PART NO. TTNHK70-EN-00

HITACHI

Reliable solutions

Technical Manual
Troubleshooting

ZW550-6
Wheel Loader

Hitachi Construction Machinery Co., Ltd.
URL:http://www.hitachi-c-m.com

PRINTED IN JAPAN (K) 2018, 07

ZW550-6 WHEEL LOADER TECHNICAL MANUAL TROUBLESHOOTING

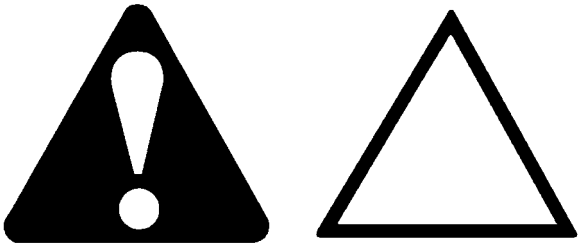
TTNHK70-EN-00

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TONHK70-EN
Technical Manual (Troubleshooting)	: Vol. No.TTNHK70-EN
Workshop Manual	: Vol. No.WNHK70-EN

Recognize Safety Information

- These are the **SAFETY ALERT SYMBOLS**.
  - When you see these symbols on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



SA-2644

Understand Signal Words

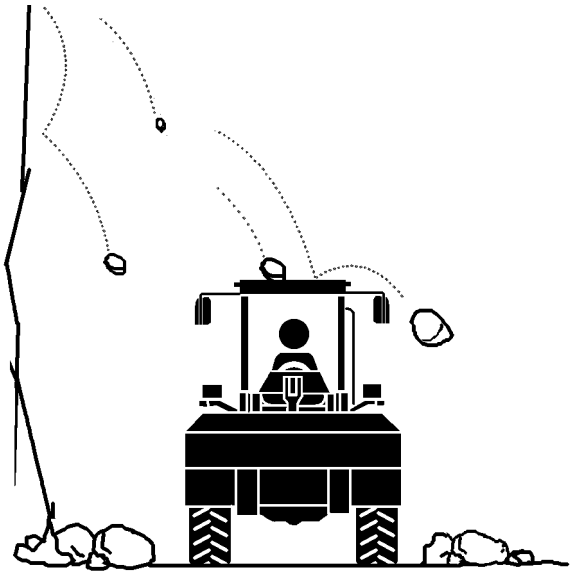
- On machine safety signs, signal words designating the degree or level of hazard - DANGER, WARNING, or CAUTION - are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
  - **DANGER or WARNING safety signs** are located near specific hazards. General precautions are listed on **CAUTION safety signs**.
  - Some safety signs do not use any of the designated signal words above after the safety alert symbol has been used on this machine.
- **CAUTION** also calls attention to safety messages in this manual.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
- ***NOTE*** indicates an additional explanation for an element of information.

SA-1223

Equipment of Head Guard, ROPS, FOPS

In case the machine is operated in areas where the possibility of falling stones or debris exist, equip a head guard, ROPS, or FOPS according to the potential hazardous conditions. (The standard cab for this machine corresponds to ROPS and FOPS.) Any modification of the ROPS structure will modify its performances and its certification will be lost.

ROPS: Roll-Over Protective Structure
FOPS: Falling Object Protective Structure



SA-521

Provide Signals for Jobs Involving Multiple Machines

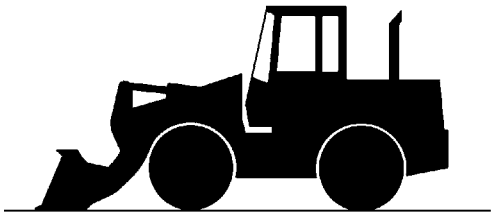
- For jobs involving multiple machines, provide signals commonly known by all personnel involved. Also, appoint a signal person to coordinate the job site. Make sure that all personnel obey the signal person's directions.

SA-481

Park Machine Safely

To avoid accidents:

- Park the machine on a firm, level surface.
- Lower bucket to the ground.
- Put the forward / reverse lever (switch) in neutral, and turn the parking brake switch (lever) ON (parking brake) position.
- Run the engine at low idle speed without load for 3 minutes.
- Turn key switch to OFF to stop engine.
- Remove the key from the key switch.
- Turn the control lever lock switch to the lock (🔒) position.
- Close windows, roof vent, and cab door.
- Lock all access doors and compartments.

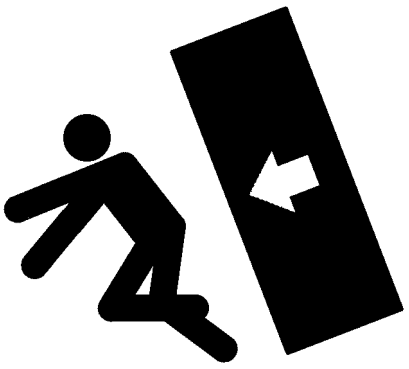


SA-456

Store Attachments Safely

- Stored attachments such as buckets, hydraulic hammers, and blades can fall and cause serious injury or death.

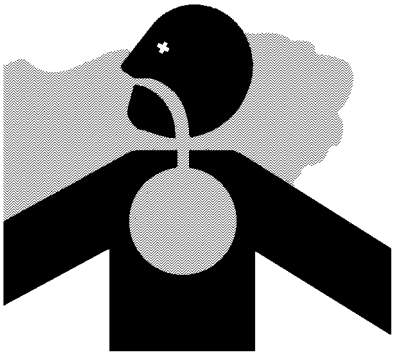
  - Securely store attachments and implements to prevent falling. Keep children and bystanders away from storage areas.



SA-034

Beware of Exhaust Fumes

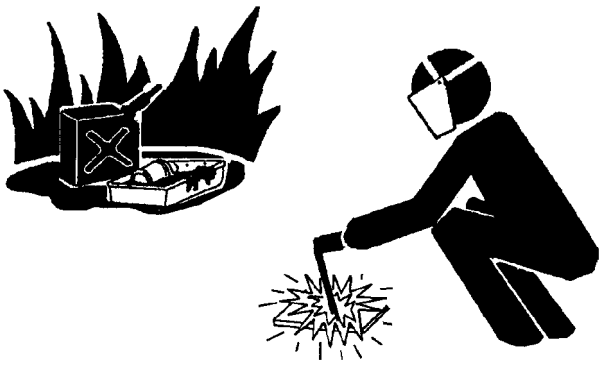
- Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.
  - If you must operate in a building, be sure there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.
  - PM (Particle Matter) combustion may generate white smoke during aftertreatment device regeneration. Do not attempt to perform aftertreatment device manual regeneration in a badly ventilated indoors.



SA-016

Precautions for Welding and Grinding

- Welding may generate gas and / or small fires.
  - Be sure to perform welding in a well ventilated and prepared area. Store flammable objects in a safe place before starting welding.
  - Only qualified personnel should perform welding. Never allow an unqualified person to perform welding.
- Grinding on the machine may create fire hazards. Store flammable objects in a safe place before starting grinding.
- After finishing welding and grinding, recheck that there are no abnormalities such as the area surrounding the welded area still smoldering.



SA-818

Avoid Heating Near Pressurized Fluid Lines

- Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.
  - Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
  - Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install temporary fire-resistant guards to protect hoses or other materials before engaging in welding, soldering, etc.

SA-030

SECTION AND GROUP CONTENTS

TECHNICAL MANUAL

(Troubleshooting)

SECTION 4 OPERATIONAL PERFORMANCE TEST

SECTION 5 TROUBLESHOOTING

All information, illustrations and specifications in this manual are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

TTNHK70-EN-00

SECTION 4 OPERATIONAL PERFORMANCE TEST

Group 2 Standard

Performance Test Designation	Unit	Performance Standard	Remarks	Reference Page
Control Lever Operating Force	N (kgf) (lbf)		MF (Joystick type) lever	T4-4-14
Lift Arm Raise		20 (2.0) (4.5) or less		
Lift Arm Raise (Detent)		40 (4.0) (9.0)or less		
Lift Arm Raise (Detent Release)		50 (5.0) (11.2) or less		
Lift Arm Lower		20 (2.0) (4.5) or less		
Lift Arm Lower (Float)		40 (4.0) (9.0) or less		
Lift Arm Lower (Float Release)		50 (5.0) (11.2) or less		
Bucket Control Lever Roll Back		20 (2.0) (4.5) or less		
Bucket Control Lever Roll Back (Detent)		40 (4.0) (9.0) or less		
Bucket Control Lever Roll Back (Detent Release)		50 (5.0) (11.2) or less		
Bucket Control Lever Dump		30 (3.0) (6.7) or less		
Joystick Steering Lever		7.9 (0.8) (1.8) or less		
Accelerator Pedal		40±2 (4.0±0.2) (9.0±0.4)		
Brake Pedal (Right)		$336^{+60/-40}$ ($34.3^{+6.1/-4.1}$) ($75.5^{+13.5/-9.0}$)		
Declutch Pedal (Left)		$318^{+60/-40}$ ($32.4^{+6.1/-4.1}$) ($71.5^{+13.5/-9.0}$)		

NOTE: MF: Multi-Function

(Blank)

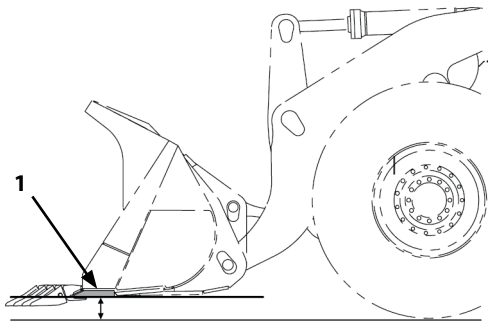
Bucket Levelness

Summary:

Check left and right inclinations of the bucket.

Preparation:

1. Place the unloaded machine on a level platen on the ground. (In case a platen is not available, place it on a horizontal flat concrete on the ground. Deal with the measurement values as guide lines.)
2. Adjust the tire air pressure to the designated value all evenly.
3. Lower the bucket onto the ground in the horizontal position.



115T4GB-04-04-011

Measurement:

CAUTION: Never put hands, feet, and measuring instruments under the bucket.

1. Float the bucket bottom slightly above the platen.
2. Measure the vertical distance from the platen and the bottom surface of space edge (1) on the left and right ends, and confirm the difference.
3. Repeat the measurement three times and calculate the mean values.

Evaluation:

Drift amount: 10 mm (0.4 in) or less

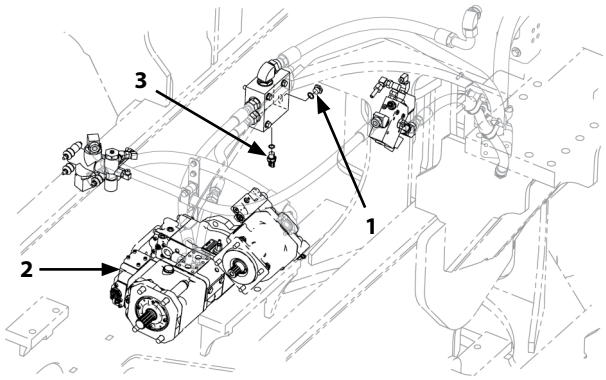
Main Pump Delivery Pressure

Preparation:

1. Stop the engine.
2. Push the air bleed valve on top of the hydraulic oil tank and bleed air.
3. Remove the plug from pressure check port (1). Install a pressure gauge with an adapter, hose, if needed.

   : 19 mm

4. Start the engine. Confirm that no oil leakage is observed at the pressure gauge connection.
5. Maintain the hydraulic oil temperature at 55±5°C (131±9°F).



115Z7-04-05-01

1- Check Port (G1/4)
2- Main Pump
3- Pump Delivery Pressure Sensor

Measurement:

1. Set the following conditions:

Accelerator Pedal	Power Mode Switch	Parking Brake Switch	Forward/ Reverse Switch
Full stroke	ON	ON	N

2. Measure pressure with the control levers in neutral without load.
3. Repeat the measurement three times and calculate the mean value.

Evaluation:

Standard (neutral): $4.0_{+1.0/-0.5}$ MPa ($580_{+145/-73}$ PSI)

Remedy:

Refer to Troubleshooting A for any accompanied error code.
Refer to Troubleshooting B for observed phenomena.

NOTE: All Actuator System Troubleshooting (p.T5-6-30)
Front Attachment System Troubleshooting (p.T5-6-33)
Steering System Troubleshooting (p.T5-6-37)

Measurement:

1. Set the following conditions:

Accelerator Pedal	Power Mode Switch
Full stroke	ON

2. Measure the pressure when fully depressing the brake pedal at left side to the floor.
3. Repeat the measurement three times and calculate the mean values.

Evaluation:

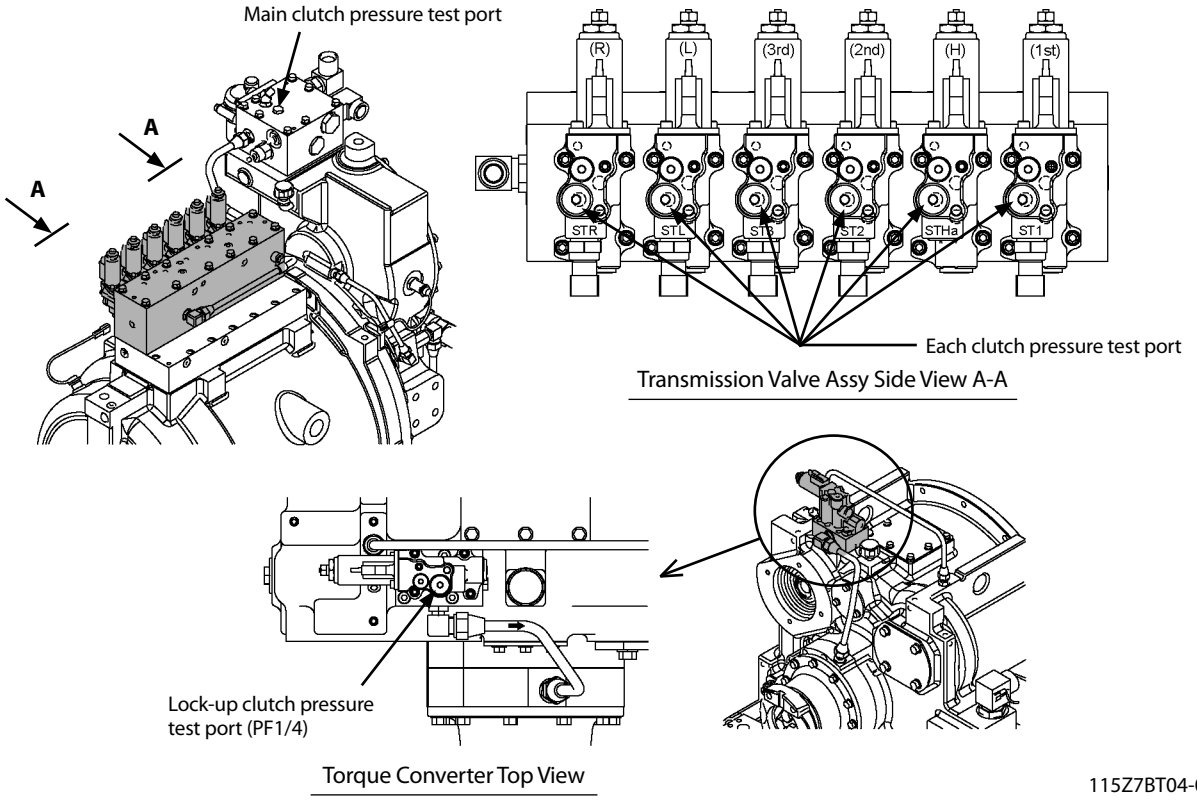
Standard: 4.2±0.6 MPa (609±87 PSI)

Remedy:

Refer to Troubleshooting B.
Normally, the front and rear wheel brake pressures become equal. If not, malfunction of the brake valve and dirt caught in the valve are suspected.

NOTE: Brake System Troubleshooting (p.T5-6-42)

Clutch Pressure Measurement Port



115Z7BT04-05-05

Transmission Clutch Pack Combination

	Directional Control Clutch Pack			Speed Control Clutch Pack			
Selected Speed Shift	Forward Low (L)	Forward High (H)	Reverse (R)	First Speed (1)	Second Speed (2)	Third Speed (3)	Lock Up (LU)
F1	○			○			
F2	○				○		
F2L	○				○		○
F3	○					○	
F3L	○					○	○
F4		○			○		
F4L		○			○		○
R1			○	○			
R2			○		○		
R2L			○		○		○
R3			○			○	
R3L			○			○	○
Neutral				*	*	*	

NOTE:

- *In the neutral position, either clutch with an asterisk (*) is engaged.*
- *The operating pressure is applied to the clutch with the mark ○ when setting the forward/reverse lever and the shift switch to each selected speed shift.*

5. Perform troubleshooting

CAUTION: Do not disconnect harnesses or hydraulic lines while the engine is running. The machine may malfunction or pressurized oil may spout, possibly resulting in personal injury. Stop the engine before disconnecting harnesses or hydraulic lines.

Perform diagnosis by connecting MPDr. to the machine or by using the service menu of monitor.
In case any fault code has been displayed by diagnosis by using MPDr. (the service menu of monitor), check the cause of the trouble by referring to Troubleshooting A in this section. In case any fault code has been displayed by diagnosis by using MPDr. (the service menu of monitor), write the fault code. Delete the fault code once and retry self-diagnosis again. If the fault code is displayed again, check the cause of the trouble by referring to Troubleshooting A in this section. After the machine trouble has been corrected, the fault code (displayed by the service menu of monitor) will be deleted. Therefore, in case the problems which are not easily re-predicable are encountered, check the fault code by using MPDr.
In case the fault code is not displayed, check operating condition of each component by referring to Troubleshooting B in this section and by using MPDr. (the service menu of monitor).

NOTE: Note that the fault codes displayed do not necessarily indicate machine trouble. The controller stores even temporary electrical malfunctions, such as a drop in battery output voltage or disconnection of the switches, sensors, etc., for inspections. For this reason, the "RETRIAL" is required to erase the accumulated fault codes from the controller memory and to confirm if any fault codes are indicated after the "RETRIAL".

TNED-05-01-001

Battery Voltage Check

1. Turn the key switch OFF. Check voltage between the battery positive terminal and the body (ground).

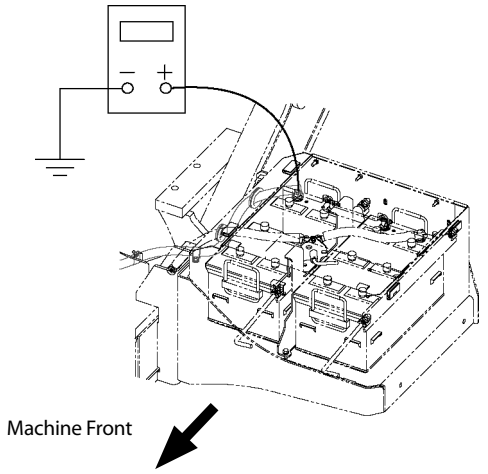
   Normal Voltage: 24 V

NOTE: If voltage is abnormal, recharge or replace the battery.

2. Start the engine. Check voltage between the battery positive terminal and the body (ground).

   Normal Voltage: 26 to 28 V

NOTE: If voltage is abnormal, check the charging system.



115Z7BT05-01-01

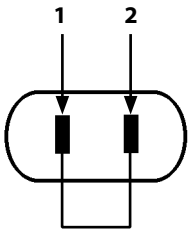
Check by False Signal

Turn the key switch OFF. Disconnect the sensor connector. Turn the key switch ON. Connect terminal #1 (power source) of the body harness end connector to terminal #2 (signal). (Power voltage is used as a false signal.)
Check this state by using the monitor function of MPDr. When the maximum value is displayed, MC and the circuit up to the body harness end connector are normal. If "ON" is displayed, the pressure switch circuits are normal.

IMPORTANT: Do not connect terminal #1 or #2 to terminal #3 or to the body (ground) when checking a three-polarity connector.

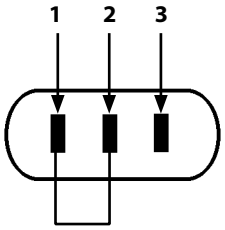
NOTE: Some kinds of sensors can be monitored by the service menu of the monitor.

Two Polarities



T107-07-05-010

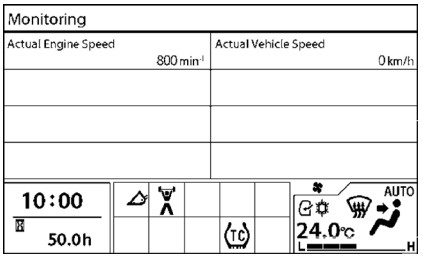
Three Polarities



T107-07-05-011

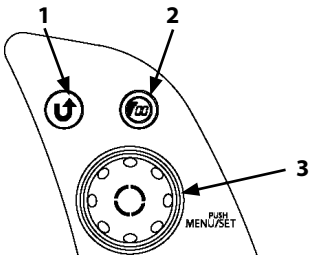
8. The selected monitoring item is started monitoring.

NOTE: Actual Engine Speed and Actual Vehicle Speed are selected as an example here.



95TNED-05-02-19

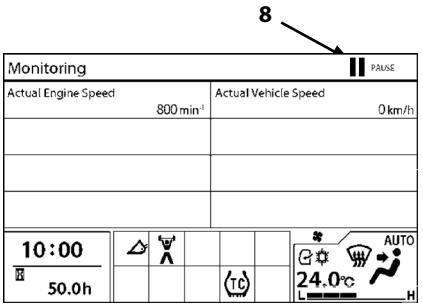
9. When pushing select / confirm knob (3) while monitoring, PAUSE (8) is displayed and the monitoring value can pause (be held).
10. When pushing select / confirm knob (3) again, pausing is stopped.



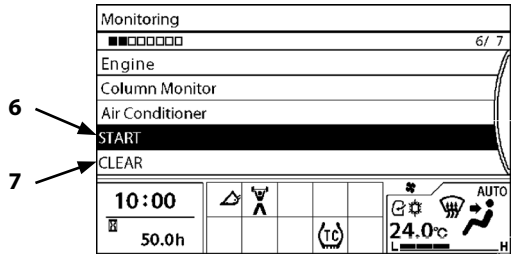
TNED-05-02-002

NOTE: Even if the key switch is set to OFF position, the selected monitoring item has been stored. In order to release the selected monitoring item, select CLEAR (7) on the Monitoring screen and push select / confirm knob (3) for a while until START (6) and CLEAR (7) disappear.

11. When pushing return to previous screen switch (1), the previous screen appears.
12. When pushing return to basic screen switch (2), the basic screen appears.



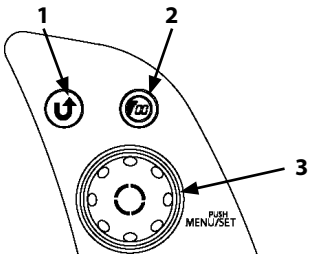
95TNED-05-02-18



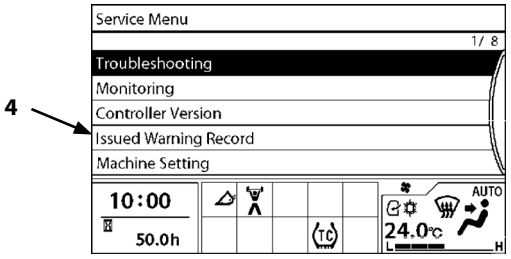
95TNED-05-02-17

Issued Warning Record

1. Turn select / confirm knob (3) and select Issued Warning Record (4) on Service Menu.

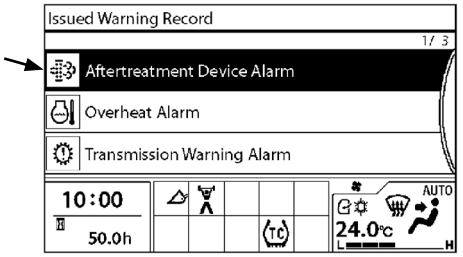


TNED-05-02-002



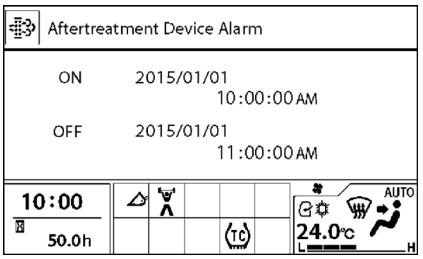
95TNED-05-02-10

2. When pushing select / confirm knob (3), the Issued Warning Record screen appears.
   The symbol and trouble of maximum ten alarms which occurred and reported recently are displayed. (Refer To List of Alarm.)



95Z7B-05-02-21E

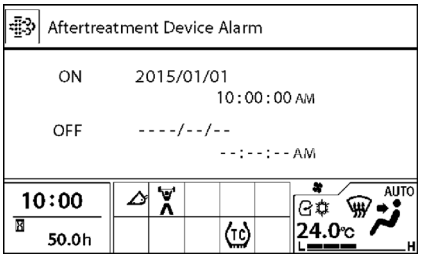
3. Turn select / confirm knob (3) and select the displayed alarm. When pushing select / confirm knob (3), the time (ON / OFF) when the selected alarm has occurred / solved are displayed.



95Z7B-05-02-22E

4. In case of currently occurring alarms, the resolving time (OFF) of the alarm is dashed (---).

NOTE: The display of date and time depends on the setting. (Refer to the operator's manual.)



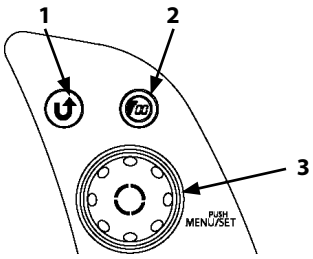
95Z7B-05-02-23E

5. When pushing return to previous screen switch (1), the previous screen appears.
6. When pushing return to basic screen switch (2), the basic screen appears.

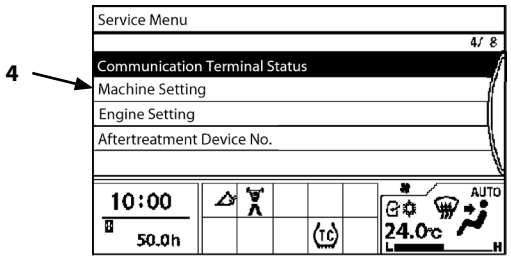
Monitor Operation:

IMPORTANT: Do not operate control levers and other switches when learning is performed.

1. Turn select / confirm knob (3) and select Machine Setting (4) on Service Menu.

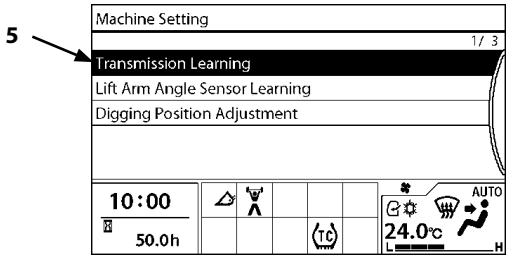


TNED-05-02-002



95Z7B-05-02-11E

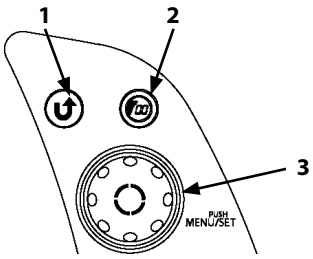
2. When pushing select / confirm knob (3), the Machine Setting screen appears.
3. Turn select / confirm knob (3) and select Transmission Learning (5).



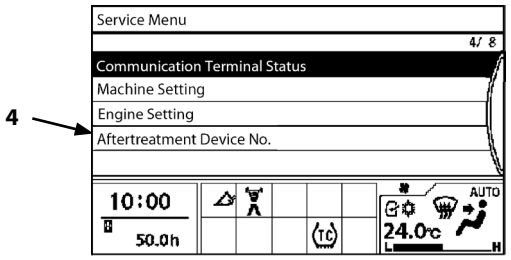
95TNED-05-02-61

Aftertreatment Device No.

1. Turn select / confirm knob (3) and select Aftertreatment Device No. (4) on Service Menu.

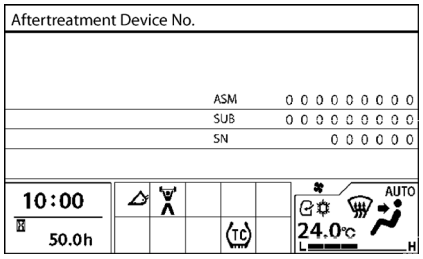


TNED-05-02-002



95Z7B-05-02-11E

2. When pushing select / confirm knob (3), the Aftertreatment Device screen appears.
3. The manufacturing number (S/N) of aftertreatment device (DOC, SCR) is displayed.



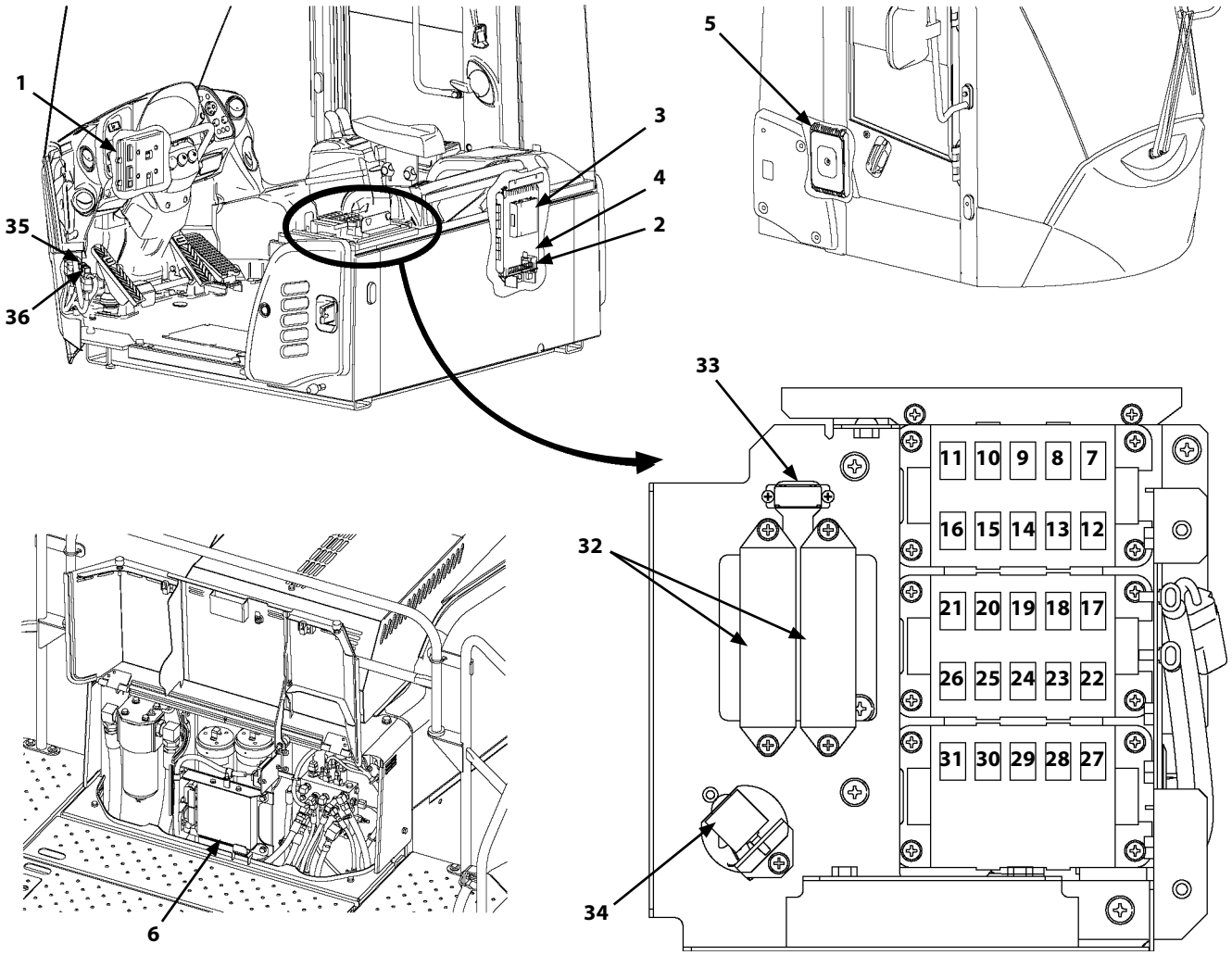
95Z7BTT05-02-05E

4. When pushing return to previous screen switch (1), the previous screen appears.
5. When pushing return to basic screen switch (2), the basic screen appears.

List of Total Operating Hours

Item		Details
Hour Meter End		Hour meter's value accumulated in machine's monitor
Travel Distance		Odometer's value accumulated in machine's monitor
Engine Operating Hours	Power Mode OFF and TCS OFF Hours	Total engine operating hours selecting power mode (OFF) and TCS (OFF)
	Power Mode ON and TCS OFF Hours	Total engine operating hours selecting power mode (ON) and TCS (OFF)
	Power Mode OFF and TCS ON Hours	Total engine operating hours selecting power mode (OFF) and TCS (ON)
	Power Mode ON and TCS ON Hours	Total engine operating hours selecting power mode (ON) and TCS (ON)
Consumed Fuel Quantity		Total amount of fuel usage amount
Idling Hours		Total operating hours when setting forward/reverse lever and forward/reverse switch (OPT) in (N) position and running engine at less than 950 min^{-1}

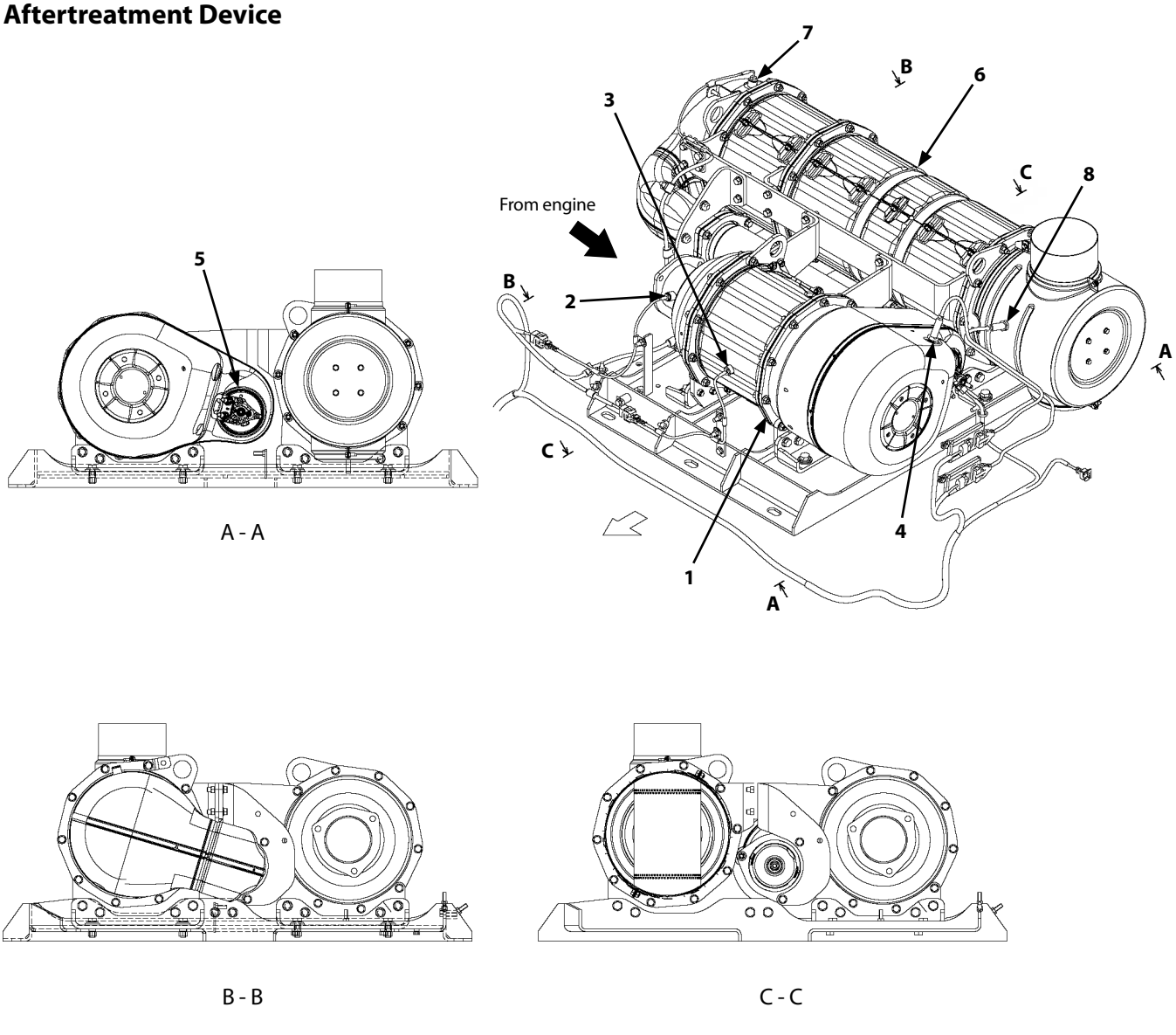
Controller and Relays



ZW550-6UT01-02-03

1- Monitor Controller
2- Flasher Relay
3- Air Conditioner Controller
4- MC (Main Controller) (Main)
5- MC (Main Controller) (Sub)
6- ECM (Engine Control Module)
7- Head Light Relay (Left)
8- Head Light Relay (Right)
9- High-Beam Relay
10- Bucket Leveler Relay
11- Back Lamp and Alarm Relay
12- Work Light Relay (Front)
13- Work Light Relay (Rear)
14- Right Turn Signal Light Relay
15- Horn Relay
16- -
17- Parking Brake Relay 1
18- Parking Brake Relay 2
19- Loading Control Lever Lock Relay
20- Brake Light Relay
21- Load Dump Relay
22- Neutral Relay
23- Turn Signal Light Relay (Left)
24- Washer Relay (Front)
25- Wiper Relay (Rear)
26- Washer Relay (Rear)
27- Starter Cut Relay
28- Engine ECM Main Relay
29- Secondary Steering Relay (Option)
30- Cab Working Light Relay (Rear)
31- Cab Working Light Relay (Front) (Option)
32- Fuse Box
33- MPDr. Connector
34- Tech2 (Engine Diagnostic Tool) Connector
35- Wiper Relay (Front) (HI)
36- Wiper Relay (Front) (LO)

Aftertreatment Device



115Z7BT01-02-14

1- Diesel Oxidation Catalyst (DOC) Unit
2- DOC Inlet Exhaust Gas Temperature Sensor
3- DOC Center Exhaust Gas Temperature Sensor
4- DOC Outlet NOx Sensor
5- Diesel Exhaust Fluid (DEF) Dosing Unit
6- Selective Catalytic Reduction (SCR) Unit
7- SCR Inlet Exhaust Gas Temperature Sensor
8- SCR Outlet NOx Sensor

MPDr. Fault Code List

Fault Code	MPDr. Message	Category	Reference 1	Reference 2
111000-2	Abnormal EEPROM	MC, SC	T5-5-12, T5-5-26	T5-5-80
111001-2	Abnormal RAM	MC, SC	T5-5-12, T5-5-26	T5-5-80
111002-2	Abnormal A/D Converter	MC, SC	T5-5-12, T5-5-26	T5-5-80
111003-3	Abnormal Sensor Voltage	MC, SC	T5-5-12, T5-5-26	T5-5-80
111006-2	(MC) Engine Controller Communication Error	MC	T5-5-13	T5-5-83
111007-2	(MC) Information Controller Communication Error 1	MC	T5-5-13	T5-5-83
111008-2	(MC) Information Controller Communication Error 2	MC	T5-5-13	T5-5-88
111009-2	(MC) Monitor Controller Communication Error 1	MC	T5-5-13	T5-5-83
111010-2	(MC) Monitor Controller Communication Error 2	MC	T5-5-13	T5-5-88
111012-2	(MC) Sub-Controller Communication Error 1	MC	T5-5-13	T5-5-83
111013-2	(MC) Sub-Controller Communication Error 2	MC	T5-5-13	T5-5-88
111014-2	(MC) Air Conditioner Controller Communication Error	MC	T5-5-13	T5-5-88
111015-2	(SC) Information Controller Communication Error 1	SC	T5-5-27	T5-5-83
111016-2	(SC) Information Controller Communication Error 2	SC	T5-5-27	T5-5-88
111017-2	(SC) Monitor Controller Communication Error 1	SC	T5-5-27	T5-5-83
111018-2	(SC) Monitor Controller Communication Error 2	SC	T5-5-27	T5-5-88
111019-2	(SC) MC Controller Communication Error 1	SC	T5-5-27	T5-5-83
111020-2	(SC) MC Controller Communication Error 2	SC	T5-5-27	T5-5-88
111021-2	(SC) Air Conditioner Controller Communication Error	SC	T5-5-27	T5-5-88
111024-2	(SC) Engine Controller Communication Error	SC	T5-5-27	T5-5-83
111025-2	(MC) Column Monitor Controller Communication Error	MC	T5-5-13	T5-5-88
111026-2	(SC) Column Monitor Controller Communication Error	SC	T5-5-27	T5-5-88

CAN Data Reception Failure

Fault Code	Trouble or MP Dr. Message	Cause	Symptoms in Machine Operation When Trouble Occurs.	Remedy
111006-2	(MC) Engine Controller Communication Error	Faulty harness	Even if accelerator pedal is operated, engine speed does not change. The manual regeneration of aftertreatment device cannot be performed.	Check the harness.
111007-2	(MC) Information Controller Communication Error 1	Faulty monitor controller Faulty CAN1 harness	Nothing observed.	Check the CAN1 harness. Replace monitor controller.
111008-2	(MC) Information Controller Communication Error 2	Faulty monitor controller Faulty CAN2 harness	Nothing observed.	Check the CAN2 harness. Replace monitor controller.
111009-2	(MC) Monitor Controller Communication Error 1	Faulty monitor controller Faulty CAN1 harness	Nothing observed.	Check the CAN1 harness. Replace monitor controller.
111010-2	(MC) Monitor Controller Communication Error 2	Faulty monitor controller Faulty CAN2 harness	Nothing observed.	Check the CAN2 harness. Replace monitor controller.
111012-2	(MC) Sub-Controller Communication Error 1	Faulty main controller (sub) Faulty CAN1 or CAN2 harness	Nothing observed.	Check the CAN harness.
111013-2	(MC) Sub-Controller Communication Error 2	Faulty main controller (sub) Faulty CAN1 or CAN2 harness	Nothing observed.	Check the CAN harness.
111014-2	(MC) Air Conditioner Controller Communication Error	Faulty air conditioner controller Faulty CAN2 harness	The air conditioner does not work.	Check the CAN2 harness. Replace the air conditioner controller.
111025-2	(MC) Column Monitor Controller Communication Error	Faulty column display controller Faulty CAN2 harness	The transmission warning indicator on column display controller do not light. Overrun alarm control is disabled.	Check the CAN2 harness. Replace column display controller.
111033-2	(Main Controller) Joystick Steering Controller Communication Error	Faulty joystick steering controller Faulty CAN2 harness	The joystick steering does not work.	Check the CAN2 harness. Replace the joystick steering controller.

NOTE: MC here refers to the Main Controller (Main). These error codes are observed on the Service Menu - Troubleshooting - Main (T/M) screen.

Sensor Failure

Fault Code	Trouble or MP Dr. Message	Cause	Symptoms in Machine Operation When Trouble Occurs.	Remedy
111600-3	T/M Output Speed Sensor Failure	(At starter key turns ON) Harness disconnection detected and voltage is 1.8 V or more. (While engine is running) When forward or reverse clutch is engaged, T/M output revolution = 0 min^{-1}, and T/M intermediate shaft revolution > 200 min^{-1} or T/C output revolution > 500 min^{-1}.	Abnormal shift down feeling. Selected speed range is not correctly indicated at shift change. Machine cannot move due to clutch slippage.	Check the harness. Replace the T/M output revolution sensor (machine speed sensor). Measure clutch pressures.
111600-4	T/M Out Speed Sensor Circuit Low Input	Harness disconnection detected at starter key turns ON and voltage is 1.1 V or less.	Abnormal shift down feeling. Selected speed range is not correctly indicated at shift change.	Check the harness. Replace the T/M output revolution sensor (machine speed sensor).
111601-3	Torque Converter Output Speed Sensor Failure	When forward or reverse clutch is engaged, and T/M output revolution = 0 min^{-1}, T/M intermediate shaft revolution > 300 min^{-1}, or T/M output revolution > 300 min^{-1}.	Controls monitoring T/C speed ratio are deactivated as it cannot be calculated.	Check the harness. Replace the T/C output revolution sensor.
111602-3	Intermediate Shaft Speed Sensor Failure	When forward or reverse clutch is engaged, and T/M output revolution = 0 min^{-1}, T/M intermediate shaft revolution > 200 min^{-1}, or T/C output revolution > 500 min^{-1}.	Service indicator turns on. If Transmission Output Revolution Sensor Error (111600-3) occurs at the same time, machine speed is not displayed.	Check the harness. Replace the T/M intermediate shaft revolution sensor (machine speed backup sensor)

NOTE: These error codes are observed on the Service Menu - Troubleshooting - Main (T/M) screen.

Pilot Failure

Fault Code	Trouble or MP Dr. Message	Cause	Symptoms in Machine Operation When Trouble Occurs.	Remedy
111217-3	Pilot Pressure Sensor Circuit High Input	Voltage: 4.75 V or more	Front control lever lock indicator on monitor is always OFF. Exhaust filter manual regeneration control is not deactivated although front control lever lock is released.	Check the harness. Replace the pressure sensor (loading pilot pressure).
111217-4	Pilot Pressure Sensor Circuit Low Input	Voltage: less than 0.25 V	Front control lever lock indicator on monitor is always OFF. Exhaust filter manual regeneration control is not deactivated although front control lever lock is released.	Check the harness. Replace the pressure sensor (loading pilot pressure).
111309-3	Service Brake Pressure (Front) Sensor Circuit High Input	Voltage: 4.75 V or more	The low brake oil pressure indicator is always ON. Although the service brake is applied, the brake oil pressure gauge points at the minimum value, zero.	Check the harness. Replace the pressure sensor (brake primary pressure) in the front service brake circuit.
111309-4	Service Brake Pressure (Front) Sensor Circuit Low Input	Voltage: less than 0.25 V	The low brake oil pressure indicator is always ON. Although the service brake is applied, the brake oil pressure gauge points at the minimum value, zero.	Check the harness. Replace the pressure sensor (brake primary pressure) in the front service brake circuit.
111310-3	Service Brake Pressure (Rear) Sensor Circuit High Input	Voltage: 4.75 V or more	The low brake oil pressure indicator is always ON. Although the service brake is applied, the brake oil pressure gauge points at the minimum value, zero.	Check the harness. Replace the pressure sensor (brake primary pressure) in the rear service brake circuit.
111310-4	Service Brake Pressure (Rear) Sensor Circuit Low Input	Voltage: less than 0.25 V	The low brake oil pressure indicator is always ON. Although the service brake is applied, the brake oil pressure gauge points at the minimum value, zero.	Check the harness. Replace the pressure sensor (brake primary pressure) in the rear service brake circuit.

NOTE: These error codes are observed on the Service Menu - Troubleshooting - Main (Sub) screen.

Monitor Controller (Information) Fault Code List

Fault Code	Trouble or MP Dr. Message	Cause	Remedy
113311-3	Fuel Level Sensor Circuit High Input	131±5 Ω or less continues for 5 seconds.	Check the harness. Replace the fuel level sensor.
113311-4	Fuel Level Sensor Circuit Low Input	4±2 Ω or less continues for 5 seconds.	Check the harness. Replace the fuel level sensor.

Symptoms in Machine Operation When Trouble Occurs.	Assumptive Conditions at Backup
The output power decreases.	Intake-air temperature is -10 °C.
The output power decreases.	Intake-air temperature is -10 °C.
The output power decreases.	Exhaust temperature 1 is 0 °C.
The output power decreases.	Exhaust temperature 1 is 0 °C.
Nothing special.	When starting: Coolant temperature is -20 °C. When operating: Coolant temperature is 50 °C.
Nothing special.	When starting: Coolant temperature is -20 °C. When operating: Coolant temperature is 50 °C.
Engine speed may not increase 2300 min^{-1} or more.	Protect the engine.
Nothing special.	Engine speed is more than 1500 min^{-1}. Coolant temperature is 79 °C (-20 °F) or higher.
Nothing special.	-
The engine cannot start.	Malfunction of ROM
The output power decreases.	Limiter open status
While the engine runs, there is nothing abnormal with machine operation. After the engine is stalled, the re-start is impossible.	While the engine runs, operate according to standard of the crank sensor. When the engine stops, the start is impossible.
While the engine runs, there is nothing abnormal with machine operation. After the engine is stalled, the re-start is impossible.	While the engine runs, operate according to standard of the crank sensor. When the engine stops, the start is impossible.
The engine speed is fixed to 1100 min^{-1}.	CAN communication is impossible.
The engine runs at idle speed.	CAN communication is impossible.

Operating Rank (Current)				Remark
A	B	C	D	
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			EGR cannot be controlled.
	○			EGR cannot be controlled.
	○			EGR cannot be controlled.
	○			EGR cannot be controlled.
○				
○				
			○	
○				The battery may run out.
		○		Engine output power and speed are restricted in a phased manner.
		○		Engine output power and speed are restricted in a phased manner.
○				
○				
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.

Operating Rank
A: Digging / travel is operable.
B: Machine can travel on a level ground and a downhill.
C: The engine only runs. (Travel and operation are impossible even in light load.)
D: The engine cannot stop / start.

Symptoms in Machine Operation When Trouble Occurs.	Assumptive Conditions at Backup
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
The engine cannot start.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	
Nothing special.	

MC Fault Codes 111006, 111007, 111009, 111012

SC Fault Codes 111015, 111017, 111019, 111024

Preparation

- Disconnect the connectors from each controller.
- Check the wiring connections first.
- Check the CAN1 harness between the controllers.
  (Refer to CAN1 Harness Check on T5-5-85 to 87.)

Fault Code	Trouble or MP Dr. Message	Inspection Method	Cause
111006-2	(MC) Engine Controller Communication Error	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111007-2	(MC) Information Controller Communication Error 1	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111009-2	(MC) Monitor Controller Communication Error 1	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111012-2	(MC) Sub-Controller Communication Error 1	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111015-2	(SC) Information Controller Communication Error 1	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111017-2	(SC) Monitor Controller Communication Error 1	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111019-2	(SC) MC Controller Communication Error 1	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.
111024-2	(SC) Engine Controller Communication Error	Continuity check (open circuit)	Open circuit in harness.
		Discontinuity check (shorted circuit)	Shorted circuit in harness.

MC Fault Codes 111103, 111105, 111106

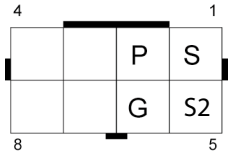
Preparation

- Check the wiring connections first.

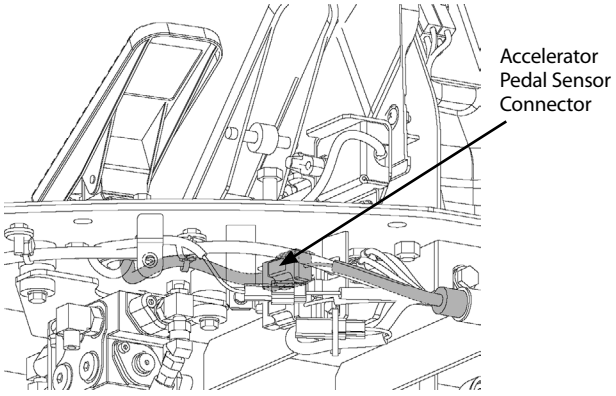
Fault Code	Trouble or MP Dr. Message	Inspection Method	Evaluation	Cause
111103-3	Accelerator Pedal Circuit High Input	Measure resistance between accelerator pedal sensor end #1 and #2.	0 Ω	Shorted circuit in harness #1 and #2.
		-	Normal in above check.	Open circuit accelerator pedal sensor.
111103-4	Accelerator Pedal Circuit Low Input	Measure voltage between accelerator pedal sensor harness end #2 and #6.	Voltage: less than 0.25 V	Open circuit in harness #2.
		Measure voltage between accelerator pedal sensor harness end #1 and #6.	Voltage: less than 0.25 V	Open circuit in harness #1.
		- - -	Normal in above check.	Faulty accelerator pedal sensor.
111105-3	Abnormal Engine Speed Sensor	Torque converter input speed sensor = 0 min^{-1} and Engine speed sent from ECM (CAN) > 500 min^{-1}		Faulty engine speed sensor
111106-3	Accelerator Pedal Position Sensor 2 High Input	Measure resistance between accelerator pedal sensor end #1 and #25	0 Ω	Shorted circuit in harness #1 and #5
		-	Normal in above check.	Open circuit accelerator pedal sensor.
111106-4	Accelerator Pedal Position Sensor 2 Low Input	Measure voltage between accelerator pedal sensor harness end #2 and #6.	Voltage: less than 0.25 V	Open circuit in rear console harness #2 (power supply line).
		Measure voltage between accelerator pedal sensor harness end #5 and #6.	Voltage: less than 0.25 V	Open circuit in rear console harness #5 (signal 2 line).
		- - -	Normal in above check.	Faulty accelerator pedal sensor.

Connector (Harness end)

- Accelerator Pedal Sensor Connector (Rear Console Cable Assy)



90Z7-05-CN06



NOTE: P: 5 V or 24 V power supply
S: Signal
G: Ground (chassis)
S2: Signal 2

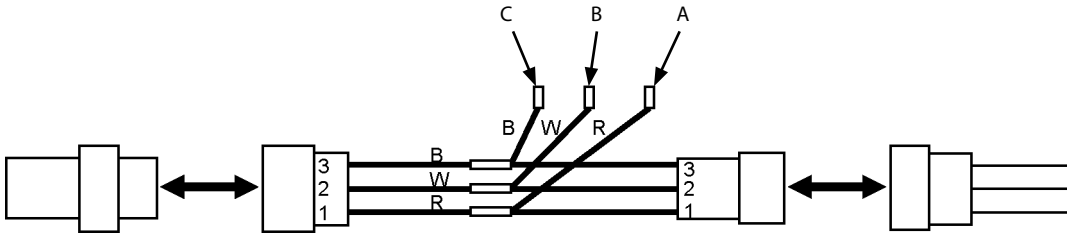
ZW550-6UT05-05-01

SC Fault Codes 111206, 111217

Preparation

- Check the wiring connections first.
- Connect the test harness and dummy sensor.
- Before inspection, set the key switch to the ON position.

Fault Code	Trouble or MP Dr. Message	Inspection Method	Evaluation	Cause
111206-3	Hyd. Fan Circuit Pressure Sensor Circuit High Input	Retry by using MPDr.	Un-displayed fault code	Faulty sensor.
		Measure voltage between B and chassis.	Voltage: 4.75 V or more	Shorted circuit in harness #1 and #2.
111206-4	Hyd. Fan Circuit Pressure Sensor Circuit Low Input	Retry by using MPDr.	Un-displayed fault code	Faulty sensor.
		Measure voltage between A and chassis.	Voltage: less than 0.25 V	Open circuit in harness #1.
		Measure voltage between A and C (GND).	Voltage: less than 0.25 V	Open circuit in harness #3.
		-	Normal in above check.	Open circuit in harness #2.
111217-3	Pilot Pressure Sensor Circuit High Input	Retry by using MPDr.	Un-displayed fault code	Faulty sensor.
		Measure voltage between B and chassis.	Voltage: 4.75 V or more	Shorted circuit in harness #1 and #2.
111217-4	Pilot Pressure Sensor Circuit Low Input	Retry by using MPDr.	Un-displayed fault code	Faulty sensor.
		Measure voltage between A and chassis.	Voltage: less than 0.25 V	Open circuit in harness #1.
		Measure voltage between A and C (GND).	Voltage: less than 0.25 V	Open circuit in harness #3.
		-	Normal in above check.	Open circuit in harness #2.



TDAA-05-06-003

SC Fault Code 111412

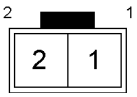
Preparation

- Check the wiring connections first.

Fault Code	Trouble or MP Dr. Message	Inspection Method	Evaluation	Cause
111412-2	Hyd. Fan P/S Valve Abnormal Feedback	Measure resistance between solenoid valve #1 and #2.	0 / ∞ Ω (Normal value: 30 Ω)	Faulty solenoid valve.
		Measure voltage between solenoid valve harness end #1 and chassis.	0 V	Open circuit in harness #1.
		Oil Pressure Driving Fan Control P/S FB	0 mA	Open circuit in harness #2.
		-	Normal in above check.	Shorted circuit in harness #1 and #2.
111412-3	Hyd. Fan P/S Valve Feedback High Current	Measure resistance between solenoid valve #1 and #2.	0 Ω (Normal value: 30 Ω)	Faulty solenoid valve.
		-	Normal in above check.	Shorted circuit in harness #1 and #2.
111412-4	Hyd. Fan P/S Valve Feedback Low Current	Measure resistance between solenoid valve #1 and #2.	∞ Ω (Normal value: 30 Ω)	Faulty solenoid valve.
		Measure voltage between solenoid valve harness end #1 and chassis.	0 V	Open circuit in harness #1.
		Oil Pressure Driving Fan Control P/S FB	0 mA	Open circuit in harness #2.

Connector (Harness end)

- Solenoid Valve Connector



90Z7-05-CN10

SC Fault Code 111900

Preparation

- Check the wiring connections first.

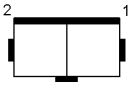
Fault Code	Trouble or MP Dr. Message	Inspection Method	Evaluation	Cause
111900-4	Torque Converter Oil Temperature Sensor Circuit Low Input	Measure resistance between sensor #1 and #2.	Refer to the table.	Faulty sensor.
		-	Normal in above check.	Shorted circuit in harness #1.
111900-3	Torque Converter Oil Temperature Sensor Circuit High Input	Measure resistance between sensor #1 and #2.	Refer to the table.	Faulty sensor.
		Measure voltage between sensor harness end #1 and chassis.	0 V	Open circuit in harness #1.
		-	Normal in above check.	Open circuit in harness #2.

Specification of Transmission Oil Temperature Sensor

Transmission Oil Temperature (°C (°F))	Resistance (kΩ)
-30 (-22)	-
-20 (-4)	77.0
-10 (14)	47.4
0 (32)	30.0
10 (50)	19.5
20 (68)	13.0
30 (86)	8.9
40 (104)	6.2
50 (122)	4.0
60 (140)	3.1
70 (158)	2.3
80 (176)	1.8
90 (194)	1.3
100 (212)	1
110 (230)	0.8
120 (248)	0.6

Connector (Harness end)

- T/M Oil Temperature Sensor



90Z7-05-CN11

Air Conditioner Controller Fault Codes 11 to 22

Preparation

- Check the wiring connections first.
- Before inspection, set the key switch to the ON position.

Fault Code	Trouble or MP Dr. Message	Inspection Method	Evaluation	Cause
11	Open circuit in re-circulated air sensor	Measure resistance between sensor #1 and #2.	∞ Ω (Normal value: 300 to 430 kΩ)	Faulty sensor.
		Measure voltage between sensor harness end #1 and chassis.	0 V	Open circuit in harness #1.
		-	Normal in above check.	Open circuit in harness #2.
12	Shorted circuit in re-circulated air sensor	Measure resistance between sensor #1 and #2.	0 Ω (Normal value: 300 to 430 kΩ)	Faulty sensor.
		-	Normal in above check.	Shorted circuit in harness #1 and #2.
13	Open circuit in outdoor ambient temperature sensor	Measure resistance between sensor #1 and #2.	∞ Ω (Normal value: 100 to 210 kΩ)	Faulty sensor.
		Measure voltage between sensor harness end #1 and chassis.	0 V	Open circuit in harness #1.
		-	Normal in above check.	Open circuit in harness #2.
14	Shorted circuit in outdoor ambient temperature sensor	Measure resistance between sensor #1 and #2.	0 Ω (Normal value: 100 to 210 kΩ)	Faulty sensor.
		-	Normal in above check.	Shorted circuit in harness #1 and #2.
18	Shorted circuit in solar radiation sensor	Check continuity between sensor harness end #1 and #2.	0 Ω	Shorted circuit in harness #1 and #2.
		-	Normal in above check.	Faulty sensor.
21	Open circuit in frost sensor	Measure resistance between sensor #1 and #2.	∞ Ω (Normal value: 100 to 115 kΩ)	Faulty sensor.
		Measure voltage between sensor harness end #1 and chassis.	0 V	Open circuit in harness #1.
		-	Normal in above check.	Open circuit in harness #2.
22	Shorted circuit in frost sensor	Measure resistance between sensor #1 and #2.	0 Ω (Normal value: 100 to 115 kΩ)	Faulty sensor.
		-	Normal in above check.	Shorted circuit in harness #1 and #2.

Parts / Item	Parking Brake Switch	Front Control Lever Lock Switch	Pilot Shut-Off Solenoid Valve
Function	Shifts parking brake solenoid valve.	Shifts pilot shut-off solenoid valve.	Opens and closes the front pilot circuit.
Symptoms in control system when trouble occurs	Same as shown below.	Same as shown below.	Same as shown below.
Symptoms in machine operation when trouble occurs	Although the parking brake switch is turned ON/OFF, the parking brake is not released/ applied with the engine running.	Open circuit: Front control lever lock switch is always OFF. Pilot shut-off solenoid valve is not shifted. The lift arm and bucket are not operated although the control lever is operated with the front control lever lock switch set in UNLOCK position. Shorted circuit: Front control lever lock switch is always ON.	When closed: The lift arm and bucket are not operated. (Pilot pressure oil is not supplied to pilot valve.) When open: Pilot pressure oil is always supplied to pilot valve.
Evaluation by Fault Code	-	-	-
Evaluation by Monitoring	Column Display Controller: Parking Brake Signal Output	SC: Pilot Primary Pressure	-
Evaluation by using Test Harness	-	-	-
Note	Although the parking brake is turned OFF, the parking brake is applied with the engine stopped.	-	The pilot shut-off solenoid valve can be manually turned ON/OFF.
Descriptions of Control (Operational Principle Section in S/M)	T2-2, T2-5	T2-4	T2-5

Parts / Item	Parking Brake Solenoid Valve	Pump Swash Plate Tilt Solenoid Valve (Pump Torque Control Solenoid)
Function	Applies and releases parking brake by using pilot pressure oil.	Supplies control pressure to main pump.
Symptoms in control system when trouble occurs	Same as shown below.	Same as shown below.
Symptoms in machine operation when trouble occurs	When closed: The parking brake is not released. (Pilot pressure oil is not supplied to parking brake.) When open: The parking brake is applied. (Pilot pressure oil is supplied to parking brake.)	The exhaust filter alarm is displayed on the monitor. High current: Pump torque of main pump is kept minimum. The loading movement becomes slow. Low current: Engine speed regulation for digging is deactivated.
Evaluation by Fault Code	-	111413
Evaluation by Monitoring	-	SC: Pump Swash Angle P/S Output, Pump Swash Angle P/S Output FB
Evaluation by using Test Harness	-	-
Note	This solenoid valve can be manually turned ON/OFF. Refer to p. T5-4-15 for the solenoid valve location.	Refer to p. T5-5-114.
Descriptions of Control (Operational Principle Section in S/M)	T2-2, 2-4	T2-2

Engine System Troubleshooting

Trouble Symptom / Parts	E-4 Power mode is not shifted down when pushing power mode switch.	E-5 Even if key switch is turned OFF, engine does not stop.	E-6 Auto idling-stop is not activated.
Main Controller (Main)	○	○	○
Engine Control Module (ECM)		●	○
Monitor Controller	○		○
Monitor	○		○
Column Display Controller			
MPDr.	○		○ (Setup)
Key Switch		●	○
Accelerator Pedal Sensor			○
Power Mode Switch	●		
Parking Brake Switch			○
Forward/Reverse Selector Switch			○
Forward/Reverse Switch			○ (Neutral)
Exhaust Filter Switch			○
Battery			○
Battery Relay		○	○
Fuse Box A			
Fuse Box B			○ (#13)
Key Switch ON Cut Relay			●
ACC Cut Relay			●
Auto Shut-Down Relay			●
Starter Relay			
ECM Main Relay		○	○
Starter			
Engine Unit		○	
Coolant Temperature Sensor			○
Pump Delivery Pressure Sensor			○
Hydraulic Oil Temperature Sensor			○
Torque Converter Oil Temperature Sensor			○
Pressure Sensor (Parking Brake)			○

●: Check required ○: Related

Travel System Troubleshooting

Trouble Symptom / Parts	T-1 Although forward/reverse switch is operated, machine does not travel forward/ reverse.	T-2 Although forward/reverse lever is set to neutral position, machine travels. (Neutral Control)	T-3 Clutch cut is not operated. (Declutch Control)
Main Controller (Main)	○	○	○
Monitor Controller			
Monitor	○		
Battery			
Fuse Box A	○ (#10)		
Fuse Box B	○ (#8, #15)	○ (#8, #15)	○ (#8, #15)
Accelerator Pedal Sensor			
Brake Pedal (Right) Switch			
Brake Valve			○
Forward/Reverse Switch	● (Forward / Reverse)	● (Neutral)	
Forward/Reverse Selector Switch	○	○	
Armrest Switch	●	○	
Joystick Steering System Switch	●	○	
Declutch Position Switch			●
Parking Brake Solenoid	○		
Parking Brake Relay	○		
Parking Brake Switch	○		
Drive Unit (Transmission Assy)	○	○	○
Transmission Control Valve	●	●	●
Torque Converter Input Speed Sensor			○
Torque Converter Output Speed Sensor			○
Transmission Intermediate Shaft Speed Sensor			
Machine Speed Sensor			○
Forward Clutch Solenoid Valve	●	●	●
Reverse Clutch Solenoid Valve	●	●	
Propeller Shaft	○		
Axle	○		
Pressure Sensor (Brake Secondary Pressure)			●
Pressure Sensor (Parking Brake)	●		

●: Check required ○: Related

E-2 Even if starter rotates, engine does not start.

Preparation

- Check the fuel level.
- Check that the fuel filter is not clogged.
- Perform the air bleeding in the fuel supply line.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Check for the cranking (the engine crank shaft is driven by the starter motor) by sound.	Key switch: START	No cranking sound	Faulty starter motor, or other power transmission mechanism to the engine
4	-	-	The check (1) above resulted normal.	Faulty ECM or engine unit

Front Attachment System Troubleshooting

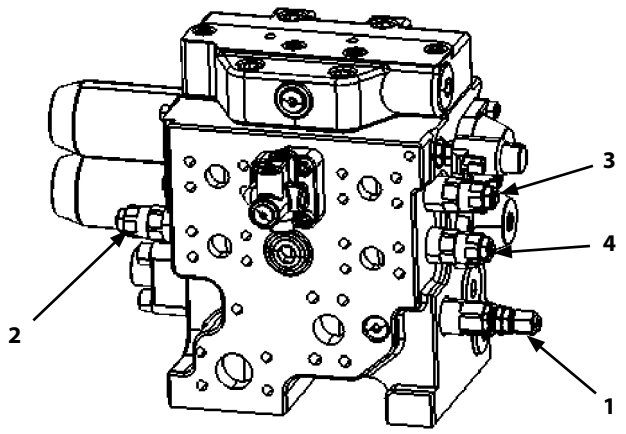
F-1 All front attachment actuator power are weak.

Main Relief Valve Set Pressure	Specification	Remark
Lift arm and bucket relief operation	31.4 ± 0.5 MPa (4554 ± 73 psi)	

Preparation

- If operating speeds are extremely slow, pump control may be faulty.
  Faulty pilot system may also cause this trouble.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Monitor Pump Delivery Pressure	Lift arm relief operation	The measured values are out of the specified range.	Faulty main relief valve (readjust)
2	-	-	The check (1) above resulted normal.	Find out cause of trouble by tracing other trouble symptoms



95Z7BTT05-06-10

1- Main Relief Valve
2- Overload Relief Valve (Bucket Bottom Side, Roll Back)
3- Overload Relief Valve (Lift Arm Rod Side, Lower)
4- Overload Relief Valve (Bucket Rod Side, Dump)

Steering System Troubleshooting

S-1 Steering operation is weak.

Main Relief Valve Set Pressure	Specification	Remark
Steering relief operation	27.4 ± 0.5 MPa (3974 ± 73 psi)	

Preparation

- If operating speeds are extremely slow, pump control may be faulty. Faulty pilot system may also cause this trouble.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Measure Steering Cylinder Pressure	Steering relief operation	The measured values are out of the specified range.	Faulty steering relief valve (readjust)
2	-	-	The check (1) above resulted normal.	Find out cause of trouble by tracing other trouble symptoms

NOTE: Refer to p. T4-5-10 for the steering relief pressure measurement and adjustment.

T-7 Speed shift is not shifted down when pushing downshift switch (DSS).

Preparation

- Check that the travel mode is AUTO 1/AUTO 2 mode.
- Refer to SYSTEM / Control System / Downshift Control (p. T2-2-38).
- Check the wiring connections first.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Monitor DSS Switch	Downshift switch (DSS): ON While machine is travelling	OFF is displayed	Faulty downshift switch (DSS) Open circuit in harness between downshift switch (DSS) and Main Controller (Main)
2	-	-	The check (1) above resulted normal.	Faulty Main Controller (Main)

O-3 Head light is not shifted to high beam.

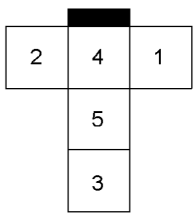
Preparation

- Check #9 fuse in fuse box A when the high beams at both sides are not ON.
- Check that the light switch is the head light position.
- Failure of the high beam indicator lighting will be also affected.
- Refer to SYSTEM / Electrical System.
- Check the wiring connections first.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Set the dimmer switch to the high beam position	Key switch: ON Light switch: Head light position	High beam is not ON	Faulty dimmer switch Open circuit in harness between dimmer switch and light switch
2	Replace high beam relay with other general relay	Key switch: ON Dimmer switch: High beam position	High beam is ON	Faulty high beam relay
3	Measure voltage between high beam relay harness end #1 and chassis	Key switch: ON Dimmer switch: High beam position	0 V	Open circuit in harness between high beam relay and dimmer switch
4	Measure voltage between high beam relay harness end #3 and chassis	Key switch: ON Dimmer switch: High beam position	0 V	Open circuit in harness between high beam relay and #9 fuse in fuse box A Faulty #9 fuse in fuse box A
5	Measure voltage between head light (left) harness end #514 and chassis	Key switch: ON Dimmer switch: High beam position	0 V	Open circuit in harness between head light (left) and high beam relay
6	Measure voltage between head light (right) harness end #514 and chassis	Key switch: ON Dimmer switch: High beam position	0 V	Faulty head light (right) Open circuit in harness between head light (right) and high beam relay
7	-	-	The above checks resulted all normal.	Faulty head light (right/left) Faulty grounding

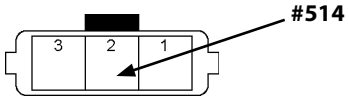
Connector (Harness end)

- High Beam Relay



95Z7B-05-CN01

- Head Light (Left/Right)



90Z7-05-06CN01

- Rear Washer

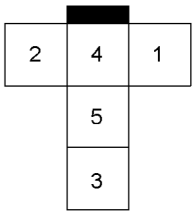
Preparation

- The rear wiper/ washer switch may be faulty when the rear washer is not operated.
- In case the rear wiper is not operated, check #18 fuse in fuse box B.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Replace the rear washer relay with other general relay	Key switch: ON Rear wiper/ washer switch: Washer ON	Rear washer is operated	Faulty rear washer relay
2	Measure voltage between rear washer relay harness end #2 and chassis	Key switch: ON Rear wiper/ washer switch: Washer ON	∞ Ω	Open circuit in harness between rear washer relay and rear wiper/ washer switch
3	Measure voltage between rear washer relay harness end #1 and chassis	Key switch: ON	0 V	Open circuit in harness between rear washer relay and #18 fuse in fuse box B Faulty #18 fuse in fuse box B
4	Measure voltage between rear washer motor harness end #1 and chassis	Key switch: ON Rear wiper/ washer switch: Washer ON	24 V	Open circuit in harness between rear washer relay and rear washer motor
5	-	-	The above checks resulted all normal.	Faulty rear washer motor or faulty #18 fuse in fuse box B

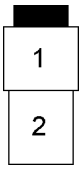
Connector (Harness end)

- Rear Washer Relay



95Z7B-05-CN01

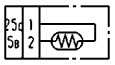
- Rear Washer Motor



95Z7BTT05-06-06

- Frost Sensor (CN12)

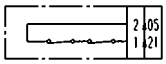
Monitors the fin temperature which is cooled by the evaporator. When the temperature is higher than 3°C (37°F) (approx. 4.2 kΩ), the controller turns the compressor relay ON. When the temperature is lower than 2°C (36°F) (approx. 4.5 kΩ), the controller turns the compressor relay OFF. Therefore, the evaporator in the air conditioner unit is prevented from freezing. The electrical resistance in the frost sensor is 100 Ω to 115 kΩ.



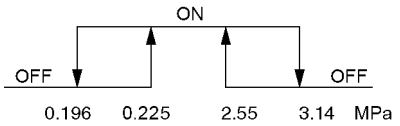
TDAA-05-07-006

- High/Low Pressure Switch (CN14)

Controls the compressor clutch solenoid while monitoring the compressor circuit pressure.
The high/low pressure switch consists of a pressure gauge and a switch. The pressure gauge detects the lower pressure range (0.196 ~ 0.225 MPa) (28.4 ~ 32.6 PSI) and the surge pressure range (2.55 ~ 3.14 MPa) (370 ~ 455 PSI). When the circuit pressure is reduced to the lower pressure range or increases to the surge pressure range, the pressure gauge turns the switch OFF so that the compressor operation stops. If the pressure is reduced to the lower range, a lack of refrigerant is suspected. Therefore, damage to the compressor due to a lack of refrigerant is prevented. In case the pressure increases to the surge range, damage to the air conditioner circuit parts due to excessively high circuit pressure is prevented.



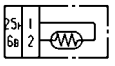
TDAA-05-07-007



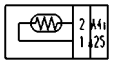
90TDAA-05-07-14

- Re-circulated Air Sensor (CN11)

Monitors the temperature 0 ~ 25°C (32 ~ 77°F) around the re-circulated air inlet as the interior air temperatures and converts them to the electrical resistance values. The temperature 0 ~ 25°C (32 ~ 77°F) corresponds to a resistance of 1.645 kΩ (0°C) (32°F) to 5 kΩ (25°C) (77°F) respectively.
The electrical resistance in the air circulation sensor is 300 Ω to 430 kΩ.



TDAA-05-07-008



TDAA-05-07-009

- Outdoor Ambient Temperature (CN15)

Monitors the temperature around the front side of the machine as the fresh air temperature, and converts the temperature to the electrical resistance value. The electrical resistance in the fresh air sensor is 100 Ω to 210 kΩ.

A: Frosted evaporator

Frosted evaporator	Stop air conditioner and melt ice			
	With voltage applied to magnet clutch	Faulty magnet clutch circuit	Check of clutch circuit	Replace clutch relay
		Faulty wiring of frost sensor	Shorted circuit check	Repair
		Faulty frost sensor characteristics	Characteristic check	Replace evaporator sensor.
		Frost sensor is out of evaporator range (faulty sensitivity)	Reinsert (floating distance from evaporator is 3 mm or less)	
	No voltage applied to magnet clutch		Faulty magnet clutch	Replace magnet clutch

A: Frosted evaporator

Frosted evaporator	Stop air conditioner and melt ice			
	With voltage applied to magnet clutch	Faulty magnet clutch circuit	Check of clutch circuit	Replace clutch relay
		Faulty wiring of evaporator sensor	Shorted circuit check	Repair
		Faulty the evaporator sensor characteristics	Characteristic check	Replace frost sensor
		Evaporator sensor is out of evaporator range (faulty sensitivity)	Reinsert (floating distance from evaporator is 3 mm or less)	
	No voltage applied to magnet clutch		Faulty magnet clutch	Replace magnet clutch

Refill Compressor Oil

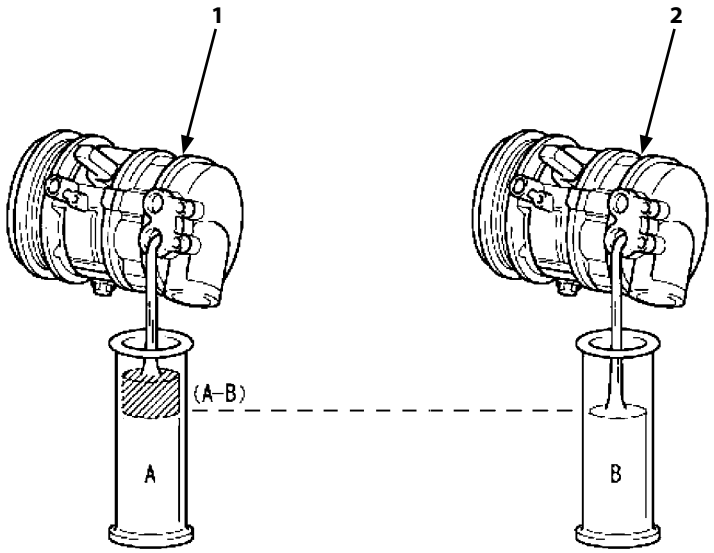
When replacing the cooling circuit parts, refill compressor oil to the specified level.

Replacement parts	Compressor	Condenser	Evaporator
Oil-replenishing quantity	Refer to the following.	40 cm^3 (2.4 in^3)	40 cm^3 (2.4 in^3)

- In case of replacing compressor

New compressor (1) is charged with oil required for cooling circuit. When replacing new compressor (1), drain excess oil from new compressor (1). Adjust oil level so that it is the same level as oil (B) in compressor (2) to be replaced.

NOTE: Compressor oil quantity: 160 cm^3 (9.8 in^3)



TDAA-05-07-015

1- New Compressor 2- Replacing Compressor