GENERAL SPECIFICATIONS

COMPONENT			SPECIFICATION			
			STANDARD (1.19m ARM)	1.19m ARM+Q/C	1.3m ARM	1.3m ARM+Q/C
Bucket capacity	CECE		0.091 m^3			
	SAE		0.078 m^3			
Operating weight			3.18 tons			
Engine	Model		3TNV82A-PDB			
	Displacement (Total dis. Volume)		1,331 cc			
	Rated power		24.3 hp @ 2,400 rpm			
			18.1 kW @ 2,400 rpm			
Front Attachment	Boom length		2,280 mm			
	Arm length (Standard)		1,190 mm			
	Arm length (Option)		1,300 mm			
Transport Dimension	Length		4,507 mm			
	Height		2,480 mm			
	Height (Boom)		1,590 mm			
	Width		1,550 mm			
Performance	Max.digging force	Bucket	2,800 kgf	2,200 kgf	2,800 kgf	2,200 kgf
		Arm	1,800 kgf	1,630 kgf	1,690 kgf	1,550 kgf
	Traveling speed	1-speed	2.6 km/h			
		2-speed	4.6 km/h			
	Swing speed		9.7 rpm			
	Drawbar pull		2,960 kg			
Hydraulic pump	Type		Variable displacement axial piston pump			
	Max. flow rate		37.2 x 2 ℓ /min + 20.4 ℓ /min (Gear pump: 10.8 ℓ /min)			
	Main relief set pressure		210 kg/cm^2			
Track	Shoe width		300 mm			
	Tumbler distance		1,650 mm			
Control	Lever control type		Hydraulic pilot			
	Lever pattern		SAE			
Tank	Fuel tank		35 ℓ			
	Hydraulic tank		35 ℓ			
Ground pressure			0.29 kg/cm^2			

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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.

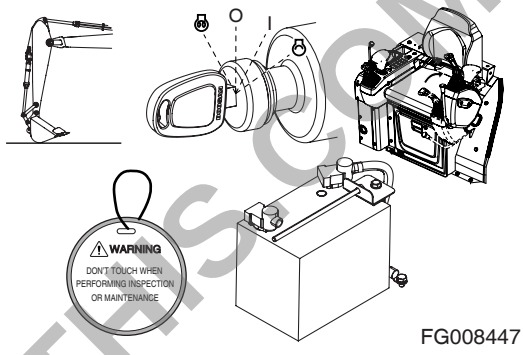
1. Park on firm and level ground.
2. Lower front attachment (bucket) to ground.
3. Shut down engine.
4. Set safety lever on "RELEASED" position.
5. Turn starter switch to "I" (ON) position.

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.

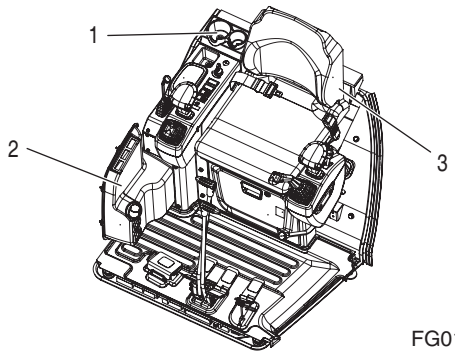
6. Fully stroke work levers (joysticks) in all directions to relieve pressure from accumulators.
7. Set safety lever on "LOCK" position.
8. Turn key to "O" (OFF) position and remove from starter switch.
9. Hang maintenance warning tag on controls.
10. Disconnect the battery cable - from the negative (-) battery terminal.
11. Remove floor mat.
12. Disconnect main harness connector after removing cup holder (1, Figure 2).
13. Remove heater cover.

    Disconnect harness connector for switches and heater hoses before removing heater cover (2, Figure 2).



FG008447

Figure 1



FG010291

Figure 2

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TORQUE VALUES FOR STANDARD METRIC FASTENERS

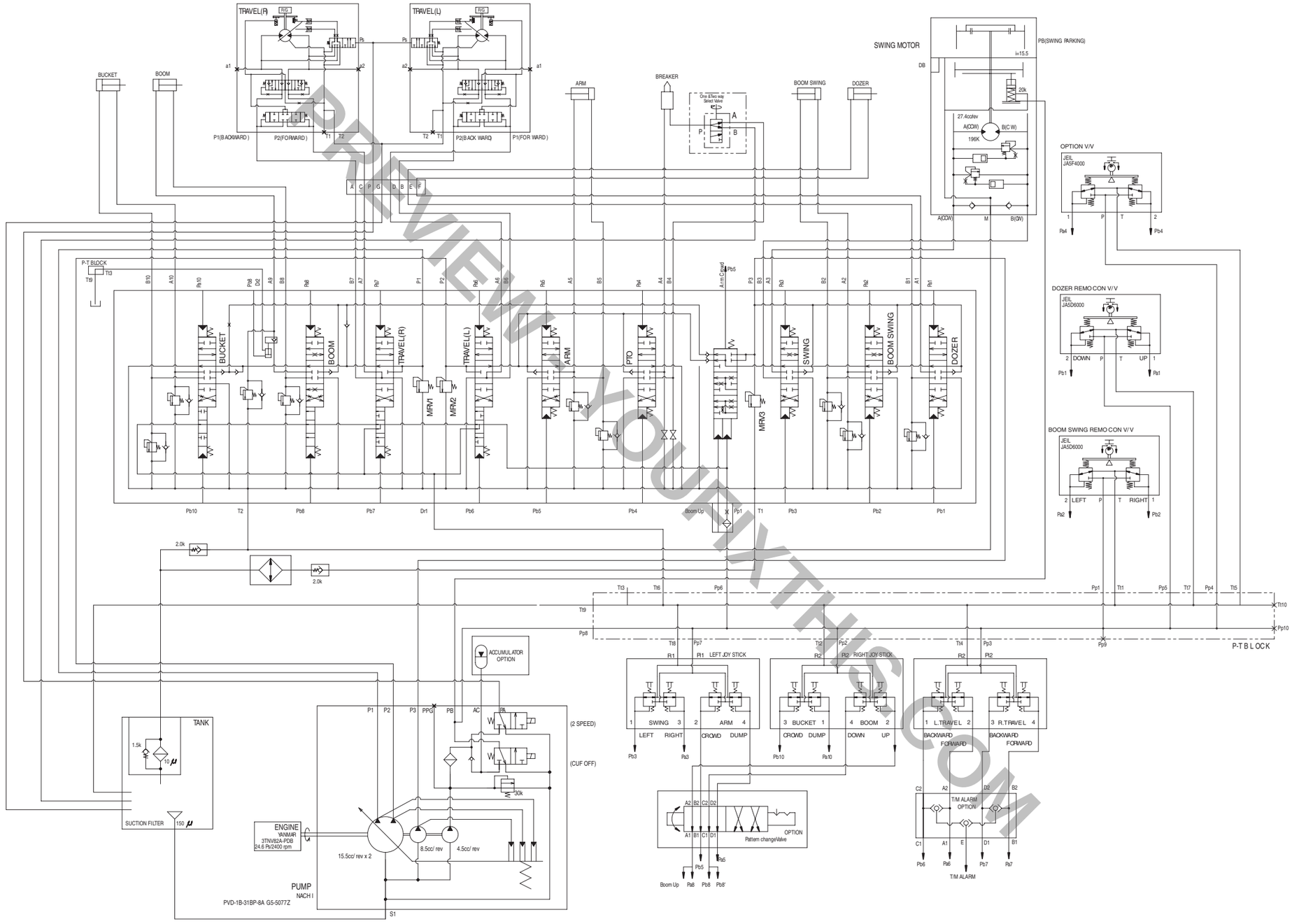
NOTE: *The units for the torque values are kg•m (ft lb).*

Dia. x Pitch (mm)	Grade										
	3.6 (4A)	4.6 (4D)	4.8 (4S)	5.6 (5D)	5.8 (5S)	6.6 (6D)	6.8 (6S)	6.9 (6G)	8.8 (8G)	10.9 (10K)	12.9 (12K)
M5 x Std.	0.15 (1.08)	0.16 (1.15)	0.25 (1.80)	0.22 (1.59)	0.31 (2.24)	0.28 (2.02)	0.43 (3.11)	0.48 (3.47)	0.50 (3.61)	0.75 (5.42)	0.90 (6.50)
M6 x Std.	0.28 (2.02)	0.30 (2.16)	0.45 (3.25)	0.40 (2.89)	0.55 (3.97)	0.47 (3.39)	0.77 (5.56)	0.85 (6.14)	0.90 (6.50)	1.25 (9.04)	1.50 (10.84)
M7 x Std.	0.43 (3.11)	0.46 (3.32)	0.70 (5.06)	0.63 (4.55)	0.83 (6.00)	0.78 (5.64)	1.20 (8.67)	1.30 (9.40)	1.40 (10.12)	1.95 (14.10)	2.35 (16.99)
M8 x Std.	0.70 (5.06)	0.75 (5.42)	1.10 (7.95)	1.00 (7.23)	1.40 (10.12)	1.25 (9.04)	1.90 (13.74)	2.10 (15.18)	2.20 (15.91)	3.10 (22.42)	3.80 (27.48)
M8 x 1	0.73 (5.28)	0.80 (5.78)	1.20 (8.67)	1.00 (7.23)	1.50 (10.84)	1.35 (9.76)	2.10 (15.18)	2.30 (16.63)	2.40 (17.35)	3.35 (24.23)	4.10 (29.65)
M10 x Std.	1.35 (9.76)	1.40 (10.12)	2.20 (15.91)	1.90 (13.74)	2.70 (19.52)	2.35 (19.99)	3.70 (26.76)	4.20 (30.37)	4.40 (31.18)	6.20 (44.84)	7.20 (52.07)
M10 x 1.25	1.50 (10.84)	1.60 (11.57)	2.50 (18.08)	2.10 (15.18)	3.10 (22.42)	2.80 (20.25)	4.30 (31.10)	4.90 (35.44)	5.00 (36.16)	7.00 (50.63)	8.40 (60.75)
M12 x Std.	2.40 (17.35)	2.50 (18.08)	3.70 (26.76)	3.30 (23.86)	4.70 (33.99)	4.20 (30.37)	6.30 (45.56)	7.20 (52.07)	7.50 (54.24)	10.50 (75.94)	12.50 (90.41)
M12 x 1.25	2.55 (18.44)	2.70 (19.52)	4.00 (28.93)	3.50 (25.31)	5.00 (36.16)	4.50 (32.54)	6.80 (49.18)	7.70 (55.69)	8.00 (57.86)	11.20 (81.00)	13.40 (96.92)
M14 x Std.	3.70 (26.76)	3.90 (28.20)	6.00 (13.23)	5.20 (37.61)	7.50 (54.24)	7.00 (50.63)	10.00 (72.33)	11.50 (83.17)	12.00 (86.79)	17.00 (122.96)	20.00 (144.66)
M14 x 1.5	4.10 (29.65)	4.30 (31.10)	6.60 (47.73)	5.70 (41.22)	8.30 (60.03)	7.50 (54.24)	11.10 (80.28)	12.50 (90.41)	13.00 (94.02)	18.50 (133.81)	22.00 (159.12)
M16 x Std.	5.60 (40.50)	6.00 (43.39)	9.00 (65.09)	8.00 (57.86)	11.50 (83.17)	10.50 (75.94)	15.50 (112.11)	17.90 (129.47)	18.50 (133.81)	26.00 (188.05)	31.00 (224.22)
M16 x 1.5	6.20 (44.84)	6.50 (47.01)	9.70 (70.16)	8.60 (62.20)	12.50 (90.41)	11.30 (81.73)	17.00 (122.96)	19.50 (141.04)	20.00 (144.66)	28.00 (202.52)	35.50 (256.77)
M18 x Std.	7.80 (56.41)	8.30 (60.03)	12.50 (90.41)	11.00 (79.56)	16.00 (115.72)	14.50 (104.87)	21.00 (151.89)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	43.00 (311.01)
M18 x 1.5	9.10 (65.82)	9.50 (68.71)	14.40 (104.15)	12.50 (90.41)	18.50 (133.81)	16.70 (120.79)	24.50 (177.20)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	49.00 (354.41)
M20 x Std.	11.50 (83.17)	12.00 (86.79)	18.00 (130.19)	16.00 (115.72)	22.00 (159.12)	19.00 (137.42)	31.50 (227.83)	35.00 (253.15)	36.00 (260.38)	51.00 (368.88)	60.00 (433.98)
M20 x 1.5	12.80 (92.58)	13.50 (97.64)	20.50 (148.27)	18.00 (130.19)	25.00 (180.82)	22.50 (162.74)	35.00 (253.15)	39.50 (285.70)	41.00 (296.55)	58.00 (419.51)	68.00 (491.84)
M22 x Std.	15.50 (112.11)	16.00 (115.72)	24.50 (177.20)	21.00 (151.89)	30.00 (216.99)	26.00 (188.05)	42.00 (303.78)	46.00 (332.71)	49.00 (354.41)	67.00 (484.61)	75.00 (542.47)
M22 x 1.5	17.00 (122.96)	18.50 (133.81)	28.00 (202.52)	24.00 (173.59)	34.00 (245.92)	29.00 (209.75)	47.00 (339.95)	52.00 (44.76)	56.00 (405.04)	75.00 (542.47)	85.00 (614.80)
M24 x Std.	20.50 (148.27)	21.50 (155.50)	33.00 (238.68)	27.00 (195.29)	40.00 (289.32)	34.00 (245.92)	55.00 (397.81)	58.00 (419.51)	63.00 (455.67)	82.00 (593.10)	92.00 (655.43)
M24 x 2.0	23.00 (166.35)	35.00 (253.15)	37.00 (267.62)	31.00 (224.22)	45.00 (325.48)	38.00 (202.52)	61.00 (441.21)	67.00 (484.61)	74.00 (535.24)	93.00 (672.66)	103.00 (744.99)

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DX30Z



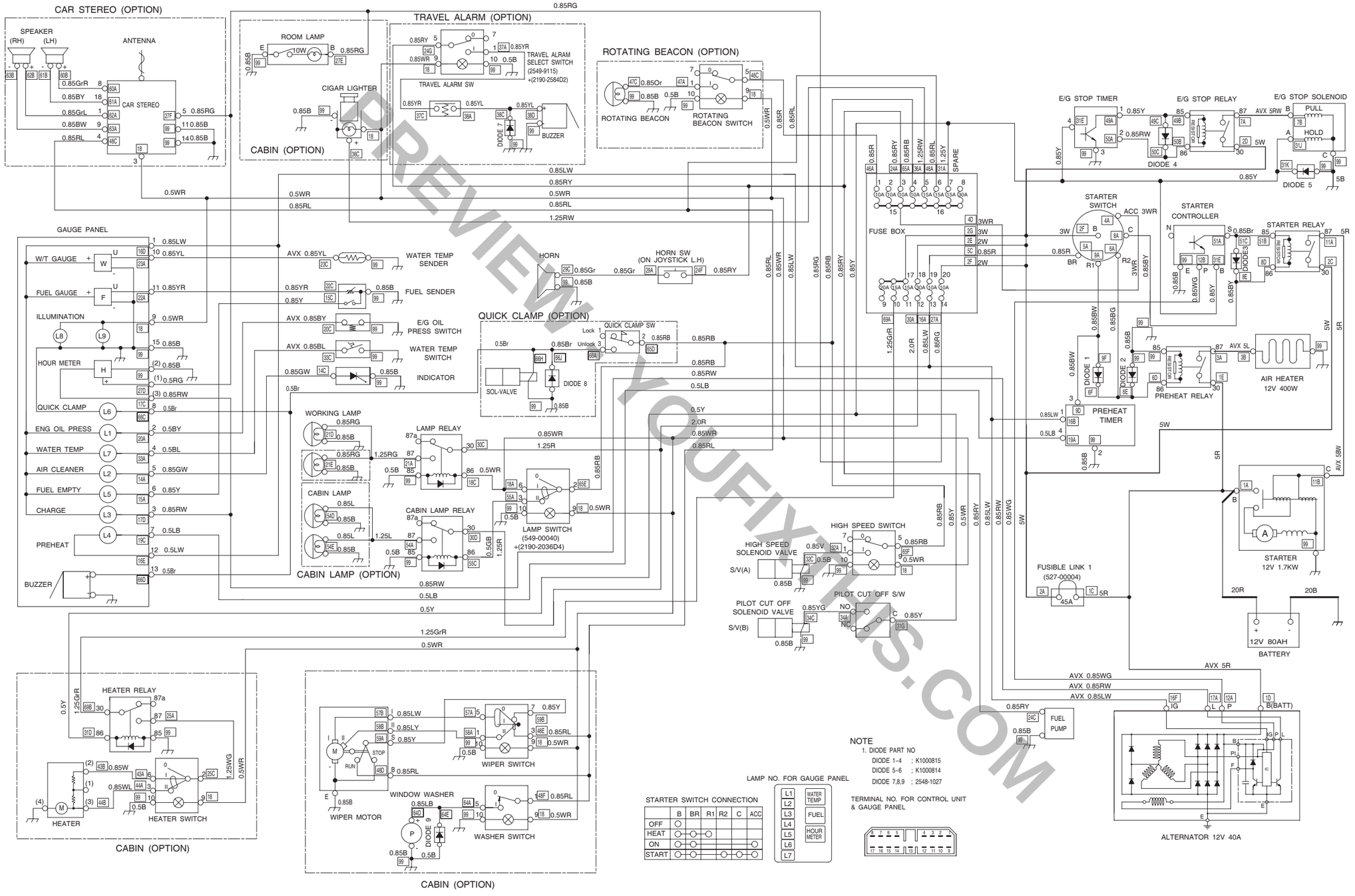
FG010045

Figure 1

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DX27Z/DX30Z



FG008825

Figure 1

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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 the load.

Remember, that ultimately safety is your own responsibility.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX27Z	5001 and Up
DX30Z	5001 and Up
DX35Z	5001 and Up

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Remote Control Valve (Work Lever / Joystick) SP001072
Travel Control Valve SP000839
Pedal Valve..... SP001073
Hydraulic Schematic (DX30Z) SP001397

Electrical System

Electrical System SP001142
Electrical Schematic (DX27Z/DX30Z)..... SP001144

Attachments

Working Attachments..... SP001398
Bucket..... SP001076

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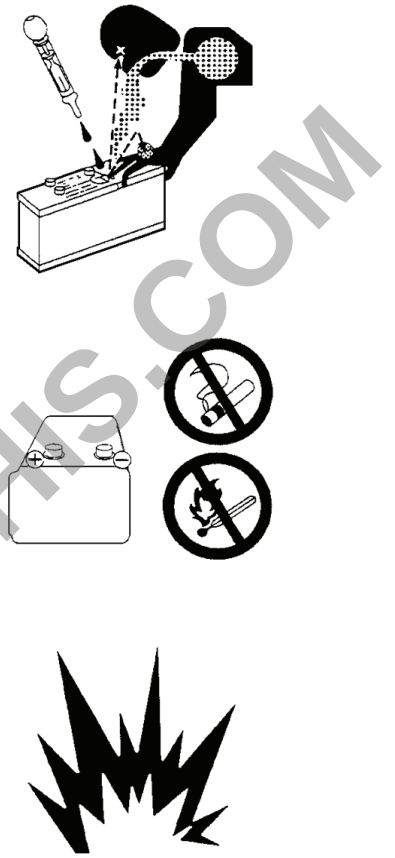
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BATTERY

Battery Hazard Prevention

Battery electrolyte contains diluted sulfuric acid and batteries generate hydrogen gas. Hydrogen gas is highly explosive, and mistakes in handling them can cause serious injury or fire. To prevent problems, always do the following:

- Do not smoke or bring any flame near the battery.
- When working with batteries, ALWAYS wear safety glasses and rubber gloves.
- If you spill battery electrolyte on yourself or your clothes, immediately flush the area with water.
- If battery electrolyte gets into your eyes, flush them immediately with large quantities of water and see a doctor at once.
- If you accidentally drink battery electrolyte, drink a large quantity of water or milk, raw egg or vegetable oil. Call a doctor or poison prevention center immediately.
- When cleaning the top surface of the battery, wipe it with a clean, damp cloth. Never use gasoline, thinner, or any other organic solvent or detergent.
- Tighten the battery caps securely.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with power from another source. There is a danger that the battery may catch fire.
- When charging the battery or starting with power from another source, let the battery electrolyte melt and check that there is no leakage of battery electrolyte before starting the operation.
- Always remove the battery from the machine before charging.



HAAE2100

Figure 40

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Curling under of any seal lip will seriously impair its efficiency. Apply a thin coat of Loctite #120 to outer diameter, of metal casing, on oil seals to assure an oil tight fit into retainer. Use extreme care not to get Loctite on lips of oil seals. If this happens, that portion of the seal will become brittle and allow leakage.

When replacing lip type seals, make sure spring loaded side is towards oil to be sealed.

5. If available, use magna-flux or similar process for checking for cracks that are not visible to the eye. Examine teeth on all gears carefully for wear, pitting, chipping, nicks, cracks or scores. Replace all gears showing cracks or spots where case hardening has worn through. Small nicks may be removed with suitable hone. Inspect shafts and quills to make certain they have not been sprung, bent, or splines twisted, and that shafts are true.

   NOTE: *Spline wear is not considered detrimental except where it affects tightness of splined parts.*

   Inspect thrust washers for distortion, scores, burs, and wear. Replace thrust washer if defective or worn.

6. Inspect bores and bearing surfaces of cast parts and machined surfaces for scratches, wear, grooves and dirt. Remove any scratches and burrs with crocus cloth. Remove foreign material. Replace any parts that are deeply grooved or scratched which would affect their operation.

Bearing inspection

The conditions of the bearing are vital to the smooth and efficient operation of the machinery. When any component containing bearings is disassembled, always carefully examine the condition of the bearings and all of its components for wear and damage.

Once the bearing is removed, clean all parts thoroughly using a suitable cleaning solution. If the bearing is excessively dirty soak the bearing assembly in a light solution and move the bearing around until all lubricants and or foreign materials are dissolved and the parts are thoroughly clean.

When drying bearings, moisture free compressed air can be used. Be careful not to direct the air in a direction which will force the bearing to dry spin while not being properly lubricated.

After the bearings have been cleaned and dried, carefully inspect all bearing rollers, cages and cups for wear, chipping or nicks. If the bearing cannot be removed and is to be 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.

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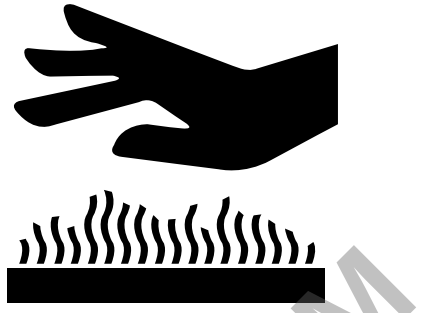
⚠ WARNING!

Burn Hazard!

If you must drain the engine oil while it is still hot, stay clear of the hot engine oil to avoid being burned.

Always wear eye protection.

Failure to comply could result in death or serious injury.



HAOA050L

Figure 17

⚠ WARNING!

Burn Hazard!

Batteries contain sulfuric acid. Never allow battery fluid to come in contact with clothing, skin or eyes. Severe burns could result. Always wear safety goggles and protective clothing when servicing the battery. If battery fluid contacts the eyes and / or skin, immediately flush the affected area with a large amount of clean water and obtain prompt medical treatment.

Failure to comply could result in death or serious injury.



FG008465

Figure 18

⚠ WARNING!

High-pressure Hazard!

Avoid skin contact with the high-pressure diesel fuel spray caused by a fuel system leak such as a broken fuel injection line. High-pressure fuel can penetrate your skin and result in serious injury. If you are exposed to high-pressure fuel spray, obtain prompt medical treatment.

Never check for a fuel leak with your hands. Always use a piece of wood or cardboard. Have your authorized Yanmar industrial engine dealer or distributor repair the damage.

Failure to comply could result in death or serious injury.



FG009150

Figure 19

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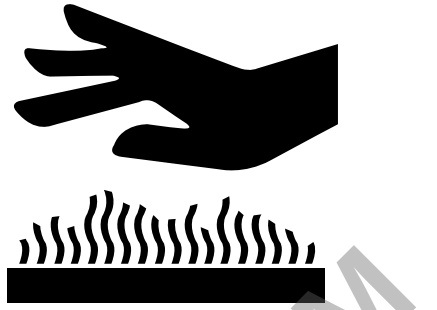
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⚠ WARNING!

Burn Hazard!

Wait until the engine cools before you drain the engine coolant. Hot engine coolant may splash and burn you.

Failure to comply could result in death or serious injury.



HAOA050L

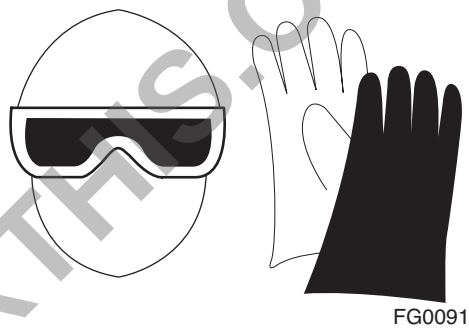
Figure 66

⚠ CAUTION!

Coolant Hazard!

Wear eye protection and rubber gloves when you handle long life or extended life engine coolant. If contact with the eyes or skin should occur, flush eyes and wash immediately with clean water.

Failure to comply may result in minor or moderate injury.



FG009154

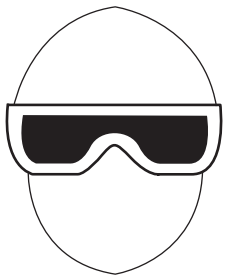
Figure 67

⚠ CAUTION!

FLYING OBJECT HAZARD!

Always wear eye protection when servicing the engine and when using compressed air or high-pressure water. Dust, flying debris, compressed air, pressurized water or steam may injure your eyes.

Failure to comply may result in minor or moderate injury.



FG009152

Figure 68

⚠ CAUTION!

Only use diesel fuels recommended by Yanmar for the best engine performance, to prevent engine damage and to comply with EPA / ARB warranty requirements.

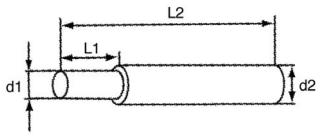
Only use clean diesel fuel.

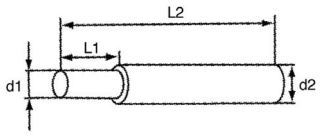
Never remove the primary strainer (if equipped) from the fuel tank filler port. If removed, dirt and debris could get into the fuel system causing it to clog.

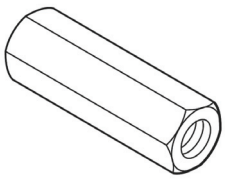
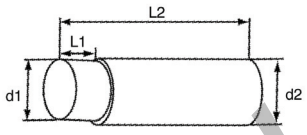
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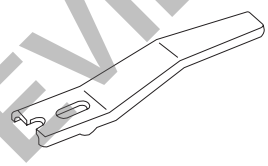
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Special Service Tools

<table>
<tr><th>No.</th><th>Illustration</th><th>Tool name</th><th>Applicable model and tool size</th></tr>
<tr><td>1</td><td>

FG008269</td><td>Valve Guide Tool (For Removing Valve Guide)</td><td><table>
<tr><th>Model</th><th>L1</th><th>L2</th><th>d1</th><th>d2</th></tr>
<tr><td>3TNV82A</td><td>0.787 in. (20mm)</td><td>2.953 in. (75mm)</td><td>0.256 in. (6.5mm)</td><td>0.394 in. (10mm)</td></tr>
</table>
*Locally manufactured</td></tr>
<tr><td>2</td><td>

FG008269</td><td>Valve Guide Tool (For Installing Valve Guide)</td><td><table>
<tr><th>Model</th><th>L1</th><th>L2</th><th>d1</th><th>d2</th></tr>
<tr><td>3TNV82A</td><td>0.472 in. (12mm)</td><td>2.362 in. (60mm)</td><td>0.256 in. (6.5mm)</td><td>0.394 in. (10mm)</td></tr>
</table>
*Locally manufactured</td></tr>
<tr><td>3</td><td>
FG008871</td><td>Fuel Injector Removal Tool (2-Valve Head)</td><td>Yanmar Part No. 129470-92305</td></tr>
<tr><td>4</td><td>

FG008271</td><td>Connecting Rod Bushing Replacer (For Removal/ Installation of Connecting Rod Bushing)</td><td><table>
<tr><th>Model</th><th>L1</th><th>L2</th><th>d1</th><th>d2</th></tr>
<tr><td>3TNV82A</td><td>0.984 in. (25mm)</td><td>3.346 in. (85mm)</td><td>0.906 in. (23mm)</td><td>1.024 in. (26mm)</td></tr>
</table>
*Locally manufactured</td></tr>
<tr><td>5</td><td>
FG008872</td><td>Valve Spring Compressor (For Removal/ Installation of Valve Spring)</td><td>Yanmar Part No. 129100-92630</td></tr>
</table>

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Reference Number	Description
1	Cylinder Block
2	Camshaft Bushing
3	Gear Case (3TNV94 - 4TNV106)
4	Dowel (2 used)
5	O-Ring
6	Front Plate (3TNV82A8)
7	Gear Case Cover (3TNV82A)
8	Front Crankshaft Seal
9	Gear Case Cover (3TNV94 - 4TNV106)
10	Tappets
11	Camshaft
12	Camshaft Gear Key
13	Camshaft End Plate
14	Camshaft Gear
15	Idler Gear Shaft
16	Idler Gear Bushing
17	Idler Gear
18	Oil Pickup O-Ring
19	Oil Pickup
20	Crankshaft
21	Parallel Pin

Reference Number	Description
22	Crankshaft Gear Key
23	Crankshaft Gear
24	Crankshaft Pulley
25	Main Bearing Inserts
26	Main Bearing Cap
27	Oil Pan
28	Thrust Bearings
29	Flywheel
30	Connecting Rod Cap
31	Connecting Rod Bearing Inserts
32	Connecting Rod
33	Wrist Pin Bushing
34	Circlip
35	Wrist Pin
36	Piston
37	Oil Ring
38	Second Compression Ring
39	Top Compression Ring
40	Crankshaft Rear Seal
41	Crankshaft Rear Seal Housing

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12. Separate the stop solenoid wiring connector (2, Figure 276).

13. Remove the rear fuel injection pump bracket(s) (1, Figure 276) from the fuel injection pump.

    NOTE: *Configuration of the fuel injection pump rear brackets may vary depending upon engine model.*

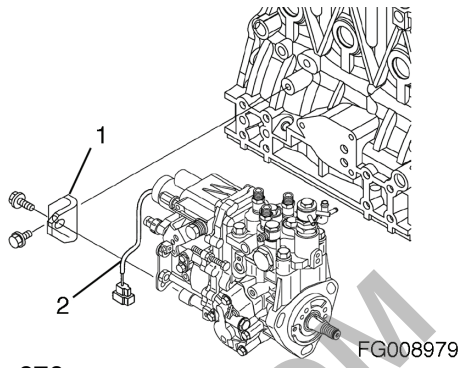


Figure 276

14. Disconnect the lube oil line (1, Figure 277) and the clamp (2, Figure 277) from the pump.

⚠ IMPORTANT!

Take care to not damage or bend the oil line. In some applications, it may be preferable to remove the complete oil line assembly from the engine before proceeding.

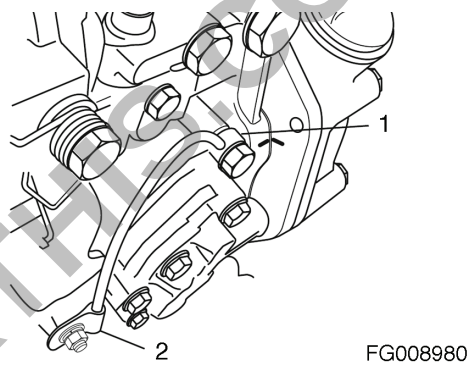


Figure 277

NOTE: *On models 3TNV82A, the fuel injection pump drive gear cover is retained to the gear case cover by 4 bolts.*

15. Remove the fuel injection pump drive gear cover (1, Figure 278) from the gear case cover (2, Figure 278).

    NOTE: *The fuel injection pump drive gear cover is secured with an adhesive sealant. Use a gasket scraper to separate the fuel injection pump cover from the gear case cover.*

    NOTE: *TNV82-88 shown.*

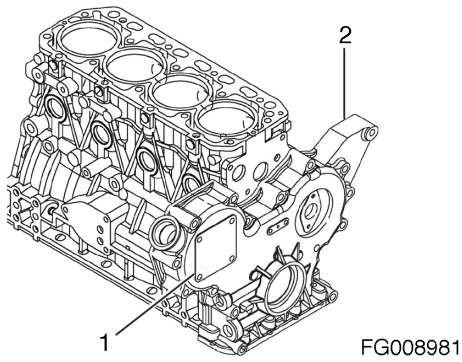


Figure 278

16. To position the fuel injection pump for easier removal and installation, install a dial indicator (See “Checking and Adjusting Fuel Injection Timing” on page -198.) into the injection pump plunger opening. Using a wrench on the crankshaft pulley bolt, rotate the crankshaft until the dial indicator shows that injection pump plunger is at the bottom of it’s stroke.

17. To aid in reassembly, make reference marks on the fuel injection pump drive gear, and on either the gear case cover or idler gear.

⚠ CAUTION!

After marking the position of the pump drive gear, do not rotate the engine crankshaft. Rotating the crankshaft will cause the fuel injection pump to become misaligned.

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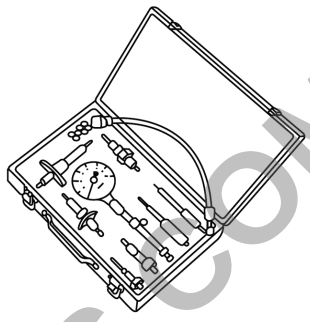
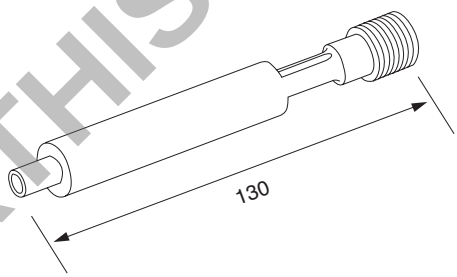
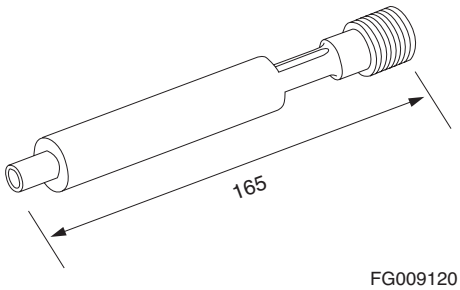
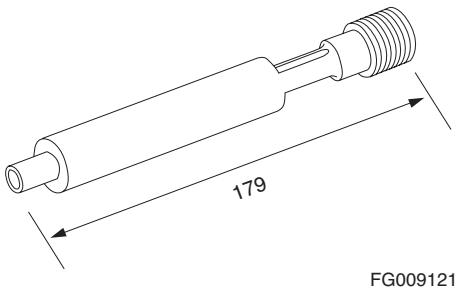
Starter Motor Specifications

Yanmar Part Number			129900-77010
Nominal Output			3.0 hp (2.3 kW)
Weight			12.1 lb (5.5 kg)
Revolution Direction (As Viewed From Pinion)			Clockwise
Engagement System			Magnetic Shift
No-load	Terminal Voltage / Current		11 V / 140 A max
	Revolution		4100 rpm (min^{-1})
	Terminal Voltage / Current		2.5 V / 1050 A max
	Torque		18 ft-lb (24.5 N•m; 2.5 kgf/m) minimum
Clutch System			Overrunning
Pinion Projection Voltage at 212°F (100 °C)			8.6 V max
Pinion DP or Module / Number of Teeth			M3/9
Difference (O-ring, Oil Seal)			Dry (none)
Application			Standard
Brush	Spring Force		7.868 lbf (35 N; 3.6 kgf)
	Height	Standard	0.591 in. (15 mm)
		Limit	0.354 in. (9 mm)
Magnetic Switch	Series Coil Resistance		0.27 W at 68°F (20°C)
	Shunt Coil Resistance		0.60 W at 68°F (20°C)
Commutator	Outside Diameter	Standard	1.437 in. (36.5 mm)
		Limit	1.398 in. (35 mm)
	Run-Out	Standard	0.001 in. (0.03 mm)
		Limit	0.008 in. (0.2 mm)
	Insulation Depth	Standard	0.020 - 0.031 in. (0.5 - 0.8 mm)
		Limit	0.008 in. (0.2 mm)
Armature	Run-Out	Standard	0.001 in. (0.03 mm)
		Limit	0.008 in. (0.02 mm)
Bearing Type	Armature Front	Nominal Number	6903DDU
	Armature Rear		608DDU
	Pinion Front		60004DDU
	Pinion Rear		6904DDU
Pinion Projection Length (Length L)			0.012 - 0.059 in. (0.3 - 1.5 mm)

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Special Service Tools

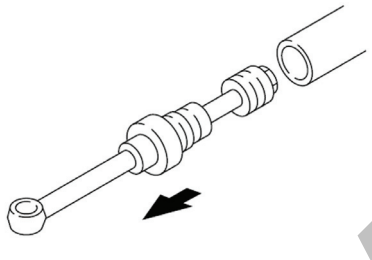
Compression Gauge Kit	For measuring compression pressure Yanmar Gauge Set Part No. TOL-97190080	 FG009118
	Adapter for direct injection 2-valve cylinder head Yanmar Adapter Part No. 119802-92950	 FG009119
	Adapter for direct injection 4-valve cylinder head for 4TNV94L/98/98T Yanmar Adapter Part No. 129906-92950	 FG009120
	Adapter for direct injection 4-valve cylinder head for 4TNV106(T) Yanmar Adapter Part No. 123907-92950	 FG009121

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4. Piston rod assembly disassembly

   Slowly turn the cylinder rod assembly to disconnect it from the tube. After disassembling the piston rod, take care not to damage it.

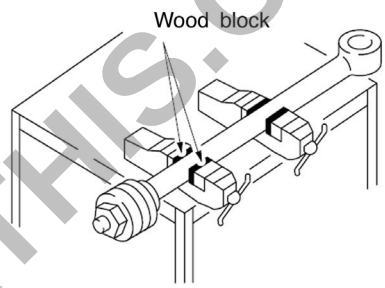


FG008499

Figure 6

5. Piston assembly disassembly

   Install a wood block on the inside of the vise as shown so that the piston rod may not be damaged. Make the surface of the surface table parallel with the piston rod. Otherwise, the piston rod may be damaged.



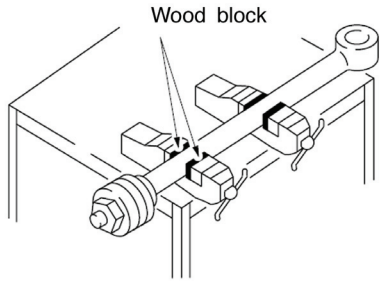
FG008500

Figure 7

Internal component disassembly procedure

1. Piston removal

   With a special tool or spanner, remove the piston nut from the piston rod assembly by turning the nut slowly counterclockwise.

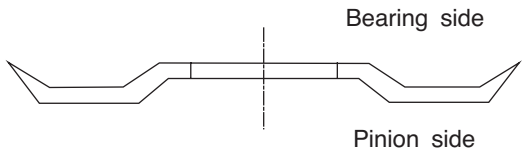


FG008500

Figure 8

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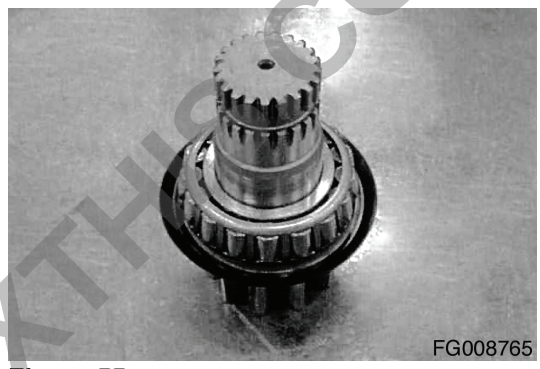


FG008764

Figure 54

3. Press-fit the inner ring of the bearing (121) to the pinion shaft (104).

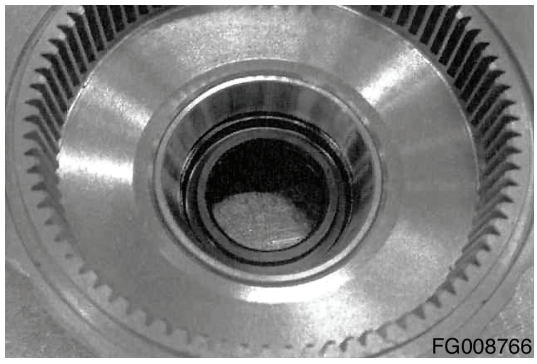
   NOTE: *After press fitting, apply grease onto the surface of the rollers, and turn them manually so that the grease can spread to the whole roller surface.*



FG008765

Figure 55

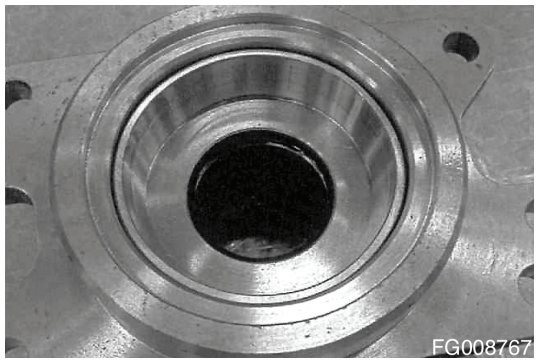
4. Press-fit the outer ring of the bearing (122) into the body (101).



FG008766

Figure 56

5. Press-fit the outer ring of the bearing (121) into the body (101).



FG008767

Figure 57

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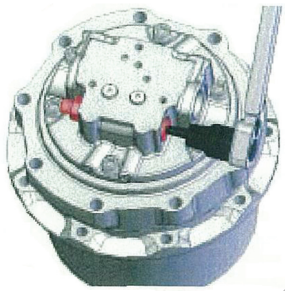
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8. Remove plugs.

   Tools required: Torque wrench

   Hexagonal bit for torque wrench

   Socket for torque wrench.

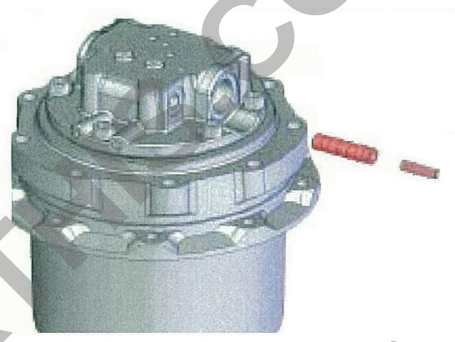


FG006496

Figure 27

9. Remove spring, spool assembly.

   Be careful not to damage around the spool.



FG006497

Figure 28

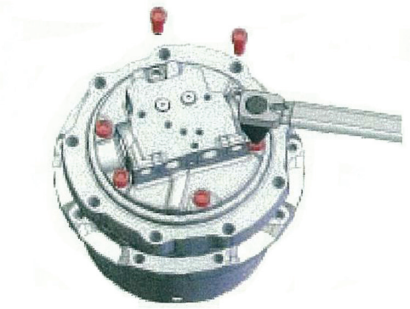
10. Remove socket head bolt.

    Tools required: Torque wrench

    Hexagonal bit for torque wrench.

IMPORTANT

To disassemble the motor easily, socket bolt should be loosened evenly because base plate lift up by the reactive force of spring.



FG006604

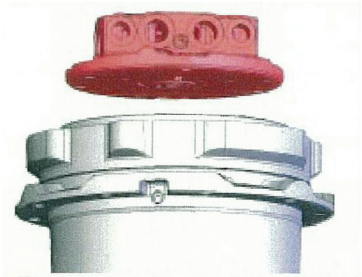
Figure 29

11. Remove base plate.

    Then, pay attention so that cylinder block dose not come out. When it is difficult to remove, strike it by use of plastic hammer. If it is more difficult to remove, remove it by lightly prying with screwdriver.

    Tools required: Plastic hammer

    Screwdriver.



FG006610

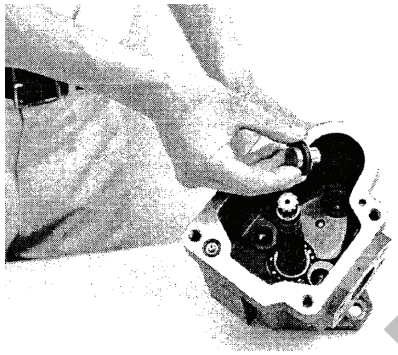
Figure 30

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4. Assembly of body S kit

   Assemble the stopper pin A kit and B kit in the body.

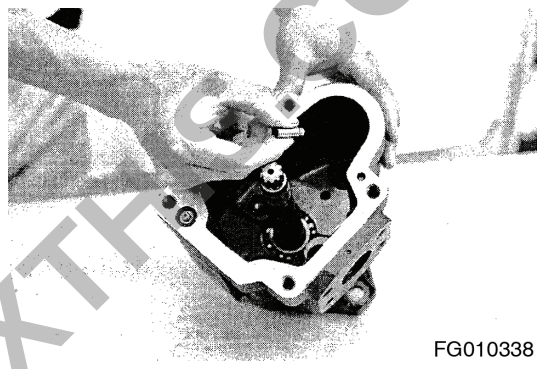


FG010330

Figure 23

5. Assembly of body S kit

   Assemble the rod G (21) in the body.

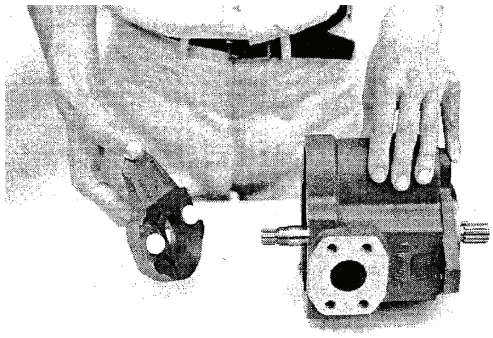


FG010338

Figure 24

6. Assembly of body S kit

   Insert wobble pin (12) into the knothole on the swash plate (10), and place it into the knothole on the body S (1).

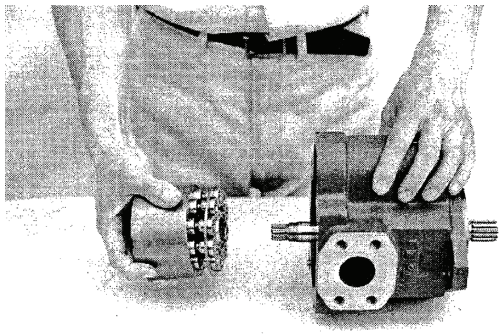


FG010329

Figure 25

7. Assembly of body S kit

   Insert the cylinder barrel kit into the body.



FG010328

Figure 26

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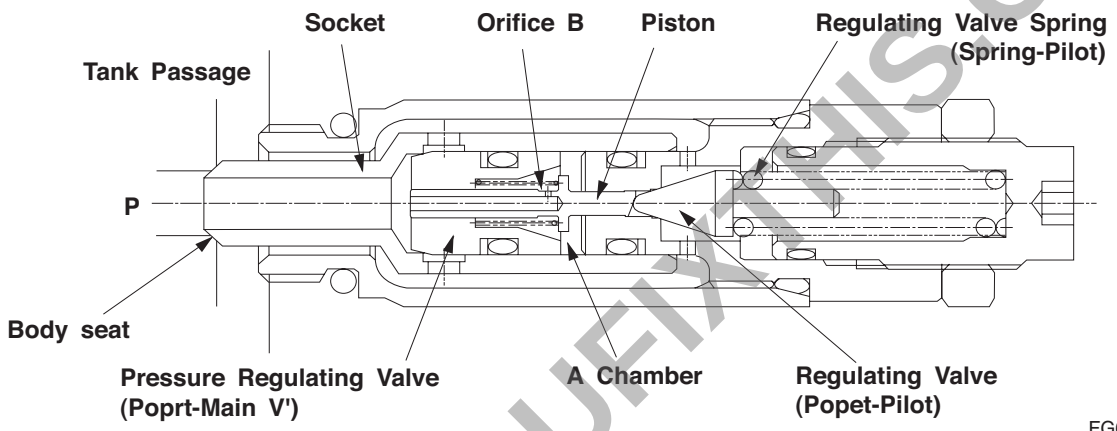
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Accessory Valve Operation

Main Relief Valve Operation

Main Relief Valves (MRV) are different in the uses for P1/P2 and P3; however, their structures and operations are the same.

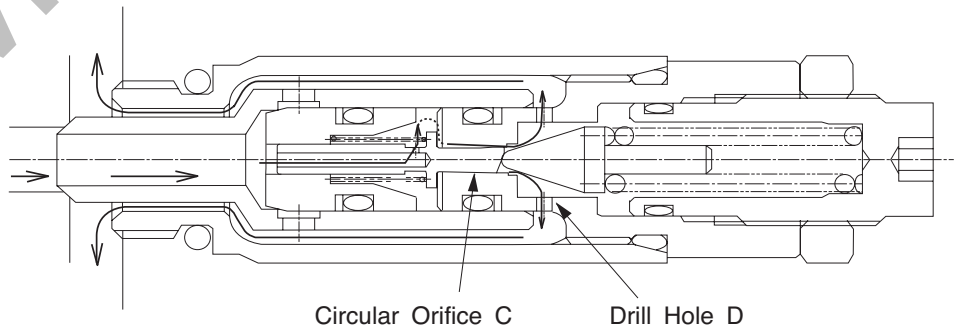
1. Pressure oil flows through the inside of the Piston built in the Pressure Regulating Valve (Poppet-Main V) and the Orifice B and then into the internal A Chamber until it is filled up. The filled up pressure causes both of the Pressure Regulating Valve and Socket and the Socket and Body Seat to be seated surely.



FG008575

Figure 24

2. When the oil pressure at port P increases up to the setting pressure of Regulating Valve Spring, the pressure oil is applied to the Regulating Valve via the Piston to open the Regulating Valve. Then, the pressure oil flows through a passage in the direction of Piston inside → Orifice B → A Chamber → Circular Orifice C → Drill Hole D and the external of Socket and then into the Tank Passage.



FG008576

Figure 25

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11. Install the packing (210) into the plug (202) (Figure 37)

CAUTION

When you install the packing, pay attention to its direction. (Refer to the following figure.)

Apply a thin film of grease to the packing before installing it.



Figure 37

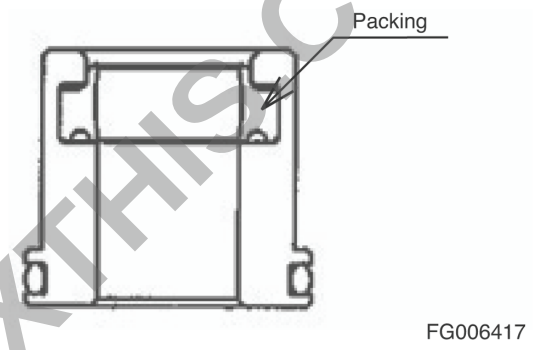


Figure 38

12. Install the grease cup (203) into the plug (202) (Figure 39).

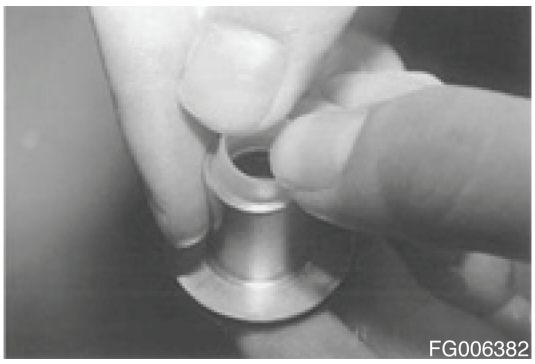


Figure 39

13. Install the push rod (214) into the plug (202) (Figure 40).

CAUTION

Apply the lubricating oil to the surface of the push rod before installing it.

Do not insert the push rod with a strong force so as not to damage the lip of the packing (210).

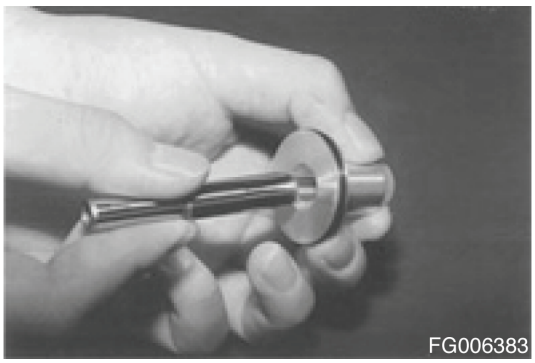


Figure 40

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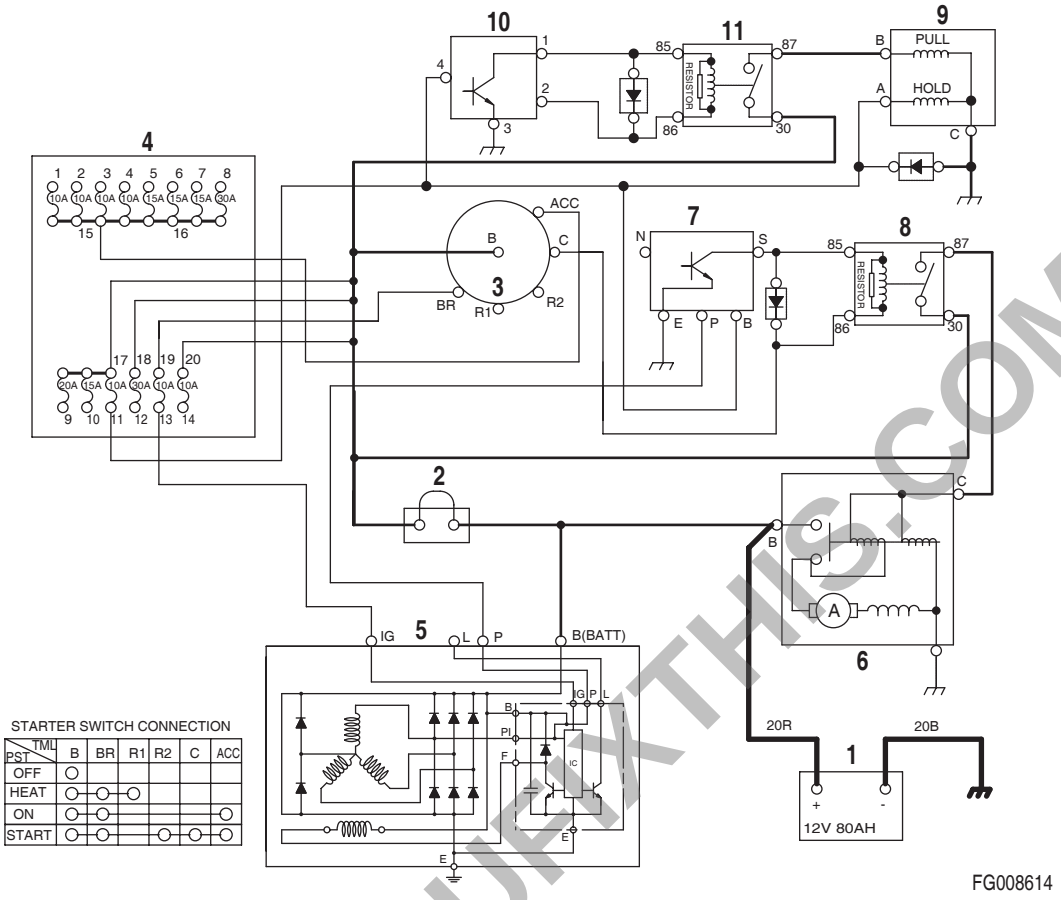


Figure 3 OPERATION OF START CIRCUIT (2) - IMMEDIATELY AFTER START

Reference Number	Description
1	Battery
2	Fusible Link
3	Starter Switch
4	Fuse Box
5	Alternator
6	Starter

Reference Number	Description
7	Starter Controller
8	Starter Relay
9	Engine Stop Solenoid
10	Engine Stop Timer
11	Engine Stop Relay

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