

HITACHI

PART NO. TO1JB-E-00

Technical Manual

Operational Principle

ZAXIS

850-3

850LC-3

870H-3

870LCH-3

Hydraulic Excavator

This Service Manual consists of three separate parts:
Technical Manual (Operational Principle)
Technical Manual (Troubleshooting)
Workshop Manual (Workshop Manual in English only)

Part No. TO1JB-E-00
Part No. TT1JB-E-00
Part No. W1JB-E-00

ZAXIS 850-3 • 850LC-3 • 870H-3 • 870LCH-3 HYDRAULIC EXCAVATOR TECHNICAL MANUAL OPERATIONAL PRINCIPLE TO1JB-E-00

Hitachi Construction Machinery
www.hitachi-c-m.com

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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: 81-298-32-7173
FAX: 81-298-31-1162

ADDITIONAL REFERENCES

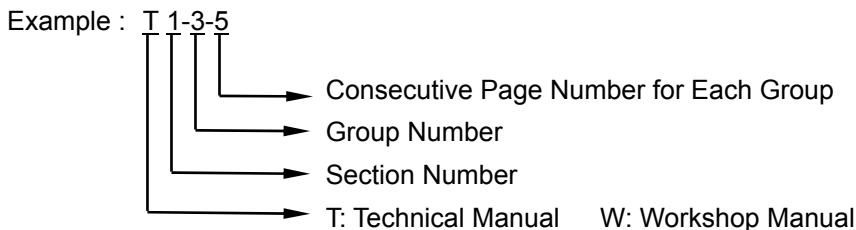
- Please refer to the materials listed below in addition to this manual.
 - The Operator's Manual
 - The Parts Catalog
 - Operation Manual of the Engine
 - Parts Catalog of the Engine
 - Hitachi Training Material

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

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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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- Group 7 Pilot Valve
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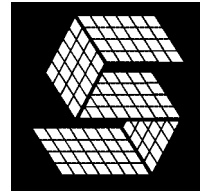
SECTION 3 UNDERCARRIAGE

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SECTION 1 GENERAL



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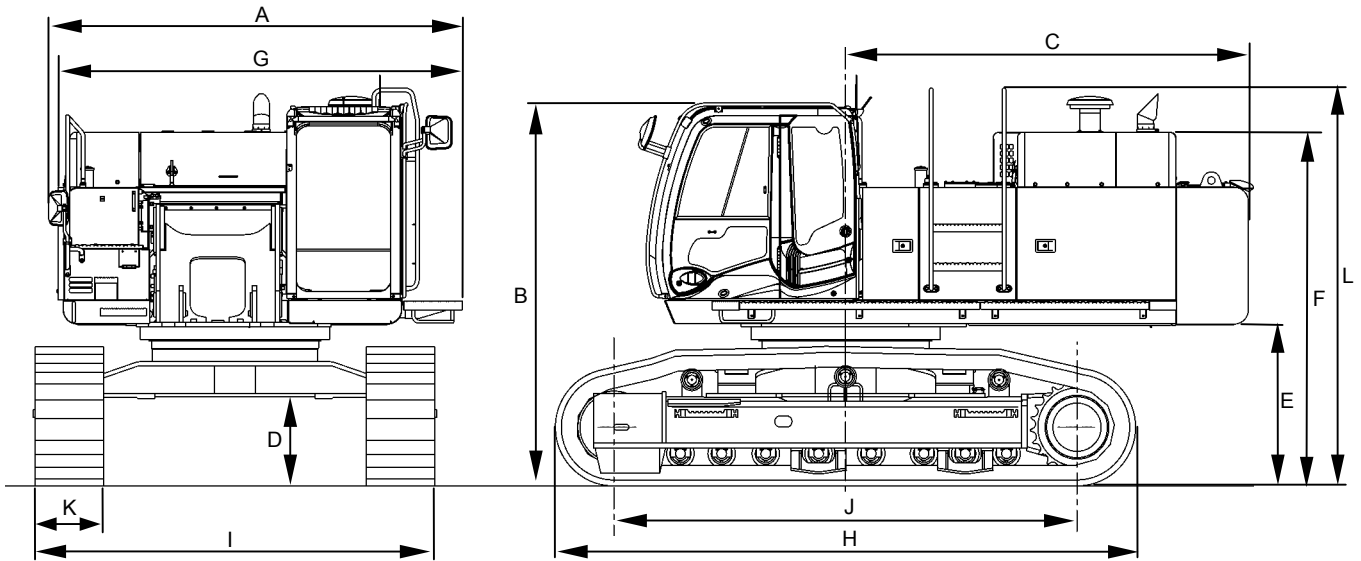
Engine	T1-3-1
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GENERAL / Specifications

SPECIFICATION

ZAXIS850-3, ZAXIS850LC-3



M1J1-12-001

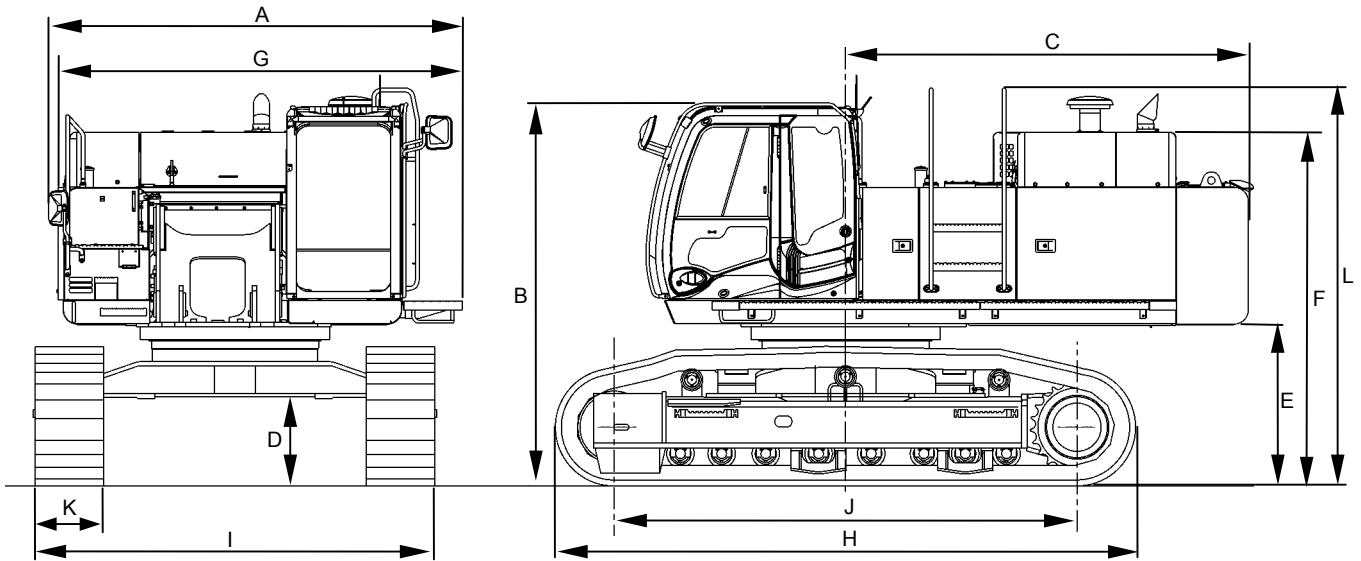
Model	ZX850LC-3 Hydraulic Excavator
Type of Front-End Attachment	3.7 m (12 ft 2 in) Arm
Bucket Capacity (Heaped)	PCSA 3.4 m ³ (4.4 yd ³) (CECE 3.0 m ³)
Operating Weight	80500 kg (177500 lb)
Basic Machine Weight	60900 kg (134300 lb)
Engine	ISUZU AH-6WG1XYSA-02 345 kW/1800 min ⁻¹ (469 PS/1800 rpm)
A: Overall Width (Excluding Rear View Mirrors)	4430 mm (14 ft 6 in)
B: Cab Height	3630 mm (11 ft 11 in)
C: Rear End Swing Radius	4600 mm (15 ft 1 in)
D: Minimum Ground Clearance	*890 mm (2 ft 11 in)
E: Counterweight Clearance	*1680 mm (5 ft 6 in)
F: Engine Cover Height	3550 mm (11 ft 8 in)
G: Overall Width of Upperstructure	4120 mm (13 ft 6 in)
H: Undercarriage Length	5840 mm (19 ft 2 in)
I: Undercarriage Width	4100 mm (13 ft 5 in)/ 3480 mm (11 ft 5 in)
J: Sprocket Center to Idler Center	4590 mm (15 ft 1 in)
K: Track Shoe Width	650 mm (2 ft 2 in) (Grouser shoe)
L: Overall Height	4200 mm (13 ft 10 in)
Ground Pressure	121 kPa (1.23 kgf/cm ² , 17.6 psi)
Swing Speed	9 min ⁻¹ (rpm)
Travel Speed (fast/slow)	5.5 km/h (2.8 mph)/ 3.4 km/h (2.1 mph)
Gradeability	35 ° (tan θ = 0.70)

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

GENERAL / Specifications

SPECIFICATION

ZAXIS850-3, ZAXIS850LC-3



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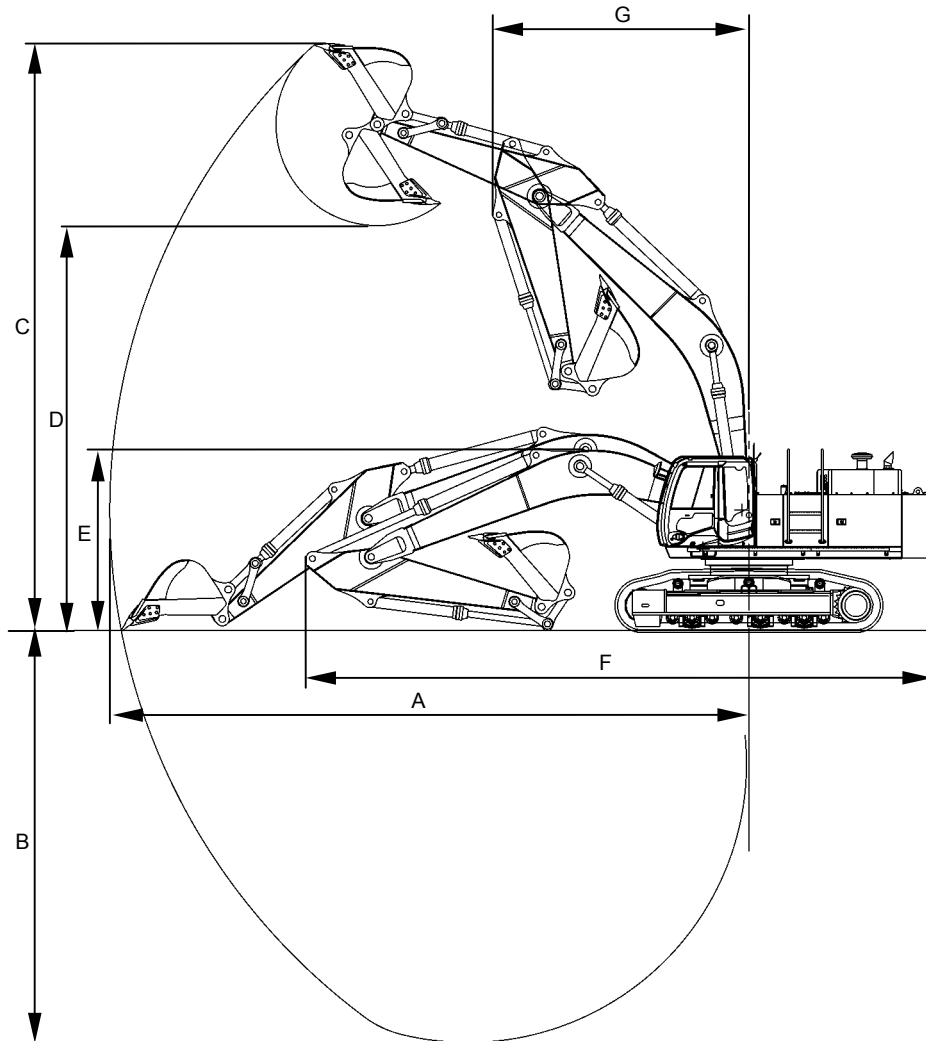
Model	ZX850LC-3 Hydraulic Excavator
Type of Front-End Attachment	3.7 m (12 ft 2 in) Arm
Bucket Capacity (Heaped)	PCSA 3.4 m ³ (4.4 yd ³) (CECE 3.1 m ³)
Operating Weight	82200 kg (181200 lb)
Basic Machine Weight	62700 kg (138200 lb)
Engine	ISUZU AH-6WG1XYSA-02 397 kW/1800 min ⁻¹ (540 PS/1800 rpm)
A: Overall Width (Excluding Rear View Mirrors)	4430 mm (14 ft 6 in)
B: Cab Height	3630 mm (11 ft 11 in)
C: Rear End Swing Radius	4600 mm (15 ft 1 in)
D: Minimum Ground Clearance	*890 mm (2 ft 11 in)
E: Counterweight Clearance	*1680 mm (5 ft 6 in)
F: Engine Cover Height	3550 mm (11 ft 8 in)
G: Overall Width of Upperstructure	4120 mm (13 ft 6 in)
H: Undercarriage Length	6360 mm (20 ft 10 in)
I: Undercarriage Width	4100 mm (13 ft 5 in)/ 3480 mm (11 ft 5 in)
J: Sprocket Center to Idler Center	5110 mm (16 ft 9 in)
K: Track Shoe Width	650 mm (2 ft 2 in) (Grouser shoe)
L: Overall Height	4200 mm (13 ft 10 in)
Ground Pressure	112 kPa (1.14 kgf/cm ² , 16.3 psi)
Swing Speed	9 min ⁻¹ (rpm)
Travel Speed (fast/slow)	5.5 km/h (2.8 mph)/ 3.4 km/h (2.1 mph)
Gradeability	35 ° (tan θ = 0.70)

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

GENERAL / Specifications

WORKING RANGE

ZAXIS850-3, 850LC-3



M1J1-12-002

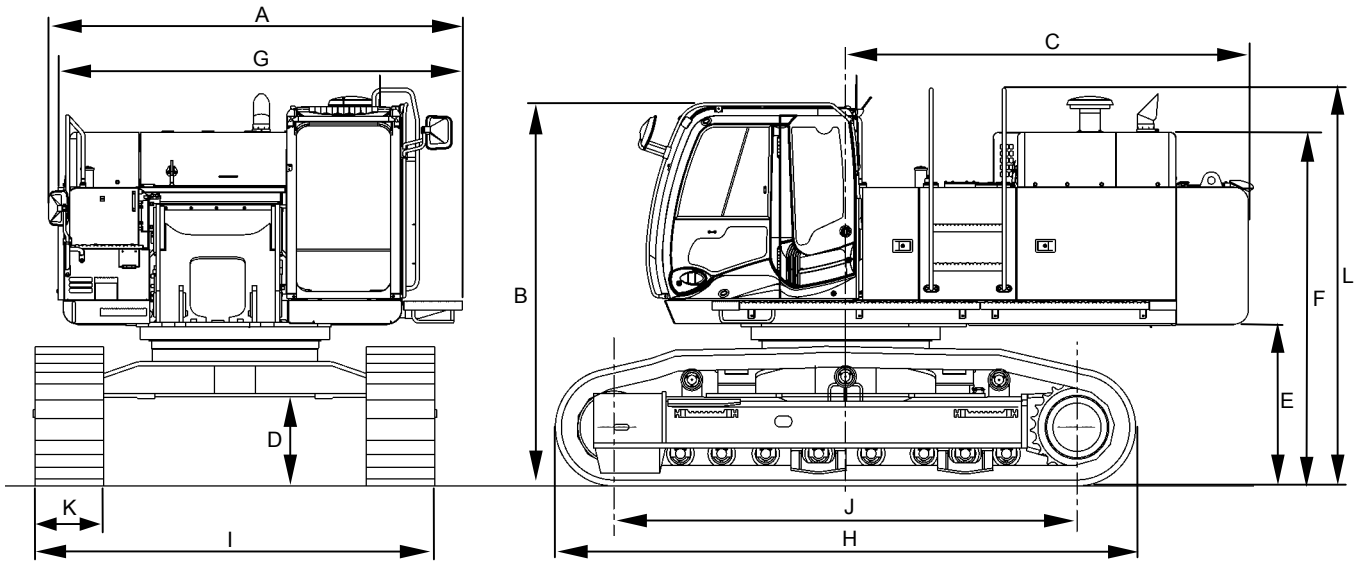
Category	8.4 m (27 ft 7 in) Boom		7.1 m (23 ft 4 in) BE Boom
	3.7 m (12 ft 2 in) Arm	4.4 m (14 ft 5 in) Arm	2.95 m (9 ft 8 in) BE Arm
A: Maximum Digging Reach mm (ft·in)	14100 (46'3")	14910 (48'11")	12340 (40'6")
B: Maximum Digging Depth mm (ft·in)	8870 (29'1")	9570 (31'5")	8870 (29'1")
C: Maximum Cutting Height mm (ft·in)	13030 (42'9")	13820 (45'4")	13030 (42'9")
D: Maximum Dumping Height mm (ft·in)	9080 (29'10")	9740 (31'12")	9080 (29'10")
E: Transport Height mm (ft·in)	*4570 (14'12")		
F: Overall Transport Length mm (ft·in)	*14770 (48'6")		
G: Minimum Swing Radius mm (ft·in)	5950 (19'6")	5950 (19'6")	5210 (17'1")

NOTE: "*" The dimensions include the height of the shoe lug.

GENERAL / Specifications

SPECIFICATION

ZAXIS870H-3, 870LCH-3



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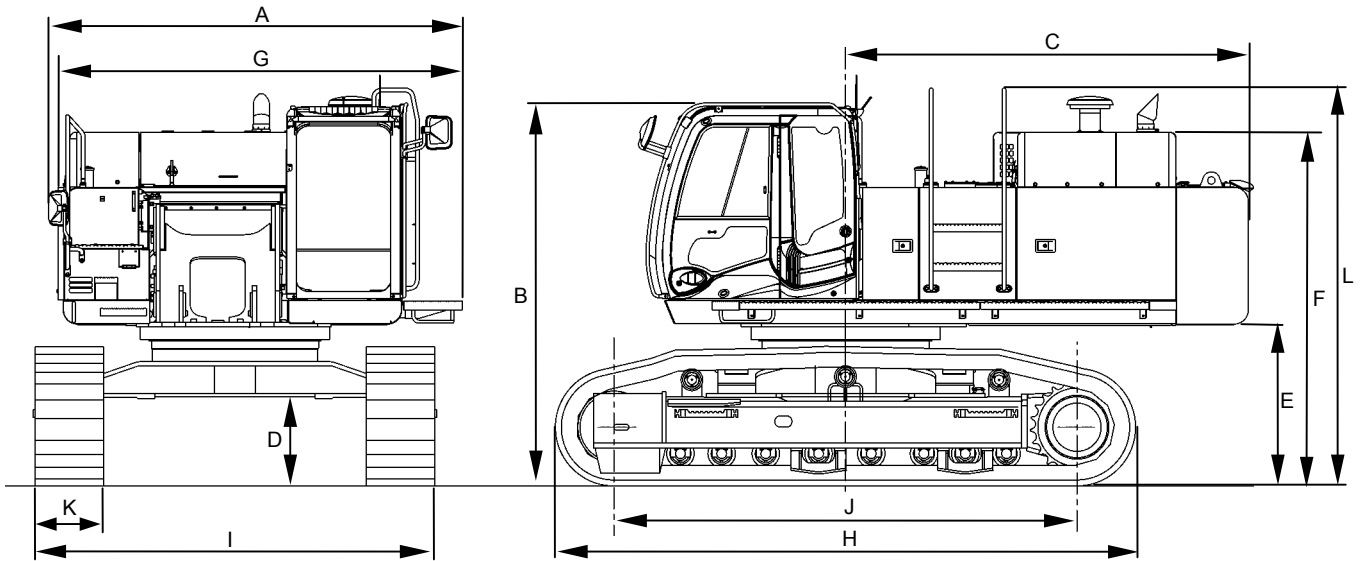
Model	ZX870H-3 Hydraulic Excavator
Type of Front-End Attachment	H Front (with 3.7 m (12 ft 2 in) Arm)
Bucket Capacity (Heaped)	PCSA 3.4 m ³ (4.4 yd ³) (CECE 3.0 m ³)
Operating Weight	82100 kg (181000 lb)
Basic Machine Weight	61600 kg (135800 lb)
Engine	ISUZU AH-6WG1XYSA-3 397 kW/1800 min ⁻¹ (540 PS/1800 rpm)
A: Overall Width (Excluding Rear View Mirrors)	4430 mm (14 ft 6 in)
B: Cab Height	3780 mm (12 ft 5 in)
C: Rear End Swing Radius	4600 mm (15 ft 1 in)
D: Minimum Ground Clearance	*890 mm (2 ft 11 in)
E: Counterweight Clearance	*1680 mm (5 ft 6 in)
F: Engine Cover Height	3550 mm (11 ft 8 in)
G: Overall Width of Upperstructure	4120 mm (13 ft 6 in)
H: Undercarriage Length	5840 mm (19 ft 2 in)
I: Undercarriage Width	4100 mm (13 ft 5 in)/ 3480 mm (11 ft 5 in)
J: Sprocket Center to Idler Center	4590 mm (15 ft 1 in)
K: Track Shoe Width	650 mm (2 ft 2 in) (Grouser shoe)
L: Overall Height	4200 mm (13 ft 10 in)
Ground Pressure	131 kPa (1.33 kgf/cm ² , 19.0 psi)
Swing Speed	9 min ⁻¹ (rpm)
Travel Speed (fast/slow)	5.5 km/h (2.8 mph)/ 3.4 km/h (2.1 mph)
Gradeability	35 ° (tan θ = 0.70)

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

GENERAL / Specifications

SPECIFICATION

ZAXIS870H-3, 870LCH-3



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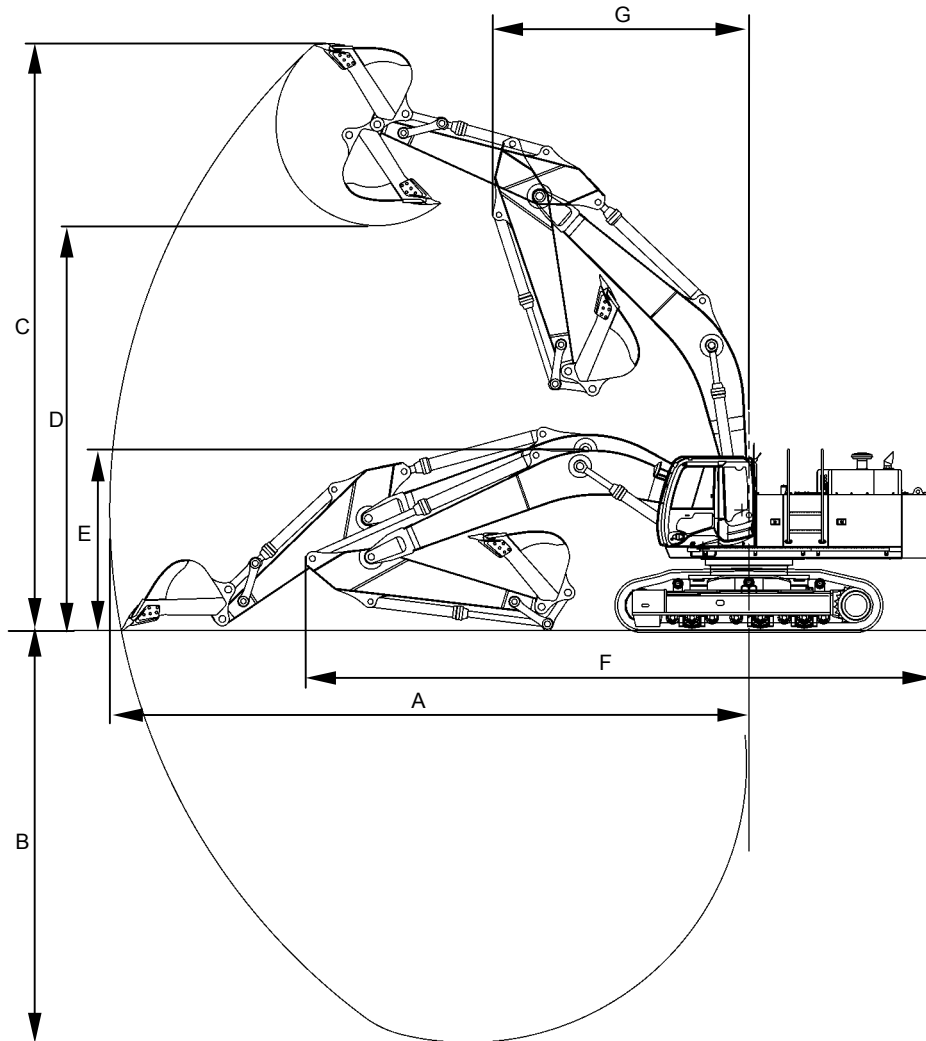
Model	ZX870LCH-3 Hydraulic Excavator
Type of Front-End Attachment	H Front (with 3.7 m (12 ft 2 in) Arm)
Bucket Capacity (Heaped)	PCSA 3.5 m ³ (4.6 yd ³) (CECE 3.1 m ³)
Operating Weight	84000 kg (185200 lb)
Basic Machine Weight	63500 kg (140000 lb)
Engine	ISUZU AH-6WG1XYSA-3 397 kW/1800 min ⁻¹ (540 PS/1800 rpm)
A: Overall Width (Excluding Rear View Mirrors)	4430 mm (14 ft 6 in)
B: Cab Height	3780 mm (12 ft 5 in)
C: Rear End Swing Radius	4600 mm (15 ft 1 in)
D: Minimum Ground Clearance	*890 mm (2 ft 11 in)
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F: Engine Cover Height	3550 mm (11 ft 8 in)
G: Overall Width of Upperstructure	4120 mm (13 ft 6 in)
H: Undercarriage Length	6360 mm (20 ft 10 in)
I: Undercarriage Width	4100 mm (13 ft 5 in)/ 3480 mm (11 ft 5 in)
J: Sprocket Center to Idler Center	5110 mm (16 ft 9 in)
K: Track Shoe Width	650 mm (2 ft 2 in) (Grouser shoe)
L: Overall Height	4200 mm (13 ft 10 in)
Ground Pressure	121 kPa (1.23 kgf/cm ² , 17.6 psi)
Swing Speed	9 min ⁻¹ (rpm)
Travel Speed (fast/slow)	4.9 km/h (3.1 mph)/ 3.4 km/h (2.1 mph)
Gradeability	35 ° (tan θ = 0.70)

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

GENERAL / Specifications

WORKING RANGE

ZAXIS870H-3, 870LCH-3



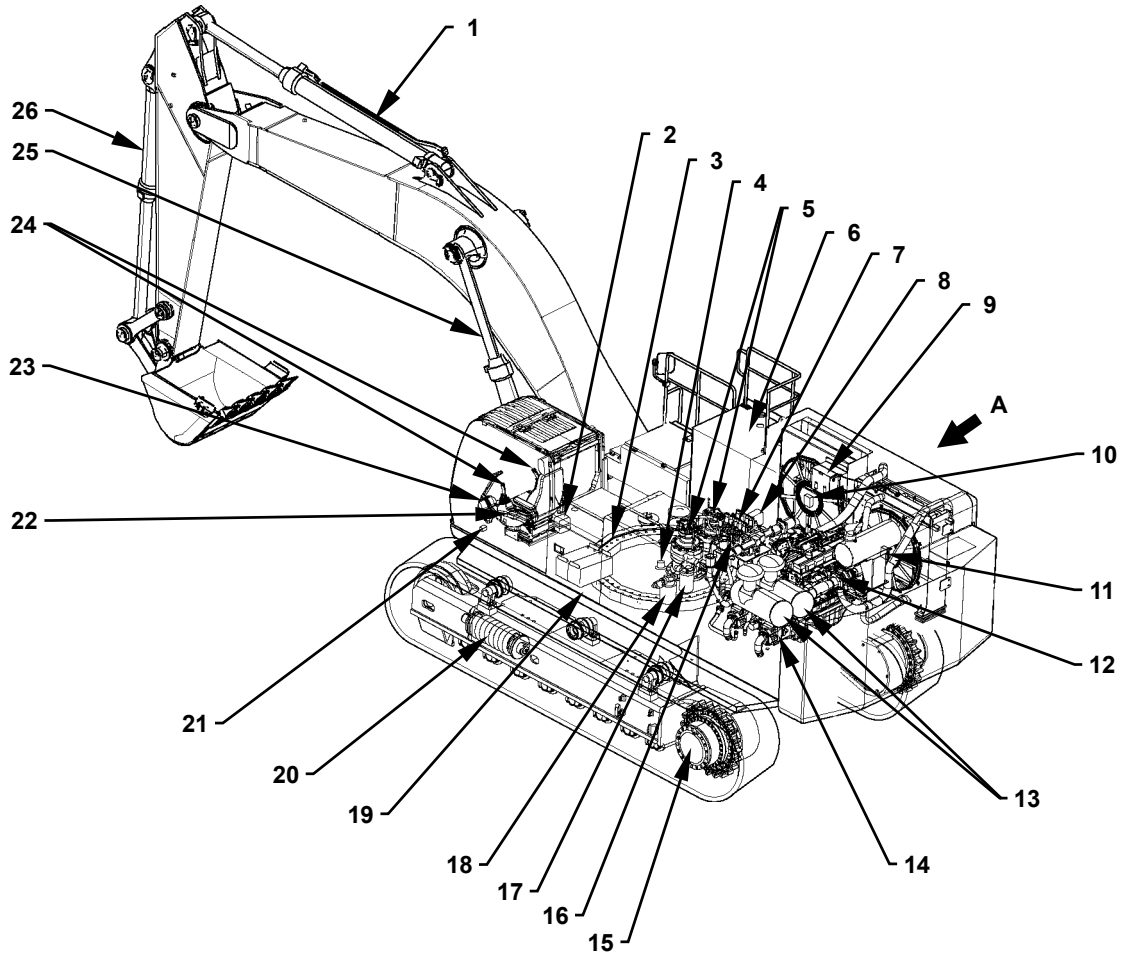
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Category	8.4 m (27 ft 7 in) H Boom		7.1 m (23 ft 4 in) BE Boom	
	3.7 m (12 ft 2 in) H Arm	2.95 m (9 ft 8 in) BE Arm	3.7 m (12 ft 2 in) H Arm	
A: Maximum Digging Reach mm (ft-in)	14100 (46'3")	12340 (40'6")	12820 (42'1")	
B: Maximum Digging Depth mm (ft-in)	8870 (29'1")	8870 (29'1")	7820 (25'8")	
C: Maximum Cutting Height mm (ft-in)	13030 (42'9")	13030 (42'9")	12130 (39'10")	
D: Maximum Dumping Height mm (ft-in)	9080 (29'10")	9080 (29'10")	8180 (26'10")	
E: Transport Height mm (ft-in)	*4570 (14'12")			
F: Overall Transport Length mm (ft-in)	*14770 (48'6")			
G: Minimum Swing Radius mm (ft-in)	5950 (19'6")	5210 (17'1")	5090 (16'8")	

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

GENERAL / Component Layout

MAIN COMPONENTS

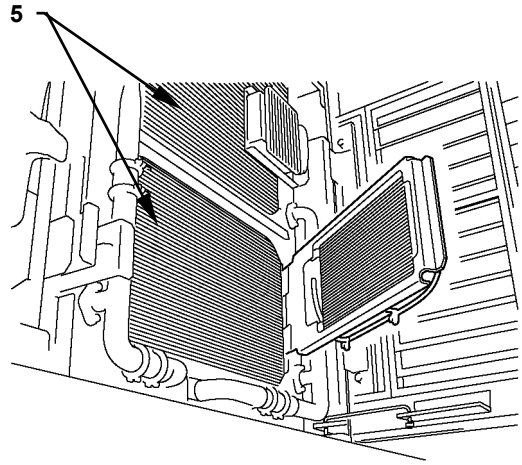
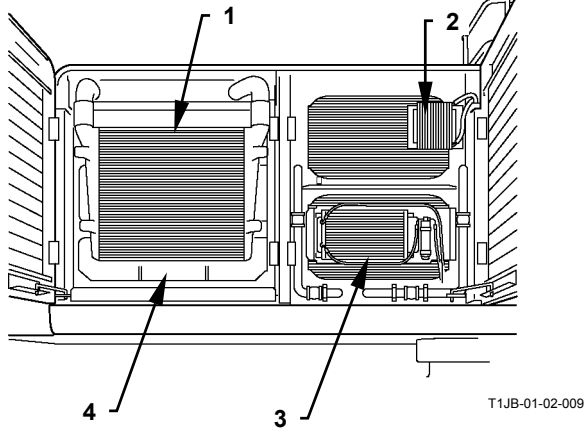


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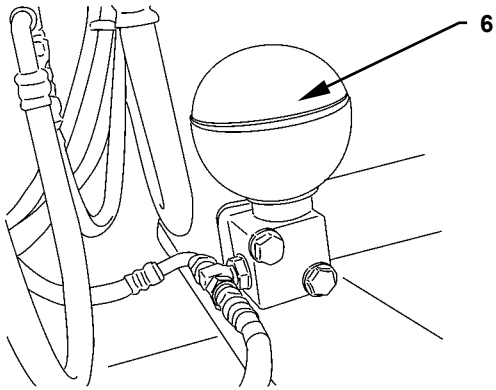
- | | | | |
|-------------------|-----------------------------|--|---|
| 1 - Arm Cylinder | 8 - Signal Control Valve | 15 - Travel Device | 21 - Pilot Shut-Off Solenoid Valve |
| 2 - Washer Tank | 9 - Reserve Tank | 16 - Solenoid Valve Unit | 22 - Shockless Valve |
| 3 - Swing Bearing | 10 - Fan Motor (Oil Cooler) | 17 - Pilot Filter / Pilot Relief Valve | 23 - Travel Pilot Valve |
| 4 - Center Joint | 11 - Fan Motor (Radiator) | 18 - Drain Filter | 24 - Front Attachment / Swing Pilot Valve |
| 5 - Swing Device | 12 - Engine | 19 - Hydraulic Oil Tank | 25 - Boom Cylinder |
| 6 - Fuel Tank | 13 - Air Cleaner | 20 - Track Adjuster | 26 - Bucket Cylinder |
| 7 - Control Valve | 14 - Pump Device | | |

GENERAL / Component Layout

View A (Around Radiator)



Control Valve Lower



1 - Inter Cooler
2 - Fuel Cooler

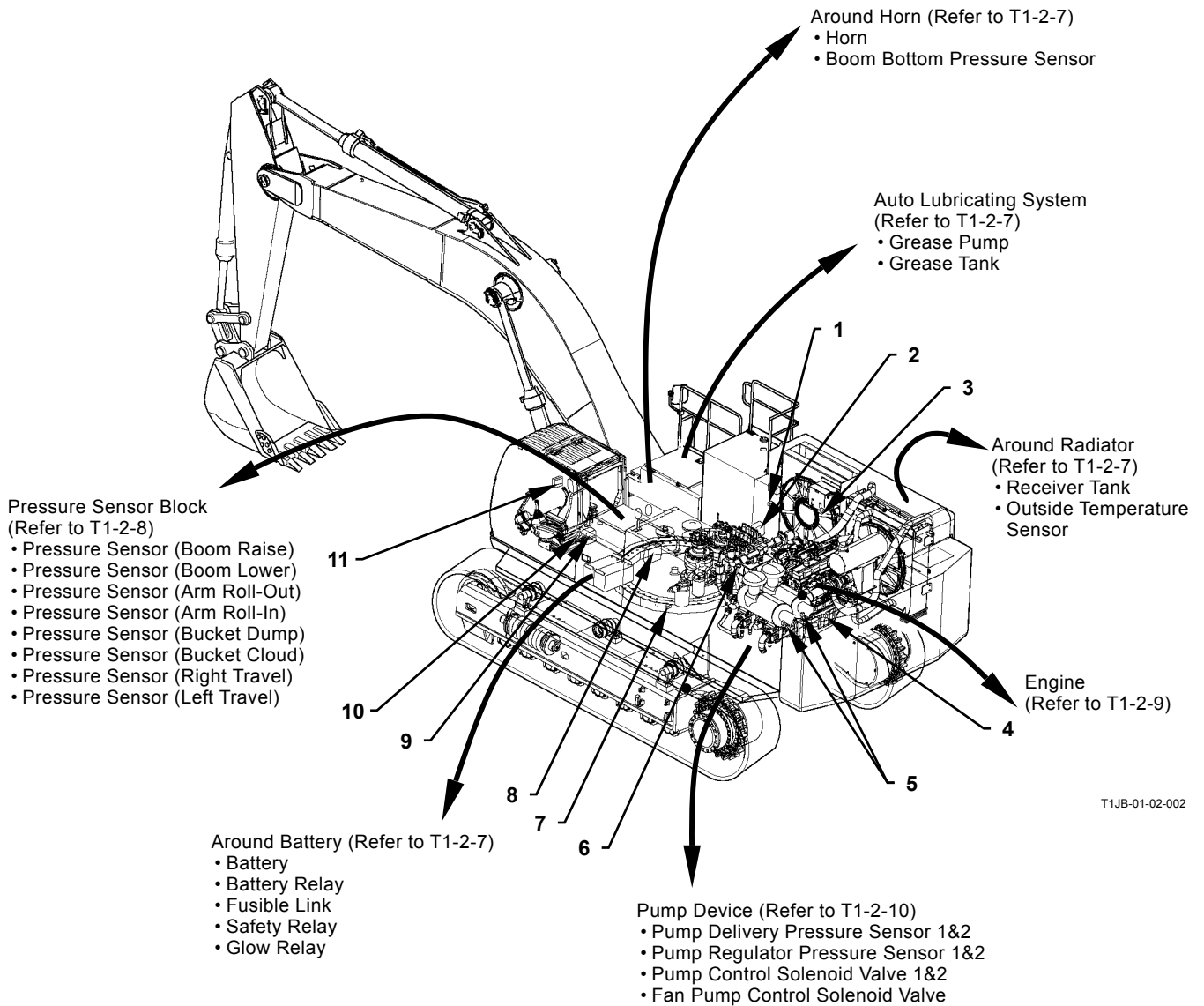
3 - Air Conditioner Condenser
4 - Radiator

5 - Oil Cooler

6 - Accumulator

GENERAL / Component Layout

ELECTRICAL SYSTEM (OVERVIEW)

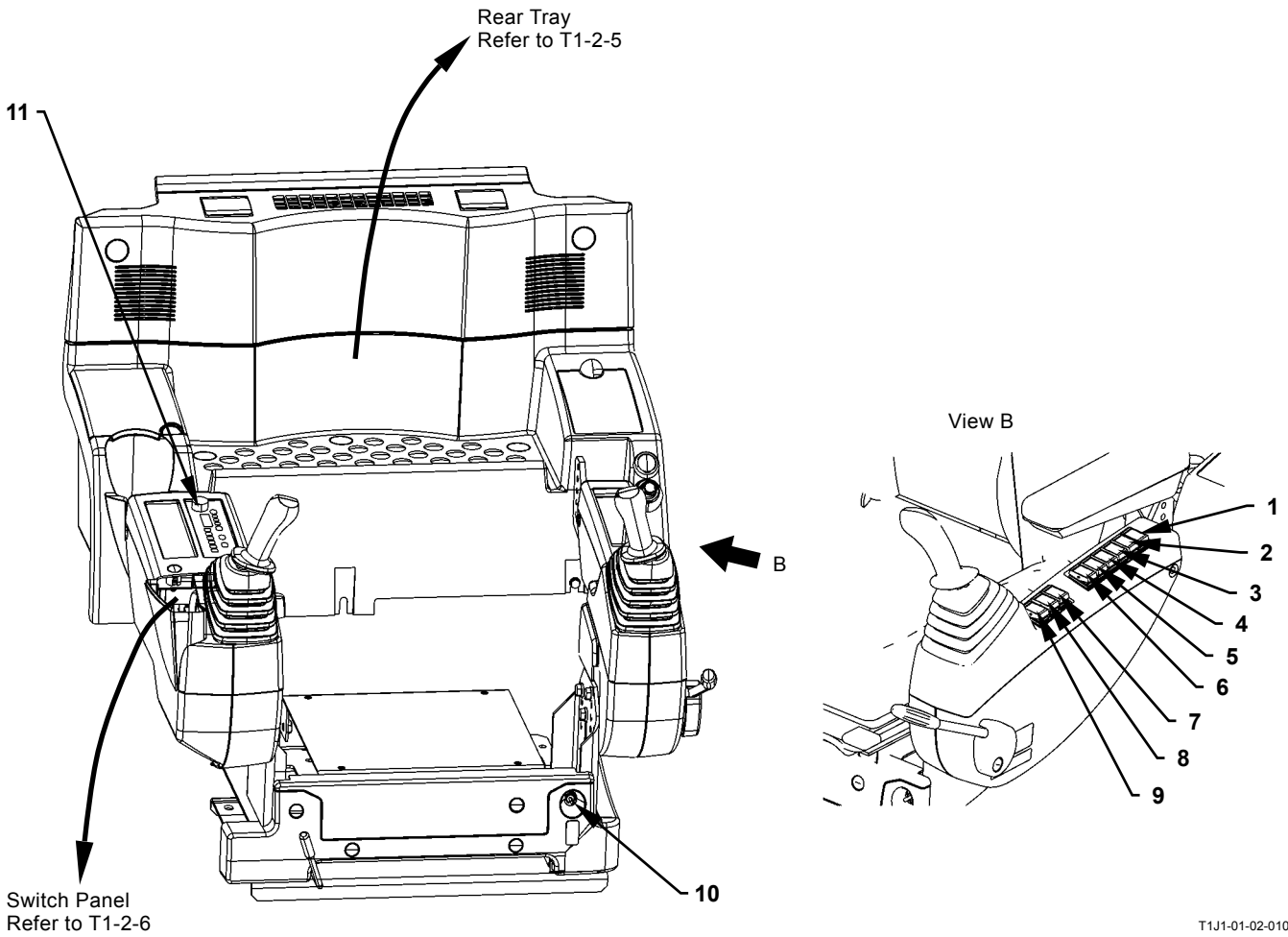


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- | | | | |
|---|---|--------------------------------------|---------------------------------|
| 1 - Fuel Level Switch | 4 - Intake Air Temperature Sensor | 7 - Hydraulic Oil Temperature Sensor | 10 - Atmosphere Pressure Sensor |
| 2 - Pressure Sensor (Swing) (Refer to T1-2-8) | 5 - Air Cleaner Restriction Switch | 8 - ECM (Engine Controller) | 11 - Monitor Unit |
| 3 - Coolant Level Switch | 6 - Solenoid Valve Unit (Refer to T1-2-8) | 9 - Washer Motor | |

GENERAL / Component Layout

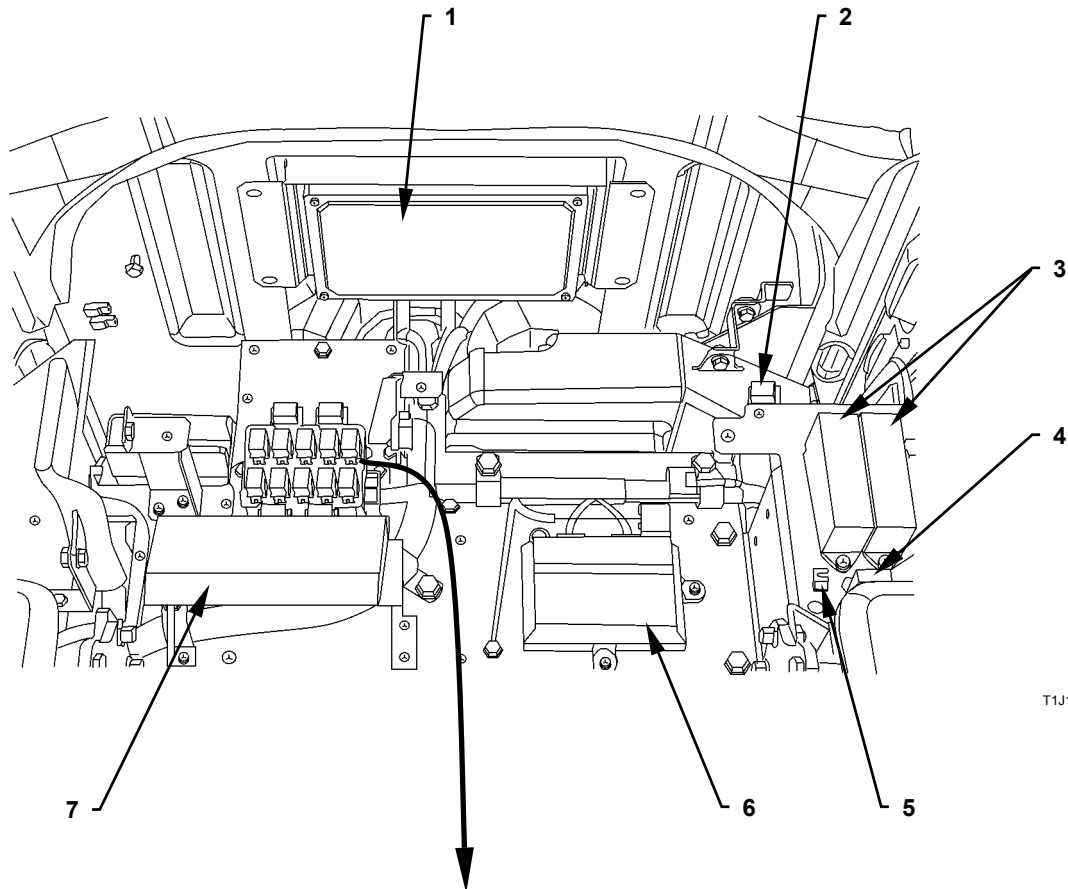
ELECTRICAL SYSTEM (In Cab)



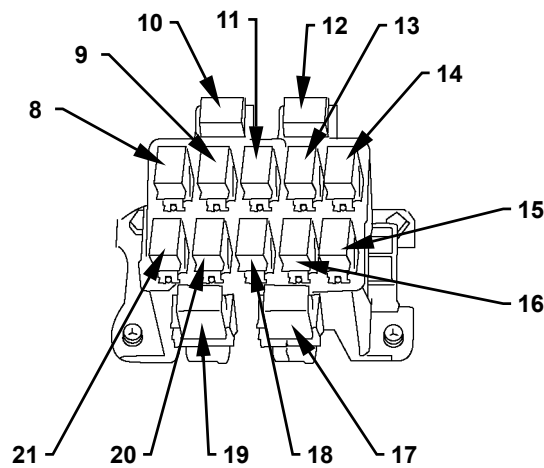
- | | | | |
|---|-------------------------------|---|-------------------------|
| 1 - Fan Rotative Direction Select Switch (Optional) | 4 - Auto Lubrication Switch | 7 - Overload Alarm Switch (Optional) | 10 - Engine Stop Switch |
| 2 - Beacon Light Switch (Optional) | 5 - Level Check Switch | 8 - Seat Heater Switch (Optional) | 11 - Radio |
| 3 - Reverse Work Light Switch (Optional) | 6 - Boom Mode Selector Switch | 9 - Travel Alarm Cancellation Switch (Optional) | |

GENERAL / Component Layout

ELECTRICAL SYSTEM (Rear Tray)



T1J1-01-02-003

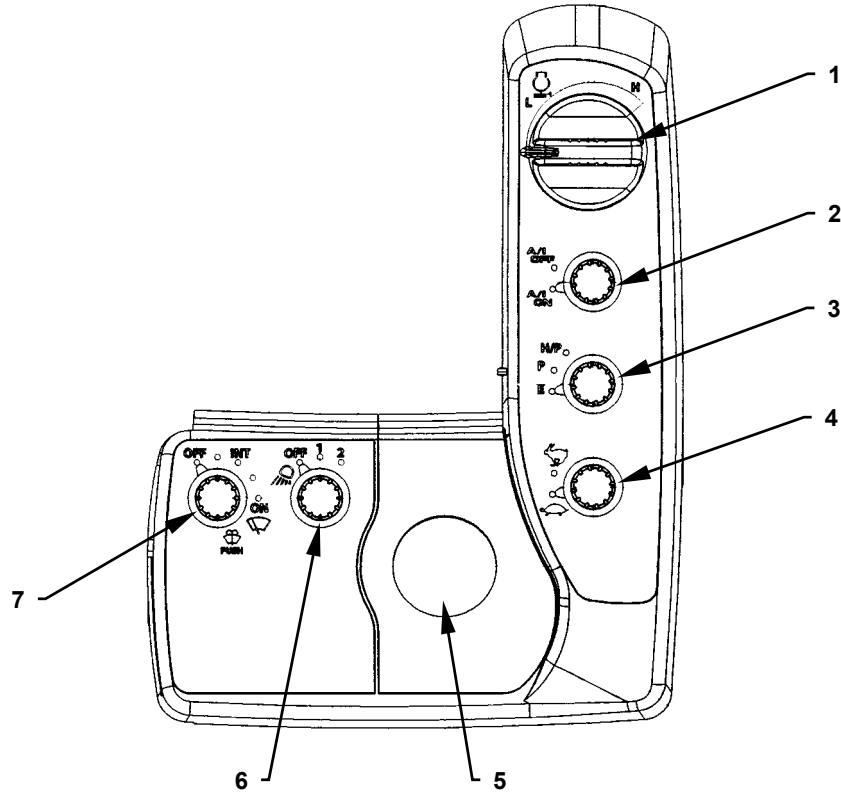


T1V1-01-02-009

- | | | | |
|---|---|--|-------------------------------------|
| 1 - MC(Main Controller) | 7 - Satellite Communication Terminal (Optional) | 12 - Auto Lubrication Relay (R11) (Optional) | 17 - Light Relay 3 (R13) (Optional) |
| 2 - Overload Alarm Relay (Optional) | 8 - Security Relay (R5) | 13 - Lock Relay (R2) | 18 - Light Relay 2 (R8) |
| 3 - Fuse Box | 9 - Starter Cut Relay (R4) | 14 - Load Dump Relay (R1) | 19 - ECM Main Relay (R14) |
| 4 - Dr. ZX Connector (Cum Download Connector) | 10 - Hour Meter Relay (R12) (Optional) | 15 - Wiper Relay (R6) | 20 - Washer Relay (R9) |
| 5 - Pump Study Switch | 11 - Security Horn Relay (R3) | 16 - Light Relay 1 (R7) | 21 - Horn Relay (R10) |
| 6 - ICF (Information Controller) | | | |

GENERAL / Component Layout

ELECTRICAL SYSTEM (Switch Panel)



T1V1-04-02-001

1 - Engine Control Dial
2 - Auto-Idle Switch

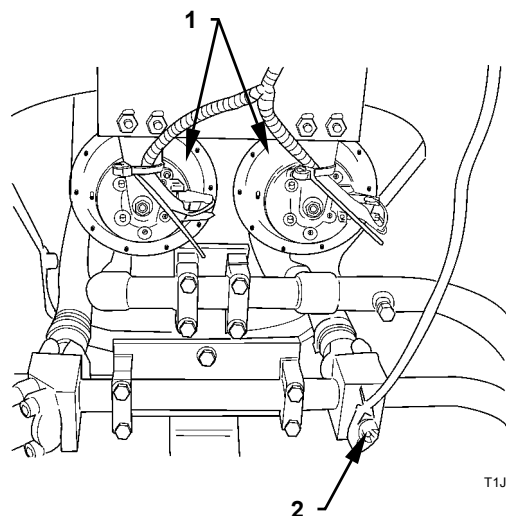
3 - Power Mode Switch
4 - Travel Mode Switch

5 - Key Switch
6 - Work Light Switch

7 - Wiper/Washer Switch

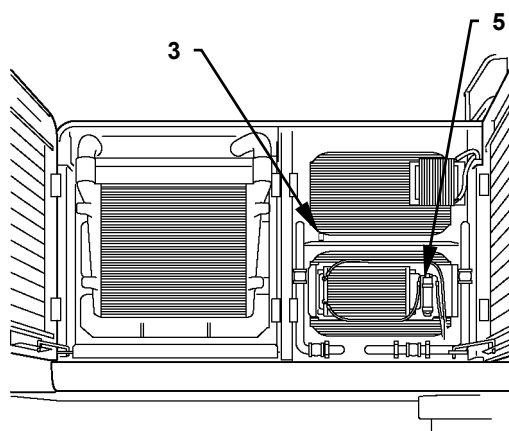
GENERAL / Component Layout

Around Horn



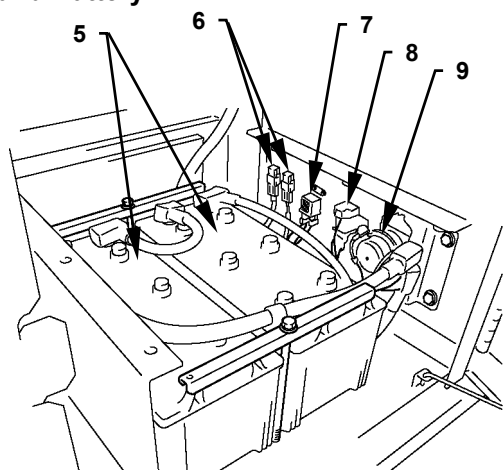
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Around Radiator



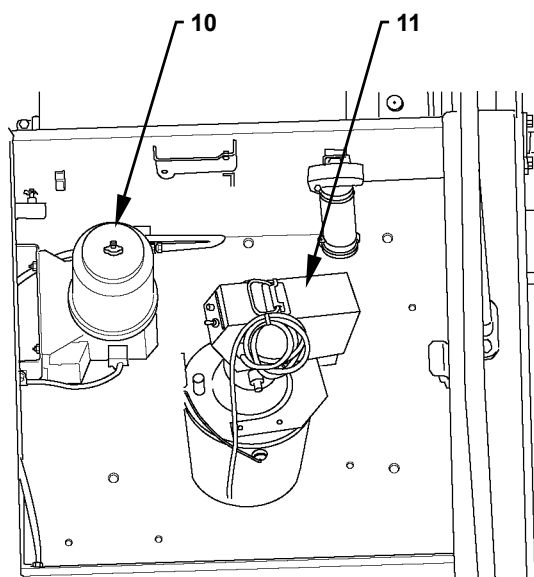
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Around Battery



M1JB-07-012

Auto Lubricating System



T1JB-01-02-011

- 1 - Horn
- 2 - Boom Bottom Pressure Sensor
- 3 - Outside Temperature Sensor

- 4 - Receiver Tank
- 5 - Battery
- 6 - Fusible Link

- 7 - Glow Relay
- 8 - Safety Relay
- 9 - Battery Relay

- 10 - Grease Pump (Optional)
- 11 - Grease Gun Pump (Optional)