Manual No. : KM-18EE
Vol. No. : TO18EE-00

Technical Manual

(Operational Principle)

EX1200-5C
Excavator

Service Manual (Manual No. KM-18EE) consists of the following three separate volumes;

Technical Manual (Operational Principle)	: Vol. No. TO18EE
Technical Manual (Troubleshooting)	: Vol. No. TT18EE

HITACHI

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

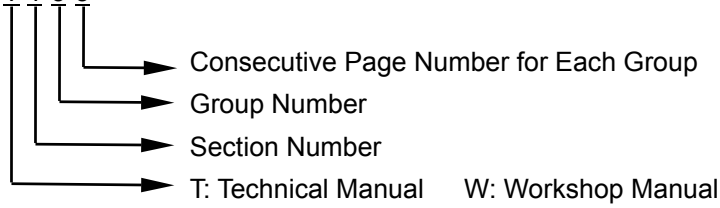
MANUAL COMPOSITION

- 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)

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)

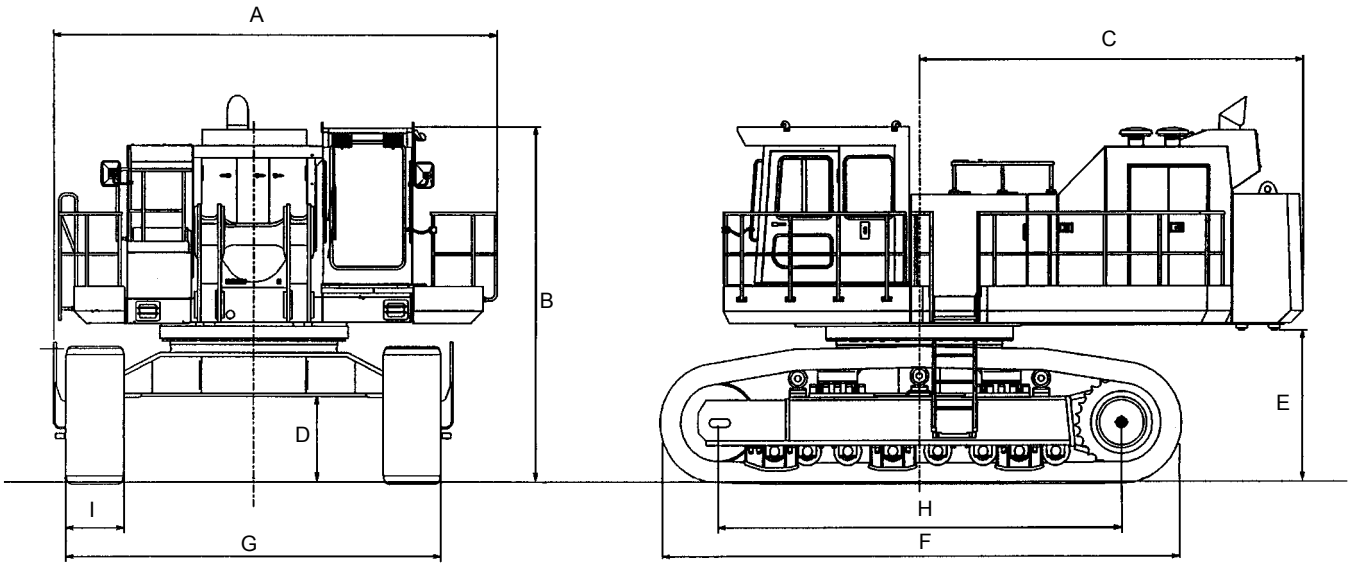
WORKSHOP MANUAL

SECTION 1
GENERAL

CONTENTS

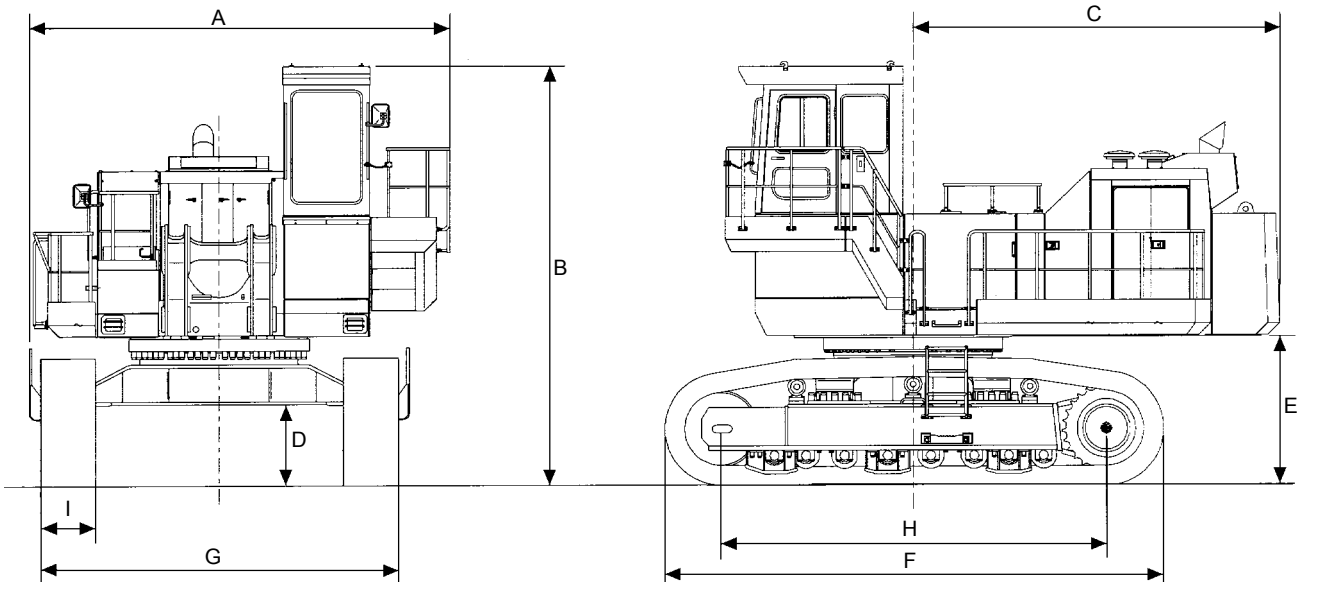
(Blank)

SPECIFICATIONS



M183-11-001

Model	EX1200-5C Hydraulic Excavator	
Type of Front-End Attachment	Backhoe [9.1 m (29'10") boom, 3.4 m (11'2") arm]	BE Backhoe [7.55 m (24'9") BE boom, 3.4 m (11'2") BE arm]
Bucket Capacity (Heaped)	PCSA 5.0 m^3 (6.5 yd^3), CECE 4.4 m^3	PCSA 6.5 m^3 (8.5 yd^3)
Operating Weight	108000 kg (238000 lb)	109000 kg (243000 lb)
Basic Machine Weight	80500 kg (177500 lb)	
Engine	Hitachi S6R-Y2TAA2 482 kW/1650 min^{-1} (655 PS/1650 rpm)	
A: Overall Width	5430 mm (17 ft 10 in)	
B: Cab Height	4320 mm (14 ft 2 in)	
C: Rear End Swing Radius	4850 mm (15 ft 11 in)	
D: Minimum Ground Clearance	990 mm (3 ft 3 in) (Excluding shoe lug)	
E: Counterweight Clearance	1790 mm (5 ft 10 in)	
F: Undercarriage Length	6410 mm (21 ft 0 in)	
G: Undercarriage Width	4610 mm (15 ft 2 in)	
H: Sprocket Center to Idler Center	5000 mm (16 ft 5 in)	
I: Track Shoe Width	710 mm (28 in) (Grouser shoe)	
Ground Pressure	136 kPa (1.39 kgf/cm^2, 19.7 psi)	137 kPa (1.40 kgf/cm^2, 19.9 psi)
Swing Speed	5.8 min^{-1} (rpm)	
Travel Speed (Fast/Slow)	3.5/2.4 km/h (2.2/1.6 mph)	
Gradeability	35° ($\tan\theta$ = 0.70)	

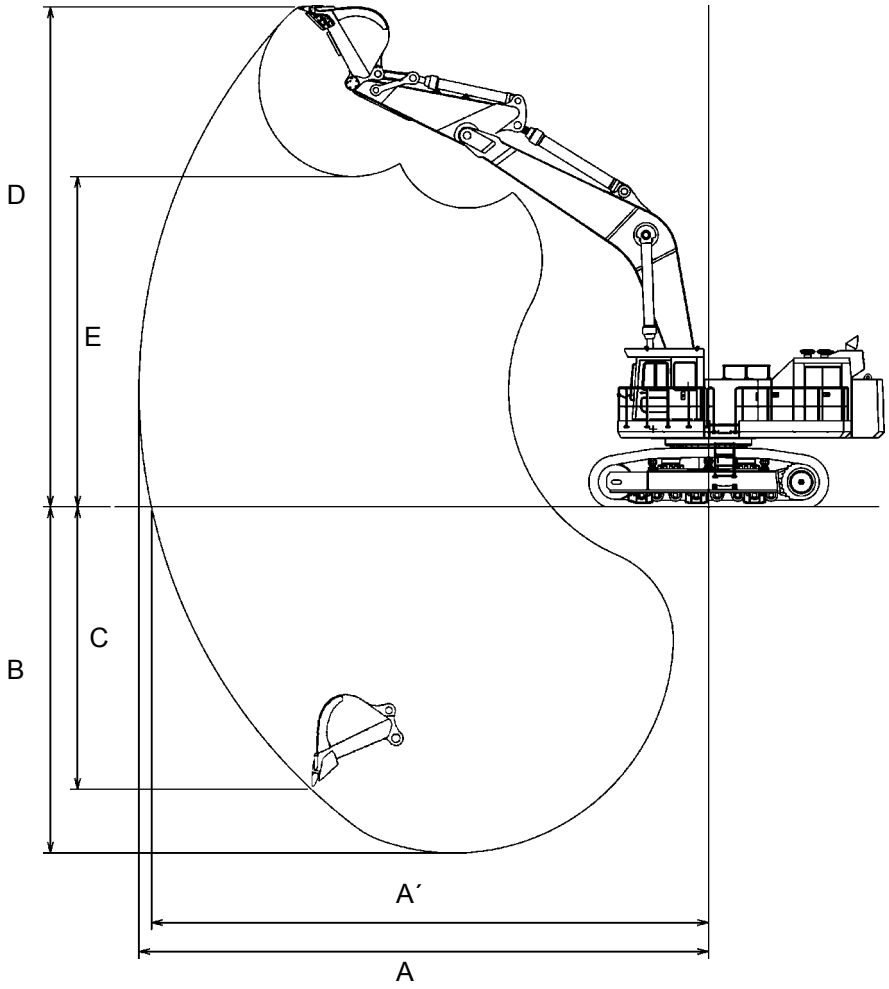


T183-01-01-002

Model	EX1200-5C Hydraulic Excavator
Type of Front-End Attachment	Loading Shovel
Bucket Capacity (Heaped)	PCSA 6.5 m^3 (8.5 yd^3)
Operating Weight	111000 kg (245000 lb)
Basic Machine Weight	80900 kg (178400 lb)
Engine	Hitachi S6R-Y2TAA2 482 kW/1800 min^{-1} (655 PS/1650 rpm)
A: Overall Width	5430 mm (17 ft 10 in)
B: Cab Height	∗5410 mm (17 ft 9 in)
C: Rear End Swing Radius	4850 mm (15 ft 11 in)
D: Minimum Ground Clearance	990 mm (3 ft 3 in) (Excluding shoe lug)
E: Counterweight Clearance	1790 mm (5 ft 10 in)
F: Undercarriage Length	6410 mm (21 ft 0 in)
G: Undercarriage Width	4610 mm (15 ft 2 in)
H: Sprocket Center to Idler Center	5000 mm (16 ft 5 in)
I: Track Shoe Width	710 mm (28 in) (Grouser shoe)
Ground Pressure	139 kPa (1.42 kgf/cm^2, 20.2 psi)
Swing Speed	5.8 min^{-1} (rpm)
Travel Speed (Fast/Slow)	3.5/2.4 km/h (2.2/1.6 mph)
Gradeability	35° ($\tan\theta = 0.70$)

NOTE: ∗The standard specification of loading shovel is equipped with an elevated cab.

WORKING RANGE (BACKHOE)

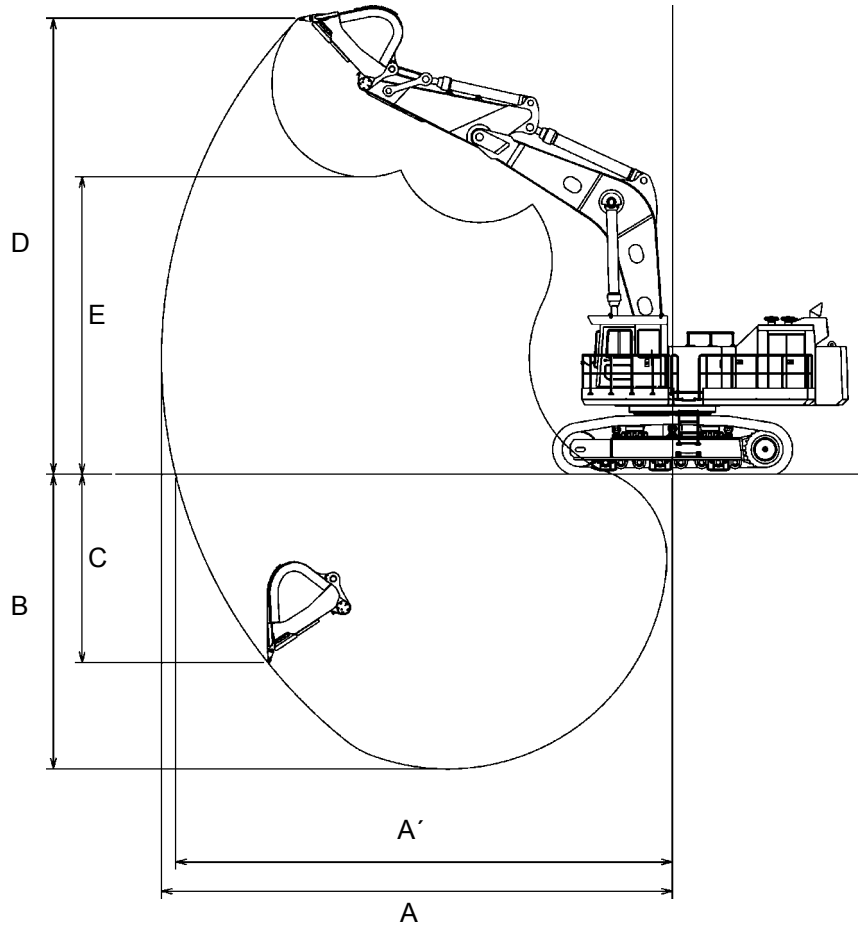


M183-11-002

Boom Length	9.10 m (29′ 10″)
Arm Length	3.40 m (11′ 2″)
A : Maximum Digging Reach	15340 mm (50′ 4″)
A' : Maximum Digging Reach (on ground)	15000 mm (49′ 3″)
B : Maximum Digging Depth	*9340 mm (30′ 8″)
C : Maximum Vertical Wall	*7620 mm (25′ 0″)
D : Maximum Cutting Height	*13490 mm (44′ 3″)
E : Maximum Dumping Height	*8920 mm (29′ 3″)

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

WORKING RANGE (BE BACKHOE)

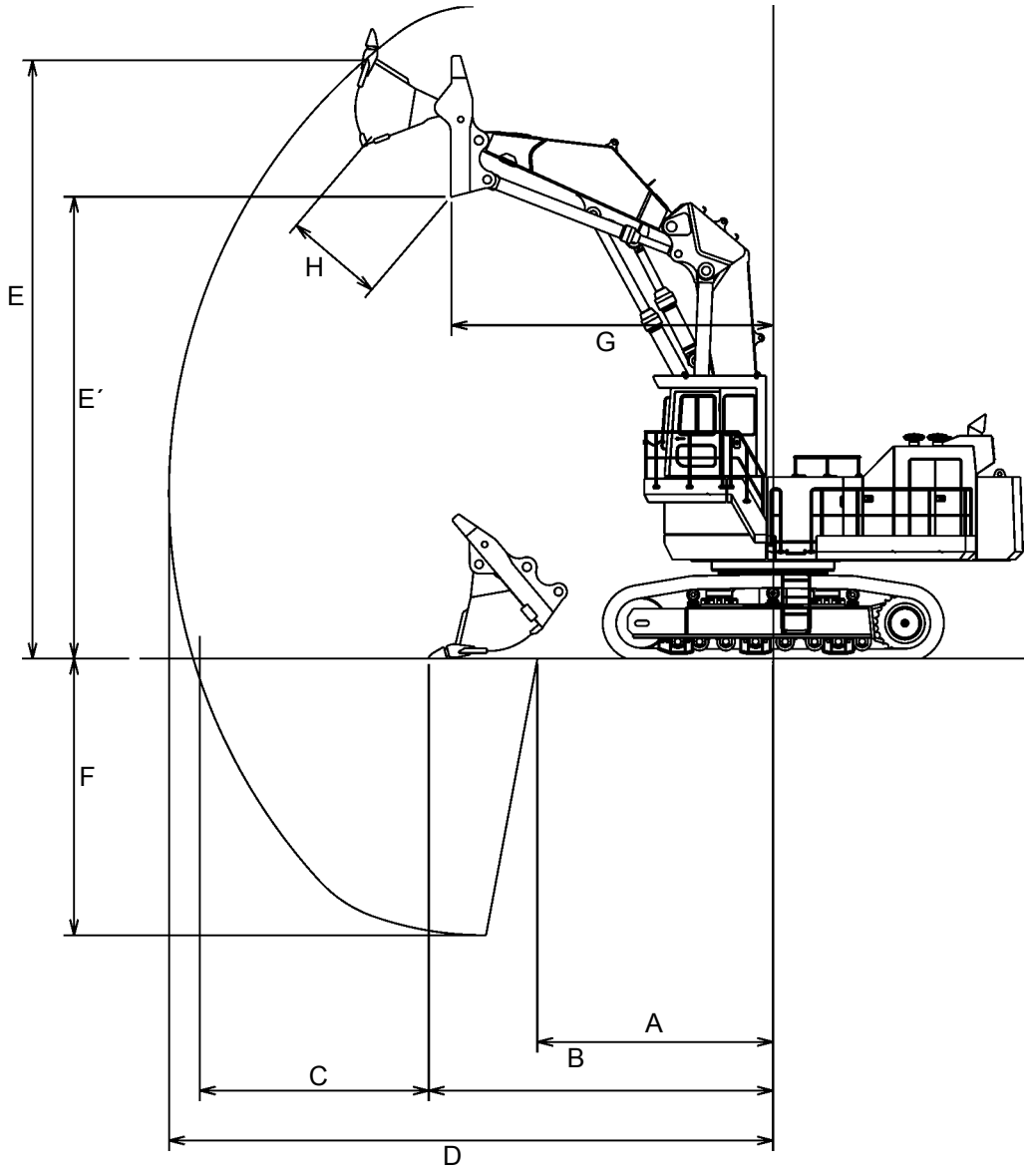


M183-11-003

Boom Length	7.55 m (24′ 9″) BE boom
Arm Length	3.40 m (11′ 2″) BE arm
A : Maximum Digging Reach	13760 mm (45′ 2″)
A' : Maximum Digging Reach (on ground)	13380 mm (43′ 11″)
B : Maximum Digging Depth	*7940 mm (26′ 1″)
C : Maximum Vertical Wall	*5080 mm (16′ 8″)
D : Maximum Cutting Height	*12300 mm (40′ 4″)
E : Maximum Dumping Height	*8020 mm (26′ 4″)

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

WORKING RANGE (LOADING SHOVEL)



T183-01-01-003

A : Minimum Digging Distance	4460 mm (14′ 8″)
B : Minimum Level Crowding Distance	6520 mm (21′ 5″)
C : Level Crowding Distance	4340 mm (13′ 10″)
D : Maximum Digging Reach	11440 mm (37′ 6″)
E : Maximum Cutting Height	*12350 mm (40′ 6″)
E' : Maximum Dumping Height	*8740 mm (28′ 8″)
F : Maximum Digging Depth	*5240 mm (17′ 2″)
G : Working Radius at Maximum Dumping Height	*6090 mm (20′ 0″)
H : Maximum Bucket Opening Width	1880 mm (6′ 2″)

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

ENGINE

MAIN SPECIFICATIONS

Manufacturer		HITACHI
Model		S6R-Y2TAA2
Type		Diesel, 4 cycle, vertical, 6-cylinder inline, water-cooled, turbo charged, inter-cooled, direct injection type
Cyl. No.-bore×stroke		6-170 mm×180 mm (6.7 in×7.09 in)
Piston displacement		24500 cm^3 (1495 in^3)
Rated output (SAE J1995)	(GROSS)	510 kW/1650 min^{-1} (693 PS/1650 rpm)
	(NET)	482 kW/1650 min^{-1} (655 PS/1650 rpm)
Dry weight		2740 kg (6040 lb)
Firing order		1-5-3-6-2-4
Rotation direction		Clockwise (view from fan side)

COOLING SYSTEM

Cooling fan	Dia. 1219 mm (48 in), draw-in type
Fan pulley ratio	0.67 : 1
Thermostat	Cracking temp. : 71 °C (160 °F)
(under atmospheric pressure)	Full open temp. : 85 °C (185 °F)
Water pump	Centrifugal type

LUBRICATION SYSTEM

Lubrication pump type	Gear pump
Oil filter	Full-flow paper element type with bypass function
Oil pan capacity	118 L (31.2 US gal) Include filters : 68 to 118 L (17.9 to 31.1 US gal)

STARTING SYSTEM

Voltage·Output	24 V·7.5 kW

PRE-HEAT SYSTEM

Type	Air heater

ENGINE STOP SYSTEM

Stop method	Fuel cut system with solenoid valve and electronic control governor

ALTERNATOR

Type	With AC generator
Voltage·Output	24 V·80 A

FUEL SYSTEM

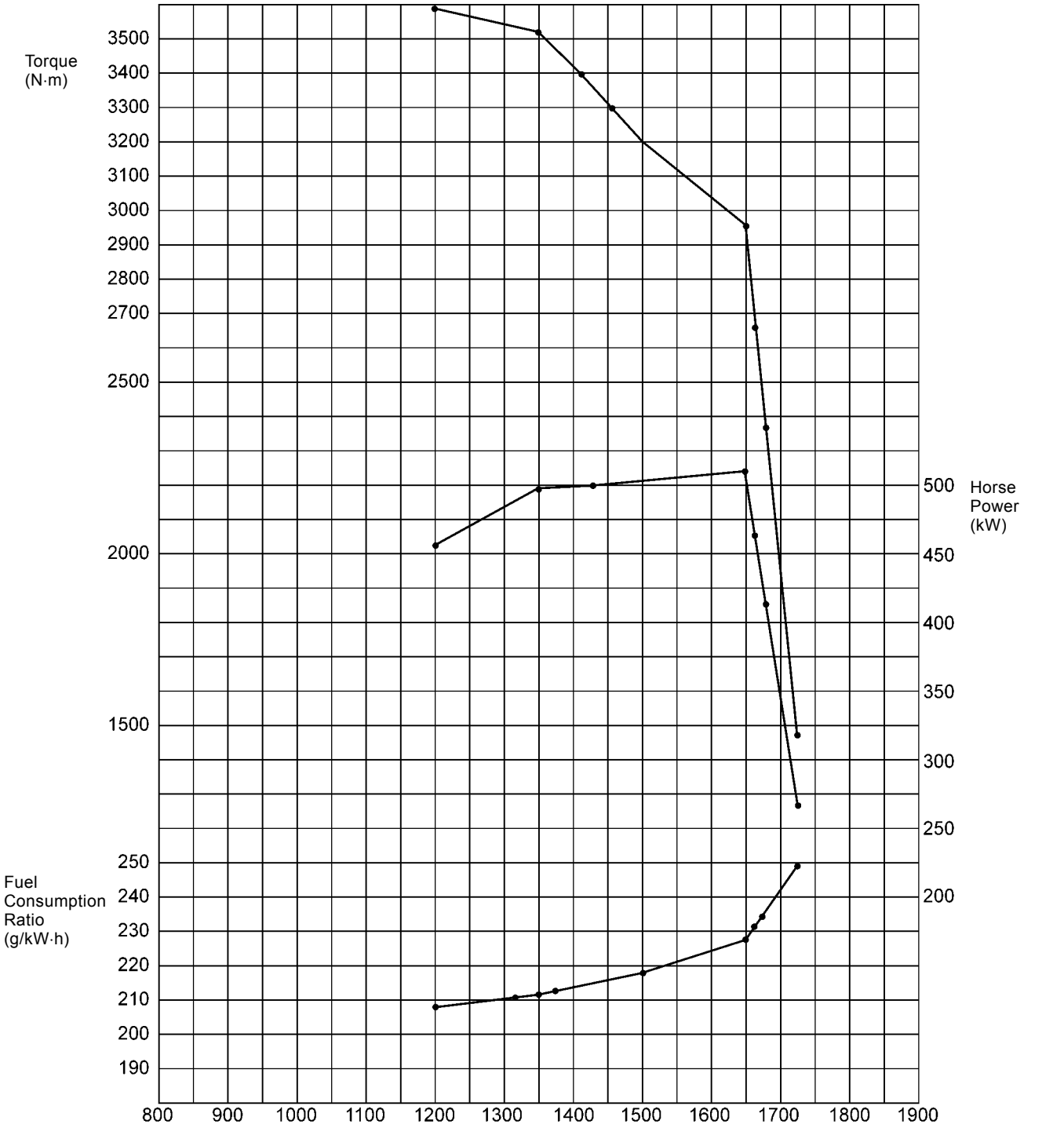
Injection pump	Mitsubishi PS6 electronic control
Governor	Electronic all speed control

PERFORMANCE

Lubrication oil consumption	0.27 g kW·h (New engine, at rated horsepower)
Fuel consumption ratio (NET)	225 g/kW·h (166 g/PS·h)
Max. output torque (NET)	3580 N·m (365 kgf·m, 2641 lbf·ft) @ 1200±100 min^{-1}
Max. no load speed	1850±50 min^{-1}

ENGINE PERFORMANCE CURVE

Test Conditions: 1. In conformity with JIS 01006 (750 mmHg, 25°C, 30 %: Performance test method for diesel engines used for construction machinery).
2. With fan and generator.



T18E-01-01-001

ENGINE ACCESSORIES

RADIATOR ASSEMBLY

Type	Radiator/Inter-cooler tandem type assembly	
Weight	350 kg (772 lb)	
	Radiator	Inter-cooler
Core type	Corrugated fin	Corrugated fin
Capacity	57 L (18 US gal)	-
Air-tight testing pressure	196 kPa (2.0 kgf/cm^2, 28 psi)	98 kPa (10 kgf/cm^2, 142 psi)
Cap opening pressure	49 kPa (0.5 kgf/cm^2, 7 psi)	-

BATTERY

Capacity	176 Ah (5 hours)
Voltage	12 V×2
Weight	66 kg (146 lb)×2

HYDRAULIC DEVICES

PUMP DEVICE

Type	Spur gear
Gear speed ratio (Engine: Main pump)	1 : 1.083
(Engine: Triple pump)	1 : 1.106

MAIN PUMP

Model	K3V280SH11RL
Type	Variable displacement swash plate type plunger pump: regulator attached type
Max. flow (Theoretical value)	500 L/min (132 US gpm)×3

3-UNIT PUMP

(OIL COOLER FAN MOTOR DRIVE PUMP)

Model	K3V63S
Type	Variable displacement swash plate type plunger pump: Regulator attached type
Max. flow (Theoretical value)	115 L/min (30.3 US gpm)

(PILOT PUMP)

Model	KFP3228
Type	Gear pump
Max. flow (Theoretical value)	51.1 L/min (13.5 US gpm)

(TRANSMISSION LUBRICATION OIL PUMP)

Model	KP1015
Type	Gear pump
Max. flow (Theoretical value)	27.1 L/min (7.2 US gpm)

MAIN CONTROL VALVE
- Model: UH36-403
- Type: Pilot pressure operated type (4-spool+5-spool)
- Main relief pressure: Normal: 31.4 MPa (310 kgf/cm^2, 4410 psi) @340 L/min (89.7 US gpm)
  High Lift: 33.3 MPa (340 kgf/cm^2, 4830 psi) @90 L/min (23.7 US gpm)
- Overload relief pressure: 33.3 MPa (340 kgf/cm^2, 4830 psi) @110 L/min (29.0 US gpm) (Boom, Arm roll-in (BH) / Arm extend (LD), Bucket, Bucket open (LD))
  34.3 MPa (350 kgf/cm^2, 4980 psi) @110 L/min (29.0 US gpm) (Arm roll-out (BH)/ Arm retract (LD))
  17.7 MPa (180 kgf/cm^2, 2560 psi) @500 L/min (132 US gpm) (Bucket close (LD))
  When jack-up prevention switch is ON:
  9.8 MPa (100 kgf/cm^2, 1420 psi) @110 L/min (29.0 US gpm) (Boom Lower)

SWING CONTROL VALVE
- Model: UH36B2T1C2A2-3
- Type: Pilot pressure operated type (4-spool)
- Main relief valve: 31.4 MPa (320 kgf/cm^2, 4550 psi) @170 L/min (44.9 US gpm)
- Overload relief valve: 31.4 MPa (320 kgf/cm^2, 4550 psi) @110 L/min (29.0 US gpm)

SWING DEVICE
- Type: Two-stage planetary reduction type

SWING MOTOR
- Model: M2X210 CAB-10A
- Type: Swash-plate type, fixed displacement plunger motor

SWING BRAKE VALVE
- Type: Non counter balance valve type
- Relief pressure: 29.4 MPa (300 kgf/cm^2, 4270 psi)

SWING PARKING BRAKE
- Type: Multiple-wet-plate negative type
- Cracking pressure for release: 2260^{+590}_{-0} kPa (23^{+6}_{-0} kgf/cm^2, 327^{+85}_{-0} psi)

TRAVEL DEVICE
- Type: Three-stage planetary reduction gear

TRAVEL MOTOR
- Model: MSF-340VP-EH
- Type: Swash-plate type, variable displacement plunger motor

TRAVEL BRAKE VALVE
- Type: Counter balance valve type
- Relief pressure: 31.4 MPa (320 kgf/cm^2, 4550 psi)

TRAVEL PARKING BRAKE

Type	Multiple-wet-plate negative type
Cracking pressure for release	1.8 MPa (18 kgf/cm^2, 256 psi)

CYLINDER

(BACKHOE)

	Boom	Arm	Bucket (3.4 m Arm)
Rod Dia.	160 mm (6.30”)	180 mm (7.09”)	160 mm (6.30”)
Cylinder Bore	230 mm (9.06”)	260 mm (10.24”)	230 mm (9.06”)
Stroke	2075 mm (6’ 10”)	2205 mm (7’ 3”)	1790 mm (5’ 10”)
Fully retracted length	3170 mm (10’ 5”)	3385 mm (11’ 1”)	2895 mm (9’ 6”)
Plating thickness	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more

	Bucket (BE)	Bucket (For 4.5 m Arm)	Bucket (For 5.8 m Arm)
Rod Dia.	170 mm (6.70”)	160 mm (6.30”)	130 mm (5.12”)
Cylinder Bore	240 mm (9.45”)	230 mm (9.06”)	190 mm (7.48”)
Stroke	1790 mm (5’ 10”)	1790 mm (5’ 10”)	1555 mm (5’ 1”)
Fully retracted length	2895 mm (9’ 6”)	2895 mm (9’ 6”)	2385 mm (7’ 10”)
Plating thickness	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more

(LOADING SHOVEL)

	Boom	Arm	Level
Rod Dia.	160 mm (6.30”)	150 mm (5.91”)	160 mm (6.30”)
Cylinder Bore	230 mm (9.06”)	215 mm (8.46”)	230 mm (9.06”)
Stroke	2075 mm (6’ 10”)	1835 mm (6’ 0”)	790 mm (2’ 7”)
Fully retracted length	3170 mm (10’ 5”)	2785 mm (9’ 2”)	1815 mm (5’ 11”)
Plating thickness	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more

	Bucket	Bucket open/close
Rod Dia.	150 mm (5.91”)	140 mm (5.51”)
Cylinder Bore	200 mm (7.87”)	85 mm (3.34”)
Stroke	1 600 mm (5’ 3”)	475 mm (1’ 7”)
Fully retracted length	3 405 mm (11’ 2”)	1 090 mm (3’ 7”)
Plating thickness	30 μm (1.18 μin) or more	30 μm (1.18 μin) or more

FRONT ATTACHMENT PILOT VALVE

Model	HVP06A-040-101

TRAVEL PILOT VALVE

Model	HVP05F-040-101

BUCKET OPEN / CLOSE PILOT VALVE (LOADING SHOVEL)

Model	HVP05H-040-101

SOLENOID VALVE UNIT

Solenoid valve (Function)	· SA : Pump power decreasing (For pump 3) · SB : Pump power decreasing (For pump 1, 2) · SC : Boom mode selection
(Max. input flow)	50 L/min (13 US grm)
Pilot relief valve	3.9 MPa (40 kgf/cm^2, 570 psi)

FLOW REDUCING SOLENOID VALVE
- Function.....Flow reducing
- Max. input flow .....60 L/min (15.8 US gal)

TRAVEL MODE SHIFT SOLENOID VALVE
- Function.....Travel mode shifting
- Max. input flow .....30 L/min (7.9 US gal)

2-SPOOL EHC VALVE
- Function.....Power increase solenoid valve ST: Speed sensing control
- Max. input pressure.....3.9 MPa (40 kgf/cm^2, 570 psi)
- Control pressure.....Solenoid Valve ST: 0 to 2.7 MPa (0 to 27.5 kgf/cm^2, 0 to 391 psi)
- Function.....Oil cooler fan control solenoid valve SF
- Max. input pressure.....3.9 MPa (40 kgf/cm^2, 570 psi)
- Control pressure.....Solenoid Valve SF: 0 to 1.4 MPa (0 to 13.9 kgf/cm^2, 0 to 198 psi)

OIL COOLER
- Weight .....725 kg (1600 lbf)
- Core type.....Plate fin
- Capacity ..... -
- Air-tight testing pressure .....980 kPa (10 kgf/cm^2, 142 psi)

OIL COOLER FAN MOTOR
- Function.....A2FM63
- Displacement.....63 cm^3/rev
- Max Motor speed.....1400 min^{-1} (rpm) @ Engine 1650 min^{-1} (rpm)
- Relief valve.....21.6 MPa (220 kgf/cm^2, 3130 psi)

OIL COOLER BYPASS CHECK VALVE
- Cracking pressure .....245 kPa (2.5 kgf/cm^2, 36 psi) at 40 L/min (11 US gpm)

ELECTRICAL EQUIPMENT

BATTERY RELAY
- Voltage·Current .....24 V·100 A

STARTER RELAY 1
- Voltage·Current .....24 V·180 A

STARTER RELAY 2
- Voltage·Current .....24 V

CHARGE RELAY
- Voltage·Current .....24 V·10 A

LOAD DUMP RELAY
- Voltage·Current .....24 V·10 A

HORN
- Specifications .....24 V·2.3 A, 330 Hz

LIGHT
- Specifications .....Work lights : halogen 24 V·70 W

AIR CONDITIONER

Refrigerant	134 a
Cooler capacity	19.73 MJ/h (4600 kcal/h)
Cooler air flow	550 m^3/h (720 yd^3/h) or more
Heater capacity	21.0 MJ/h (5000 kcal/h) or more
Temperature control	Electronic control
Refrigerant quantity	Std. cab : 1250±50 g (2.76±0.1 lb) Elevated cab : 1300±50 g (2.87±0.1 lb)
Compressor oil quantity	Std. cab : 180 cm^3 (0.19 US qt) Elevated cab : 220 cm^3 (0.23 US qt) (After replacement of the compressor, high pressure hose, condenser, receiver tank, liquid hose, or air conditioner unit, the compressor oil quantity is added.)