

HITACHI

Training Text

ZAXIS

170W-3

190W-3

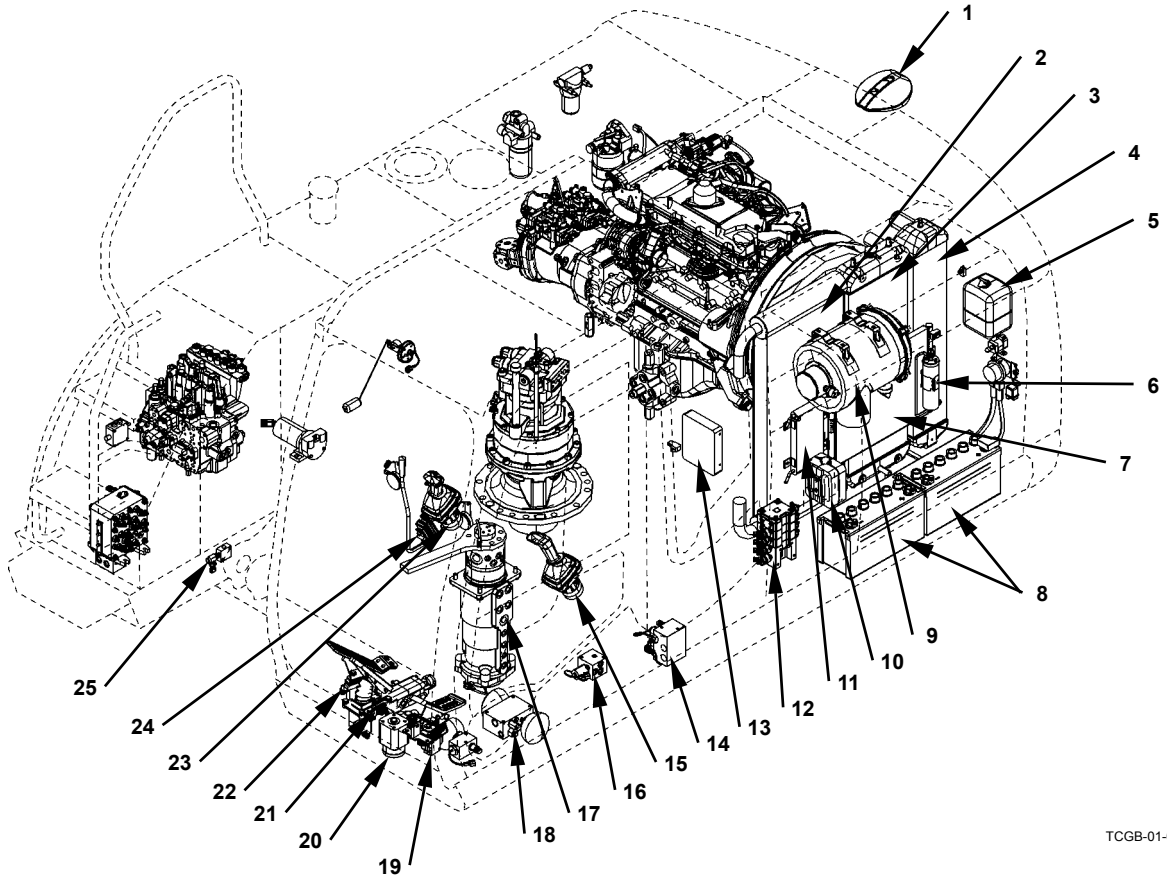
OPERATIONAL PRINCIPLE

Technical Training Center

GENERAL / Component Layout

MAIN COMPONENT LAYOUT

Upperstructure (1)



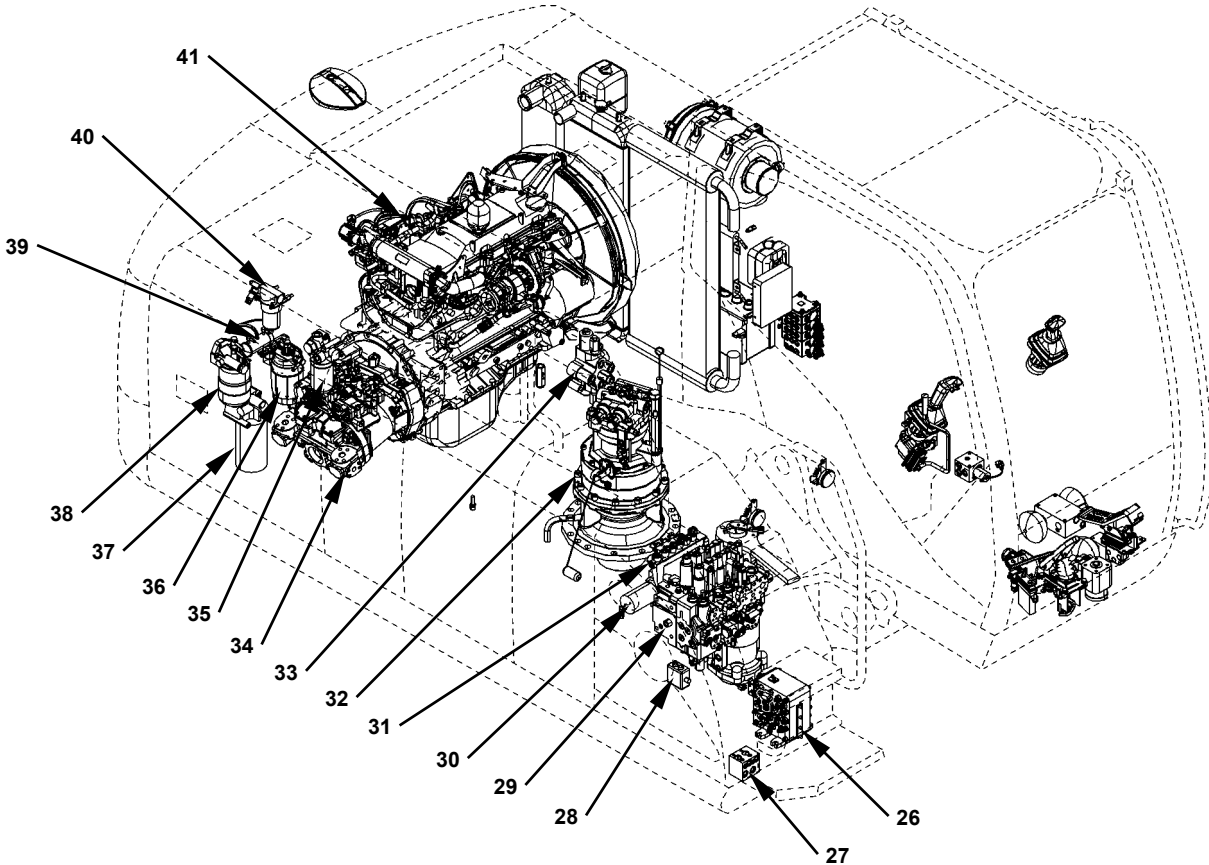
TCGB-01-02-001

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|-------------------------------|---|---|---------------------------------------|
| 1 - Rear Camera | 8 - Battery | 14 - Travel Shockless Valve | 20 - Steering Valve |
| 2 - Radiator | 9 - Air Cleaner | 15 - Pilot Valve (Left) | 21 - Brake Valve |
| 3 - Oil Cooler | 10 - Washer Tank | 16 - Pilot Shut-Off Solenoid Valve | 22 - Travel Pilot Valve |
| 4 - Inter Cooler | 11 - Fuel Cooler | 17 - Center Joint | 23 - Pilot Valve (Right) |
| 5 - Reserve Tank | 12 - Solenoid Valve Unit (For Electric Lever) | 18 - Accumulator Charging Valve | 24 - Blade / Outrigger Electric Lever |
| 6 - Receiver Drier | 13 - ECM (Engine Controller) | 19 - Auxiliary / Positioning Electric Lever | 25 - Shuttle Valve |
| 7 - Air Conditioner Condenser | | | |

Operation of Solenoid Valve Unit
Refer to T1-2-14

GENERAL / Component Layout

Upperstructure (2)



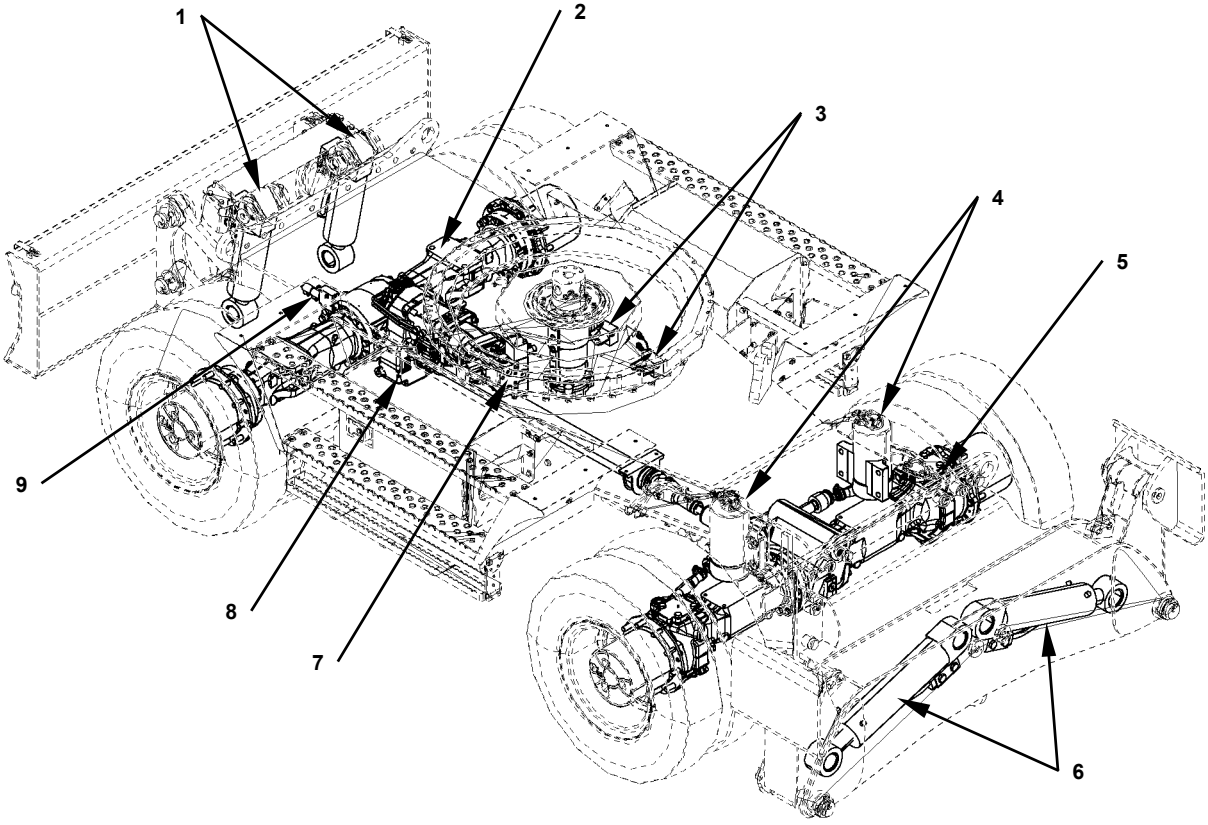
TCGB-01-02-002

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|-------------------------------|----------------------------------|------------------------|-----------------------|
| 26 - Signal Control Valve | 30 - Automatic Fueling Pump | 34 - Pump Device | 38 - Fuel Main Filter |
| 27 - Swing Shockless Valve | 31 - 3-Spool Solenoid Valve Unit | 35 - Pilot Filter | 39 - Solenoid Pump |
| 28 - Automatic Fueling Switch | 32 - Swing Device | 36 - Fuel Pre Filter | 40 - Steering Filter |
| 29 - Control Valve | 33 - Positioning Control Valve | 37 - Engine Oil Filter | 41 - Engine |

3-Spool Solenoid Valve Unit	
SC	Arm Regenerative Valve
SF	Work Brake
SI	Axle Lock Cylinders

GENERAL / Component Layout

Undercarriage



TCJB-01-02-011

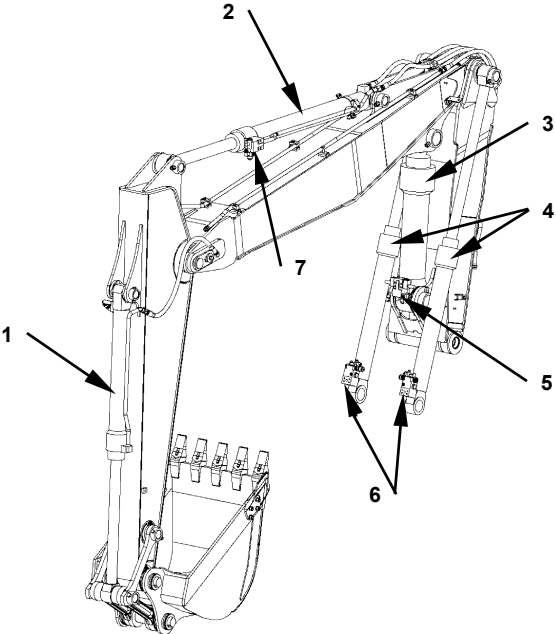
- | | | | |
|--|------------------------|------------------------|--|
| 1 - Blade Cylinder | 4 - Axle Lock Cylinder | 6 - Outrigger Cylinder | 8 - Transmission |
| 2 - Rear Axle | 5 - Front Axle | 7 - Travel Motor | 9 - Transmission Changeover Solenoid Valve |
| 3 - 2-Spool Solenoid Valve Unit (Blade / Outrigger Cylinder) | | | |

Slow Speed
High Speed

GENERAL / Component Layout

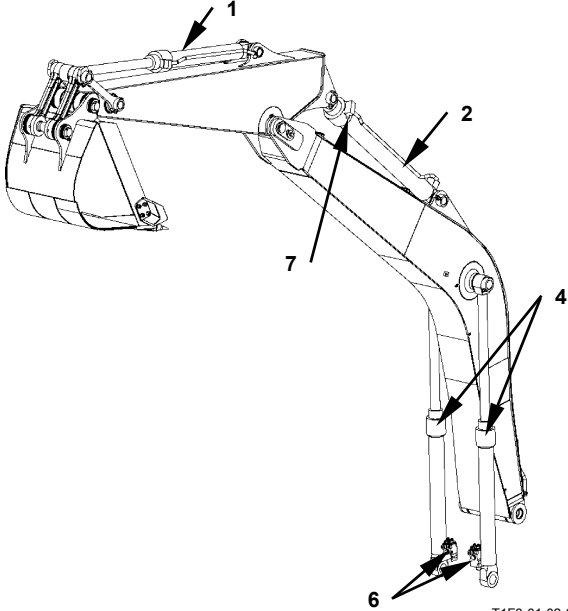
Front Attachment

- 2-Piece Boom



T1F3-01-02-003

- Monoblock Boom



T1F3-01-02-004

- 1 - Bucket Cylinder
- 2 - Arm Cylinder

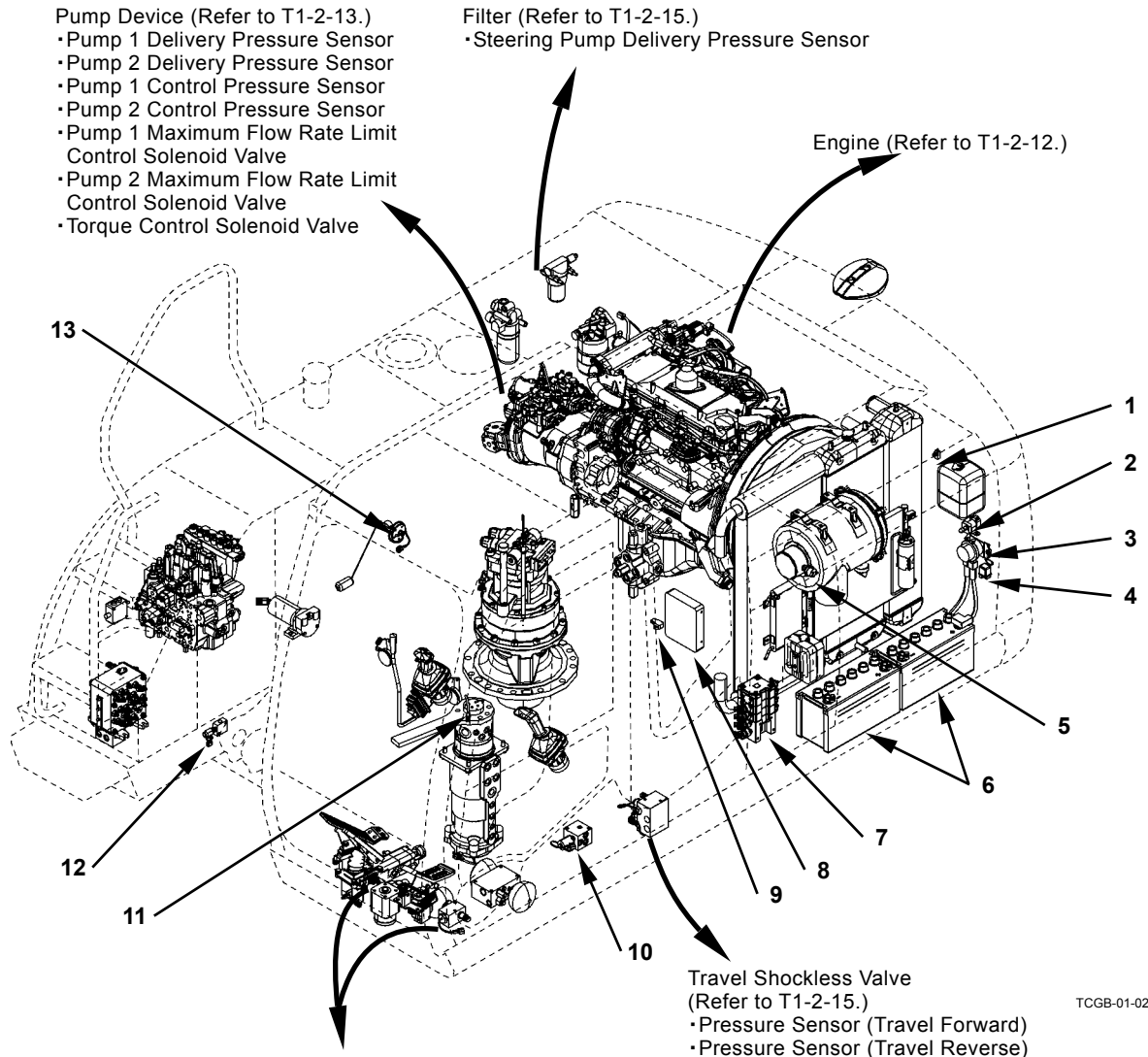
- 3 - Positioning Cylinder
- 4 - Boom Cylinder

- 5 - Hose Rupture Valve (Positioning)
- 6 - Hose Rupture Valve (Boom)

- 7 - Hose Rupture Valve (Arm)

GENERAL / Component Layout

ELECTRICAL COMPONENT LAYOUT (Overview)



TCGB-01-02-001

Brake Valve (Refer to T1-2-14.)

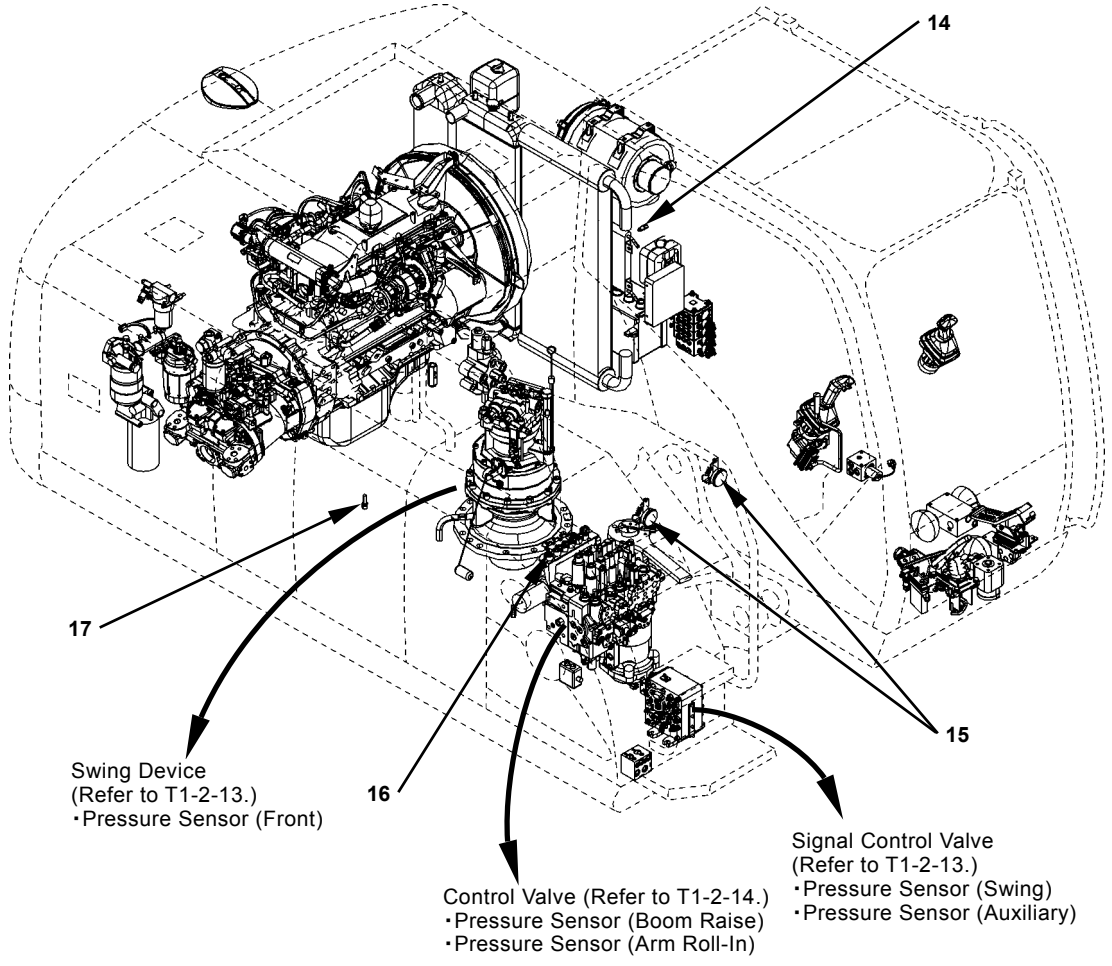
- Brake Pressure Sensor
- Work Brake Release Switch
- Brake Remain Pressure Sensor

- | | | | |
|----------------------------------|--|------------------------------------|------------------------------------|
| 1 - Fresh Air Temperature Sensor | 5 - Air Cleaner Restriction Switch | 8 - ECM | 11 - Slip Ring |
| 2 - Starter Relay | 6 - Battery | 9 - Atmosphere Pressure Sensor | 12 - Pressure Sensor (Positioning) |
| 3 - Battery Relay | 7 - Solenoid Valve Unit (For Electric Lever) | 10 - Pilot Shut-Off Solenoid Valve | 13 - Fuel Sensor |
| 4 - Glow Plug Relay | | | |

Electric Lever Pilot Cut Control

The option control compares electric levers, blade/outtrigger switch and assist switch operation with input values and output values. If recognized abnormality, all solenoid valves stop.

GENERAL / Component Layout



TCGB-01-02-002

14 - Intake Air Temperature Sensor

15 - Horn

16 - 3-Spool Solenoid Valve Unit

17 - Hydraulic Oil Temperature Sensor (Main)

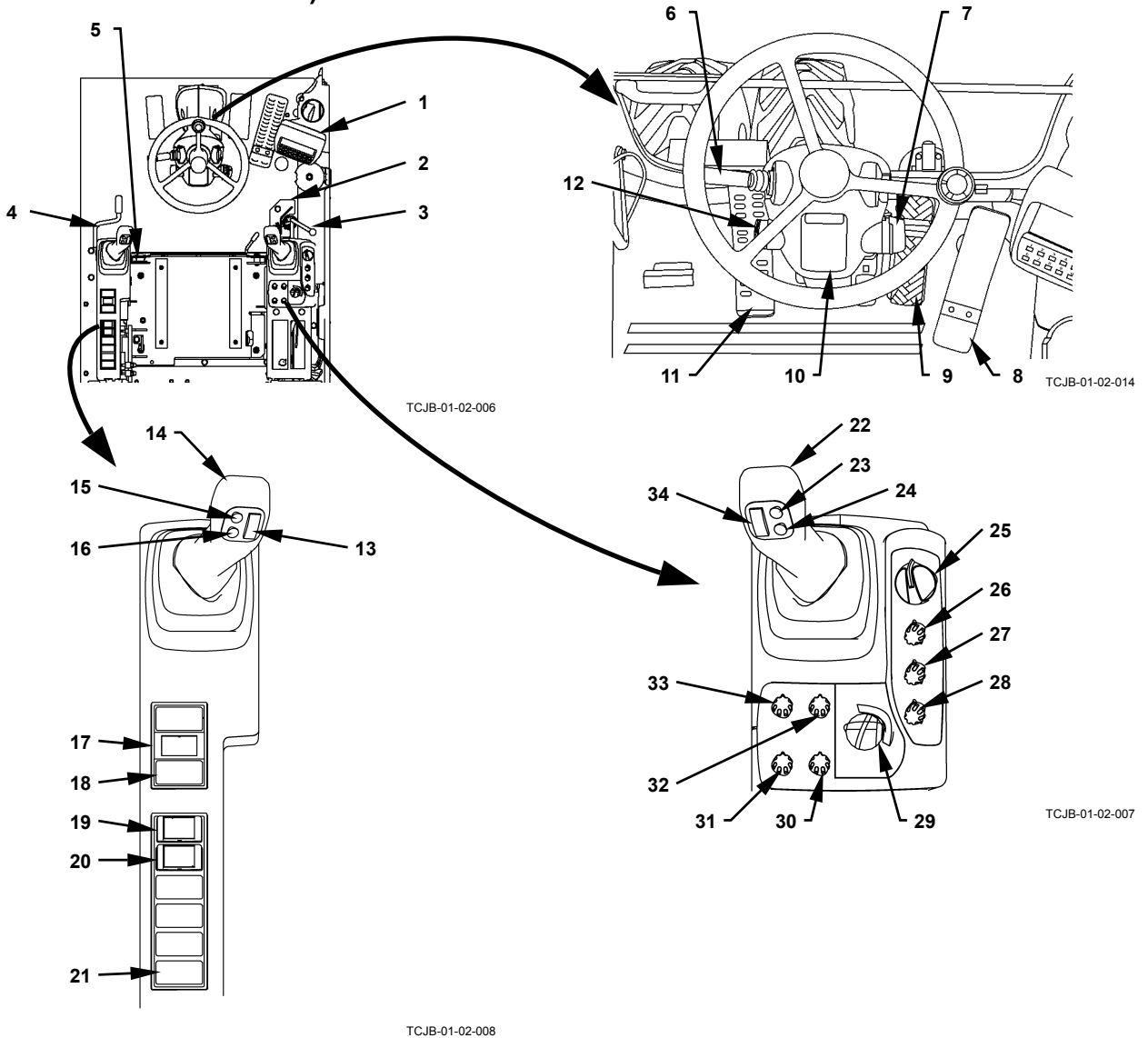
Swing Device
(Refer to T1-2-13.)
•Pressure Sensor (Front)

Control Valve (Refer to T1-2-14.)
•Pressure Sensor (Boom Raise)
•Pressure Sensor (Arm Roll-In)

Signal Control Valve
(Refer to T1-2-13.)
•Pressure Sensor (Swing)
•Pressure Sensor (Auxiliary)

GENERAL / Component Layout

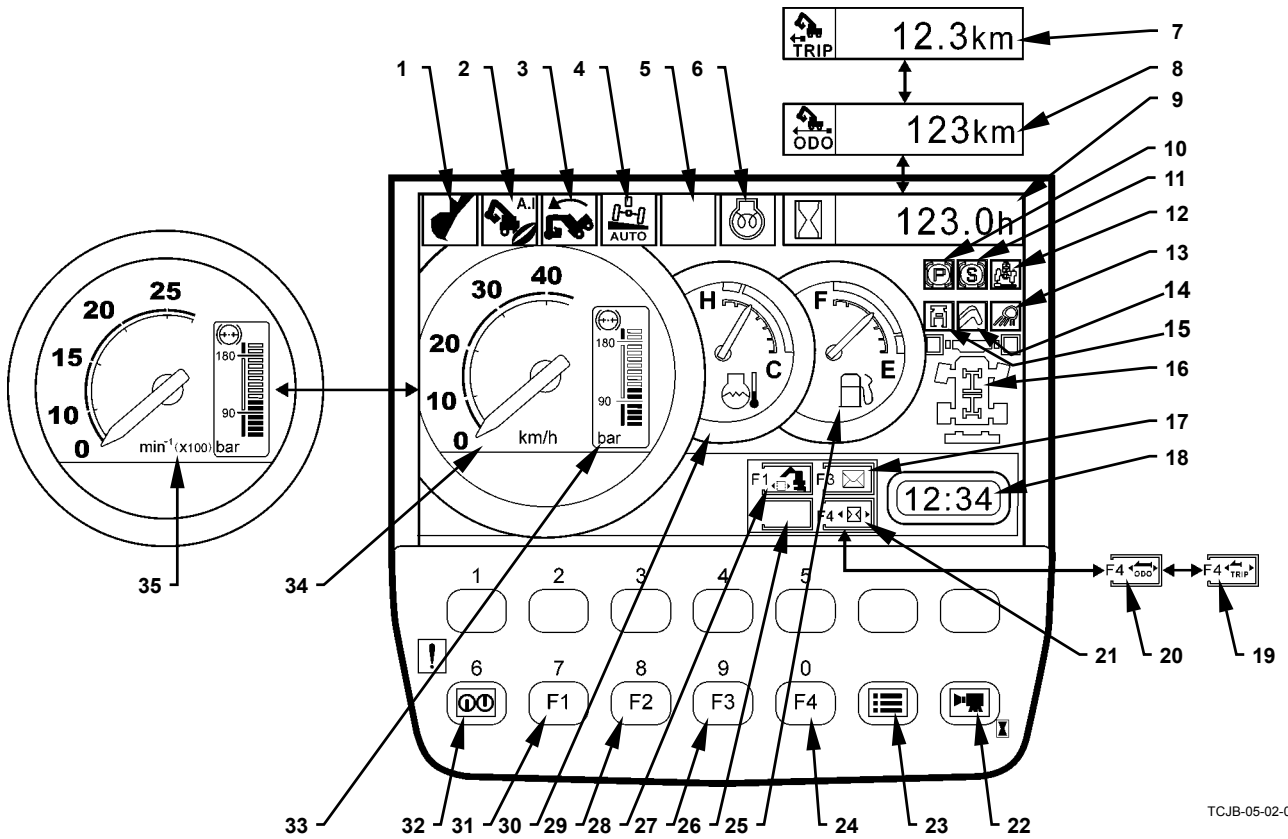
ELECTRICAL COMPONENT LAYOUT (MONITORS AND SWITCHES)



- | | | | |
|---|--|--|--|
| 1 - Monitor Unit
(Refer to T1-2-8.) | 10 - Steering Column Monitor
(Refer to T1-2-9.) | 19 - Blade/Outrigger Front-Rear
Selector Switch | 27 - Engine Speed Control Mode
Selection Switch |
| 2 - Swing Lock Lever | 11 - Auxiliary/Positioning Pedal
(Optional) | 20 - Outrigger Left-Right
Selector Switch | 28 - Power Mode Switch |
| 3 - Blade/Outrigger Lever | 12 - Horn Switch | 21 - Heater Seat Switch
(Optional) | 29 - Key Switch |
| 4 - Pilot Shut-Off Lever | 13 - Left Analog Switch
(Auxiliary) | 22 - FNR Switch | 30 - Blade/Outrigger Selector
Switch |
| 5 - Engine Stop Switch | 14 - Horn Switch | 23 - Auxiliary | 31 - Auto-Idle Switch |
| 6 - Combination Switch
· Turn Signal Switch
· Light Switch
· Dimmer Switch
· Passing Switch | 15 - Positioning Pedal Selection
Switch | 24 - Auxiliary | 32 - Work Light Switch |
| 7 - Brake Switch | 16 - Auxiliary Pedal Selection
Switch | 25 - Engine Control Dial | 33 - Wiper/Washer Switch |
| 8 - Accelerator Pedal | 17 - Hazard Switch | 26 - Travel Speed Mode Switch | 34 - Right Analog Switch
(Assist) (Optional) |
| 9 - Brake Pedal | 18 - Electrical Control Main
Switch (Optional) | | |

GENERAL / Component Layout

Monitor Unit

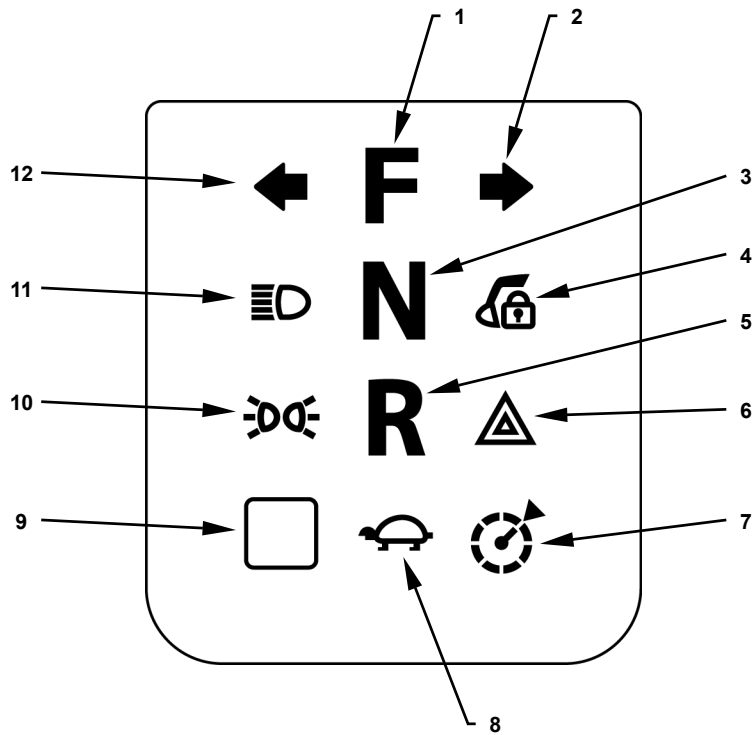


TCJB-05-02-043

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|---------------------------------------|--|--------------------------------|--------------------------------|
| 1 - Work Mode Display | 10 - Parking Brake Display | 19 - Trip Meter Display | 28 - Work Mode Display |
| 2 - Auto-Idle Display | 11 - Work Brake Display | 20 - Odometer Display | 29 - Auxiliary Selection |
| 3 - Overload Alarm Display (Optional) | 12 - Axle Lock Display | 21 - Hour Meter Display | 30 - Coolant Temperature Gauge |
| 4 - Auto Axle Lock Display | 13 - Work Light Display | 22 - Back Monitor Selection | 31 - Work Mode Selection |
| 5 - Auxiliary | 14 - Auxiliary 2 (Positioning) Selection Display | 23 - Menu | 32 - Return to Primary Screen |
| 6 - Glow Signal Display | 15 - Auxiliary 1 (Attachment) Selection Display | 24 - Meter Display Selection | 33 - Brake Oil Pressure Gauge |
| 7 - Trip Meter | 16 - Blade/Outrigger Settings and Brake Mode Display | 25 - Fuel Gauge | 34 - Speedometer |
| 8 - Odometer | 17 - Mail Display (Optional) | 26 - Auxiliary | 35 - Tachometer |
| 9 - Hour Meter | 18 - Clock | 27 - Mail Selection (Optional) | |

GENERAL / Component Layout

Steering Column Monitor

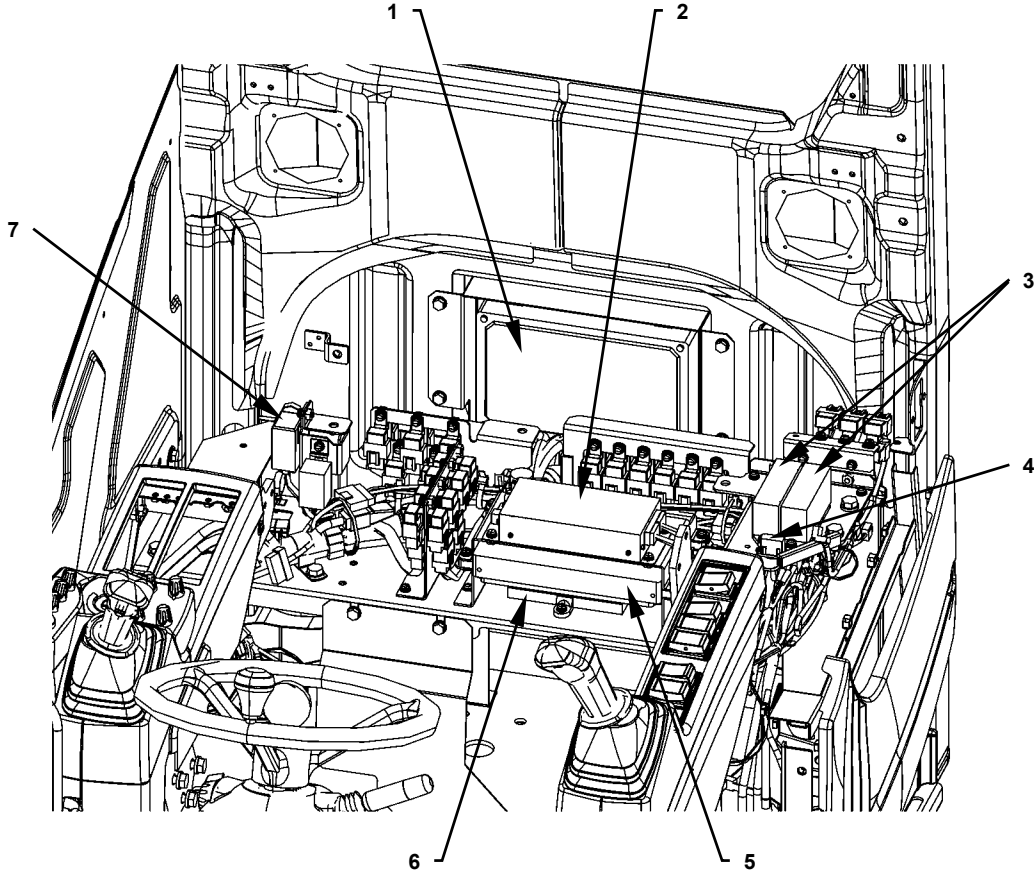


TCJB-02-01-008

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

GENERAL / Component Layout

ELECTRICAL COMPONENT LAYOUT (CONTROLLERS AND RELAYS)

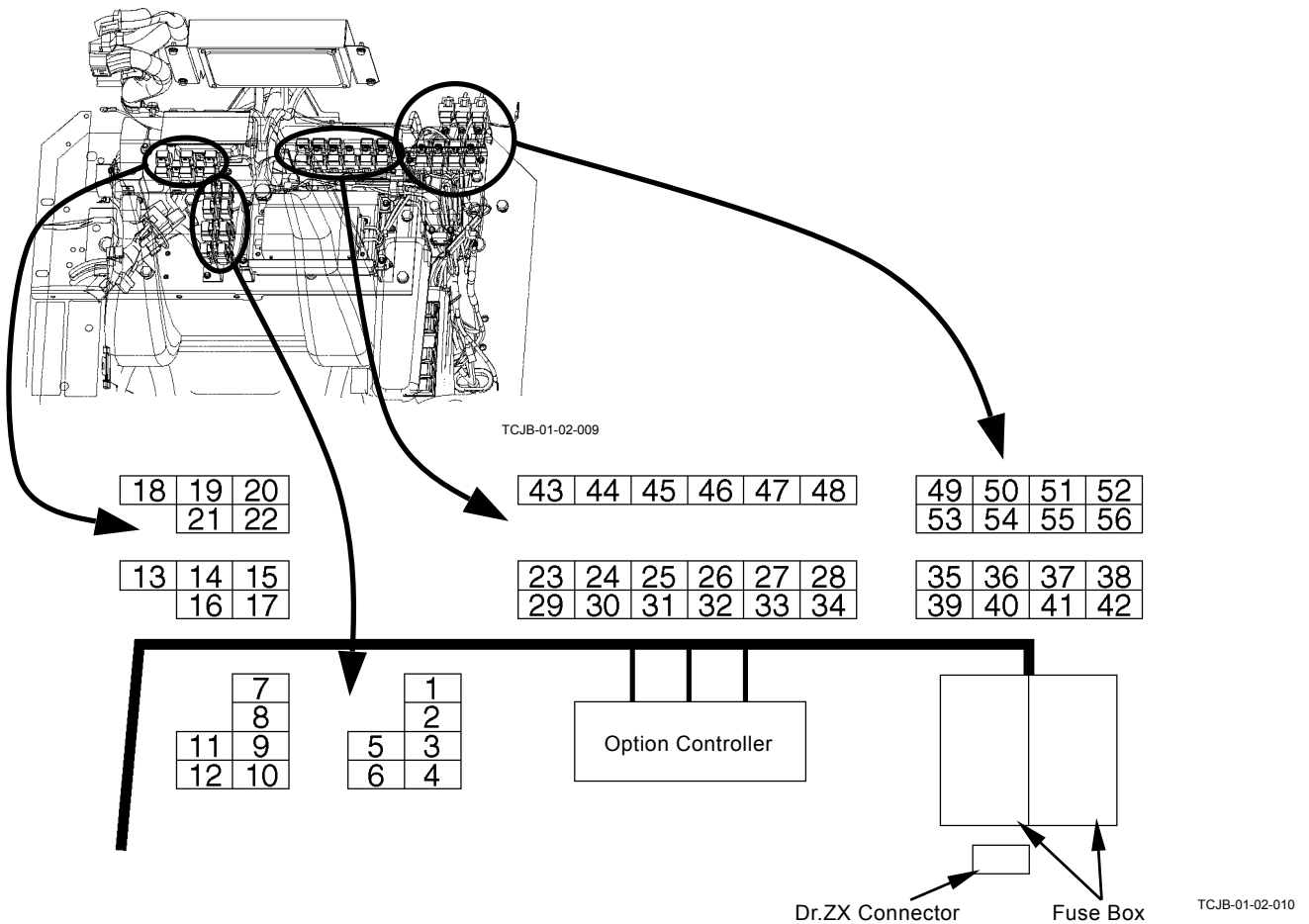


TCJB-01-02-015

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|--|--|----------------------------------|-------------|
| 1 - MC (Main Controller) | 3 - Fuse Box | 5 - Option Controller | 7 - Flasher |
| 2 - Satellite Communication
Terminal (Optional) | 4 - Dr.ZX Connector
(Use as Download Connector) | 6 - ICF (Information Controller) | |

GENERAL / Component Layout

Relays Position

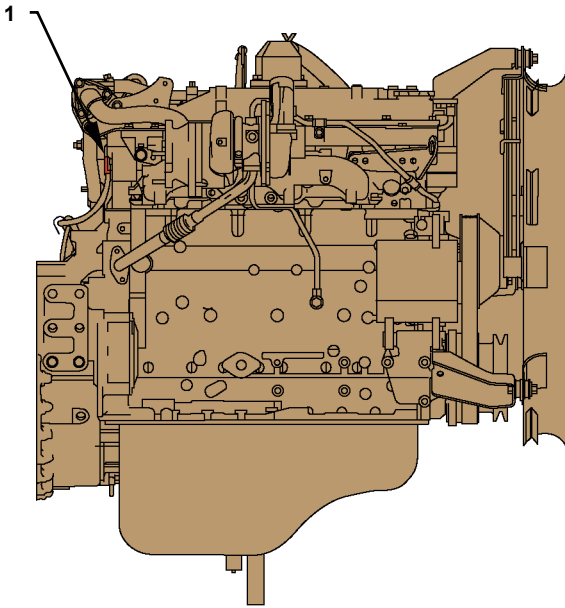


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|--------------------------------------|---|---|---------------------------------------|
| 1 - High Beam Relay | 15 - Stop Light Relay | 29 - Blade/Outrigger Relay (Front-Right) | 43 - Twin Wiper Relay 1 (OP) |
| 2 - Clearance Light Relay (Left) | 16 - Washer Relay | 30 - Blade/Outrigger Relay (Front-Left) | 44 - Twin Wiper Relay 2 (OP) |
| 3 - Clearance Light Relay (Right) | 17 - Horn Relay | 31 - Blade/Outrigger Relay (Main 1) | 45 - Twin Wiper Relay 3 (OP) |
| 4 - Head Light Relay (Left) | 18 - Load Dump Relay | 32 - Auto-Cruise Relay (OP) | 46 - Twin Wiper Relay 4 (OP) |
| 5 - Head Light Relay (Right) | 19 - Pilot Shut-Off Relay | 33 - Heater Seat Relay (OP) | 47 - Twin Wiper Relay 5 (OP) |
| 6 - Travel Slow Selection Relay | 20 - Security Horn Relay | 34 - Room Lamp Controller Relay (OP) | 48 - Twin Wiper Relay 6 (OP) |
| 7 - Compressor Relay (A/C) | 21 - Starter Cut Relay | 35 - Assist Relay 1 (OP) | 49 - Swing Alarm Relay (OP) |
| 8 - Heater Relay (A/C) | 22 - Security Relay | 36 - Assist Relay 2 (OP) | 50 - Rear Head Light Relay (OP) |
| 9 - MAX-Hi Relay (A/C) | 23 - Travel Fast Selection Relay | 37 - Assist Flow Rate Control Relay (OP) | 51 - Additional Front Head Light (OP) |
| 10 - ECM Main Relay | 24 - Blade/Outrigger Relay (Rear) | 38 - Blank | 52 - Additional Front Head Light (OP) |
| 11 - Turn Signal Light Relay (Left) | 25 - Blade/Outrigger Relay (Front) | 39 - Auxiliary/Positioning Selection Relay 1 (OP) | 53 - Revolving Light Relay (OP) |
| 12 - Turn Signal Light Relay (Right) | 26 - Blade/Outrigger Relay (Rear-Right) | 40 - Auxiliary/Positioning Selection Relay 2 (OP) | 54 - Immobilizer 1 (OP) |
| 13 - Wiper Relay | 27 - Blade/Outrigger Relay (Rear-Left) | 41 - Auxiliary/Positioning Selection Relay 3 (OP) | 55 - Immobilizer 2 (OP) |
| 14 - Boom Light Relay | 28 - Blade/Outrigger Relay (Main 2) | 42 - Auxiliary/Positioning Selection Relay 4 (OP) | 56 - Immobilizer 3 (OP) |

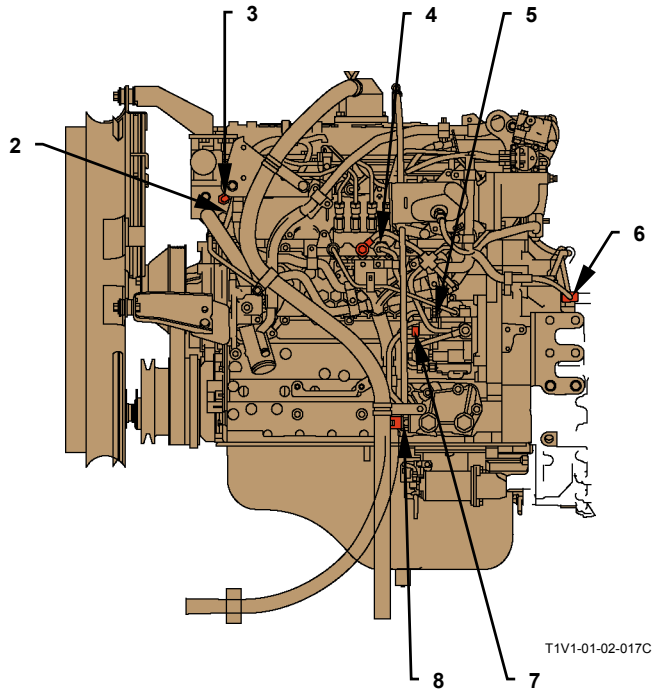
NOTE: OP: Optional

GENERAL / Component Layout

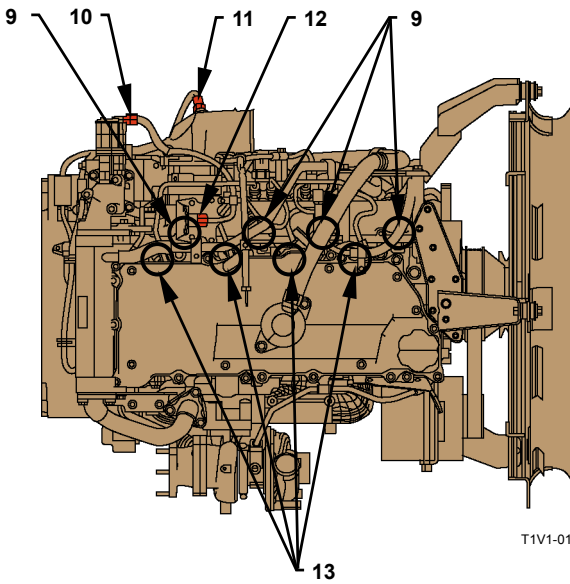
ENGINE



T1V1-01-02-016C



T1V1-01-02-017C

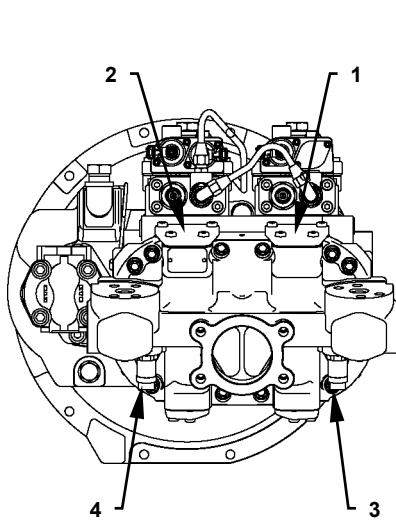


T1V1-01-02-015C

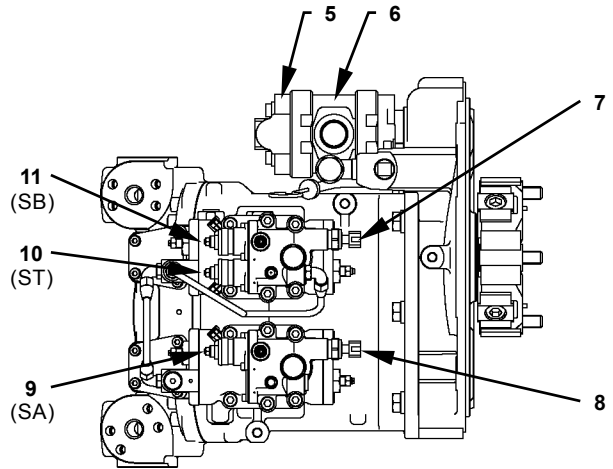
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|---------------------------------|-----------------------------|--|-------------------------------|
| 1 - Cam Angle Sensor | 5 - Fuel Temperature Sensor | 8 - Engine Oil Pressure Sensor | 11 - Boost Temperature Sensor |
| 2 - Overheat Switch | 6 - Crank Speed Sensor | 9 - Injector | 12 - Boost Pressure Sensor |
| 3 - Coolant Temperature Sensor | 7 - Supply Pump Actuator | 10 - EGR (Exhaust Gas Recirculation) Valve | 13 - Glow Plug |
| 4 - Common Rail Pressure Sensor | | | |

GENERAL / Component Layout

PUMP DEVICE

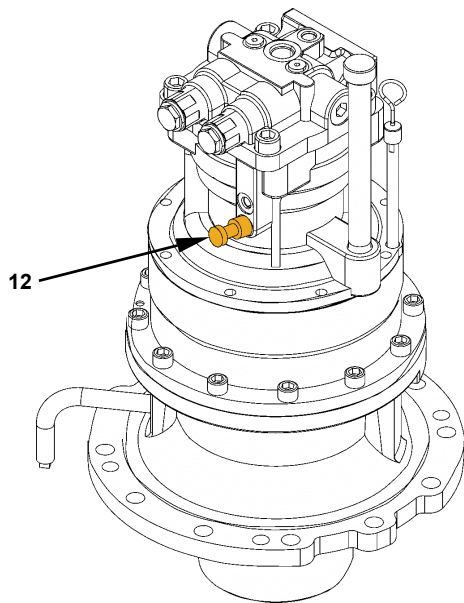


TCEB-03-01-003



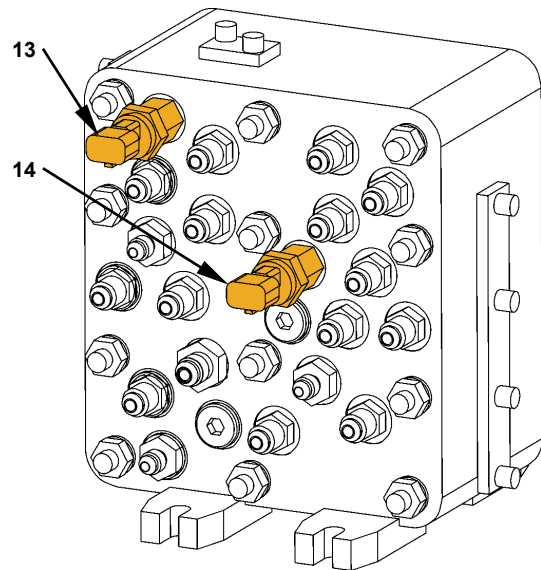
TCEB-03-01-001

SWING DEVICE



T178-03-02-001C

SIGNAL CONTROL VALVE

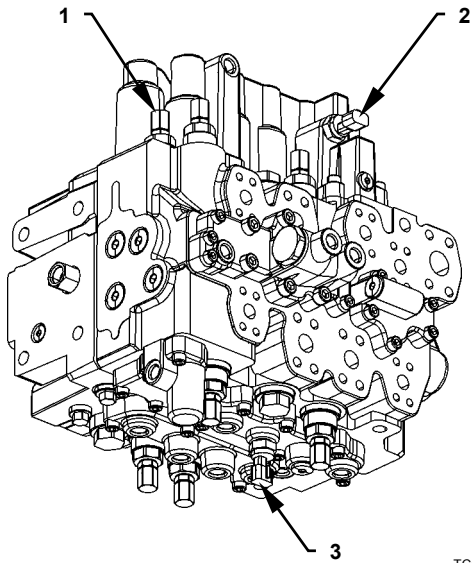


T1F3-03-06-003C

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|-------------------------------------|------------------------------------|--|----------------------------------|
| 1 - Pump 1 | 5 - Pilot Pump | 9 - Pump 1 Maximum Flow Rate Limit Control Solenoid Valve | 12 - Pressure Sensor (Front) |
| 2 - Pump 2 | 6 - Steering Pump | 10 - Torque Control Solenoid Valve (Speed Sensing) | 13 - Pressure Sensor (Auxiliary) |
| 3 - Pump 1 Delivery Pressure Sensor | 7 - Pump 2 Control Pressure Sensor | 11 - Pump 2 Maximum Flow Rate Limit Control Solenoid Valve | 14 - Pressure Sensor (Swing) |
| 4 - Pump 2 Delivery Pressure Sensor | 8 - Pump 1 Control Pressure Sensor | | |

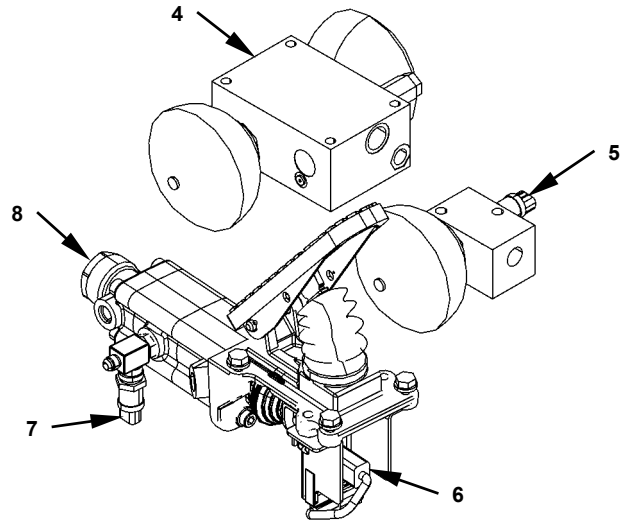
GENERAL / Component Layout

CONTROL VALVE



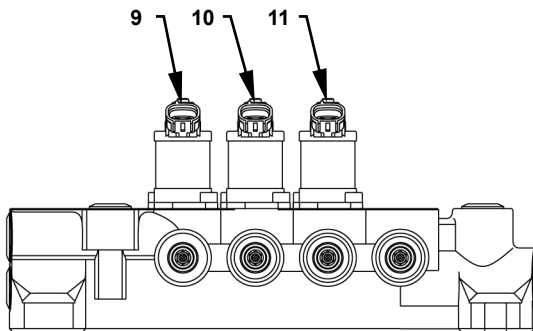
TCGB-01-02-003

BRAKE VALVE



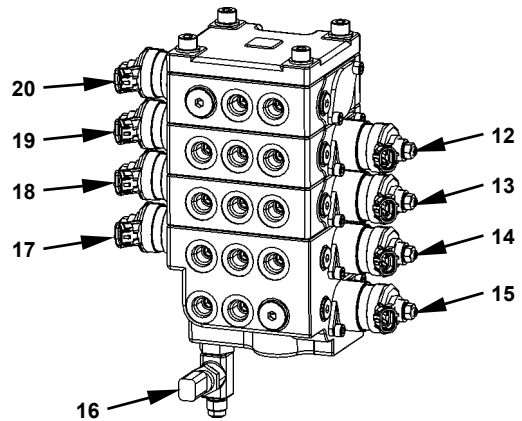
TCJB-01-02-017

3-SPOOL SOLENOID VALVE UNIT



TCGB-03-12-001

SOLENOID VALVE UNIT (FOR ELECTRIC LEVER)

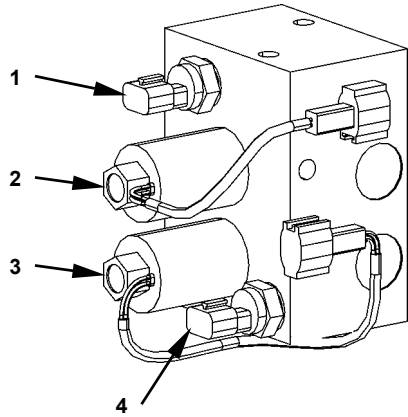


TCJB-01-02-018

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|-----------------------------------|---|---|--|
| 1 - Main Relief Valve | 6 - Stop Light / Work Brake Release Switch | 11 - Solenoid Valve Unit (SI) (Axle Lock Cylinders) | 16 - Hydraulic Oil Temperature Sensor (For Electric Lever) |
| 2 - Pressure Sensor (Arm Roll-In) | 7 - Brake Pressure Sensor | 12 - Positioning / Assist Solenoid Valve | 17 - Blade / Outrigger Solenoid Valve |
| 3 - Pressure Sensor (Boom Raise) | 8 - Brake Valve | 13 - Auxiliary Solenoid Valve | 18 - Auxiliary Solenoid Valve |
| 4 - Accumulator Charging Valve | 9 - Solenoid Valve Unit (SC) (Arm Regenerative Valve) | 14 - Blade / Outrigger Solenoid Valve | 19 - Positioning / Assist Solenoid Valve |
| 5 - Brake Remain Pressure Sensor | 10 - Solenoid Valve Unit (SF) (Work Brake) | 15 - Travel Make-Up Solenoid Valve | 20 - Swing Parking Brake Release Solenoid Valve |

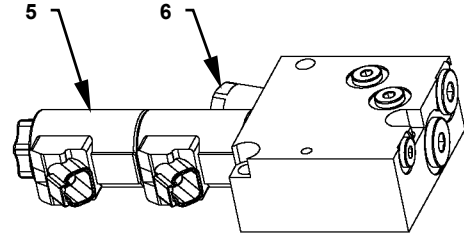
GENERAL / Component Layout

TRAVEL SHOCKLESS VALVE



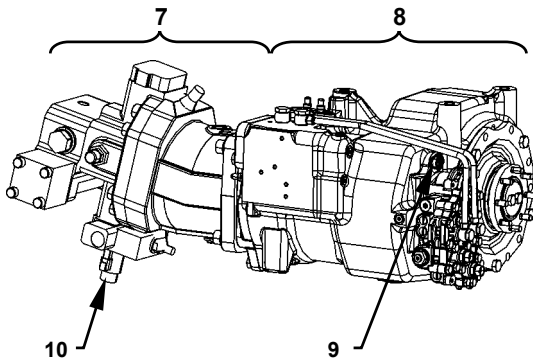
TCJB-01-02-019

TRANSMISSION CHANGEOVER SOLENOID VALVE



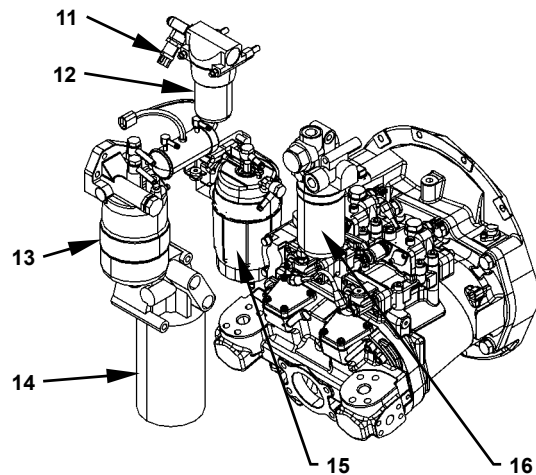
TCJB-05-07-002

TRAVEL DEVICE



TCJB-01-02-020

FILTER



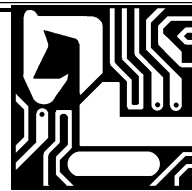
TGGB-01-02-004

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|--|---|---|------------------------|
| 1 - Pressure Sensor (Travel Forward) | 5 - Travel Mode Selector Solenoid Valve | 9 - Travel N Sensor | 13 - Fuel Main Filter |
| 2 - Travel Forward Pi Cut Solenoid Valve | 6 - Pressure Reducing Valve | 10 - Travel Motor Displacement Control Solenoid Valve | 14 - Engine Oil Filter |
| 3 - Travel Reverse Pi Cut Solenoid Valve | 7 - Travel Motor | 11 - Steering Pump Delivery Pressure Sensor | 15 - Fuel Pre Filter |
| 4 - Pressure Sensor (Travel Reverse) | 8 - Transmission | 12 - Steering Filter | 16 - Pilot Filter |

GENERAL / Component Layout

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SECTION 2 SYSTEM



CONTENTS

Group 1 Controller

Outline.....	T2-1-1
Can: Controller Area Network (Network Provided for Machine)	T2-1-2
MC: Main Controller.....	T2-1-3
ECM: Engine Control Module	T2-1-12
ICF: Information Controller	T2-1-14
Monitor Unit	T2-1-16
Option Controller	T2-1-31
Steering Column Monitor	T2-1-36

Group 2 Control System

Outline.....	T2-2-1
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Pump Control	T2-2-32
Valve Control	T2-2-52
Other Controls	T2-2-71
Option Controller Control.....	T2-2-97
Electric and Hydraulic Composite Circuit Control.....	T2-2-114

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Fuel Injection Control	T2-3-2
Fuel Injection Amount Correction Control..	T2-3-10
Preheating Control	T2-3-11
EGR (Exhaust Gas Recirculation) Control.....	T2-3-12
Engine Stop Control.....	T2-3-14

Group 4 Hydraulic System

Outline	T2-4-1
Pilot Circuit	T2-4-2
Service Brake Circuit	T2-4-18
Steering Circuit	T2-4-19
Main Circuit.....	T2-4-20

Group 5 Electrical System

Outline	T2-5-1
Main Circuit.....	T2-5-2
Electric Power Circuit (Key Switch: OFF)..	T2-5-4
Accessory Circuit.....	T2-5-6
Starting Circuit (Key Switch: START)	T2-5-8
Charging Circuit (Key Switch: ON).....	T2-5-14
Serge Voltage Prevention Circuit	T2-5-18
Pilot Shut-Off Circuit (Key Switch: ON) ...	T2-5-20
Security Lock Circuit	T2-5-22
Engine Stop Circuit (Key Switch: OFF) ...	T2-5-24
Security Horn Circuit.....	T2-5-26
Wiper/Washer Circuit.....	T2-5-28
Light Circuit.....	T2-5-30

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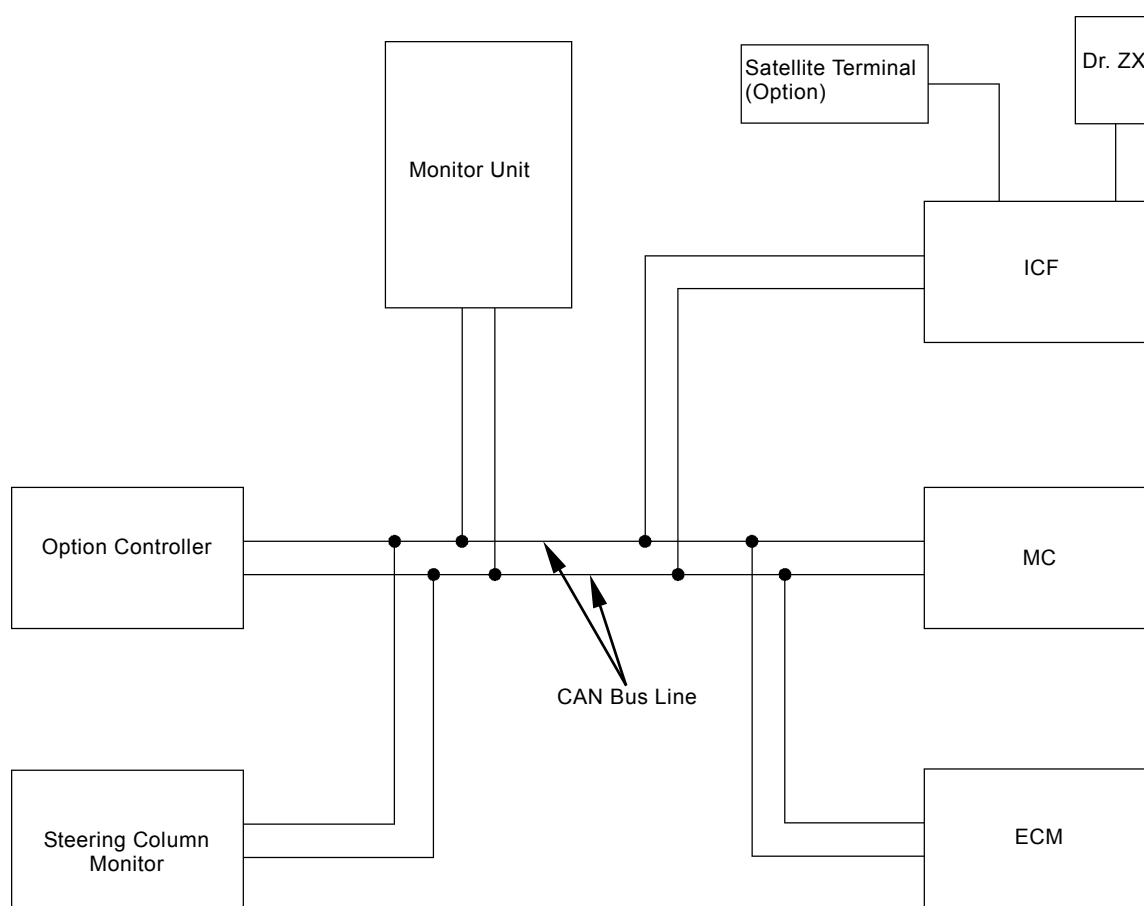
SYSTEM / Controller

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 cab or the monitoring of machine overall condition including the engine.

- MC: Main Controller
- ECM: Engine Control Module
- ICF: Information Controller
- Monitor Unit
- Option Controller
- Steering Column Monitor



TCJB-02-01-001

 NOTE: CAN (CAN Bus Line)