YANMAR

TECHNICAL MANUAL

DIESEL TRACTOR

EF-494T

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SYMBOL INDICATION

1 Safety-alert Symbol

This is the safety-alert symbol. When you see this symbol on your tractor or in this manual, personal injury is possible or even likely if you do not follow the advice given. Read the messages that follow carefully.



2 Signal Words

The signal words "DANGER" "WARNING" "CAUTION" are used with the safety-alert symbol.

(1) "DANGER" indicates the extreme hazard that would result in high probability of irreparable injury if proper precautions are not taken.



(2) "WARNING" indicates the hazard that would result in injury if proper precautions are not taken.

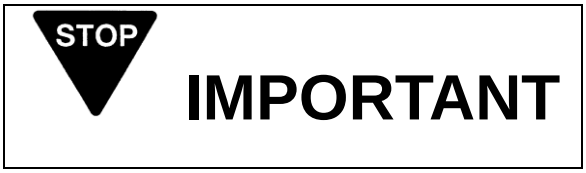


(3) "CAUTION" indicates the general precautions.



3 Service Instructions

(1) This stop symbol indicates an important message about proper operation or service. When you see this symbol, read the message that follows carefully.

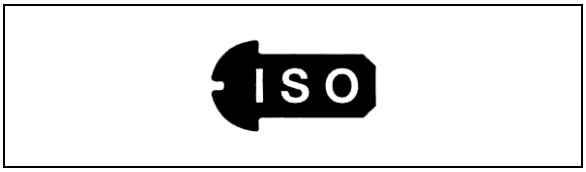


(2) NOTE describes precautions to take while working.



4 Measurements

This tractor is based on metric measurements. All hardware is therefore metric (ISO). Make sure to use the specified metric hardware when service is necessary.



5 Direction

The right and left sides of the tractor are determined by facing in the same direction as the tractor moves when going forward.



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0.3.3 SCREW TIGHTENING TORQUE TABLE

Tighten screws, bolts and nuts according to the table below. If the tightening torque is specified, follow the specification.

General tightening torque Unit: N-m (kgf-m)

Items	Thread diameter	Tightening torque
PT plug	1/8	9.8 (1.0)
	1/4	19.6 (2.0)
	3/8	29.4 (3.0)
	1/2	58.8 (6.0)
Pipe joint bolt	M8	13.0 - 16.4 (1.3 - 1.7)
	M12	24.5 - 34.3 (2.5 - 3.5)
	M14	39.2 - 49.0 (4.0 - 5.0)
	M16	49.0 - 58.8 (5.0 - 6.0)

General tightening torque of bolts N-m (kgf-m)

	Standard thread screw	
Nominal size	4T	7T
M6	4.90 - 6.86 (0.5 - 0.7)	8 - 12 (0.8 - 1.2)
M8	12.74 - 16.66 (1.3 - 1.7)	23 - 29 (2.3 - 3.0)
M10	24.50 - 34.36 (2.5 - 3.5)	44 - 59 (4.5 - 6.0)
M12	44.10 - 58.80 (4.5 - 6.0)	78 - 98 (8.0 - 10.0)
M14	68.80 - 83.30 (7.0 - 8.5)	118 - 147 (12.0 - 15.0)
M16	107.80 - 137.20 (11.0 - 14.0)	167 - 206 (17.0 - 21.0)
M18	156.80 - 186.20 (16.0 - 19.0)	235 - 284 (24.0 - 29.0)
M20	215.60 - 264.60 (22.0 - 27.0)	324 - 402 (33.0 - 41.0)

IMPORTANT

- **The tightening torque of fine thread screws shall be 80% of that of the standard thread screws.**
- **To tighten any aluminum part, apply torque equivalent to 80% of the specified value.**
- **Recently, all the bolts may be standardized to 7T bolts under the plant line management of Yanmar.**
- **When 7T bolt is used with rubber, rubber packing or aluminum parts, tighten the bolt following the values in the 4T-bolt table.**

Bolt standard

		4T	7T
Tensile Strength (kgf/sq.mm)	Minimum	40	70
Brinell Hardness (Hb)	Minimum	105	201
	Maximum	229	277
Yield Point (kgf/sq.mm)	Minimum	23	50

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9.1.2 Hydraulic cylinder case

No.	Parts
1	Piston
2	Sleeve
3	Packing
4	Piston rod
5	Lift crank
6	Lifting shaft
7	Sleeve (Lifting shaft)
8	Washer 65x82x2
9	Lift arm
10	O-ring 1A G 65.0
11	Spline shaft seal
12	Seal plate
13	Packing
14	Plug 3/4-16UNF
15	Plug NPTF 1/4
16	Packing 19
17	Filter adapter
18	Filter adapter

Relief valve

No.	Parts
18	Relief valve CMP
19	Spring (Relief valve)
20	O-ring 2.5 x 23
21	Plug (Relief valve)
22	Packing 20x27.8x2
23	Shim set

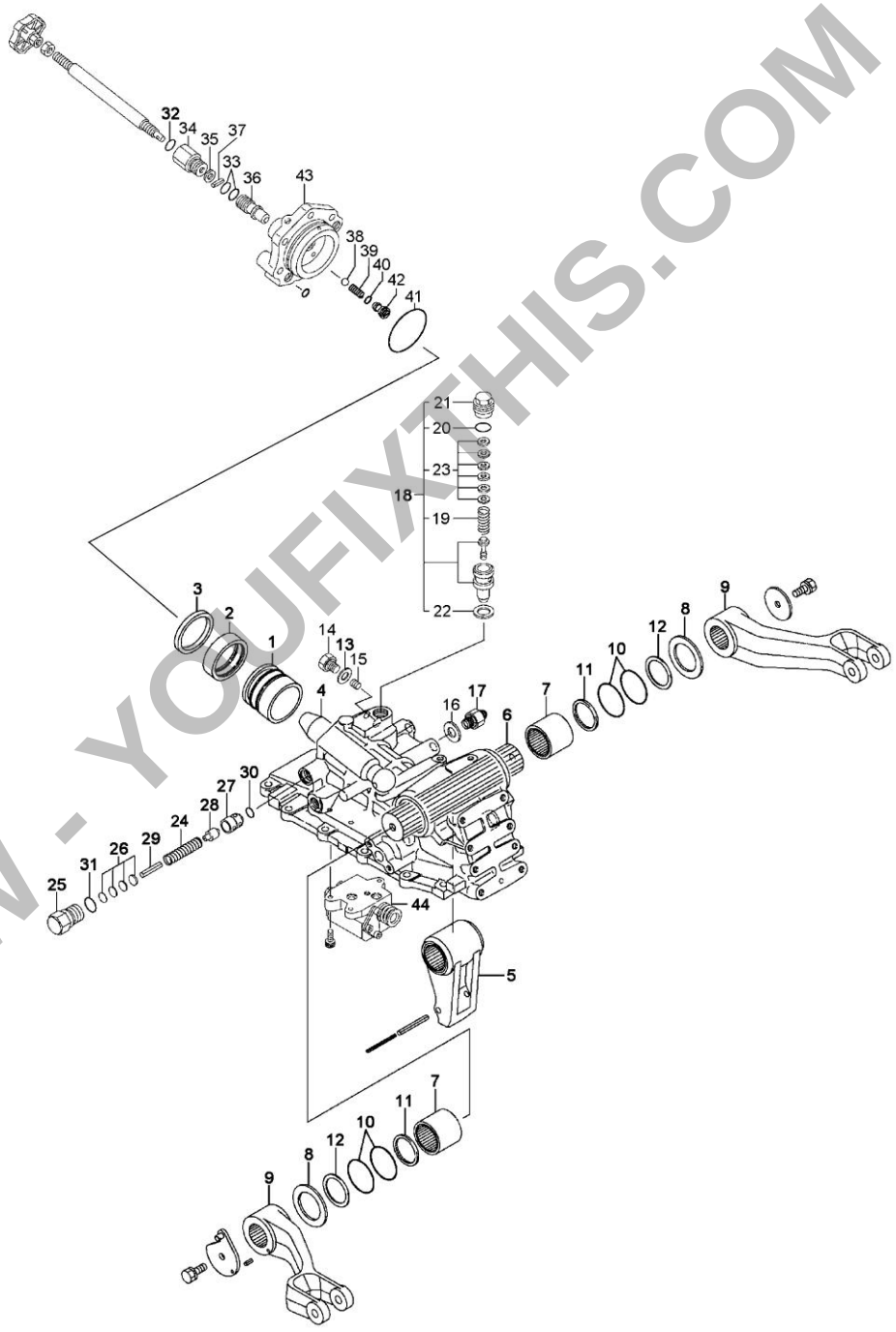
Safety valve

No.	Parts
24	Spring (Relief valve)
25	Plug (Safety valve)
26	Shim pack
27	Seat (Safety valve)
28	Poppet
29	Spring pin 6x30
30	O-ring 1A P 12.0
31	O-ring 1A P 18.0

Cylinder head

No.	Parts
32	O-ring 1A P 12.0
33	O-ring 1A P 11.0
34	Valve holder
35	Washer
36	Stop valve
37	Spring pin 4x12
38	Steel ball 12/32
39	Spring
40	O-ring 1 B P 12.0
41	O-ring 1 B G 80.0
42	Plug
43	Cylinder head

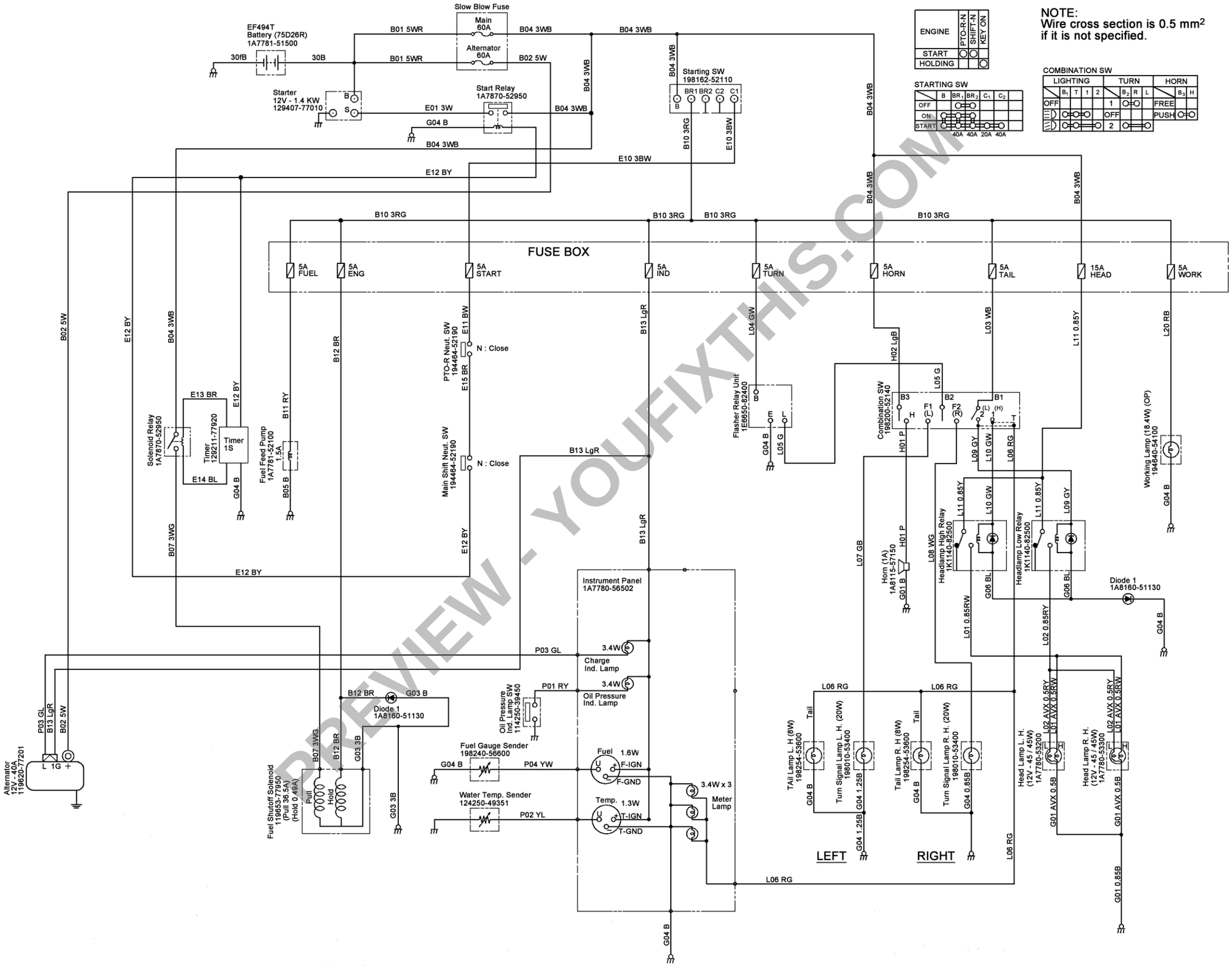
44	Control valve



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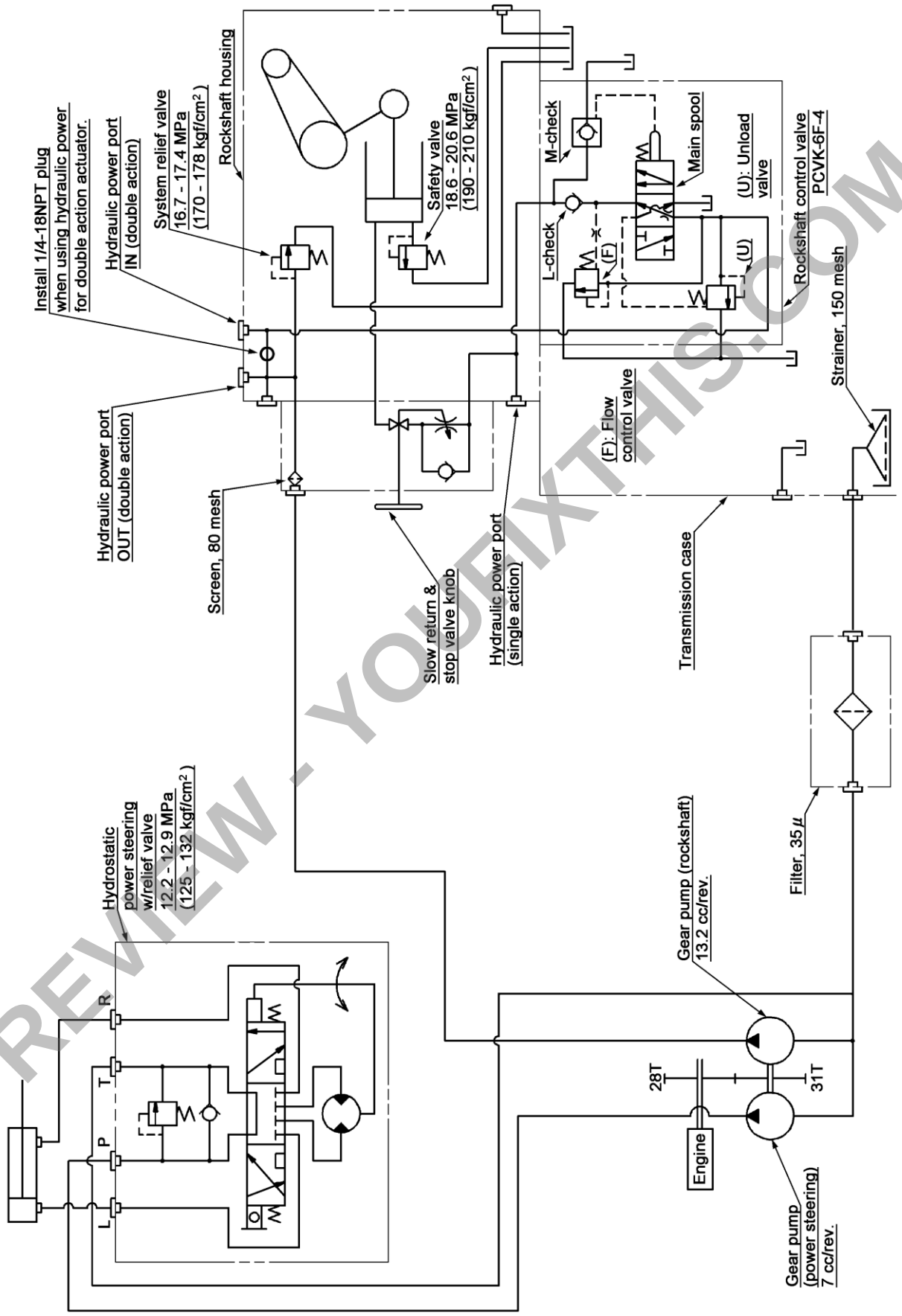
11.2.3 ELECTRICAL WIRING DIAGRAM



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11.1 HYDRAULIC CIRCUIT DIAGRAM

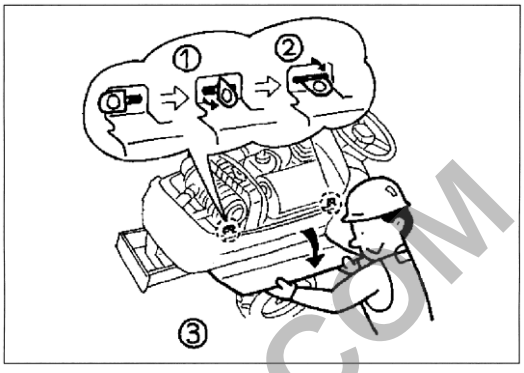


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2.1 REMOVING THE ENGINE BONNET COVER

2.1.1 Removing/mounting the side covers



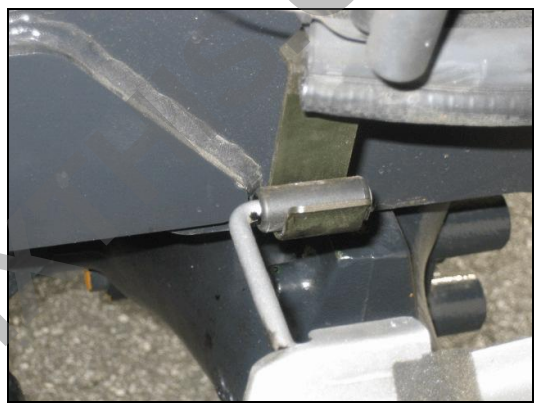
<Removing>

(1) Open the bonnet.

(2) Put the locking knobs in the vertical position (each forward and rear).

(3) Remove the side covers.

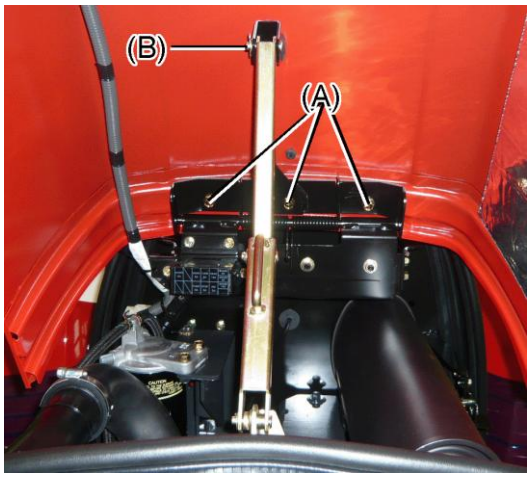
<Mounting>



(1) Clamp the cover lower hooks (x 2).

(2) Fix the cover top with the locking knob.

2.1.2 Removing the engine bonnet cover



Remove the 3 bolts (A) and the pin (B), and remove the engine bonnet cover.

CAUTION
This work should be done by 2 people. If you work alone, you may be injured.

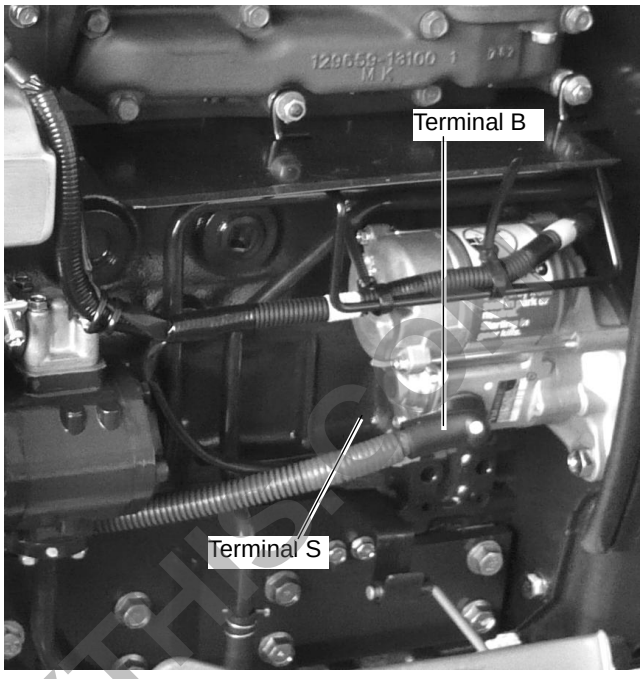
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10.1.3 Checkpoints of electrical equipment

3. Starter motor

Starter (129407-77010)



Continuity test of single item

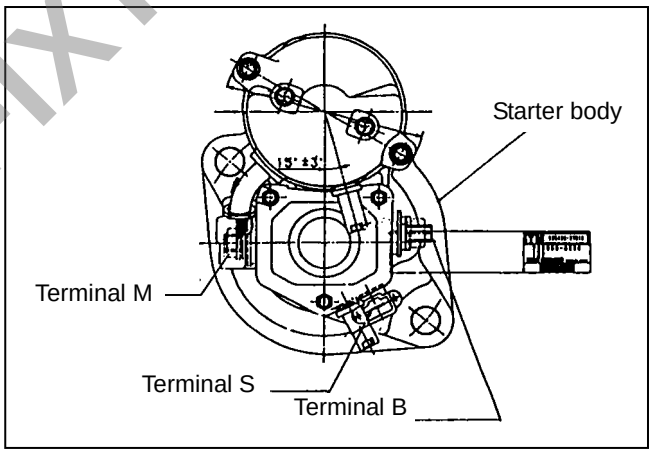
Range	Measuring point		Status	Result
	Tester probe +	Tester probe –		
Continuity	Starter body	Terminal S		Continuity
	Terminal M	Terminal S		Continuity
	Terminal M	Terminal B	The pinion is drawn out.	Continuity

Measurement of voltage at harness of machine

Range	Measuring point		Status	Result
	Tester probe +	Tester probe –		
DCV	Terminal B	Chassis grounding		Approx. 12 V
	Terminal S	Chassis grounding	Reverser (N) PTO (N)	Approx. 12 V

[Reference] Direct connection test (Single item check)

Battery – terminal	Battery + terminal	Result
Starter body	Connect to terminal M	The motor runs.
Starter body	Connect to terminal S	The pinion is drawn out
Starter body	Connect to terminal B	None
Starter body	Connect to terminals B and S	The pinion is drawn out and the motor runs.

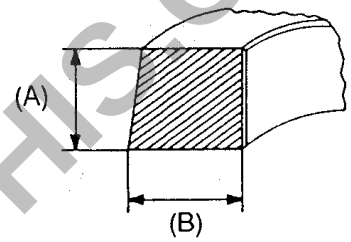


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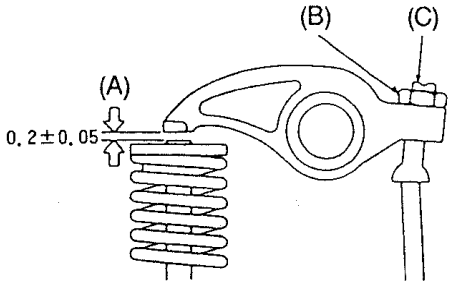
Unit: mm

Parts		4TNV88	
		Criteria	Limit
Top ring	Groove width	2.060-2.075	—
	Dimension B	1.970-1.990	1.950
	Min gap between groove and ring	0.070-0.105	—
	Opening	0.200-0.400	0.490
Second ring	Groove width	2.025-2.040	2.140
	Dimension B	1.970-1.990	0.195
	Min gap between groove and ring	0.035-0.070	0.190
	Opening	0.200-0.400	0.490
Oil ring	Groove width	4.015-4.030	4.130
	Dimension B	3.970-3.990	3.950
	Min gap between groove and ring	0.025-0.060	0.180
	Opening	0.200-0.400	0.490



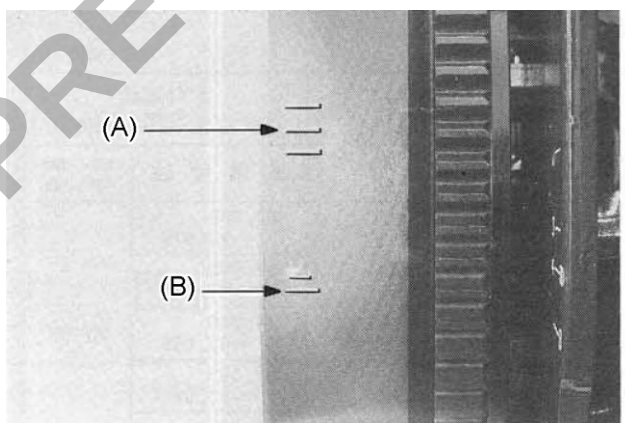
(A) Dimension B (width)
(B) Thickness

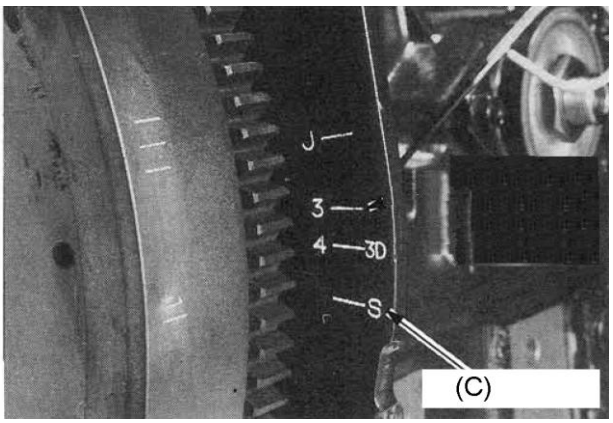
Piston and piston ring table, oversize (0.25 mm)

Model	Piston assembly code	Piston assembly code	Valve clearance
4TNV88	129005-22700	129005-22900	

(A) Valve clearance
(B) Lock nut
(C) Adjusting screw

Injection timing marks





(A) Injection timing gauge (B) Cylinder Top Dead Center (TDC) (C) Alignment point

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3.5 ADJUSTMENT SPECIFICATIONS

3.5.1 Engine adjustments

No.	Inspection item			Standard	Limit
1	Intake/exhaust valve clearance (mm)			0.15 to 0.25	—
2	Tension of V-belt at 98 N (10 kgf) (mm)	Between alternator and crank pulley	For used product	10 to 14	—
			For new product	8 to 12	—
3	Fuel valve injection pressure MPa (kgf/cm^2)			21.57 to 22.55 (220 to 230)	—
4	Compression pressure MPa (kgf/cm^2)			3.43 (35)±0.1 (1)	2.75 (28)±0.1 (1)
5	Cooling water quantity (L)			2.4 (Sub tank 0.45)	—
6	Lubricating oil quantity (in oil pan) (L)			5.3	2.4
7	Lubricating oil pressure MPa (kgf/cm^2)			At rated speed : 0.29 (3.0) to 0.39 (4.0)	At idling speed : 0.06 (0.6)minimum
8	Hydraulic switch actuating pressure MPa (kgf/cm^2)			50±10 (0.5±0.1)	—
9	Thermostat			Temperature at which the valve is opened (°C)	Lift to fully open the valve (mm) (temperature)
				85	8 minimum (95°C)

3.5.2 Cylinder head

No.	Inspection item			Standard	Limit
1	Distortion of combustion surface (mm)			0.05 maximum	0.15
2	Valve recession (mm)		Intake	0.30 to 0.50	0.8
			Exhaust	0.36 to 0.56	0.8
3	Valve seat	Seat angle (degrees)	Intake	120	—
			Exhaust	90	—
		Seat correction angle (degrees) *See the engine service manual.		40、150	—

3.5.3 Intake/exhaust valve and guide

No.	Inspection item		Standard	Limit
1	Intake valve	Guide I.D. (mm)	8.010 to 8.250	8.10
		Stem O.D. (mm)	7.955 to 7.975	7.90
		Clearance (mm)	0.035 to 0.070	0.18
	Exhaust valve	Guide I.D. (mm)	80.15 to 8.030	8.10
		Stem O.D. (mm)	7.955 to 7.960	7.90
		Clearance (mm)	0.045 to 0.075	0.18
2	Valve guide projection from cylinder head (mm)		14.7 to 15.0	
3	Valve guide installation method		Expansion fit	—

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