PRECAUTIONS FOR DISASSEMBLING AND ASSEMBLING

Precautions for Disassembling and Assembling

- Clean the Machine

  Thoroughly wash the machine before bringing it into the shop. Bringing a dirty machine into the shop may cause machine components to be contaminated during disassembling/assembling, resulting in damage to machine components, as well as decreased efficiency in service work.

- Inspect the Machine

  Be sure to thoroughly understand all disassem-bling/assembling procedures beforehand, to help avoid incorrect disassembling of components as well as personal injury.
  Check and record the items listed below to prevent problems from occurring in the future.

  - The machine model, machine serial number, and hour meter reading.
  - Reason for disassembly (symptoms, failed parts, and causes).
  - Clogging of filters and oil, water or air leaks, if any.
  - Capacities and condition of lubricants.
  - Loose or damaged parts.

- Prepare and Clean Tools and Disassembly Area

  Prepare the necessary tools to be used and the area for disassembling work.

- Precautions for Disassembling

  - To prevent dirt from entering, cap or plug the removed pipes.
  - Before disassembling, clean the exterior of the components and place on a work bench.
  - Before disassembling, drain gear oil from the reduction gear.
  - Be sure to provide appropriate containers for draining fluids.
  - Use matching marks for easier reassembling.
  - Be sure to use the specified special tools, when instructed.
  - If a part or component cannot be removed after removing its securing nuts and bolts, do not attempt to remove it forcibly. Find the cause(s), then take the appropriate measures to remove it.
  - Orderly arrange disassembled parts. Mark and tag them as necessary.
  - Store common parts, such as bolts and nuts with reference to where they are to be used and in a manner that will prevent loss.
  - Inspect the contact or sliding surfaces of disassembled parts for abnormal wear, sticking, or other damage.
  - Measure and record the degree of wear and clearances.

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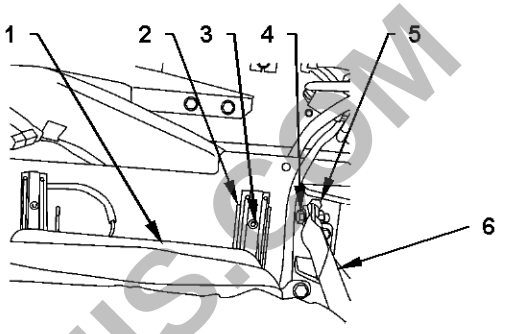
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REMOVAL AND INSTALLATION OF CAB

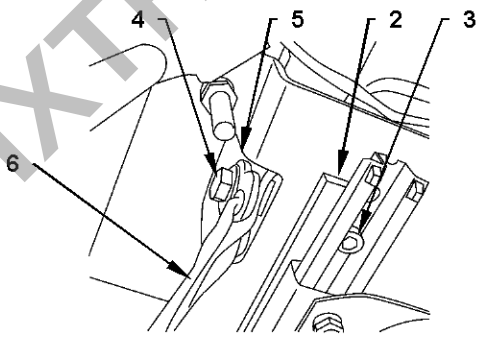
Removal

CAUTION: Seat (1) weight: 40 kg (90 lb)

1. Remove sems bolts (4) (2 used) from safety belts (6) (2 used). Remove safety belts (6) (2 used) from brackets (5) (2 used).
   : 16 mm

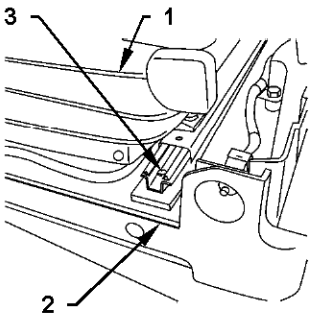


WCEB-02-01-001



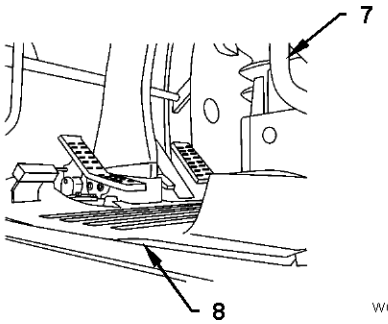
WCEB-02-01-017

2. Remove socket bolts (3) (4 used) from seat (1). Remove seat (1) from plate (2).
   : 6 mm



WCEB-02-01-002

3. Remove mat (8) from the inside of cab (7).



WCEB-02-01-003

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INTRODUCTION

TO THE READER

- This manual is written for an experienced technician to provide technical information needed to maintain and repair this machine.
  - Be sure to thoroughly read this manual for correct product information and service procedures.
  - If you have any questions or comments, at if you found any errors regarding the contents of this manual, please contact using “Service Manual Revision Request Form” at the end of this manual. (Note: Do not tear off the form. Copy it for usage.):

    Publications Marketing & Product Support
    Hitachi Construction Machinery Co. Ltd.
    TEL: 81-29-832-7084
    FAX: 81-29-831-1162

ADDITIONAL REFERENCES

- Please refer to the materials listed below in addition to this manual.
  - The Operator’s Manual
  - The Parts Catalog
  - The Engine Manual
  - Parts Catalog of the Engine
  - Hitachi Training Material

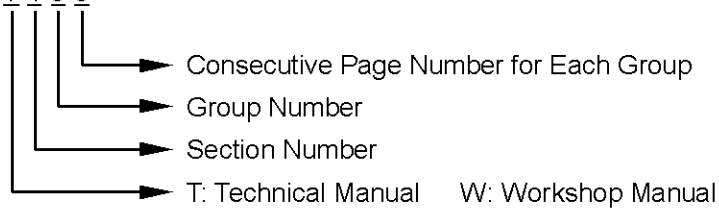
MANUAL COMPOSITION

- This manual consists of three portions: the Technical Manual (Operational Principle), the Technical Manual (Troubleshooting) and the Workshop Manual.
  - Information included in the Technical Manual (Operational Principle):
    technical information needed for redelivery and delivery, operation and activation of all devices and systems.
  - Information included in the Technical Manual (Troubleshooting):
    technical information needed for operational performance tests, and troubleshooting procedures.
  - Information included in the Workshop Manual:
    technical information needed for maintenance and repair of the machine, tools and devices needed for maintenance and repair, maintenance standards, and removal/installation and assemble/disassemble procedures.

PAGE NUMBER

- Each page has a number, located on the center lower part of the page, and each number contains the following information:

Example : T 1-3-5



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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, swing, 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.

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- Auto-Idle Display (2)
  When the auto-idle switch on switch panel is turned ON, the data is displayed.
  When the key switch is turned ON with the auto-idle switch ON, the data blinks for 10 seconds.

- Overload Alarm (3)

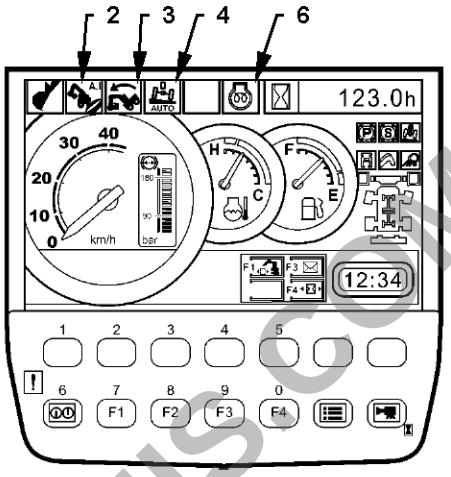


TCJB-05-02-061

  The system measures the load of suspended load from the boom cylinder bottom pressure sensor. When overload is detected, an alarm is displayed. (Refer to T5-2-15.)

- Auto Axle Lock Display (4)
  The data is displayed when the brake switch in the auto axle lock position.

- Glow Signal Display (5)
  While ECM is supplying current to the glow plug, the data is displayed according to the signal from ECM.

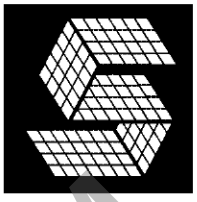


TCJB-05-02-042

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SECTION 1
GENERAL



CONTENTS

Group 1 Specifications

Specifications T1-1-1
Working Ranges T1-1-6

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Electrical System (Overview) T1-2-5
Electrical System
(Monitors and Switches) T1-2-7
Electrical System
(Controllers and Relays) T1-2-10
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Pump Device T1-2-13
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4-Spool Solenoid Valve Unit T1-2-14
Solenoid Valve Unit (for Electric Lever) ... T1-2-14
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Transmission Changeover
Solenoid Valve T1-2-15
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Group 3 Component Specifications

Engine T1-3-1
Engine Accessories T1-3-5
Hydraulic Component T1-3-7
Electrical Component T1-3-13

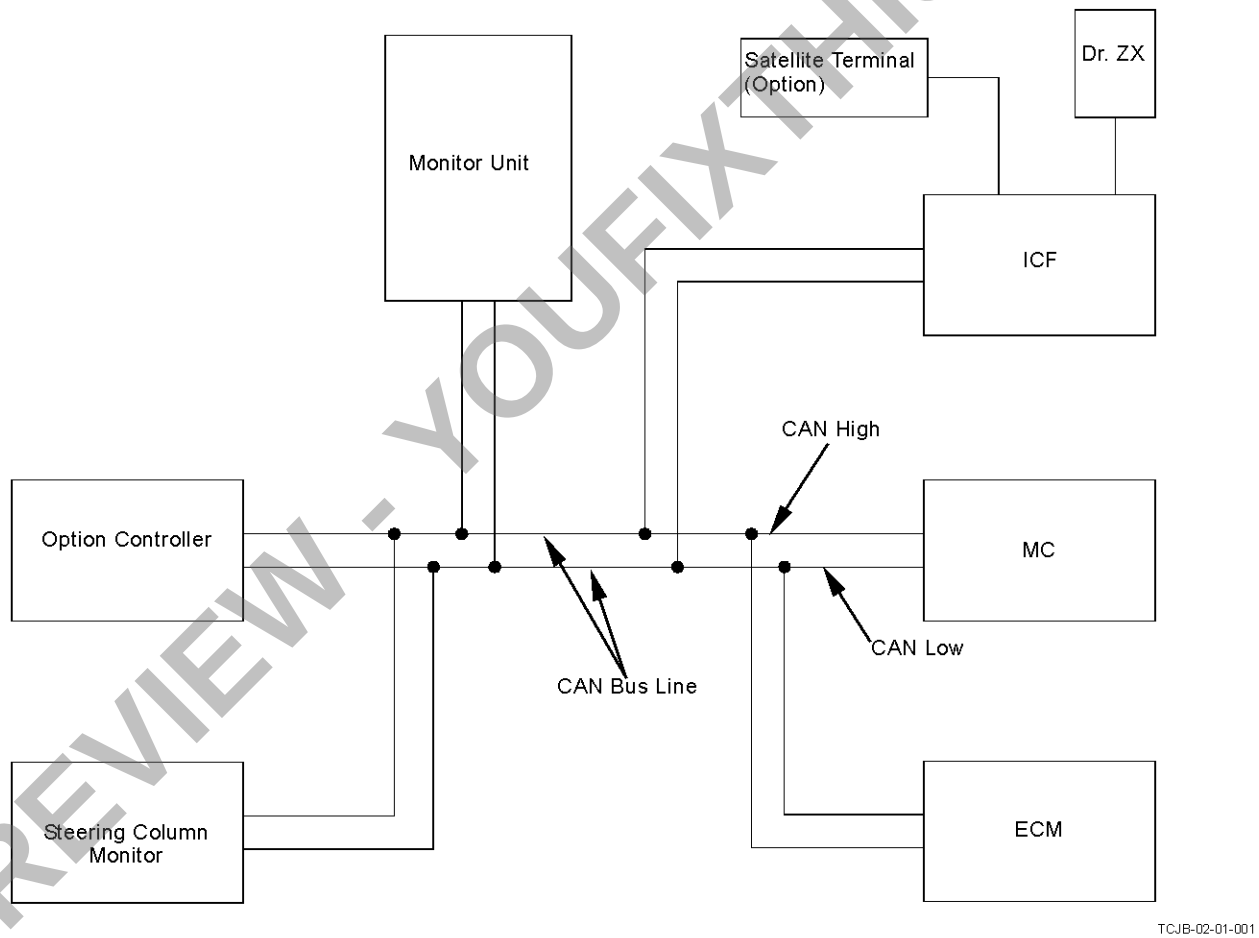
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CAN: CONTROLLER AREA NETWORK (NETWORK PROVIDED FOR MACHINE)

MC, ECM, ICF, monitor unit, option controller and steering column monitor are connected by using CAN bus line and communicate the signal and data each other.

CAN bus line consists of two wires, CAN High and CAN Low.
Each controller judges the CAN bus line level due to potential difference between CAN High and CAN Low.
Each Controller arranges the CAN bus line level and sends the signal and data to other controllers.



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SECTION AND GROUP CONTENTS

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

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

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
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SECTION 3 COMPONENT OPERATION
Group 1 Pump Device
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Group 4 Pilot Valve
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Group 6 Transmission
Group 7 Axle
Group 8 Travel Motor
Group 9 Signal Control Valve
Group 10 Steering Valve
Group 11 Brake Valve
Group 12 Others (Upperstructure)
Group 13 Others (Undercarriage)

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.

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Maintenance Information Display ON/OFF

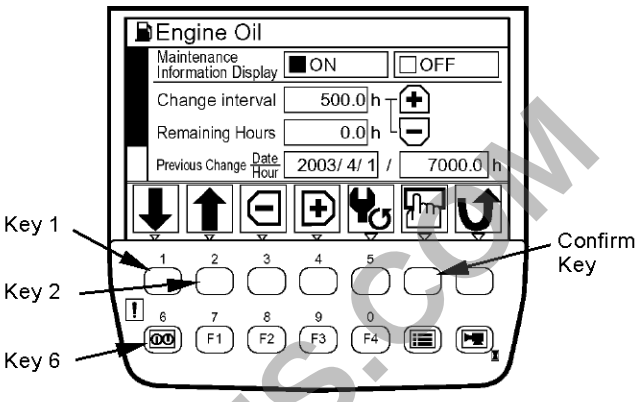
Example: Maintenance Information Display OFF→ON

ON: When time comes to change, the information message is displayed on the screen.
OFF: No information message is displayed.

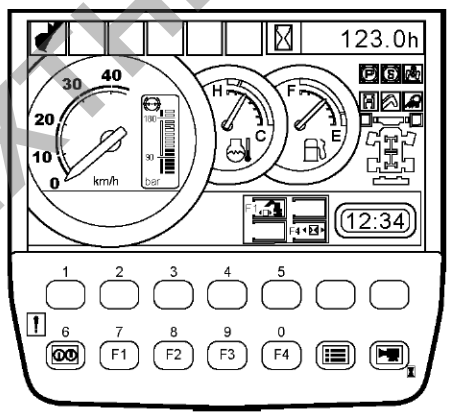
1. Select maintenance information display by using keys 1 and 2.

2. Push the confirm key and select ON.

3. In order to complete setting, push key 6. Then, the primary screen appears.



Interval ON/OFF Setup Screen T1V5-05-01-052

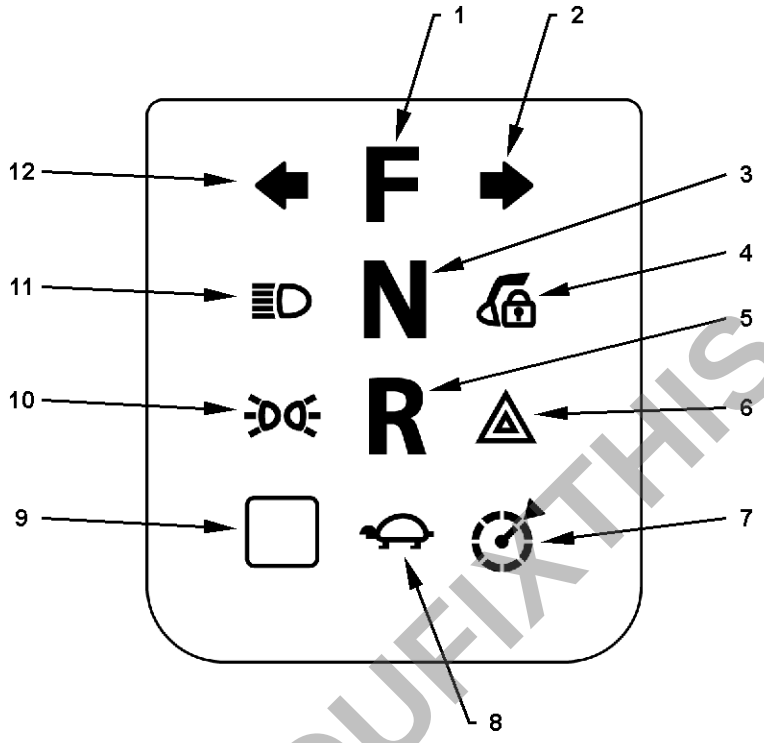


Primary Screen TCJB-05-02-064

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Steering Column Monitor



TCJB-02-01-008

1 - Travel Forward Indicator
2 - Turn Signal Indicator (Right)
3 - Neutral Indicator
4 - Pilot Cut Indicator
5 - Travel Reverse Indicator
6 - Hazard Light Indicator
7 - Auto-Cruise Indicator (Optional)
8 - Travel Slow Speed Indicator
9 - Auxiliary
10 - Clearance Light Indicator
11 - High Beam Indicator
12 - Turn Signal Indicator (Left)

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Pulverizer Control (Optional)

IMPORTANT: Pulverizer 1 is set at pulverizer 1 of attachment mode in monitor unit when the machine is carried out. When pulverizer 2 to 5 is used, set the setting by using Dr. ZX.

Purpose: Increases operating speed of the pulverizer. Reduces flow rate through the auxiliary spool and improve arm, boom, swing or travel operation during combined operation of arm roll-out, arm roll-out+ boom raise, swing or travel and secondary crusher.

Operation:

1. When selecting pulverizer 1 in the monitor unit, MC drives the auxiliary flow combiner control solenoid valve.
2. When operating the pulverizer, pressure oil from the auxiliary solenoid valve flows through the auxiliary flow combiner control solenoid valve and shifts the bypass shut-out valve and auxiliary flow combiner valve.
3. As the neutral circuit in 4-spool side is blocked by the bypass shut-out valve, pressure oil from pump 1 through the auxiliary flow combiner valve is combined with pressure oil from pump 2 so that combined pressure oil is supplied to the auxiliary spool. Therefore, operating speed of the pulverizer increases.
4. Flow rate of the auxiliary flow rate control solenoid valve can be adjusted finely in the monitor unit.

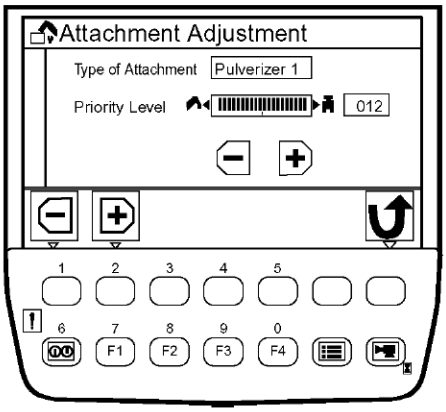
During Combined Operation

Operation:

1. When the following conditions exist, MC drives the auxiliary flow rate control solenoid valve MC controls restricted flow rate of the auxiliary flow rate control solenoid valve and reduces pressure oil which flows to the pulverizer through the auxiliary spool from pump 2.
2. As pressure oil which flows to arm roll-out, arm roll-out+ boom raise, swing or travel from pump 2 increases, arm roll-out, arm roll-out+ boom raise, swing or travel operation is improved.

Condition:

- Auxiliary Pressure Sensor: Output ting signal
  Arm Roll-Out Pressure Sensor: Outputting signal
- Auxiliary Pressure Sensor: Outputting signal
  Arm Roll-Out and Boom Raise Pressure Sensors: Outputting signal
- Auxiliary Pressure Sensor: Outputting signal
  Swing Pressure Sensor: Outputting signal
- Auxiliary Pressure Sensor: Outputting signal
  Travel Pressure Sensor: Outputting signal



T1V5-05-01-024

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PILOT SHUT-OFF CIRCUIT (KEY SWITCH: ON)

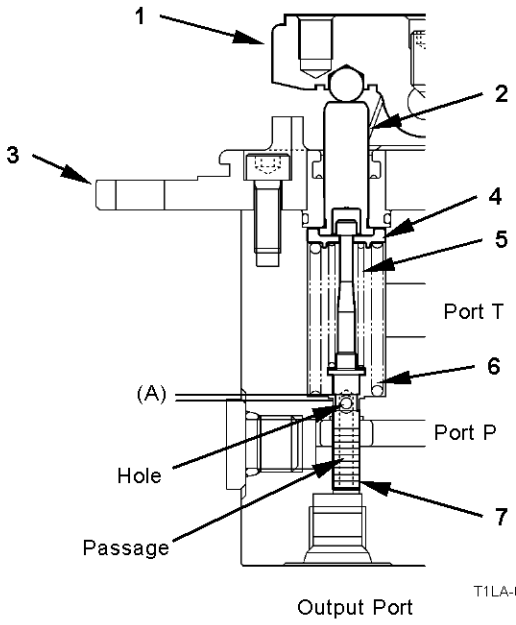
1. When the pilot shut-off lever is turned to the UNLOCK position, the pilot shut-off switch is turned ON.
2. Electrical current from fuse #4 flows to the ground through the pilot shut-off relay and pilot shut-off switch so that the pilot shut-off relay is excited.
3. At the same time, the starter cut relay is connected to the ground circuit.
4. When the pilot shut-off relay is excited, the ground in pilot shut-off solenoid valve is connected to the ground through the pilot shut-off relay and security relay.
5. Therefore, the pilot shut-off solenoid valve is turned ON, pressure oil from the pilot pump is routed to the pilot valve.
6. When the key switch is turned to the START position, the starter cut relay is excited.
7. When the starter cut relay is excited, the circuit between terminal ST in the key switch and terminal S in starter relay is blocked.
8. Therefore, when the pilot shut-off lever is in the UNLOCK position the key switch is turned to the START position, the engine does not start.

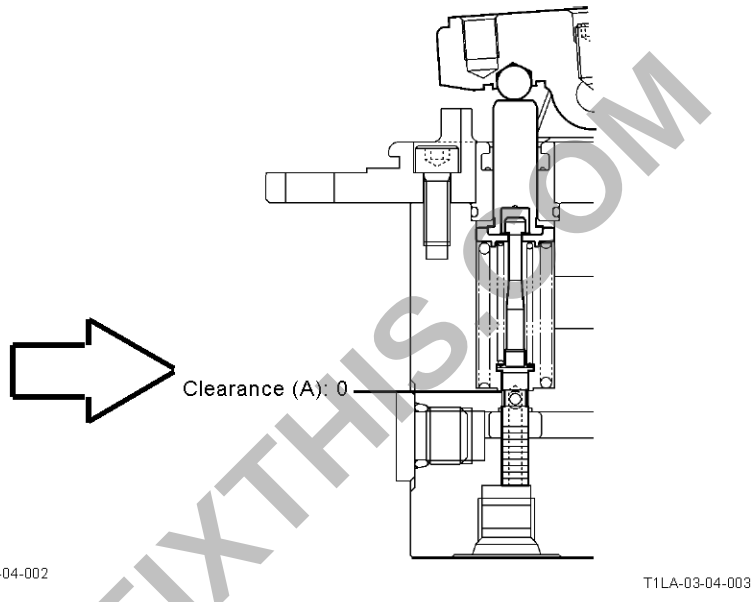
NOTE: The signal; Pilot shut-off switch: ON (Pilot shut-off lever: UNLOCK position) is recognized by the option controller. The option controller sends the signal; Pilot shut-off switch: ON to MC by using CAN communication.

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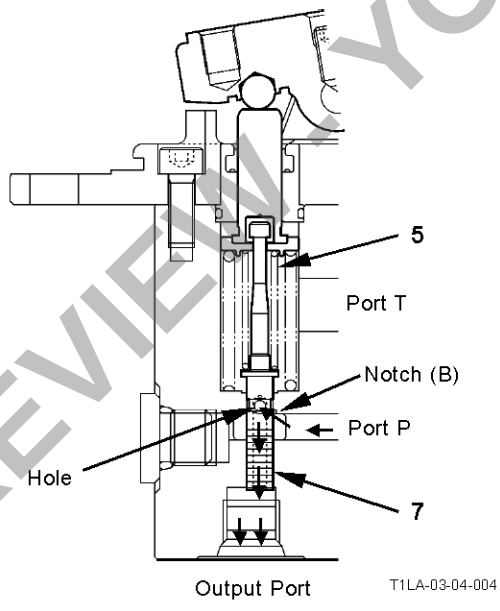
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Pusher Stroke: A to B

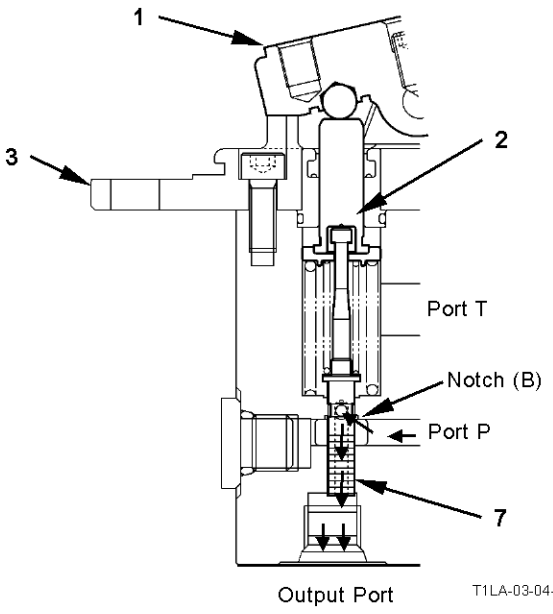




Pusher Stroke: C to D



Pusher Stroke: E to F



1 - Cam
2 - Pusher
3 - Plate
4 - Spring Guide
5 - Balance Spring
6 - Return Spring
7 - Spool

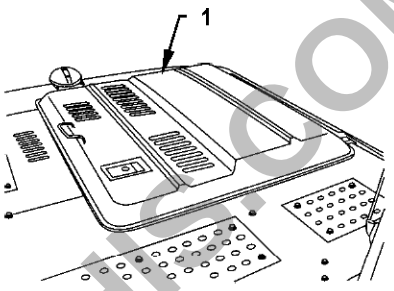
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REMOVAL AND INSTALLATION OF PUMP DEVICE

CAUTION: Bleed air from the hydraulic oil tank before doing any work. (Refer to BLEED AIR FROM HYDRAULIC OIL TANK on W1-4-1.)

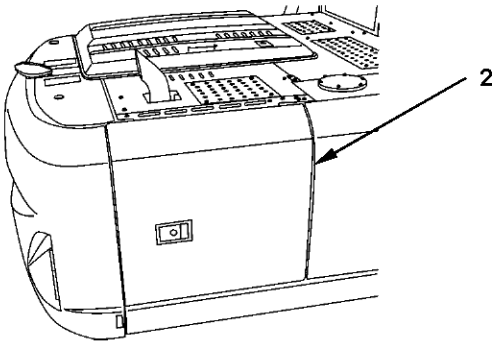
Removal

1. Open cover (1).



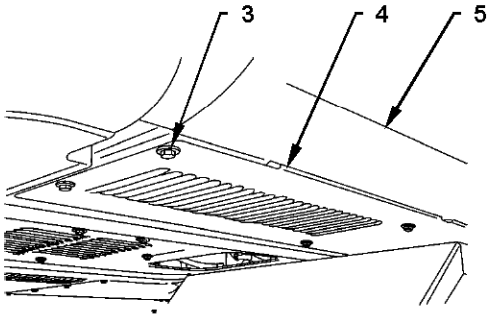
WCJB-02-02-002

2. Open cover (2).



WCJB-02-02-001

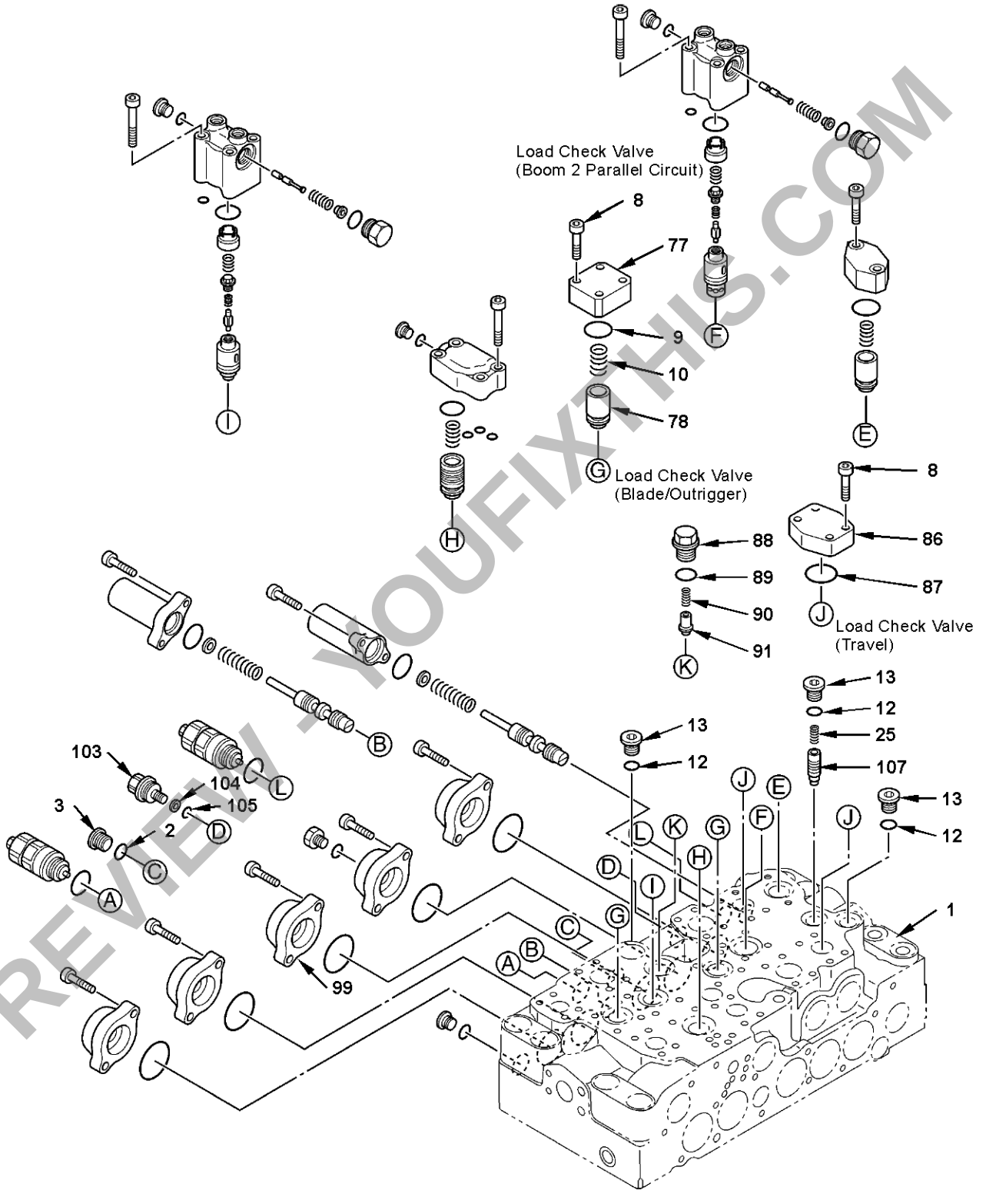
3. Remove sems bolts (3) (4 used) from cover (4). Remove cover (4) from main frame (5).
   : 17 mm



WCJB-02-04-007

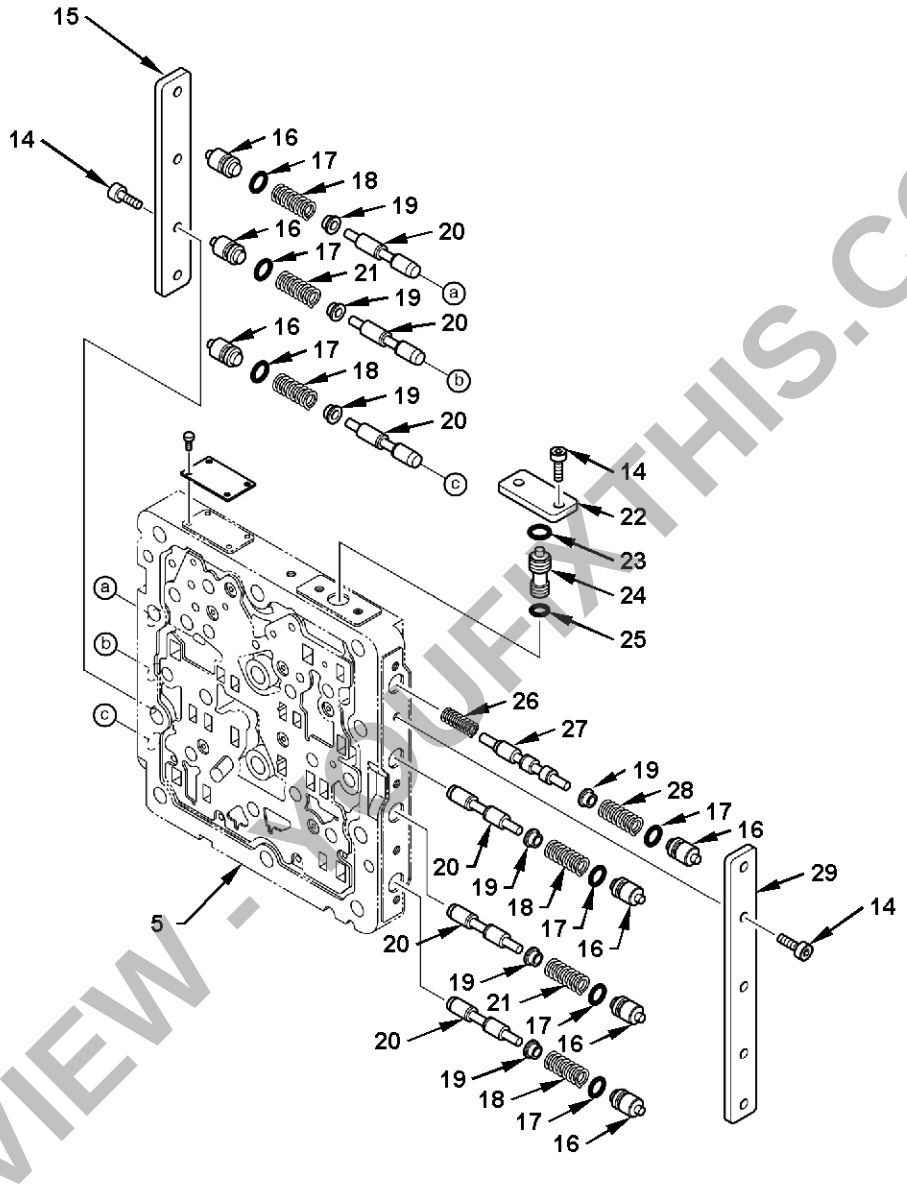
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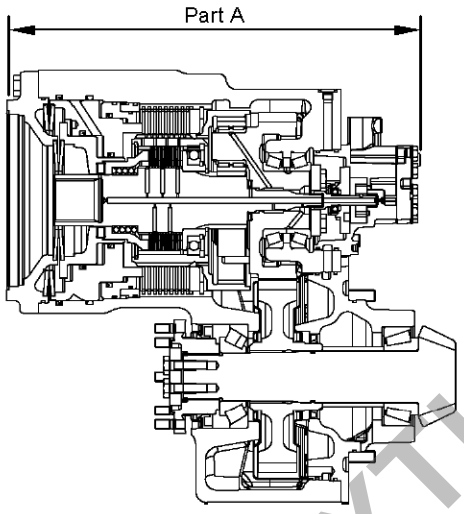


Detail of Body 2 (5)

1 - Bolt (3 Used)	9 - Body 3	17 - O-Ring (7 Used)	25 - O-Ring
2 - Body 1	10 - Gasket	18 - Spring (4 Used)	26 - Spring
3 - Gasket	11 - Body 4	19 - Spring Guide (7 Used)	27 - Spool
4 - Filter (17 Used)	12 - Gasket	20 - Spool (6 Used)	28 - Spring
5 - Body 2	13 - Body 5	21 - Spring (2 Used)	29 - Plate
6 - Gasket	14 - Socket Bolt (11 Used)	22 - Plate	
7 - Shuttle Valve (2 Used)	15 - Plate	23 - O-Ring	
8 - Spring (4 Used)	16 - Plug (7 Used)	24 - Shuttle Valve	

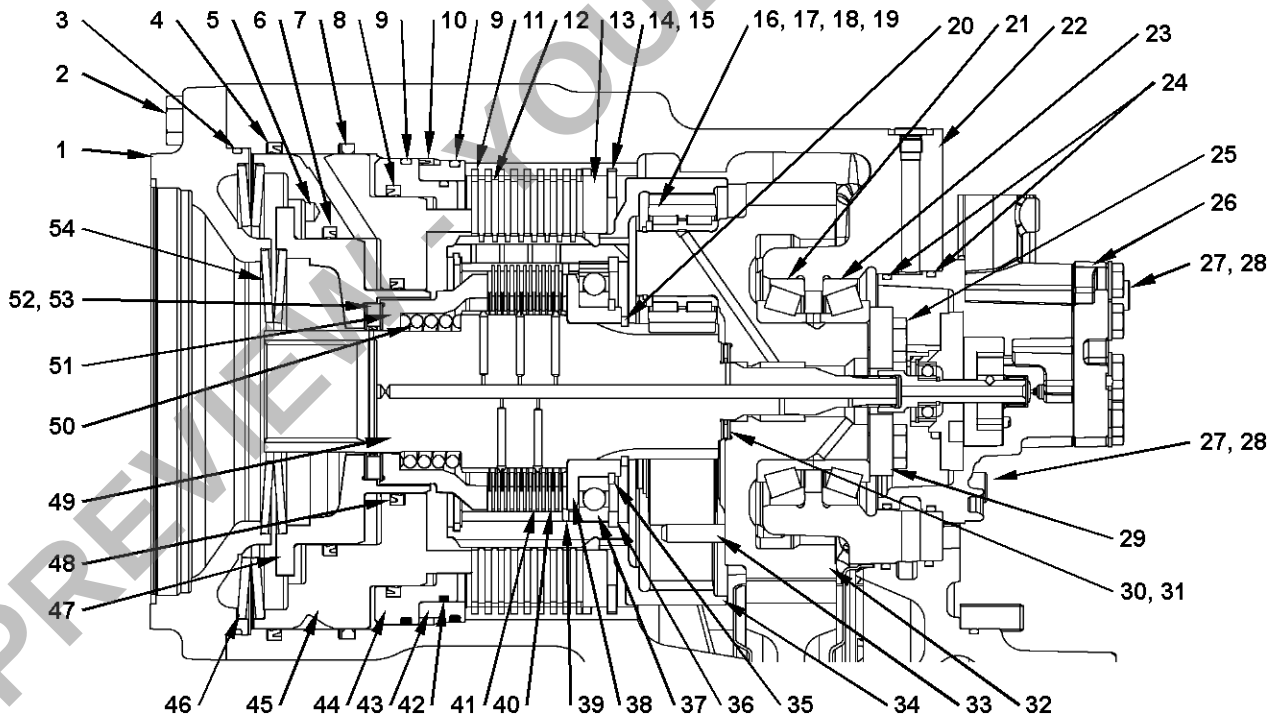
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DISASSEMBLY OF TRANSMISSION



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Part A



WCQB-03-04-002

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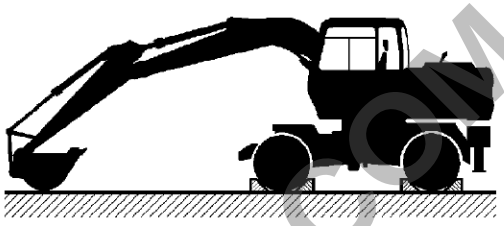
REMOVEAL AND INSTALLATION OF PROPELLER SHAFT

Preparation

1. Place the machine on a solid, level surface. Lower the front attachment onto the ground.

2. Lower the blade and the outrigger onto the ground.

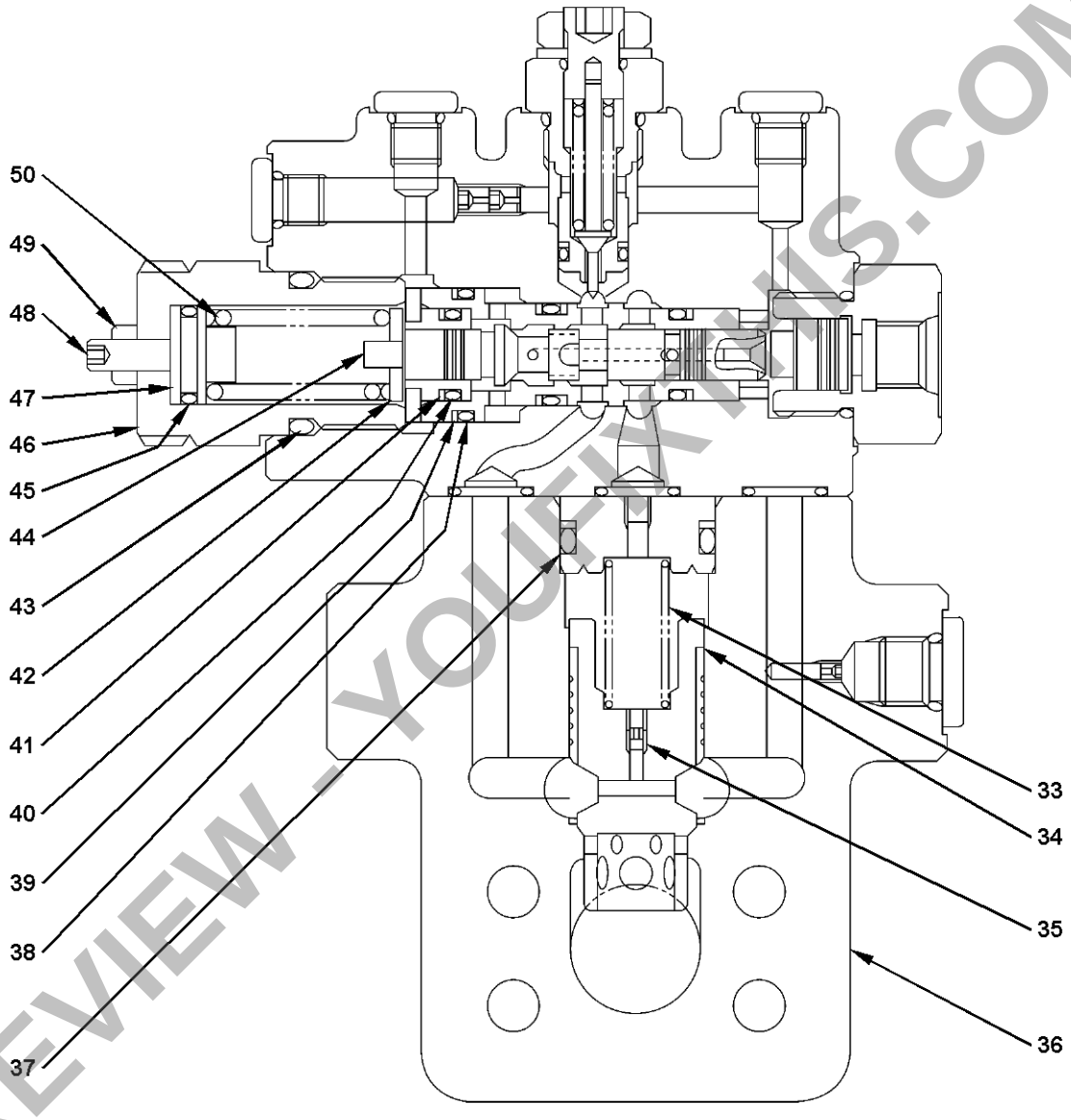
3. Place the blocks in front of and behind the axle in order to secure the machine.



WCJB-03-10-004

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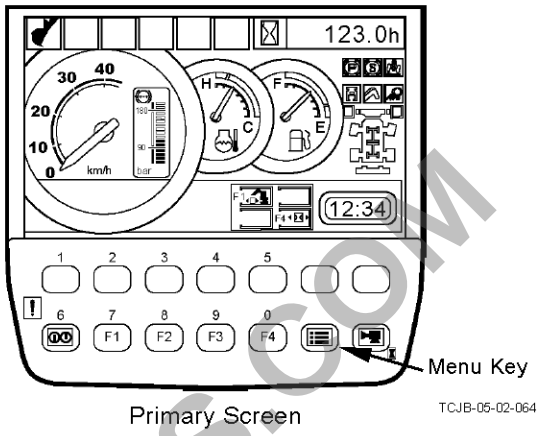


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METER COMBINATION SETTINGS

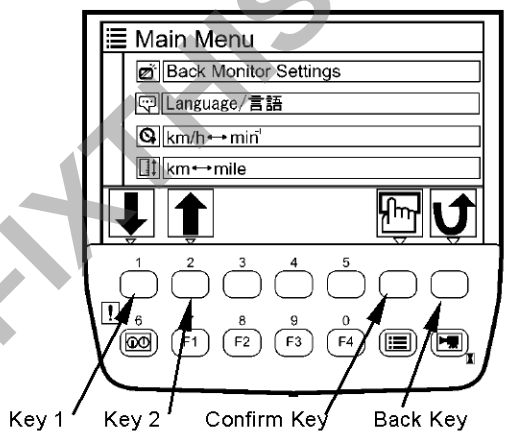
1. After the primary screen is displayed, push the menu key and display main menu.



Primary Screen TCJB-05-02-064

2. Select km/h ↔ min^{-1} from main menu by using keys 1 and 2. Push the confirm key. Then, the meter combination setup screen is displayed.

NOTE: If mile is selected by unit settings (km ↔ mile), mph ↔ min^{-1} is displayed.

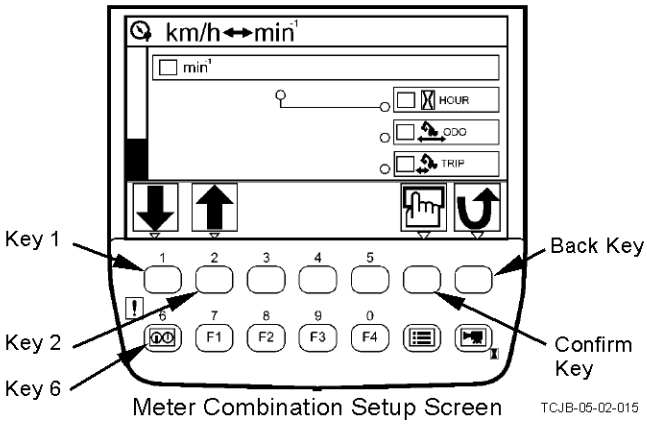


TCHB-05-02-003

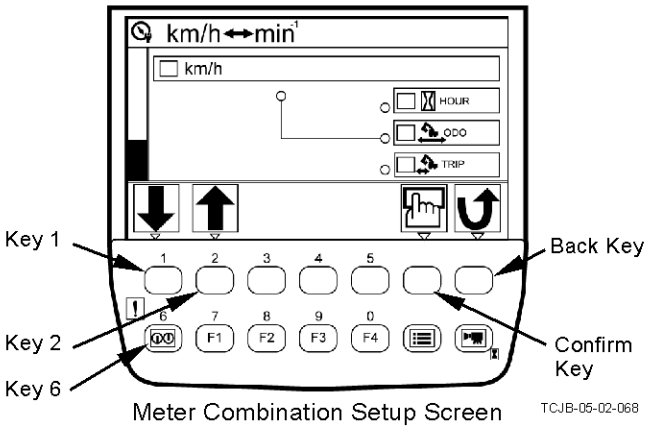
3. Select the meter combination by using keys 1 and 2. Push the confirm key.

NOTE: When pushing the back key, return to the previous screen.

4. Push key 6, and the primary screen is displayed.



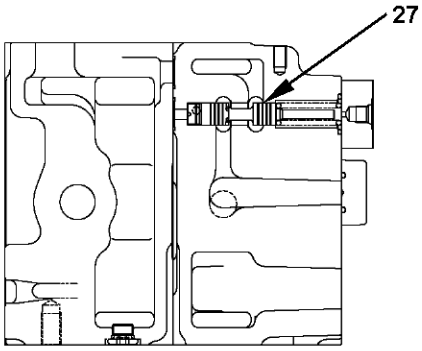
Meter Combination Setup Screen TCJB-05-02-015



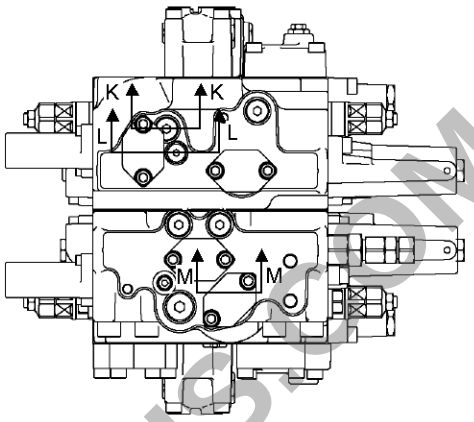
Meter Combination Setup Screen TCJB-05-02-068

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Cross Section J-J

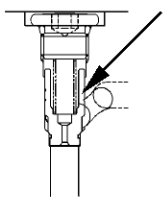


TCJB-03-03-016

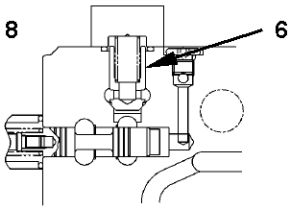


TCJB-03-03-001

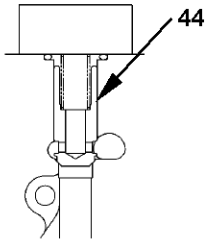
Cross Section K-K



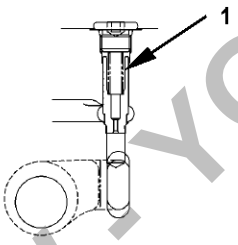
Cross Section L-L



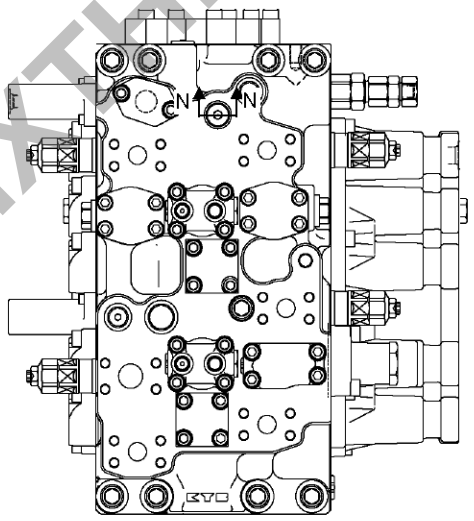
Cross Section M-M



Cross Section N-N



T1V1-03-03-022



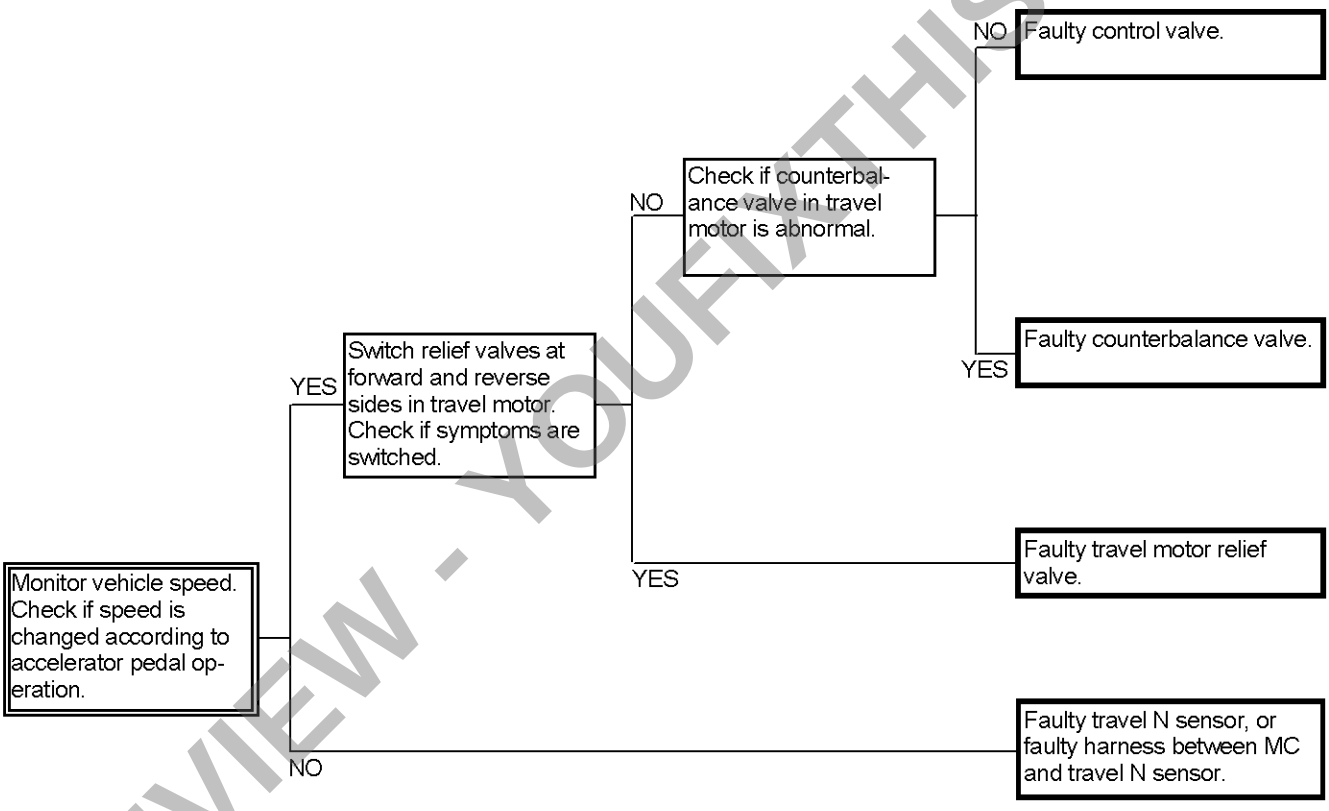
TCJB-03-03-003

13 - Load Check Valve (Blade / Outrigger Parallel Circuit)
14 - Check Valve (Main Relief Circuit)
15 - Main Relief Valve
16 - Check Valve (Auxiliary Combiner Valve Circuit)
17 - Auxiliary Flow Combiner Valve
18 - Check Valve (Flow Combiner Valve Circuit)
19 - Flow Combiner Valve
20 - Load Check Valve (Orifice) (Bucket)
21 - Check Valve (Main Relief Circuit)
22 - Bucket Flow Rate Control Valve (Poppet Valve)
23 - Bucket Flow Rate Control Valve (Switch Valve)
24 - Bucket Regenerative Valve
25 - Make-Up Valve (Travel Reverse Side)
26 - Make-Up Valve (Travel Forward Side)
27 - Overload Relief Valve (Bucket: Rod Side)
28 - Overload Relief Valve (Bucket: Bottom Side)
29 - Boom Flow Rate Control Valve (Poppet Valve)
30 - Boom Lower Meter-In Cut Valve
31 - Boom Flow Rate Control Valve (Switch Valve)
32 - Overload Relief Valve (Boom: Bottom Side)
33 - Boom Anti-Drift Valve (Check Valve)
34 - Overload Relief Valve (Boom: Rod Side)
35 - Boom Regenerative Valve
36 - Boom Anti-Drift Valve (Switch Valve)
36 - Arm 2 Flow Rate Control Valve (Switch Valve)
37 - Load Check Valve (Arm 2 Tandem Circuit)
38 - Bypass Shut-Out Valve
39 - Arm 2 Flow Rate Control Valve (Poppet Valve)
40 - Arm Regenerative Valve
41 - Unused
42 - Load Check Valve (Digging Regenerative Circuit)
43 - Arm 1 Flow Rate Control Valve (Poppet Valve)
44 - Load Check Valve (Swing Circuit)
45 - Arm 1 Flow Rate Control Valve (Switch Valve)
46 - Load Check Valve (Arm Regenerative Circuit)
47 - Arm Anti-Drift Valve (Switch Valve)
48 - Overload Relief Valve (Arm: Bottom Side)
49 - Arm Anti-Drift Valve (Check Valve)
50 - Overload Relief Valve (Arm: Rod Side)
51 - Check Valve (Digging Regenerative Circuit)
52 - Load Check Valve (Boom 2 Parallel Circuit)
53 - Auxiliary Flow Rate Control Valve (Poppet Valve)
54 - Auxiliary Flow Rate Control Valve (Switch Valve)
55 - Load Check Valve (Blade / Outrigger Tandem Circuit)
56 - Overload Relief Valve (Blade / Outrigger: Rod Side)
57 - Overload Relief Valve (Blade / Outrigger: Bottom Side)

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T-4 When releasing accelerator pedal, hydraulic brake is not applied. (Machine runs away.)

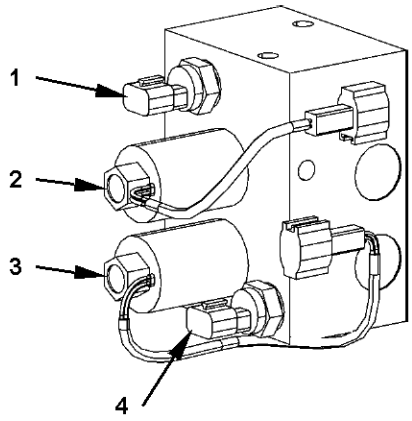
- If the travel motor displacement angle control solenoid valve is faulty, fault code 11422 is displayed.
- Similar symptom may appear when the travel pilot valve, travel shuttle valve and/or travel spool is faulty.



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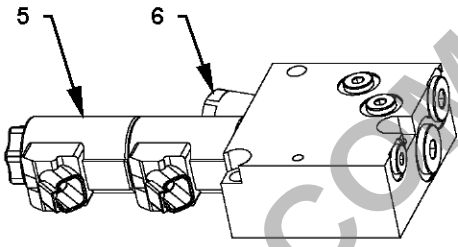
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TRAVEL SHOCKLESS VALVE



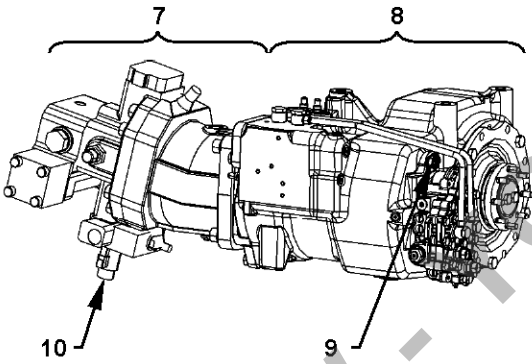
TCJB-01-02-019

TRANSMISSION CHANGEOVER SOLENOID VALVE



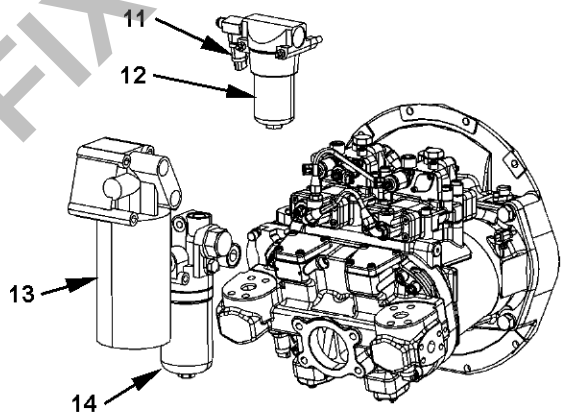
TCJB-05-07-002

TRAVEL DEVICE



TCJB-01-02-020

FILTER



TCJB-01-02-021

1 - Pressure Sensor (Travel Forward)
2 - Travel Forward Pi Cut Solenoid Valve
3 - Travel Reverse Pi Cut Solenoid Valve
4 - Pressure Sensor (Travel Reverse)
5 - Travel Mode Selector Solenoid Valve
6 - Pressure Reducing Valve
7 - Travel Motor
8 - Transmission
9 - Travel N Sensor
10 - Travel Motor Displacement Control Solenoid Valve
11 - Steering Pump Delivery Pressure Sensor
12 - Steering Filter
13 - Engine Oil Filter
14 - Pilot Filter

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Pump 1 Flow Rate Limit Control (Only Machine Equipped with Attachment)

Purpose: Combines pressure oil pump 1, 2 and delivers combined pressure oil to the actuator when attachment (mainly a vibrating hammer) is used and pump 2 flow rate is lack.
(Refer to the SYSTEM / Hydraulic system group.)
At this time, limits the combined pump 1 flow rate and make up for pump flow rate for attachment operation.

Operation:

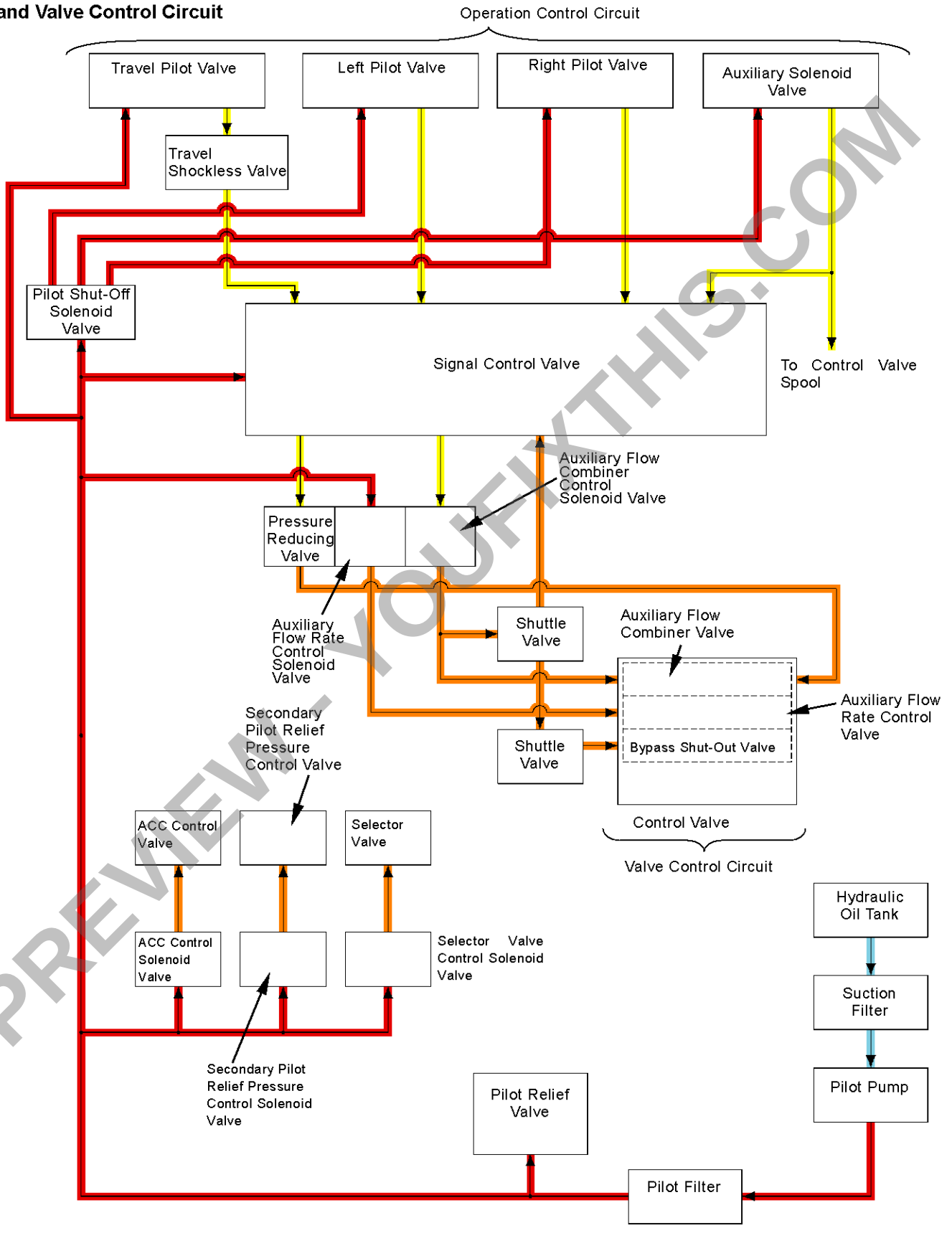
1. When the attachment is used with the accelerator pedal in neutral, MC receives the signals from pressure sensor (auxiliary) (optional).
2. In response to attachment control operation, MC drives the pump 1 maximum flow rate limit control solenoid valve and controls pump 1 flow rate.

NOTE: The minimum pump swash set-angle on monitor unit for a attachment (breaker 1 to 5, pulverizer 1 to 5, crusher 1 to 5 or vibrating hammer 1 to 5) can be adjusted within 50 % set in the service mode of Dr. ZX.

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Front Attachment Operation Circuit (Optional) and Valve Control Circuit



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