

Technical Manual

Operational Principle

ZW

310

Wheel Loader

Service Manual consists of the following separate Part No;
Technical Manual (Operational Principle) : Vol. No. TO4HA-E
Technical Manual (Troubleshooting) : Vol. No. TT4HA-E
Workshop Manual : Vol. No. W4HA-E

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.)
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TEL: 81-29-832-7084
FAX: 81-29-831-1162

ADDITIONAL REFERENCES

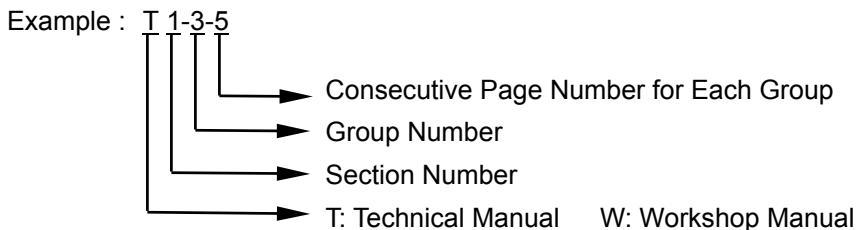
- Please refer to the materials listed below in addition to this manual.
 - The Operator's Manual
 - The Parts Catalog
 - The Engine Manual
 - Parts Catalog of the Engine
 - Hitachi Training Material

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:



INTRODUCTION


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 or 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 parentheses just behind SI units.

Example : 24.5 MPa (250 kgf/cm², 3560 psi)

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

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				

SECTION AND GROUP CONTENTS

TECHNICAL MANUAL

(Operational Principle)

SECTION 1 GENERAL

Group 1 Specification

Group 2 Component Layout

Group 3 Component Specifications

SECTION 2 SYSTEM

Group 1 Control System

Group 2 ECM System

Group 3 Hydraulic System

Group 4 Electrical System

SECTION 3 COMPONENT OPERATION

Group 1 Pump Device

Group 2 Control Valve

Group 3 Hydraulic Fan Motor

Group 4 Steering Pilot Valve

Group 5 Steering Valve

Group 6 Pilot Valve

Group 7 Charging Block

Group 8 Ride Control Valve

Group 9 Drive Unit

Group 10 Axle

Group 11 Brake Valve

Group 12 Others

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.

TECHNICAL MANUAL (Troubleshooting)

SECTION 4 OPERATIONAL PERFORMANCE TEST

Group 1 Introduction

Group 2 Standard

Group 3 Engine Test

Group 4 Wheel Loader Test

Group 5 Component Test

Group 6 Adjustment

SECTION 5 TROUBLESHOOTING

Group 1 Diagnosing Procedure

Group 2 Dr-ZX

Group 3 e-Wheel

Group 4 Component Layout

Group 5 Troubleshooting A

Group 6 Troubleshooting B

Group 7 Troubleshooting C

Group 8 Electrical System Inspection

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WORKSHOP MANUAL

SECTION 1 GENERAL INFORMATION

- Group 1 Precautions for Disassembling and Assembling
- Group 2 Tightening Torque
- Group 3 Painting
- Group 4 Bleeding Air from Hydraulic Oil Tank

SECTION 2 BASE MACHINE (UPPER STRUCTURE)

- Group 1 Cab
- Group 2 Counterweight
- Group 3 Frame
- Group 4 Pump Device
- Group 5 Control Valve
- Group 6 Pilot Valve
- Group 7 Ride Control Valve
- Group 8 Pilot Shutoff Valve
- Group 9 Hydraulic Fan Motor

SECTION 3 BASE MACHINE (TRAVEL SYSTEM)

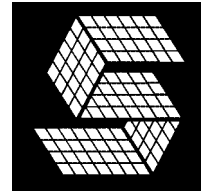
- Group 1 Tire
- Group 2 Drive Unit
- Group 3 Axle
- Group 4 Propeller Shaft
- Group 5 Brake Valve
- Group 6 Charging Block
- Group 7 Steering Pilot Valve
- Group 8 Steering Valve
- Group 9 Steering Cylinder
- Group 10 Emergency Steering Pump Unit (Optional)

SECTION 4 FRONT ATTACHMENT

- Group 1 Front Attachment
- Group 2 Cylinder

SECTION 5 ENGINE

SECTION 1 GENERAL



—CONTENTS—

Group 1 Specifications

Specifications T1-1-1

Group 2 Component Layout

Main Component Layout..... T1-2-1

Electrical Component Layout..... T1-2-4

(Overview)

Electrical System (Cab) T1-2-5

Electrical System T1-2-6

(Controller and Relays)

Electrical System (Right Console) T1-2-7

Electrical System (Monitor and Switches)... T1-2-8

Monitor Panel T1-2-9

Engine and Fan Pump T1-2-10

Pump Device and Drive Unit..... T1-2-11

Control Valve T1-2-12

Ride Control Valve, Charging Block

and Fan Motor T1-2-13

Steering Valve and Emergency Steering

Pump (Optional)..... T1-2-14

Group 3 Component Specifications

Engine T1-3-1

Engine Accessories T1-3-5

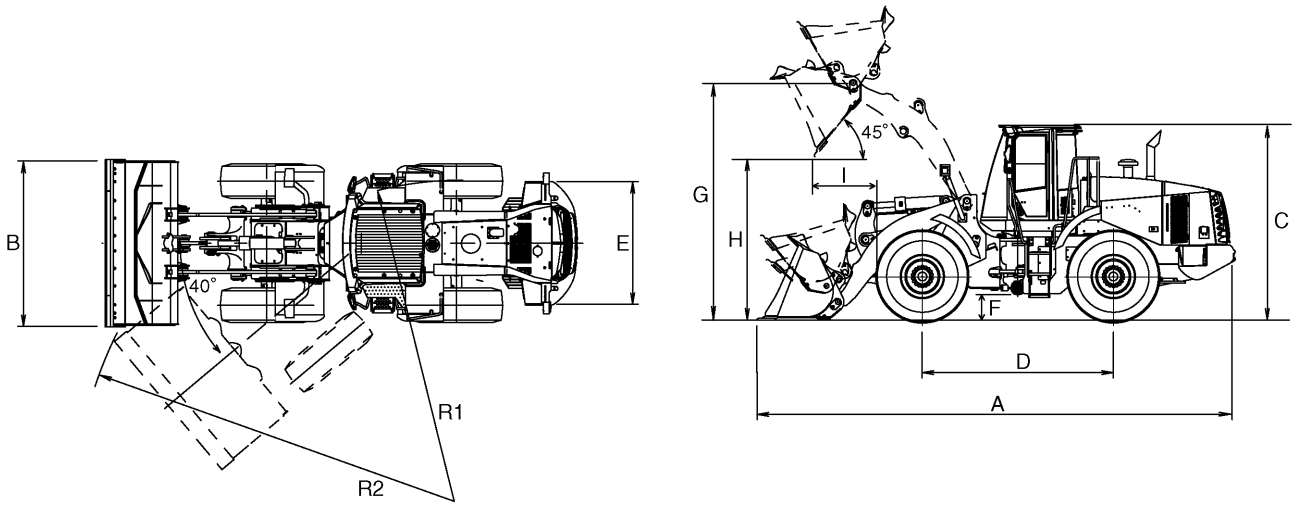
Hydraulic Component T1-3-6

Electrical Component..... T1-3-10

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GENERAL / Specification

SPECIFICATIONS



M4GB-12-002

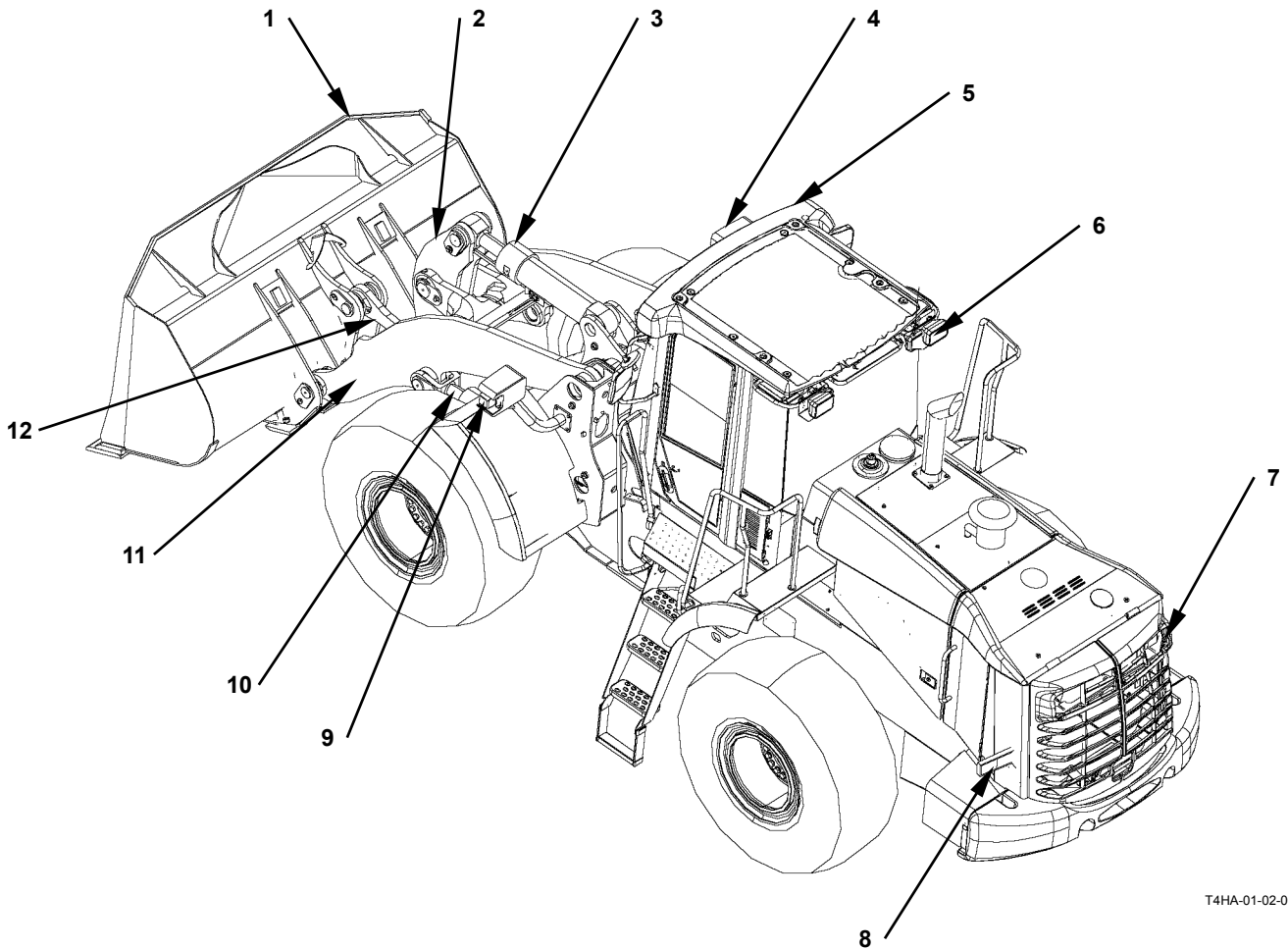
Type	–	ZW310 (EU)	ZW310 (Standard)
Bucket Capacity (Heaped)	m ³ (yd ³)	4.2 (BOC)	4.0 (BOC)
Operating Weight	kg(lb)	23270	22290
Static Tipping Load (Full Turn)	kg(lb)	16600	15000
Rated Loading Weight	kg(lb)	7200	6400
Engine	–	OM460LA 216.0 kW/2000 rpm (293.7 PS/2000 rpm)	OM460LA 216.0 kW/2000 rpm (293.7 PS/2000 rpm)
A: Overall Length	mm(ft.in)	8840	8760
B: Overall Width (Bucket)	mm(ft.in)	2980	3150
C: Overall Height	mm(ft.in)	3460	3465
D: Wheel Base	mm(ft.in)	3450	3450
E: Tread	mm(ft.in)	2230	2300
F: Ground Clearance	mm(ft.in)	480	485
G: Height to Bucket Hinge Pin, Fully Raised	mm(ft.in)	4390	4395
H: Dumping Clearance 45 Degree, Full Height	mm(ft.in)	3070	3130
I: Dumping Reach, 45 Degree Dump, Full Height	mm(ft.in)	1240	1180
R1: Turning Radius (Centerline of Outside Tire)	mm(ft.in)	5860	5900
R2: Loader Clearance Circle, Bucket in Carry Position	mm(ft.in)	6920	6970
Maximum Travel Speed (Forward/Reverse)	km/h(mph)	35.5/35.5	34.5/34.5
Number of Travel Shift (Forward/Reverse)	–	4/4	4/4
Articulation Angle (Left/Right)	Degree(%)	40	40
Tire Size	–	26.5R25	26.5R-25-16PR

GENERAL / Specification

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GENERAL / Component Layout

MAIN COMPONENT LAYOUT (OVERVIEW)

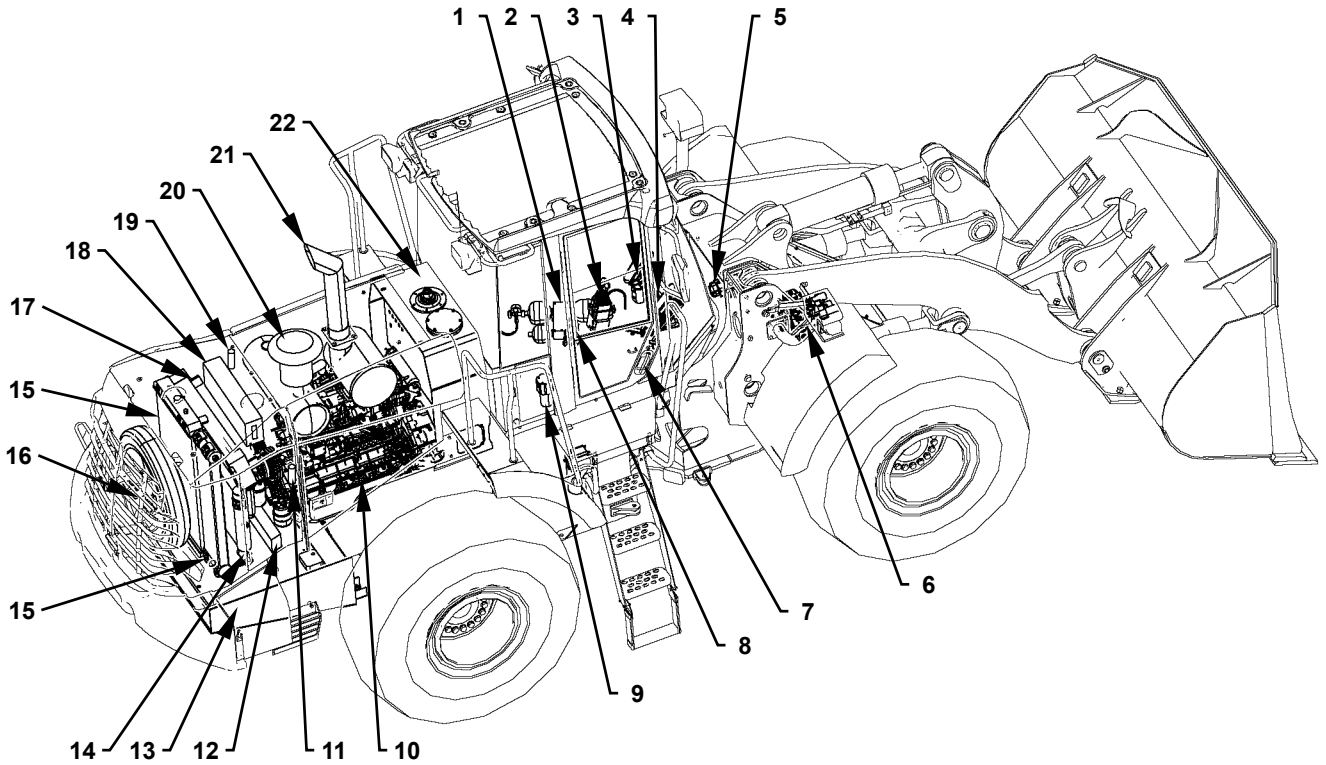


T4HA-01-02-008

- | | | | |
|---------------------|--|--|------------------------|
| 1 - Bucket | 4 - Head Light | 7 - Rear Working Light | 10 - Lift Arm Cylinder |
| 2 - Bell Crank | 5 - Front Working Light | 8 - Rear Combination Light
(Turn Signal, Hazard Light
Clearance Light, Brake
Light and Reverse Light) | 11 - Lift Arm |
| 3 - Bucket Cylinder | 6 - Rear Working Light (Op-
tional) | 9 - Turn Signal, Hazard Light
and Clearance Light | 12 - Bucket Link |

GENERAL / Component Layout

MAIN COMPONENT LAYOUT (UPPERSTRUCTURE)

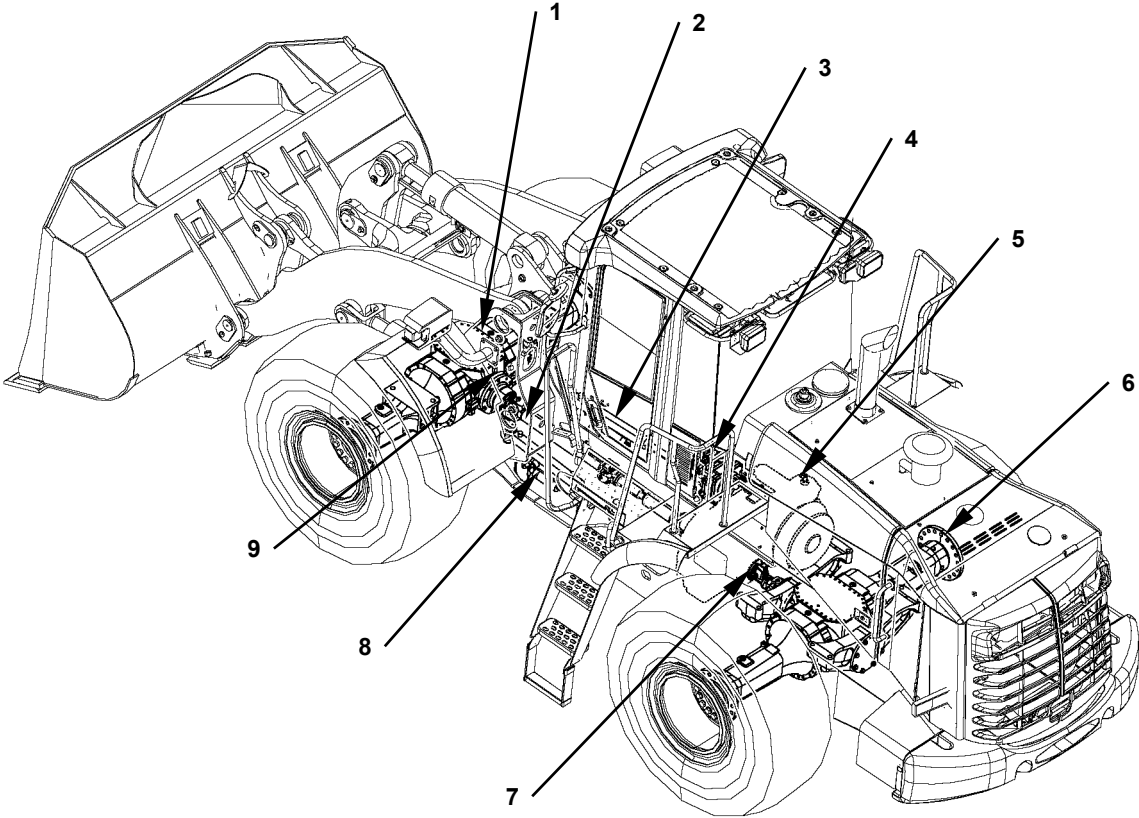


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- | | | | |
|--------------------------|------------------------------|-------------------|------------------------|
| 1 - Charging Block | 7 - Stop Valve | 13 - Fuel Tank | 19 - Engine Oil Filter |
| 2 - Pilot Valve | 8 - Pilot Shutoff Valve | 14 - Oil Cooler | 20 - Muffler |
| 3 - Brake Valve | 9 - Pilot Filter | 15 - Radiator | 21 - Air Cleaner |
| 4 - Steering Pilot Valve | 10 - Engine | 16 - Fan Motor | 22 - Hydraulic Tank |
| 5 - Steering Valve | 11 - Fuel Filter | 17 - Inter Cooler | |
| 6 - Control Valve | 12 - Torque Converter Cooler | 18 - Reserve Tank | |

GENERAL / Component Layout

MAIN COMPONENT LAYOUT (TRAVEL SYSTEM)

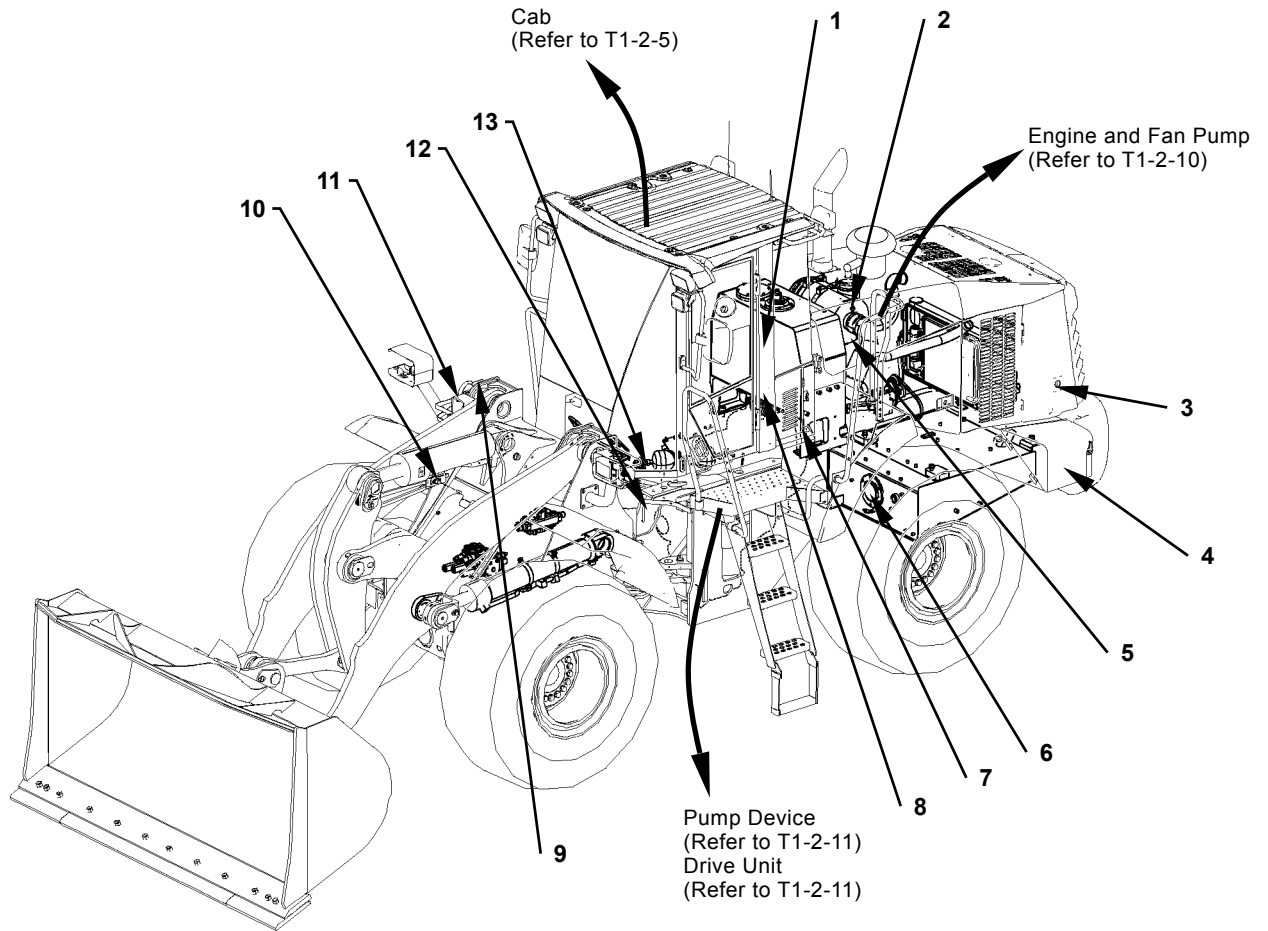


T4HA-01-02-010

- 1 - Front Axle
- 2 - Propeller Shaft (Front)
- 3 - Steering Cylinder
- 4 - Pump Device
- 5 - Transmission
- 6 - Rear Axle
- 7 - Propeller Shaft (Rear)
- 8 - Steering Accumulator
- 9 - Brake Pressure Sensor

GENERAL / Component Layout

ELECTRIC COMPONENT LAYOUT (OVERVIEW)

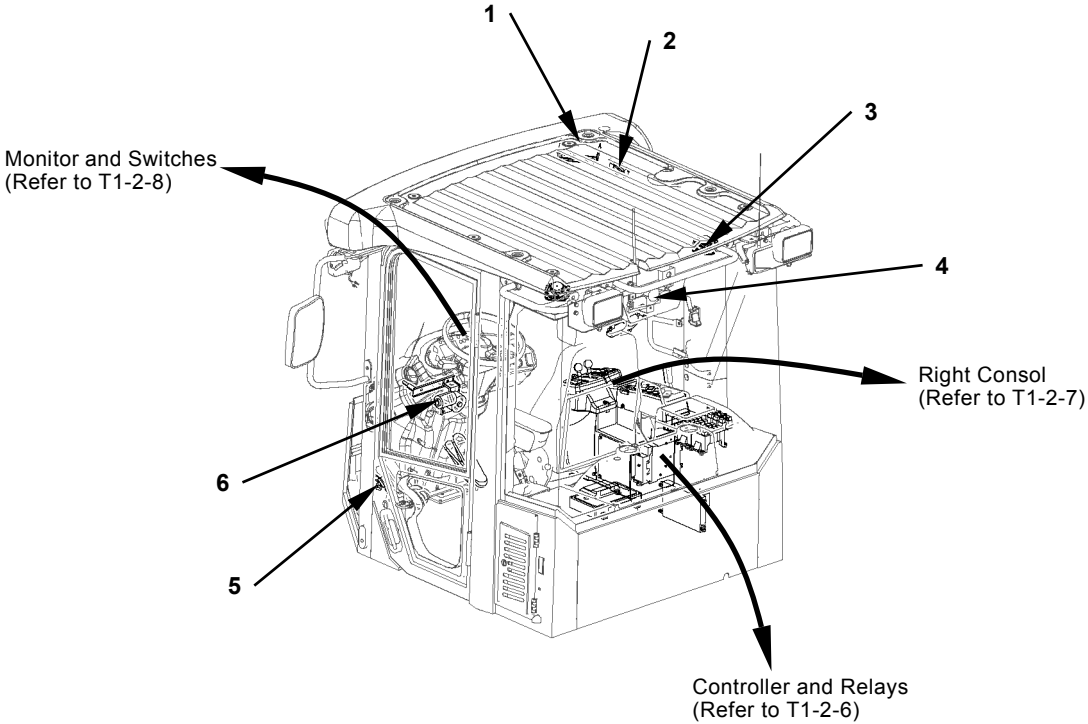


T4HA-01-02-011

- | | | | |
|-----------------------------------|---|---|-------------------------------------|
| 1 - Hydraulic Oil Level Switch | 5 - Boost Pressure Sensor | 8 - Emergency Steering Pump
Delivery Pressure Switch | 11 - Lift Arm Proximity Switch |
| 2 - Air Filter Restriction Switch | 6 - Fuel Level Sensor | 9 - Lift Arm Angle Sensor
(Optional) | 12 - Implement Pressure Sensor |
| 3 - Reverse Buzzer | 7 - Hydraulic Oil Temperature
Sensor | 10 - Bucket Proximity Switch | 13 - Out Side Temperature
Sensor |
| 4 - Battery | | | |

GENERAL / Component Layout

ELECTRICAL SYSTEM (CAB)

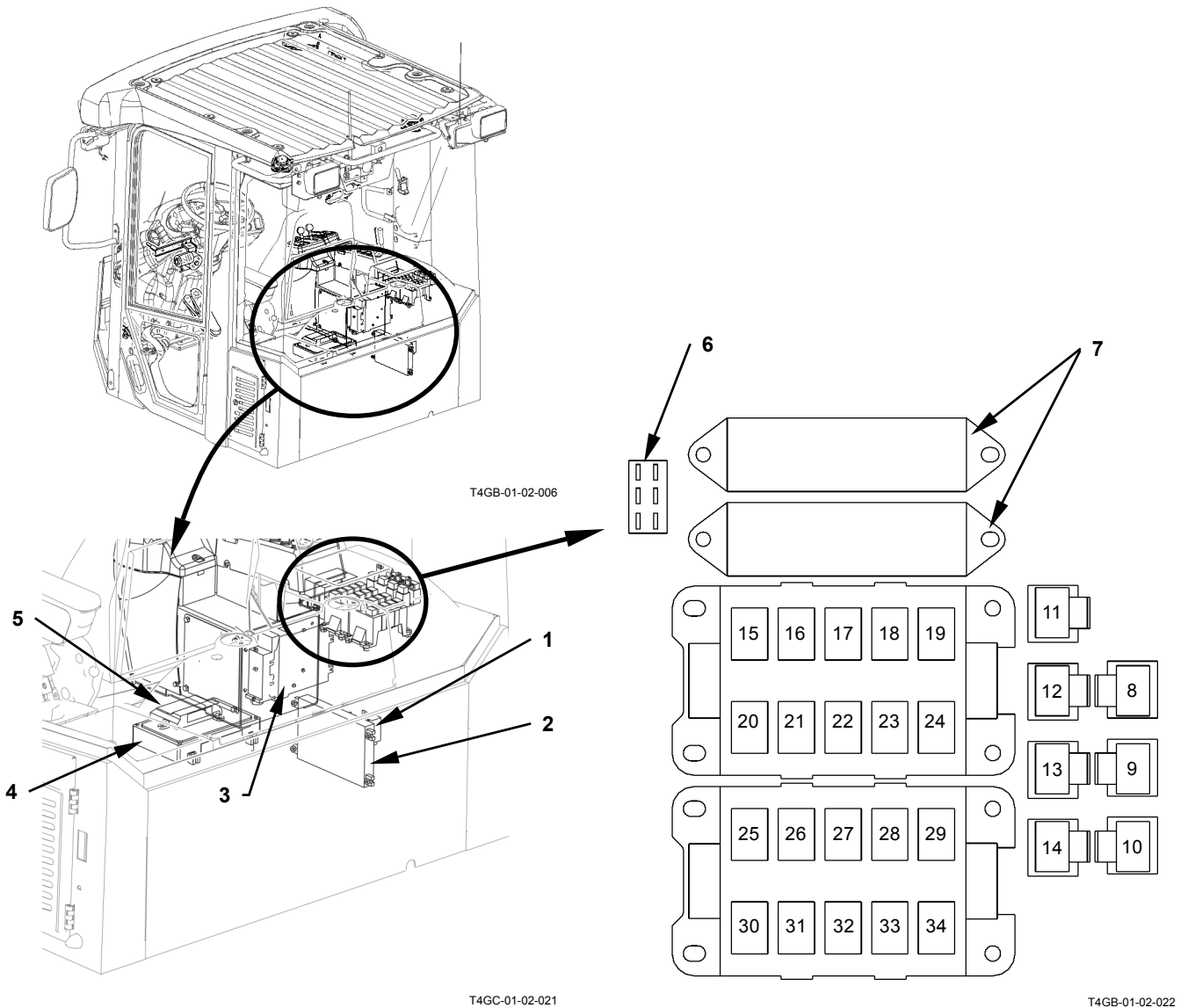


T4GB-01-02-006

- 1 - Radio
- 2 - Auxiliary Switch Panel (Optional)
- 3 - Speaker
- 4 - Rear Wiper Motor
- 5 - Brake Lamp Switch
- 6 - Front Wiper Motor

GENERAL / Component Layout

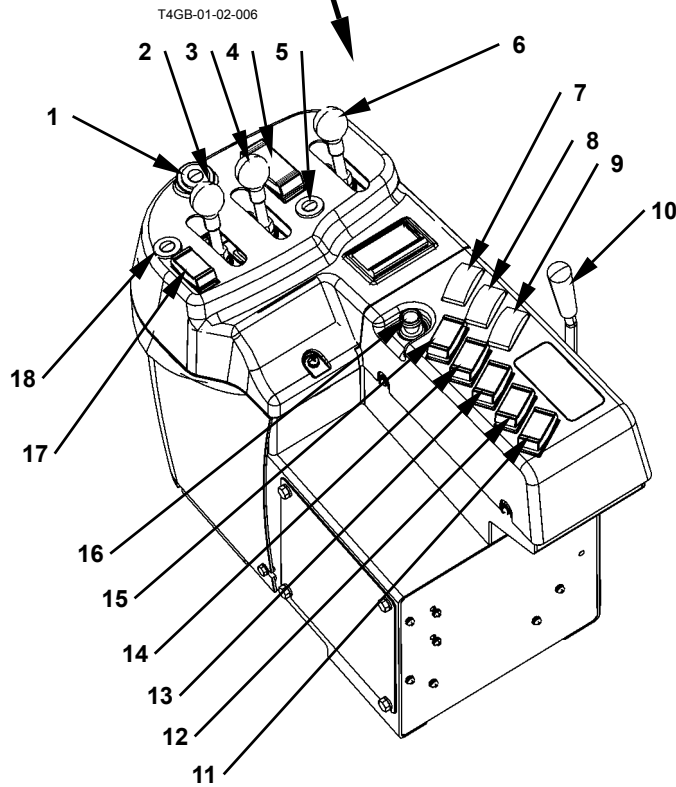
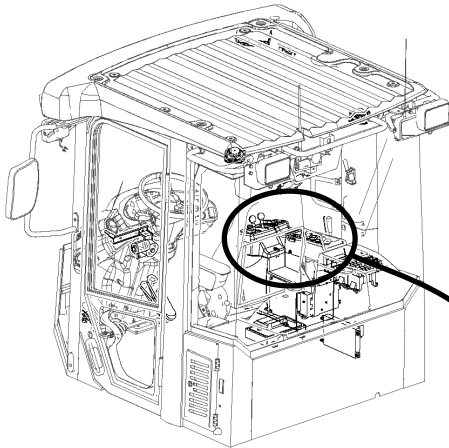
Controller and Relays



- | | | | |
|----------------------------------|--------------------------------------|---|--------------------------------------|
| 1 - Flasher Relay | 10 - Front Window Heater Relay | 19 - Head Light Relay (Left) (A-R1) | 27 - Load Dump Relay (B-R3) |
| 2 - Option Controller (Optional) | 11 - Neutral Relay | 20 - Emergency Steering Relay (A-R10) | 28 - Parking Brake Relay (B-R2) |
| 3 - ECM1 | 12 - Rear Window Heater Relay | 21 - Hone Relay (A-R9) | 29 - Parking Brake Relay (B-R1) |
| 4 - MCF | 13 - Wiper Relay (Left) | 22 - Turn Signal Relay (Right) (A-R8) | 30 - Fuel Pump Relay (B-R10) |
| 5 - ICF | 14 - Wiper Relay (Right) | 23 - Working Light Relay (Rear) (A-R7) | 31 - Main Relay (B-R9) |
| 6 - Dr.ZX Connector | 15 - Reverse Light Relay (A-R5) | 24 - Working Light Relay (Front) (A-R8) | 32 - Rear Washer Relay (B-R8) |
| 7 - Fuse Box | 16 - Brake Light Relay (A-R4) | 25 - Front Wiper Relay (B-R5) | 33 - Turn Signal Relay (Left) (B-R7) |
| 8 - Fog Light Relay (Optional) | 17 - High Beam Relay (A-R3) | 26 - Neutral Relay (B-R4) | 34 - Rear Wiper Relay (B-R6) |
| 9 - Auxiliary | 18 - Head Light Relay (Right) (A-R2) | | |

GENERAL / Component Layout

Right Console

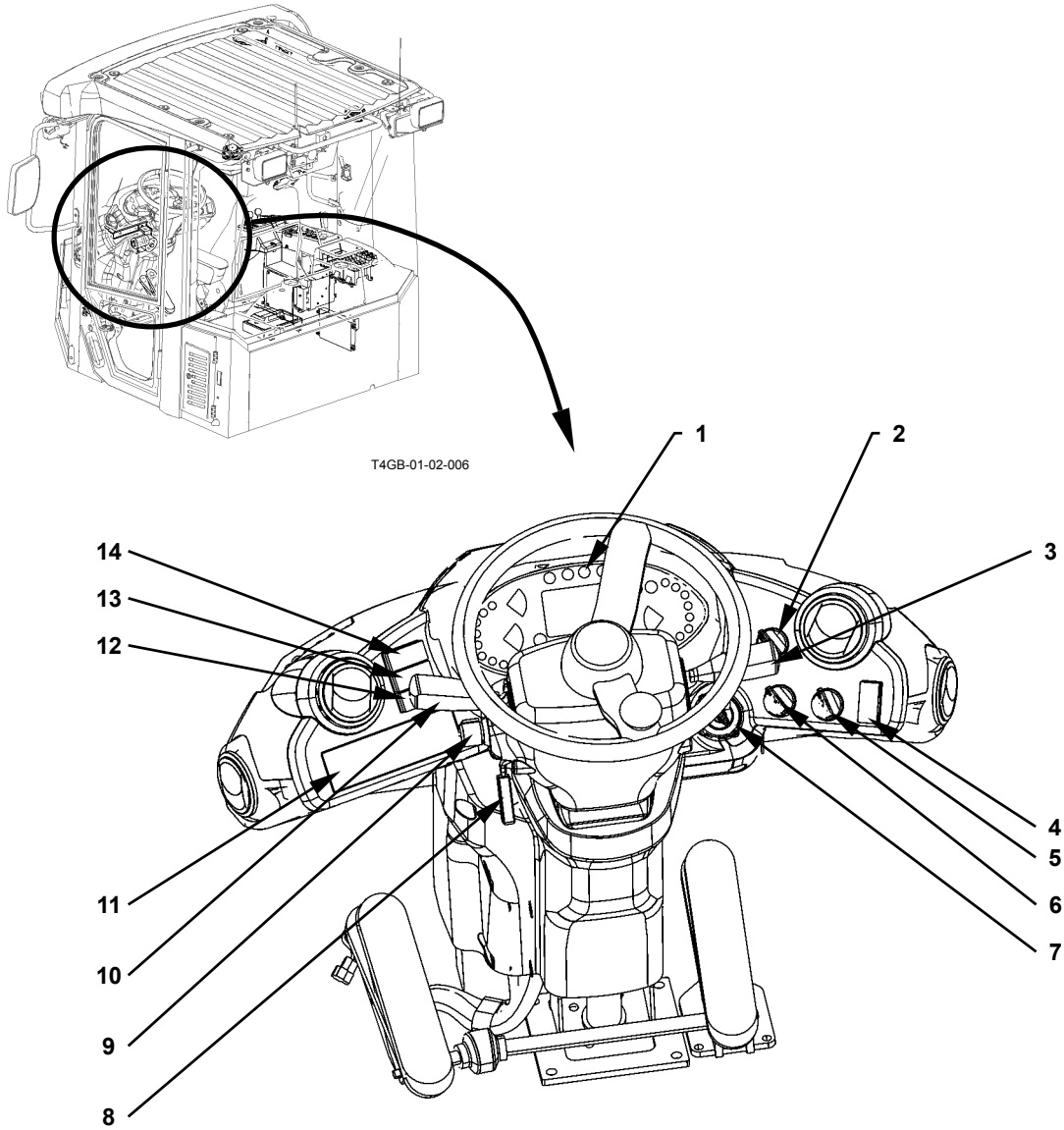


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- | | | | |
|----------------------------|--|--------------------------------------|--------------------------------------|
| 1 - Down Shift Switch | 6 - Auxiliary Control Lever (Optional) | 11 - Emergency Steering Check Switch | 15 - Forward/Reverse Selector Switch |
| 2 - Bucket Operation Lever | 7 - Quick Coupler Switch (Optional) | 12 - Fan Reverse Switch | 16 - Cigar Lighter |
| 3 - Lift Arm Control Lever | 8 - Lift Arm Auto Leveler Downward Set Switch (Optional) | 13 - Fog Light Switch (Optional) | 17 - Up-shift/Down-shift Switch |
| 4 - Forward/Reverse Switch | 9 - Lift Arm Auto Leveler Upward Set Switch (Optional) | 14 - Ride Control Switch (Optional) | 18 - Hold Switch |
| 5 - Hone Switch | 10 - Front Control Lock Lever | | |

GENERAL / Component Layout

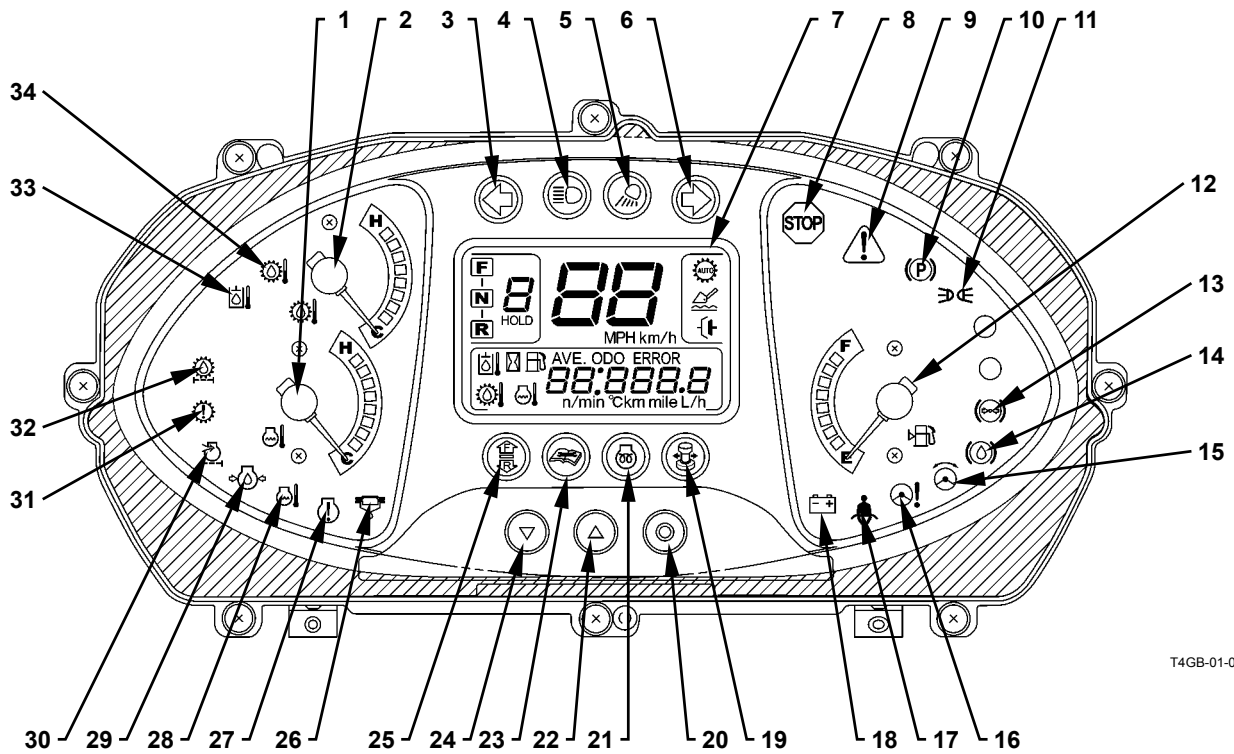
Monitor and Switches



- | | | | |
|--|---|--|---------------------------|
| 1 - Monitor Panel
(Refer to T1-2-9) | 5 - Work Mode Selector Switch | 9 - Front Wiper Switch | 12 - Rear Wiper Switch |
| 2 - Driving Mode Switch | 6 - Clutch Cat Position Switch | 10 - Forward/Reverse Lever
and Shift Switch | 13 - Working Light Switch |
| 3 - Turn Signal Lever/Head Light
Switch/Dimmer Switch | 7 - Key Switch | 11 - Air Conditioner Switch
Panel | 14 - Hazard Light Switch |
| 4 - Parking Brake Switch | 8 - Steering Column Tilt
/Telescopic Lever | | |

GENERAL / Component Layout

Monitor Panel

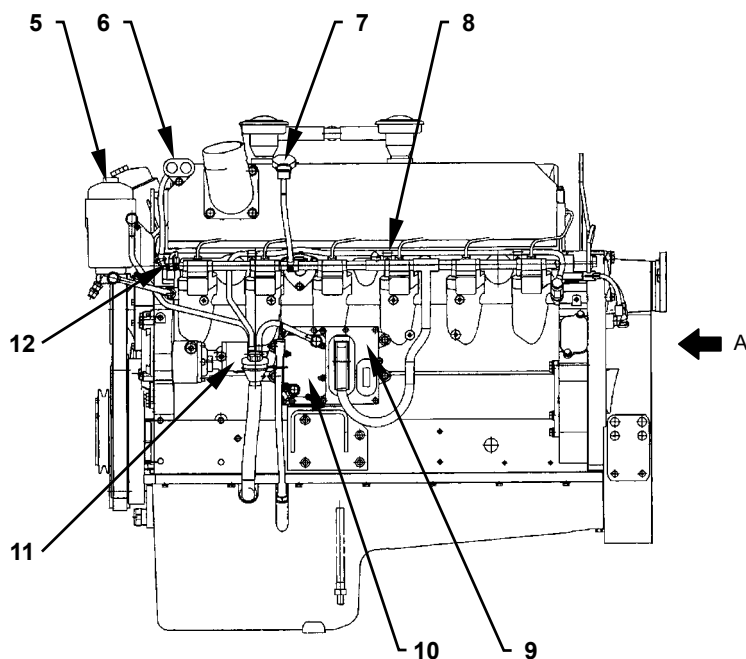
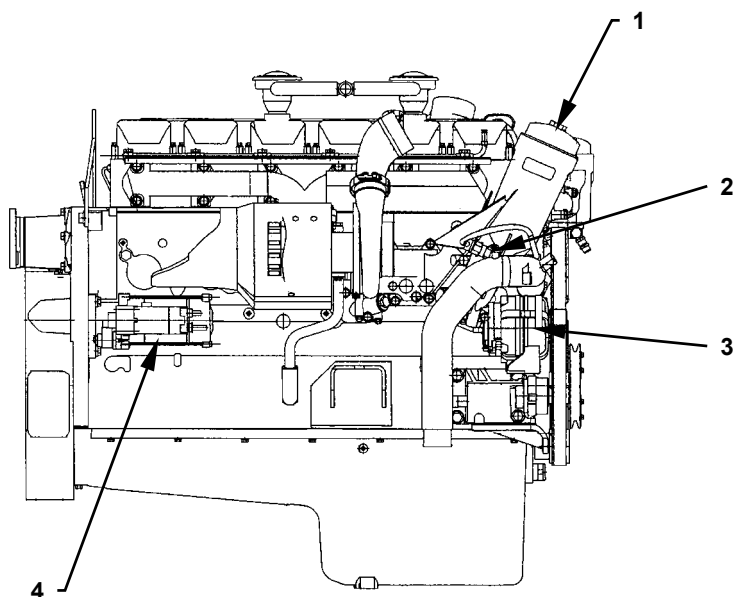


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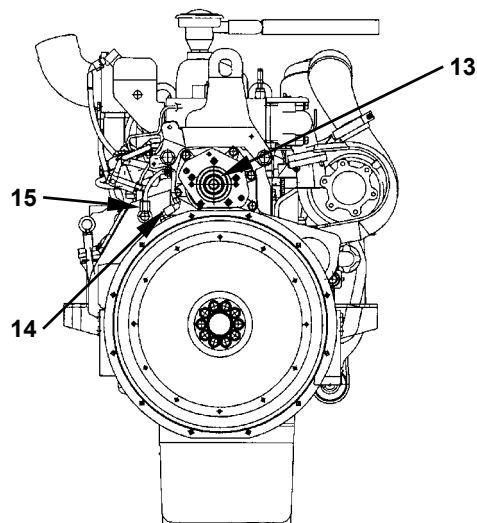
- | | | | |
|--|--|--|--|
| 1 - Coolant Temperature Gauge | 10 - Parking Brake Indicator | 19 - Lever Steering Indicator (Optional) | 27 - Engine Warning Indicator |
| 2 - Transmission Oil Temperature Gauge | 11 - Clearance Light Indicator | 20 - Monitor Mode Selector | 28 - Overheat Indicator |
| 3 - Turn Signal Indicator (Left) | 12 - Fuel Gauge | 21 - Glow Signal | 29 - Engine Low Oil Pressure Indicator |
| 4 - High Beam Indicator | 13 - Brake Low Oil Pressure Indicator | 22 - Monitor Display Selector (Up) | 30 - Air Filter Restriction Indicator |
| 5 - Working Light Indicator | 14 - Brake Low Oil Level Indicator | 23 - Maintenance Indicator | 31 - Transmission Warning Indicator |
| 6 - Turn Signal Indicator (Right) | 15 - Emergency Steering Indicator (Optional) | 24 - Monitor Display selector (Down) | 32 - Transmission Oil Filter Restriction Indicator |
| 7 - Monitor Display | 16 - Low Steering Oil Pressure Indicator | 25 - Forward/Reverse Switch Indicator | 33 - Hydraulic Oil Temperature Indicator |
| 8 - Stop Indicator | 17 - Seat Belt Indicator | 26 - Water Separator Indicator | 34 - Transmission Oil Temperature Indicator |
| 9 - Service Indicator | 18 - Discharge Warning Indicator | | |

GENERAL / Component Layout

ENGINE AND FAN PUMP



View A



T4HA-01-02-007

- | | | | |
|--|---|--------------------------------|--|
| 1 - Engine Oil Filter | 5 - Fuel Filter | 9 - ECM2 | 13 - Fan Pump (Not shown in the image) |
| 2 - Engine Oil Combination Sensor (Temperature and Pressure) | 6 - Start and Stop Switch | 10 - Fuel Cooler (ECM2 Cooler) | 14 - Top Dead Center Sensor |
| 3 - Alternator | 7 - Inlet Air Combination Sensor (Temperature and Pressure) | 11 - Low Pressure Fuel Pump | 15 - Crank Revolution Sensor |
| 4 - Starter | 8 - Coolant Temperature Sensor | 12 - Fuel Temperature Sensor | |