Inspection and maintenance table

Refer to Operation & Maintenance Manual for maintenance procedures.

IMPORTANT

Severe application require more frequent maintenance.
Severe conditions include heavy dust, extremely abrasive material, caustic chemicals, exremely wet conditions or abnormally hot or cold ambient temperatures.

△ : First time replacement or cleaning only

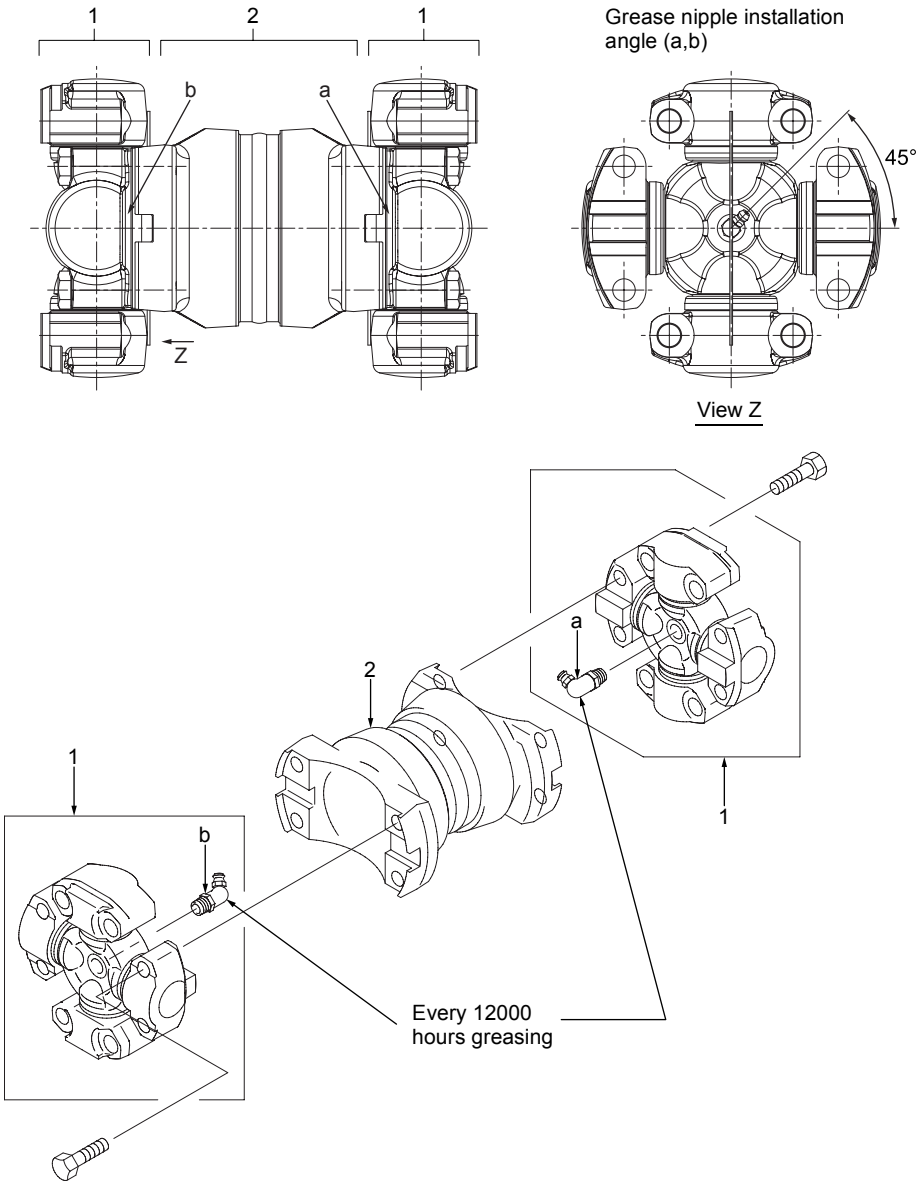
Section	Item for check	Operating hours						When Required
		10	50	250	500	1000	2000	
Engine	Check Engine Oil Level	○						
	Check Engine Coolant Level	○						
	Drain Water and Sediment from Fuel Prefilter	○						
	Check Drive Belt	○						
	Check Air Intake System	○						
	Check Cooling Fan	○						
	Check Warning Lamps	○						
	Check Fuel Level	○						
	Check Exhaust Gas	○						
	Drain Water and Sediment from Fuel Tank		○					
	Replace Fuel Filter Cartridge			○				
	Replace DCA4 Coolant Filter Cartridge			○	○ *1			
	Clean Crankcase Breather Tube			○				
	Adjust Belt Tension			○				
	Replace Engine Oil and Oil Filter Cartridge				○			
	Check and Adjust Injection Timing					○		
	Check Engine Compression Pressure					○		
	Check Injection Pressure					○		
	Replace Fuel Tank Breather					○		
	Clean Fuel Tank						○	
	Check and Adjust Valve Lash Clearance						○	
	Check Vibration Damper						○	
	Clean Crankcase Breather						○	
	Clean or Replace Air Cleaner Element							○
	Clean Radiator / Air cooler / Hydraulic oil cooler Fins							○
	Replace Ether Cylinder							○
	Clean or Replace Air Cleaner Element	After six cleanings or once a year ○						
	Replace Coolant	Every 2 years or 3000 hours ○						

Note:
*1 applies to machines from S/N 9101 and thereafter. Refer to the Operation & Maintenance Manual for details.

Item				Standard measurement values for performance check	Remarks
System	Measurement item				
Hydraulic line	Cylinder drift (when boom and bucket are horizontal and with no load) (mm/min) (in/min)	Boom cylinder		3 (1/8) or less	
		Bucket cylinder		4 (5/32) or less	
	Boom rising time (no load) (sec)	Engine speed	Idling (LI)	25±3.0	
			1,500 min^{-1} (rpm)	10.5±1.0	
			Maximum (HI)	8.4±0.5	
	Full steering time (sec)	Engine speed	Idling (LI)	5.0±0.5	
			1,500 min^{-1} (rpm)	3.9±0.3	
			Full accelerated engine speed	3.9±0.5	
	Relief valve setting pressure MPa (kgf/cm^2) (psi)	Loading line main relief pressure (HI)		20.6±0.5 (210±5) (2,986±71)	
		Loading line overload relief pressure (LI)		23.5±0.5 (240±5) (3,413±71)	Run engine at lowest possible speed while setting
		Steering line main relief pressure (HI)		20.6±0.5 (210±5) (2,986±71)	
		Steering line overload relief pressure (LI)		$24.5\ ^{+1.0}_{0}$ ($250\ ^{+10}_{0}$) ($3,555\ ^{+142}_{0}$)	Run engine at lowest possible speed while setting
		Pilot line reducing pressure (LI)		3.5 (36) (512)	Run engine at lowest possible speed while setting
	Fan maximum revolution (HI) min^{-1} (rpm)	Engine water temp. <80ºC (180ºF) T/C oil temp. <110ºC (230ºF) Hydraulic oil temp. <90ºC (195ºF)		$1,120\ ^{+75}_{-200}$	
		Engine water temp. >95ºC (205ºF) T/C oil temp. >115ºC (240ºF) Hydraulic oil temp. >95ºC (205ºF)		$1,300\ ^{+100}_{-50}$	
	Fan minimum revolution (LI) min^{-1} (rpm)	Engine water temp. <60ºC (140ºF) Engine idle revolution		$900\ ^{+50}_{-200}$	

First propeller shaft assembly

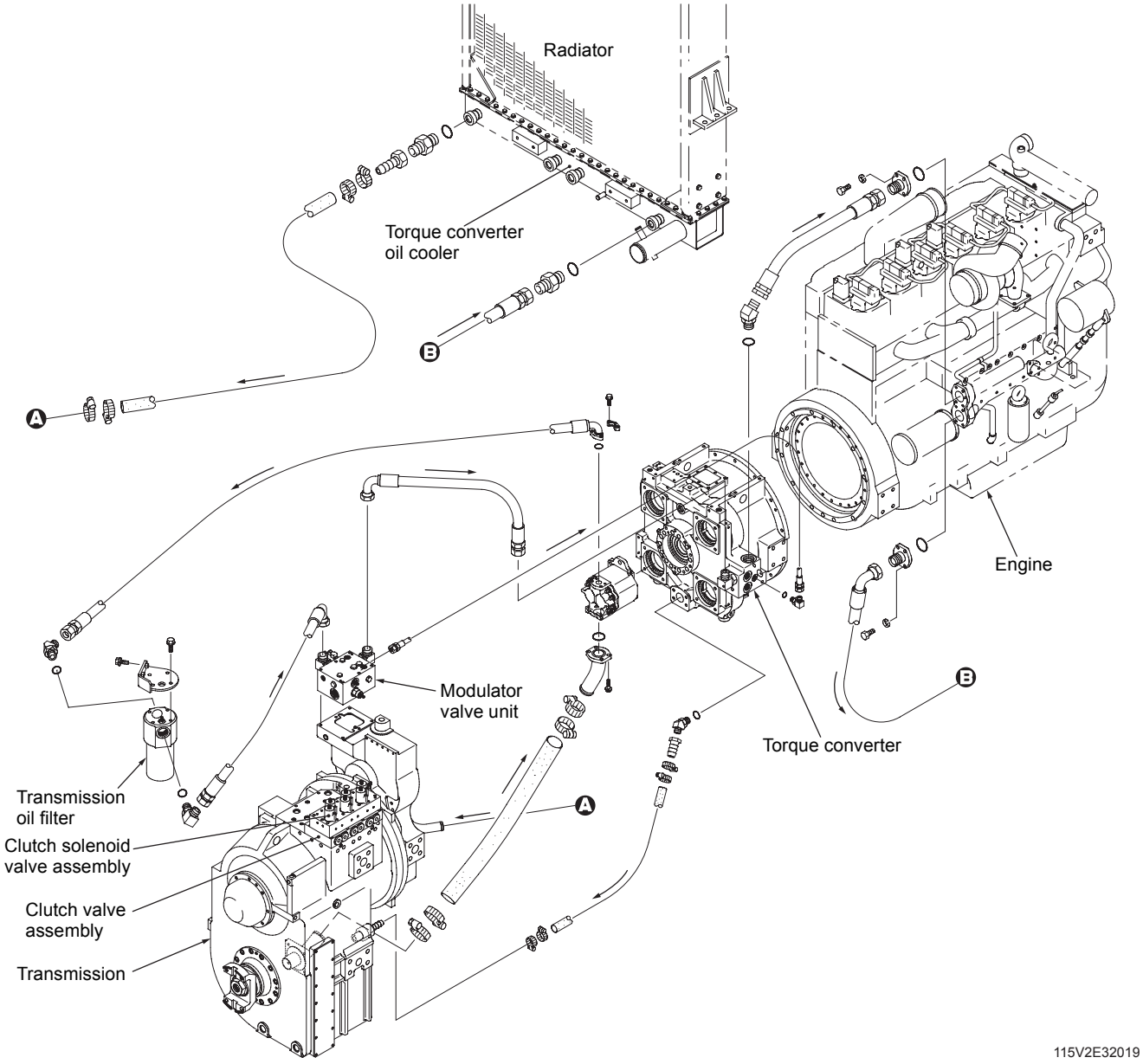
Transmission – Torque converter



115V2U22002

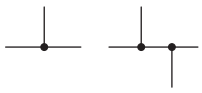
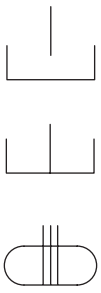
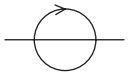
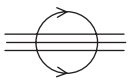
1. Journal spider assy
2. Propeller shaft

T/C and T/M Oil Circulation

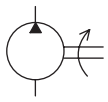
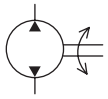
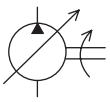
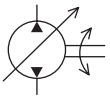
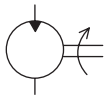
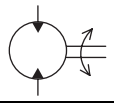
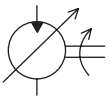
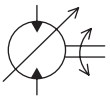


Hydraulic Circuit Symbols

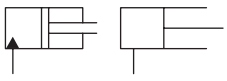
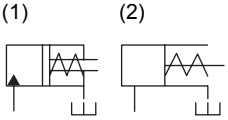
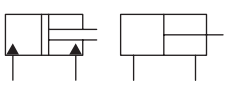
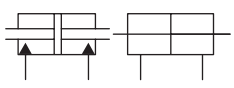
Hydraulic lines

Working hydraulic line	
Pilot line Drain line	
Lines joining	
Flexible line	
Lines passing	
Line to tank (Above fluid level) Line to tank (Below fluid level) Hydraulic tank (Pressurized type)	
Fixed restriction	
Rotary joint (1) one line (Unidirectional) (2) three line (Bidirectional)	(1)  (2) 

Pumps & motors

Fixed displacement, Hydraulic pump (1) Unidirectional (2) Bidirectional	(1)  (2) 
Variable displacement, Non-compensating hydraulic pump (1) Unidirectional (2) Bidirectional	(1)  (2) 
Fixed displacement, Rotary hydraulic motor (1) Unidirectional (2) Bidirectional	(1)  (2) 
Variable displacement, Rotary hydraulic motor (1) Unidirectional (2) Bidirectional	(1)  (2) 

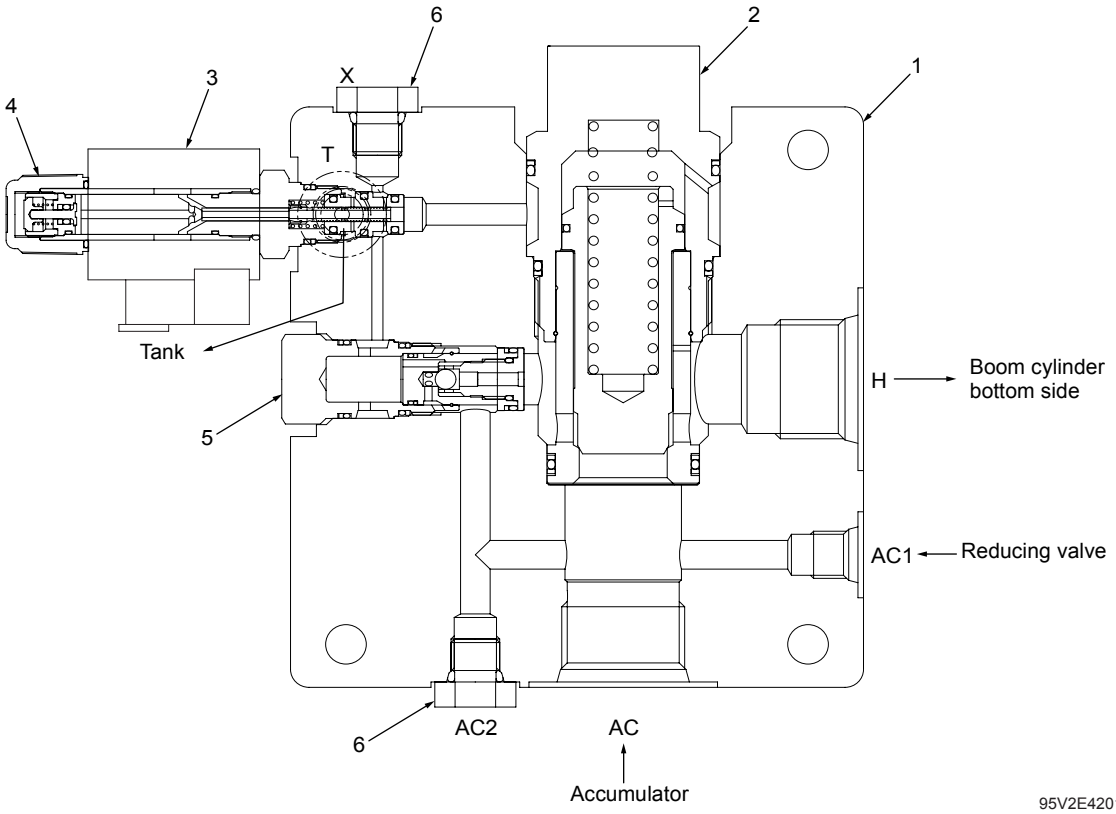
Cylinders

Single acting cylinder (without spring)	(1) (2) 
Single acting cylinder (with spring)	(1) (2) 
Double acting cylinder (single rod)	(1) (2) 
Double acting cylinder (double rod)	(1) (2) 

(1) detail symbol
(2) mnemonic symbol

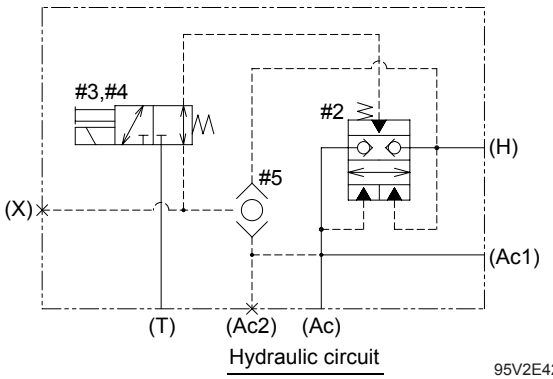
Ride control valve assembly (Accumulator circuit)

Outline drawing



95V2E42016

1. Block
2. Selector valve
3. Solenoid
4. Valve
5. Shuttle valve
6. Plug



Hydraulic circuit

95V2E42017

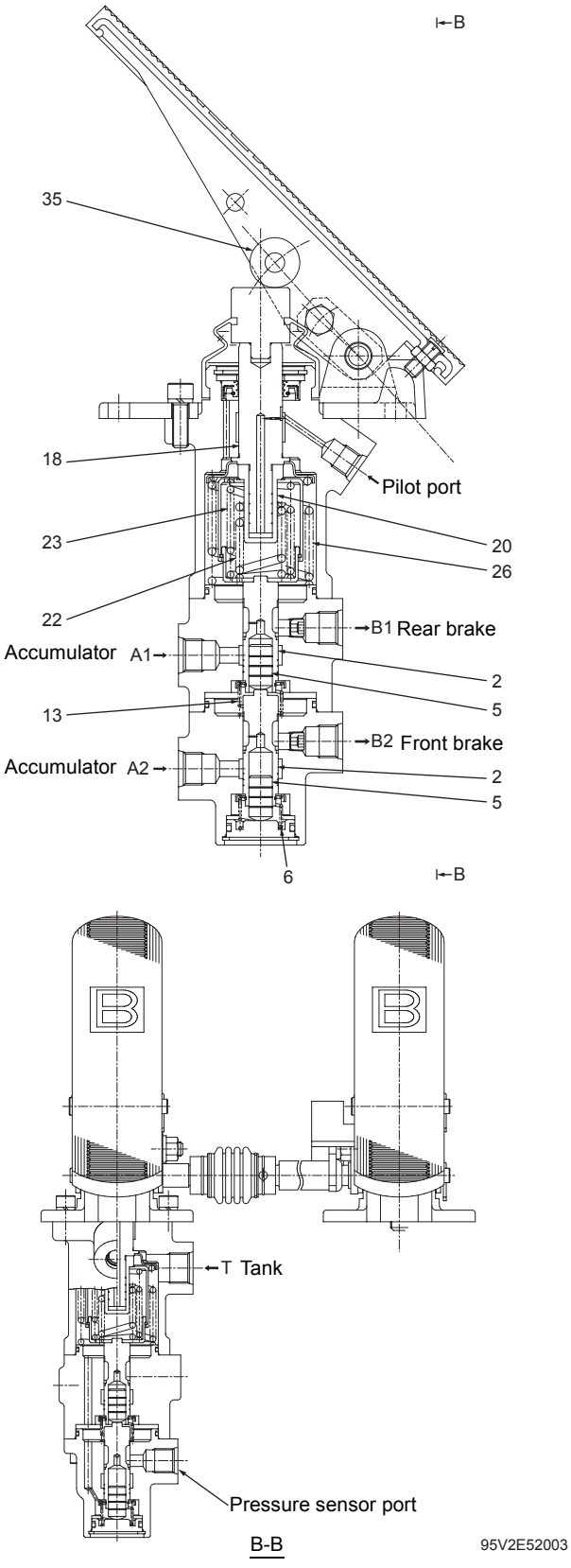
Brake valve outline

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

The brake valve is the tandem type, and consists of two independent systems. When the right side pedal is depressed, the movement of right side pedal is transmitted to a left side pedal by the linkage and brake is applied. But when the left side pedal is depressed, only left pedal is worked.

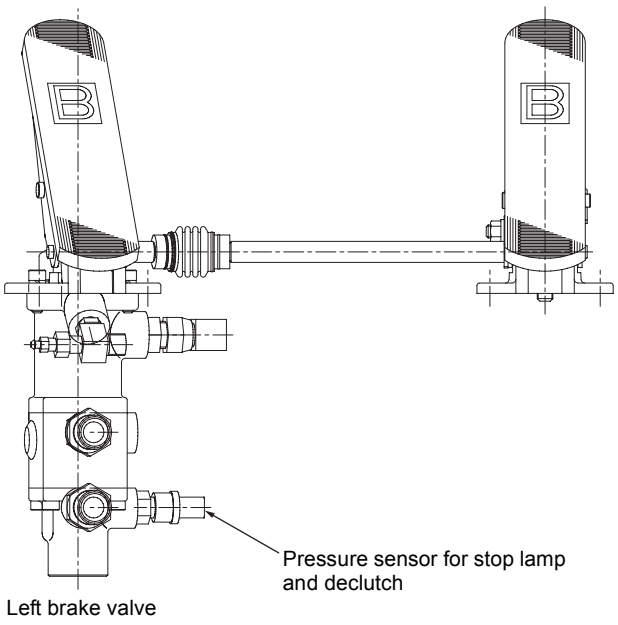
The valve is the closed center type (in which the import is closed while the pedal is released). High pressure is always applied on the in-port side to improve the responsiveness during operation.

While the valve is not operating



Pressure Sensor (for stop lamp and declutch)

Pressure sensor (for stop lamp)



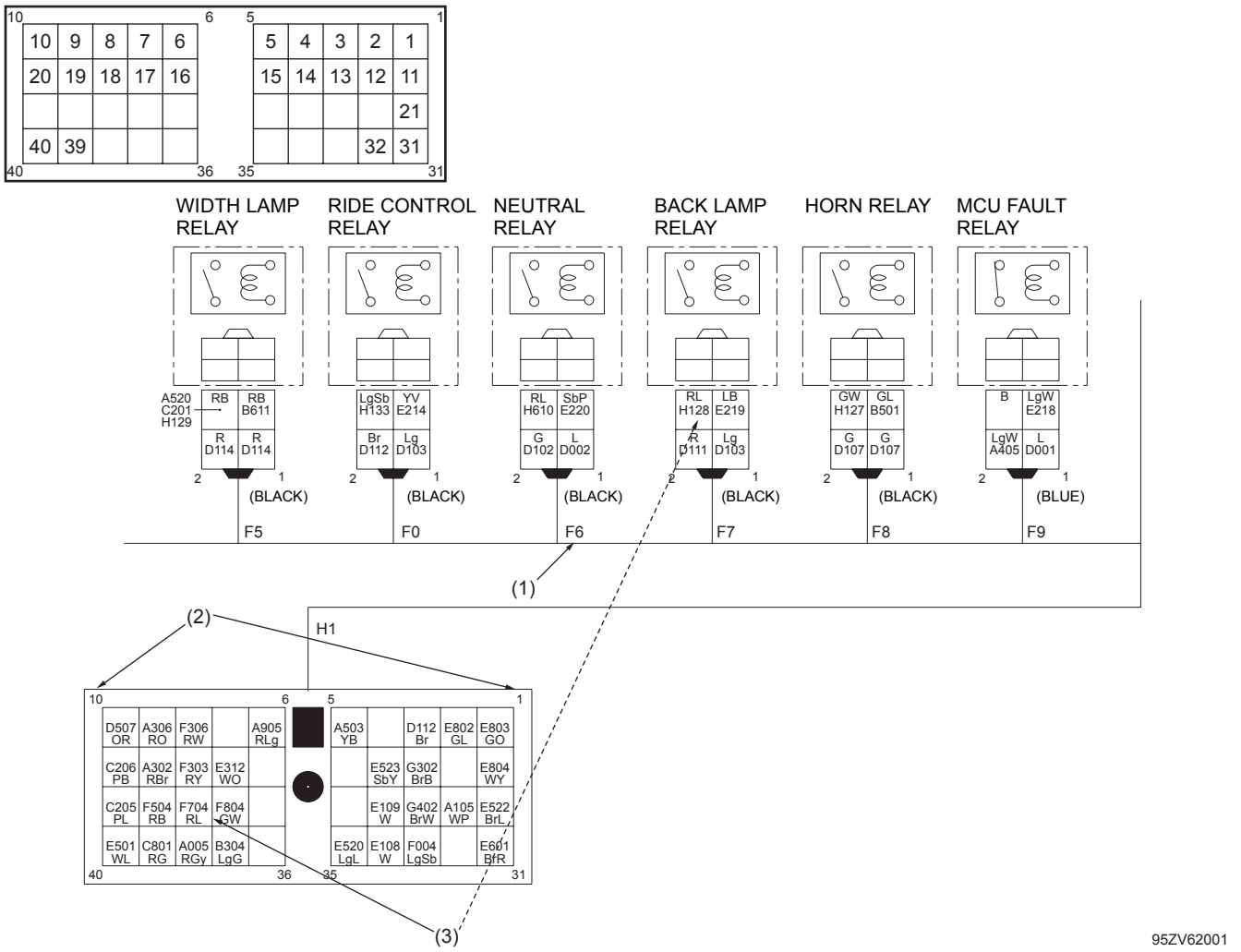
115V2E52007

This pressure sensor that set valve is controlled by the MCU is installed between the brake valve and the front brake.

When the brake pedal is depressed and the pressure increases to the setting of the MCU (0.26 MPa (2.5 kgf/ cm^2) (35 psi)), the stop lamp turns on.

How to Use Electrical Wiring Diagram

Example



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:

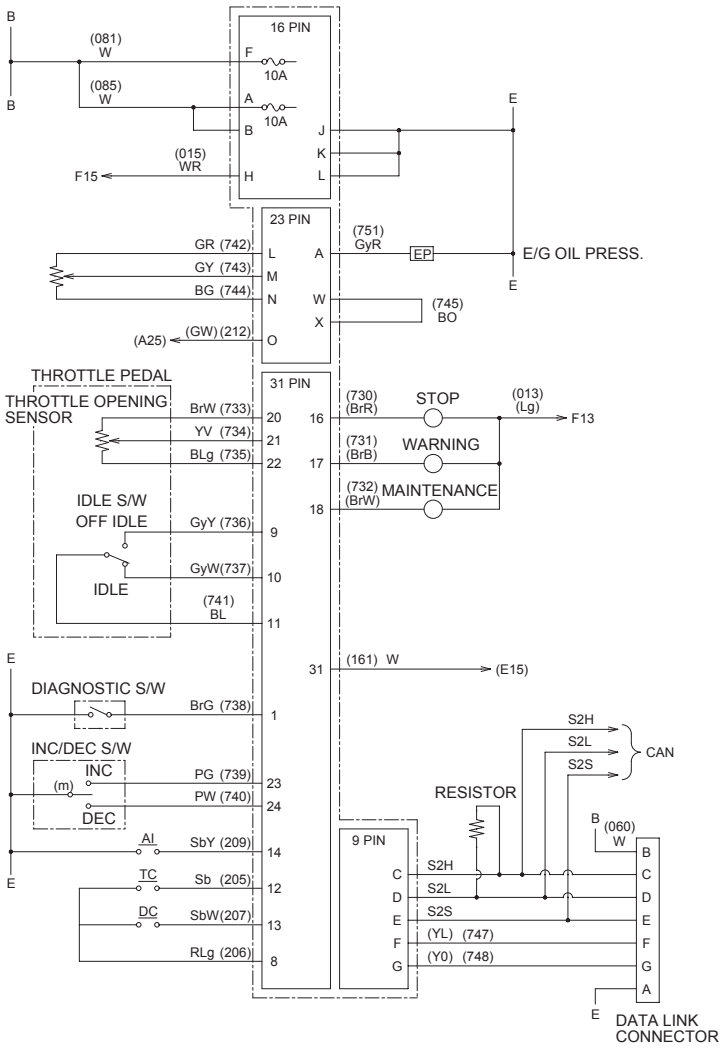
1. F704
   Shows that the terminal is connected to the 4th terminal of the F7 connector.
   Check the description in the 4th terminal of the F7 connector (F704), it shows that the F704 terminal is connected to H128. This means that the 4th terminal of the F7 connector is connected to the 28th terminal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

ECM (Engine Controller)

Function of ECM

- Stops the engine.
- Operates the engine.
- Monitors the engine, and diagnoses it for faults.

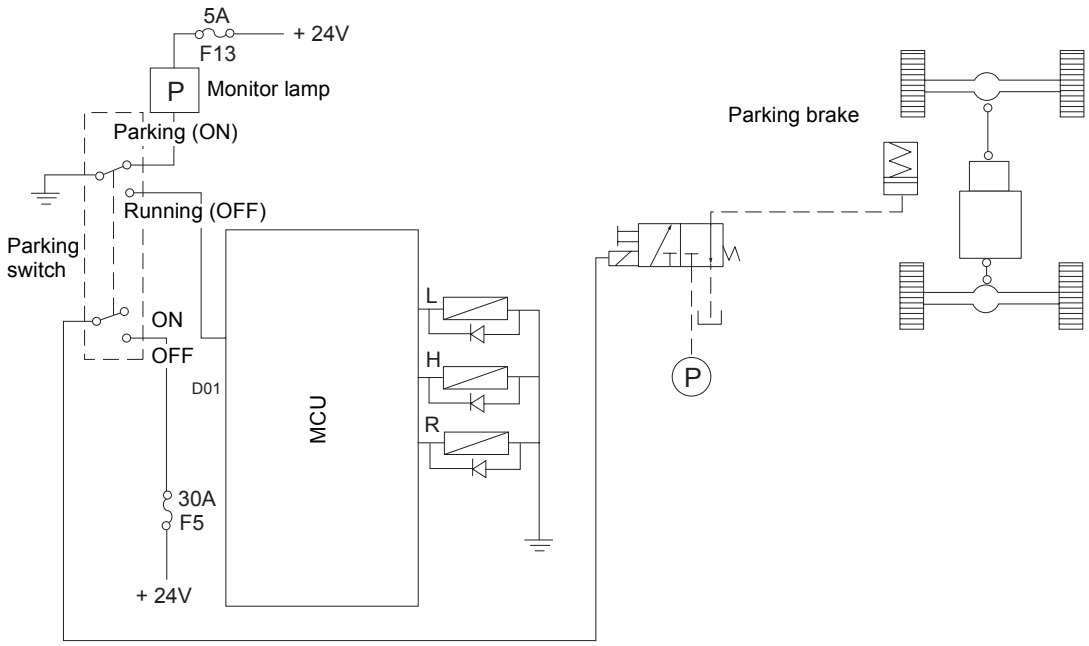
Connection diagram



E/G ECM connection diagram

115V2E62006

Parking brake



95V2E62014

The parking brake solenoid valve activates the parking brake.

Parking switch ON:

When the power of the solenoid valve is turned off, no oil will be fed to the piston chamber of the parking brake. The piston presses the brake disc with the spring force to actuate the parking brake. If the transmission shift lever is set to the forward or reverse (F or R) position, the buzzer will sound and the clutch will not be engaged.

Parking switch OFF:

When the power of the solenoid valve is turned on, oil will be fed into the piston chamber, the spring is compressed, and the parking brake is released.

Parking brake operation

	Parking switch	Monitor lamp	Buzzer	Parking brake solenoid valve
Parking *	"Parking" position (pulled up)	(P)	Sounds when shift lever is set to F or R	No electric power supply
Running	"Running" position (pushed in)	Off	No buzzer	Electric power supply

*When the parking switch is set to "parking", the forward or reverse clutch is disengaged and set to neutral.

Code	Failure	Detection condition (In case of)
CN352	Hydraulic oil temperature sensor malfunction (2)	Input voltage is lower than 0.263 V for more than 3 seconds
CN381	Fuel level sensor malfunction	Input signal corresponds to "any other pattern" in fuel level indication table
CN391	Air temperature probe malfunction (1)	Input voltage is larger than 4.35 V for more than 3 seconds
CN392	Air temperature probe malfunction (2)	Input voltage is lower than 0.13 V for more than 3 seconds
CN412	Abnormal brake oil pressure (1)	Brake oil pressure sensor 1 detects pressure below 4,081 kPa (41.6 kgf/cm^2) (592 psi) for more than 1 second during engine running
CN413	Abnormal brake oil pressure (2)	Brake oil pressure sensor 2 detects pressure below 4,081 kPa for (41.6 kgf/cm^2) (592 psi) more than 1 second during engine running
CN414	Abnormal brake oil pressure difference	Brake oil pressure difference switch is in abnormal condition for more than 1 second
CN415	Abnormal brake oil amount	Brake oil amount switch is in abnormal condition for more than 1 second
CN421	Abnormal engine oil pressure	Engine oil pressure switch is OFF for more than 2 seconds during engine running
CN431	Abnormal engine coolant temperature (1)	Engine coolant temperature switch is ON for more than 2 seconds
CN432	Abnormal engine coolant temperature (2)	Engine coolant temperature sensor is in 101 deg. C (214 deg. F) condition for more than 2 seconds
CN451	Abnormal T/M oil temperature (1)	T/M oil temperature switch is ON for more than 2 seconds
CN452	Abnormal T/M oil temperature (2)	T/M oil temperature sensor is in 122 deg. C (252 deg. F) condition for more than 2 seconds
CN461	Abnormal hydraulic oil temperature	Hydraulic oil temperature sensor is in 100 deg. C (212 deg. F) condition for more than 2 seconds
CN471	Clogged T/M oil filter	30 minutes after starter switch is ON, T/M oil filter switch is ON for more than 2 seconds when T/M oil temperature sensor detects oil temperature more than 60 deg. C (140 deg. F)
CN481	Clogged air cleaner element	Air cleaner switch is ON for more than 2 seconds
CN491	Abnormal cooling water level in radiator	Radiator cooling water level switch is OFF for more than 2 seconds when the engine is off.
CN496	Abnormal hydraulic oil level	Hydraulic oil level switch is in abnormal condition for more than 30 seconds
CN801	CAN disconnect	CAN line is disconnected
CN802	Abnormal engine coolant temperature (CAN)	No engine coolant temperature data received for more than 3 seconds
CN912	Abnormal MCU voltage (1)	Voltage is larger than 30±1 V
CN913	Abnormal MCU voltage (2)	Voltage is lower than 22±0.5 V for more than 10 seconds during engine running

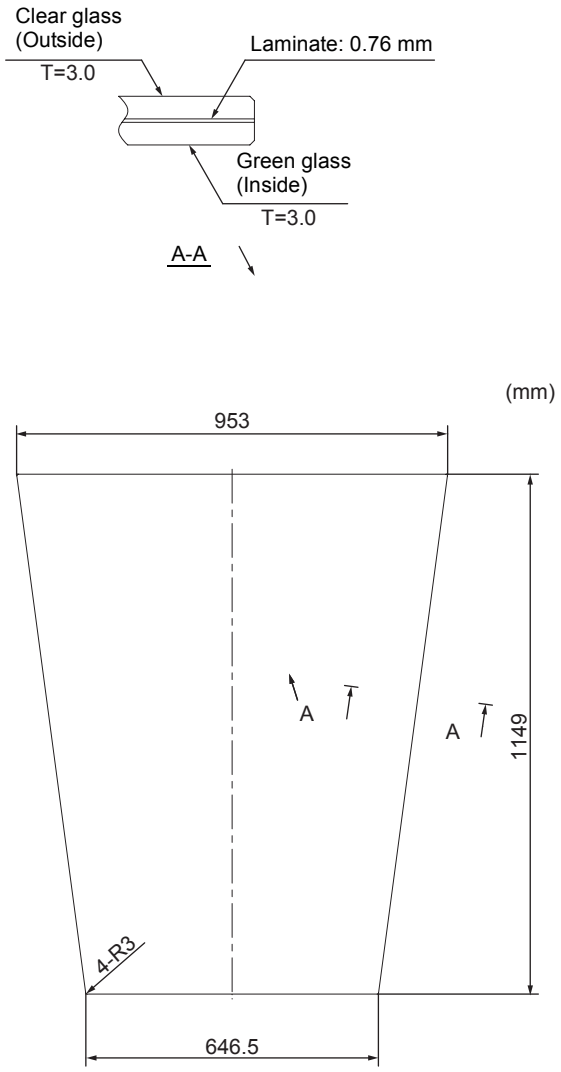
Fuel level display table

Input					Output				
1/8	1/4	1/2	3/4	F	E	1/4	1/2	3/4	F
x	x	x	x	x	◎	—	—	—	—
○	x	x	x	x	●	—	—	—	—
○	○	x	x	x	—	●	—	—	—
○	○	○	x	x	—	—	●	—	—
○	○	○	○	x	—	—	—	●	—
○	○	○	○	○	—	—	—	—	●
Other than above					—	—	—	—	—

○: No input signal given ●: Lamp on ◎: Lamp flashing
x : Input signal given — : Lamp off

Note
This table applies to ZW550 units.

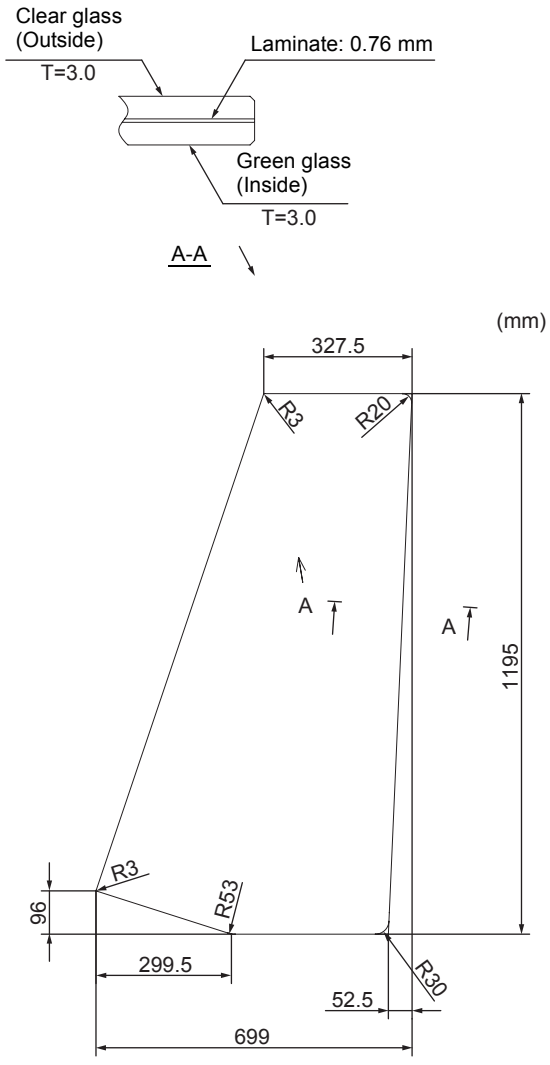
1. Part number KC3201121690



70V2E72002

Note
This glass must comply with ECE REG43.

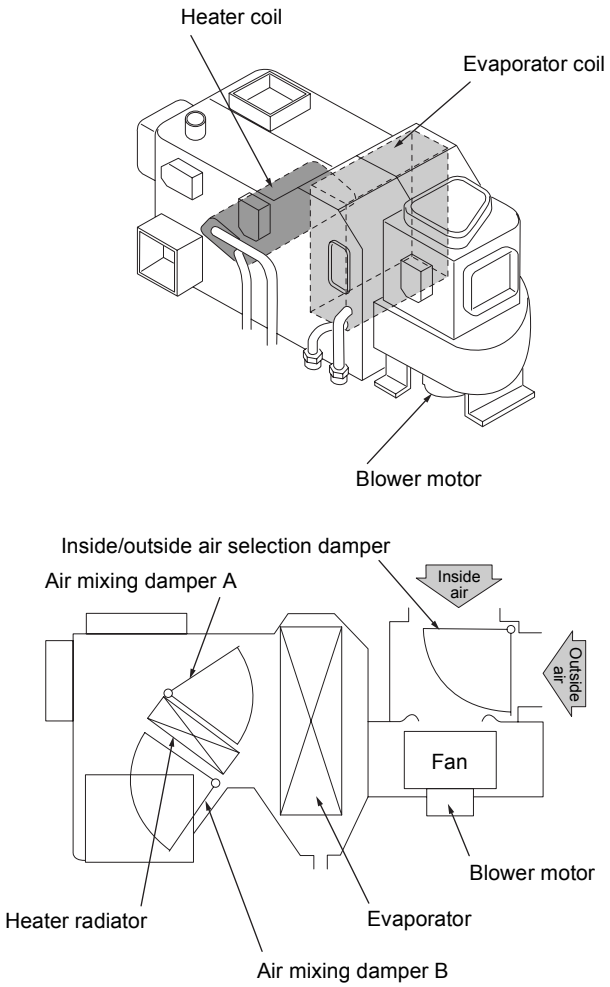
2. Part number KC3201121700



70V2E72003

Note
This glass must comply with ECE REG43.

Air conditioner unit

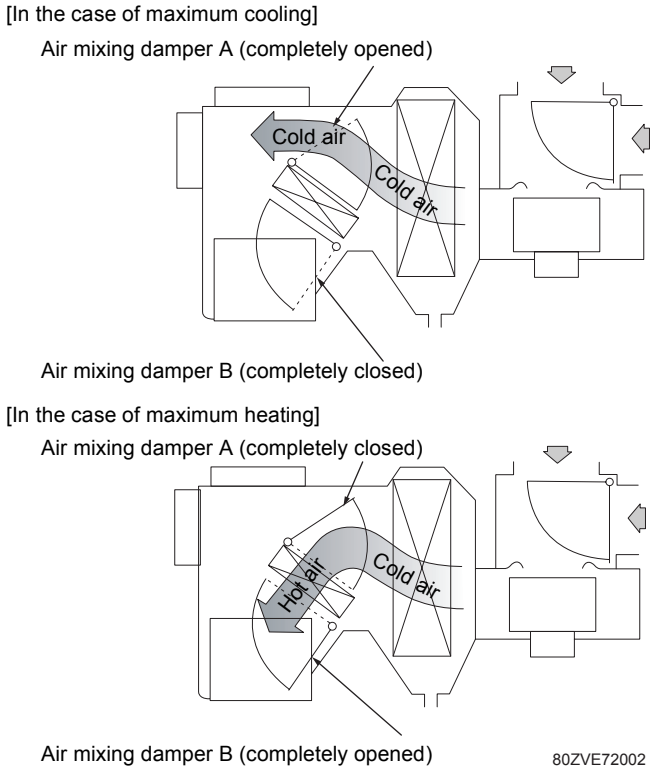


The air conditioner unit has the cooling, heating and air blowing functions to perform conditioning of the air inside the cab, and consists of an evaporator which cools down the air, a heater radiator which warms the air and a blower motor which blows the air.

The temperature in the vent position is adjusted when the opening/closing position of the air mixing damper is so controlled that the cooled air while passing through the evaporator and the warmed air while passing through the heater radiator are mixed.

The air mixing damper is controlled by the servo motor for air mixing assembled in the unit.

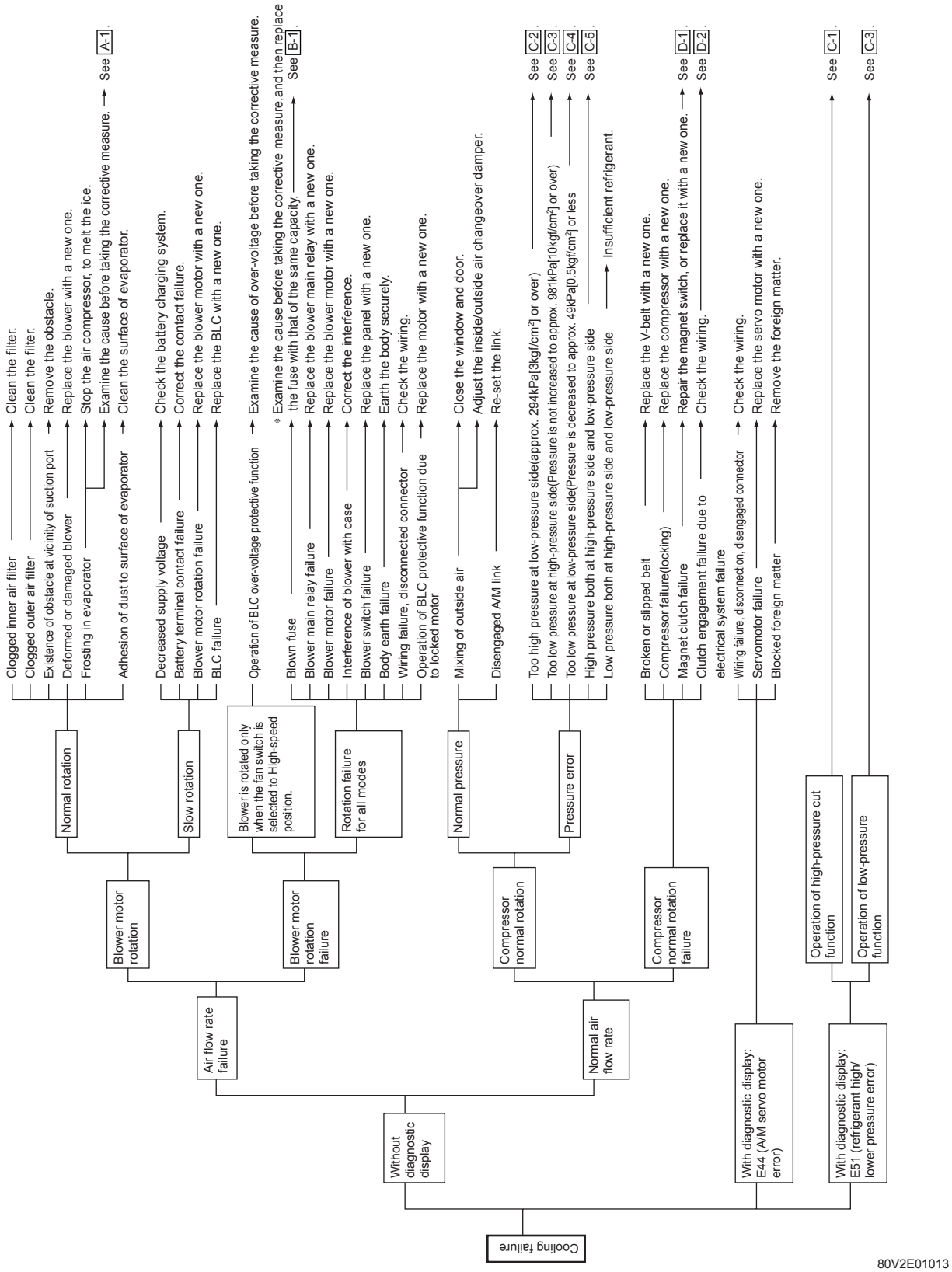
Air mixing damper



During maximum cooling, the air mixing damper B is completely closed, and the air mixing damper A is completely opened. As a result, the air cooled by the evaporator does not go through the heater radiator but is blown off.

During maximum heating, the air mixing damper A is completely closed, and the air mixing damper B is completely opened. As a result, all the air which has gone through the evaporator goes through the heater radiator, then the warmed air is blown off.

<Trouble shooting charts>



80V2E01013