PART NO. TODDF-EN-00

HITACHI

Reliable solutions

Technical Manual
Operational Principle

ZX
280-5G
280LC-5G
Hydraulic Excavator

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODDF-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDDF-EN
Workshop Manual	: Vol. No.WDDF-EN
Engine Manual	: Vol. No.EDCD-EN

ZX280-5G • 280LC-5G HYDRAULIC EXCAVATOR TECHNICAL MANUAL OPERATIONAL PRINCIPLE

TODDF-EN-00

Hitachi Construction Machinery Co., Ltd.

URL:http://www.hitachi-c-m.com

PRINTED IN JAPAN (K) 2011, 11

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
  - E-mail: dc@hitachi-kenki.com

Additional References

Please refer to the other materials (operator's manual, parts catalog, engine technical material and Hitachi training material etc.) in addition to this manual.

Manual Composition

This manual consists the Technical Manual, the Workshop Manual and the Engine Manual.

- Information included in the Technical Manual: Technical information needed for redelivery and delivery, operation and activation of all devices and systems, 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.
- Information included in the Engine Manual: Technical information needed for redelivery and delivery and maintenance and repair of the machine, operation and activation of all devices and systems, troubleshooting 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:

- Technical Manual: T 1-3-5

T	Technical Manual
1	Section Number
3	Group Number
5	Consecutive Page Number for Each Group

- Workshop Manual: W 1-3-2-5

W	Workshop Manual
1	Section Number
3	Group Number
2	Sub Group Number
5	Consecutive Page Number for Each Group

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 parentheses 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 purposes.

Quantity	To Convert From	Into	Multiply By
Length	mm	in	0.03937
	mm	ft	0.003281
Volume	L	US gal	0.2642
	L	US qt	1.057
	m^3	yd^3	1.308
Weight	kg	lb	2.205
Force	N	kgf	0.10197
	N	lbf	0.2248
Torque	N·m	kgf·m	0.10197
Pressure	MPa	kgf/cm^2	10.197
	MPa	psi	145.0
Power	kW	PS	1.360
	kW	HP	1.341
Temperature	°C	°F	°C×1.8+32
Velocity	km/h	mph	0.6214
	min^{-1}	rpm	1.0
Flow rate	L/min	US gpm	0.2642
	mL/rev	cc/rev	1.0

NOTE: The numerical value in this manual might be different from the above-mentioned table.

SYMBOL AND ABBREVIATION

Symbol / Abbreviation	Name	Explanation
TO	Technical manual (Operational principle)	Technical manual (Operational Principle).
TT	Technical manual (Troubleshooting)	Technical manual (Troubleshooting).
T/M	Technical manual	Technical manual.
W, W/M	Workshop manual	Workshop manual (Removal and Installation, Disassembly and Assembly).
MC	Main Controller	Main controller. MC controls the engine, pump, and valve according to the machine operating condition.
ECF	Engine Controller	Engine controller. ECF controls EC motor according to the machine operating condition.
GSM	Global System for Mobile communications controller	Communication controller. GSM is a type of wireless communication system, is used in more than on 100 countries around Europe and Asia, and becomes the factual global standards of the mobile telephone.
GPS	Global Positioning System	Global positioning system.
CAN	Controller Area Network	CAN communication. CAN is a serial communications protocol internationally-standardized by ISO (International Organization for Standardization).
A/C	Air Conditioner	Air conditioner.
OP, OPT	Option	Optional component.
MPDr.	Maintenance Pro Dr.	MPDr. is software that troubleshooting, monitoring, and adjustment.
A/I	Auto-Idle	Auto-idle.
WU	Warming-Up	Warming-up.
Li	Low (Slow) Idle	Slow idle engine speed.
ATT	Attachment	Attachment. Attachment is optional parts such as breaker, crusher, and pulverizer in this manual.
HI, Hi	High	Travel fast position.
LO, Lo	Low	Travel slow position.

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SECTION AND GROUP CONTENTS

TECHNICAL MANUAL

(Operational Principle)

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.

TODDF-EN-00(20161116)

SECTION 1

GENERAL

CONTENTS

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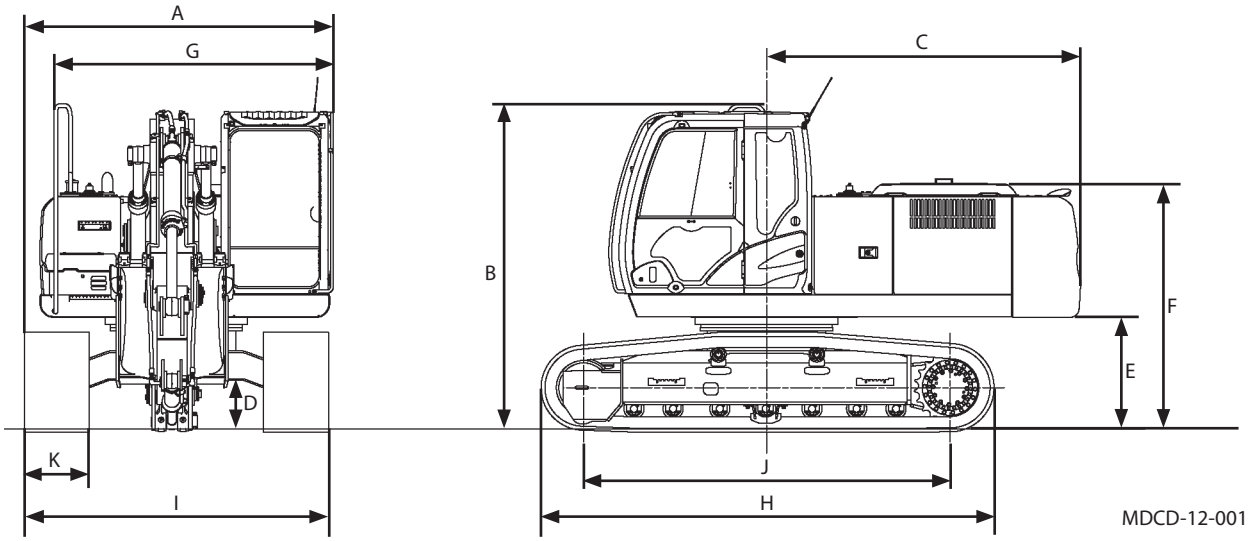
Specifications

ZX280-5G, 280LC-5G

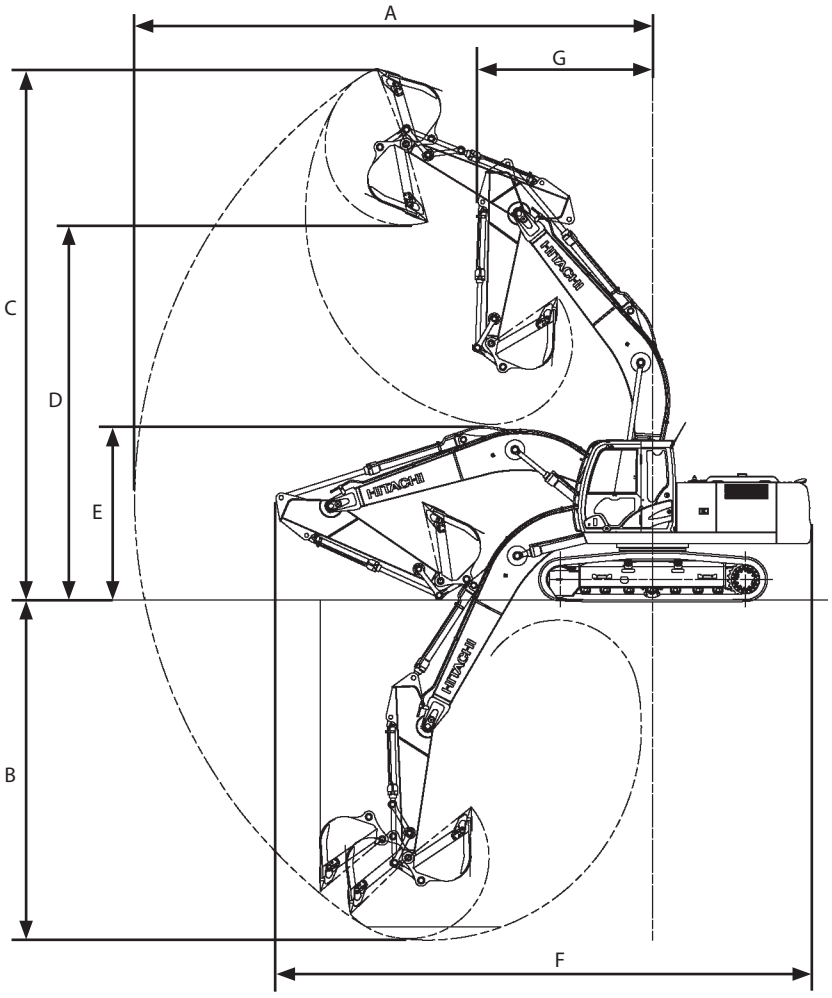


Model		ZX280-5G	ZX280LC-5G
Type of Front-End Attachment	-	3.11 m Arm	
Bucket Capacity (Heaped)	m^3	PCSA 1.1 m^3 (1.44 yd^3), CECE 1.0 m^3	
Operating Weight	kg	27400	28400
Base Machine Weight	kg	21300	22400
Engine	-	ISUZU CC-6BG1TRA-13 132 kW/2150 min^{-1} (180 PS/2150 rpm)	
A: Overall Width (Excluding back mirrors)	mm	3190	
B: Cab Height	mm	3110	
C: Rear End Swing Radius	mm	3140	
D: Minimum Ground Clearance	mm	*510	
E: Counterweight Clearance	mm	*1170	
F: Engine Cover Height	mm	*2560	
G: Overall Width of Upperstructure	mm	2870	
H: Undercarriage Length	mm	4670	4940
I: Undercarriage Width	mm	3190	
J: Sprocket Center to Idle Center	mm	3728	4052
K: Track Shoe Width	mm	600 (Grouser shoe)	
Ground Pressure	kPa(kgf/cm^2)	55(0.56)	53(0.54)
Swing Speed	min^{-1}(rpm)	10.3 (10.3)	
Travel Speed (fast/slow)	km/h	5.2/3.1	
Gradeability	Degree (%)	35(70)	

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

Working Ranges (Grouser shoe)

ZX280-5G, 280LC-5G



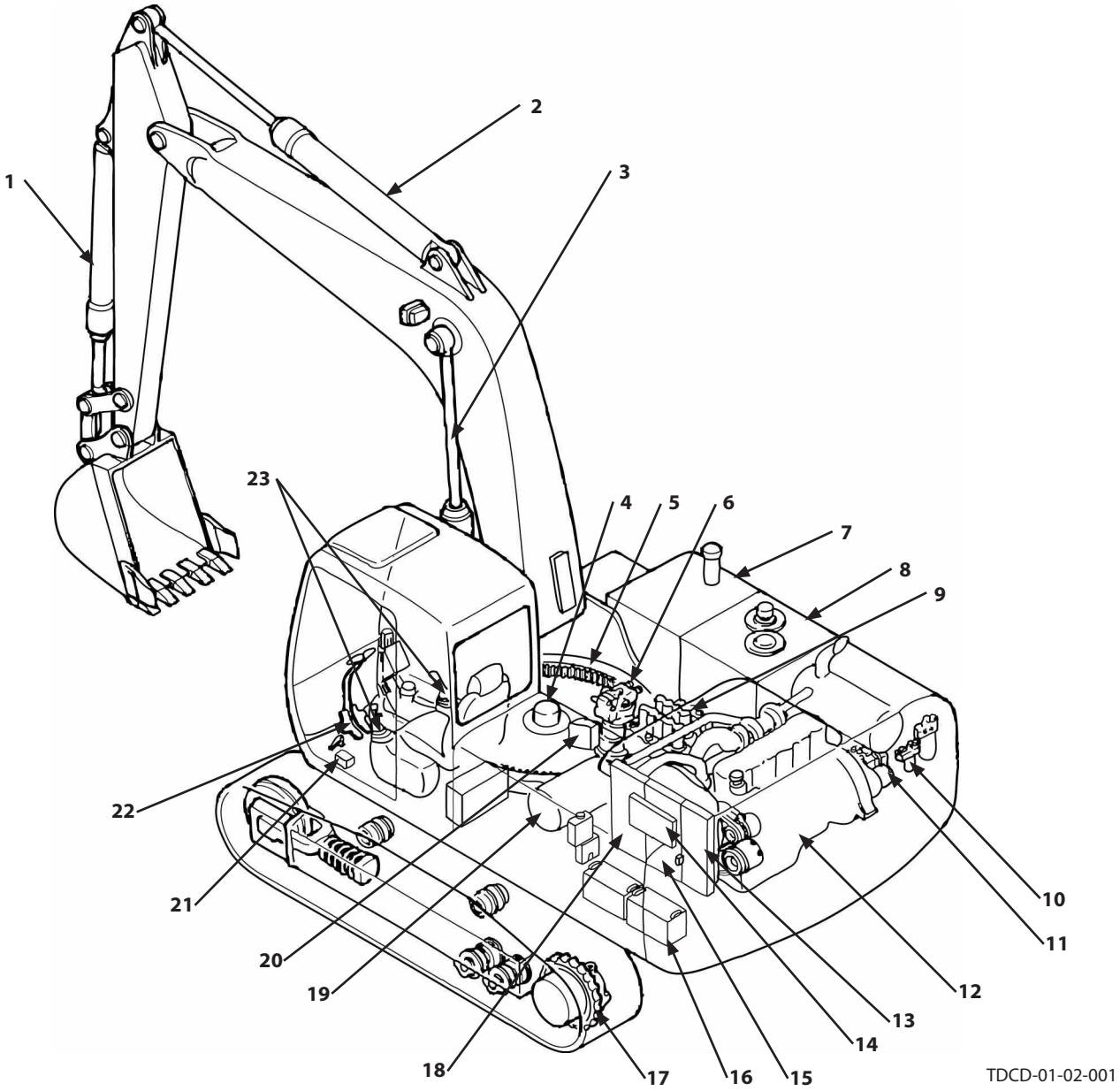
MDCD-12-002

Backhoe

Model		ZX280-5G, 280LC-5G		
Item \ Category		2.42 m Arm	3.11 m Arm	3.76 m Arm
		Backhoe	Backhoe	Backhoe
A: Maximum Digging Reach	(mm)	10060	10710	10270
B: Maximum Digging Depth	(mm)	6530	7220	7870
C: Maximum Cutting Height	(mm)	9910	10270	10470
D: Maximum Dumping Height	(mm)	6980	7330	7540
E: Overall Height	(mm)	3450	3200	3380
F: Overall Length	(mm)	10640	10550	10600
G: Minimum Swing Radius	(mm)	4060	3900	3890

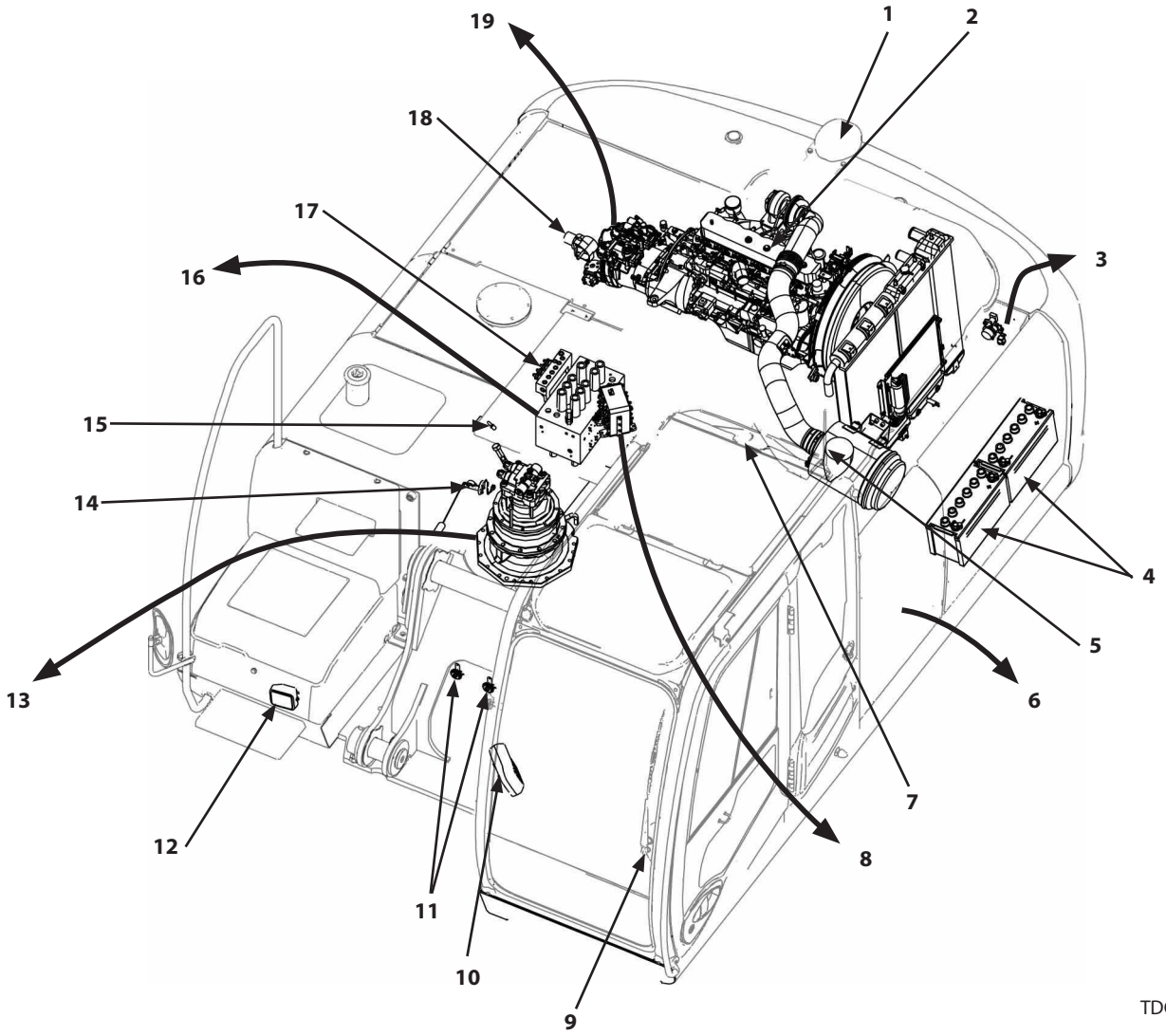
NOTE: The dimensions do not include height of the shoe lug (except Item E).

Main Component



1- Bucket Cylinder
2- Boom Cylinder
3- Arm 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- Air Cleaner
20- Signal Control Valve
21- Pilot Shut-Off Solenoid Valve
22- Travel Pilot Valve
23- Front Attachment / Swing Pilot Valve

Electrical System (Overview)

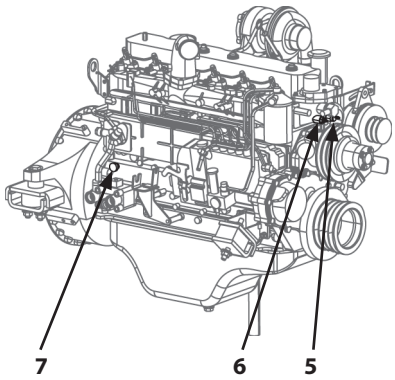


TDCD-01-02-003

1- Rear View Camera
2- Components Related with Engine (Refer to T1-2-3.)
3- Electrical System (Relays) (Refer to T1-2-7.)
4- Battery
5- *Communication Aerial (for Satellite Communication)
6- Electrical System (Around Air Cleaner) (Refer to T1-2-6.)
7- GPS Aerial
8- Components Related with Signal Control Valve (Refer to T1-2-9.)
9- Wiper Motor
10- Monitor
11- Horn
12- Work Light
13- Components Related with Swing Device (Refer to T1-2-11.)
14- Fuel Sensor
15- Hydraulic Oil Temperature Sensor
16- Components Related with Control Valve (Refer to T1-2-9.)
17- 3-Spool Solenoid Valve Unit
18- EC Motor/EC Sensor
19- Components Related with Pump Device (Refer to T1-2-8.)

*NOTE: *: This component is different by an area.*

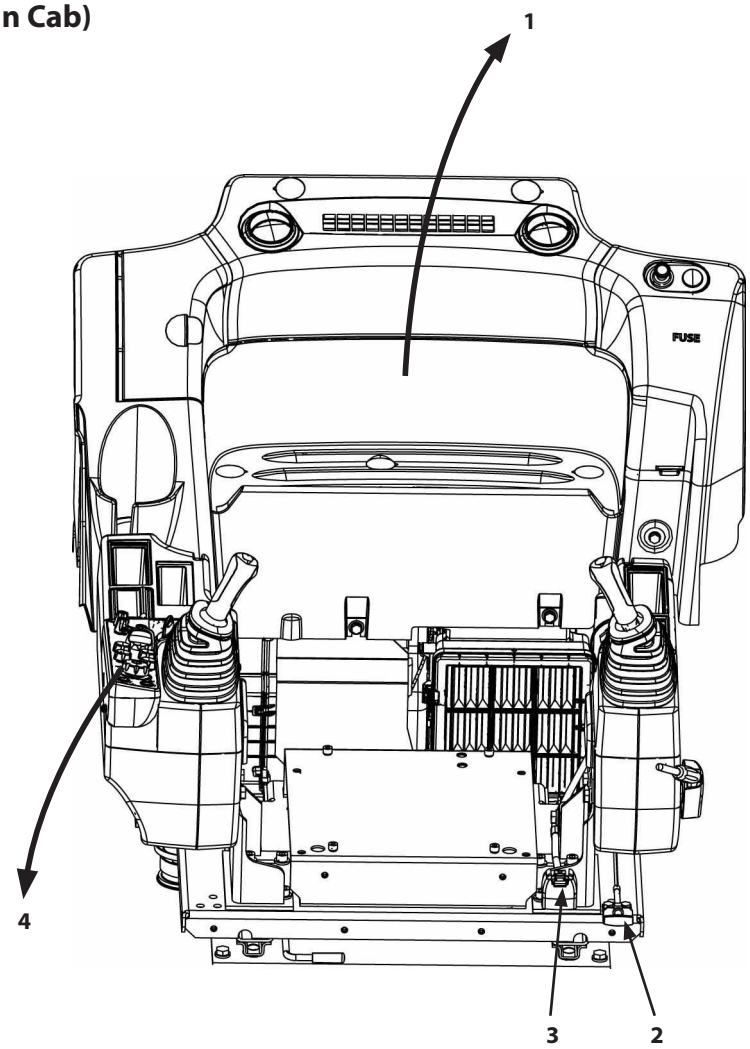
Engine



TDCD-01-02-008

5- Overheat Switch
6- Coolant Temperature Sensor
7- Engine Oil Pressure Switch

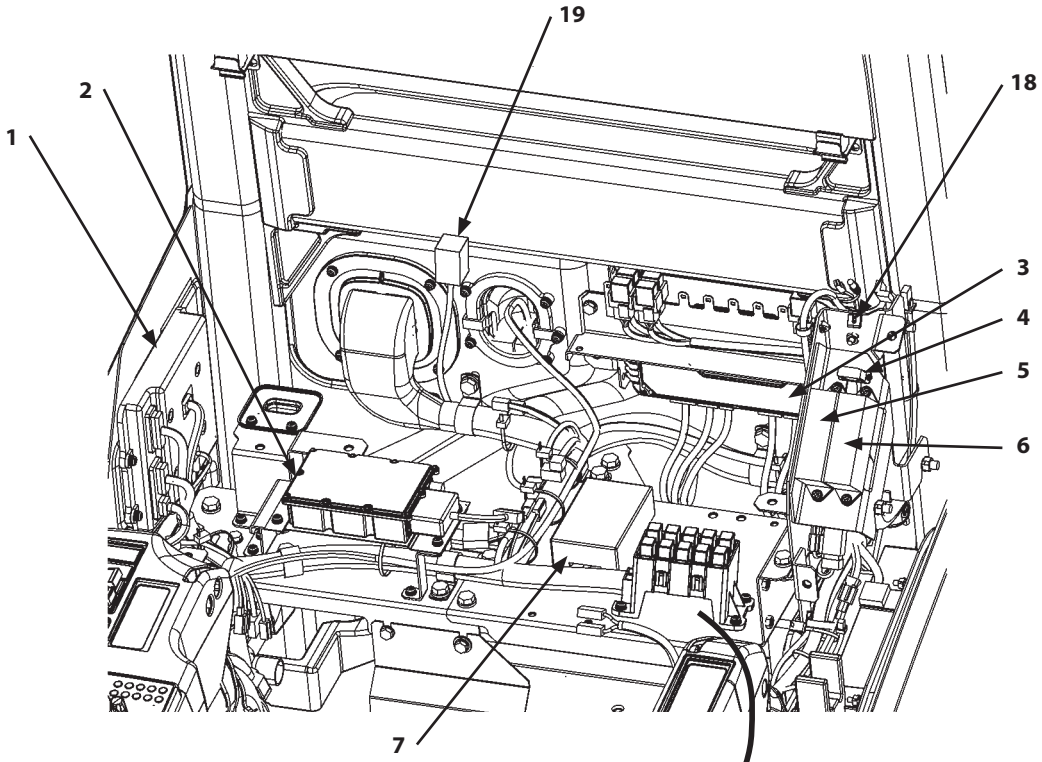
Electrical System (In Cab)



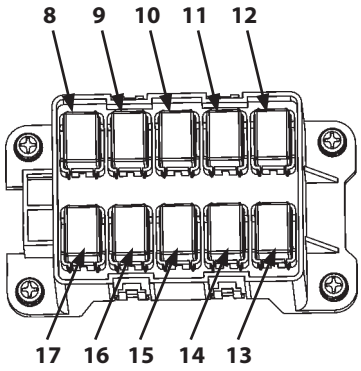
TDCD-01-02-004

1- Components Related with Rear Tray (Refer to T1-2-4.)
2- Engine Stop Knob
3- Engine Stop Switch
4- Components Related with Switch Panel (Refer to T1-2-5.)

Electrical System (Rear Tray)



TDCD-05-04-001

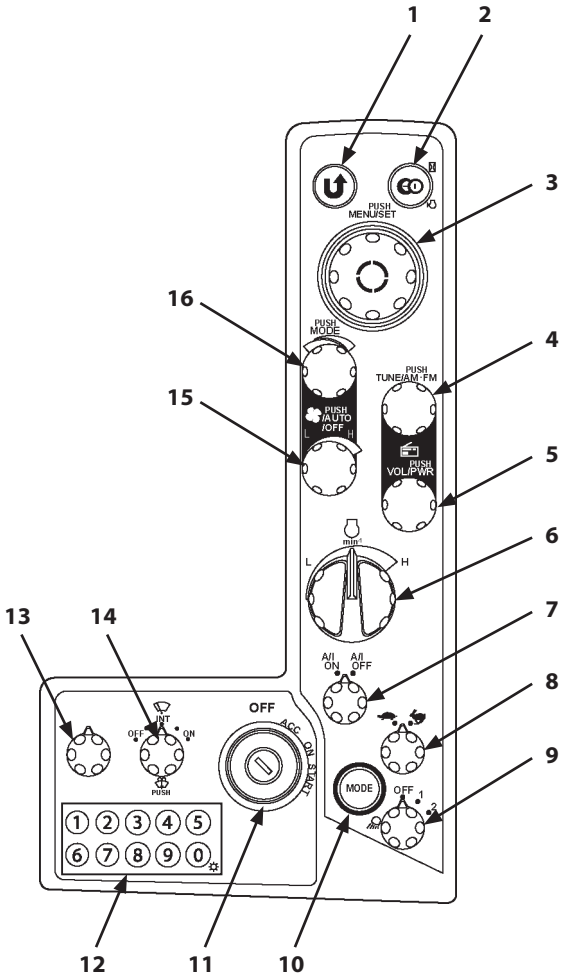


TDCD-01-02-009

1- Monitor Controller
2- *GSM (Mobile Communication Controller)
3- MC (Main Controller)
4- MPDr. Connector (Download Connector Using Combinedly)
5- Fuse Box
6- Fuse Box (for Attachment)
7- Wiper/Light Controller
8- Wiper Relay (R6)
9- Work Light Relay 1 (R7)
10- Work Light Relay 2 (R8)
11- Washer Relay (R9)
12- Horn Relay (R10)
13- Security Relay (R5)
14- Starter Cut Relay (R4)
15- Security Horn Relay (R3)
16- Pilot Shut-Off Relay (R2)
17- Load Damp Relay (R1)
18- Engine Learning Switch
19- QOS Controller

*NOTE: *: This component is different by an area.*

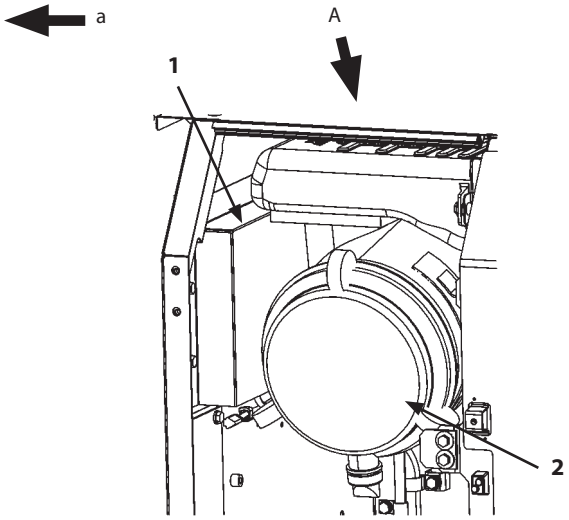
Electrical System (Switch Panel)



TDAA-05-02-059

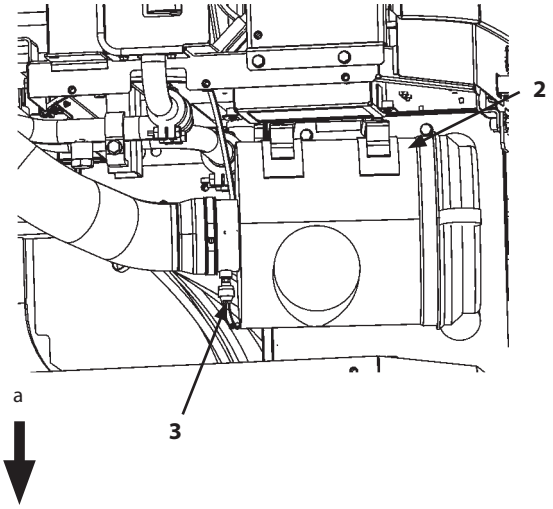
1- Return to Previous Screen Switch
2- Return to Basic Screen Switch
3- Selector/Set Switch
4- AM·FM Switch/Tuning Switch
5- Power Switch/Volume Control Switch
6- Engine Control Dial
7- Auto-Idle Switch
8- Travel Mode Switch
9- Work Light Switch
10- Power Mode Switch
11- Key Switch
12- TEN-key Switch
13- Overhead Window Wiper/ Overhead Window Washer Switch (Optional)
14- Wiper/Washer Switch
15- AUTO/OFF Switch/Blower Switch
16- Temperature Control Switch/ MODE Switch

Electrical System (Around Air Cleaner)



TDCD-01-02-006

View A



TDCD-01-02-007

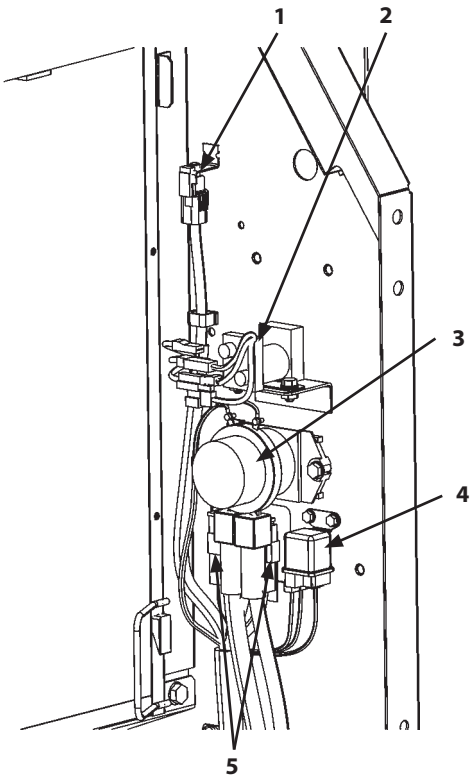
a- Machine Front

1- ECF (Engine Controller)

2- Air Cleaner

3- Air Cleaner Restriction Switch

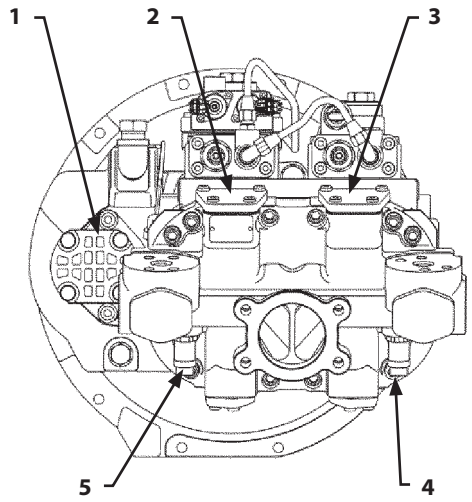
Electrical System (Relays)



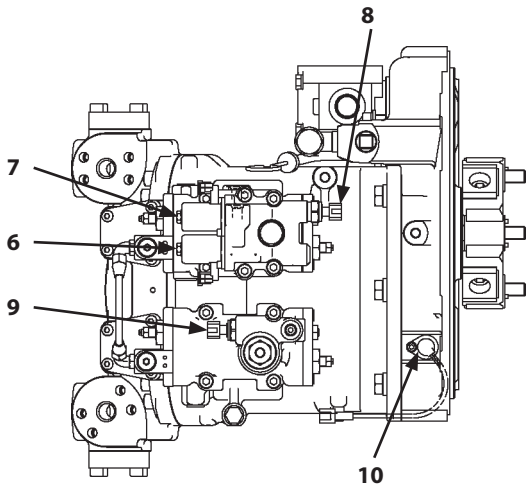
TDCD-01-02-002

1- Ambient Temperature Sensor
2- Starter Relay 2
3- Battery Relay
4- Glow Plug Relay
5- Fusible Link (Red: 45A, Black: 65A)

Pump Device



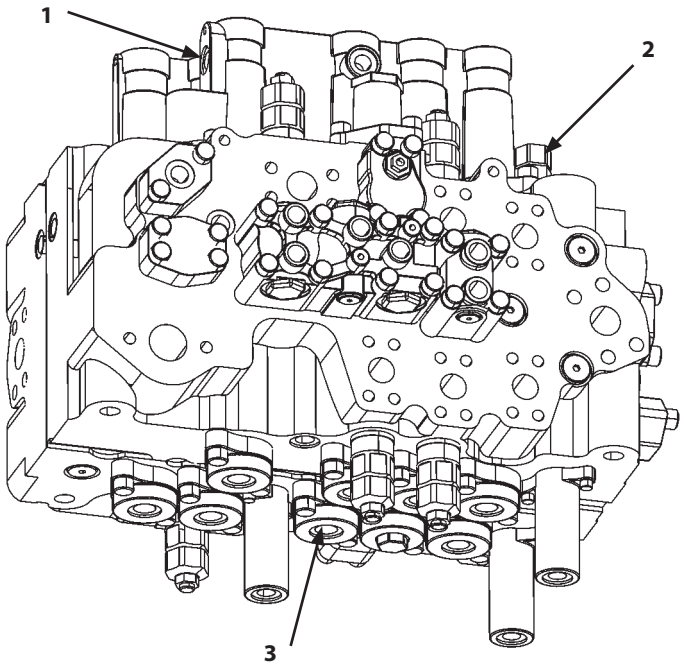
T1V1-01-02-032



TDCD-03-01-004

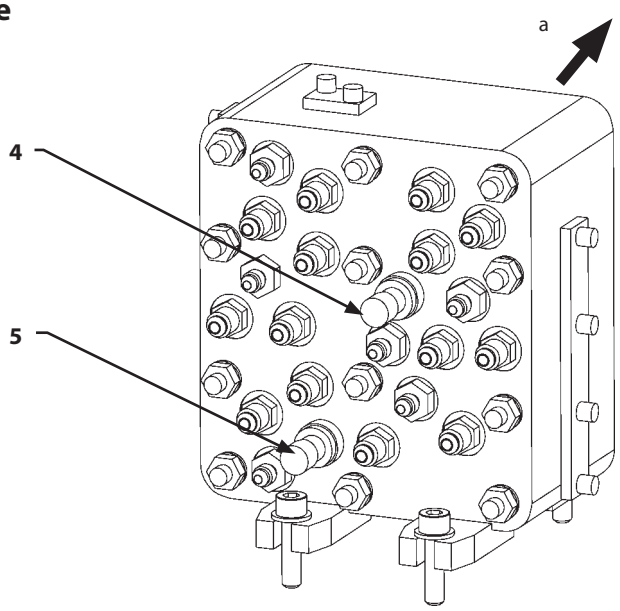
1- Pilot Pump
2- Pump 2
3- Pump 1
4- Pump 1 Delivery Pressure Sensor
5- Pump 2 Delivery Pressure Sensor
6- Torque Control Solenoid Valve
7- Maximum Pump 2 Flow Rate Limit Control Solenoid Valve
8- Pump 2 Control Pressure Sensor
9- Pump 1 Control Pressure Sensor
10- N Sensor

Control Valve



T1V1-03-03-073

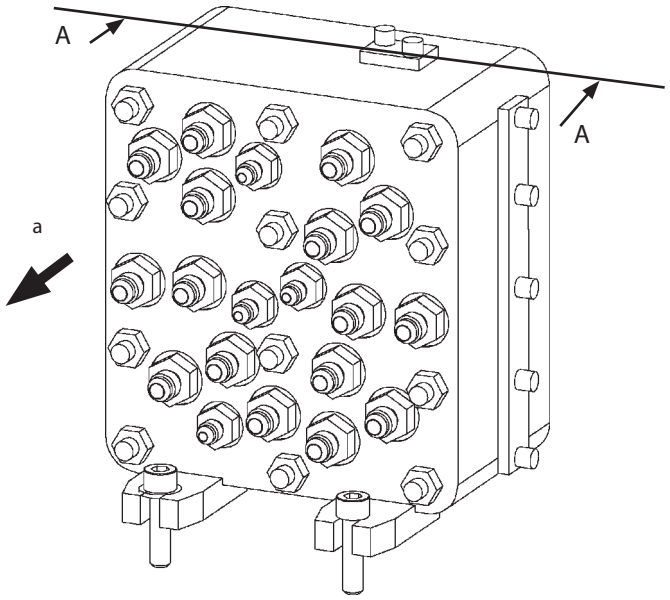
Signal Control Valve



T1V1-01-02-014

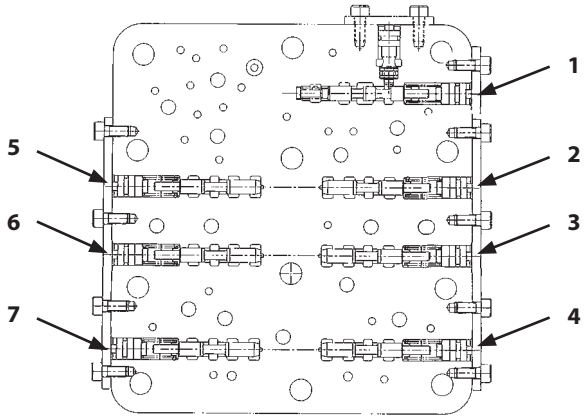
a- Pilot Valve Side

1- Pressure Sensor (Arm Roll-In)
2- Main Relief Valve
3- Pressure Sensor (Boom Raise)
4- Pressure Sensor (Swing)
5- Pressure Sensor (Travel)



T178-03-06-016

Cross Section A-A

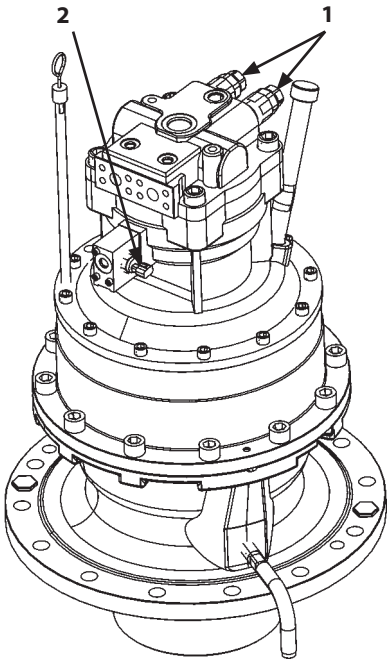


T178-03-06-002

a- Pilot Valve Side

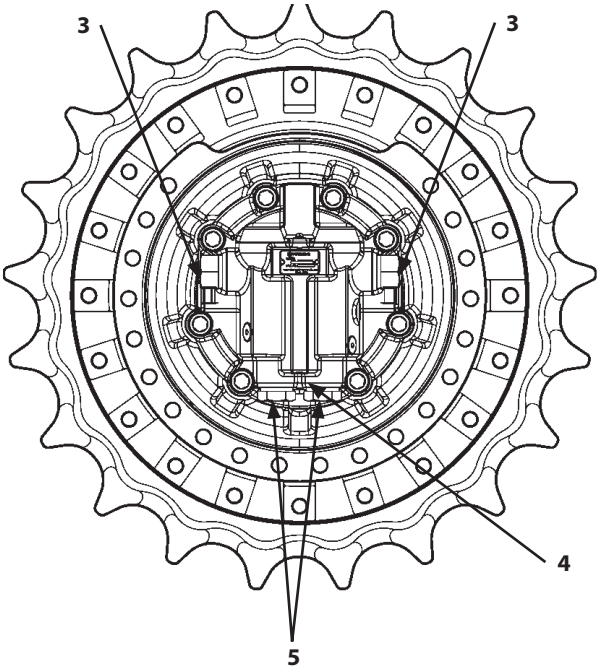
1- Shockless Valve
2- Bucket Flow Rate Control Valve Control Spool
3- Pump 2 Flow Rate Control Valve
4- Flow Combiner Valve Control Spool
5- Arm 1 Flow Rate Control Valve Control Spool
6- Pump 1 Flow Rate Control Valve
7- Swing Parking Brake Release Spool

Swing Device



TDDE-01-02-003

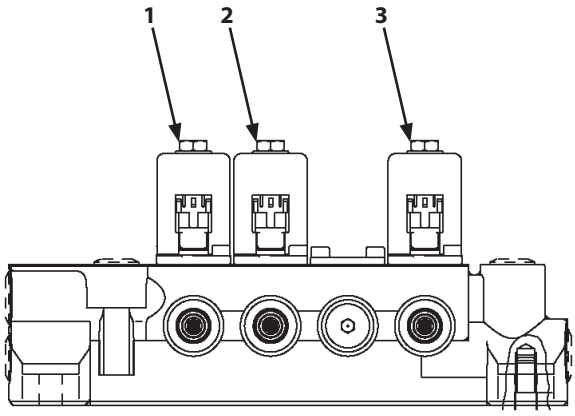
Travel Device



T178-01-02-014

1- Swing Relief Valve
2- Pressure Sensor (Front Attachment)
3- Counterbalance Valve
4- Travel Motor Swash Angle Control Valve
5- Travel Relief Valve

3-Spool Solenoid Valve Unit



TDCD-03-07-001

1- 3-Spool Solenoid Valve Unit (SC)
2- 3-Spool Solenoid Valve Unit (SF)
3- 3-Spool Solenoid Valve Unit (SG)

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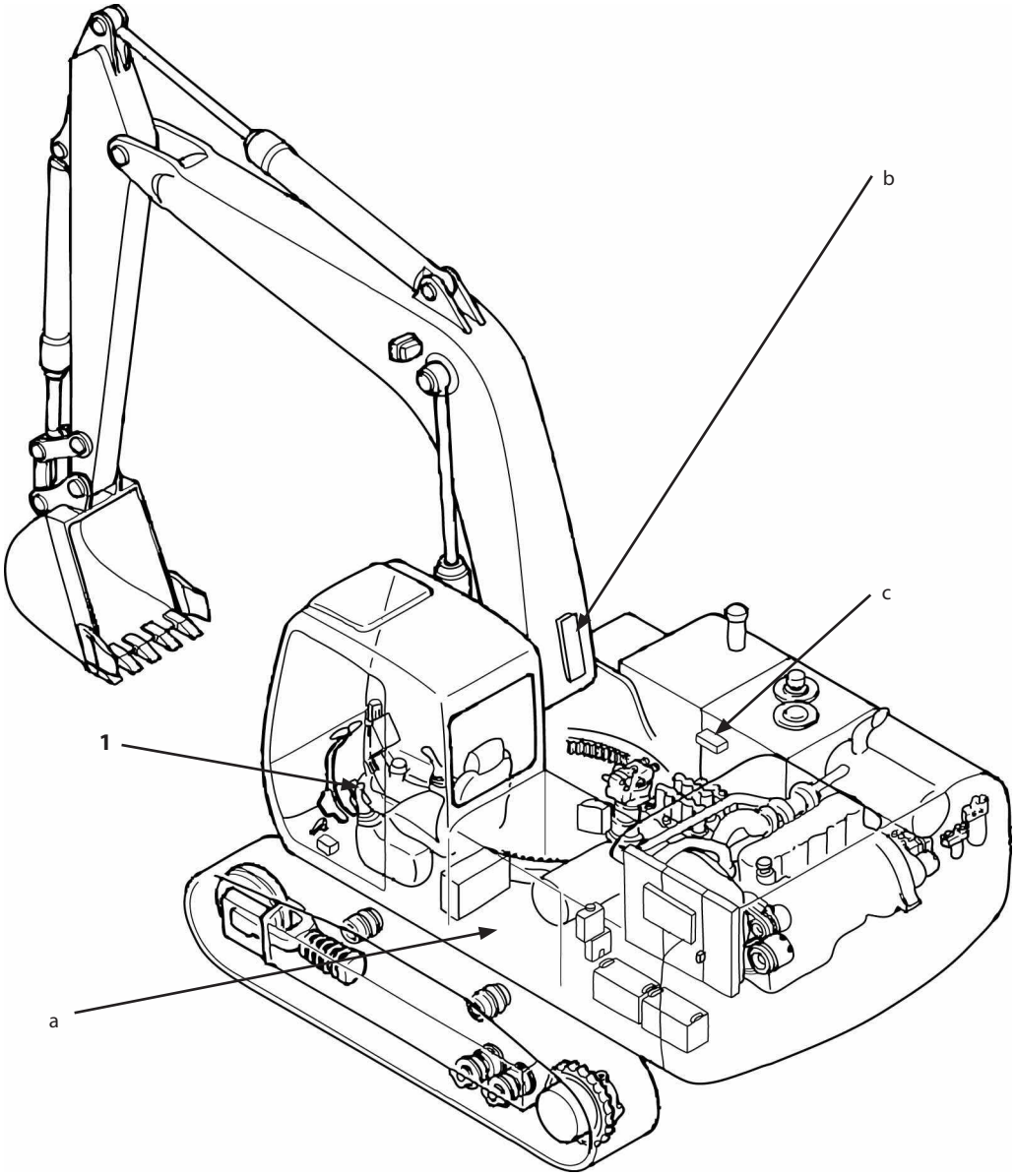
Layout of Attachment Spec. Parts



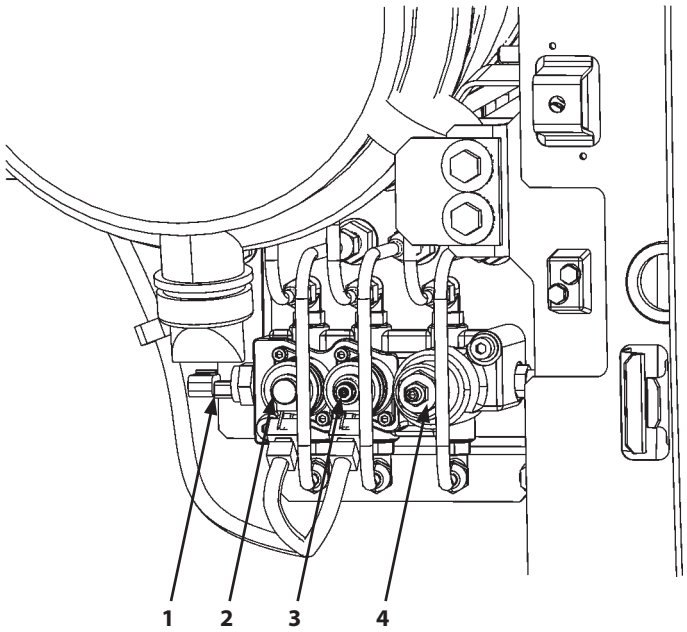
TDCD-01-02-005

a- Utility Space (Refer to T1-2-15.)
b- Boom Upper Side (Refer to T1-2-15.)
c- Selector Valve (Refer to T1-2-15.)

1- Pilot Valve (Auxiliary)

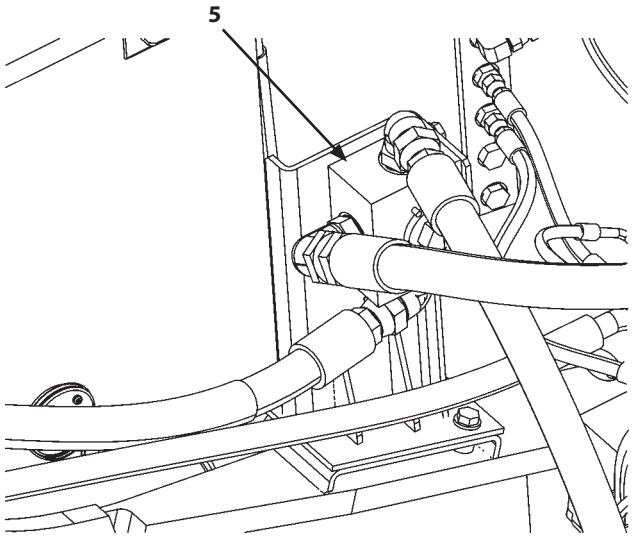
a	Utility Space	Pressure Sensor (Auxiliary)	Refer to T1-2-16.
		Auxiliary Flow Combiner Control Solenoid Valve	
		Auxiliary Flow Rate Control Solenoid Valve	
		Pressure Reducing Valve	
b	Boom Upper Side	Accumulator Control Valve	Refer to T1-2-17.
		Accumulator (High Pressure)	
		Accumulator (Low Pressure)	
		Secondary Pilot Relief Pressure Valve	
		Secondary Pilot Relief Pressure Control Valve	
c	Selector Valve	–	Refer to T1-2-16.

Utility Space



TDCD-01-02-011

Selector Valve

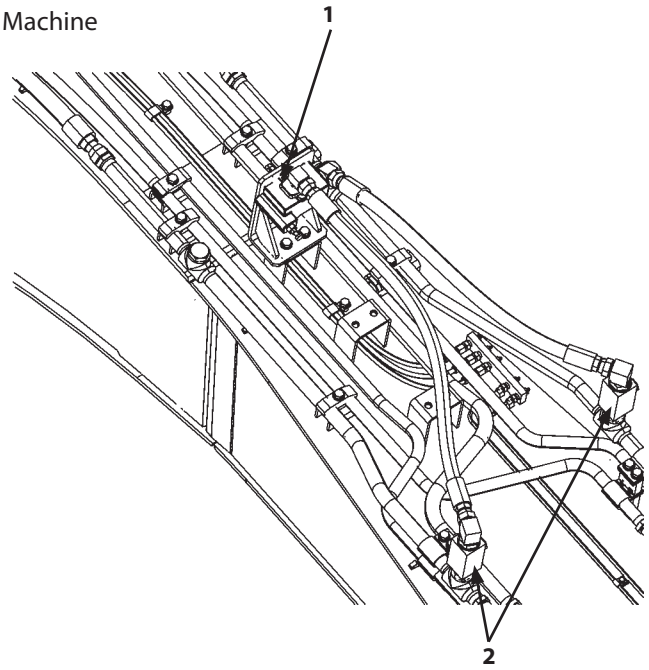


TDCD-01-02-012

1- Pressure Sensor (Auxiliary)
2- Auxiliary Flow Combiner Control Solenoid Valve
3- Auxiliary Flow Rate Control Solenoid Valve
4- Pressure Reducing Valve
5- Selector Valve

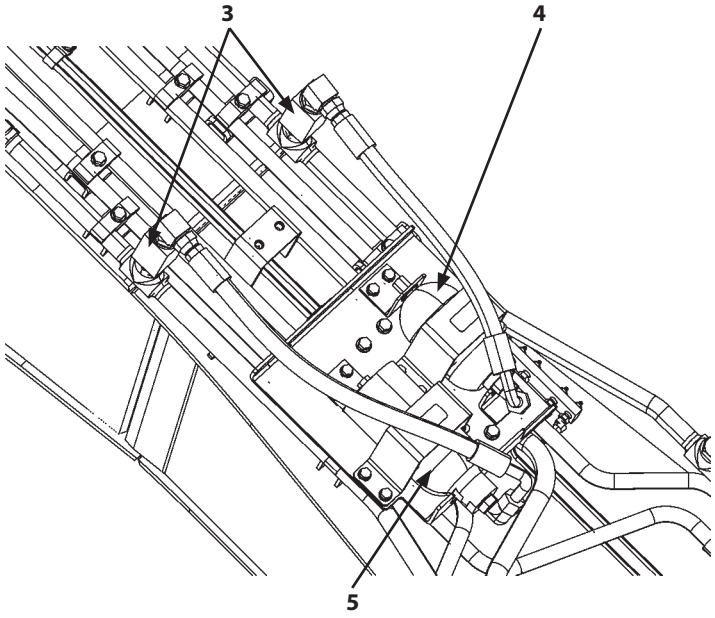
Boom Upper Side

Breaker 1 (HSB Breaker) Shared Machine



TDCD-01-02-013

Breaker 2 (NPK Breaker) Shared Machine



TDCD-01-02-014

1- Secondary Pilot Relief Pressure Valve
2- Secondary Pilot Relief Pressure Control Valve
3- Accumulator Control Valve
4- Accumulator (Low Pressure)
5- Accumulator (High Pressure)

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