SEN06803-03

Shop Manual

COMPACT
HYDRAULIC
EXCAVATOR

PC18MR-5

SERIAL NUMBERS 30001 and up

KOMATSU

Symbols

Important safety and quality portions are marked with the following symbols so that shop manual is used effectively.

Symbol	Item	Remark
	Danger	This signal indicates an extremely hazardous situation which will result in death or serious injury if it is not avoided.
	Warning	This signal indicates a potentially hazardous situation which will result in death or serious injury if it is not avoided.
	Caution	This signal indicates a potentially hazardous situation which will result in injury or property damage around the machine if it is not avoided.
	Weight	This signal indicates the weight of parts and components, and items which requires great attention to a selection of wires and working posture for slinging work.
	Tightening torque	This signal indicates the tightening torque for portions which requires special care in assembling work.
	Coat	This signal indicates a place to be coated with adhesive, grease, etc. in assembling work.
	Oil and coolant	This signal indicates a place to supply oil, coolant, etc. and the quantity.
	Draining	This signal indicates a place to drain oil, coolant, etc. and the quantity.
	Safety	This symbol indicates the works which require special caution for the machine safety when assembling.

Signal word

Signal word for notice and remark describes the following.

Symbol	Item	Remark
NOTICE	Notice	If the precaution of this signal word is not observed, the machine damage or shortening of service life may occur.
REMARK	Remark	This signal word contains useful information to know.

Unit

International System of Units (SI) is used in this manual. For reference, units that have been used in the past are given in { }.

- When there are thatched houses, dry leaves or pieces of paper near the work site, set the system to disable the regeneration before starting work to prevent fire hazards due to highly heated exhaust gas caused by KDPF regeneration.
  See the Operation and Maintenance Manual for the setting procedure.

Explosion caused by lighting equipment

- When checking fuel, oil, battery electrolyte, or coolant, always use lighting equipment with anti-explosion specifications.
- When taking the electrical power for the lighting equipment from the machine, follow the instructions in the Operation and Maintenance Manual.

- Bend the cotter pins and lock plates securely.
- When applying adhesive, clean and degrease the surface to apply, and apply 2 to 3 drops of adhesive to the threaded portion.
- When applying liquid gasket, clean and degrease the surface, and apply it uniformly after making sure that the surface is free from dust or damage.
- Clean all of the parts. If there is any damage, dents, burrs, or rust found on them, repair it.
- Apply engine oil to the rotating parts and sliding surface.
- Apply molybdenum disulfide lubricant (LM-P) to the surfaces of the press-fitting parts.
- After installing the snap ring, check that the snap ring is settled in the ring groove completely.
- When connecting wiring harness connectors, clean the connectors to remove oil, dust, or water, then connect them securely.
- Use the eye bolts without fatigue and deformation and screw them in securely. Match the directions of the eyes and the hook.
- When installing split flanges, tighten the bolts uniformly and alternately to prevent uneven tightening.
- As a rule, apply liquid gasket (LG-5) or liquid sealant (LS-2) to the threaded portion of each taper male screws which receive pressure.

  REMARK

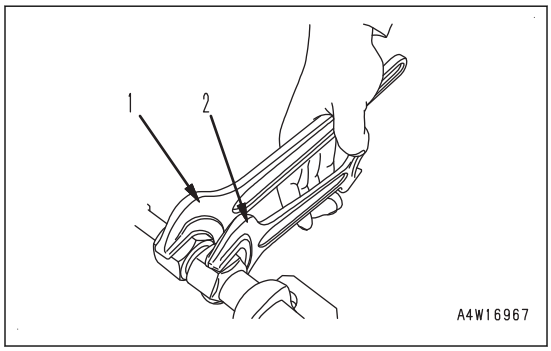
  If the threaded portion is difficult to degrease, you may use a seal tape.

  When winding a seal tape onto a right-handed taper male screw, start winding the screw clockwise from the third thread in the advancing direction of the threads seeing from the screw end.

  NOTICE

  If the seal tape is wound counterclockwise, it may become loose when screwed in, and it may come off. If the sealed tip is pushed outside, it may cause oil leakage.

- To connect the face seal type hose to the cylinder tube connected to the cylinder with the face joint seal, tighten it by gripping the two wrenches together, one is the wrench (1) on the hose side, and the other is the wrench (2) on the cylinder tube reaction force point as shown in the following figure. Use the grip strength only. Check after the hose is connected that the joint portion of the cylinder and the cylinder tube is tightened to the specified torque. Re-tighten it if the tightening torque is insufficient.



  NOTICE

  Cylinder tube is rotated due to the load applied to the reaction force point of the cylinder tube, and it is a cause of weakening of the tightening torque. It may lead to oil leakage.

NOTICE

When assembling the hydraulic equipment such as cylinders, pumps and pipings which are removed, be sure to bleed air from the hydraulic circuit before operating it for the first time according to the following procedure.

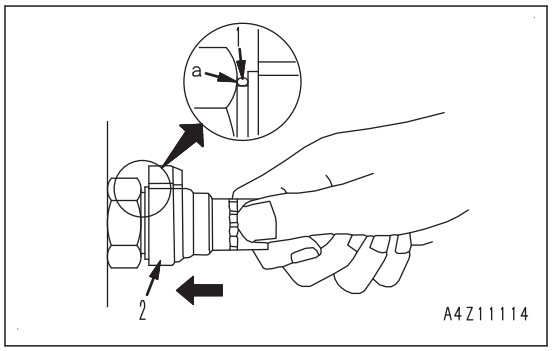
1. Start the engine, and run it at low idle.
2. Perform the operation to extend and retract each cylinder of the work equipment and stop it at approximately 100 mm before the stroke end for 4 or 5 times.
3. Perform the operation to extend and retract each cylinder of the work equipment and stop it at the stroke end for 3 or 4times.

NOTICE

After repair is finished, when operating the machine which has been stored for a long period, bleed air from the hydraulic circuit according to the same procedure.

Connection

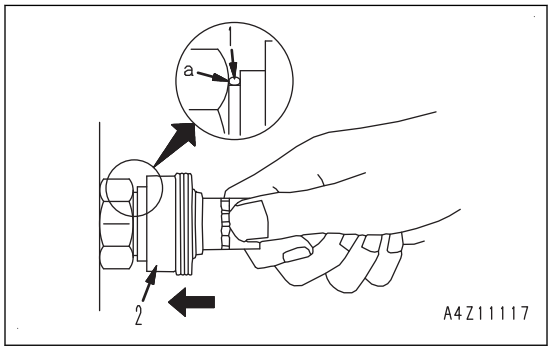
Hold the tightening adapter part, and push body (2) straight until sliding prevention ring (1) contacts contact surface (a) of the hexagonal part at the male end.



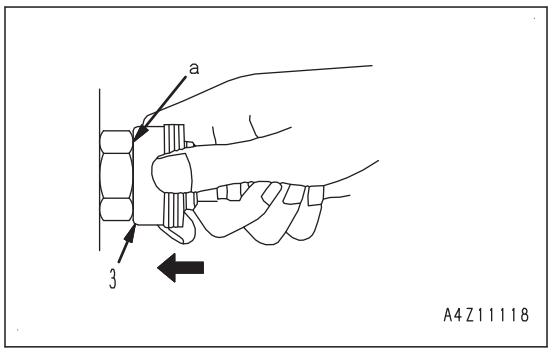
METHOD FOR DISCONNECTING AND CONNECTING TYPE 3 PUSH-PULL TYPE COUPLER

Disconnection

1. Hold the tightening adapter part and push body (2) straight until sliding prevention ring (1) contacts contact surface (a) of the hexagonal part at the male end.



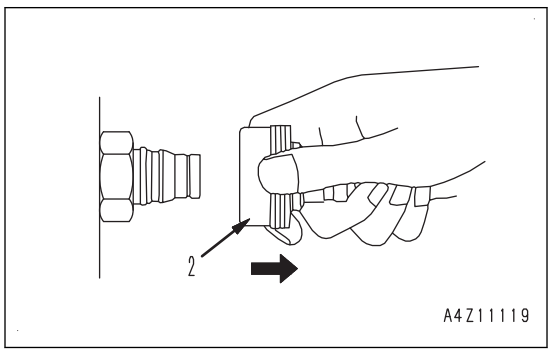
2. While keeping the condition of step 1, push cover (3) straight until it contacts contact surface (a) of the hexagonal portion on the male side.



3. While keeping the conditions of steps 1 and 2, pull out whole body (2) to disconnect it.

   REMARK

   Provide an container to receive a quantity of hydraulic oil which may flow out.

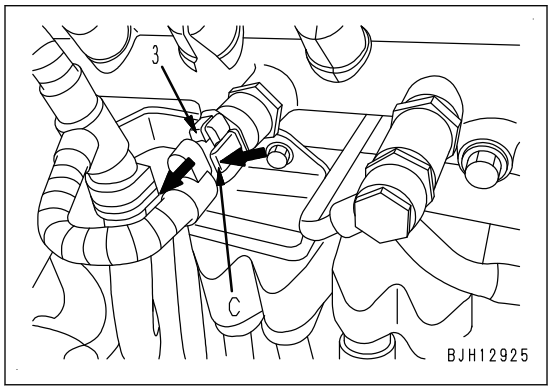


METHOD FOR DISCONNECTING AND CONNECTING CONNECTOR WITH LOCK TO PUSH

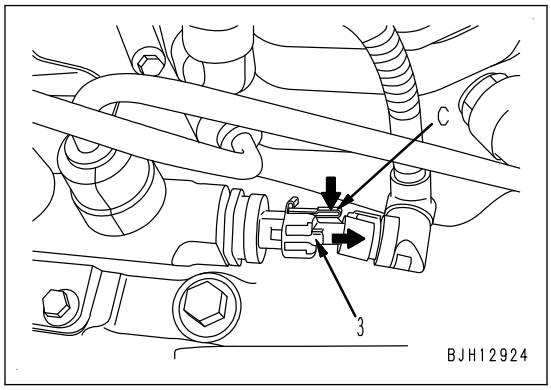
Method for disconnecting connector with lock to push (BOSCH-3)

While pressing lock (C), pull out connector (3) in the direction of the arrow.

- 114 series



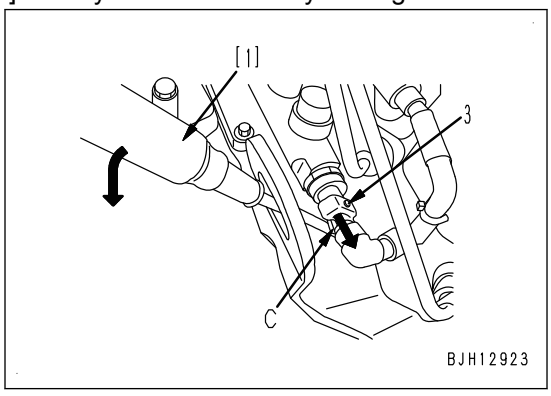
- 107 series



REMARK

If the lock is located on the underside, use flat-head screwdriver [1] since you cannot insert your fingers.

While pushing up lock (C) of the connector with flat-head screwdriver [1], pull out connector (3) in the direction of the arrow.



Method for connecting connector with lock to push (BOSCH-3)

Insert it straight until it clicks.

CONVERSION TABLE

Method of using the conversion table

The conversion table is provided to enable simple conversion of the numerical numbers between the different units. For further details of the method of using the conversion table, see the examples given below.

Examples of using the conversion table to convert a unit from mm to in.

When converting 55 mm to in

1. Locate the number 50 in the leftmost column, take this as (A), and then draw a horizontal line from (A).
2. Locate the number 5 in the top row, take this as (B), then draw a vertical line down from (B).
3. Take the crossover point of the two lines as (C). This point (C) gives the value when converting the unit from mm to in. Accordingly, 55 mm = 2.165 in.

When converting 550 mm to in

1. The number 550 does not appear in the table. Divide it by 10 (move the decimal point one place to the left) to get 55 mm.
2. Convert 55 mm to 2.165 in according to the preceding procedure.
3. The original value (550 mm) has been divided by 10, so multiply 2.165 in by 10 (move the decimal point one place to the right) to restore the target value. This gives 550 mm = 21.65 in

mm to in

(B)

1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
						(C)				
50	1.969	2.008	2.017	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.847	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701		3.780	3.819	3.858	3.898

(A)

mm to in

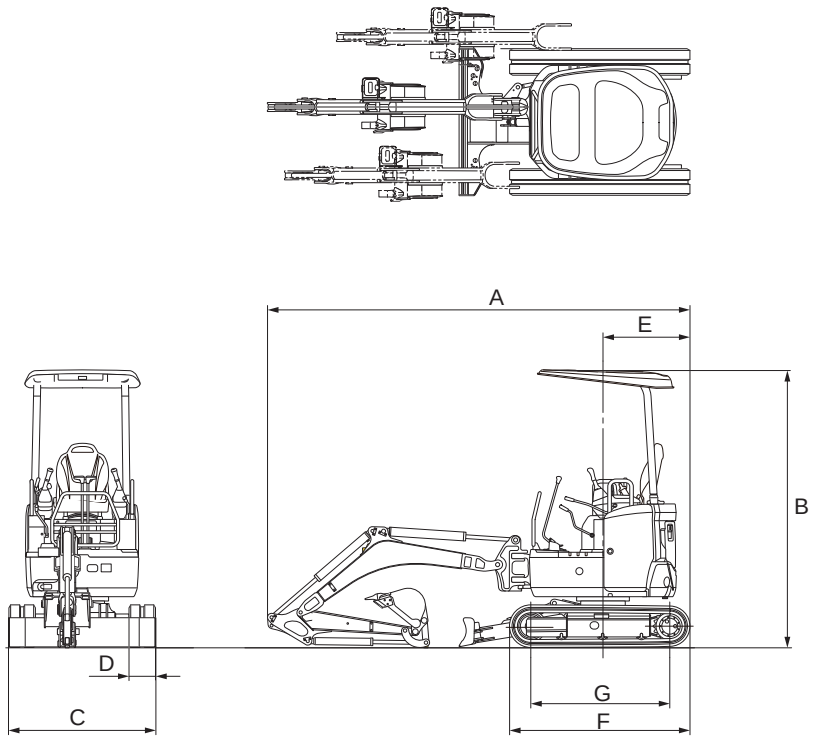
1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323

SPECIFICATIONS

SPECIFICATION DRAWING

SPECIFICATION DRAWING: PC18MR-5



G0079333

	Item	Unit	PC18MR-5
	Machine weight Rubber shoe specification Steel shoe specification	kg	 1820 1910
	Bucket capacity	m^3	0.044
	Engine model	-	Komatsu 3D67E-2 diesel engine
	Engine rated horsepower • SAE J1995 (gross) • ISO 14396 • ISO 9249/SAE J1349 (net)	kW{HP}/ min^{-1}{rpm}	 11.8{15.8}/2600{2600} 11.8{15.8}/2600{2600} 11.4{15.3}/2600{2600}
A	Overall length	mm	3670
B	Overall height	mm	2410
C	Overall width (*1)	mm	1280(990)
D	Shoe width	mm	230
E	Tail swing radius	mm	715
F	Overall length of the track	mm	1570

FUEL, COOLANT, LUBRICANT

USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid type	Recommended Komatsu Fluids	Ambient temperature °C	
			Min.	Max.
Engine oil pan	Engine oil	EO30-DH	0	40
		EO10W30-DH	-20	40
		EO15W40-DH	-15	40
Final drive case	Power train oil	TO30	-20	40
Hydraulic system	Power train oil	TO10	-30	40
	Hydraulic oil	HO46-HM	-20	40
	Biodegradable Hydraulic oil (Note 1)	BO46-G4	-20	40
Grease fitting	Hyper grease (Note 2)	G0-T	-20	40
		G2-T	-10	40
	Lithium EP grease	G0-LI	-20	40
		G2-LI	-20	40
		G2-LI-S	-30	30
	Biodegradable grease (Note 1) (Note 3)	G2-BT	-20	40
Cooling system	Non-Amine Engine Coolant (AF-NAC) (Note 4)	AF-NAC	-30	40
Fuel tank	Diesel fuel	ASTM D975 No.1–D S15 or S500	-30	20
		ASTM D975 No.2–D S15	0	40

Lubrication portion	Specified capacity (ℓ)	Refill capacity (ℓ)
Engine oil pan	3.6	3.3
Final drive case (each of right and left)	0.3	0.3
Hydraulic oil system	23.8	15.2
Cooling system	3.1	-
Fuel tank	19	-

REMARK

Specified capacity is the total quantity of fluid that includes the fluid in the tank and the piping. Refill capacity is the quantity of fluid needed to fill the system during inspection and maintenance.

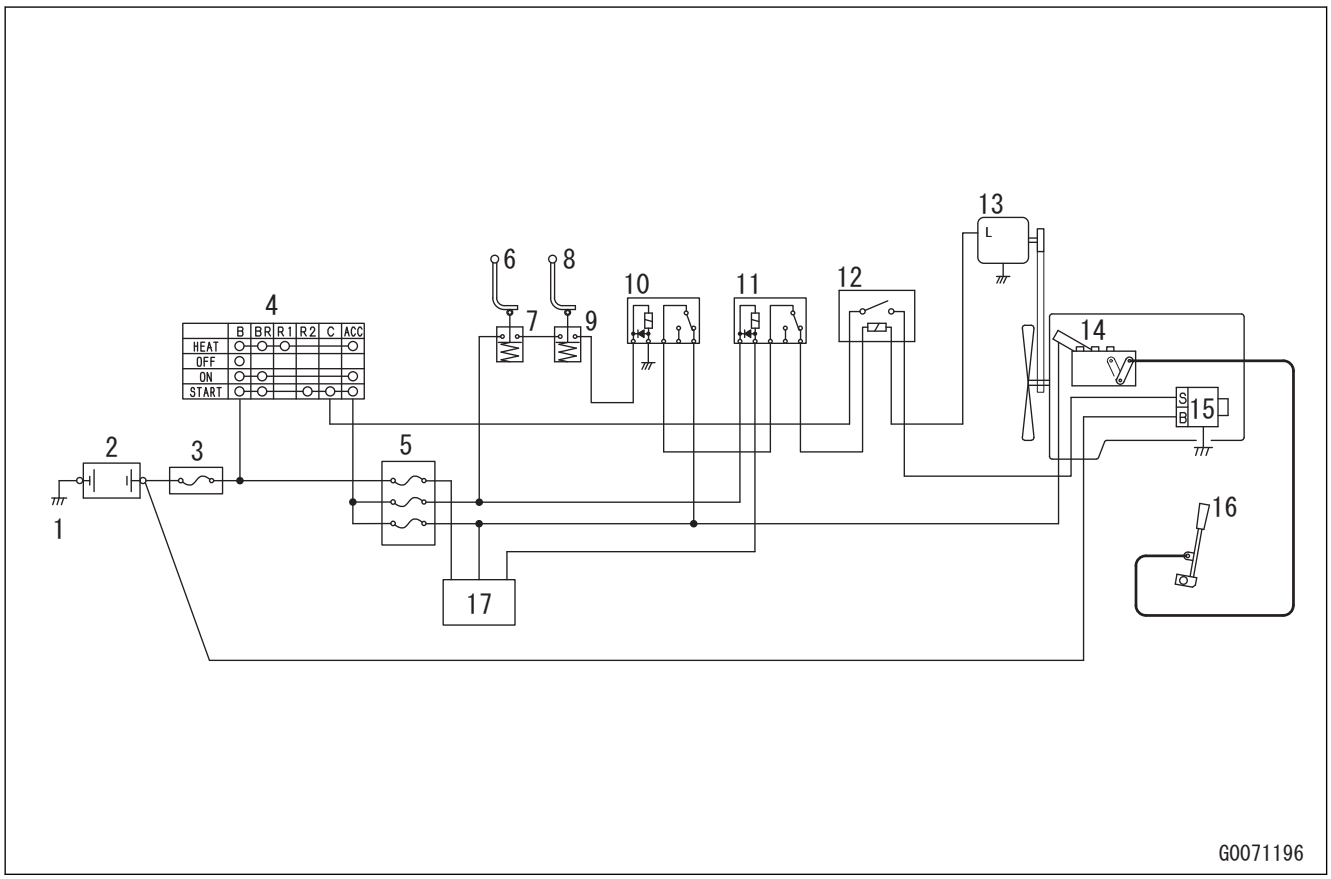
Note 1: When environment preservation is important in river works, marine and shore works, forest works, etc., recommend use of bio hydraulic oil and bio-grease. If you use bio-hydraulic oil, the fuel economy decreases a little.

Note 2: Hyper white grease (G0-T, G2-T) is high-performance white grease. We recommend use of G0-T or G2-T in the cases that follow.

- When it is necessary to improve the lubricating ability of grease to prevent creaks of pins and bushings.

ENGINE CONTROL SYSTEM

SYSTEM DIAGRAM OF ENGINE CONTROL



1: Ground cable of battery
2: Battery
3: Fusible link
4: Starting switch
5: Fuse box
6: Lock lever (left)
7: Lock switch (left)
8: Lock lever (right)
9: Lock switch (right)
10: Stating motor cut-off relay
11: Personal code relay
12: Engine safety relay
13: Alternator
14: Engine stop solenoid
15: Starting motor
16: Fuel adjustment lever
17: KOMTRAX terminal

OPERATION OF ENGINE CONTROL SYSTEM

Engine start operation

- In this system, when the starting switch (4) is turned to the "ON" position, the engine stop solenoid (14) moves the governor stop lever to the "DRIVE" side, and the engine stops if a trouble is found in the electrical system. This is a fail-safe mechanism.
- When the starting switch (4) is turned to the "START" position while the lock levers (6) and (8) are in the LOCK positions, the starting current is supplied to the starting motor (15) to start the engine.
  While the lock lever (6) or (8) is in the FREE position, the starting motor cut-off relay (10) activates to cut off the starting current to the starting motor (15) and the engine does not start. This is a neutral safety mechanism.

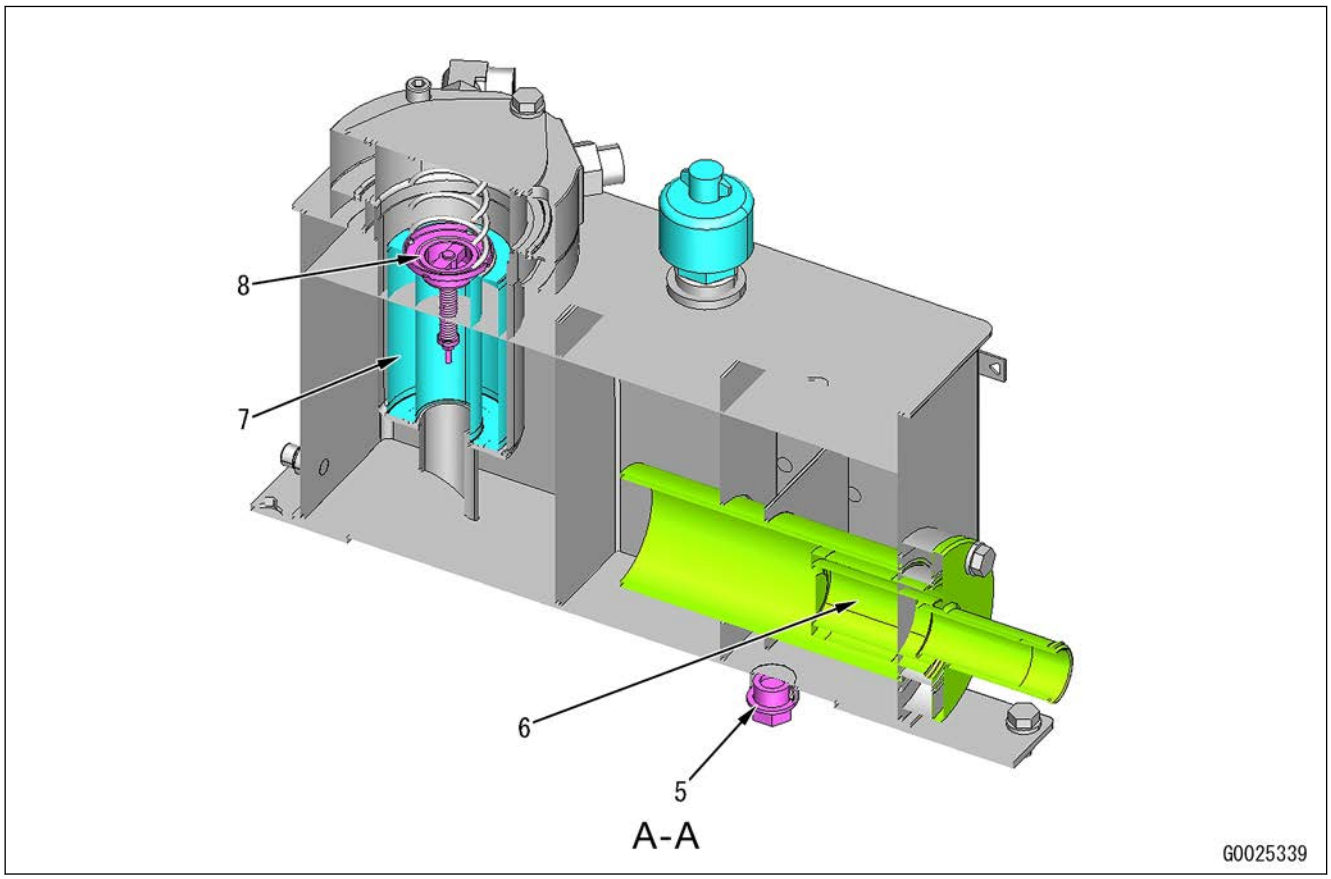
CAUTION LAMPS SHOWN ON MACHINE MONITOR

Symbol	Display item	Range for display	Method for display	Color	Light source
 G0006427	Electrical system	If a trouble is found in the system	If a trouble is found: Lit or flash	Red	LED
 G0000233	Engine oil pressure	Below specified pressure	If a trouble is found: Flash		
 G0000232	Charge level	When charging is not sufficient	If a trouble is found: Flash		
 G0006368	Seat belt	When seat belt is not fastened	Not fastened: Lit		

PILOT LAMPS SHOWN ON MACHINE MONITOR

Symbol	Display item	Range for display	Method for display	Color	Light source
 G0000246	Preheating	During preheating	During operation: Flash (18 seconds)	Green	LED
 G0025719	Travel speed increase	When travel speed increases	When increases: Lit	Orange	
 G0025718	Lock lever	When work equipment is locked	Locked: Lit	Red	

Sectional view



5: Drain plug
6: Strainer
7: Filter
8: Bypass valve

SPECIFICATIONS OF HYDRAULIC TANK

Hydraulic tank capacity: 17.6 ℓ

Hydraulic tank refill capacity: 14.3 ℓ

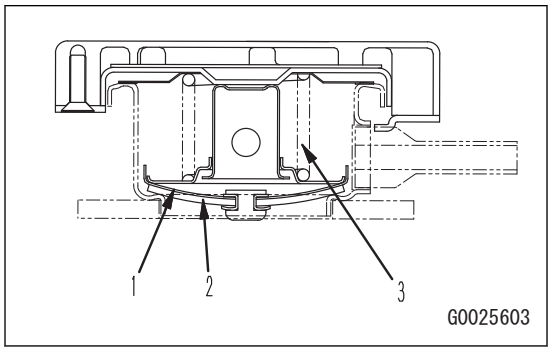
Bypass valve set pressure: 0.25±0.05 MPa {2.5±0.5 kg/cm^2}

HYDRAULIC TANK OIL FILLER CAP

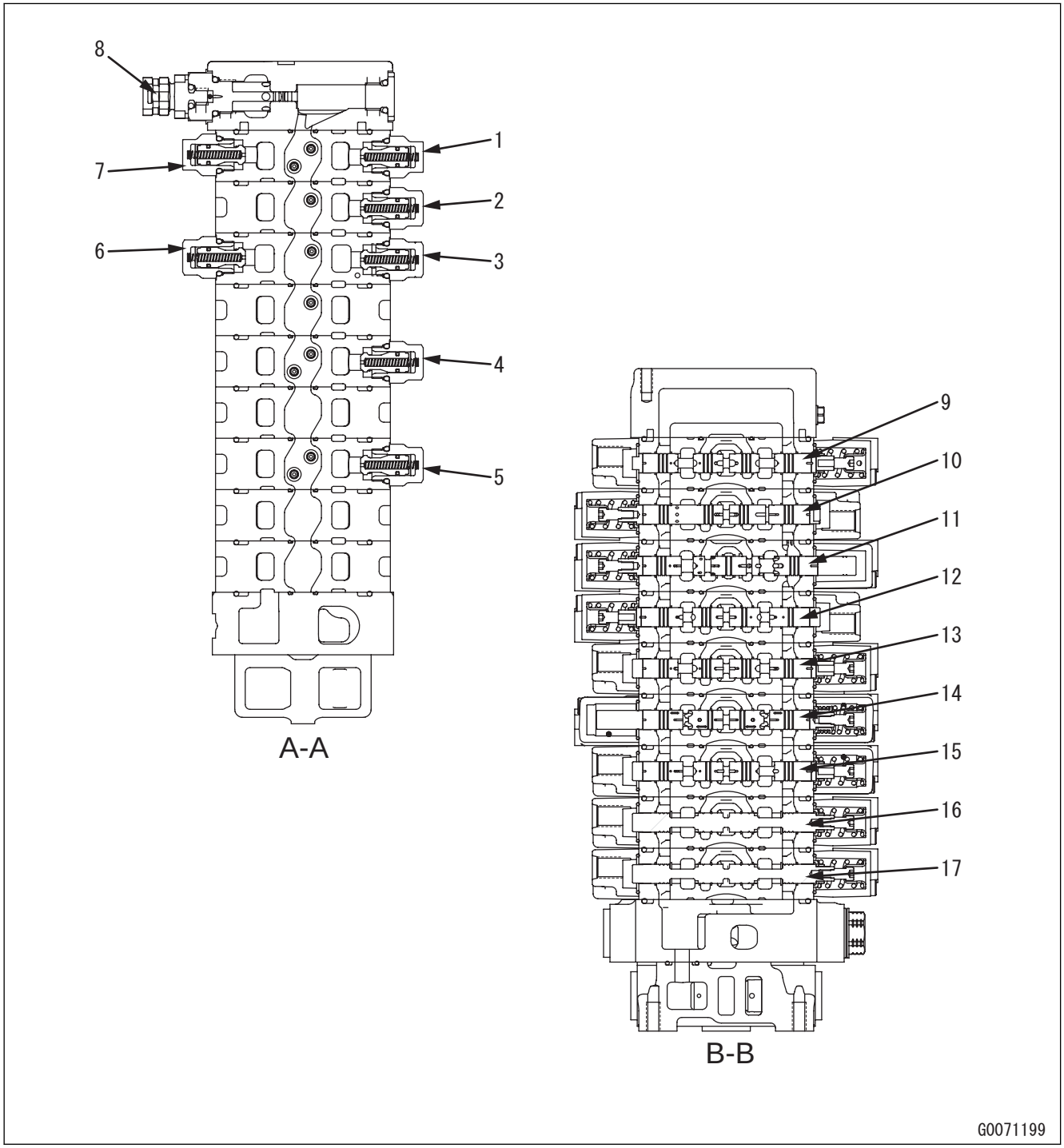
STRUCTURE OF OIL FILLER CAP OF HYDRAULIC TANK

Sectional view

1: Bottom plate
2: Gasket
3: Spring



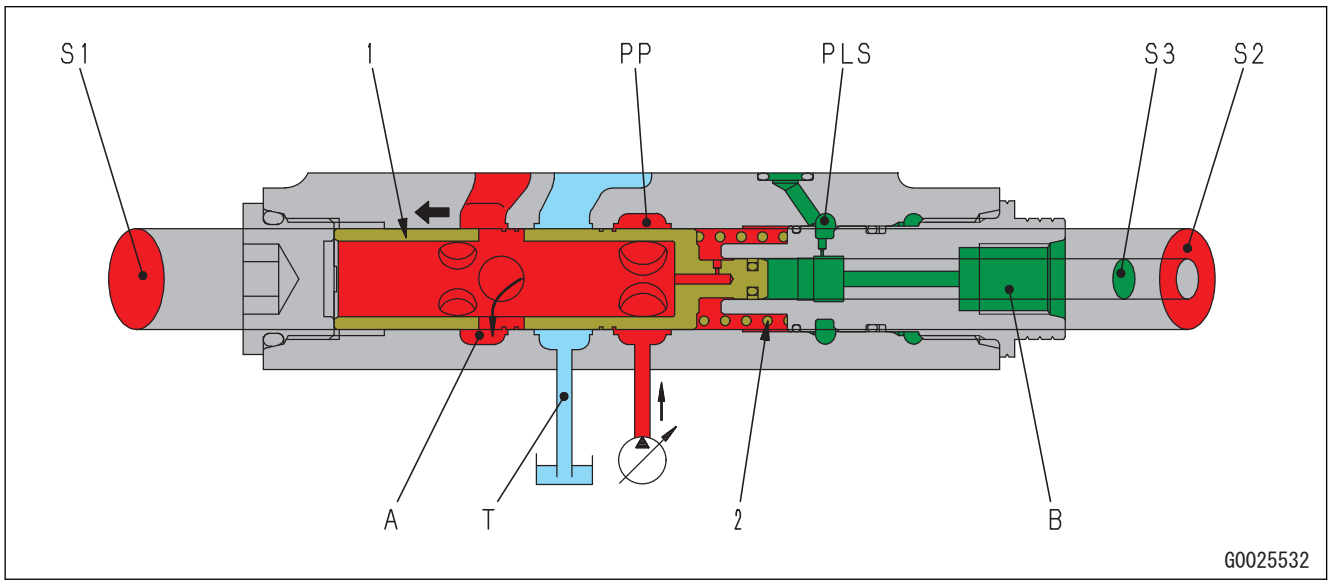
Sectional view (A-A, B-B)



1: Suction valve (attachment)
2: Suction valve (boom swing head)
3: Suction valve (boom bottom)
4: Suction valve (bucket head)
5: Suction valve (arm bottom)
6: Suction valve (boom head)
7: Suction valve (attachment)
8: Safety valve
9: Spool (attachment)
10: Spool (boom swing)
11: Spool (boom)
12: Spool (blade)
13: Spool (bucket)
14: Spool (swing)
15: Spool (arm)
16: Spool (right travel)
17: Spool (left travel)

3. The differential pressure between the pump discharged pressure (PP) and LS pressure (PLS) reaches the set pressure (1.76 MPa {18.0 kg/cm^2}) of the spring (2).
4. The spool (1) moves to the right, and the pump circuit (PP) is connected to the tank circuit (T).
5. The pump pressure (PP) is set to the set pressure of the spring (2) (1.76 MPa {18.0 kg/cm^2}) + LS pressure (PLS).
6. The LS differential pressure (△PLS) becomes the set pressure of the spring (2) (1.76 MPa {18.0 kg/cm^2}).

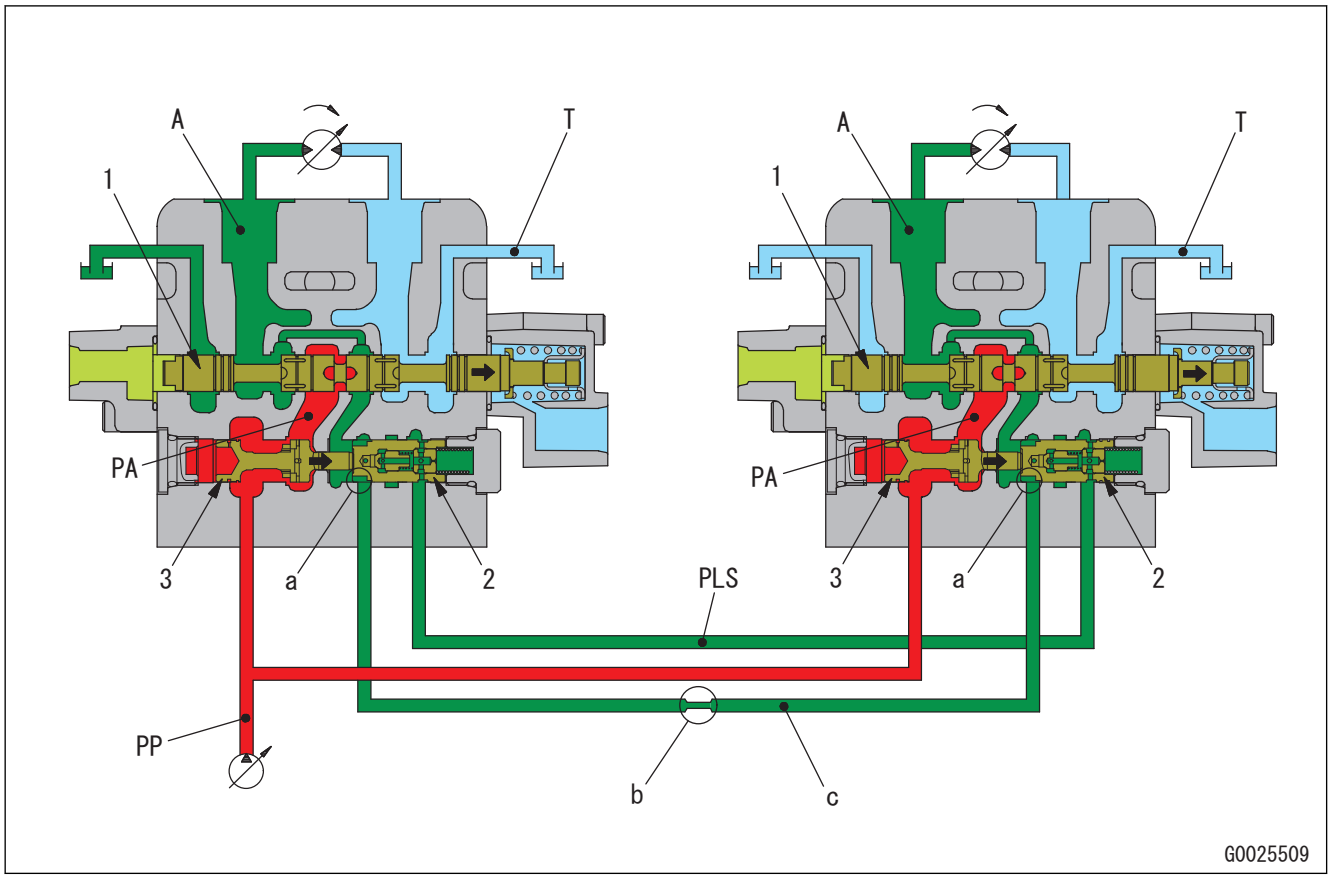
When control lever is operated



1. When the control lever is largely operated, the LS pressure (PLS) is generated, and it is applied on the right end surface (S3) of the spool (1).
2. The opening area of the control valve spool is large, and the differential pressure between the LS pressure (PLS) and pump discharged pressure (PP) becomes small.
3. The differential pressure between the pump discharged pressure (PP) and LS pressure (PLS) does not reach the set pressure of the spring (2).
4. The spool (1) is pushed to the left by the spring (2).
5. The pump pressure (PP) is disconnected from the tank circuit (T), and all the pump discharged volume (Q) flows to the actuator circuit.

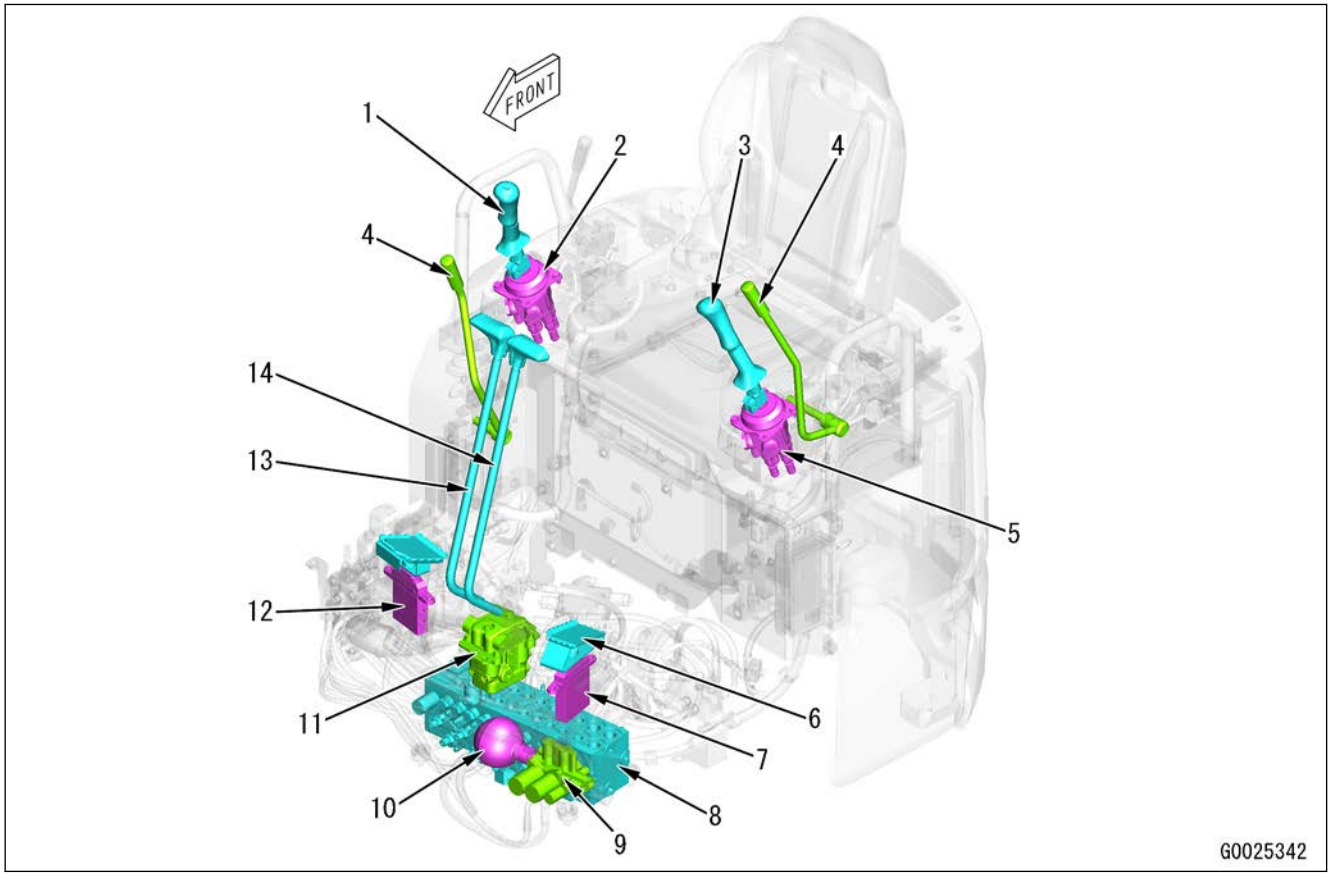
TRAVEL JUNCTION VALVE OF CONTROL VALVE

FUNCTION OF TRAVEL JUNCTION VALVE OF CONTROL VALVE



- The travel junction circuit is installed to correct the flow difference between the right and left travel circuits when the machine travels straight.
- This function makes the flows to the right and left travel motors almost equal to reduce the travel deviation when the machine travels straight.
- The pressure reducing valve in the travel valve inside the steering returns by the difference of the load pressure, and the opening area of the interconnection circuit becomes small when the steering is operated.

STRUCTURE OF VALVE CONTROL



1: R.H. work equipment control lever (for boom and bucket operation)
2: R.H. work equipment PPC valve
3: L.H. work equipment control lever (for arm and swing operation)
4: Lock lever
5: L.H. work equipment PPC valve
6. Attachment control pedal
7: Attachment PPC valve
8: Control valve
9: Bipartite solenoid valve
10: Pilot circuit accumulator
11: Travel PPC valve
12: Boom swing PPC valve
13: R.H. travel lever
14: L.H. travel lever

ATTACHMENT PPC VALVE

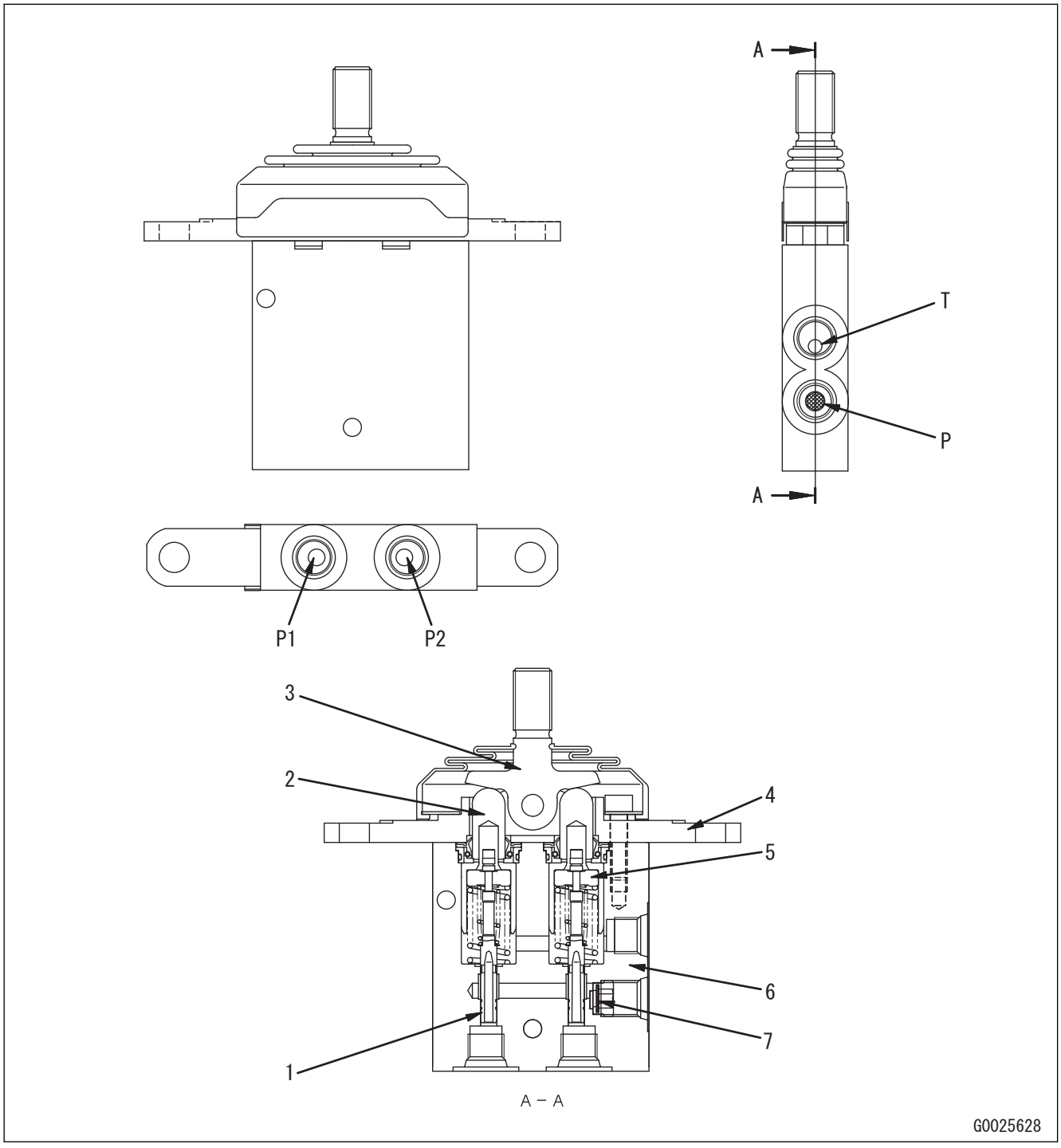
(Machines with attachment)

PPC

Abbreviation for Proportional Pressure Control

STRUCTURE OF ATTACHMENT PPC VALVE

General view and sectional view



P: From pilot pump

P1: To control valve (attachment port)

1: Spool

P2: To control valve (attachment port)

T: To hydraulic tank

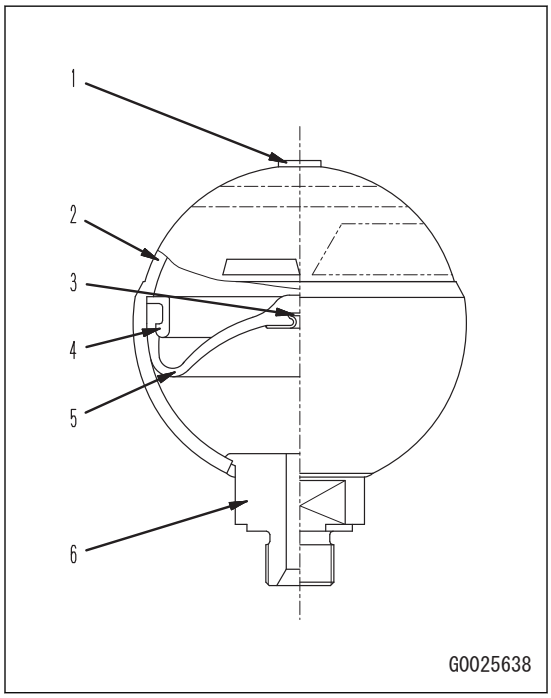
2: Piston

PILOT CIRCUIT ACCUMULATOR

STRUCTURE OF PILOT CIRCUIT ACCUMULATOR

General view and sectional view

1: Gas plug
2: Shell
3: Poppet
4: Holder
5: Bladder
6: Oil port



SPECIFICATIONS OF PILOT CIRCUIT ACCUMULATOR

Gas used: Nitrogen gas

Quantity of gas: 300 cc

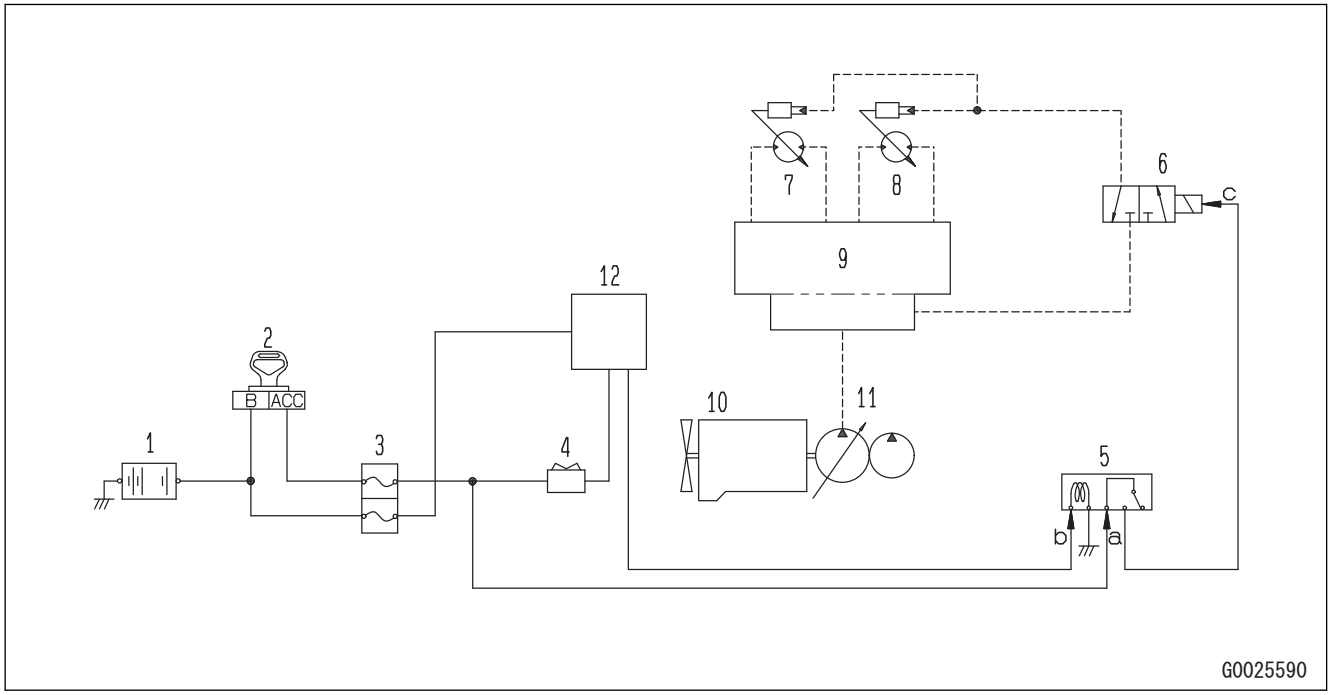
Filling gas pressure: 1.18 MPa {12 kgf/cm^2} (at 80 ˚C)

Maximum operating pressure: 6.87 MPa {70 kgf/cm^2}

FUNCTION OF PILOT CIRCUIT ACCUMULATOR

This accumulator (for pilot circuit) is installed to the solenoid valve. Even if the engine is stopped while the work equipment is raised, the pilot oil pressure continues to be transmitted to the work equipment control valve with the pressure of the compressed nitrogen gas in the accumulator. Thus when the spool is operated, the work equipment lowers by its own weight.

SYSTEM DIAGRAM OF TRAVEL CONTROL



Input and output signals

a: Solenoid power supply

b: 2nd travel speed selector signal

c: Solenoid valve drive signal

1: Battery

2: Starting switch

3: Fuse box

4: 2nd travel speed selector switch

5: 2nd travel speed selector solenoid relay

6: 2nd travel speed selector solenoid valve

7: L.H. travel motor

8: R.H. travel motor

9: Control valve

10: Engine

11: Main pump

12: Machine monitor

FUNCTION OF TRAVEL CONTROL SYSTEM

When travel speed selector switch of the blade control lever is operated, the motor capacity changes, and as a result the travel speed changes.

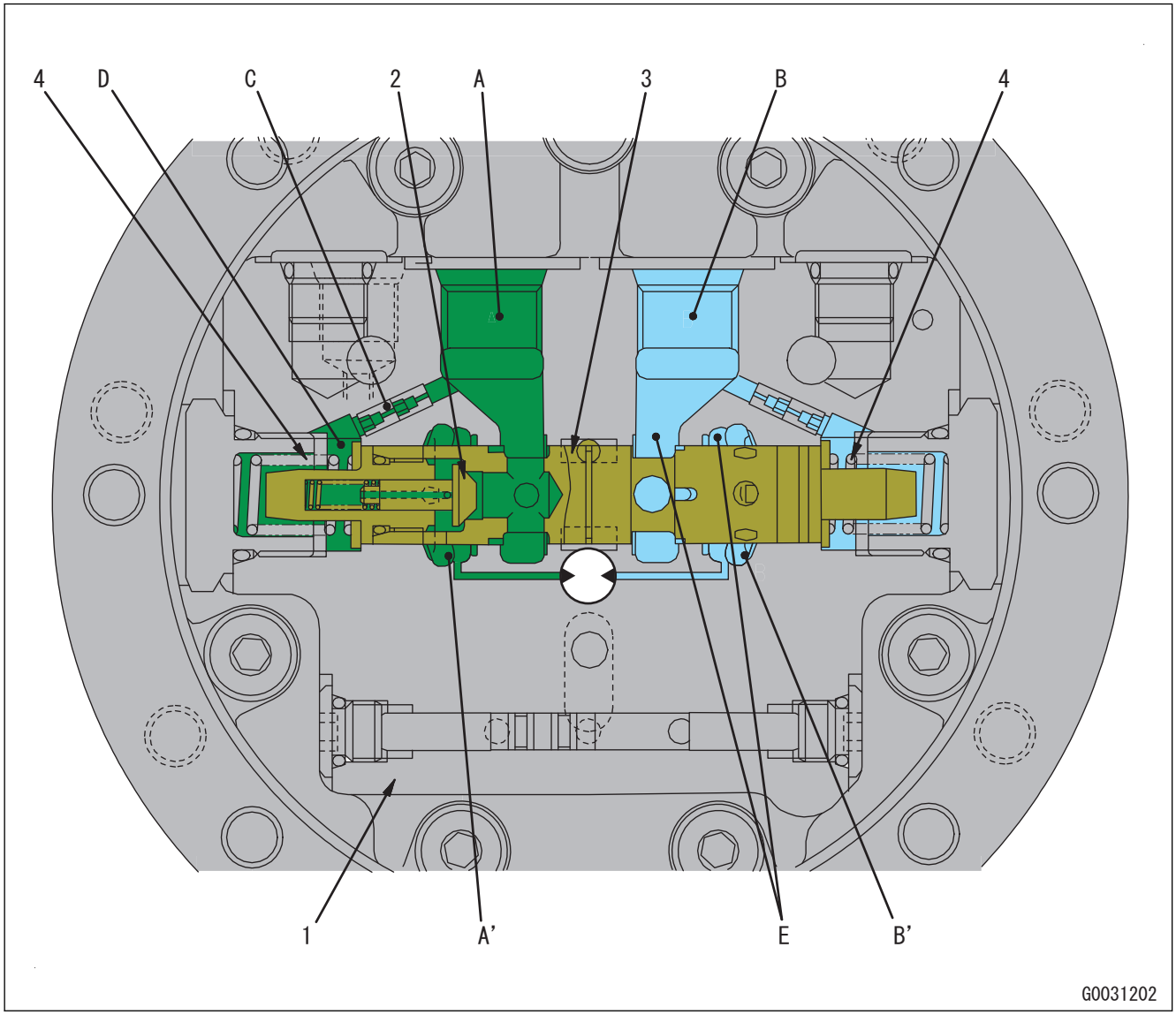
REMARK

The travel speed changes to low speed (Lo) automatically if the load increases on a soft ground or on a slope even when the machine travels at high speed (Hi).
At this time, the travel speed display on the machine monitor is at the high speed (Hi) position and stays there.

Travel speed selector switch	Lo (Low speed)	Hi (High speed)
2nd travel speed selector solenoid valve	OFF	ON
Motor capacity	12.4 cc/rev	6.2 cc/rev
Travel speed	2.2 km/h	4.1 km/h
Travel motor swash plate angle	Maximum	Minimum

COUNTERBALANCE VALVE AND CHECK VALVE OF TRAVEL MOTOR

OPERATION OF COUNTERBALANCE VALVE AND CHECK VALVE OF TRAVEL MOTOR

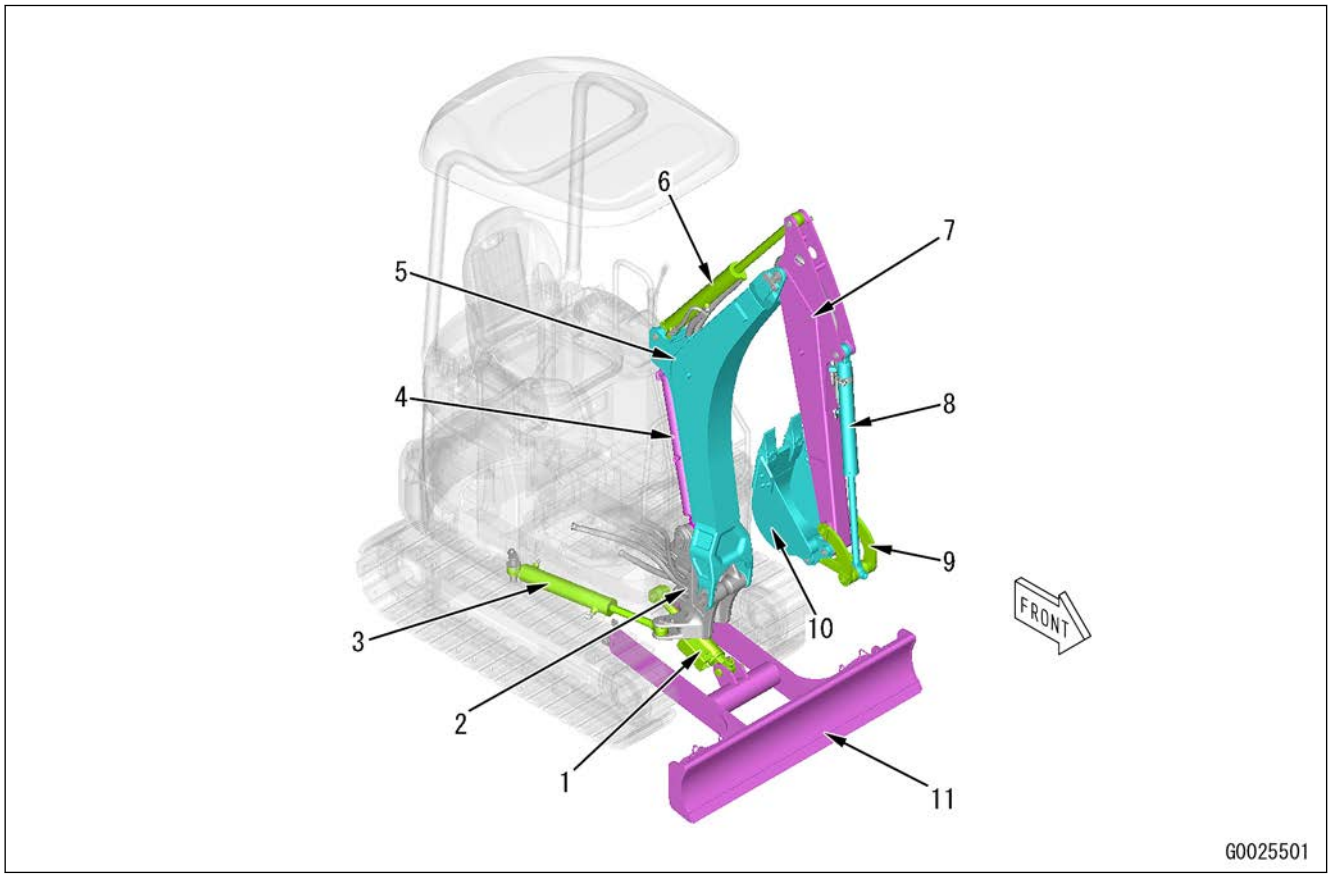


1. When the pressurized oil flows from the port (A), the oil pressure opens the check valve (2), and is transmitted to the port (A') on the inlet side of the hydraulic motor.
2. The pressurized oil flows through the choke (C) into the chamber (D), and the spool (3) moves to the right against the spring (4).
3. As a result, the oil at the return side of the hydraulic motor flows from the port (B'), goes back to the port (B) through the main unit (1) and the opening (E) of the spool (3), and it makes the hydraulic motor rotate.
4. When the pressurized oil flows from the port (B), each part operates in the opposite direction and the hydraulic motor rotates in reverse.
5. Then, when the pressurized oil in the port (A) is disconnected from the pressurization state, the spool (3) that was moved to the right goes back to the left by the force of the spring (4).
6. At that time, the oil in the chamber (D) controls the speed that the spool (3) goes back to the left by the throttle of the choke (C).
7. Even after the pressurized oil in port (A) is blocked, the hydraulic motor continues rotation by inertial force.
8. At this time, the return oil is controlled gradually by the change of the travel speed and the cut-out part of the spool (3), and the hydraulic motor stops smoothly.

WORK EQUIPMENT

STRUCTURE OF WORK EQUIPMENT

General view



1: Blade cylinder
2: Boom swing bracket
3: Boom swing cylinder
4: Boom cylinder
5: Boom
6: Arm cylinder
7: Arm
8: Bucket cylinder
9: Bucket link
10: Bucket
11: Blade

Work equipment, swing, boom swing, travel oil pressure

Item	Test condition		Unit	Standard value for new machine	Repair limit
Unload pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • All control levers, control pedals: NEUTRAL position		MPa {kg/cm^2}	2.5 to 3.48 {25 to 35}	2.5 to 3.48 {25 to 35}
Boom relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	21.92 to 23.88 {224 to 244}	21.92 to 23.88 {224 to 244}
Arm relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	21.92 to 23.88 {224 to 244}	21.92 to 23.88 {224 to 244}
Bucket relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	21.92 to 23.88 {224 to 244}	21.92 to 23.88 {224 to 244}
Boom swing relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	21.92 to 23.88 {224 to 244}	21.92 to 23.88 {224 to 244}
Swing relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	18.33 to 20.78 {187 to 217}	18.33 to 20.78 {187 to 217}
Blade relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	21.92 to 23.88 {224 to 244}	21.92 to 23.88 {224 to 244}
Travel relief pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position		MPa {kg/cm^2}	21.92 to 23.88 {224 to 244}	21.92 to 23.88 {224 to 244}
Control circuit oil pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • All control levers, control pedals: NEUTRAL position		MPa {kg/cm^2}	3.62 to 4.11 {37 to 42}	3.62 to 4.11 {37 to 42}
LS differential pressure	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • LS differential pressure = Pump discharge pressure - LS pressure	All control levers, control pedals: NEUTRAL position	MPa {kg/cm^2}	2.5 to 3.48 {25 to 35}	2.5 to 3.48 {25 to 35}
		Bucket control lever: Half stroke		1.47 to 1.67 {15 to 17}	1.47 to 1.67 {15 to 17}
Outlet pressure of solenoid valve	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • Energized/De-energized conditions of solenoid: See TESTING AND ADJUSTING, “TEST OUTLET PRESSURE OF SOLENOID VALVE”	Solenoid: OFF (de-energized)	MPa {kg/cm^2}	0	0
		Solenoid: ON (energized)		3.04 to 3.53 {31 to 36}	3.04 to 3.53 {31 to 36}

Fig. 11

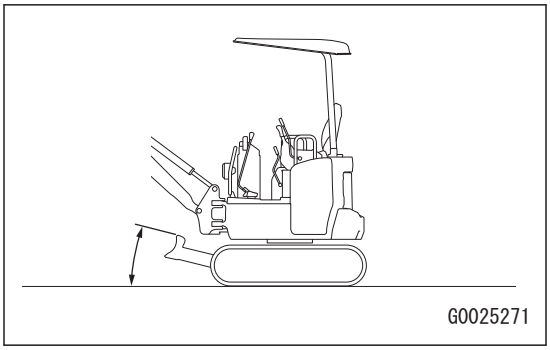


Fig. 12

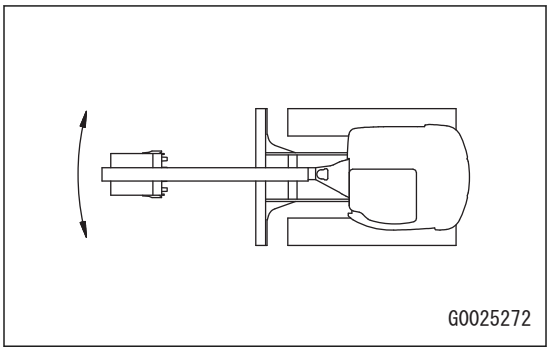


Fig. 13

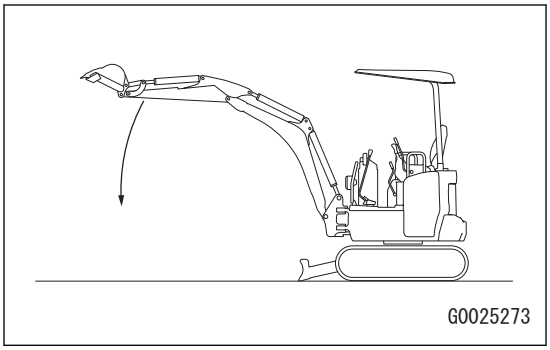


Fig. 14

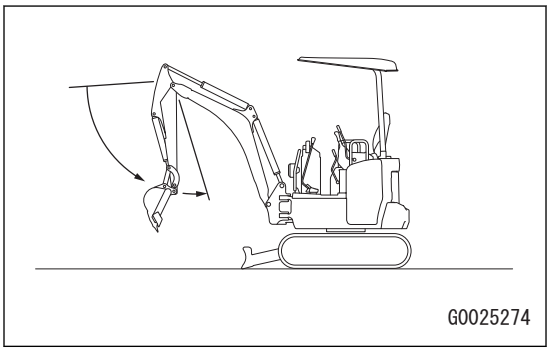
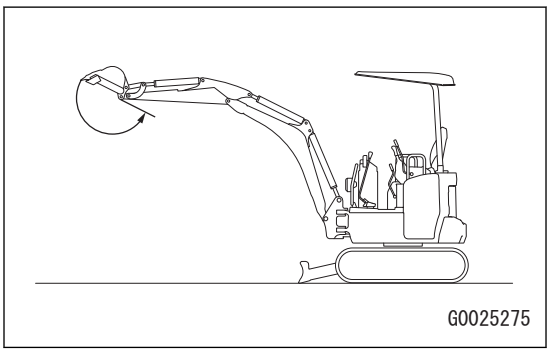
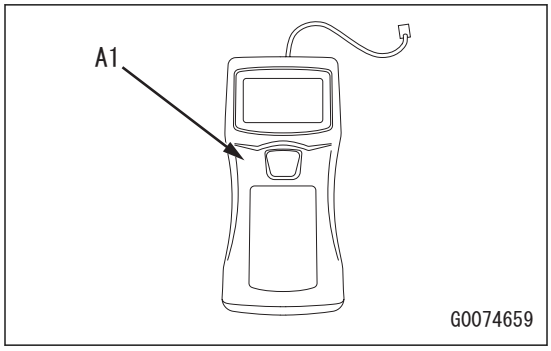


Fig. 15



4. Install the tachometer A1 to the probe A2.



Set the measurement condition

5. Start the engine.
6. Make sure that the engine coolant temperature and hydraulic oil temperature are in the measurement condition range.
   - Engine coolant temperature: In the operation range
   - Hydraulic oil temperature: 45 to 55°C
7. Turn the fuel control lever to the high idle position.

Do the testing

8. Test the fan speed when control levers and control pedals are in NEUTRAL position.
9. Calculate the engine speed.

   Engine speed = Fan speed/1.04

Restoration

10. Stop the engine.

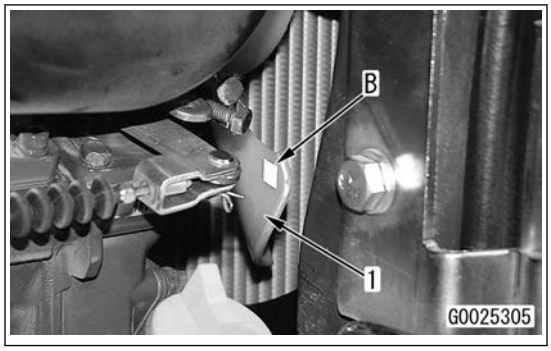
    ⚠ Immediately after the engine is stopped, the parts and oil are very hot and can cause burn injury. Wait for the temperature to go down, and then start the work.

11. remove the tachometer A1 from the probe A2.
12. Remove the probe A2 and stand A3.
13. Peel off the reflection tape B from the end surface of the fan (1). Close the engine rear cover.

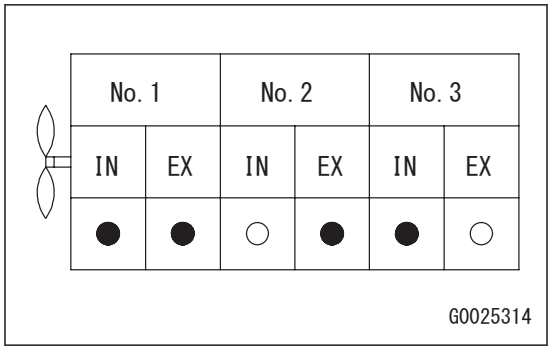
TEST ENGINE LOW IDLE SPEED

Set the device for testing

1. Open the engine rear cover.
2. Attach the reflection tape B to the end surface of the fan (1).



7. After completing the adjustment of the valves marked by ●, rotate the crankshaft forward. Then, align the “1.TC” stamp line (a) of the flywheel with the stamp line (b) inside of the housing or the internal protruding part of the inspection hole.
8. Adjust the valve clearance marked by ○ in the valve layout drawing at the position where the mark is aligned.
9. In response to “CHECK VALVE CLEARANCE”, check the valve clearance.



ADJUST FUEL INJECTION TIMING

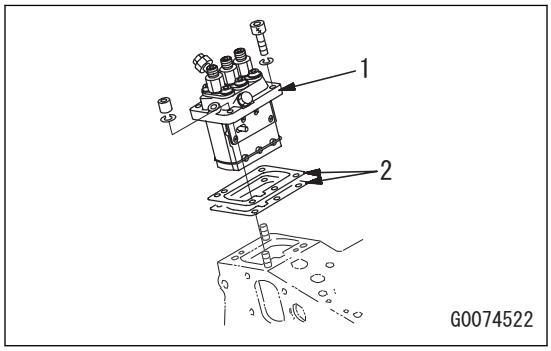
If the injection timing stamp line of the flywheel does not align with the stamp line inside the housing or the internal protruding part of the inspection hole, the fuel injection timing is incorrect. Obey the procedure that follows to adjust the timing.

Adjustment

1. Remove the fuel injection pump (1), and check the thickness of the shims (2).

   REMARK

   - Be careful not to drop the shims (2).
   - Record and store the installation position and number of shims (2).



2. Increase or decrease the thickness of the shims (2) to adjust the fuel injection timing.

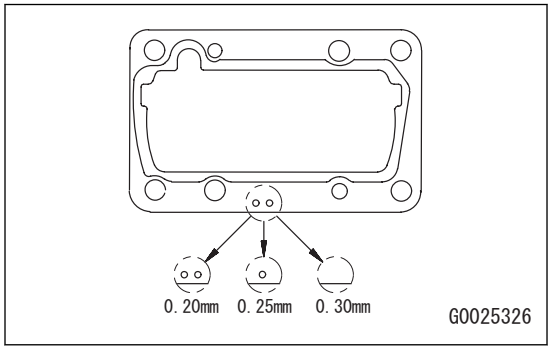
   REMARK

   - When the fuel injection timing is short, increase the thickness of the shims.
   - When the fuel injection timing is long, decrease the thickness of the shims.
   - When the shim thickness is increased or decreased by 0.20 mm, the fuel injection timing changes by approximately 2°.
   - The shim has the thickness depending on the presence and number of identification holes.

   0.20 mm shim: Two identification holes

   0.25 mm shim: One identification hole

   0.30 mm shim: No identification holes



3. Mount the selected shims (2), and install the fuel injection pump (1).
4. Bleed air from the fuel circuit. For details, see “BLEED AIR FROM FUEL SYSTEM”.
5. Run the engine, and check the fuel for leakage.

   Apply a thin layer of liquid gasket (ThreeBond 1215 or 1104) on the two surfaces of the shim.

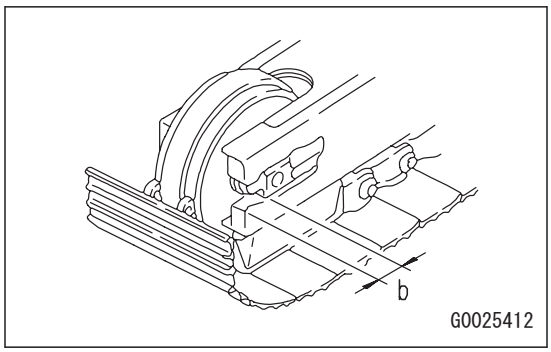
   Mounting bolt and nut of the fuel injection pump: 9.8 to 11.3 Nm {1.0 to 1.15 kgm}
6. After the adjustment, check that the fuel injection timing is normal.

   For details about how to check the timing, see “TEST FUEL INJECTION TIMING”.

For the steel shoe specification

REMARK

If the tension is loose even when you pump in the grease until the dimension (b) between the ends of the idler guide and the track frame becomes 0 mm, the worn quantities of the pin and the bushing are large. Turn 180 deg. or replace the pin and the bushing.



How to decrease the tension

Adjustment

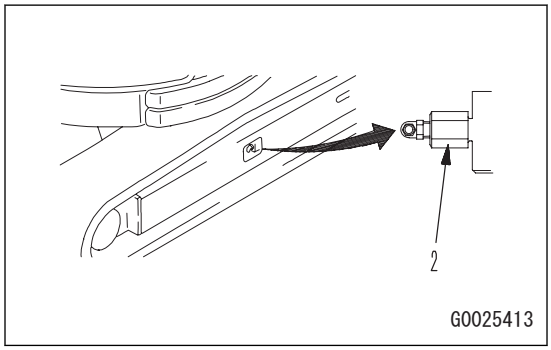
1. Loosen the valve (2), remove the grease, and tighten the valve (2).

   ⚠ **There is a danger of the valve jumping out by the high pressurized grease inside it. Do not loosen the valve one or more turns.**

2. Test the track shoe tension in response to “TEST TRAVEL DEVIATION”.

   REMARK

   If the track shoe tension is out of the standard value range, adjust it again.



2. Loosen the lock nut (4) with the adjustment screw (3) of the main relief valve (2) fixed.
3. Turn the adjustment screw (3) to adjust the oil pressure.

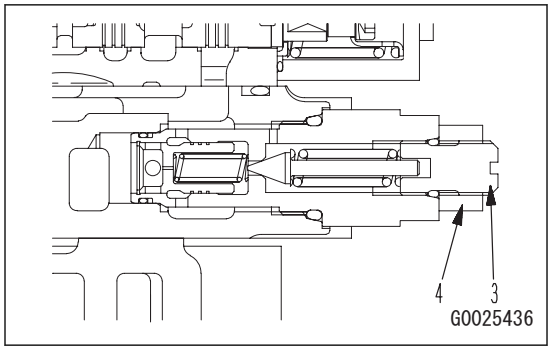
   Quantity of adjustment for each turn of the adjustment screw: 12.6 MPa {128 kg/cm^2}

   NOTICE

   Do not remove the lock nut (4) because internal parts might fall off.

   REMARK

   - Turn the adjustment screw (3) to the right, and the pressure is increased.
   - Turn the adjustment screw (3) to the left, and the pressure is decreased.



4. While the adjustment screw (3) is fixed, tighten the locknut (4).

   Lock nut (4): 59 to 79 Nm {6 to 8 kgm}

5. In response to “TEST AND ADJUST OIL PRESSURE IN WORK EQUIPMENT, TRAVEL, AND SWING CIRCUITS” , test the oil pressure in the work equipment and travel circuits.

ADJUST SWING RELIEF PRESSURE

Adjustment

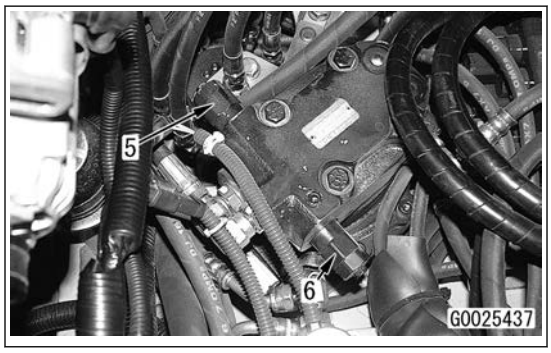
1. If the swing relief pressure is not normal, obey the procedure that follows to adjust the safety valves (5) and (6) of the swing motor.

   Safety valve (5): Right relief

   Safety valve (6): Left relief

   REMARK

   To adjust the main relief valve of the control valve, open the cover of the travel PPC lever. For details, see “TILT TRAVEL PPC LEVER”.



2. With the adjustment screw (7) of the safety valves (5) and (6) fixed, loosen the lock nut (8).
3. Turn the adjustment screw (7) to adjust the oil pressure.

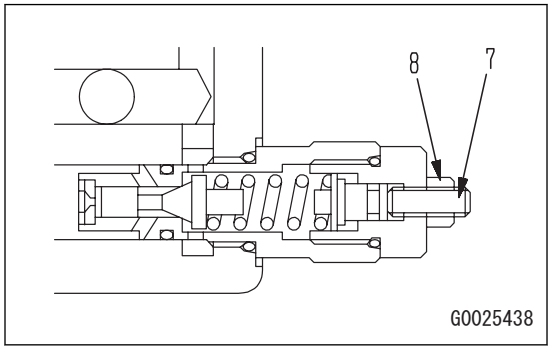
   Quantity of adjustment for each turn of the adjustment screw: Approximately 4.5 MPa {approximately 46 kg/cm^2}

   NOTICE

   Do not remove the lock nut (8) because internal parts might fall off.

   REMARK

   - Turn the adjustment screw to the right, and the pressure is increased.
   - Turn the adjustment screw to the left, and the pressure is decreased.



4. While the adjustment screw (7) is fixed, tighten the locknut (8).

   Lock nut (8): 3.92 Nm {0.4 kgm}

5. In response to “TEST AND ADJUST OIL PRESSURE IN WORK EQUIPMENT, TRAVEL, AND SWING CIRCUITS”, test the oil pressure in the swing circuit.

Hose (2): 34 to 54 Nm {3.5 to 5.5 kgm}

17. Install the floor cover in response to “TILT TRAVEL PPC LEVER”.
18. Pressurize the hydraulic tank. For details, see “PRESSURIZE HYDRAULIC TANK”.

REMARK

If the pressure in the accumulator becomes empty, run the engine for approximately 10 seconds for pressure accumulation.

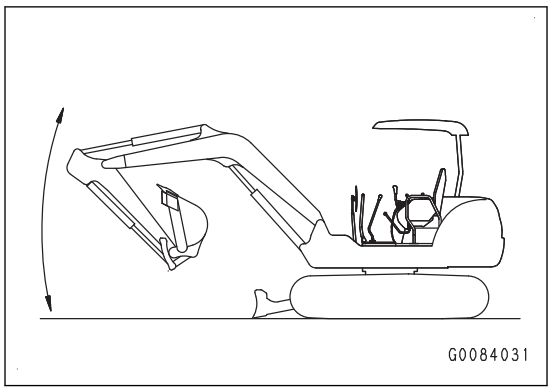
How to identify defects

When there is a difference between the LOCK position and the FREE position in the hydraulic drift: Defective PPC valve (internal defect)

NOTICE

Operate the lock lever with the starting switch set to the ON position.

5. Raise and lower the boom four or five times.



NOTICE

- **Make sure to stop the piston rod at 100 to 200 mm before each stroke end to prevent relief.**
- **When the pressure in the piston rod is at relief at the stroke end, damage to the seal of the cylinder might be caused.**

6. Set the fuel adjustment lever to the high idle position.
7. Raise and lower the boom four or five times.

NOTICE

Make sure to stop the piston rod at 100 to 200 mm before each stroke end to prevent relief.

8. Set the fuel adjustment lever to the low idle position.
9. Operate the piston rod to the stroke end to be at relief the pressure.
10. Close the oil filter cap.
11. In the same method, bleed air from the arm, bucket, blade, and boom swing cylinders.

NOTICE

Pressurize the hydraulic tank after bleeding air. For details, see "PRESSURIZE HYDRAULIC TANK".

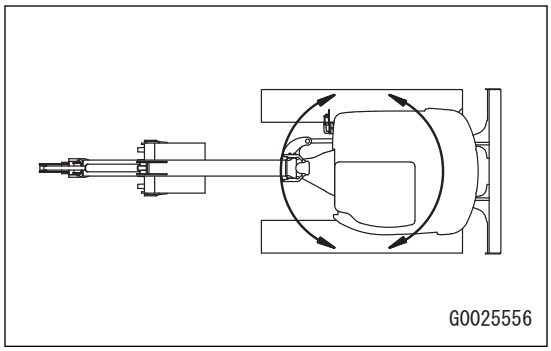
BLEED AIR FROM SWING MOTOR

NOTICE

When the swing motor is turned without bleeding air, damage to the bearing of the swing motor might be caused.

Bleed air from the swing motor only when the oil in the swing motor case is drained.

1. Start the engine.
2. Set the fuel adjustment lever to the low idle position.
3. Loosen the oil filler cap of the hydraulic tank.
4. Do the left and right swing operations three turns.
5. Close the oil filter cap.



BLEED AIR FROM TRAVEL MOTOR

Bleed air from the travel motor only when the oil in the travel motor case is drained.

1. Start the engine.
2. Set the fuel adjustment lever to the low idle position.
3. Use the work equipment to raise the left track shoe.

Date	
Name	

Terminal Replacement Sheet

To: KOMTRAX Support Center, KLTD
E-mail: JP00MB_register_gkom@global.komatsu

Machine	
Model	
Type	
Serial Number	

Faulty Terminal/Monitor		New Terminal/Monitor	
Part Number		Part Number	
Serial Number		Serial Number	

Reason for replacement :	
Date Terminal Replacement will be performed	
Country to use	
Name of distributor	

Note:
If the communication is not canceled for faulty terminal, the communication fee will be charged.

■Only for changing to Orbcomm terminal series(TC3**) :
1. After terminal replacement is completed in KBA, please click 'Apply' button in KBA.
2. KL TD will assign new terminal to the machine based on given terminal info in this form.

■ For changing to Mobile and Iridium communication terminal
1. Please completed terminal replacement in KBA.

■For changing to all KOMTRAX terminal changes (Mobile, Iridium, Orbcomm):
Please ensure to send this 'Terminal Replacement Sheet' to KOMTRAX Support Center, KLTD. because this "Terminal Replacement Sheet" is also used as a deactivation request.

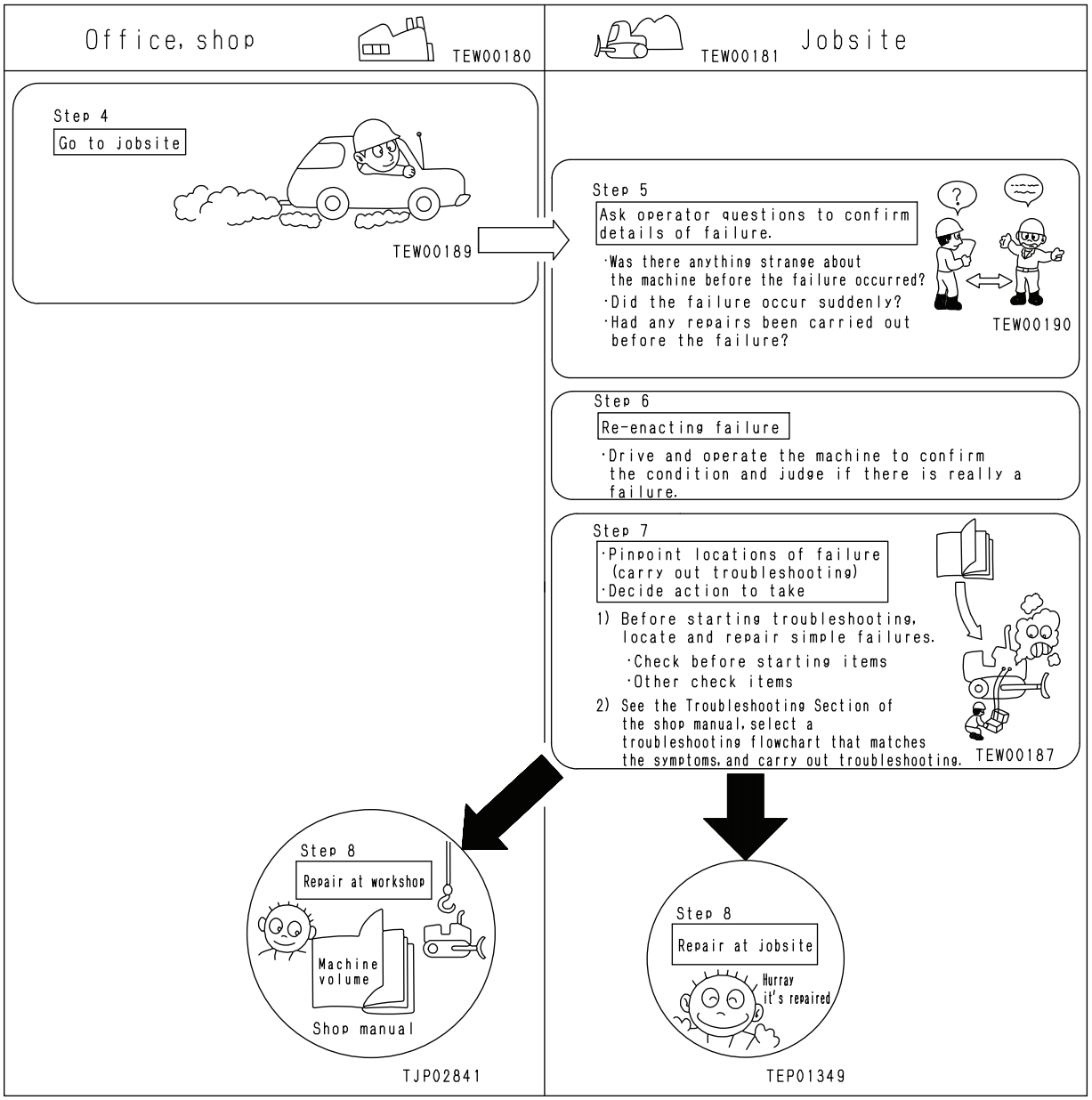
■ "Terminal Replacement Sheet' can be used when faulty terminal and faulty modem.

■For MH801/UM600:
Based on given monitor/K-Plus2 info in this form, KLTD will assign new monitor to the modem.

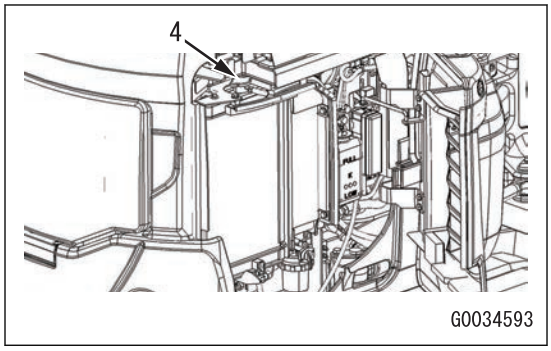
■New Komtrax terminal is unable to starting communication, unless activation is completed.
*KBA: KOMTRAX application (DFM)

G0078250

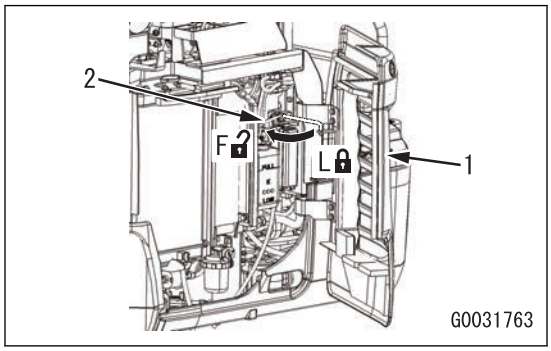
Item	Test condition	Unit	Standard value for new machine	Repair limit	Measured value	Good	No good
Bucket CURL	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • Measurement range: Time required to move the bucket from bucket DUMP stroke end to bucket CURL stroke end • Measurement posture: “Fig. 10”, in STANDARD VALUE TABLE, “MACHINE POSTURE AND PROCEDURES TO MEASURE PERFORMANCE”.	second	2.0 to 2.4	Max. 2.6			
Bucket DUMP	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • Measurement range: Time required to move the bucket from bucket DUMP stroke end to bucket CURL stroke end • Measurement posture: “Fig. 10”, in STANDARD VALUE TABLE, “MACHINE POSTURE AND PROCEDURES TO MEASURE PERFORMANCE”.	second	1.5 to 1.9	Max. 2.3			
Blade RAISE	• Hydraulic oil temperature: 45 to 55°C • Fuel control lever: High idle position • Time required to move the blade from ground to maximum RAISE • Measurement posture: “Fig. 11”, in STANDARD VALUE TABLE, “MACHINE POSTURE AND PROCEDURES TO MEASURE PERFORMANCE”.	second	0.7 to 1.3	Max. 1.6			


Office, shop
TEW00180
TEW00181
Jobsite
Step 4
Go to jobsite
TEW00189
Step 5
Ask operator questions to confirm details of failure.
·Was there anything strange about the machine before the failure occurred?
·Did the failure occur suddenly?
·Had any repairs been carried out before the failure?
TEW00190
Step 6
Re-enacting failure
·Drive and operate the machine to confirm the condition and judge if there is really a failure.
Step 7
·Pinpoint locations of failure (carry out troubleshooting)
·Decide action to take
1) Before starting troubleshooting, locate and repair simple failures.
·Check before starting items
·Other check items
2) See the Troubleshooting Section of the shop manual, select a troubleshooting flowchart that matches the symptoms, and carry out troubleshooting.
TEW00187
Step 8
Repair at workshop
Machine volume
Shop manual
TJP02841
Step 8
Repair at jobsite
Hurray it's repaired
TEP01349
G0026118

- When the coolant level is in the range between FULL and LOW, it is correct.
- If the coolant level is low, remove the water filler cap of the reservoir tank (3), and add the coolant up to FULL.
  1) Remove the water filler cap of the reservoir tank (3).
  2) Add coolant into the reservoir tank (3) up to FULL.
  3) Close the water filler cap of the reservoir tank (3).
- If the reservoir tank is empty, check and add the coolant in the procedure that follows.
  1) Check the coolant system for leakage.
     If a problem is found, repair it immediately.
  2) Make sure that the surface of the radiator cap (4) is cool enough to be touched by bare hand.
  3) While you push the cap (4), slowly turn it until it gets in contact with the stopper, and release the pressure.
  4) Remove the cap (4).
  5) Check the coolant level in the radiator.
     - When the coolant is filled up to the mouth of water filler port, the level is correct.
     - If the coolant level is low, add the coolant up to the mouth of water filler port.
  6) Tighten the cap.
  7) Remove the water filler cap of the reservoir tank (3).
  8) Add coolant into the reservoir tank (3) up to FULL.
  9) Close the water filler cap of the reservoir tank (3).



4. Set the rod (2) of the cooling cover (1) to the FREE position (F).
5. Close the cooling cover (1). Then, keep it pushed and lock it.



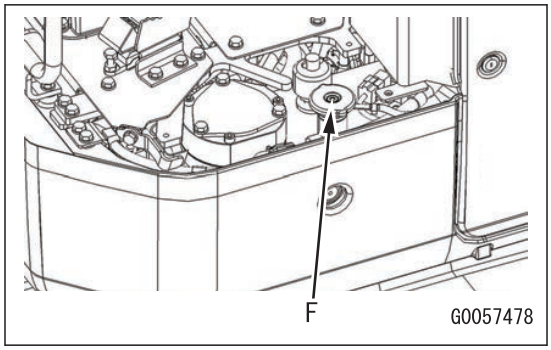
CHECK, CLEAN AND REPLACE AIR CLEANER

⚠ When you clean with the compressed air, dirt flies out, it can cause personal injury.
⚠ Wear protective eyeglasses, dust mask, or other protective equipment.

NOTICE

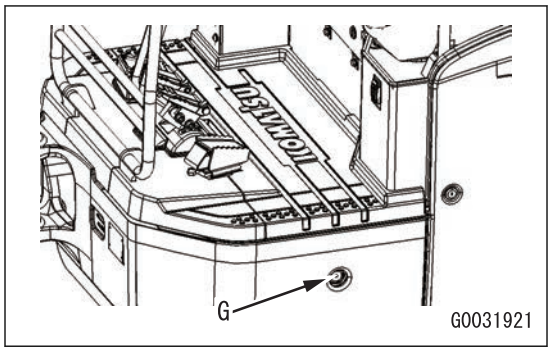
- **Do not clean the air cleaner element before the red piston is projected into the transparent part of dust indicator.**
  If you clean the element frequently, the true performance of the air cleaner is not reached and the filtration efficiency deteriorates.
- **If dirt enters the engine, it can damage the engine. Stop the engine before you clean or replace the air cleaner.**
  When you clean or replace the air cleaner, do not allow dirt attached to the element to fall off into the air cleaner body.
  Do not clean or replace the air cleaner in strong winds or in a dusty area.

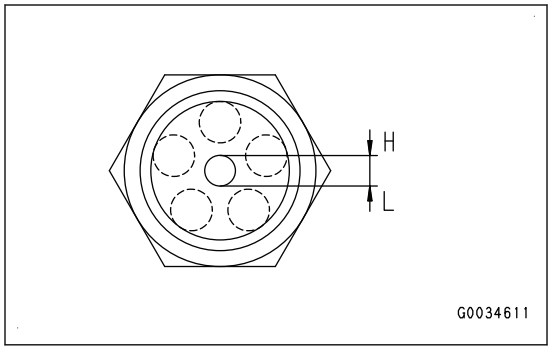
4) Loosen the cap of oil filler port (F) slowly to release the internal pressure in the hydraulic tank.



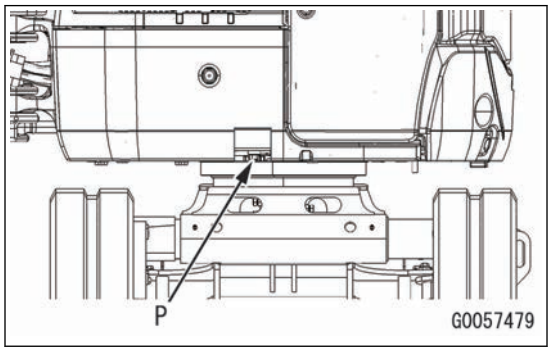
5) Add the oil from oil filler port (F) up to the level between H and L of sight gauge (G).

- When the oil level is above H of sight gauge (G), drain the oil in the procedure that follows.
  Items to be provided
  - Container to receive the drained oil
  - Handle for socket wrench

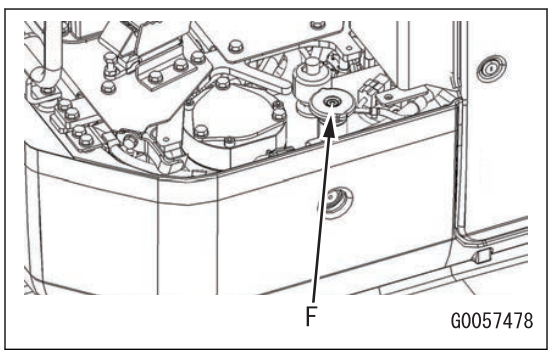




1) Swing the upper structure until drain plug (P) at the bottom of the hydraulic tank comes between the right and left tracks.
2) Stop the engine.



3) After the hydraulic oil becomes cool, loosen the cap of oil filler port (F) slowly to release the internal pressure in the hydraulic tank.
4) Put the container to receive the drained oil below the drain plug (P) on the bottom side of the machine.
5) Remove drain plug (P) by use of a handle for socket wrench, and drain the oil.
   Be careful not to get oil on yourself.
6) Install the drain plug (P).
   Tightening torque: 58.8 to 78.5Nm{6 to 8kgfm}

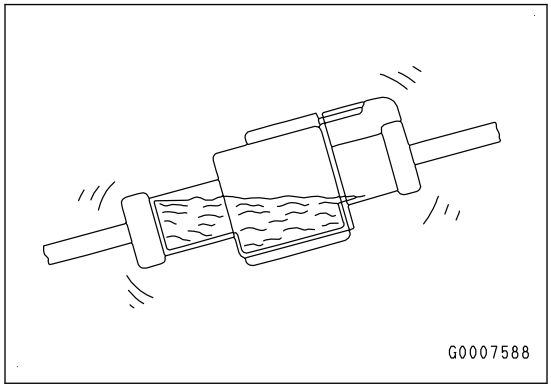


Check the connector for entry of water and foreign material

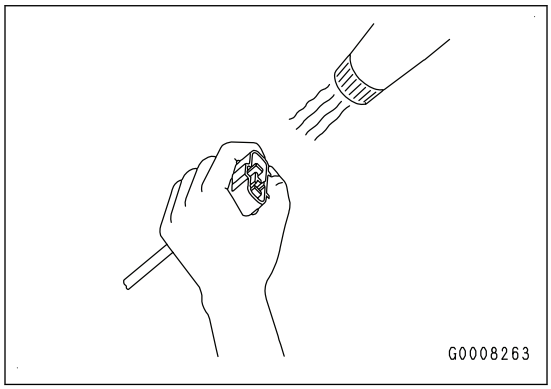
19. Disconnect the connectors, and check inside of the connector for entry of water or foreign materials.

    NOTICE

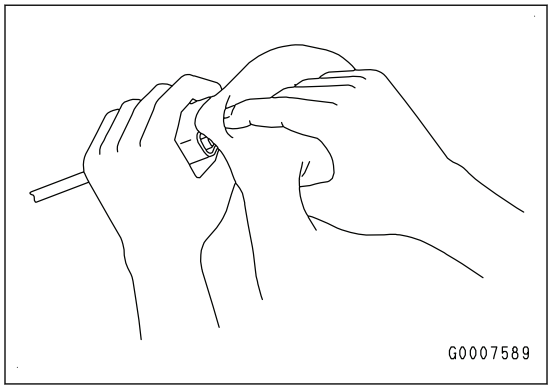
    If there is entry of water or foreign material into the connector, the seals can be defective. Check the seals for damage.



- If the seal is defective, repair or replace it.
- Dry the inside of the connector with a dryer.



- Wipe and remove any foreign material inside connector with a cloth or others, and blow the air to clean the connector.

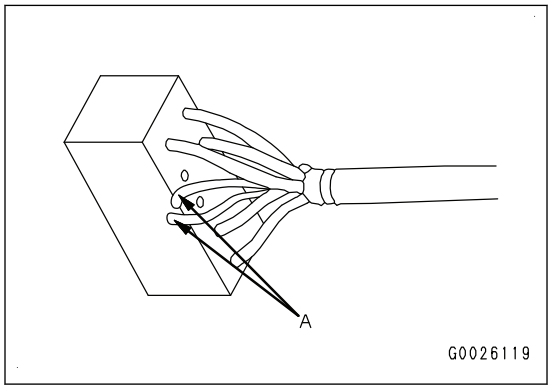


Check of wiring harness for open or short circuit

20. Check the connection (crimped part) between the connector pins and wiring harness.

    If there is a breakage as shown in (A), repair or replace the wiring harness or connectors.

21. Visually check the wiring harness covers for peel-off and the pins for contact with adjacent pins by a defective crimping.



Check of fuse for blow-out and corrosion

22. When you replace the fuse, make sure to turn off the power supply (turn the starting switch to the OFF position), and then disconnect the battery ground terminal.
    - A fusible link is a large-capacity fuse.

No.	Cause	Procedure, measuring location, criteria, and remarks
7	Defective controller	Precautions for troubleshooting (1) Connector number indication method and handling of T-adapter For troubleshooting, insert or connect T-adapters as follows unless otherwise specified. • When (male) or (female) is not indicated with a connector number, disconnect the connector, and insert T-adapters to both sides of male and female. • When (male) or (female) is indicated with a connector number, disconnect the connector, and connect T-adapter to the indicated side of connector. • “Male and female” means male and female of connector pins, not connector housings. • Male and female of connector pins and housing in DT series, etc, are opposite to those described in this manual. Take care. (2) Pin number description sequence and tester lead handling For troubleshooting, connect the positive (+) and negative (-) leads of a multimeter as shown below unless otherwise specified. • Connect the positive (+) lead to pin or wiring harness indicated first. • Connect the negative (-) lead to a pin or wiring harness indicated second.

Related circuit diagram

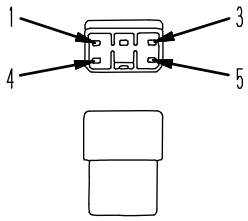
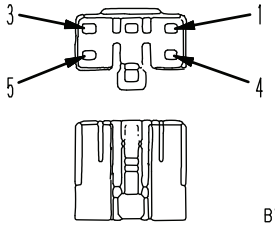
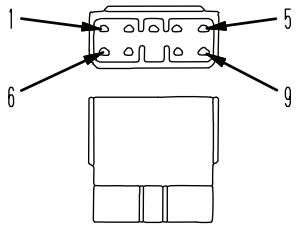
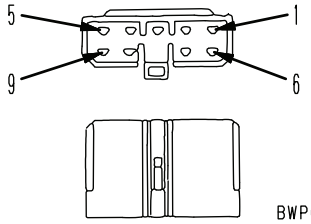
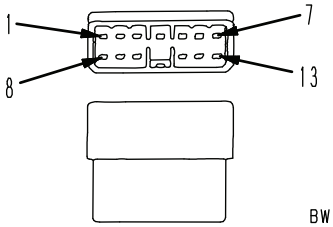
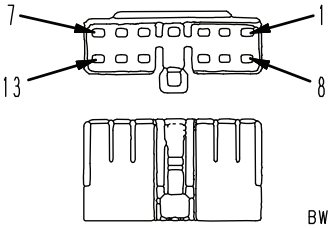
This is the excerpted circuit diagram related to troubleshooting

- The circuit diagram contains the connector No., pin No., and connector color related to the failure.
- “/” is used in the connector No. in the following 2 cases.
  - Abbreviation (3 letters in many cases)
    Example) T/C: Abbreviation for Torque Converter
  - Male side and female side have different connector Nos.
    Example) BREAK OUT / E24
- The circuit diagram contains the destination or source of the branch line in a wiring harness.
- Arrow (↔): Approximate installation position on the machine

  NO: Normally Open

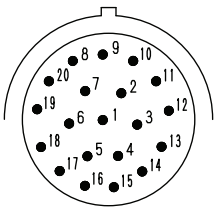
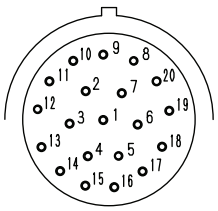
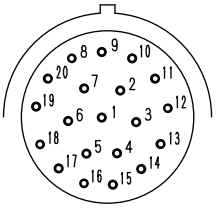
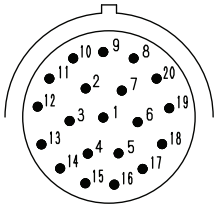
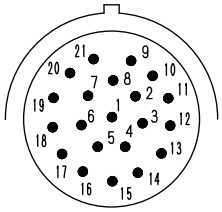
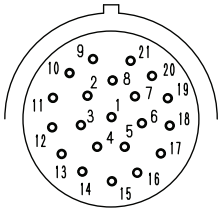
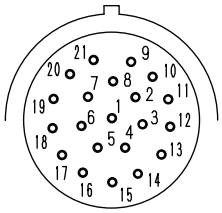
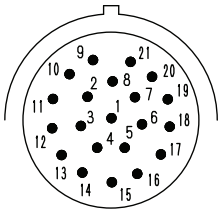
  NC: Normally Closed
- Signal names such as GND and 24 V are included in addition to connector numbers at junctions, etc. in circuit diagrams.
- Except for GND and 24 V, a signal name indicated at a junction, etc. shows that the wire is connected to another junction or controller at where the same signal name is indicated.

Connector From							Connector To		Identification number, color
Connector (terminal) No.	Address		Device name	Model	Total number of pins	Pin number	Connector (terminal) No.	Pin number	
	Connector layout	Connector and wiring harness chart							
T	-	K211	Joint	-	-	-	D02	2	*0.5B
							M04	C	*2B
							M05	1	*0.85B
							TM6	-	*2B
TF1	B4	B204	Starting motor switch B	Terminal	1	-	FB1	1A	*2RW
							M02	1	8RW
TF2	B4	B205	Starting motor switch BR	Terminal	1	-	FB1	2B	*3R
TF3	B3	B206	Starting motor switch ACC	Terminal	1	-	FB1	5E	*8R
TF4	B3	B207	Starting motor switch C	Terminal	1	-	BJ	-	0.5Y
							ER2	2	*2Y
TF5	B5	B208	Starting motor switch R1	Terminal	1	-	F07	8	0.5BR
							M16 (female)	1	*3BR
							TF6	-	3BR
TF6	B4	B209	Starting motor switch R2	Terminal	1	-	TF5	-	3BR
TM1	E6	H215	Battery	Terminal	1	-	M02	2	8RW
TM3	G7	O209	Engine oil pressure switch	Terminal	1	-	F07	7	*0.85Y
TM5	B11	-	Glow plug	Terminal	1	-	M16 (male)	1	3BR
TM6	H6	K225	Grounding (Revo frame)	Terminal	1	-	AA	-	*2B
							AL	-	*2B
							M	-	*2B
							T	-	*2B
U	-	N237	Joint	-	-	-	M	-	*2B
							M01	1	*0.85B
							M09	2	*0.85B
							W	-	1.25B
V	-	K227	Joint	-	-	-	D01	4	*0.85G
							F01	2	*0.85G
							M15	1	*0.85G

No. of pins	MIC type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
7	Body part No. : 79A-222-2640 (Q'ty:5)	Body part No. : 79A-222-2630 (Q'ty:5)	—
11	Body part No. : 79A-222-2680 (Q'ty:5)	Body part No. : 79A-222-2670 (Q'ty:5)	—
5	 BWP04741	 BWP04742	799-601-2710 (T-adapter)
	Body part No. : 79A-222-2620 (Q'ty:5)	Body part No. : 79A-222-2610 (Q'ty:5)	
9	 BWP04743	 BWP04744	799-601-2950 (T-adapter)
	Body part No. : 79A-222-2660 (Q'ty:5)	Body part No. : 79A-222-2650 (Q'ty:5)	
13	 BWP04745	 BWP04746	799-601-2720 (T-adapter)
	Body part No. : 79A-222-2710 (Q'ty:2)	Body part No. : 79A-222-2690 (Q'ty:2)	

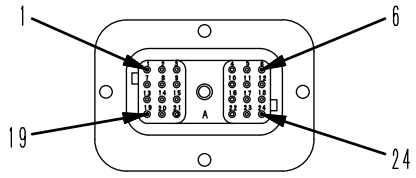
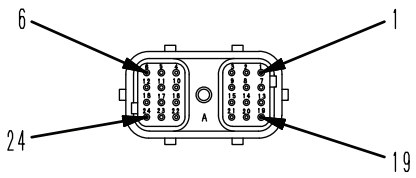
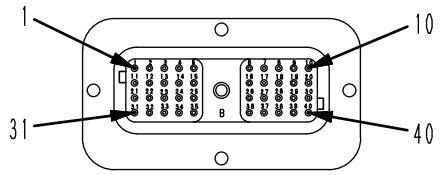
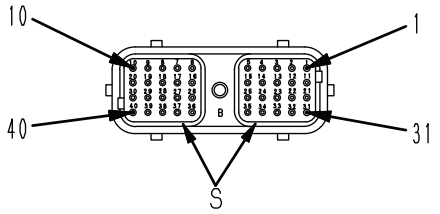
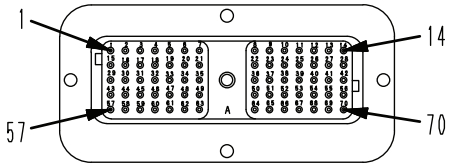
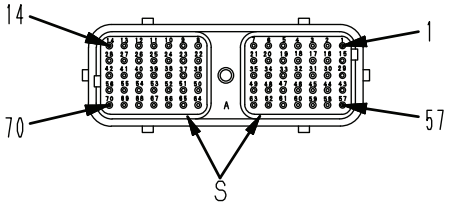
G0026137

[The pin No. is also marked on the connector (electric wire insertion end)]

Type (shell size code)	HD30 Series connector		
	Body (plug)	Body (receptacle)	Testing connection use special tool Part No.
18-20 (3)	Pin (male terminal)	Socket (female terminal)	799-601-9230 (T-adapter)
	 BWP05009	 BWP05010	
	Part No. :08191-31201, 08191-31202	Part No. :08191-34101, 08191-34102	
	Socket (female terminal)	Pin (male termial)	799-601-9230 (T-adapter)
	 BWP05011	 BWP05012	
	Part No. :08191-32201, 08191-32202	Part No. :08191-33101, 08191-33102	
18-21 (4)	Pin (male terminal)	Socket (female terminal)	799-601-9240 (T-adapter)
	 BWP05013	 BWP05014	
	Part No. :08191-41201, 08191-42202	Part No. :08191-44101, 08191-44102	
	Socket (female terminal)	Pin (male termial)	799-601-9240 (T-adapter)
	 BWP05015	 BWP05016	
	Part No. :08191-42201, 08191-42202	Part No. :08191-43101, 08191-43102	

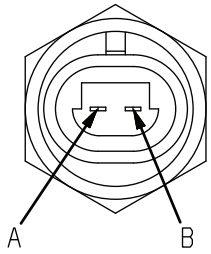
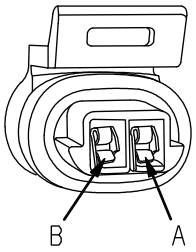
G0026147

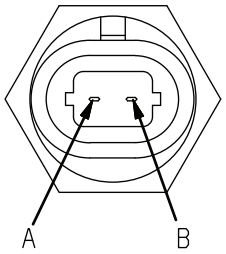
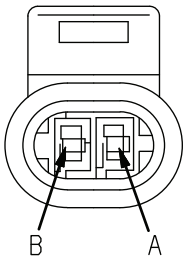
[The pin No. is also marked on the connector (electric wire insertion end)]

No. of pins	DRC12, 16 Series connector		
	DRC12:Male pin (female housing)	DRC16:Female pin (male housing)	Testing connection use special tool Part No.
24			–
	–	–	
40			–
	–	Seal(S) Part No. : 17A-06-41830	
70			–
	–	Seal(S) Part No. : 17A-06-41840	

G0026157

PACKARD conncetor for engine

No. of pins	Temperature sensor of coolant, fuel and lubricating oil (95, 107, 114, 125, 140 engine)		
	Sensor side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
2			795-799-5530 (Socket) (Kit : 799-601-4101) (Kit : 799-601-4201)
	☆ Non-polarity	—	

No. of pins	Boost (air intake) temperature sensor (125, 140 engine)		
	Sensor side (plug)	Harness side (receptacle)	
2			795-799-5540 (Socket) (Kit : 799-601-4101) (Kit : 799-601-4201)
	☆ Non-polarity	—	

G0026167

Part No.	Part name	Number of pins	ID marking	T-adapter kit													Non-kit part
				799-601-2500	799-601-2700	799-601-2800	799-601-7000	799-601-7100	799-601-7400	799-601-7500	799-601-8000	799-601-9000	799-601-9100	799-601-9200	799-601-9300	799-601-4101	799-601-4201	
799-601-4340*	Socket for engine (CRI-T3) Pump actuator	2	2, PA													●	●	
799-601-4380*	Socket for engine (CRI-T3) (95) Intake pressure/temperature	4	1, 2, 3, 4T															●
799-601-4260	Adapter for controller (ENG)	4	DTP4													●	●	
799-601-4211	Adapter for controller (ENG)	50	DRC50													●		
799-601-4220	Adapter for controller (ENG)	60	DRC60													●		
799-601-4390*	Socket for controller (95ENG)	60																●
799-601-4280*	Box for controller (PUMP)	121																●
799-601-9720	Adapter for controller (HST)	16	HST16A															●
799-601-9710	Adapter for controller (HST)	16	HST16B															●
799-601-9730	Adapter for controller (HST)	26	HST26A															●
799-601-9890	Multi-adapter for DT 2 to 4, DTM 2 pins	2, 3, 4																●
799-902-9600	T-adapter for ICT control box	26																●
799-902-9700	T-box	26																●
799-970-1010	Adapter for radio control receiver	7																●

*: These are not T-adapters but sockets.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measurement location, criteria and remarks</th></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Defective lock lever lock (PPC lock) switch (L.H.)</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connector F06 and connect the T-adapter to the female side.
3. Operate the lock lever (L.H.) to do the troubleshooting.</td></tr>
<tr><td rowspan="4">Resistance</td><td rowspan="2">Between F06 (female) (A) and (C)</td><td>Lock lever: LOCK</td><td>Max. 1Ω</td></tr>
<tr><td>Lock lever: FREE</td><td>Min. 1MΩ</td></tr>
<tr><td rowspan="2">Between F06 (female) (A) and (B)</td><td>Lock lever: LOCK</td><td>Min. 1MΩ</td></tr>
<tr><td>Lock lever: FREE</td><td>Max. 1Ω</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Defective personal code relay</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connector R04 and replace it with travel speed increase relay (R05).
3. Operate the starting switch to do the troubleshooting.</td></tr>
<tr><td colspan="2">Starting switch: START</td><td colspan="2">Start the engine.</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Defective starting motor cutoff relay</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connector R01 and replace it with travel speed increase relay (R05).
3. Operate the starting switch to do the troubleshooting.</td></tr>
<tr><td colspan="2">Starting switch: START</td><td colspan="2">Start the engine.</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">Defective safety relay</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connector ER2 and replace with the same type relay.
3. Operate the starting switch to do the troubleshooting.</td></tr>
<tr><td colspan="2">Starting switch: START</td><td colspan="2">Start the engine.</td></tr>
<tr><td rowspan="3">11</td><td rowspan="3">Defective diode (D02)</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connector D02, and connect the T-adapter to male side to do the troubleshooting.
REMARK
Measure it with diode range of multimeter.</td></tr>
<tr><td>Continuity</td><td colspan="2">Between D02 (male) (1) and (2)</td><td>No continuity</td></tr>
<tr><td colspan="2">Between D02 (male) (2) and (1)</td><td>Continuity</td></tr>
</table>

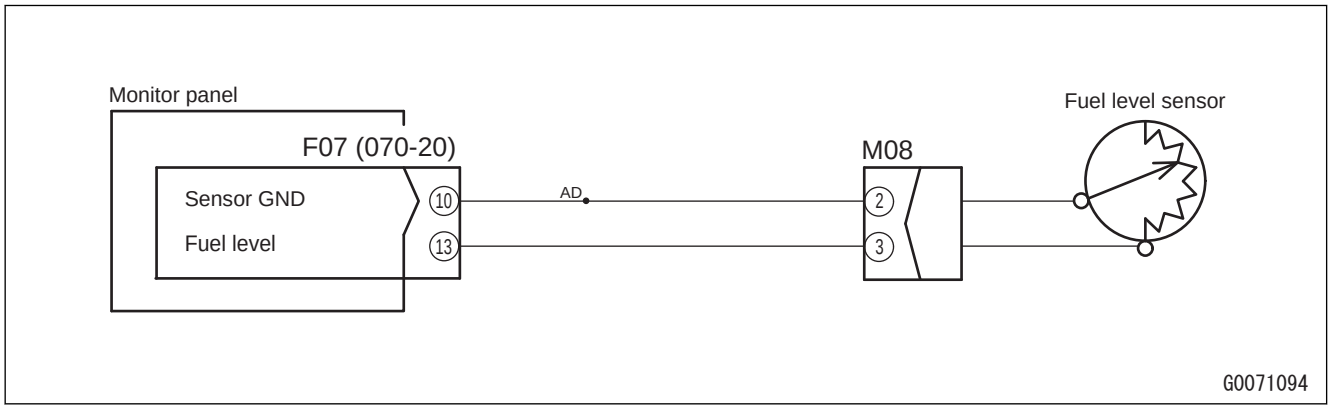
No.	Cause	Procedure, measurement location, criteria and remarks		
5	Open circuit in wiring harness	1. Turn the starting switch to the OFF position. 2. Disconnect the negative (-) terminal R of the battery. 3. Remove the fuses No.1 and No.5 in fuse box FB1. 4. Disconnect the starting switch terminals TF1 and TF3. 5. Disconnect the connectors F07, M02, J01, and F14 and connect the T-adapter to each female side to do the troubleshooting.		
		Resistance	Between battery R negative (-) terminal and ground	Max. 1Ω
			Between M02 (female) (2) and battery positive (+) terminal L	Max. 1Ω
			Between M02 (female) (1) and TF1	Max. 1Ω
			Between F07 (female) (20) and FB1-1	Max. 1Ω
			Between F07 (female) (19) and J01 (female) (9)	Max. 1Ω
			Between J01 (4) and F14 (2)	Max. 1Ω
			Between F14 (1) and FB1-5E	Max. 1Ω
			Between J01 (7) and F14 (5)	Max. 1Ω
			Between F14 (4) and FB1-5E	Max. 1Ω
			Between F07 (female) (1) and ground	Max. 1Ω
			Between fuse FB1-1A and TF1	Max. 1Ω
			Between fuse FB1-5E and TF3	Max. 1Ω

E-10 FUEL GAUGE DOES NOT SHOW CORRECT FUEL LEVEL

Failure	Fuel gauge does not show the actual fuel level.
Related information	Make sure that there is no problem on the fuel level itself.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measurement location, criteria and remarks</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Defective fuel level sensor</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connector M08. Connect the T-adapter to the male side of M08 to do the troubleshooting.</td></tr>
<tr><td rowspan="3">Resistance</td><td rowspan="3">Between M08 (male) (2) and (male) (3)</td><td>Fuel level FULL</td><td>Min. 1MΩ</td></tr>
<tr><td>Fuel level 1/2</td><td>50Ω (Reference value)</td></tr>
<tr><td>Fuel level EMPTY</td><td>150{+10/-10}Ω</td></tr>
<tr><td>2</td><td>Defective machine monitor</td><td colspan="4">If no failure is found by the above checks, the machine monitor is defective. (Troubleshooting cannot be done because this is an internal defect.)</td></tr>
</table>

Circuit diagram of fuel level sensor

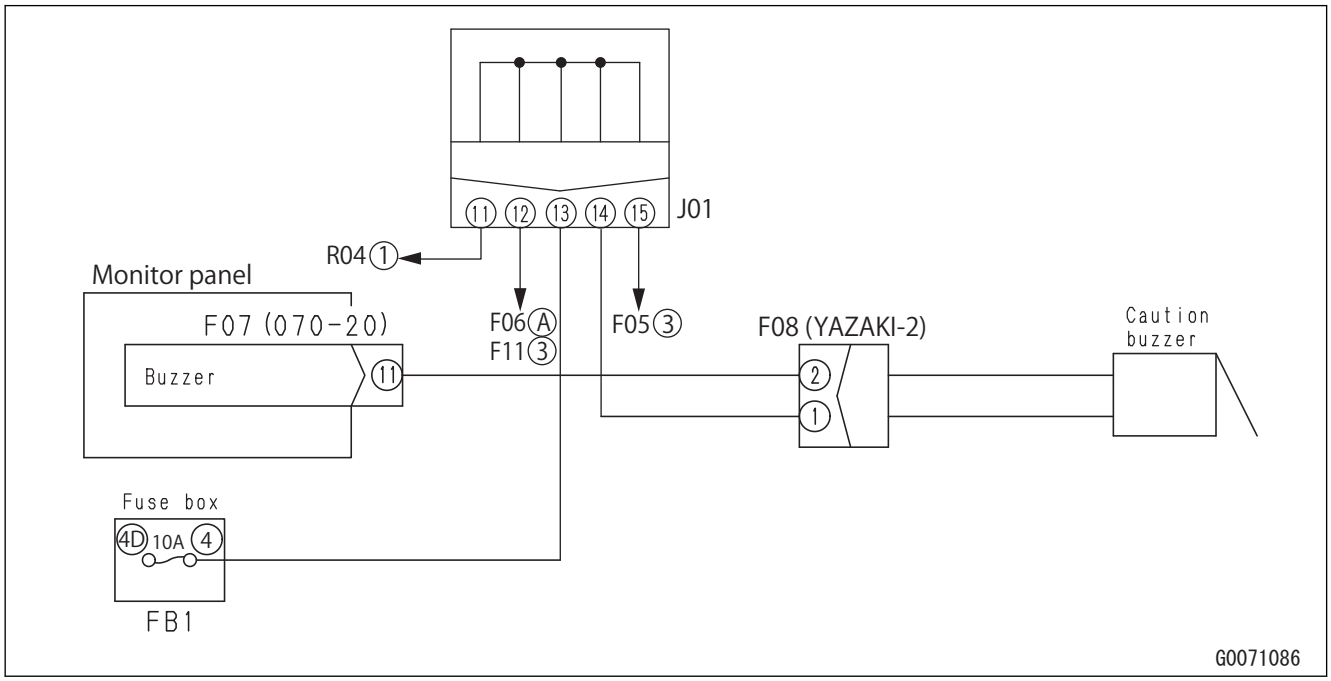


E-15 ALARM BUZZER CANNOT BE STOPPED

Failure	Alarm buzzer cannot be stopped.
Related information	**Pre-troubleshooting** Make sure that the fuse No.4 in fuse box FB1 is not disconnected.

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Ground fault in wiring harness	1. Turn the starting switch to the OFF position. 2. Disconnect the negative (-) terminal R of the battery. 3. Disconnect the connectors F07 and F08. Connect the T-adapter to the female side on one of the connectors to do the troubleshooting.		
		Resistance	Between ground and one of F07 (female) (11) and F08 (female) (2)	Min. 1MΩ
2	Defective machine monitor	If no failure is found by the above checks, the machine monitor is defective. (Troubleshooting cannot be done because this is an internal defect.)		

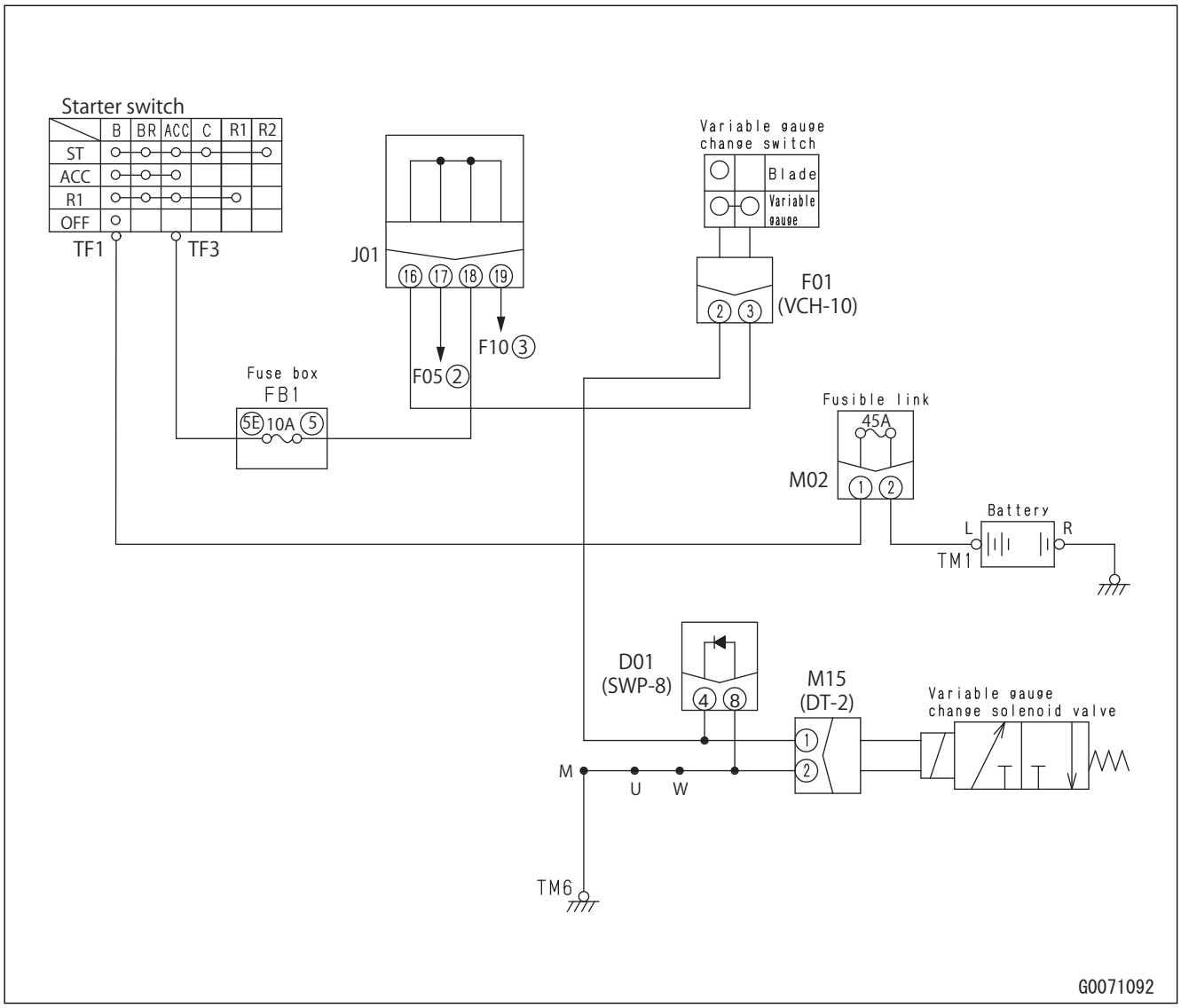
Circuit diagram of alarm buzzer



No.	Cause	Procedure, measurement location, criteria and remarks		
8	Hot short circuit in wiring harness	1. Turn the starting switch to the OFF position. 2. Disconnect the negative (-) terminal R of the battery. 3. Disconnect the connectors R02, R03, M09, F07, F11, F13, and D01. Connect the T-adapter to the female side of one of the connectors. 4. Lock lever automatic lock cancel switch is in the USUAL (DOWN) position. 5. Turn the starting switch to the ON position. Then, do the troubleshooting.		
		Voltage	Between ground and one of R02 (female) (3) and R03 (female) (5)	Max. 1V
			Between ground and one of R03 (female) (5) and D01 (female) (6)	Max. 1V
			Between ground and M09 (female) (1), R02 (female) (4), F07 (female) (18) and F13	Max. 1V
			Between ground and one of F11 (female) (3) and R03 (female) (1)	Max. 1V

No.	Cause	Procedure, measurement location, criteria and remarks		
6	Ground fault in wiring harness	1. Turn the starting switch to the OFF position. 2. Disconnect the connectors F01, M15, D01, J01, F10, and F05. Connect the T-adapter to the female side of one of the connectors to do the trouble-shooting.		
		Resistance	Between ground and one of F01 (female) (3) and J01 (female) (16)	Min. 1MΩ
			Between ground and one of F01 (female) (2) and M15 (female) (1)	Min. 1MΩ
			Between ground and one of J01 (female) (17) and F05 (female) (2)	Min. 1MΩ
			Between ground and one of J01 (female) (19) and F10 (female) (3)	Min. 1MΩ

Circuit diagram of blade and variable gauge selector switch



H-2 TRAVEL AND BLADE DO NOT OPERATE

Failure	Travel and blade do not operate.
Related information	• Make sure that the hydraulic tank oil level is correct. • Do the troubleshooting with the hydraulic oil temperature at 45 to 55℃. • Make sure that all the work equipment and the swing operate correctly.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measurement location, criteria and remarks</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Defective center swivel joint</td><td colspan="3">1. Stop the engine.
2. Block with plug the control valve side of hydraulic hose connected to travel circuit or blade circuit.
3. Start the engine. Then, do the troubleshooting with the engine at high idle.</td></tr>
<tr><td>Main pump relief pressure</td><td>Travel lever circuit (hose disconnected side)</td><td>21.92 to 23.88MPa
{224 to 244kg/cm^2}</td></tr>
<tr><td colspan="3">If the oil pressure is low at all the circuit in the previous troubleshooting, check the center swivel joint because it is possibly defective.</td></tr>
</table>

H-11 BUCKET SPEED OR POWER IS LOW

Failure	Bucket speed or power is low.
Related information	• Make sure that the hydraulic tank oil level is correct. • Do the troubleshooting with the hydraulic oil temperature at 45 to 55℃.

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Malfunction of R.H. PPC valve (bucket circuit)	1. Be prepared with the engine stopped. 2. Start the engine. Then, do the troubleshooting with the engine at high idle.		
		PPC valve outlet pressure	R.H. work equipment control lever: NEUTRAL	0MPa {0kg/cm^2}
			R.H. work equipment control lever: Bucket CURL and bucket DUMP	2.84 to 3.43MPa {29 to 35kg/cm^2}
2	Malfunction of bucket control valve (spool)	1. Remove the pressure that remains in the hydraulic oil tank and piping. 2. Do the troubleshooting with the engine stopped.		
		• Check for stuck or seized bucket spool in control valve body. (It must be moved smoothly and must not be caught.) • Remove the bucket spool from the valve body, and check it for damage and dirt. When you make the machine to be original state, be careful not to allow the dirt to enter.		
3	Malfunction of bucket control valve (pressure compensation valve)	Check the pressure compensation valve of bucket control valve because it is possibly defective.		
4	Malfunction of bucket control valve (suction valve) or defective seal	Check the seal of the suction valve of bucket control valve (bottom side and head side) because the operation or seal is possibly defective.		
5	Malfunction of safety valve and suction valve or defective seal	Check the safety valve and suction valve of the control valve because there is a possibility of malfunction in them or defective seal.		
6	Defective bucket cylinder	1. Remove the pressure that remains in the hydraulic oil tank and piping. 2. Do the troubleshooting with the engine stopped.		
		Leakage from bucket cylinder	Bucket CURL relief	Max. 10 mℓ/min

H-20 IN COMBINED OPERATION OF WORK EQUIPMENT, WORK EQUIPMENT WITH HEAVIER LOAD MOVES SLOWER

Failure	In combined operation of work equipment, work equipment with heavier load moves slower.
Related information	Do the troubleshooting with the hydraulic oil temperature at 45 to 55℃.

No.	Cause	Procedure, measurement location, criteria and remarks			
1	Malfunction of control valve (pressure compensation valve) with smaller load	Pressure compensation valve in the control valve with smaller load can be defective.			
		Malfunction of pressure compensation valve	Combination of multiple operations: Boom RAISE + arm IN	Side with larger load: Boom	Pressure compensation valve on arm side
			Combination of multiple operations: Boom RAISE + arm OUT	Side with larger load: Arm	Pressure compensation valve on boom side
			Combination of multiple operations: Boom RAISE + bucket CURL	Side with larger load: Boom	Pressure compensation valve on bucket side
			Combination of multiple operations: Arm OUT + bucket CURL	Side with larger load: Arm	Pressure compensation valve on bucket side
			Combination of multiple operations: Boom LOWER + arm OUT	Side with larger load: Arm	Pressure compensation valve on boom side

H-27 MACHINE DOES NOT SWING TO RIGHT OR LEFT

Failure	Machine does not swing to right or left.
Related information	• Make sure that the hydraulic tank oil level is correct. • Do the troubleshooting with the hydraulic oil temperature at 45 to 55℃.

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Malfunction of swing PPC valve	1. Be prepared with the engine stopped. 2. Start the engine. Then, do the troubleshooting with the engine at high idle.		
		Swing PPC valve outlet pressure	L.H. work equipment control lever: NEUTRAL	0MPa {0kg/cm^2}
			L.H. work equipment control lever: Swing LEFT, swing RIGHT	2.84 to 3.43MPa {29 to 35kg/cm^2}
2	Malfunction of swing motor (swing parking brake)	1. Be prepared with the engine stopped. 2. Start the engine. Then, do the troubleshooting with the engine at high idle.		
		Release pressure for parking brake of swing motor	L.H. work equipment control lever: Operated for arm IN or swing RIGHT and LEFT	2.84 to 3.43MPa {29 to 35kg/cm^2}
		If no failure is found by the above checks, the swing parking brake is possibly defective.		
3	Malfunction of swing motor (safety valve)	1. Be prepared with the engine stopped. 2. Start the engine. Then, do the troubleshooting with the engine at high idle.		
		Swing relief pressure (pump pressure)	L.H. work equipment control lever: Swing LEFT relief, swing RIGHT relief	18.33 to 20.78MPa {187 to 217kg/cm^2}
		If the same voltage is sensed on the right and left swing and the voltage is lower than the standard value, safety valve seal can be defective.		
4	Malfunction of swing control valve (spool)	1. Be prepared with the engine stopped. 2. Start the engine. Then, do the troubleshooting with the engine at high idle.		
		Swing PPC circuit pressure	L.H. work equipment control lever: Operated for swing RIGHT and LEFT	2.84 to 3.43MPa {29 to 35kg/cm^2}
		If no failure is found by the above checks, check the spool of the swing control valve because it is possibly defective.		

H-35 SWING DRIFT ON A SLOPE IS LARGE (WHILE SWING PARKING BRAKE IS APPLIED)

Failure	Swing drift on a slope is large. (while swing parking brake is applied)
Related information	• Make sure that the hydraulic tank oil level is correct. • Do the troubleshooting with the hydraulic oil temperature at 45 to 55℃. • When the control lever for swing and arm IN side is in the NEUTRAL position, the swing brake operates and the swing is fixed with disc brake.

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Malfunction of swing motor parking brake	1. Be prepared with the engine stopped. 2. Start the engine. Then, do the troubleshooting with the engine at high idle.		
		Release pressure for parking brake of swing motor	L.H. work equipment control lever: Operated for arm IN or swing RIGHT and LEFT	2.84 to 3.43MPa {29 to 35kg/cm^2}
		If no failure is found by the above checks, check the brake because it is possibly defective.		

S-6 ENGINE STOPS DURING OPERATION

Failure	The engine stops during operation.
Related information	-

No.	Cause	Point to check, remarks	Remedy
1	Low fuel level	It is found by check that the fuel tank is empty.	Add fuel.
2	Clogged air bleeding hole of fuel tank cap	Air bleeding hole of the fuel tank cap is clogged.	Flush the air bleeding hole of fuel tank cap, and clean its circumference.
3	Clogged fuel filter element	Check the used hours of fuel filter element. If it is used over specified time, there is a possibility of clogged fuel filter element.	Replace the fuel filter element.
4	Mixing of foreign materials into fuel	When the fuel is drained from fuel tank, the rust or water comes out.	Replace the fuel.
5	Air mixed in fuel piping system	When air is bled from the fuel system, air comes out. (Reference: See TESTING AND ADJUSTING, “BLEED AIR FROM FUEL SYSTEM”.)	• Bleed air. • Repair or replace the fuel piping.
6	Leakage from fuel piping system	There is a fuel leakage from the fuel piping. (Reference: See TESTING AND ADJUSTING, “TEST FUEL SYSTEM FOR LEAKAGE”.)	Repair or replace the fuel piping circumference.
7	Defective fuel injection pump	Check the fuel injection pump. (Reference: See TESTING AND ADJUSTING, “TEST FUEL SYSTEM FOR LEAKAGE”.)	Adjust the fuel injection pump.
8	Defective air intake hose	Visually check the air intake hose for damage.	Replace the air intake hose.
9	Defective air intake manifold	Check the air intake manifold for internal damage.	Replace the air intake manifold.
10	Defective exhaust pipe	Check the exhaust pipe for breakage and exhaust gas leakage. (Check the heat insulation cover and heat insulation plate for sticking of soot.)	Replace the exhaust pipe.
11	Breakage of valve or rocker arm	Check the valves and rocker arms. (a sudden stop occurred with unusual noise)	Replace the valve and rocker arm.
12	Breakage or seizure of piston and connecting rod	• Oil drained from the oil pan contains metal powder. • Remove the oil pan to check the piston and the connecting rod. (Reference: a sudden stop occurred with unusual noise or stop occurred by overheating)	Replace the pistons or connecting rods.
13	Breakage or seizure of crankshaft main bearing	• Oil drained from the oil pan contains metal powder. • Remove the oil pan. Check the crankshaft main bearing.	Replace the crankshaft main bearings.
15	Defective starting switch wiring	Check the starting switch wiring.	Do the troubleshooting for “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” in E-mode, and take corrective measures.

S-14 FUEL MIXES INTO ENGINE OIL

Failure	Fuel mixes into engine oil.
Related information	-

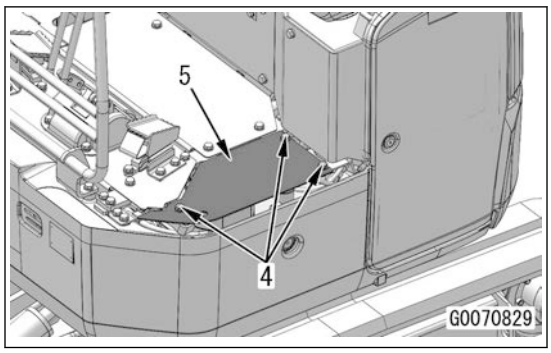
No.	Cause	Point to check, remarks	Remedy
1	Defective fuel injection valve (clogged fuel injection valve, defective injection)	Check “fuel injection valve”. (Reference: See Engine Shop Manual.)	Adjust the fuel injection valve.
2	Fuel leakage from fuel injection pump and O-ring (spill line)	Check fuel injection valve and O-ring.	Replace the fuel injection valve and O-ring.
3	Defective seal between fuel injection valve and injection pipe, cracked injection pipe	Check the seal between fuel injection valve and injection pipe, cracked injection pipe.	Repair or replace it.
4	Internal defect of fuel injection pump	• Check if the oil level has increased or there is a smell of diesel fuel. • Check the internal seal of fuel injection pump.	Repair the fuel injection pump.

Symbol	Item	Summary
Notice	Notice	If the precaution of this signal word is not observed, the machine damage or shortening of service life can occur.
Remarks	Remarks	Information contained in this signal word is useful to know.

How to read the unit

International System of Units (SI) is used in this manual. For reference, units that have been used in the past are given in { }.

3. Remove the bolts (4) (3 pieces), and remove the cover (5).
   Tool: Socket wrench
   Bolt (4): Width across flats 17 mm, M10



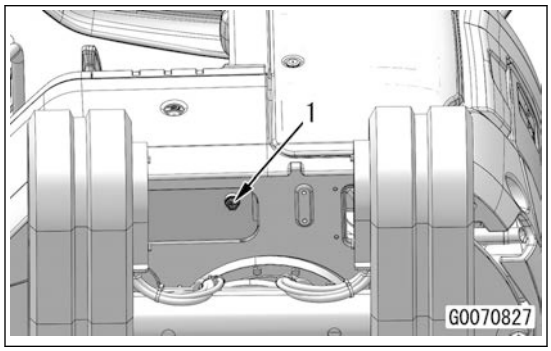
4. Turn the hydraulic oil cap (6) gradually to release the internal pressure.

5. Loosen the drain plug (1) slowly to remove it, and drain the hydraulic oil.

   REMARK

   - (For details of the drain quantity, see SPECIFICATIONS, “FUEL, COOLANT, LUBRICANT”.)
   - Make sure that the hydraulic oil is drained fully, and then tighten the drain plug (1).

   Tool: Socket wrench, oil container, torque wrench (socket)
   Drain plug (1): Width across flats 24 mm
   Drain plug (1): 58.8 to 78.4 Nm {6.0 to 8.0 kgm}



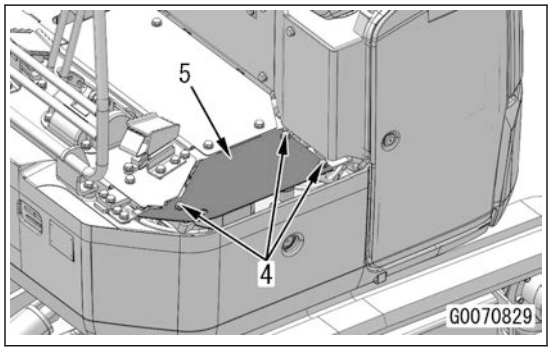
ADD HYDRAULIC OIL

1. Fill with Komatsu genuine oil to the specified level through the oil filler port. Run the engine to supply the oil through the piping. Then check the oil level again.

   REMARK

   For details of the amount, see SPECIFICATIONS, “FUEL, COOLANT, LUBRICANT”.

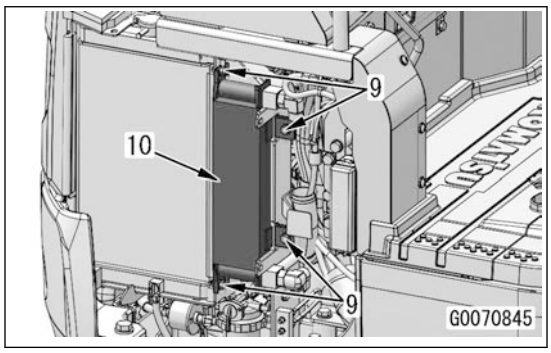
2. Bleed air from the hydraulic circuit. For details, see TESTING AND ADJUSTING, “BLEED AIR FROM HYDRAULIC SYSTEM”.
3. Install the cover (5) with the bolts (4) (3 pieces).
   Tool: Torque wrench (socket)
   Bolt (4): Width across flats 17 mm, M10
   Bolt (4): 59 to 74 Nm {6 to 7.5 kgm}



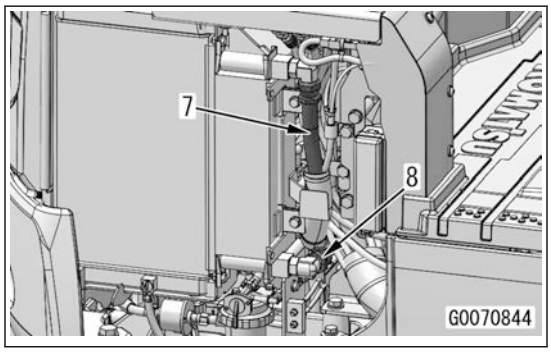
INSTALL HYDRAULIC OIL COOLER ASSEMBLY

Hydraulic oil cooler assembly

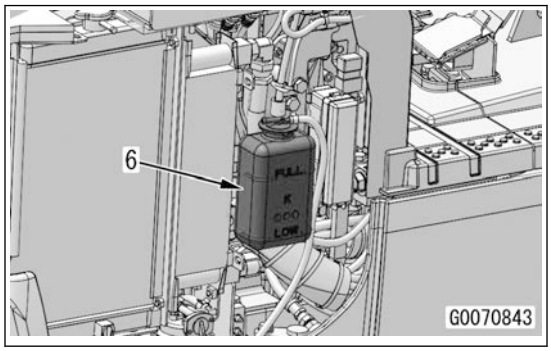
1. Install the hydraulic oil cooler assembly (10) with the bolts (9) (4 pieces).
   Tool: Torque wrench (socket)
   Bolt (9): Width across flats 13 mm, M8
   Bolt (9): 27 to 34 Nm {2.8 to 3.5 kgm}



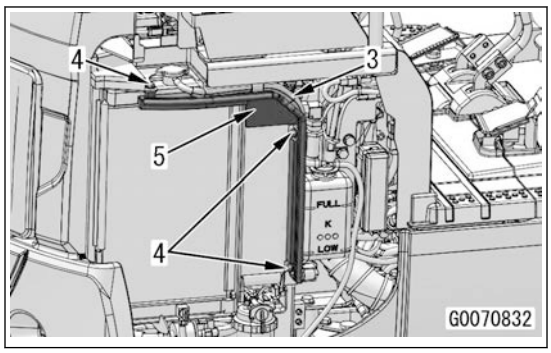
2. Connect the hoses (7) and (8).
   Tool: Torque wrench (open-end)
   Hose (7), (8): Width across flats 32 mm, nominal 05
   Hose (7), (8): 128 to 186 Nm {13.0 to 19.0 kgm}



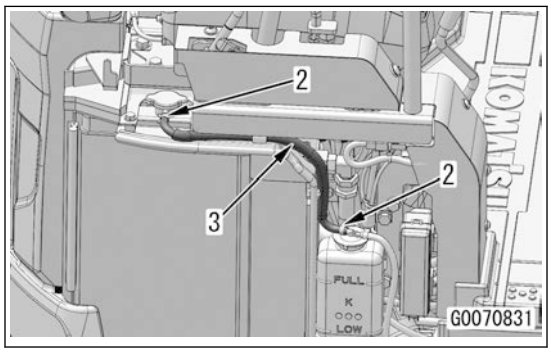
3. Install the reservoir tank (6).



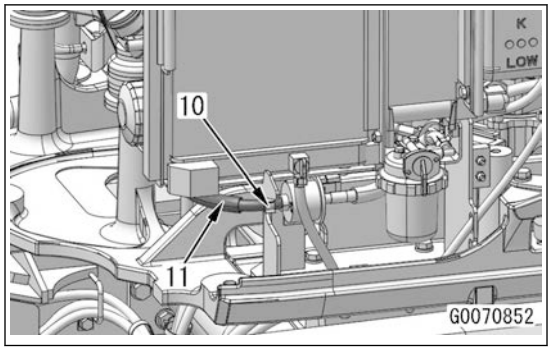
4. Install the cover (5) and hose (3) together with the bolts (4) (3 pieces).
   Tool: Torque wrench (socket)
   Bolt (4): Width across flats 13 mm, M8
   Bolt (4): 27 to 34 Nm {2.8 to 3.5 kgm}



5. Connect the hose (3) with the clamps (2) (2 pieces).



16. Connect the hose (11) with the clip (10).



17. Lift the counterweight and fuel tank assembly (9), and set it to the installation position.

    Counterweight and fuel tank assembly (9): 180 kg

18. Install the bolts (7) and (8) (2 pieces).

    Tool: Torque wrench (socket)

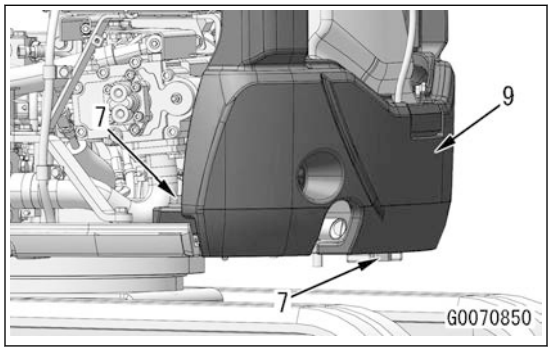
    Bolt (7): Width across flats 24 mm, M16

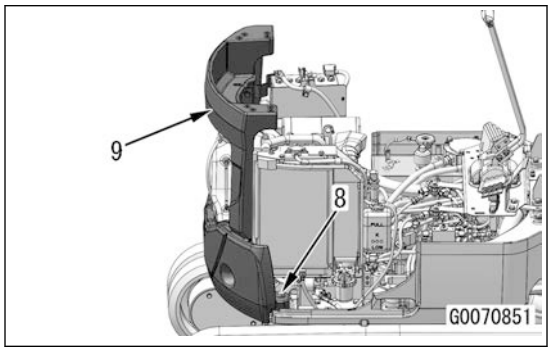
    Bolt (8): Width across flats 30 mm, M20

    Bolt (7), (8): Liquid adhesive (LT-2)

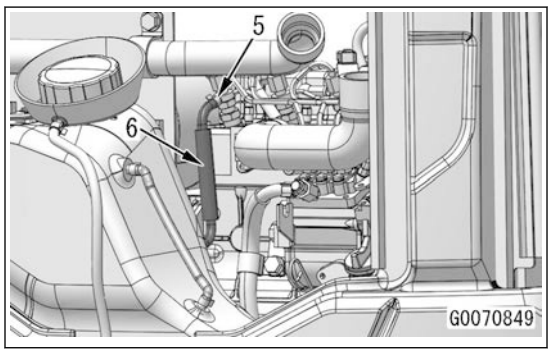
    Bolt (7): 235 to 285 Nm {23.5 to 29.5 kgm}

    Bolt (8): 455 to 565 Nm {46.5 to 58 kgm}

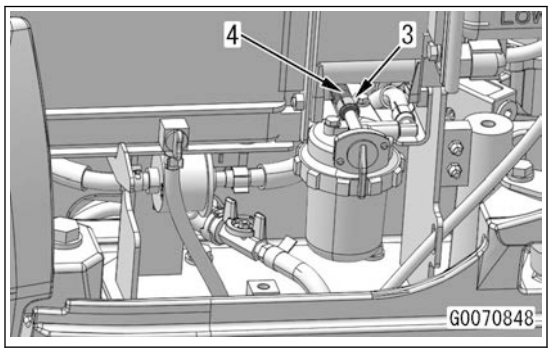




19. Connect the hose (6) with the clip (5).



20. Connect the hose (4) with the clip (3).



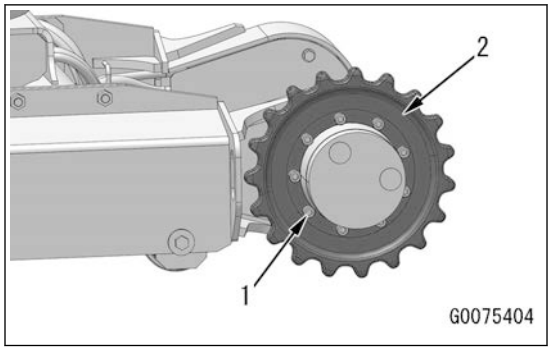
6. Install the sprocket (2) with the hexagonal socket head bolts (1) (9 pieces).

   Tool: Torque wrench (hexagonal)

   Hexagonal socket head bolt (1): Width across flats 8 mm, M10

   Hexagonal socket head bolt (1): Liquid adhesive (LT-2)

   Hexagonal socket head bolt (1): 59 to 74 Nm {6 to 7.5 kgm}



7. Remove the block below the track frame.

Track shoe assembly

8. Install the track shoe assembly. For details, see “REMOVE AND INSTALL TRACK ASSEMBLY”.

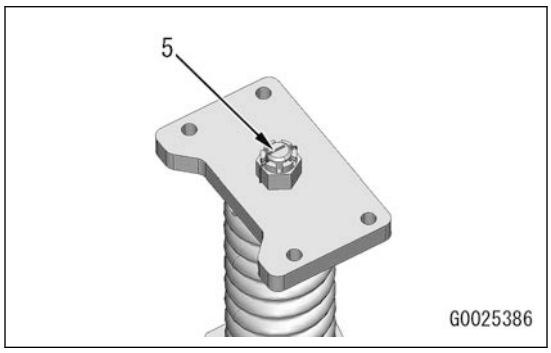
Bleed air from hydraulic circuit

9. Bleed air from the hydraulic circuit. For details, see TESTING AND ADJUSTING, “BLEED AIR FROM HYDRAULIC SYSTEM”.

REMARK

This operation is only for steel shoe specification.

4. Remove the cotter pin (5).



5. Set the recoil spring assembly to the hydraulic press with the sleeve (A).

   ⚠ **Be sure to set it properly because the load at installed length of the spring is big and dangerous.**

   Tool: Sleeve (A)

6. Apply hydraulic pressure gradually to retract the spring (8), and remove the nut (6).

   REMARK

   Retract the spring until the nut is loosened.

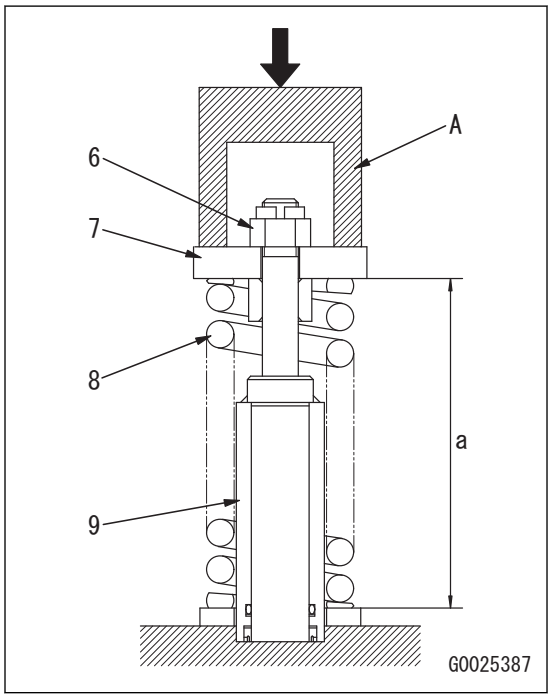
   Tool: Socket wrench

   Nut (6): Width across flats 27 mm

   Load at installed length of spring: 6860 N {700 kg}

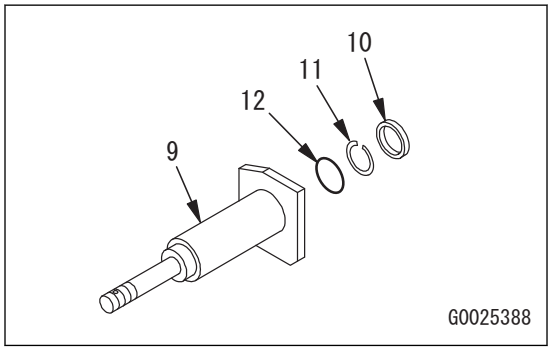
7. Release the hydraulic pressure gradually to extend the spring, and remove the stopper (7) and spring (8) from the cylinder (9).

   Free length of spring: 200 mm



Cylinder

8. Remove the dust seal (10) from the cylinder (9).
9. Remove the backup ring (11).
10. Remove the O-ring (12).



REMOVE AND INSTALL REVOLVING FRAME ASSEMBLY

Standard tool list

The listed parts are for reference only. You can use the part that is not listed if it is applicable.

Symbol	Part name	Part No.	Specifications	Q'ty	Remarks
1	Socket wrench	Commercially available	17 mm	1	
2	Open-end wrench	Commercially available	19 mm	1	
3	Open-end wrench	Commercially available	22 mm	1	
4	Torque wrench (socket)	Commercially available	20 to 100 Nm {2.04 to 10.2 kgm}	1	
5	Torque wrench (open-end)	Commercially available	20 to 100 Nm {2.04 to 10.2 kgm}	1	

⚠ Place the machine on a level ground, and lower the work equipment to the ground in a stable posture.

⚠ Set the lock lever to the LOCK position.

⚠ Turn the starting switch to the OFF position to stop the engine.

⚠ Set the battery disconnect switch to the OFF position. (For details, see TESTING AND ADJUSTING, "BATTERY DISCONNECT SWITCH".)

REMOVE REVOLVING FRAME ASSEMBLY

Work equipment assembly

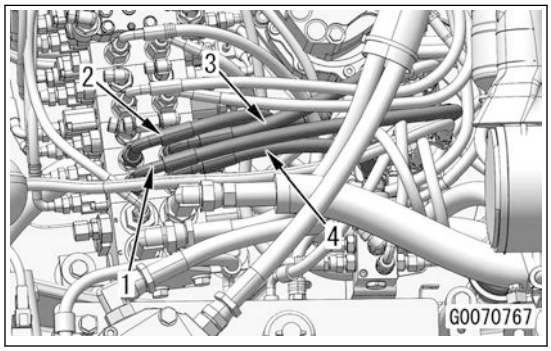
1. Remove the work equipment assembly. For details, see REMOVE AND INSTALL WORK EQUIPMENT ASSEMBLY.

Floor frame assembly

2. Remove the floor frame assembly. For details, see "REMOVE AND INSTALL FLOOR FRAME ASSEMBLY".
3. Disconnect the hoses (1), (2), (3), and (4).

   Tool: Open-end wrench

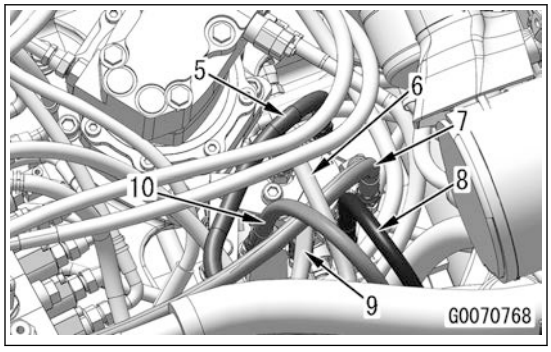
   Hose (1), (2), (3), (4): Width across flats 22 mm, nominal 03



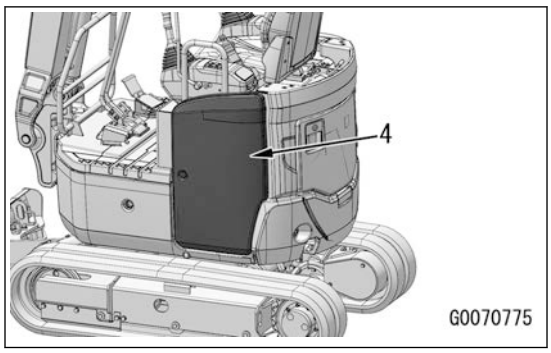
4. Disconnect the hoses (5), (6), (7), (8), (9), and (10).

   Tool: Open-end wrench

   Hose (5), (6), (7), (8), (9), (10): Width across flats 19 mm, nominal 02



13. Close the cover (4).



Counterweight and fuel tank assembly

14. Lift the canopy (3), and set it to the installation position.

    Canopy (3): 65 kg

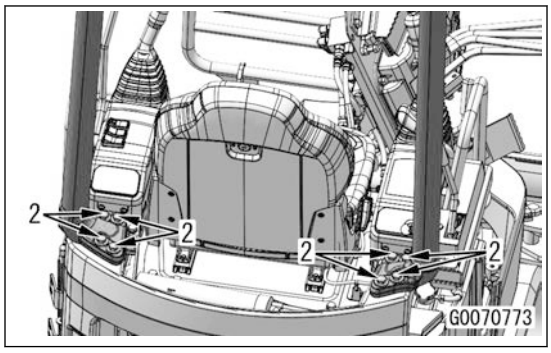
15. Install the bolts (2) (8 pieces).

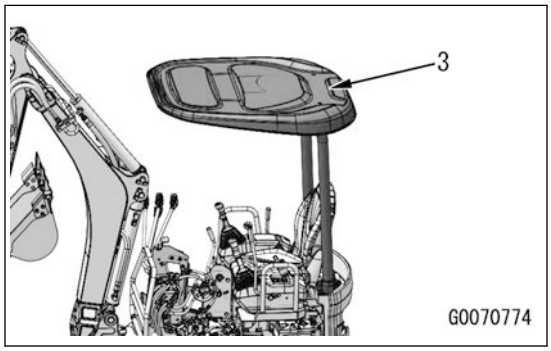
    Tool: Torque wrench (socket)

    Bolt (2): Width across flats 19 mm, M12

    Bolt (2): Liquid adhesive (LT-2)

    Bolt (2): 98 to 122.5 Nm {10 to 12.5 kgm}





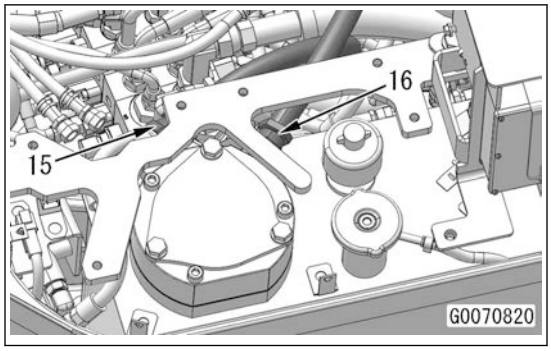
Add fuel

16. Add fuel to the specified level through the fuel filler port of the fuel tank.

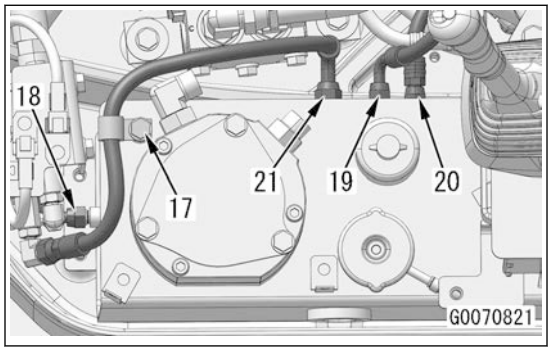
    REMARK

    For details of the amount, see SPECIFICATIONS, “FUEL, COOLANT, LUBRICANT”.

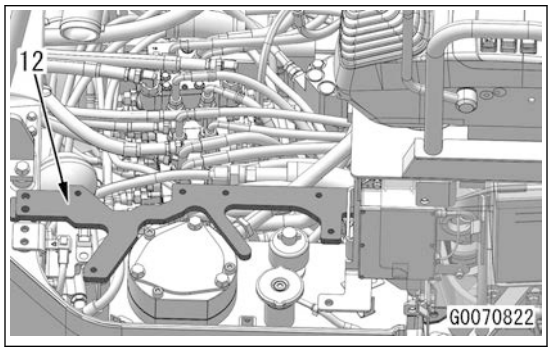
10. Disconnect the hoses (15) and (16).
    Tool: Open-end wrench
    Hose (15), (16): Width across flats 32 mm, nominal 05



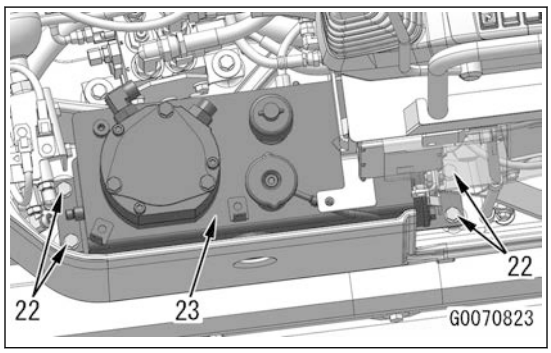
11. Remove the clamp (17).
    Tool: Socket wrench
    Bolt for clamp (17): Width across flats 17 mm, M10
12. Disconnect the hoses (18), (19), (20), and (21).
    Tool: Open-end wrench
    Hose (18), (19), (20): Width across flats 19 mm, nominal 02
    Hose (21): Width across flats 22 mm, nominal 03



13. Tilt the bracket (12) to the inside of the machine where it does not interfere with the work.



14. Remove the bolts (22) (4 pieces), lift the hydraulic tank assembly (23), and remove it.
    Tool: Socket wrench
    Bolt (22): Width across flats 17 mm, M10
    Hydraulic tank assembly (23): 30 kg



5. Lift the blade assembly (4), and hold it.

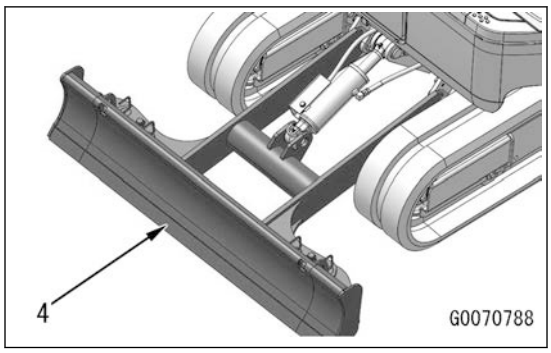
   Blade assembly (4): 90 kg

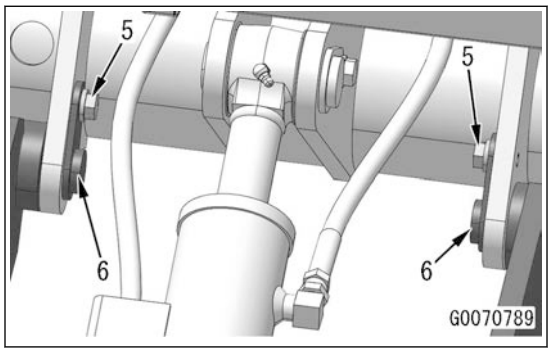
6. Remove the bolts (5) (2 pieces), and remove the pins (6) (2 pieces).

   Tool: Socket wrench

   Bolt (5): Width across flats 17 mm, M10

7. Lift the blade assembly (4), and remove it.





INSTALL BLADE ASSEMBLY

Blade assembly

1. Lift the blade assembly (4), and set it to the installation position.

   Blade assembly (4): 90 kg

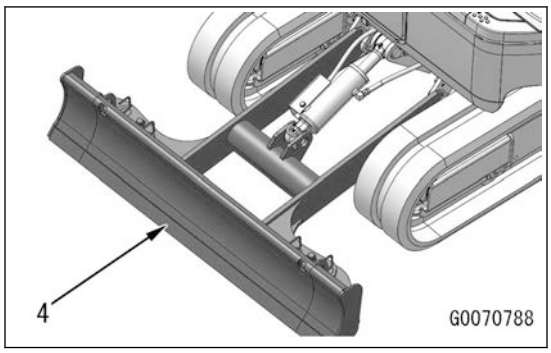
2. Install the pins (6) (2 pieces) with the bolts (5) (2 pieces).

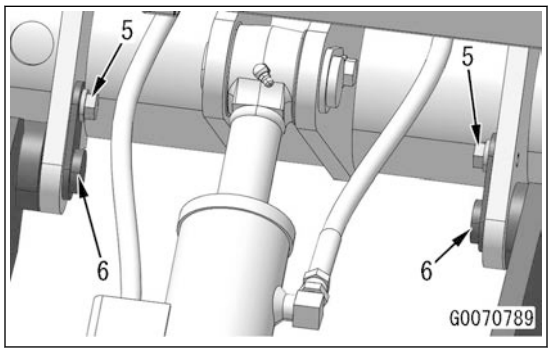
   Tool: Torque wrench (socket)

   Bolt (5): Width across flats 17 mm, M10

   Pin (6): Grease (G2-T)

   Bolt (5): 59 to 74 Nm {6 to 7.5 kgm}





Piston assembly

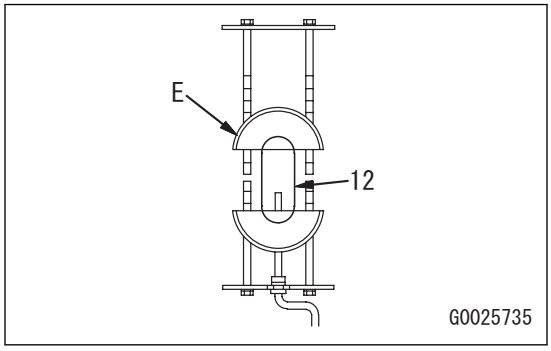
9. Expand the piston ring (12) with the expander (E).

   REMARK

   Set the piston ring on the expander (E), and rotate the handle 8 to 10 turns to expand it.

   Tool: Expander (E)

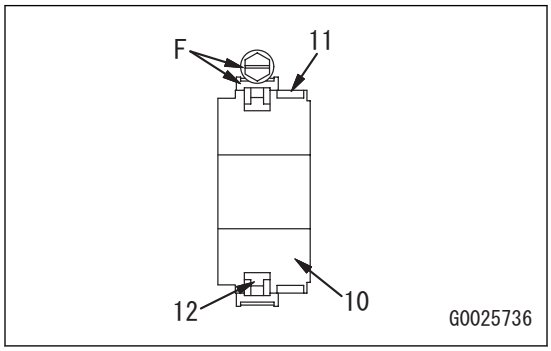
10. Remove the piston ring (11) from the expander (E), and install it to the piston (10).



11. Compress the piston ring (12) with the clamp and ring (F).

    Tool: Clamp, ring (F)

12. Install the wear ring (11) to the piston (10).

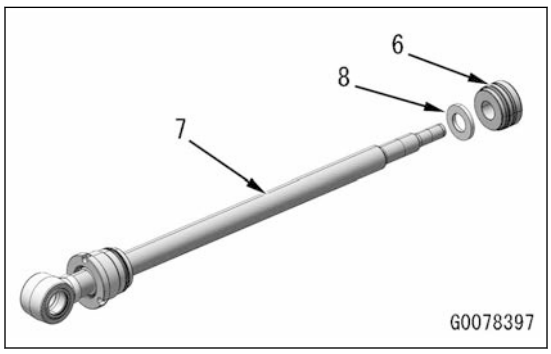


Piston rod assembly

13. Install the piston assembly (6) and retainer (8) to the piston rod (7).

    REMARK

    The retainer (8) is installed to the boom cylinder and arm cylinder only.



14. Set the piston rod assembly (3) to the repair stand (A).

    Tool: Repair stand (A)

15. Install the nut (5).

    Tool: Torque wrench (socket)

    Nut (5): Width across flats 41 mm (boom cylinder)

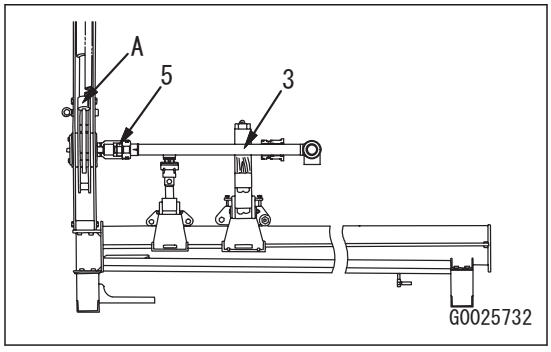
    Nut (5): Width across flats 41 mm (arm cylinder)

    Nut (5): Width across flats 32 mm (bucket cylinder)

    Nut (5): Width across flats 32 mm (swing cylinder)

    Nut (5): Width across flats 36 mm (blade cylinder)

    Nut (5): Width across flats 32 mm (variable gauge cylinder)



- Threaded part of piston rod (3): Liquid adhesive (Loctite No.262)
- Nut (5): 647±64.5 Nm {66±6.6 kgm} (boom cylinder)
- Nut (5): 618±62.0 Nm {63.0±6.3 kgm} (arm cylinder)
- Nut (5): 343±34.0 Nm {35.0±3.5 kgm} (bucket cylinder)
- Nut (5): 343±34.0 Nm {35±3.5 kgm} (swing cylinder)
- Nut (5): 412±41.0 Nm {42±4.2 kgm} (blade cylinder)

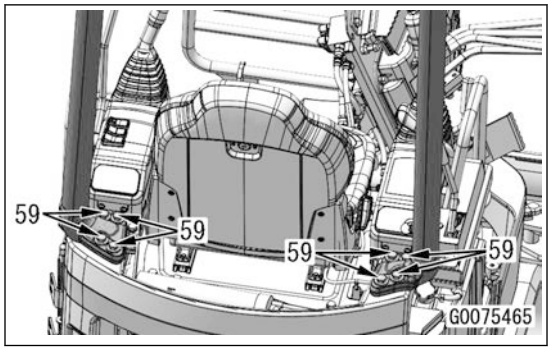
39. Lift the canopy (60), and hold it.

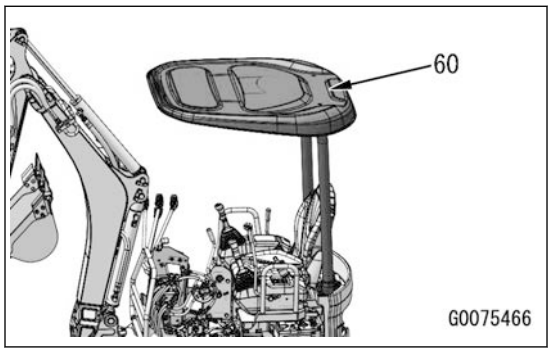
    Canopy (60): 65 kg

40. Remove the bolts (59) (8 pieces), lift the canopy (60), and remove it.

    Tool: Socket wrench

    Bolt (59): Width across flats 19 mm, M12

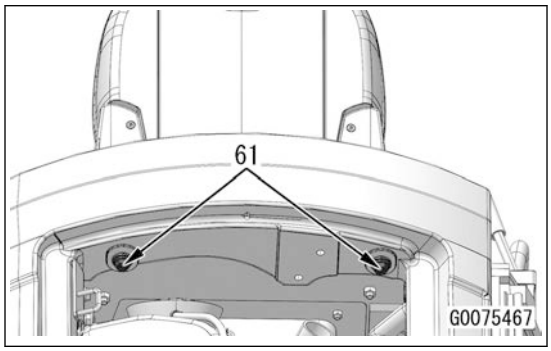




41. Remove the bolts (61) (2 pieces).

    Tool: Socket wrench

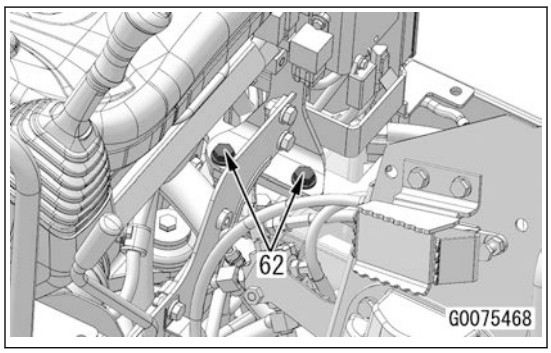
    Bolt (61): Width across flats 19 mm, M12

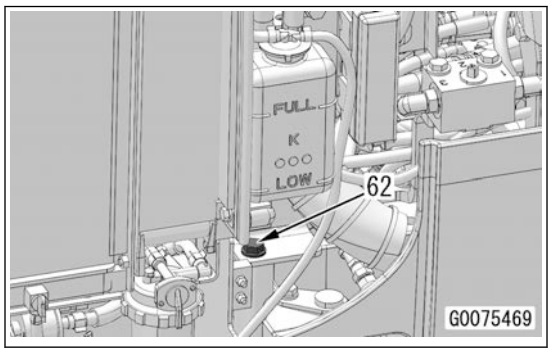


42. Remove the bolts (62) (3 pieces).

    Tool: Socket wrench

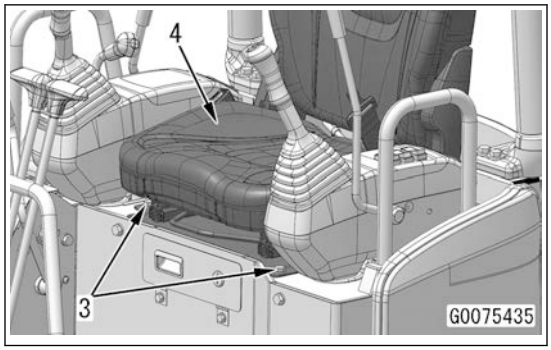
    Bolt (62): Width across flats 19 mm, M12

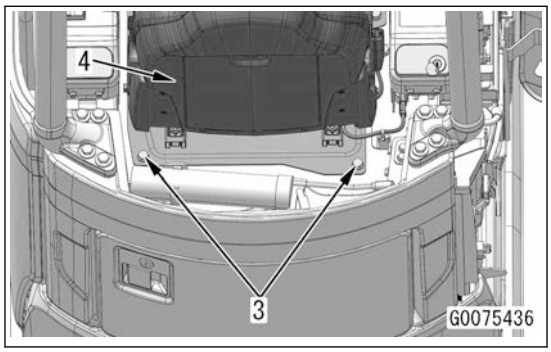




43. Close the cover of the travel PPC lever. For details, see TESTING AND ADJUSTING, “TILT OF COVER OF TRAVEL PPC LEVER”.

3. Remove the bolts (3) (4 pieces).
   Tool: Socket wrench
   Bolt (3): Width across flats 17 mm, M10
4. Lift the operator's seat (4) slowly with 2 persons, and remove it.
   Operator's seat (4): 30 kg

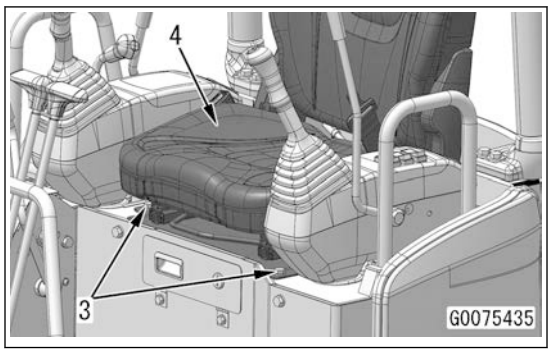


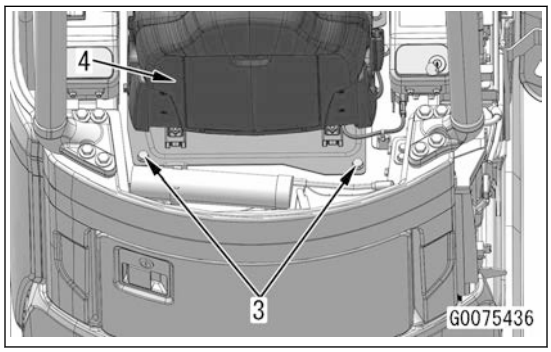


INSTALL OPERATOR'S SEAT

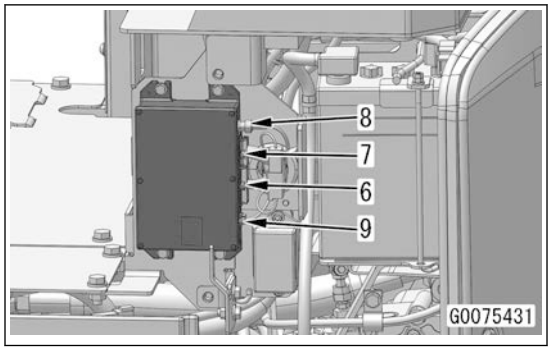
Operator's seat

1. Lower the operator's seat (4) slowly with 2 persons, and set it to the installation position.
   Operator's seat (4): 30 kg
2. Install the bolts (3) (4 pieces).
   Tool: Torque wrench (socket)
   Bolt (3): Width across flats 17 mm, M10
   Bolt (3): 59 to 74 Nm {6 to 7.5 kgm}

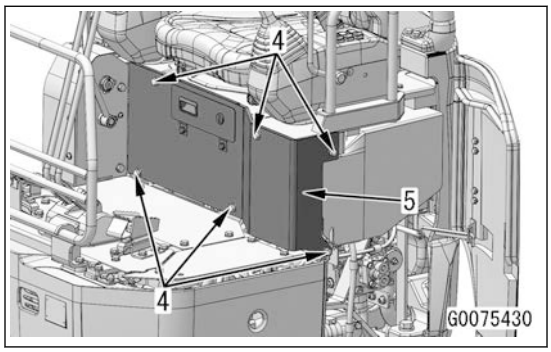




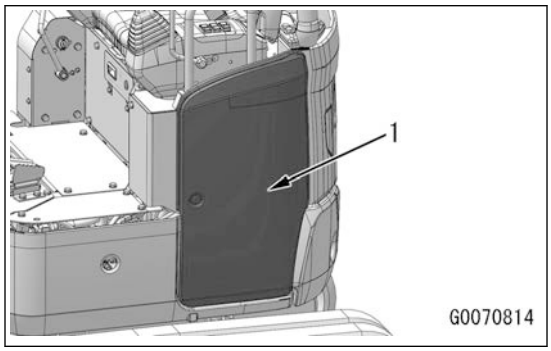
2. Connect the KOMTRAX GPS antenna (9).
3. Connect the KOMTRAX communication antenna (8).
4. Connect the connectors CK1 (6) and CK2 (7).



5. Install the cover (5) with the bolts (4) (6 pieces).
   Tool: Torque wrench (socket)
   Bolt (4): Width across flats 17 mm, M10
   Bolt (4): 59 to 74 Nm {6 to 7.5 kgm}



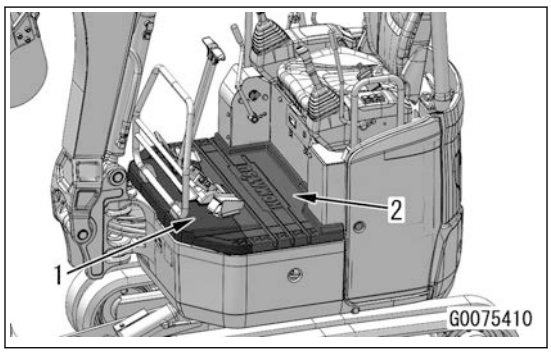
6. Close the cover (3).



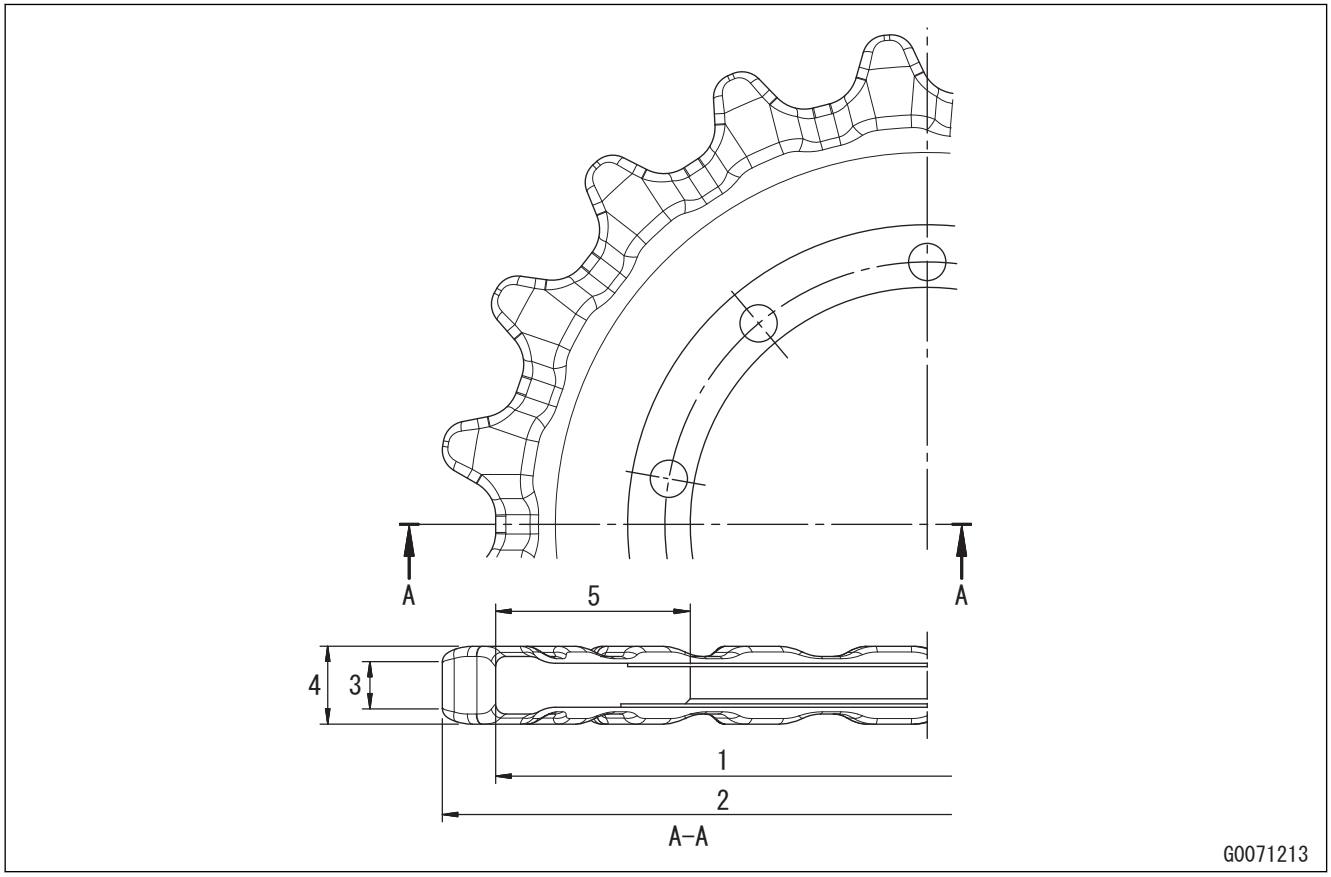
7. Install the floor mats (1) and (2).

   REMARK

   Install the floor mat. For details, see TESTING AND ADJUSTING, “TILT OF COVER OF TRAVEL PPC LEVER”.

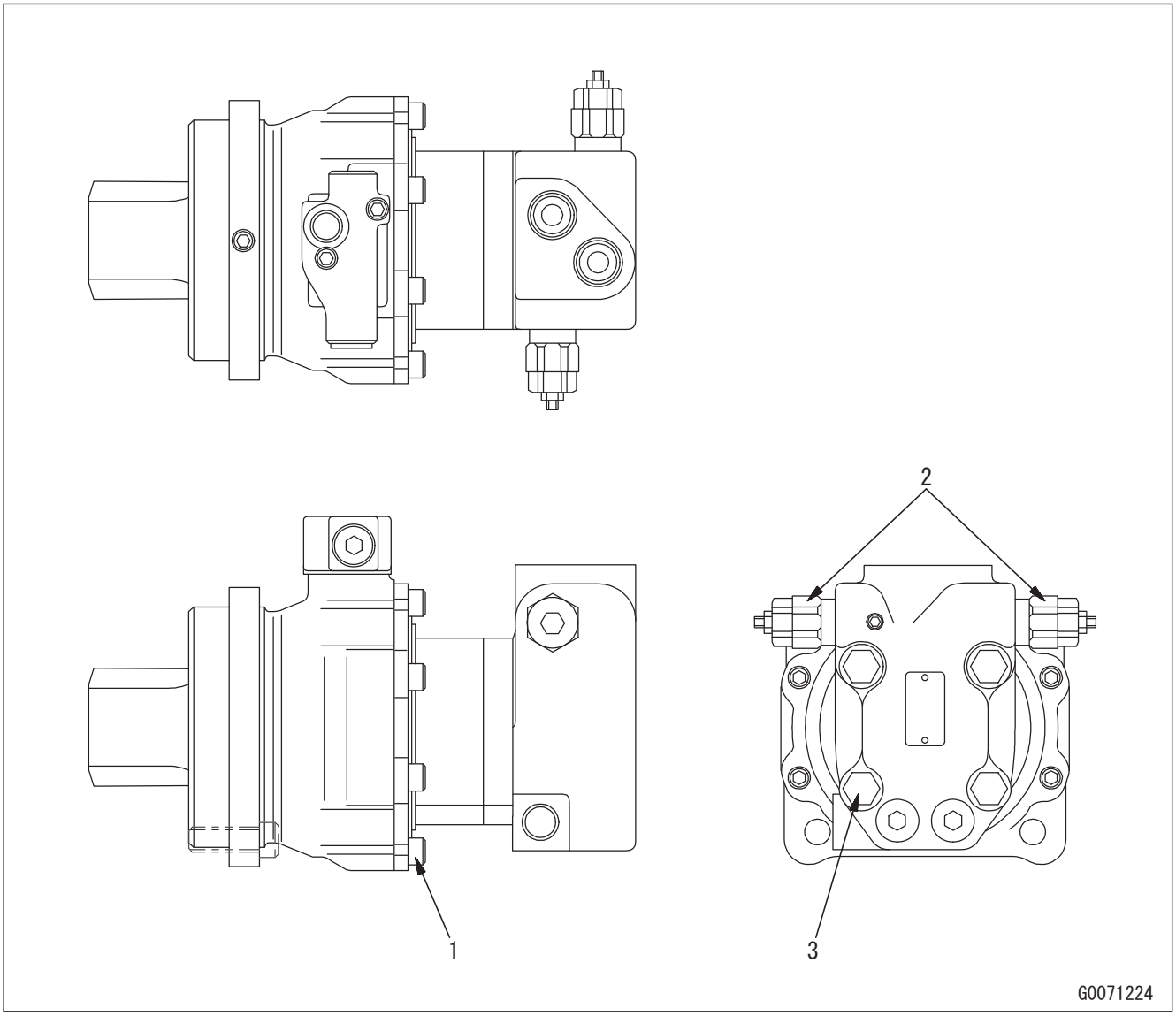


MAINTENANCE STANDARD OF SPROCKET



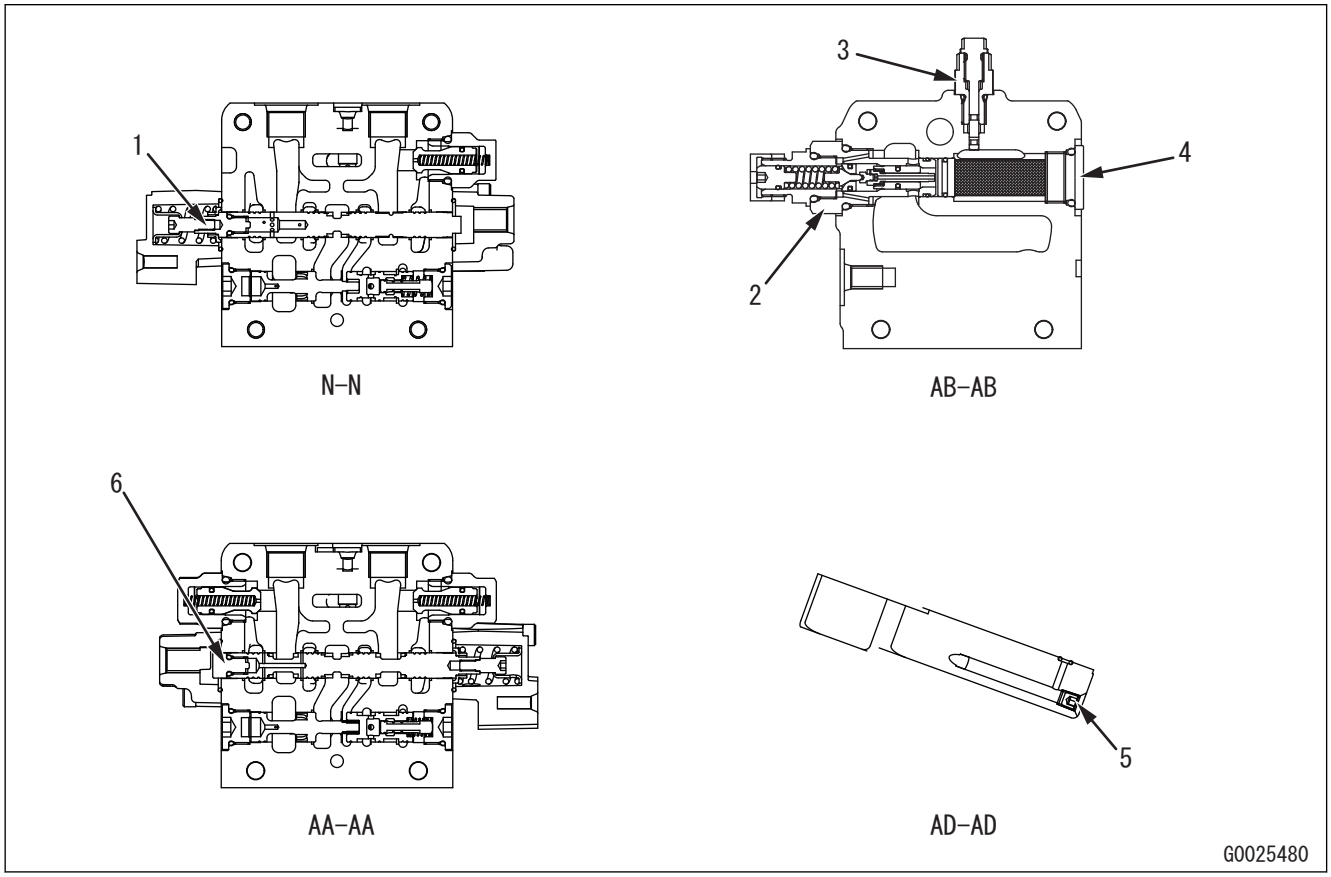
No.	Item	Judgment criteria			Remedy
		Standard dimensions	Tolerance	Repair limit	
1	Wear on tooth root diameter	255 mm	+1.0 mm -2.0 mm	251 mm	Repair by build-up welding or replace
2	Wear on tooth end diameter	290 mm	±1.5 mm	278 mm	
3	Wear on tooth end width	17 mm	-	15 mm	
4	Wear on tooth bottom width	23 mm	+1.0 mm -2.0 mm	21 mm	
5	Thickness of tooth bottom	57.5 mm	+1.0 mm -2.0 mm	55.5 mm	

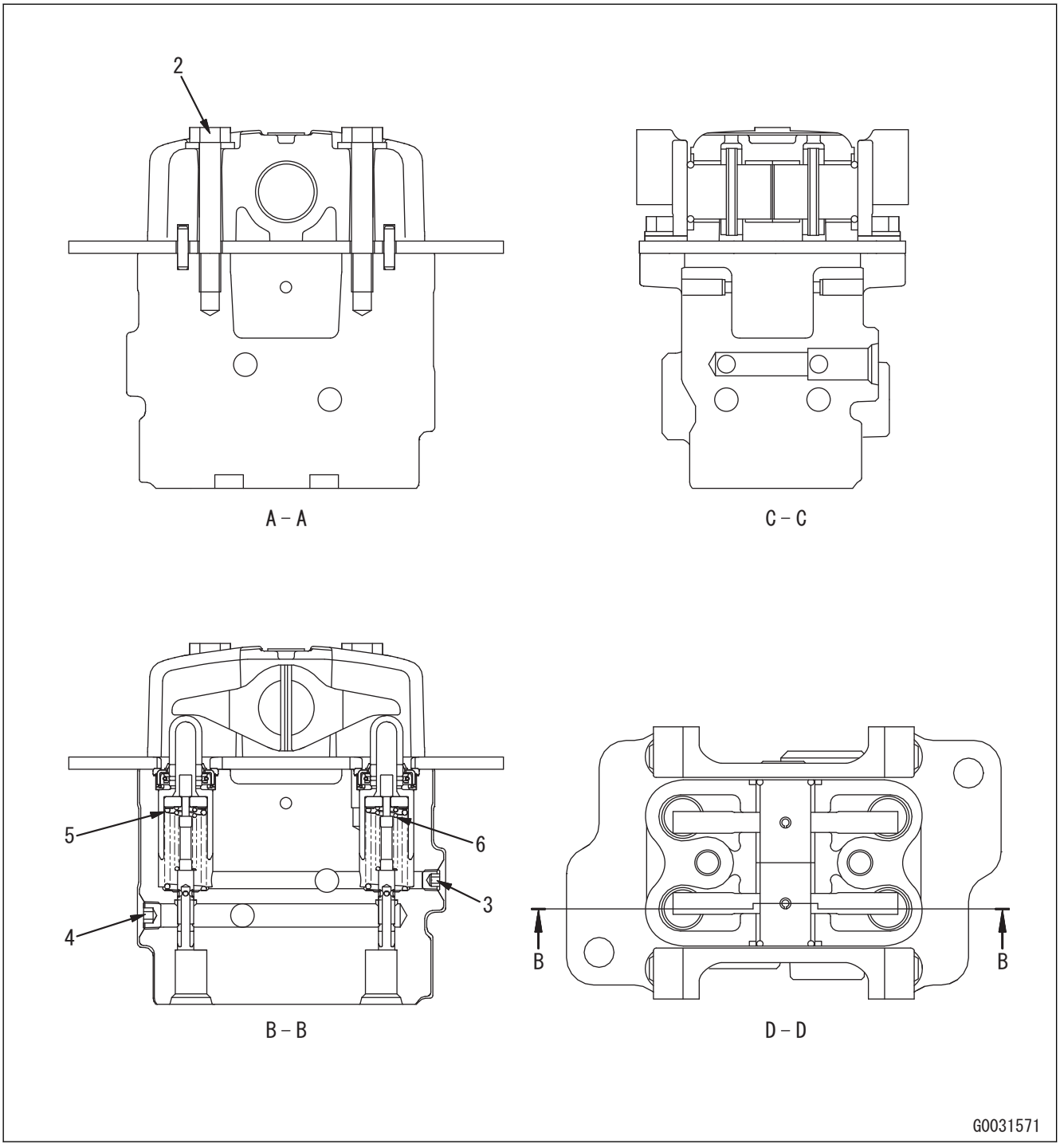
MAINTENANCE STANDARD OF SWING MOTOR



No.	Item	Judgment criteria	Remedy
1	Tightening torque of bolt	34.3 Nm {3.5 kgm}	Retighten
2	Tightening torque of valve	98 Nm {10 kgm}	
3	Tightening torque of bolt	53.0 Nm {5.4 kgm}	

No.	Item	Judgment criteria	Remedy
3	Tightening torque of plug	14.7 to 19.6 Nm {1.5 to 2 kgm}	Retighten
4	Tightening torque of plug	14.7 to 19.6 Nm {1.5 to 2 kgm}	
5	Tightening torque of plug	14.7 to 19.6 Nm {1.5 to 2 kgm}	
6	Tightening torque of plug	14.7 to 19.6 Nm {1.5 to 2 kgm}	
7	Tightening torque of plug	14.7 to 19.6 Nm {1.5 to 2 kgm}	
8	Tightening torque of plug	14.7 to 19.6 Nm {1.5 to 2 kgm}	





No.	Item	Judgment criteria	Remedy
1	Tightening torque of bolt	27 to 34 Nm {2.8 to 3.5 kgfm}	Retighten
2	Tightening torque of bolt	25 to 31 Nm {2.5 to 3.2 kgfm}	
3	Tightening torque of bolt	4 to 9 Nm {0.4 to 0.9 kgfm}	
4	Tightening torque of bolt	6 to 11 Nm {0.6 to 1.1 kgfm}	

No.	Item	Judgment criteria					Remedy
		Boss width		Hinge width		Standard clearance	
		Standard dimensions	Tolerance	Standard dimensions	Tolerance		
26	Connection part of arm and bucket cylinder	35 mm	0 mm -0.5 mm	36 mm	±0.5 mm	0.5 to 2.0 mm	Use shims to adjust the clearance to be 1.0 mm or below.
		L26: - R26: Insert a shim with thickness of 1.0 mm (1).					
27	Connection part of arm and bucket	118 mm	0 mm -0.5 mm	119 mm	+1.0 mm -0.5 mm	0.5 to 2.5 mm	-
		L27: - R27: -					
28	Connection part of link and bucket	118 mm	0 mm -0.5 mm	119 mm	+1.0 mm -0.5 mm	0.5 to 2.5 mm	-
		L28: - R28: -					
29	Connection part of links	118 mm	0 mm -0.5 mm	-	-	-	-
		L29: - R29: -					
30	Connection part of arm and link	118 mm	0 mm -0.5 mm	-	-	-	-
		L30: - R30: -					
31	Connection part of track frame and blade	45 mm	±0.8 mm	48 mm	+1.0 mm 0 mm	2.2 to 4.8 mm	-
		L31: - R31: -					
32	Connection part of track frame and blade cylinder	45 mm	0 mm -0.5 mm	50 mm	+1.0 mm 0 mm	5.0 to 6.5 mm	Use shims to adjust the clearance to be 1.0 mm or below.
		L32: - R32: Insert a shim with thickness of 1.0 mm (4).					
33	Connection part of blade and blade cylinder	45 mm	0 mm -0.5 mm	48 mm	+1.0 mm 0 mm	3.0 to 4.5 mm	Use shims to adjust the clearance to be 1.0 mm or below.
		L33: - R33: Insert a shim with thickness of 1.0 mm (4).					

*1: The values of the standard dimension and tolerance for the boss width include the 2 spacers.

The number in parentheses after each shim thickness is the required number of shims.

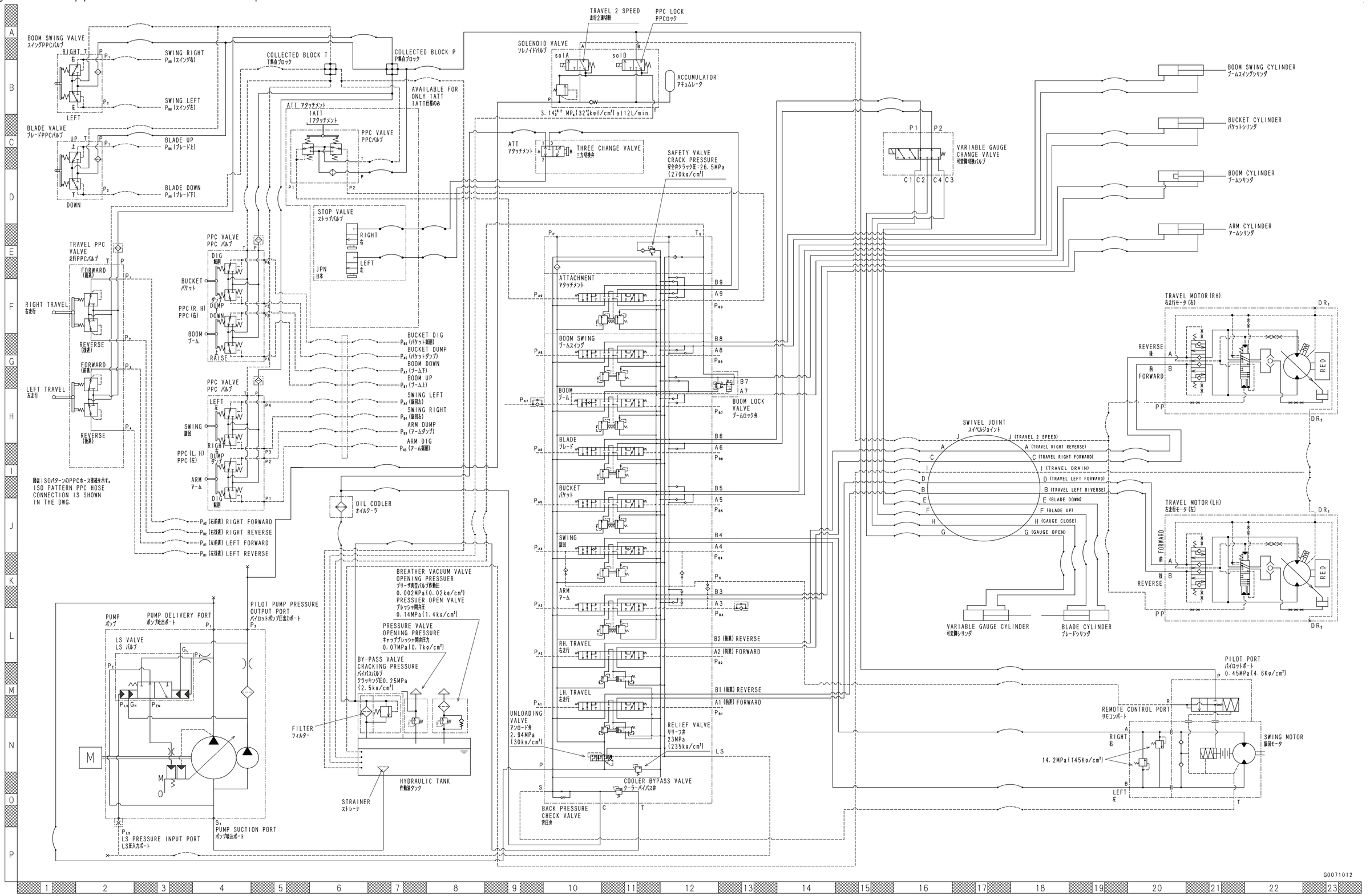
90 CIRCUIT DIAGRAMS

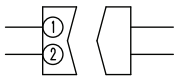
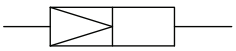
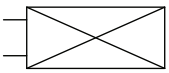
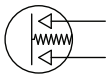
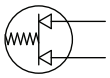
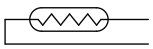
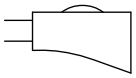
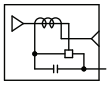
HYDRAULIC CIRCUIT DIAGRAM

PC18MR-5

REMARK

This figure includes the equipment and device that are not available as optional items in some areas.



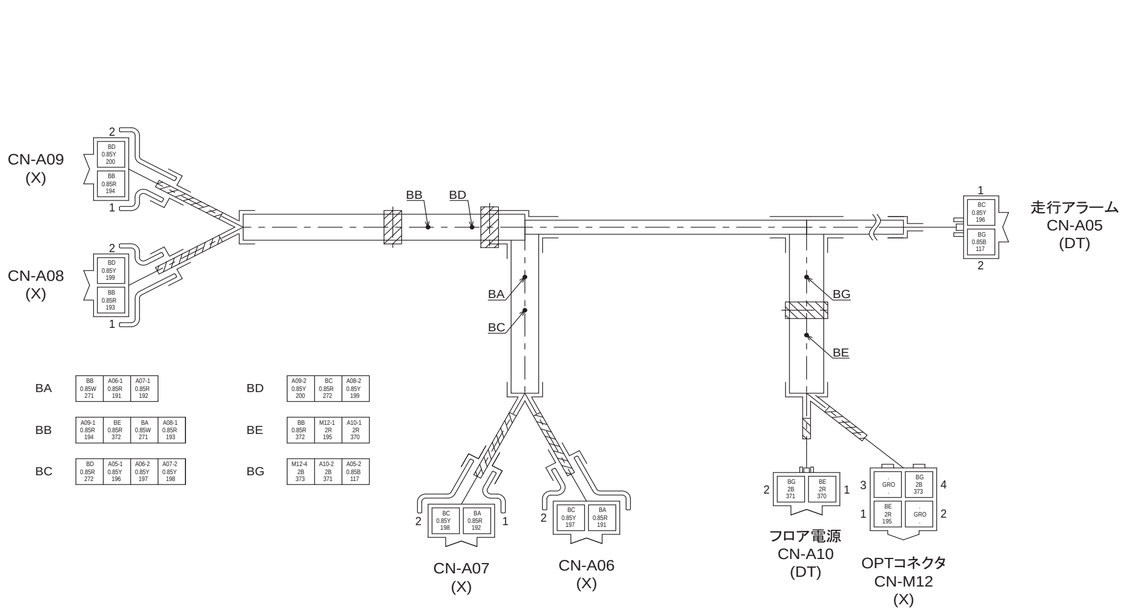
Symbol	Content
 G0009646	Connector • Concave side (left on the figure): female • Convex side (right on the figure): male **REMARK** The figure shows the disconnected state.
 G0009647	QQ type connector (left: male, right: female) **REMARK** The figure shows the connected state.
 G0009648	Solenoid
 G0009649	Motor
 G0009650	Lamp
 G0009651	Pressure switch (NO type) NO: Normally Open
 G0009652	Pressure switch (NC type) NC: Normally Close
 G0009653	Potentiometer, fuel control dial
 G0009654	Temperature sensor
 G0009655	Starting switch
 G0009656	Backup alarm
 G0009657	Horn

CONNECTOR AND WIRING HARNESS CHART (3/3)

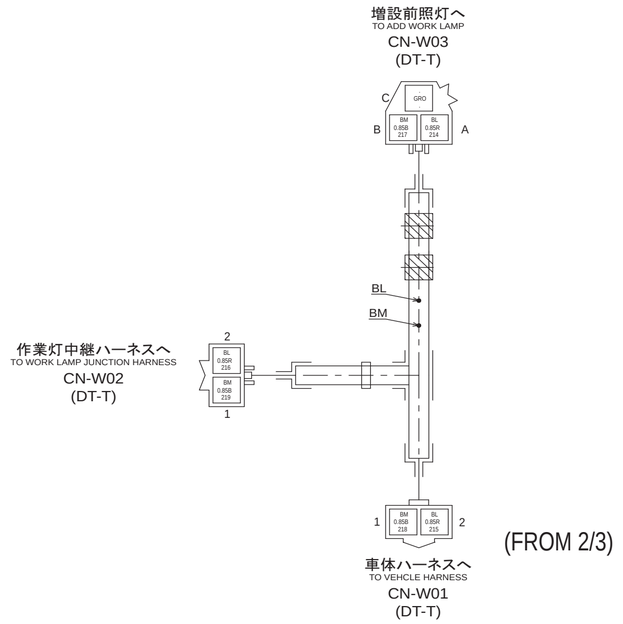
PC18MR-5

REMARK

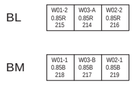
This figure includes the devices that are not available as optional items in some areas.

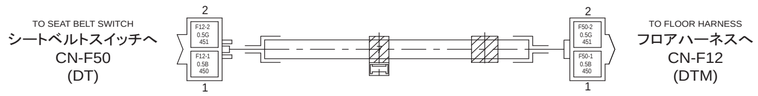


(FROM 2/3)

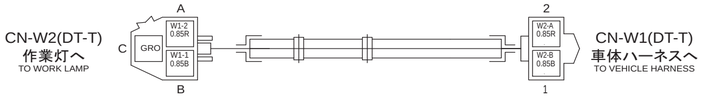


(FROM 2/3)





(FROM 1/3)



(FROM 2/3)

G0023005