GENERAL SPECIFICATIONS

DX210

Shipping Weight	20.3 metric tons (44,754 lb), includes fuel 10%, boom, 5,700 mm (18' 7"), arm 2,400 mm (7' 10"), standard bucket and standard shoes
Operating Weight	Add weight of full fuel tank and operator.
Major Component Weight	Standard Boom 5,700 mm (18' 8") 1,428 kg (3,148 lb)
	2,400 mm (7' 10") Arm 579 kg (1,276 lb)
	Boom Cylinders 169 kg (373 lb) each
	Arm Cylinder 234 kg (516 lb)
	Bucket Cylinder 141 kg (311 lb)
	Counterweight 3,800 kg (8,377 lb)
	Upper Structure 5,573 kg (12,286 lb) (Excluding Counterweight and Front)
	Lower - 7,130 kg (15,719 lb) (Including Swing Bearing)
Bucket Cylinder	11,400 kg (25,133 lb)
Arm Cylinder	10,500 kg (23,149 lb) with 2,400 mm (7' 10") arm
Fuel Tank Capacity	400 liters (105.7 U.S. gal)
Hydraulic System Capacity	240 liters (63.4 U.S. gal)
Hydraulic Reservoir Capacity	140 liters (37 U.S. gal)
Bucket Heaped Capacity Range	PCSA 0.51 - 1.28 m^3 (0.67 - 1.67 yd^3)
	IMPORTANT: Refer to the Load Weight, Bucket and Arm Length Compatibility Table for information on which bucket sizes may be used safely with which arm length, for load material weights.
Shoe Type	Triple Grouser
Shoe Width Sizes	600 mm (24") - standard
Ground Pressure Ratings:	
Standard 600 mm (24") shoe	0.42 kg/cm^2 (6.0 psi)
Transport Dimensions	
Overall Shipping Length (standard boom and arm)	9,500 mm (31' 2")
Overall Shipping Width (standard shoes)	2,800 mm (9' 2")
Overall Shipping Height (to top of cylinder hose)	3,005 mm (9' 9")
Track Shipping Length	4,065 mm (13' 3")
Transport Trailer Capacity	30 metric tons (33 tons), minimum load capacity
Transport Loading Ramp Allowable Slope	15° angle **CAUTION:** Refer to Transport Maximum Procedure for Safe Shipping Instructions.

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SAFETY PRECAUTIONS

CAUTION

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
ALL MODELS	ALL RANGES

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Hydraulics

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Electrical System

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REMOVAL

CAUTION

Avoid disassembling cabin if there are strong wind gusts, which could catch large surface area of cabin shell and push it sideways during lift.

1. Park on firm and level ground.
2. Lower front attachment (bucket) to ground.
3. Shut down engine.
4. Set safety lever on "RELEASED" position.
5. Turn starter switch to "I" (ON) position.

WARNING

If engine must be run while performing maintenance, use extreme care. Always have one person in the cabin at all times. Never leave the cabin with the engine running.

6. Fully stroke work levers (joysticks) in all directions to relieve pressure from accumulators.
7. Set safety lever on "LOCK" position.
8. Turn key to "O" (OFF) position and remove from starter switch.
9. Hang maintenance warning tag on controls.
10. Disconnect the battery cable from the negative (-) battery terminal.
11. Prepare cabin shell for removal by disconnecting wiring connectors for:
    A. Cabin interior lighting.
    B. External light wiring.
    C. Radio antenna and connections.
    D. Wiper/washer connections.

NOTE: *Control console wiring harnesses and hydraulic piping lines that pass through the floor of the cabin do not need to be disassembled.*

NOTE: *If unit is equipped with a cabin protective structure (for forestry, or hazardous working conditions), it must be removed.*

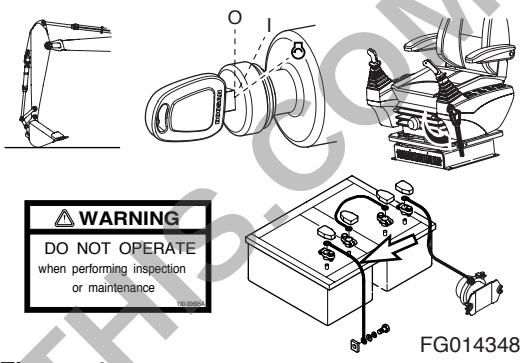


Figure 1

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GENERAL DESCRIPTION

⚠ WARNING

Engine fuel is highly flammable and potentially explosive. To prevent possible injury and/or damage to equipment, extinguish or move to a safe distance all potential fire hazards.

Parts List

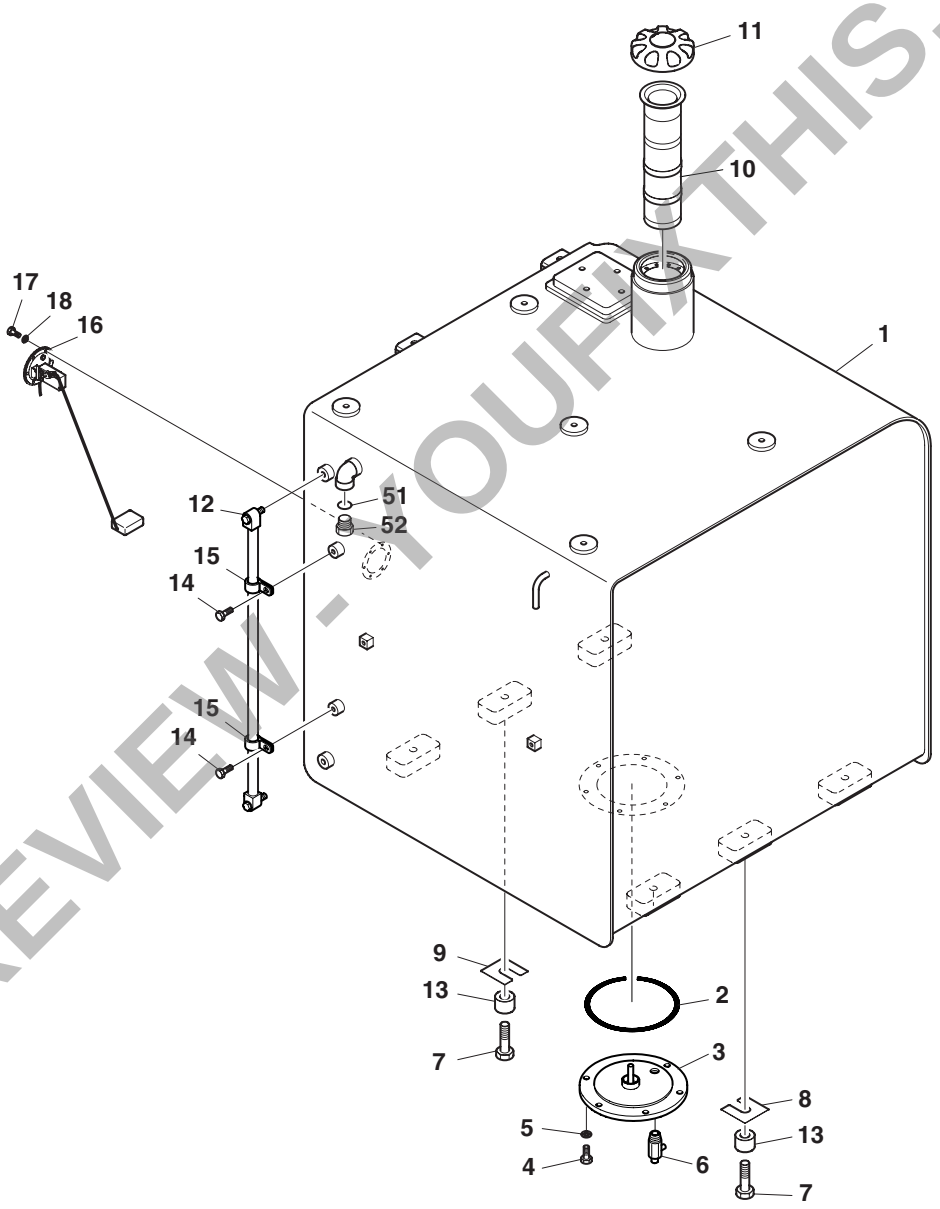


Figure 1

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SAFETY PRECAUTIONS

CAUTION

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APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
DX210	5001 and Up
DX225LCB	5001 and Up

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TOWING

Precautions When Towing

If any mistake is made in the method of selecting or inspecting the towing wire or in the method of towing, it may lead to serious personal injury. Always do the following:

- Always use the method of towing given in this Operation and Maintenance Manual. Do not use any other method.
- Use leather gloves when handling the wire rope.
- When carrying out the preparation work for towing with two or more workers, determine the signals to use and follow these signals correctly.
- Always fit the towing rope to the left and right hooks and secure in position.
- If the engine on the problem machine will not start or there is a failure in the brake system. always contact your *DOOSAN* distributor.
- Never go between the towing machine and the towed machine during the towing operation.
- It is dangerous to carry out towing on slopes, so select a place where the slope is gradual. If there is no place where the slope is gradual, carry out operations to reduce the angle of the slope before starting the towing operation.
- When towing a problem machine, always use a wire rope with a sufficient towing capacity.
- Do not use a frayed, kinked rope or a rope with any loss of diameter.
- Do not use the lightweight towing hook for towing another machine.

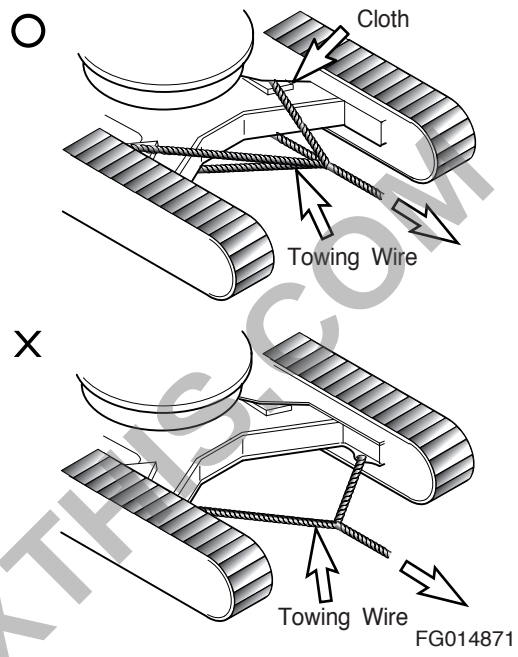


Figure 42

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inspected in place, check foe roughness of rotation, scoring, pitting, cracked or chipped races. If any of these defects are found replace the whole bearing assembly. NEVER replace the bearing alone without replacing the mating cup or the cone at the same time.

After inspection lightly coat the bearing and related parts with oil and wrap in a clean lintless cloth or paper and protect them from moisture and other foreign materials until installation.

It is also important to inspect the bearing housing and/or shaft for grooved, galled or burred conditions that indicate that the bearing has been turning in its housing or on its shaft.

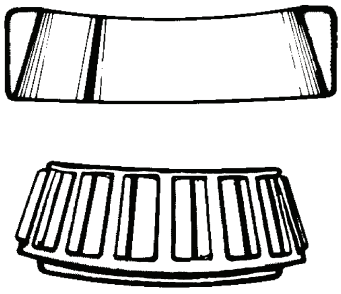
If available, use magna-flux or similar process for checking for cracks that are not visible to the naked eye.

The following illustrations will aid in identifying and diagnosing some of the bearing related problems.

NOTE: *The illustrations will only show tapered roller bearings, but the principles of identifying, diagnosing and remedying the defects are common to all styles and types of bearings.*

Normal Bearing

Smooth even surfaces with no discoloration or marks.

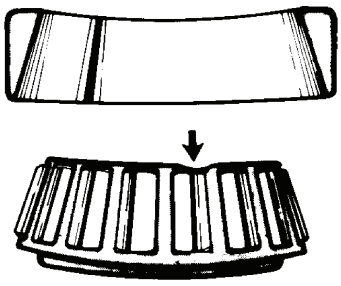


HASA620S

Figure 2

Bent Cage

Cage damage due to improper handling or tool usage.



HASA460S

Figure 3

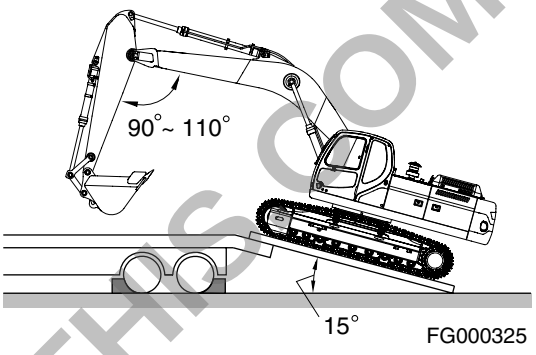
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⚠ WARNING

If the turntable deck has been unbalanced by removal of weight from one end only, traveling the excavator, swinging the turntable, movement over bumps or sloping and uneven surfaces could cause loss of control and possible accidents or injuries.

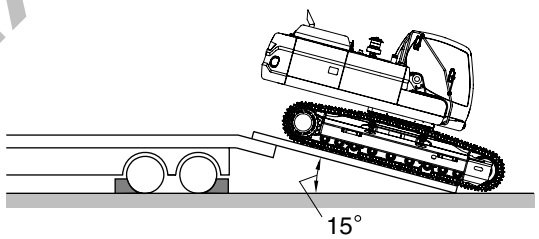
To maintain stability the counterweight should be removed whenever the front attachment is taken off the machine.



FG000325

Figure 1

When loading an excavator (either track or wheeled type) on a trailer for transport after the front attachment has been removed, always go backwards up the loading ramp. The counterweight end of the deck has to get on the trailer first, while the cabin is still going up the ramp (Figure 1).



FG000326

Figure 2

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Parts List

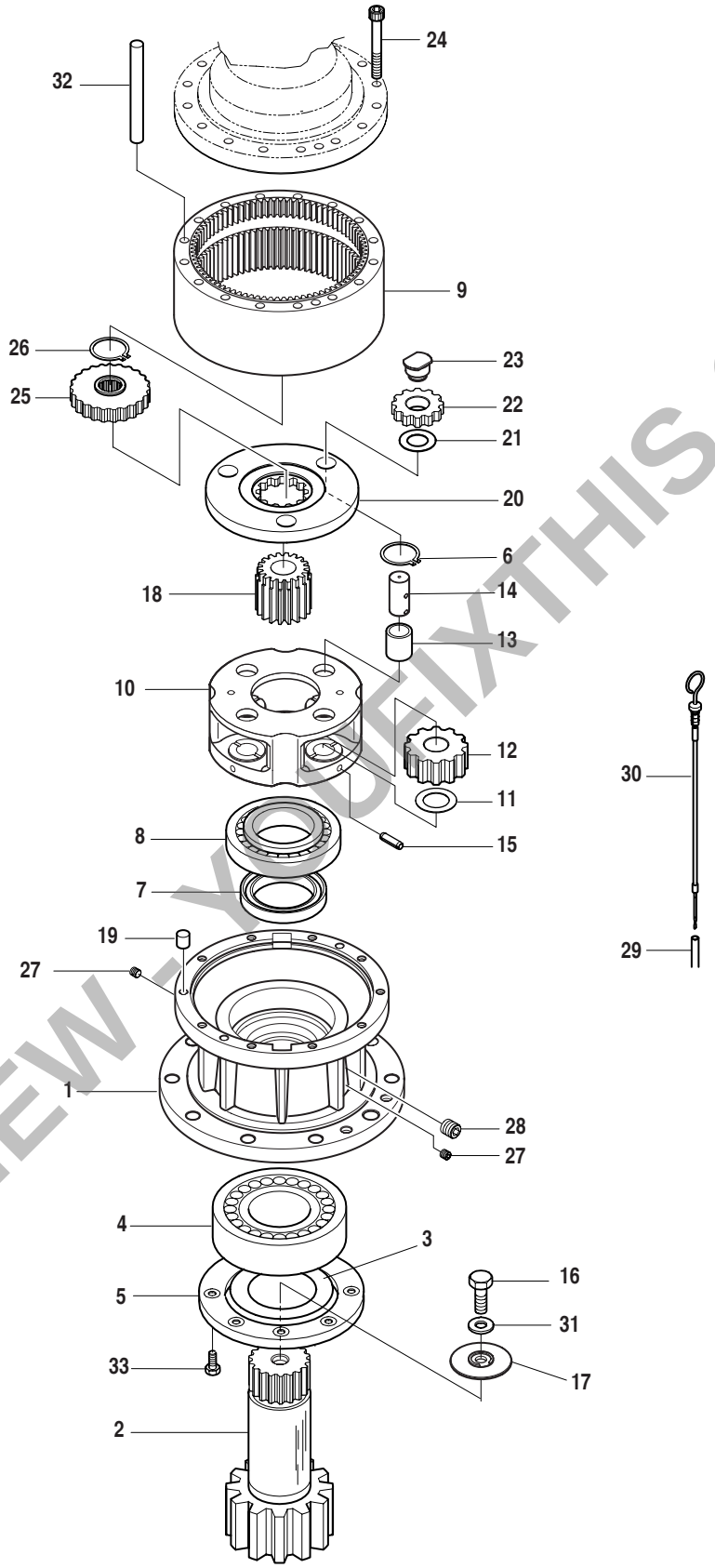


Figure 1

FG007053

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2. Measuring the distance (A, Figure 2) between the bottom of the side frame and the top of the lowest crawler shoe. Recommended tension for operation over most types of terrain is distance "B" on below table.

   NOTE: *This measurement can be thrown off if there is too much mud or dirt or other material in the track assembly. Clean off the tracks before checking clearance.*

3. Too little sag in the crawler track (less than clearance distance "C" on below table) can cause excessive component wear. The recommended adjustment can also be too tight causing accelerated stress and wear if ground conditions are wet, marshy or muddy, or if the ground is hard and full of rocks or gravel.

4. The increased clearance recommended for muddy ground conditions is between distance "D" on below table. The clearance should be approximately distance "E" on below table for operation over gravel, rocky terrain, or over sand or snow.

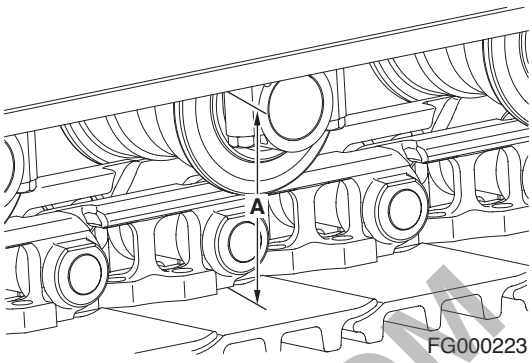


Figure 2

Terrain Type	Distance "A"
	DX210 / DX225LCB
Normal "B"	320 - 340 mm (12.60 - 13.39 in)
Minimum "C"	320 mm (12.60 in)
Muddy "D"	340 - 370 mm (13.39 - 14.57 in)
Gravel, Rocky, Sand or Snow "E"	370 mm (14.57 in)

⚠ WARNING

The track adjusting mechanism is under very high-pressure. NEVER release pressure too suddenly. The grease cylinder valve should never be backed off more than 1 complete turn from the fully tightened down position. Bleed off pressure slowly and keep your body away from the valve at all times.

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SAFETY PRECAUTIONS

CAUTION

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APPLICABLE MODELS

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MODEL	SERIAL NUMBER RANGE
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DX225LCB	5001 and Up

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GENERAL DESCRIPTION

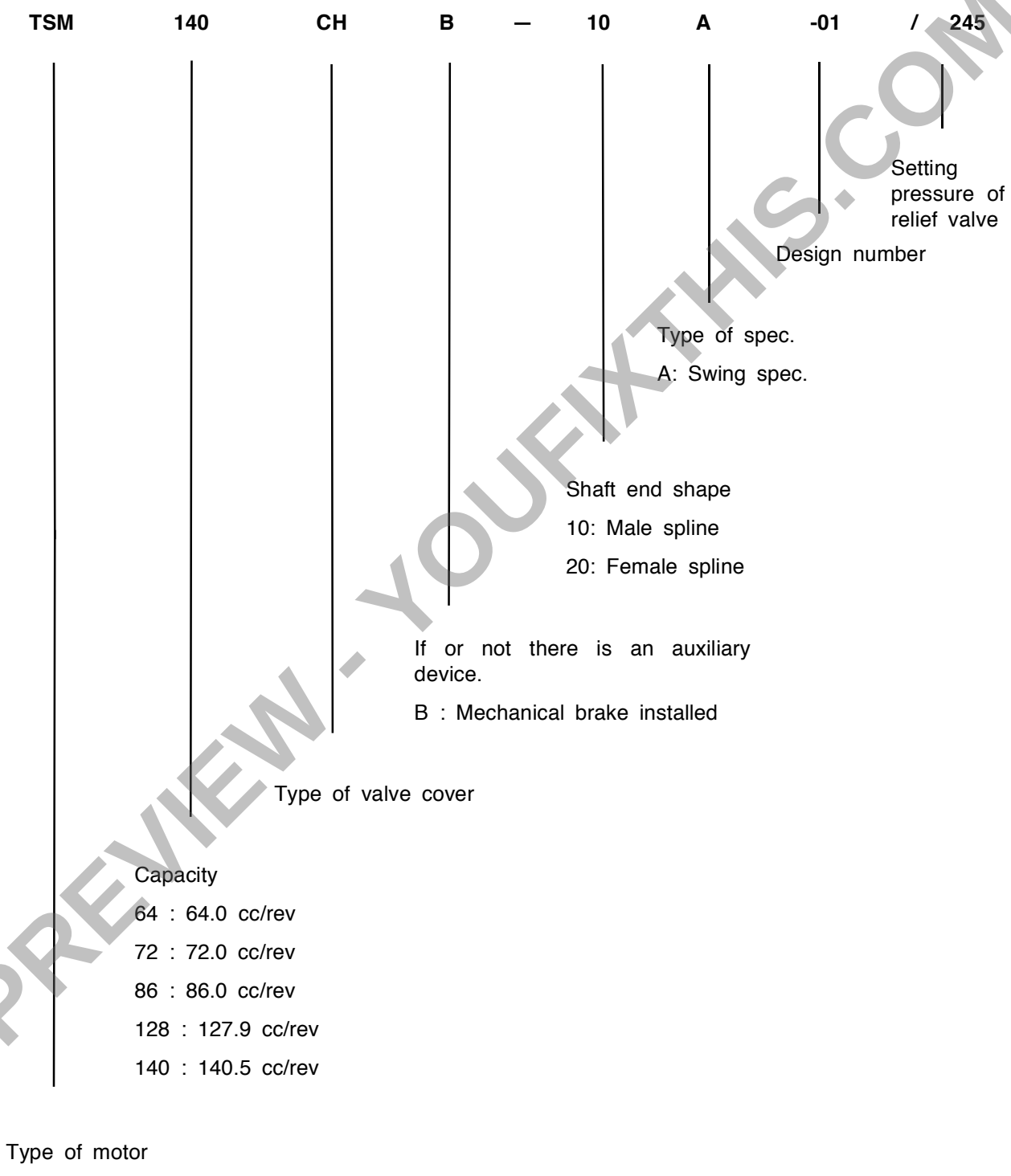
The center joint (swivel) is designed to allow hydraulic oil from the upper structure to flow to components in the lower structure.

It is capable of allowing continuous 360° rotation of the upper structure in relationship to the lower structure.

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Information on Marking



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Hydraulic Oil

As the products are shipped with hydraulic oil in the hydraulic motor case being drained, be sure to fill the case with hydraulic oil before operation.

1. Selection of Hydraulic Oil

   Take care the following matters when selecting hydraulic oil for TM motor.

   A. Use hydraulic oil equal to ISO VG32-VG56 (SAE 10W-20).

   B. Hydraulic oil should be of wear resistance.

   C. Contact us when selecting other hydraulic oil than those in the table below.

Grade	Viscosity (40°C)	32 CST	46 CST
	ISO VG	VG 32	VG 46
Manufacturers	HOUGHTON	HYDRO DRIVE HP32	HYDRO DRIVE HP46
	GULF	HARMONY 32AW	HARMONY 46AW
	CALTEX	RANDO HD32, AZ	RANDO HD46
	MOBLIL	DTE 24	DTE 25
	SHELL	TELUS 32	TELUS 46

2. Check and Change of Hydraulic Oil

   Change oil according to the following intervals, though its frequency depends on operation conditions.

   The following is the recommended interval of changing hydraulic oil.

   A. Interval - 1000 hours or 1 year

   B. Change criteria

Checking Points	**Change Standards**
Change of Viscosity (40°C)	± 10%
Oxidization (mgKQH/g)	※
Water (%)	0.1 %
Impurities	10mg / 100 ㎖
Insolubility (%)	0.05 %
Color	Excessively changed.

NOTE: *Contact us for the type of hydraulic oil, for it is different depending on its maker.*

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- Reassembly 9

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3. Install drive shaft (111) containing bearing (123), bearing spacer (127), and stop ring (824) in swash plate support (251).

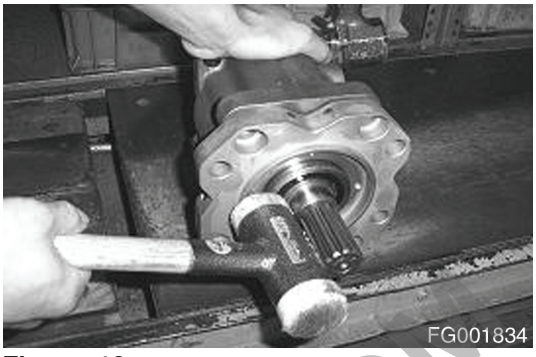


Figure 13

CAUTION

1. Do not strike drive shaft with hammer or things like that.

2. Use a plastic hammer to gently knock the rim of bearing to insert it and use a steel rod to insert it up to the end firmly.

4. Insert seal cover (F)(261) in pump casing (271) and fix it with socket bolts (406).

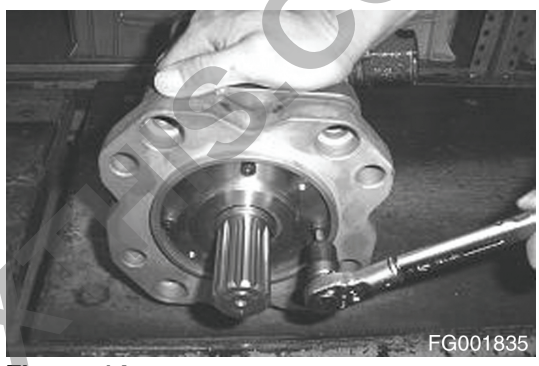


Figure 14

CAUTION

1. Apply a thin grease coating to the oil seal of seal cover (F).

2. Take care not to damage the oil seal during reassembly.

3. For the tandem pump, assemble parts up to rear cover (263) in the same way as for seal cover (262).

5. Assemble the piston cylinder subassembly [cylinder block (141), piston sub (151, 152), push plate (153), flexible bush (156), spacer (158), and cylinder spring (157)] and install it in pump casing by arranging it to the spool line of cylinder block and flexible bush.

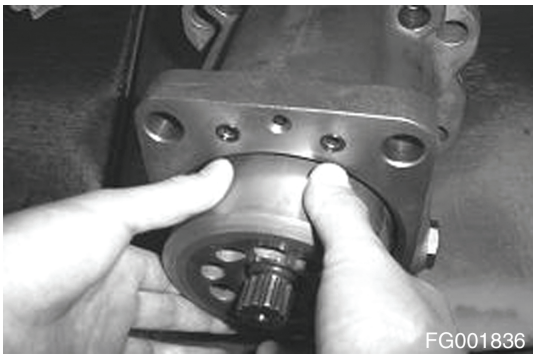


Figure 15

6. Install valve plate (313) in valve block (312) by arranging pin (885).

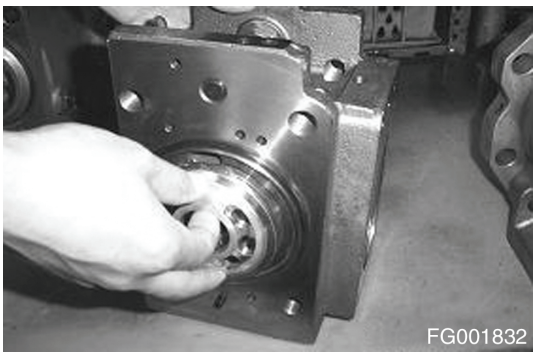


Figure 16

CAUTION

Take care to set correct directions of suction and discharge of the valve plate.

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Pressure Reducing Valve

1. Neutral Condition

   If pedal is in neutral, spool is pushed up by return spring and spring seat. Port (P) is blocked by bottom part of spool and four operating ports (left forward and backward, right forward and backward) are connected to port (T) through inner hole of spool.

2. Half Operation Condition

   If pedal is moved, push rod moves down, and they transmit this force through spring seat and control spring to spool. If spool is moved, primary pressure is transmitted through an inner hole of spool to operating port. If lever is stopped in middle position, compressed control spring force and secondary pressure transmitted through hole acts at bottom part of spool, balance is maintained by hydraulic force acted upward, and then this pressure is transmitted to traveling spool of control valve. That is, primary pressure is transmitted to operating port as secondary pressure equivalent to control spring force compressed by spool.

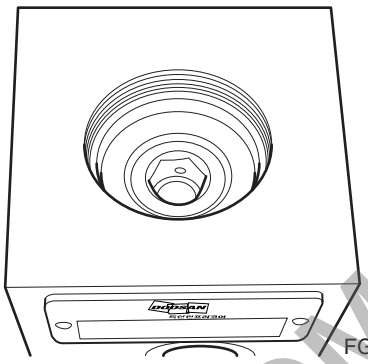
3. Full Operating Condition

   If pedal is moved to a maximum, bottom part of push rod presses spool seat to a maximum, and compresses control spring to a maximum. Primary pressure is transmitted through inner hole of spool to operation port, secondary pressure transmitted through spool overcomes control spring force and pushes spool up, but spool is restricted by push rod and does not move any more. That is, when pedal lever is moved to a maximum, control spring does not function, spool is restricted by push rod, and then primary pressure equalizes to secondary pressure.

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2. Assemble the spool, the spring, and the pin.



FG003693

Figure 13

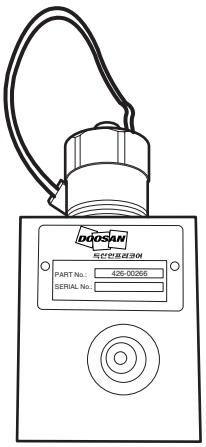
- The spring and the pin should not be fell off.



FG003696

Figure 14

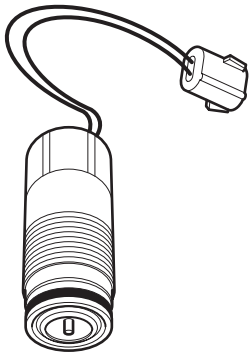
3. Assemble the solenoid correctly.



FG003697

Figure 15

- Take care not to damage O-rings of the solenoid.



FG003698

Figure 16

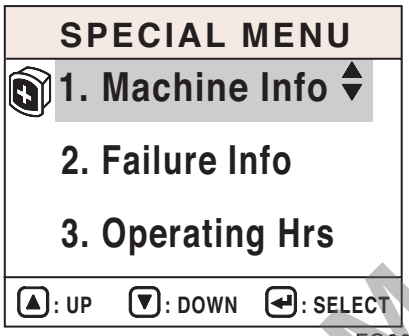
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Special Menu Screen

NOTE: *Displayed language on the special menu screen consists of Korean and English.*

If any language except for Korean is selected during language selection mode of main menu, only English will be displayed on special menu screen.



FG000558

Figure 26

Exiting/Escaping Menus

1. If escape button (ESC, 4 on Figure 24) is pressed for more than 1 second, the special menu screen will be returned to the normal mode screen.
2. If this special menu is "ON" without any activity, for more than 20 seconds, it will turn to the normal mode screen.
3. After the turning starter switch to the "OFF" position, turn it back to the "ON" position, and the normal mode screen displayed once again.

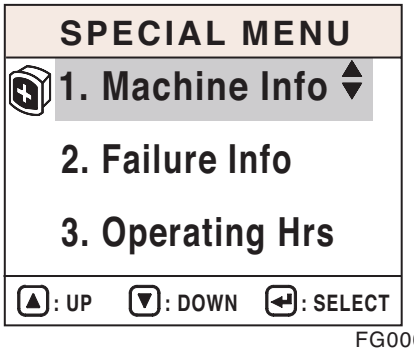
Special Menu Selections

Submenu Selection Method

Various sub-menus can be selected by pressing "Up (▲, 1 on Figure 24)" and "Down (▼, 2 on Figure 24)" button.

Move the cursor to desired menu and a selected menu will be inverse displayed.

When the selected menu is inverse displayed, press the "Enter (↵, 3 on Figure 24)" button for menu selection.

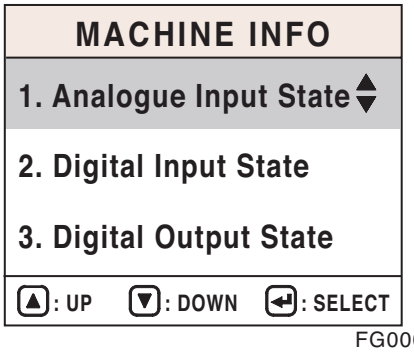


FG000558

Figure 27

Information of Machine Status

1. Entering Sub-menus: When cursor is located on "Machine Info" of special menu screen, press "Enter (↵, 3 on Figure 24)" button and the "Machine Info" will be displayed.
2. Exiting Sub-menus: If escape button (ESC, 4 on Figure 24) is pressed for more than 1 second, display will be turned to previous screen.



FG000559

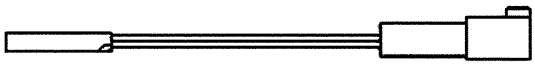
Figure 28

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Water Temperature Sensor: It senses the temperature of coolant water in the heater core.

Temperature (°C)	Resistance (KΩ)
-10	55.8 ±1.7
0	32.9 ±0.9
15	15.76 ±0.5
25	10.0 ±0.3
35	6.5 ±0.2

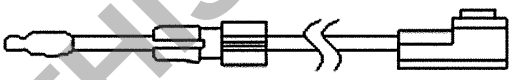


FG001060

Figure 84

Internal Air Temperature Sensor: Built in the internal air filter, it senses the internal temperature.

Temperature (°C)	Resistance (KΩ)
-15	218.2 ±7.5
0	97.83 ±0.9
15	47.12 ±0.7
25	30.0 ±0.36
35	19.60 ±0.3



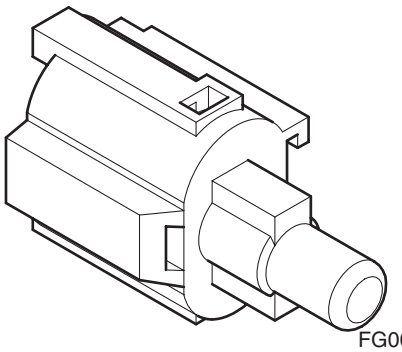
FG001061

Figure 85

Ambient Air Temperature Sensor

Built at the bottom of the cockpit, it senses the temperature of external air.

Temperature (°C)	Resistance (KΩ)
-10	163 ±4.9
0	96.9 ±2.9
10	59.4 ±1.8
20	37.4 ±1.1
25	30 ±0.9
30	24.2 ±0.7



FG001064

Figure 86

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