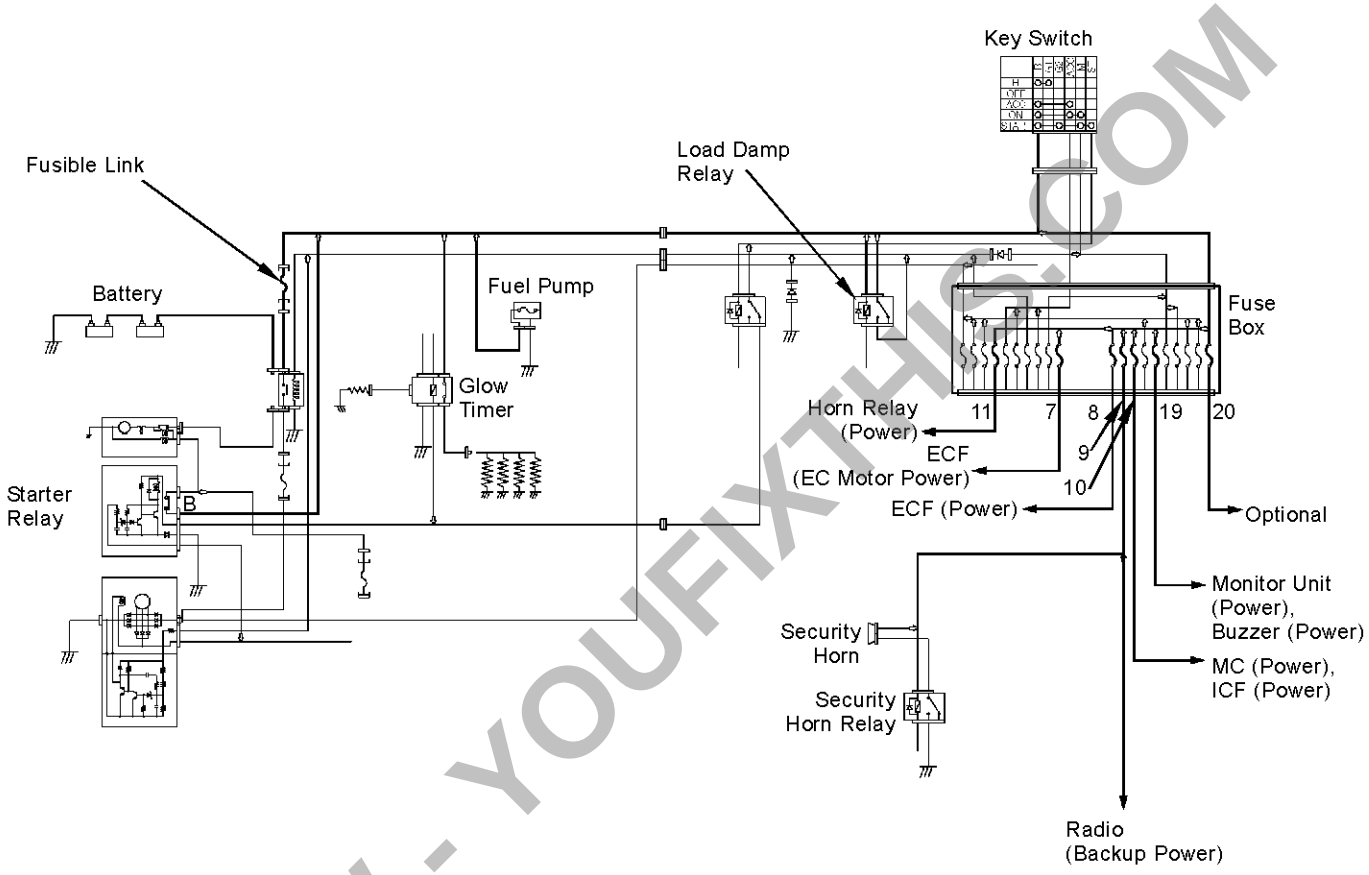
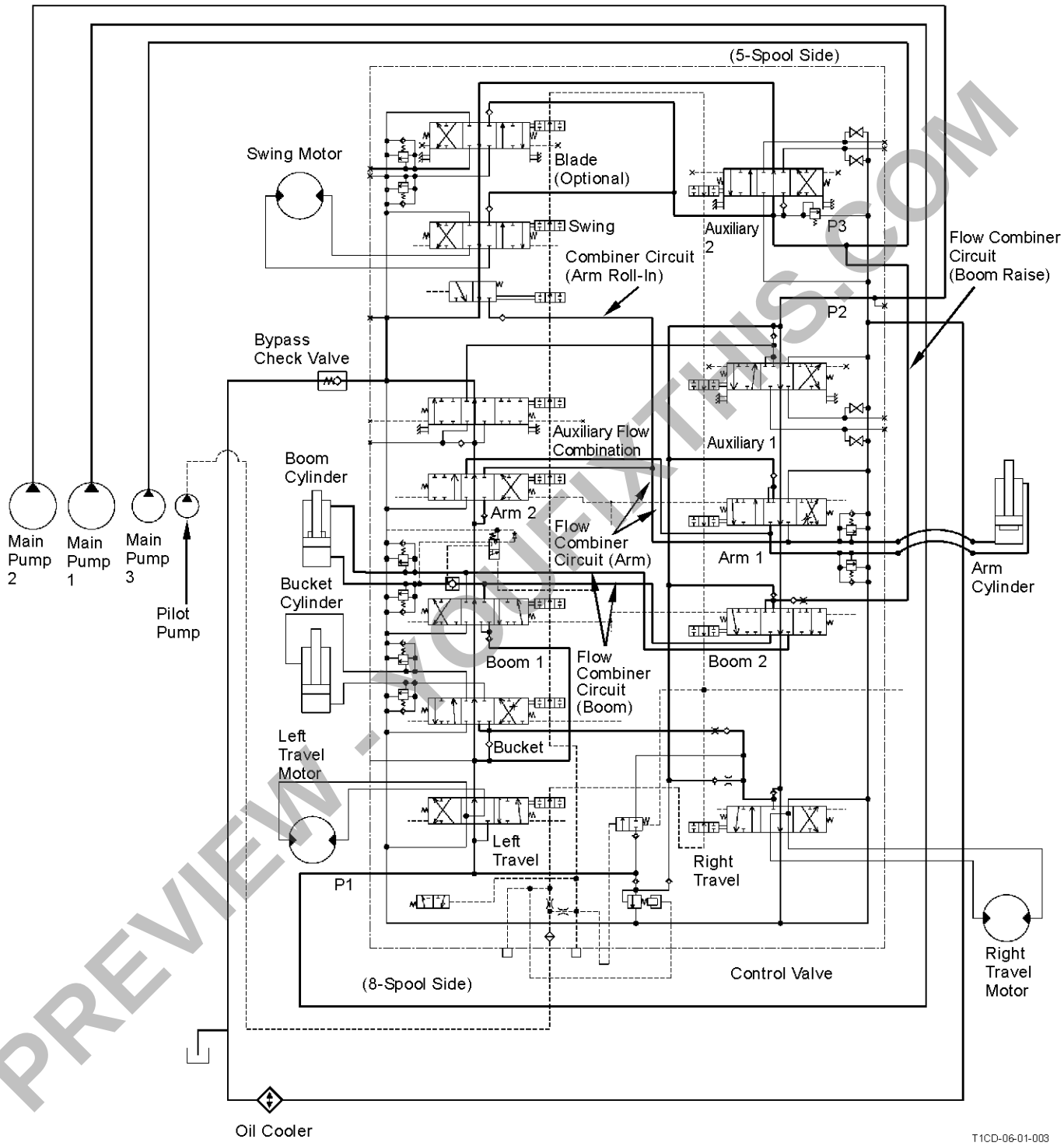


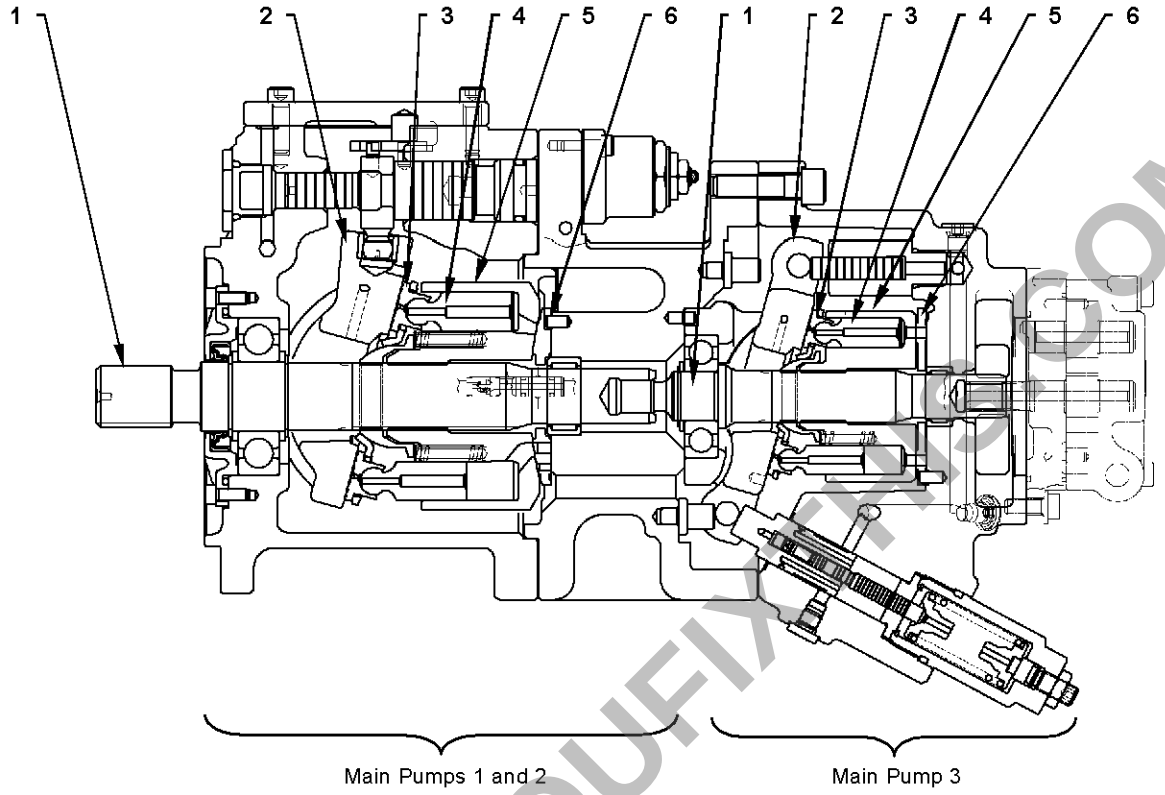
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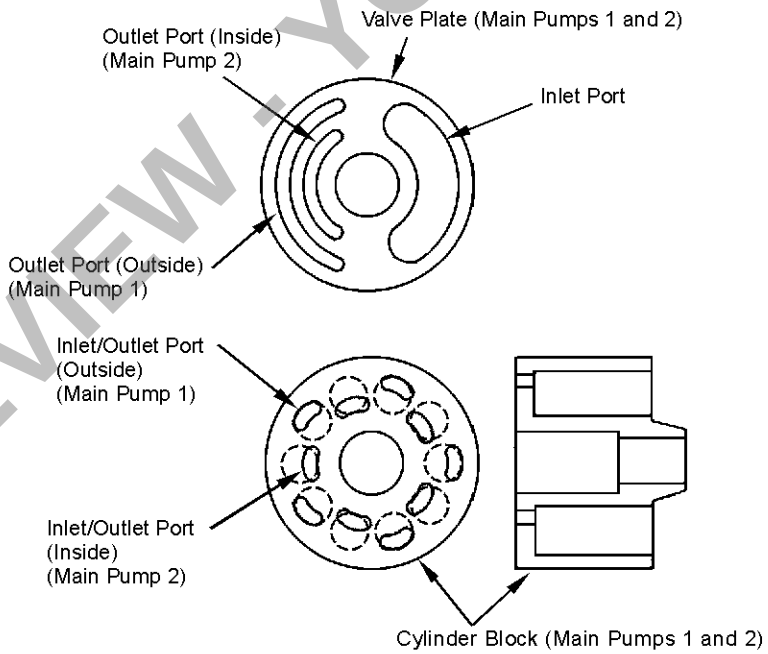


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T1P1-03-01-005



T563-02-02-003

1 - Shaft
2 - Swash Plate
3 - Shoe
4 - Plunger
5 - Cylinder Block
6 - Valve Plate

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MC FAULT CODE LIST

Fault Code	Trouble	Cause	Influenced Control
11000-2	Abnormal EEPROM	Faulty MC	All controls
11001-2	Abnormal RAM	Faulty MC	All controls
11002-2	Abnormal A/D conversion	Faulty MC	All controls
11003-3	Abnormal sensor voltage	Faulty MC Faulty sensor Faulty harness	All controls
11004-2	Abnormal CAN communication	Faulty MC Faulty CAN harness	• CAN cycle data communication

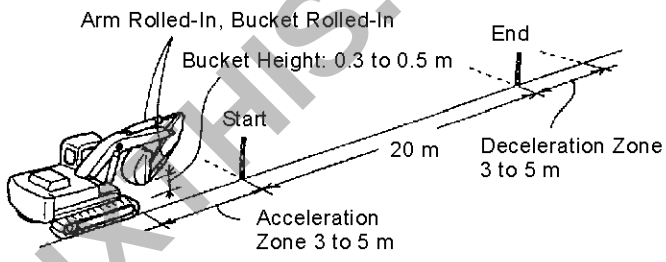
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TRAVEL SPEED

Summary:
Measure the time required for the excavator to travel a test track and check the performance of the travel device systems (from main pump to travel motor).

Preparation:
1. Adjust the track sag on both tracks equally.
2. Prepare a flat and solid test track 20 m (65.6 ft) in length with extra length of 3 to 5 m (9.8 to 16 ft) on both ends for machine acceleration and deceleration.
3. With the arm and the bucket fully extended, hold the bucket 0.3 to 0.5 m (12 to 20 in) above the ground.
4. Maintain hydraulic oil temperature at 50±5 °C (122±9 °F).



T105-06-03-001

Measurement:
1. Measure at both slow and fast speeds of the machine.
2. Select the following switch positions:

Travel Mode Switch	Engine Control Dial	Power Mode Switch	Auto-Idle Switch
Slow Mode	Fast Idle	P	OFF
Fast Mode	Fast Idle	P	OFF

3. Start traveling the machine in the acceleration zone with the travel levers to full stroke.
4. Measure the time required to travel 20 m (65.6 ft).
5. After measuring the forward travel speed, turn the upperstructure 180° and measure the reverse travel speed in the same way.
6. Repeat the measurement three times in each direction and calculate the average values.

Evaluation:
Refer to Operational Performance Standard in T4-2.

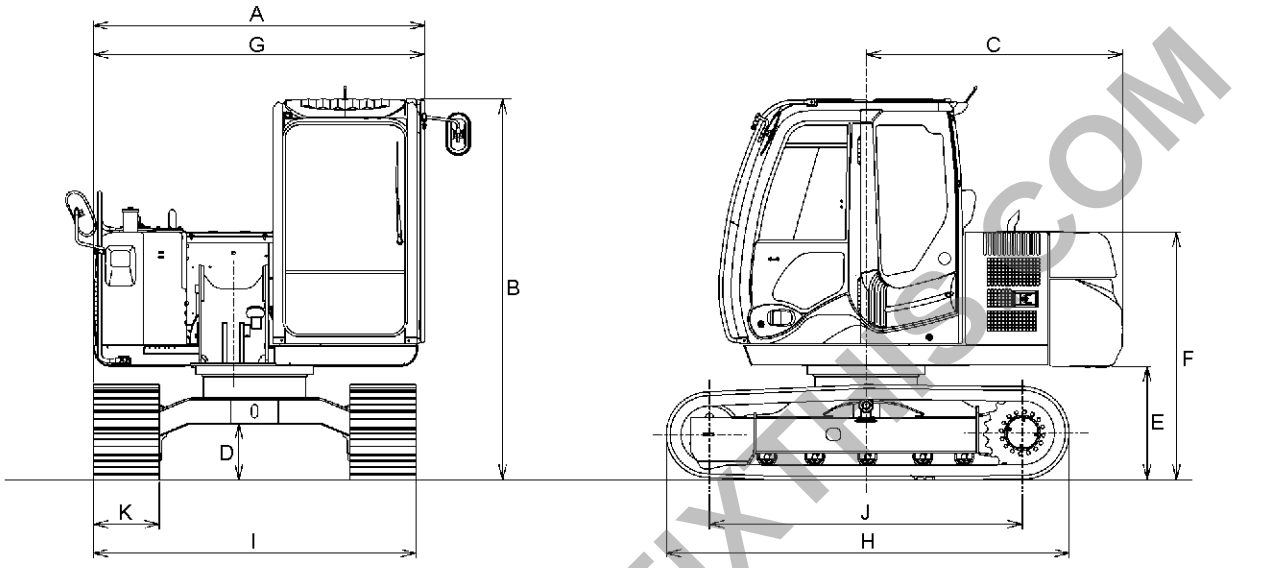
Remedy:
Refer to Troubleshooting B in T5-7.

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SPECIFICATIONS (STANDARD)

ZX70-3, 70LC-3



M1P1-12-001

Model	ZX70-3	ZX70LC-3
Front-End Attachment	1.62 m (5 ft 4 in) Arm	
Standard Bucket Capacity (Heaped)	PCSA 0.28 m^3 (0.37 yd^3), CECE 0.24 m^3	PCSA 0.33 m^3 (0.43 yd^3), CECE 0.29 m^3
Operating Weight	6470 kg (14300 lb)	6570 kg (14500 lb)
Base Machine Weight	5080 kg (11200 lb)	5160 kg (11400 lb)
Engine	Isuzu AU-4LE2X 40.5 kW (55 PS)/2000 min^{-1} (rpm)	
A: Overall Width	2260 mm (7 ft 5 in)	2320 mm (7 ft 7 in)
B: Cab Height	2600 mm (8 ft 6 in)	
C: Rear End Swing Radius	1750 mm (5 ft 9 in)	
D: Minimum Ground Clearance	* 360 mm (1 ft 2 in)	
E: Counterweight Clearance	* 760 mm (2 ft 6 in)	
F: Engine Cover Height	* 1680 mm (5 ft 6 in)	
G: Overall Width of Upperstructure	2260 mm (7 ft 5 in)	
H: Undercarriage Length	2765 mm (9 ft 1 in)	2920 mm (9 ft 7 in)
I : Undercarriage Width	2200 mm (7 ft 3 in)	2320 mm (7 ft 7 in)
J : Sprocket Center to Idle Center	2140 mm (7 ft 0 in)	2290 mm (7 ft 6 in)
K : Track Shoe Width	450 mm (18 in)	
Ground Pressure	30 kPa (0.31 kgf/cm^2, 4.4 psi)	28 kPa (0.29 kgf/cm^2, 4.1 psi)
Swing Speed	10.5 min^{-1} (rpm)	
Travel Speed	5.3/3.4 km/h (3.3/2.1 mph)	
Gradeability	35 degree (70 %)	

*NOTE: * The dimensions do not include the height of the shoe lug.*

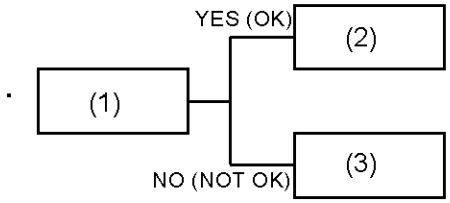
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TROUBLESHOOTING B PROCEDURE (Machine Diagnosis by Using Trouble Symptom)

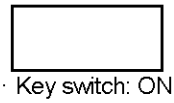
Refer to troubleshooting B for diagnosis by using trouble symptom. Apply troubleshooting B procedure when no fault code is displayed on the service menu (built-in diagnosing system) in monitor unit and the diagnosing by Dr. ZX although the machine operation is abnormal. When the fault code is displayed, refer to the troubleshooting A group and diagnose.

On the front section pages of this group are the tables indicating the relationship between machine trouble symptoms and related parts which may cause such trouble if failed.
Start the troubleshooting with more probable causes selected by referring to these tablesHow to Read the Troubleshooting Flow Charts

- How to read troubleshooting flowchart



- After checking or measuring item (1), select either YES (OK) or NO (NOT OK) and proceed to item (2) or (3), as appropriate.

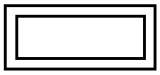


· Key switch: ON

- Special instructions or reference item are indicated in the spaces under the box. Incorrect measuring or checking methods will render troubleshooting impossible, and may damage components as well.



- Explanation of how to use test harness kit required. Refer to “Electrical System Inspection” Group (Group 8) in this section.

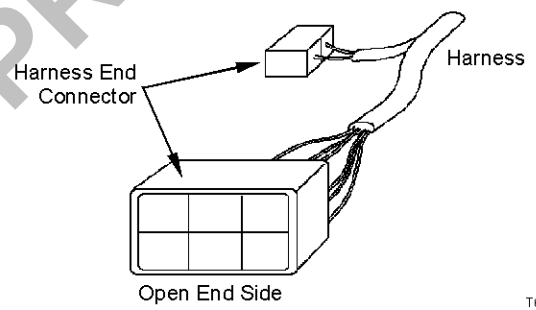


- Use the service menu (built-in diagnosing system) in the monitor unit or the diagnosing system / monitor function in Dr. ZX.



- Causes are stated in a thick-line box. Scanning through thick-line boxes, possible causes can be seen without going through the flow chart.

NOTE: Harness end connector viewed from the open end side by the all connectors image shown in this section



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SECTION AND GROUP CONTENTS

TECHNICAL MANUAL

(Operational Principle)

SECTION 1 GENERAL

Group 1 Specifications
Group 2 Component Layout
Group 3 Component Specifications

SECTION 2 SYSTEM

Group 1 Controller
Group 2 Control System
Group 3 Hydraulic System
Group 4 Electrical System

SECTION 3 COMPONENT OPERATION

Group 1 Pump Device
Group 2 Swing Device
Group 3 Control Valve
Group 4 Pilot Valve
Group 5 Travel Device
Group 6 Others (Upperstructure)
Group 7 Others (Undercarriage)

TECHNICAL MANUAL (Troubleshooting)

SECTION 4 OPERATIONAL PERFORMANCE TEST

Group 1 Introduction
Group 2 Standard
Group 3 Engine Test
Group 4 Excavator Test
Group 5 Component Test
Group 6 Adjustment

SECTION 5 TROUBLESHOOTING

Group 1 Diagnosing Procedure
Group 2 Monitor Unit
Group 3 Dr. ZX
Group 4 ICF
Group 5 Component Layout
Group 6 Troubleshooting A
Group 7 Troubleshooting B
Group 8 Electrical System Inspection

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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.



001-E01A-0001

SA-688

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 don't use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.
- 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.



002-E01A-1223

SA-1223

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SAFETY ALERT SYMBOL AND HEADLINE NOTATIONS

In this manual, the following safety alert symbol and signal words are used to alert the reader to the potential for personal injury of machine damage.

⚠ This is the safety alert symbol. When you see this symbol, be alert to the potential for personal injury.
Never fail to follow the safety instructions prescribed along with the safety alert symbol.
The safety alert symbol is also used to draw attention to component/part weights.
To avoid injury and damage, be sure to use appropriate lifting techniques and equipment when lifting heavy parts.

- ⚠ **CAUTION:**
  Indicated potentially hazardous situation which could, if not avoided, result in personal injury or death.

- **IMPORTANT:**
  Indicates a situation which, if not conformed to the instructions, could result in damage to the machine.

- *NOTE:*
  Indicates supplementary technical information or know-how.

UNITS USED

- SI Units (International System of Units) are used in this manual.
  MKSA system units and English units are also indicated in parenthheses just behind SI units.
  Example : 24.5 MPa (250 kgf/cm^2, 3560 psi)

  A table for conversion from SI units to other system units is shown below for reference purposees.

Quantity	To Convert From	Into	Multiply By	Quantity	To Convert From	Into	Multiply By
Length	mm	in	0.03937	Pressure	MPa	kgf/cm^2	10.197
	mm	ft	0.003281		MPa	psi	145.0
Volume	L	US gal	0.2642	Power	kW	PS	1.360
	L	US qt	1.057		kW	HP	1.341
	m^3	yd^3	1.308	Temperature	°C	°F	°C×1.8+32
Weight	kg	lb	2.205	Velocity	km/h	mph	0.6214
Force	N	kgf	0.10197		min^{-1}	rpm	1.0
	N	lbf	0.2248	Flow rate	L/min	US gpm	0.2642
Torque	N·m	kgf·m	1.0197		mL/rev	cc/rev	1.0
	N·m	lbf·ft	0.7375				

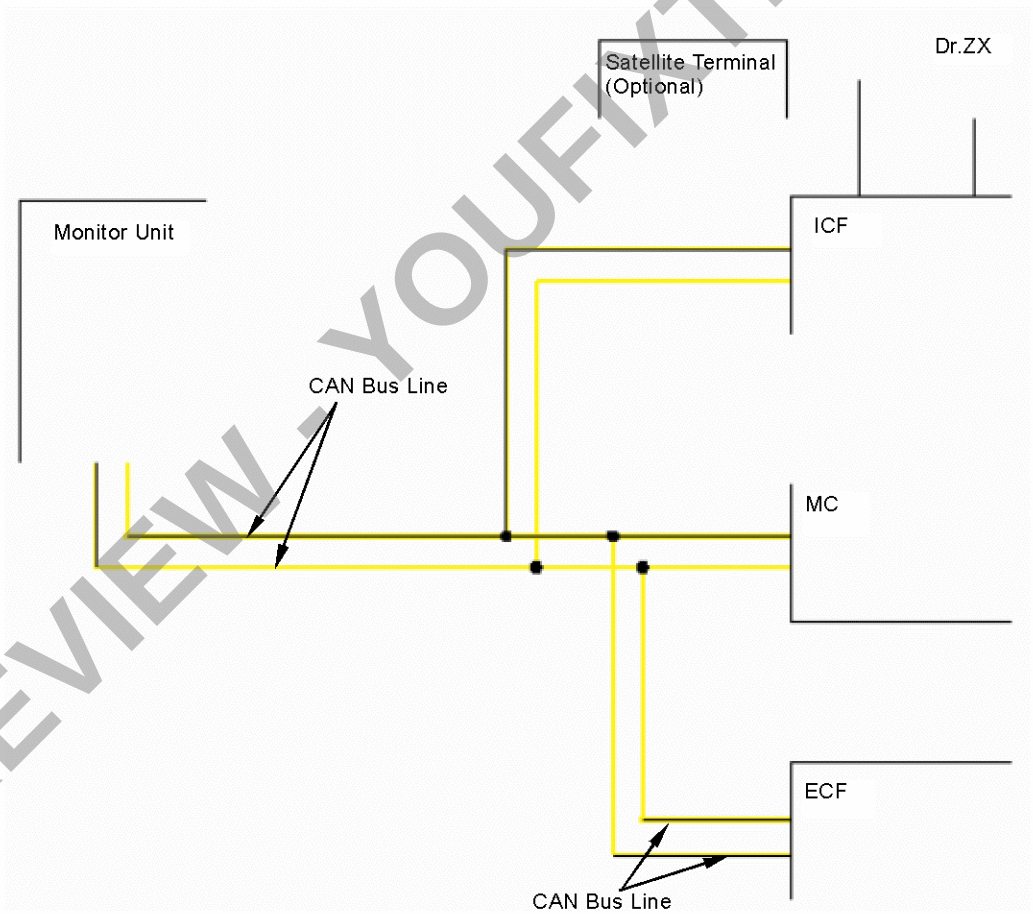
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OUTLINE

The controllers are provided for each control respectively.
Each controller is connected by using CAN (Controller Area Network) in order to display on the monitor unit in the cab or the monitoring of the machine overall condition including the engine.

- MC : Main Controller
- ECF : Engine Controller
- ICF : Information Controller
- Monitor Unit



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NOTE: CAN (CAN Bus Line)

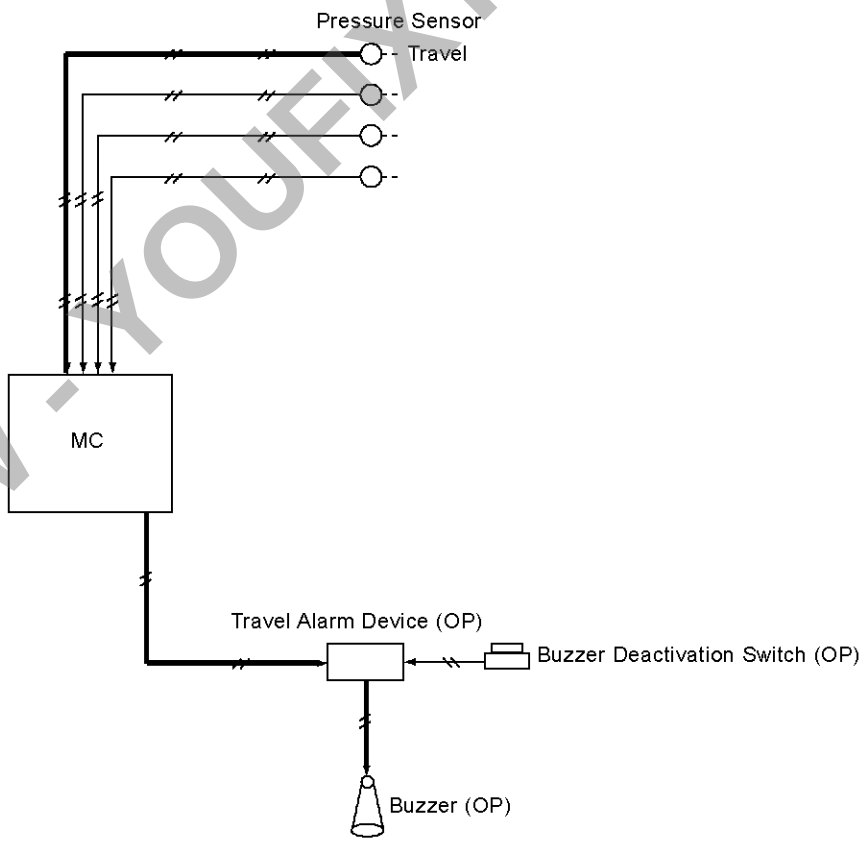
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Travel Alarm Control
(Only Machines with Optional Parts Equipped)

Purpose: It sounds the buzzer while the machine is traveling.

Operation:
1. MC receives a signal from the pressure sensor (travel) when the travel operation is carried out.
2. MC sends a signal to the travel alarm device and sounds the buzzer.

NOTE: After traveling continuously for more than 13 seconds, the buzzer can be stopped by the buzzer deactivation switch.
(OP): Optional



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ENGINE STOP CIRCUIT (KEY SWITCH: OFF)

1. When the key switch is turned to the OFF position from the ON position, current which flows to the engine stop solenoid holding side and terminal #18 in ECF from terminal M is blocked.
2. Therefore, the engine stop solenoid is turned OFF.
3. When the engine stop solenoid is turned OFF, the fuel cut lever is moved to the fuel cut position by the spring.
4. Consequently, as fuel is not supplied to the engine, the engine is stopped.
5. ECF operates the EC motor to the STOP position.

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RELIEF VALVE

The relief valve reduces shocks developed when swing movement starts or stops (shockless function) and protects the circuit from overloading (relief function).

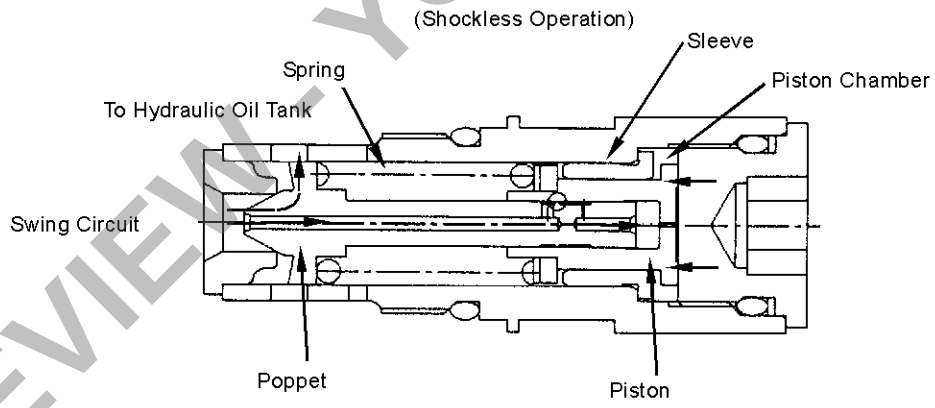
Shockless Operation

1. When the circuit pressure increases, pressure oil flows to the piston chamber through the poppet and the oil passage in the piston so that the piston is moved.
2. As long as the piston is moving, the spring force is increased.
3. Therefore, as long as the piston is moving, the poppet is opened by the pressure lower than the relief set pressure and hydraulic oil flows to the hydraulic oil tank. Therefore, as long as the piston is moving, the poppet is opened by the pressure lower than the relief set pressure and hydraulic oil flows to the hydraulic oil tank.
4. When the piston comes in contact with the end of the sleeve, the spring force increases up to the normal relief set pressure.
5. Therefore, the pressure should be relieved before the circuit pressure reaches the relief pressure.

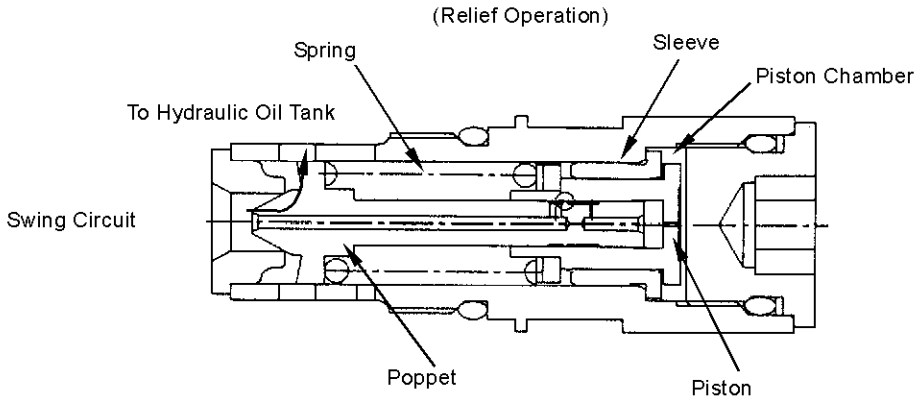
Relief Operation

During swing operation, when the circuit pressure exceeds the relief set pressure, the poppet is opened and hydraulic oil is relieved.

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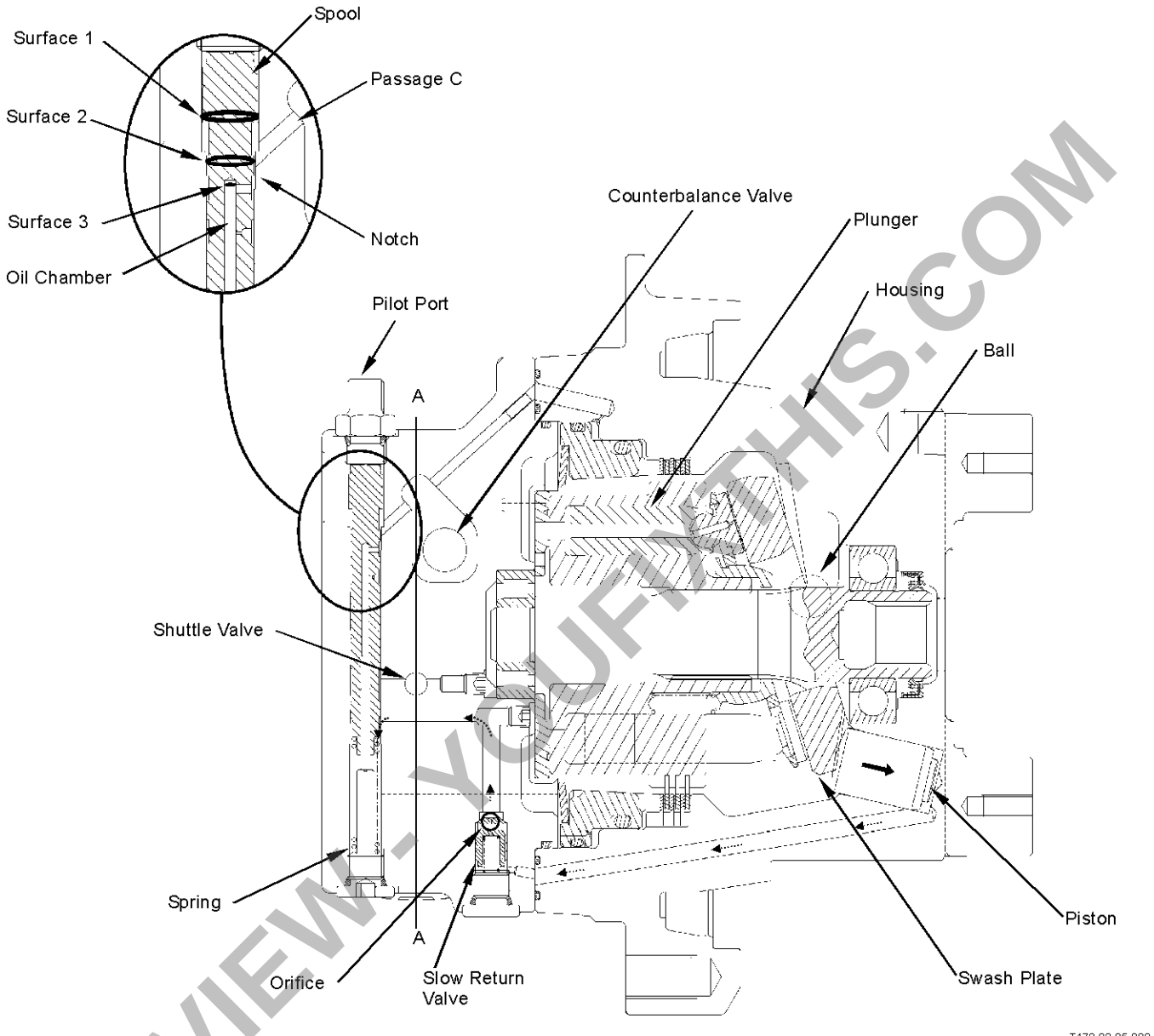


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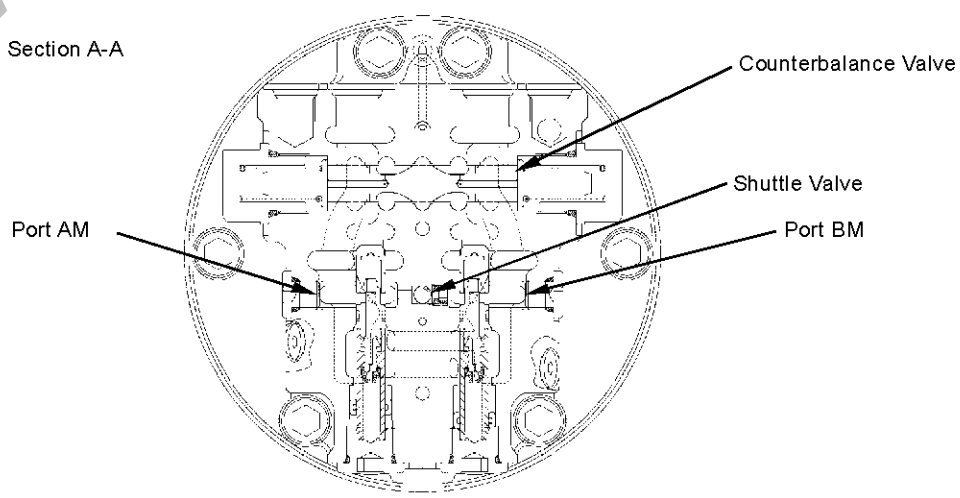


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T172-03-05-009



T172-03-05-010

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USE HANDHOLDS AND STEPS

- Falling is one of the major causes of personal injury.

  - When you get on and off the machine, always face the machine and maintain a three-point contact with the steps and handrails.
  - Do not use any controls as hand-holds.
  - Never jump on or off the machine. Never mount or dismount a moving machine.
  - Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.

008-E01A-0439



SA-439

ADJUST THE OPERATOR'S SEAT

- A poorly adjusted seat for either the operator or for the work at hand may quickly fatigue the operator leading to mis-operations.

  - The seat should be adjusted whenever changing the operator for the machine.
  - The operator should be able to fully depress the pedals and to correctly operate the control levers with his back against the seat back.
  - If not, move the seat forward or backward, and check again.
  - Adjust the rear view mirror position so that the best rear visibility is obtained from the operator's seat. If the mirror is broken, immediately replace it with a new one.

009-E01A-0462



SA-462

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Performance Test Designation	Performance Standard	Remarks	Reference Page
CONTROL LEVER OPERATING FORCE N (kgf, lbf)		HITACHI lever pattern	T4-4-16
Boom Lever	16 (1.6, 3.6) or less		
Arm Lever (ISO lever pattern: Swing lever)	13 (1.3, 2.9) or less		
Bucket Lever	13 (1.3, 2.9) or less		
Swing Lever (ISO lever pattern: Arm lever)	16 (1.6, 3.6) or less		
Travel Lever	28 (2.8, 6.3) or less		
Blade Lever	25 (2.5, 5.6) or less		
CONTROL LEVER STROKE mm		HITACHI lever pattern	T4-4-17
Boom Lever	97±10		
Arm Lever (ISO lever pattern: Swing lever)	82±10		
Bucket Lever	82±10		
Swing Lever (ISO lever pattern: Arm lever)	97±10		
Travel Lever	120±10		
Blade Lever	88±10		
COMBINED OPERATION OF BOOM RAISE/SWING sec	2.5±0.3	1.62 m arm 0.28 m^3 (PCSA heaped) bucket, Bucket: empty	T4-4-18
Bucket Teeth Height: H mm	3500 or more		
Bucket Teeth Height: H (with HRV) mm	3380 or more		
Bucket Teeth Height: H (2.12 m arm) mm	3600 or more		
Bucket Teeth Height: H (2.12 m arm, with HRV) mm	3450 or more		

NOTE: HRV: Hose Rupture Valve

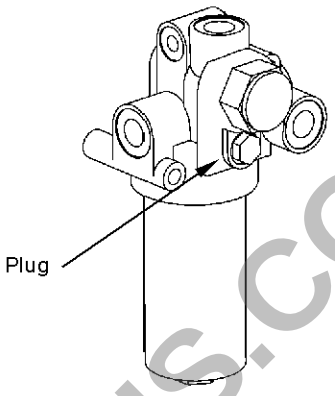
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PRIMARY PILOT PRESSURE

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 the pilot filter. Install the adapter (ST 6069) and the pressure gauge (ST 6942) to the pressure check port.
   : 14 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).



T178-03-07-001

Measurement:

1. Select the following switch positions:

Engine Control Dial	Power Mode Switch	Auto-Idle Switch
Fast Idle	P	OFF
Slow Idle	P	OFF

2. Measure pilot pressure in each specified setting above without load.
3. Repeat the measurement three times and calculate the average values.

Evaluation:

Refer to Operational Performance Standard in T4-2.

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DIAGNOSING PROCEDURE

These six basic steps are essential for efficient troubleshooting:

1. Study the System
   Study the machine's technical manuals. Know the system and how it works, and what the construction, functions and specifications of the system components are.

2. Ask the operator
   Before inspecting, get the full story of malfunctions from the operator below.

   (a) How is the machine being used? (Find out if the machine is being operated correctly)

   (b) When was the trouble noticed, and what types of work the machine doing at that time?

   (c) What are the details of the trouble? Is the trouble getting worse, or did it appear suddenly for the first time?

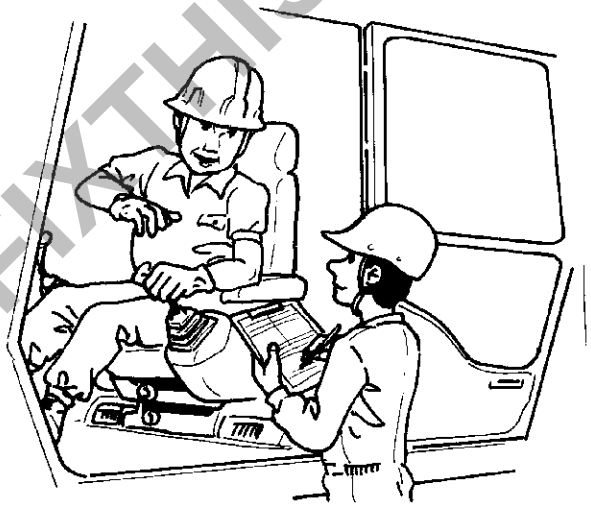
   (d) Did the machine have any other troubles previously? If so, which parts were repaired before?

3. Inspect the machine
   Before starting the troubleshooting procedure, check the machine's daily maintenance points, as shown in the operator's manual.

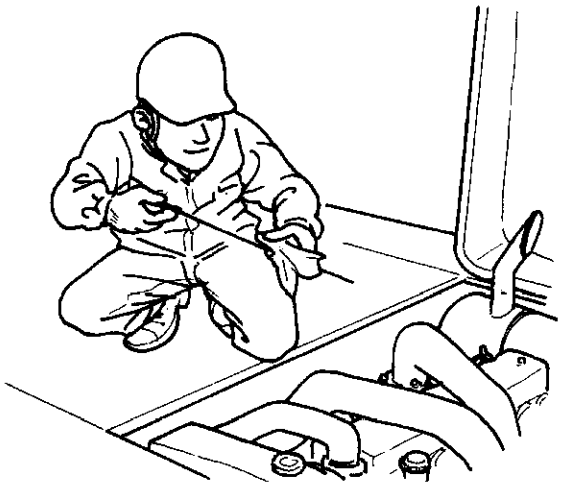
   Also, check the electrical system, including the batteries, as troubles in the electrical system such as low battery voltage, loose connections and blown fuses will result in malfunction of the controllers, causing total operational failure of the machine.
   If troubleshooting is started without checking for blown fuses, a wrong diagnosis may result, wasting time. Check for blown fuses before troubleshooting. Even if a fuse looks normal by visual inspection, a fine crack is difficult to find. Always use a tester when checking the fuses.



T107-07-01-001



T107-07-01-002



T107-07-01-003

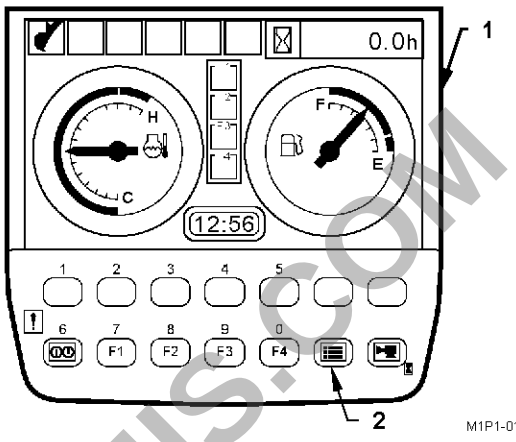
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MONITORING

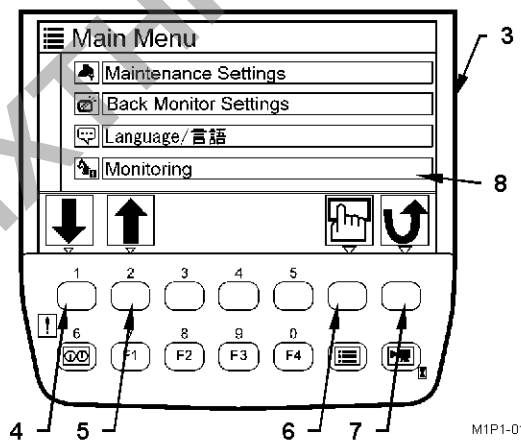
The actual engine speed can be displayed.

1. After primary screen (1) appears, push menu key (2) and display Main Menu (3).

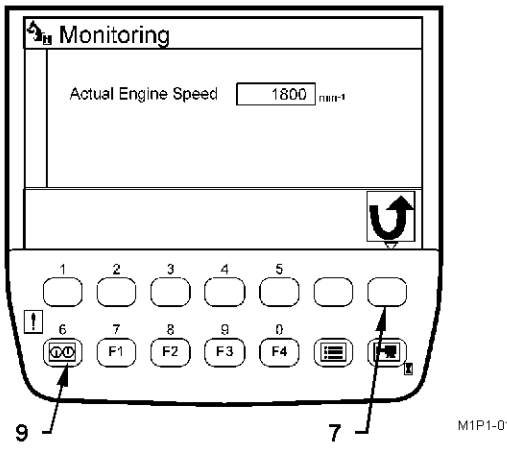


2. Select Monitoring (6) from Main Menu (3) by using keys (4) and (5). Push key (6), and the monitoring screen is displayed.

NOTE: When pushing key (7), return to the previous screen.



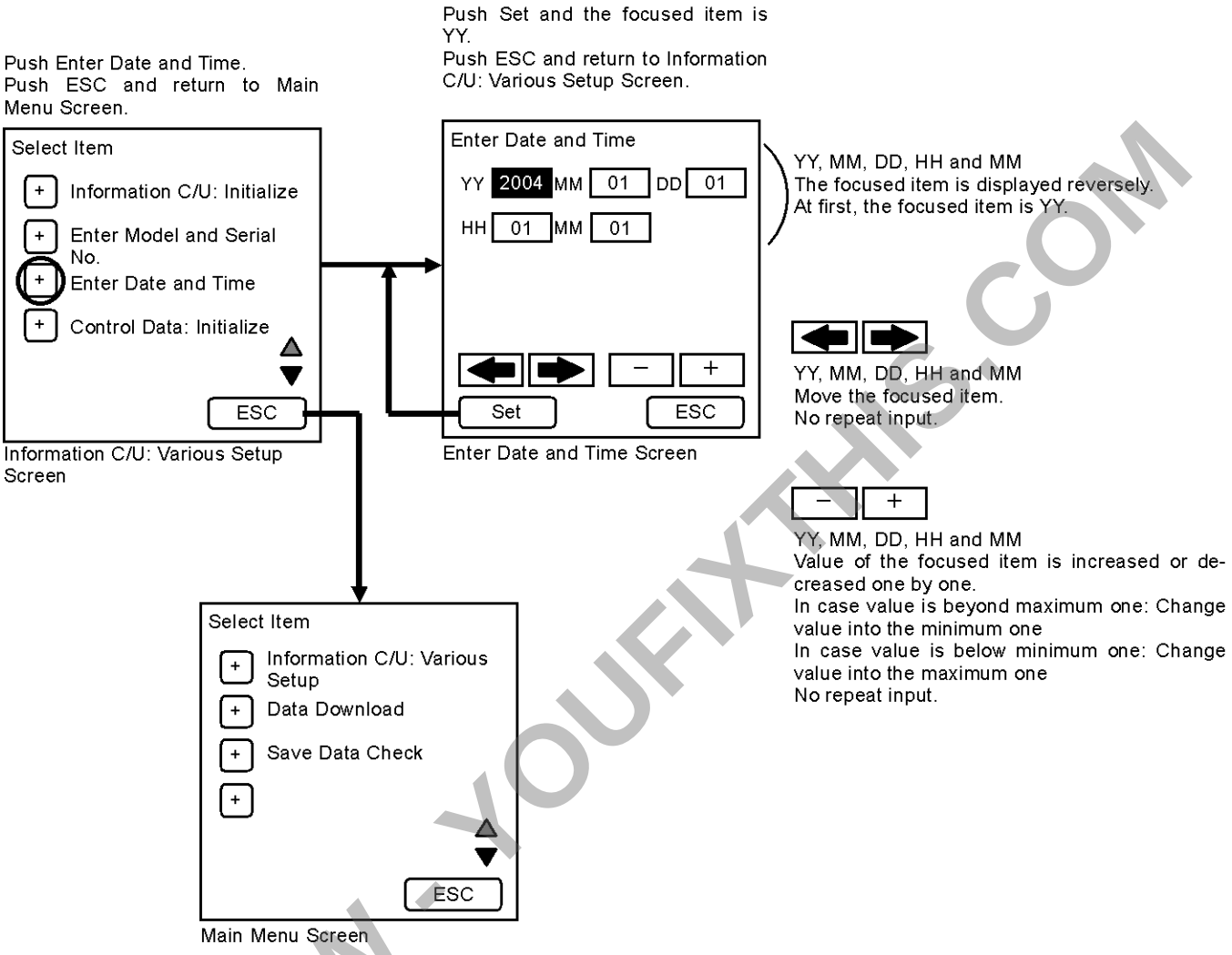
3. Push key (9), and primary screen (1) appears.



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1.3 Enter Date and Time



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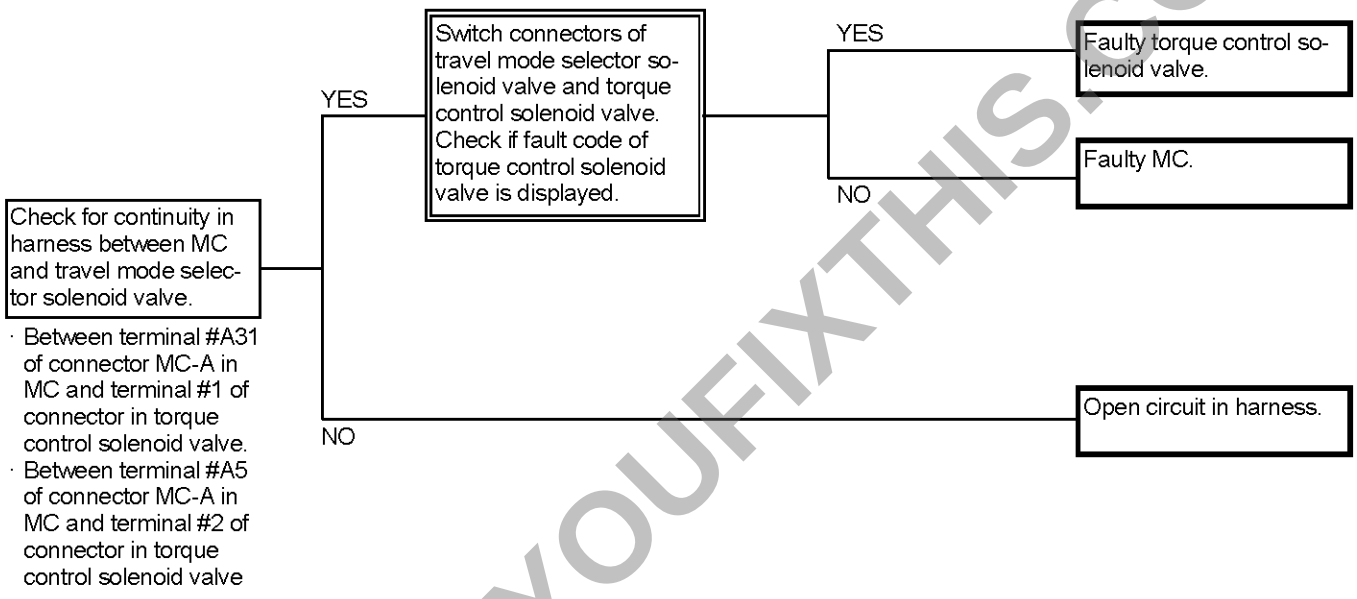
Symptoms in Machine Operation When Trouble Occurs.	Remedy by Dr. ZX	Remedy
Machine operation speed is slow. (During speed sensing, torque is decreased.) Engine stall is displayed on e-Service.	Retrial B	• Check the harness.
When theft prevention is ON set by Dr. ZX, Engine speed = Slow idle Pump torque = Minimum displacement angle Those values are fixed.	Retrial B	• Check the harness.
–	Retrial B	• Check the harness.
When fuel rate display is set on monitor, "---" is displayed.	Retrial B	• Check the harness.

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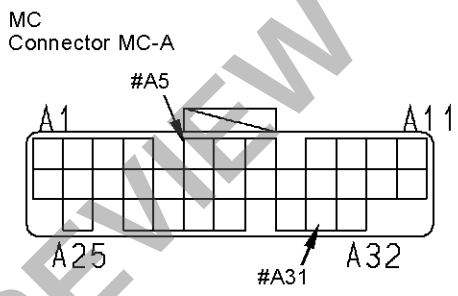
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MC FAULT CODE 11405

Fault Code	Trouble	Cause
11405-2	Abnormal current feedback of travel mode selector solenoid valve	Current: both of higher than 920 mA or less than 60 mA
11405-3	Abnormal feedback high current of travel mode selector solenoid valve	Current: higher than 920 mA
11405-4	Abnormal feedback low current of travel mode selector solenoid valve	Current: less than 56 mA

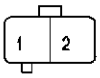


Connector (Harness end of connector viewed from the open end side)



T183-05-04-008

Travel Mode Selector Solenoid Valve



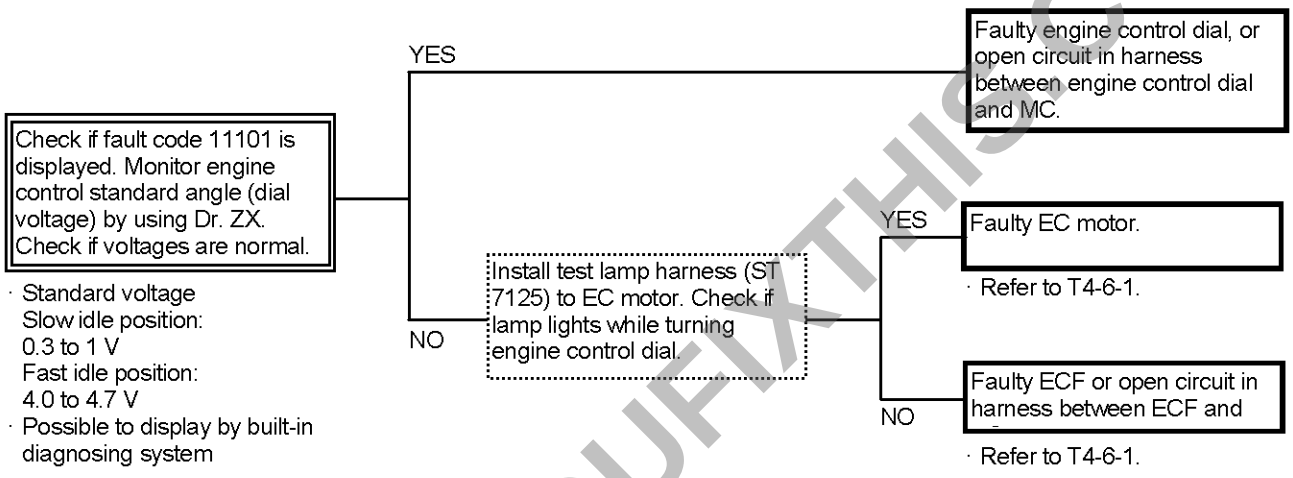
T1V1-05-04-003

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E-4 Even if engine control dial is rotated, engine speed remains unchanged.

- If the EC motor fails, the engine cannot stop with the key switch OFF.
- Check the wiring connections first.

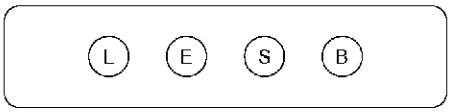


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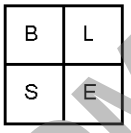
INT. Position	Setting Time
Slow Speed	8 seconds
Middle Speed	6 seconds
Fast Speed	3 seconds

Window Contact (Cab end)

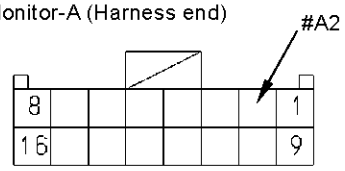


T1V1-05-07-005

Connector
Wiper Motor (Harness end)

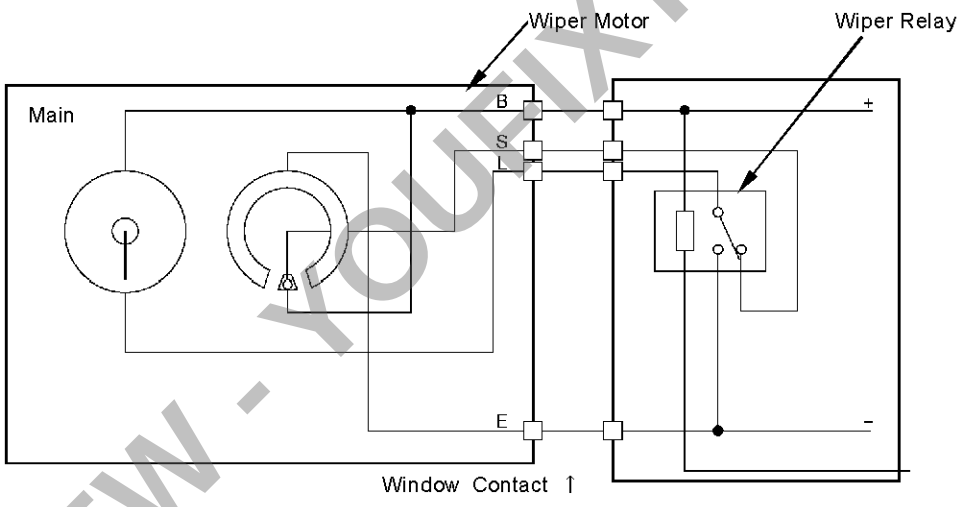


Monitor Unit
Connector Monitor-A (Harness end)



T183-05-05-001

Wiper Driving Circuit



T1V1-05-07-004

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