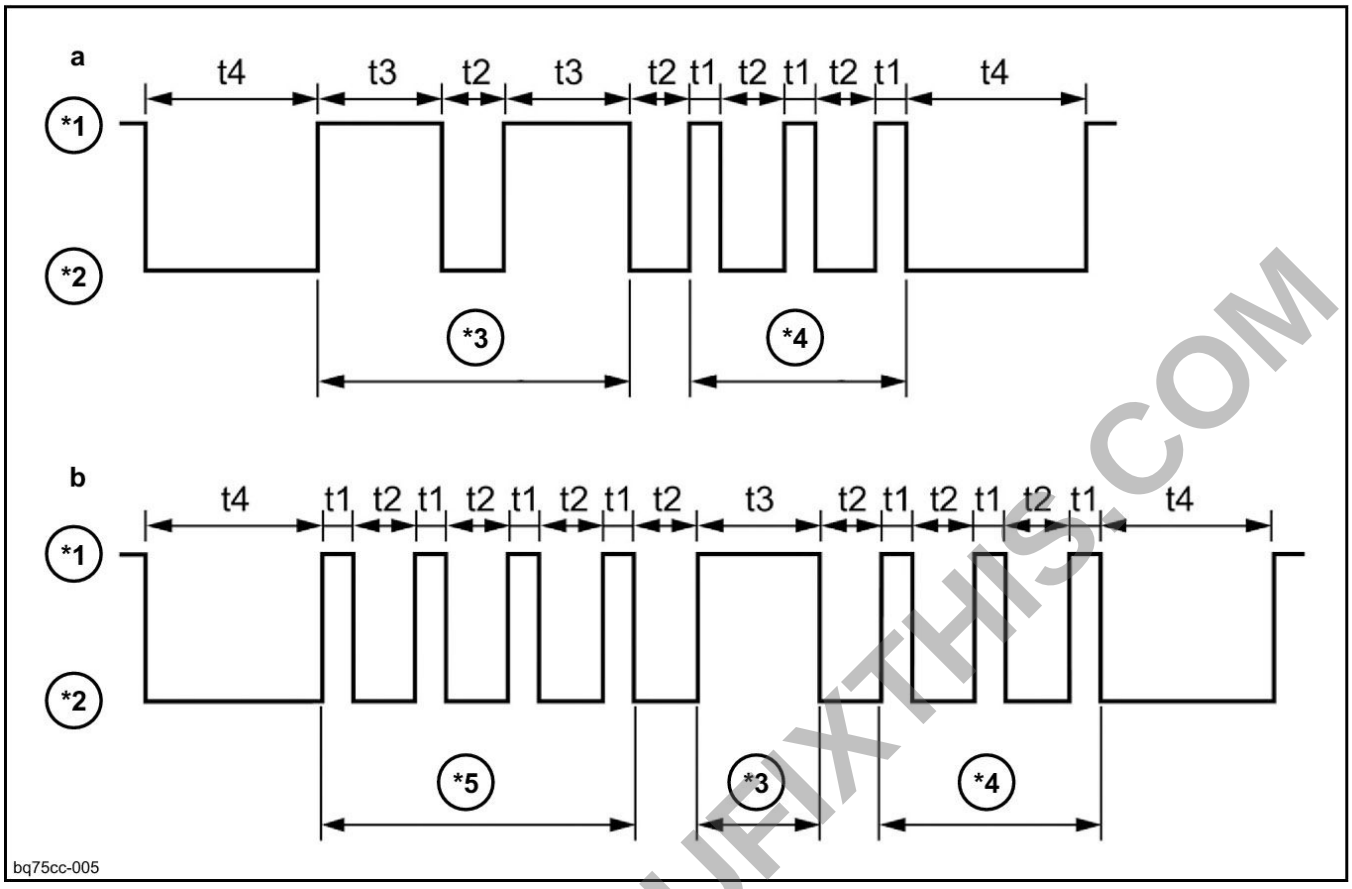
⚠ WARNING

The high pressure pipe and injector pipe in the fuel system should not be reused.
When it is once removed, make sure to replace it with new one.

The pressure limiter or fuel pressure sensor should not be replaced individually.
When a failure is found, the common rail assembly and all fuel pipes should be replaced.

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a	At code "23"
b	At code "413"

*1	ON	*3	Tens digit	*5	Hundreds digit
*2	Goes off	*4	Units digit		

t1	Approx. 0.3 sec	t3	Approx. 1.2 sec
t2	Approx. 0.6 sec	t4	Approx. 2.4 sec

DTC indicated by monitor blinking display
The current and past DTCs are both displayed while the engine is being stopped.
While the engine is in operation, the light is turned on only when a current DTC exists.
Using the trouble display monitor to read the DTC
When a DTC occurs, the DTC can be displayed on the trouble display monitor of the actual unit.
Using the scan tool to read the DTC
The DTC can be read using the trouble diagnosis scan tool.

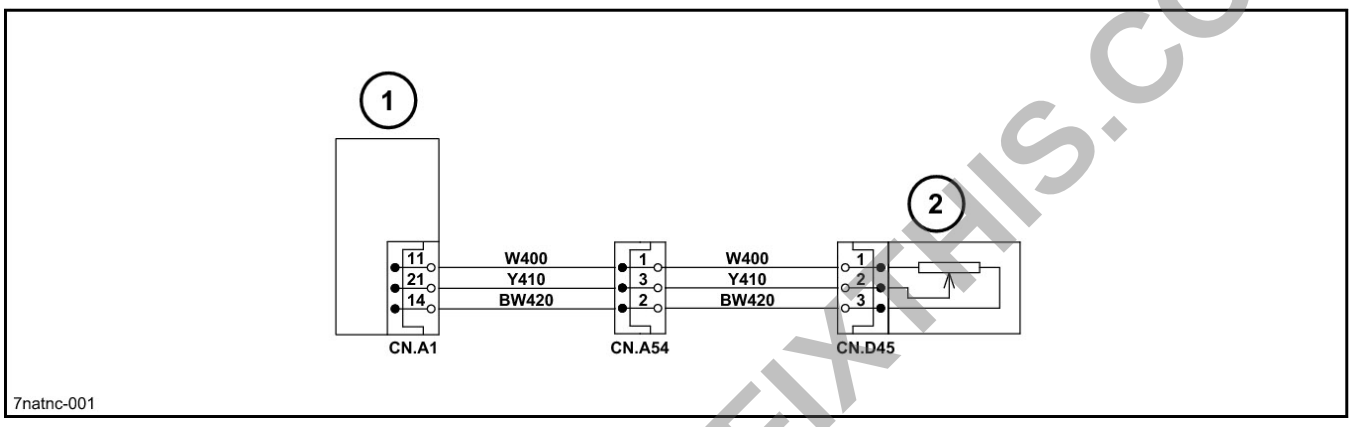
ANNOTATION:

- *For the work procedure, refer to the manual of the trouble diagnosis scan tool.*

When the DTC is recorded
Perform repairs accurately according to the specified DTC chart.
If no DTC is available
Select the symptom from "Diagnosis By Symptom".
Complete the repair according to the diagnostic procedure.
It is also possible to perform the inspection by referring to the functional diagnosis.
When the appropriate symptom is not found;
Investigate the complaint in detail.
Create a diagnosis plan.
Utilize the schematics and operation principles.
When repair history for similar cases are available, request technical assistance.
Combine technical knowledge and effective utilization of available service information.
Intermittent

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Step	Action	Standard value	Yes	No
11	1. Turn the key switch ON. 2. Measure the voltage between the ground and terminal 1 of the CN. D45 harness side. Is it about 5 V?	About 5 V	Go to Step 12	W400 or W401 harness defect (disconnection). Repair or replace
12	1. Measure the voltage between the ground and terminal 2 of the CN. D45 harness side. Is it 0.25 V or higher?	0.25 V or higher	Computer A defect. Replace	Y410 harness defect (disconnection). Replace

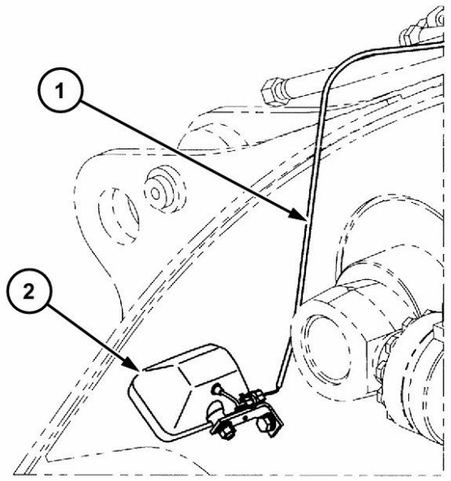


1	COMPUTER A
2	PRESS. SENSOR (P1)

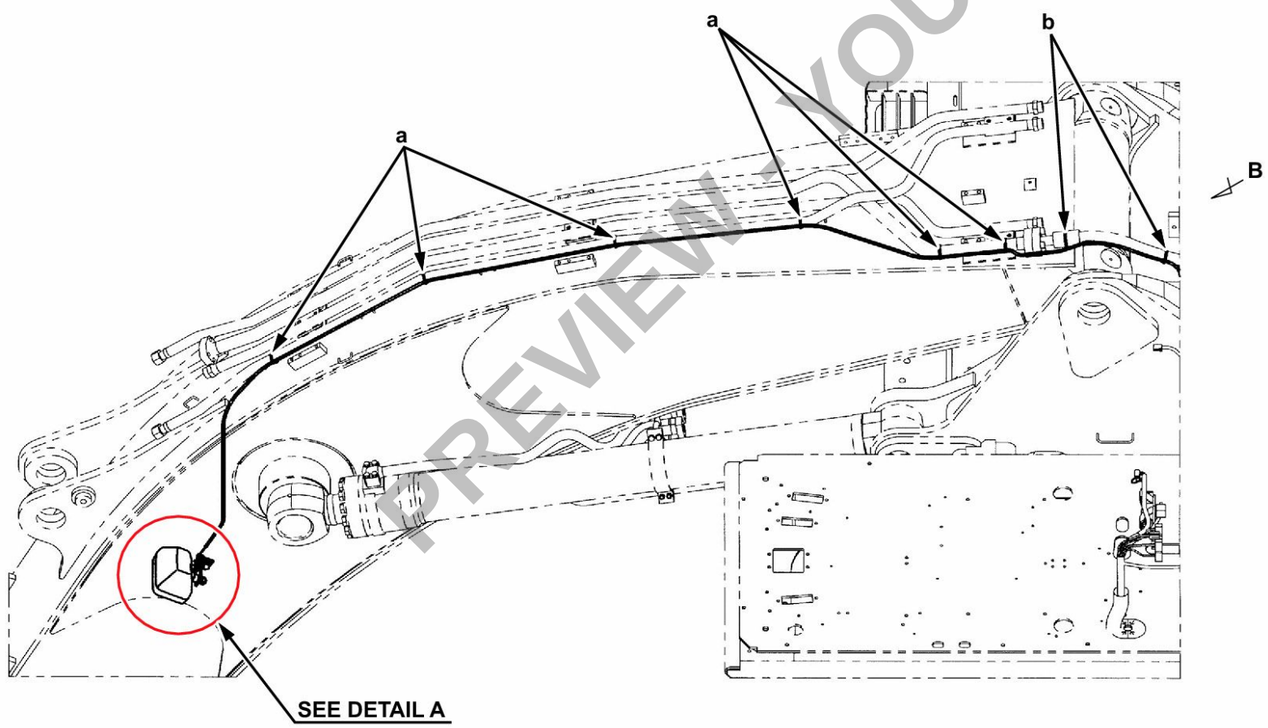
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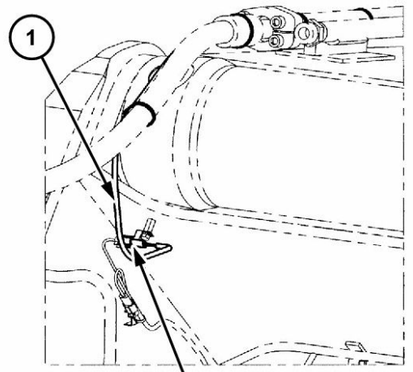
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Attachments



DETAIL A





CN.D73
B~

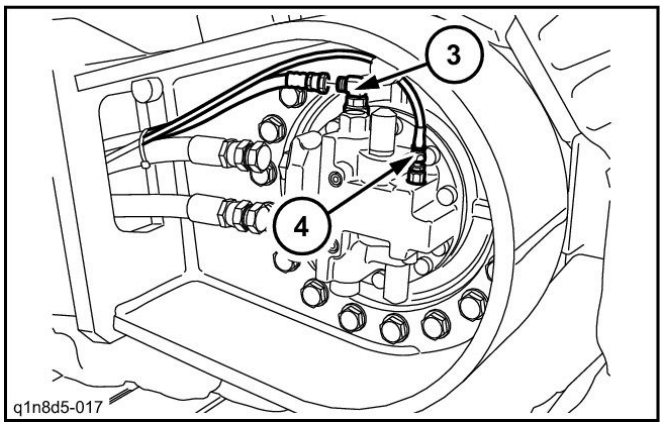
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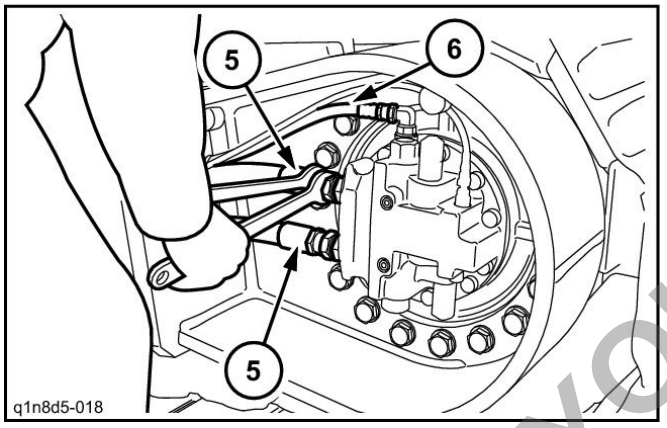
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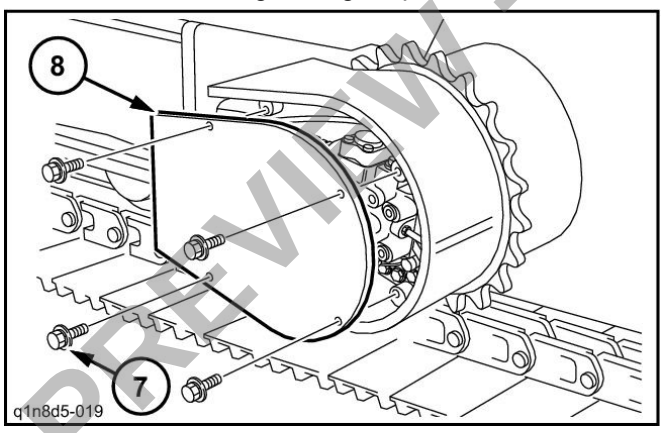
3. Use a wrench (27 mm) to remove the elbow (3) and a wrench (19 mm) to install the pilot hose (4).



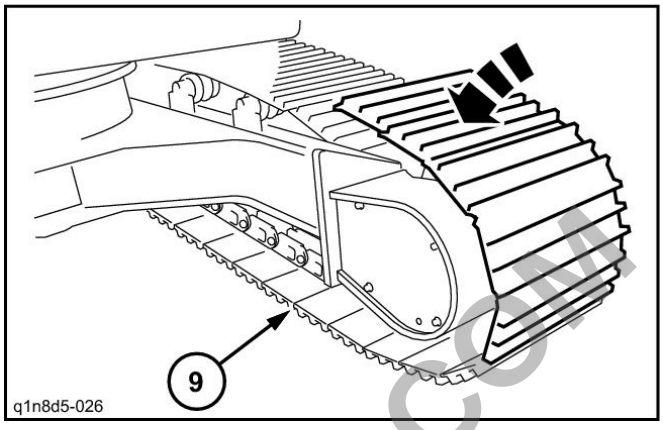
4. Use wrenches (27 mm for drain hose, 36 mm for high-pressure hose) to install the drain hose (6) and high-pressure hoses (5).



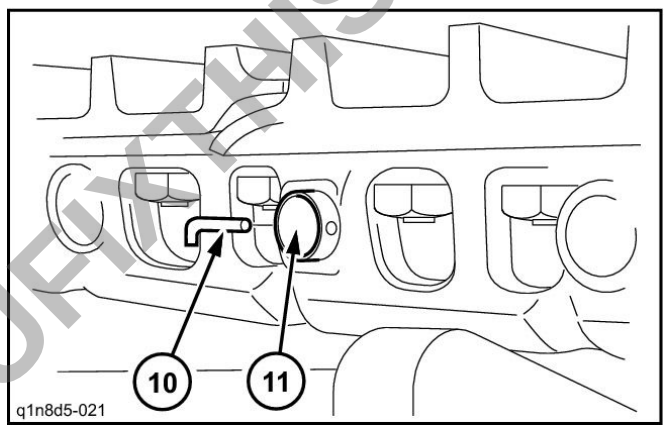
5. Use a wrench (19 mm) to install the cover (8) with the 4 bolts (7).
   Installation bolt tightening torque: 63.7 - 73.5 N· m



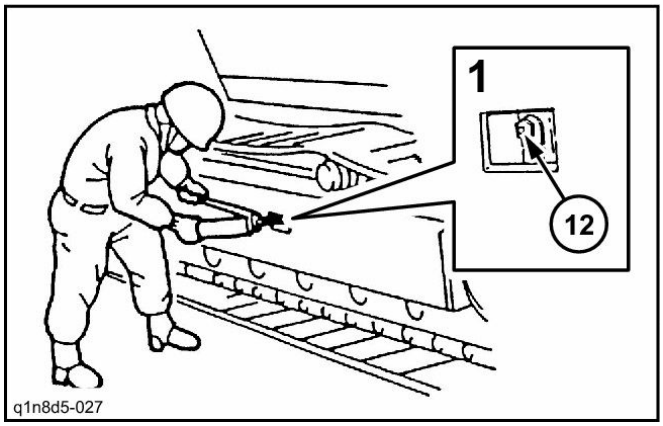
6. Wrap the shoe (9).



7. Insert the master pin (11).
   Insert the S-pin (10) and bend it so that it cannot slip out.



8. Tighten the check valve (12).
   While monitoring the track shoe tension, inject grease into the grease cylinder.



9. When adjusting the track shoe tension, raise the lower side frame as shown in the diagram.
   Place a wood plank (13) under the lower frame to prevent falling.
   Adjust the tension so that the distance indicated with A between the frame bottom (14) of the center area of the lower side frame and the lowest hanging part of the top of the shoe plate (15) is 340 - 360 mm.

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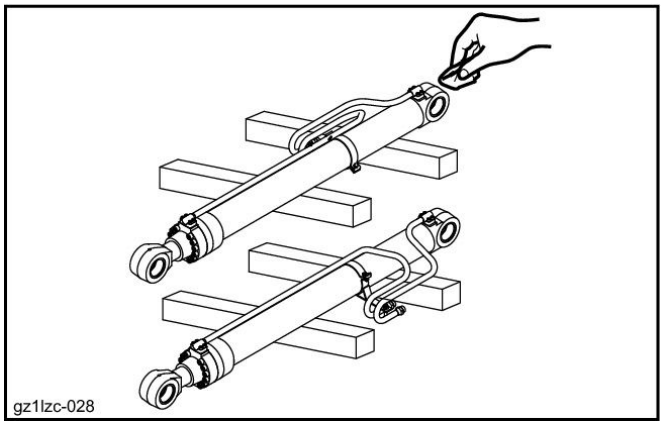
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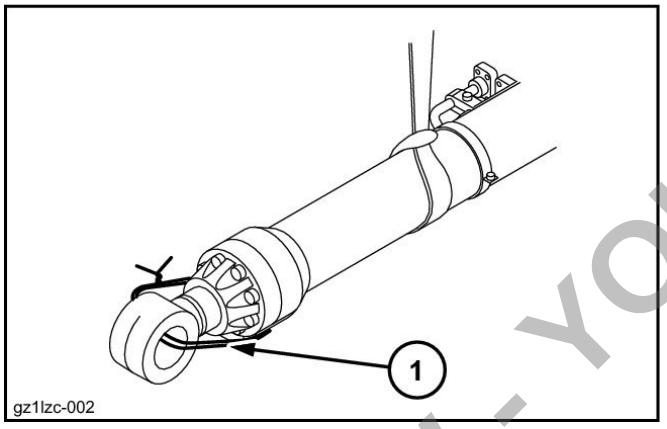
Installation of Boom Cylinder

- Tighten bolts being installed to the specified torque.
- When the torque is not specified, check the "Bolt Size and Torque Table".

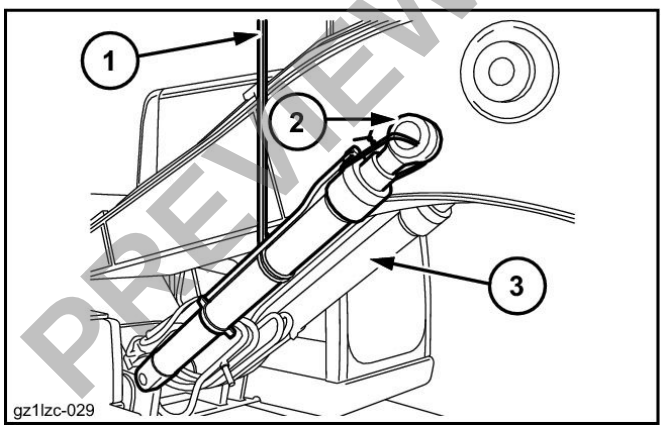
1. Clean each pin and pin hole.



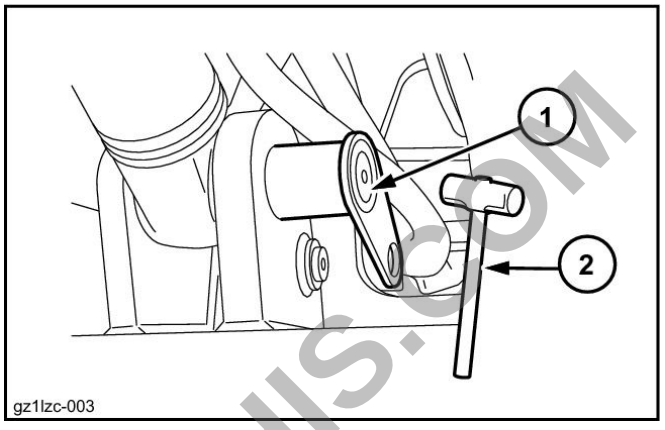
2. Tie the cylinder rods on the left and right sides with wire (1) so that they cannot come out.



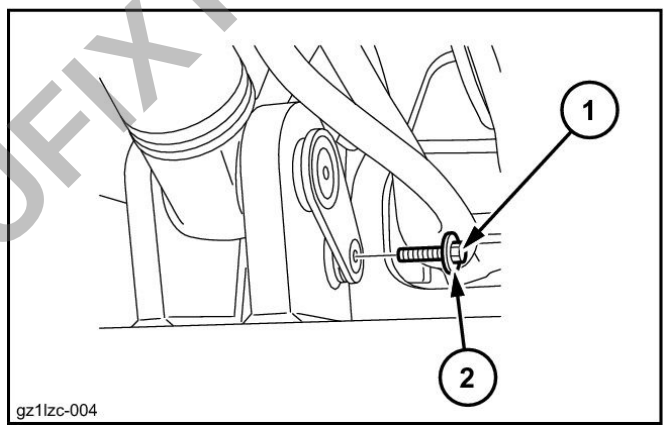
3. Use a liftcrane and nylon slings (1) to lift the boom cylinders (right) (left) (2) (3).



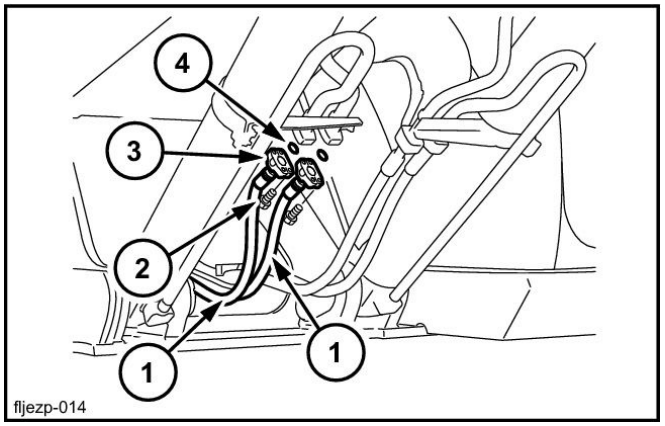
4. Align the boom cylinders (right) (left) with the swing frame pin holes and use a hammer (2) to push in the pin (1).
   - When inserting the pin, be careful not to damage the installed dust seals.



5. Use a wrench (30 mm) to tighten the bolt (1) and spacer (2).
   Also, attach the cab side in the same way.



6. After setting the 2 O-rings (4) on the line side, install the hose (1) with the 4 split flanges (3) and the 8 hexagon bolts (2).
   - The O-rings cannot be reused.
     Replace them with new parts.



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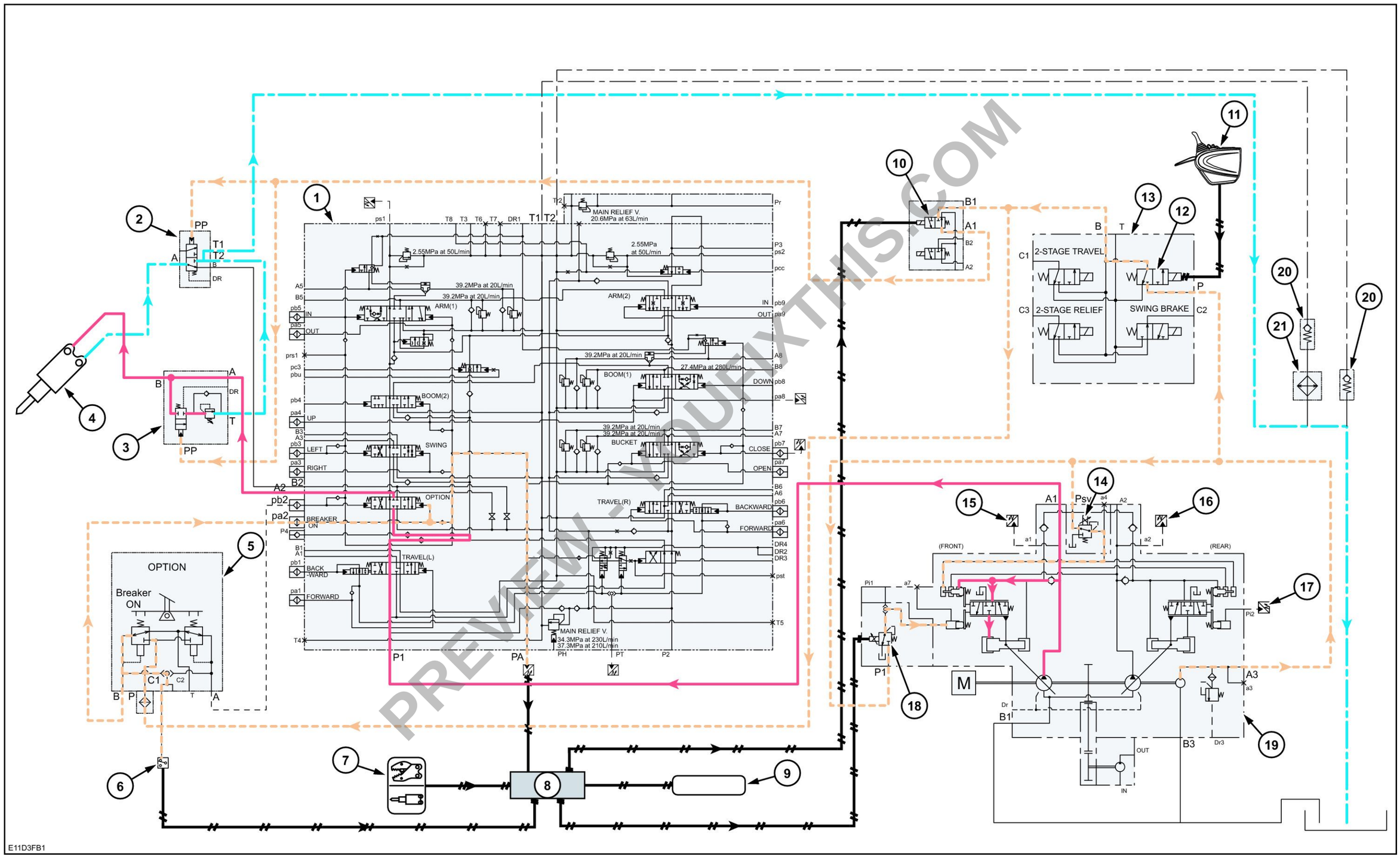
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Multi-purpose circuit (breaker Q control)



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2. When the handle is tilted (See Diagram 3.)
   When the handle is tiled and the push rod (212) is moved through a stroke, the (spring seating (216)) spool (201) moves down and the oil fed from the pilot pump flows out to the ports (2, 4) through the P port and the ports (2, 4) and pressure is generated.

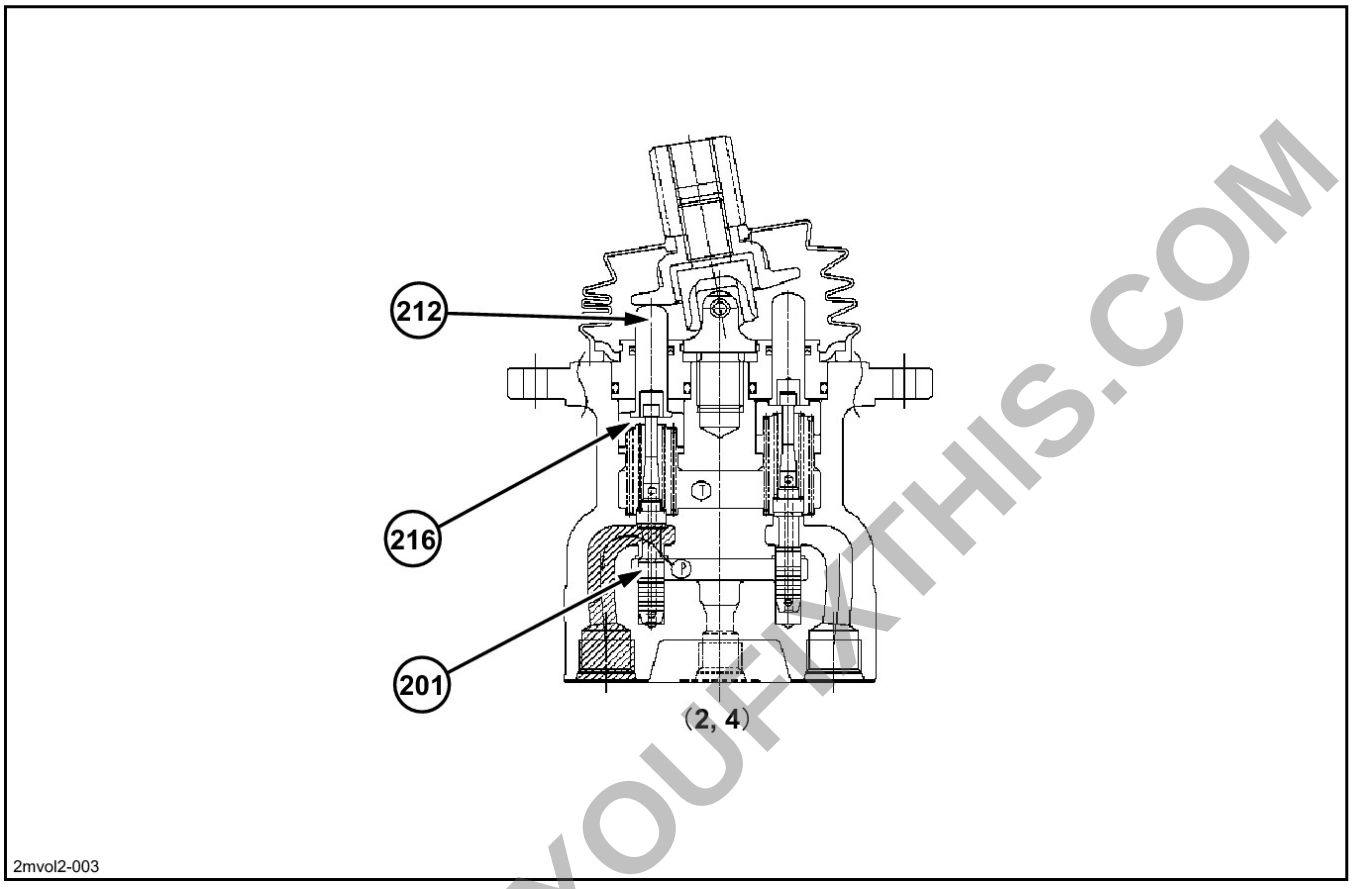


Diagram 3 When the handle is tilted

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