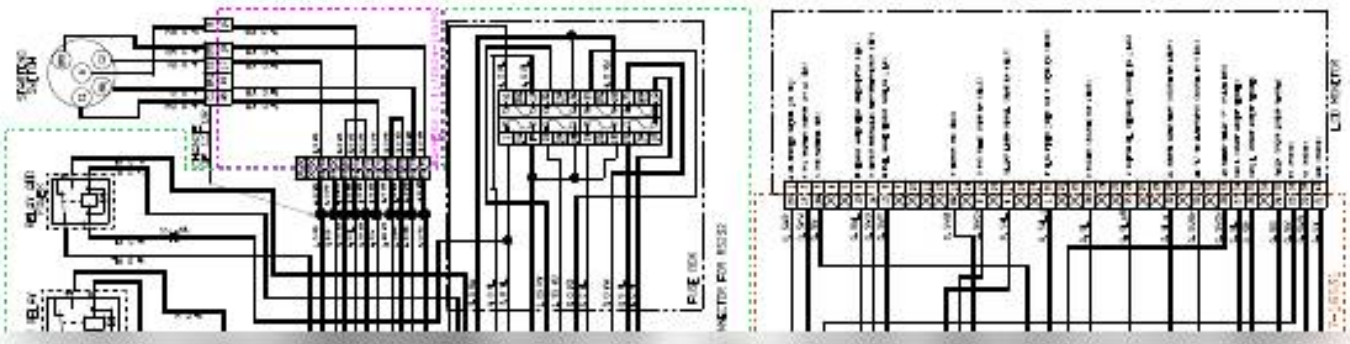
2. TECHNICAL DATA

2-9 Wiring Diagram



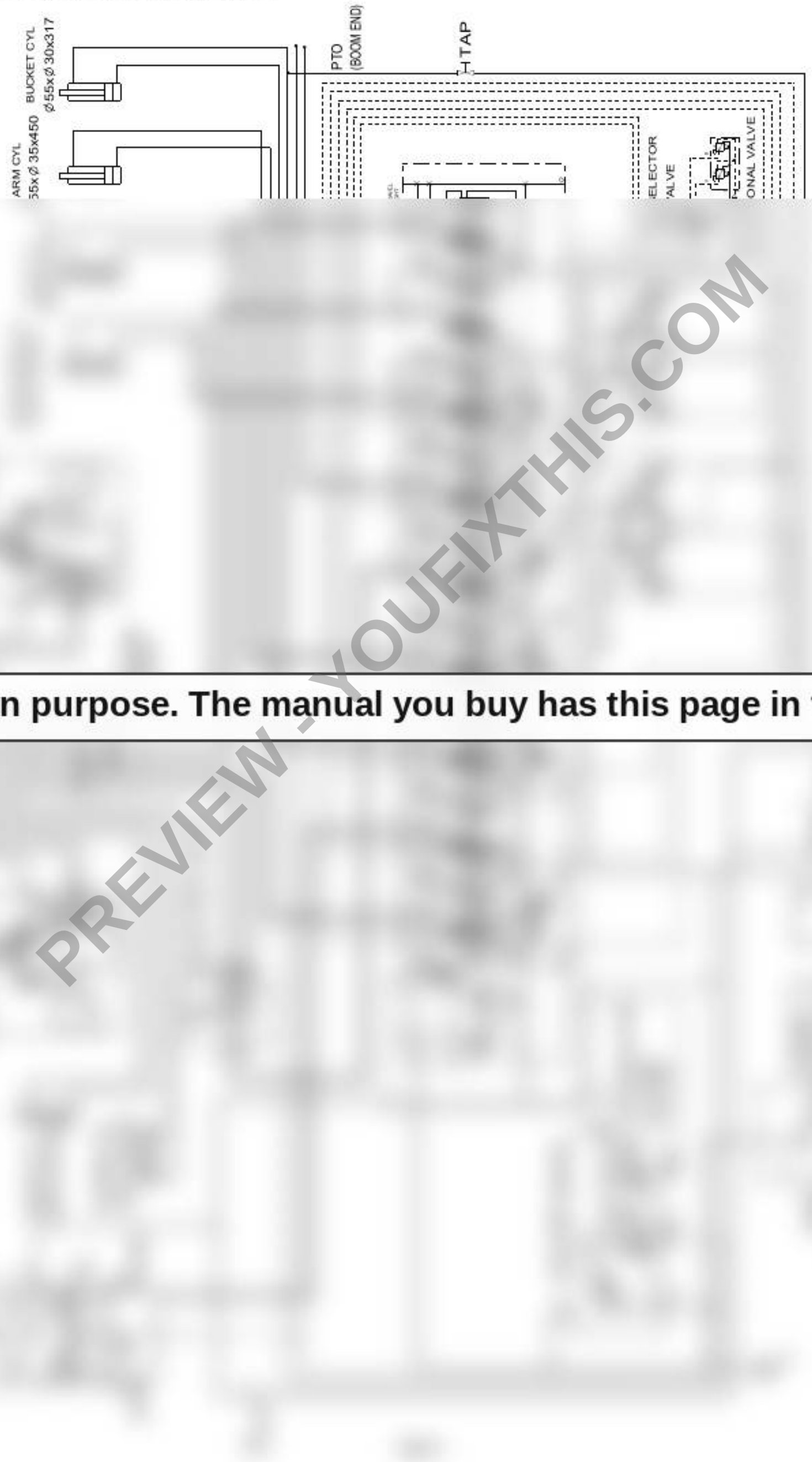
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2. TECHNICAL DATA

2-8 Hydraulic Circuit Schematic



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4-2-4 Cylinder Head

Cylinder Head Components

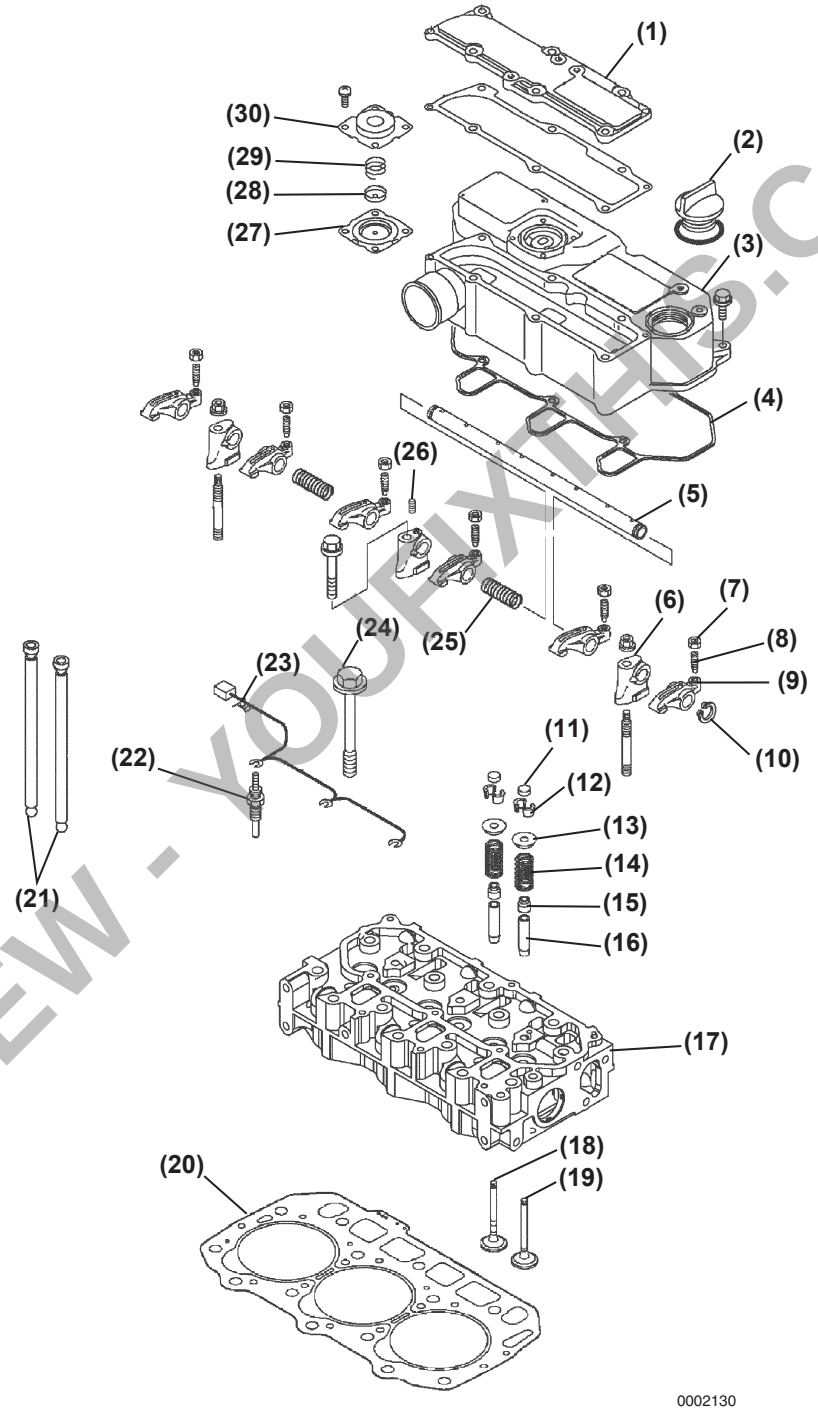


Figure 4-2-1

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3. SERVICE STANDARDS

3-7-3 Tightening Torque for General Bolts and Nuts

Item	Thread size × Pitch	Tightening torque [Unit : N•m]	Remarks
	M5	5,5 to 6,5	
	M6	9,5 to 11,5	
	M8	23 to 27	

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NOTICE

When the battery indicator goes out, it should not come on again. The battery indicator only comes on during operation if the alternator fails. However, if an LED is used in the battery indicator, the LED will shine faintly during normal operation.

NOTICE

Using a non-specified V-belt will cause inadequate charging and shorten the belt life. Use the specified belt.

NOTICE

Agricultural or other chemicals, especially those with a high sulfur content, can adhere to the IC regulator. This will corrode the conductor and result in battery over-charging (boiling) and charging malfunctions. Consult Yanmar before using the equipment in such an environment or the warranty is voided.

NOTICE

Make sure that the combined total resistance of the battery cable in both directions between the starter motor and the battery is within the value indicated on the wiring diagram. The starter motor will malfunction or break down if the resistance is higher than the specified value.

NOTICE

The starter motor is water-proofed according to JIS D 0203, R2 which protects the motor from rain or general cleaning. Do not use high-pressure wash or submerse the starter motor in water.

NOTICE

Use a specialized battery charger to recharge a battery with a voltage of 8 volts or less. Booster starting a battery with a voltage of 8 volts or less will generate an abnormally high voltage and destroy electrical equipment.

NOTICE

Removing the battery cables or the battery while the engine is operating may cause damage to the current limiter depending on the electrical equipment being used. This situation could cause loss of control of output voltage. The continuous high voltage of 23-24 volts (for 5000 rpm dynamo) will damage the current limiter and other electrical equipment.

NOTICE

Reversing the battery cable connections at the battery or on the engine will destroy the SCR diode in the current limiter. This will cause the charging system to malfunction and may cause damage to the electrical harnesses.

NOTICE

- NEVER attempt to modify the engine's design or safety features such as defeating the engine speed limit control or the diesel fuel injection quantity control.
- Modifications may impair the engine's safety and performance characteristics and shorten the engine's life. Any alterations to this engine may void its warranty. Be sure to use Yanmar genuine replacement parts.

NOTICE

Identify all parts and their location using an appropriate method. It is important that all parts are returned to the same position during the reassembly process.

NOTICE

Do not rotate the crankshaft with the injection pump removed.

NOTICE

Keep the piston pin parts, piston assemblies, and connecting rod assemblies together to be returned to the same position during the reassembly process. Label the parts using an appropriate method.

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1 – Baffle Plate
2 – Oil Fill Cap
3 – Valve Cover / Intake Manifold
4 – Gasket
5 – Rocker Arm Shaft
6 – Rocker Arm Shaft Support
7 – Adjuster Lock Nut
8 – Valve Adjuster Screw
9 – Rocker Arm
10 – Circlip
11 – Valve Cap
12 – Keeper
13 – Valve Spring Retainer
14 – Valve Spring
15 – Valve Stem Seal
16 – Valve Guide
17 – Cylinder Head
18 – Exhaust Valve
19 – Intake Valve
20 – Cylinder Head Gasket
21 – Push Rod (2 per cylinder)
22 – Glow Plug
23 – Glow Plug Wiring Harness
24 – Cylinder Head Bolt

Disassembly of Cylinder Head

Prepare a clean, flat working surface on a workbench large enough to accommodate the cylinder head assembly. Discard all gaskets, O-rings and seals. Use new gaskets, O-rings and seals on reassembly of cylinder head.

IMPORTANT

Mark all valve train components so they can be installed in their original locations.

Note: Record all measurements taken during disassembly.

1. Drain coolant from engine into a suitable container.

NOTICE

Identify all parts and their location using an appropriate method. It is important that all parts are returned to the same position during the reassembly process.

---

2. Remove the coolant pump. *See Disassembly of Engine Coolant Pump on page 4-4-4.*
3. Remove the high-pressure fuel lines and fuel injectors from the cylinder head. *See Removal of Fuel Injectors on page 4-3-18.*

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2. TECHNICAL DATA

Item			Unit	SV18
Hydraulic equipment				
Cylinder				
Boom	Stroke		mm	415
	Inside diameter		mm	60
	Piston rod diameter		mm	35
	[illegible]	Up (Ground - Max. height)	sec.	2,5

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3. SERVICE STANDARDS

3-7-2 Engine

1) Tightening torque of major components fasteners

Unit: N•m

No.	Item	Thread size × Pitch	Tightening torque	Lubricating oil
1	Cylinder head bolt	M9 × 1.25	53,9 to 57,9	Applied

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2. TECHNICAL DATA

2. Technical Data

2-1 Specifications

Item			Unit	SV18
Main specifications of machine				
Dimensions				
	Overall length	Standard		3660

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2-6 Periodic Inspection and Servicing

○: Verification and adjustment ●: Replacement □: Cleaning ■: Greasing

Parts & Operations		Daily	Every 50h	Every 250h	Every 500h	Every 1000h / Every year	Every 2000h / Every two years
General.	Missing or broken parts	○					
	Tightening of nuts and bolts	○					
	Motor state	○					
	Machine	□					
Transmissions	Oil for travel gears		● 1st time		○	●	
Hydraulic circuit	Hydraulic oil	○				●	
	Aspiration filter					□	
	Hydraulic oil return filter		● 1st time		●		
	Operation of the accumulator	○					
Greasing	Greasing points	■					
	Rotation pin and crown		■				
Chassis	Bearing rollers and bearings, idler wheels	○				■	
	Track tension	○					
Electrical equipment	Headlights, horn, travel alarm	○					
	Dashboard and indicators	○					
	System state	○					
Engine	Water separator	○					
	GO filter			●	●		
	Air filter (dusty atmosphere every 250 h)				●		
	Engine oil	○	● 1st time		●*		
	Oil filter		● 1st time		●*		
	Cooling fluid	○					●
	Belt	○				●	
	Radiator vents	○			□		
	Fuel hose, coolant hose						●
	Intake and exhaust valves					○	
	Injectors and injection pressure						○
Heating						○	

*. Every 500h / Every year

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CHAPTER 1

GENERAL CAUTIONS FOR MAINTENANCE WORK

1-1 Correct Work 1-1
1-2 Safety Precautions 1-1
1-3 Preparations 1-1
1-4 Cautions for Disassembly and Reassembly 1-1
1-5 Cautions for Removal and Installation of Hydraulic Equipment 1-2
1-6 Cautions for Removal and Installation of Hydraulic Piping 1-2
1-7 Cautions for Handling Seals 1-3
1-8 Correct Installation of Hydraulic Hose 1-3
1-9 Specifications of Hydraulic Hose 1-6
1-10 Air Release of Hydraulic Equipment 1-8

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3. SERVICE STANDARDS

3-7 List of Tightening Torque

3-7-1 Machine

Applicable model			SV18		
Equipment			Thread size	Tightening torque N•m	Adhesive
No		Tightening part			
Engine / Electrical equipment					

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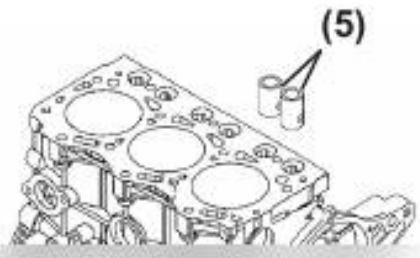
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Removal of Camshaft

1. Before removing the camshaft, check the camshaft end play.
   - **Method A:** Install a dial indicator **(Figure 4- 2-46, (1))** on the cylinder block. Move the camshaft and gear **(Figure 4-2-46, (2))** in and out to measure the end play. Record the measurement. See "2-2

2. Remove two bolts **(Figure 4-2-48, (3))** retaining the camshaft thrust plate **(Figure 4- 2-48, (1))** .



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Reassembly of Engine Coolant Pump

1. Reinstall the thermostat **(Figure 4-4-9, (1))**.

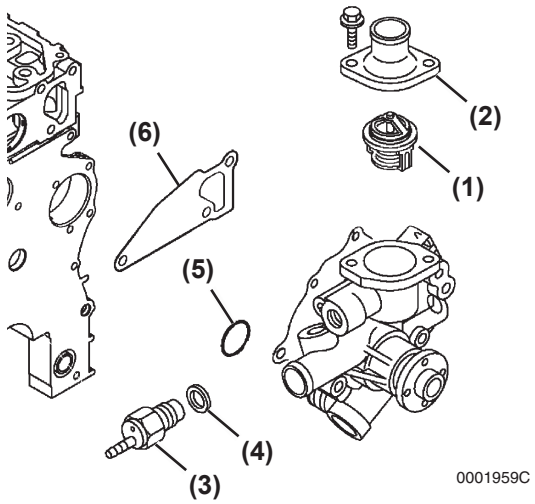


Figure 4-4-9

2. Reinstall the thermostat cover **(Figure 4-4-9, (2))**. Tighten the thermostat cover bolts.
3. Reinstall the temperature switch **(Figure 4-4-9, (3))** and a new gasket **(Figure 4-4-9, (4))**.
4. Position the engine coolant pump on the engine and install a new gasket **(Figure 4-4-9, (6))**. Use a new special O-ring **(Figure 4-4-9, (5))** on assembly between the engine coolant pump and the joint.

NOTICE

Use a new special O-ring between the engine coolant pump and the joint. Be sure to use the special O-ring for each engine model. Although the O-ring dimensions are the same as a commercially available O-ring, the material is different.

5. Reinstall the engine coolant pump bolts. Tighten the bolts.
6. Inspect and reinstall the coolant hoses and the temperature switch lead wire.
7. Reinstall the engine coolant pump V-pulley **(Figure 4-4-10, (3))**, spacer **(Figure 4-4-10, (2))** engine coolant fan **(Figure 4-4-10, (1))** and engine coolant fan guard (if equipped).

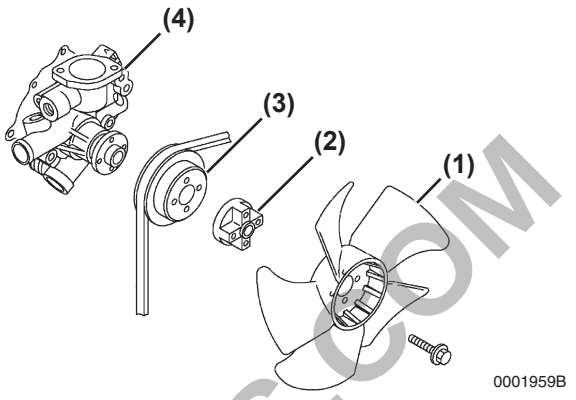


Figure 4-4-10

8. Inspect the condition of the V-belt. There must be clearance **(Figure 4-4-11, (1))** between the V-belt and the bottom of the pulley groove. If there is no clearance **(Figure 4-4-11, (2))** between the V-belt and the bottom of the pulley groove, replace the V-belt.

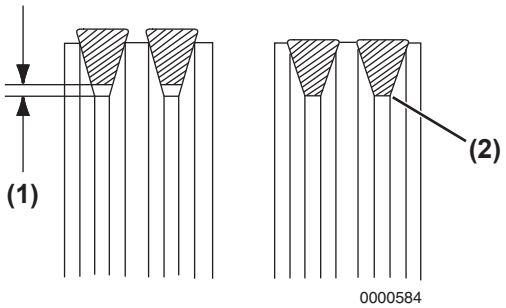


Figure 4-4-11

9. Reinstall the V-belt. Tighten the V-belt to the proper tension.
10. Reinstall and tighten the drain plug or close the drain cock in the radiator. Reinstall and tighten the engine block drain plug or reconnect the coolant hose at the oil cooler.
11. Fill radiator and engine with engine coolant.

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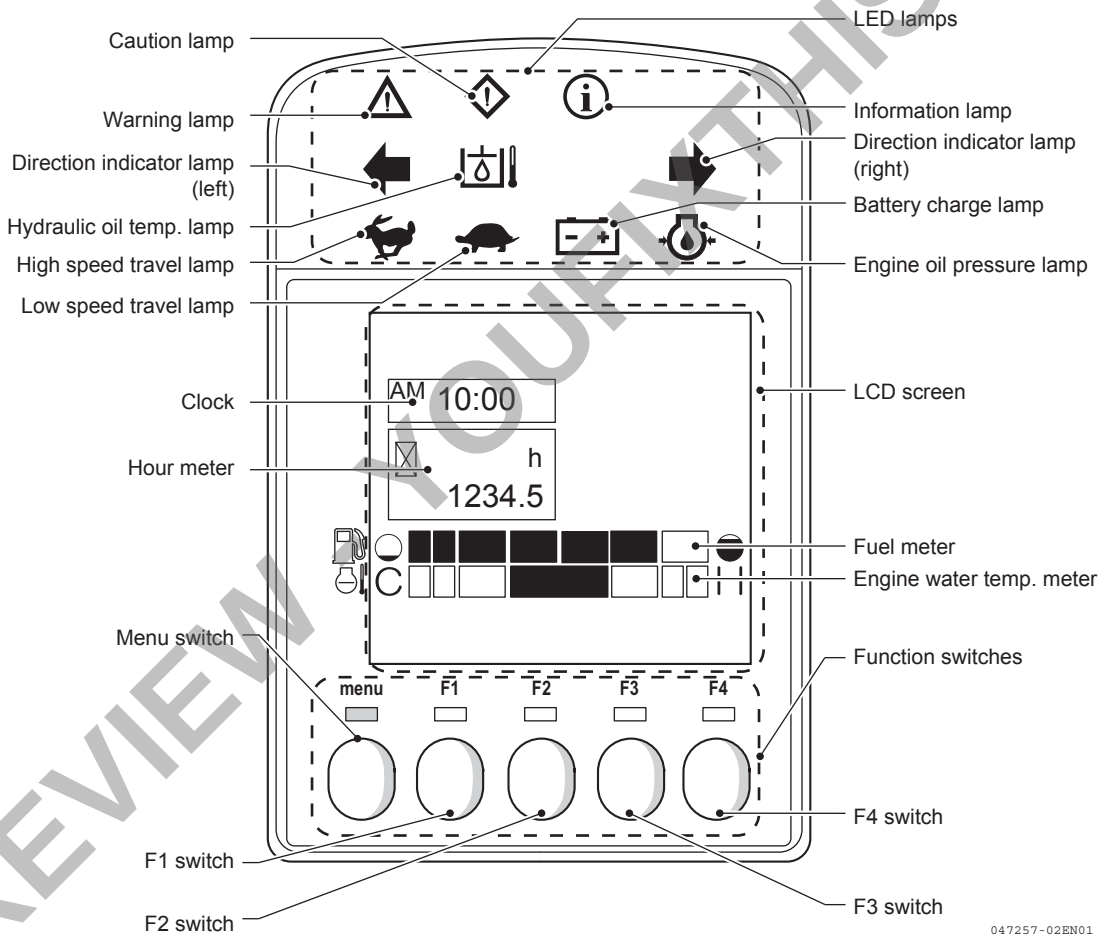
5-1-2 LCD Monitor and Alarm Systems

For safer machine operation, the operator needs to have a clear understanding of the machine's condition. However, it is difficult for the operator to keep an eye on every aspect of the machine he/she is operating.
Therefore, gauges and alarms are installed to warn the operator of any trouble of the machine at the early stage.

Note:

The monitors do not give a full assurance of the machine's condition. The indications shown on them should be used as a guide for daily check and periodic maintenance according to the operation and maintenance manual.

1) Part Name



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6-4-2 Troubleshooting

CAUTION :

Before starting any procedures of trouble shooting or removing the control block, inspect the global machine's hydraulic system to eliminate all possible malfunctions not related to the SX 10 control block.

Abnormal operation of the actuators connected to the control block

Malfunction	Probable cause	Additional checks	Remedy
Lack of strength at all actuators	(1) LS pressure relief valve defective	Take a pressure measure-ment	Replace LS pressure relief valve
	(2) LS pressure relief valve out of adjustment		Make necessary adjustments
Lack of force on one actuator only	Secondary pressure relief valve defective or unsuitable		Replace secondary pressure relief valve
Lack of speed in the performance of a movement or all movements	(1) Spool stroke incorrect	Manual control: measure spool stroke	If stroke is incorrect: replace housing + spool assembly
	(2) Hydraulic operator adjustable stopnut out of adjustment		Make necessary adjustments
	(3) Individual compensator pressure blocked		Replace housing + pressure compensator assembly
Lack of load hold	(1) Load hold check valve failure		Replace check valve
	(2) Excessive clearance between the housing and the spool		Replace housing + spool assembly
Simultaneous movement malfunction	(1) Blockage of the individual compensator orifice		Remove and clean individual compensator
	(2) Individual pressure compensator blocked		Replace the housing + pressure compensator assembly
	(3) LS line leakage		Replace flow regulator

Abnormal machine operation

Malfunction	Probable Cause	Additional Checks	Remedy
Engine remains under load after spools are returned to neutral	(1) Flow regulator blocked		Replace flow regulator
	(2) Flow regulator filter clogged		Replace the filter

Abnormal machine operation

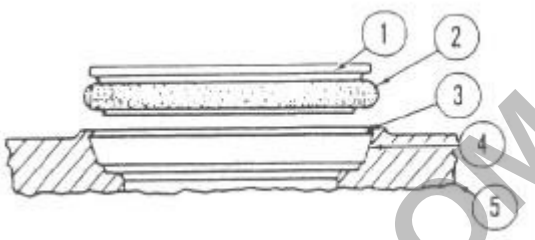
Malfunction	Probable Cause	Additional Checks	Remedy
Increase of force on controls or spool return defective	(1) Control block assembly tie rods too tight	Check tightening torque	Loosen and tighten to torque 15 ± 10% N.m. ***CAUTION :*** *Remove control block from its fixation points*
	(2) Spool seals obsolete		Replace spool seals

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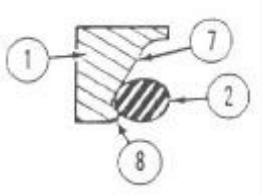
6-7-5 Installation Procedure Duo-Cone Seals

Seal rings, torics, and housings must be clean and free of any oil film, dust, or other foreign matter. Use a solvent that evaporates quickly, leaves no residue, and is compatible with the rubber toric rings. The recommended solvent is 1-1-1 Trichloroethane. (Note: Follow all safety guidelines for use on the solvent's Material Safety Data Sheet). Ring and housings should be wiped with a solvent-soaked lint free cloth or paper towel.

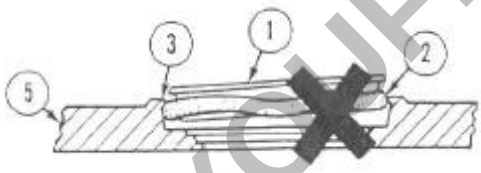


1.Seal Ring
2.Rubber Toric Ring
3.Housing Retaining Lip
4.Housing Ramp
5.Seal Ring Housing

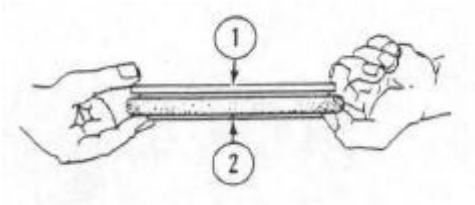
After all components have been wiped clean, the torics should be installed on the metal seal rings so that they rest in the radius on the tail of the metal ring. Insure that the torics are not twisted by inspecting the mold flash line on the outside diameter of the toric for for true circumferential tracking around the seal. Twisted torics will cause nonuniform face load that can result in leakage of lubricant and pumping of debris past the toric. If a twist is apparent, it can be eliminated by gently pulling a section of a toric radially away from the metal seal ring and letting it "snap" back. Repeating this in several places around the ring will eliminate any twist in the toric ring.



Put the toring ring 2 on seal ring 1, at the bottom of the seal ring ramp 7 and against the retaining lip 8.



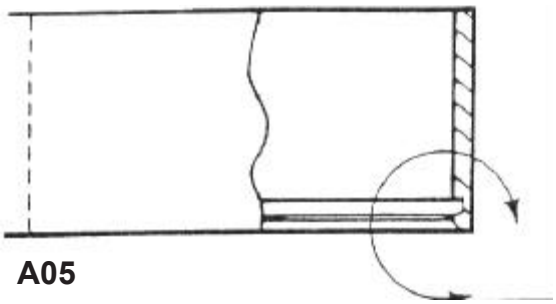
The toric ring 2 can twist if it is not wet all around during installation or if there are burrs or fins on the retaining lip 3 of the housing 5.



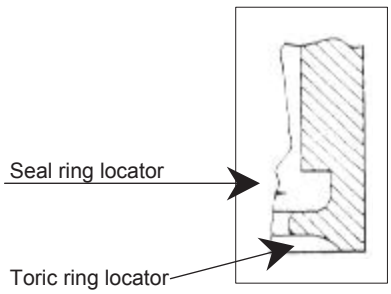
Eliminate toric twist by gently pulling a section of the toric 2 rapidly away from the seal ring 1 and letting it "sanp" back.

After the torics are installed on the seal rings, teh seal assembly is ready to be installed into the retainer housing. It is recommended to use installation tools available through Comer Industries (tool **A05**) to insure accurate assembly.

These durable installation tools are designed to locate on the toric ring and slide it past the housing retaining lip. A sedond locator is designed into larger seal installation tools to insure the proper seal stand out height. Improper seal assembly installation into the reatainer housing can result in poor seal performance due to nonuniform loding. Duo-Cone Seal installation tools help insure precise installation.



A05



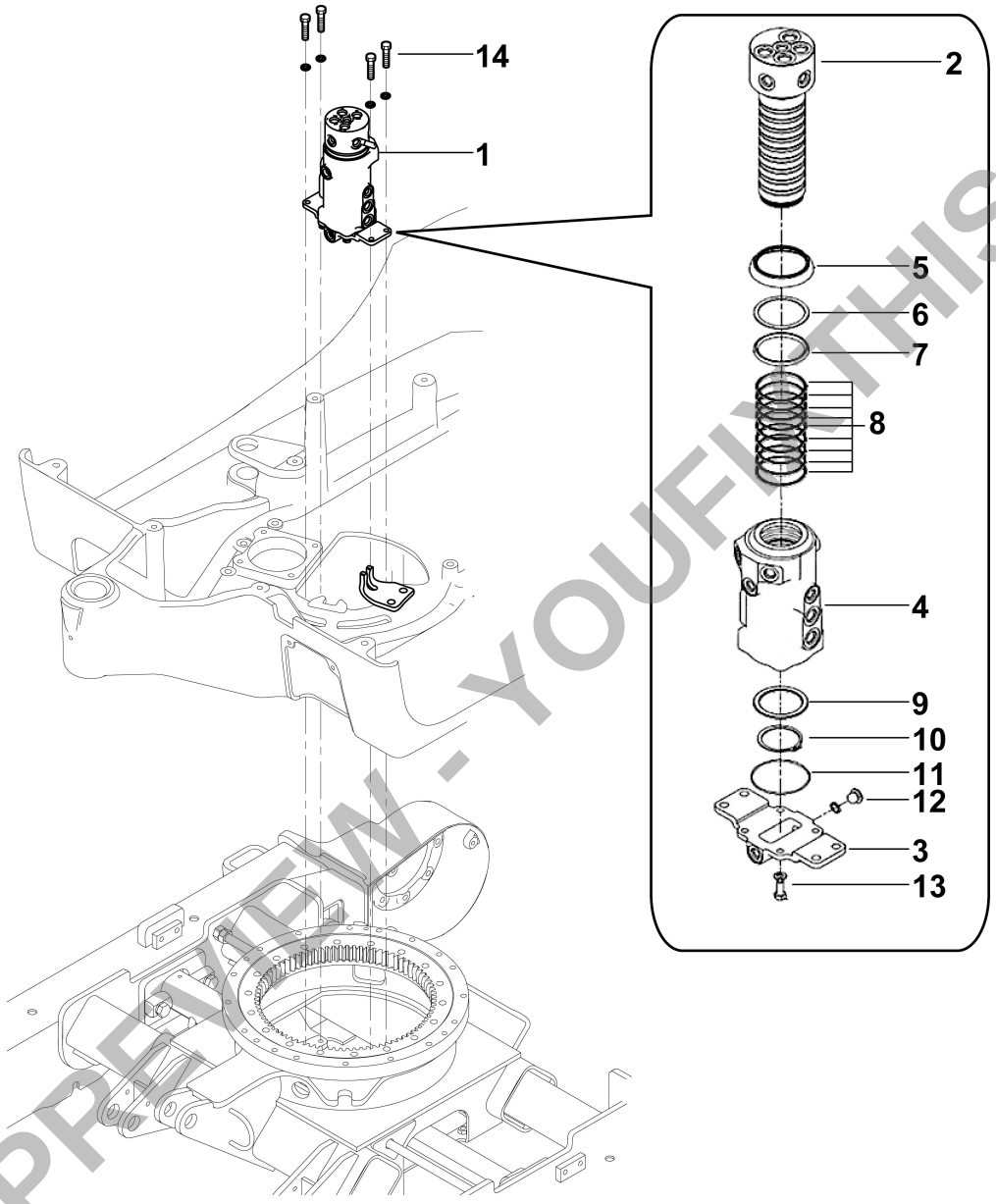
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7-5-5 Disassembly and Reassembly of Swivel Joint

1) Structure

The swivel joint is used to prevent the hydraulic piping from twisting when the upperstructure swings. The swivel joint consists of the shaft, hub and seal kit. The shaft and hub have holes and grooves, and the oil supplied from the port of the shaft, passing through the hub groove, is fed to the actuators of the undercarriage.



No.	Part	Quantity	No.	Part	Quantity
1	Swivel joint assembly	1	8	Slipper seal (O-ring)	9
2	Swivel shaft	1	9	Thrust ring	1
3	Swivel flange (with spring washer 10×30)	1	10	Snap ring	1
			11	O-ring	1
4	Swivel hub	1	12	Plug R1/8	1
5	Seal dust	1	13	Bolt M 8x25 (10.9T)	4
6	Back-up ring	1	14	Bolt M 10x25 (10.9)	4
7	O-ring	1			

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