SEN06591-09

Shop Manual

COMPACT
HYDRAULIC
EXCAVATOR

PC30MR-5
PC35MR-5

SERIAL NUMBERS PC30MR-50001 and up
PC35MR-30001

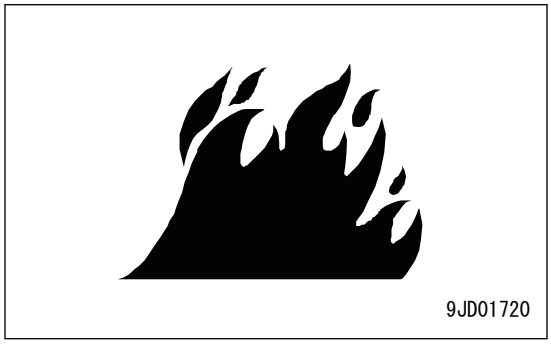
KOMATSU

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
CRI	Common Rail Injection	Engine	This is a function that maintains optimum fuel injection amount and fuel injection timing. This is performed the engine controller which electronically controls supply pump, common rail, and injector.
ECM	Electronic Control Module	Electronic control system	This is an electronic control device that send the command to actuators using the signals from the sensors on the machine so that the optimum actuation is performed. (Same as ECU)
ECMV	Electronic Control Modulation Valve	Transmission (D, HD, WA, etc)	This is a proportional electromagnetic valve that decreases the transmission shock by gradually increasing oil pressure for engaging clutch.
ECSS	Electronically Controlled Suspension System	Travel (WA)	This is a device that ensures smooth high-speed travel by absorbing vibration of machine during travel with hydraulic spring effect of accumulator.
ECU	Electronic Control Unit	Electronic control system	This is an electronic control device that send the command to actuators using the signals from the sensors on the machine so that the optimum actuation is performed. (Same as ECM)
EGR	Exhaust Gas Recirculation	Engine	This is a function that recirculates a part of exhaust gas to combustion chamber, so that it reduces combustion temperature, and reduces emission of NOx.
EMMS	Equipment Management Monitoring System	Machine monitor	This is a function with which operator can check information from each sensor on the machine (filter, oil replacement interval, malfunctions on machine, failure code, and failure history).
EPC	Electromagnetic Proportional Control	Hydraulic system	Electromagnetic proportional control This is a mechanism with which actuators operate in proportion to the current.
FOPS	Falling Object Protective Structure	Cab and canopy	This structure protects the operator's head from falling objects. (Falling object protective structure) This performance is standardized as ISO 3449.
F-N-R	Forward-Neutral-Reverse	Operation	Forward - Neutral - Reverse
GPS	Global Positioning System	Communication (KOMTRAX, KOMTRAX Plus)	This system uses satellites to determine the current location on the earth.
GNSS	Global Navigation Satellite System	Communication (KOMTRAX, KOMTRAX Plus)	This is a general term for system uses satellites such as GPS, GALILEO, etc.
HSS	Hydrostatic Steering System	Steering (D Series)	This is a function that enables the machine to turn without steering clutch by controlling a difference in travel speed of right and left tracks with a combination of hydraulic motor and bevel shaft.
HST	Hydro Static Transmission	Transmission (D, WA)	Hydraulic transmission system that uses a combination of hydraulic pump and hydraulic motor without using gears for stepless gear shifting.

PRECAUTIONS TO PREVENT FIRE

Fire caused by fuel, oil, coolant or window washer fluid

Do not bring any open flame close to fuel, oil, coolant or window washer fluid. Always observe the following.



- Do not smoke or use any open flame near fuel or other flammable substances.
- Shut down the engine before adding fuel.
- Do not leave the machine when adding fuel or oil.
- Tighten all the fuel and oil caps securely.
- Be careful not to spill fuel on overheated surfaces or on parts of the electrical system.
- After adding fuel or oil, wipe up any spilled fuel or oil.
- Put greasy rags and other flammable materials into a safe container to maintain safety at the workplace.
- When washing parts with oil, use a non-flammable oil. Do not use diesel oil or gasoline.There is danger that they may catch fire.
- Do not weld or use a cutting torch to cut any pipes or tubes that contain flammable liquids.
- Determine well-ventilated areas for storing oil and fuel. Keep the oil and fuel in the specified place and do not allow unauthorized persons to enter.
- When performing grinding or welding work on the machine, move any flammable materials to a safe place before starting.

Fire caused by accumulation or attachment of flammable material

- Remove any dry leaves, chips, pieces of paper, coal dust, or any other flammable materials accumulated or attached to or around the engine exhaust manifold, muffler, or battery, or on the undercovers.
- To prevent fires from being caught, remove any flammable materials such as dry leaves, chips, pieces of paper, coal dust, or any other flammable materials accumulated around the cooling system (radiator, oil cooler) or on the undercover.

Fire coming from electric wiring

Short circuits in the electrical system can cause fire. Always observe the following.

- Keep all the electric wiring connections clean and securely tightened.
- Check the wiring every day for looseness or damage. Reconnect any loose connectors or refasten wiring clamps. Repair or replace any damaged wiring.

Fire caused by piping

Check that all the clamps for the hoses and tubes, guards, and cushions are securely fixed in position.

If they are loose, they may vibrate during operation and rub against other parts.There is danger that this may lead to damage to the hoses and cause high-pressure oil to spurt out, leading to fire and serious personal injury or death.

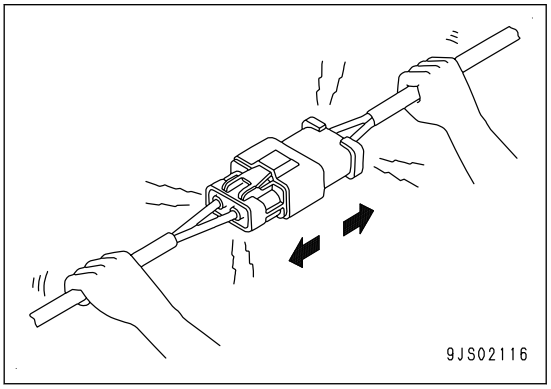
Fire around the machine due to highly heated exhaust gas

Some models and specifications may be equipped with KDPF (Komatsu Diesel Particulate Filter).

KDPF is a system for purifying exhaust gas by removing soot in exhaust gas. In the process of purification (regeneration), the temperature of discharged exhaust gas may be higher than that of conventional models. Do not bring any flammable materials close to exhaust pipe outlet.

Disconnection in wiring

If the wiring harness is pulled to disconnect the connector, or the components are lifted with a crane while the wiring harness is still connected, or a heavy object hits the wiring harness, it may separate the crimping of the connector, or damage the soldering, or break the wiring harness.

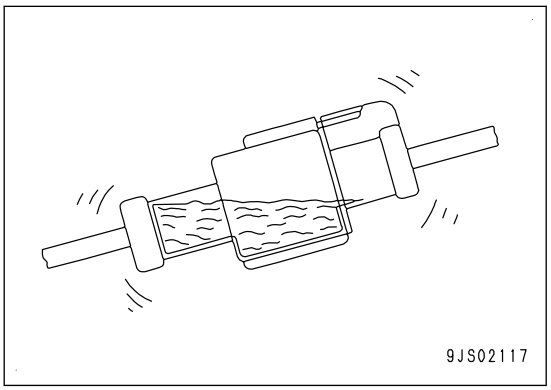


Water entering the connector by high-pressure jetting

The connector is designed to make it difficult for water to enter (drip-proof structure), but if high-pressure water is sprayed directly on the connector, water may enter the connector, depending on the direction of the water jet.

Do not spray water directly on the connector.

If the connector is waterproof, intruded water is hardly drained. Once water enters into the connector, water goes through pins to cause short-circuit. Drying the drenched connector or take appropriate actions before providing electricity.



Entry of water, dirt, or dust when disconnecting a connector

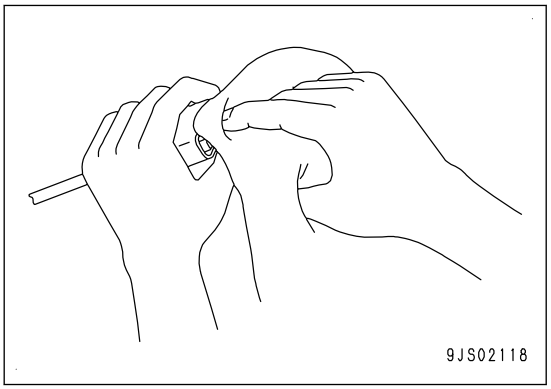
If any water, mud or dust is stuck to the outside surface of a connector, it can enter inside the connector when the connector is disconnected. Before disconnecting the connector, wipe off any stuck water or dirt by using a dry cloth or blow it with compressed air.

Oil, mud, or dust stuck to connector

If any oil or grease is stuck to the connector and an oil film is formed on the mating surface of the male and female pins, the oil prevents electricity from passing through resulting in defective contact. If any oil, grease, dirt or dust is stuck to the connector, wipe it off with a dry cloth or blow it with compressed air, and wash it with electrical contact restorer.

NOTICE

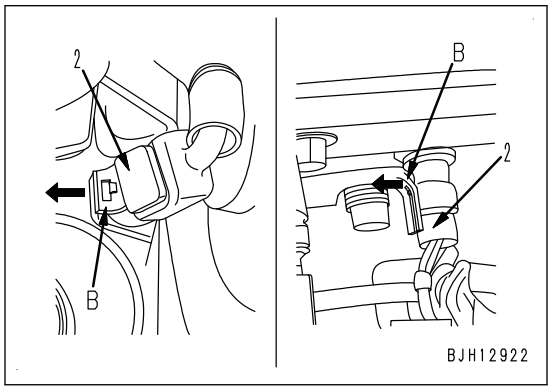
- **When wiping the jointed portion of the connector, do not apply excessive force or deform the pins.**
- **If there is oil or water in the compressed air, it causes the contacts to become dirtier. Use clean air which any oil and water has been removed from.**



METHOD FOR DISCONNECTING AND CONNECTING CONNECTOR WITH LOCK TO PULL

Method for disconnecting connector with lock to pull

Disconnect the connector (2) by pulling lock (B) (on the wiring harness side) of connector (2) outward.



Method for connecting connector with lock to pull

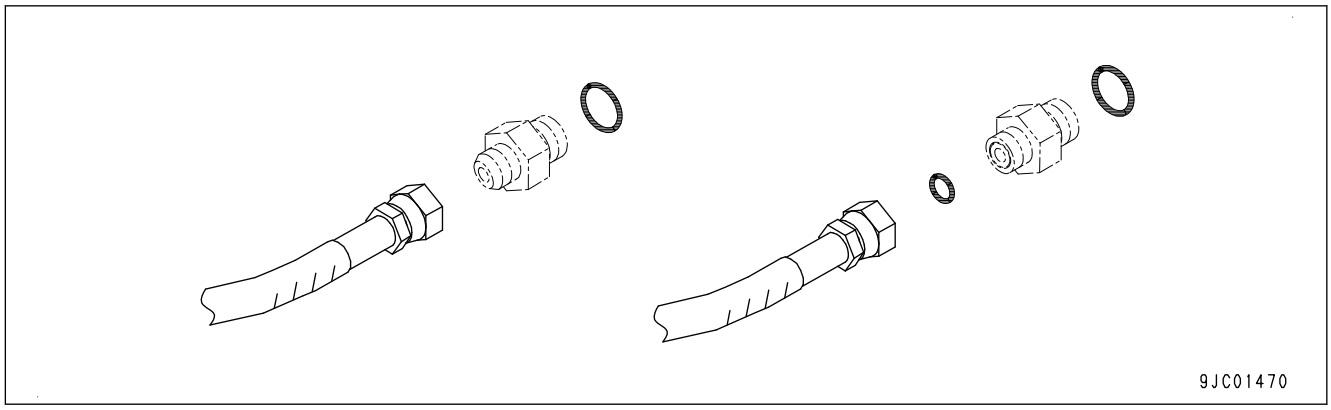
Insert the connector securely until it “clicks”.

Nominal No.	Thread diameter (mm)	Width across flats (mm)	Tightening torque (Nm {kgfm})	
			Range	Target
18	18	27	34.3 to 44.1 {3.5 to 4.5}	39.2 {4.0}
20	20	30	44.1 to 53.9 {4.5 to 5.5}	49.0 {5.0}
24	24	32	58.8 to 78.4 {6.0 to 8.0}	68.6 {7.0}
30	30	32	93.1 to 122.5 {9.5 to 12.5}	107.8 {11.0}
33	33	-	107.8 to 147.0 {11.0 to 15.0}	127.4 {13.0}
36	36	36	127.4 to 176.4 {13.0 to 18.0}	151.9 {15.5}
42	42	-	181.3 to 240.1 {18.5 to 24.5}	210.7 {21.5}
52	52	-	274.4 to 367.5 {28.0 to 37.5}	323.4 {33.0}

Table of tightening torque for hose (taper seal type and face seal type)

REMARK

- Tighten the hose fittings (taper seal type and face seal type) to the torque shown in the following table unless otherwise specified.
- The table is applied to the threaded portion coated with engine oil (wet threaded portion).



Nominal No. of hose	Width across flats (mm)	Tightening torque (Nm {kgfm})		Taper seal	Face seal	
		Range	Target	Thread size (mm)	Nominal size - threads per inch	Thread root diameter(mm) (reference)
02	19	34 to 54 {3.5 to 5.5}	44 {4.5}	-	$^{9}/_{16}$-18UN	14.3
		34 to 63 {3.5 to 6.5}	44 {4.5}	14	-	-
03	22	54 to 93 {5.5 to 9.5}	74 {7.5}	-	$^{11}/_{16}$-16UN	17.5
	24	59 to 98 {6.0 to 10.0}	78 {8.0}	18	-	-
04	27	84 to 132 {8.5 to 13.5}	103 {10.5}	22	$^{13}/_{16}$-16UN	20.6
05	32	128 to 186 {13.0 to 19.0}	157 {16.0}	24	1 -14UNS	25.4
06	36	177 to 245 {18.0 to 25.0}	216 {22.0}	30	$1^{3}/_{16}$-12UN	30.2
(10)	41	177 to 245 {18.0 to 25.0}	216 {22.0}	33	-	-
(12)	46	197 to 294 {20.0 to 30.0}	245 {25.0}	36	-	-
(14)	55	246 to 343 {25.0 to 35.0}	294 {30.0}	42	-	-

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
TOPS	Tip-Over Protective Structure	Cab and canopy	This is a protective structure that intended to protect the operator wearing seat belt from suffering injury which may be caused if the cab is crushed when the machine tips over. (Roll-over protective structure of hydraulic excavator) This performance is standardized as ISO 12117.
TWV	2-Way Valve	Hydraulic system	This is a solenoid valve that switches over direction of flow.
VGT	Variable Geometry Turbocharger	Engine	This is a turbocharger on which the cross-section area of the exhaust passage is variable.
VHPC	Variable Horse Power Control	Engine control	This is a function that finely controls the maximum output of the machine so that high work efficiency and low fuel consumption rate are both achieved.

*1: Code for applicable machine model

D: Bulldozer

HD: Dump truck

HM: Articulate dump truck

PC: Hydraulic excavator

WA: Wheel loader

List of abbreviations used in the circuit diagrams

Abbreviation	Actual word spelled out
A/C	Air Conditioner
A/D	Analogue-to-Digital
A/M	Air Mix Damper
ACC	Accessory
ADD	Additional
AUX	Auxiliary
BR	Battery Relay
CW	Clockwise
CCW	Counter Clockwise
ECU	Electronic Control Unit
ECM	Electronic Control Module
ENG	Engine
EXGND	External Ground
F.G.	Frame Ground
GND	Ground
IMA	Inlet Metering Actuator
NC	No Connection

WEIGHT TABLE

WEIGHT TABLE: PC30MR-5

⚠ **This weight table is provided for your reference when handling the components or when transporting.**

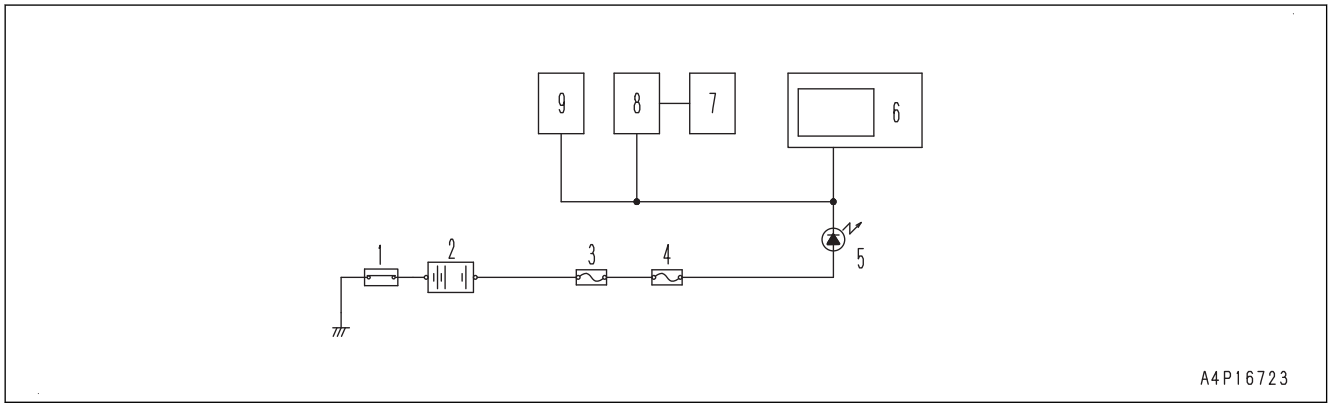
⚠ **This weight table shows the dry weight.**

Unit: kg

Item	PC30MR-5
Engine assembly	206
• Engine	152
• Engine mount	7
• PTO	10
• Main pump	30
Cooling assembly	18
Battery	19
Revolving frame	350
Floor frame assembly	163
Canopy (*1)	87
Handrail (*1)	6
Operator's cab assembly (including floor frame assembly) (*2)	439
Operator's seat	25
Fuel tank	6
Hydraulic tank	30
Control valve	44
Counterweight	265
Swing motor (including brake valve)	14
Swing circle	37
Swing machinery	19
Center swivel joint	15
Track frame assembly (excluding track shoes)	655
• Track frame	365
• Idler and idler cushion assembly	26 x 2
• Idler assembly	14 x 2
• Carrier roller	4 x 2
• Track roller	24 x 2
• Travel motor (including reduction gear)	36 x 2
• Sprocket	10 x 2
Track shoe assembly	
Rubber shoe (300 mm)	122 x 2
Double grouser shoe (300 mm)	170 x 2
Road liner (300 mm)	193 x 2

SYSTEM OPERATING LAMP SYSTEM

SYSTEM OPERATING LAMP SYSTEM DIAGRAM



1: Quick release battery terminal (-)
2: Battery
3: Fusible link
4: Fuse box
5: System operating lamp
6: Machine monitor
7: Engine controller
8: Machine controller
9: KOMTRAX terminal

FUNCTION OF SYSTEM OPERATING LAMP SYSTEM

An abnormal disconnection during the operation can be avoided for the circuit of each controller by not removing the quick release battery terminal (-) while the system operating lamp shows that any of systems is still in operation by its being lit.

REMARK

- Check that the system operating lamp is not lit always after turning the starting switch to “OFF” position, then remove the quick release battery terminal (-) to shut off the battery power supply circuit.
- A controller data loss error may occur if the quick release battery terminal (-) is removed (battery power supply circuit is shut off) while the system operating lamp is lit. Do not remove the quick release battery terminal (-) while the system operating lamp is lit.
- The system operating lamp goes out in a maximum of eight seconds after the starting switch is turned to “OFF” position.
- The system operating lamp may be lit while the starting switch is in “OFF” position, because KOMTRAX terminal may maintain its communication under this condition.

Being lit and not being lit of system operating lamp

- Voltage of 12 V is constantly applied to one side of system operating lamp (light emitting diode).
- Voltage of 12 V is constantly applied to one side of system operating lamp (light emitting diode).
- The controller side outputs a turn-on (0 V), and a current flows through the diode and the system operating lamp is lit when any of controllers is in operation.

  REMARK

  The system operating lamp may look slightly luminous in the dark even when it is not lit. It is due to the minute leakage of current and this is not an abnormal phenomenon.
- KOMTRAX terminal repeats the start and stop to maintain the periodic communication when the starting switch is in “OFF” position.
- The start and stop cycle (sleep cycle) of KOMTRAX terminal varies depending on the factors including the communication state and the time when the machine is not in operation. The lamp may stay lit approximately for the maximum of one hour.

FUNCTION OF OVERHEAT PREVENTION SYSTEM

This system prevents overheating by reducing the pump load and by lowering the engine speed, and protects engine and hydraulic components when coolant temperature becomes too high during operation 100 seconds or more after the engine is started.

Operating condition	→	Operation and remedy	→	Condition to cancel
Working mode: Travel (Hi mode) Coolant temperature: 98 °C or above	→	Engine speed: Kept as it is Pump discharged volume: Throttled	→	Coolant temperature: Below 96 °C • When above condition is satisfied, it is restored to the state before operation (automatic restoration).

Operating condition	→	Operation and remedy	→	Condition to cancel
Working mode: All modes Coolant temperature: 105 °C or above	→	Engine speed: Kept as it is Pump discharged volume: Throttled	→	Coolant temperature: Below 100 °C • When above condition is satisfied, it is restored to the state before operation (automatic restoration).

Operating condition	→	Operation and remedy	→	Condition to cancel
Working mode: All modes Coolant temperature: 107 °C or above	→	Engine speed: Kept as it is Pump discharged volume: Throttled Warning lamp: Lit	→	Coolant temperature: Below 107 °C • When above condition is satisfied, it is restored to the state before operation (automatic restoration).

Operating condition	→	Operation and remedy	→	Condition to cancel
Working mode: All modes Coolant temperature: 110 °C or above	→	Engine speed: Low idle Warning lamp: Lit Alarm buzzer: Sounds	→	Coolant temperature: Below 110 °C Fuel control dial: Return to Low idle (MIN) position. • When above condition is satisfied, it is restored to the state before operation (manual restoration).

Category (*1)	Item	Display order (*2)
B	Selection of auto-deceleration	
	Selection of working mode	
	Selection of travel speed	
	Stop operation of alarm buzzer	
	Operation to display clock and service meter	
	Check of maintenance information	
	Setting and display of user menu • Operation Record • Machine Setting • Maintenance • Monitor Setting • User message (including KOMTRAX messages for user)	
C	Caution lamp	
	Action level and failure code	
D	Checking function of LCD (Liquid Crystal Display)	
	CHECKING FUNCTION OF SERVICE METER	
	Function of inducement setting and changing password	

*1: The operator mode items are classified as follows.

A: Display which is displayed from the time when the starting switch is turned to “ON” position to the time when display changes to the standard screen, and display which is displayed after starting switch is turned to “OFF” position

B: Display when the machine monitor switch is operated

C: Display when conditions are satisfied

D: Display that requires special operations of switches

*2: The sequence of display from the time when the starting switch is turned to “ON” position to the time when the standard screen appears varies depending on the settings and conditions of the machine as follows:

W: When the engine start lock is enabled.

X: When the engine start lock is disabled.

Y: When any abnormality is detected by the check before starting

Z: When any item is detected as the maintenance due time is over

REMARK

- For how to operate the operator mode functions, see “Operation and Maintenance Manual”.
- For the operating method of the engine start lock function, see“ Password setting and canceling manual”.

SERVICE MODE FUNCTION OF MACHINE MONITOR

These functions are not displayed normally. A technician can display and set them special operation of switches. These functions are used for special settings, testing, adjusting, or troubleshooting.

Items available in the service mode are as follows:

REMARK

For operating method of the service mode functions, see TESTING AND ADJISTING, “SERVICE MODE”.

Pre-defined Monitoring

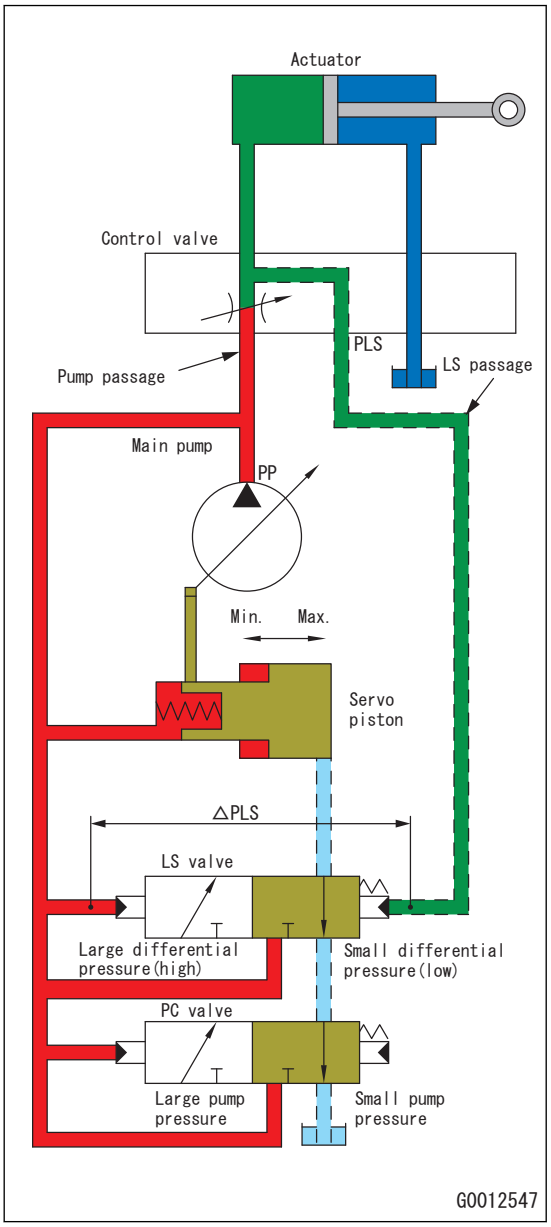
FUNCTION OF CLSS

Control of pump swash plate angle

CLSS controls the pump swash plate angle (pump discharged volume) so that LS differential pressure (ΔPLS) will be constant, which is the differential pressure between pump discharged pressure (PP) and control valve outlet LS pressure (PLS) (actuator load pressure).

"LS differential pressure (ΔPLS) = Pump discharged pressure (PP) - LS pressure (PLS)"

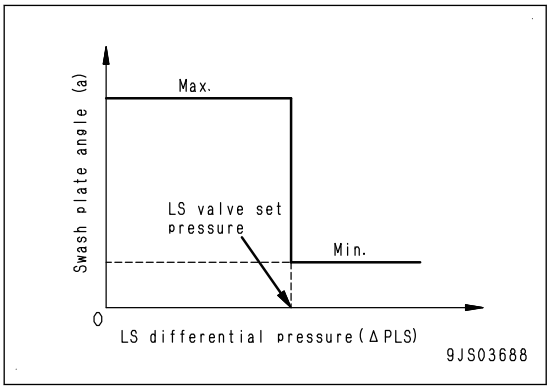
- The pump swash plate shifts toward the maximum angle position when LS differential pressure (ΔPLS) is lower than the set pressure of the LS valve (when the actuator load pressure is high).
- The pump swash plate shifts toward the minimum angle position when LS differential pressure is higher than the set pressure (when the actuator load pressure is low).



LS differential pressure (ΔPLS) and pump swash plate angle

REMARK

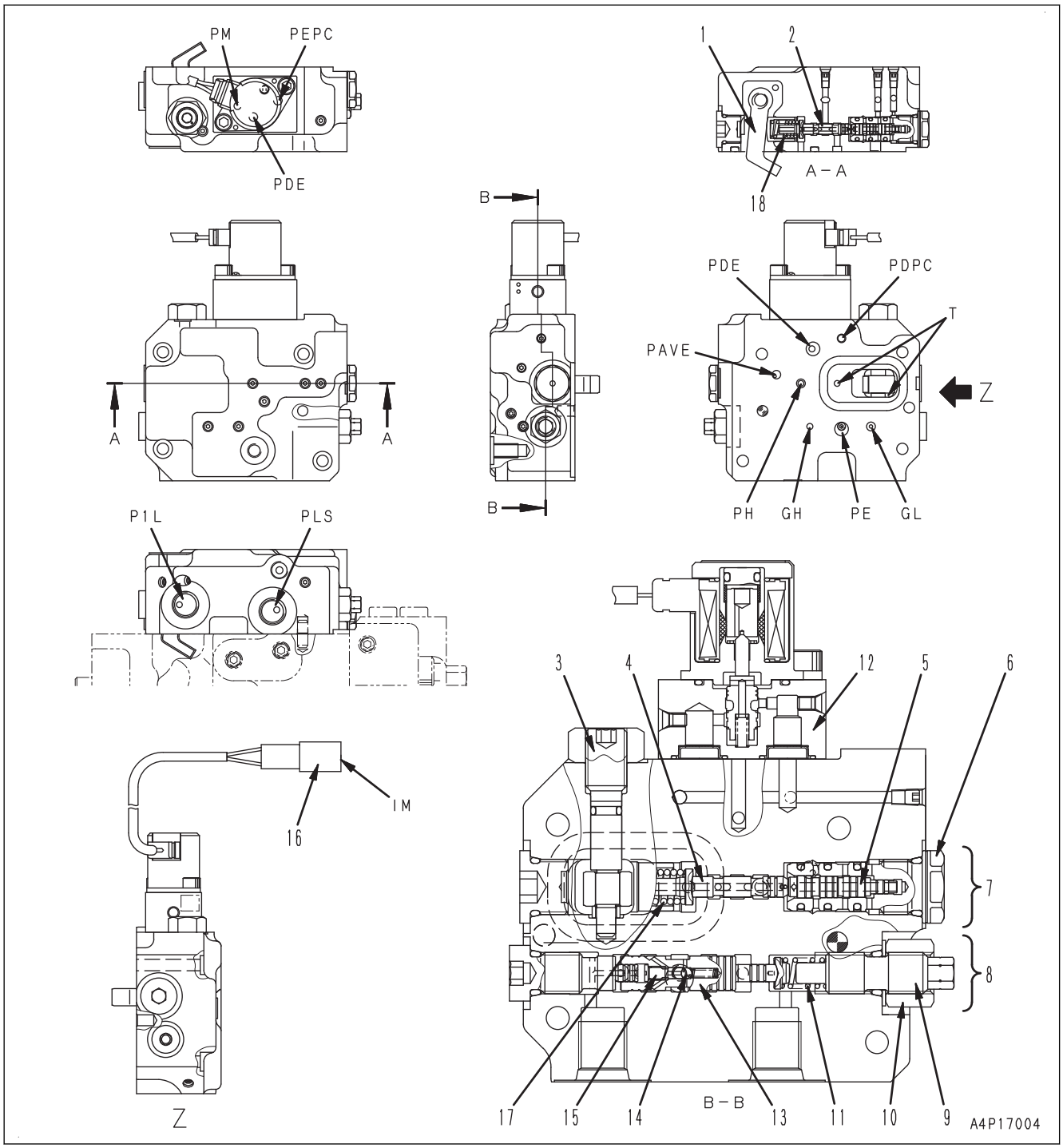
For details of the operation, see "MAIN PUMP".



MAIN PUMP SERVO VALVE

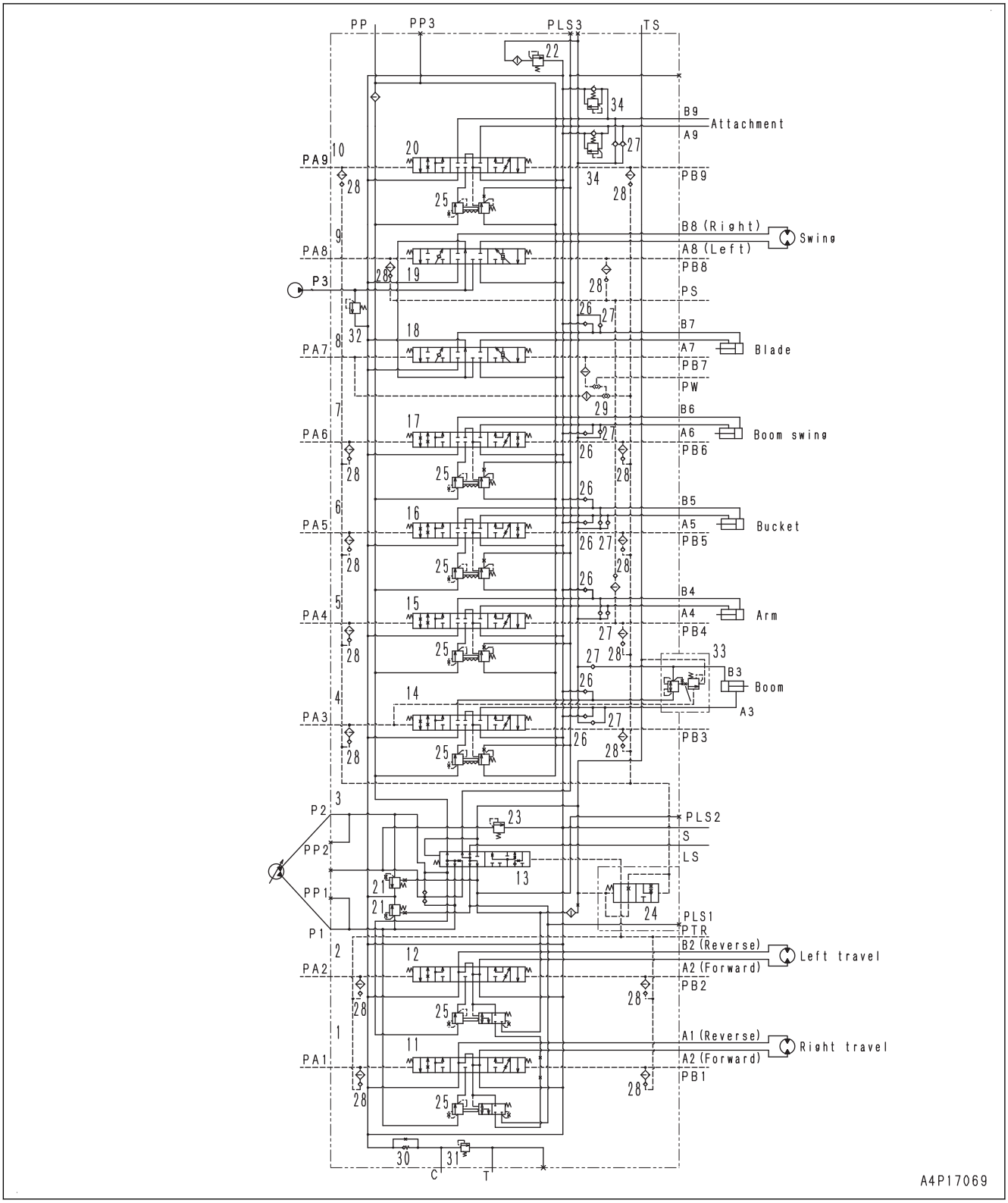
STRUCTURE OF MAIN PUMP SERVO VALVE

General view and sectional view



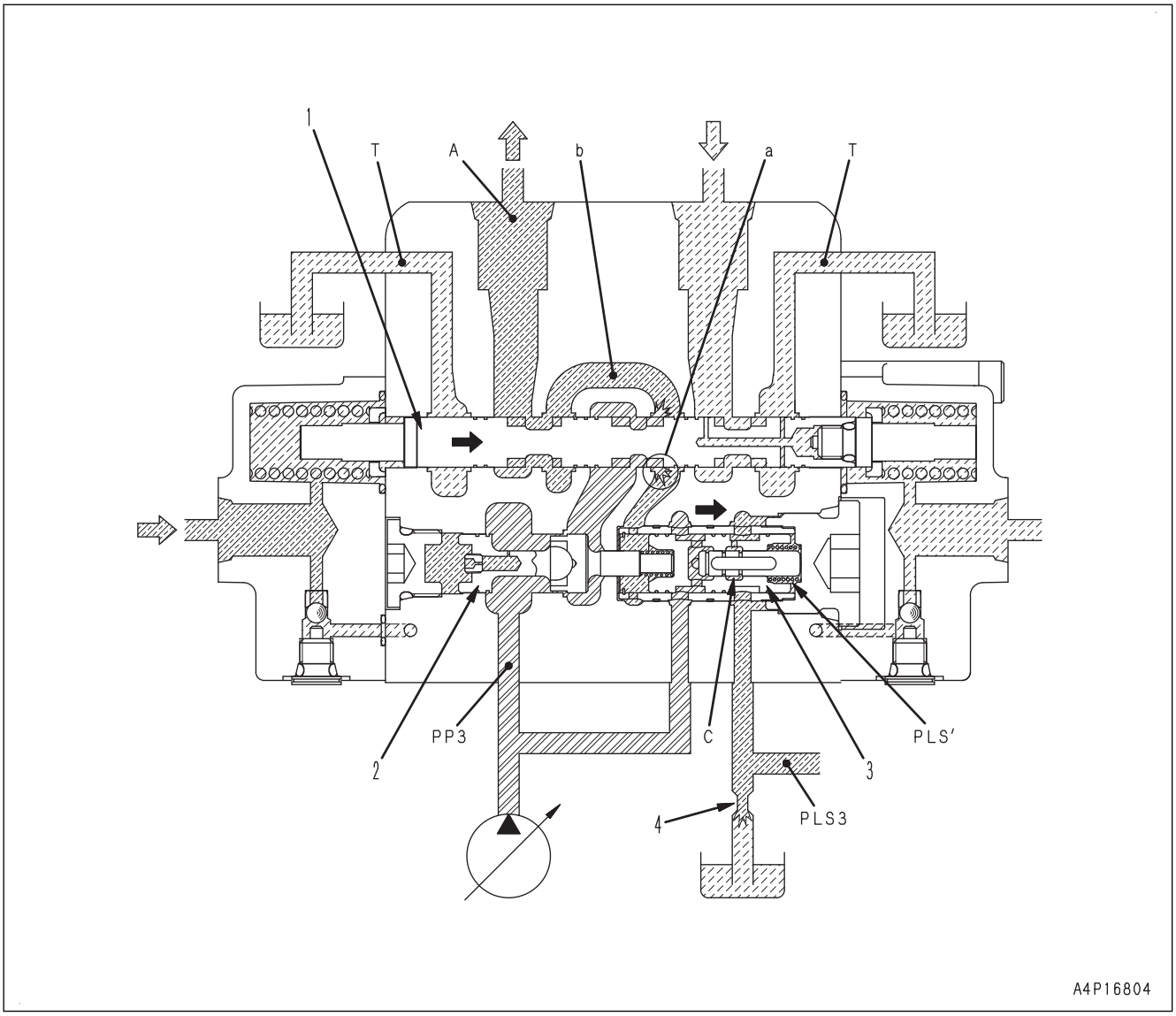
GH: Swing and blade pump Hi signal port
GL: Swing and blade pump Lo signal port
PAVE: Pump average pressure input port
PDE: EPC drain port
PE: Control piston pressure port
PEPC: EPC source pressure input port
PLS: LS pressure input port
PH: Pump shuttle pressure port
PM: PC mode selector pressure input port
P1L: Pump pressure input port
T: Drain port

HYDRAULIC CIRCUIT DIAGRAMS OF CONTROL VALVE AND NAMES OF VALVES



1: Right travel valve
2: Left travel valve
3: Merge-divider valve
4: Boom valve
5: Arm valve
6: Bucket valve
7: Boom swing valve
8: Blade valve

OPERATION OF INTRODUCTION OF LS PRESSURE IN CONTROL VALVE



1. Pump discharged pressure (PP3) flows through flow control valve (2), notch (a) in the spool, and bridge passage (b) to actuator circuit (A) when spool (1) is operated.
2. Pressure reducing valve (3) moves to the right at this time, pump discharged pressure (PP3) is reduced by pressure loss at notch (c), and sent to LS circuit (PLS3). Then, it is sent to spring chamber (PLS').
3. LS circuit (PLS) is connected from LS bypass plug (4) to tank circuit (T). (See “LS BYPASS PLUG OF CONTROL VALVE”.)
4. Actuator circuit pressure (A) acts on the left side of pressure reducing valve (3). The reduced pump discharged pressure (PP3) acts on the opposite side.
5. Pressure reducing valve (3) is balanced out at a position where actuator circuit pressure (A) and the pressure of spring chamber (PLS') are the same. Pump discharged pressure (PP3) reduced at notch (a) becomes actuator circuit pressure (A), and is transmitted into LS circuit (PLS3).

LS BYPASS PLUG OF CONTROL VALVE

LS

Abbreviation for Load Sensing

FUNCTION OF LS BYPASS PLUG OF CONTROL VALVE

- It releases the remaining pressure of LS pressure (PLS).

When the work equipment is operated, the pilot pressures of the boom, arm, bucket, boom swing, blade, and attachment are outputted to auto-deceleration sensor port (PW) through the check valves and shuttle valves in their respective spring cases.

TRAVEL PILOT PRESSURE DETECTION CIRCUIT OF CONTROL VALVE

FUNCTION OF TRAVEL PILOT PRESSURE DETECTION CIRCUIT OF CONTROL VALVE

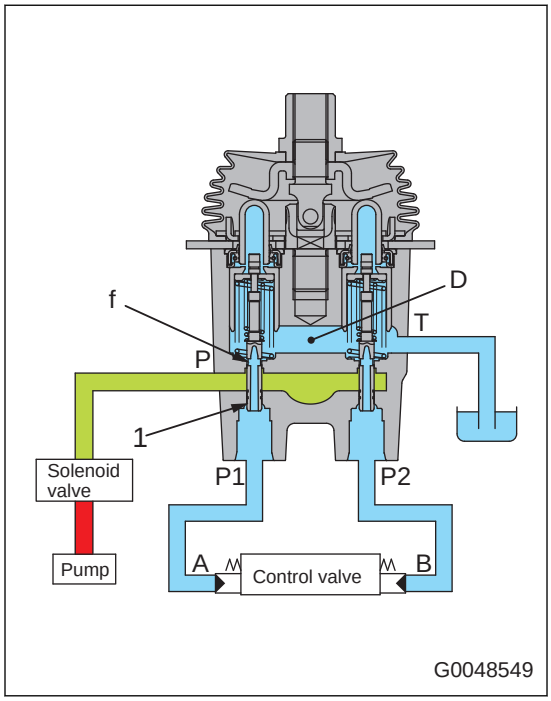
This circuits collects the pilot pressures for R.H. travel and L.H. travel, and outputs oil pressure signals through the auto-deceleration sensor port.

7: Retainer
8: Body
9: Filter

OPERATION OF WORK EQUIPMENT AND SWING PPC VALVE

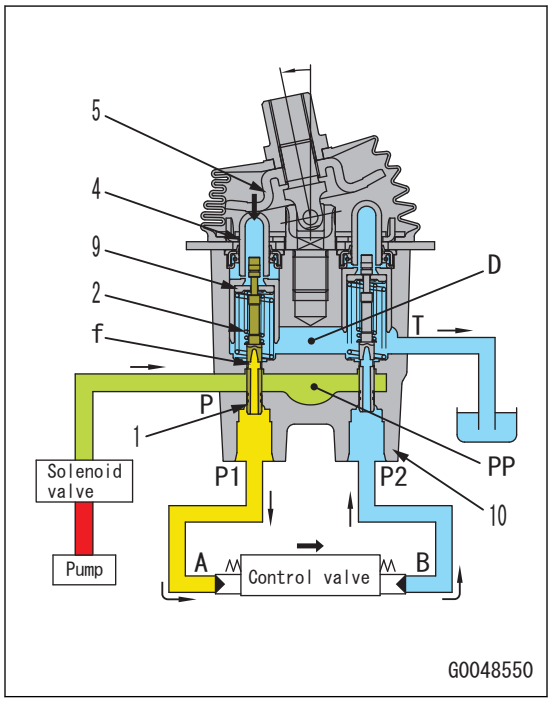
When it is in neutral

Ports (A) and (B) of the control valve and ports (P1) and P2) of PPC valve are connected to drain chamber (D) through fine control hole (f) of spool (1).



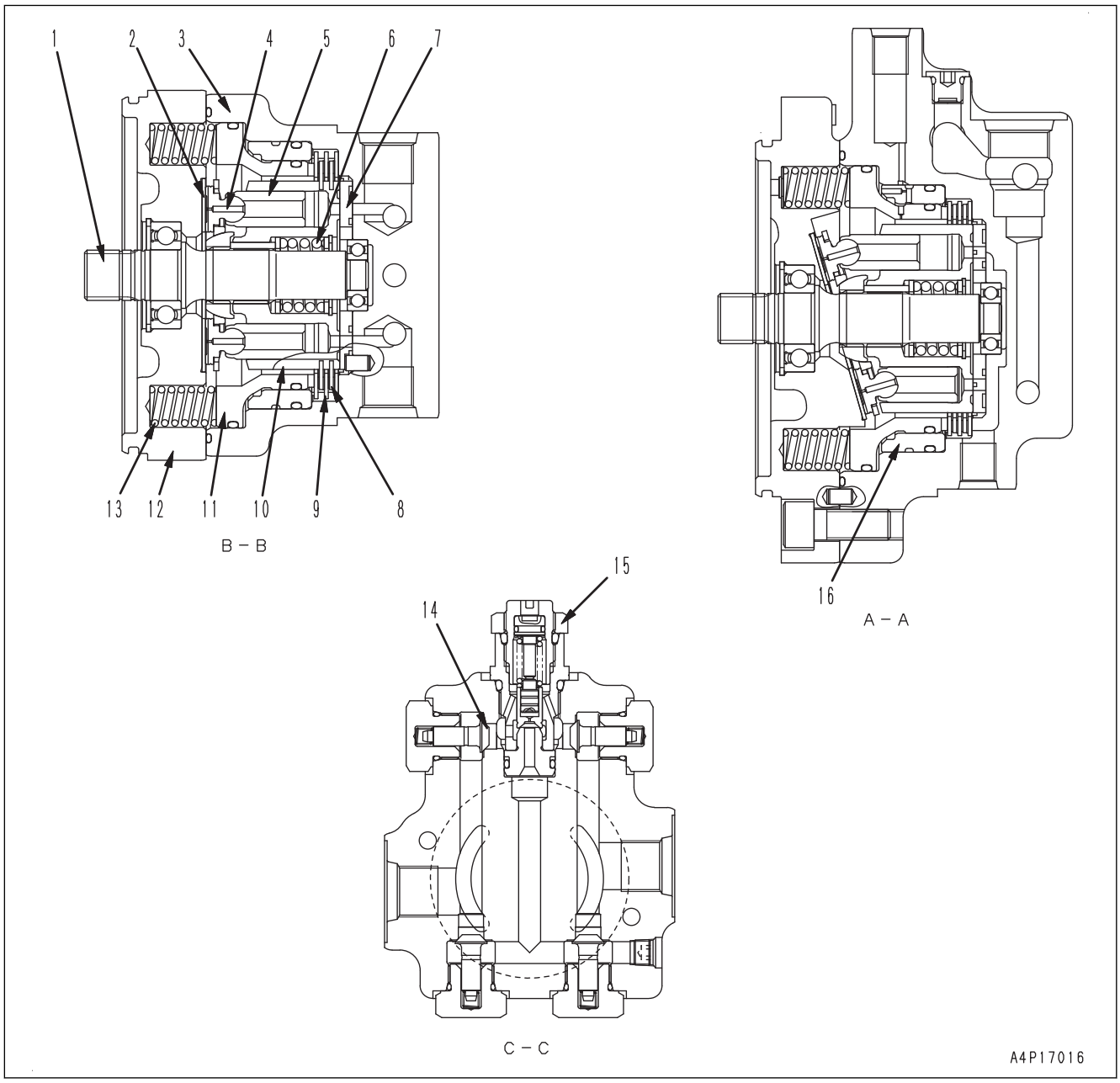
When operating with fine control(when fine control is started from neutral state)

1. When piston (4) is pushed by disc (5), retainer (9) is pushed, spool (1) is also pushed and moved down through metering spring (2).
2. When fine control hole (f) is blocked from drain chamber (D), it is connected to pump pressure chamber (PP) almost at the same time.
3. The pilot pressure oil of the control pump flows to port (A) through fine control hole (f) and port (P1).
4. When the pressure in port (P1) increases, spool (1) is pushed back. When fine control hole (f) is disconnected from pump pressure chamber (PP), it is connected to drain chamber (D) almost at the same time, and the pressure in port (P1) is released.
5. Spool (1) moves up and down so that the force of metering spring (2) is balanced with the pressure in port (P1).
6. The positional relation between spool (1) and body (10) (fine control hole (f) is at intermediate position between drain chamber (D) and pump pressure chamber (PP)) does not change until retainer (9) touches spool (1).
7. Metering spring (2) is compressed in proportion to the travel of control lever.



8. The pressure in port (P1) also increases in proportion to the travel of control lever.
9. The control valve spool moves to a position where the pressure in port (A) (which is the same as the pressure in port (P1)) is balanced with the reaction force of the control valve spool return spring.

Sectional view



1: Output shaft
2: Thrust plate
3: Housing
4: Shoe
5: Piston
6: Center spring
7: Valve plate
8: Disc
9: Plate
10: Cylinder block
11: Brake piston
12: Swash plate
13: Brake spring
14: Check valve
15: Safety valve
16: Brake ring

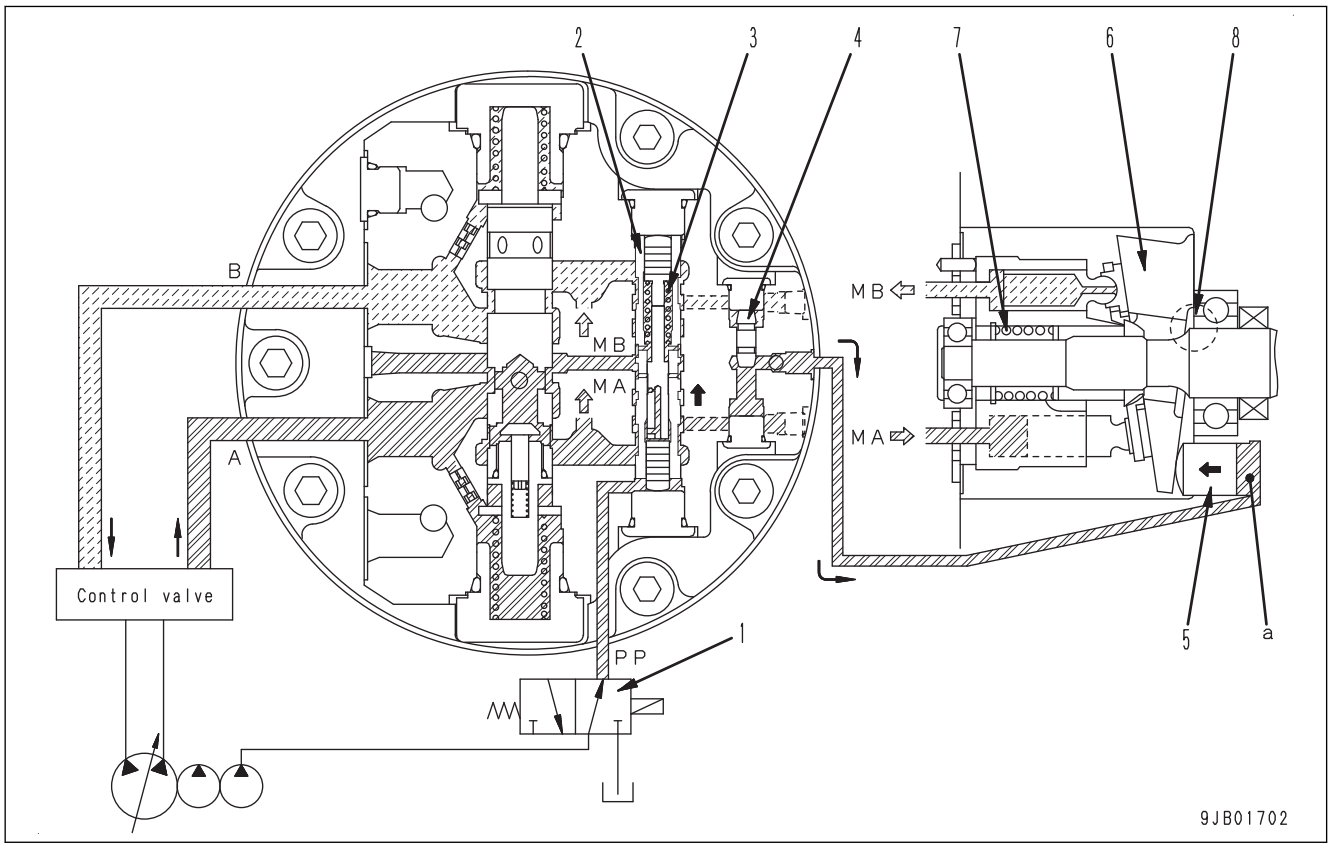
SPECIFICATIONS OF SWING MOTOR

Model: LMF16 (15)

Theoretical displacement: 15.0 cm^3/rev

Rated speed: 1113 min^{-1} {1113 rpm}

Operation at high speed (motor swash plate angle is at minimum)



1. The pilot pressure from the pilot pump flows to port PP when 2nd travel speed selector solenoid valve (1) is energized.
2. Automatic gear shift valve (2) compresses spring (3) and moves up, and the circuit to control chamber (a) is connected.
3. The pressurized oil from the control valve flows from automatic gear shift valve (2) through check valve (4) to control chamber (a), and pushes control piston (5) to the left.
4. Swash plate (6) leans around ball (8) toward the minimum swash plate angle side against center spring (7), the motor capacity becomes minimum, and the travel speed increases.

REMARK

The automatic gear shift function works only while the travel speed selector switch is set in the high speed position. See “OPERATION OF AUTOMATIC GEAR SHIFT VALVE OF TRAVEL MOTOR”.

Control lever, pedal stroke

Machine model				PC30MR-5	
Engine				3D88E-7	
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
Boom control lever	• Engine: Stopped • Testing point: At the center of the grip • Testing point: At the tip of pedal • Read maximum value when the lever is operated to stroke end (excluding play at NEUTRAL position)	N to boom RAISE, LOWER	mm	85±10	85±10
Arm control lever		N to arm IN, OUT		85±10	85±10
Bucket control lever		N to bucket CURL, DUMP		85±10	85±10
Swing control lever		N to swing LEFT, RIGHT		85±10	85±10
Boom swing control pedal		N to swing LEFT, RIGHT		25±5	25±5
Blade control lever		N to RAISE, LOWER		50±5	50±5
Travel control lever		N to travel FORWARD, REVERSE (L.H., R.H.)		100±10	100±10
Play of control lever		Work equipment, Swing, Blade		Max. 5	Max. 5
		Traveling		Max. 5	Max. 5

Operating effort of control lever and pedal

Machine model			PC30MR-5	
Engine			3D88E-7	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Boom control lever	• Hydraulic oil temperature: 45 to 55 ℃ • Fuel control dial: MAX (High idle) position • Testing point: At the center of the grip • Testing point: At the tip of pedal • Read the maximum value when the lever is operated to stroke end	N {kgf}	15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Arm control lever			15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Bucket control lever			15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Swing control lever			15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Boom swing control pedal			78.4±19.6 {8.0±2.0 }	78.4±29.4 {8.0±3.0 }
Blade control lever			29.4±9.8 {3.0±1.0 }	29.4±19.6 {3.0±2.0 }
Travel control lever			19.6±4.9 {2.0±0.5 }	19.6±9.8 {2.0±1.0 }

Control lever, Pedal stroke

Machine model				PC35MR-5	
Engine				3D88E-7	
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
Boom control lever	• Engine: Stopped • Testing point: At the center of the grip • Testing point: At the tip of the pedal • Read the maximum value when the lever is operated to stroke end (excluding play at NEUTRAL position)	N to boom RAISE, LOWER	mm	85±10	85±10
Arm control lever		N to arm IN, OUT		85±10	85±10
Bucket control lever		N to bucket CURL, DUMP		85±10	85±10
Swing control lever		N to swing LEFT, RIGHT		85±10	85±10
Boom swing control pedal		N to swing LEFT, RIGHT		25±5	25±5
Blade control lever		N to RAISE, LOWER		50±5	50±5
Travel control lever		N to travel FORWARD, REVERSE (L.H., R.H.)		100±10	100±10
Play of control lever		Work equipment, Swing, Blade		Max. 5	Max. 5
		Traveling		Max. 5	Max. 5

Operating effort of control lever and pedal

Machine model			PC35MR-5	
Engine			3D88E-7	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Boom control lever	• Hydraulic oil temperature: 45 to 55 ℃ • Fuel control dial: MAX (High idle) position • Testing point: At the center of the grip • Testing point: At the tip of the pedal • Read the maximum value when the lever is operated to stroke end	N {kgf}	15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Arm control lever			15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Bucket control lever			15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Swing control lever			15.68±4.9 {1.6±0.5 }	15.68±9.8 {1.6±1.0 }
Boom swing control pedal			78.4±19.6 {8.0±2.0 }	78.4±29.4 {8.0±3.0 }
Blade control lever			29.4±9.8 {3.0±1.0 }	29.4±19.6 {3.0±2.0 }
Travel control lever			19.6±4.9 {2.0±0.5 }	19.6±9.8 {2.0±1.0 }

Fig. 9

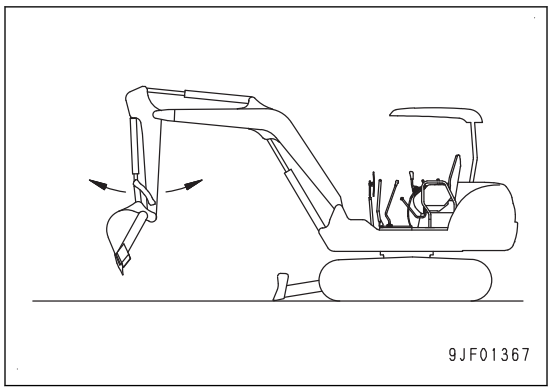


Fig. 10

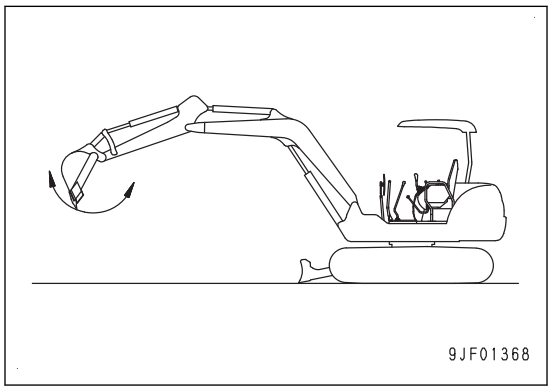


Fig. 11

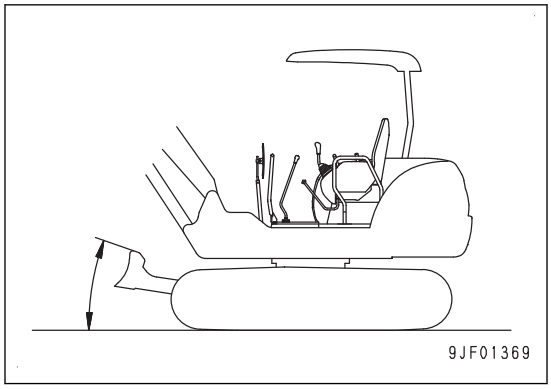
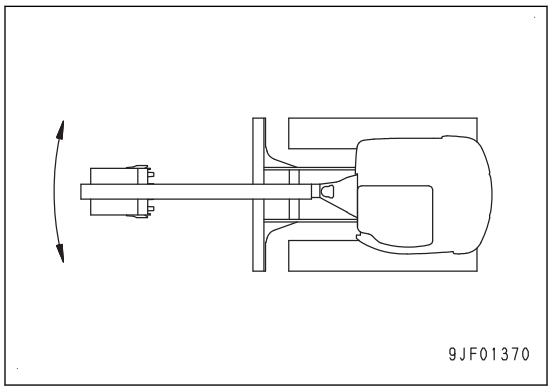


Fig. 12



Tools for testing PPC valve outlet pressure

Symbol		Part No.	Part name	Q'ty	Remarks
A	-	799-101-5002	Hydraulic tester	1	
	1	799-101-5130	Gauge	1	Pressure range: 6 MPa
	2	799-101-5160	Nipple	1	Size: R1/8
B		790-261-1205	Digital hydraulic tester	1	Pressure range: 70 MPa
C		799-401-3100	Adapter	1	Size: 02
D		799T-404–8500	Sensor adapter	1	Pressure range: 50 MPa

Tools for testing oil leakage

Symbol	Part No.	Part name	Q'ty	Remarks
A	Commercially available	Measuring cylinder	1	Capacity: 100 to 200 ml
B	07376-70315	Plug	1	Size: 03
C	07376-70210	Plug	1	Size: 02
D	Commercially available	Block	1	
E	Commercially available	Wooden block	1	

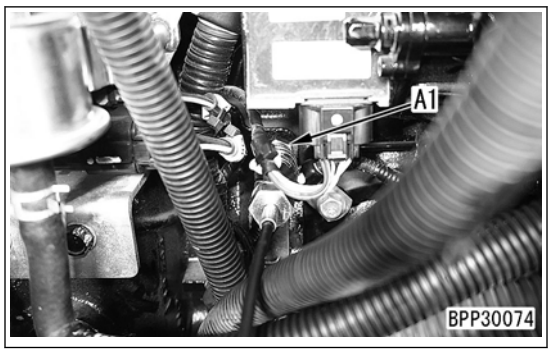
Tools for bleeding air from hydraulic circuit

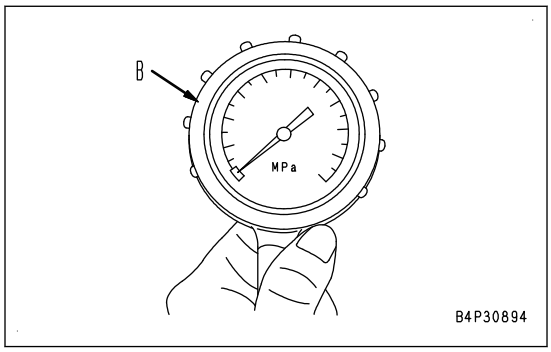
Symbol	Part No.	Part name	Q'ty	Remarks
A	Commercially available	Oil container	1	
B	Commercially available	Air bleeding hose	1	

Tools for opening and closing the floor

Symbol	Part No.	Part name	Q'ty	Remarks
A	Commercially available	Wooden block	2	

5. Install the nipple A1 of hydraulic tester A, and connect gauge B.
6. Connect the quick release battery terminal (-).
7. Start the engine.

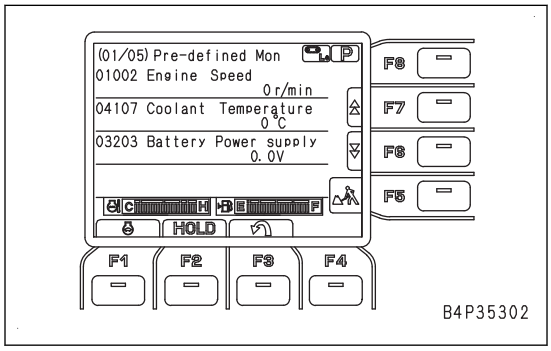




8. Select and display (01/05) “Predefined Mon” or following monitoring item on “SET AND OPERATE MACHINE MONITOR”.

   Monitoring code: 04107 “Coolant Temperature”
9. Raise the coolant temperature to the specified range.
10. Set the working mode to P (“Power Mode”).
11. Turn off the auto-deceleration.
12. Set all control levers and control pedals to NEUTRAL position.
13. Test the engine oil pressure when the fuel control dial is at MAX (High idle) and MIN (Low idle) positions.

    For standard values, see STANDARD VALUE TABLE, “STANDARD VALUE TABLE FOR ENGINE”.



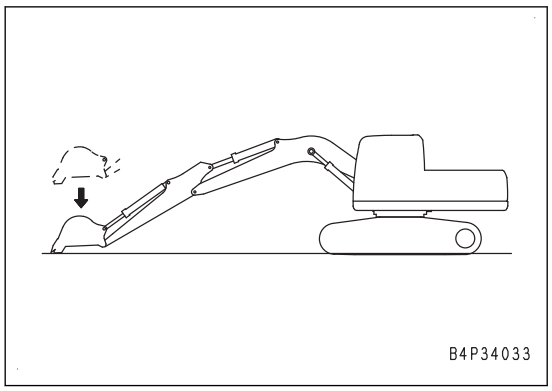
After finishing the test, remove the testing tools and restore the machine.

Engine oil pressure switch (1):
3.9 to 6.9 Nm {0.4 to 0.7 kgfm}

REMARK

Since the engine oil pressure is tested with the engine oil pressure switch removed, failure code [#B1192] is displayed.
Delete the abnormality record. See “SET AND OPERATE MACHINE MONITOR”, “METHOD FOR CONFIRMING ABNORMALITY RECORD (ELECTRICAL SYSTEMS)”.

5) Operate the work equipment control levers fully in LOWER direction and check that the work equipment is lowered to the ground.



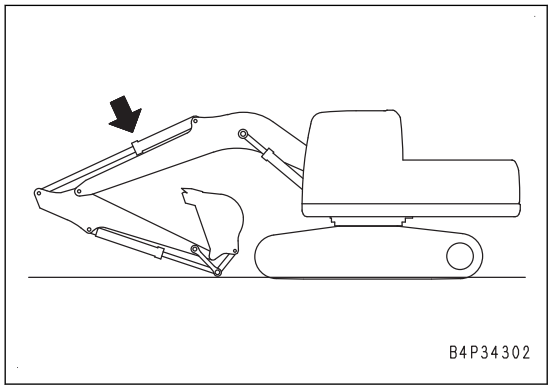
NOTICE

- **Pressure of PPC accumulator drops gradually after the engine stops. Be sure to perform steps 2) to 5) in 15 seconds.**
- **If the work equipment is lowered or stops lowering the bucket halfway through the operation, pressure in PPC accumulator may be low, and pressure cannot be released with this procedure.**

REMARK

- If the work equipment is lowered by its own weight to the ground, the function of PPC accumulator is normal.
- PPC accumulator is a periodic inspection item and an important periodic replacement part.

2. Start the engine.
3. Extend the arm cylinder to the end (to the maximum IN position), and lower the work equipment to the ground.



REMARK

- Since the anti-drop valve is attached to the arm cylinder head side, hydraulic oil on arm cylinder head side is drained in this posture when work equipment is lowered to the ground, and remaining pressure decreases.
- The amount of oil on the head side decreases as well.

4. Turn the starting switch to OFF position.
5. Loosen the oil filler cap of the hydraulic tank gradually, and release the air in the tank.

REMARK

Leave the oil filler cap of the hydraulic tank removed.

6. Release the remaining pressure in hydraulic cylinder circuit
   1) Turn the starting switch to ON position.
   2) Set the lock lever to FREE position, and operate the right and left work equipment control levers forward, backward, rightward, and leftward.

   REMARK

   The work equipment is operated by the pressure in PPC accumulator. Pressure in PPC accumulator is lost by operating the work equipment control levers 2 or 3 times.

   3) Set the lock lever in LOCK position.
   4) Start the engine and run it with the fuel control dial at MIN (Low idle) position for approximately 10 seconds to increase the pressure in PPC accumulator.
7. Repeat steps 1) and 4) 4 or 5 times to release the remaining pressure from the hydraulic cylinder circuit.

⚠ When disassembling the anti-drop valve, loosen anti-drop valve mounting bolts gradually. Make sure that hydraulic oil pressure is released, then disassemble.

⚠ Do not turn adjustment screw (3) counterclockwise more than 1 turn because it may fly out.

4. After adjusting pressure, tighten lock nut (2).

   Locknut (2):
   39 to 49 Nm {4 to 5 kgfm}

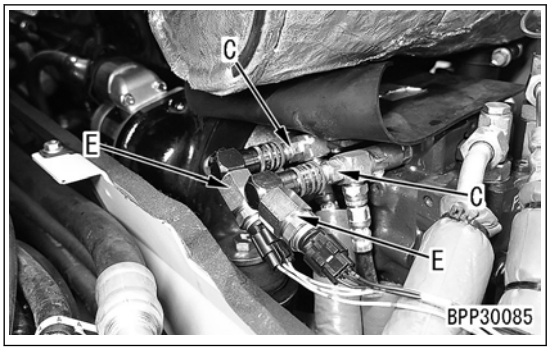
After the adjustment, recheck the oil pressure according to the testing procedure described above.

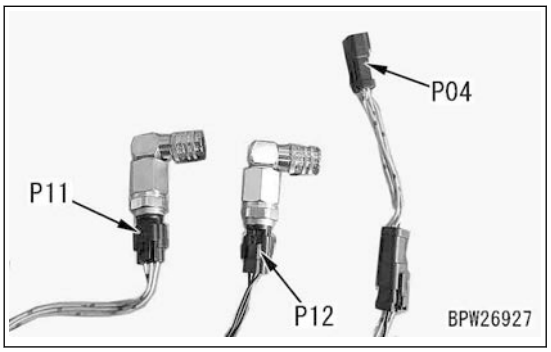
4. Install the nipples C to each port, and connect couplings (P11) and (P12) of sensor adapter E.

   REMARK

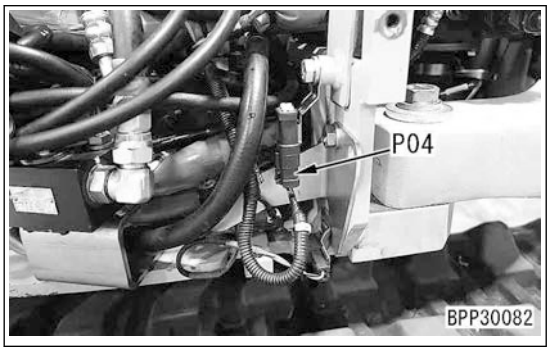
   - Coupling (P11) side is displayed by monitoring code: 01141 “Service Press. Sens1”.
   - Coupling (P12) side is displayed by monitoring code: 01142 “Service Press. Sens2”.

5. Remove the cover on the front side of the machine.





6. Connect the connector (P04) of sensor adapter E to service pressure connector (P04).
7. Start the engine.

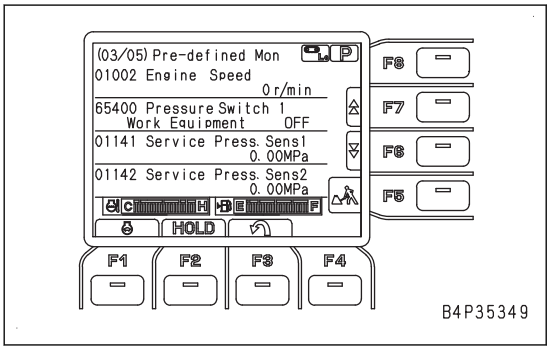


8. Select and display (03/05) “Predefined Mon” or following monitoring item on “SET AND OPERATE MACHINE MONITOR”.

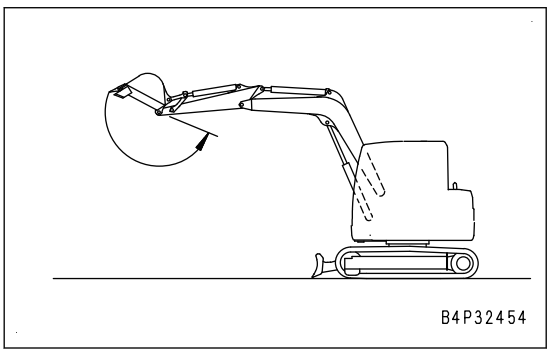
   Monitoring code: 01141“ Service Press. Sens1”

   Monitoring code: 01142“ Service Press. Sens2”

9. Adjust the hydraulic oil temperature within the specified range.



10. Operate the work equipment and move the cylinders as follows.
    - Boom cylinder: Fully extended
    - Arm cylinder: Fully retracted
    - Bucket cylinder: Fully retracted
11. Set the working mode to P (“Power Mode”).
12. Turn the fuel control dial to MAX (High idle) position.
13. Check the pump discharged pressure and LS pressure (actuator load pressure) simultaneously when all the control levers and pedals are in NEUTRAL and the bucket CURL control lever is moved to half stroke position.

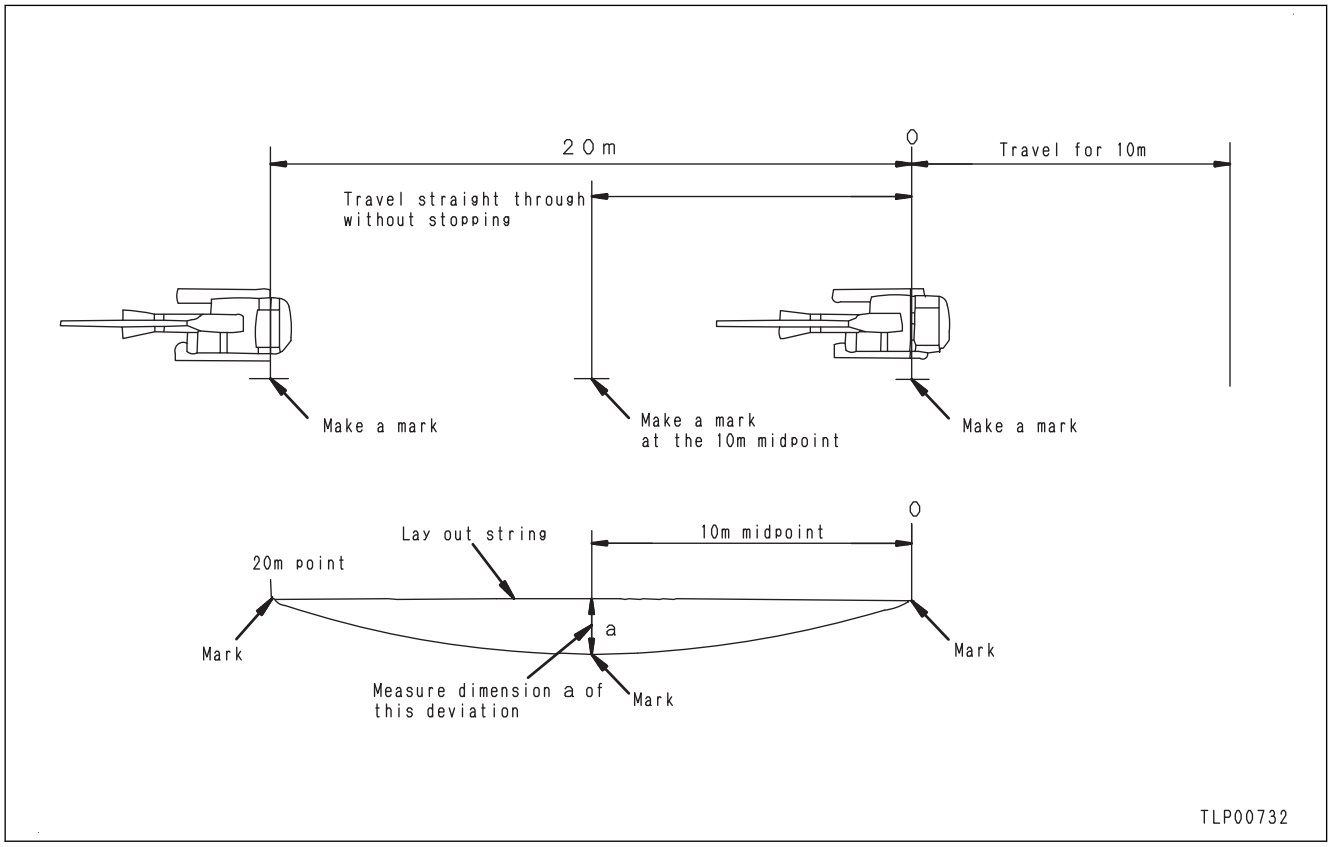


TEST AND ADJUST TRAVEL DEVIATION

Check this item under the following conditions.

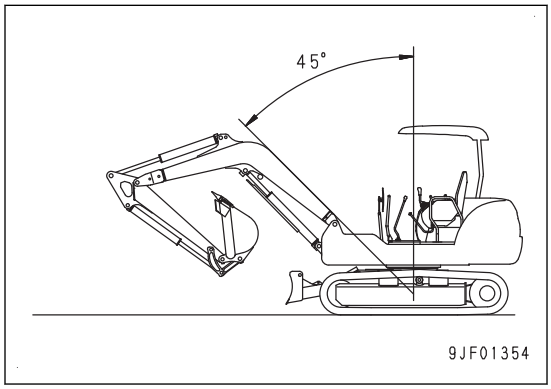
Hydraulic oil temperature: 45 to 55 °C

For testing and adjusting of travel deviation, refer to this section.



METHOD FOR TESTING TRAVEL DEVIATION

1. Run the engine and keep the hydraulic oil temperature to the testing condition range.
2. Fully extend the bucket cylinder, arm cylinder, and blade cylinder, and keep the boom angle at 45 °.
3. Set the working mode to P (“Power Mode”).
4. Set the travel mode to Lo.
5. Turn the fuel control dial to MAX (High idle) position.
6. Run up 10 m with the engine speed at high idle and then travel 20 m continuously, and measure deviation (a).



REMARK

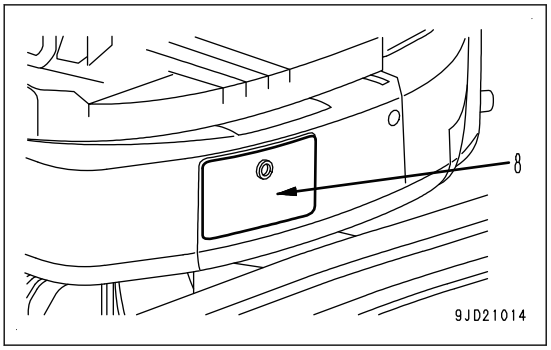
Check that the discharged pressures of main pumps P1 and P2 are even. See “TEST AND ADJUST OIL PRESSURE IN WORK EQUIPMENT, TRAVEL, AND BOOM SWING CIRCUITS”.

ADJUST TRAVEL DEVIATION

⚠ If the adjustment plug is loosened more than the adjustment limit, high-pressure oil can be splashed. Do this operation carefully.

⚠ Lower the work equipment to the ground, stop the engine, and operate the control lever several times to release the remaining pressure in the piping. And then, loosen the oil filter cap of the hydraulic tank slowly to release the pressure in the tank.

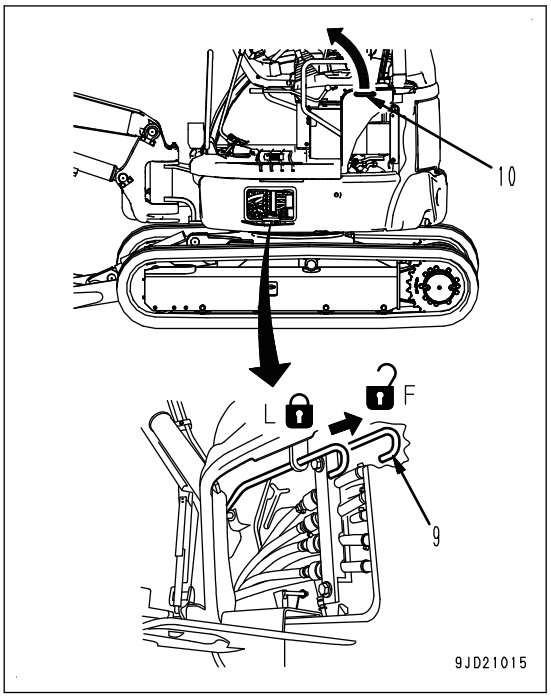
6. Open the inspection window (8).



7. While pulling the floor lock release lever (9) to FREE position (F) with your left hand, hold the handle (10) with your right hand and push it up to the direction of arrow (approximately 45 °) to release the floor lock.
8. Hold the handle (10) and push it up to the direction of arrow (approximately 45 °) to raise the floor.

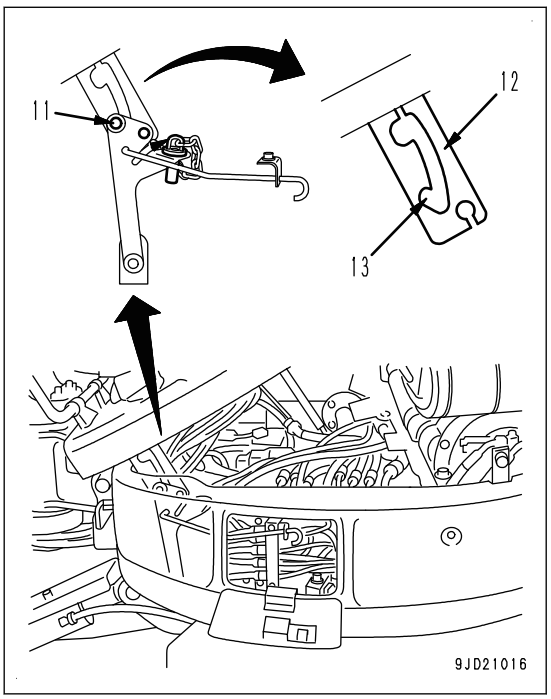
   REMARK

   - If the floor does not rise, the release lever is not in RELEASE position.
     Pull back the handle with your right hand, and repeat the preceding procedure again.
   - Since the gas spring assists the opening of floor, the force to push up the floor decreases in the following cases. Take care.
     - When outside air temperature is low
     - When the force of gas spring decreases due to the long-term operation



9. Once floor rises, push it up until the lock pin (11) reaches to the locking notch (13) of lock plate (12).

   When the lock pin (11) moves into the locking notch (13), the first lock is fixed.



Code	Item		Reference page
03	Abnormality Record	Mechanic Sys Error Record	METHOD FOR CONFIRMING ABNORMALITY RECORD (MECHANICAL SYSTEMS)
		Electric Sys Error Record	METHOD FOR CONFIRMING ABNORMALITY RECORD (ELECTRICAL SYSTEMS)
04	Maintenance Record		METHOD FOR CONFIRMING MAINTENANCE RECORD
05	Maintenance Mode Setting		METHOD FOR OPERATING MAINTENANCE MODE SETTING
06	Phone Number Entry		METHOD FOR OPERATING PHONE NUMBER ENTRY SETTING
07	Default	Key-on Mode	METHOD FOR SETTING WITH DEFAULT SETTING MENU (KEY-ON MODE)
		Unit	METHOD FOR SETTING WITH DEFAULT SETTING MENU (UNIT)
		With/Without Attachment	METHOD FOR SETTING WITH DEFAULT SETTING MENU (WITH/WITHOUT ATTACHMENT)
		Auto Idle Stop Time Fixing	METHOD FOR SETTING WITH DEFAULT SETTING MENU (AUTO IDLE STOP TIMER FIXING)
08	Adjustment	Pump Absorption Torque	METHOD FOR ADJUSTING WITH ADJUSTING MENU (PUMP ABSORPTION TORQUE)
		Attachment EPC 2 Adjustment	METHOD FOR ADJUSTING WITH ADJUSTING MENU (ATTACHMENT EPC 2 ADJUSTMENT)
		Attachment EPC 3 Adjustment	METHOD FOR ADJUSTING WITH ADJUSTING MENU (ATTACHMENT EPC 3 ADJUSTMENT)
09	Battery Disconnect Setting		METHOD FOR OPERATING BATTERY DISCONNECT SWITCH SETTING
10	KOMTRAX Settings	Terminal Status	METHOD FOR CONFIRMING KOMTRAX SETTINGS (TERMINAL STATUS)
		GPS & Communication State	METHOD FOR CONFIRMING KOMTRAX SETTINGS (GPS AND COMMUNICATION STATUS)
		Modem Information	METHOD FOR CONFIRMING KOMTRAX SETTINGS (MODEM STATUS)
11	Service Message		METHOD FOR DISPLAYING SERVICE MESSAGE

METHOD FOR CHECKING PRE-DEFINED MONITORING INFORMATION

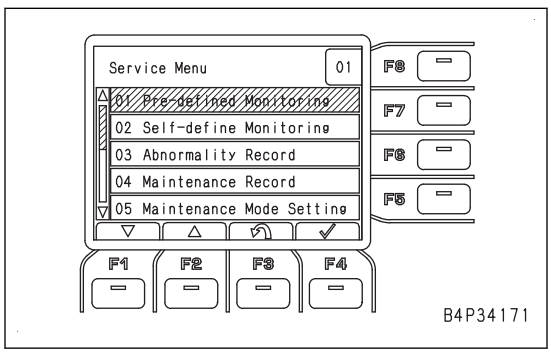
The machine monitor monitors the condition of the machine in real time using signals from various switches, sensors, actuators, and their controllers which are installed on various parts of the machine.

In Pre-defined Monitoring, frequently used monitoring items are selected beforehand.

1. Select “Predefined Mon” from the “Service Menu” screen.

   REMARK

   For the selection method, see “Operating method of service mode” in “SERVICE MODE”.



F3: Cancels the selection and returns the screen to maintenance item screen

F4: Enters the selection and returns the screen to maintenance item screen

7. Select “Set” of each maintenance item. When the screen of each maintenance item is displayed, perform the setting with the function switches.

   Default value: Maintenance notice time set on the machine monitor (Recommended by the manufacturer and not changeable).

   Set value: Maintenance notice time that is arbitrarily set. Maintenance reminder function works according to this set time in operator mode (the time can be increased or decreased in multiples of 25 h).

   F1: Decreases the set value

   F2: Increases the set value

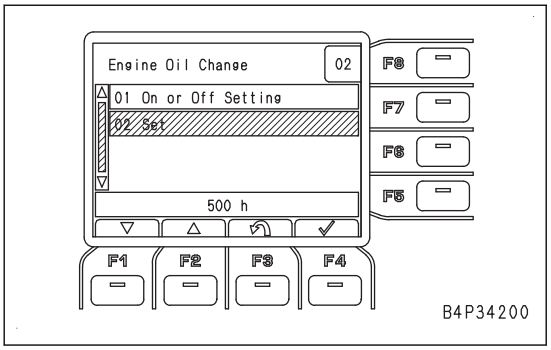
   F3: Cancels the set value and returns the screen to maintenance item screen

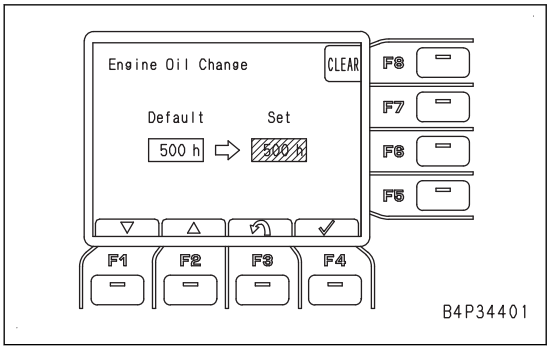
   F4: Enters the set value and returns the screen to maintenance item screen

   F8: Cancels unconfirmed contents of settings

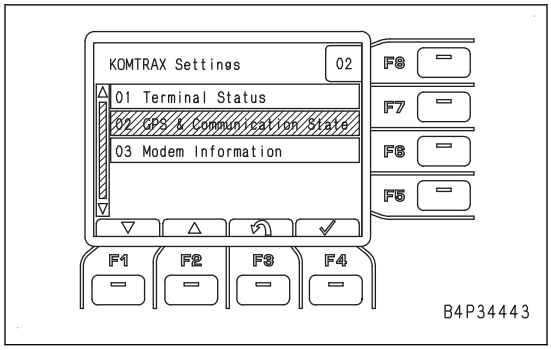
   REMARK

   - After pressing F4 and confirming the value, the screen returns to maintenance item screen.
   - If the function of maintenance item is “ON” but the setting has been changed after operating the machine for more than 1 hour, the change is recognized as a reset operation.

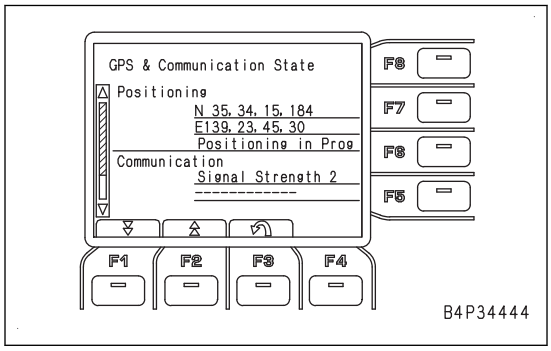




2. On “KOMTRAX Settings” screen, select “GPS & Communication State”.
   F1: Moves the selected item down by one item
   F2: Moves the selected item up by one item
   F3: Returns the display to the “Service Menu” screen
   F4: Enters the selected item
   F8: Moves to the code entry screen



3. Following information is displayed on “GPS & Communication State” screen.
   Positioning: GPS positioning state
   Communication: Communication environment and connection state of the communication modem
   Number of messages not yet sent: Number of mails that are saved on the machine monitor and have not yet been transmitted
   F1: Moves to the next page
   F2: Returns to the previous page
   F3: Returns the display to “KOMTRAX Settings” screen



METHOD FOR CONFIRMING KOMTRAX SETTINGS (MODEM STATUS)

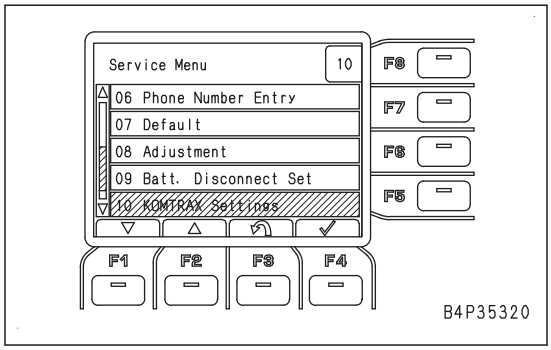
The setting and operating state of KOMTRAX can be checked by using the menu of KOMTRAX Settings.

Telephone number and IMSI of KOMTRAX confirmation modem can be checked from “Modem Information”.

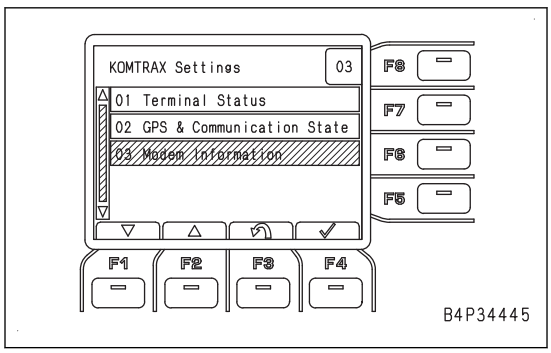
1. Select “KOMTRAX Settings” from the “Service Menu” screen.

   REMARK

   For the selection method, see “Operating method of service mode” in “SERVICE MODE”.



2. On “KOMTRAX Settings” screen, select “Modem Information” with the function switch.
   F1: Moves the selected item down by one item
   F2: Moves the selected item up by one item
   F3: Returns the display to the “Service Menu” screen
   F4: Enters the selected item
   F8: Moves to the code entry screen



Machine model			PC30MR-5			Good	No good
Engine			3D88E-7				
Item	Testing conditions	Unit	Standard value for new machine	Repair limit	Measured value		
Blade RAISE	• Hydraulic oil temperature: 45 to 55 ℃ • Fuel control dial: MAX (High idle) position • Working mode: P (Power Mode) • Measurement range: Time required to move blade between ground level and rising end • See measuring posture, STANDARD VALUE TABLE, “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, “Fig. 11”.	Sec.	0.9 to 1.5	Max. 1.5			
Blade LOWER	• Hydraulic oil temperature: 45 to 55 ℃ • Fuel control dial: MAX (High idle) position • Working mode: P (Power Mode) • Measurement range: Time required to move blade between ground level and rising end • See measuring posture, STANDARD VALUE TABLE, “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, “Fig. 11”.	Sec.	1.0 to 1.6	Max. 1.6			

INSPECTION PROCEDURE BEFORE TROUBLESHOOTING

WALK-AROUND CHECK

Before starting the engine, look around and under the machine to check for any loose nuts or bolts, leakages of oil, fuel, or coolant, and check the condition of the work equipment and hydraulic system.

Check the connectors for looseness, wiring harnesses for play, and accumulation of dust in places that reach high temperatures.

⚠ **Any combustible materials accumulated around the battery or other hot engine parts, and leakage of fuel or oil will cause the machine to catch fire. Check carefully, and if any abnormality is found, repair it.**

- Check of unusual noise and smell
  Check for unusual noise or smell.
  If the machine is operated under the unusual noise or smell, the cause of it may damage the machine, so stop the operation immediately once you recognize it.
- Check around engine and removal of dirt
  Check and remove any accumulated dirt around the engine and any combustibles (dead leaves, twigs, etc.) on hot engine parts.
- Check around engine for water leakage
- Check around engine for oil leakage
  Check for oil leakage from engine and coolant leakage from cooling system. If any abnormality is found, repair it.
- Check of fuel line for leakage
  Check for fuel leakage, check hoses and pipes for damage. If any abnormality is found, repair it.
- Check of radiator and removal of dirt
  Check if there is any accumulated dirt and any combustibles (dead leaves, twigs, etc.) around the radiator. If any, remove them.
  For removal of dirt from the radiator, see Operation and Maintenance Manual, “METHOD FOR CHECKING AND CLEANING RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS”.
- Check of work equipment, cylinders, linkage and hoses for breakage, wear and clearance
  Check the work equipment, cylinders, linkage, and hoses for breakage, wear, and clearance. If any abnormality is found, repair it.
- Check of hydraulic equipment, hydraulic tank, hoses, and joints for oil leakage
  Check for oil leaks. If any abnormality is found, repair it.
- Air bleeding
  For the bleeding air from the fuel system, see TESTING AND ADJUSTING, “BLEED AIR FROM FUEL SYSTEM”.
  For the bleeding air from the hydraulic system, see TESTING AND ADJUSTING, “BLEED AIR FROM HYDRAULIC CIRCUIT”.
- Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers
  If any abnormality is found, repair it.
- Check of handrails for abnormality and looseness of bolts
  If any abnormality is found, repair it and tighten any loose bolts.
- Check and clean of rearview mirrors
  Check rearview mirror for abnormality. If any, repair it.
  Clean the mirror surface and adjust the mirror angle so that the rear of the machine can be seen from the operator's seat.
- Check of gauges and monitors for abnormality
  Check gauges and monitors in the operator's cab for abnormality. If any abnormality is found, replace it with a new one.
  Clean up the surfaces.

CHECK HYDRAULIC OIL STRAINER

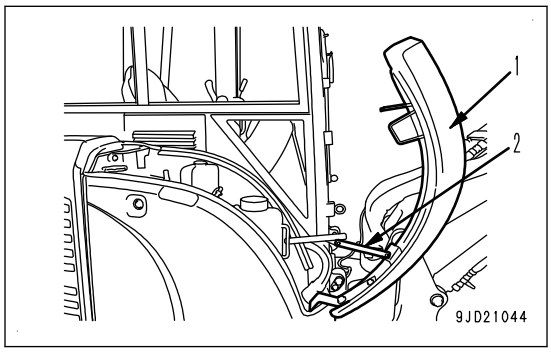
⚠ **Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.**

⚠ **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it carefully.**

1. Open the dirt cover (1).

   REMARK

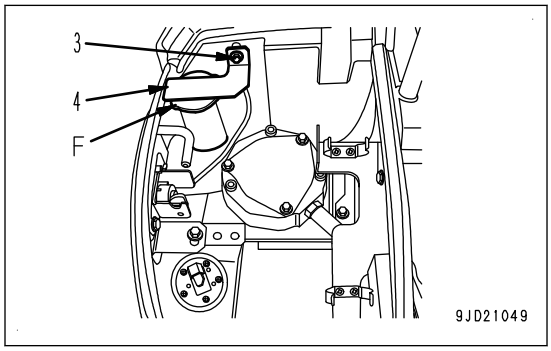
   Open the dirt cover (1) fully and it will be secured by the cover support lever (2).



2. Loosen the bolt (3) of the hydraulic tank, move the plate (4) on oil filler port (F), and turn the cap of oil filler port (F) slowly to remove it.

   REMARK

   Release the internal pressure.



3. Place the oil container under the drain plug (P) at the bottom of the machine to receive the drained oil.
4. Remove the drain plug (P) to drain the oil by using the socket wrench handle.

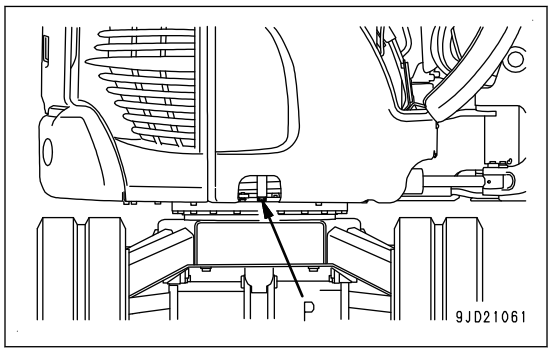
   REMARK

   When removing the drain plug (P), be careful not to get oil on yourself.

5. Check the O-ring installed to the drain plug (P) for damage.

   REMARK

   If the O-ring is damaged, replace it with new O-ring.



6. After draining the oil, tighten the drain plug (P).

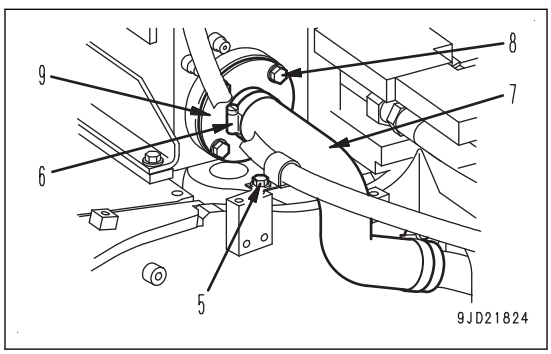
   Tightening torque: 68.6±9.81 Nm {7±1 kgfm}

7. Open the floor. For details, see TESTING AND ADJUSTING, “METHOD FOR OPENING AND CLOSING FLOOR”.
8. Remove the bolt (5) of hose clamp.
9. Loosen the hose clamp (6) and remove the hose (7).
10. Loosen the bolts (8) and remove the strainer (9).
11. Remove all dirt from strainer (9), then wash it in clean diesel fuel or flushing oil.

    REMARK

    If strainer (9) is damaged, replace it with a new strainer.

12. Fix the strainer (9) with bolt (8).



PROCEDURE FOR TESTING AND TROUBLESHOOTING

Classification of troubleshooting

Mode	Content
Display of code	Troubleshooting by failure code
E mode	Troubleshooting of electrical system
H mode	Troubleshooting of hydraulic and mechanical systems
S mode	Troubleshooting of engine

1. Check if action level and failure code are displayed on machine monitor:

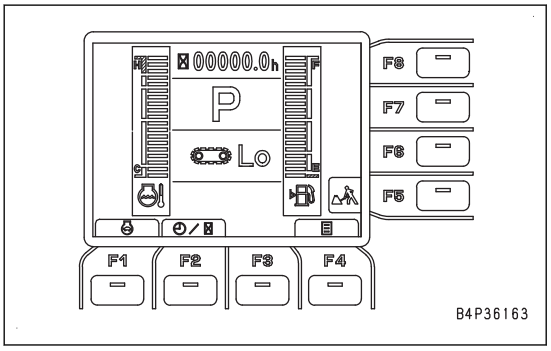
   REMARK

   If multiple failure codes are displayed simultaneously, all codes are displayed repeatedly in order. Write down all of the failure codes.

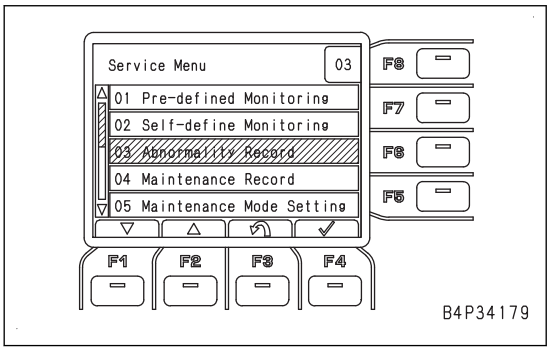
   If action level and failure code are displayed on the standard screen of the machine monitor, perform the troubleshooting for the “Display of code” corresponding to the displayed failure code.

2. Check a mechanical system failure code and an electrical system failure code with the abnormality record function of the machine monitor.

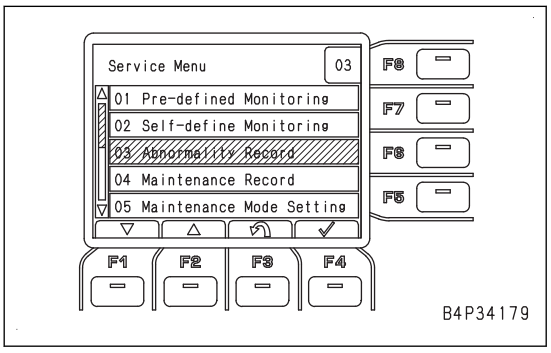
   1) Press F1, F2 and F3 in order while pressing the function switch F8 on the standard screen.



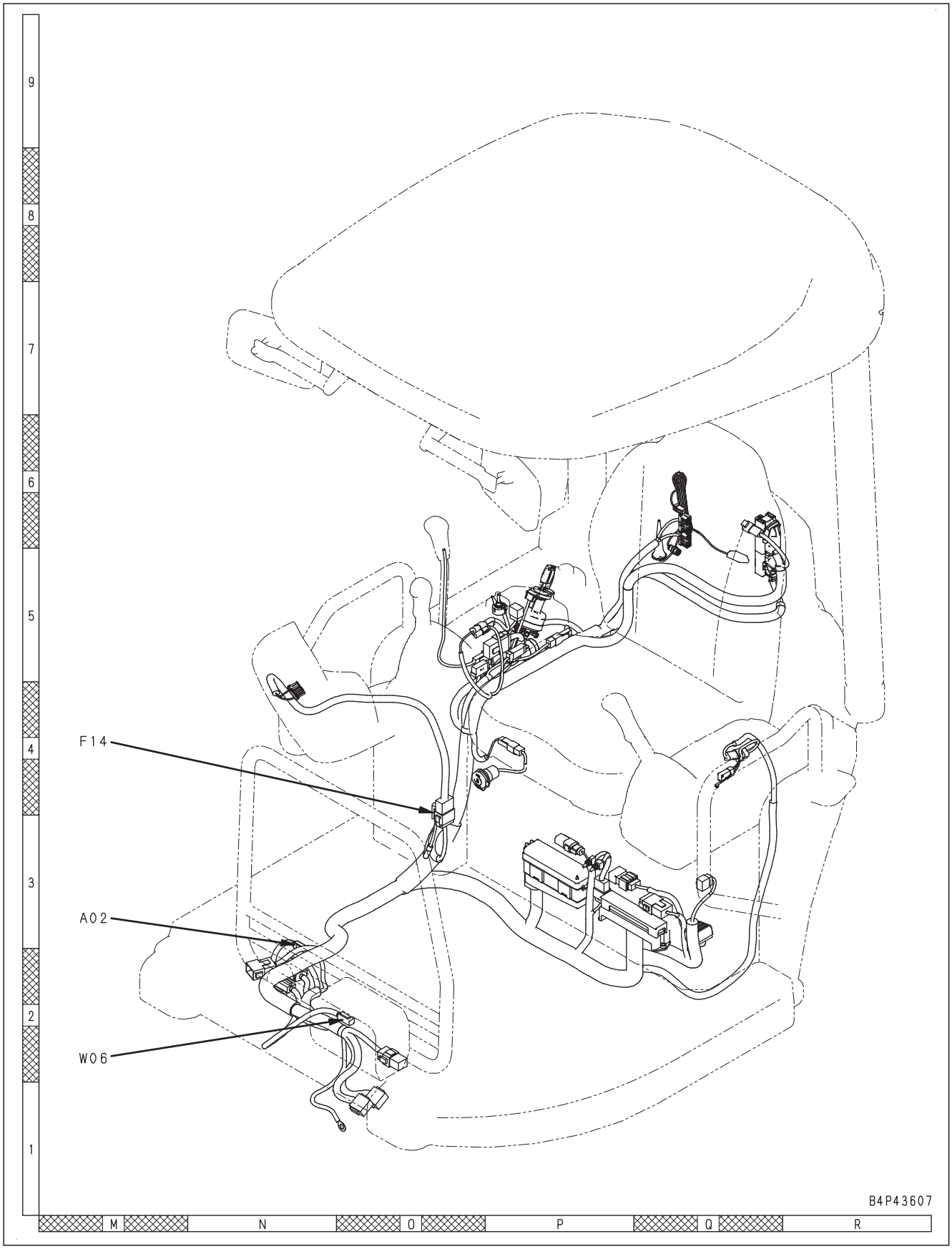
   2) On the service menu screen, press the function switch F1 twice, and select “03 Abnormality Record”.



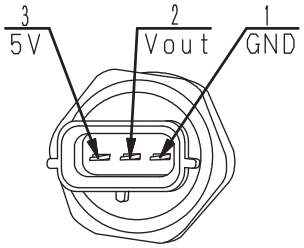
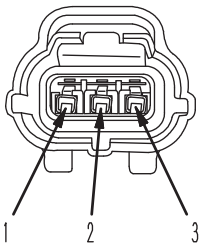
   3) Press the function switch F4 to enter the selected item, and go to “Abnormality Record” screen.



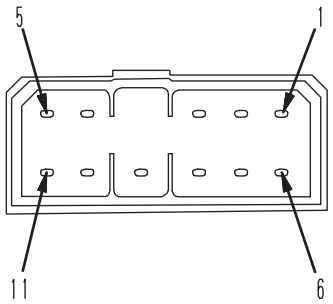
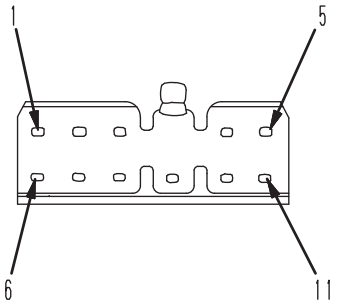
3/7 (canopy specifications)



AMP/EJ2 connetor

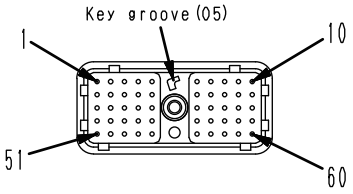
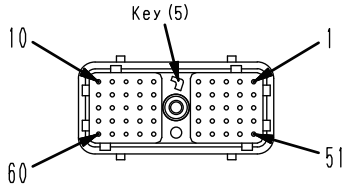
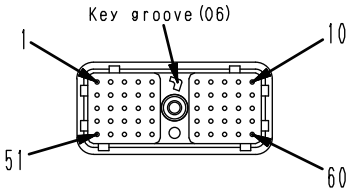
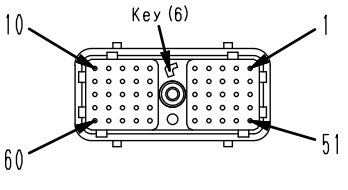
No. of pins	Oil pressure sensor		
	Sensor side (plue)	Harness side (receptacle)	Testing connection use special tool Part No.
3			799-601-9420 (T-adapter) (kit:799-601 -4101) (kit:799-601 -4201)
	—	—	

YAZAKI connector

No. of pins	WIPER INTERMITTENT UNIT		
	Male pin (female housing)	Female pin (male housing)	
11			—
	—	—	

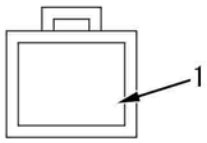
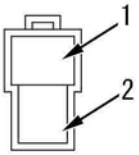
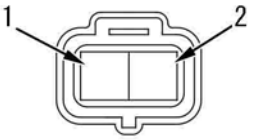
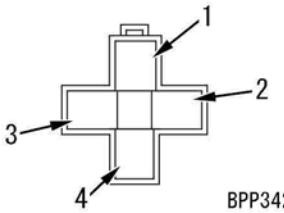
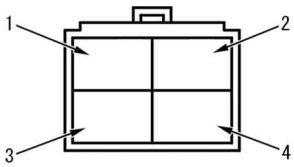
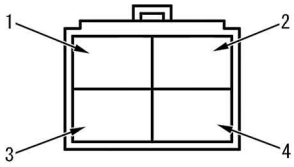
B4D18200

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

No. of pins	DRC26 Series connector		
	Male pin (female housing)	Female pin (male housing)	Testing connection use special tool Part No.
60 -05※	 BJD14063	 BJD14064	799-601-4220 (T-adapter) (Kit:799-601-4101)
	–	Part No. 08194-04104	
	※-05:Key position		
60 -06※			799-601-4390 (Socket)
	–	–	
	※-06:Key position		

B4D18415

CONNECTOR CONTACT IDENTIFICATION (FOR 4D88E-7 ENGINE)

Number of pins	Equipment name (Chapter 90 Electrical circuit diagram)	Equipment name (Engine shop manual)	Connector manufacturer	Shape of mating surface, pin No.
1	Glow plug	Glow plug	YAZAKI	 BPP34238
2	Oil pressure switch	Oil pressure switch	SUMITOMO	 BPP34242
2	Coolant temperature sensor	Coolant temperature sensor	Tyco	 BPP34244
4	Starting motor relay Glow plug relay	Starting motor relay Start auxiliary relay	YAZAKI	 BPP34250
4	Main relay	Main relay	YAZAKI	 BPP36164
4	Rack actuator relay	Rack actuator relay	YAZAKI	 BPP36165

Failure code	Failure (Displayed on screen)	Applicable component	Action level	History category	Remarks
DBH5KP	5V Sensor 1 Power Voltage Low Error	MACHINE	-	Mechanical system	
DBH5KP	5V Sensor 1 Power Voltage Low Error	MACHINE	-	Mechanical system	
DBH9KQ	Model Selection Signal Mismatch (MCN Controller)	MACHINE	L01	Electrical system	
DBHLKA	Operating Lamp Open Circuit(Mcn Con)	MACHINE	-	Mechanical system	
DBHLKB	Operating Lamp Short Circuit(Mcn Con)	MACHINE	-	Mechanical system	
DBHQKR	Controller Area NW 2 Defect Communicat (Machn Con)	MON	L03	Electrical system	
DDNRKA	W/E Lever Lock SW Open Circuit	MACHINE	L03	Electrical system	
DDNRKY	W/E Lever Lock SW Hot Short Circuit	MACHINE	L03	Electrical system	
DDNS00	Lock Lever Auto Lock Release SW On	MACHINE	-	Electrical system	
DDWLKA	Breaker Switch Open Circuit or Ground Fault	MACHINE	-	Electrical system	
DDWLKB	Breaker Switch Hot Short Circuit	MACHINE	-	Electrical system	
DFB1KZ	Service Lever Potentio 1 Open or Short Circuit	MACHINE	L01	Electrical system	
DFB3L8	Service Lever 1 Potentio Signal Incompatibility	MACHINE	-	Electrical system	
DFB5KZ	Service Lever sub-Potentio 1 Open or Short Circuit	MACHINE	L01	Electrical system	
DHS1MA	Swing PPC Pressure Sensor System Abnormality	MACHINE	L01	Electrical system	
DHS5MA	Travel PPC Pressure Sensor Error	MACHINE	L01	Electrical system	
DKULKA	PPC Lock Relay Open Circuit	MACHINE	L03	Electrical system	
DKULKB	PPC Lock Relay Short Circuit	MACHINE	L03	Electrical system	
DKULKY	PPC Lock Relay Hot Short Circuit	MACHINE	L03	Electrical system	
DV00KB	Buzzer Output Short Circuit	MON	L01	Electrical system	
DV20KB	Travel Alarm Short Circuit	MACHINE	L01	Electrical system	
DW43KA	Travel Speed Solenoid Open Circuit	MACHINE	L01	Electrical system	
DW43KB	Travel Speed Solenoid Short Circuit	MACHINE	L01	Electrical system	

FAILURE CODE [D811MC]

Action level	Failure code	Failure	KOMTRAX Malfunction (KOMTRAX system)
-	D811MC		
Detail of failure	KOMTRAX Malfunction		
Action of controller			
Phenomenon on machine	KOMTRAX system does not operate normally.		
Related information	After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	KOMTRAX Error	Defective KOMTRAX (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

Circuit diagram related to machine monitor power supply

PC30MR-5(Canopy specifications): Serial No.: 50001 to 52907

PC35MR-5(Canopy specifications): Serial No.: 30001 to 31037

PC30MR-5(Cab specifications): Serial No.: 50001 to 52848

PC35MR-5(Cab specifications): Serial No.: 30001 to 31023

PC30MR-5(quick coupler specifications): Serial No.: 50001 to 52556

PC35MR-5(quick coupler specifications): Serial No.: 30001 to 30888

Circuit diagram related to CAN2 communication

PC30MR-5(Canopy specifications): Serial No.: 52908 and up

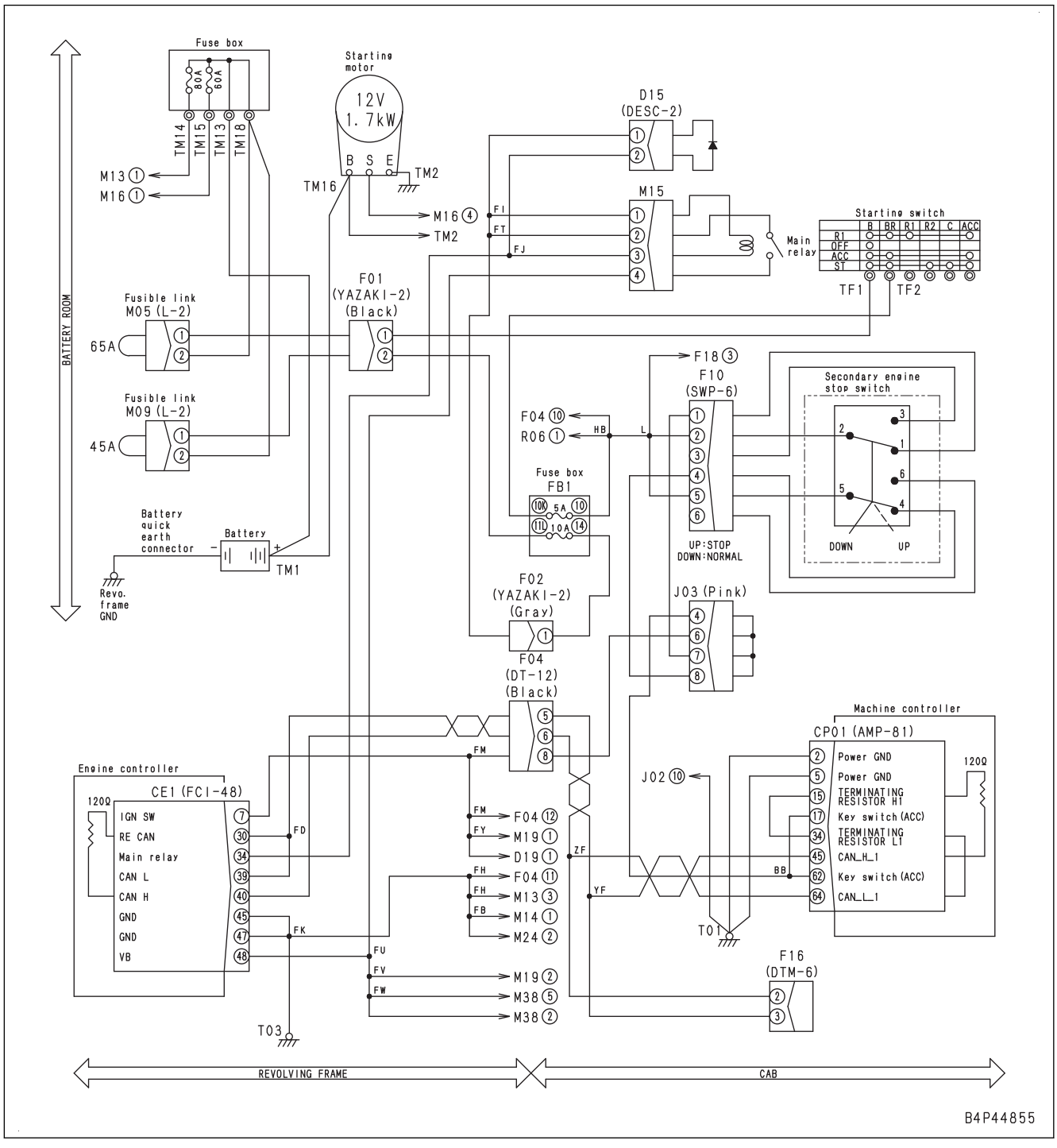
PC35MR-5(Canopy specifications): Serial No.: 31038 and up

PC30MR-5(Cab specifications): Serial No.: 52849 and up

PC35MR-5(Cab specifications): Serial No.: 31024 and up

PC30MR-5(quick coupler specifications): Serial No.: 52557 and up

PC35MR-5(quick coupler specifications): Serial No.: 30889 and up



FAILURE CODE [DBHLKA]

Action level	Failure code	Failure	System Operating Lamp Open Circuit (Machine controller)
-	DBHLKA		(Machine controller system)
Detail of failure	Machine controller has detected an open circuit because the output line voltage of system operating lamp is approximately 5 V and below while the machine controller does not output the voltage for approximately 3 seconds after the starting switch is turned to ON position.		
Action of controller	None in particular		
Phenomenon on machine	System operating lamp indicates the period that the quick release battery terminal (-) should not be disconnected. If the quick release battery terminal (-) is disconnected while the system operating lamp is lit, memory data of machine controller and engine controller may be destroyed.		
Related information	• This failure code can be detected only when “Battery Disconnect Setting” is enabled. **REMARK** “Battery Disconnect Setting” that is displayed on the machine monitor denotes “quick release battery terminal (-)” of this machine. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. • Although machine controller is not able to light up system operating lamp, no trouble will result unless the quick release battery terminal (-) is not disconnected. • When controller lights up system operating lamp, output circuit voltage is at low level. • Since no controller drives system operating lamp for approximately 3 seconds after starting switch is turned to ON position, open circuit can be detected.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fuse	If fuse No.12 in fuse box FB1 is blown out, circuit probably has ground fault, etc.		
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn the starting switch to OFF position. 2. Remove the fuse-12 in fuse box FB1. 3. Disconnect the connectors CP02 and M22, and connect T-adapter to each female side.		
		Resistance	Between CP02 (female) (99) and M22 (female) (2)	Max. 1 Ω
			Between M22 (female) (1) and FB1-12	Max. 1 Ω
3	Defective machine controller	If no failure is found by preceding checks, work equipment controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to PPC lock switch

PC30MR-5(Canopy specifications): Serial No.: 50001 to 52907

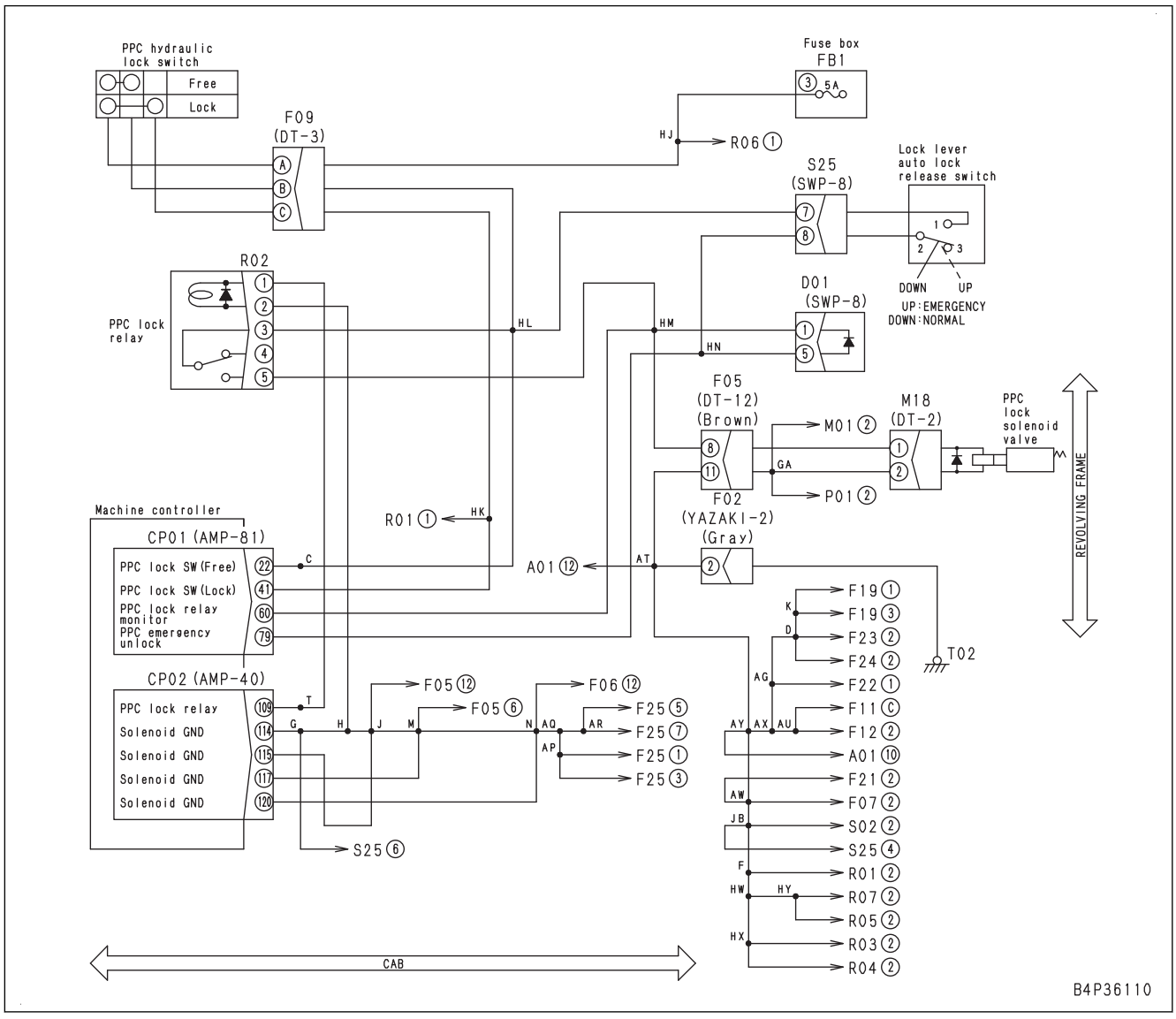
PC35MR-5(Canopy specifications): Serial No.: 30001 to 31037

PC30MR-5(Cab specifications): Serial No.: 50001 to 52848

PC35MR-5(Cab specifications): Serial No.: 30001 to 31023

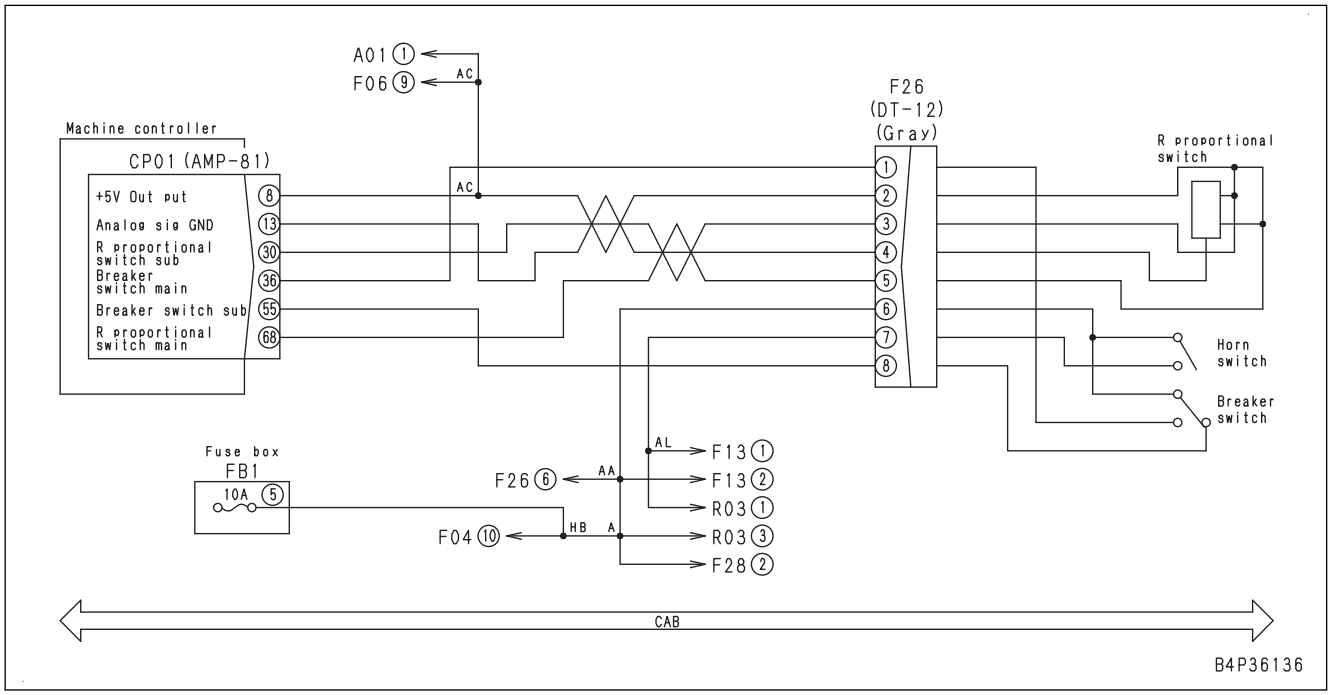
PC30MR-5(quick coupler specifications): Serial No.: 50001 to 52556

PC35MR-5(quick coupler specifications): Serial No.: 30001 to 30888



No.	Cause	Procedure, measuring location, criteria and remarks		
5	Defective machine controller	1. Turn the starting switch to OFF position. 2. Disconnect connector CP01, and connect T-adapter to female side.		
		Resistance	Between CP01 (female) (13) and (8)	4.0 to 6.0 kΩ
			Between CP01 (female) (68) and (13)	0.25 to 5.0 kΩ
			Between CP01 (female) (68) and (8)	0.25 to 5.0 kΩ
			Between CP01 (female) (30) and (13)	0.25 to 5.0 kΩ
			Between CP01 (female) (30) and (8)	0.25 to 5.0 kΩ
			Between CP01 (female) (68) and ground	Min. 1 MΩ

Circuit diagram related to service lever potentio 1



Circuit diagram related to PPC lock switch

PC30MR-5(Canopy specifications): Serial No.: 52908 and up

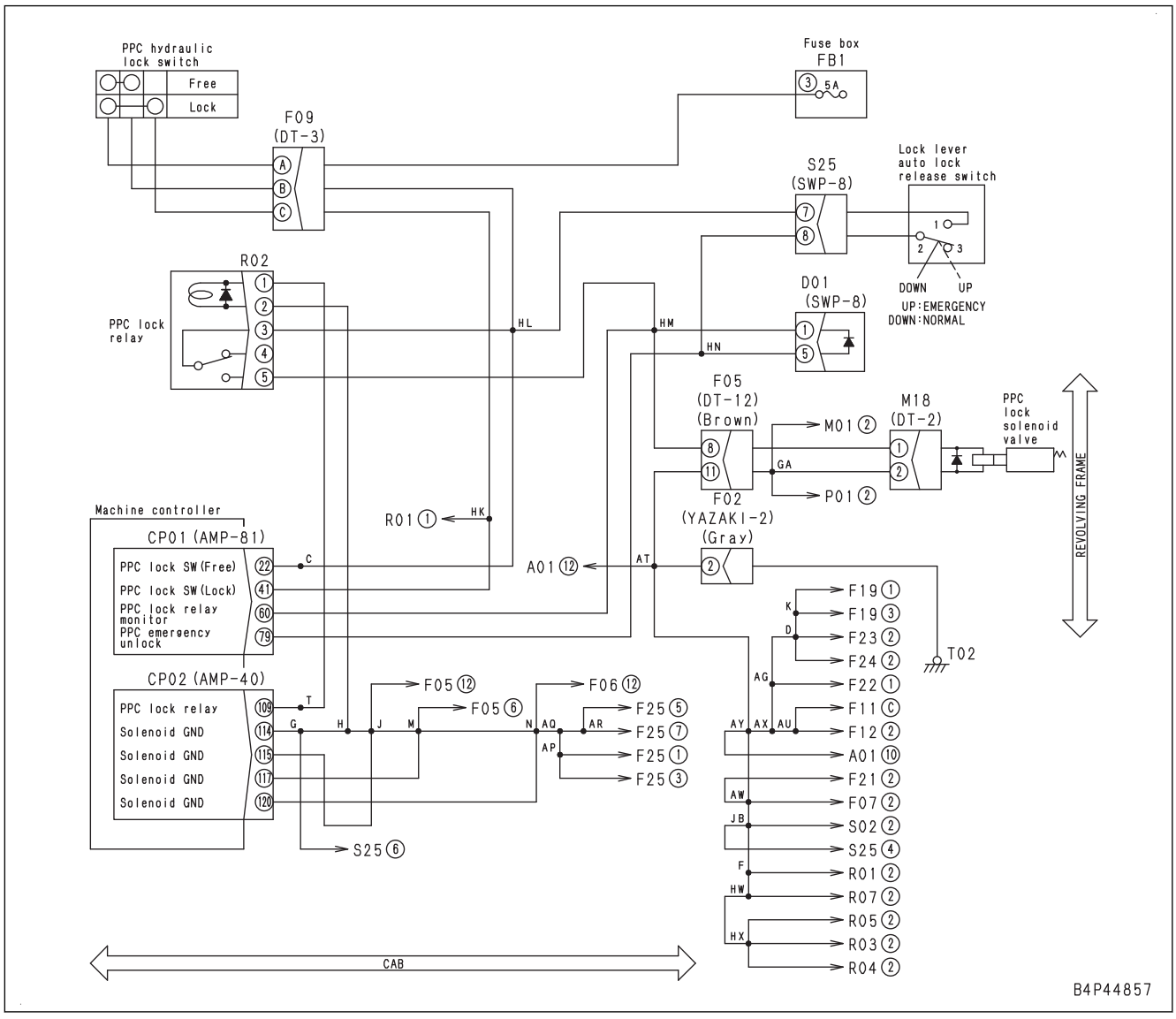
PC35MR-5(Canopy specifications): Serial No.: 31038 and up

PC30MR-5(Cab specifications): Serial No.: 52849 and up

PC35MR-5(Cab specifications): Serial No.: 31024 and up

PC30MR-5(quick coupler specifications): Serial No.: 52557 and up

PC35MR-5(quick coupler specifications): Serial No.: 30889 and up



Circuit diagram related to PC-EPC solenoid system

PC30MR-5(Canopy specifications): Serial No.: 52908 and up

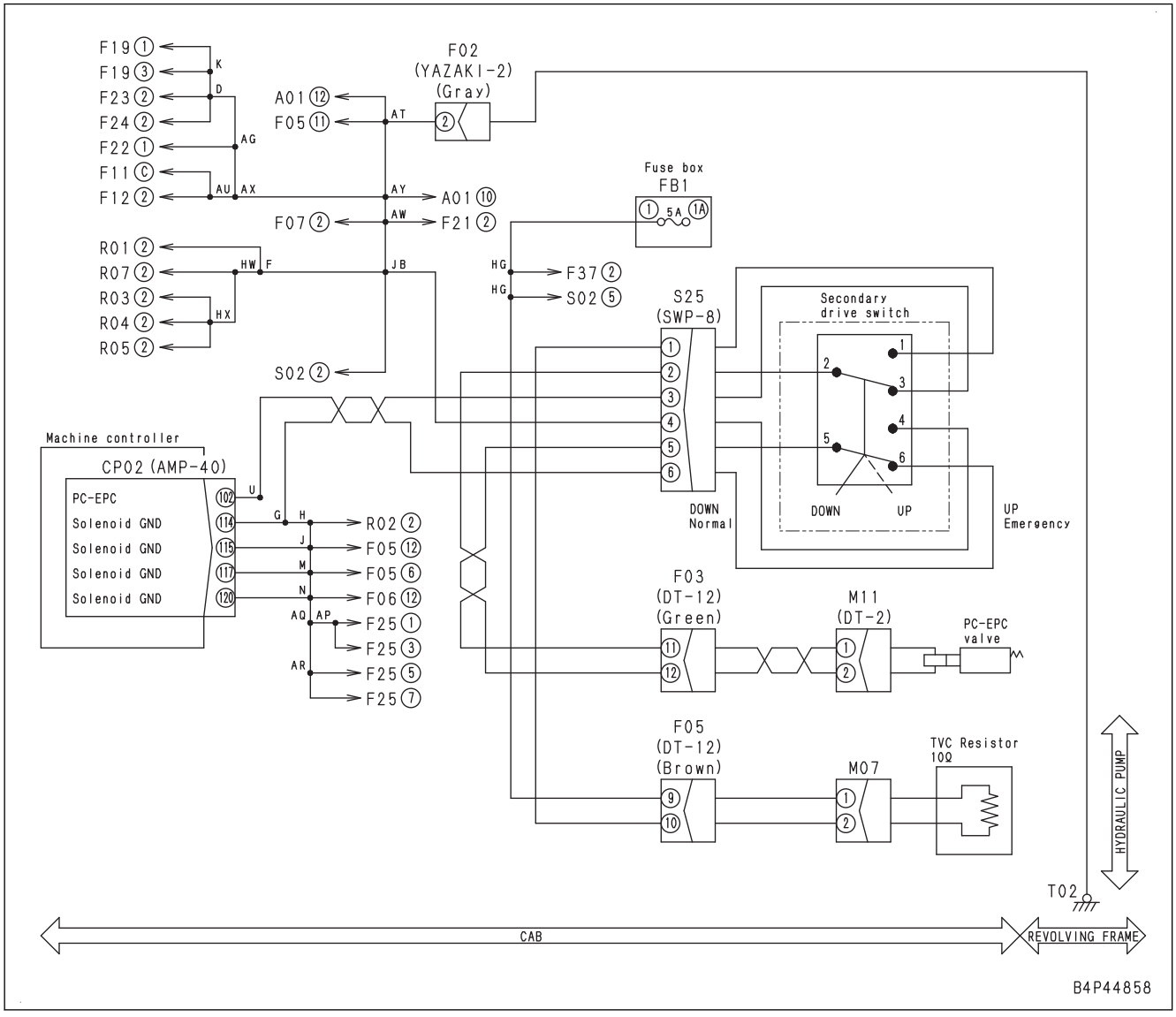
PC35MR-5(Canopy specifications): Serial No.: 31038 and up

PC30MR-5(Cab specifications): Serial No.: 52849 and up

PC35MR-5(Cab specifications): Serial No.: 31024 and up

PC30MR-5(quick coupler specifications): Serial No.: 52557 and up

PC35MR-5(quick coupler specifications): Serial No.: 30889 and up



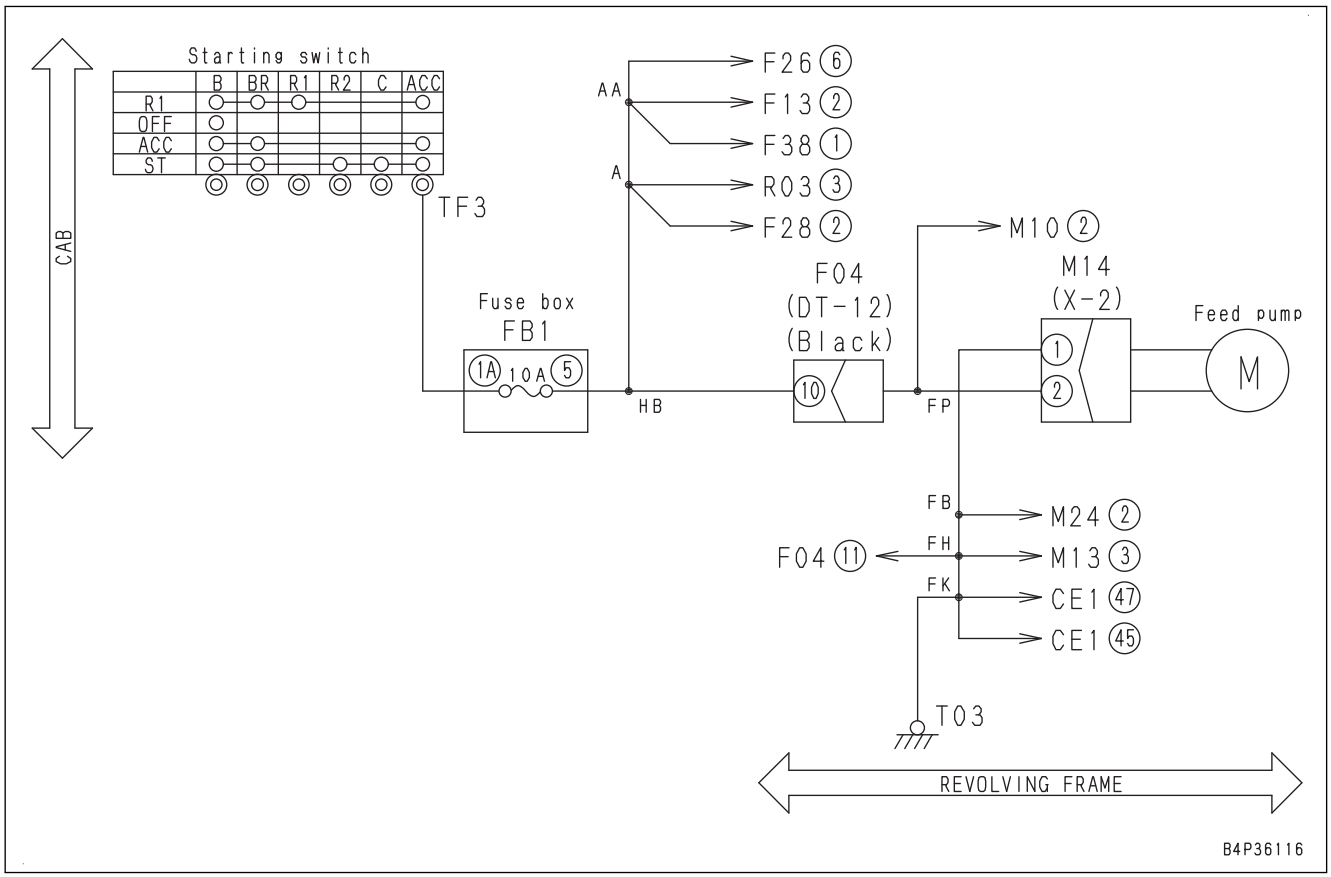
TROUBLESHOOTING OF ELECTRICAL SYSTEM (E-MODE)

E-1 ENGINE DOES NOT START (ENGINE DOES NOT CRANK)

Failure	Engine does not start (engine does not crank) PC30MR-5(Canopy specifications): Serial No.: 50001 to 52907 PC35MR-5(Canopy specifications): Serial No.: 30001 to 31037 PC30MR-5(Cab specifications): Serial No.: 50001 to 52848 PC35MR-5(Cab specifications): Serial No.: 30001 to 31023 PC30MR-5(quick coupler specifications): Serial No.: 50001 to 52556 PC35MR-5(quick coupler specifications): Serial No.: 30001 to 30888
Related information	• The engine start circuit is equipped with the start lock function of the following two systems. 1. Start lock by password of machine monitor 2. Start lock by lock lever • If failure symptom machine monitor does not light up is displayed while starting switch is turned to ON position, main power supply system may be defective. Perform troubleshooting for E-mode “WHEN STARTING SWITCH IS TURNED TO ON POSITION, MACHINE MONITOR DISPLAYS NOTHING”.

No.	Cause	Procedure, measuring location, criteria and remarks	
1	Loose terminal or open circuit in terminal	1. Turn the starting switch to OFF position.	
		Check the terminals of starting motor, alternator, and the ground terminals T101, T02, T03, etc.	
2	Insufficient battery capacity	Check battery voltage and specific gravity of battery electrolyte.	
		Battery voltage (per 1 cell)	Min. 12 V
		Gravity of battery	Min. 1.26
3	Defective engine controller system	As for engine controller power supply and ACC signal, perform troubleshooting for causes 1 and 2 of failure code [DB2QKR] first.	
4	Defective fuse	If the fuses No.3 and No.15 in the fuse box FB1 are blown out, circuit probably has ground fault. (See ground fault (contact to ground circuit) of wiring harness.)	
5	Defective fusible link	• If the fusible link M05 is burnt out, circuit may have ground fault. In this case, perform troubleshooting for ground fault of wiring harness in cause 13 first. • Fusible link M05 is connected to the fuses No.1 to 10 and has large scale of circuits connected. Accordingly, if no failure is found by check on cause 13, reproduce the phenomenon to locate the ground fault place by unusual noise and burnt smell so that the trouble can be resolved earlier.	
6	Defective slow-blow fuse	If slow-blow fuse (TM15) is blown out, circuit probably has ground fault, etc. (See check on cause of wiring harness ground fault.)	

CIRCUIT DIAGRAM (ELECTRIC FUEL FEED PUMP SWITCH)



E-10 FUEL LEVEL MONITOR LIGHTS UP IN RED WHILE ENGINE IS RUNNING

Failure	Fuel level monitor lights up in red while engine is running.
Related information	• Signal voltage of fuel sensor can be checked with monitoring function. (Code: 04200)

No.	Cause	Procedure, measuring location, criteria and remarks
1	Fuel level reduction (When system works properly)	Because fuel level may be lowered, check and refill with fuel if level is lowered.
2	Defective fuel gauge system	If no failure is found by preceding checks, fuel gauge system may be defective. Perform following troubleshooting: • E-mode “FUEL GAUGE DISPLAY DOES NOT MOVE FROM MINIMUM OR MAXIMUM” • E-mode “DISPLAY OF FUEL GAUGE DIFFERS FROM ACTUAL FUEL LEVEL” (indicates neither full nor empty).

E-22 ALARM BUZZER DOES NOT SOUND

Failure	Alarm buzzer does not sound.
Related information	• When turning the starting switch from OFF to ON position, buzzer sound by self check is not heard (for 2 seconds). • When travel speed increasing switch and function switch are pressed while starting switch is in ON position, no switching sound is heard (short sound). • Check that fuse FB1 (5) is not blown out before performing troubleshooting.

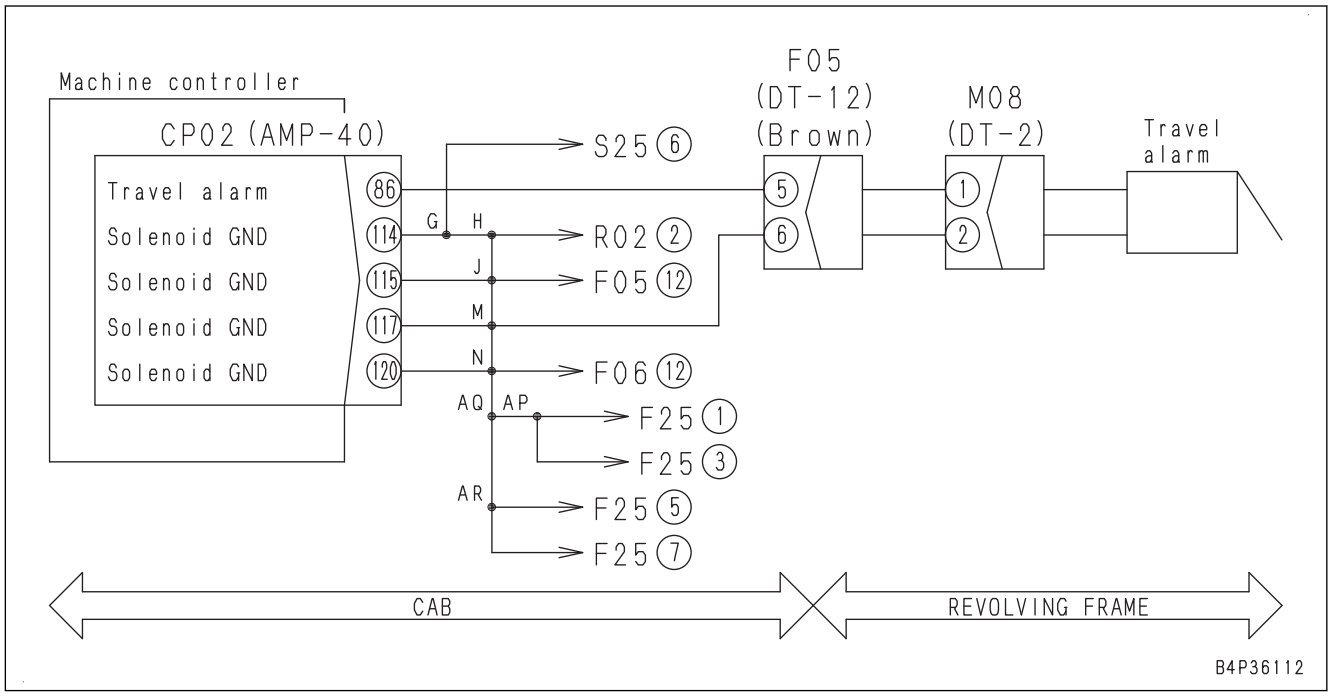
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective alarm buzzer	1. Turn the starting switch to OFF position. 2. Insert T-adapter in connector F28, and connect T-adapter box to it. 3. Turn the starting switch to ON position. 4. Connect No.1 of T-adapter box to the ground.		
		Buzzer sound	It sounds only when connected,	
		Voltage	Between F28 (2) and ground	10 to 15 V
2	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn the starting switch to OFF position. 2. Disconnect connectors F15 and F28, and connect T-adapter to each female side.		
		Resistance	Between F15 (female) (5) and F28 (female) (1)	Max. 1 Ω
			Between FB1 (5) and F28 (female) (2)	Max. 1 Ω
3	Defective machine monitor	1. Turn the starting switch to OFF position. 2. Disconnect connector F15, and connect T-adapter and T-adapter box to female side. 3. Turn the starting switch to ON position. 4. Connect No.5 of T-adapter box to the ground.		
		Buzzer sound	It sounds only when connected,	

E-29 ALARM DOES NOT STOP SOUNDING WHILE MACHINE IS STOPPED

Failure	Alarm does not stop sounding while machine is stopped.
Related information	

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective travel PPC oil pressure sensor system (internal open or short circuit)	Perform troubleshooting for failure code [DHS5MA].		
2	Hot short circuit in wiring harness (Contact with 12 V circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector M08, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between M08 (female) (1) and ground	Max. 1 V

Circuit diagram related to travel alarm



E-34 WORKING LAMP AND HEADLAMP DO NOT LIGHT UP (CANOPY SPEC)

Failure	Working lamp and headlamp do not light up (canopy specification).
Related information	If working lamp relay, working lamp switch, diode, and a harness shared between working lamp, headlamp are defective, both working lamp and headlamp do not light up (if either lamp lights up, checking the cause of these failures is not required).

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td>1</td><td>Defective working lamp and headlamp</td><td colspan="4">Because the working lamp and headlamp may be defective, check for burned-out bulb.</td></tr>
<tr><td>2</td><td>Defective fuse</td><td colspan="4">If fuse No.1 and No.11 in fuse box FB1 are blown out, circuit probably has ground fault, etc. Accordingly, perform troubleshooting for “Ground fault of wiring harness” first.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Defective working lamp relay
(Internal open or short circuit)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Replace working lamp relay R04 with another one.
3. Turn the starting switch to ON position.
4. Turn on the working lamp switch.</td></tr>
<tr><td colspan="4">If working lamp lights up, original working lamp relay is defective.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Defective additional lamp relay
(Internal open or short circuit)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Replace additional lamp relay R05 with another one.
3. Turn the starting switch to ON position.
4. Turn on the working lamp switch.</td></tr>
<tr><td colspan="4">If travel lamp and additional lamp light up, original additional lamp relay is defective.</td></tr>
<tr><td rowspan="5">5</td><td rowspan="5">Defective working lamp switch</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect the connector S02, and connect T-adapter to male side.
3. Turn the working lamp switch ON/OFF to perform troubleshooting. (ON has 2 directions.)</td></tr>
<tr><td rowspan="4">Resistance</td><td rowspan="2">Between S02 (male) (5) and (6)</td><td>OFF</td><td>Min. 1 MΩ</td></tr>
<tr><td>ON</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="2">Between S02 (male) (5) and (4)</td><td>OFF</td><td>Min. 1 MΩ</td></tr>
<tr><td>ON</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="5">6</td><td rowspan="5">Defective diode
(internal open or short circuit)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect connector D01, and connect T-adapter to male side.
REMARK
Measure it with diode range of multimeter.</td></tr>
<tr><td rowspan="4">Continuity</td><td colspan="2">Between D01 (male) (3) (+) and (7) (-)</td><td>No continuity</td></tr>
<tr><td colspan="2">Between D01 (male) (7) (+) and (3) (-)</td><td>Continuity</td></tr>
<tr><td colspan="2">Between D01 (male) (4) (+) and (8) (-)</td><td>No continuity</td></tr>
<tr><td colspan="2">Between D01 (male) (8) (+) and (4) (-)</td><td>Continuity</td></tr>
</table>

Circuit diagram related to windshield washer

PC30MR-5(Canopy specifications): Serial No.: 52908 and up

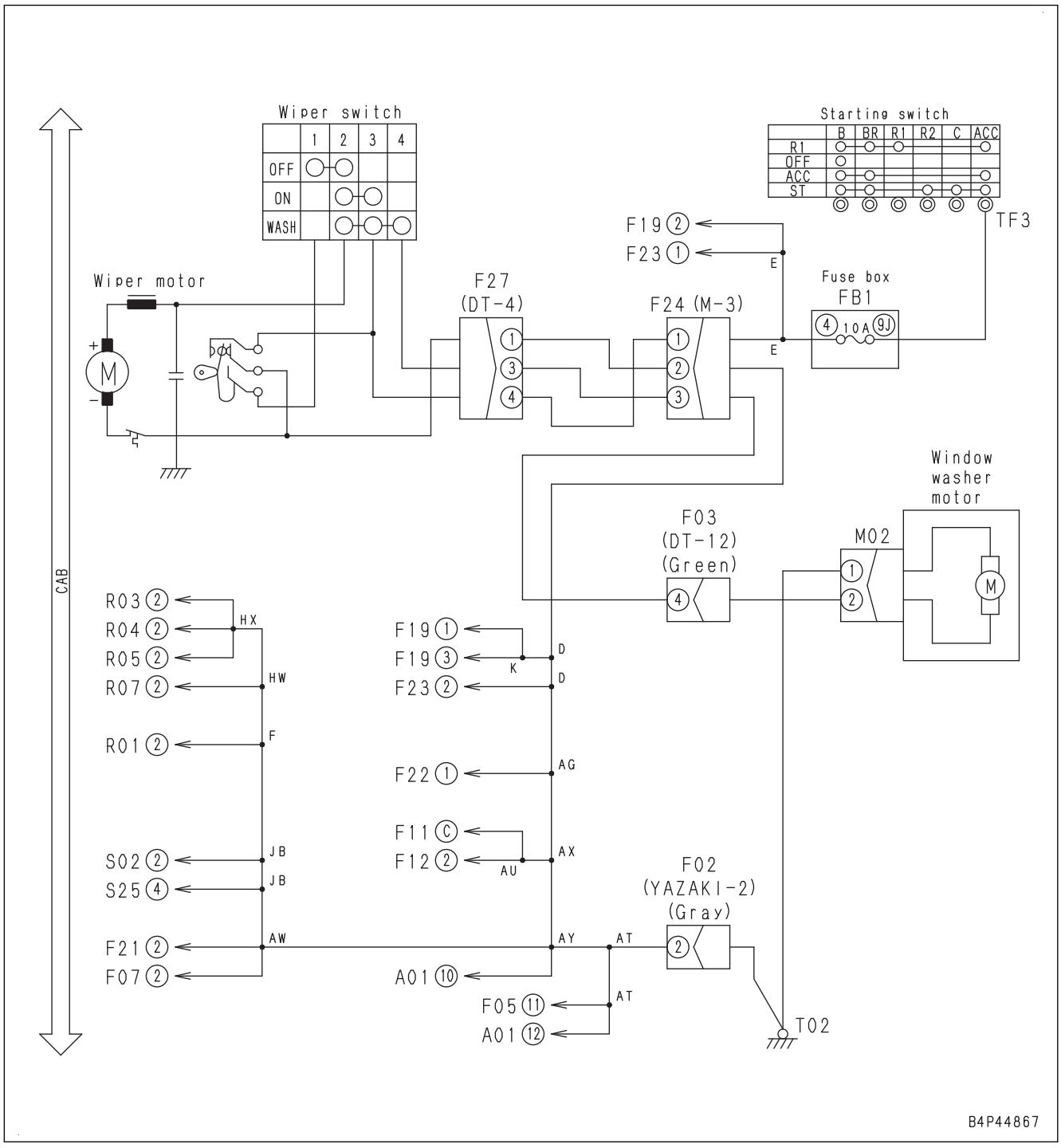
PC35MR-5(Canopy specifications): Serial No.: 31038 and up

PC30MR-5(Cab specifications): Serial No.: 502849 and up

PC35MR-5(Cab specifications): Serial No.: 31024 and up

PC30MR-5(quick coupler specifications): Serial No.: 52557 and up

PC35MR-5(quick coupler specifications): Serial No.: 30889 and up



H-9 FINE CONTROL PERFORMANCE OR RESPONSE IS POOR

Failure	Fine control performance or response is poor.
Related information	• Perform all troubleshooting with working mode to be set to power mode (P). • Perform troubleshooting with the hydraulic oil temperature at 45 to 55 °C.

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Clogging of LS circuit orifice	LS circuit orifice may be clogged. Check it.			
2	Defective adjustment and malfunction of LS valve	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		LS differential pressure	Bucket CURL operated	Differential pressure between pump discharged pressure and LS valve input pressure	1.41±0.1 MPa {14.4±1 kgf/cm^2}
		Lever operation and oil pressure ratio	All control levers in NEUTRAL	Differential pressure between pump discharged pressure and LS valve input pressure	2.9(+0.98/0) MPa {30(+10/0) kgf/cm^2}
		When pressure cannot be adjusted to normal level, the LS valve may have malfunction. Check for malfunction of the LS valve (fatigue of spring), internal defect (seized LS spool, stick), etc.			
3	Malfunction of servo piston	Check if orifice and filter in pump servo device is not clogged.			
4	Malfunction of unload valve	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Unload pressure	All control levers in NEUTRAL		1.95(+0.98/0) MPa {20(+10/0) kgf/cm^2}
5	Clogged main pump orifice plug	If no failure is found by above checks, main pump orifice plug may be clogged. Check it.			

H-21 BLADE SPEED OR POWER IS LOW

Failure	Blade speed is low or power is low.
Related information	• Set working mode to power mode (P), and perform all troubleshooting with power mode (P). • Check that the oil level in hydraulic tank is correct. • Perform troubleshooting with the hydraulic oil temperature at 45 to 55 °C. • If swing speed is slow, perform troubleshooting for “SWING AND BLADE SPEED IS LOW OR POWER IS LOW” in H mode first. • If travel speed is slow, perform troubleshooting for “TRAVEL AND BLADE SPEED IS LOW OR POWER IS LOW” in H mode first.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Improper adjustment or malfunction of swing and blade pump relief valve	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Swing and blade pump relief pressure	Blade LOWER relief	21.6±0.98 MPa {220±10 kgf/cm^2}
		When pressure cannot be adjusted to normal level, relief valve for swing and blade pump may malfunction or may have internal defect. Check it.		
2	Malfunction of blade PPC valve (blade circuit)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		PPC valve outlet pressure	Blade control lever: NEUTRAL	0 MPa {0 kgf/cm^2}
			Blade control lever: RAISE and LOWER	2.94 (+0.49/-0.1) MPa {30 (+5/-1) kgf/cm^2}
3	Malfunction of blade control valve (spool)	Release remaining pressure from hydraulic tank and piping, and then perform troubleshooting with engine stopped.		
		• Check if blade spool is stuck or seized with valve body. (Spool should move smoothly.) • Remove blade spool from valve body, and check it for flaw and sticking of dirt. • When restoring, be careful about the dirt to enter.		
4	Defective blade cylinder	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Leakage of blade cylinder	Blade LOWER relief	Max. 10 mℓ/min
5	Malfunction of load check valve in the spool of control valve	Load check valve in the spool of control valve may malfunction. Check it.		

No.	Cause	Procedure, measuring location, criteria and remarks		
7	Malfunction of L.H. travel control valve (spool)	Release remaining pressure from hydraulic tank and piping, and then perform troubleshooting with engine stopped.		
		• Check if travel spool is stuck or seized with control valve body. (Spool should move smoothly.) • Remove travel spool from valve body, and check it for flaw and sticking of dirt.		
8	Malfunction of R.H. travel control valve (pressure compensation valve)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Travel relief pressure	R.H. travel FORWARD hydraulic relief	26.0(+0.98/-1.47) MPa {265(+10/-15) kgf/cm^2}
9	Malfunction of L.H. travel control valve (pressure compensation valve)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Travel relief pressure	L.H. travel FORWARD hydraulic relief	26.0(+0.98/-1.47) MPa {265(+10/-15) kgf/cm^2}
10	Defective operation of travel control valve (suction valve)	Even after the relief valve is adjusted, if the relief pressure is low at only 1 port, suction valve may malfunction. Check the check valve for damage and spring for fatigue.		
11	Defective center swivel joint	Check whether the turn direction changes if the right and left hoses are switched between the swivel joint and travel motor.		
12	Defective R.H. travel motor (safety valve)	In the check on cause (6) and (8), if “Right Travel” is abnormal on both forward and reverse, or “Left Travel” is abnormal on both forward and reverse, safety valve may malfunction. Exchange the safety valves of right and left travel motor and check whether the phenomenon changes.		
13	Defective L.H. travel motor (safety valve)	In the check on cause (7) and (9), if “Left Travel” is abnormal on both forward and reverse, safety valve may malfunction. Exchange the safety valves of right and left travel motor and check whether the phenomenon changes.		
14	Defective R.H. travel motor (check valve)	In the check on cause (6) and (8), if the pressure compensation valve is normal, check valve may malfunction. Exchange the safety valves of right and left travel motor and check whether the phenomenon changes.		
15	Defective L.H. travel motor (check valve)	In the check on cause (7) and (9), if the pressure compensation valve is normal, check valve may malfunction. Exchange the forward and reverse check valves of the same motor and check whether the phenomenon changes.		
16	Defective travel motor (counterbalance valve and check valve)	Counter balance valve and check valve of travel motor may malfunction. Check it. (You can exchange them between forward and reverse or right and left of the same motor, and check whether failure symptom changes for judgment.)		

H-41 SWING ACCELERATION OR SWING SPEED IS LOW IN BOTH DIRECTIONS (RIGHT AND LEFT)

Failure	Swing acceleration or swing speed is low in both directions of right and left.
Related information	• Set working mode to power mode (P), and perform all troubleshooting with power mode (P). • Check that the oil level in hydraulic tank is correct. • Perform troubleshooting with the hydraulic oil temperature at 45 to 55 °C. • If blade speed is slow, perform troubleshooting for “SWING AND BLADE SPEED IS LOW OR POWER IS LOW” in H mode first.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Malfunction of swing motor (safety valve)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Swing relief pressure (pump pressure)	L.H. work equipment control lever: Swing LEFT relief, swing RIGHT relief	20.1(+0.98/-0.49) MPa {205(+10/-5) kgf/cm^2}
		If normal pressure is not obtained after adjustment, sealing of safety valve may be defective.		
2	Malfunction of swing motor parking brake	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Swing motor parking brake release pressure	L.H. work equipment control lever: Operate arm IN direction or swing RIGHT/LEFT direction	2.94 (+0.49/-0.1) MPa {30 (+5/-1) kgf/cm^2}
		If no failure is found by preceding checks, the brake may malfunction. Check it.		
3	Defective swing machinery	Check for unusual noise, unusual heat, and metallic powders in drained oil to make judgment.		
4	Malfunction of swing PPC valve	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Swing PPC valve outlet pressure	L.H. work equipment control lever: In NEUTRAL	0 MPa {0 kgf/cm^2}
			L.H. work equipment control lever: In swing RIGHT/LEFT direction	2.94(+0.49/-0.1) MPa {30(+5/-1) kgf/cm^2}
5	Malfunction of swing control valve (spool)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.		
		Swing PPC circuit pressure	L.H. work equipment control lever: Operate swing RIGHT/LEFT direction	2.94 (+0.49/-0.1) MPa {30 (+5/-1) kgf/cm^2}
		If no failure is found by preceding checks, the spool of swing control valve may malfunction. Check it.		

S-1 ENGINE DOES NOT CRANK WHEN STARTING SWITCH IS TURNED TO START POSITION

Failure	Engine does not crank when starting switch is turned to “START” position
Related information	• See E-mode in “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” for electrical system troubleshooting • If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Defective starting circuit wiring system	When starting switch is turned to START, starting motor pinion does not pop out.	Perform troubleshooting of “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” in E mode, and take corrective action.
2	Defective starting motor (safety relay portion)	• Starting motor pinion makes grating noise (When starting switch is turned to START position, starting motor pinion pops out). • Starting motor pinion comes off halfway (When starting switch is turned to START position, starting motor pinion pops out). • Starting motor makes flapping sound and does not turn (When starting switch is turned to START position, starting motor pinion protrudes) (Reference: “Flapping sound” means sound made when starting motor pinion pops in and out)	Perform troubleshooting of “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” in E mode, and take corrective action.
3	Breakage of flywheel ring gear	If starting motor pinion makes grating noise and the starting motor does not turn, visually check the flywheel ring gear.	Replace if the item is broken

S-13 OIL PRESSURE DROPS

Failure	Oil pressure drops.
Related information	• If any failure code is displayed, perform troubleshooting for that code first. • Check if machine is operated on slopes steeper than angle specified in Operation and Maintenance Manual.

No.	Cause	Point to check, remarks	Remedy
1	Insufficient oil in oil pan	Oil level in oil pan is insufficient. Oil pressure monitor indicates low oil pressure on slopes.	Oil refiling
2	Defective oil pressure sensor or wiring harness	Check oil pressure sensor, wiring harness, and connectors	Oil pressure sensor, wiring harness, and connectors replacement
3	Fuel mixed in oil	• Perform oil analysis and check for mixing of oil • Oil smells of diesel fuel.	If fuel is mixed into oil, perform troubleshooting of “FUEL MIXES INTO ENGINE OIL” in S mode, and take corrective action.
4	Water mixed in oil	• Perform oil analysis and check for mixing of water • Oil is milky.	If water is mixed into oil, perform troubleshooting of “WATER MIXES INTO ENGINE OIL (MILKY)” in S mode, and take corrective action.
5	Clogged oil filter	• Check oil filter. (Reference: Oil filter is used for more than specified period, oil is deteriorated badly, etc.) • Oil filter may be blocked by water.	Oil filter replacement
6	Clogged oil strainer	Check oil strainer.	Oil strainer cleaning
7	Flattened or clogged hydraulic piping	Hydraulic piping is flattened or clogged.	Hydraulic piping replacement
8	Defective oil pump	• Check oil pump (for wear or breakage of gear) • Oil pump is heavy in turning or has play.	Oil pump replacement
9	Defective regulator valve	Check whether the valve spring is deformed and damaged	Regulator valve exchange
10	Defective oil pump relief valve	Valve and spring of oil pump relief valve are weakening and damaged.	Oil pump relief valve exchange
11	Cracking in oil pump suction piping	Check around oil pump suction piping (for cracking ing piping).	Oil pump suction piping replacement
12	Defective seal between oil pump and oil pump suction piping	Check sealing portion.	Seal replacement
13	Leakage from EGR hydraulic piping	Check EGR hydraulic piping.	EGR hydraulic piping replacement
14	Wear of main journal bearing	• Check main journal bearing. • Metal particles are contained in oil drained from oil pan.	Bearing of main journal replacement

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
ICT	Information and Communication Technology	Communication and electronic control	A general term for the engineering and its socially applied technology of information processing and communication.
IMA	Inlet Metering Actuator	Engine	This is a valve that adjusts the fuel intake amount at the pump inlet in order to control the supply pump fuel discharged volume. (Same as IMV)
IMU	Inertial Measurement Unit	Engine	This is a device to detect the angle (or angular velocity) and acceleration of the 3 axes that control motions.
IMV	Inlet Metering Valve	Engine	This is a valve that adjusts the fuel intake amount at the pump inlet in order to control the supply pump combustion discharged volume. (Same as IMA)
KCCV	Komatsu Closed Crankcase Ventilation	Engine	This is a mechanism that burns the blowby gas again by separating oil from blowby gas and returning it to the intake side. It primarily consists of filters.
KCSF	Komatsu Catalyzed Soot Filter	Engine	This is a filter that captures soot in exhaust gas. It is built in to KDPF.
KDOC	Komatsu Diesel Oxidation Catalyst	Engine	This is a catalyst that is used for purifying exhaust gas. It is built in to KDPF or assembled with the muffler.
KDPF	Komatsu Diesel Particulate Filter	Engine	This is a component that is used to purify the exhaust gas. KDOC (catalyst) and KCSF (filter to capture soot) are built-in it. It is installed instead of the conventional muffler.
KTCS	Komatsu Traction Control System	Travel and brake (HM)	This is a function that performs braking with the optimum force and recovers the driving force of the wheels by actuating the inter-axle differential lock when the wheels runs idle while the machine travels on the soft ground.
LCD	Liquid Crystal Display	Machine monitor	This is an image display equipment such as a monitor in which the liquid crystal elements are assembled.
LED	Light Emitting Diode	Electronic parts	This is a semiconductor element that emits light when the voltage is applied in forward direction.
LIN	Local Interconnect Network	Communication and electronic control	This is one of communication standards that are used in the network on the machine.
LS	Load Sensing	Hydraulic system	This is a function that detects differential pressure of pump, and controls discharged volume corresponding to load.
LVDS	Low Voltage Differential Signaling	Communication and electronic control	This is one of communication standards that are used in the network on the machine.
MAF	Mass Air Flow	Engine	This indicates engine intake air flow. This is not used independently but is used as combined with sensor. Mass air flow sensor can be called as MAF sensor.

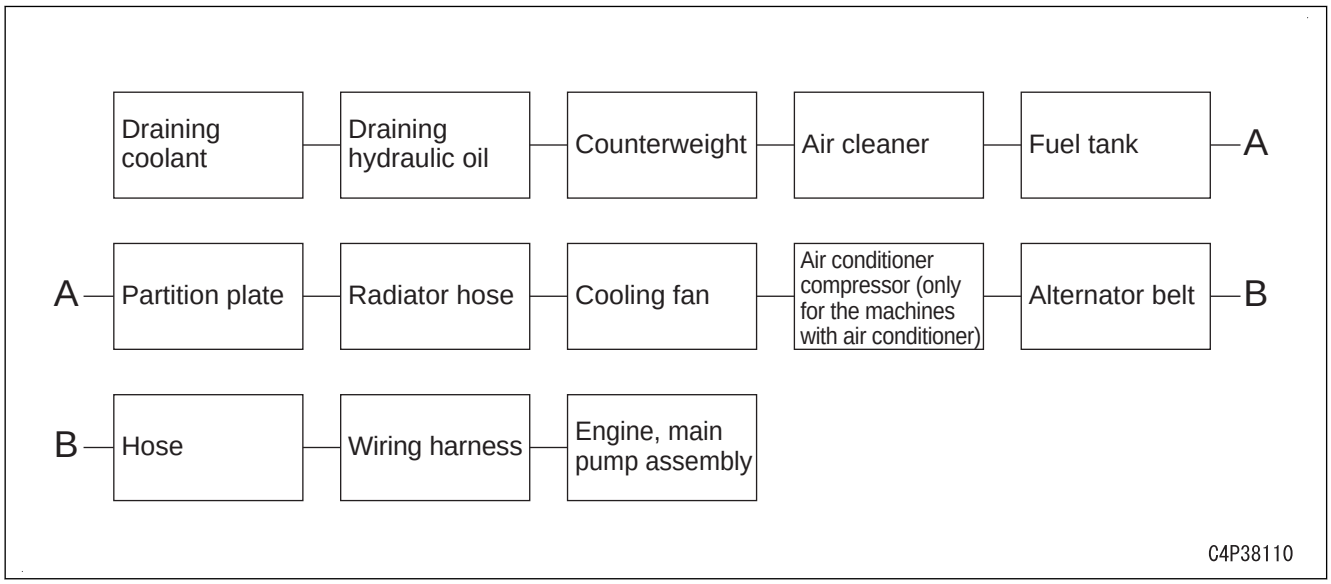
Tools to be used when removing and installing the floor frame assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	Commercially available	Lifting tool	■	1			• Removal and installation of canopy assembly • Removal and installation of floor frame assembly

Tools to be used when removing and installing the operator's cab glass (adhered glass)

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	793-498-1210	Lifter (suction cup)	■	2			Removal and installation of operator's cab glass (adhered glass)
B	Commercially available	Seal cutter	■	1			
C	Commercially available	Extra fine wire (piano wire, etc)	■	1			
D	Commercially available	Pliers	■	1			
E	Commercially available	Cutter knife	■	1			
F	Commercially available	Scraper	■	1			
G	Commercially available	Caulking gun	■	1			

REMOVE AND INSTALL ENGINE AND MAIN PUMP ASSEMBLY



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

⚠ Set the lock lever to LOCK position.

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

⚠ If you drain the radiator coolant when it is still hot, you may be scalded. Accordingly, wait for the coolant temperature to drop before draining.

⚠ Loosen the radiator cap slowly, and release the pressure inside the radiator.

⚠ Release the remaining pressure in the hydraulic system. For details, see TESTING AND ADJUSTING, "RELEASE REMAINING PRESSURE FROM HYDRAULIC SYSTEM".

⚠ Check that the system operating lamp is not lit. Then, disconnect the quick release battery terminal (-). (For details, see TESTING AND ADJUSTING, "HANDLE QUICK RELEASE BATTERY TERMINAL (-)".)

REMARK

- Check the connector numbers and installed positions before disconnecting wirings and hoses, and record them.
- When disconnecting the wirings and hoses, take extreme care not to damage or deform the wirings and hoses.

METHOD FOR REMOVING ENGINE AND MAIN PUMP ASSEMBLY

Draining coolant

1. Open the cover (1a), and fix it by using the lock bar (1b).

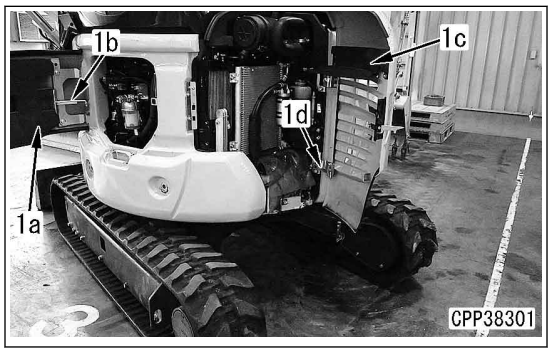
   REMARK

   - Swing the machine so that the coolant drain hose outlet and the hydraulic tank drain valve come to the area between the track shoes.
   - Check that the lock bar (1b) is securely fixed.

2. Open the cover (1c), and fix it by using the lock bar (1d).

   REMARK

   Check that the lock bar (1d) is securely fixed.



 Radiator:

3.3 ℓ

Refilling with hydraulic oil

44. Refill the hydraulic tank with Komatsu genuine oil to the specified level through the oil filler port. Start the engine to circulate the oil through the piping, and check the oil level again.

 Hydraulic tank:

20 ℓ

Air bleeding

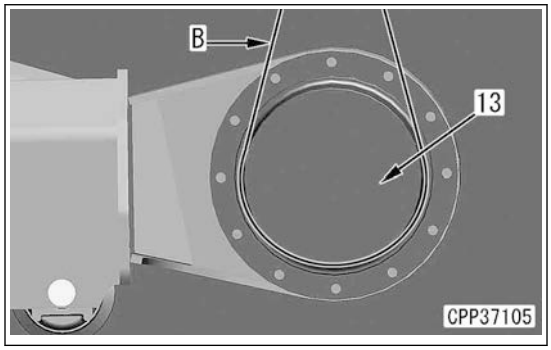
45. Bleed air from the hydraulic circuit by referring to TESTING AND ADJUSTING, “BLEED AIR FROM HYDRAULIC CIRCUIT”.

METHOD FOR INSTALLING TRAVEL MOTOR AND FINAL DRIVE ASSEMBLY

Travel motor, final drive assembly

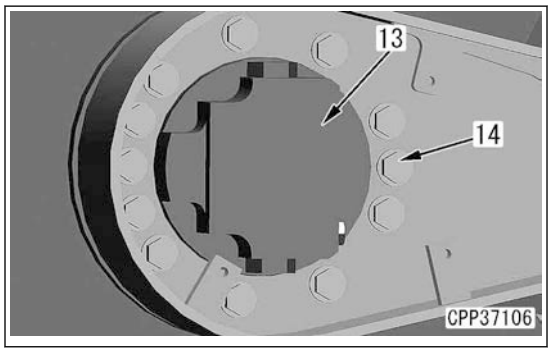
1. By using the lifting tool (B), sling the travel motor, final drive assembly (13), and set them on the machine.

   Travel motor, final drive assembly (13):
   36 kg



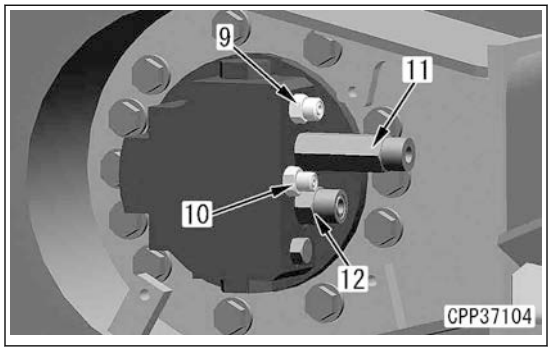
2. Install the travel motor, final drive assembly (13) with the bolts (14) (12 pieces).

   Bolt (14):
   98 to 123 Nm {10 to 12.5 kgfm}

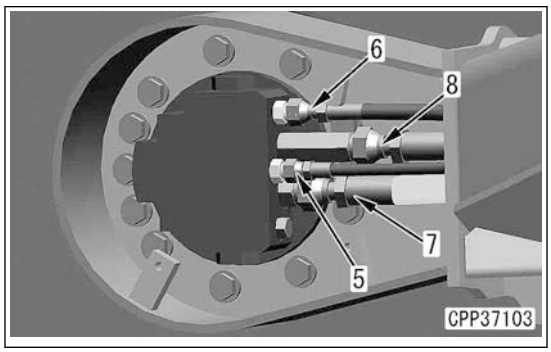


Hose

3. Install the adapters (12), (11), (10), and (9).

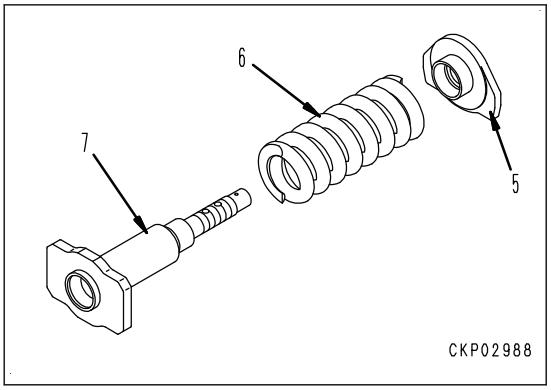


4. Connect the hoses (8), (7), (6), and (5).



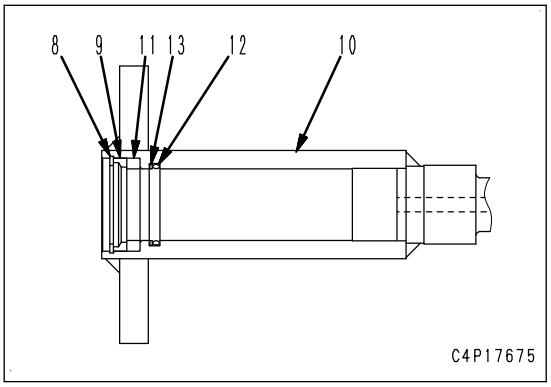
5. Release oil pressure slowly to extend the spring, and remove the stopper (5) and spring (6) from the cylinder assembly (7).

   Free length of spring: 257 mm



Cylinder

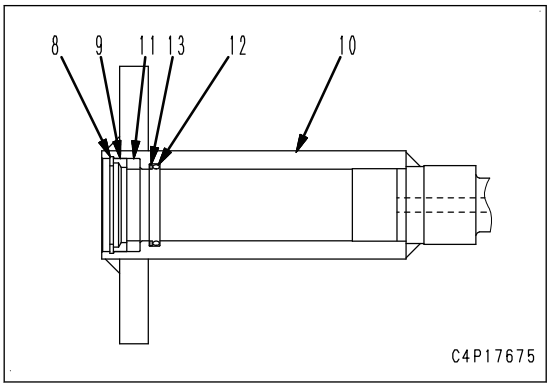
6. Remove the snap ring (8), and remove the spacer (9) from the cylinder (10).
7. Remove the dust seal (11).
8. Remove O-ring (12) and backup ring (13).



METHOD FOR ASSEMNLING RECOIL SPRING ASSEMBLY

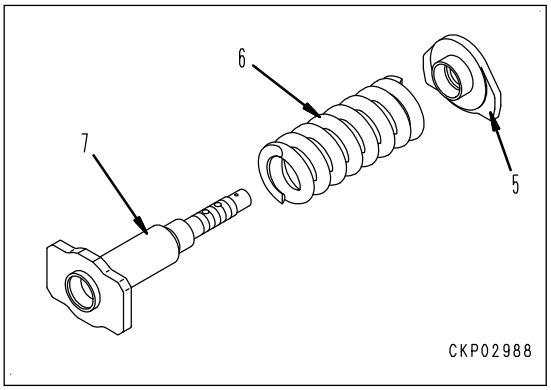
Cylinder

1. Install O-ring (12) and backup ring (13) to the cylinder (10).
2. Install the dust seal (11).
3. Install the spacer (9), and fix it with the snap ring (8).



Recoil spring

4. Assemble the cylinder assembly (7), spring (6), and stopper (5).

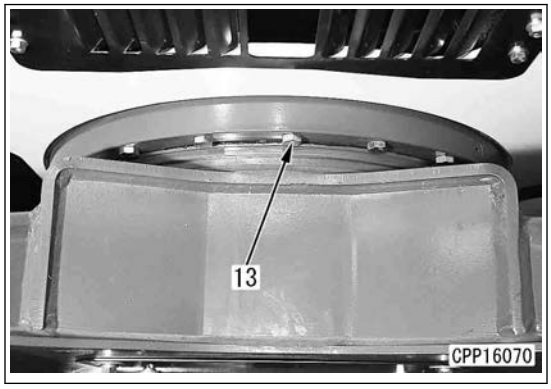


Revolving frame assembly

5. Sling the revolving frame assembly, hold it, and remove the bolts (13) (16 pieces).

   REMARK

   Leave the bolts (13) (approximately 2 pieces on the front and rear sides) installed.



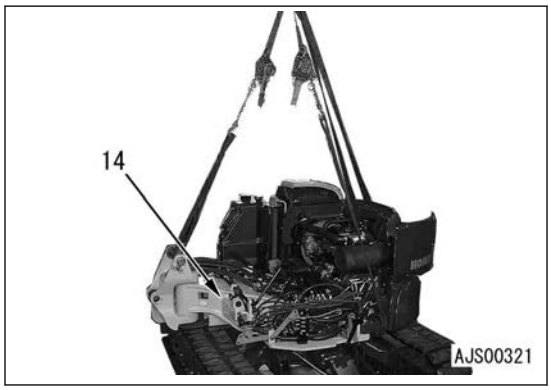
6. Remove the remaining bolts (13), sling the revolving frame assembly (14), and remove it.

   REMARK

   - Remove the remaining bolts (13) while vertically and horizontally balancing the assembly by using the lever block, etc.
   - Check that all the pipes are removed, and remove the center swivel joint while taking care not to damage it.

   Revolving frame assembly (14) (PC30MR-5):
   1300 kg

   Revolving frame assembly (14) (PC35MR-5):
   1550 kg



METHOD FOR INSTALLING REVOLVING FRAME ASSEMBLY

Revolving frame assembly

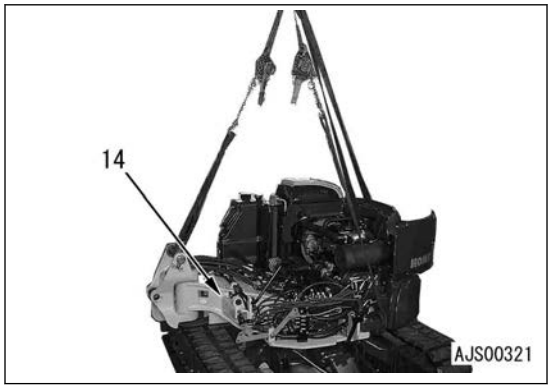
1. Sling the revolving frame assembly (14), and set it on the machine.

   REMARK

   Be careful not to damage the center swivel joint when installing it.

   Revolving frame assembly (14) (PC30MR-5):
   1300 kg

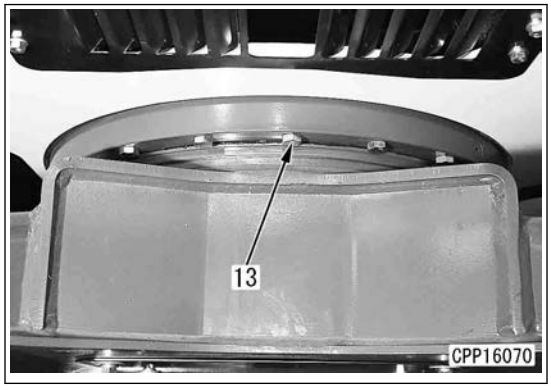
   Revolving frame assembly (14) (PC35MR-5):
   1550 kg



2. Sling the revolving frame assembly, hold it, and install the bolt (13).

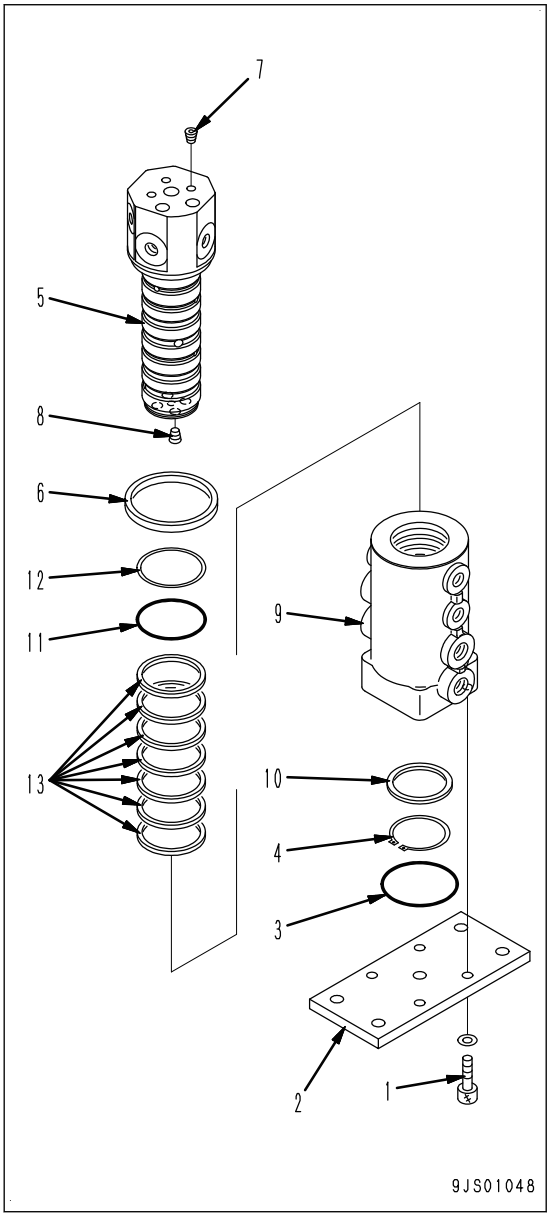
   Revolving frame assembly mounting bolt (13):
   Liquid adhesive (LT-2)

   Revolving frame assembly mounting bolt (13):
   117.6 to 137.2 Nm {12 to 14 kgfm}



METHOD FOR ASSEMBLING CENTER SWIVEL JOINT ASSEMBLY

Center swivel joint assembly



1. Install O-ring (11), backup ring (12), and packings (13) (7 pieces) to the rotor (9).
2. Install the dust seal (6) to the swivel shaft (5).

   Dust seal lip part:
   Grease (G2-LI)
3. Install the plugs (7) (3 pieces) and plugs (8) (4 pieces) to the swivel shaft (5).

   REMARK

   - Completely clean, degrease and dry the threaded portion.
   - After installing, check that the plug end surface is lower than the shaft end surface.

   Plug (7):
   16.7±2.9 Nm {1.7±0.3 kgfm}

   Plug (8):
   33.3±3.9 Nm {3.4±0.4 kgfm}
4. Set the swivel shaft (5) on the block, install the rotor (9) by tapping it lightly by using a plastic hammer, etc. and push tool.

   REMARK

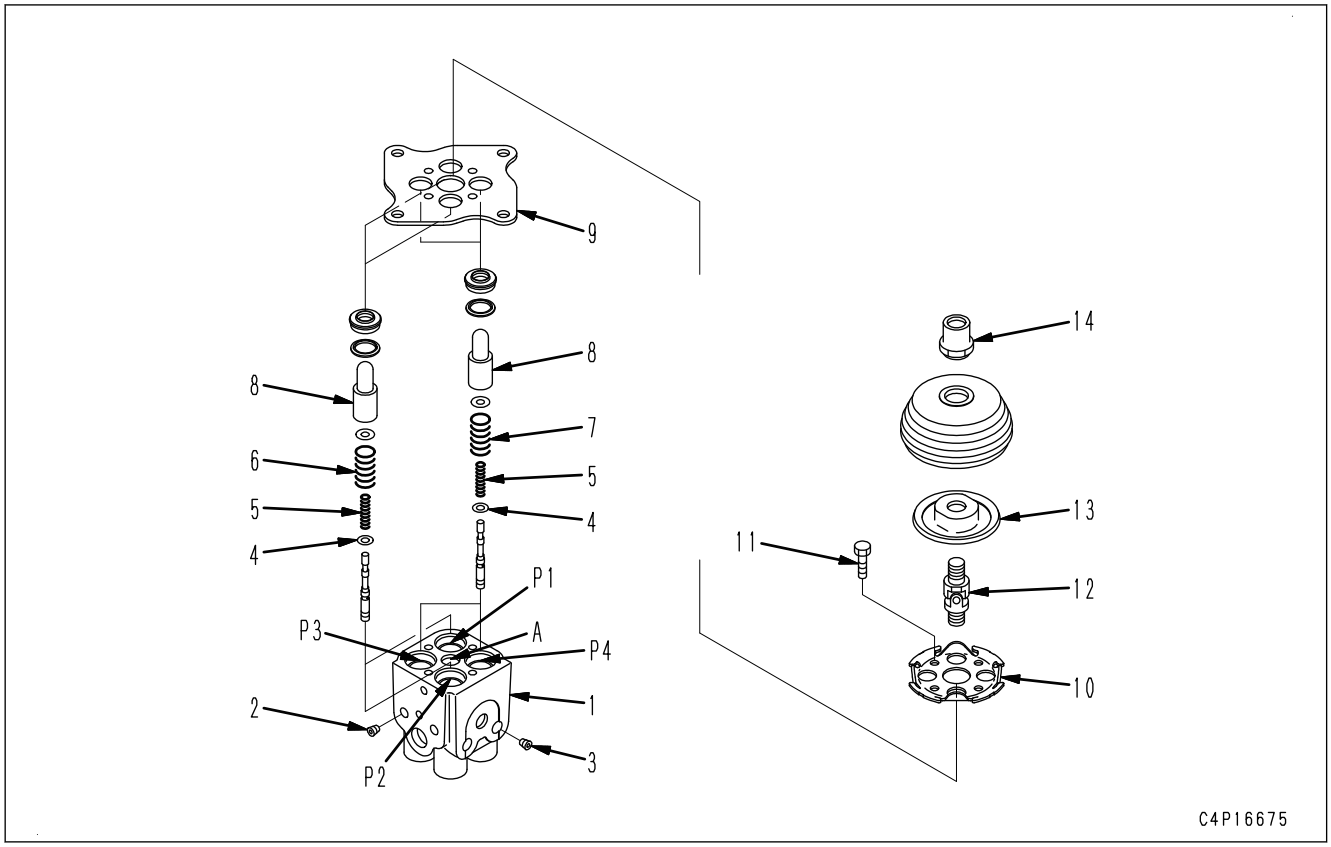
   Take extreme care not to damage the packing and O-ring.

   Contact surfaces of the rotor and swivel shaft:
   Grease (G2-LI)
5. Install the ring (10), snap ring (4), and O-ring (3).
6. Install the plate (2) with the bolt (1).

   Bolt (1):
   66±7 Nm {6.7±0.7 kgfm}

DISASSEMBLE AND ASSEMBLE WORK EQUIPMENT PPC VALVE ASSEMBLY

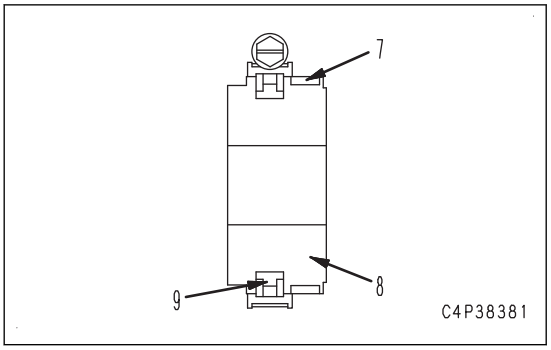
METHOD FOR DISASSEMBLING WORK EQUIPMENT PPC VALVE ASSEMBLY



Only precautions for disassembling the work equipment PPC valve assembly are explained below.

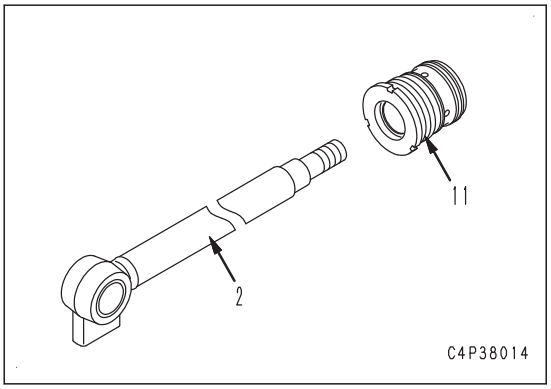
2 each of 2 different types of springs with different load at installed height are installed to springs (6) and (7). Check the installing position (hydraulic port) to prevent any wrong installation.

9. Remove the wear ring (7) from the piston (8).
10. Remove the piston ring (9) from the piston (8).



Cylinder head assembly

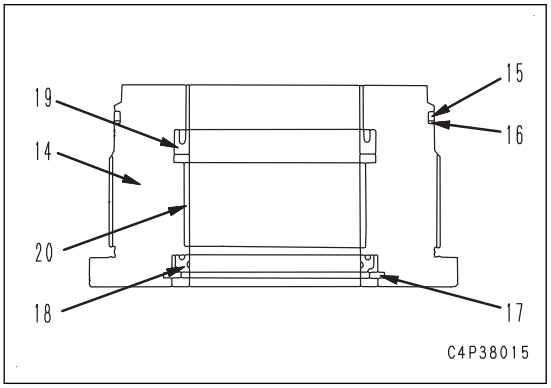
11. Remove the cylinder head assembly (11) from the piston rod assembly (2).



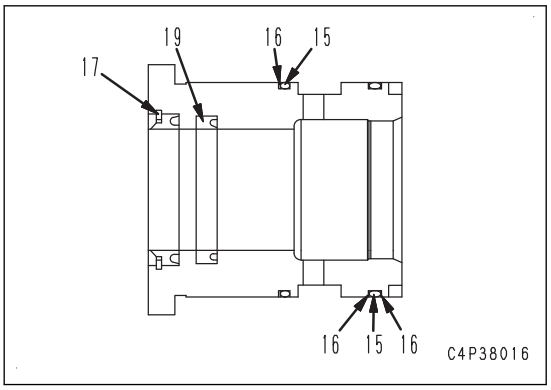
12. Remove O-ring (15) and backup ring (16).

    REMARK

    The boom cylinder has O-rings (15) (2 pieces) and backup rings (16) (3 pieces).
13. Remove the rod packing (19).
14. Remove the snap ring (17).
15. Remove the dust seal (18).

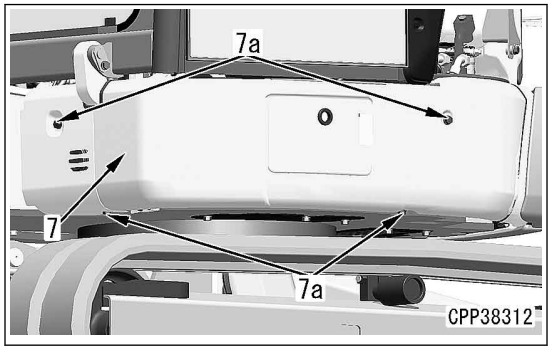


16. Remove the bushing (20) from the cylinder head (14). (Excluding boom cylinder)
    - The following drawing shows the boom cylinder.

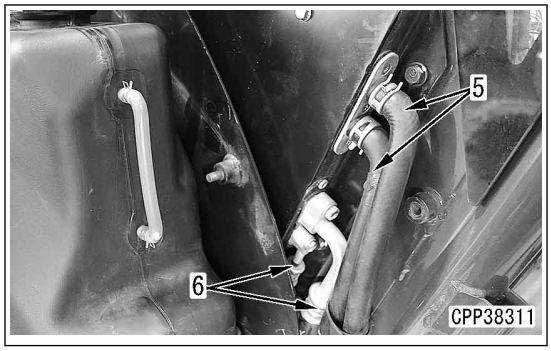


Cover

18. Install the cover (7) with the bolts (7a) (4 pieces).

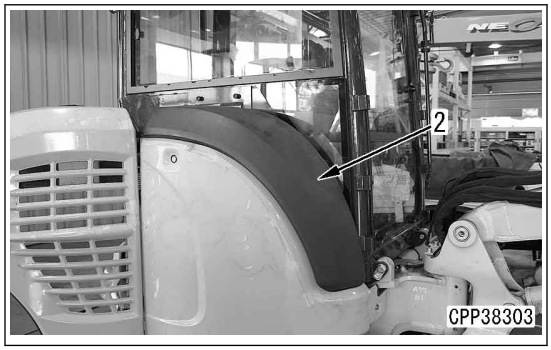


19. Connect the heater hoses (5) (2 pieces) and air conditioner hoses (6) (2 pieces).

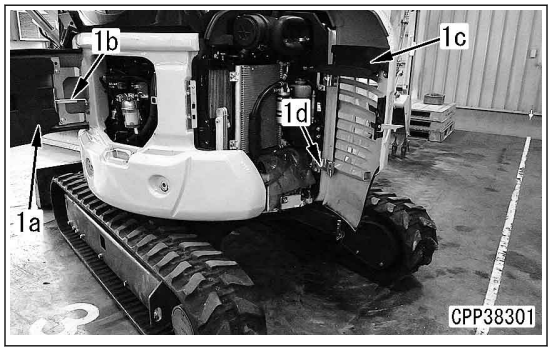


20. Install the cover (2) with the bolts (4) (2 pieces).
21. Install the pin (3), and install the stopper pin (3a).

22. Close the cover (2).

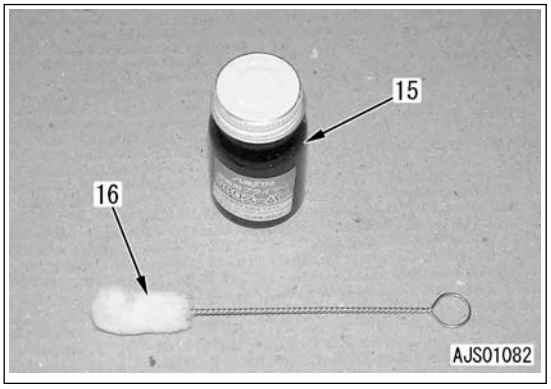


23. Unlock the lock bar (1d), and close the cover (1c).
24. Unlock the lock bar (1b), and close the cover (1a).



Application of primer

3. Apply primer (15).



NOTICE

- **Never apply the incorrect primer since the primer significantly affects the adhesion strength. If the incorrect primer is applied, completely wipe it off by the cleaning solvent.**
- **Do not use the primer if it expires the date of 4 months from its production.**
- **Make sure to use the primer within 2 hours after opening the cap.**
- **Even when it is plugged again immediately after opening, be sure to use it within 24 hours after opening. (The primer must be disposed 24 hours after it has been opened.)**

1) Stir both primers for paint surface and for glass thoroughly before use.

REMARK

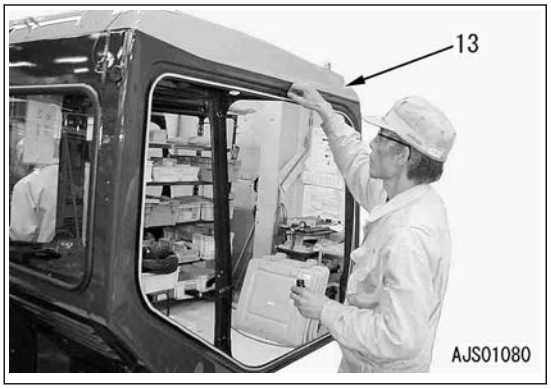
If the primer has been refrigerated, leave it in a room temperature for a half day or more, and stir it. (If it is opened soon after having been refrigerated, condensation formed. Allow enough time for the primer to become the room temperature.)

2) When reusing a brush (16) for applying the primer, clean it with white gasoline before use.

REMARK

- Check again that the brush is free from stains or fouling after cleaning.
- 2 brushes must be prepared separately, one for the primer for paint surface and another for glass.

3) Apply primer for paint surface evenly to the mounting part of the dam rubber (10) of operator's cab (13) and the place outside which adhesive is applied to.



NOTICE

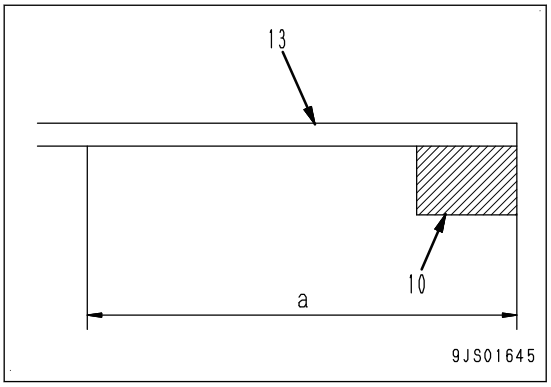
- **Limit the application of the primer to 2 times. (Application beyond 2 times causes degradation.)**
- **After applying the primer, leave it for at least 5 minutes (maximum 8 hours) for air drying.**

Primer for paint surface:
SUNSTAR Paint Surface Primer 580 SUPER

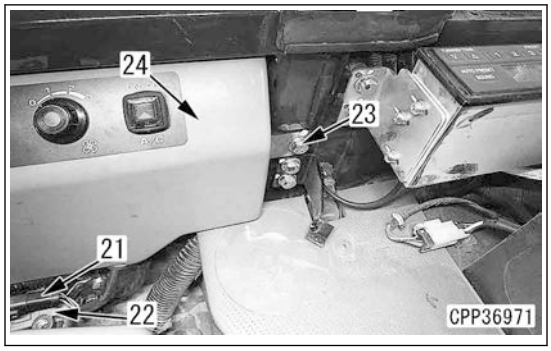
REMARK

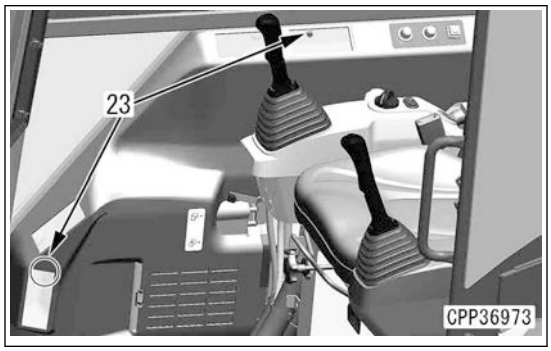
Area to be coated: Entire area of dimension (a).

Primer application dimension (a): 25 mm

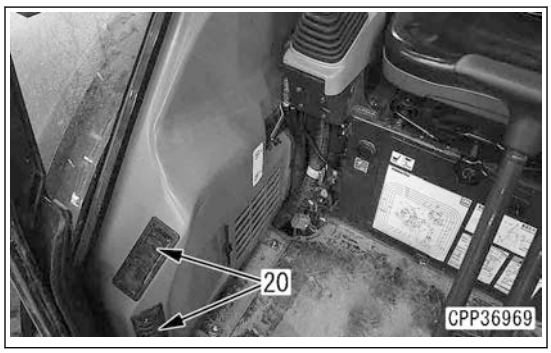


5. Install the cover (24) with the mounting bolts (23) (5 pieces).
6. Connect the connectors (21) and (22).





7. Install the vents (20) (3 pieces).



REMOVE AND INSTALL KOMTRAX TERMINAL ASSEMBLY

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

⚠ **Set the lock lever to LOCK position.**

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

⚠ **Check that the system operating lamp is not lit. Then, disconnect the quick release battery terminal (-). (For details, see TESTING AND ADJUSTING, "HANDLE QUICK RELEASE BATTERY TERMINAL (-)".)**

REMARK

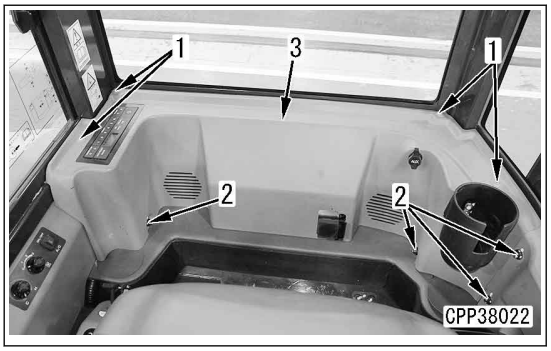
- Check the connector numbers and installed positions before disconnecting wirings and hoses, and write them down.
- When disconnecting the wirings and hoses, take extreme care not to damage or deform the wirings and hoses.

METHOD FOR REMOVING KOMTRAX TERMINAL ASSEMBLY

Cover

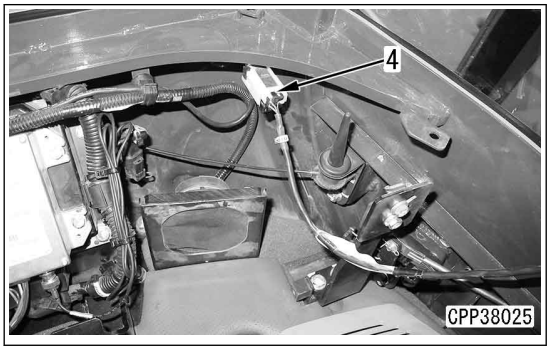
1. For the operator's cab specifications, remove the rivets (1) (4 pieces) and hexagonal socket head bolts (2) (4 pieces), and remove the cover (3).

   (Operator's cab specifications)



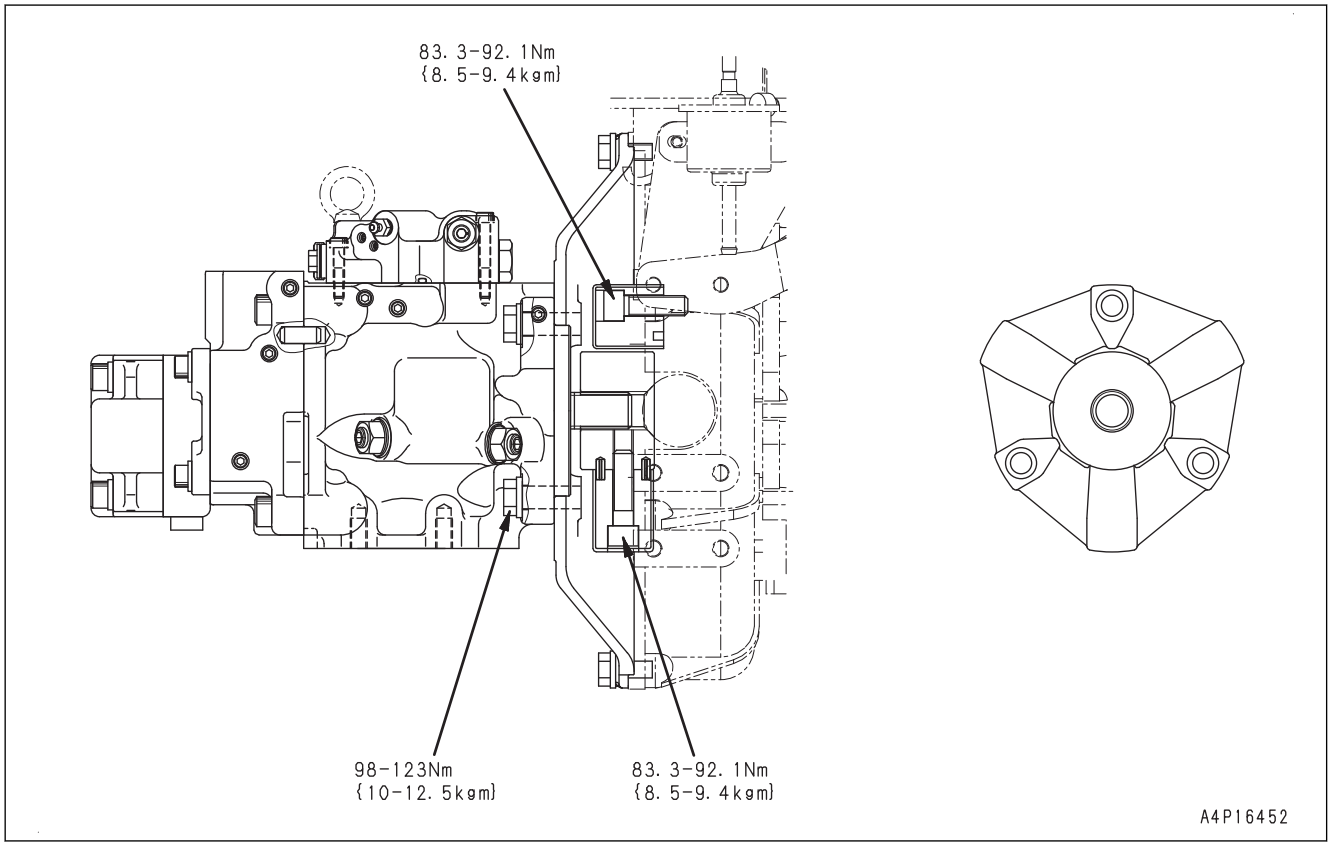
   REMARK

   For the operator's cab specifications, disconnect the connector M01B (4) on the back side of the cover (3).

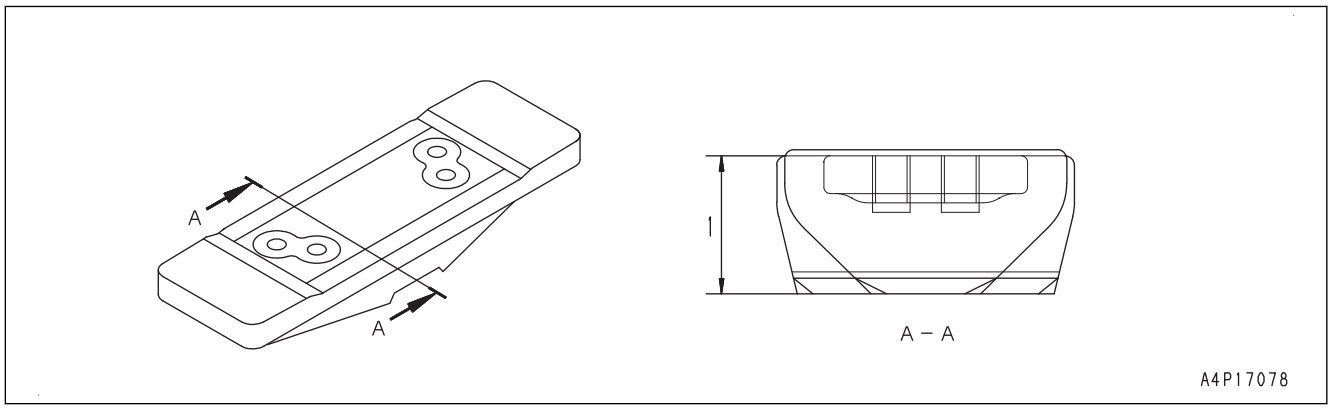


ENGINE AND COOLING SYSTEM

MAINTENANCE STANDARD FOR PTO



MAINTENANCE STANDARD OF ROAD LINER



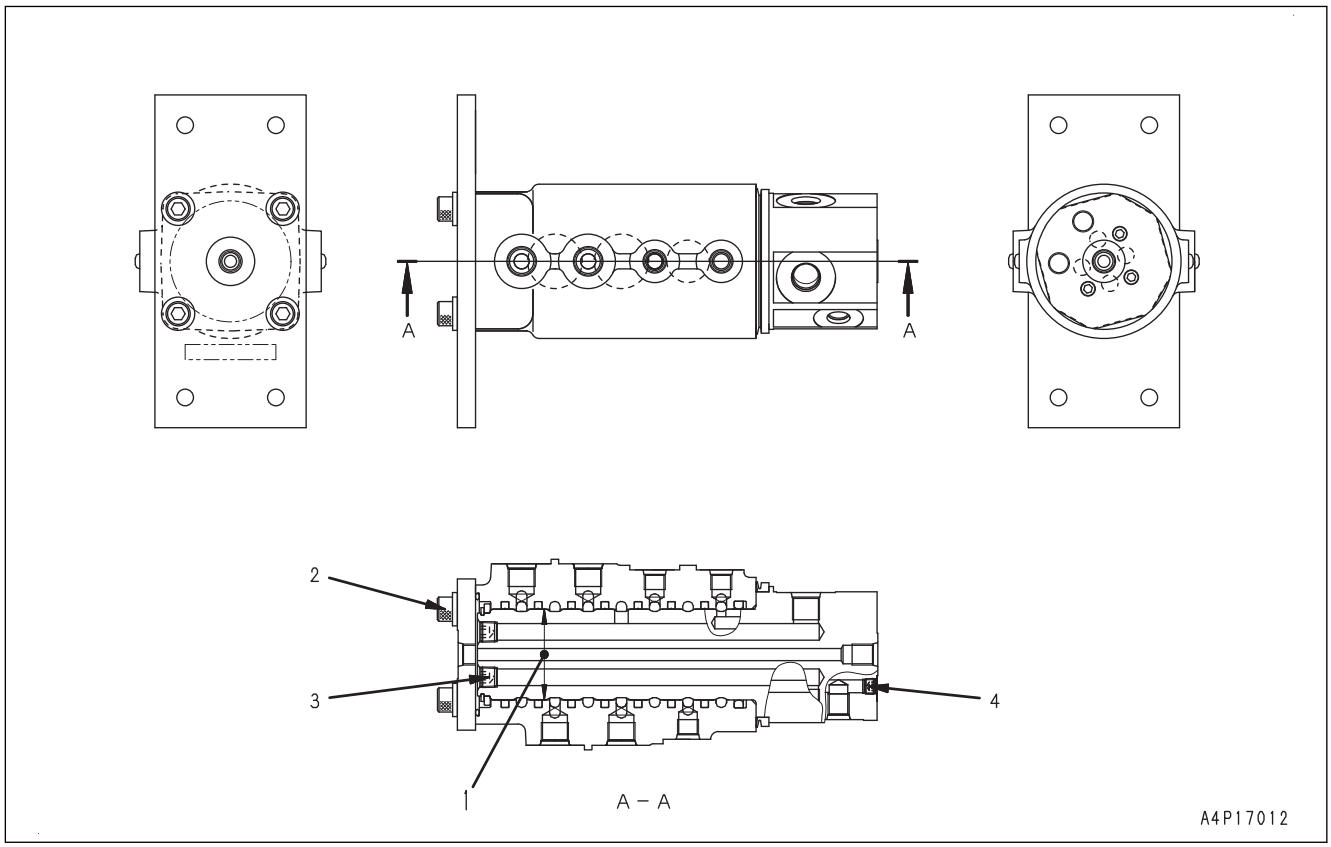
Unit: mm

No.	Item	Judgment criteria		Remedy
1	Grouser height	Standard dimensions	Repair limit	Replace
		44	20	

Unit: mm

No.	Item	Judgment criteria					Remedy
1	Tightening torque of plug	65.7 to 82.3 Nm {6.7 to 8.4 kgfm}					Retighten
2	Tightening torque of relief valve	49 to 58.8 Nm {5 to 6 kgfm}					
3	Tightening torque of plug	19.6 to 24.5 Nm {2 to 2.5 kgfm}					
4	Tightening torque of unload valve	34.3 to 44.1 Nm {3.5 to 4.5 kgfm}					
5	Tightening torque of relief valve	14.7 to 19.6 Nm {1.5 to 2.0 kgfm}					
6	Tightening torque of spool and plug	14.7 to 19.6 Nm {1.5 to 2.0 kgfm}					
7	Tightening torque of plug	15.7 to 20.6 Nm {1.6 to 2.1 kgfm}					
8	Check valve spring	Standard dimensions			Repair limit		Replace (Replace spring if damaged or deformed as well)
		Free height x outside diameter	Installed height	Load at installed height	Free height	Load at installed height	
		28.5 x 5.4	25	1.96 N {0.2 kgf}	-	1.57 N {0.16 kgf}	
9	Check valve spring (boom)	16.4 x 7.5	9.9	2.25 N {0.23 kgf}	-	1.80 N {0.18 kgf}	
10	Check valve spring	21.9 x 5	15.8	1.96 N {0.2 kgf}	-	1.57 N {0.16 kgf}	
11	Logic valve spring	10.98 x 6.2	9.5	5.49 N {0.56 kgf}	-	4.41 N {0.45 kgf}	

MAINTENANCE STANDARD OF CENTER SWIVEL JOINT



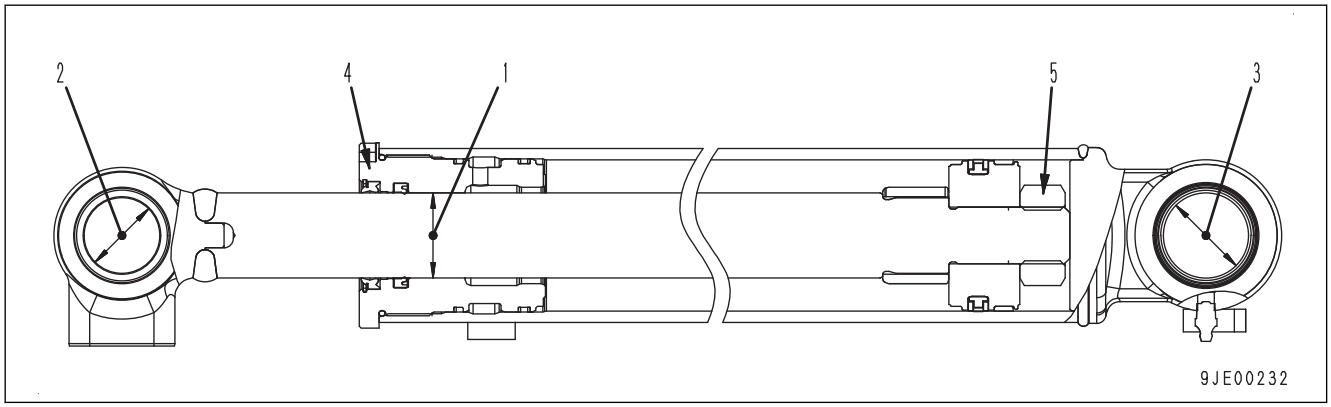
Unit: mm

No.	Item	Judgment criteria			Remedy
1	Clearance between rotor and shaft	Standard dimensions	Standard clearance	Allowable clearance	Replace
		60	0.055 to 0.085	0.090	
2	Tightening torque of bolt	66±7 Nm {6.7±0.7 kgfm}			Retighten
3	Tightening torque of plug	33.3±3.9 Nm {3.4±0.4 kgfm}			
4	Tightening torque of plug	16.7±2.9 Nm {1.7±0.3 kgfm}			

MAINTENANCE STANDARD OF BOOM CYLINDER

REMARK

The figure shows PC35MR-5.



PC30MR-5

Unit: mm

No.	Item	Judgment criteria					Remedy
		Standard dimensions	Tolerance		Standard clearance	Allowable clearance	
			Shaft	Hole			
1	Clearance between piston rod and bushing	45	-0.025 -0.087	+0.039 0	0.025 to 0.126	0.426	Replace the cylinder head
2	Clearance between piston rod support shaft and bushing	40	-0.025 -0.064	+0.142 +0.080	0.105 to 0.206	1.0	Replace pin and bushing
3	Clearance between cylinder bottom support shaft and bushing	45	-0.025 -0.064	+0.142 +0.080	0.105 to 0.206	1.0	
4	Tightening torque of cylinder head	588±59 Nm {60±6.0 kgfm}					Retighten
5	Tightening torque of cylinder piston nut	912±91.0 Nm {93±9.3 kgfm} (Width across flats: 46 mm)					

PC35MR-5

Unit: mm

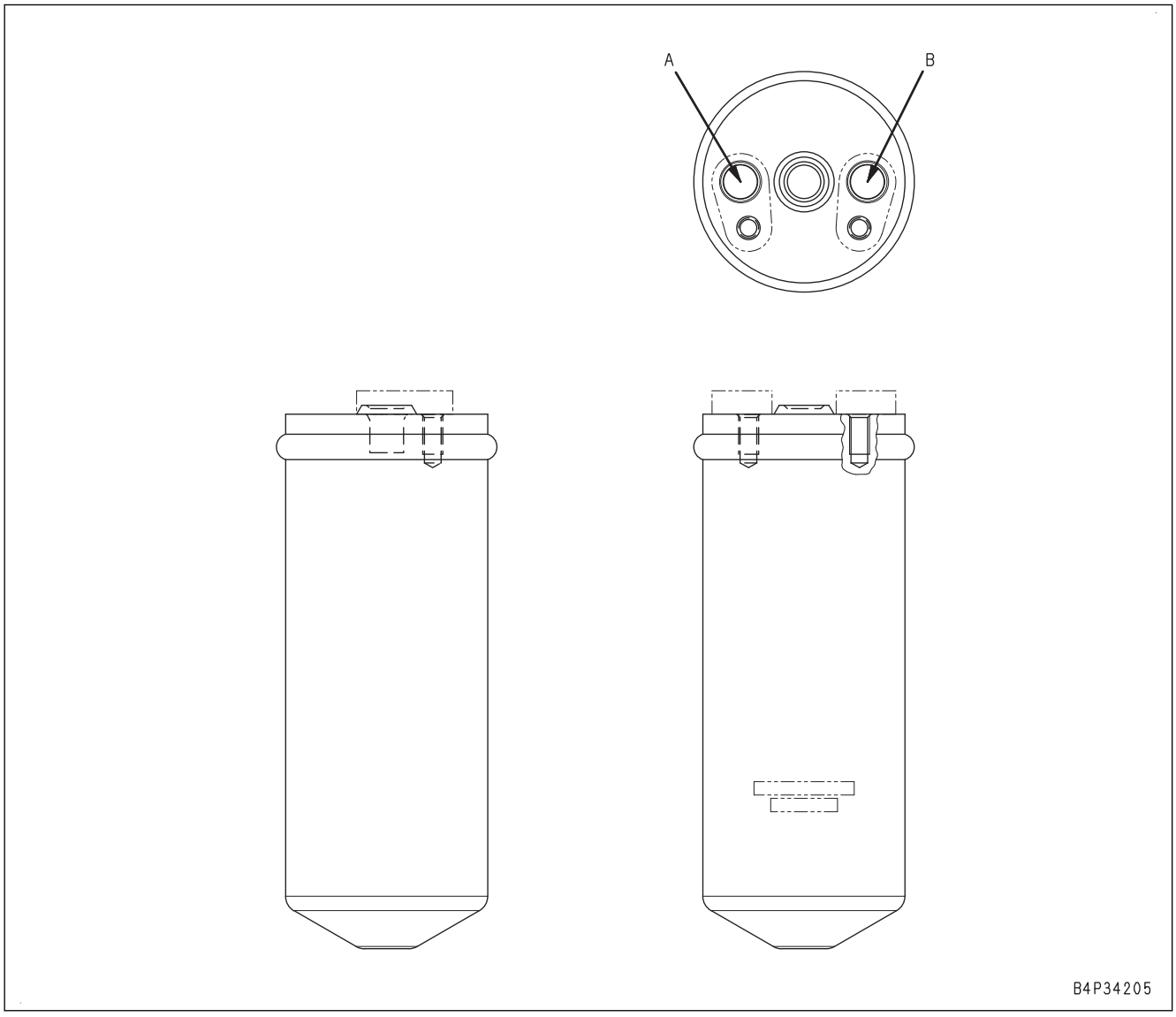
No.	Item	Judgment criteria					Remedy
		Standard dimensions	Tolerance		Standard clearance	Allowable clearance	
			Shaft	Hole			
1	Clearance between piston rod and bushing	45	-0.025 -0.064	+0.039 0	0.025 to 0.103	0.403	Replace the cylinder head
2	Clearance between piston rod support shaft and bushing	40	-0.025 -0.064	+0.142 +0.080	0.105 to 0.206	1.0	Replace pin and bushing
3	Clearance between cylinder bottom support shaft and bushing	45	-0.025 -0.064	+0.142 +0.080	0.105 to 0.206	1.0	

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
MMS	Multimedia Messaging Service	Communication	This is a service that allows transmission and reception of short messages consisting of characters or voice or images between cell phones.
NC	Normally Closed	Electrical system, hydraulic system	This is a characteristic of electrical or hydraulic circuits. Circuit is normally closed if it is not actuated, and it opens when it is actuated.
NO	Normally Open	Electrical system, hydraulic system	This is a characteristic of electrical or hydraulic circuits. Circuit is normally open if it is not actuated, and it closes when it is actuated.
OLSS	Open-center Load Sensing System	Hydraulic system	This is a hydraulic system that can operate multiple actuators at the same time regardless of the load.
PC	Pressure Compensation	Hydraulic system	This is a function that corrects the oil pressure.
PCCS	Palm command control system	Steering (D Series)	This is a function that electrically controls the engine and transmission in an optimal way with the controller instantly analyzing data from levers, pedals, and dials.
PCV	Pre-stroke Control Valve	Engine	This is a valve that adjusts the fuel intake amount at the pump inlet in order to control fuel discharged volume of supply pump.
PPC	Proportional Pressure Control	Hydraulic system	This is a system that operates actuators in proportion to the oil pressure.
PPM	Piston Pump and Motor	Hydraulic system (D, PC, etc)	Piston type hydraulic pump and motor.
PTO	Power Take Off	Power train system	Power take-off mechanism
PTP	Power Tilt and power Pitch dozer	Work equipment (D Series)	This is a function that performs hydraulic control of the tilt and pitch of the dozer blade of the bulldozer.
ROPS	Roll-Over Protective Structure	Cab and canopy	ROPS is a protective structure that intended to protect the operator wearing seat belt from suffering injury which may be caused if the cab is crushed when the machine rolls over. (Roll-over protective structure) This performance is standardized as ISO 3471 or ISO 12117-2.
SCR	Selective Catalytic Reduction	Urea SCR system	This is an exhaust gas purifier using urea water that converts nitrogen oxides (NOx) into harmless nitrogen and water by oxidation-reduction reaction. It may also be mentioned as exhaust gas purification catalyst or part of the name of related devices.
SI	Le Systeme International d' Unites (International unit system)	Unit	Abbreviation for “International System of Units” It is the universal unit system and “a single unit for a single quantity” is the basic principle applied.
SOL	Solenoid	Electrical system	This is an actuator that consists of a solenoid and an iron core that is operated by the magnetic force when the solenoid is energized.

RECEIVER DRIER

STRUCTURE OF RECEIVER DRIER

General view and sectional view



A: Refrigerant inlet (from condenser) B: Refrigerant outlet (to air conditioner unit)

SPECIFICATIONS OF RECEIVER DRIER

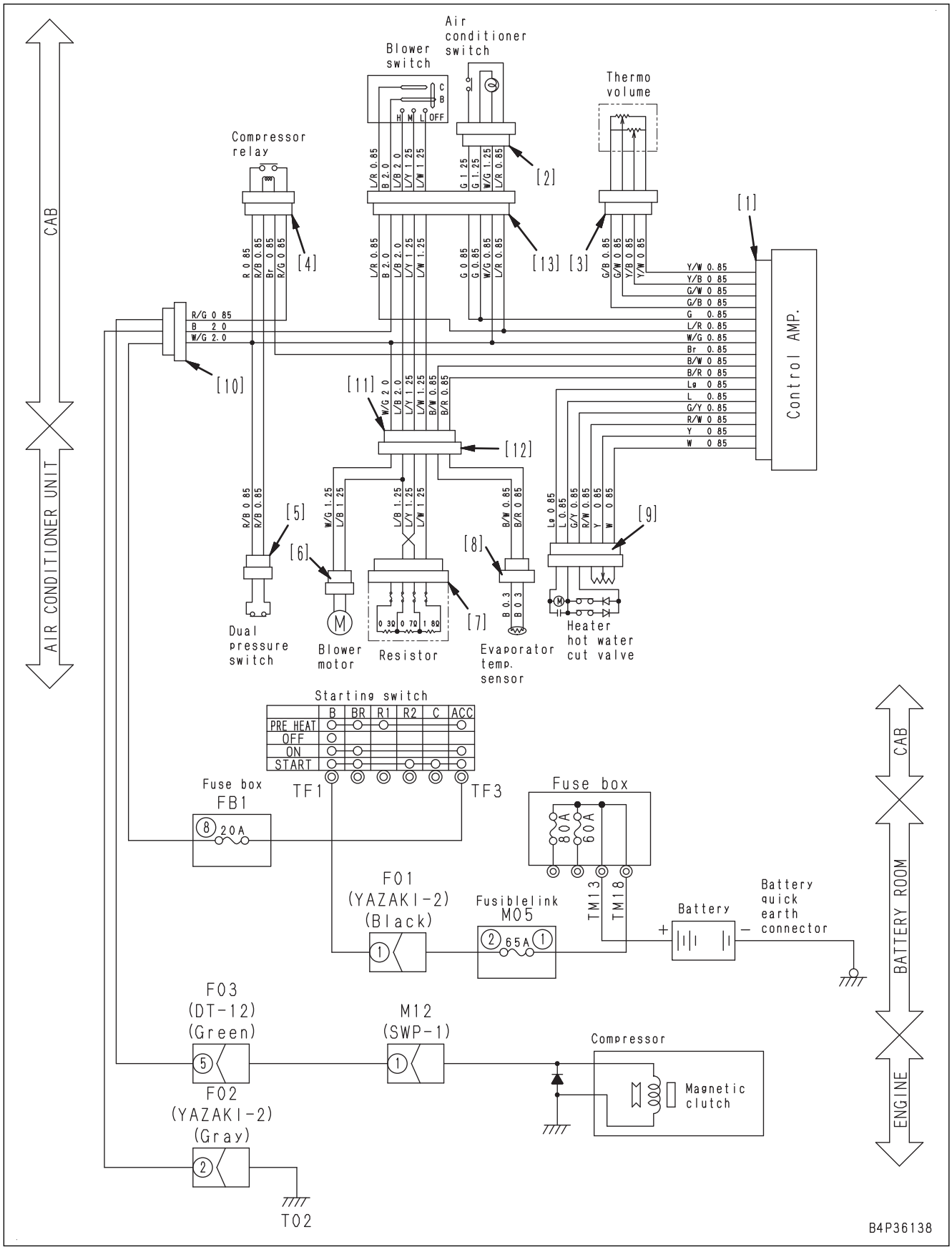
Effective capacity: : 240 cc

Weight of desiccating agent: : 100 g

FUNCTION OF RECEIVER DRIER

- The receiver drier temporarily stores the high pressure and high temperature liquid refrigerant from the condenser so that it can be supplied to the evaporator corresponding to the need of cooling.
- Even if bubbles are mixed in the refrigerant, depending on the heat radiation condition of the condenser, the refrigerant can be liquefied perfectly by sending out the accumulated refrigerant from the bottom to the evaporator.
- The built-in filter and desiccating agent remove foreign material in the circulation circuit and moisture contained in the refrigerant.

Circuit diagram related to compressor and refrigerant system



ABBREVIATION LIST

- This list of abbreviations includes the abbreviations used in the text of the shop manual for parts, components, and functions whose meaning is not immediately clear. The spelling is given in full with an outline of the meaning.
- Abbreviations that are used in general society may not be included.
- Special abbreviations which appear infrequently are noted in the text.
- This list of abbreviations consists of two parts. The first part is a list of the abbreviations used in the text of the manual, and the second part is a list of the abbreviations used in the circuit diagrams.

List of abbreviations used in the text

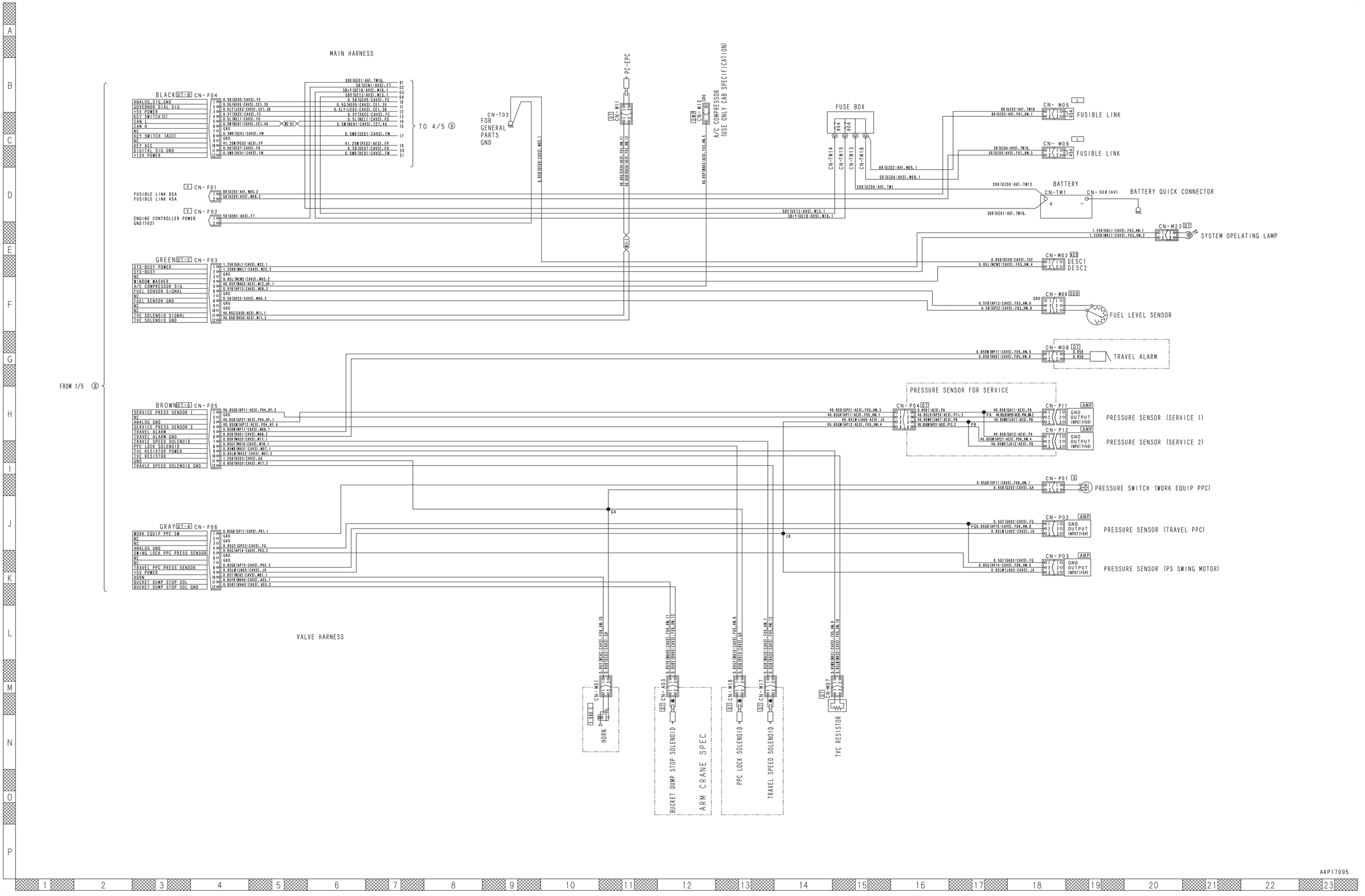
Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
ABS	Antilock Brake System	Travel and brake (HD, HM)	This is a function that releases the brake when the tires skid (tires are not rotated). This function applies the brake again when the tires rotate.
AISS	Automatic Idling Setting System	Engine	This is a function that automatically sets the idle speed.
AJSS	Advanced Joystick Steering System	Steering (WA)	This is a function that performs the steering operations with a lever instead of using a steering wheel. This function performs gear shifting and changing forward and reverse direction.
ARAC	Automatic Retarder Accelerator Control	Travel and brake (HD, HM)	This is a function that automatically operates the retarder with a constant braking force when letting go of the accelerator pedal on the downhill.
ARSC	Automatic Retarder Speed Control	Travel and brake (HD, HM)	This is a function that automatically operates the retarder to ensure that the machine speed does not accelerate above the speed set by the operator when letting go of the accelerator pedal on the downhill.
ASR	Automatic Spin Regulator	Travel and brake (HD, HM)	This is a function that drives both wheels automatically using the optimum braking force when the tire on one side spins on the soft ground surfaces.
ATT	Attachment	Work equipment	A function or component that can be added to the standard specification.
BCV	Brake cooling oil control valve	BRAKE (HD)	This is a valve that bypasses a part of the brake cooling oil to reduce the load applied to the hydraulic pump when the retarder is not being used.
CAN	Controller Area Network	Communication and electronic control	This is one of communication standards that are used in the network on the machine.
CDR	Crankcase Depression Regulator	Engine	This is a regulator valve that is installed to KCCV ventilator. It is written as CDR valve and is not used independently.
CLSS	Closed-center Load Sensing System	Hydraulic system	This is a system that can actuate multiple actuators simultaneously regardless of the load (provides better combined operation than OLSS).

ELECTRICAL CIRCUIT DIAGRAM (CANOPY SPEC) (SERIAL NUMBER: 50001 - 52907)(3/5)

PC30MR-5

REMARK

This figure includes the equipment and devices that are unavailable as optional items in some areas.

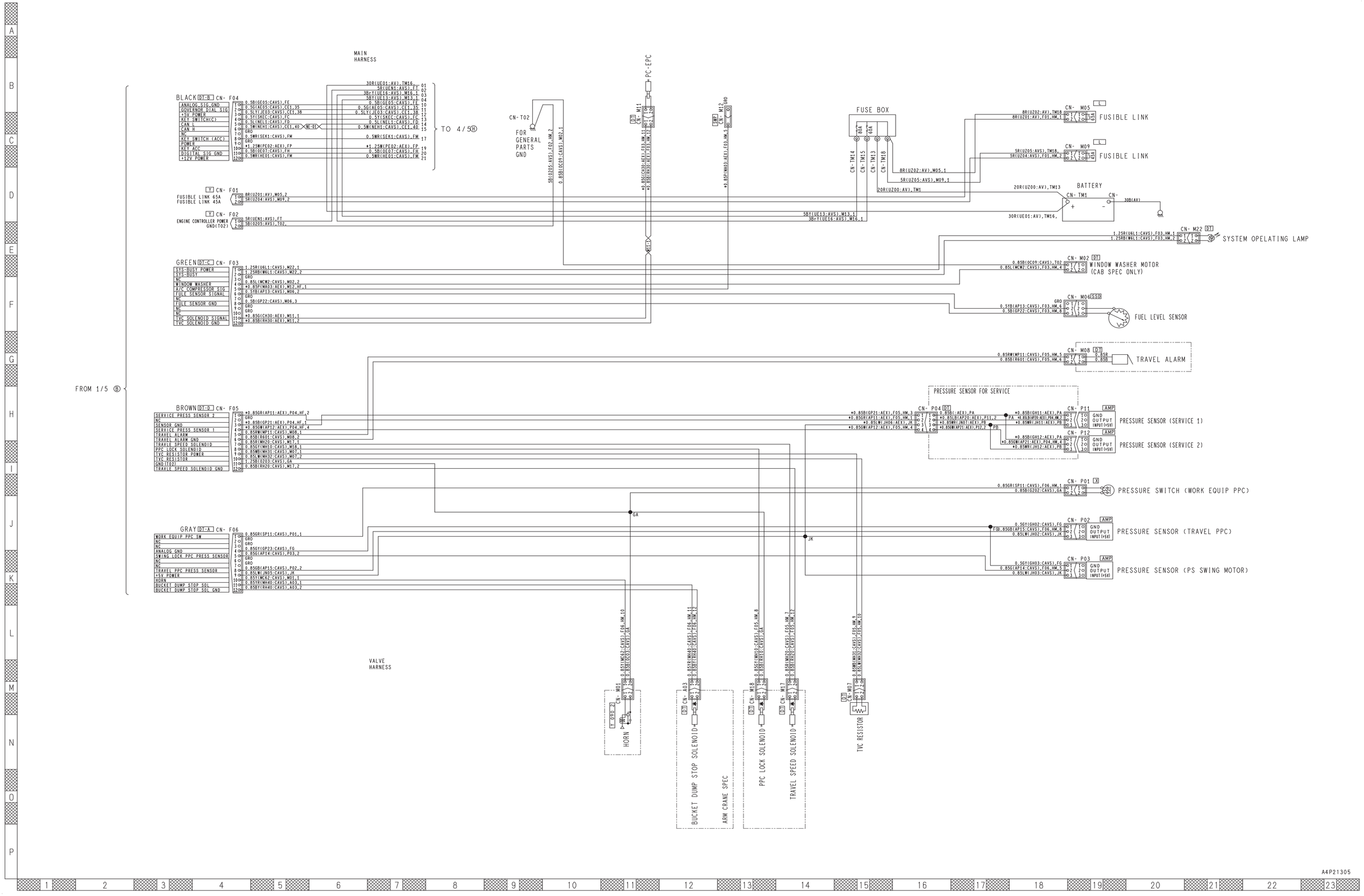


ELECTRICAL CIRCUIT DIAGRAM (CANOPY SPEC) (SERIAL NUMBER: 31038 AND UP)(3/5)

PC35MR-5

REMARK

This figure includes the equipment and devices that are unavailable as optional items in some areas.

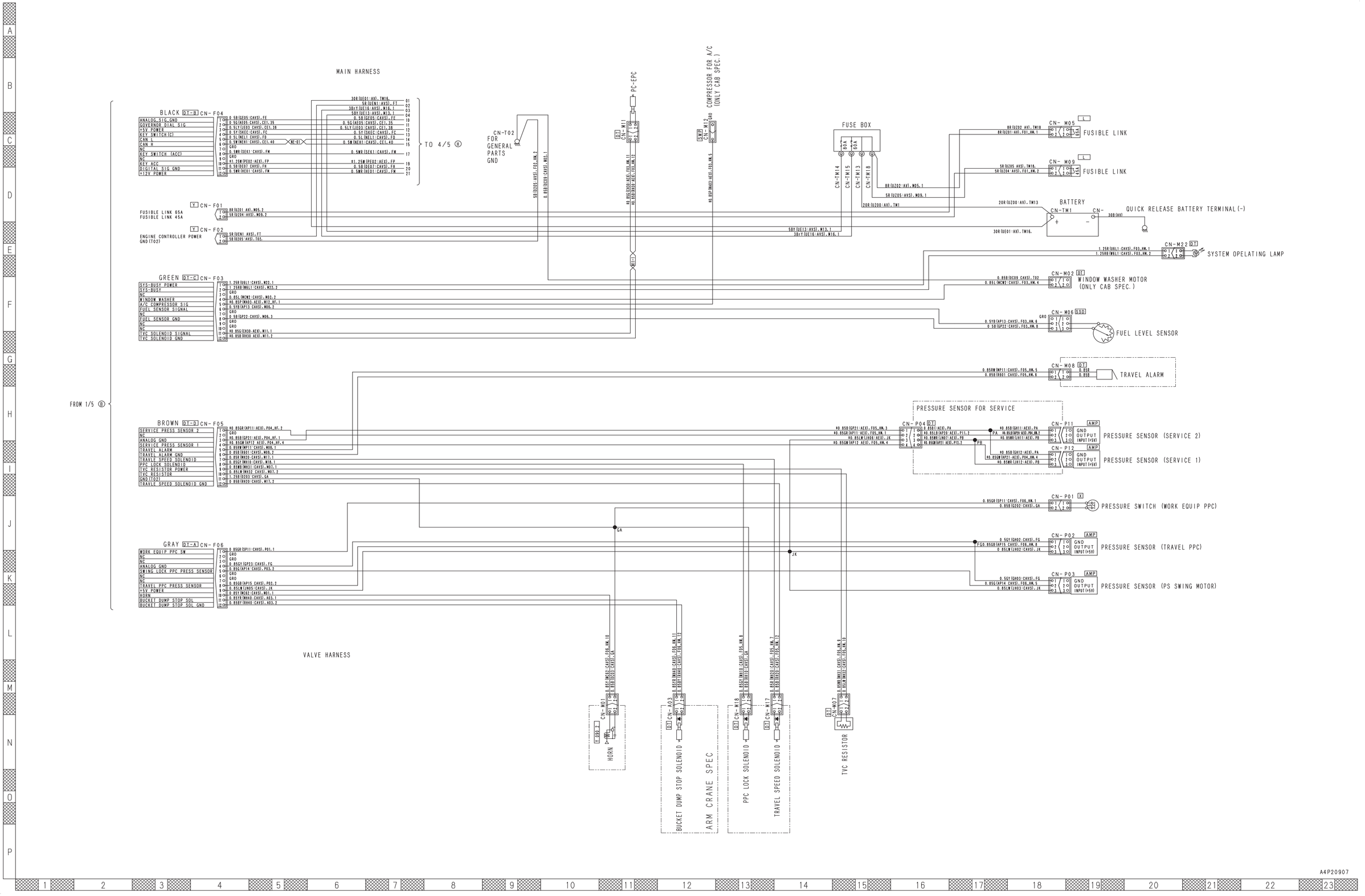


ELECTRICAL CIRCUIT DIAGRAM (FOR CANOPY SPEC MACHINE WITH QUICK COUPLER) (SERIAL NUMBER: 30001 - 30888)(3/5)

PC35MR-5

REMARK

This figure includes the equipment and devices that are unavailable as optional items in some areas.

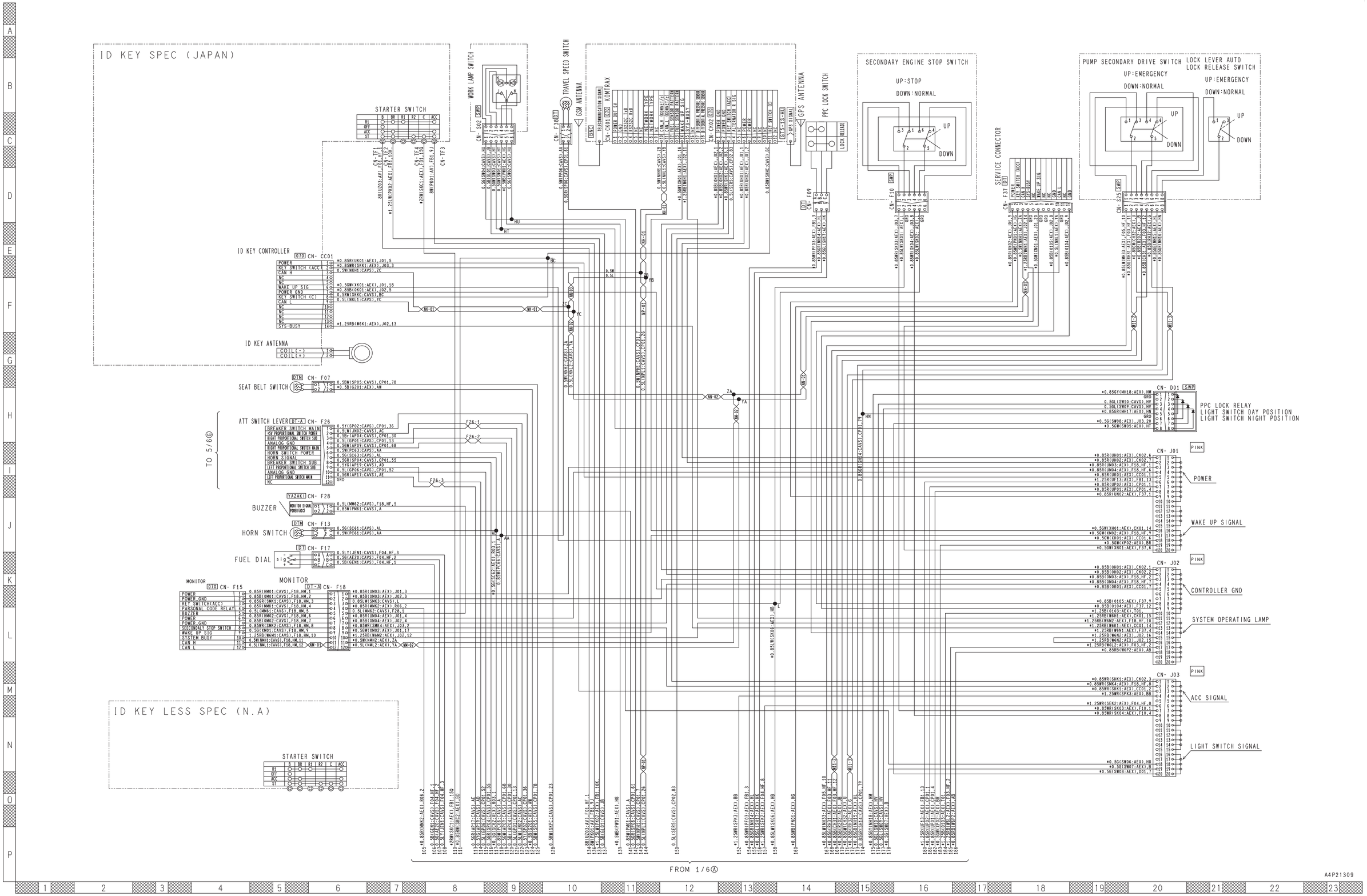


ELECTRICAL CIRCUIT DIAGRAM (CAB SPEC) (SERIAL NUMBER: 52849 AND UP)(2/6)

PC30MR-5

REMARK

This figure includes the equipment and devices that are unavailable as optional items in some areas.

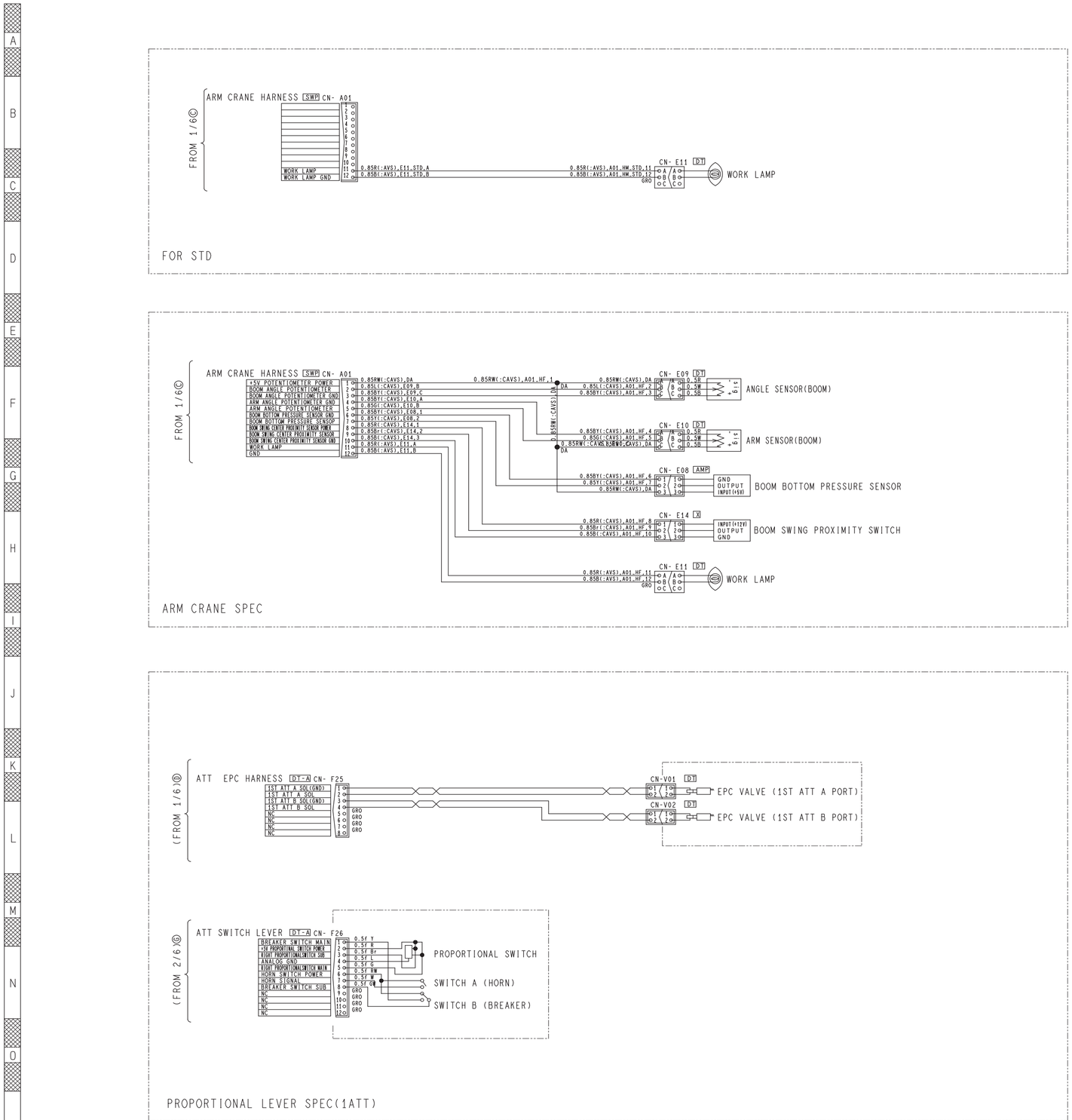


ELECTRICAL CIRCUIT DIAGRAM (CAB SPEC) (SERIAL NUMBER: 31024 AND UP)(5/6)

PC35MR-5

REMARK

This figure includes the equipment and devices that are unavailable as optional items in some areas.



A4P21312

ELECTRICAL CIRCUIT DIAGRAM (FOR CAB SPEC MACHINE WITH QUICK COUPLER) (SERIAL NUMBER: 30001 - 30888)(2/6)

PC35MR-5

REMARK

This figure includes the equipment and devices that are unavailable as optional items in some areas.