

Product: Takeuchi TB153FR Mini Compact Excavator Service Repair Workshop Manual(Book No.CJ2E000)

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TB153 FR

Compact Excavator

BOOK No. CJ2E000

WORKSHOP MANUAL

Serial No. 15820004~

Sample of manual All 716 pages at

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takeuchi

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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.

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.

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

I. GENERAL

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SAFETY PRECAUTIONS



SAFETY ALERT SYMBOL

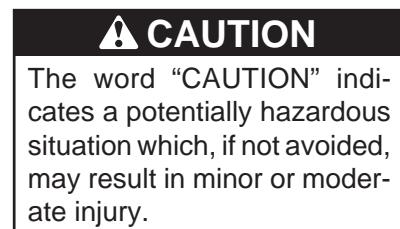
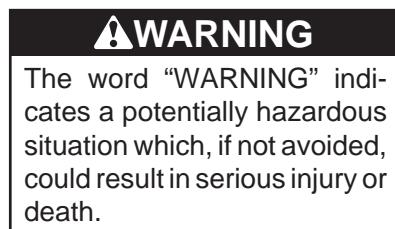
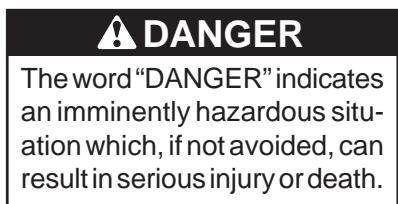
This symbol means Attention! Be Alert! Your Safety Is Involved.

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:



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.

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.



E3A040

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.

GENERAL

Provide a fire extinguisher and first aid kit



E3A080

Anti-explosive lighting



E3A550

- 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.

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



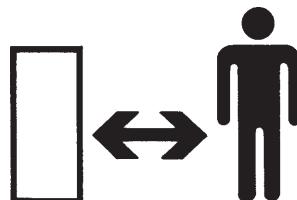
E3A530

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

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.

Do not allow unauthorized personnel in the work area

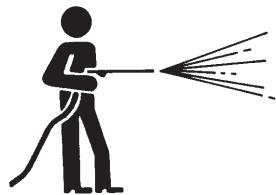


E3A140

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.

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

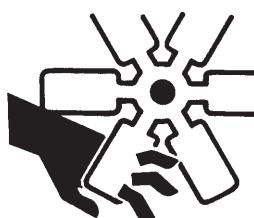
E3A580

- 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.

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

E3A630

- 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.

Securely block the machine or any component that may fall

E3A570

- 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.

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.

GENERAL

Place heavy objects in a stable position



E3A560

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

Use caution when fueling



E3A100

- 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



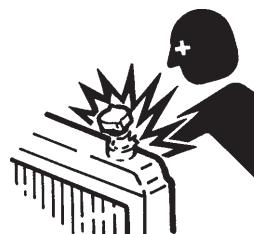
E3A110

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.

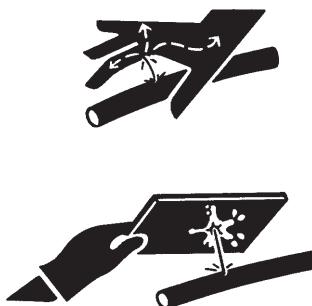
Be careful when loosening caps and plugs. Working on the machine under these conditions could result in burns or injuries due to the hot oil spurting out.

Be careful with hot cooling systems



E3A540

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.

Be careful with fluids under pressure

E3A600

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.

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.

Handling of the Accumulator

NOA005

High pressure nitrogen gas is enclosed in the accumulator and incorrect handling could possibly bring about serious injury due to explosion. The following matters should be strictly observed:

- Do not disassemble.
- Do not bring close to fire or throw into a fire.
- Do not make hole, weld, or fuse.
- Do not subject to shock such as hitting or rolling.
- At time of disposal, it will be necessary to release the enclosed gas. Please contact a Takeuchi sales or service agent.

Be careful with grease under pressure

E3A620

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.

Disconnect the battery

E3A590

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.

GENERAL

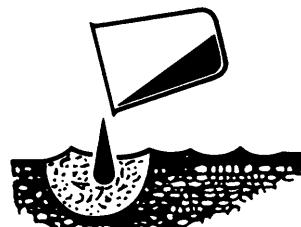
Avoid battery hazards

- 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.

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



E3A640

- 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.

Have a Takeuchi service agent repair welding cracks or other damage

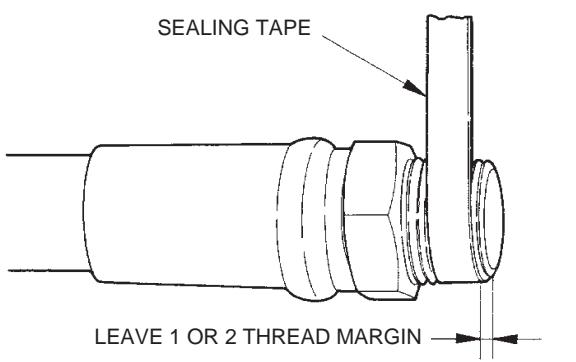
Ask a Takeuchi service agent to repair any welding problems which are detected. If not feasible, make sure the welding is done by a qualified person in a properly equipped workplace.

Safety signs

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

CAUTIONS DURING DISASSEMBLY AND ASSEMBLY

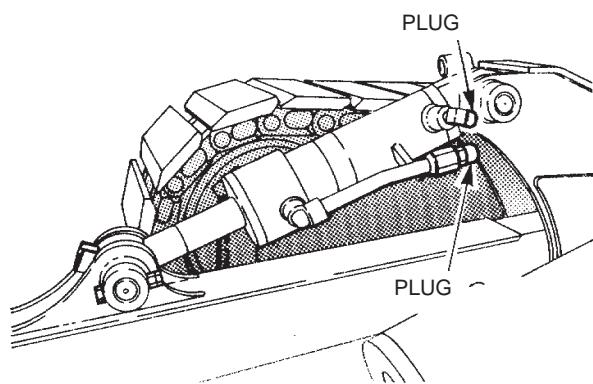
1. Clean the machine before disassembly operation.
2. Before disassembly, check the machine conditions and record them.
 - Model, Machine Serial Number, Hourmeter
 - Reason for Repairs, Repair History
 - Dirtiness of Filters
 - Fuel and Oil Conditions
 - Damage to each parts, etc.
3. To make reassembly 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.

CAUTIONS DURING REMOVAL AND INSTALLATION OF THE HYDRAULIC UNITS

1. Make sure that the temperature of the hydraulic oil 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 tank should be released.
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.

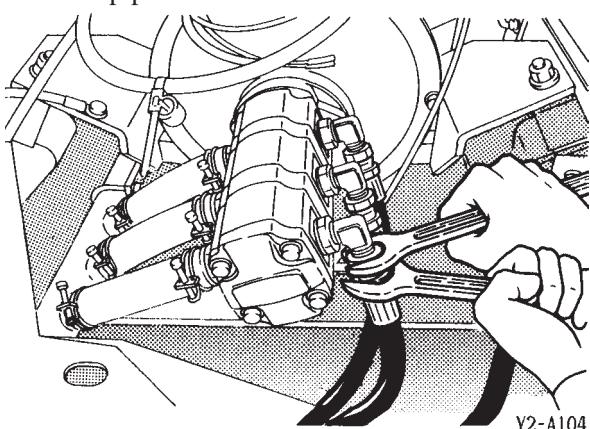


4. It is easy to mistake hydraulic oil adhering to the hydraulic unit for an oil leak, so wipe the unit off thoroughly.
5. Be sure that no damage is done to the plating on the rod in the hydraulic cylinder.
6. As a rule, removal and installation of the hydraulic cylinder should be done with the rod fully 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"

GENERAL

CAUTIONS DURING REMOVAL AND INSTALLATION OF PIPING

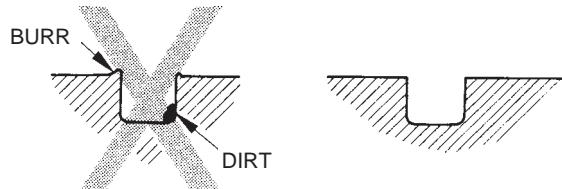
1. When hydraulic hoses are installed, tighten them once to the prescribed torque, then loosen them slightly and retighten them to the prescribed torque.
 - Tighten the fittings after the installation surfaces fit snugly together.
 - Pieces wrapped with seal tape are excluded.
2. Use 2 spanners, each 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.

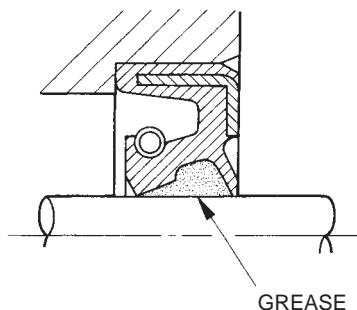
HANDLING OF SEALS

1. Clean the grooves for O-rings and if there is any burr, 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.

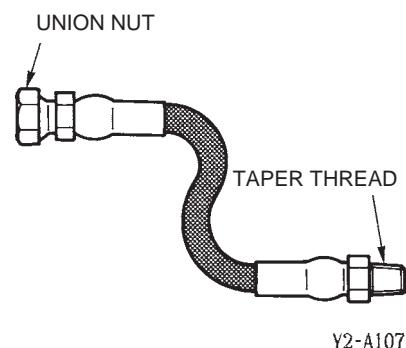


Y2-A106

TIGHTENING TORQUES

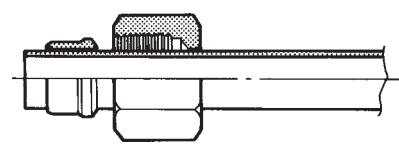
Hydraulic Hoses

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

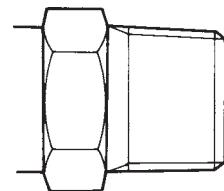


Y2-A108

GENERAL

Joints for Piping

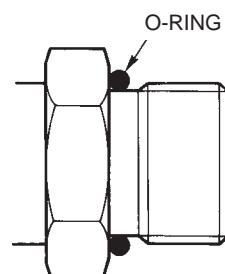
Nominal Thread Diameter (R)	Torque			
	Steel		Cast Steel	
	N·m	ft-lb	N·m	ft-lb
1/8	11.8 ±1.2	8.7 ±0.8	10.8 ±1.1	8.0 ±0.7
1/4	29.4 ±2.9	21.7 ±2.1	24.5 ±2.5	18.1 ±1.7
3/8	53.9 ±5.4	39.8 ±3.9	49 ±4.9	36.2 ±3.5
1/2	88.3 ±8.8	65.1 ±6.4	73.5 ±7.4	54.3 ±5.3
3/4	147.1 ±14.7	108.5 ±10.7	127.5 ±12.7	94.1 ±9.3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



Y2-A109

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



Y2-A110

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

1. General Tightening Points (Non-lubricated)
 - All securing points other than the special tightening points.
2. 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.
3. Points where thread-locking compound is used
(Three Bond #1324 is applied.)
Thread-locking compound positions and associated instructions are given in the text.
4. 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.)
5. In order to tighten bolts and nuts evenly, they should be tightened alternately top, bottom, left, right.

GENERAL

II. SPECIFICATIONS

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In regard to Standard Values and Allowable Values

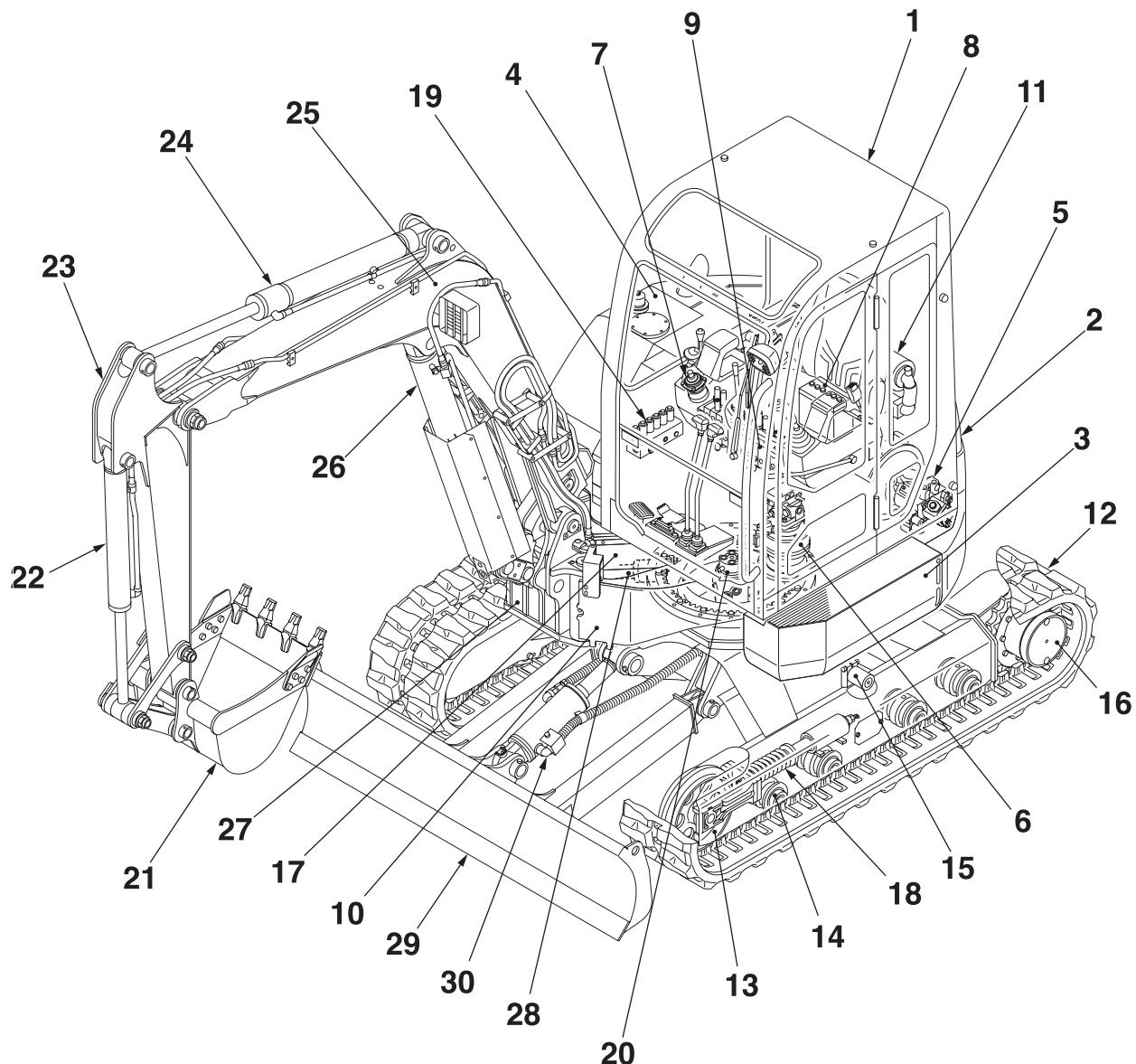
The terms used in the items “Servicing Standards” and “Standards for Judging Performance” have the following meanings.

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.

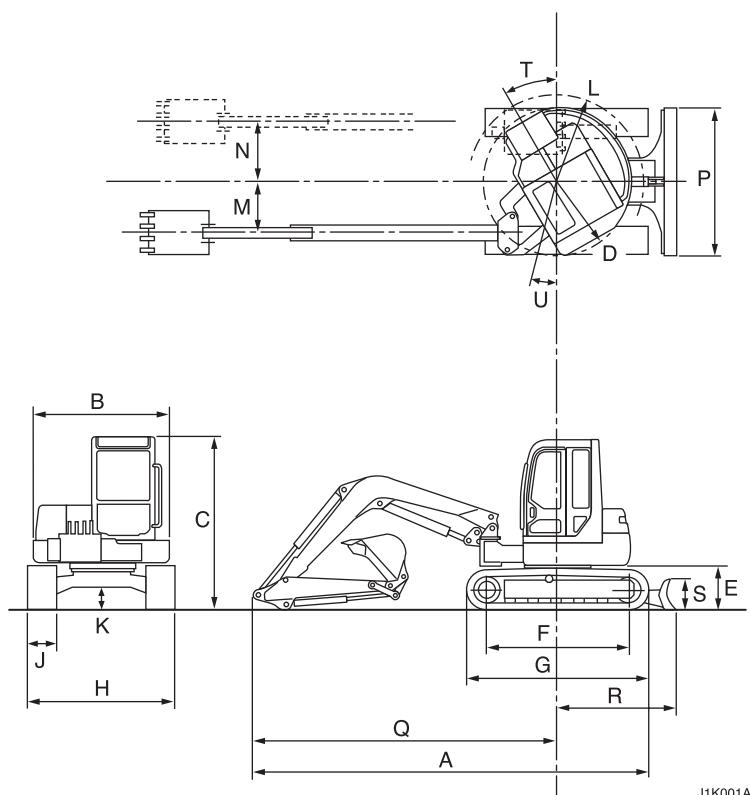
NAMES OF COMPONENTS



J1B0001

1. Cab	12. Crawler belt	23. Arm
2. Engine hood	13. Idler	24. Arm cylinder
3. Fuel tank	14. Track roller	25. Boom
4. Hydraulic tank	15. Carrier roller	26. Boom cylinder
5. Hydraulic pump	16. Travel motor	27. Boom bracket
6. Slew motor	17. Right link arm	28. Offset cylinder
7. Pilot valve	18. Track adjuster	29. Dozer blade
8. Battery	19. Pilot valve (Offset)	30. Dozer blade cylinder
9. Control valve	20. Swivel joint	31. Pilot valve (Travel)
10. Left link arm	21. Bucket	
11. Engine	22. Bucket cylinder	

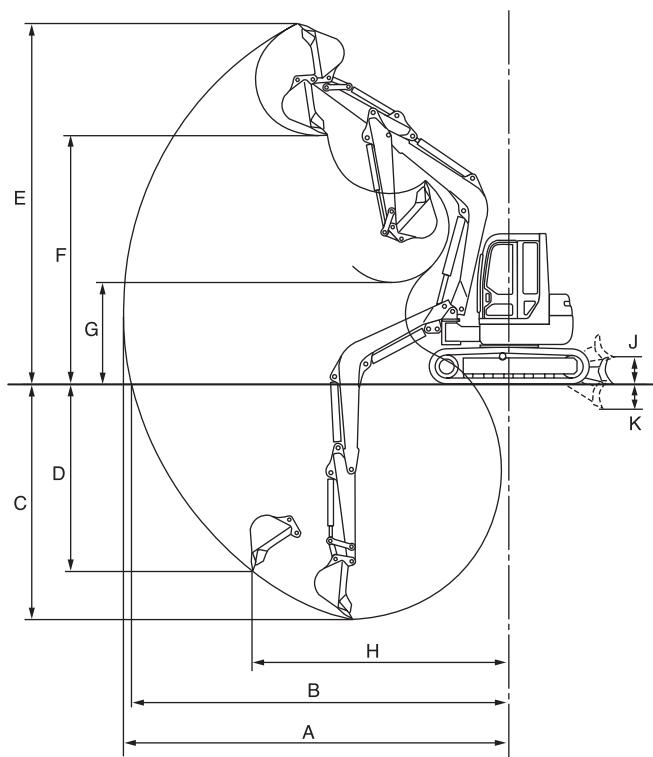
DIMENSIONS



Machine Dimensions

Unit: mm

	Canopy		Cab	
	Standard Arm	Long Arm	Standard Arm	Long Arm
A	5330	5350	5330	5350
B	1860	←	←	←
C	2585	←	2570	←
D	1110	←	←	←
E	615	←	←	←
F	1985	←	←	←
G	2500	←	←	←
H	2000	←	←	←
J	400	←	←	←
K	300	←	←	←
L	1285	←	←	←
M	720	←	←	←
N	825	←	←	←
P	2000	←	←	←
Q	4085	4105	4085	4105
R	1510	←	←	←
S	430	←	←	←
T	30°	←	←	←
U	15°	←	←	←



Operating Range

Unit: mm

	Canopy		Cab	
	Standard Arm	Long Arm	Standard Arm	Long Arm
A	5905	6195	5905	6195
B	5765	6065	5765	6095
C	3590	3900	3590	3900
D	2735	3030	2735	3030
E	5320	5490	5320	5490
F	3710	3885	3710	3885
G	1435	1125	1435	1125
H	3885	4075	3885	4075
J	320	←	←	←
K	325	←	←	←

J1K002A

SPECIFICATION TABLES**SPECIFICATIONS**

Serial Number	15820004~		
Machine Type	Canopy		Cab
Machine Mass (not including operator)			
Rubber Crawler	kg	5505 (5540*)	5615 (5645*)
Steel Crawler	kg	5575 (5605*)	5680 (5715*)
Engine Rated Output	kW/min ⁻¹	28.9/2400	←
Bucket Capacity (Standard Bucket)			
Rated Capacity	m ³	0.141	←
Struck Capacity	m ³	0.102	←
Performance			
Slew Speed	min ⁻¹	9.8	←
Travel Speed: Rubber Crawler 1st/2nd	km/h	2.8/5.0	←
Steel Crawler 1st/2nd	km/h	2.5/4.7	←
Gradeability	% (degree)	58 (30)	←
Ground Pressure: Rubber Crawler	kPa	31.6 (31.8*)	32.2 (32.4*)
Steel Crawler	kPa	32.0 (32.2*)	32.6 (32.8*)
Noise Level: Sound-power	dB (A)	LWA96	←
Sound-pressure level	dB (A)	LPA76	←
Auxiliary Hydraulic Flow Rate	L/min	55.9	←
Dimensions			
Overall Length in Transport Position	mm	5330	←
Overall Width	mm	2000	←
Overall Height	mm	2585	2570
Dimensions of Base Machine			
Tail Swing Radius	mm	1110	←
Distance of Rearmost Upper Structure from Axis of Rotation	mm	1110	←
Clearance Height under Upper Structure	mm	615	←
Crawler Base	mm	1985	←
Crawler: Overall Length	mm	2500	←
Overall Width	mm	2000	←
Crawler Shoe Width	mm	400	←
Minimum Ground Clearance	mm	300	←

*: Long Arm

Serial Number	15820004~		
Machine Type	Canopy		Cab
Working Equipment (Hoe Attachment)			
Boom Swing Angle: L.H.	degree	30	←
R.H.	degree	15	←
Maximum Reach	mm	5905	←
Maximum Reach at GRP	mm	5765	←
Maximum Digging Depth	mm	3590	←
Radius at Maximum Digging Depth	mm	2255	←
Vertical Digging Depth	mm	2735	←
Maximum Digging Height	mm	5520	←
Radius at Maximum Digging Height	mm	3625	←
Maximum Dumping Height	mm	3710	←
Minimum Dumping Height	mm	1435	←
Minimum Front Swing Radius	mm	2570	←
Minimum Front Swing Radius at Boom Offset	mm	1285	←
Overall Height at Minimum Front Swing Radius at Boom Offset	mm	4400	←
Maximum Bucket Offset Volume: Left	mm	720	←
Right	mm	825	←
Digging Force: Bucket	kN	36.3	←
Arm	kN	25.2	←
Working Equipment (Dozer Blade)			
Dozer Blade: Width	mm	2000	←
Height	mm	430	←
Dozer Blade: Lift Height	mm	320	←
Depth of Cut	mm	325	←

SPECIFICATIONS OF DEVICE

Serial Number	15820004~				
Engine					
Model	Yanmar 4TNV88-PTBZ1				
Type	4-Cycle, vertical, water-cooled, in-line, 4-cylinder diesel engine				
Number of Cylinders-Bore × Stroke	mm	4-88 × 90			
Total Displacement	mL	2189			
Compression Ratio	19.1 : 1				
Performance					
Maximum Torque	N·m/min ⁻¹	132.7~144.5/1440			
Maximum No-load R.P.M.	min ⁻¹	2590 ±25			
Minimum No-load R.P.M.	min ⁻¹	1000 ±25			
Specific Fuel Consumption	g/kW·h	≤251			
Starter	V-kW	12~2.3			
Generator	V-kW	12~0.48			
Battery	V-A·h	12~72			
Hydraulic Pump					
Model	AP2D25LV1RS7				
Type	Variable displacement type double axial piston plus double gear				
Delivery: P1	L/min	55.9			
P2	L/min	55.9			
P3	L/min	38.9			
P4	L/min	10.8			
Pilot Relief Valve Pressure Setting:	MPa	3.4			
Control Valve					
Model	KVSE-72-11				
Number of Circuits	11				
Main Relief Valve Pressure Setting: P1	MPa	20.6			
P2	MPa	20.6			
P3	MPa	20.6			
Port Relief Valve Pressure Setting:	MPa	23.5			
	MPa	25.5			
Solenoid Valve					
Model	07706-00000				
Use	Interference Prevention, Auxiliary Hydraulics				
Reducing Valve Pressure Setting	MPa	1.18			
Number of Solenoid	5				
Solenoid Rated Voltage	V	12			
Solenoid Valve					
Model	16435-0000A				
Use	Interference Prevention				
Number of Solenoids	3				
Solenoid Rated Voltage	V	12			

Serial Number	15820004~		
Bucket Cylinder			
Bore Diameter × Rod Diameter	mm	80 × 45	
Stroke	mm	585	
Fully Retracted Length (Pitch)	mm	915	
Cushion Mechanism		—	
Offset Cylinder			
Bore Diameter × Rod Diameter	mm	100 × 55	
Stroke	mm	420	
Fully Retracted Length (Pitch)	mm	783	
Cushion Mechanism		Rod Side	
Dozer Blade Cylinder			
Bore Diameter × Rod Diameter: Standard	mm	110 × 60	
Stroke	mm	175	
Fully Retracted Length (Pitch)	mm	540	
Cushion Mechanism		—	
Travel Motor			
Model	PHV-4B		
Type	2-Speed Piston Motor		
Total Displacement: 1st	cm ³ /rev	1735	
2nd	cm ³ /rev	908	
Motor Displacement: 1st	cm ³ /rev	36.5	
2nd	cm ³ /rev	19.1	
Reduction Gear Ratio		1/47.53	
2-Speed Control Pressure	MPa	3.43	
Parking Brake Torque	N·m	5176 or more	
Parking Brake Release Pressure	MPa	2.0	
Amount of Reduction Gear Lubricant	L	1	
Slew Motor			
Model	MSG-27P-23E		
Type	Piston		
Total Displacement	cm ³ /rev	570	
Motor Displacement	cm ³ /rev	25.1	
Reduction Gear Ratio		1/22.7	
Relief Valve Pressure Setting	MPa	18.6	
Parking Brake Torque	N·m	2040 or more	
Parking Brake Release Pressure	MPa	2.0	
Swivel Joint			
Model	YV-7095B		

MASS TABLES

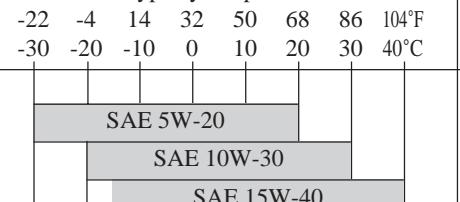
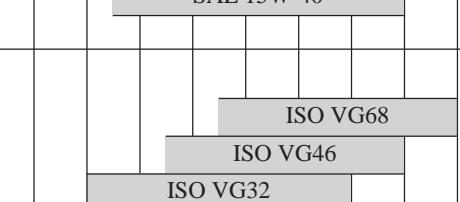
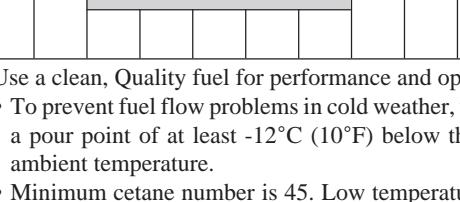
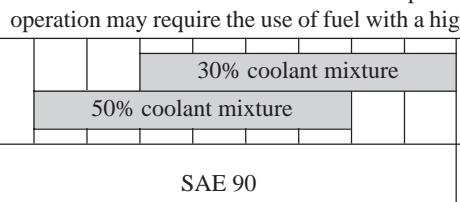
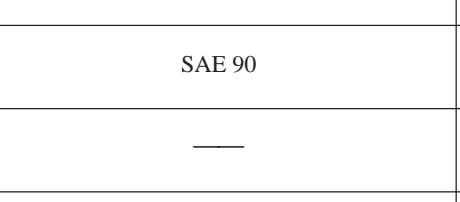
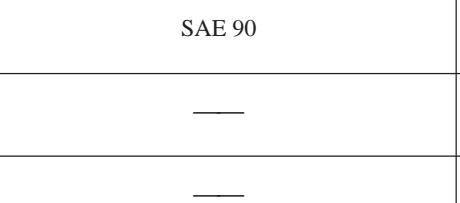
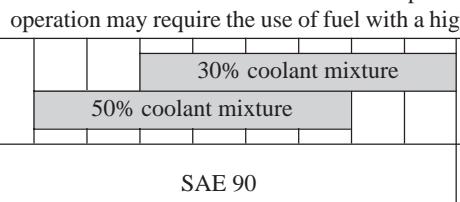
UNIT MASS (Dry Mass)

		Unit: kg
Serial Number		15820004~
Upper Machinery		
Engine		170
Radiator		25
Hydraulic Pump		36
Hydraulic Tank Assembly		68
Fuel Tank Assembly		37
Control Valve		46
Slew Motor		50
Canopy/Cab		119/250
Counterweight		720
Boom Bracket		120
Offset Cylinder		42
Left link arm		110
Right link arm		110
Lower Machinery		
Swivel Joint		22
Slew Bearing		84
Crawler Belt: Rubber/Steel		242/264
Travel Motor		57
Carrier Roller		4
Track Roller: Rubber/Steel		11.6/12.1
Idler		43
Sprocket		15.4
Track Adjuster		25
Dozer Blade		200/210
Dozer Blade Cylinder		41
Hoe Attachment		
Boom		230
Arm		100
Bucket: Standard		97
Boom Cylinder		70
Arm Cylinder		47
Bucket Cylinder		34

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: 7.4 L Lower limit: 4.0 L		
														
														
Hydraulic tank	Antiwear hydraulic oil (Option: Biodegradable oil)										Every 2000 hrs.	Total system: 110 L Tank level: 68 L		
														
														
Fuel tank	Diesel fuel	<p>Use a clean, Quality fuel for performance and optimum engine life.</p> <ul style="list-style-type: none"> • 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. 									60 L			
Engine cooling system	Coolant (water**+Coolant***)										Every 1000 hours	8.4 L		
Travel reduction gear	Gear oil API-GL-4	SAE 90									After first 250 hrs.* Every 1000 hrs.	1 L		
Carrier Roller	Gear oil API-GL-4	SAE 90									—	60 mL		
Track Roller	Mobil gear SHG 680	—									—	65 mL		
Idler	Gear oil API-GL-4	SAE 90									—	70 mL		
Slew Grease Bath	Lithium based grease EP-2 NLGI No. 2	—									—	2.8 L		
Slew bearing		—									Every 50 hrs.			
Working equipment		—									Daily or every 10 hrs.	As required		
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 manufacturer's instructions to determine the mixture ratio.

SPECIFICATIONS

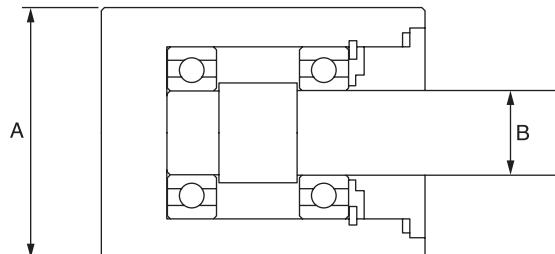
SERVICING STANDARDS

TRAVEL SYSTEM

Carrier Roller

Unit: mm

Code	Designated Standard	
A	Basic Dimension	Allowable Value
	84	78
B	30	—

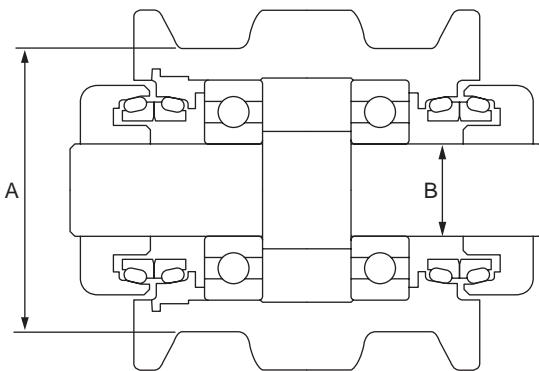


F4B001

Track Roller

Unit: mm

Code	Designated Standard	
A	Basic Dimension	Allowable Value
	110	106
B	35	—

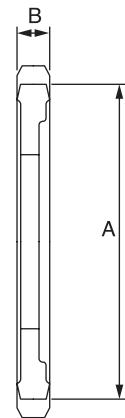


F4B002

Drive Sprocket

Unit: mm

Code	Designated Standard	
A	Basic Dimension	Allowable Value
	380.4	372
B	32	28

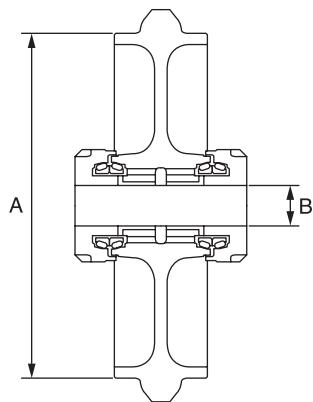


F4B003

Idler

Unit: mm

Code	Designated Standard	
A	Basic Dimension	Allowable Value
	350	344
B	45	—



F4B004