Hitachi Zx160lc 180lc 180lcn 3 Hydraulic Excavator Operational Principle
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PART NO. TO1T1-E-00

HITACHI

Technical Manual
Operational Principle

ZAXIS
160LC-3
180LC-3
180LCN-3
Hydraulic Excavator

Service Manual consists of the following separate Part No;

Technical Manual (Operational Principle)	: Vol. No.TO1T1-E
Technical Manual (Troubleshooting)	: Vol. No.TT1T1-E
Workshop Manual	: Vol. No.W1T1-E
Engine Manual	: Vol. No.KM-4JJ1-E

Hitachi Construction Machinery Co., Ltd.
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ZAXIS160LC-3 • 180LC-3 • 180LCN-3 HYDRAULIC EXCAVATOR TECHNICAL MANUAL OPERATIONAL PRINCIPLE

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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

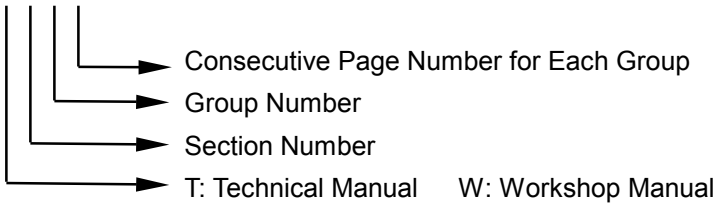
MANUAL COMPOSITION

- 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:

  Example : T 1-3-5



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				

SECTION AND GROUP CONTENTS

TECHNICAL MANUAL

(Operational Principle)

SECTION 1 GENERAL

SECTION 2 SYSTEM

SECTION 3 COMPONENT OPERATION

TECHNICAL MANUAL (Troubleshooting)

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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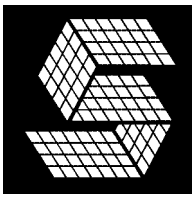
WORKSHOP MANUAL

SECTION 1
GENERAL



—CONTENTS—

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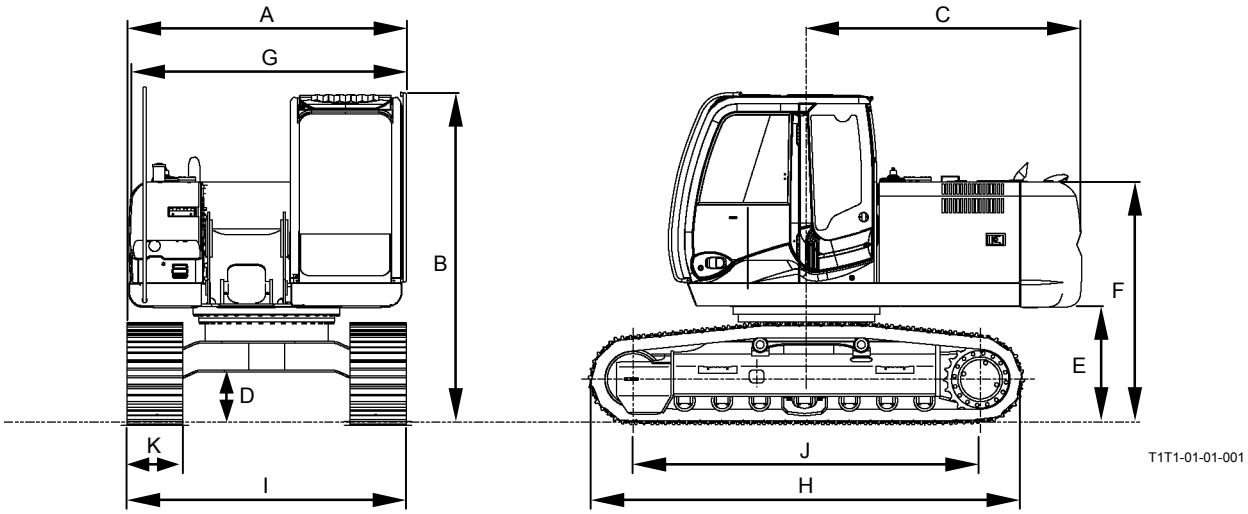
SPECIFICATIONS

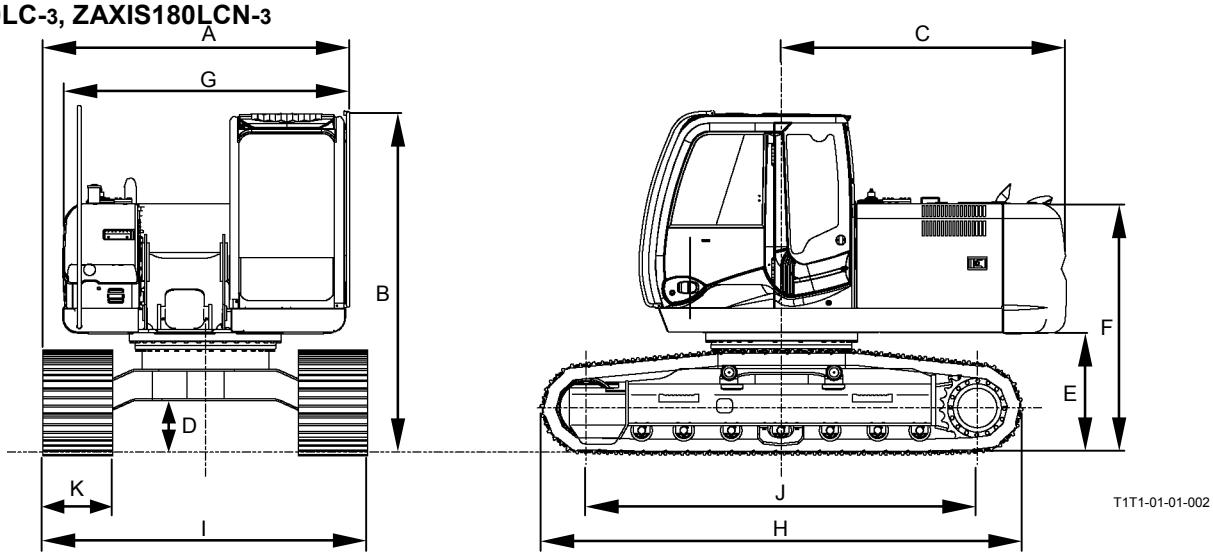
ZAXIS160LC-3



Model	ZAXIS160LC-3
Type of Front-End Attachment	2.58 m (8 ft 6 in) Arm
Bucket Capacity (Heaped)	PCSA 0.6 m^3 (0.76 yd^3), CECE 0.55 m^3
Operating Weight	16500 kg (36380 lb)
Basic Machine Weight	13000 kg (28660 lb)
Engine	Isuzu AH-4JJ1XYSA-01 90.2 kW/2200 min^{-1} (123 PS/2200 rpm) (HP Mode)
A: Overall Width (Excluding back mirrors)	2500 mm (8 ft 2 in)
B: Cab Height	2950 mm (9 ft 8 in)
C: Rear End Swing Radius	2490 mm (8 ft 2 in)
D: Minimum Ground Clearance	* 470 mm (19 in)
E: Counterweight Clearance	* 1030 mm (3 ft 5 in)
F: Engine Cover Height	* 2140 mm (8 ft 0 in)
G: Overall Width of Upperstructure	2480 mm (8 ft 2 in)
H: Undercarriage Length	3920 mm (12 ft 10 in)
I: Undercarriage Width	2490 mm (8 ft 2 in)
J: Sprocket Center to Idler Center	3100 mm (10 ft 2 in)
K: Track Shoe Width	500 mm (20 in) (Grouser shoe)
Ground Pressure	48 kPa (0.49 kgf/cm^2, 7.0 psi)
Swing Speed	13.3 min^{-1} (rpm)
Travel Speed (fast/slow)	5.3/3.4 km/h (3.4/2.1 mph)
Gradeability	35° ($\tan\theta = 0.70$)

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

ZAXIS180LC-3, ZAXIS180LCN-3

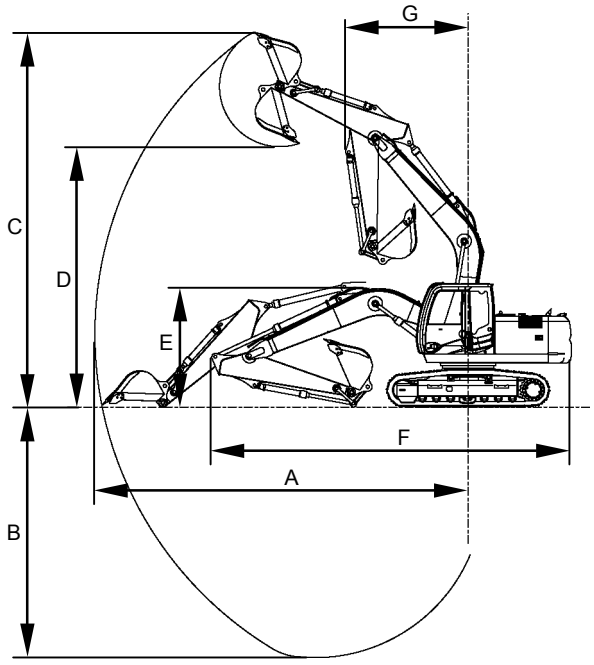


Model	ZAXIS180LC-3	ZAXIS180LCN-3
Type of Front-End Attachment	2.71 m (8 ft 11 in) Arm	
Bucket Capacity (Heaped)	PCSA 0.7 m^3 (0.92 yd^3), CECE 0.6 m^3	
Operating Weight	18300 kg (40340 lb)	18000 kg (39680 lb)
Basic Machine Weight	14400 kg (31750 lb)	14100 kg (31090 lb)
Engine	Isuzu AH-4JJ1XYSA-01 90.2 kW/2200 min^{-1} (123 PS/2200 rpm)	
A: Overall Width (Excluding back mirrors)	2800 mm (9 ft 2 in)	2500 mm (8 ft 3 in)
B: Cab Height	2950 mm (9 ft 8 in)	
C: Rear End Swing Radius	2490 mm (9 ft 8 in)	
D: Minimum Ground Clearance	* 450 mm (18 in)	
E: Counterweight Clearance	* 1030 mm (3 ft 5 in)	
F: Engine Cover Height	* 2140 mm (7 ft 0 in)	
G: Overall Width of Upperstructure	2480 mm (8 ft 2 in)	
H: Undercarriage Length	4170 mm (13 ft 8 in)	
I: Undercarriage Width	2800 mm (9 ft 2 in)	2490 mm (8 ft 2 in)
J: Sprocket Center to Idler Center	3370 mm (11 ft 1 in)	
K: Track Shoe Width	600 mm (24 in) (Grouser shoe)	500 mm (20 in)
Ground Pressure	41 kPa (0.42 kgf/cm^2, 5.9 psi)	48 kPa (0.49 kgf/cm^2, 7.0 psi)
Swing Speed	14.1 min^{-1} (rpm)	
Travel Speed (fast/slow)	5.3/3.4 km/h (3.4/2.1 mph)	
Gradeability	35° ($\tan\theta = 0.70$)	

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

WORKING RANGES

ZAXIS160LC-3 (Machine with Mono Boom)

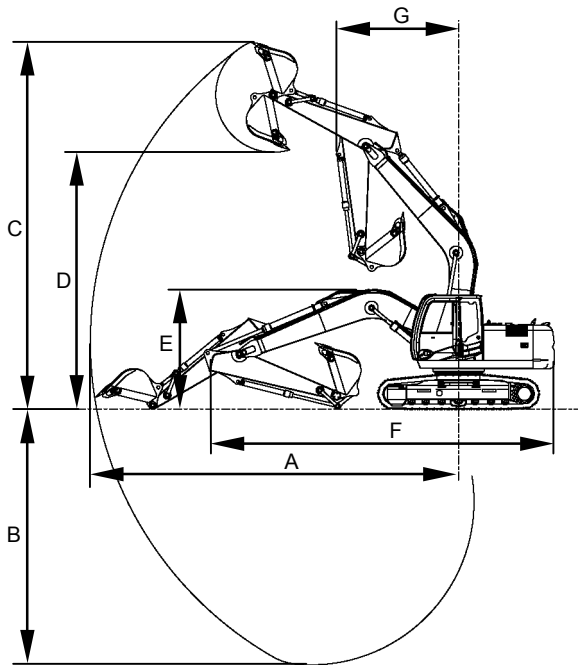


T1T1-01-01-003

Model	ZAXIS160LC-3					
Category / Item	2.22 m (7 ft 4 in) Arm		2.58 m (8 ft 6 in) Arm		3.08 m (10 ft 2 in) Arm	
	mm	ft·in	mm	ft·in	mm	ft·in
A: Maximum Digging Reach	8520	27’12”	8870	29’2”	9330	30’8”
B: Maximum Digging Depth	5620	18’6”	5980	19’8”	6490	21’4”
C: Maximum Cutting Height	8620	28’4”	8890	29’2”	9130	29’12”
D: Maximum Dumping Height	5940	19’’6”	6170	20’3”	6400	20’12”
E: Transport Height	3190	10’6”	3010	9’5”	3110	10’3”
F: Overall Transport Length	8650	28’5”	8550	28’1”	8580	28’2”
G: Minimum Swing Radius	3290	10’10”	2910	9’7”	2920	9’7”

NOTE: The dimensions do not include height of the shoe lug (except Item E).

ZAXIS180LC-3, ZAXIS180LCN-3 (Machine with Mono Boom)

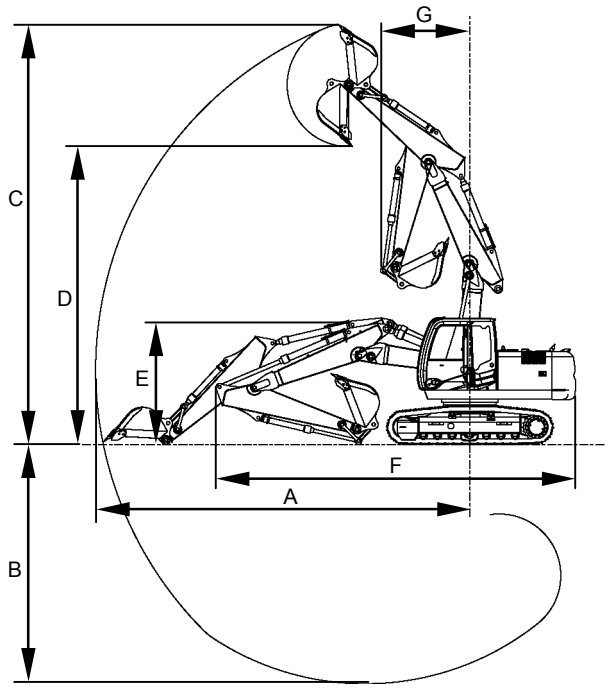


T1T1-01-01-004

Model	ZAXIS180LC-3, ZAXIS180LCN-3					
Category / Item	2.26 m (7 ft 5 in) Arm		2.71 m (8 ft 11 in) Arm		3.21 m (10 ft 7 in) Arm	
	mm	ft·in	mm	ft·in	mm	ft·in
A: Maximum Digging Reach	9070	29’10”	9430	30’12”	9940	32’8”
B: Maximum Digging Depth	6120	20’1”	6570	21’7”	7070	23’3”
C: Maximum Cutting Height	9290	30’6”	9400	30’11”	10090	23’2”
D: Maximum Dumping Height	6450	21’2”	6570	21’7”	7210	23’8”
E: Transport Height	3100	10’2”	3080	10’2”	3390	11’2”
F: Overall Transport Length	9000	29’7”	8970	29’6”	8970	29’6”
G: Minimum Swing Radius	3140	10’4”	3130	10’4”	2880	9’6”

NOTE: The dimensions do not include height of the shoe lug (except Item E).

ZAXIS160LC-3 (Machine with 2-Piece Boom)

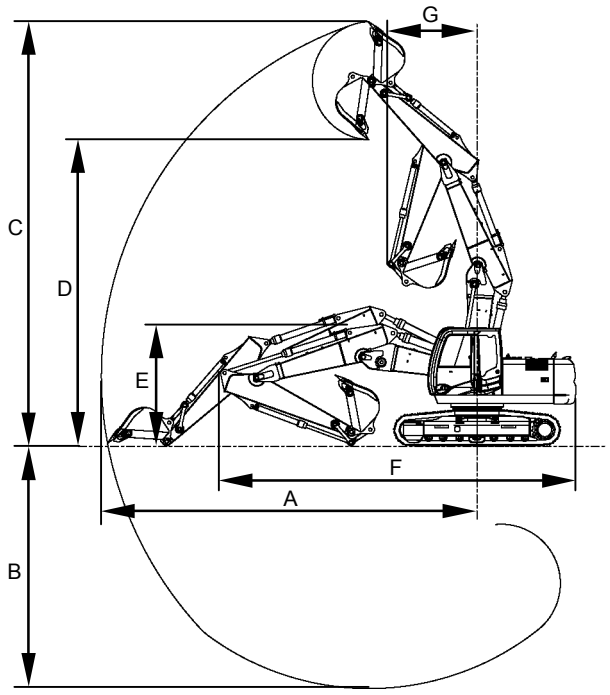


T1T1-01-01-005

Model	ZAXIS160LC-3					
Category	2.22 m (7 ft 4 in) Arm		2.58 m (8 ft 6 in) Arm		3.08 m (10 ft 2 in) Arm	
Item	mm	ft·in	mm	ft·in	mm	ft·in
A: Maximum Digging Reach	8330	27’4”	8690	28’7”	9150	30’1”
B: Maximum Digging Depth	5210	17’2”	5580	18’4”	6080	19’12”
C: Maximum Cutting Height	9420	30’11”	9740	31’12”	10090	33’2”
D: Maximum Dumping Height	6600	21’8”	6900	22’8”	7250	23’10”
E: Transport Height	3090	10’2”	3010	9’11”	3060	10’1”
F: Overall Transport Length	8450	27’9”	8350	27’5”	8370	27’6”
G: Minimum Swing Radius	2580	8’7”	2070	6’10”	2280	7’6”

NOTE: The dimensions do not include height of the shoe lug (except Item E).

ZAXIS180LC-3, ZAXIS180LCN-3 (Machine with 2-Piece Boom)

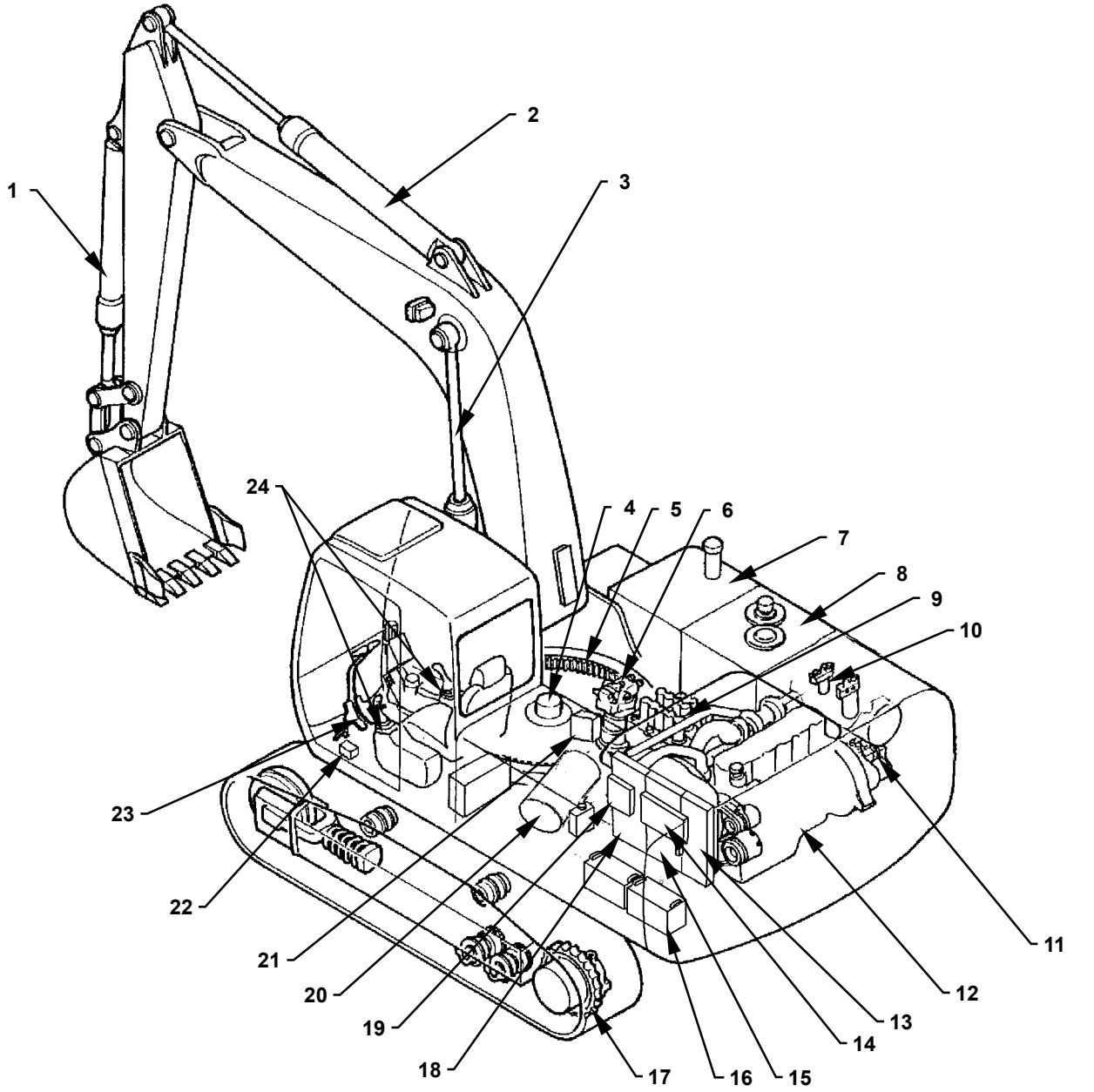


T1T1-01-01-006

Model	ZAXIS180LC-3, ZAXIS180LCN-3					
Category / Item	2.26 m (7 ft 5 in) Arm		2.71 m (8 ft 11 in) Arm		3.21 m (10 ft 7 in) Arm	
	mm	ft·in	mm	ft·in	mm	ft·in
A: Maximum Digging Reach	8980	29’6”	9350	30’9”	9860	32’5”
B: Maximum Digging Depth	5640	18’6”	6050	19’11”	6570	21’7”
C: Maximum Cutting Height	10260	33’8”	10530	34’7”	10990	36’1”
D: Maximum Dumping Height	7320	24’1”	7590	24’11”	8060	26’6”
E: Transport Height	3030	9’12”	3030	9’12”	3330	10’12”
F: Overall Transport Length	8850	29’1”	8840	29’0”	8780	28’10”
G: Minimum Swing Radius	2280	7’6”	2230	7’4”	2550	8’5”

NOTE: The dimensions do not include height of the shoe lug (except Item E).

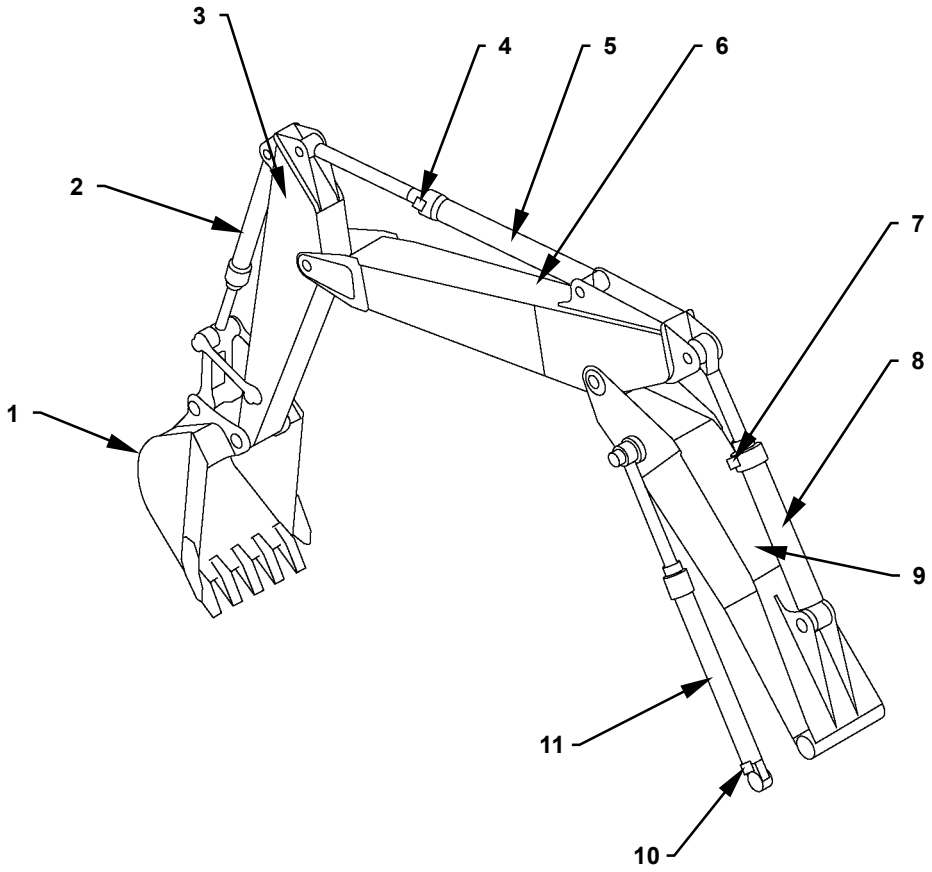
MAIN COMPONENTS



T1T1-01-02-010

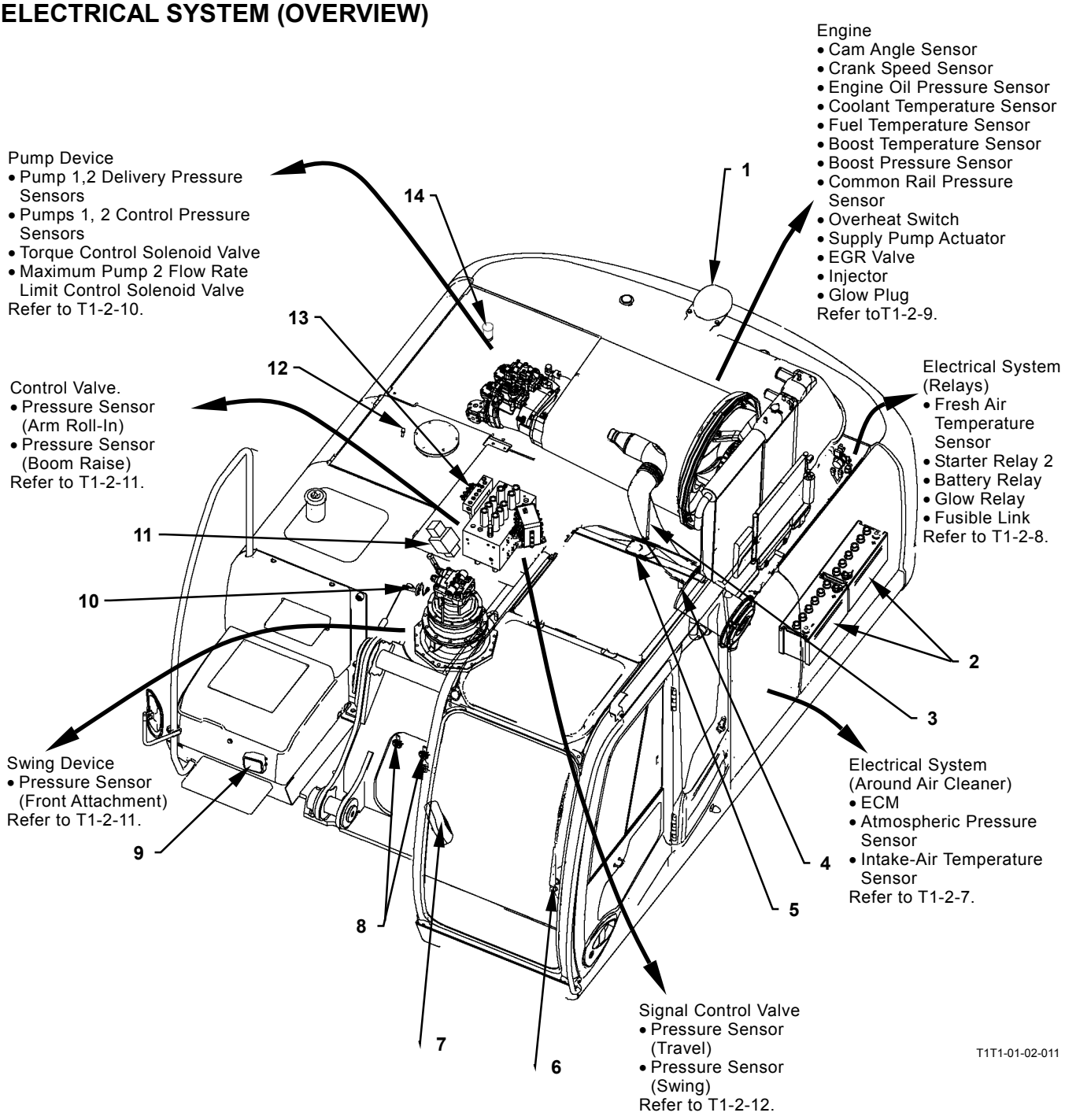
1 - Bucket Cylinder
2 - Arm Cylinder
3 - Boom Cylinder
4 - Center Joint
5 - Swing Bearing
6 - Swing Device
7 - Fuel Tank
8 - Hydraulic Oil Tank
9 - Control Valve
10 - Pilot Filter/ Pilot Relief Valve
11 - Pump Device
12 - Engine
13 - Intercooler
14 - Air Conditioner Condenser
15 - Radiator
16 - Battery
17 - Travel Device
18 - Oil Cooler
19 - Fuel Cooler
20 - Air Cleaner
21 - Signal Control Valve
22 - Pilot Shut-Off Solenoid Valve
23 - Travel Pilot Valve
24 - Front Attachment / Swing Pilot Valve

Front Attachment (2-Piece Boom)



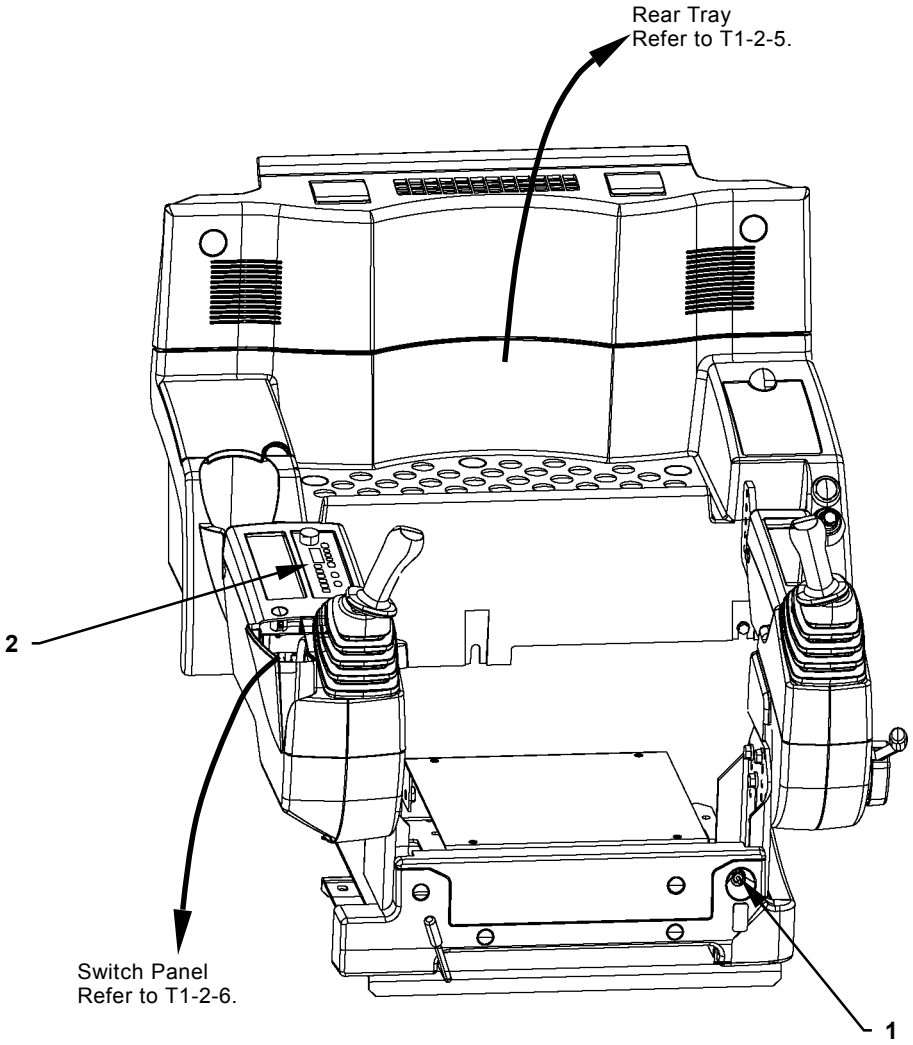
1 - Bucket
2 - Bucket Cylinder
3 - Arm
4 - Hose Rupture Valve (Arm Cylinder)
5 - Arm Cylinder
6 - Upper Boom
7 - Hose Rupture Valve (Positioning Cylinder)
8 - Positioning Cylinder
9 - Bottom Boom
10 - Hose Rupture Valve (Boom Cylinder)
11 - Boom Cylinder

ELECTRICAL SYSTEM (OVERVIEW)



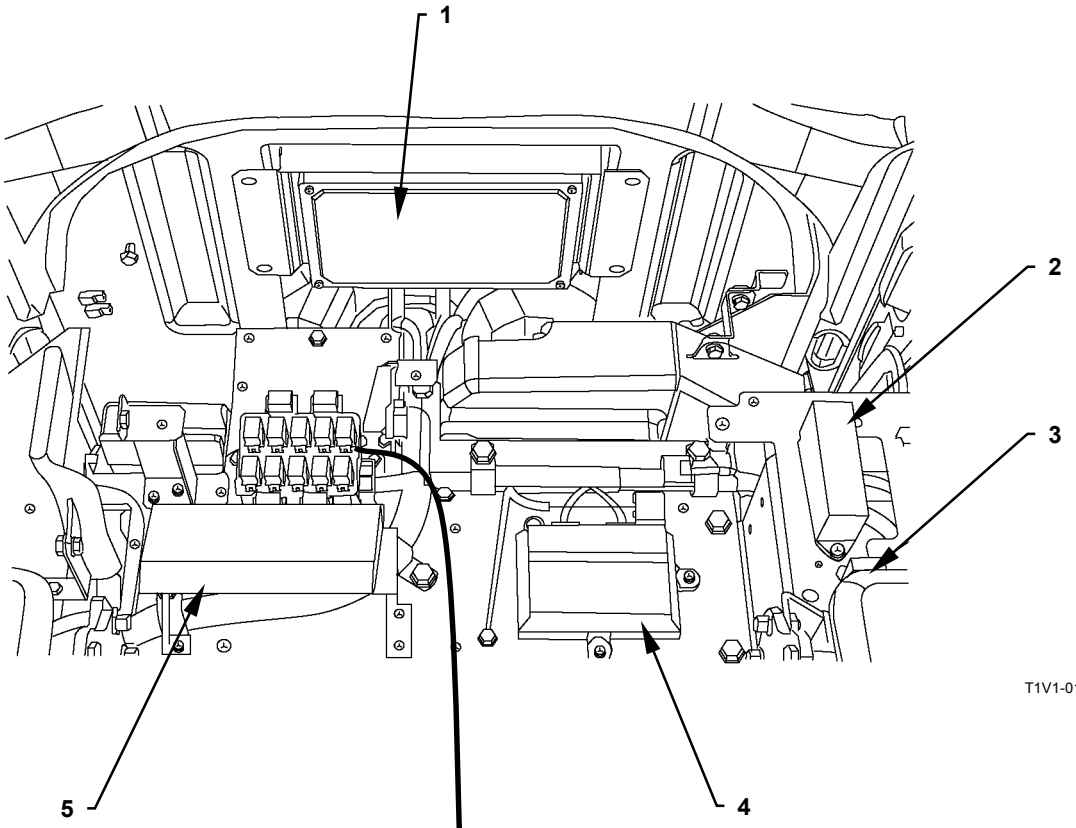
1 - Rear View Camera
2 - Battery
3 - Communication Aerial
4 - Air Filter Restriction Switch
5 - GPS (Global Positioning System) Aerial
6 - Wiper Motor
7 - Monitor Unit
8 - Horn
9 - Working Light
10 - Fuel Sensor
11 - Positioning Control Valve (2-Piece Boom Machine Only)
12 - Hydraulic Oil Temperature Sensor
13 - Solenoid Valve Unit
14 - Solenoid Pump

ELECTRICAL SYSTEM (IN CAB)



1 - Engine Stop Switch 2 - Radio

ELECTRICAL SYSTEM (REAR TRAY)



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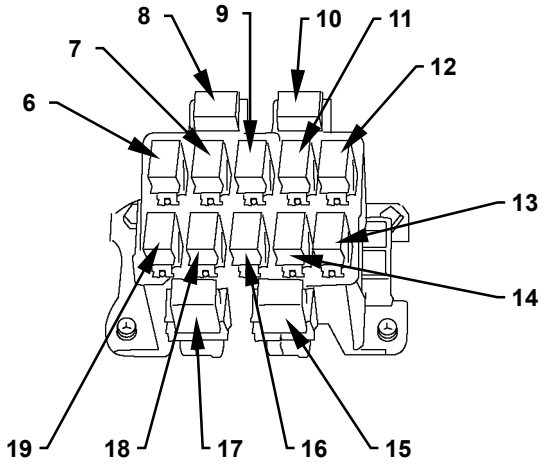

T1V1-01-02-009

1 - MC (Main Controller)
2 - Fuse Box
3 - Dr. ZX Connector (Download Connector Using Combinedly)
4 - ICF (Information Controller)
5 - Satellite Communication Terminal (Optional)
6 - Starter Relay 2 (R5)
7 - Starter Cut Relay (R4)
8 - OFF Relay (Air Conditioner) (R12)
9 - Security Horn Relay (R3)
10 - Air Conditioner Relay (R11)
11 - Pilot Shut-Off Relay (R12)
12 - Load Damp Relay (R1)
13 - Wiper Relay (R6)
14 - Light Relay 1 (R7)
15 - MAX HI Relay (Air Conditioner) (R13)
16 - Light Relay 2 (R8)
17 - ECM (Engine Control Module) Main Relay (R14)
18 - Washer Relay (R9)
19 - Horn Relay (R10)

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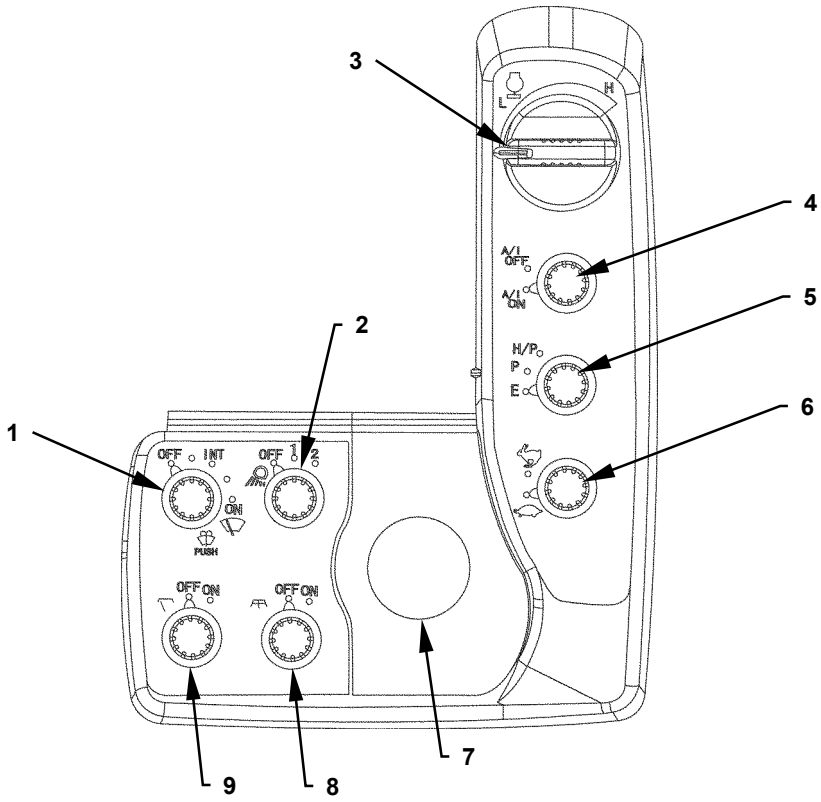
ELECTRICAL SYSTEM (SWITCH PANEL)



1 – Wiper / Washer Switch
2 – Working Light Switch
3 – Engine Control Dial
4 - Auto-Idle Switch
5 - Power Mode Switch
6 - Travel Mode Switch
7 - Key Switch
8 - Overhead Window Washer Switch (Optional)
9 - Overhead Window Wiper Switch (Optional)

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