



### SAFETY ALERT SYMBOL


This symbol means Attention! Be Alert! Your Safety Is Involved.


The message that follows the symbol contains important information about safety.


Read and understand the message to avoid personal injury or death.

### ■ SIGNAL WORDS

Safety messages appearing in this manual and on machine decals are identified by the words “DANGER”, “WARNING” and “CAUTION”. These signal words mean the following:

 <b>DANGER</b>
The word “DANGER” indicates an imminently hazardous situation which, if not avoided, can result in serious injury or death.

 <b>WARNING</b>
The word “WARNING” indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

 <b>CAUTION</b>
The word “CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.


**IMPORTANT:** The word “IMPORTANT” is used to alert against operators and maintenance personnel about situations which can result in possible damage to the machine and its components.

This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. For maintenance work, each person must take adequate safety precautions against possible hazards present in the respective working environment.

### ■ SYMBOLS

 means “Please refer to the section quoted.”

 Indicates the tightening torque at the specific section that requires special attention in designing.

 Indicates the mass of a part or device.

## **FOREWORD**

This manual is intended for persons who engage in maintenance operations, and explains procedures for disassembly and reassembly of the machine, check and maintenance procedures, maintenance reference values, troubleshooting and outline specifications, etc. Please use this manual as a reference in service activities to improve maintenance techniques.

Further, please be advised that items contained in this manual are subject to change without notice due to design modifications, etc.

### **MACHINE FRONT AND REAR, LEFT AND RIGHT**

The end where the dozer blade is mounted is the front and the end with the travel motors is the rear. Also the right and left sides of the operator when he is seated in the driver's seat are the right and left sides of the machine.

### **MACHINE SERIAL NUMBER**

The machine serial number is stamped on the identification plate. When sending reports and inquiries, and when ordering parts, etc., be sure to include this number.

### **MANUAL CONTROL**

Information on those to whom this manual is distributed is recorded in the ledger in the section in charge at this company, so please decide on a person to be in charge of it and control it. When there are updates or additions, etc., we will notify the person in charge.

- I . GENERAL**
- II . SPECIFICATIONS**
- III. MACHINE CONFIGURATION**
- IV. HYDRAULIC UNITS**
- V . TROUBLESHOOTING**
- VI. ENGINE**

# **I . GENERAL**

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## SAFETY PRECAUTIONS

### Observe all safety rules

- Operation, inspection and maintenance of this machine must be performed only by a trained and qualified person.
- All rules, regulations, precautions and safety procedures must be understood and followed when performing operation, inspection and maintenance of this machine.
- Do not perform any operation, inspection and maintenance of this machine when under the adverse influence of alcohol, drugs, medication, fatigue, or insufficient sleep.

### Wear appropriate clothing and personal protective equipment

- Do not wear loose clothing or any accessory that can catch on controls or in moving parts.
- Do not wear oily or fuel stained clothing that can catch fire.
- Wear a hard hat, safety shoes, safety glasses, filter mask, heavy gloves, ear protection and other protective equipment as required by job conditions. Wear required appropriate equipment such as safety glasses and filter mask when using grinders, hammers or compressed air, as metal fragments or other objects can fly and cause serious personal injury.
- Use hearing protection when operating the machine. Loud prolonged noise can cause hearing impairments, even the total loss of hearing.



E3A040

### Provide a fire extinguisher and first aid kit

- Know where a fire extinguisher and first aid kit are located and understand how to use them.
- Know how to contact emergency assistance and first aid help.



E3A080

## GENERAL

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### Attach a “DO NOT OPERATE” tag

Severe injury could result if an unauthorized person should start the engine or touch controls during inspection or maintenance.

- Stop the engine and remove the key before performing maintenance.
- Attach a “DO NOT OPERATE” tag to the starter switch or control lever.

### Use the correct tools

Do not use damaged or weakened tools or tools designed for other purposes. Use tools suited for the operation at hand.



E3A530

### Replace important safety parts periodically

- Replace fuel hoses periodically. Fuel hoses become weaker over time, even if they appear to be in good shape.
- Replace important safety parts whenever an irregularity is found, even if it is before the normal time for replacement.

Refer to the section titled Important Parts for further details.

### Anti-explosive lighting

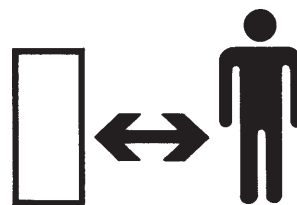
Use anti-explosive electrical fixtures and lights when inspecting fuel, oil, coolant, battery fluid, etc. If lighting that is not anti-explosive should break, the substance could ignite, resulting in serious injury or death.



E3A550

### Do not allow unauthorized personnel in the work area

Do not allow unauthorized personnel in the work area. Chips or other debris can fly off machine parts when grinding, welding or using a hammer.



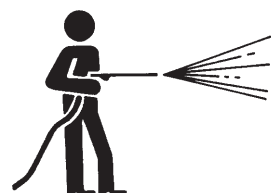
E3A140

### Prepare the work area

- Select a firm, level work area. Make sure there is adequate light and, if indoors, ventilation.
- Clear obstacles and dangerous objects. Eliminate slippery areas.

### Always clean the machine

- Clean the machine before performing maintenance.
- Cover electrical parts when washing the machine. Water on electrical parts could cause short-circuits or malfunctions.  
Do not use water or steam to wash the battery, sensors, connectors or the operator's seat area.



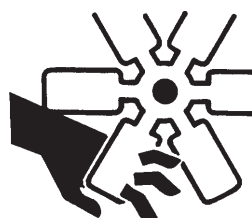
E3A580

### Stop the engine before performing maintenance

- Avoid lubrication or mechanical adjustments with the machine in motion or with the engine running while stationary.
- If maintenance must be performed with the engine running, always work as a 2-person team with one person sitting in the operator's seat while the other works on the machine.
  - When performing maintenance, be sure to keep your body and clothing away from moving parts.

### Stay clear of moving parts

- Stay clear of all rotating and moving parts. Wrapping or entanglement may result in serious injury or death.
- Keep hands, clothing and tools away from the rotating fan and running fan belts.



E3A630



## GENERAL

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### Securely block the machine or any component that may fall

- Before performing maintenance or repairs under the machine, set all working equipment against the ground or in the lowermost position.
- Securely block the tracks.
- If you must work beneath the raised machine or equipment, always use wood blocks, jack-stands or other rigid and stable supports. Never get under the machine or working equipment if they are not sufficiently supported. This procedure is especially important when working on hydraulic cylinders.



E3A570

### Securely block the working equipment

To prevent unexpected movement, securely block the working equipment when repairing or replacing the cutting edges or bucket teeth.

### Secure the engine hood or cover when opened

Be sure to secure the engine hood or cover when opening it. Do not open the engine hood or cover on slopes or in strong wind.

### Cautions on tilting up the platform

- Raising or lowering the platform while the engine is running may cause the machine to move, and cause serious injury or death.  
Stop the engine before raising or lowering the platform.
- When the floor is tilted up, support it firmly with the stopper to prevent it from falling.

### Place heavy objects in a stable position

When removing or installing the hoe attachment, place it in a stable position so that it does not tip over.



E3A560

### Use caution when fueling

- Do not smoke or permit open flames while fueling or near fueling operations.
- Never remove the fuel cap or refuel with the engine running or hot. Never allow fuel to spill on hot machine components.
- Maintain control of the fuel filler nozzle when filling the tank.
- Do not fill the fuel tank to capacity. Allow room for expansion.
- Clean up spilled fuel immediately.
- Tighten the fuel tank cap securely. Should the fuel cap be lost, replace it only with the original manufacturer's approved cap. Use of a non-approved cap without proper venting may result in pressurization of the tank.
- Never use fuel for cleaning purposes.
- Use the correct fuel grade for the operating season.



### Handling of hoses

Fuel, oil or hydraulic fluid leaks can cause a fire.

- Do not twist, bend or hit the hoses.
- Never use twisted, bent or cracked hoses, tubes and pipes. They may burst.
- Retighten loose connections.

### Be careful with hot and pressurized components

Stop the engine and allow the machine to cool down before performing inspection and maintenance.

- The engine, muffler, radiator, hydraulic lines, sliding parts and many other parts of the machine are hot directly after the engine is stopped. Touching these parts will cause burns.
- The engine coolant, oil and hydraulic fluid are also hot and under high pressure.

Be careful when loosening caps and plugs. Working on the machine under these conditions could result in burns or injuries due to the hot oil spurting out.



E3A110

## GENERAL

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### Be careful with hot cooling systems

Do not remove the radiator cap or drain plugs when the coolant is hot. Stop the engine, let the engine and radiator cool and loosen the radiator cap or drain plugs slowly.



E3A540

### Be careful with fluids under pressure

Pressure can be maintained in the hydraulic circuit long after the engine has been shut down.

- Release all pressure before working on the hydraulic system.
- Hydraulic fluid under pressure can penetrate the skin or eyes and cause injury, blindness or death. Fluid escaping from a small hole can be almost invisible. Wear a safety goggles and heavy gloves and use a piece of cardboard or wood to search for suspected leaks.

If fluid is injected into the skin, it must be removed within a few hours by a doctor familiar with this type of injury.



E3A600

### Release all pressure before working on the hydraulic system

Oil may spurt out if caps or filters are removed or pipes disconnected before releasing the pressure in the hydraulic system.

- Gradually loosen the vent plug to relieve tank pressure.
- Move all the control levers and pedals several times in all directions to release the pressure from the working equipment circuitry. (For link type controls)
- When removing plugs or screws or disconnecting hoses, stand to the side and loosen slowly to gradually release the internal pressure before removing.

### Be careful with grease under pressure

The track adjuster contains highly pressurized grease. If the tension is adjusted without following the prescribed procedure, the grease discharge valve may fly off, resulting in injury.

- Loosen the grease discharge valve slowly. Do not unfasten it more than one full turn.
- Do not put your face, arms, legs or body in front of the grease discharge valve.



E3A620

### Disconnect the battery

Disconnect the battery before working on the electrical system or doing any welding. Remove the negative (–) battery cable first. When reconnecting the battery, connect the negative (–) battery cable last.



E3A590

### Avoid battery hazards

- Batteries contain sulfuric acid which will damage eyes or skin on contact.
  - If acid contacts eyes, flush immediately with clean water and get prompt medical attention.
  - If acid is accidentally swallowed, drink large quantities of water or milk and call a physician immediately.
  - If acid contacts skin or clothing, wash off immediately with clean water.
- Wear safety glasses and gloves when working with batteries.
- Batteries generate flammable and explosive gases. Keep arcs, sparks, flames and lighted tobacco away.
- Use a flashlight to check battery electrolyte level.
- Stop the engine and shut off electrical equipment while inspecting or handling the battery.
- Do not short circuit the battery posts with metal items.
- Always unfasten the negative (–) battery cable first when disconnecting the battery cable. Always connect the negative (–) battery cable last when fastening the battery cable.
- Loose battery terminals may result in sparks. Be sure to fasten terminals tightly.
- Make sure the vent caps are tightened securely.
- Do not charge a battery or jump-start the engine if the battery is frozen. Warm to 15°C (60°F) or the battery may explode.

## GENERAL

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### Have a Takeuchi service agent repair welding cracks or other damage

Ask a Takeuchi service agent to repair any welding problems which are detected. If not feasible, make sure the welding is done by a qualified person in a properly equipped workplace.

### Safety signs

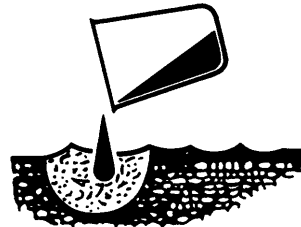
- Keep all safety signs clean and legible.
- Replace all missing, illegible or damaged safety and warning signs.

### Checks after maintenance

- Gradually raise the engine speed from a low idle to maximum speed and check that no oil or air is leaking from serviced parts.
- Move the controls and check that the machine is operating properly.

### Disposing of wastes

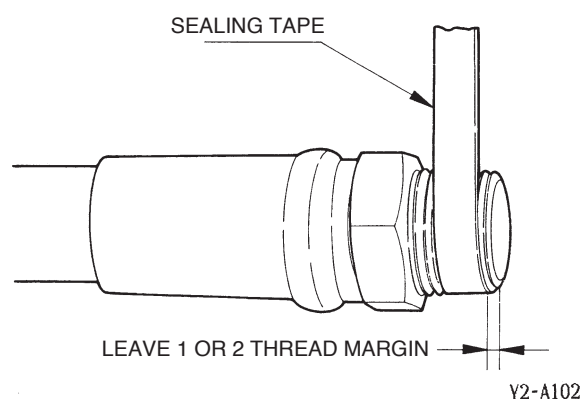
- Funnel spent fluids from the machine into containers. Disposing of fluids improperly destroys the environment.
- Follow the prescribed regulations when disposing of oil, fuel, engine coolant, refrigerant, solvents, filters, batteries or other harmful substances.



E3A640

**CAUTIONS DURING DISASSEMBLY AND ASSEMBLY**

1. Clean the machine before disassembly operation.
2. Before disassembly, check the machine conditions and record them.
  - Model, Machine Serial Number, Hourmeter
  - Reason for Repairs, Repair History
  - Dirtiness of Filters
  - Fuel and Oil Conditions
  - Damage to each parts, etc.
3. To make reassembly operations easy, make matching marks at the necessary points.
4. Clean all disassembled parts and new parts, then arrange them in the proper sequence.
5. Be sure to replace all seals and cotter pins, etc., with new parts.
6. Keep parts which should not come in contact with oil and water separate from parts with oil on them.
  - Electrical Parts, Rubber, V-Belts, etc.
7. When installing bearings, bushings and oil seals, as a rule, use a press. When a hammer, etc., is used, it leaves bruises.
8. Wipe all joining surfaces clean so that there is no dirt or dust adhering to them.
9. Wrap seal tape from the front end, Wrapping it tight and leaving 1 or 2 threads bare, Overlap the tape by about 10 mm.

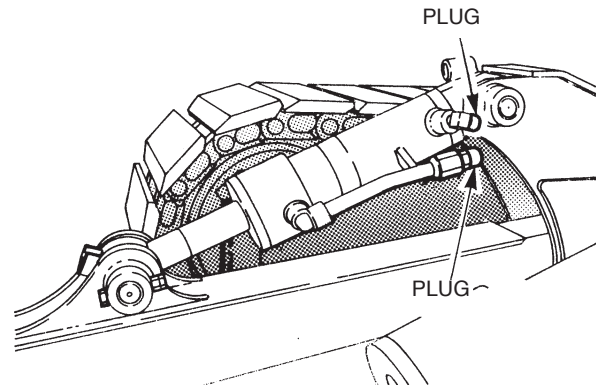


10. When fitting the snap rings, the bigger, rounder side of their circumferences should face the mating surfaces.

## GENERAL

### CAUTIONS DURING REMOVAL AND INSTALLATION OF THE HYDRAULIC UNITS

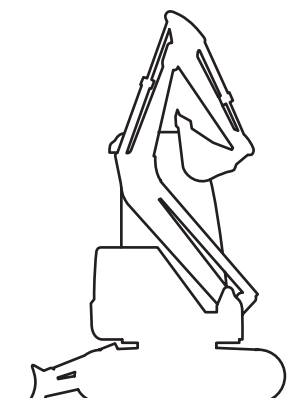
1. Make sure that the hydraulic oil's temperature has dropped.
2. To prevent a loss of flow of the hydraulic oil, the residual pressure in the piping and the internal pressure in the hydraulic oil tank should be bled out.
3. Be sure to install caps or plugs on all openings in the hydraulic unit to prevent dirt from getting into the unit through the openings.



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4. It is easy to mistake hydraulic oil adhering to the hydraulic unit for an oil leak, so wipe the unit off thoroughly.
5. Be sure that no damage is done to the plating on the rod in the hydraulic cylinder.
6. As a rule, removal and installation of the hydraulic cylinder should be done with the rod fully retracted.
7. Be sure to bleed the air after replacing the hydraulic oil or removing any of the hydraulic devices.  
☞ “III. Machine Configuration, Hydraulic System”

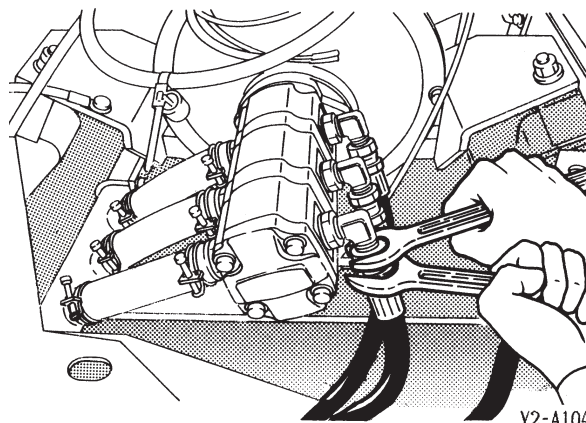
8. After installation of the hydraulic unit, be sure to pressurize the hydraulic oil tank. If this operation is forgotten, it could cause cavitation of the hydraulic pump. Also, it could have a drastic effect on the life of the hydraulic pump.
  - Hydraulic tank pressurization method:  
Lower the dozer blade until it comes in contact with the ground. Extend all the cylinders fully except the dozer blade cylinder. In this state, tighten the air vent plug to seal the tank tight.



E4G013A

**CAUTIONS DURING REMOVAL AND INSTALLATION OF PIPING**

1. When hydraulic hoses are installed, tighten them once to the prescribed torque, then loosen them slightly and retighten them to the prescribed torque.
  - Tighten the fittings after the installation surfaces fit snugly together.
  - Pieces wrapped with seal tape are excluded.
2. Use 2 spanners, each on an opposite side, to remove and tighten fittings so that the hoses or steel pipes are not twisted.



3. After installation of hydraulic hoses or steel pipes, apply the maximum working pressure 5 or 6 times and confirm that there is no leakage.

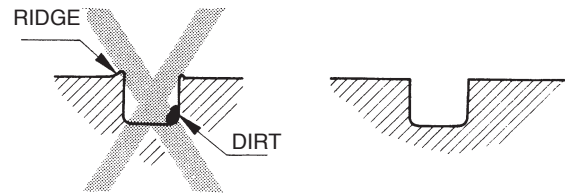


## GENERAL

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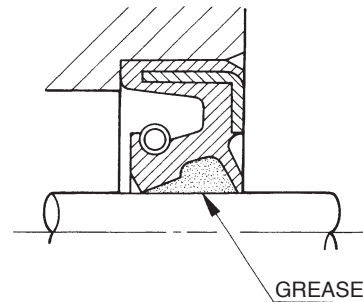
### HANDLING OF SEALS

1. Clean the grooves for O-rings and if there is any ridge, etc., remove it.



Y2-A105

2. Be careful not to twist O-rings. If an O-ring is twisted, remove the twist with the fingertips.
3. During insertion, be careful not to damage the seal.
4. Handling of Floating Seals
  - Wipe all oil off the O-ring and housing of the floating seal.
  - When assembling, apply a thin coating of gear oil to the contact surface of the housing.
  - After assembly, turn the seal 2 or 3 times to get it to fit snugly.
5. Apply grease to the lip of the oil seal.
  - This is to prevent wear when it is first started up after assembly.

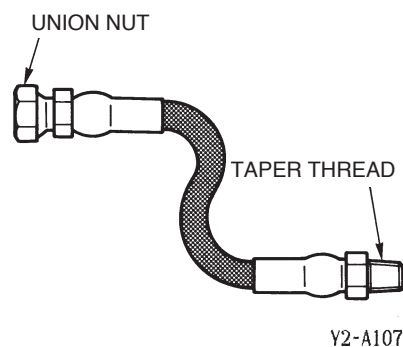


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## TIGHTENING TORQUES

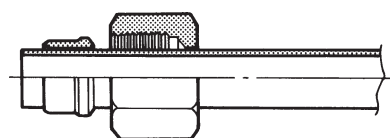
## Hydraulic Hoses

Hose Fitting Size	Torque			
	Union Nut (G)		Taper Thread (R)	
	N·m	ft-lb	N·m	ft-lb
1/8	9.8 $^{+4.9}_0$	7.3 $^{+3.5}_0$	11.8 ±1.2	8.7 ±0.8
1/4	24.5 $^{+4.9}_0$	18.1 $^{+3.5}_0$	29.4 ±2.9	21.7 ±2.1
3/8	49 $^{+4.9}_0$	36.2 $^{+3.5}_0$	53.9 ±5.4	39.8 ±3.9
1/2	58.8 $^{+4.9}_0$	43.4 $^{+3.5}_0$	88.3 ±8.8	65.1 ±6.4
3/4	117.7 $^{+4.9}_0$	86.8 $^{+3.5}_0$	147.1 ±14.7	108.5 ±10.7
1	137.3 $^{+4.9}_0$	101.3 $^{+3.5}_0$	196.1 ±19.6	144.7 ±14.3



## Bite Type Pipe Fitting for Steel Pipe

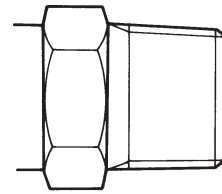
Pipe Outer Diameter (mm)	Torque	
	N·m	ft-lb
8	34.3 ±4.9	25.3 ±3.5
10	41.7 ±2.5	30.7 ±1.7
12	58.8 ±4.9	43.4 ±3.5
15	88.3 ±4.9	65.1 ±3.5
16	93.2 ±4.9	68.7 ±3.5
18	132.4 ±4.9	97.6 ±3.5
22	205.9 ±9.8	151.8 ±7.2
27.2	245.2 ±9.8	181.0 ±7.2
28	313.8 ±19.6	231.4 ±14.3
32	313.8 ±19.6	231.4 ±14.3
35	411.9 ±19.6	303.7 ±14.3



## GENERAL

### Joints for Piping

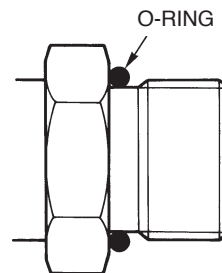
Nominal Thread Diameter (R)	Torque			
	Steel		Cast Steel	
	N·m	ft-lb	N·m	ft-lb
1/8	11.8 ±1.2	8.7 ±0.8	10.8 ±1.1	8.0 ±0.7
1/4	29.4 ±2.9	21.7 ±2.1	24.5 ±2.5	18.1 ±1.7
3/8	53.9 ±5.4	39.8 ±3.9	49 ±4.9	36.2 ±3.5
1/2	88.3 ±8.8	65.1 ±6.4	73.5 ±7.4	54.3 ±5.3
3/4	147.1 ±14.7	108.5 ±10.7	127.5 ±12.7	94.1 ±9.3
1	196.1 ±19.2	144.7 ±14.3	171.6 ±17.2	126.6 ±12.5



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### Joints for Piping (O-ring Seal Type)

Nominal Thread Diameter (G)	Torque	
	N·m	ft-lb
1/8	19.6 ±2.0	14.5 ±1.4
1/4	34.3 ±4.9	25.3 ±3.5
3/8	53.9 ±4.9	39.8 ±3.5
1/2	63.7 ±4.9	47.0 ±3.5
3/4	93.2 ±4.9	68.7 ±3.5
1	107.9 ±9.8	79.5 ±7.2
1-1/4	117.7 ±9.8	86.8 ±7.2
1-1/2	137.3 ±9.8	101.2 ±7.2



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Nominal Thread Diameter (UNF)	Torque	
	N·m	ft-lb
7/16–20	16.7 ±2.0	12.3 ±1.4
1/2–20	22.6 ±2.0	16.6 ±1.4
9/16–18	31.4 ±2.9	23.1 ±2.1
3/4–16	59.8 ±4.9	44.1 ±3.5
1-1/16–12	102.0 ±5.9	75.2 ±4.4
1-5/16–12	135.3 ±7.8	99.8 ±5.8
1-5/8–12	181.4 ±9.8	133.8 ±7.2

**Bolts and Nuts (for ISO Strength Category 10.9)**

Thread	Size × Pitch	Torque					
		General Tightening Points			Special Tightening Points		
		N·m	kgf·m	ft-lb	N·m	kgf·m	ft-lb
Coarse	M 6 × 1.0	9.8 ±0.5	1.0 ±0.05	7.2 ±0.4	11.8 ±0.6	1.2 ±0.06	8.7 ±0.4
	M 8 × 1.25	22.6 ±1.1	2.3 ±0.11	16.6 ±0.8	26.5 ±1.3	2.7 ±0.13	19.5 ±0.9
	M10 × 1.5	47.1 ±2.4	4.8 ±0.24	34.7 ±1.7	54.9 ±2.7	5.6 ±0.28	40.5 ±2.0
	M12 × 1.75	83.4 ±4.1	8.5 ±0.42	61.5 ±3.0	97.1 ±4.8	9.9 ±0.49	71.6 ±3.5
	M14 × 2.0	134.4 ±6.7	13.7 ±0.68	99.1 ±4.9	155.9 ±7.7	15.9 ±0.79	115.0 ±5.7
	M16 × 2.0	207.9 ±10.4	21.2 ±1.06	153.3 ±7.7	241.2 ±12.1	24.6 ±1.23	177.9 ±8.9
	M20 × 2.5	410.9 ±20.5	41.9 ±2.09	303.1 ±15.1	475.6 ±23.7	48.5 ±2.42	350.8 ±17.5
Fine	M 8 × 1.0	24.5 ±1.2	2.5 ±0.12	18.1 ±0.9	28.4 ±1.4	2.9 ±0.14	21.0 ±1.0
	M10 × 1.25	50.0 ±2.5	5.1 ±0.25	36.9 ±1.8	58.8 ±2.9	6.0 ±0.30	43.4 ±2.2
	M12 × 1.5	87.3 ±4.3	8.9 ±0.44	64.4 ±3.2	102.0 ±5.1	10.4 ±0.52	75.2 ±3.8
	M14 × 1.5	135.3 ±6.8	13.8 ±0.69	99.9 ±5.0	157.9 ±7.8	16.1 ±0.80	116.5 ±5.8
	M16 × 1.5	220.6 ±11.0	22.5 ±1.12	162.7 ±8.1	256.0 ±12.7	26.1 ±1.30	188.8 ±9.4
	M20 × 1.5	452.1 ±22.6	46.1 ±2.30	333.4 ±16.6	524.7 ±26.1	53.5 ±2.66	387.0 ±19.2

- General Tightening Points (Non-lubricated)
  - All securing points other than the special tightening points.
- Special Tightening Points (Grease with molybdenum disulfide applied.)
  - Points where particularly necessary due to function.  
Special tightening positions and associated instructions are given in the text.
- Points where thread-locking compound is used (Three Bond #1324 is applied.)  
Thread-locking compound positions and associated instructions are given in the text.
- If tightening torque values are provided in this manual, then tightening should be done according to those values.  
(This indicates that the tightening torque differs from the values given in this table.)
- In order to tighten bolts and nuts evenly, they should be tightened alternately top, bottom, left, right.

## **II . SPECIFICATIONS**

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### **In regard to Standard Values and Allowable Values**

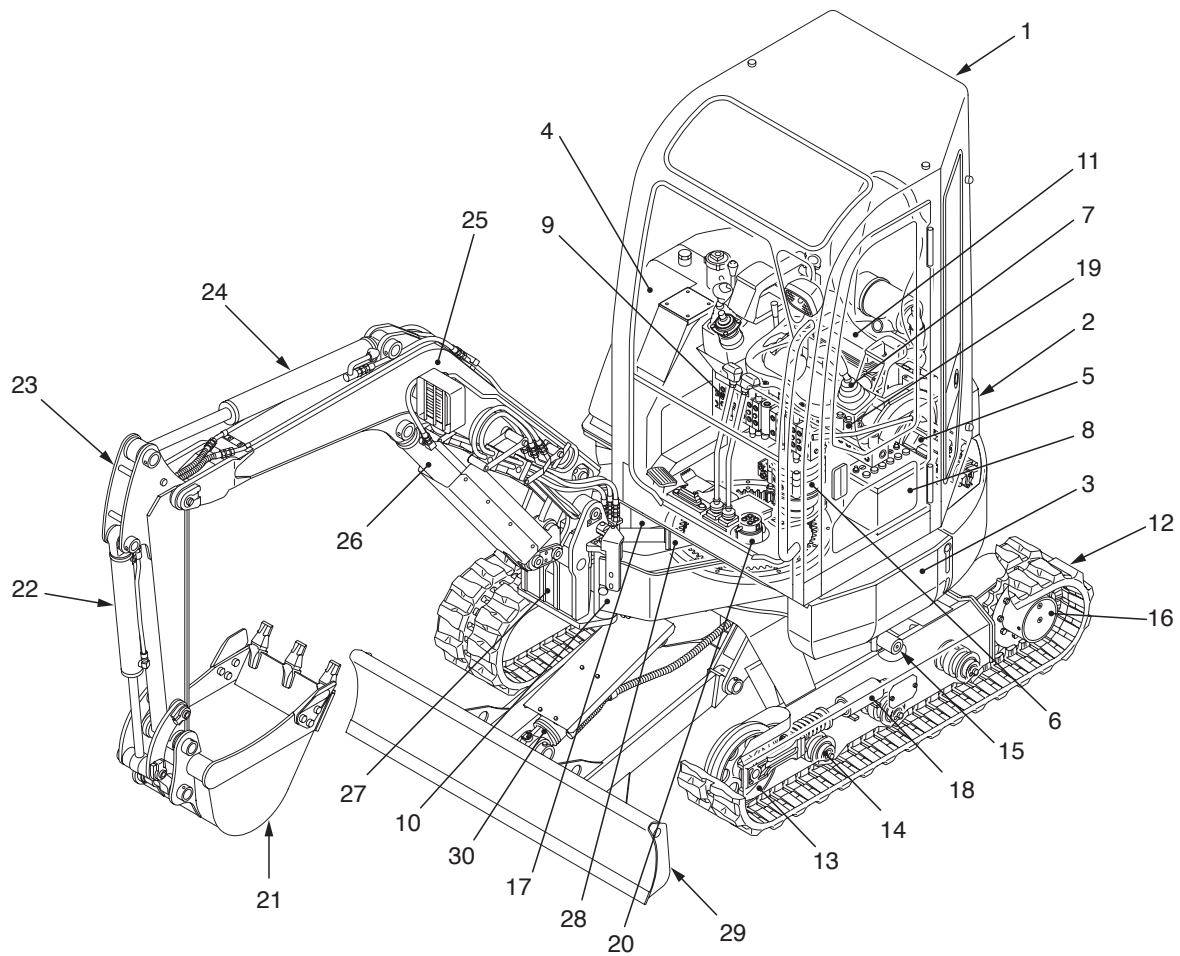
The terms used in the items “Servicing Standards” and “Standards for Judging Performance” have the following meanings.

Standard Value ..... This indicates the standard value for the new machine at the time of shipping from the factory.  
It should be used as the target value for maintenance work after operation.

Allowable Value ..... The dimensions of parts change during use because of wear and deformation. Also, the performance of pumps, motors, and other hydraulic equipment drops, and this is the estimated value indicating the use limit for the respective part. It is decided under reference to the standard at the time of shipping, the results of various tests, etc. As the use conditions, the degree of repairs, etc., differ for each machine, these should be combined and used as reference for servicing standards and standards for judging performance.

\* Do not use the standard values and the allowable values as standards for customer claims.

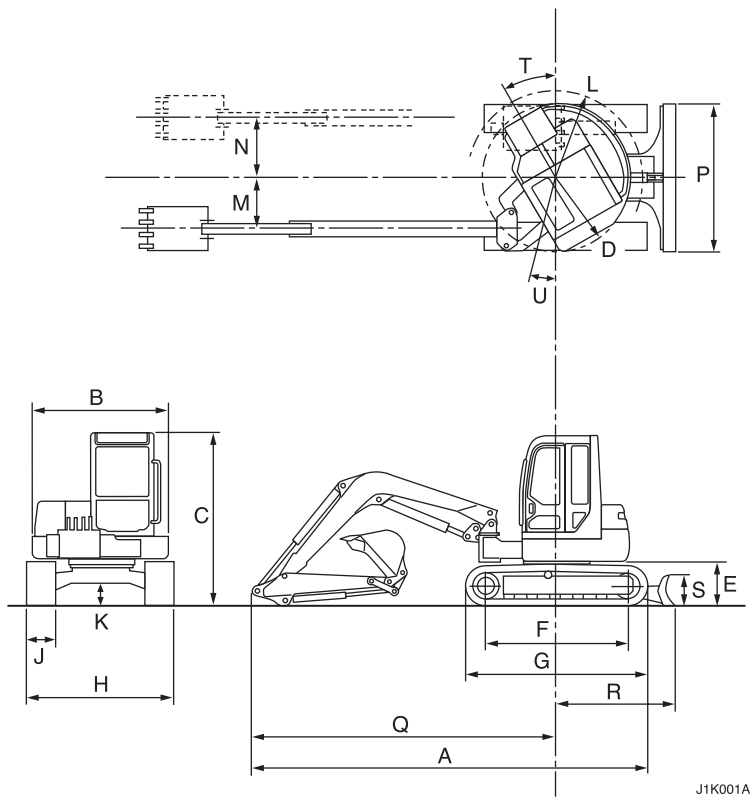
**NAMES OF COMPONENTS**



F4B000

- |                   |                    |                          |
|-------------------|--------------------|--------------------------|
| 1. Cab            | 11. Engine         | 21. Bucket               |
| 2. Engine hood    | 12. Crawler belt   | 22. Bucket cylinder      |
| 3. Fuel tank      | 13. Idler          | 23. Arm                  |
| 4. Hydraulic tank | 14. Track roller   | 24. Arm cylinder         |
| 5. Hydraulic pump | 15. Carrier roller | 25. Boom                 |
| 6. Slew motor     | 16. Travel motor   | 26. Boom cylinder        |
| 7. Pilot valve    | 17. Right link arm | 27. Boom bracket         |
| 8. Battery        | 18. Track adjuster | 28. Offset cylinder      |
| 9. Control valve  | 19. Solenoid valve | 29. Dozer blade          |
| 10. Left link arm | 20. Swivel joint   | 30. Dozer blade cylinder |

DIMENSIONS

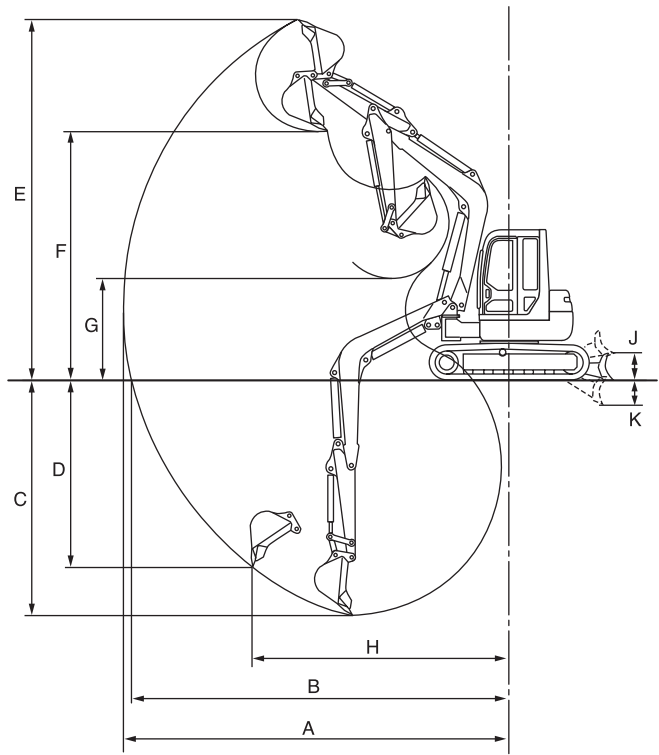


J1K001A

Machine Dimensions

Unit: mm

	Canopy	Cab
A	4250	←
B	1515	←
C	2550	2525
D	780	←
E	605	←
F	1545	←
G	2000	←
H	1560	←
J	300	←
K	300	←
L	1015	←
M	670	←
N	695	←
P	1560	←
Q	3245	←
R	1315	←
S	350	←
T	30°	←
U	15°	←



J1K002A

Operating Range

Unit: mm

	Canopy	Cab
A	4760	←
B	4630	←
C	2575	←
D	2150	←
E	4700	←
F	3380	←
G	1440	←
H	3130	←
J	335/320*	←
K	280/285*	←

\*Serial No. 12820076~



## LIFTING CAPACITIES

- The loads in the charts do not exceed 87% of hydraulic lift capacity or 75% of tipping load.
- Rated lift capacities limited by rated hydraulic lift capacity are identified by an asterisk. (\*)
- The mass of slings and any auxiliary lifting devices shall be deducted from the rated load to determine the net load that may be lifted.
- The load point is the bucket hinge pin, and the bucket posture is with the standard bucket completely retracted under the arm.
- Units: kg (lbs.)

### Load hooking system

A load hooking system with all of the following capacities must be provided and used.

1. A system which can withstand a weight of two times the rated lift capacity no matter at what position the load is applied.
2. A system in which there is no risk of the lifted load falling from the hooking device, for example one equipped with a hook slippage prevention device.
3. A system in which there is no risk of the hooking system slipping from the hoe attachment.

### WARNING

- DO NOT attempt to lift or hold any load that is greater than these rated values at their specified load radii and height.
- All rated lift capacities are based on the machine being level and on a firm supporting surface. For safe working loads, the user is expected to make due allowance for the particular job conditions such as soft or uneven ground, non-level condition, side loads, hazardous conditions, experience of personnel, etc. The operator and other personnel should fully acquaint themselves with the operator's manual furnished by the manufacturer before operating this machine, and rules for safe operation of equipment shall be adhered to at all times.

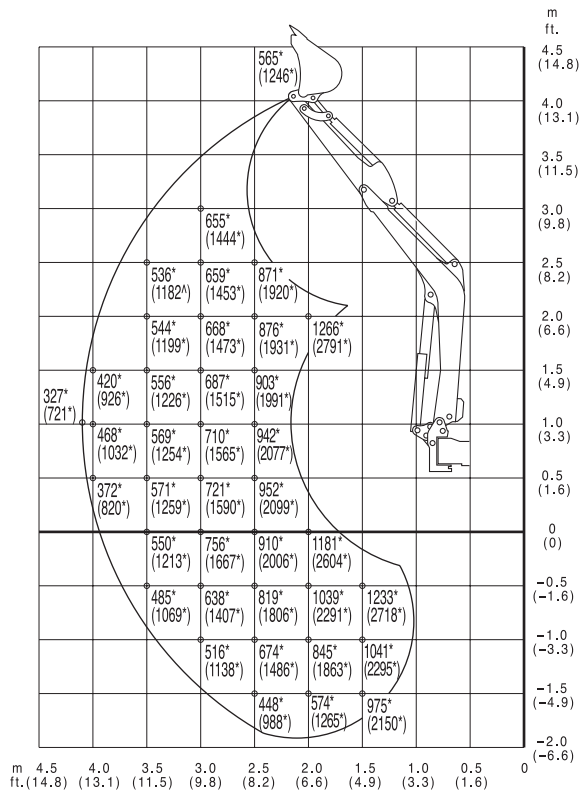
## SPECIFICATIONS

## LIFTING CAPACITIES

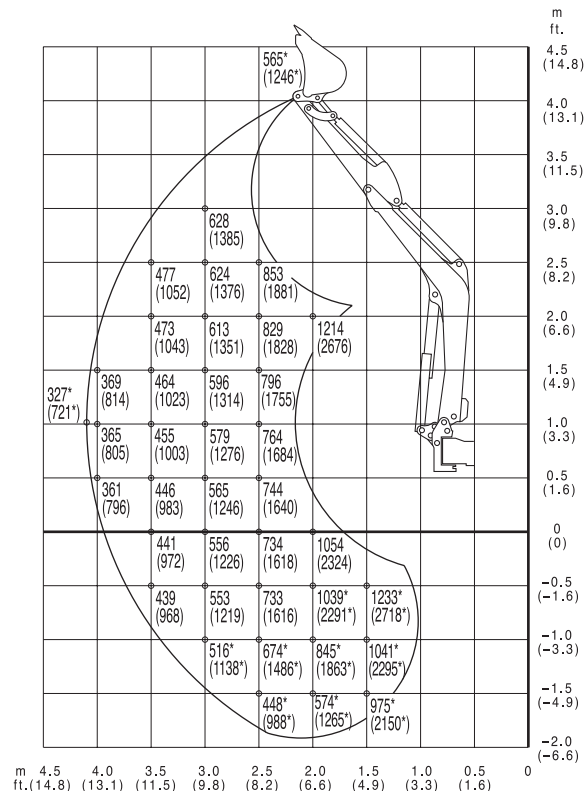
### Equipped with Standard Arm

Unit: kg (lbs.)

### Over Front; Dozer Blade Down

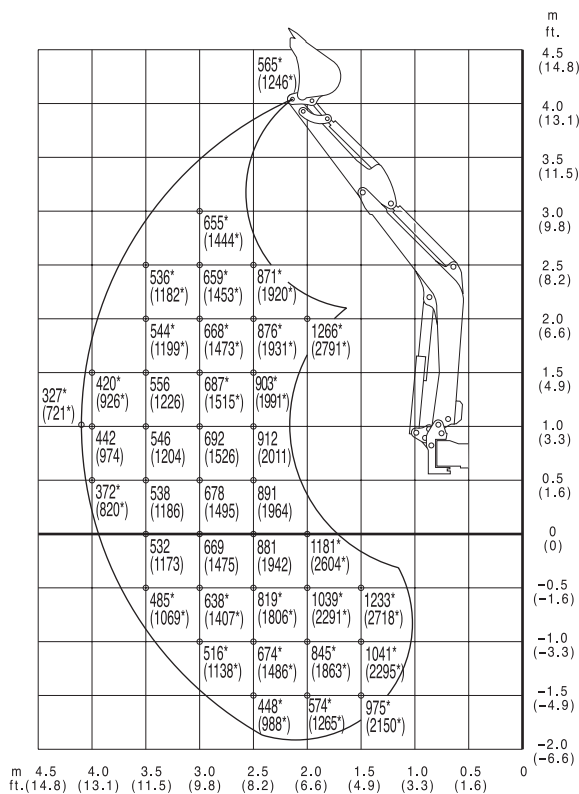


Over Front; Dozer Blade Up

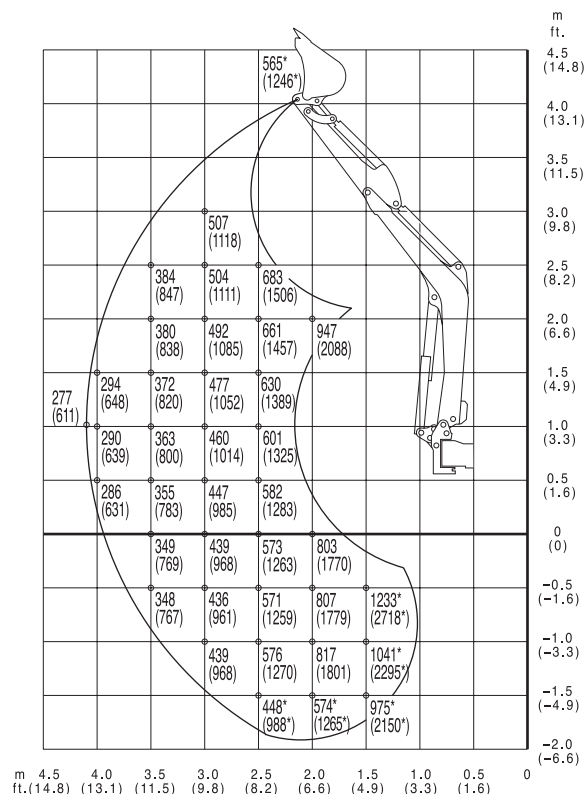


F4K001A

Over Rear



Over Side



F4K002A

**SPECIFICATION TABLES****SPECIFICATIONS**

Serial Number		12820004~	
Machine Type		Canopy	Cab
Machine Mass (not including operator)			
Rubber Crawler	kg	3010	3095
Steel Crawler	kg	—	—
Engine Rated Output	kW/min <sup>-1</sup>	16.8/2300	←
Bucket Capacity (Standard Bucket)			
Rated Capacity	m <sup>3</sup>	0.068	←
Struck Capacity	m <sup>3</sup>	0.051	←
Performance			
Slew Speed	min <sup>-1</sup>	9.6	←
Travel Speed: 1st/2nd	km/h	2.3/4.1	←
Gradeability	% (degree)	58 (30)	←
Ground Pressure: Rubber Crawler	kPa	29.6	30.4
Steel Crawler	kPa	—	—
Noise Level: Sound-power	dB (A)	—	LWA94
Sound-pressure level	dB (A)	—	LPA83
Auxiliary Hydraulic Flow Rate	L/min	56.8	←
Dimensions			
Overall Length in Transport Position	mm	4250	←
Overall Width	mm	1560	←
Overall Height	mm	2550	2525
Dimensions of Base Machine			
Tail Swing Radius	mm	780	←
Distance of Rearmost Upper Structure from Axis of Rotation	mm	780	←
Clearance Height under Upper Structure	mm	605	←
Crawler Base	mm	1545	←
Crawler: Overall Length	mm	2000	←
Overall Width	mm	1560	←
Crawler Shoe Width	mm	300	←
Minimum Ground Clearance	mm	300	←

Serial Number		12820004~	
Machine Type		Canopy	Cab
Working Equipment (Hoe Attachment)			
Boom Swing Angle: L.H.	degree	30	←
R.H.	degree	15	←
Maximum Reach	mm	4760	←
Maximum Reach at GRP	mm	4630	←
Minimum Level Cut Radius with Bucket Flat on GRP	mm	1640	←
Maximum Digging Depth	mm	2575	←
Radius at Maximum Digging Depth	mm	2110	←
Vertical Digging Depth	mm	2150	←
Maximum Digging Height	mm	4700	←
Radius at Maximum Digging Height	mm	2175	←
Maximum Dumping Height	mm	3380	←
Radius at Maximum Dumping Height	mm	2130	←
Minimum Dumping Height	mm	1440	←
Minimum Front Swing Radius	mm	1805	←
Minimum Front Swing Radius at Boom Offset	mm	1015	←
Overall Height at Minimum Front Swing Radius	mm	3545	←
Overall Height at Minimum Front Swing Radius at Boom Offset	mm	3485	←
Maximum Bucket Offset Volume: Left	mm	670	←
Right	mm	695	←
Digging Force: Bucket	kN	21.9	←
Arm	kN	15.5	←
Working Equipment (Dozer Blade)			
Dozer Blade: Width	mm	1560	←
Height	mm	350	←
Dozer Blade: Lift Height	mm	335	←
Depth of Cut	mm	280	←

## SPECIFICATIONS OF DEVICE

Serial Number		12820004~	
Engine		Yanmar 3TNE82A-TB	
Model		4-Cycle, vertical, water-cooled, in-line, 3-cylinder diesel engine	
Type		3-82 × 84	
Number of Cylinders-Bore × Stroke		mm	
Total Displacement		mL	
Compression Ratio		1330	
Performance		18.0	
Maximum Torque		N·m/min <sup>-1</sup>	
Maximum No-load R.P.M.		min <sup>-1</sup>	
Minimum No-load R.P.M.		min <sup>-1</sup>	
Specific Fuel Consumption		g/kW·h	
Starter		V-kW	
Generator		V-kW	
Battery		V-A·h	
Hydraulic Pump		AP2D18LV1RS7	
Model		Variable displacement type double axial piston plus	
Type		double gear	
Delivery: P1		L/min	
P2		L/min	
P3		L/min	
P4		L/min	
Rated Pressure: P1		MPa	
P2		MPa	
P3		MPa	
P4		MPa	
Pilot Relief Valve Pressure Setting:		MPa	
Control Valve		07847-00010	
Model		10	
Number of Circuits		20.6	
Main Relief Valve Pressure Setting: P1		MPa	
P2		MPa	
P3		MPa	
Port Relief Valve Pressure Setting:		MPa	
Solenoid Valve		07706-00000	
Model		3.9	
Rated Pressure		mL/min	
Rated Flow Rate: Flow through Spool		7	
Pressure Reducing Valve Pressure Setting		MPa	
		1.18	

Serial Number		12820004~
Pilot Valve		
Model		07509-0000B
Secondary Side Pressure (Ports 1, 3)	MPa	0.54~1.9
(Ports 2, 4)	MPa	0.54~1.9
Operating Angle: Ports 1, 3	degrees	19
Ports 2, 4	degrees	25
Pilot Valve (Offset)		
Model		07435-0000
Secondary Side Pressure	MPa	0.5~1.96
Primary Pressure	MPa	3.43
Boom Cylinder		
Bore Diameter × Rod Diameter	mm	80 × 45
Stroke	mm	515
Fully Retracted Length (Pitch)	mm	845
Cushion Mechanism		Rod Side
Arm Cylinder		
Bore Diameter × Rod Diameter	mm	75 × 45
Stroke	mm	520
Fully Retracted Length (Pitch)	mm	825
Cushion Mechanism		Rod Side
Bucket Cylinder		
Bore Diameter × Rod Diameter	mm	63 × 35
Stroke	mm	420
Fully Retracted Length (Pitch)	mm	660
Cushion Mechanism		—
Offset Cylinder		
Bore Diameter × Rod Diameter	mm	90 × 50
Stroke	mm	315
Fully Retracted Length (Pitch)	mm	615
Cushion Mechanism		—
Dozer Blade Cylinder		
Bore Diameter × Rod Diameter: Standard	mm	95 × 55
Stroke	mm	140
Fully Retracted Length (Pitch)	mm	560
Cushion Mechanism		—

Serial Number		12820004~
Travel Motor		
Model		MAG-18VP-270E
Type		2-Speed Piston Motor
Total Displacement: 1st	cm <sup>3</sup> /rev	954
2nd	cm <sup>3</sup> /rev	514
Motor Displacement: 1st	cm <sup>3</sup> /rev	18.0
2nd	cm <sup>3</sup> /rev	9.7
Reduction Gear Ratio		53.0
2-Speed Control Pressure		MPa 0.6 or more
Parking Brake Torque		N·m 1670 or more
Parking Brake Release Pressure		MPa 1.5
Amount of Reduction Gear Lubricant		L 0.5
Slew Motor		
Model		MSG-27P-10-T
Type		Piston
Total Displacement	cm <sup>3</sup> /rev	237.6
Motor Displacement	cm <sup>3</sup> /rev	24.0
Reduction Gear Ratio		9.9
Relief Valve Pressure Setting		MPa 15.7
Parking Brake Torque		N·m 775 or more
Parking Brake Release Pressure		MPa 2.0 or more
Swivel Joint		
Model		YV-7104A

**MASS TABLES****UNIT MASS (Dry Mass)**

Unit: kg

Serial Number	12820004~
Upper Machinery	
Engine	128
Radiator	5.2
Hydraulic Pump	28
Hydraulic Tank	46
Fuel Tank	23
Control Valve	26
Solenoid Valve	10
Slew Motor	32
Canopy/Cab	111/160
Counterweight	319
Boom Bracket	67
Offset Cylinder	29
Left link arm	65
Right link arm	56
Lower Machinery	
Swivel Joint	11
Slew Bearing	40
Crawler Belt: Rubber/Steel	124/160
Travel Motor	36
Carrier Roller	3.7
Track Roller	7.8
Idler	23
Sprocket	14
Track Adjuster	11
Dozer Blade	119
Dozer Blade Cylinder	32
Hoe Attachment	
Boom	126
Arm	45
Bucket: Standard	55
Boom Cylinder	33
Arm Cylinder	28
Bucket Cylinder	16



## RECOMMENDED LUBRICANTS

Use different fuels, lubricants and greases according to the temperature, referring to the chart below.

- Change the lubricant earlier than as shown in the table if it is extremely dirty or its performance has deteriorated severely.
- Whenever possible, use the same brand of lubricant as before. If changing with a different brand, replace the entire quantity – do not mix different brands.

Part	Type	Type by temperature										Replacement interval	Capacity
		-22 -30	-4 -20	14 -10	32 0	50 10	68 20	86 30	104°F 40°C				
Engine oil pan	Diesel engine oil API service CD											After first 50 hrs. Every 250 hrs.	Upper limit: 3.9 L Lower limit: 2.7 L
Hydraulic tank	Antiwear hydraulic oil (Option: Biodegradable oil)											Every 2000 hrs.	Total system: 70 L Tank level: 44 L
Fuel tank	Diesel fuel	Use a clean, Quality fuel for performance and optimum engine life. • To prevent fuel flow problems in cold weather, use diesel fuel with a pour point of at least -12°C (10°F) below the lowest expected ambient temperature. • Minimum cetane number is 45. Low temperature or high altitude operation may require the use of fuel with a higher cetane number.											35 L
Engine cooling system	Coolant (water**+Coolant***)											Every 1000 hours	4.5 L
Travel reduction gear	Gear oil API-GL-4											After first 500 hrs.* Every 1000 hrs.	0.5 L
Carrier Roller	Gear oil API-GL-4											—	45 mL
Track Roller	Gear oil API-GL-4											—	70 mL
Idler	Gear oil API-GL-4											—	50 mL
Slew Grease Bath	Lithium based grease EP-2 NLGI No. 2											—	2.8 L
Slew bearing												Every 50 hrs.	As required
Working equipment												Daily or every 10 hrs.	
Levers												When required	

\* If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.

\*\* For water, use tap water (soft). Do not use well or river water.

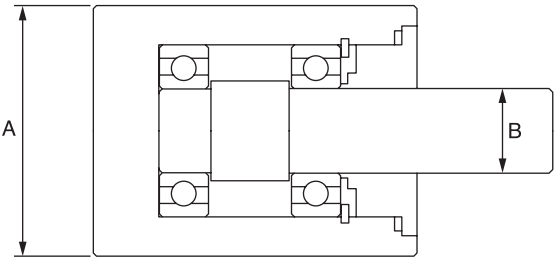
\*\*\* When the ambient temperature drops below 0°C, add coolant (antifreeze). Follow the coolant manufacture's instructions to determine the mixture ratio.

SERVICING STANDARDS

TRAVEL SYSTEM

Carrier Roller

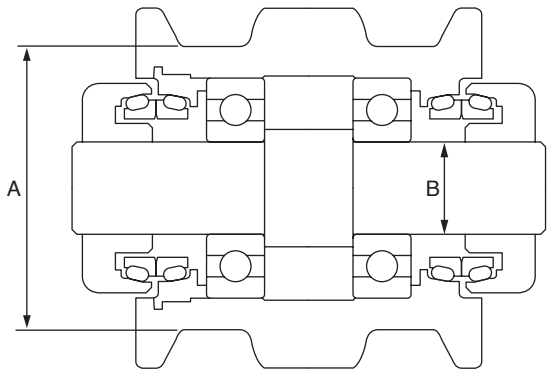
Unit: mm		
Code	Designated Standard	
A	Basic Dimension	Allowable Value
	75	69
B	25	—



F4B001

Track Roller

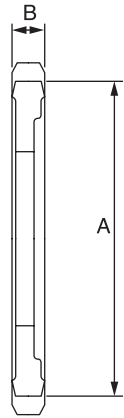
Unit: mm		
Code	Designated Standard	
A	Basic Dimension	Allowable Value
	93	87
B	30	—



F4B002

Drive Sprocket

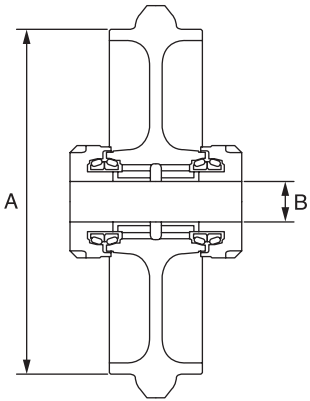
Unit: mm		
Code	Designated Standard	
A	Basic Dimension	Allowable Value
	344.2	336
B	36	32



F4B003

Idler

Unit: mm		
Code	Designated Standard	
A	Basic Dimension	Allowable Value
	305	299
B	35	—



F4B004

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