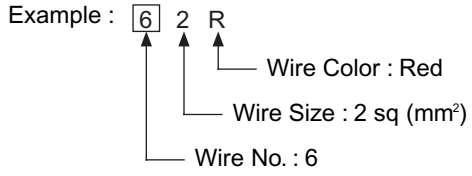
23.1 HOW TO READ CIRCUIT DIAGRAM AND HARNESS CONNECTION

23.1.1 ELECTRIC CIRCUIT DIAGRAM

(1) In the diagram, the number, size and color of wires are shown on the wiring line.
The size of the wire is to be 0.75 sq (square mm = mm^2) unless otherwise specified.

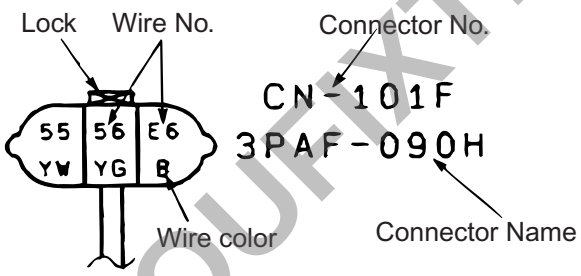


WIRING COLOR TABLE

Symbol	Color	Symbol	Color	Symbol	Color
B	BLACK	Y	YELLOW	Gr	GRAY
G	GREEN	P	PINK	Sb	SKY BLUE
L	BLUE	O	ORANGE	V	VIOLET
R	RED	Br	BROWN		
W	WHITE	Lg	LIGHT GREEN		

23.1.2 HARNESS CONNECTION

(1) Indication for Connector



1. The figure for the connector pin arrangement is shown by putting the lock (nail) to upper portion, and looking from the fitting face.
2. The numbers in the connector show the wire No., and alphabetical letters show the wire color.
3. On the side face of connector, the connector name and serial number of the connector No. are indicated.
4. At the place indicated as "DOUBLE SPLICE", Two wires are connected to one place.

(2) The connector is to be connected with engaging the male (M) and female (F) connectors of the same number.
Example : CN-101M and CN-101F
Where : M means for Male, and F for Female.

(3) +<-- mark means the connector with diode. The direction for diode is shown by the arrow.

(4) The AVSS wires are to be used for the size between 0.75 sq and 2 sq. AVS wires between 3 sq and 5 sq and others are AV wires, unless otherwise specified.

(5) The wire size is 0.75 sq, unless otherwise specified.

(6) The treatment for the harness end is to be as follows :

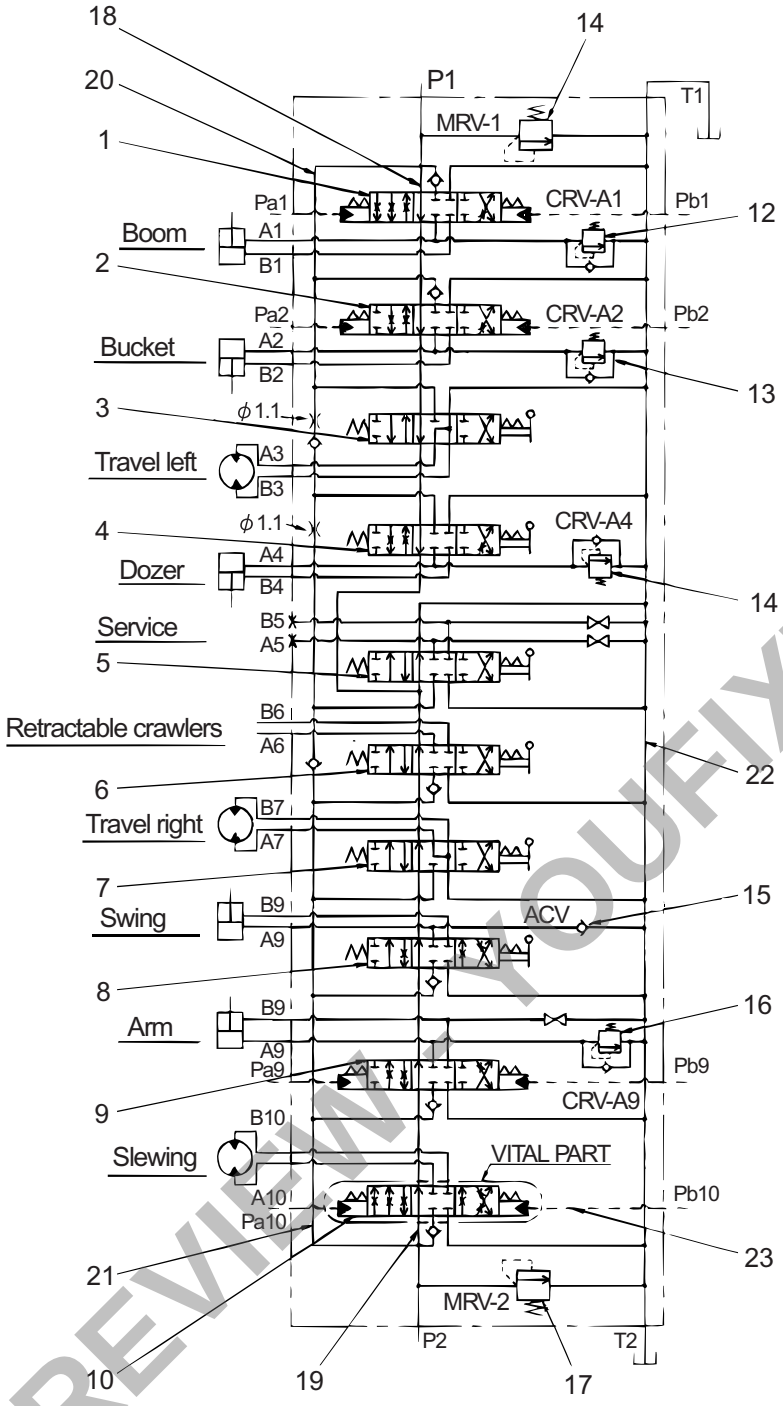
1) ═══ : After roughly applying harness taping, wires are installed in a corrugated tube.
2) ——— : Harness taping by two plies.
3) ——— : No harness treatment for connection

(7) The length for the above (6)-3) is to be 30±10 mm. (1.2±0.4 in), and the length includes in the total length of wire shown in the diagram.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

24.1.3.4 HYDRAULIC CIRCUIT DIAGRAM



No.	NAME
1	Boom spool
2	Bucket spool
3	Travel (left) spool
4	Dozer spool
5	Service spool
6	Retractable crawlers
7	Travel (right) spool
8	Swing spool
9	Arm spool
10	Slewing spool
11	P1 Main relief valve
12	A1 Over load relief valve
13	A2 Over load relief valve
14	A4 Over load relief valve
15	A8 Anti cavitation valve
16	A9 Over load relief valve
17	P2 Main relief valve
18	Bypass passage (P1 Pump line)
19	Bypass passage (P2 Pump line)
20	Parallel passage (P1 Pump line)
21	Parallel passage (P2 Pump line)
22	Tank passage
23	Pilot passage (for spool exchange)

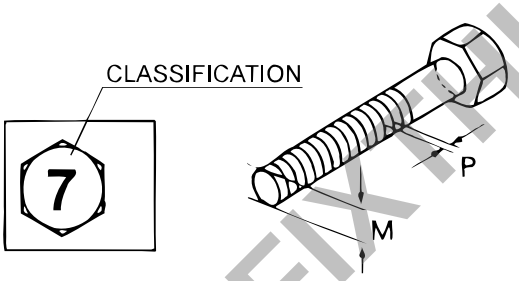
PREVIEW YOUFIXTHIS.COM

Download full manual at youfixthis.com

11.1 TORQUE SPECIFICATIONS FOR CAPSCREWS & NUTS

The following Torque Specifications are provided for use when 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 the periodical maintenance. Retighten the loosened ones, and install new ones for the dropped off. For the new machine, the check and retightening of them must be carried out at first 50 hours operation. For the replacement of them, make sure to use the same size of 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 our distributor. Over-tightening may cause damages on the parts to be fixed.
- In case that 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 of capscrews, M 5 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)

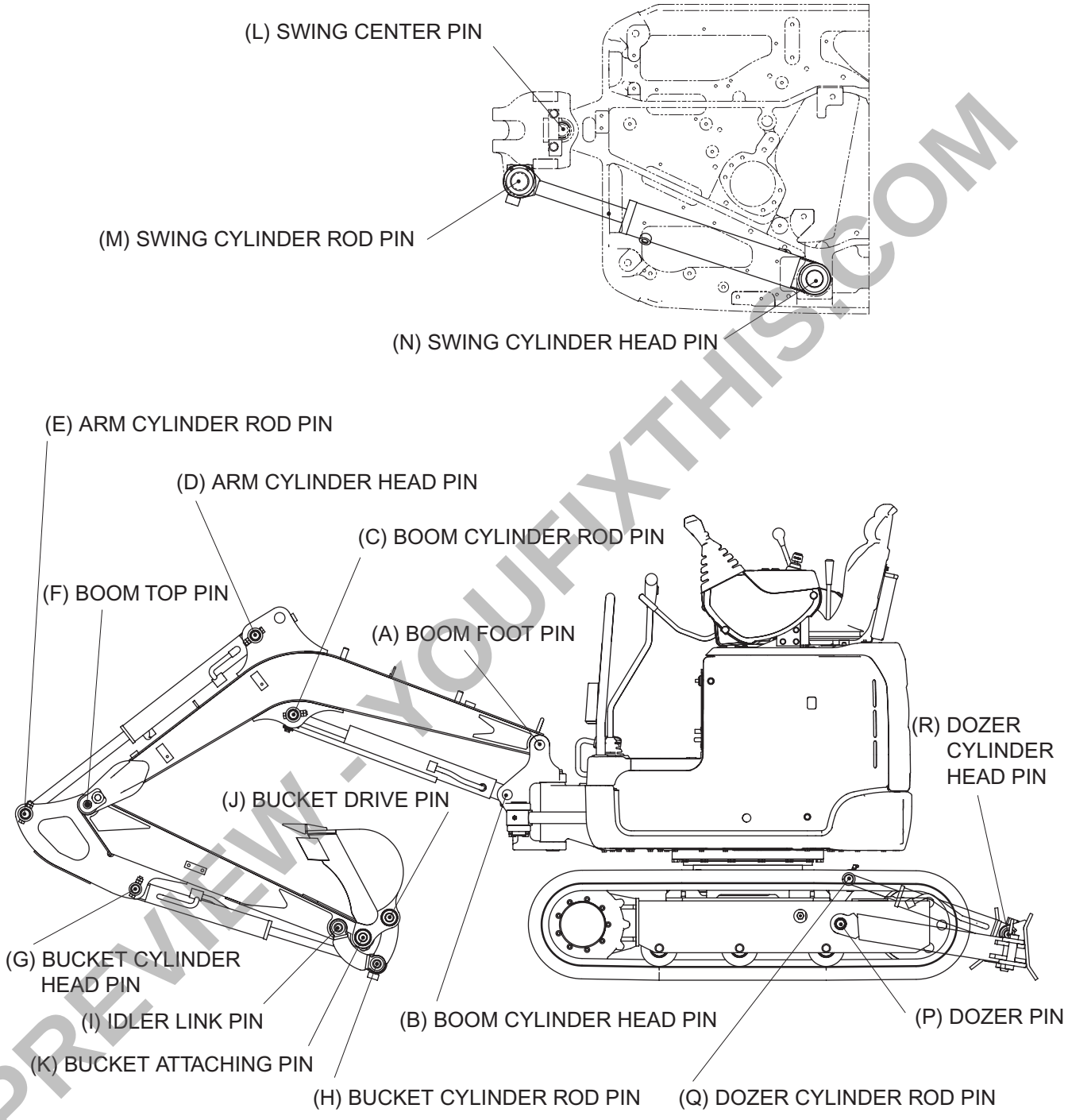
Classification		4.8T		7T		10.9T	
Nominal size		No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M6	P=1	4.4±0.5 (3.2±0.4)	3.7±0.4 (2.7±0.3)	9.6±1.0 (7.1±0.7)	8.1±0.8 (6.0±0.6)	17.4±1.8 (12.8±1.3)	14.7±1.5 (10.8±1.1)
M8	P=1.25	10.7±1.1 (7.9±0.8)	9.0±0.9 (6.6±0.7)	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)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

32.1 REMOVING AND INSTALLING

32.1.1 ATTACHMENT ASSEMBLY AND NAME



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

42.2 TROUBLE DIAGNOSIS : HYDRAULIC

Classification	Group No.		Probable Cause/ Component / Trouble		Pump				Control valve					
				Engine speed	Pump P1	Pump P2	Pump P3	Pilot relief valve	Travel spool	Slewing spool	Boom spool	Arm spool	Bucket spool	Load check valve
Attachment operation	1	(1)	Incapable of attachment operation				◯	◯			◯	◯	◯	
		(2)	Attachment force small	◯	◯	◯	◯	◯			◯	◯	◯	◯
		(3)	Attachment speed low	◯	◯	◯	◯	◯			◯	◯	◯	◯
Travel operation	2	(1)	Incapable of travel operation				◯	◯	◯					
		(2)	Traction force small	◯	◯	◯			◯					◯
		(3)	Travel speed low	◯	◯	◯			◯					◯
		(4)	Incapable of shifting 1st / 2nd speed					◯						
		(5)	Deviation in single(independent)operation	◯	◯	◯			◯					◯
Slewing operation	3	(1)	Incapable of slewing operation				◯	◯		◯				
		(2)	Slewing speed low	◯		◯	◯	◯		◯				◯
		(3)	Slewing force small	◯		◯	◯	◯		◯				◯
Pump	4	(1)	Malfunction of pump		◯	◯	◯							

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

2.3 SPECIFICATIONS AND PERFORMANCE

(1) SPEED AND GRADEABILITY

Item	E10SR	
	Rubber crawler shoe	
Slewing Speed	9.0 min^{-1}	
Travel Speed	Low (1st)	High (2nd)
	2.0 km/h (1.2mph)	3.7 km/h (2.3mph)
Gradeability [%(degree)]	58 % (30°)	

(2) ENGINE

Model	YANMAR 2TNV70-WYB
Type	Water-cooled, 4 cycle 2 cylinder, diesel engine
Number of cylinders-Bore × Stroke	2 - 70 mm X 74 mm (2.76 in X 2.91 in)
Total Displacement	0.569 L (34.7 cu-in)
Output Rating	Net 5.9 kw (8.0 PS) / 2000 min^{-1} (ISO 9249) Net 6.1 kw (8.3 PS) / 2000 min^{-1} (ISO 14396)
Maximum Torque	Net 31.2 N-m (23.0 lbf-ft) / 1500 min^{-1} (ISO 9249) Net 31.7 N-m (23.4 lbf-ft) / 1500 min^{-1} (ISO 14396)
Starting Motor	12 V / 1.0 kw
Generator (Dynamo)	12 V / 20 A

(3) HYDRAULIC COMPONENTS

Hydraulic Pump	Variable displacement axial piston + gear pump
Hydraulic Motor (Slewing)	Orbit motor
Hydraulic Motor w / Reducer (Travel)	Axial piston, 2-Speed motor
Control Valve	10-function multiple control valve
Cylinder (Boom, Arm, Swing, Bucket, Dozer, Frame width)	Double action cylinder
Return Filter	Safety valve containing / Filter Type (ß10≥8μ)

(4) SIDE DIGGING & DOZER

Type		Boom swing by hydraulic cylinder
Boom Swing Angle	Right	50°
	Left	80°
Stroke of Dozer (above/below) mm (in)		190 / 240 (7.5 / 9.4)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREFACE

(1) Working Conditions

1. Technicians : One more technicians who are qualified by Manufacturer are needed. The technicians need five years of 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 to be equipped with a good enough capacity of building with crane and inspection instruments necessary for specific self inspection activities.
3. Place : The workshop to be located on a flat land at which the work is able to perform and to which 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 which has operated in a normal circumstances.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

23.2 ELECTRICAL EQUIPMENT & HARNESS

23.2.1 ELECTRICAL EQUIPMENT LIST

Group	Code	Part Name	Part No.
Diode	D-1	DIODE	YN02D01001P1
	D-4	DIODE	↑
	D-5	DIODE	↑
	D-6	DIODE	↑
	D-13	DIODE	↑
	D-14	DIODE	↑
Electrical Fittings	E-1	FUSE BOX	PA73E00002F1
	E-2	GENERATOR	E/G accessory (119910-77200)
	E-3	HORN	PY53S00002P1
	E-4	FUSIBLE LINK	PA73S00001P1
	E-7	GLOW PLUG	E/G accessory (119717-77800)
	E-8	CURRENT LIMITER	PM13E01028P1
	E-9	BATTERY	PA72S00004P1
	E-10	SOCKET (12V)	PF81S01001P1
	E-14	SEQUENCE BOX	PA24S00002P3
	E-20	TRAVEL ALARM	PM53S00001F2
	E-25	FUSE	2479R655S10
	E-26	HOUR METER	PA58S00001P1
Light	L-1	BOOM WORKING LIGHT (RIGHT)	PA80S00003F1
	L-2	CHARGE LAMP	PA80S00005P1
	L-3	ENG. WATER TEMP.LAMP	PA80S00006P1
	L-4	ENG. OIL PRESS. LAMP	PA80S00007P1
	L-5	TWO-SPEED SELECT LAMP	PA80S00008P1
Motor	M-1	STARTER MOTOR	E/G accessory (119515-77010)
Relay	R-1	SAFETY RELAY	PA24S00005P1
	R-3	ENG. STOP RELAY	PX24S00003P1
	R-5	CHARGE INDICATOR RELAY	PA24E01001P1
	R-6	TIMER UNIT	PH25S00002P1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

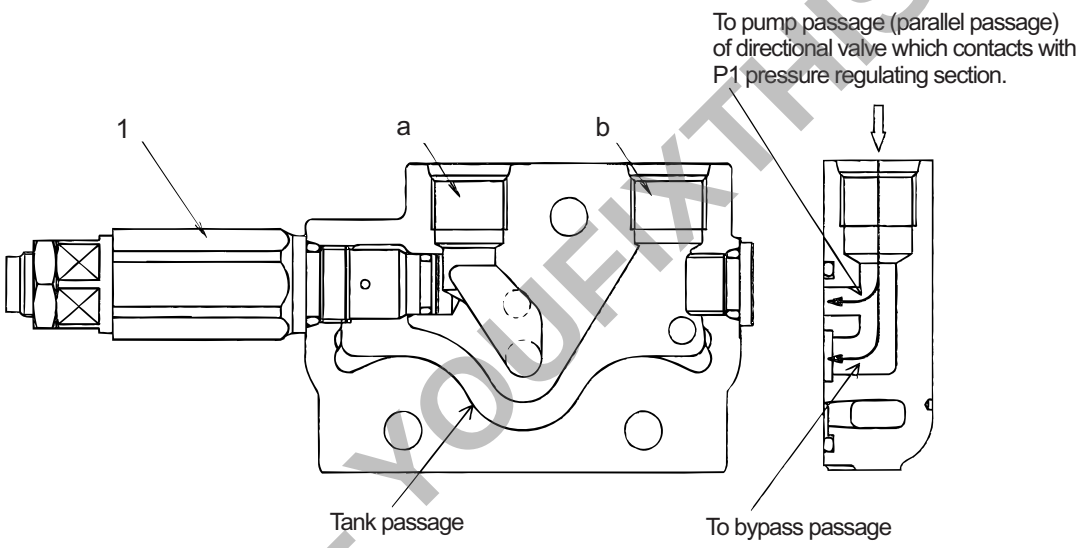
24.1.3.5 EXPLANATION OF OPERATION

(1) Configuration of pressure regulating and operation

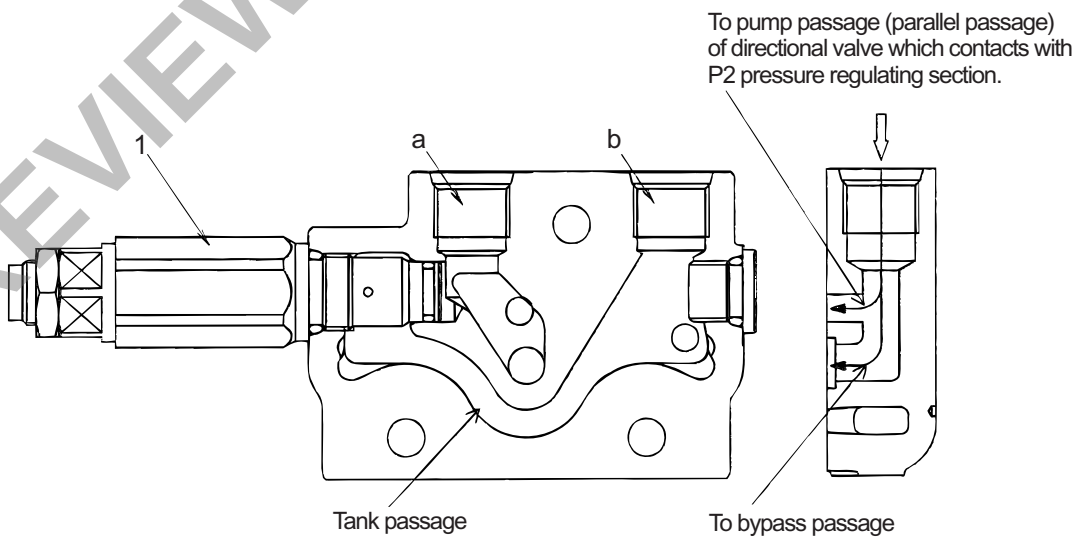
Pressure regulating sections (P1, P2) are composed of 5 sections below.

1. Pump port (a): This delivers pressurized oil from pump.
2. Pump passage (parallel passage): This leads the oil from pump port (a) to directional section.
3. Bypass passage: This returns delivery oil to tank when directional valve is neutral position.
4. Tank port (b): This drains return oil which flows from bypass passage and actuator.
5. Main relief valve (1)
   The oil delivered from pump flows to pump passage and bypass passage.

When directional valve is in neutral position, the delivery oil flows through each bypass passage, and returns to tank from tank port on pressure regulating section through tank passage. (See the hydraulic circuit diagram.)
When directional valve is actuated, pump pressure becomes loading pressure. And when the loading pressure reaches to setting pressure of main relief valve, the main relief valve is actuated and this function keeps circuit pressure to the setting pressure of main relief valve.



P1 pressure regulating section



P2 pressure regulating section

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

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)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

32.2 DISASSEMBLING AND ASSEMBLING COMPONENTS

32.2.1 CYLINDER

32.2.1.1 NECESSARY TOOLS

Though the required tools and jigs differ in types of cylinder, as a guide line, tools and jigs to be prepared are shown in below Table.

List of Tools and Jigs

Tool/Jig	Remarks	Tool/Jig	Remarks
Hammer	1. Steel hammer 2. Wooden or plastic hammer	Gimlet	A sharp-point tool may be used in place of gimlet
Screwdriver	Several kinds of minus driver of small and large sizes	Jig	1. For installing seal ring 2. For pushing seal ring into groove 3. For reforming seal ring 4. For pressing bushing
Chisel	Flat chisel		
Vise	Capable to hold outer dia. of cylinder head and tube installing pin portion.		
Wrench	1. Special wrench 2. Extension pipe for wrench	Measuring Device	1. Slide calipers 2. Micrometer 3. Cylinder gauge 4. V-block

- For the details of special jigs, refer to 32.2.1.7 of this section.

32.2.1.2 GENERAL PRECAUTIONS

- Carry out the disassembly and assembly works in a clean work shop, and always keep disassembled parts at clean conditions.
- Prior to disassembly, thoroughly clean the cylinder externally.
- Use caution not to give any damages to the parts while carrying out the disassembly / assembly works.
- Thinly apply grease or hydraulic oil to seals prior to installation.
- After the installation of O-ring, confirm there is no twist on it.
- Apply clean hydraulic oil to each sliding portion before the installation.
- Ensure each sliding portion for no burr and defect, and its smooth sliding operation.
- This manual describes mainly for the boom cylinder as an typical example.
  Refer to 24.1.8 of COMPONENT SYSTEM for the construction of hydraulic cylinders when disassembling and reassembling the cylinders.

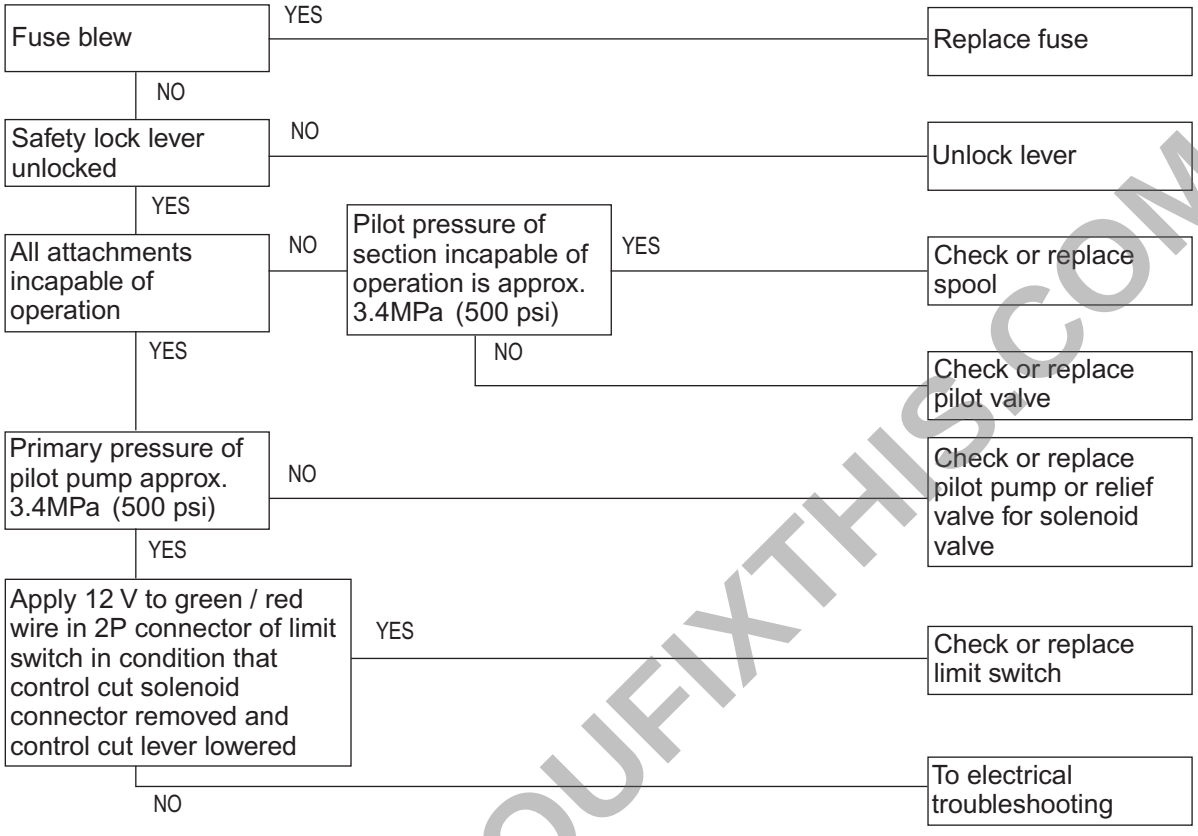
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

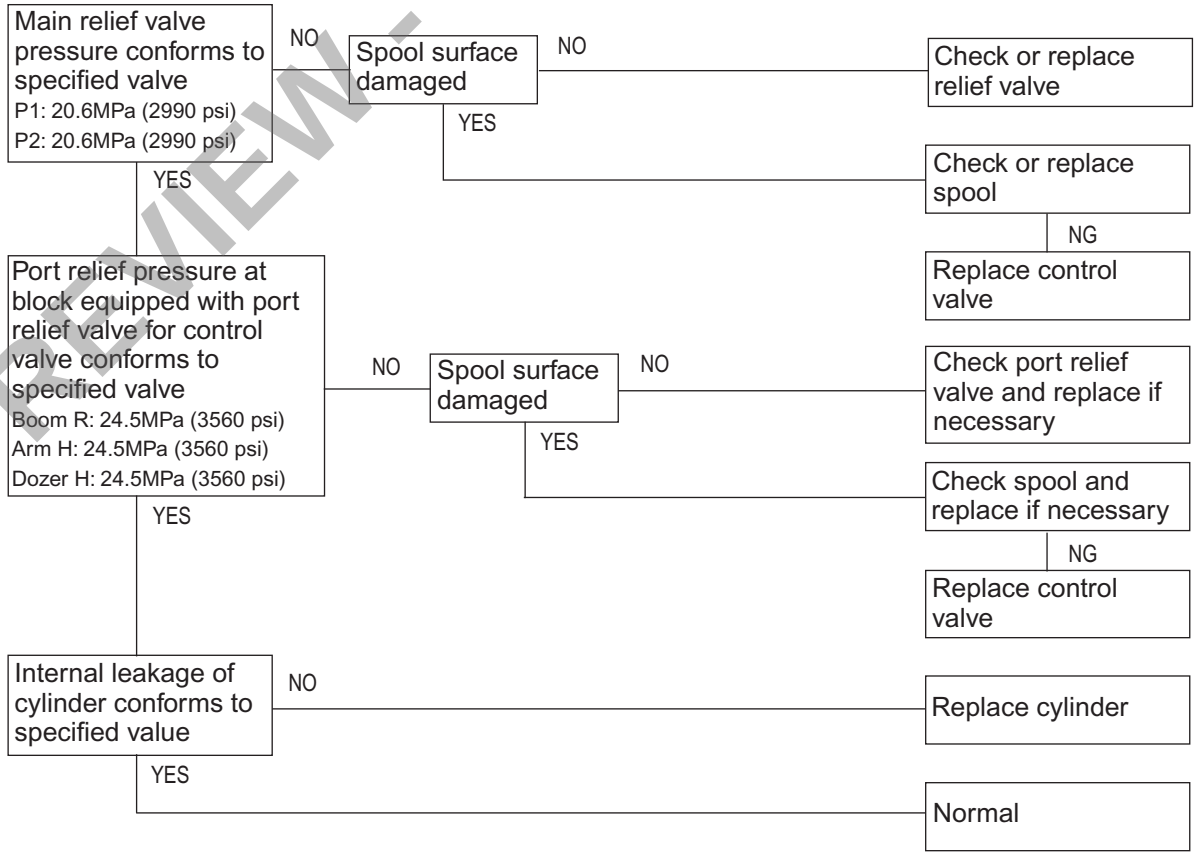
42.3 TROUBLESHOOTING

42.3.1 ATTACHMENT OPERATION

42.3.1.1 Incapable of attachment operation



42.3.1.2 Attachment force small



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

2.4 MACHINE & COMPONENTS WEIGHT (DRY)

Unit : kg (lbs)

MODEL	E10SR
COMPLETE MACHINE	1040 (2290)
UPPER SLEWING BODY (ASSY OF FOLLOWINGS)	504 (1110)
UPPER FRAME	118 (260)
ENGINE	84 (185)
RADIATOR	2.8 (6.2)
HYDRAULIC PUMP	10 (22)
HYDRAULIC TANK	18 (40)
FUEL TANK	1.5 (3.3)
CONTROL VALVE	13 (29)
SLEWING MOTOR	15 (33)
SWING BRACKET	16 (35)
SWING CYLINDER	16 (35)
COUNTERWEIGHT	46 (101)
TRAVEL SYSTEM (ASSY OF FOLLOWINGS)	395 (870)
LOWER FRAME	132 (291)
SWIVEL JOINT	11 (24)
SLEWING BEARING	17 (37)
CRAWLER SHOE	33X2 (73X2)
TRAVEL MOTOR	17X2 (37X2)
LOWER ROLLER	3.8X6 (8.4X6)
IDLER	4.5X2 (9.9X2)
SPROCKET	5.2X2 (11.5X2)
IDLER ADJUSTER	2.8X2 (6.2X2)
DOZER	41 (90)
DOZER CYLINDER	8 (18)
CRAWLER WIDTH CYLINDER	7.5 (17)
HOE ATTACHMENT (ASSY OF FOLLOWINGS)	115 (254)
BOOM	33 (73)
ARM	23 (51)
BUCKET (STANDARD)	17 (37)
BOOM CYLINDER	7 (15)
ARM CYLINDER	9 (20)
BUCKET CYLINDER	7 (15)
FLUIDS	26 (57)
HYDRAULIC OIL	15 (33)
COOLING WATER	2.2 (5)
ENGINE OIL	1.7 (4)
FUEL	10 (32)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

13. MAINTENANCE STANDARD AND TEST PROCEDURE

TABLE OF CONTENTS

13.1 HOW TO USE MAINTENANCE STANDARDS AND PRECAUTIONS 13-3
13.2 PERFORMANCE INSPECTION STANDARD TABLE 13-5
13.2.1 STANDARD VALUE TABLE 13-5
13.3 MEASURING ENGINE SPEED 13-7
13.3.1 ENGINE SPEED MEASUREMENT 13-7
13.4 MEASUREMENT OF HYDRAULIC PRESSURE 13-9
13.4.1 STANDARD FOR HYDRAULIC OIL PRESSURE MEASUREMENT 13-9
13.4.2 PRESSURE MEASUREMENT AND ADJUSTMENT 13-9
13.5 MEASURING TRAVEL PERFORMANCES 13-13
13.5.1 TRAVEL 13-13
13.5.2 TRAVEL DEVIATION 13-14
13.5.3 MOVEMENT DRIFT DUE TO GRAVITY 13-14
13.5.4 DRAIN RATE ON TRAVEL MOTOR 13-15
13.6 MEASURING SWING PERFORMANCES 13-16
13.6.1 SLEW TIME 13-16
13.6.2 OVERRUN WHEN SLEWING STOPS 13-16
13.6.3 SLEW DRIFT DUE TO GRAVITY 13-16
13.6.4 DRAIN RATE OF SLEW MOTOR 13-17
13.7 MEASURING ATTACHMENT OPERATING PERFORMANCES 13-18
13.7.1 CYLINDER SPEED 13-18
13.7.2 GRAVITY DRIFT OF CYLINDERS 13-19
13.8 MEASURING SLEW BEARING PERFORMANCES 13-20
13.8.1 SLEW BEARING-BUCKET TIP PLAY 13-20
13.8.2 SLEW BEARING PLAY 13-20
13.9 MEASURING CRAWLER TENSION 13-21
13.9.1 CRAWLER TENSION 13-21

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Group	Code	Part Name	Part No.
Solenoid	SV-1	OPERATING LEVER LOCK SOLENOID	PX35V00003F1
	SV-2	TWO-SPEED SELECT SOLENOID	↑
	SV-3	ENG. STOP SOLENOID	E/G accessory (119233-77932)
Switch	SW-1	KEY SWITCH	PW50S00007F1
	SW-2	TWO-SPEED SELECT SWITCH	YN03M01286S002
	SW-3	LEVER LOCK SWITCH (RIGHT)	PA50S00001P1
	SW-4	LEVER LOCK SWITCH (LEFT)	↑
	SW-5	HORN SWITCH	YN50E01001P2
	SW-6	ENG. WATER TEMP. SWITCH	E/G accessory (121250-44901)
	SW-7	ENG. OIL PRESS. SWITCH	E/G accessory (114250-39450)

Note

The part number may be changed owing to modification, use them only for reference.

PREVIEW - YOUFIXTHIS.COM

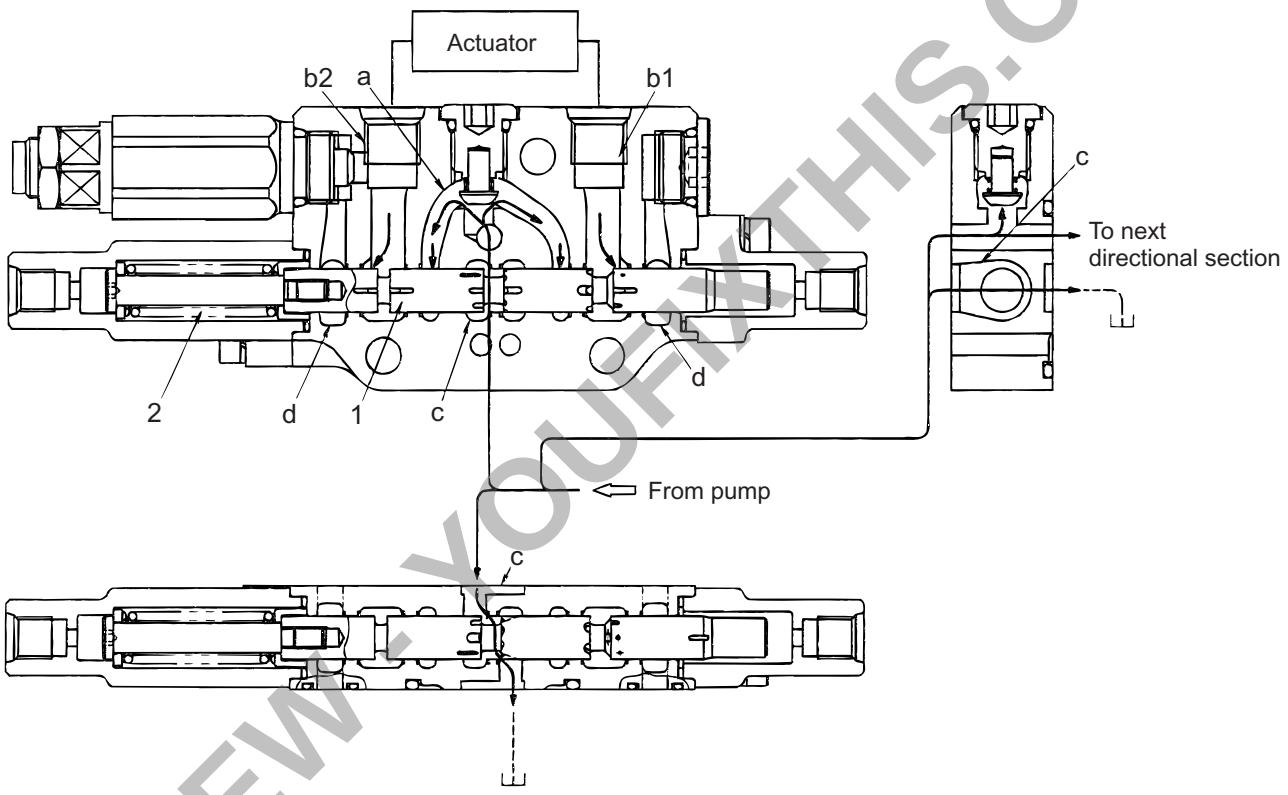
Download full manual at youfixthis.com

(2) Operation of directional valve (except travel)

Directional sections other than travel are composed of spool of all port block type.
Because of the structure and shape similar, we explain the example of boom directional section.
Operation is the same though manual directional valve has the different spool retaining parts.

1. When the spool of directional valve is in neutral position (Valve is not operated.)
   The spool (1) is held in neutral position by the return spring (2) force.

   When the spool is in neutral position, the passage is closed between pump passage (a) and actuator passage (b1, b2). Also the passage is closed between actuator passage (b1, b2) and tank passage (d) too.
   Consequently, actuator is stopped because all passage to actuator is closed.
   On the other hand, when directional valve is in neutral position, delivery oil from the pump returns to tank from tank port on pressure regulating section through bypass passage (c) of each directional valve.



Directional section of boom (At neutral position)

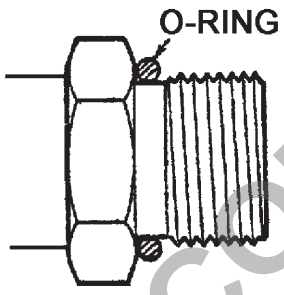
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

11.3 TORQUE SPECIFICATIONS FOR JOINTS AND HOSES

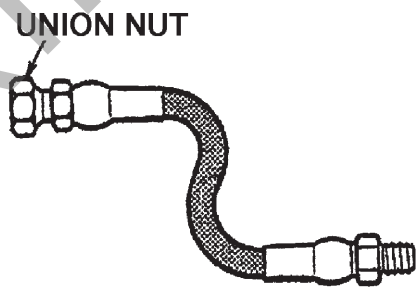
11.3.1 JOINTS FOR PIPING (O-RING SEALING TYPE)

Nominal screw size (PF)	Spanner size (mm)	Tightening torque N•m (lbf•ft)
1 / 8	14	17±2 (12±1)
1 / 4	19	36±2 (27±1)
3 / 8	22	74±5 (54±4)
1 / 2	27	108±9.8 (80±7)
3 / 4	36	162±9.8 (119±7)
1	41	255±9.8 (188±7)



11.3.2 HYDRAULIC HOSE (30 DEG. FLARE TYPE)

Nominal screw size (PF)	Spanner size (mm)	Tightening torque N•m (lbf•ft)
1 / 8	17	15±2.0 (11±1)
1 / 4	19	29±4.9 (22±4)
3 / 8	22	49±4.9 (36±4)
1 / 2	27	78±4.9 (58±4)
3 / 4	36	118±9.8 (87±7)
1	41	137±15 (101±11)



NOTE : The application of the tightening torque is subject to a dry condition.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

33.1 REMOVING AND INSTALLING

33.1.1 CANOPY

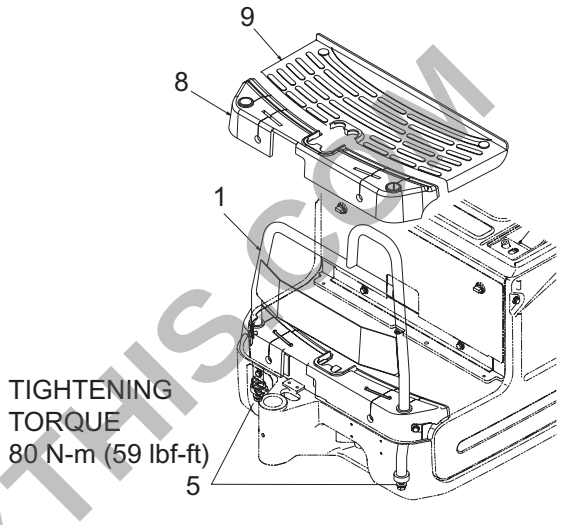
33.1.1.1 CANOPY REMOVAL

(1) Remove the floor mats (8) and (9).

(2) Removing handrail (1)

Loosen two capscrews M12X40 (5) to remove the handrail (1).

Tools: Socket: 19mm



Floor mat and handrail removal

(3) Removing canopy assembly

1.

Fix the right and left connecting fittings of the seat belt to the fittings (a) respectively.

2.

Loosen four capscrews M16X90 (7) to remove the canopy.

Tools: Socket: 24mm

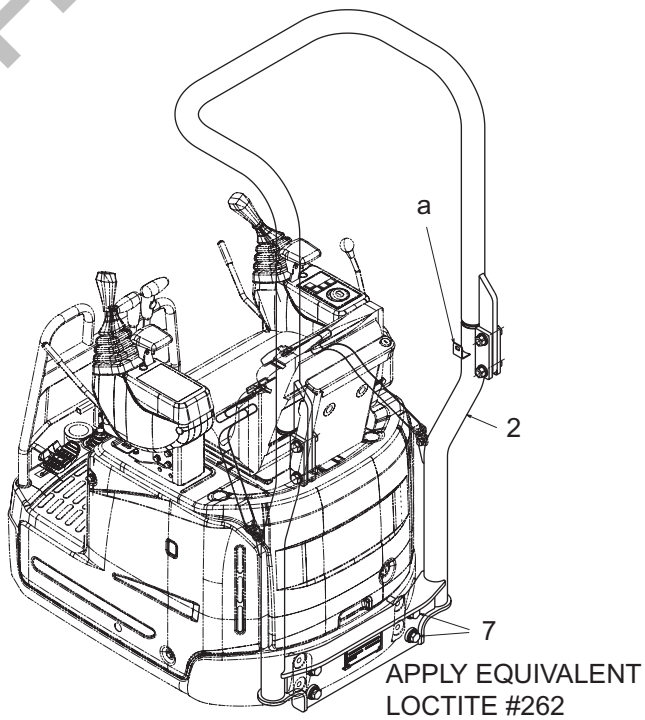
Canopy weight: 46kg (101 lbs)

(4) Install the canopy in reverse order of the removal.

Tighten the capscrews at the torque specified below:

M12: T= 80 N-m (59 lbf-ft)

M16: T= 191 N-m (141 lbf-ft)



Removal of canopy assembly

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

43.1 TROUBLE DIAGNOSIS : ELECTRICAL

Classification	Group No.			Electrical equipment			Solenoid			Switch			Relay					Others
				Hour meter	Current limiter	Working light	1st/2nd travel speed solenoid	Lever lock solenoid	Engine stop solenoid	Horn switch	1st/2nd travel speed switch	Lever lock limit switch	Engine stop solenoid relay	Charging indicator relay	Safety relay	Timer unit	1st/2nd travel speed relay	Fuse, wire breakage, short circuit and coming off
General	1	(1)	Engine not start						○				○		○	○		○
		(2)	Horn not sound							○								○
		(3)	Working light not lighted			○												○
		(4)	Hour meter not work	○	○									○				○
Attachment operation	2	(1)	Incapable of all operation					○				○						○
Travel operation	3	(1)	Travel lock incapable of being released					○				○						○
		(2)	Incapable of shifting 1st / 2nd travel speed				○				○						○	○

Note ; indication of Wire Color in the following pages to be.

XXX / YYY ; XXX shows base color of wire.

YYY shows narrow line color of wire.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

2.10 ENGINE SPECIFICATIONS

2.10.1 SPECIFICATIONS

ITEM / Model		E10SR	
Engine model		2TNV70-WYB	
Type		Water-cooled, 4 cycle 2 cylinder diesel engine	
No. of cylinder-Bore X Stroke		2 - 70mm (2.76 in) X 74mm (2.91 in)	
Total displacement		0.569 L (34.7 cu-in)	
Compression ratio		23.4	
Rated output		Net 5.9kw (8.0 PS) / 2000min^{-1} (ISO 9249) Net 6.1kw (8.3 PS) / 2000min^{-1} (ISO 14396)	
Maximum torque		Net 31.2N-m (23.0 lbf-ft) / 1500min^{-1} (ISO 9249) Net 31.7N-m (23.4 lbf-ft) / 1500min^{-1} (ISO 14396)	
Low idling		1350±25 min^{-1}	
High idling		2160±25 min^{-1}	
Fuel consumption ratio		267±7 g/kw·h (196±5 g/PS·h)	
Allowable tilting angles		Back and forth, Left and right 25° (momentary 30°)	
Rotating direction		Counterclockwise as seen from flywheel side	
Firing order		1-2-1	
Fuel injection timing (FID,b.T.D.C)		15±1°	
Fuel injection pressure		12.3 to 13.3 MPa (1780 to 1925 psi)	
Valve action		Open	Close
	Intake valve	b.T.D.C 12±5°	a.B.D.C 40±5°
	Exhaust valve	b.T.D.C 40±5°	a.B.D.C 12±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		3.43±0.1Mpa (497±15psi) at 250min^{-1}	
Lubrication oil pressure		0.335 to 0.35 MPa (48.3 to 50.5 psi) at 2000min^{-1}	
Dimension (L X W X H)		417 mm X 434 mm X 503 mm (16.4 X 17.1 X 19.8 in)	
Dry weight		84 to 89 kg (185 to 196 lbs)	
Governor		Mechanical centrifugal governor (all speed type)	
Lubrication system		Forced lubrication with trochoid pump	
Cooling system		Liquid cooling / Radiator	
Starter capacity		12V X 1.0kw	
Generator capacity		12V X 20A	
Cooling water capacity : Engine only		0.9L (0.24gal)	
Engine oil volume : High / Low / other		1.8 / 1.2 / 0.3 (0.48 / 0.32 / 0.08gal)	

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

INDEX

E10SR

Mini Excavators

	Title	Index No.
SPECIFICATIONS	OUTLINE	1
	SPECIFICATIONS	2
	ATTACHMENT DIMENSIONS	3
MAINTENANCE	TOOLS	11
	STANDARD MAINTENANCE TIME SCHEDULE	12
	MAINTENANCE STANDARD AND TEST PROCEDURE	13
SYSTEM		
	HYDRAULIC SYSTEM	22
	ELECTRIC SYSTEM	23
	COMPONENTS SYSTEM	24
DISASSEMBLING		
	ATTACHMENT	32
	UPPER SLEWING STRUCTURE	33
	TRAVEL SYSTEM	34
TROUBLESHOOTING		
	HYDRAULIC SYSTEM	42
	ELECTRICAL SYSTEM	43
	ENGINE SYSTEM	44
E/G	ENGINE	51
	APPLICABLE MACHINES **PA03-05001~**	

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

TO PREVENT ACCIDENTS

Most of the accidents and injuries occurring in the factory, at home or on the road are caused by the failure to follow simple and fundamental safety rules or precautions. For this reason, MOST ACCIDENTS CAN BE PREVENTED by recognizing the real cause and taking the necessary precautions before the accident occurs.

With any type of machine, although well designed and constructed, it is not possible to absolutely exclude any possibility of accidents.

A careful and cautious operator and/or technician is the best insurance against accidents. The scrupulous observance of this one simple rule would prevent many thousands of serious injuries each year.

This rule is: never attempt to clean, lubricate or service a machine with the engine running.

⚠ WARNING

Before carrying out any maintenance, adjustment or repair operation on machines equipped with attachments, controlled hydraulically or mechanically, make sure that the attachment is lowered and safely set on the ground. If it is necessary to have the attachment partially or fully raised to gain access to certain items, make sure the attachment is suitably supported by means other than the hydraulic lifting cylinders, the cables and/or the mechanical devices used for controlling the attachment.

CNH S.p.A.

Viale delle Nazioni, 55
41100 MODENA - Italy

All rights reserved.
Reproduction of text or illustrations, in whole or in part, is strictly prohibited.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

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 our Distributor for a replacement.
If you have any questions, please consult an authorized our 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 word of "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 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.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

33.1.12 PUMP

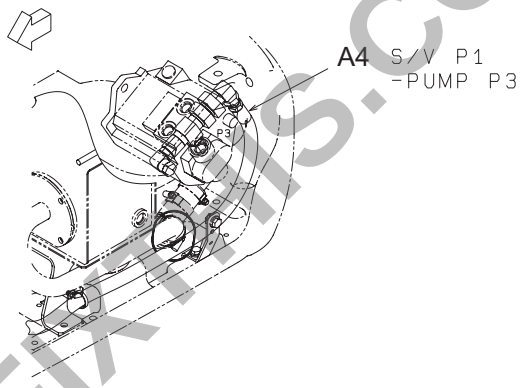
33.1.12.1 REMOVAL PREPARATION

(1) Remove the fuel tank (See item 33.1.10).
(2) Depressurize the tank and drain the hydraulic oil (See item 11).

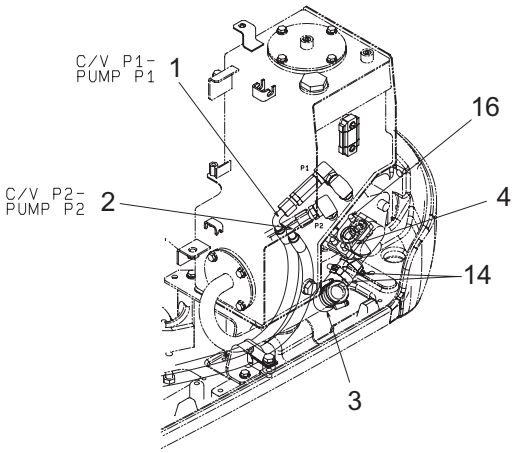
33.1.12.2 REMOVAL

(1) Disconnecting the hoses and fittings connected to the pump
-Attach a tag to hoses to identify.

a. Disconnect the pilot discharge oil hose (A4).
Tools: Spanner: 22mm
b. Remove the clip (14) and the suction hose (3).
Tools: Minus screw driver
c. Remove four M10X25 capscrew (16) and the suction tube (4).
Tools: Socket: 17mm
d. Disconnect the main pup discharge oil hoses (1) and (2).
Tools: Spanner: 22mm

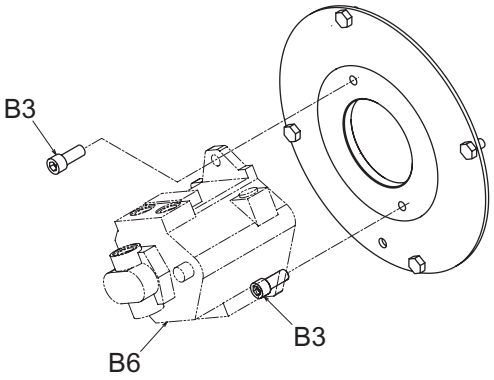


Pilot hydraulic assembly



Main pump hose removal

(5) Remove two M12X15 capscrews (B3).
Tools: Allen wrench: 10mm
-Special tool approx. 30mm (1.2 inch) long with face to face 10mm.
(6) Remove the pump (B6).
Weight : Approx. 10kg (22 lbs)



Pump Removal

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Precautions and concerns regarding the use of bio-fuels:

1. Free methanol in FAME may result in corrosion of aluminum and zinc FIE components.
2. Free water in FAME may result in plugging of fuel filters and increased bacterial growth.
3. High viscosity at low temperatures may result in fuel delivery problems, injection pump seizures, and poor injection nozzle spray atomization.
4. FAME may have adverse effects on some elastomers (seal materials) and may result in fuel leakage and dilution of the engine lubricating oil.
5. Even bio-diesel fuels that comply with a suitable standard as delivered, will require additional care and attention to maintain the quality of the fuel in the equipment or other fuel tanks. It is important to maintain a supply of clean, fresh fuel. Regular flushing of the fuel system, and / or fuel storage containers, may be necessary.
6. The use of bio-diesel fuels that do not comply with the standards as agreed to by the diesel engine manufacturers and the diesel fuel injection equipment manufacturers, or bio-diesel fuels that have degraded as per the precautions and concerns above, may affect the warranty coverage of your engine. *See Yanmar Limited Warranty on page 2-3.*

Filling the Fuel Tank

⚠ DANGER



FIRE AND EXPLOSION HAZARD!

- **Diesel fuel is flammable and explosive under certain conditions.**
- **Only fill the fuel tank with diesel fuel. Filling the fuel tank with gasoline may result in a fire and will damage the engine.**
- **NEVER refuel with the engine running.**
- **Wipe up all spills immediately.**
- **Keep sparks, open flames or any other form of ignition (match, cigarette, static electric source) well away when refueling.**
- **NEVER overfill the fuel tank.**
- **Fill the fuel tank. Store any containers containing fuel in a well-ventilated area, away from any combustibles or sources of ignition.**
- **Failure to comply will result in death or serious injury.**

0000005en

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 674 pages

The full manual includes:

- All 674 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

New Holland E10SR Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual