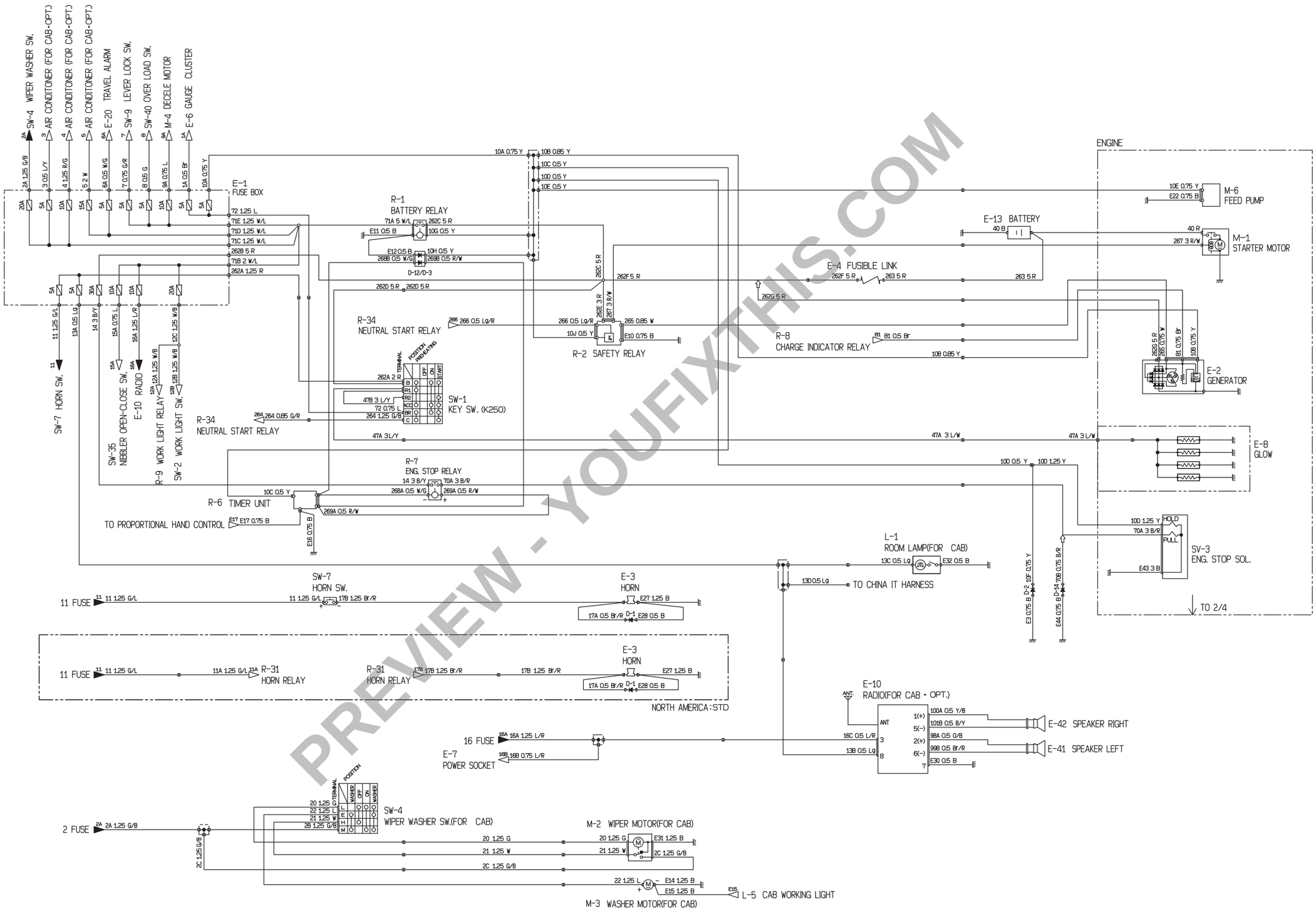
23.2.3 ELECTRIC CIRCUIT DIAGRAM

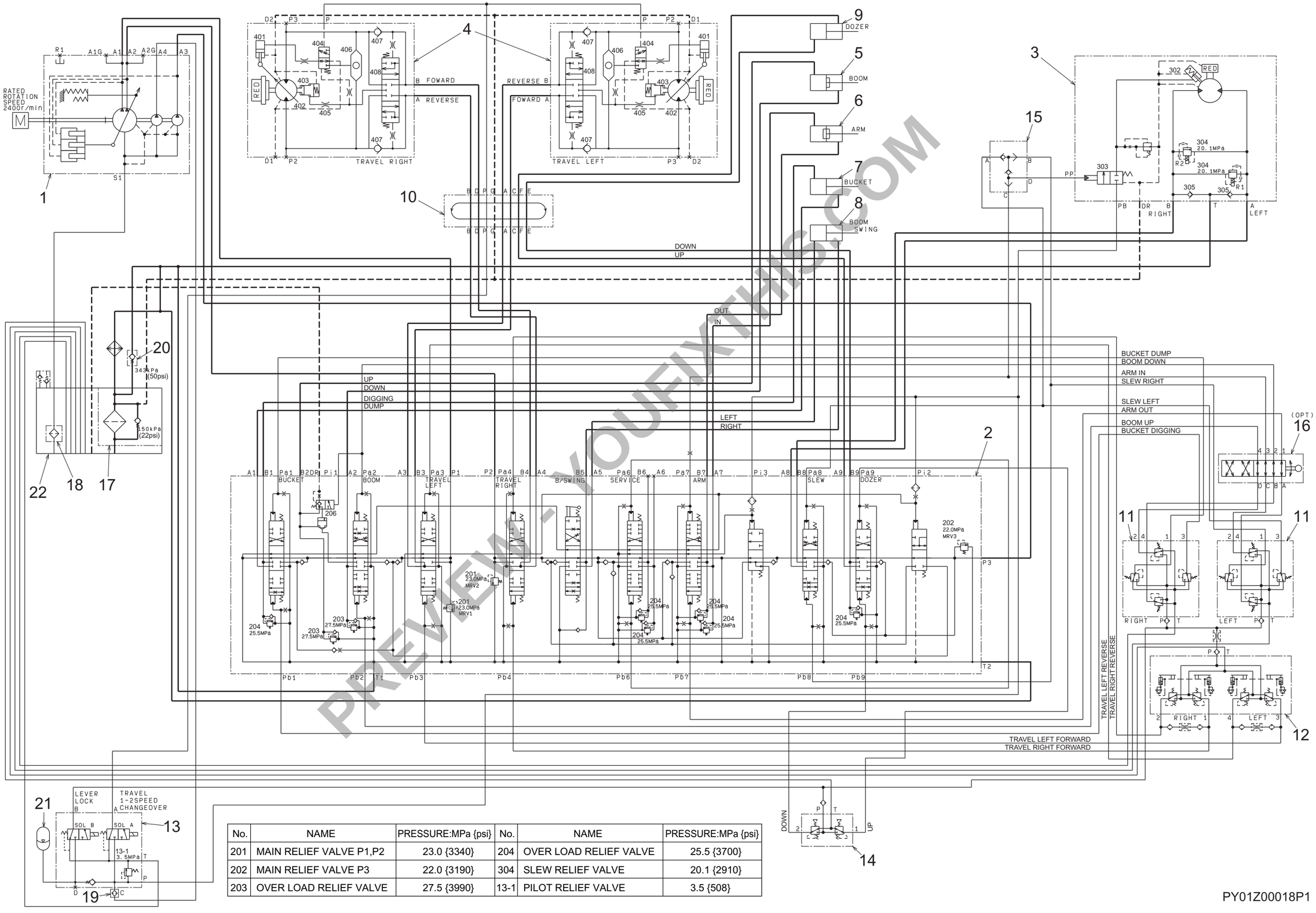


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22.2.1 STANDARD SPECIFICATION



No.	NAME	PRESSURE:MPa {psi}	No.	NAME	PRESSURE:MPa {psi}
201	MAIN RELIEF VALVE P1,P2	23.0 {3340}	204	OVER LOAD RELIEF VALVE	25.5 {3700}
202	MAIN RELIEF VALVE P3	22.0 {3190}	304	SLEW RELIEF VALVE	20.1 {2910}
203	OVER LOAD RELIEF VALVE	27.5 {3990}	13-1	PILOT RELIEF VALVE	3.5 {508}

PY01Z00018P1 (01)

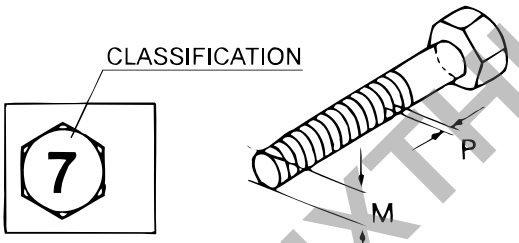
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11.1 TORQUE SPECIFICATIONS FOR CAPSCREWS & NUTS

The following Torque Specifications are provided for use when the actual torque value of a fastener is not known. Check the capscrews and nuts for their looseness and dropping off before the start of daily work and at periodical maintenance. Retighten the loosened fasteners, and install new ones for the dropped off fasteners. For the new machine, the check and retightening of fasteners must be carried out at first 50 hours operation. For the replacement of them, make sure to use the same size of the manufacturer's genuine parts.
Refer to the table below for the tightening and retightening of capscrews.

- The table below is not applicable for the capscrews to fix the cover, etc., made of plastic. For the tightening torque for such capscrews, consult with an authorized distributor. Over-tightening may cause damage on the parts to be fixed.
- If the tightening torque is specified in the manual, use such torque values regardless to the table below.
- Numerical indication on the capscrew head shows the classification for strength (e.g., 7 = 7 T). No indication is provided for smaller size capscrews, M5 or less.



11.1.1 Metric Coarse Thread Standard Tightening Torque Values. Make Certain to tighten all Capscrews & Nuts to proper torque values.

Torque value Unit : N•m (lbf•ft)

Classification		4.8T		7T		10.9T	
Nominal size		No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M6	P=1	4.4±0.5 (3.2±0.4)	3.7±0.4 (2.7±0.3)	9.6±1.0 (7.1±0.7)	8.1±0.8 (6.0±0.6)	17.4±1.8 (12.8±1.3)	14.7±1.5 (10.8±1.1)
M8	P=1.25	10.7±1.1 (7.9±0.8)	9.0±0.9 (6.6±0.7)	23.5±2.0 (17.3±1.5)	19.6±2.0 (14.5±1.5)	42.2±3.9 (31.1±2.9)	35.3±3.9 (26.0±2.9)
M10	P=1.5	21.6±2.0 (15.9±1.4)	17.9±1.8 (13.2±1.3)	46.1±4.9 (34.0±3.6)	39.2±3.9 (28.9±2.9)	83.4±8.8 (61.5±6.5)	70.6±6.9 (52.1±5.1)
M12	P=1.75	36.3±3.9 (26.8±2.9)	31.4±2.9 (23.2±2.1)	79.4±7.8 (58.6±5.8)	66.7±6.9 (49.2±5.1)	143±15 (105±11)	121±12 (89.2±8.9)
M14	P=2	57.9±5.9 (42.7±4.4)	49.0±4.9 (36.1±3.6)	126±13 (92.9±9.6)	106±10 (78.2±7.4)	226±20 (167±15)	191±19 (141±14)
M16	P=2	88.3±8.8 (65.1±6.5)	74.5±6.9 (55.0±5.1)	191±20 (141±15)	161±16 (119±12)	343±39 (253±29)	284±29 (209±21)
M18	P=2.5	122±12 (90.0±8.9)	103±10 (75.8±7.2)	265±29 (195±21)	226±20 (167±15)	481±49 (355±36)	402±39 (297±29)
M20	P=2.5	172±17 (127±13)	144±14 (106±10)	373±39 (275±29)	314±29 (232±21)	667±69 (492±51)	559±59 (412±44)

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Issue	Date of Issue	Applicable Machines	Remarks
First Edition	June, 2009	E10SR: PA03-05001~	S5PA3105E01 (NHK-EUR)
↑	March, 2010	CX27B: PV13-33292~	↑ (CASE-NA)
↑	↑	E27B: PV13-33292~	↑ (NH-NA)
↑	April, 2010	SK50SR-5: PJ06-09807~	↑ (KCM North America)
↑	↑	CX50B: PJ06-09807~	↑ (CASE-NA)
↑	↑	E50B: PJ06-09807~	↑ (NH-NA)
↑	↑	SK30SR-5: PW14-46519~ SK35SR-5: PX15-21105~	↑ (KCM S.E.ASIA&OCE)
↑	↑	CX31B: PW14-46519~ CX36B: PX15-21105~	↑ (CASE-AUS)
↑	↑	E30B: PW14-46519~ E35B: PX15-21105~	↑ (NH-AUS)
↑	↑	CX27B: PV13-33001~	↑ (CASE-Australia)
↑	↑	E27B: PV13-33001~	↑ (NH-AUS)
↑	May, 2010	SK40SR-5: PH07-06609~ SK50SR-5: PJ06-09807~	↑ (KCM S.E.ASIA&OCE)
↑	↑	E50B: PJ06-09807~	↑ (NH-AUS)
↑	↑	CX50B: PJ06-09807~	↑ (CASE-AUS)
↑	↑	SK27SR-5: PV13-33453~	↑ (NA)
↑	↑	CX27B: PV13-33453~	↑ (CASE-NA)
↑	↑	E27B: PV13-33453~	↑ (NH-NA)
↑	↑	SK20SR-5: PM10-10609~ SK27SR-5: PV13-33453~	↑ (KCM S.E.ASIA&OCE)
↑	↑	CX27B: PV13-33453~	↑ (CASE-Australia)
↑	↑	E27B: PV13-33453~	↑ (NH-AUS)
↑	September, 2010	SK55SRX: PS02-00101~	↑ (KCM North America)
↑	↑	CX55B: PS02-00101~	↑ (CASE-NA)
↑	↑	E55B: PS02-00101~	↑ (NH-NA)

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42.1 GENERAL PRECAUTIONS

Troubleshooting provides the process to investigate the cause of the trouble in order when trouble occurs. This manual describes how to solve the specific phenomenon systematically as quick as possible. For the troubleshooting concerning the inside of equipment, refer to the troubleshooting for each component manual of the equipment.

42.1.1 CONFIRM ACTUAL TROUBLED CONDITIONS AT SITE

(1) Get To The Site As Quickly As Possible.

Verify the machine model, serial number, situation of trouble and field, and notify possible arrival time to the user.



Make Field Investigation

(2) Verify background of the problem.

1. Model name and serial number.
2. Kind of attachment.
   Check that the combination of attachments was proper and that the operating manner was not unreasonable.
3. Operating time on the hour-meter.
4. Record of troubles.
   First trouble or repeated trouble.
5. History of the trouble and additional modifications.
   Reoccurrence of the same trouble in the past or trouble due to additional modification.



Verifying Background of Trouble Occurred

(3) How to Diagnose Trouble

1. Verify defective part.
2. Reproduce the troubled conditions.
3. Where the defective part can not be verified, surmise the possible causes systematically.
4. Verify the surmised cause.
5. Report estimated repairing method, procedures and terms to the user.



Diagnosing Trouble By Means Troubleshooting

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2.3 SPECIFICATIONS AND PERFORMANCE

SPEED AND GRADEABILITY

Model		SK55SRX			
Applicable Machines		PS02-00101~			
Shoe Type		Rubber shoe		Iron shoe (OPT)	
Slewing Speed	min^{-1} {rpm}	8.9 {8.9}			
Travel Speed	km/h (mph)	Low (1st)	High (2nd)	Low (1st)	High (2nd)
		2.7	4.6	2.7	4.6
Gradeability	% (degree)	58 (30)			

ENGINE

Model (YANMAR)		4TNV88-BXPYBD (EDM-4TNV88)
Type		Water-cooled, 4-cycle type Swirl chamber type diesel engine
Number of cylinders-Bore X Stroke		4 - 88 dia. mm X 90 mm (3.46 in X 3.54 in)
Total Displacement	L	2.189 (134 cu-in)
Output Rating	kW/min^{-1} {PS/rpm}	29.1/2,400 {40/2,400}
Maximum Torque	$N\text{-}m/min^{-1}$ (lbf-ft/rpm)	131/1,440 (97/1,440)
Starting Motor	V X kW	12 X 2.3
Generator	V X A	12 X 55

HYDRAULIC COMPONENTS

Hydraulic Pump	Variable displacement axial piston + gear pump
Hydraulic Motor	Axial piston
Hydraulic Motor w/Reducer (Travel)	2-Axial piston, 2-Speed motor
Control Valve	11-spool multiple control valve
Cylinder (Boom, Arm, Swing, Bucket, Dozer)	Double action cylinder
Return Filter	Safety valve containing/Filter Type (30μ)

SIDE DIGGING & DOZER

Type		Boom swing by hydraulic cylinder
Boom Swing Angle	Right	60 degrees
	Left	70 degrees
Stroke of Dozer (above/below)	mm (in)	497 / 373 (19.6/14.7)

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PREFACE

(1) Working Conditions

1. Technicians: One or more technicians who are qualified by the Manufacturer are needed. The technicians need five years or more experience, and they have to complete the training in the operation of this machine.
2. Facilities: General jigs, tools, apparatus, testers to be provided.
   The maintenance workshop should be equipped with a large enough building with a crane and inspection instruments necessary for specific self inspection activities.
3. Place: The workshop should be located on a flat land where the work is to be performed and where a service car or truck crane is accessible.

(2) Applicable Range of Standard Maintenance Time

1. Standard maintenance time: Direct maintenance time plus spare time.
2. Direct maintenance time: Net time actually spent for maintenance.
3. Spare time: Time for transportation of the machine for maintenance, preparation for safety work, meeting for the work and physiological time for the needs of body.

(3) Excluded Time (not included in the standard maintenance time)

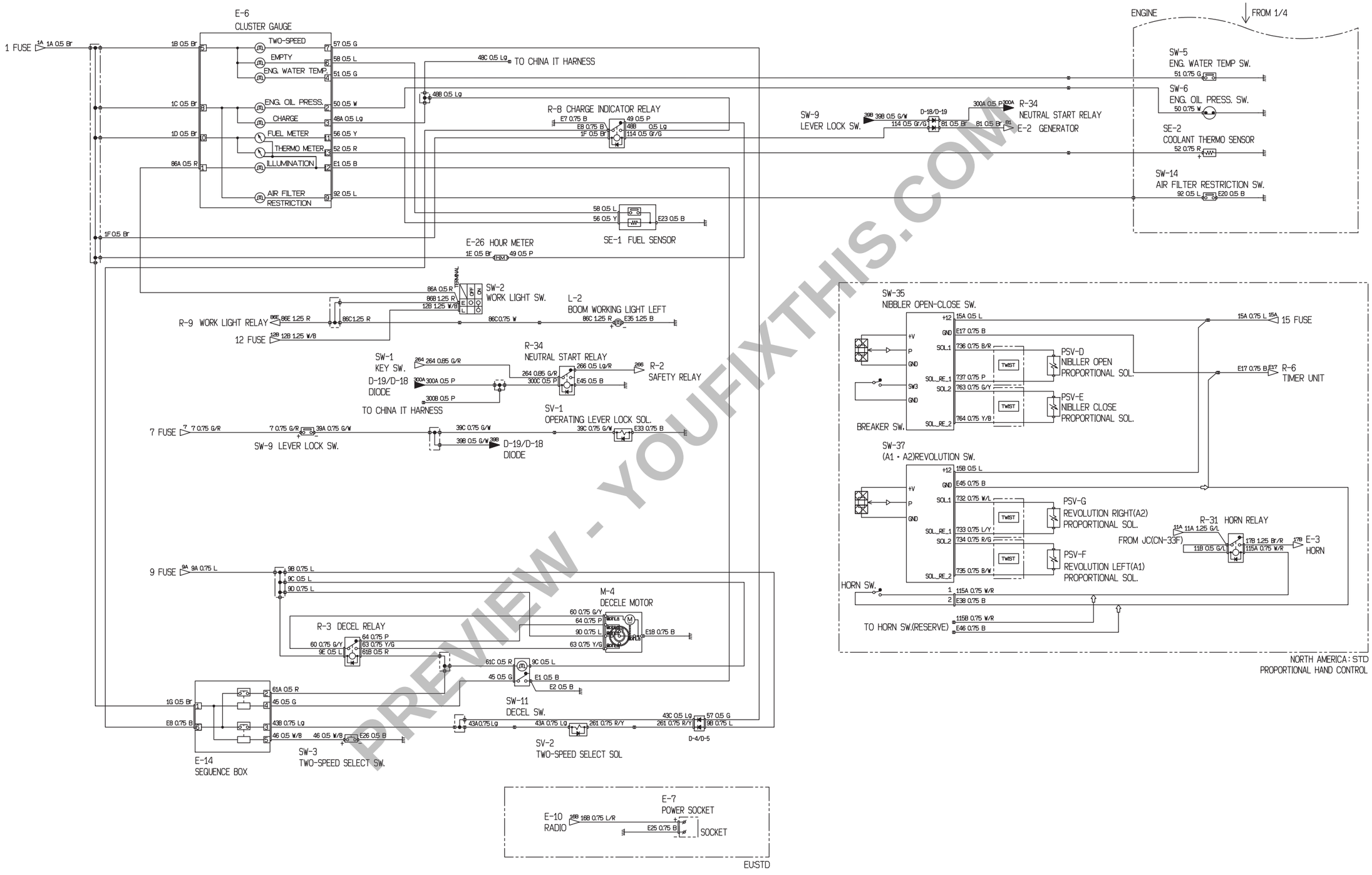
1. Repairing time: Time for machining, sheet metal processing, welding, gas cutting, removing broken screw, taking care of parts and painting.
2. Items excluded from maintenance time because of uncertainty in time:
   Receiving the vehicle into shop, transportation, delivery, final inspection and investigation of causes for trouble, diagnosis and inspection.
3. Indirect time: Time for field work, preparation of required parts, etc., before starting work, going to and from the site, waiting due to user's convenience at the site and paper work for reports, bills, etc.
4. Special time: Working time at early morning, at mid night and on holidays shall be separately calculated.
5. Separate calculation: The cost for service cars, trucks with crane and truck cranes shall be separately calculated.

(4) Applicable Machine for Estimation of Standard Maintenance Time

1. Standard machine.
2. A well maintained machine combined with standard attachments that has operated in normal circumstances.

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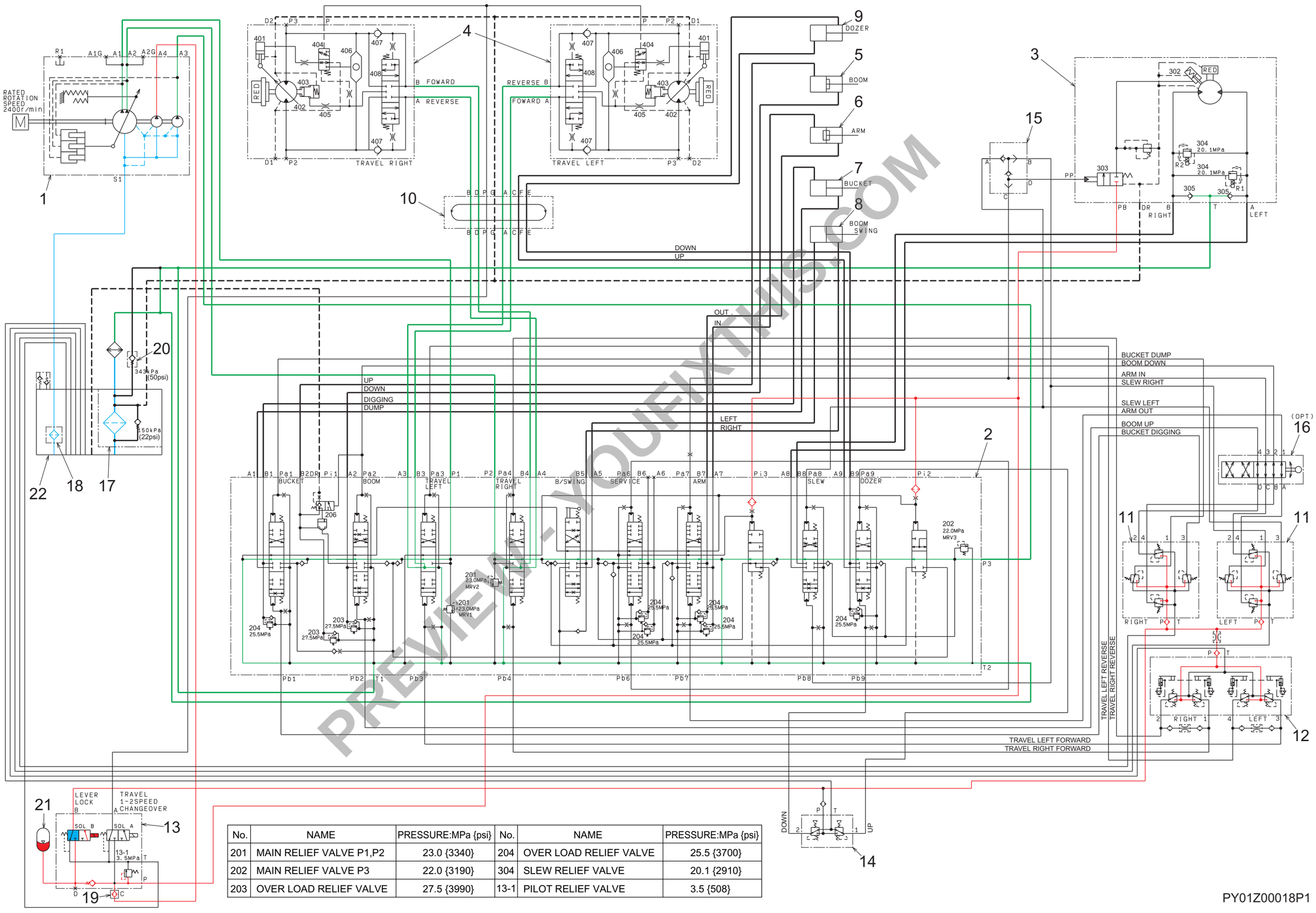
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No.	NAME	PRESSURE:MPa {psi}	No.	NAME	PRESSURE:MPa {psi}
201	MAIN RELIEF VALVE P1,P2	23.0 {3340}	204	OVER LOAD RELIEF VALVE	25.5 {3700}
202	MAIN RELIEF VALVE P3	22.0 {3190}	304	SLEW RELIEF VALVE	20.1 {2910}
203	OVER LOAD RELIEF VALVE	27.5 {3990}	13-1	PILOT RELIEF VALVE	3.5 {508}

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Neutral Circuit

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Torque value Unit : N•m (lbf•ft)

Classification		4.8T		7T		10.9T	
Nominal size		No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M22	P=2.5	226±20 (167±15)	192±20 (142±15)	500±49 (369±36)	422±39 (311±29)	902±88 (665±65)	755±78 (557±58)
M24	P=3	294±29 (217±21)	235±29 (173±21)	637±69 (470±51)	520±49 (383±36)	1160±118 (856±87)	941±98 (694±72)
M27	P=3	431±39 (318±29)	353±39 (260±29)	941±98 (694±72)	765±78 (564±58)	1700±167 (1250±123)	1370±137 (1010±101)
M30	P=3.5	588±59 (434±44)	490±49 (361±36)	1285±127 (948±94)	1079±108 (796±80)	2300±235 (1700±173)	1940±196 (1430±145)
M33	P=3.5	794±78 (586±58)	667±69 (492±51)	1726±177 (1270±131)	1451±147 (1070±108)	3110±314 (2290±232)	2610±265 (1930±195)
M36	P=4	1030±98 (760±72)	863±88 (637±65)	2226±226 (1640±167)	1863±186 (1370±137)	4010±402 (2960±297)	3360±333 (2480±246)

11.1.2 Metric Fine Thread Standard Tightening Torque values. Make certain to tighten all Capscrews & Nuts to proper torque values.

Torque value Unit : N•m (lbf•ft)

Classification		4.8T		7T		10.9T	
Nominal size		No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M8	P=1.0	11.3±1.1 (8.3±0.8)	9.5±1.0 (7.0±0.7)	24.5±2.0 (18.1±1.5)	20.6±2.0 (15.2±1.5)	44.1±3.9 (32.5±2.9)	37.3±3.9 (27.5±2.9)
M10	P=1.25	22.6±2.0 (16.7±1.5)	18.7±1.9 (13.8±1.4)	48.1±4.9 (35.5±3.6)	41.2±3.9 (30.3±2.9)	87.3±8.8 (64.4±6.5)	73.5±6.9 (54.2±5.1)
M12	P=1.25	39.2±3.9 (28.9±2.9)	33.3±2.9 (24.6±2.1)	85.3±8.8 (62.9±6.5)	71.6±6.9 (52.8±5.1)	154±16 (114±12)	129±13 (95.2±9.6)
M16	P=1.5	92.2±8.8 (68.0±6.5)	77.5±7.8 (57.2±5.8)	196±20 (145±15)	169±17 (125±13)	363±39 (268±29)	304±29 (224±21)
M20	P=1.5	186±19 (137±14)	155±16 (114±12)	402±39 (297±29)	333±29 (246±21)	726±69 (535±51)	608±59 (448±44)
M24	P=2	314±29 (232±21)	265±29 (195±21)	686±69 (506±51)	569±59 (420±44)	1240±118 (915±87)	1030±98 (760±72)
M30	P=2	637±59 (470±44)	530±49 (391±36)	1390±137 (1030±101)	1157±118 (853±87)	2500±255 (1840±188)	2080±206 (1530±152)
M33	P=2	853±88 (629±65)	706±70 (521±52)	1860±186 (1370±137)	1550±155 (1140±114)	3350±334 (2470±246)	2790±275 (2060±203)
M36	P=3	1070±108 (789±80)	892±88 (658±65)	2330±226 (1720±167)	1940±196 (1430±145)	4200±422 (3100±311)	3500±353 (2580±260)

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32. ATTACHMENTS

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43.1 TROUBLE DIAGNOSIS: ELECTRIC SYSTEM

Classification	Reference No.		Phenomenon \ Causes	Electrical equipment: Gauge cluster	Electrical equipment: Current limiter	Electrical equipment: Working light	Electrical equipment: Decel motor	Electrical equipment: Horn	Electrical equipment: Travel alarm	Sensor: Coolant temp.sensor	Sensor: Fuell level sensor	Solenoid: Travel 1,2 speed SOL	Solenoid: Lever lock SOL	Solenoid: Engine stop SOL	Switch: Horn switch	Switch: Working light switch	Switch: Travel 1,2 speed switch	Switch: Lever lock limit switch	Switch: Deceleration switch	Switch: Travel pressure SW	Relay: Engine stop SOL relay	Relay: Charging indicator relay	Relay: Safety relay	Relay: Timer unit	Relay: Holding ciruit unit	Relay: Neutral start relay	Others: Fuse,Disconnection,Short circuit,Looseness
General	1	(1)	Engine does not start.											○				○			○		○	○		○	○
		(2)	Horn does not sound.					○							○												○
		(3)	Working light does not light up.			○										○											○
		(4)	Hourmeter does not actuate.	○	○																	○					○
		(5)	Fuel gauge does not actuate.	○							○																○
		(6)	Water temperature does not actuate.	○						○																	○
Attachment operation	2	(1)	All controls does not function.										○					○									○
Travel operation	3	(1)	Travel 1 & 2 speed can not be changed.									○					○								○		○
Deceleration	4	(1)	Deceleration switching operation can not be carried out.				○												○						○		○
Travel alarm	5	(1)	Travel alarm (OPT) does not sound						○											○							○

Abbreviation

Decel : Deceleration
SOL : Solenoid
SW : Switch

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2.8 ENGINE SPECIFICATIONS

2.8.1 SPECIFICATIONS

Model		SK55SRX	
Engine Model (YANMAR)		4TNV88-BXPYBD (EDM-4TNV88)	
Type		Vertical, 4-cycle water-cooled diesel engine	
No. of cylinders - Bore × Stroke		4 - 88 mm (3.46 in) × 90 mm (3.54 in)	
Total displacement		2.189 liter (134 cu•in)	
Compression ratio		19.1	
Rated output		29.1 kW (40 PS) at 2400 rpm	
Maximum torque		131 ~ 142.7 N•m (97 ~ 105lbf•ft) at 1440 rpm	
Low idling		1175±25 rpm	
High idling		2600±25 rpm	
Fuel consumption rate		Less than 251 g / kWh (185 g / PS•h)	
Allowable tilting angles		Continuous ; 30° for all direction	
Rotating direction		Counterclockwise as seen from flywheel side	
Firing order		1-3-4-2-1	
Fuel injection timing (b.T.D.C.)		14.5±1°	
Fuel injection pressure		19.6^{+1}_{0} MPa (2840^{+145}_{0} psi)	
Valve action		Open	Close
	Intake valve	b.T.D.C. 15±5°	a.B.D.C. 45±5°
	Exhaust valve	b.T.D.C. 56±5°	a.B.D.C. 18±5°
Valve clearance	Intake valve	0.2 mm (0.008 in) in cold condition	
	Exhaust valve	0.2 mm (0.008 in) in cold condition	
Thermostat action		Start 71 ± 1.5°C (160 ± 3°F) / Full open 85°C (185°F)	
Compression pressure		3.4 ± 0.1 MPa (500 ± 14 psi) at 250 rpm	
Lubrication oil pressure		0.37 MPa (54 psi) at 2400 rpm	
Dimensions L × W × H		674 × 553 × 671 mm (26.5 ×21.8 × 26.4 in)	
Dry weight		170 kg (375 lb)	
Governor		Mechanical centrifugal governor (All speed type)	
Fuel filtration		cartridge type paper filter	
Lubrication system		Forced lubrication with trochoid pump	
Cooling system		Liquid cooling / Radiator	
Starter capacity		12 V × 2.3kW	
Generator capacity		12 V × 55 A	
Starting aid		Glow plug	
Cooling water capacity : Max / Engine		6.0 / 2.7 liter (1.59 / 0.71 gal)	
Engine oil volume : Max / Effective		7.4 / 4.0 liter (1.96 / 1.06 gal)	

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13. MAINTENANCE STANDARD AND TEST PROCEDURE

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HYDRAULIC EXCAVATOR

SHOP MANUAL model SK55SRX

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2	MAINTENANCE SECTION
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4	DISASSEMBLY SECTION
5	TROUBLESHOOTING
6	ENGINE SECTION
7	PROCEDURE OF INSTALLING OPTIONS SECTION

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GENERAL SAFETY INFORMATION

⚠ WARNING

Do not operate or perform any maintenance on this machine until all instructions found in the OPERATOR'S MANUAL and this MANUAL have been thoroughly read and understood.
Improper operation or maintenance of this machine may cause accidents and could result in serious injury or death.
Always keep the manual in storage.
If it is missing or damaged, place an order with an authorized Distributor for a replacement.
If you have any questions, please consult an authorized Distributor.

(1) Most accidents, which occur during operation, are due to neglect of precautionary measures and safety rules. Sufficient care should be taken to avoid these accidents. Erroneous operation, lubrication or maintenance services are very dangerous and may cause injury or death of personnel. Therefore all precautionary measures, NOTES, DANGERS, WARNINGS and CAUTIONS contained in the manual and on the machine should be read and understood by all personnel before starting any work with or on the machine.

(2) Operation, inspection, and maintenance should be carefully carried out, and safety must be given the first priority. Messages of safety are indicated with marks. The safety information contained in the manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.

(3) Messages of safety appear in the manual and on the machine: All messages of safety are identified by either the word "DANGER", "WARNING" and "CAUTION".

1) **DANGER-** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury and is represented as follows:

⚠ DANGER

2) **WARNING-** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury and is represented as follows:

⚠ WARNING

3) **CAUTION-** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against possible damage to the machine and its components and is represented as follows:

⚠ CAUTION

(4) It is very difficult to forecast every danger that may occur during operation. However, safety can be ensured by fully understanding proper operating procedures for this machine according to methods recommended by the Manufacturer.

(5) While operating the machine, be sure to perform work with great care, so as not to damage the machine, or allow accidents to occur.

(6) Continue studying the manual until all Safety, Operation and Maintenance procedures are completely understood by all persons working with the machine.

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SAFETY PRECAUTIONS

⚠ WARNING

The proper and safe lubrication and maintenance for this machine, recommended by the Manufacturer, are outlined in the OPERATOR'S MANUAL for the machine.
Improper performance of lubrication or maintenance procedures are dangerous and could result in injury or death. Read and understand the MANUAL before performing any lubrication or maintenance.

The serviceman or mechanic may be unfamiliar with many of the systems on this machine. This makes it important to use caution when performing service work. A knowledge of the system and or components is important before the removal or disassembly of any component.

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table is shown in the section, SPECIFICATIONS.

The following is a list of basic precautions that must always be observed.

(1) Read and understand all Warning plates and decals on the machine before Operating, Maintaining or Repairing this machine.

(2) Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when using hammers, punches or drifts on any part of the machine or attachments. Use welders gloves, hood/goggles, apron and the protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing. Remove all rings from fingers, loose jewelry, confine long hair and loose clothing before working on this machinery.

(3) Disconnect the battery and hang a "Do Not Operate" tag in the Operators Compartment. Remove ignition keys.

(4) If possible, make all repairs with the machine parked on a firm level surface. Block the machine so it does not roll while working on or under the machine. Hang a "Do Not Operate" tag in the Operators Compartment.

(5) Do not work on any machine that is supported only by lift, jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.

⚠ WARNING

Do not operate this machine unless you have read and understand the instructions in the OPERATOR'S MANUAL. Improper machine operation is dangerous and could result in injury or death.

(6) Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.

(7) Lower the bucket, dozer, or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, dozer, ripper or other attachment is blocked correctly to prevent it from dropping unexpectedly.

(8) Use steps and grab handles when mounting or dismounting a machine. Clean any mud or debris from steps, walkways or work platforms before using. Always face the machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.

(9) To avoid back injury, use a hoist when lifting components which weigh 20 kg (45 lbs) or more. Make sure all chains, hooks, slings, etc., are in good condition and are the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.

(10) To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes, and compartments.

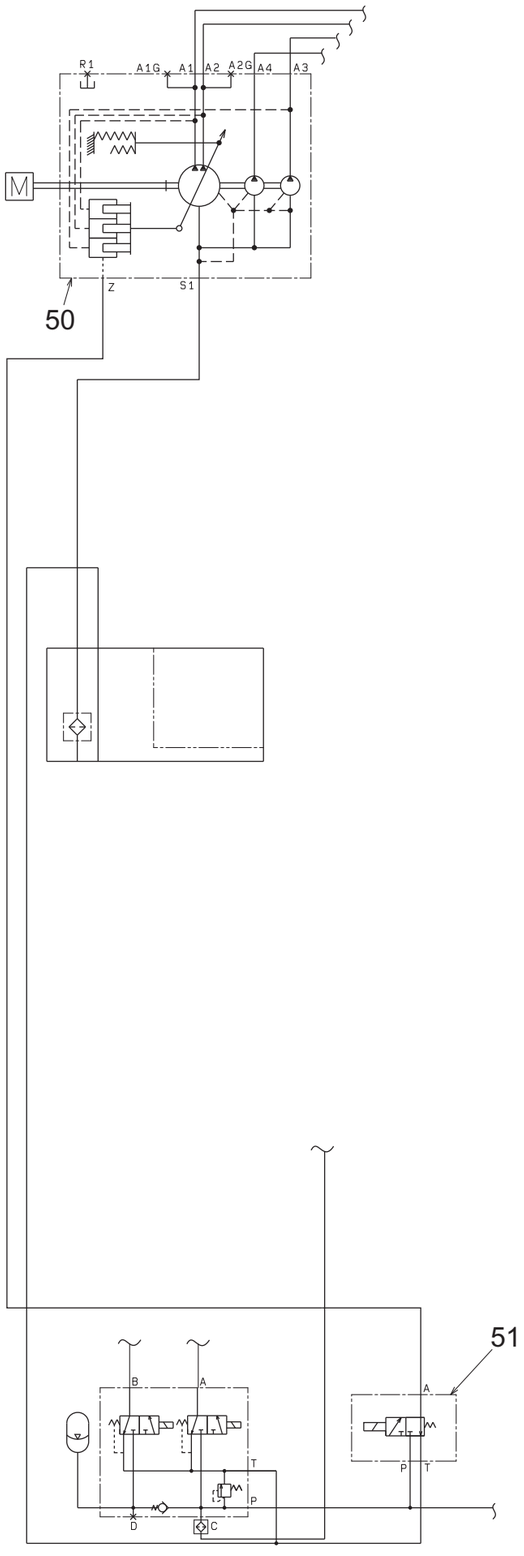
(11) Be careful when removing cover plates. Gradually back off the last two capscrews or nuts located at opposite ends of the cover or device and carefully pry cover loose to relieve any spring or other pressure, before removing the last two capscrews or nuts completely.

(12) Be careful when removing filler caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.

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22.2.3 AIR-CONDITIONER SPECIFICATION



AIR-CONDITIONER SPECIFICATION		PY01Z00026P1	
NO.	PARTS	PART No.	MODEL No.
50	PUMP ASSY	PH10V00015F1	AP2D25LV1RS7
51	SOLENOID VALVE	YJ35V00004F2	16353-00000

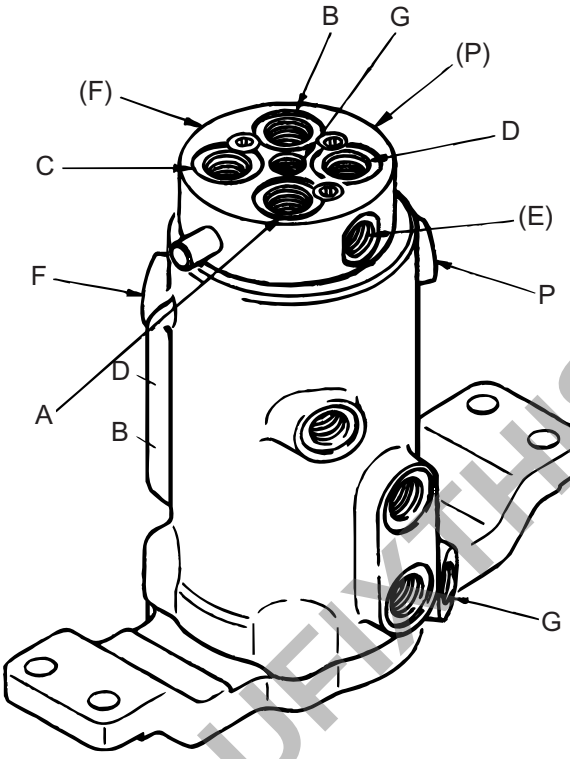
NOTE: 1. THIS HYDRAULIC CIRCUIT IS USED TO ADD TO STANDARD CIRCUIT.

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24.1.7 SWIVEL JOINT

24.1.7.1 GENERAL VIEW



General View

24.1.7.2 SPECIFICATIONS

Part No.		24100J12703F1			
Port No.		A, B, C, D	E, F	P	G (Drain)
Max. working pressure	MPa (psi)	22.6 (3280)	<--	3.4 (500)	0.5 (73)
Pressure test	MPa (psi)	30.9 (4480)	<--	30.9 (4480)	1.0 (145)
Flow	L/min (gal/min)	70 (18.5)	40 (10.6)	10 (2.6)	5 (1.3)
Port size		PF1/2	PF3/8	PF1/4	PF3/8
Revolution	rpm	Less than 15			
Weight	kg (lb)	Approx 22 (49)			

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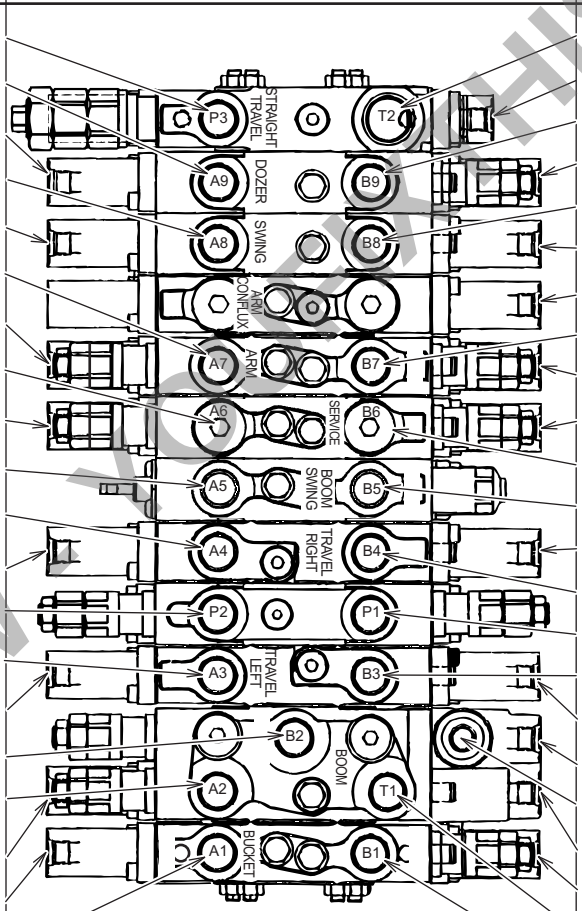
33.1.7 CONTROL VALVE

33.1.7.1 REMOVAL PREPARATION

(1) Unlock and open the right upper cover (2).
(2) Remove the right lower cover (6) (See Section 33.1.2.1-(4)).
-Spread a vinyl sheet under the control valve to prevent contamination due to oil leakage.
(3) Release the residual pressure in the circuit and the pressure in the hydraulic oil tank.

33.1.7.2 REMOVAL

(1) Disconnecting hoses
Disconnect all the hoses connected to the control valve as shown below, and install plugs and caps. Attach tags on hoses to record the installation place.

Functions	Ports	Ports on upper side	Ports	Functions
P3 pump	P3		T2	Tank return
Dozer-up	A9		Pi2	Bypass valve Pi
Dozer-down Pi	Pa9		B9	Dozer-down
Swing left	A8		Pb9	Dozer-down Pi
Swing left Pi	Pa8		B8	Swing right
Arm-in	A7		Pb8	Swing right Pi
Arm-in Pi	Pa7		Pi3	Conflux valve Pi
Nibbler open	A6		B7	Arm-out
Nibbler open Pi	Pa6		Pb7	Arm-out Pi
Boom swing left	A5		Pb6	Nibbler-close Pi
Travel right reverse	A4		B6	Nibbler-close
Travel right reverse Pi	Pa4		B5	Boom swing right
P2 pump	P2		Pb4	Travel right forward Pi
Travel left reverse	A3		B4	Travel right forward
Travel left reverse Pi	Pa3		P1	P1 pump
Boom-up	B2		B3	Travel left forward
Boom-down	A2		Pb3	Travel left forward Pi
Boom-down Pi	Pa2		DR	Drain return
Bucket dump Pi	Pa1		Pi1	Boom lock valve release Pi
Bucket dump	A1		Pb2	Boom-up Pi
			Pb1	Bucket digging Pi
			T1	Tank return
			B1	Bucket digging

Control Valve Ports (1/1)

Note

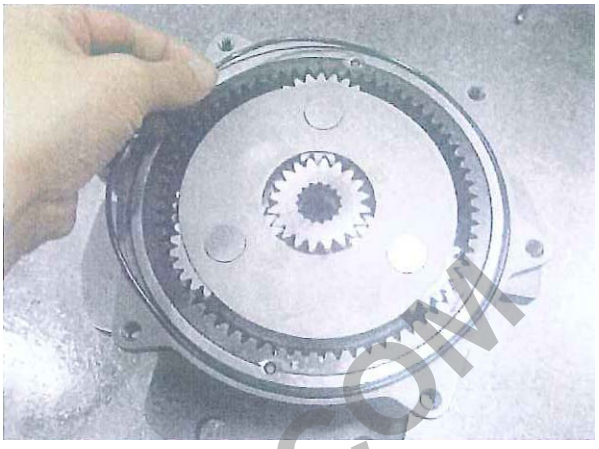
Pi shows pilot line.

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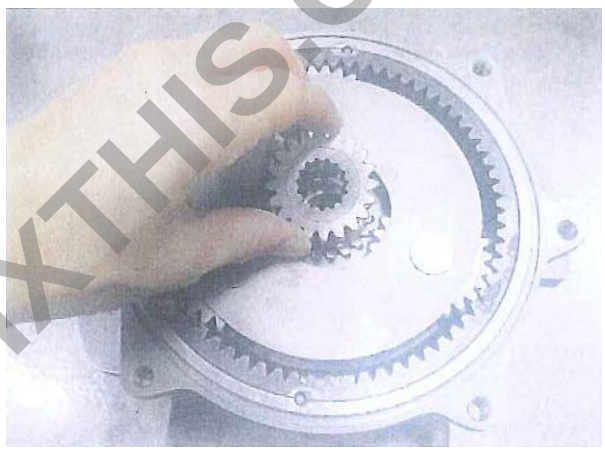
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(4) Disassembly of Reduction Gear

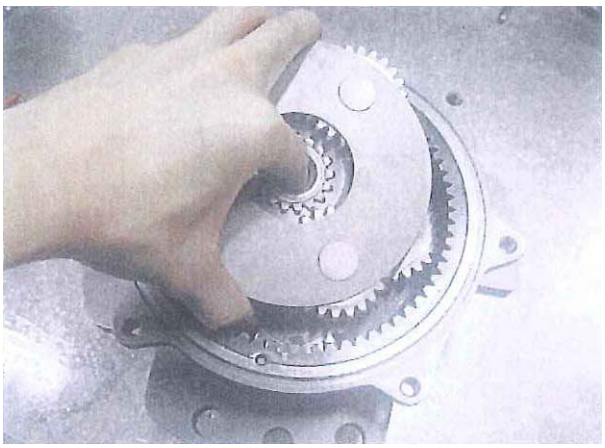
1. Take out the O-ring (114).



2. Take out the S2 gear (109).



3. Take out the carrier 2 kit.



Note

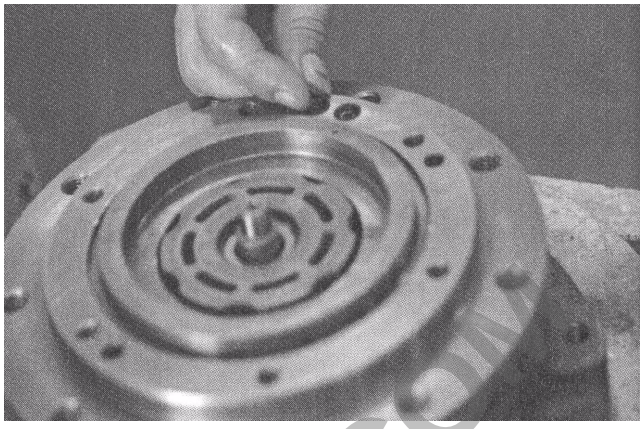
Pay attention not to scatter each part when lifting the S1 gear up.

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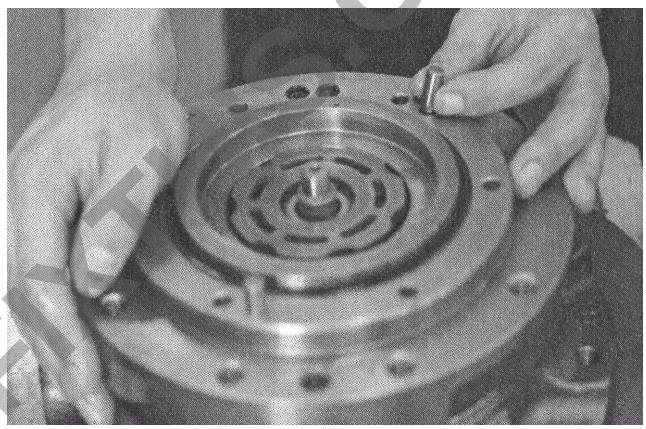
(10) Connecting rear flange with the spindle

1. Insert the O-rings (43) and (44) into the O-ring groove of the spindle (2).
   -Fit the O-rings (43) without applying grease. Otherwise grease may ooze out of the contact face between the rear flange (201) and the spindle (2) as if oil leakage occurred.



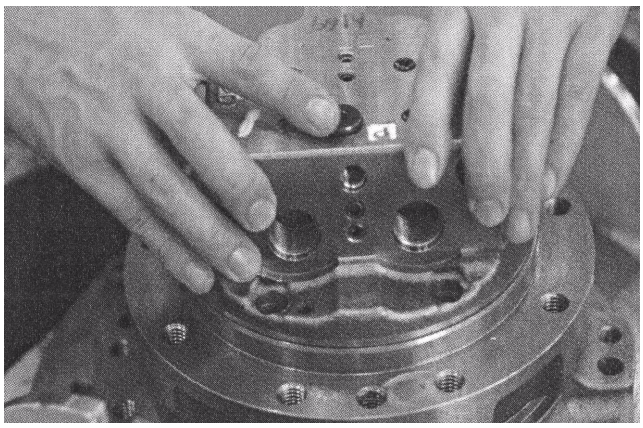
Installing O-rings (43) and (44)

2. Fix two parallel pins (42) to the spindle (2).
3. Fill 0.3 L (0.08 gal) of hydraulic oil into the spindle (2).



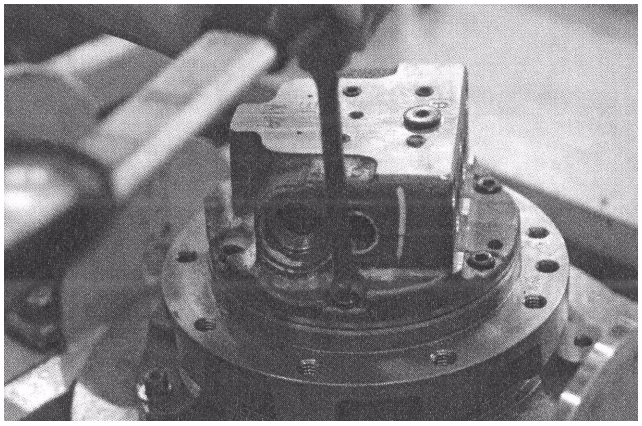
Installing Parallel Pin (42)

4. Align two parallel pins (42) set in the spindle (2) with the pin holes of the rear flange and install the rear flange (201) into the spindle (2).



Installing Rear Flange (201)

5. Screw six hexagonal bolts (243) into the spindle (2) and tighten them at the specified torque.
   Tightening torque:
   29.4 ± 4.9 N-m (22 ± 4 lb-ft)



Tightening Socket Bolts (243)

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3TNV84T (~ EPA Tier2)

Engine Model	3TNV84T						
Version	CL			VM			
Type	Vertical In-line Diesel Engine						
Combustion System	Direct Injection						
Aspiration	Turbocharged						
No. of Cylinders	3						
Bore × Stroke	84 × 90mm						
Displacement	1.496L						
Continuous Rated Output	min^{-1}	1500	1800				
	kW	14.0	16.5				
	PS	19.0	22.5				
Max. Rated Output (Net)	min^{-1}	1500	1800	2400	2600	2800	3000
	kW	15.8	18.8	25.0	26.8	29.1	30.9
	PS	21.5	25.5	34.0	36.5	39.5	42.0
High Idling	min^{-1}	1600 ± 25	1895 ± 25	2590 ± 25	2810 ± 25	2995 ± 25	3210 ± 25
Engine Weight (Dry) *with Flywheel Housing	161 kg			155 kg			
PTO Position	Flywheel End						
Direction of Rotation	Counterclockwise Viewed From Flywheel End						
Cooling System	Liquid-Cooled with Radiator						
Lubricating System	Forced Lubrication with Trochoid Pump						
Normal Oil Pressure at Rated Engine Speed	0.29 - 0.44 MPa			0.34 - 0.49 MPa		0.39 - 0.54 MPa	
Normal Oil Pressure at Low Idle Speed	0.06 MPa						
Starting System	Electric Starting (Starter Motor: DC12V (1.2 kW)) ***						
	Alternator: DC12V, 40A***						
	Recommended Battery Capacity: 12V,55 Ah*** (5h rating)						
Dimensions (L × W × H)*	589 × 486 × 622mm			564 × 486 × 622mm			
Engine Oil Pan Capacity**	6.7/3.9L (Dipstick Upper Limit / Lower Limit)						
Engine Coolant Capacity	2.0L Engine Only						
Standard Cooling Fan	350mm O.D., 6 Blade Pusher-Type ***						
Crank V-pulley dia./ Fan V-pulley dia.	ϕ120/ ϕ90mm ***			ϕ110/ ϕ110mm ***			

* *Engine specifications without radiator.*

** *Engine oil capacity for a "Deep Standard" oil pan. Refer to the operation manual provided by the driven machine manufacturer for the actual engine oil capacity of your machine.*

*** *May vary depending on application.*

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CAUTION

Any part determined to not meet the service standard or limit before the next service, as determined from the state of current rate of wear, should be replaced even though the part currently meets the service standard limit.

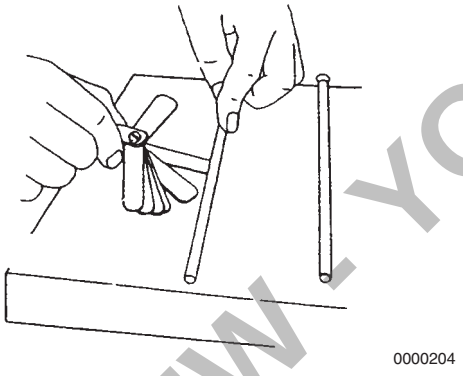
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Inspection of Push Rods

Push Rod Bend

Determine if the bend of the push rods are within the specified limit.

1. Place the push rods on a flat inspection block or layout bed.
2. Roll the push rods until a gap can be observed between a portion of the push rod and the surface of the block or layout bed.
3. Use a feeler gauge to measure the gap **(Figure 6-15)**. *See Push Rod on page 6-9 for the service limit.*



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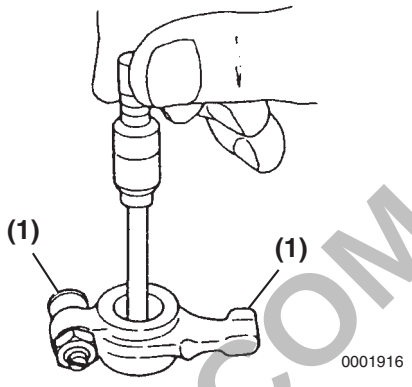
Figure 6-15

Inspection of Rocker Arm Assembly

Rocker Arm Shaft Hole Diameter

Use a test indicator and micrometer to determine if the inside diameter of all the rocker arm support brackets and the rocker arms **(Figure 6-16)** are within the specified limits. *See Rocker Arm and Shaft on page 6-9 for the service limit.*

Inspect the contact areas **(Figure 6-16, (1))** for excessive wear or damage**.**

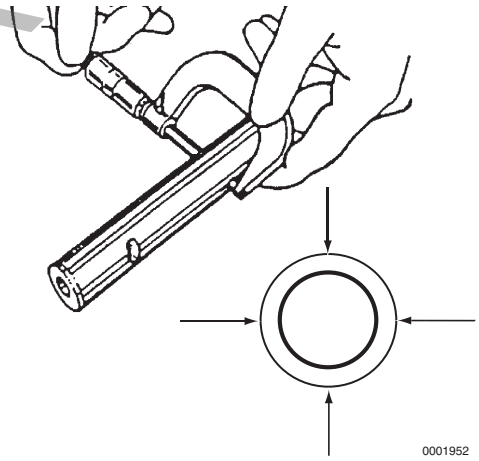


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Figure 6-16

Rocker Arm Shaft Outside Diameter

Use a micrometer to measure the rocker arm shaft diameter. Measure at each rocker arm location in two directions 90° apart **(Figure 6-17)**. *See Rocker Arm and Shaft on page 6-9 for the service limit.*



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Figure 6-17

Inspection of Valve Guides

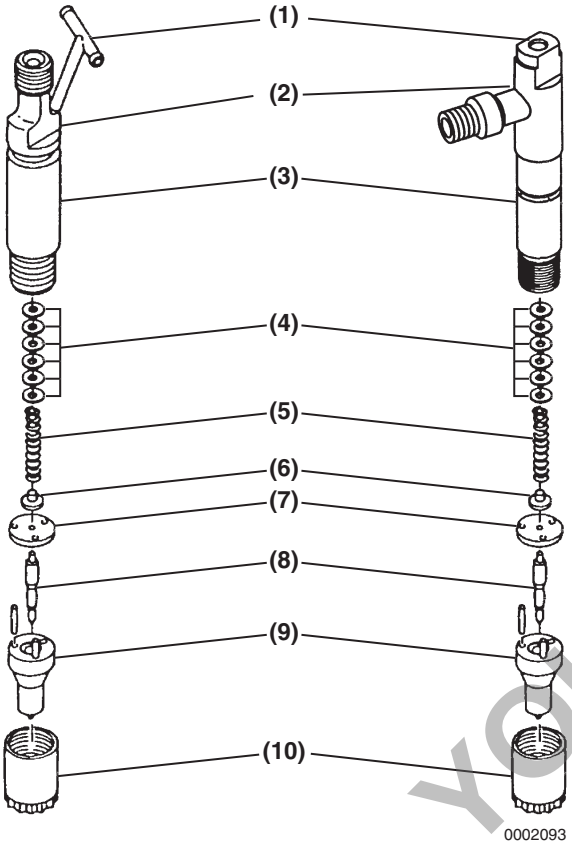
Visually inspect the valve guides for distortions, scoring or other damage.

Note: Measure the valve guides while they are installed in the cylinder head.

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Adjusting Fuel Injector Pressure

The fuel injectors open when pressure reaches a predetermined pressure threshold. They close when the pressure is reduced below that threshold. The pressure threshold can be adjusted by adding or removing shims **(Figure 7-58, (3))**.



1 – Fuel Return Passage
2 – Injector ID Location
3 – Injector Body
4 – Pressure Adjusting Shims
5 – Spring
6 – Spring Seat
7 – Valve Stop Spacer
8 – Nozzle Valve
9 – Nozzle Body
10 – Nozzle Case Nut

Figure 7-58

The injection pressure will change by approximately 275 psi (1.9 MPa; 19 kgf/cm^2) for every 0.1 mm (0.004 in.) in shim thickness.

See the parts catalog for available shims.

CAUTION

Each pressure adjusting shim removed or added changes the pressure threshold by approximately 275 psi (1.9 MPa, 19 kgf/cm^2). Adding adjusting shims increases the threshold pressure. Removing adjusting shims reduces the pressure threshold.

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1. Disassemble the fuel injector assembly. *See Disassembly and Inspection of Fuel Injectors on page 7-39*.
2. Remove or add adjusting shims as needed.
3. Reassemble the fuel injector assembly. *See Reassembly of Fuel Injectors on page 7-41*.
4. Retest the fuel injector. *See Testing of Fuel Injectors on page 7-38*. If the injector cannot be adjusted to the appropriate pressure, discard the fuel injector.

Reassembly of Fuel Injectors

1. Secure the injector in a soft-jawed vise with the nozzle end up.
2. Reinstall the shims, nozzle spring, nozzle spring seat, valve stop spacer, nozzle valve, and nozzle body.
3. Reinstall the nozzle case nut. Tighten it to specification. *See Special Torque Chart on page 7-11*.

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