PART NO. TTNDG90-EN-00

HITACHI

Reliable solutions

Technical Manual
Troubleshooting

ZW 150-5B 150PL-5B
Wheel Loader

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TONDG90-EN
Technical Manual (Troubleshooting)	: Vol. No.TTNDG90-EN
Workshop Manual	: Vol. No.WNDG90-EN

ZW150-5B • 150PL-5B WHEEL LOADER TECHNICAL MANUAL TROUBLESHOOTING

TTNDG90-EN-00

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

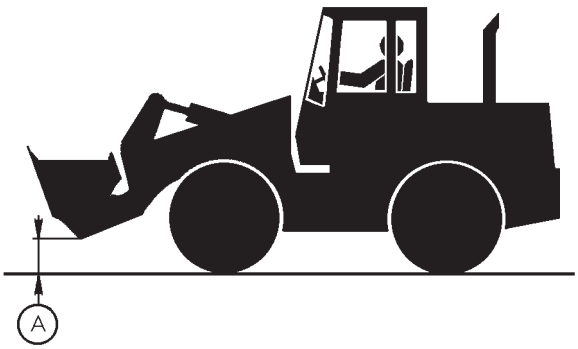
PRINTED IN JAPAN (K) 2016, 04

General Precautions for Cab

- Before entering the cab, thoroughly remove all dirt and/or oil such as mud, grease, soil or stones that may mess up the cab from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots, the operator's foot may slip off the pedal, possibly resulting in a personal accident.
- Do not mess up around the operator's seat with parts, tools, soil, stones, obstacles that may fold up or turn over, cans or lunch box. The levers or pedals become inoperable if obstacle jams in operation stroke of the accelerator pedal, brake pedals, control lever lock switch or control levers, which may result in serious injury or death.
- Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
- Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
- Keep all flammable objects and/or explosives away from the machine.
- After using the ashtray, always cover it to extinguish the match and/or tobacco.
- Do not leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.
- Use proper floor mat dedicated to the machine. If another floor mat is used, it may be displaced and contact with the accelerator or brake pedals during operation, resulting in serious injury or death.

Travel on Public Roads Safely

- This machine is not allowed to drive on public roads with the bucket loaded.
  - Be sure to empty the bucket.
  - Hold the bucket at mark (A) 300 mm (12 in) above the road surface as illustrated.



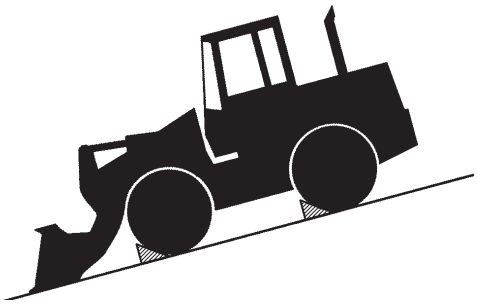
SA-453

Avoid Injury from Rollaway Accidents

- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:
- Select level ground when possible to park machine.
- Do not park the machine on a grade.
- Lower the bucket to the ground.
- Put the forward / reverse lever (switch) in neutral, and pull up the parking brake switch (lever) in the ON (parking brake) position.
- Run the engine at low idle speed without load for 5 minutes to cool down the engine.
- Stop the engine and remove the key from the key switch.
- Turn the control lever lock switch to the lock (🔒) position.
- Block both tires and lower the bucket to the ground.
- Position the machine to prevent rolling.
- Park at a reasonable distance from other machines.

SA-457



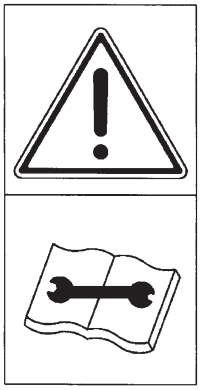
SA-458

- Sufficiently illuminate the work site. Use a maintenance work light when working under or inside the machine.
- Always use a work light protected with a guard. In case the light bulb is broken, spilled fuel, oil, antifreeze fluid, or window washer fluid may catch fire.

SA-037

Warn Others of Service Work

- Unexpected machine movement can cause serious injury.
  - Before performing any work on the machine, attach a "Do Not Operate" tag on the control lever. This tag is available from your authorized dealer.



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Support Machine Properly

- Never attempt to work on the machine without securing the machine first.
  - Always lower the attachment to the ground before you work on the machine.
  - If you must work on a lifted machine or attachment, securely support the machine or attachment. Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack.

SA-527

Handle Chemical Products Safely

- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, coolants, paints, and adhesives.

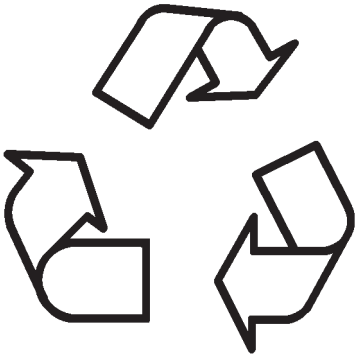
  - A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
  - Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and use recommended equipment.
  - See your authorized dealer for MSDS's (available only in English) on chemical products used with your machine.

SA-309

Dispose of Waste Properly

- Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with HITACHI equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries.

  - Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.
  - Do not pour waste onto the ground, down a drain, or into any water source.
  - Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.
  - Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your authorized dealer.



SA-226

Operational Performance Tests

Use operational performance test procedure to quantitatively check all system and functions on the machine.

Purpose of Performance Tests

1. To comprehensively evaluate each operational function by comparing the performance test data with the standard values.
2. According to the evaluation results, repair, adjust, or replace parts or components as necessary to restore the machine's performance to the desired standard.
3. To economically operate the machine under optimal conditions.

Kinds of Tests

1. Base machine performance test is to check the operational performance of each system such as engine, travel, and hydraulic cylinders.
2. Hydraulic component unit test is to check the operational performance of each component such as hydraulic pump, motor, and various kinds of valves.

Performance Standards

"Performance Standard" is shown in tables to evaluate the performance test data.

Precautions for Evaluation of Test Data

1. To evaluate not only that the test data are correct, but also in what range the test data are.
2. Be sure to evaluate the test data based on the machine operation hours, kinds and state of work loads, and machine maintenance conditions.

The machine performance does not always deteriorate as the working hours increase. However, the machine performance is normally considered to reduce in proportion to the increase of the operation hours. Accordingly, restoring the machine performance by repair, adjustment, or replacement shall consider the number of the machine's working hours.

Definition of "Performance Standard"

1. Operation speed values and dimensions of the new machine.
2. Operational performance of new components adjusted to specifications. Allowable errors will be indicated as necessary.

Engine Speed

Summary:

1. Measure the engine speed by using the monitor unit or MPDr.
2. Measure the engine speeds in each mode.

NOTE: If the engine speed is not adjusted correctly, all other performance data will be unreliable. Consequently, measure the engine speed before performing all other tests in order to check that the engine speed meets specification.

Preparation:

1. Select the service menu of monitor (In case of MPDr., connect MPDr. first).
2. Warm up the machine until coolant temperature reaches 50 °C (122 °F) or more and hydraulic oil temperature is 50±5 °C (122±9 °F).

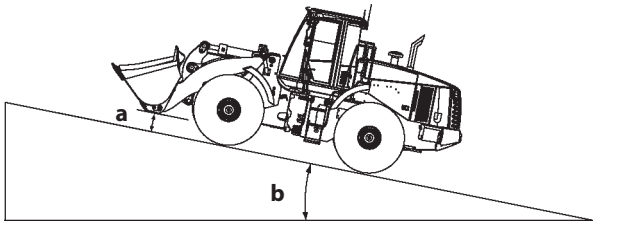
Parking Brake Function Check

Summary:

1. Measure the parking brake function on a specified slope.
2. The braking capability of the brake is an item of safety control. Be sure to conduct the performance test.

Preparation:

1. Measure on a pavement surface with a gradient of 20 % (11.31°).
2. Empty the bucket and hold the bucket with it floated 0.4 to 0.5 m (1 ft 4 in to 1 ft 8 in) above the ground.
3. Maintain the hydraulic oil temperature at 50±5 °C (122±9 °F). Warm the axle oil satisfactorily by repeating travel operation and brake operation. Make a warm up operation so that the indicator of the coolant temperature monitor should rise above the horizontal position.



T4GB-04-04-003

a- 0.4 to 0.5 m (1 ft 4 in to 1 ft 8 in) b- 20 % (11.31°)

Measurement:

1. Climb the slope and set the parking brake switch to the ON position.
2. Stop the engine.
3. After the body has stopped, put a mark (white line) on the tire and the road surface respectively.
4. After five minutes have passed, measure the amount of movement between white lines of tire and road surface.
5. Repeat the measurement three times and calculate the mean values.

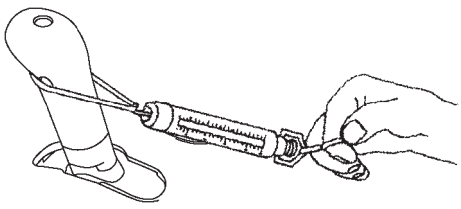
Evaluation:

Refer to Operational Performance Standard.

Measurement:

1. Measure for each control lever, pedal, and steering wheel.
2. Select the pedal, switches, and forward/reverse lever as follows.

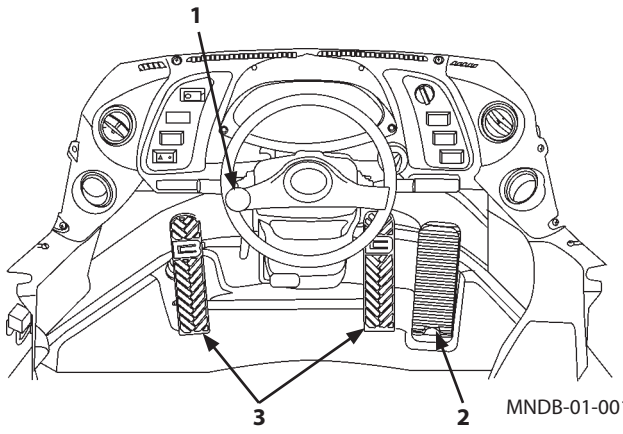
Control Lever	Accelerator Pedal	Parking Brake Switch	Forward/ Reverse Lever	Front Attachment Control Lever Lock
Each Control Lever	Neutral (engine: slow idle speed)	ON	N	OFF
Each Pedal	Neutral (engine: slow idle speed)	ON	N	ON
Steering Wheel	Neutral (engine: slow idle speed)	OFF	N	ON



TNDF-04-04-003

CAUTION: Prevent personal injury. Always make sure that the area is clear and that coworkers are out of the steering area before starting the measurement.

3. Attach a spring balance scale (tension type) onto each of the lift arm, bucket, and forward/reverse lever. Measure the maximum operating force by operating them to the stroke end.
4. In case of the pedals, attach a spring balance scale (compression type) or a load cell onto them. Measure the operating force when they are stepped slightly.
5. In case of the steering wheel, attach a spring balance scale (tension type) onto knob (1). Measure the maximum operating force when it is moved.
6. Repeat the measurement three times and calculate the mean values.



MNDB-01-001

1- Knob
2- Accelerator Pedal
3- Brake Pedal

Evaluation:

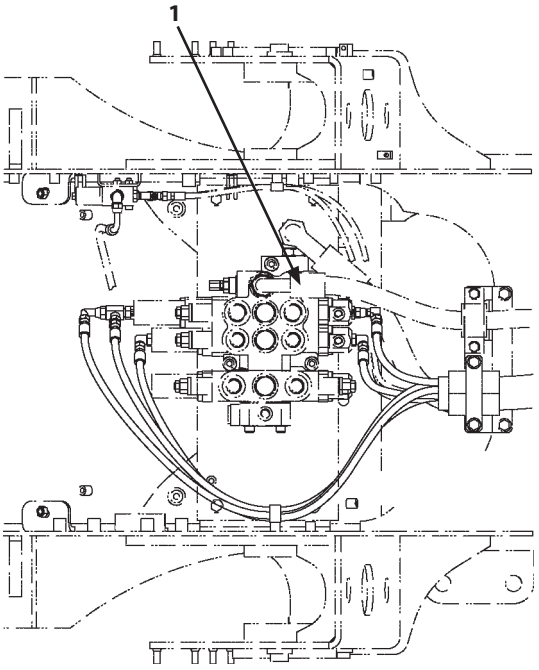
Refer to Operational Performance Standard.

(Blank)

Preparation:

1. Stop the engine.
2. Push the air bleed valve on top of the hydraulic oil tank and bleed air.
3. Disconnect main hose (1) in the control valve. Install tee (2) (263E7-62331), nipple (3) (ST 6069), and pressure gauge (4) (ST 6941).

   : 14 mm, 19 mm, 36 mm
4. Start the engine. Confirm that no oil leakage is observed at the pressure gauge connection.
5. Maintain the hydraulic oil temperature at 50±5 °C (122±9 °F)



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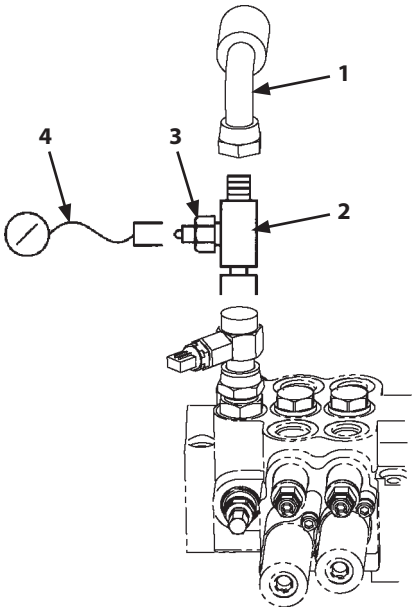


TNDF-04-05-006

1- Main Hose
2- Tee
3- Nipple
4- Pressure Gauge

Measurement:

1. Select the following conditions:

Forward/Reverse Lever	Parking Brake Switch
N	ON

2. Stop the engine. Set the key switch to the ON position.
3. Depress the brake pedal several times. Measure the pressure when the buzzer sounds.
4. Repeat the measurement three times and calculate the mean values.

Evaluation:

Refer to Operational Performance Standard.

Remedy:

Refer to Troubleshooting B.

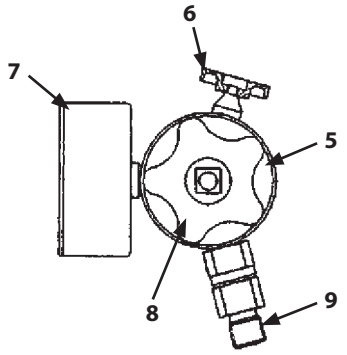
7. Turn release valve (6) clockwise and set it to the completely closed status.
8. Turn valve (8) counterclockwise and loosen seal bolt (4).
9. If the pointer in pressure gauge (7) has moved, turn valve (8) counterclockwise furthermore by one turn.
10. Confirm that the gas is not leaking from check valve (9) and release valve (6).

Measurement:

Confirm the charging pressure by using pressure gauge (7).

Evaluation:

Refer to Operational Performance Standard.



T4FC-04-05-102

5- Sealing Tool
6- Release Valve
7- Pressure Gauge
8- Valve
9- Check Valve

Maintenance of Muffler Filter

IMPORTANT: When the filter (CSF) has been replaced or cleaned, perform ASH Sedimentation Signal Reset in order to reset Muffler Filter maintenance history on the monitor.

1. Connect MPDr.
2. Set the key switch to the ON position.
3. Select Functions-Engine/Muffler Filter-Muffler Filter maintenance with MPDr. (Fig A)
4. Perform the followings.

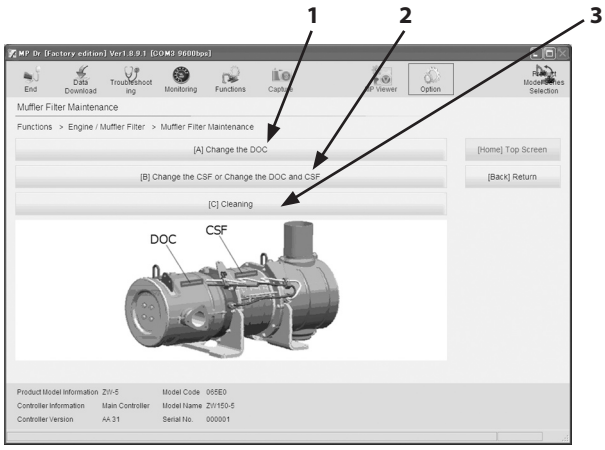
Item	Content
Change (1) the DOC	Setting Muffler Filter No.
Change (2) the CSF or Change the DOC and CSF	Setting Muffler Filter No. and ASH Sedimentation Signal Reset
Cleaning (3)	Setting Muffler Filter No. and ASH Sedimentation Signal Reset

5. Set or check the muffler filter serial No. (Refer to Rewrite for Muffler Filter Serial No.)
6. Perform ASH Sedimentation Signal Reset. (Fig B)

IMPORTANT: After Setting Muffler Filter No. and ASH ASH Sedimentation Signal Reset are performed, upload the data to e-Service.

NOTE: When the set data is uploaded to e-Service, the M-Find product specification and history will be updated.

A



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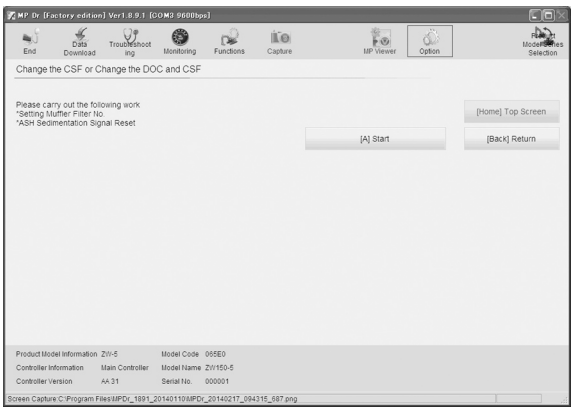
B



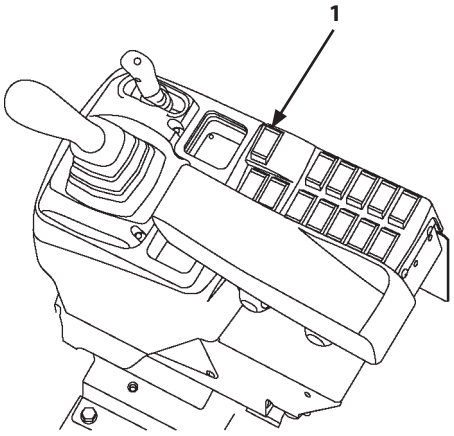
TNDF-04-06-016

Lift Arm Angle Sensor Learning

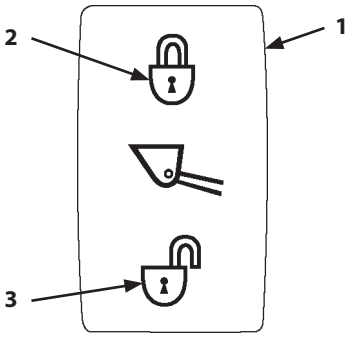
IMPORTANT: When lift arm angle sensor or MC has been replaced, perform lift arm angle sensor learning.

Preparation:

1. Connect MPDr. (Refer to clutch Learning.)
2. Start the engine.
3. Set control lever lock switch (1) to UNLOCK position (3).
4. Raise the lift arm to the highest level by lift arm raise operation.
5. Set control lever lock switch (1) to LOCK position (2).
6. Set the key switch to the OFF position.



MNDF-01-006



MNEC-01-015

2- LOCK 3- UNLOCK

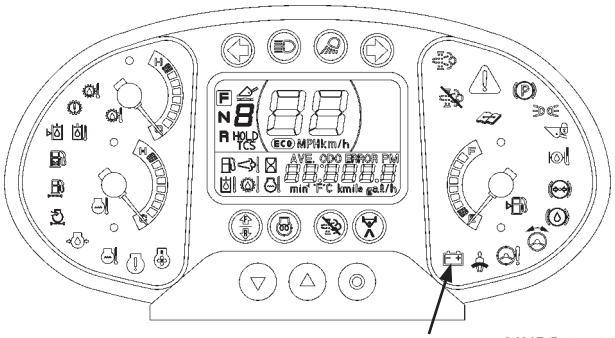
Electric System Inspection

The precautions and information for the electrical system inspection are explained here. The electrical system inspection contains as follows.

- Precautions for Inspection and Maintenance
- Instructions for Disconnecting Connectors
- Fuse Inspection
- Fusible Link Inspection
- Battery Voltage Check
- Alternator Check
- Continuity Check
- Voltage and Current Measurement
- Check by False Signal
- Test Harness

Alternator Check

Generally, if the alternator has generated electricity, alternator alarm (1) will disappear. If discharge warning indicator (1) is displayed while the engine is running, the alternator might be defective.

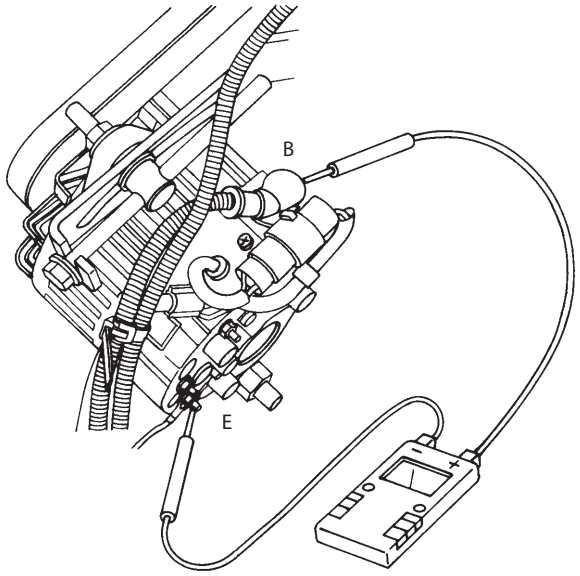


MNDB-01-008

How to Check Alternator

1. Set the key switch to the ON position. Confirm that discharge warning indicator (1) is displayed.
2. Measure voltage between terminals B and E of the alternator. If the measured voltage is around 24 V, the alternator circuit can be considered normal. If the measured voltage is low, a shortage in battery capacity or looseness of the wire connectors of alternator circuit might be the cause of the malfunction. When voltage is 0 V, the wiring between fuse box and alternator might be loose or disconnected. Also, the alternator cannot generate electricity if the ground line is disconnected.
3. Next, start the engine and measure voltage generated while the alternator rotates. As described above, measure voltage between terminals B and E on the alternator side.

   If voltage is around 28 V, the alternator is operating normally. If the rated voltage is not being generated (around 24 V), there is some trouble with the alternator or the regulator.



T157-07-06-003

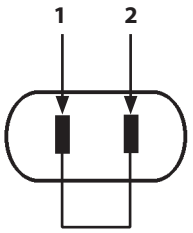
Check by False Signal

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.

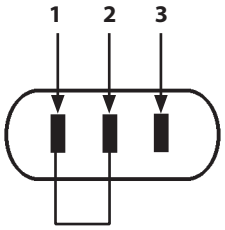
NOTE: Some kinds of sensors can be monitored by the service menu of the monitor.

Two Polarities



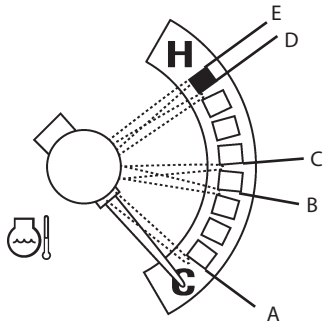
T107-07-05-010

Three Polarities

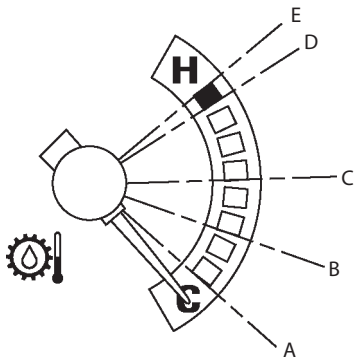


T107-07-05-011

Coolant Temperature Gauge and HST Oil Temperature Gauge

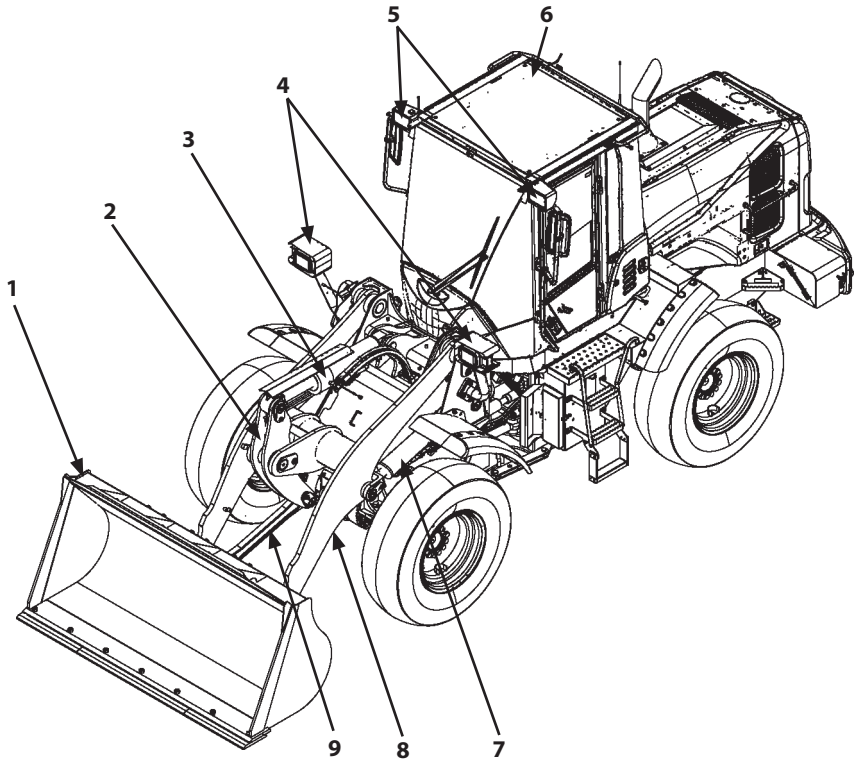
Coolant Temperature Gauge	No.	Coolant Temperature (°C)
 TNED-05-02-003	A	25
	B	40
	C	95
	D	105
	E	(120)

NOTE: When the coolant temperature reaches the (D) zone or more, the maintenance indictor on the monitor panel is ON and the buzzer sounds.

HST Oil Temperature Gauge	No.	Coolant Temperature (°C)
 TNDB-05-02-010	A	25
	B	50
	C	80
	D	120
	E	(125)

NOTE: When the HST oil temperature reaches the (D) zone for ten seconds or more, the maintenance indictor on the monitor panel is ON.

Main Component Layout (Overview)



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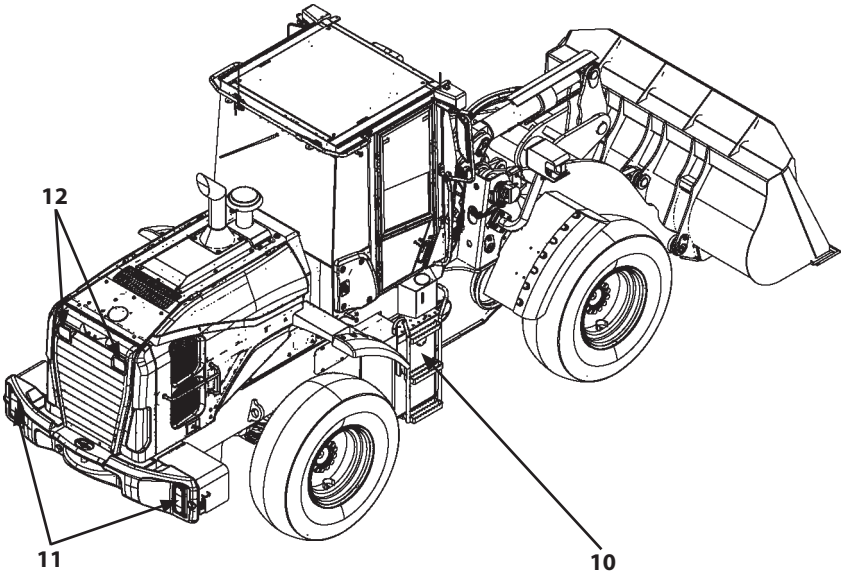
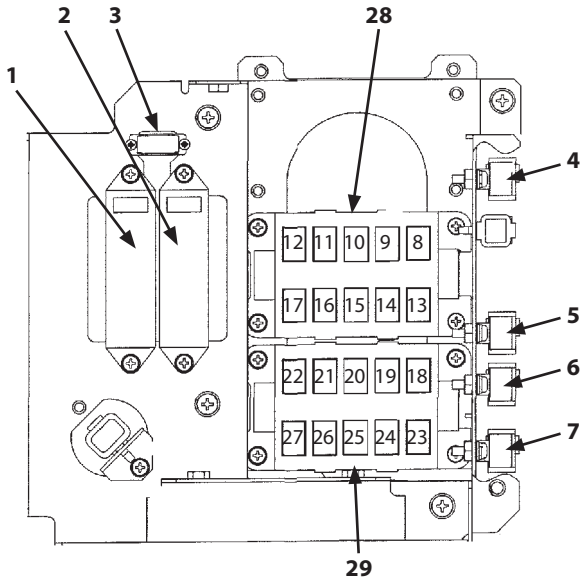


TNDF-01-02-002

1- Bucket
2- Bell Crank
3- Bucket Cylinder
4- Front Combination Light (Head Light/Turn Signal/ Clearance Light/Hazard Light) (2 Used)
5- Front Work Light (2 Used)
6- Cab
7- Lift Arm Cylinder (2 Used)
8- Lift Arm
9- Bucket Link
10- Hydraulic Oil Tank
11- Rear Combination Light (Turn Signal/Hazard Light/Tail Light/ Brake Light/Backup Light) (2 Used)
12- Rear Work Light (2 Used)

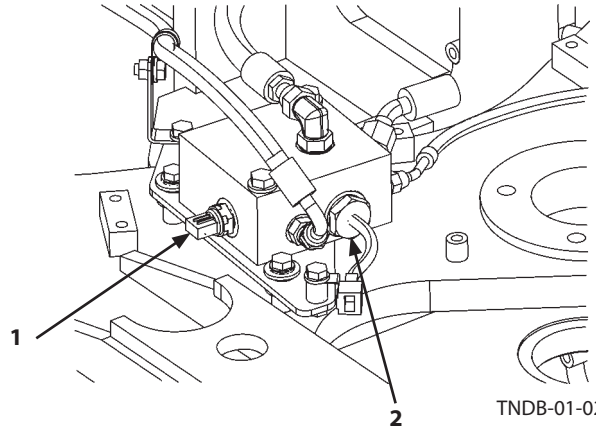
Rear Console



TNED-01-02-009

1- Fuse Box B
2- Fuse Box A
3- MPDr. Connector
4- Main Relay
5- Fuel Pump Relay
6- Back Buzzer Relay
7- Starter Cut Relay
8- Head Light Relay (Left) (A-R1)
9- Head Light Relay (Right) (A-R2)
10- High Beam Relay (A-R3)
11- Bucket Leveler Relay (A-R4)
12- Lift Arm Kickout Relay (A-R5)
13- Work Light (Front) Relay (A-R6)
14- Work Light (Rear) Relay (A-R7)
15- Right Turn Signal Light Relay (A-R8)
16- Horn Relay (A-R9)
17- Emergency Steering Relay (OPT)(A-R10)
18- Parking Brake Relay 1 (B-R1)
19- Parking Brake Relay 2 (B-R2)
20- Control Lever Lock Relay (B-R3)
21- Brake Light Relay (B-R4)
22- Load Dump Relay (B-R5)
23- Neutral Relay (B-R6)
24- Left Turn Signal Light Relay (B-R7)
25- Front Washer Relay (B-R8)
26- Rear Wiper Relay (B-R9)
27- Rear Washer Relay (B-R10)
28- Relay Box A
29- Relay Box B

Emergency Steering Block (Optional)



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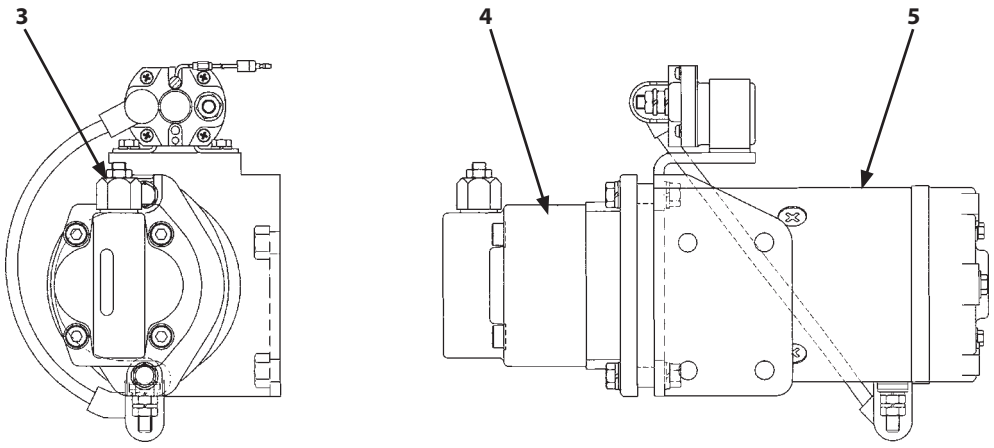
Emergency Steering Pump (Optional)



TNED-01-02-019

1- Emergency Steering Pump Delivery Pressure Sensor (Optional)
2- Steering Pressure Switch (Optional)
3- Relief Valve
4- Gear Pump
5- Electric Motor

Fault Code	Trouble	Cause	Symptoms in Machine Operation When Trouble Occurs.	Remedy
111422-2	Ride control Solenoid Valve Abnormal FB	Solenoid valve output: 140 mA or more, feedback current: More than 920 mA or less than 70 mA; both are detected.	The ride control (OPT) becomes ineffective.	Check the harness.
111422-3	Ride control Solenoid Valve FB High Current	Current: more than 920 mA	The ride control (OPT) is always activated.	Check the harness.
111422-4	Ride control Solenoid Valve FB Low Current	Current: less than 70 mA	The ride control (OPT) is not always activated.	Check the harness.

Information Controller Fault Code List

Fault Code	Trouble	Cause	Remedy
114001-2	Flash Memory Read/ Write Error	The internal memory of information controller is abnormal.	After initializing the information controller by using MPDr., retry the troubleshooting. If the fault code is displayed after retry, the information controller may be broken. Replace the information controller. When initializing the information controller, all stored data is deleted.
114002-2	External RAM Read/ Write Error	The internal memory of information controller is abnormal.	After initializing the information controller by using MPDr., retry the troubleshooting. If the fault code is displayed after retry, the information controller may be broken. Replace the information controller. When initializing the information controller, all stored data is deleted.
114003-2	Abnormal EEPROM	The internal memory of information controller is abnormal.	Retry the troubleshooting by using MPDr. If the fault code is displayed after retry, the information controller may be broken. Replace the information controller.
114006-2	Communication Terminal : Communication Error	Communication error with communication equipment	Check the communication line, power line, and fuses for communication terminal. Then, retry the troubleshooting by using MPDr. If the fault code is displayed after retry, the communication equipment may be broken. Replace the communication equipment.
114008-2	Abnormal Internal RAM	The internal memory of information controller is abnormal.	Retry the troubleshooting by using MPDr. If the fault code is displayed after retry, the information controller may be broken. Replace the information controller.

Operating Rank (Current)				Remark
A	B	C	D	
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
○				In case accelerator sensor system 2 is connected
○				In case accelerator sensor system 2 is connected
		○		In case accelerator sensor system 2 is connected
○				In case accelerator sensor system 2 is connected
		○		In case accelerator sensor system 2 is connected
○				
○				
	○			
	○			The boost pressure is reduced due to turbo control and the output power decreases.
	○			The boost pressure is reduced due to turbo control and the output power decreases.
○				Diagnosing starts over 3 minutes after the engine starts or coolant temperature is beyond 50 °C.
○				
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			The indicator does not light due to overheat switch alarm in the same way as Tier 3. Send the CAN fault code.

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

Symptoms in Machine Operation When Trouble Occurs.	Assumptive Conditions at Backup
Vibration of the engine is large, rough idle, output power decrease, faulty increasing of rotation speed, exhaust gas becomes bad.	The injector cannot be controlled.
Vibration of the engine is large, rough idle, output power decrease, faulty increasing of rotation speed, exhaust gas becomes bad.	The injector cannot be controlled.
Vibration of the engine is large, rough idle, output power decrease, faulty increasing of rotation speed, exhaust gas becomes bad.	The injector cannot be controlled.
Vibration of the engine is large, rough idle, output power decrease, faulty increasing of rotation speed, exhaust gas becomes bad.	The injector cannot be controlled.
The output power may decrease, white smoke may occur and vibration may occur, the engine may be stalled. (If the cam senor is normal, the engine can re-start.)	The engine is operated according to the cam sensor standard. Rotation speed cannot be detected by the crank speed sensor.
The output power may decrease, white smoke may occur and vibration may occur, the engine may be stalled. (If the cam senor is normal, the engine can re-start.)	The engine is operated according to the cam sensor standard. Rotation speed cannot be detected by the crank speed sensor.
The output power decreases, or the engine cannot start.	Malfunction of CPU
Same to when accelerator sensor, crank speed sensor, and rail pressure sensor are abnormal.	←
Same to when atmospheric pressure sensor, cam angle sensor, and boost temperature sensor are abnormal.	←
Nothing special.	Manifold temperature is 60 °C.
Nothing special.	Manifold temperature is 60 °C.
Vibration of the engine may be large, rough idle, output power decrease may occur, faulty increasing of rotation speed, dark smoke may occur, output power may be too large.	Fuel leakage is too much.
Vibration of the engine may be large, rough idle, output power decrease may occur, faulty increasing of rotation speed, dark smoke may occur, output power may be too large.	Fuel leakage is too much.

Operating Rank (Current)				Remark
A	B	C	D	
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			
	○			Limit Q and rotation speed limit control are not performed as boost pressure decreases.
	○			Limit Q and rotation speed limit control are not performed as boost pressure decreases.
	○			Limit Q is performed as regeneration stops. Diagnosing starts when coolant temperature is beyond 70 °C over 30 seconds to 10 minutes after the engine starts.
	○			Limit Q is performed as regeneration stops.
○				
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops.
	○			Limit Q is performed as regeneration stops. (Refer to T5-6-7.)
○				
			○	
	○			Limit Q and rotation speed limit control are not performed as boost pressure decreases.
	○			

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

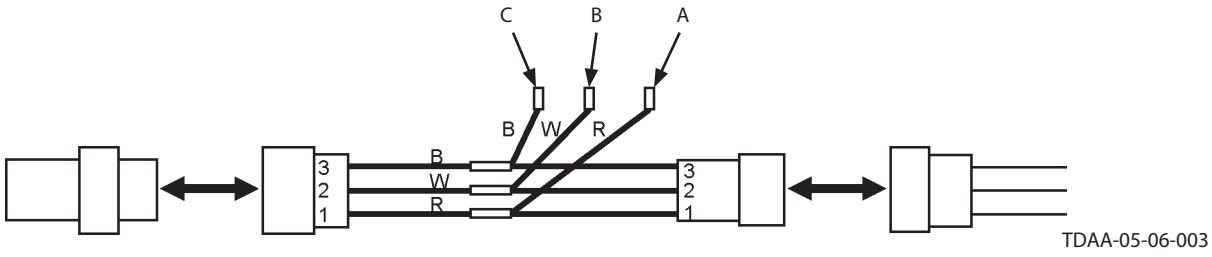
(Blank)

MC Fault Codes 111217

Preparation

- Check the wiring connections first.
- Connect the test harness (ST 6703) and dummy sensor equivalent to #4436535.
- Before inspection, set the key switch to the ON position.

Fault Code	Trouble	Inspection Method	Evaluation	Cause
111217-3	Primary Pilot Pressure Sensor Circuit High Input	Retry by using MPDr.	Un-displayed fault code	Faulty sensor
		Measure voltage between B and body.	Voltage: or more 4.75 V	Shorted circuit in harness #1 and #2
111217-4	Primary Pilot Pressure Sensor Circuit Low Input	Retry by using MPDr.	Un-displayed fault code	Faulty sensor
		Measure voltage between A and body.	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



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MC Fault Codes 120003, 120004, 120014

Fault Code	Trouble	Inspection Method	Evaluation	Cause
120003-2	Emergency Steering Operation Alarm	Check the emergency steering operation check switch (OPT).	Correct	Faulty harness
			Incorrect	Faulty emergency steering operation check switch (OPT)
120004-2	Emergency Steering Operating Pressure Error	Disconnect a connector from the steering pressure switch (OPT). Retry by using MPDr.	Displayed fault code	Faulty MC or shorted circuit in harness.
			Un-displayed fault code	Faulty steering pressure switch (OPT)
120014-2	Overrun Alarm	Diagnose on fault codes of HST controller.	-	-

HST Controller Fault Codes 111620, 111621

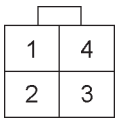
Preparation

- Check the wiring connections first.

Fault Code	Trouble	Inspection Method	Evaluation	Cause
111620-2	Vehicle Speed 1 Sensor (Rotation Direction) Error	Disconnect a connector from the vehicle speed 1 sensor. Retry by using MPDr.	Fault code 111620-2 is not displayed.	Faulty vehicle speed 1 sensor
		Measure voltage between vehicle speed 1 sensor harness end #1 and body.	Less than 0.25 V	Open circuit in harness #1
		Check shorted circuit in harness between vehicle speed 1 sensor harness end #1 and #4.	0 Ω	Shorted circuit in harness #1 and #4
		-	Normal in above check	Faulty HST controller
111621-2	Vehicle Speed 1 Sensor (Rotation Speed) Error	Disconnect a connector from the vehicle speed 1 sensor. Retry by using MPDr.	Fault code 111621-2 is not displayed.	Faulty vehicle speed 1 sensor
		Measure voltage between vehicle speed 1 sensor harness end #1 and body.	Less than 0.25 V	Open circuit in harness #1
		Check shorted circuit in harness between vehicle speed 1 sensor harness end #1 and #3.	0 Ω	Shorted circuit in harness #1 and #3
		-	Normal in above check	Faulty HST controller

Connector (Harness end)

- Vehicle Speed 1 Sensor Connector



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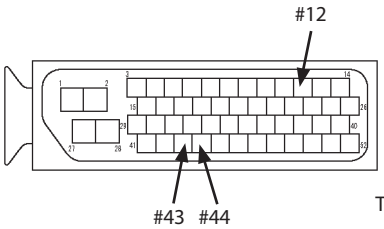
- HST Controller Connector



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- Vehicle Speed 1 Sensor Connector (Harness end)
  Connection List

Terminal No.	HST Controller End Terminal No.	Remark
#1	-	Fuse #6 in fuse box A
#2	#43	GND
#3	#44	Rotation Speed
#4	#12	Rotation Direction

Air Conditioner Controller Fault Codes E43 to E92

Preparation

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

Fault Code	Trouble	Inspection Method	Evaluation	Cause
E43	Abnormal air vent damper servo motor	Measure voltage between air vent damper servo motor harness end 7C and body. (AUTO/OFF switch / blower switch: ON)	0 V	Faulty controller or open circuit in harness between controller and air vent damper servo motor.
		Measure voltage between air vent damper servo motor harness end 7C and 25D. (AUTO/OFF switch / blower switch: ON)	0 V	Faulty controller or open circuit in harness between controller and air vent damper servo motor.
		-	Normal in above check.	Faulty air vent damper servo motor.
E44	Abnormal air mix damper servo motor	Measure voltage between air mix damper servo motor harness end 7D and body. (AUTO/OFF switch / blower switch: ON)	0 V	Faulty controller or open circuit in harness between controller and air mix damper servo motor.
		Measure voltage between air mix damper servo motor harness end 7D and 25E. (AUTO/OFF switch / blower switch: ON)	0 V	Faulty controller or open circuit in harness between controller and air mix damper servo motor.
		-	Normal in above check.	Faulty air mix damper servo motor.
E51	Abnormal refrigerant pressure high and low.	Measure voltage between High and low pressure switch harness end A21 and A05. (AUTO/OFF switch / blower switch: ON)	0 V	Faulty controller or open circuit in harness between controller and High and low pressure switch.
		-	Normal in above check.	Faulty High and low pressure switch.
E91	CAN communication error	Check continuity in CAN1 harness.	Normal	Faulty controller.
			Abnormal	Faulty CAN1 harness.
E92	CAN bus off error	Check continuity in CAN1 harness.	Normal	Faulty controller.
			Abnormal	Faulty CAN1 harness.

Parts / Item	Back Buzzer Switch (Optional)	Lift Arm Auto Leveler (Raise) Switch (Optional)	Lift Arm Auto Leveler (Lower) Switch (Optional)
Function	Turns back buzzer ON/OFF.	Sets lift arm auto leveler height kickout control (OPT).	Sets lift arm auto leveler lower kickout control (OPT).
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	Even if back buzzer switch is turned ON, back buzzer does not sound while driving in reverse direction.	The lift arm auto leveler height kickout control (OPT) is not activated.	The lift arm auto leveler lower kickout control (OPT) is not activated.
Evaluation by Fault Code	-	-	-
Evaluation by Monitoring	-	-	-
Evaluation by using Test Harness	-	-	-
Note	-	-	-
Descriptions of Control (Operational Principle Section in T/M)	T2-2, T2-4	T2-2, T2-4	T2-2, T2-4

Parts / Item	Fan Speed Control Solenoid Valve	Fan Reverse Rotation Control Solenoid Valve (Optional)	Muffler Filter Regeneration Control Solenoid Valve
Function	Controls fan rotation speed.	Shifts fan reverse rotation spool of fan valve.	Shifts muffler filter regeneration/ quick coupler spool in control valve.
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	High current: The fan speed is fixed to the minimum. Low current: The fan speed is fixed to the maximum.	High current: The fan always rotates in reverse. Low current: The fan does not rotate in reverse.	Regeneration may not be performed during manual or auto regeneration of the muffler filter.
Evaluation by Fault Code	111412	111411	111406
Evaluation by Monitoring	MC: Hyd Fan Speed Control P/S Output, Hyd Fan Speed Control P/S Output FB	MC: Hyd Fan Reverses Rotation P/S Output, Hyd Fan Reverses Rotation P/S Output FB	MC: Muf/Fltr Regeneration P/S Output, Muf/Fltr Regeneration Load P/S Output FB
Evaluation by using Test Harness	-	-	Install light harness (ST 7226). Check output signals from MC and harness condition.
Note	-	-	-
Descriptions of Control (Operational Principle Section in T/M)	T2-2, 2-4	T2-2, 2-4	T2-2, 2-4

Trouble Symptom / Parts	E-4 Even if power mode switch is operated, power mode is not shifted.	E-5 Even if key switch is turned OFF, engine does not stop.	E-6 Auto shut-down (optional) is not activated.
MC	○	○	○
ECM		●	○
HST Controller			
Information Controller			○
Monitor	○		○
Column Display Controller			
MPDr.	○		○ (Setup)
Key Switch		●	○
Accelerator Pedal Sensor			○
Power Mode Switch	●		
Traction Control Switch	●		
Parking Brake Switch			○
Forward/Reverse Lever			○ (Neutral)
Forward/Reverse Selector Switch (Optional)			○
Forward/Reverse Switch (Optional)			○ (Neutral)
Muffler Filter Switch			○
Battery			○
Battery Relay		○	○
Fuse Box A			○ (#1)
Fuse Box B			○ (#8, 15)
Key Switch ON Cut Relay (Optional)			●
ACC Cut Relay (Optional)			●
Auto Shut-Down Relay (Optional)			●
Starter Relay 1			
ECM Main Relay		○	○
Fuel Pump Relay			○
Starter			
Engine Unit			
Coolant Temperature Sensor			
Pressure Sensor (Front Attachment Pressure)			
HST Oil Temperature Sensor			○
Pressure Sensor (Parking Brake)			○
Remark			

Trouble Symptom / Parts	F-10 Bucket tilt operating speed is slow. (Parallel Link Front Attachment)	F-11 Bucket dump operating speed is slow. (Parallel Link Front Attachment)
Pilot Pump	○	○
Bucket Regenerative Valve	●	●
Bucket Regenerative Selector Valve	○	●
Pilot Valve	○	○
Spool (Control Valve)	○	○
Main Relief Valve (Front Attachment)	○	○
Overload Relief Valve (Control Valve)	○	○
Cylinder	○	○
Main Pump	○	○
Remark		

Trouble Symptom / Parts	O-10 Wiper is not operated.	O-11 Washer is not operated.	O-12 Cab light is not ON.
MC			
Information Controller			
Column Display Controller	●		
Key Switch	○ (ON)	○ (ON)	
Battery			○
Fuse Box A	● (#3)	● (#3)	
Fuse Box B	● (#18)	● (#18)	● (#3)
Front Wiper/ Washer Switch	●	●	
Rear Wiper/ Washer Switch	●	●	
Cab Light Switch			●
Rear Cab Light Switch			●
Door Open/Close Switch (Cab)			●
Front Wiper Relay 1	●		
Front Wiper Relay 2	● (Fast Speed)		
Rear Wiper Relay	●		
Front Washer Relay		●	
Rear Washer Relay		●	
Front Wiper Motor	●		
Rear Wiper Motor	●		
Front Washer Motor		●	
Rear Washer Motor		●	
Remark			

A-3 Auto or manual regeneration of muffler filter cannot be performed. (It fails.)

Preparation

- Refer to SYSTEM/Control System/Muffler Filter Manual/Auto Regeneration Control.
- Check the wiring connections first.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Monitor Forward/Reverse Lever (N).	Forward/reverse lever: N	F or R is displayed	Faulty forward/reverse lever
2	Monitor Parking Brake Pressure.	Parking brake switch: OFF Engine: Running	The measured values are not within the normal values (Normal value: 3.0 to 4.4 MPa)	Stuck spool in parking brake solenoid valve
3	Monitor Pilot Primary Pressure	Front control lever lock switch: UNLOCK position	Pressure is not detected	Faulty pilot shut-off circuit (A-1)
4	Monitor Muf/Fltr Switch.	Muffler filter regeneration switch: OFF	ON is displayed.	Faulty muffler filter regeneration switch
5	Measure pressure at port A of muffler filter regeneration control solenoid valve.	Muffler filter: ON	The measured value is not within the normal values. (Normal value: approx. 3.7 MPa)	Stuck spool in muffler filter regeneration control solenoid valve
6	Monitor Pump Delivery Pressure	Control lever in neutral	The measured value is not within the normal values. (Normal value: 1.0 to 2.5 MPa)	Faulty control valve (stuck spool)
7	-	-	The check mentioned above is normal	Faulty MC

F-7 Lift arm auto leveler height kickout control (optional) is not activated.

Preparation

- Refer to SYSTEM/Control System/Lift Arm Auto Leveler Height Kickout Control.
- In case fault code 111720-2 is displayed, perform the lift arm angle sensor learning. (Refer to T4-6.)
- Check fuse #16 in fuse box B.
- Check the wiring connections first.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Measure voltage between pilot valve lift arm raise side coil harness end #1 and body.	Key switch: ON	0 V	Open circuit in harness between fuse #16 in fuse box B and pilot valve lift arm raise side coil
2	Check continuity between pilot valve lift arm raise side coil harness end #2 and body.	Lift arm raise, detent control lever operation	0 Ω	Faulty ground in pilot valve lift arm raise side coil
3	Monitor Lift Arm Auto Leveler Switch (raise).	Lift arm auto leveler switch (raise): ON	OFF is displayed.	Faulty lift arm auto leveler switch (raise)
4	Monitor lift arm Angle Sensor.	Lift arm raise/ lower operation	0 V, or Sensor value: Fixed	Faulty lift arm angle sensor or open circuit in harness between MC and sensor
5	-	-	The check mentioned above is normal.	Faulty pilot valve lift arm raise side coil

Travel System Troubleshooting

T-1 Even if forward/reverse lever is operated, Vehicle does not travel forward/reverse.

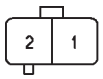
Preparation

- When the HST warning indicator is turned on, something related with the HST control may be faulty.
- Refer to SYSTEM/Control System/Forward/Reverse Selection Control.
- Check the wiring connections first.
- Check that the parking brake is not abnormal.
- Faulty transmission and/or axle (front and/or rear) may be the cause of this trouble. Check if a noise is emitted from each section.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Monitor Forward/Reverse Lever (F) and (R)	Forward/reverse lever: F, R	N is displayed	Faulty forward/reverse lever, or open circuit in harness between forward/reverse lever and HST controller
2	Measure resistance between forward/reverse control solenoid valve #1 and #2.	-	0/∞ Ω (Normal value: 22±0.4 Ω)	Faulty forward/reverse control solenoid valve
3	Measure resistance between pump displacement angle control solenoid valve #1 and #2.	-	0/∞ Ω (Normal value: 22±0.4 Ω)	Faulty pump displacement angle control solenoid valve
4	-	-	The check mentioned above is normal.	HST controller

Connector (Harness end)

- Solenoid Valve Connector



TNED-05-05-020

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

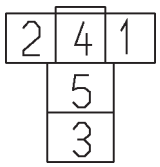
Preparation

- Check fuse #19 in fuse box B 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, or open circuit in harness between dimmer switch and light switch
2	Switch 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 body.	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 body.	Key switch: ON Dimmer switch: High beam position	0 V	Open circuit in harness between high beam relay and #19 fuse in fuse box B, or faulty fuse #19
5	Measure voltage between head light (left) harness end #511A and body.	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 #511B and body.	Key switch: ON Dimmer switch: High beam position	0 V	Faulty head light (right), or open circuit in harness between head light (right) and high beam relay
7	-	-	The check mentioned above is normal.	Faulty head light (right/left) or faulty ground

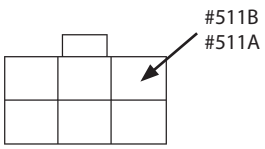
Connector (Harness end)

- High Beam Relay



T183-05-04-003

- Head Light (Left/Right)



TNED-05-06-003

- Rear Washer

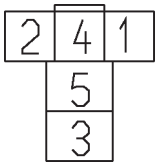
Preparation

- The rear wiper/ washer switch may be faulty when the rear washer is not operated.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Switch 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	Check continuity between rear washer relay harness end #2 and body.	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 body.	Key switch: ON Rear wiper/ washer switch: Washer ON	0 V	Open circuit in harness between rear washer relay and fuse #18 in fuse box B
4	Measure voltage between rear washer motor harness end #2 and body.	Key switch: ON Rear wiper/ washer switch: Washer ON	0 V	Open circuit in harness between rear washer relay and rear wiper motor
5	-	-	The check mentioned above is normal.	Faulty rear wiper motor or faulty fuse #3 in fuse box A

Connector (Harness end)

- Rear Washer Relay



T183-05-04-003

- Rear Washer Motor

TNED-05-06-006

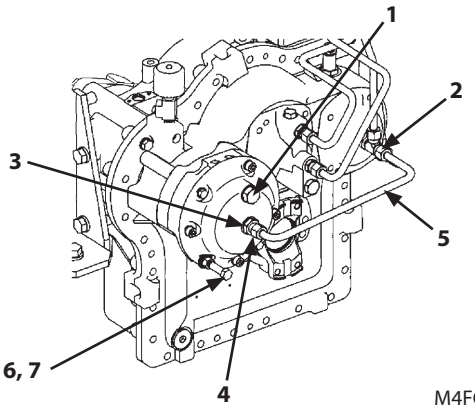
Procedures

⚠ CAUTION:

- **Once the parking brake is released, the machine becomes impossible to stop with the brake system.**
- **Wedge wheel stoppers to all tires to prevent the machine from moving.**

1. Remove plug (1) from brake cap (8).
2. Remove nut (3) while preventing oil from spilling out by using waste cloth.
3. Loosen nut (2).
4. Remove connector (4). Install connector (4) to the hole of plug (1). Install tube (5) to connector (4) and secure them with nuts (2, 3).
5. Remove orifice (9) from brake cap (8).
6. Remove release bolt (6) and flat washer (7).
7. Insert release bolt (6) and flat washer (7) into the hole of orifice (9). Tighten release bolt (6).
8. When release bolt (6) touches brake cap (8), further tighten release bolt (6) for 2 turns (apporx. 2 to 3 mm). The parking brake will be released.

   Wrench size: 17 mm, 22 mm, 27 mm
   8 mm (Hexagonal wrench)



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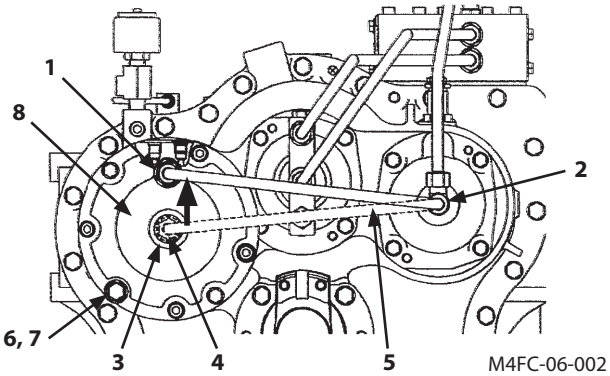

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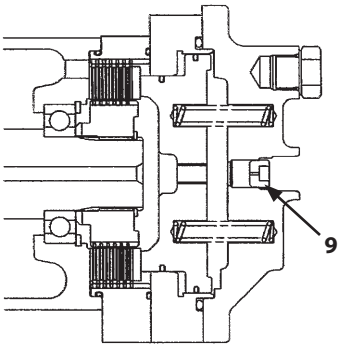
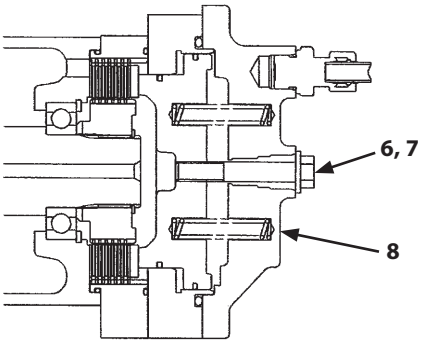


M4FC-06-003



M4FC-06-004

<table>
<tr><th colspan="3">Trouble</th><th>Cause</th></tr>
<tr><td rowspan="10">Data on Machine Information</td><td colspan="2">Clock (time, 24-hour)</td><td rowspan="9">If the data of monitoring function can be displayed on MPDr., CAN communication between column display controller and other controllers is faulty. If the data cannot be displayed on MPDr., the sensor system detecting the related signal is faulty. (As for the machine, some trouble must occur. Refer to Troubleshooting A and conduct the remedy.)</td></tr>
<tr><td colspan="2">Hour Meter</td></tr>
<tr><td colspan="2">Odometer</td></tr>
<tr><td colspan="2">PM Accumulating Amount</td></tr>
<tr><td>Engine Speed</td><td>Displayed only when starting on service mode</td></tr>
<tr><td>Engine Coolant Temperature</td><td>Displayed only when starting on service mode</td></tr>
<tr><td>HST Oil Temperature</td><td>Displayed only when starting on service mode</td></tr>
<tr><td>Fault Code</td><td>Displayed only when starting on service mode</td></tr>
<tr><td>Fuel Consumption</td><td>Displayed only when starting on normal mode</td></tr>
<tr><td>Average Fuel Consumption</td><td>Displayed only when starting on service mode</td></tr>
<tr><td colspan="2">Hydraulic Oil Hour Meter</td><td rowspan="13">As for these troubles, the liquid crystal display in monitor panel may be faulty or the logic circuit may be faulty.</td></tr>
<tr><td colspan="2">Hydraulic Oil Filter 1 Hour Meter (Hydraulic Oil Return Filter)</td></tr>
<tr><td colspan="2">Hydraulic Oil Filter 2 Hour Meter (Pilot Filter)</td></tr>
<tr><td colspan="2">Hydraulic Oil Filter 3 Hour Meter (HST Charge Oil Filter)</td></tr>
<tr><td colspan="2">Transmission Oil Hour Meter</td></tr>
<tr><td colspan="2">Transmission Oil Filter Hour Meter</td></tr>
<tr><td colspan="2">Engine Oil Hour Meter</td></tr>
<tr><td colspan="2">Engine Oil Filter Hour Meter</td></tr>
<tr><td colspan="2">Fuel Filter Hour Meter</td></tr>
<tr><td colspan="2">Axle Oil Hour Meter</td></tr>
<tr><td colspan="2">Muffler Filter Hour Meter</td></tr>
</table>

Malfunction of HST Warning Indicator

- Check the wiring connections first.

Even when the HST controller circuit is abnormal, the indicator does not light.

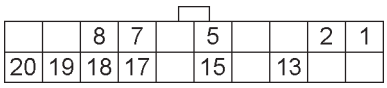
	Inspection Method	Condition	Evaluation	Cause
1	Measure voltage at terminal #13 of column display controller 1-A connector.	Key Switch: ON	0 V	Open circuit in harness between HST controller and column display controller
2	-	-	Normal in above check	Faulty column display controller

Even when the HST controller circuit is not abnormal, the indicator lights.

	Inspection Method	Condition	Evaluation	Cause
1	Check continuity between harness end terminal #13 of column display controller 1-A connector and the body.	Key Switch: ON	0 Ω	Shorted circuit in harness between HST controller and column display controller
2	-	-	Normal in above check	Faulty column display controller

Connector (Harness end)

- Column Display Controller 1-A Connector



TNDF-05-05-005

Malfunction of Air Filter Restriction Indicator

- Check the wiring connections first.

Even when the air filter is clogged, the indicator does not light.

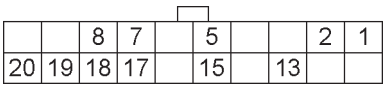
Procedure	Inspection Method	Condition	Evaluation	Cause
1	Connect the air filter restriction switch harness end connector to the body.	Key Switch: ON	Indicator: ON	Faulty air filter restriction switch
2	After connecting the air filter restriction switch harness end connector to the body, check continuity between terminal #18 of column display controller 1-A connector and the body.	Key Switch: ON	∞ Ω	Open circuit in harness between column display controller and air filter restriction switch
3	-	-	Normal in above check	Faulty column display controller

Even when the air filter is not clogged, the indicator lights.

Procedure	Inspection Method	Condition	Evaluation	Cause
1	Disconnect the air filter restriction switch connector.	Key Switch: ON	Indicator: OFF	Faulty air filter restriction switch
2	Disconnect column display controller 1-A connector.	Key Switch: ON Connect only to terminal #2.	Indicator: OFF	Shorted circuit in harness between column display controller and air filter restriction switch
3	-	-	Normal in above check	Faulty column display controller

Connector (Harness end)

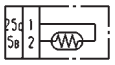
- Column Display Controller 1-A Connector



TNDF-05-05-005

- Frost Sensor (CN12)

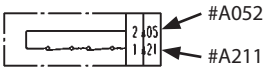
Monitors the fin temperature which is cooled by the evaporator. When the temperature is higher than 3 °C (approx. 4.2 kΩ), the controller turns the compressor relay ON. When the temperature is lower than 2 °C (approx. 4.5 kΩ), the controller turns the compressor relay OFF. Therefore, the evaporator in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



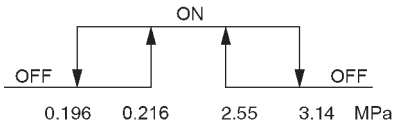
TDAA-05-07-006

- 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 MPa to 0.216 MPa) and the surge pressure range (2.55 MPa to 3.14 MPa). 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.



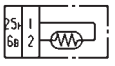
TDAA-05-07-007



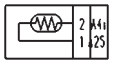
TDAA-05-07-014

- Re-circulated Air Sensor (CN11)

Monitors the temperatures (0 to 25 C) around the re-circulated air inlet as the interior air temperatures and converts them to the electrical resistance values. The temperatures 0 °C to 25 °C corresponds to a resistance of 1.645 kΩ (0 °C) to 5 kΩ (25 °C) 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 Sensor (CN15)

Monitors the temperature around the rear 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 frost 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 frost sensor characteristics	Characteristic check	Replace frost 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

Refill Compressor Oil

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

Replacement parts	Compressor	Condenser	Evaporator	Receiver	D hose (between compressor and condenser)	L hose (between condenser and unit)	S hose (between unit and compressor)
Oil-replenishing quantity	Refer to the following.	40 cm^3 (2.4 in^3)	40 cm^3 (2.4 in^3)	20 cm^3 (1.2 in^3)	6 to 9 cm^3/m (0.4 to 0.5 in^3/m)	2 to 4 cm^3/m (0.1 to 0.2 in^3/m)	8 to 11 cm^3/m (0.5 to 0.7 in^3/m)

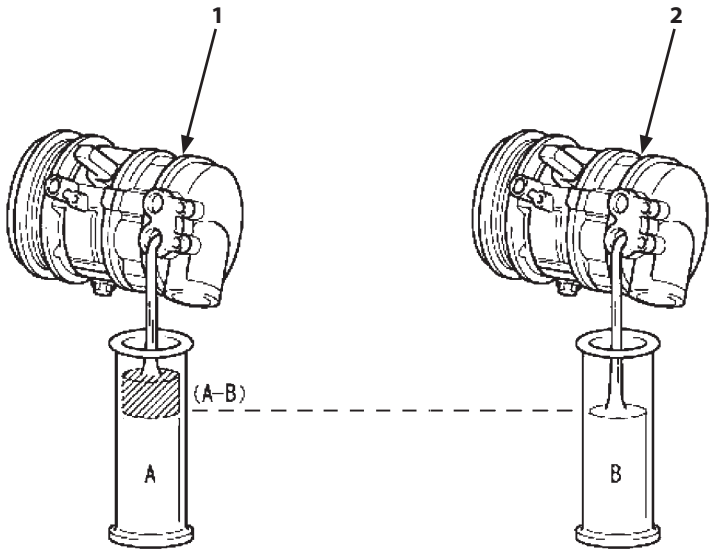
- In case of replacing compressor

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.

- Compressor oil refill container

Oil type	Part No	Quantity
ND-OIL8	4422696	40 cm^3 (2.4 in^3)

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



TDAA-05-07-015

1- New Compressor 2- Replacing Compressor