



70ZV

SHOP MANUAL

General Information
Function & Structure

93208-00133



93208-00133
December 2009

SHOP MANUAL

WHEEL LOADER

70ZV

**General Information
Standard Measurement Values for
Performance Check
Function & Structure
Check & Adjustment**

Powered by CUMMINS QSB5.9 ENGINE

Serial No. 70C4-9001 and up

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Service Brake	52-18
Service brake operation	52-18
Service brake friction plate	52-19
Parking Brake	52-22
Parking brake operation	52-23
Parking brake solenoid valve	52-24
Parking Brake Manual Release	52-25
Parking Brake Spring Chamber	52-27
Brake Circuit Check Valve	52-28
70ZV Check & Adjustment Brake Group	53-1
Brake Circuit Oil Pressure	53-2
Unloader valve setting pressure	53-2
Brake valve oil pressure	53-6
Service Brake	53-8
Service brake performance check	53-8
Service brake friction plate wear measurement	53-9
Cautions on installing brake discs	53-10
Parking Brake	53-11
Parking brake performance check	53-11
Parking brake clearance adjustment	53-13
70ZV Function & Structure Electrical Group	62-1
How to Use Electrical Wiring Diagram	62-2
Utilisation des schémas des câblages électriques (FRANÇAIS)	62-3
Verwendung des elektrischen Schaltplans (DEUTSCH)	62-4
Modalità di utilizzo dello schema dei collegamenti elettrici (ITALIANO)	62-5
Cómo utilizar un Diagrama de Alambrado Eléctrico (ESPAÑOL)	62-6
Como Utilizar o Diagrama de Ligações Eléctricas (PORTUGUÊS)	62-7
Electrical Cable Color Codes	62-8
Electrical Circuit Symbols	62-9
Sensor Mount	62-10
Fuse	62-11
Fuse box	62-12
Fusible link	62-13

00-6
70ZV General Information
Outline

△ : First time replacement or cleaning only

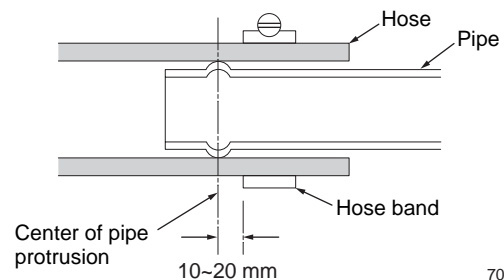
Section	Item for check	Operating hours						When Required
		10	50	250	500	1000	2000	
Axle system	Check Tire for Damage, Air and Tread Depth	○						
	Greasing (Axle support)		○					
	Check Tire Air Pressure		○					
	Check Differential Gear Oil			○				
	Check Planetary Gear Oil			○				
	Greasing (Pillow block bearing unit)			○				
	Check Tightness of Wheel Bolts			○				
	Greasing (2nd Propeller Shaft)						○	
	Greasing (3rd Propeller Shaft)						○	
	Replace Differential Gear Oil						○	
	Replace Planetary Gear Oil						○	
Steering system	Check Steering Wheel Operation	○						
	Greasing (Steering Cylinder)		○					
	Clean Filter for Orbitrol®			△			○	
Brake system	Check Service Brake Operation	○						
	Check Parking Brake Operation	○						
	Adjust Parking Brake Lining					○		
	Check Service Brake Disk Wear						○	
	Check Brake Accumulators						○	
	Clean Filter for Brake Line			△			○	
Loading system	Check Hydraulic Oil Level	○						
	Greasing		○					
	Replace Hydraulic Oil Return Filter			△		○		
	Replace Hydraulic Oil, Clean Filter						○	
	Replace Bucket Teeth (option)							○
	Replace Cutting Edge (option)							○

Hose band tightening torque

Low pressure hose (heat resisting hose)		Hose band	Tightening torque (N-m)	Tightening torque (kgf-cm)	Tightening torque (lb-ft)
Inner dia. (mm)	Outer dia. (mm)				
6.3	16.5	69002-02200	1.6	16	1.2
7.9	18.5				
9.5	20.5				
12.7	24.5	69002-02700	4	40	2.9
15.9	29.9	69002-03100			
19.0	30.0				
25.4	38.0	69002-04400			
31.8	45.8	69002-05200			
38.1	52.1	69002-05700			
50.8	67.8	69002-07100			
60.5	76.0	69002-08200			
75.5	93.0	69002-09500			

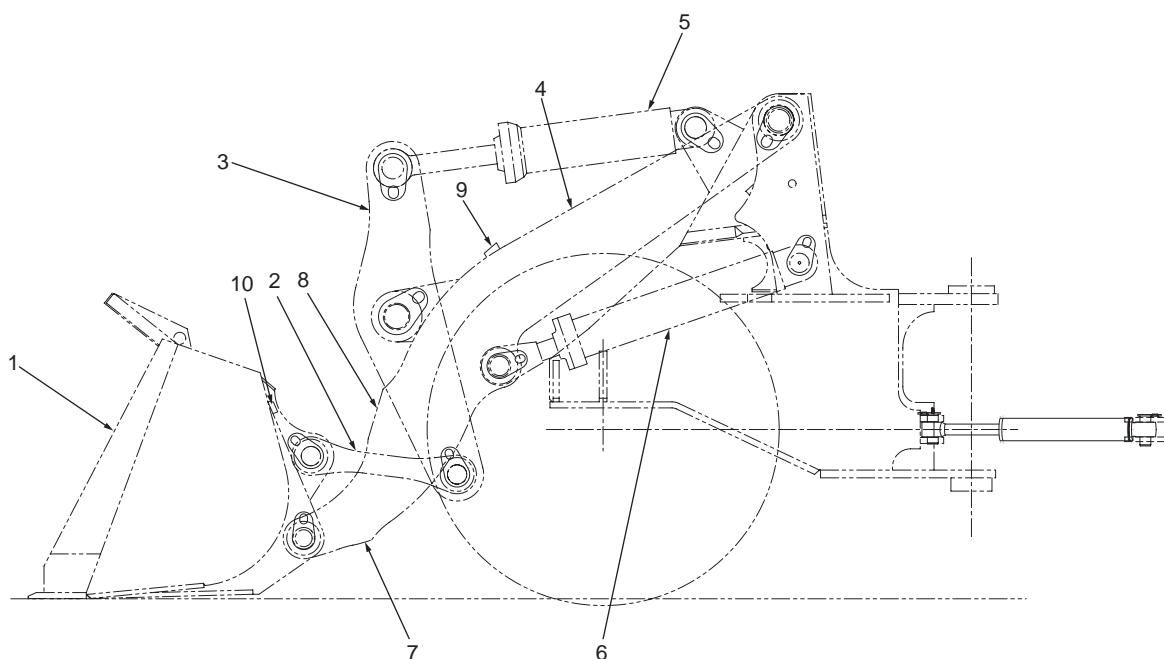
Low pressure hose		Hose band	Tightening torque (N-m)	Tightening torque (kgf-cm)	Tightening torque (lb-ft)
Inner dia. (mm)	Outer dia. (mm)				
6	16.5	69002-02200	1.6	16	1.2
8	18.5				
9	20.5				
9	22.0	69002-02300	4	40	2.9
12	24.5	69002-02700			
12	26.0				
15	29.0	69002-03100			
15	30.5				
19	32.0	69002-03800			
19	34.0				
25	39.5	69002-04400			
25	41.5				
32	46.0	69002-05200			
32	48.0				
38	54.0	69002-05700			
50	70.5	69002-07600			
50	73.0				

To connect the hose to the pipe, tighten the hose band at the following position:



Front Chassis

Loading linkage



70ZV12001

1. Bucket
2. Link
3. Lever
4. Boom
5. Bucket cylinder
6. Boom cylinder
7. Dump stopper surface
8. Roll-back stopper surface
9. Lever stopper surface
10. Bucket stop plate
(Design differs by manufacturer of the attachment)

Linkage Pin

⚠ WARNING

Unexpected movement of the machine may cause an accident resulting in injury or death.

Before starting adjustment work, be sure to observe the following items:

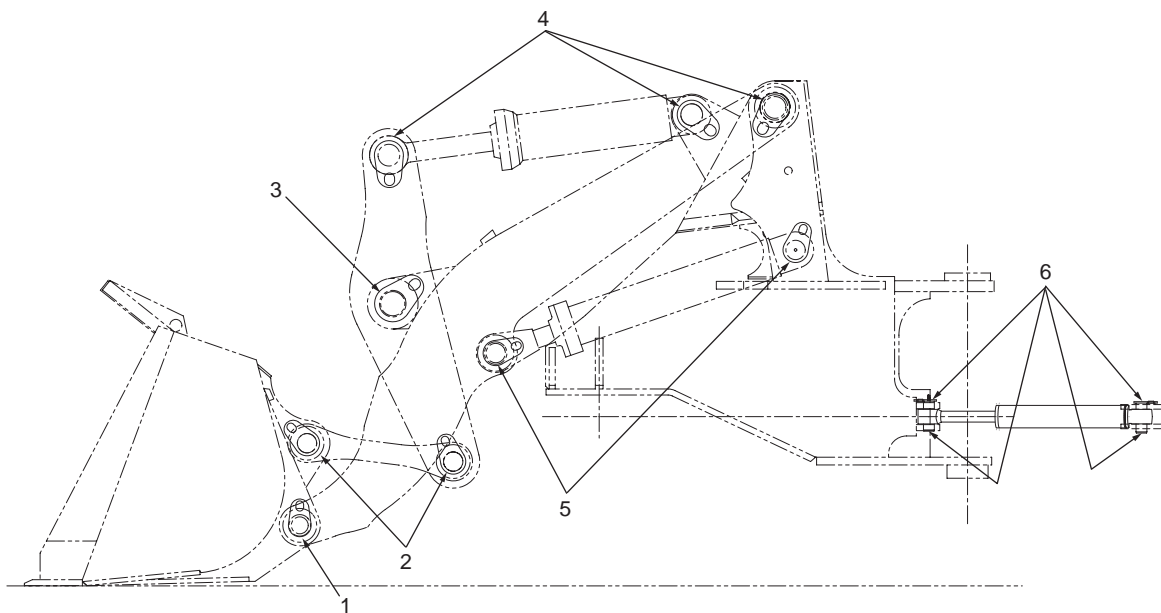
- Park the machine on level ground.
- Apply the parking brake.
- Remove the starter key, and hang a "DO NOT OPERATE!" tag on the steering wheel.
- Block the tires with chocks to prevent the tires from moving.

⚠ CAUTION

Unexpectedly dropped parts may cause an accident resulting in injury.

- Before liner insertion, be sure to lift the cylinder using a crane to prevent the cylinder from unexpectedly dropping during liner insertion.
- Wear protective clothes like work gloves and steel toed shoes.

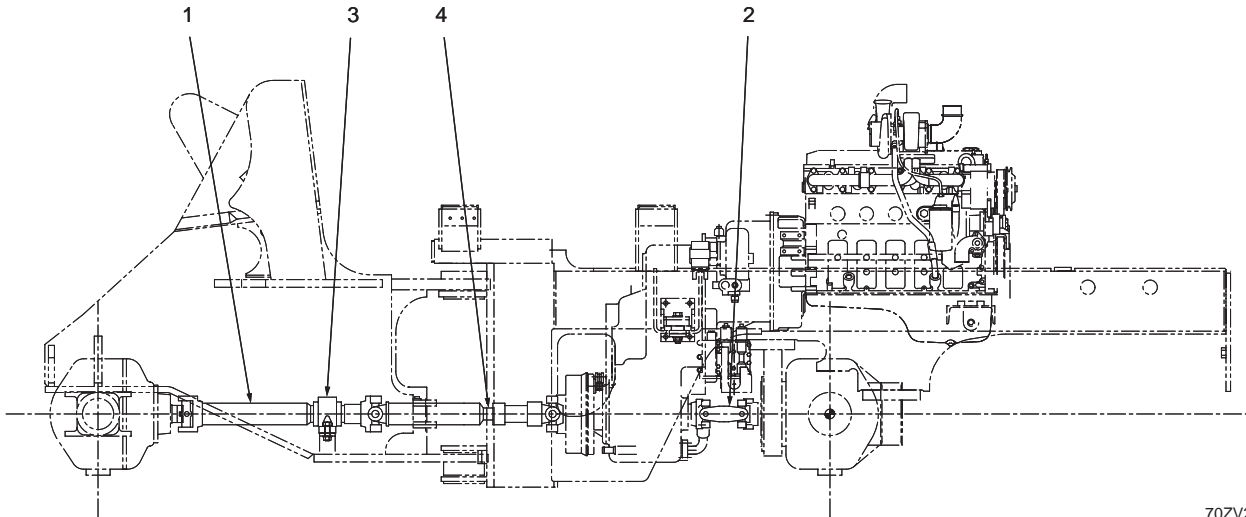
Liner



70ZV12009

Adjustment portion	1	2	3	4	5	6
Liner hole dia. mm (in)	71 (2.80)	81 (3.19)	111 (4.37)	91 (3.58)	Adjustment unnecessary	46 (1.81)

Propeller Shaft



70ZV22005

1. 2nd propeller shaft
2. 3rd propeller shaft (fixed type)
3. Pillow block
4. Slip joint

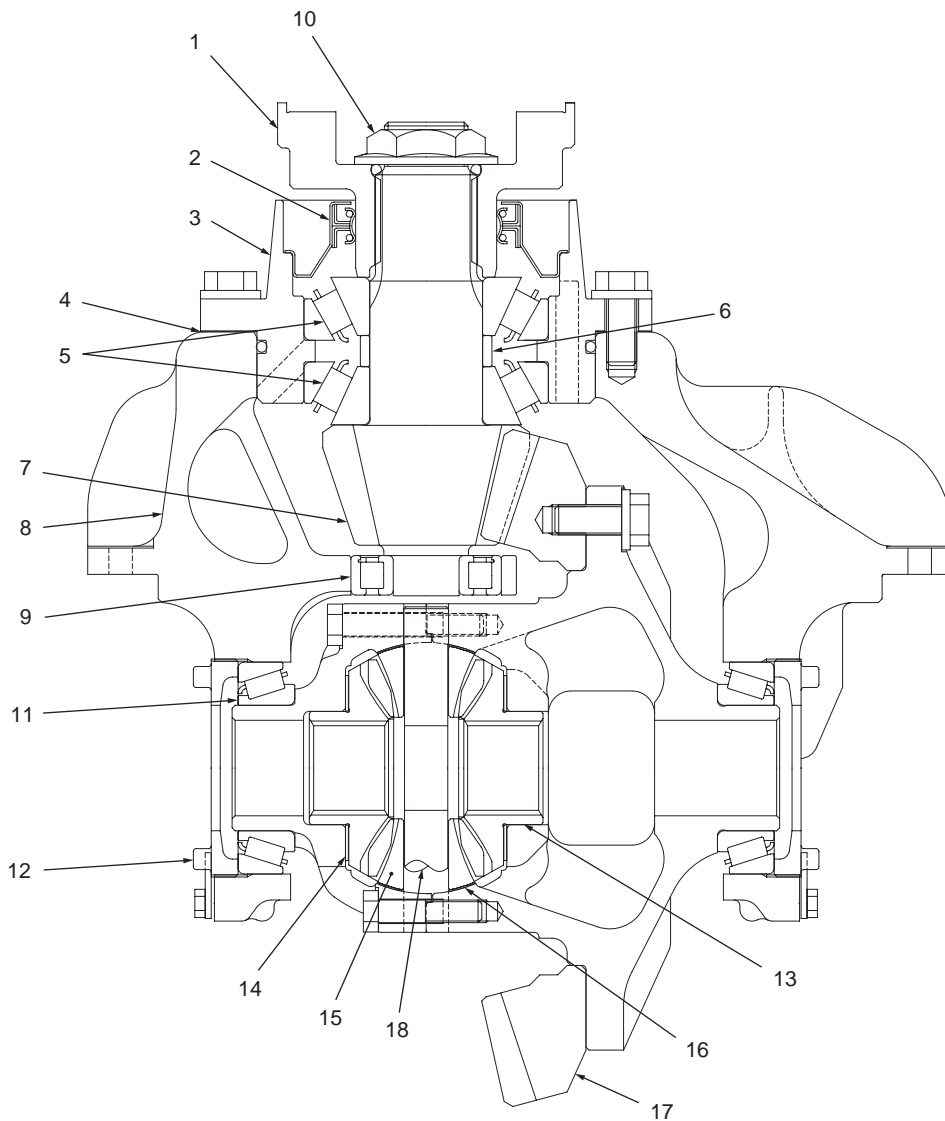
The power output from the engine is transmitted to the transmission through the torque converter (combined with the transmission). The power is then transmitted through the second and third propeller shafts to the front and the rear axles.

For the second propeller shaft, the universal joint and slip joint type spline shaft are used for smooth power transmission at any steering angle or change in propeller shaft length.

The third propeller shaft is the fixed type with universal joints.

Differential Gear (TPD) (S/N 9001~9017)

Front differential gear (S/N 9001~9017)



70ZV22014

- | | |
|--------------------------|---------------------------------|
| 1. Flange | 12. Adjusting nut |
| 2. Oil seal (double lip) | 13. Side gear |
| 3. Cage | 14. Thrust washer (side gear) |
| 4. Shim | 15. Differential pinion |
| 5. Taper roller bearing | 16. Thrust washer (pinion gear) |
| 6. Collar | 17. Ring gear |
| 7. Drive pinion | 18. Spider (cross shaft) |
| 8. Carrier | |
| 9. Pilot bearing | |
| 10. Nut | |
| 11. Taper roller bearing | |

Note

See page 22-21 for the front differential gear (S/N 9018~).

Engine

WARNING

Unexpected movement of the machine may cause an accident resulting in injury or death.

Therefore, to provide repair service with the engine running, be sure to observe the following items:

- Park the machine on level ground.
- Apply the parking brake.
- Block the tires with chocks to prevent the tires from moving.
- Determine the signals between the service men.
- Prohibit any person from walking into dangerous areas.
 - Near articulation area of the machine
 - Under the machine
 - Around the engine
 - In front of or behind the machine

CAUTION

Do not touch the fan or V-belt of the engine or high-temperature section if the engine is running.

An accident resulting in injury may occur.

Be sure to stop the engine before you open the side cover of the engine room.

Keep all guards in place.

Avoid high temperature components even when the engine is stopped.

Use a photo tachometer when checking engine revolution.

Measuring engine speed

Measurement instrument

- Tachometer

Standard measurement value

Low idle (min^{-1}): 775 ± 50

High idle (min^{-1}): $2,600 \pm 50$

Measuring engine oil pressure

Measurement instrument

- Pressure gauge

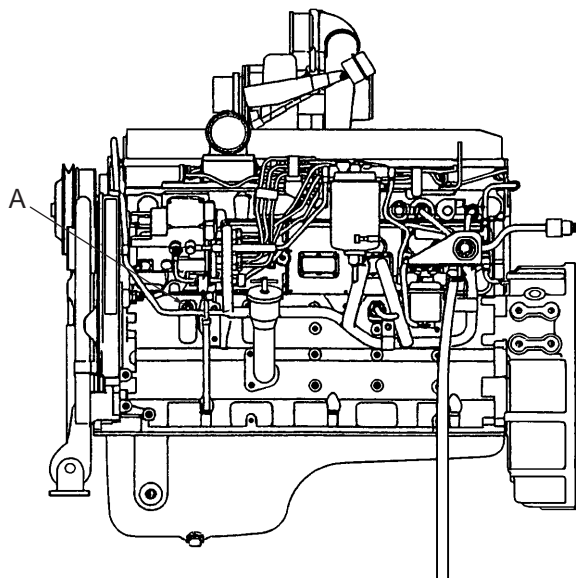
Install position

1. Location (A)
2. Measuring port: M10 x 1.0
3. Oil pressure gauge: 1.0 MPa (10 kgf/cm^2) (150 psi)

Standard measurement value

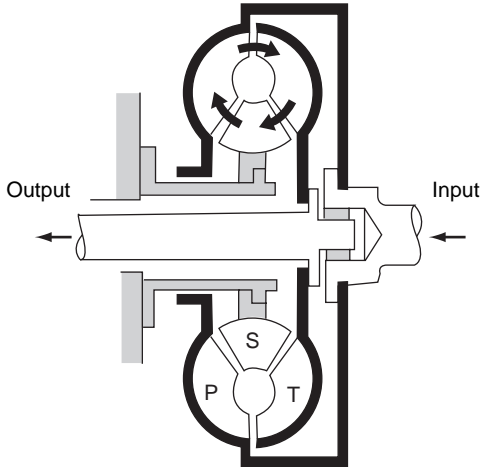
Engine speed	Service standard (Regulator set pressure)
$2,400 \text{ min}^{-1}$	0.5 MPa (4.6 kgf/cm^2) (65 psi)

[Engine coolant temperature $50 \text{ }^\circ\text{C}$ ($120 \text{ }^\circ\text{F}$)]



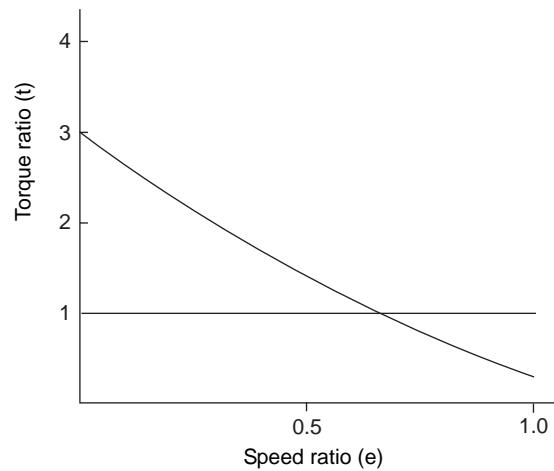
QSB5.9 Engine

Torque Converter



95ZV32002

Torque multiplication



95ZV32003

Torque converter structure

The torque converter is between the engine and transmission, and consists of three impellers as shown in the figure. The three impellers are pump (P), turbine (T), and stator (S) impellers.

If the engine speed/pump impeller speed stays the same but the turbine impeller speed is reduced due to the transmission load-output torque is increased. This is "torque multiplication". Heat is also generated.

$$\text{Speed ratio}(e) = \frac{\text{Turbine impeller speed (min}^{-1}\text{) (rpm)}}{\text{Pump impeller speed (min}^{-1}\text{) (rpm)}}$$

Power flow path

The pump is connected to the engine flywheel, and rotates together with the engine.

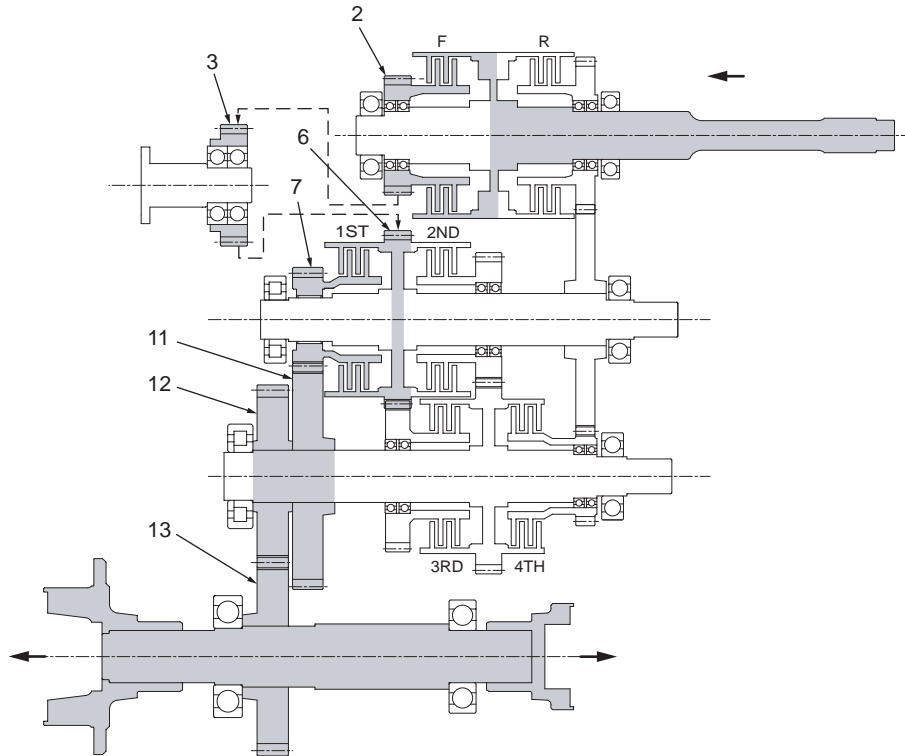
The turbine is connected to the torque converter output shaft to transmit the power to the transmission.

The stator is fixed to the torque converter case. The area of the impellers is filled with oil. When the engine is started, the pump impeller rotates, therefore the oil will circulate to rotate the turbine impeller (circulation order: pump→turbine→stator→pump). Oil is redirected by the fixed stator impeller back to the pump impeller. When the turbine impeller rotates, the power will be transmitted to the output shaft.

Power Flow Path in the Transmission

Forward

Forward 1st speed



65ZV32010J

The power from the torque converter is transmitted to

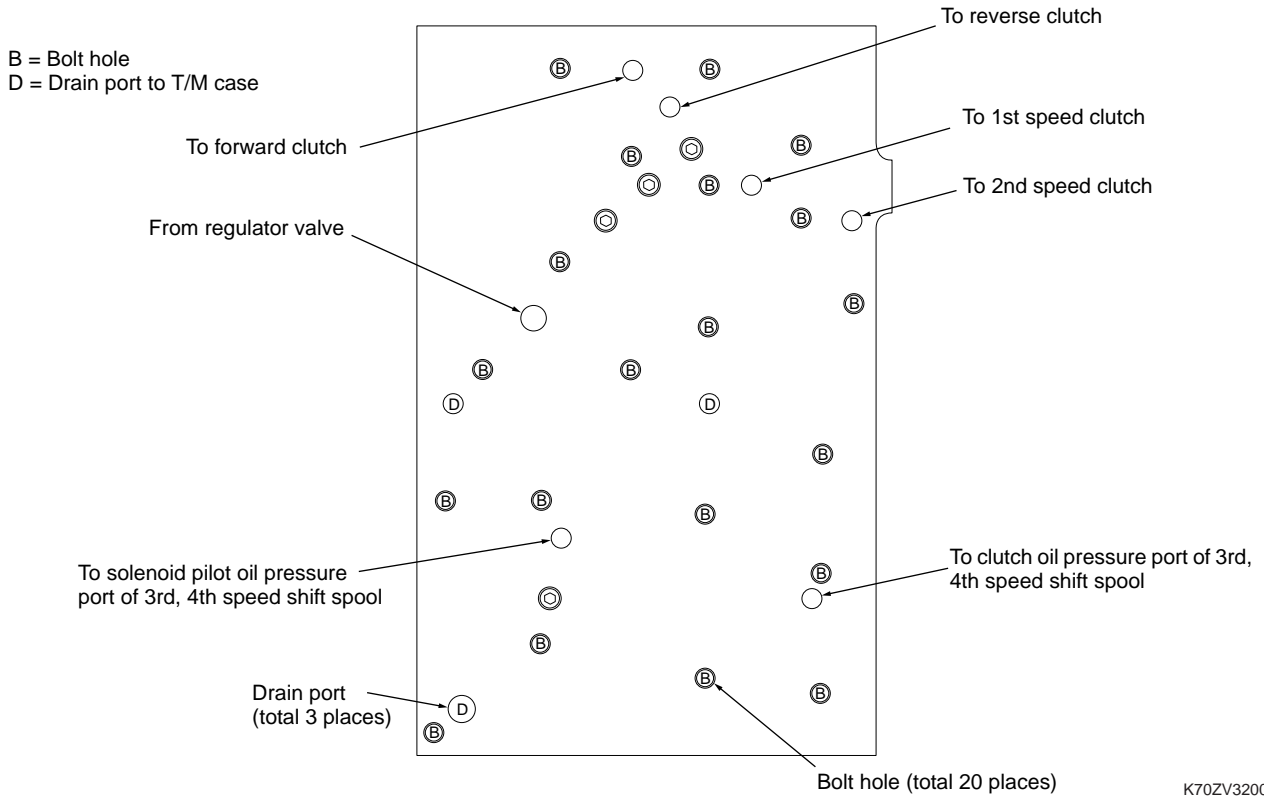


then the power is finally transmitted to the output shaft.

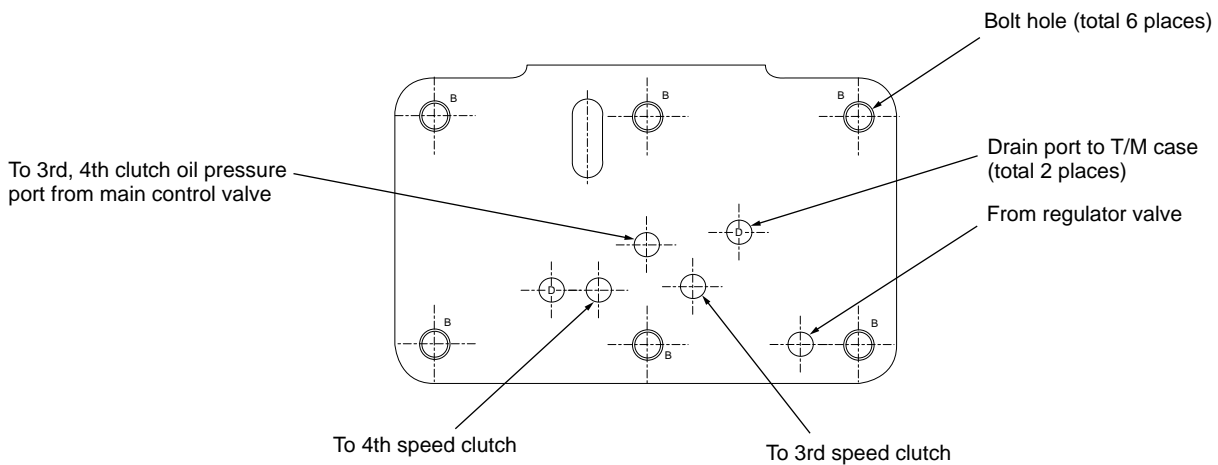
Oil port layout

Layout of ports on mounting surface of control valve (at T/M case side)

Main control valve



3rd, 4th speed control valve



Clutch Oil Pressure

Measuring clutch oil pressure

WARNING

Unexpected movement of the machine may cause an accident resulting in injury or death.

Therefore, to provide repair service with the engine running, be sure to observe the following items:

- Park the machine on level ground.
- Apply the parking brake.
- Block the tires with chocks to prevent the tires from moving.
- Determine the signals between the service men.
- Prohibit any person from walking into dangerous areas.
 - Near articulation area of the machine
 - Under the machine
 - Around the engine.
 - In front of or behind the machine

Hydraulic System Operation

Hydraulic system operation outline

The hydraulic system consists of the following systems:

- Loading system
- Steering system
- Fan motor system
- Ride control system (OPT)

Loading system

The loading system consists of the following components. All numbers base on page 92-4.

- Hydraulic pump (1)
- Unloader valve (22)
- Line filter (81)
- Reducing valve (28)
- Check valve (32)
- Reducing valve (45)
- Pilot valve (16)
- Multiple control valve (3)
- Boom cylinders (5)
- Bucket cylinder (6)

Oil from pump (1) flows to pilot valve (16) through unloader valve (22), line filter (81), reducing valve (45), check valve (32) and reducing valve (28). Oil to pilot valve (16) is reduced to 3.5 MPa (36 kgf/cm²) (512 psi) by reducing valve (28).

When the pilot control lever is operated, the pilot valve line is opened, and the oil pressure is generated depending on the position of the pilot control lever.

The pilot pressure entering the oil pack to multiple control valve (3) moves the spool against its return spring.

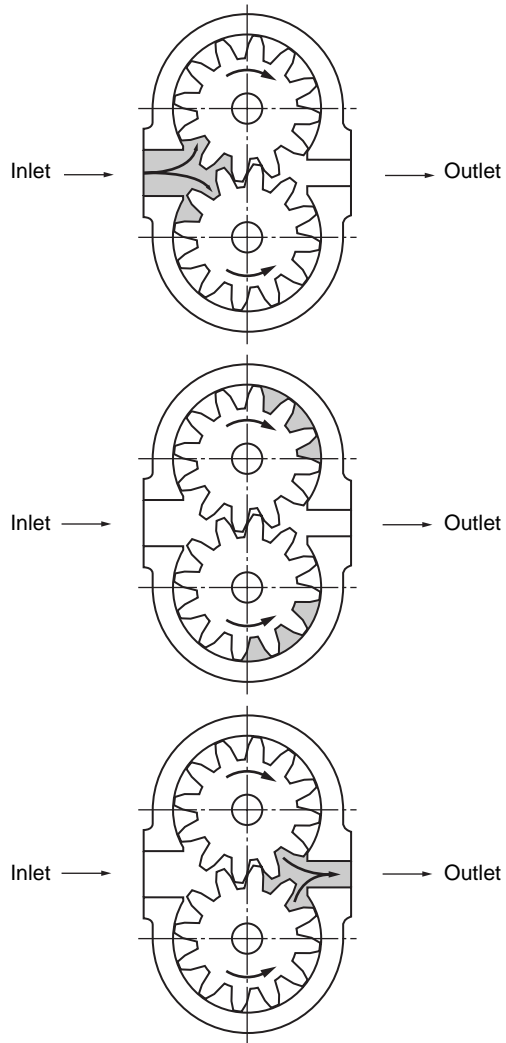
The spool press-in distance (displacement) depends on the pilot valve pressure.

Oil from the loader pump is then directed through multiple control valve (3) to boom cylinders (5) and bucket cylinder (6).

Return oil from the cylinders flows through multiple control valve (3) to the oil cooler or cooler bypass valve (11), return filter (12) and into the hydraulic tank.

Even if no hydraulic pump supplies oil to the loading and pilot control circuits due to trouble, or if the engine is shut off, the boom can be lowered to the ground by the pressure in accumulator (33) in the brake circuit in case of an emergency.

Hydraulic pump principle



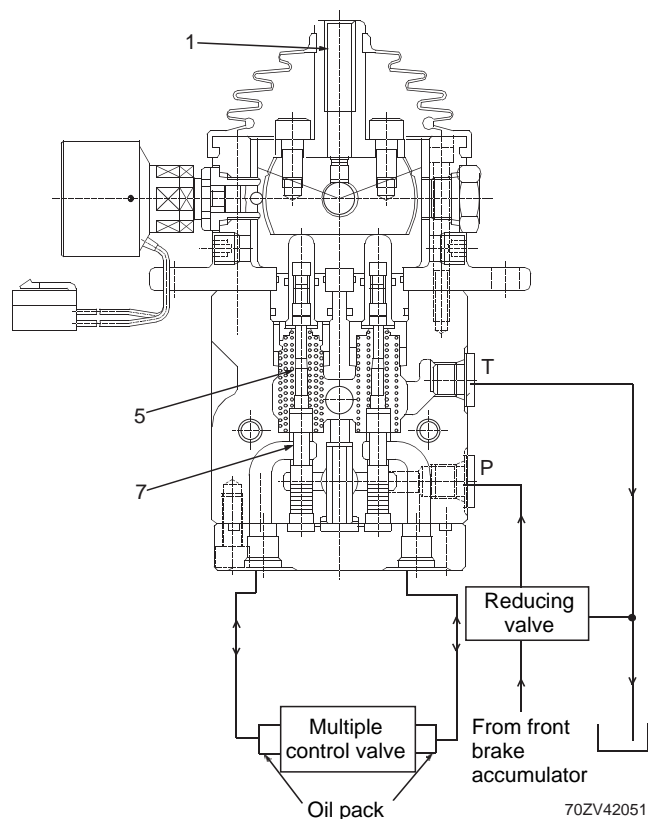
95ZV42040

The oil at the inlet area is taken in the cavities between the gear teeth right after disengagement and transferred towards the outlet area enclosed in between the teeth and the gear casing.

When the gear teeth mesh again, the oil is extruded out of the tooth cavities and forwarded to the outlet.

Pilot valve operation

(Modulated position)



Accordingly the oil pressure in the multiple control valve oil pack is reduced below the desired pressure. The spool (7) moves down again by the spring (5) and closes the tank port. The pump port is opened. It raises the oil pressure in the multiple control valve oil pack again. This cycling action maintains a constant pressure to the multiple control valve.

The oil pressure to the multiple control valve is proportional to the lever (1) angle, and is balanced with the lever angle. This results in the multiple control valve spool being moved the desired amount. Oil flow from the loading pump to the cylinder is also proportional. Cylinder speed is easily controlled.

When the lever (1) is in the neutral position, the spool (7) closes the pump port and the tank port is opened. Therefore the oil pressure is not applied to the multiple control valve oil pack. The spool of the multiple control valve is held in neutral by its centering springs. There is no oil flow to the cylinder.

When the lever (1) is shifted from the neutral, the spool (7) is forced down by the spring (5).

Then the tank port is closed and the pump port is opened. As a result, the pressurized oil from the pump flows into the multiple control valve oil pack. The spool of the multiple control valve moves allowing oil from the loading pump to flow to the cylinder.

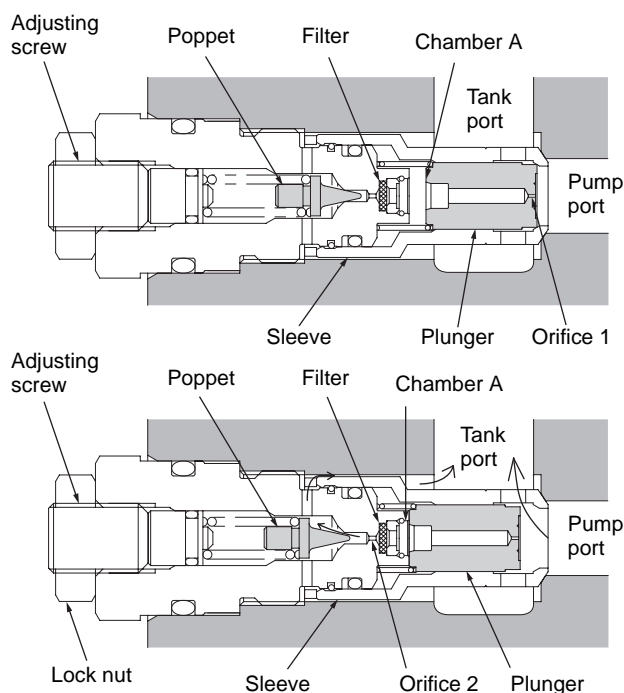
When the oil pressure in the multiple control valve oil pack reaches over the desired pressure, the spool (7) moves up. As a result, the tank port is opened and the pump port is closed.

- Spool diameter at tank side is greater than spool diameter at pump side.

Multiple control valve main relief valve

The main relief valve is installed between the pump and the control spool. When the cylinder comes to the stroke end, or if the pressure is above the set pressure, the oil fed from the pump will be discharged into the tank through this valve (main relief valve) to prevent pump and pipe damage.

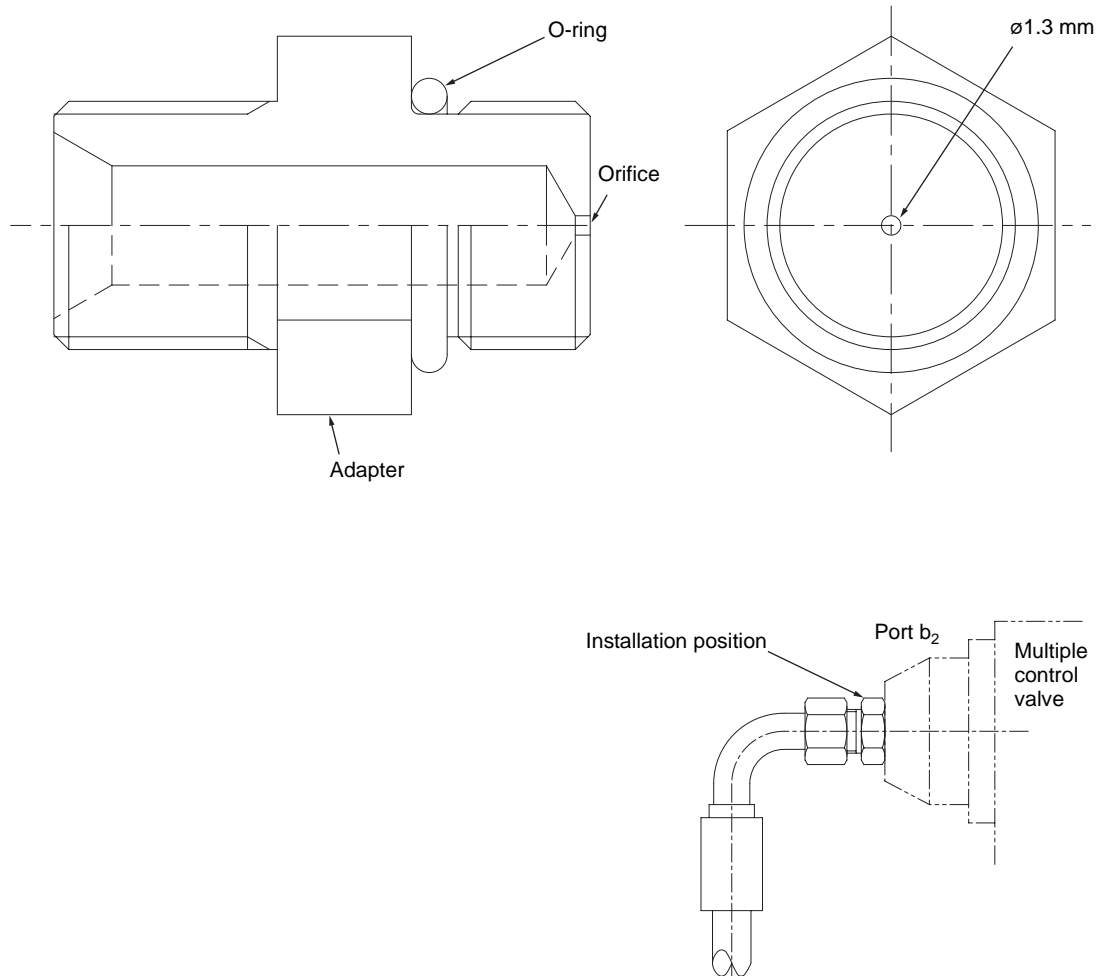
Main relief valve operation



70ZV42013

1. When the oil pressure is at the set point or below
 - The pressurized oil from the pump flows in to the chamber A through the orifice 1, and the plunger is pressed against the sleeve by the pressure area difference of the plunger and the spring force. Also the sleeve completely closes the pump port by the pressure area difference of the sleeve between the pump port side and chamber A side.
2. When the oil pressure exceeds the set point
 - When the oil pressure in the cylinder line rises above the pressure set by the spring, the poppet is moved to the left and opens the port. Then the oil in the chamber A flows to the tank through clearance between the body and sleeve.
As a result, the pressure in the chamber A rapidly lowers and the plunger is moved to the left. Then the plunger opens the port to the tank port and the pressurized oil in the pump port escapes to the tank port.

Adapter (Orifice)



80ZV42018

The adapter is installed in the boom lowering line between the pilot valve and the multiple control valve.

When the lever is shifted back to the holding position just after lowering the boom, the boom spool of the multiple control valve is quickly returned to the holding position by the return spring. At this time, the boom lowering inertia causes a shock to the machine body.

To lessen this shock to the machine body, the adapter (orifice) controls the spool return speed by slowly returning the pilot oil which was pushing the spool.

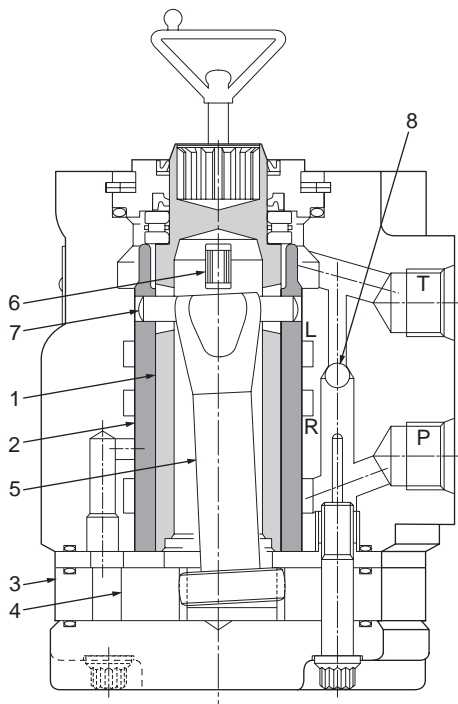
Note

When the oil is very cold it will pass very slowly through the orifice. As a result it will take longer than normal for the spool to shift to neutral or holding position. Always warm up the oil before beginning normal operation.

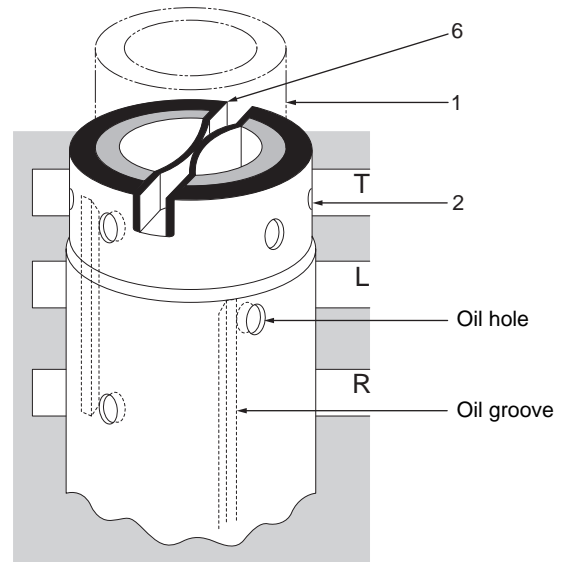
Orbitrol® operation

Neutral

(When the steering wheel is not being turned)



85V2E42019

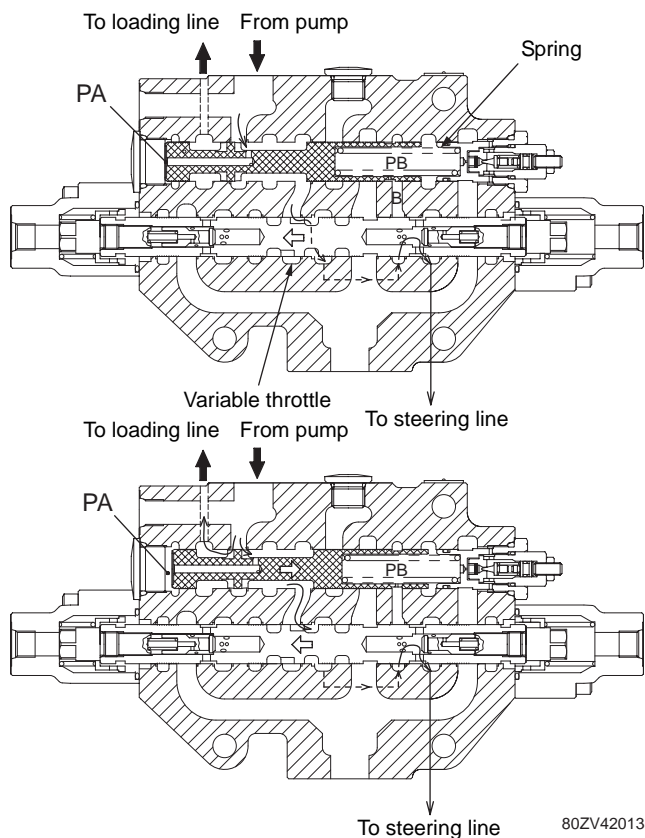


70ZV42025

- | | |
|-----------|---------------------|
| 1. Spool | 5. Drive shaft |
| 2. Sleeve | 6. Centering spring |
| 3. Stator | 7. Cross pin |
| 4. Rotor | 8. Check valve |

- The spool (1) and the sleeve (2) of the valve part each have a slit into which the centering spring (6) consisting of plate springs is set.
- When the steering wheel is not being turned, the spool (1) and the sleeve (2) are kept in the neutral position by means of the center spring (6).
- This Orbitrol® is the closed center and non-load reaction type.
 When in the neutral position, the oil groove of the spool does not match the oil hole of the sleeve, so the flow route of oil from the pump to the steering valve is totally closed.

Steering valve flow control plunger



When the pump discharge amount is small, the pressure difference between the chambers A and B is small (pressure PA in chamber A \approx pressure PB in chamber B), and the flow control plunger is being pushed to the left by the spring. Accordingly, the oil sent from the pump flows into to the steering circuit.

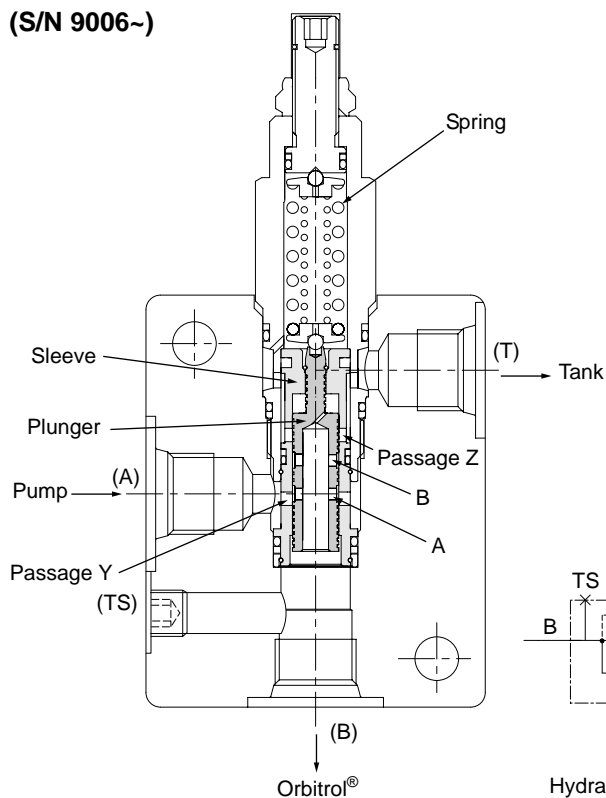
When the pump discharge amount is increased and the pressure difference (PA-PB) is increased to 0.72 MPa (7.3 kgf/cm²) (104 psi) or more, the flow control plunger starts to be shifted to the right and the excessive oil is bypassed to the loading circuit.

As described above, the steering circuit is given priority in receiving the pressurized oil from the pump.

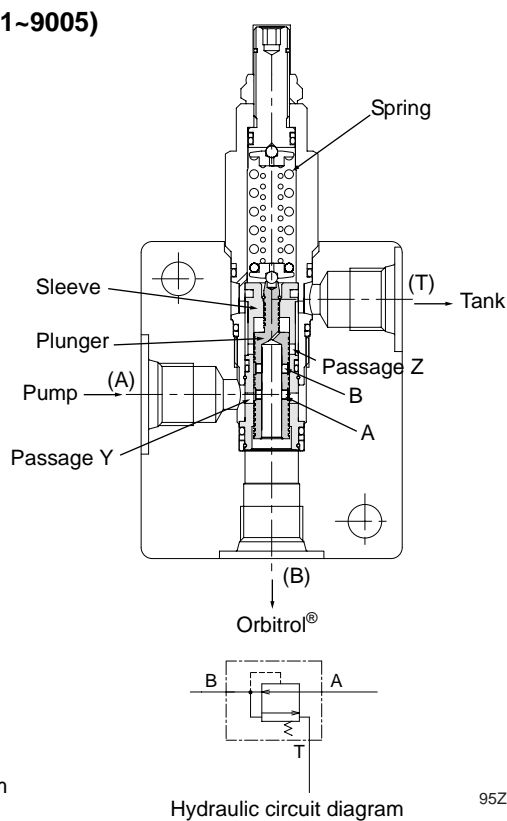
However, when the number of rotations of the engine becomes larger and the oil flow rate exceeds the preset value, the flow control plunger bypasses the excessive oil to the loading circuit. This keeps the oil flow rate constant in the steering circuit.

Reducing Valve (for Orbitrol®)

(S/N 9006~)



(S/N 9001~9005)



The oil fed from the pump flows into the Orbitrol® circuit by way of passage Y and port A in the plunger.

When the oil pressure in the Orbitrol® circuit reaches or exceeds the set pressure (spring force), the plunger is moved up by the oil pressure and passage Y is closed from port A so that the Orbitrol® side does not exceed the set pressure.

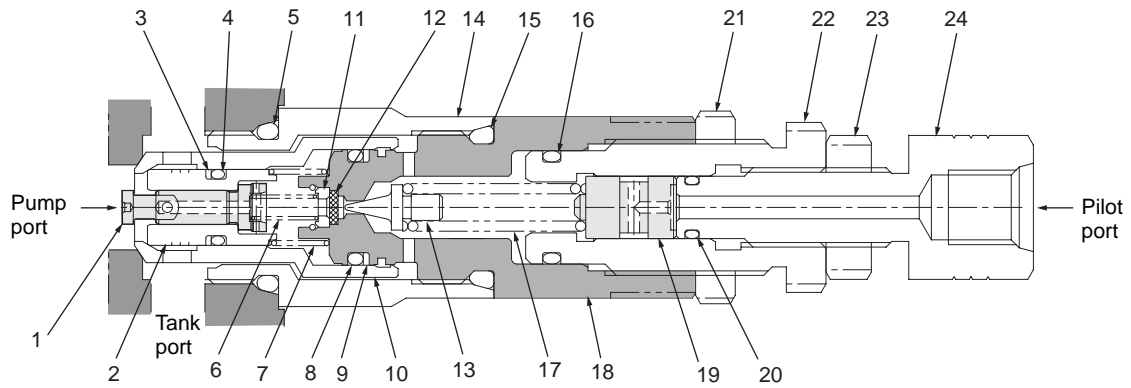
When the pressure exceeds the value which closes passage Y, the plunger is moved up further, the oil hole B is connected to the passage Z, and the oil escapes to the tank so that the pressure in the circuit on the Orbitrol® side does not exceed the set pressure.

When the oil pressure in circuit on the Orbitrol® side decreases, the plunger is moved down by the spring force, passage Y is open, and the pump pressure is introduced to the Orbitrol® side so that the pressure is maintained at the specified value.

This oil is supplied from the Orbitrol® to the steering valve pilot port, and moves the spool.

Set pressure
 3.5 MPa (36 kgf/cm²) (512 psi)

Relief valve (two-step relief)



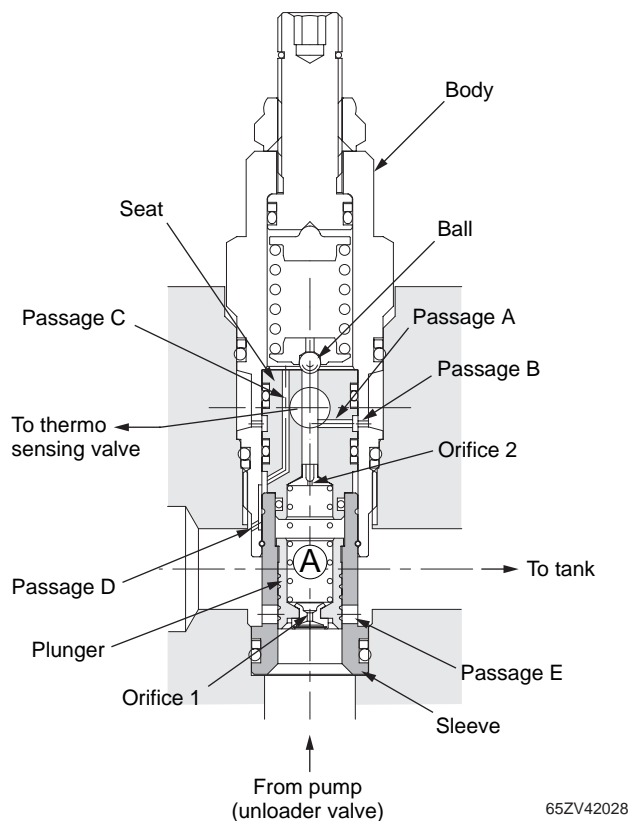
70ZV42054

- | | | |
|----------------|--------------------|---|
| 1. Piston | 11. Filter stopper | 21. Lock nut |
| 2. Plunger | 12. Filter | 22. Adjusting screw
(high pressure side) |
| 3. Backup ring | 13. Poppet | 23. Lock nut |
| 4. O-ring | 14. Body | 24. Adjusting screw
(low pressure side) |
| 5. O-ring | 15. O-ring | |
| 6. Spring | 16. O-ring | |
| 7. Spring | 17. Spring | |
| 8. O-ring | 18. Plug | |
| 9. Backup ring | 19. Piston | |
| 10. Seat | 20. O-ring | |

Note

For pressure adjustment, set the pressure on the high pressure side first.

Fan motor relief valve



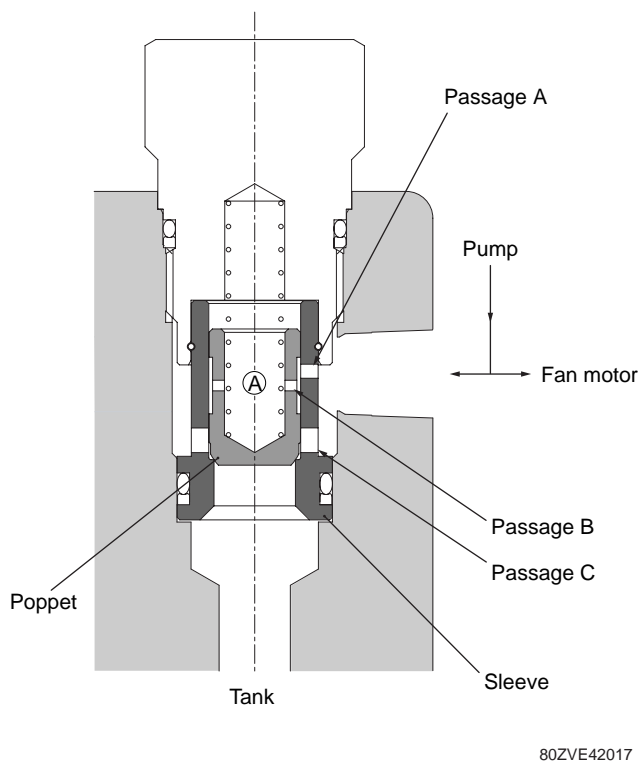
The oil from the pump goes through orifices 1 and 2 and passages A and B, then flows from the body perimeter to the thermo-sensing valve.

When the engine cooling water temperature increases and reaches $93 \pm 2^\circ\text{C}$ ($200 \pm 3.6^\circ\text{F}$), the spring load of the thermo-sensing valve becomes maximum, and the pressure in the fan motor line increases. When this pressure reaches 14.7 MPa (150 kgf/cm^2) ($2,130 \text{ psi}$), the pressure oil from the orifice 2 pushes up the ball and releases into the tank by way of passages C and D. As a result, the oil pressure in chamber A decreases, the pressure oil from the pump pushes up the plunger and flows into the tank port by way of passage E.

Accordingly, the maximum number of revolutions ($2,000 \text{ min}^{-1}$) of the fan motor is determined by this relief pressure.

Set pressure (guideline):
 14.7 MPa (150 kgf/cm^2) ($2,130 \text{ psi}$)

Fan motor check valve (Make-up valve)



While the engine is running, the oil from the pump enters the chamber A by way of passages A and B, and presses both the spring and the poppet against the sleeve. As a result, the oil does not flow into the tank port.

When the engine is stopped, the pressure in the pump port (chamber A) becomes negative pressure (or a void) because the oil is not fed to the fan motor though the fan continues to turn by the inertia. In order to prevent generation of negative pressure, the poppet is pushed up from the tank port side, and the oil at the tank port flows into the fan motor line by way of passage C.

This status continues until revolution of the fan caused by the inertia is attenuated and stopped.

Loading/Steering Circuit Relief Valve

Loading circuit relief valve setting pressures

WARNING

Unexpected movement of the machine may cause an accident resulting in injury or death.

Therefore, to provide repair service with the engine running, be sure to observe the following items:

- Park the machine on level ground.
- Apply the parking brake.
- Block the tires with chocks to prevent the tires from moving.
- Determine the signals between the service man.
- Prohibit any person from walking into dangerous areas.
 - Near articulation areas of the machine
 - Under the machine
 - Around the engine
 - In front of or behind the machine

CAUTION

Be careful, you may get burned if the high pressure oil spouts out. To prevent such an accident, be sure to release the residual pressure from the pipe, and open the cap of the hydraulic oil tank before removing the plug from the pressure measurement port.

Releasing residual pressure from tank and pipes

Keep the bottom surface of the bucket horizontal, and stop the engine when the bucket is approximately 30 cm (1 ft.) above the ground.

Tilt down the bucket until it comes in contact with the ground. Place the bucket control lever in the roll back position, and then lower the boom.

Push down on, then open the cap of the hydraulic oil tank to release the residual pressure.

CAUTION

Do not touch the fan or V-belt of the engine or a high-temperature section if the engine is running. An accident resulting in injury may occur.

Be sure to stop the engine before you open the side cover of the engine room. Keep all guards in place.

Avoid high temperature components even when the engine is stopped.

Measurement instruments

Pressure gauge

30 MPa (300 kgf/cm²) (5,000 psi)
(for loading line with 3 m (10 ft.) hose and steering line with 1.5 m (4 ft.) hose)

5 MPa (50 kgf/cm²) (1,000 psi)
(for pilot line) with 2~3 m (6~10 ft.) hose

Note

For safety, route the gauge to an area where it may be safely read by the person doing the test.

Standard measurement value

Loading line main relief pressure (at maximum speed) (MPa (kgf/cm ²) (psi))	20.6 ± 0.5 (210 ± 5) (2,986 ± 71)
Loading line overload relief pressure (at idling speed) (MPa (kgf/cm ²) (psi))	23.5 ± 0.5 (240 ± 5) (3,413 ± 71)
Pilot line (MPa (kgf/cm ²) (psi))	3.5 (36) (512)

Hydraulic oil temp
50~80 °C (120~180 °F)

Hydraulic Cylinder

Cylinder natural drift

WARNING

Standing under the boom or bucket during service work is dangerous. An accident resulting in injury or death may be caused.

To prevent such an accident, be sure to lock the boom and bucket control levers in the cab, securely support the boom, and remove the starter key.

In addition, hang a "DO NOT OPERATE!" tag on the steering wheel.

Measurement instrument

- Scale
150 to 300 mm (1 ft.)
- Stop watch
- Black vinyl "electrician's" type

Note

Warm-up the hydraulic oil before measuring cylinder drift.

Standard measurement value (mm/min) (in/min)

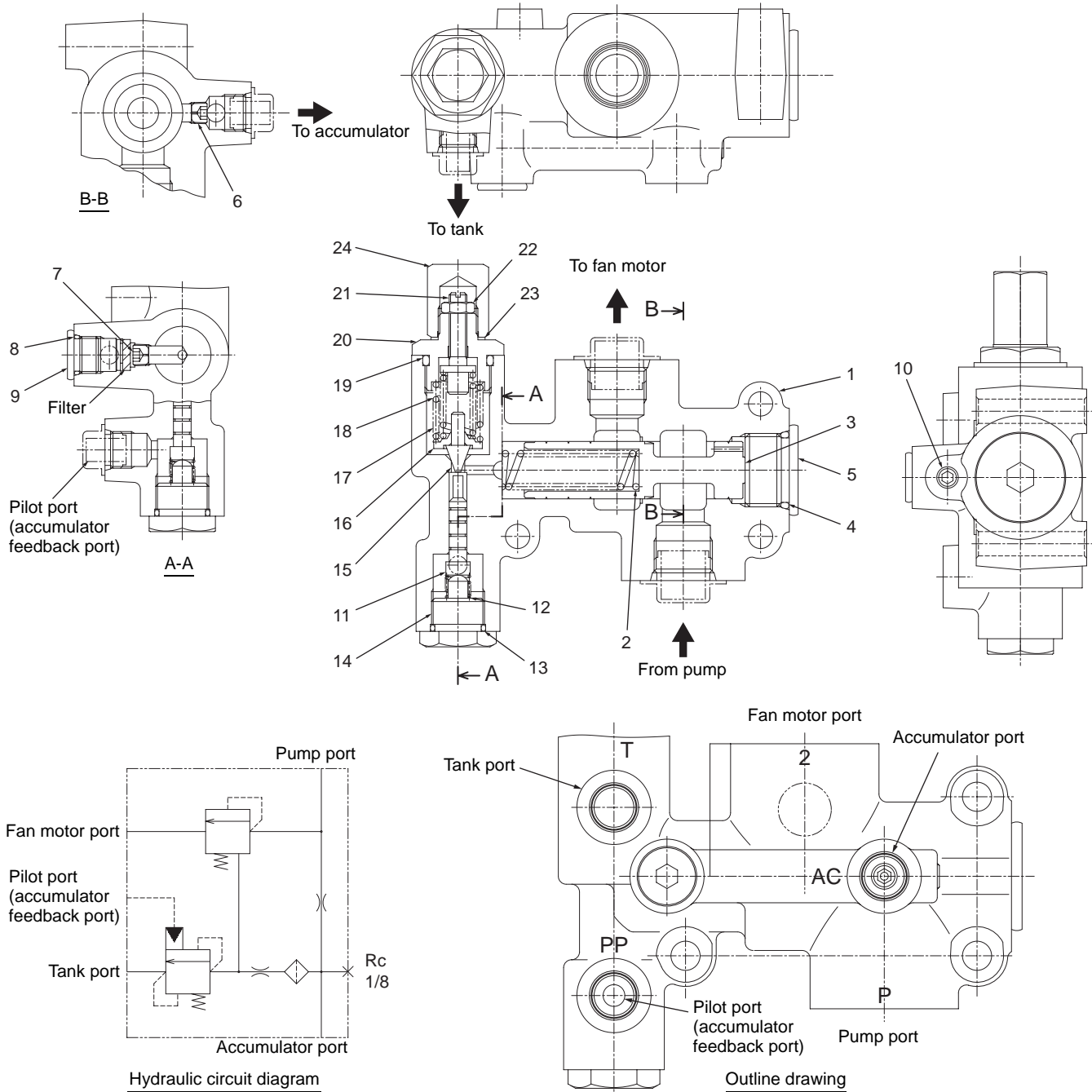
Boom cylinder	3 (1/8) or less
Bucket cylinder	4 (5/32) or less

Measurement procedure

1. Unload the bucket.
2. Keep the boom and bucket horizontal.
3. Set the parking brake switch to the "ON" position.
4. Lock the boom and bucket control levers using the safety lock.
5. Stop the engine.
6. Mark the cylinder rod at a point 100~150 mm (4~6 in) away from the cylinder head cover.
7. Measure the accurate distance from the cylinder head cover to the vinyl tape. This is distance "A" mm (in). Measure the distance again 5 minutes later. This is distance "B" mm (in).

$$\text{Cylinder drift (mm/min)} = \frac{A - B}{5} \text{ (mm) (in)}$$
$$\text{(in/min)} = \frac{\text{mm}}{5 \text{ (min)}}$$

Unloader Valve



- | | | |
|------------|-----------------------|---------------------|
| 1. Body | 9. Plug (gauge port) | 17. Spring |
| 2. Spring | 10. Plug (gauge port) | 18. Spring |
| 3. Spool | 11. Governor plunger | 19. O-ring |
| 4. O-ring | 12. Spring | 20. Plug |
| 5. Plug | 13. O-ring | 21. Adjusting screw |
| 6. Orifice | 14. Plug | 22. Lock nut |
| 7. Orifice | 15. Pilot valve | 23. Packing |
| 8. O-ring | 16. Spring seat | 24. Cap |

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Brake valve outline

The brake valve integrated into the pedal converts the pump oil pressure into the pressure corresponding to the pedal pressing force, and transmits it to the brake.

The main valve (in the left pedal) is the tandem type, and consists of two independent systems. The pilot valve (in the right pedal) is the single type. When the right side pedal is depressed, the oil pressure from this valve acts as the pilot pressure applied to the main valve.

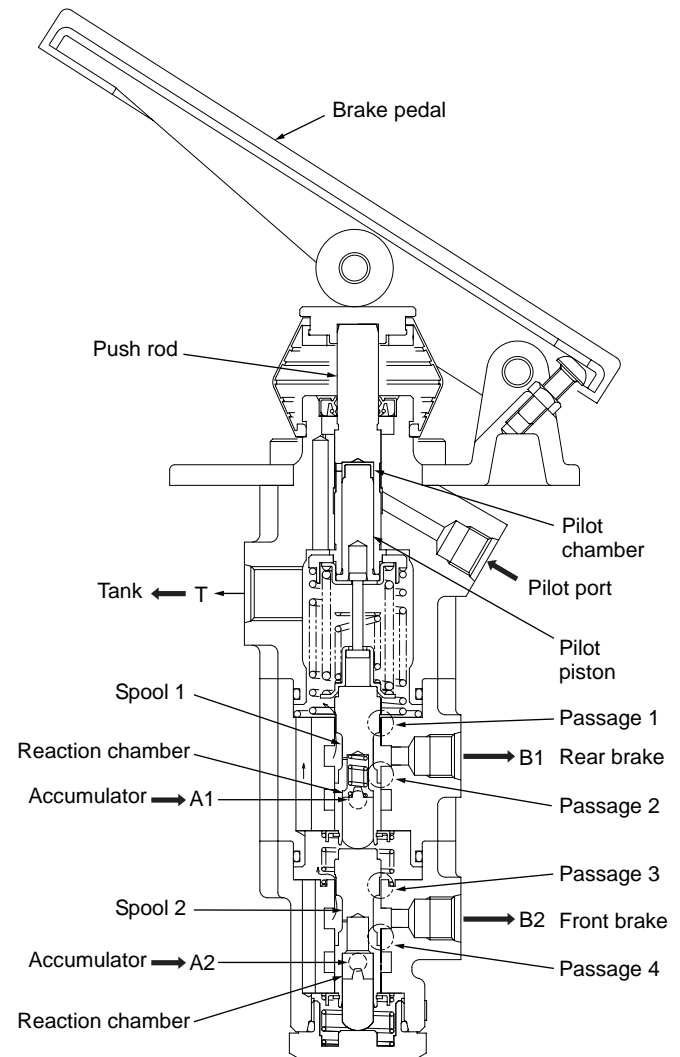
Each valve is the closed center type (in which the in-port is closed while the pedal is released). High pressure is always applied on the in-port side to improve the response during operation.

Note

Some illustrations of a different valve model having the same inner structure are used in the following pages for easier understanding of valve operation.

Main valve (tandem type) operation

While the valve is not operating

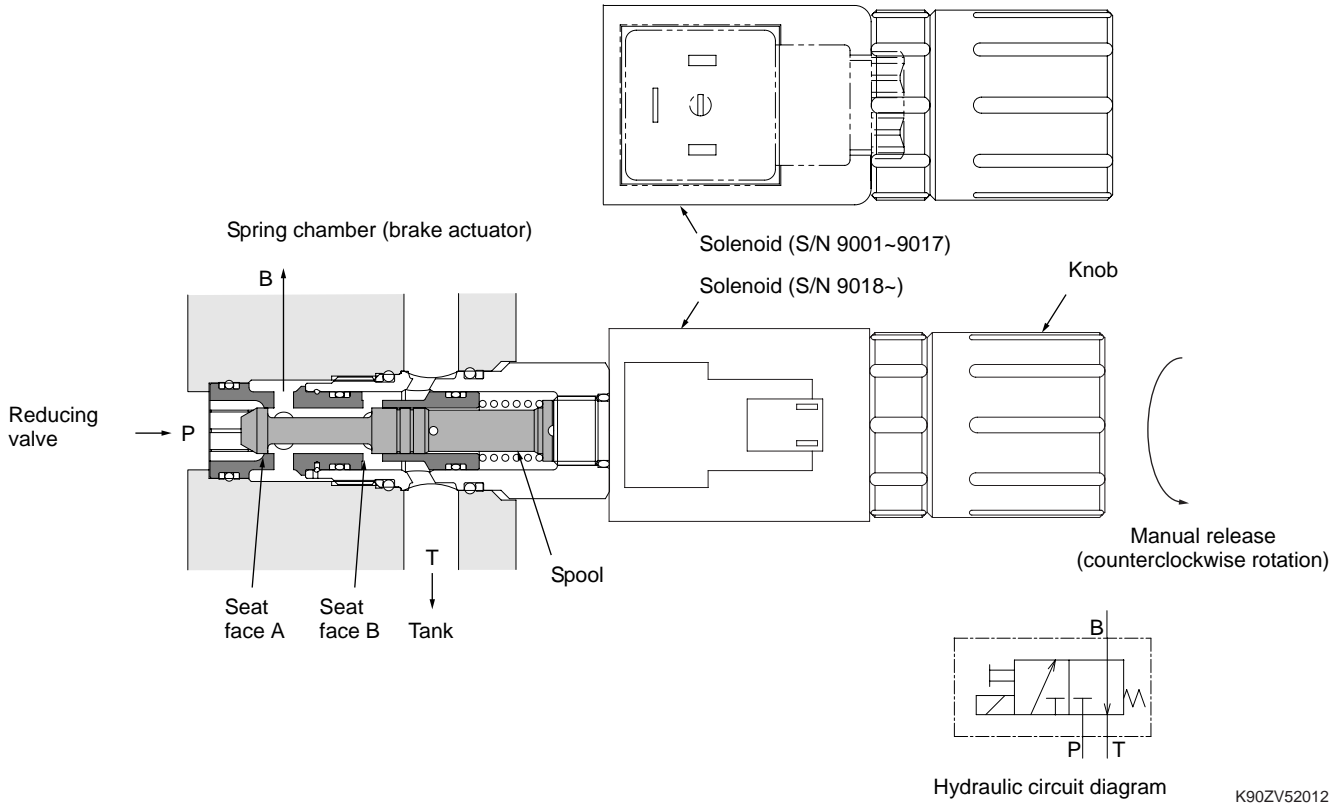


70ZV52025

Oil sent from the pump is stored in the accumulator, and sent to the in-ports A1 and A2. The passages 2 and 4 (out-ports B1 and B2) are closed by spools (1)(2).

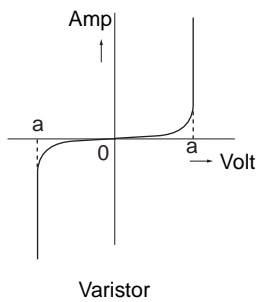
Spools (1)(2) are pushed to the non-operation position by the springs. Oil in the brake piston chamber is sent into the inside of the valve from the out-ports B1 and B2, and returned to the tank from the tank port T. As a result, the pressure inside the brake piston chamber becomes equivalent to the pressure in the tank.

Parking brake solenoid valve



K90ZV52012

Solenoid valve operation



95ZV42079

When the parking switch is set to OFF (that is, when the power is supplied to the solenoid), the spool is pushed to the left, the seat face A is open, and the seat face B is closed. As a result, the oil from the reducing valve enters the spring chamber, and the parking brake is released.

Note

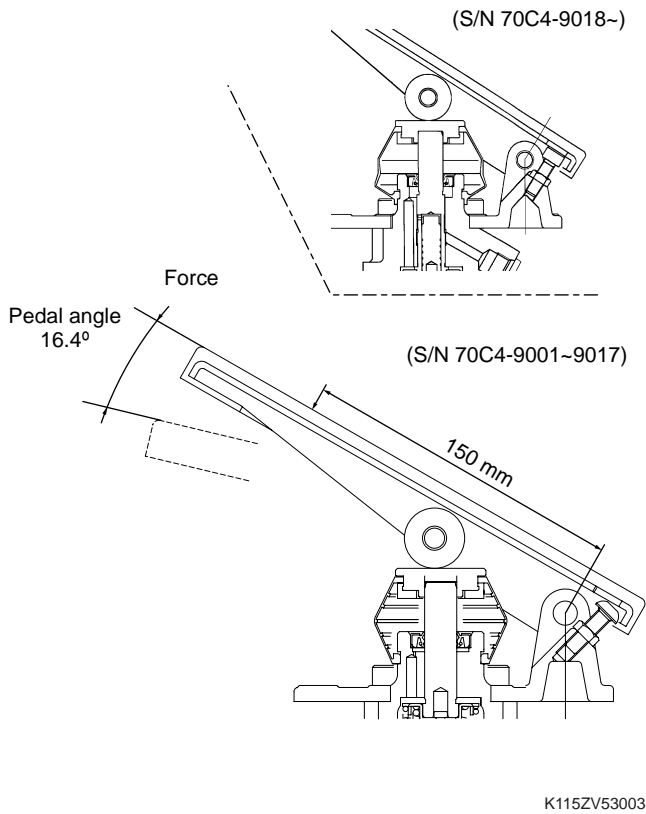
The varistor (variable resistor) is used for the solenoid coil to protect the circuit.

While the parking switch is ON (that is, while the power is not supplied to the solenoid), the seat face A is closed and the seat face B is open. As a result, the spring chamber port is connected to the tank, and the parking brake is applied.

Solenoid valve specifications

Voltage	DC24 V
Current	0.69 A
Resistance	34.8 Ω

Brake valve oil pressure

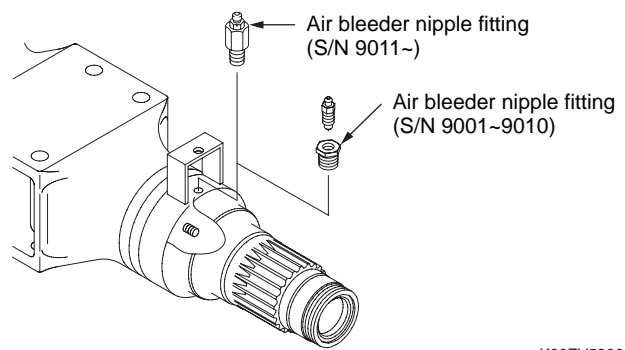


Gauge port

Remove air bleeder nipple on the axle housing, and then install the pressure gauge to the bleeder position.

Size of air bleeder port
Rc (PT) 1/4

(In case of the bleeder valve
M10 X 1.0)



Air bleeder nipple

- 9 N·m (90 kgf·m) (6.6 lb·ft) (S/N 9001~9010)
- Three Bond 1215 or equivalent (S/N ~9010)
- Three Bond 1327 or equivalent (S/N 9011~)

Measurement instrument

Hydraulic pressure gauge
10 MPa (1,500 psi)

Measurement procedure

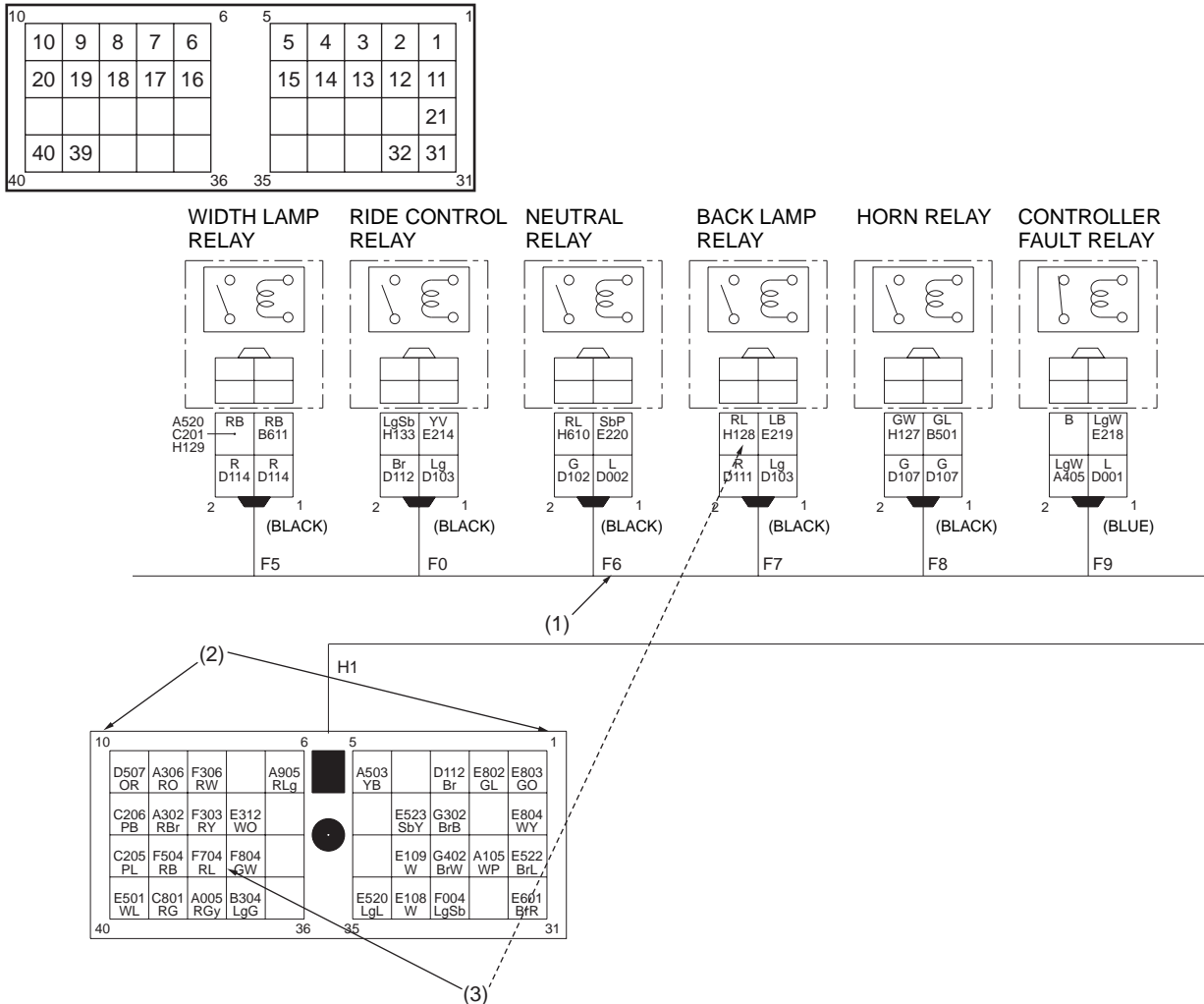
Check to be sure the brake valve is fully released.

Press down the brake pedal to check that the oil pressure rises in proportion to the pedal angle.

Release the brake pedal to check that the oil pressure drops to zero in proportion to the pedal angle. In addition, visually check for brake oil leakage.

How to Use Electrical Wiring Diagram

Example



95ZV62001

The address method is used for electrical wiring diagrams. For this method, a symbol is attached to each connector and connector terminal in order to easily locate the other terminal where the other end of the cable is connected.

Example 1

Symbol under (or above) connector, such as F6:
 Shows the address of the connector.

Example 2

Symbol at the multi-terminal connector, such as 1 and 10:
 Shows the terminal number and the numbering direction.

Example 3

Checking the other connector terminal where F704 RL (item (3)) is connected:

1. F704

Shows that the terminal is connected to the 4th terminal of the F7 connector.

Check the description in the 4th terminal of the F7 connector (F704), it shows that the F704 terminal is connected to H128. This means that the 4th terminal of the F7 connector is connected to the 28th terminal of the H1 connector.

2. RL

Shows the color of the wire "RL" represents that the insulation color is red, and "L" represents a blue stripe is on the red insulation.

Fuse box

1. For chassis

Fuse No.	Fuse capacity (A)	Protective circuit	
1	20A	Lighting head light	
2	15A	Rear work light	20A
3	10A	Boom kickout Bucket leveler	Spare
4	15A	Back lamp Stop lamp Turn signal	Spare
5	10A	Parking brake Controller	15A
6	15A	Front work light	Spare
7	10A	Air suspension seat (option)	
8	15A	Spare	10A
9	15A	Spare	
10	15A	4-way flasher Horn Room lamp Radio backup	Spare
11	10A	Spare	5A
12	15A	Preheat	
13	5A	Buzzer Monitor (controller)	Spare
14	5A	Neutral relay	
15	5A	Battery relay ECM	

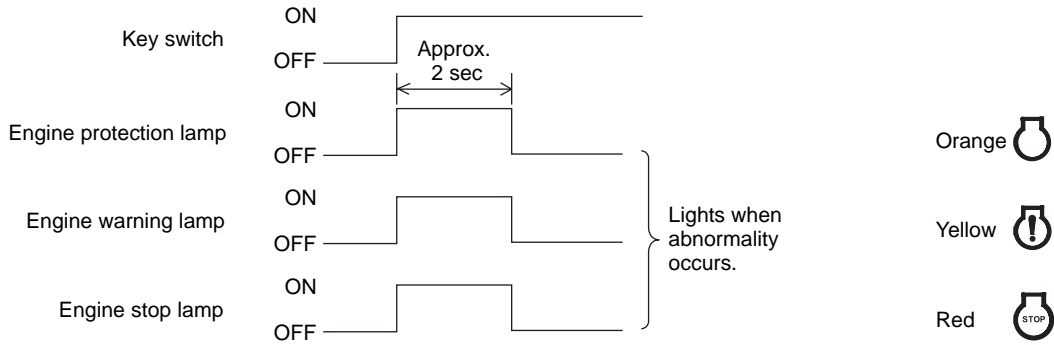
2. For cab

Fuse No.	Fuse capacity (A)	Protective circuit	
16	5A	Spare	
17	5A	Spare	20A
18	5A	Rear wiper	Spare
19	10A	Front wiper	
20	10A	Cigar lighter	15A
21	15A	Spare	Spare
22	3A	Radio	
23	10A	Spare	10A
24	10A	Spare	Spare
25	20A	Spare	
26	5A	Air conditioner (option)	5A
27	5A	Air conditioner (option)	Spare
28	10A	Air conditioner (option)	
29	20A	Air conditioner (option)	
30	20A	Spare	

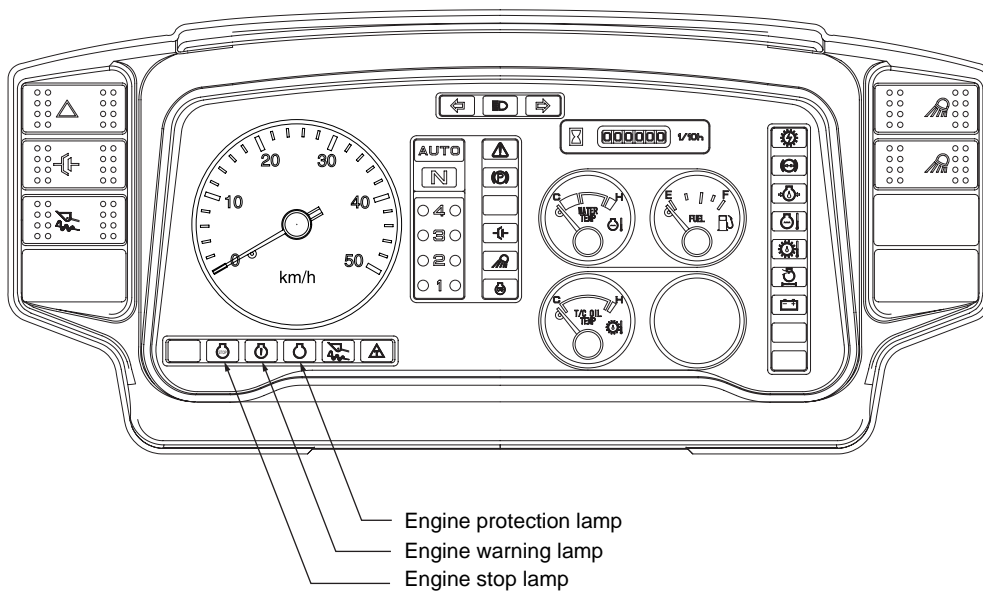
3. For engine controller (ECM)

Fuse No.	Fuse capacity (A)	Protective circuit
31	10A	ECM
32	7.5A	ECM
33	7.5A	ECM
34	7.5A	ECM
35	10A	ECM
36	10A	Spare

Monitor lamp test



95ZV62025



70ZVE62023

When the starter switch is set to ON, three engine monitor lamps (engine protection, engine warning and engine stop) are lit for approximately 2 seconds.

After that, if there is an abnormality in a circuit, a corresponding monitor lamp lights.

62-32
70ZV Function & Structure Electrical Group
ECM (Engine Controller)

FAULT CODE/ LAMP	DESCRIPTION	QSB5.9 (70ZV)	QSL9 (85ZV)	QSM11 (90ZV)	QSX15 (95ZV)	QSK19 (115ZV)	QST30 (135ZV)
EG351 Yellow	Injector Power Supply.	○	○			○	
EG352 Yellow	Sensor Supply Voltage #1 Circuit - shorted low.	○	○	○	○	○	
EG378 Yellow	Fueling Actuator #1 Circuit - open circuit.				○		
EG379 Yellow	Fueling Actuator #1 Circuit - grounded circuit.				○		
EG386 Yellow	Sensor Supply Voltage #1 Circuit - shorted high.	○	○	○	○	○	
EG387 Yellow	Accelerator Pedal Position Sensor Supply Voltage Circuit - shorted high.	○	○	○	○		
EG394 Yellow	Timing Actuator #1 Circuit - open circuit.				○		
EG395 Yellow	Timing Actuator #1 Circuit - grounded circuit.				○		
EG396 Yellow	Fueling Actuator #2 Circuit - open circuit.				○		
EG397 Yellow	Fueling Actuator #2 Circuit - grounded circuit.				○		
EG398 Yellow	Timing Actuator #2 Circuit - open circuit.				○		
EG399 Yellow	Timing Actuator #2 Circuit - grounded circuit.				○		
EG415 Red	Engine Oil Pressure Low - critical.	○	○			○	○
EG418 Yellow	Water in Fuel Indicator High - maintenance.	○	○			○	
EG419 Yellow	Intake Manifold Boost Pressure Imbalance.			○	○		
EG422 Yellow	Engine Coolant Level Sensor Circuit - data incorrect.			○	○		○
EG426 Yellow	SAE J1939 datalink - cannot transmit.	○	○	○	○	○	
EG428 Yellow	Water in Fuel Sensor Circuit - shorted high.	○	○	○	○		
EG429 Yellow	Water in Fuel Sensor Circuit - shorted low.	○	○	○	○		
EG431 Yellow	Accelerator Pedal Idle Validation Circuit - data incorrect.	○	○	○	○	○	○
EG432 Red	Accelerator Pedal Idle Validation Circuit - out of calibration.	○	○	○	○	○	○
EG433 Yellow	Intake Manifold Pressure Sensor Circuit - data incorrect.	○	○	○	○		
EG434 Yellow	Unswitched Battery Supply Circuit.	○		○	○		
EG435 Yellow	Engine Oil Pressure Switch Circuit - data incorrect.	○	○	○	○	○	
EG441 Yellow	Battery #1 Voltage Low - warning.	○	○	○	○	○	○
EG442 Yellow	Battery #1 Voltage High - warning.	○	○	○	○	○	○
EG443 Yellow	Accelerator Pedal Position Sensor Supply Voltage Circuit - shorted low.	○	○	○	○		

62-42

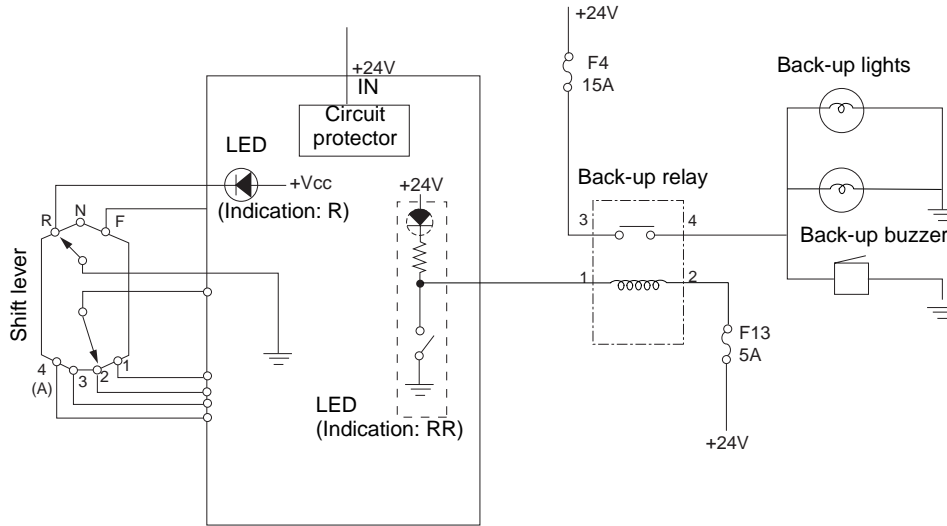
70ZV Function & Structure Electrical Group
Transmission Control Circuit and Monitor Circuit

Connector CN3 (Input)		
No.	Symbol	Signal
1	MR	Diagnostic sw (Malfunction recall)
2	A/M	Auto/manual switching signal
3	SE	Speedometer ground (Not used in USA)
4	SO	Speedometer output (Not used in USA)
5	MC	Reset sw (Malfunction clear)
6	E	1·2·5 COM ground
7	SC	Odometer converter
8		

Connector CN4		
No.	Symbol	Signal
1	DDI	Ride control switch (OPT)
2	DDO	Ride control relay (OPT)
3	OPT	(Spare) Solenoid valve (OPT)
4	SPI	Steering circuit pressure (OPT)
5	SPO	Steering circuit pressure warning lamp (OPT)
6	SPS	Emergency steering relay (OPT)

Connect No.2 and No.6 terminals of connector CN3 using a jumper wire to cancel the automatic shift function.

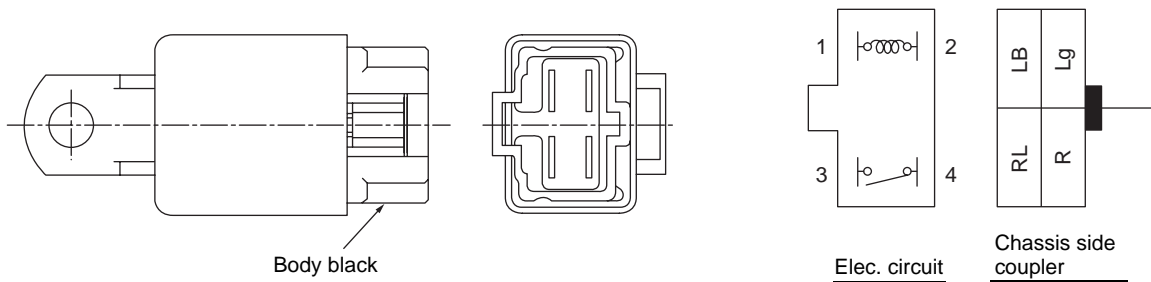
Back-up alarm



70ZVE62015

When the shift lever is set to the reverse (R) position, the coil of the back-up (or reverse) relay will be energized, and the main contact will be closed. The back-up lamp, therefore, will light, and the buzzer will sound.

Back-up relay



K85ZV62009

Note

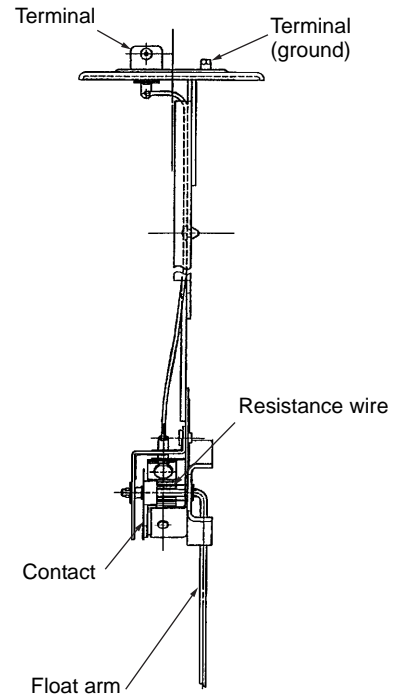
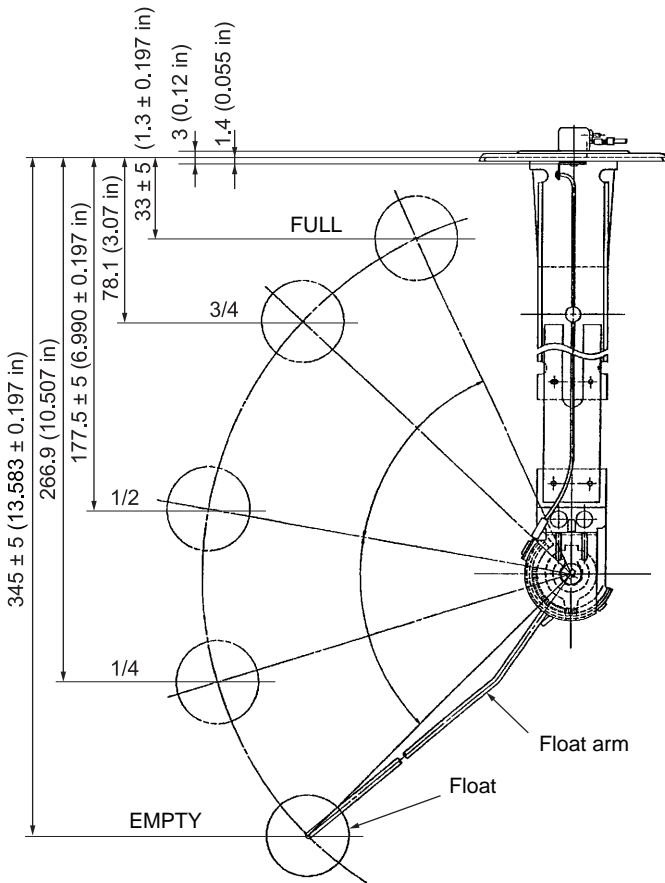
The structures of the neutral relay, back-up relay, horn relay, width lamp relay, the head lamp relay and water temperature relay (S/N 9011~) are identical each other.

They may be interchanged for testing purposes.

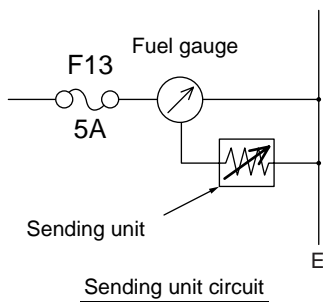
Shift lever position	Between 1 and 2	Between 3 and 4	Lamp and buzzer
R	Electric power supply	ON	ON
F or N	No electric power supply	OFF	OFF

Rating	DC 24 V
Operation voltage	16 V or less
Reset voltage	2.4 V or more
Coil resistance	320 Ω

Fuel level sensor



70ZV62045



80ZVE62022

The sending unit float arm in the fuel tank moves by the fuel level movement in the tank. The contact installed on the float arm axis also moves by contacting the resistance wire. The contact position is fixed, based on the float position and the fuel level.

When the fuel level becomes low, the resistance value rises accordingly.

The position of the fuel gauge pointer is decided by this resistance value, and the fuel gauge shows the fuel amount left in the tank.

Float position	FULL	3/4	1/2	1/4	EMPTY
Resistance (Ω)	(10 ^{+1.0} _{-0.5})	(19)	32±3	(49.5)	80 ⁺¹² ₋₂

Note

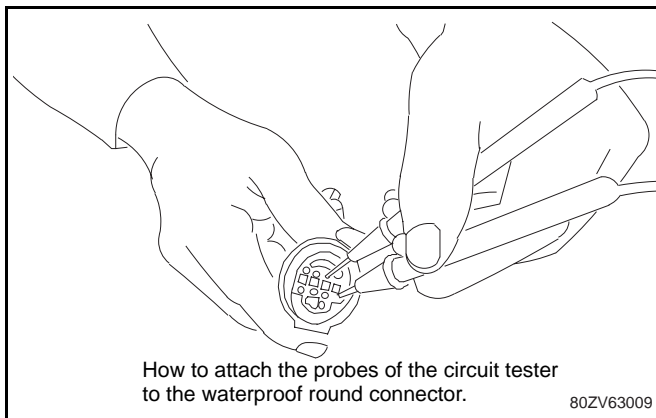
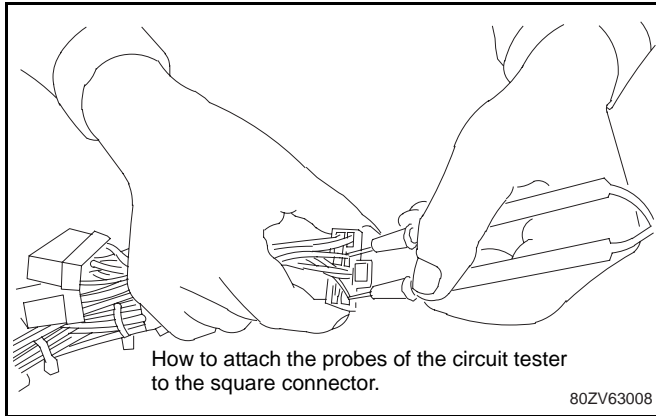
Figures in () are for the reference resistance.

Failure code

The failure code is indicated in the failure code inspection window of the controller.

Code		Failure	Detection condition	Mode
Transmission Input Circuit Malfunction	11	Shift lever F and R contact ON at the same time	In case the failure continues for more than 3 seconds	A
	12	Shift lever any of more than two 1-2-3-4 contacts on at the same time	The same as the above	A
	23	Shift lever all 1-2-3-4 contacts OFF	In case all 1-2-3-4 signal OFF continues for more than 3 seconds	A
	25	QUAD switch malfunction	In case the switch is ON for more than 10 seconds	A
	26	Inching switch malfunction	In case the switch is ON for more than 3 minutes	A
Machine System Input Malfunction	31	Air cleaner element clogging	In case the failure continues for more than 2 seconds	B
	32	Transmission oil temperature high	The same as the above	B
	33	Engine water temperature high	The same as the above	B
	34	Engine oil pressure low	In case the failure continues for more than 2 seconds during engine running	B
	35	Brake oil pressure low	In case the brake oil pressure is low during engine running	B
Transmission Output Circuit Malfunction	51	1st solenoid valve malfunction	Output circuit is disconnected or short-circuited	A
	52	2nd solenoid valve malfunction	The same as the above	A
	53	3rd solenoid valve malfunction	The same as the above	A
	54	4th solenoid valve malfunction	The same as the above	A
	55	F solenoid valve malfunction	The same as the above	A
	56	R solenoid valve malfunction	The same as the above	A
	72	Machine speed sensor malfunction	Input circuit is disconnected or short-circuited	A
	81	F-1 solenoid valve malfunction	Output circuit is disconnected or short-circuited	A
	82	F-2 solenoid valve malfunction	The same as the above	A

How to attach the probes of the circuit tester



When checking the conductivity or the voltage, follow the procedure below:

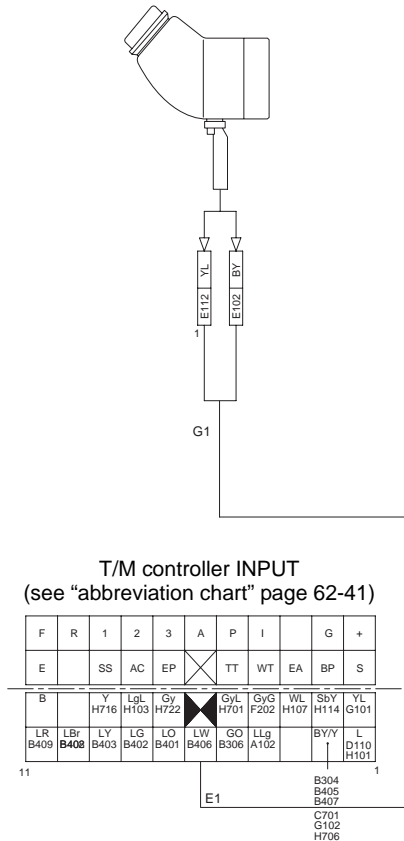
1. Square connector

Insert the probes for the tester to the wire side of the connector. Do not insert the probes into the open side of the connector. The damaged connector may cause poor contact.

2. Waterproof round connector

For the waterproof round connector, do not attach the probes of the tester to the wire side because the wire side is waterproofed. Attach the probes to the open connector side. Do not force the probes into the female side. The damaged connector may cause poor contact.

QUAD switch input electrical circuit check



The QUAD switch does not shift the speed

[Checking transmission controller input LED indicator]

Check that the transmission controller "S" LED indicator lights instantaneously when the QUAD switch is turned ON.

LED	Judgment		Remarks
ON	Normal		
OFF	Abnormal	Disconnect	Shift change impossible

If the "S" indicator does not light:
 Checking QUAD switch:

Disconnect the switch G1 connector. Check that the terminal line between 1 and 2 is conductive when the switch is depressed.

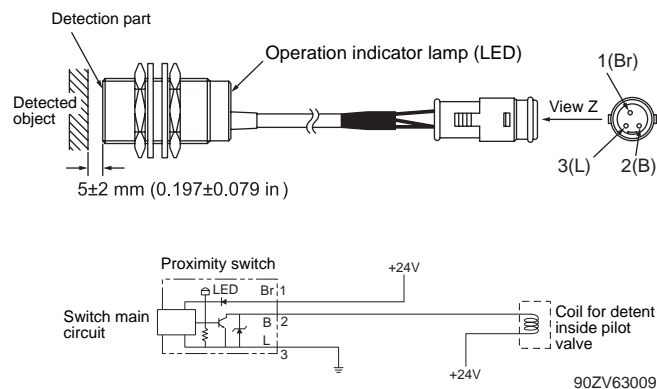
<Solution>

If the switch is defective (non-conductive), replace it. If the switch is not defective, judge that the cable or connector between the control box and switch is defective. Repair or replace the defective unit.

K70VE63003

[While traveling at the 2nd speed, turn on the QUAD switch, and the speed will be shifted to the 1st speed. (For both manual and automatic modes)] Turn the switch ON again and the transmission should be shifted back to the 2nd speed.

Bucket positioner electrical circuit check



Though the clearance between the proximity switch and the rod (detecting element) is 5 ± 2 mm (0.197 \pm 0.079 in), the operation indicator lamp (LED) is not lit, judge that the proximity switch is defective, or the cable at the chassis side is disconnected or a wire broken.

<Step 1> Checking proximity switch

Supply +24 V to pin 1 (Br) and pin 2 (B), and connect the ground to pin 3 (L).

If the operation indicator lamp (LED) does not light, judge that the proximity switch is defective.

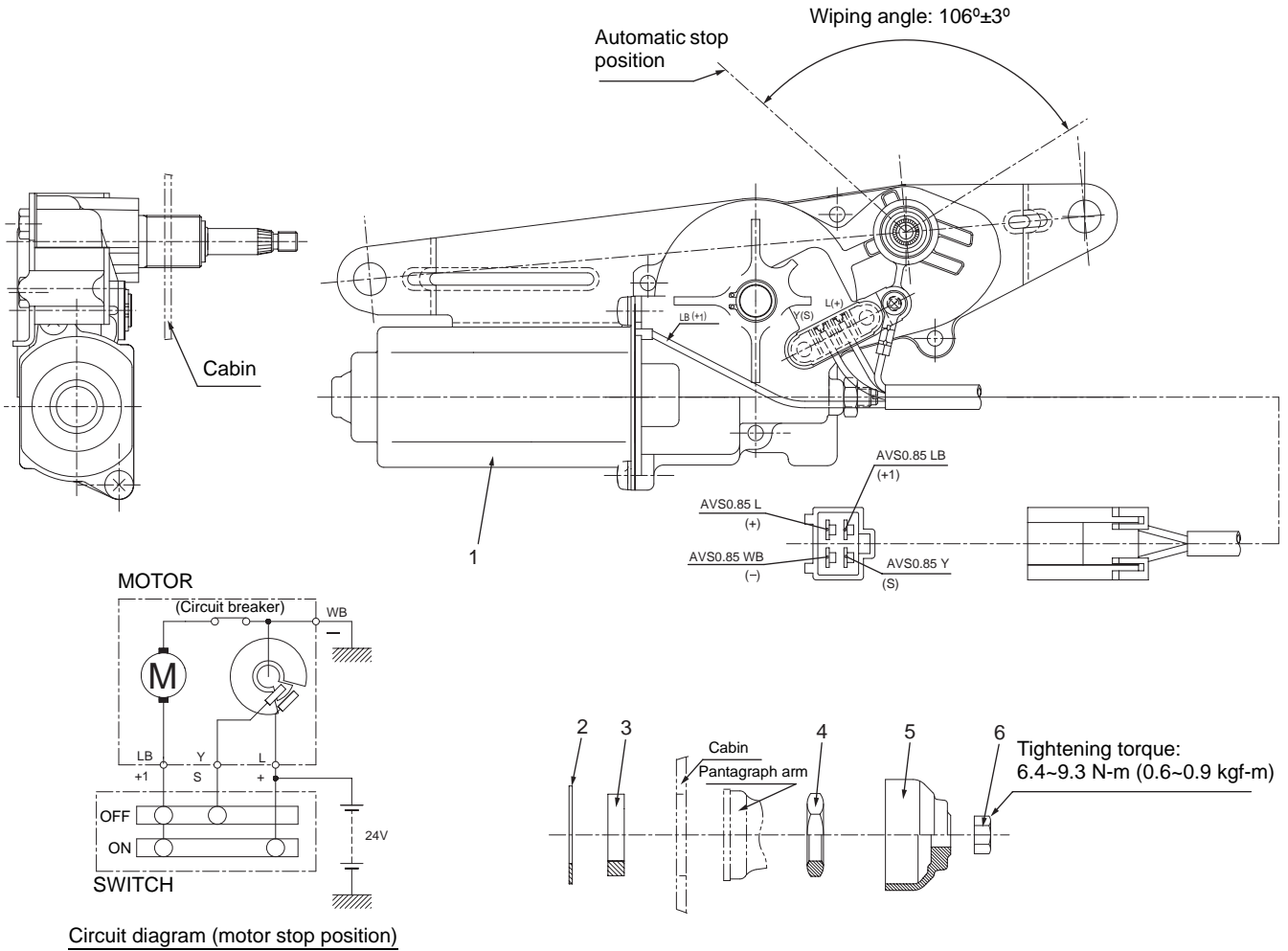
<Solution>

Replace the proximity switch.

<Step 2> Checking cable at chassis side

Check the cable from the proximity switch to the pilot valve detent magnet solenoid in order. If wire disconnection is found, repair it.

Rear



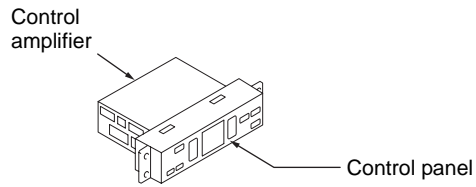
K97V2J72001

1. Wiper motor
2. Washer
3. Packing
4. Nut
5. Cap
6. Nut

Wiper motor (rear) specifications

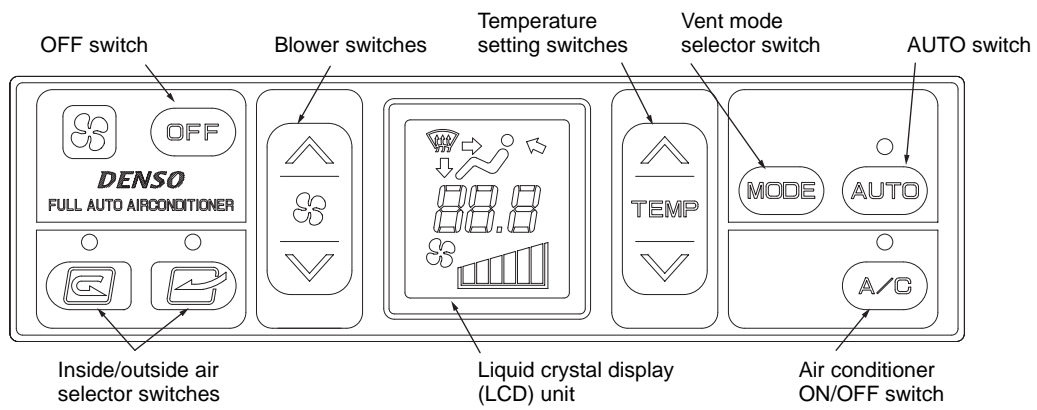
Nominal torque		12 N-m (1.2 kgf-m)
Rated voltage		DC 24 V
Rotating speed Load: 0.6 N-m (0.6 kgf-m)	Speed	$38 \pm 5 \text{ min}^{-1}$
	Current	2 A or less
Rotating speed No load	Speed	$40 \pm 5 \text{ min}^{-1}$
	Current	1 A or less
Starting voltage		16 V or less
Locked rotor current		7 A or less

Control unit



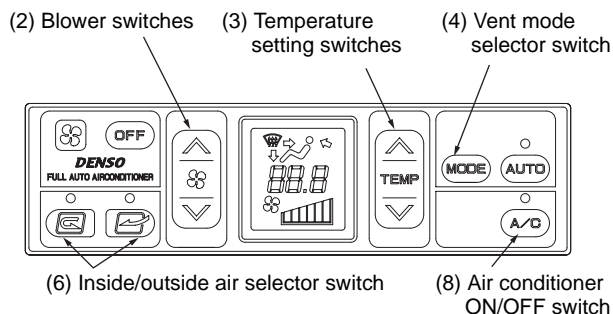
97ZV72027

Control panel



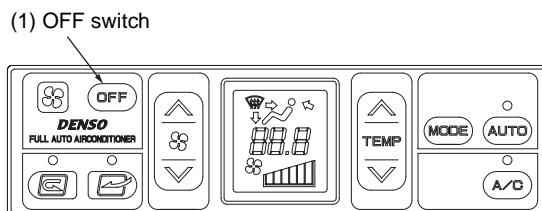
97ZV72028

3. Manual operation



97ZV72042

4. Stopping the manual operation

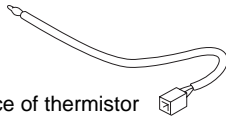


97ZV72041

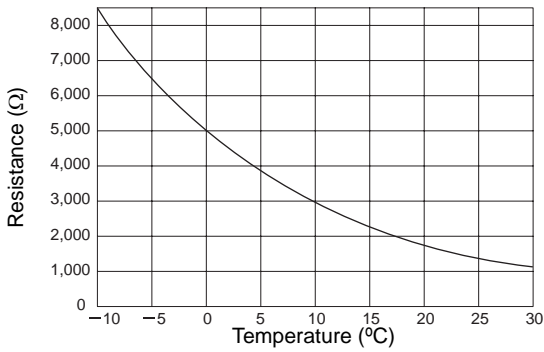
- Press the blower switches (2), and adjust the air flow quantity.
 Confirm that the set temperature and the air flow quantity are displayed on the LCD unit.
- Set to ON the air conditioner ON/OFF switch (8).
 Confirm that the indicator lamp above the switch lights.
- Adjust the temperature setting switches (3), and set arbitrary temperature.
- Press the vent mode selector switch (4), and select arbitrary vent mode.
- Press an either inside/outside air selector switch (6) to select inside air circulation or outside air entry.

Press the OFF switch (1). Then, the set temperature and the air flow quantity displayed on the LCD unit are extinguished, the indicator lamps above the AUTO switch (5) and the air conditioner ON/OFF switch (8) are extinguished, and the operation is stopped.

Thermistor



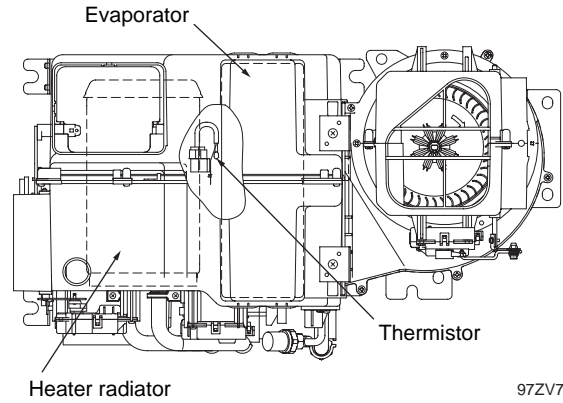
Appearance of thermistor



Characteristics curve between temperature and resistance of thermistor 97ZV72055

The thermistor, a kind of semi-conductor, offers the characteristics as shown in the curve on the above.

When the temperature becomes high, its resistance becomes small. When the temperature becomes low, its resistance becomes large.



97ZV72056

The thermistor mounted on the blowoff port side of the evaporator detects the temperature of the air cooled by the evaporator, and transmits it as a signal to the control amplifier.

If the air at the vent is 3°C or less, the control amplifier turns off the compressor clutch relay. If the air at the blowoff port becomes 4°C or more, the control amplifier turns on the compressor clutch relay again to restart cooling.

Because the air temperature at the vent is detected and the compressor clutch relay is turned on and off accordingly, freezing of the evaporator is prevented.

Troubleshooting the thermistor

Item	Symptom	Cause	Action
Cable in thermistor is broken.	Compressor clutch does not work.	- Thermistor	- Replacement
Thermistor is short-circuited.	Air is not blown.		

72-48
70ZV Function & Structure Operator Station Group
Air Conditioner

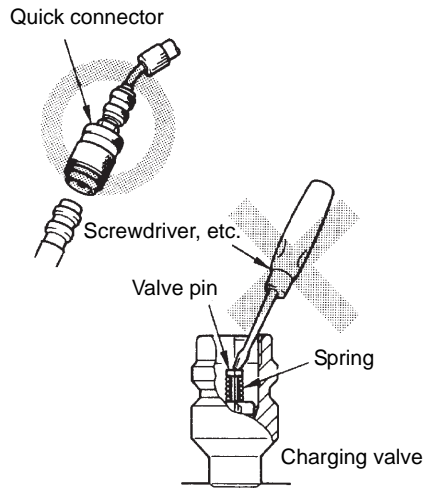
Switch	Function	Switching pressure kPa (kgf/cm ²)	Switch operation confirmation method	Causes of abnormal pressure
High pressure switch	When pressure between compressor and expansion valve becomes abnormally high, this switch shuts down power supplied to compressor magnetic clutch to protect circuit.	<p>2,550 (26) 3,136 (32)</p> <p>ON</p> <p>OFF</p>	<p>Pressure switch coupler</p> <p>Check conductivity between A and B.</p>	Heat radiation of condenser is insufficient due to clogging in condenser or defective rotation of condenser fan.
Medium pressure switch	When detecting fluctuation of pressure between compressor and expansion valve, this switch gives a signal to control amplifier about whether to rotate condenser fan motor at low speed or high speed. While this switch is ON, fan motor rotates at high speed. While this switch is OFF, fan motor rotates at low speed.	<p>1,519 (15.5)</p> <p>ON</p> <p>OFF</p> <p>1,225 (12.5)</p>	<p>Check conductivity between C and D in pressure switch coupler shown above.</p>	_____
Low pressure switch	When pressure between compressor and expansion valve becomes abnormally low due to refrigerant leak, this switch shuts down power supplied to compressor magnetic clutch to prevent seizure of compressor caused by insufficient compressor oil which decreased together with refrigerant.	<p>226 (2.3)</p> <p>ON</p> <p>OFF</p> <p>196 (2.0)</p>	<p>Check conductivity between A and B in pressure switch coupler shown above.</p>	Refrigerant leak from a part of circuit.

Troubleshooting the pressure switch

Item	Symptom	Cause	Action
Insufficient cooling	- Condenser fan motor does not change its speed (to high speed).	- Medium pressure switch	- Replacement
Gas leak	- Even when abnormal high pressure (3,136 kPa (32 kgf/cm ²)) occurs, compressor does not turn off. - Even when gas (refrigerant) has run short, compressor does not turn off.	- High or low pressure switch*	- Replacement

*If abnormal high pressure occurs while the high pressure switch is nonconforming, the equipment in the cooling circuit may be damaged. The pressure relief valve releases the refrigerant to the atmosphere in order to prevent damages of the equipment.

Precautions



97ZV72082

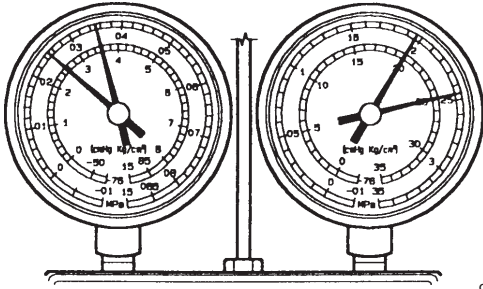
IMPORTANT

If you push the valve pin with a considerable force [294 kPa (3 kgf/cm²)] with a screwdriver, etc., the spring may come off and the refrigerant may leak. Never do this.

When there is too much refrigerant or cooling in the condenser is insufficient

<Low pressure side>
 245~343 kPa
 (2.5~3.5 kgf/cm²)

<High pressure side>
 1,961~2,452 kPa
 (20~25 kgf/cm²)

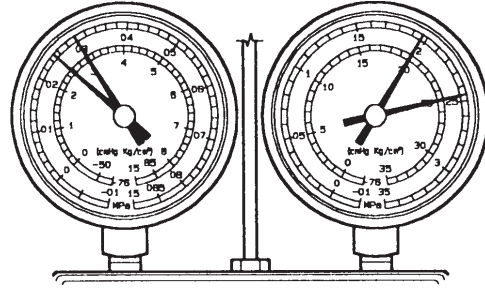


97ZV72096

When air has entered into the cooling circuit

<Low pressure side>
 245~294 kPa
 (2.5~3.0 kgf/cm²)

<High pressure side>
 1,961~2,452 kPa
 (20~25 kgf/cm²)



97ZV72097

Symptom	Cause	Inspection/action point
- Pressure is high on both low pressure side and high pressure side.	- Refrigerant quantity is too much.	- Check and correct refrigerant charge pressure.
- Even when engine rpm's (min ⁻¹) are reduced, gas bubbles cannot be seen at all in sight glass.	- Plugged or bent condenser fins.	- Inspect and repair condenser fins.
- Air in cab does not become cool enough.	- Bad fan motor or fan blade.	- Repair or replace fan or fan motor
	- Heat transfer does not occur in evaporator has plugged fins	- Inspect and repair evaporator fins.

Symptom	Cause	Inspection/action point
- Pressure is high on both low pressure side and high pressure side.	Air has entered system.	- Refrigerant is bad.
- Low pressure piping is not cold.		- Evacuate system completely.
- Gas bubbles go through sight glass.		- Replace refrigerant.

72-78
70ZV Function & Structure Operator Station Group

MEMO

Controller	62-40
Controller connection diagram	62-43
Controller function	62-44
Coolant Specification	00-9
Coolant specification	00-9
Cooling circuit	72-22
Cooling mechanism	72-19
Cooling unit	72-14
Cylinder natural drift	43-12
Cylinders	42-4

D

Detent adjustment procedure	42-30
Detent solenoid	62-65
Diag. Inc/Dec switch assembly (option)	62-23
Diagnostic (T/M controller) failure code detection condition	62-74
Diagnostic failure history indication and deletion	62-75
Diagnostic failure history memory data	62-71
Diagnostic switch	62-77
Diagnostic System	62-70
Diagnostic system flow	62-70
Difference in gear shapes	22-19
Differential Gear (LSD) (S/N 9018~)	22-21
Differential Gear (TPD) (S/N 9001~9017)	22-16
Differential gear adjustment procedure	23-6
Diode	62-66
Diode check method	62-67
Diode check mode	62-67
Diode unit	62-18
Directional control valve	42-6
Disconnecting or reinstalling connector	63-2
Dust seal	12-9

E

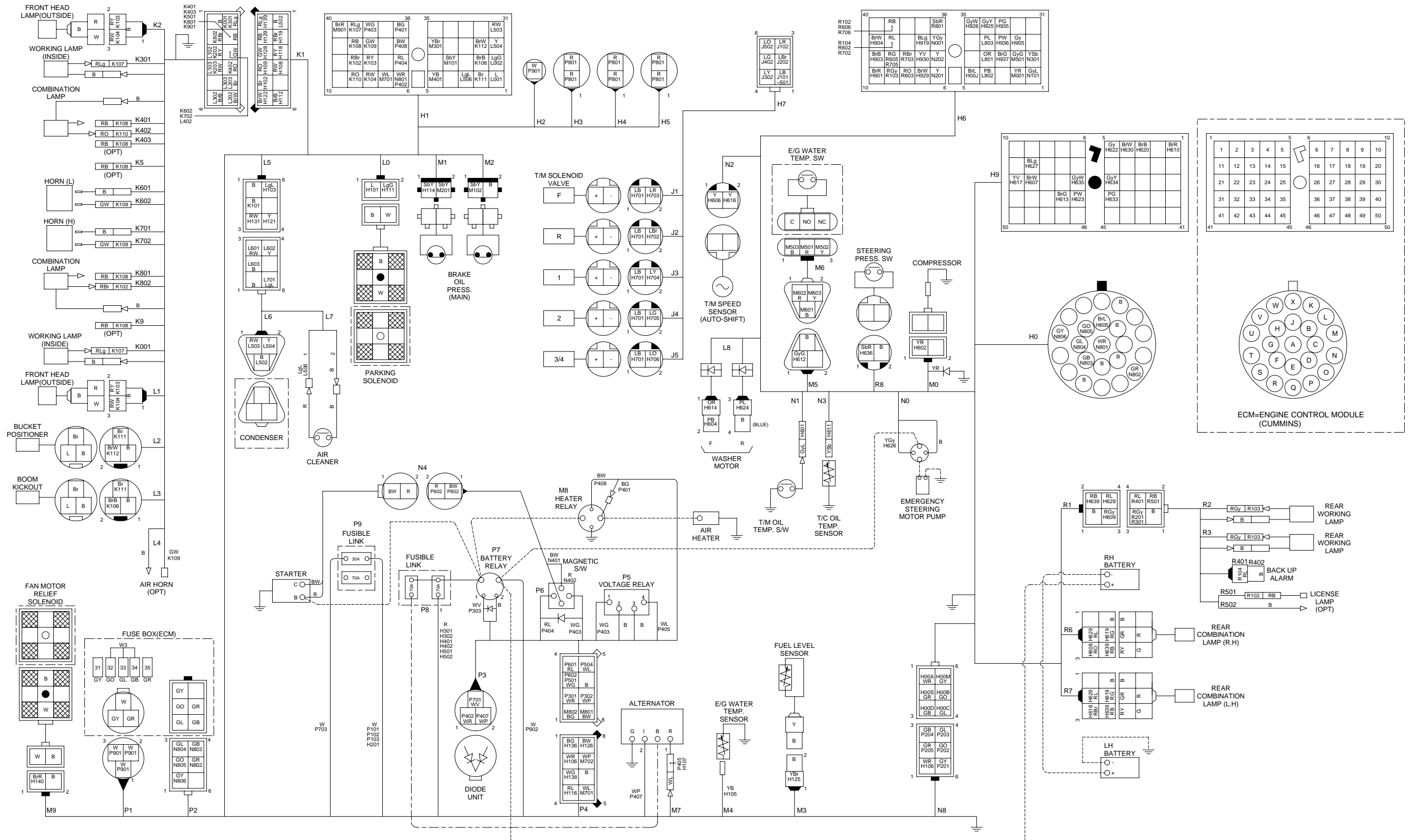
ECM (Engine Controller)	62-21
Electrical Cable Color Codes	62-8
Electrical circuit	72-23
Electrical Circuit Check	63-10
Electrical Circuit Diagram (Cabin Air Conditioner)	92-32
Electrical Circuit Symbols	62-9
Electrical Connection Diagram (S/N 9001~9010)	92-20
Electrical Connection Diagram (S/N 9011~)	92-21
Electrical Detent Circuit	62-63
Electrical Equipment Layout	92-23
Electrical Transmission Control System Troubleshooting Flowchart	63-5
Electrical Wiring (Reversal Fan) (OPT)	92-22
Electrical Wiring (Reversal Fan) (OPT) (S/N 5131~)	92-22
Electrical Wiring Diagram (1/2) (S/N 9001~9010)	92-8
Electrical Wiring Diagram (1/2) (S/N 9011~9017)	92-10
Electrical Wiring Diagram (1/2) (S/N 9018~9030)	92-12
Electrical Wiring Diagram (1/2) (S/N 9031~)	92-14
Electrical Wiring Diagram (2/2) (S/N 9001~9010)	92-9
Electrical Wiring Diagram (2/2) (S/N 9011~9017)	92-11
Electrical Wiring Diagram (2/2) (S/N 9018~9030)	92-13
Electrical Wiring Diagram (2/2) (S/N 9031~)	92-15
Electrical Wiring Diagram (CAB)	92-17
Electrical Wiring Diagram (Cabin Air Conditioner)	92-33

Electrical wiring diagram abbreviation chart	92-16
Engine	23-2
Engine / Transmission	22-3
Engine / transmission mount	22-3
Engine diagnostic switch (option)	62-25
Engine Start Circuit	62-15
Engine start circuit diagram	62-15
Equipment Operation Table (Cabin Air Conditioner)	92-34

F

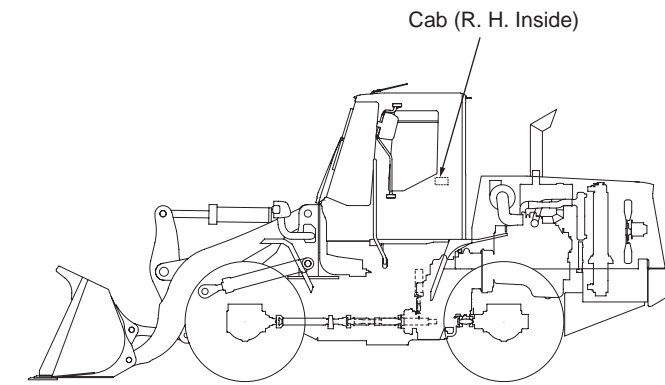
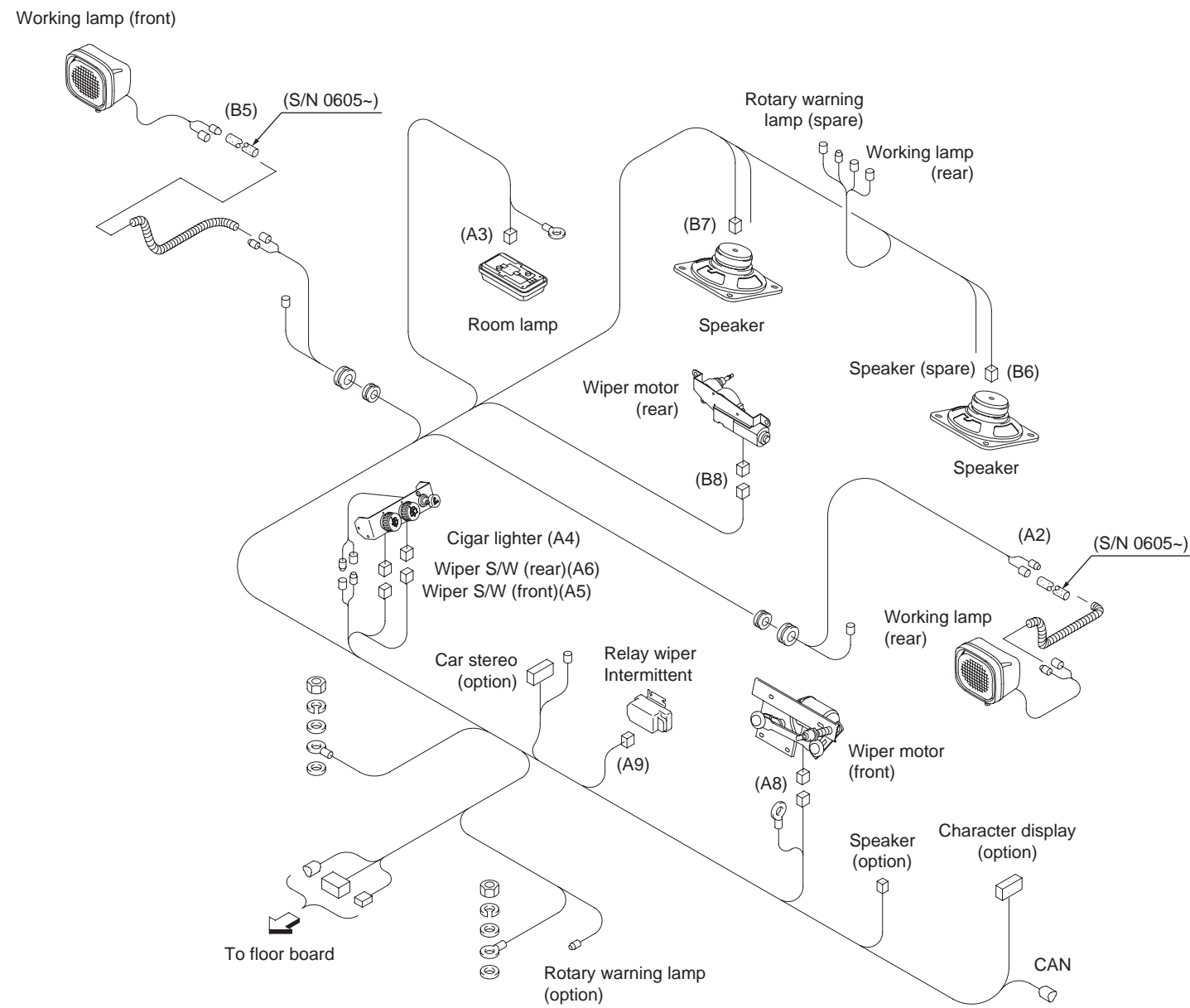
Failure code	62-72
Failure diagnosis	62-23
Failure diagnostic chart	62-26
Failure history deletion	62-75
Failure history indication	62-75
Fan maximum revolution measurement	43-15, 43-17
Fan motor (GM20W-1T7T8-B70A61L)	42-86
Fan motor (GM20W-1T7T8-K70A61L)	42-94
Fan motor check valve (Make-up valve)	42-98
Fan Motor Line (S/N 9001~9010)	42-84
Fan Motor Line (S/N 9011~)	42-92
Fan motor relief valve	42-98
Fan motor relief valve assembly	42-97
Fan motor specifications	42-86
Fan motor system	42-9
Fan Revolution (S/N 9001~9010)	43-15
Fan Revolution (S/N 9011~)	43-17
Fan revolution adjustment	43-16, 43-18
Fault diagnosis procedure	72-70
Flanged hexagon bolt	00-15
Float	62-64
Floor board	12-5
Floor board mount	12-5
Flow amplifier notch and pilot orifice	42-74
Flow control valve	42-5
Flushing Hydraulic Circuit	42-2
For forward/reverse and speed clutches	32-28
For word 2nd speed	32-13
Forward	32-12
Forward 1st speed	32-12
Forward 3rd speed	32-14
Forward 4th speed	32-15
Forward and 3rd speed clutches	32-9
Forward/reverse (F/R) shifting and speed change	62-44
Friction plate: mm (in)	32-6
From torque converter gear pump to torque converter	32-19
Front Chassis	12-2
Front wiper	72-6
Fuel level sensor	62-62
Fuel tank (S/N 9001~9005)	12-6
Fuel tank (S/N 9006~)	12-7
Function	42-54
Function of ECM	62-21
Fuse	62-11
Fuse box	62-12
Fuse box location	62-11
Fusible link	62-13

Electrical Wiring Diagram (2/2) (S/N 9001~9010)



CAB

(S/N 0429~)



Cab serial number plate location

Note
Serial number (S/N) on this page shows the serial numbers for the cab and not for the machine.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL