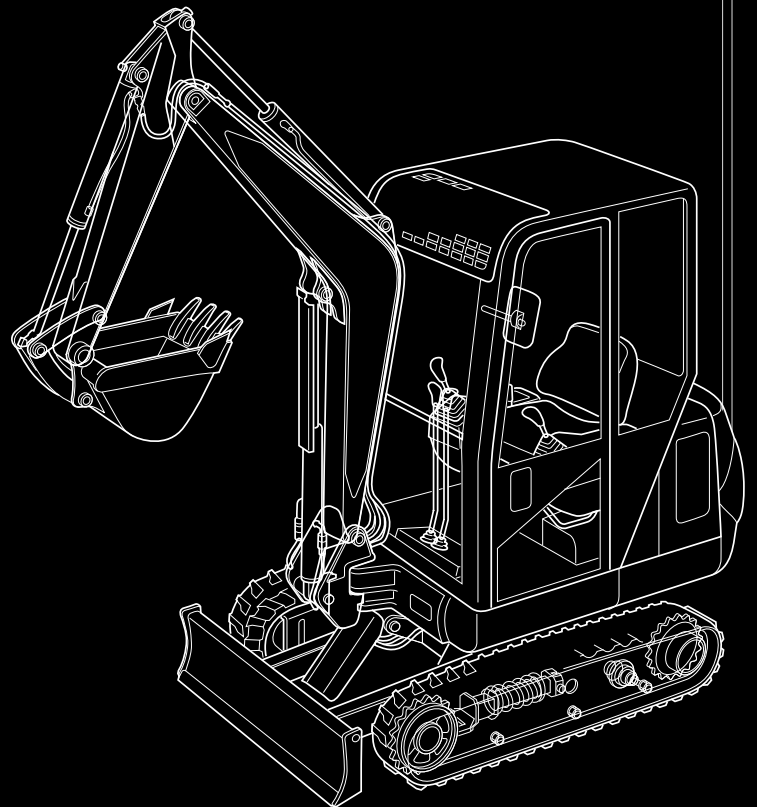


**H22B**

**HANIX**  
Japanese Craftsmanship



**H22B**

# Service Manual

Japanese Craftsmanship



# INTRODUCTION

To insure a long life for the machine and the engine and to prevent failure and problems, proper operation, maintenance and repairs are indispensable.

This service manual includes an “outline,” “structure and operation,” “inspection and adjustment,” “disassembly and assembly,” “standard maintenance,” and “repair and replacement of parts” of the machine which are necessary to carry out the inspections and repairs in the repair shop.

We hope that this manual helps you to efficiently and effectively carry out repairs by providing an accurate description of the product and the correct repair techniques.



# CONTENTS

1. Precautions on Maintenance
2. Outline
3. Attachment
4. Engine
5. Main Pump
6. Hydraulic Oil Filter
7. Control Valve
8. Joystick
9. Slew Motor
10. Travelling Motor
11. Hydraulic Cylinder
12. Swivel Joint
13. Crawler
14. Spring Case and Grease Cylinder
15. Idler
16. Sprocket
17. Track Roller
18. Electrical Equipment
19. Troubleshooting

# 1 PRECAUTIONS ON MAINTENANCE

## 1. Correct operation

Correct operation means to follow the correct “procedure” and “method.”

Procedure focuses on speed and accuracy of each job.

In the method, are addressed what type of facility, tools, instruments, materials, oil should be used, how and which part should be checked, adjusted or disassembled, and what matters to attend to.

## 2. Precautions on operation

### 1. Safety check

Check that stoppers and sleepers are correctly installed for the vehicle jack-up operation.

### 2. Preparation

Prepare all of the tools and inspect and adjust the instruments.

### 3. For efficiency

#### 1) Understand the state before disassembly.

What is the problem? Is disassembly absolutely necessary?

#### 2) Before disassembly

Determine whether match marks are necessary. For the electrical system, disconnect the cable from the battery terminal.

#### 3) Precautions for disassembly

In stead of checking all of the disassembled parts at once, check each part individually as it is disassembled. When removing the hydraulic unit or the hoses, mount a dust cap on the connection.

#### 4) Repair of disassembled parts

Keep the disassembled parts in order. Clearly distinguish the parts to be replaced with new parts from those to be reused. Packings, seals, rings, split pins must be replaced.

#### NOTE:

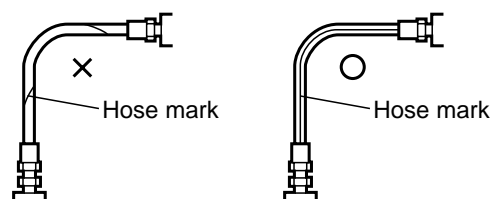
Electrical equipment, rubbers and V belts (which are easily affected by water and oil) must be handled carefully in order to prevent soiling them.

#### 5) Clean disassembled parts

Thoroughly clean the disassembled parts.

#### 6) Assembly

Perform the assembly correctly (tightening torque, application of Three Bond, screw lock, grease, use of seal tape, etc.). Also install the hose correctly.

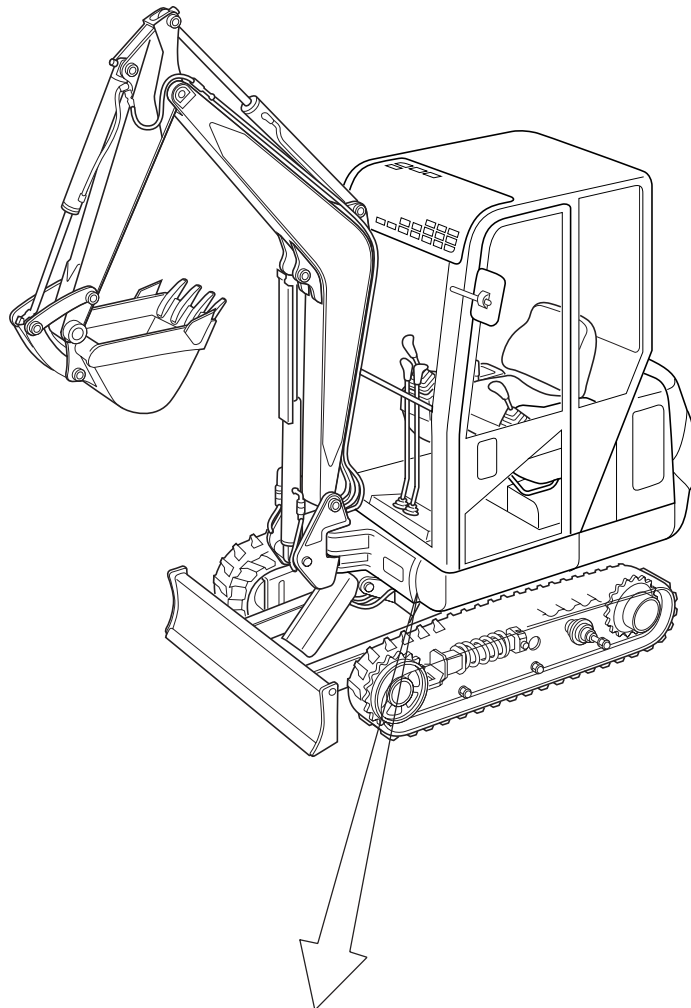


## **2** OUTLINE

### **CONTENTS**

- 2-1 Location of serial No.
- 2-2 Name of each part
- 2-3 Dimensions and specification
- 2-4 Weight list
- 2-5 Oil and grease supply points
- 2-6 List of supply oil and grease
- 2-7 When to repair
- 2-8 Hydraulic circuit diagram

## 2-1 Location of Serial Number



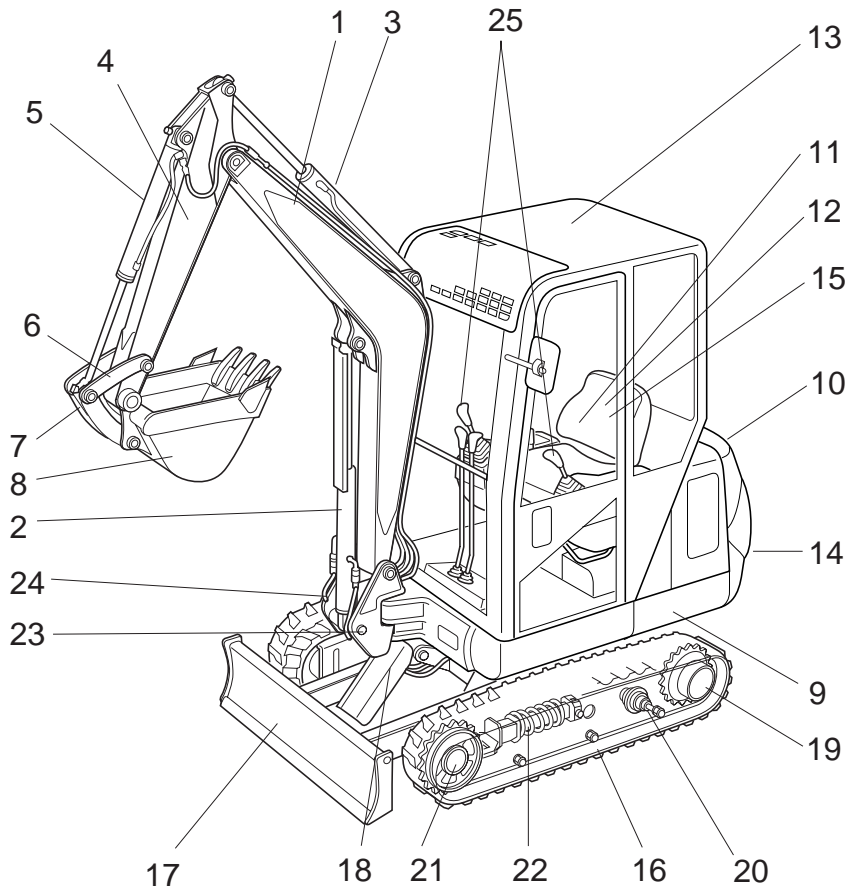
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	WEIGHT	<input type="text"/>	
	YEAR	<input type="text"/>	
ENGINE	MODEL	<input type="text"/>	
	NO.	<input type="text"/>	
	POWER	<input type="text"/>	
<b>HANIX EUROPE LTD.</b> Oldham Street, Denton, Manchester M34 3SW, United Kingdom. MADE IN U.K.			

Model name

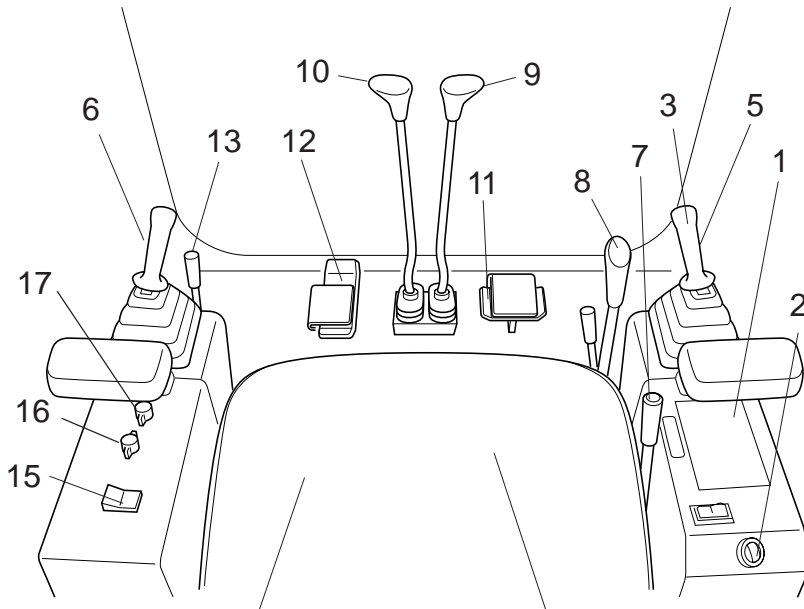
Serial No.



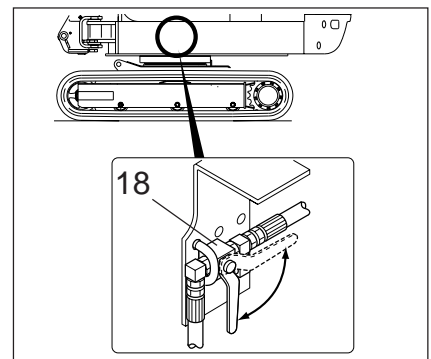
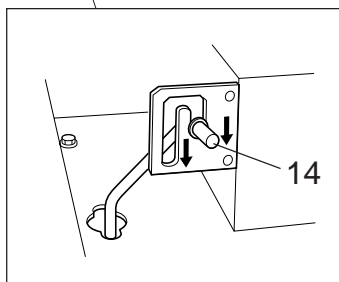
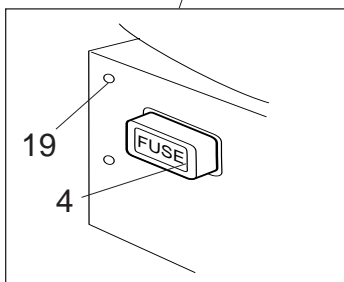
## 2-2 Name of each part



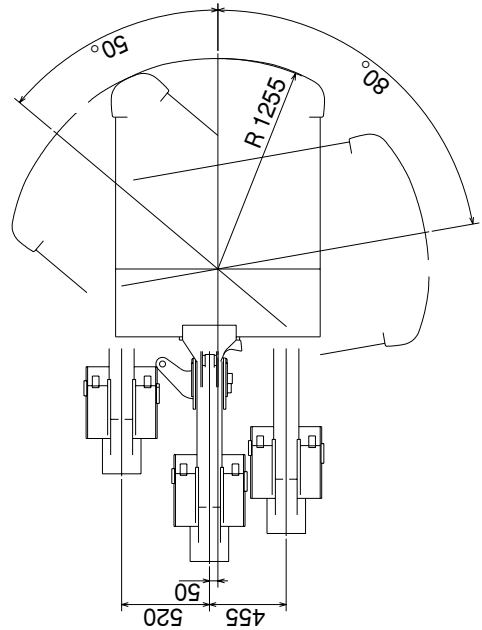
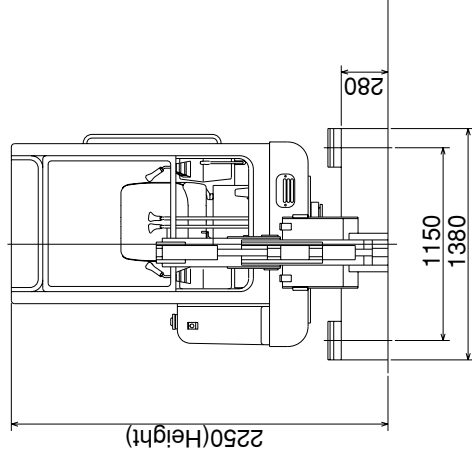
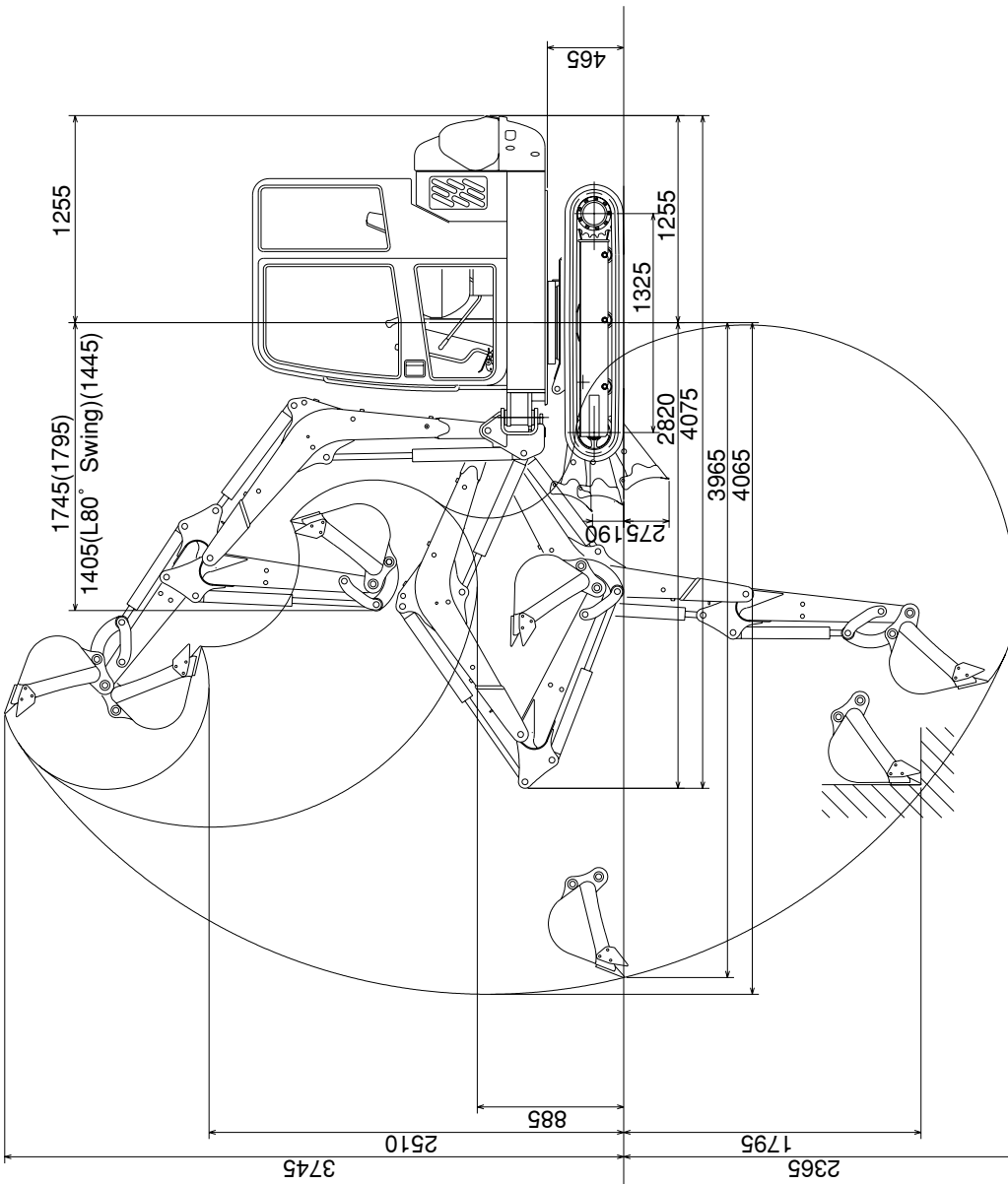
1. Boom
2. Boom cylinder
3. Arm cylinder
4. Arm
5. Bucket cylinder
6. Bucket links
7. Dump link
8. Bucket
9. Swing frame
10. Engine cover
11. Fuel tank
12. Hydraulic tank
13. Roof
14. Counter weight
15. Operator's seat
16. Crawler
17. Dozer blade
18. Dozer cylinder
19. Travelling motor
20. Track roller
21. Front idler
22. Grease cylinder
23. Swing post
24. Swing cylinder
25. Operation levers



1. Meter unit
2. Starter switch
3. Horn switch
4. Fuse box
5. Right operation lever
6. Left operation lever
7. Accelerator lever
8. Dozer operation lever
9. Right travelling lever
10. Left travelling lever
11. Swing pedal
12. P.T.O. pedal
13. Operation lock lever
14. Swing lock pin
15. Overdrive switch
16. Heater switch(for Cabin)
17. Wiper switch(for Cabin)
18. Manual boom lowering lever
19. Cigarette lighters



## 2-3 Dimensions and Specifications



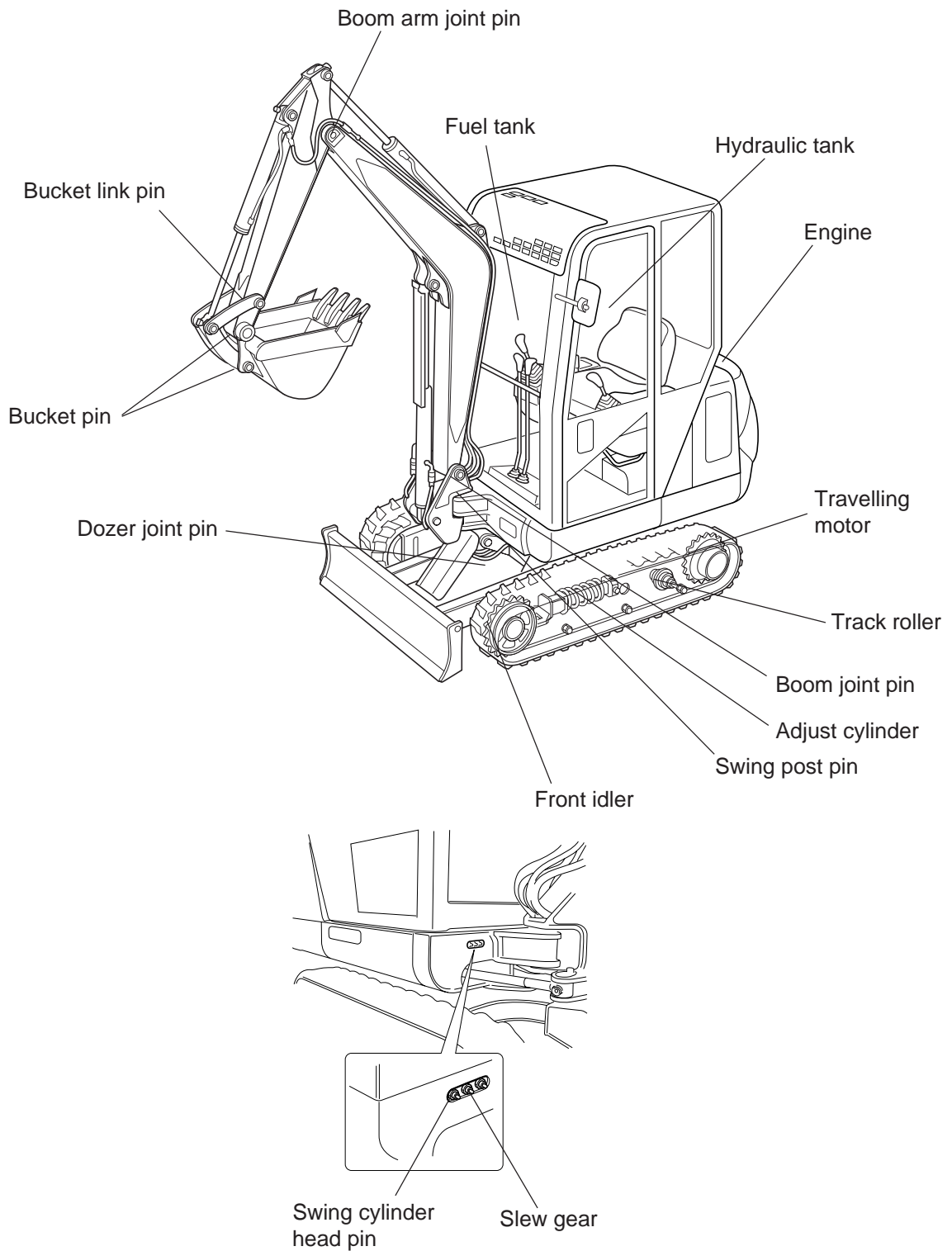
Model		Unit	H22B	
Machine weight	Cabin rubber	kg(lb)	2200(4850)	
	Cabin steel		2250(4960)	
Standard bucket capacity		m <sup>3</sup> (ft <sup>3</sup> )	0.06(2.1)	
Standard bucket width		mm(in)	450(17.7)	
Engine	Type		MITSUBISHI L3E	
	Displacement		cc(in <sup>3</sup> )	952(58.1)
	Rated output		kW(ps)/min <sup>-1</sup>	12.5(17)/2400
Working range	Max.digging depth		mm(in)	2365(93.1)
	Max. digging depth with blade down		mm(in)	2520(99.2)
	Max.vertical digging depth		mm(in)	1795(70.7)
	Max.digging height		mm(in)	3745(147.4)
	Max.dumping height		mm(in)	2510(98.8)
	Max.digging radius		mm(in)	4065(160.0)
	Min.turning radius	front	mm(in)	1745(68.7)
		swing	mm(in)	1405(55.3)
	Rear end radius		mm(in)	1255(49.4)
Boom swing angle		Angle	Left80°/Right50°	
Dimensions	Overall length		mm(in)	4075(160.4)
	Overall width		mm(in)	1380(54.3)
	Overall height		mm(in)	2250(88.6)
	Dozer(width×height)		mm(in)	1380×280(54.3×11.0)
Performance	Travelling speed		km(mile)/h	2.2(1.37)/3.8(2.36)
	Slew speed		min <sup>-1</sup>	11.5
	Gradeability		Angle	30°
	Max.digging force(bucket)		kN(lbf)	16.3(3664)
	Max.digging force(arm)		kN(lbf)	13.7(3082)
Undercarriage	Ground pressure	Cabin rubber	kPa(psi)	33.5(4.86)
		Cabin steel		34.2(4.96)
	Shoe width×tumbler center		mm(in)	230×1325(9.1×52.2)
	Type of travelling motor			Piston shoe-in type
Crawler tension system			Grease cylinder	
Hydraulic pressure	Type of hydraulic pump			Piston×2+Gear
	Main pump oil flow Qty.		ℓ (in <sup>3</sup> ·gallon)/min	24.0(1465·5.28·6.34US)×2+15.6(952·3.43·4.12US)
	P.T.O oil flow Qty.		ℓ (in <sup>3</sup> ·gallon)/min	48(2929·10.6·12.7US)
	Pressure P1,P2,P3		MPa(psi)	18.6(2698)×2+17.2(2495)
Capacity	Hyd.oil capacity		ℓ (in <sup>3</sup> ·gallon)	33(2014·7.26·8.72US)
	Engine oil capacity		ℓ (in <sup>3</sup> ·gallon)	3.6(220·0.79·0.95US)
	Fuel capacity		ℓ (in <sup>3</sup> ·gallon)	29(1770·6.38·7.66US)
	Cooling water capacity		ℓ (in <sup>3</sup> ·gallon)	4.3(262·0.95·1.14US)
Noise level Lw/LpA		dB	96/82	

## 2-4 Weight list

Unit: kg(lb)

Part name		Part name	
Boom	70(154)	Slew bearing	29(64)
Arm	40(88)	Track frame	179(395)
Bucket	57(125)	Dozer	74(163)
Dump link	9.4(21)	Crawler(steel)	84(185)×2
Bucket link(R)	1.7(3.7)	Crawler(rubber)	59(130)×2
Bucket link(L)	2.0(4.4)	Idler	8(18)×2
Boom joint pin	2.0(4.4)	Adjust cylinder	12(26)×2
Arm joint pin	1.7(3.7)	Track roller	5.0(11)×6
Bucket pin	1.7(3.7)×2	Sprocket	4(9)×2
Bucket link pin	1.5(3.3)	Slew motor	15(33)
Swing post	36(79)	Travering motor	25(55)×2
Swing post pin	4.1(9.0)	Joystick	2.0(4.4)×2
Swing frame	258(569)	Engine	94(207)
Hydraulic oil tank	28(62)	Radiator	7.0(15)
Fuel tank	16(35)	Battery	12(26)
Engine cover(A)(B)	24(53)	Seat plate	16.5(36)
Engine cover(C)	8.0(18)	Swivel joint	11(24)
Counter weight	200(441)	Pump	15(33)
Boom cylinder	20(44)	Pump frange	9(20)
Arm cylinder	20(44)	Control valve	23(51)
Bucket cylinder	17(37)	Tops roof	110(243)
Swing cylinder	16(35)	Cabin	230(507)
Dozer cylinder	13(29)		

## 2-5 Oil and grease supply points



## 2-6 List of lubrication

Name	Quantity of oil/water	Type of oil according to ambient condition	
		-10°C~40°C	-20°C~0°C
Engine cooling water	5.6 ℓ (1.2 gal, 1.5 U.S. gal, 342 in <sup>3</sup> )	Soft water (antifreeze is mixed in water)	
Fuel tank (effective capacity)	29 ℓ (6.4 gal, 7.7 U.S. gal, 1,770 in <sup>3</sup> )	Diesel fuel with freezing point below -7°C	
Engine lubricating oil	3.5 ℓ (0.8 gal, 0.9 U.S. gal, 213 in <sup>3</sup> )	SAE10W-30 CD (CF or higher grade in hot environment)	
Travelling motor (reduction gear)	0.33 ℓ (20.1 in <sup>3</sup> )	SAE 30-CD	
Hydraulic tank	33 ℓ (7.3 gal, 8.7 U.S. gal, 2,014 in <sup>3</sup> )	ISO VG 46	
Track roller (1 piece)	100cm <sup>3</sup> (6.1 in <sup>3</sup> )	SAE 30-CD	
Front idler (1 piece)	40cm <sup>3</sup> (2.4 in <sup>3</sup> )	SAE 30-CD	

### Genuine oil

Be sure to use Castrol Hyspin 46.

### Table of recommended Lubricants (makers shown below are reference purposes only)

No.	LUBRICANT	SHELL	MOBIL
1	Engine Oil	Myrina oil 10W-30	Delvac Super 10W-30
2	Gear Oil	Spirax Heavy Duty 140	Mobilub HD 85W-140
3	Hydraulic Oil	ISO VG 46 (equivalent)	ISO VG 46 (equivalent)
4	Cup Grease	Alvinia 2	Mobilux 2
5	Anti Freeze	Anti Freeze	Anti Freeze
6	Diesel Fuel	—	—

\*The engine oil SAE 10W-30 CF or equivalent at the time of shipment is used for the lubricating oil for slewing and travelling speed reducer.

\*Use class CD engine oil in API Service Classification (CF or higher in hot environment).

### Cooling water (antifreeze)

\*To prevent the cooling system from freezing, add antifreeze to the cooling water.

Replace the cooling water after 1 year from its delivery, because the effect will decrease.

\*Use "Long-life coolant" for the antifreeze.

\*Mixing ratio of antifreeze.

Temperature	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C
Injection rate	1.3 ℓ (79in <sup>3</sup> )	1.6 ℓ (97in <sup>3</sup> )	2.0 ℓ (122in <sup>3</sup> )	2.3 ℓ (140in <sup>3</sup> )	2.7 ℓ (165in <sup>3</sup> )	3.2 ℓ (195in <sup>3</sup> )

Engine inside capacity	Radiator capacity	Reserve tank capacity	Total
1.7 ℓ (104in <sup>3</sup> )	3.5 ℓ (214in <sup>3</sup> )	0.4 ℓ (23in <sup>3</sup> )	5.6 ℓ (342in <sup>3</sup> )

## 2-7 When to repair

It is difficult to judge when to perform periodic inspections, maintenance and repairs. Although the wearing rate of each component differs depending on the grade of daily inspection, the skill in machine operation, the working conditions, the quality of used lubricating oil, the frequency of oil replacement, the quality of land to be dug, the digging rate, the schedule for maintenance and repairs should be decided considering the state of engine, the indication of the hour meter, the degree of wear in each part, the state of hydraulic system, your experience and data.

### 2.7.1 Category of maintenance

Prestart-up inspection	Execute every day before beginning operation
Maintenance after the first 25 service hours	Execute every 25 hours by the hour meter
Maintenance after the first 50 service hours	Execute once a week (every 50 hours by the hour meter)
Maintenance after the first 100 service hours	Execute every 100 hours by the hour meter
Maintenance after the first 250 service hours	Execute every 250 hours by the hour meter
Maintenance after the first 300 service hours	Execute every 300 hours by the hour meter
Maintenance after the first 500 service hours	Execute every 500 hours by the hour meter
Maintenance after the first 1,000 service hours	Execute every 1,000 hours by the hour meter
Maintenance after the first 2,000 service hours	Execute every 2,000 hours by the hour meter

## 2-7-2 Maintenance procedure

	Inspection and maintenance item	Inspection and maintenance interval (hours)					
		7	50	100	250	500	1,000
1	Engine oil pan	Check oil level	Replace the engine oil (New machine only)		Replace the engine oil		Clean
	Engine oil filter		Replace the cartridge (New machine only)		Replace the cartridge		
2	Fuel filter			Check and clean		Replace the element	
3	Engine valve clearance		Inspect and adjust (New machine only)			Inspect and adjust	
4	Fan belt	Check and adjust					
5	Fuel tank	Check oil level	Drain water and sediment, clean strainer				
6	Radiator (sub-tank)	Check water level				Replace and clean	
	Radiator fin		Check and clean				
7	Air cleaner			Check and clean		Replace the element	
8	Hydraulic oil tank	Check oil level			Drain water and sediment		Replace oil
9	Hydraulic line filter			Replace the cartridge (New machine only)		Replace the cartridge	
10	Hydraulic suction filter			Clean the element (New machine only)		Replace the element	
11	Bucket teeth and others	Inspect					
12	Slew bearing		Inspect and grease				
13	Inspect crawler tension (grease cylinder) and grease the crawler	Check and adjust					
14	Battery liquid amount and specific gravity		Inspect, clean and supply distilled water				
15	Inspect each body part for loosening and damage	Check and tighten					
16	Each lever and instrument	Inspect					
17	Lubricating oil of slew/travelling reduction gear					Replace oil (after the first 500 service hours only for a new machine)	Replace oil
	Lubricating oil of track roller/Front Idler reduction gear						Replace oil
18	Electrical wiring	Inspect					
19	Water and oil leakage in each body part	Inspect					
20	Inspect and grease attachment	Inspect attachment	Supply oil and grease				



## 2-7-3 Prestart inspections

### (1)Prestart inspections

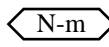
	Item	Content	Remarks
1	Engine oil pan	Check oil level	Before starting engine
2	Fuel tank	Check fuel level	Check that the fuel level is above the center of level gauge.
3	Radiator	Check water level	Check that the amount of water in sub-tank is within a specified level.
4	Each oil/grease supply point	Oil and grease	Refer to page 2-6
5	Inspect each body part for looseness and damage	Looseness, removal, water and oil leakage	Refer to tightening torque list.
6	Each lever and instrument	Operation check	Whether abnormal operation exists or not
7	Hydraulic oil tank	Check oil level	Add oil if its level falls below the specified level. (Be careful of the position of machine.)
8	Bucket teeth and others	Wear	Check whether the replacement of parts is necessary or not.
9	Electrical wiring	Looseness and tears	Loosened terminal, torn covering, etc.
10	Fan belt	Check and adjust	10 to 12 mm sag at the center

### (2)Post operation inspections

	Item	Content	Remarks
1	Each body part	Clean, check for water and oil leaks. Looseness, failure, etc.	Treatment of the part where cleaning was not sufficient such as dirt sticking to the body or muddy water remaining on the body.
2	Fuel tank	Fuel supply	Add fuel
3	Cooling water	Drain	Only when the danger of freezing exists

## Tightening Torque List

At prestart inspections, always check the bolts and nuts for looseness. If any bolt or nut is loose, retighten according to the table below.

 Tightening torque of the bolt and nut (Body)

Material Size	8.8 N-m(lb-ft)	10.9 N-m(lb-ft)	12.9 N-m(lb-ft)
M6	12.5 (9)	16 (12)	20 (15)
M8	30 (22)	39 (29)	45 (33)
M10	62 (46)	72 (53)	80 (59)
M12	100 (74)	120 (89)	130 (96)
M14	160 (118)	195 (144)	220 (162)
M16	250 (184)	305 (225)	340 (251)

 Tightening torque of the hydraulic pipings

PT screw

Torque Size	N-m (lb-ft)
$\frac{1}{4}$	36 (27)
$\frac{3}{8}$	55 (41)
$\frac{1}{2}$	86 (63)
$\frac{3}{4}$	130 (96)
1	195 (144)
$1\frac{1}{4}$	300 (221)
$1\frac{1}{2}$	400 (295)

PF screw

Torque Size	N-m (lb-ft)
$\frac{1}{4}$	27-30 (20-22)
$\frac{3}{8}$	47-52 (35-38)
$\frac{1}{2}$	57-63 (42-46)
$\frac{3}{4}$	108-120 (80-89)
1	126-140 (93-103)

#### 2-7-4 Maintenance after the first 50 service hours

	Item	Content	Remarks
1	Engine oil pan and Engine oil filter	Replace engine oil and filter	Only for a new machine. After this, every 250 service hours
3	Engine valve clearance	Inspect and adjust	Only for a new machine. After this, every 500 service hours

#### 2-7-5 Maintenance every 50 service hours

5	Fuel tank	Drain sediment and water	Remove the drain plug on the lower part of the tank
		Clean the strainer	Wash strainer with diesel fuel
6	Radiator fin	Clean the fins	Dust sticking to the fin affects the cooling effect and causes overheating
12	Slew bearing	Inspect and grease	Always grease the machine after it is used in water
14	Battery	Liquid quantity	Whether the liquid level is proper or not. If short, add distilled water
		Specific gravity	1.26 when fully charged; 1.20 when discharged (Recharge the battery when 1.20.)
		Clean	Clean each part, brush and connect terminal and apply grease
20	Each oil/grease supply point	Oil and grease	Refer to page 2-6

**2-7-6 Maintenance after the first 100 service hours**

	Item	Content	Remarks
9	Hydraulic line filter	Replace the cartridge	Only for a new machine. After this, every 500 service hours
10	Hydraulic suction filter	Clean the element	Only for a new machine. After this, every 500 service hours

**2-7-7 Maintenance every 100 service hours**

	Item	Content	Remarks
2	Fuel filter	Clean the element	After cleaning, open the cock to vent air
7	Air cleaner	Clean the dust cover, clean or replace the element	Check also for a loosened band

**2-7-8 Maintenance every 250 service hours**

	Item	Content	Remarks
1	Engine oil	Replace the engine oil	Remove the drain plug on the lower part of the tank. (After 50 service hours for a new machine)
	Engine oil filter	Replace the cartridge	After 50 service hours for a new machine
8	Hydraulic oil tank	Drain water and sediment	After air is vent, loosen the drain plug

**2-7-9 Maintenance after the first 500 service hours**

	Item	Content	Remarks
17	Lubricating oil of slew and travelling reduction gears	Replace lubricating oil	Replace oil after the first 500 service hours. Every 1,000 service hours after this (Refer to Table of Oil/Grease Supply Points)

**2-7-10 Maintenance every 500 service hours**

	Item	Content	Remarks
2	Fuel filter	Replace the element	Clean the inside of bowl
3	Engine valve clearance	Check valve clearance	Clearance between the valve and the rocker
6	Radiator	Replace cooling water and clean the radiator	Remove the drain plug, clean the radiator and add water to the sub-tank up to the specified level.
7	Air cleaner	Replace the element	
9	Hydraulic line filter	Replace the cartridge	After 100 service hours for a new machine
10	Hydraulic suction filter	Replace the element	