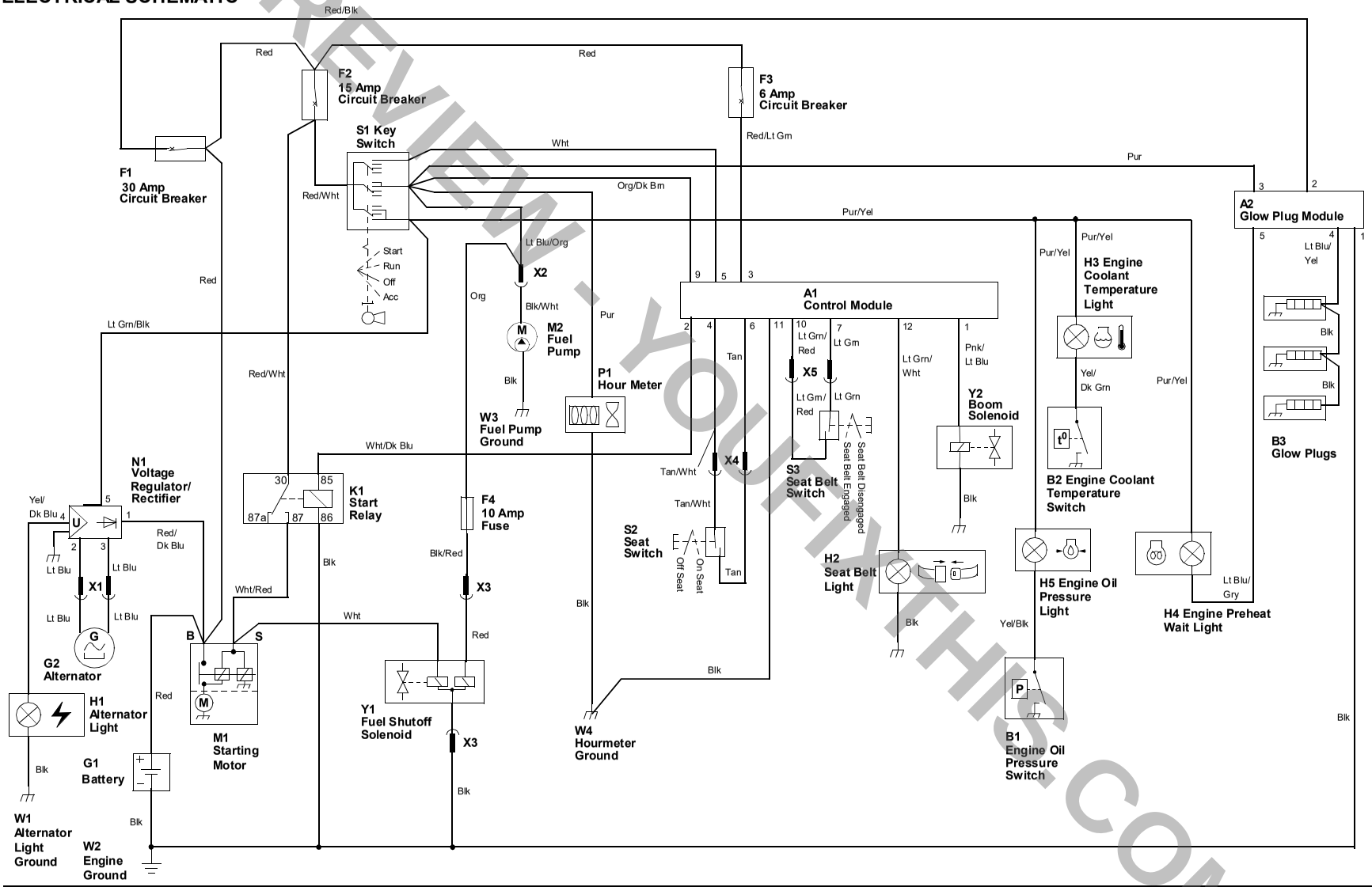
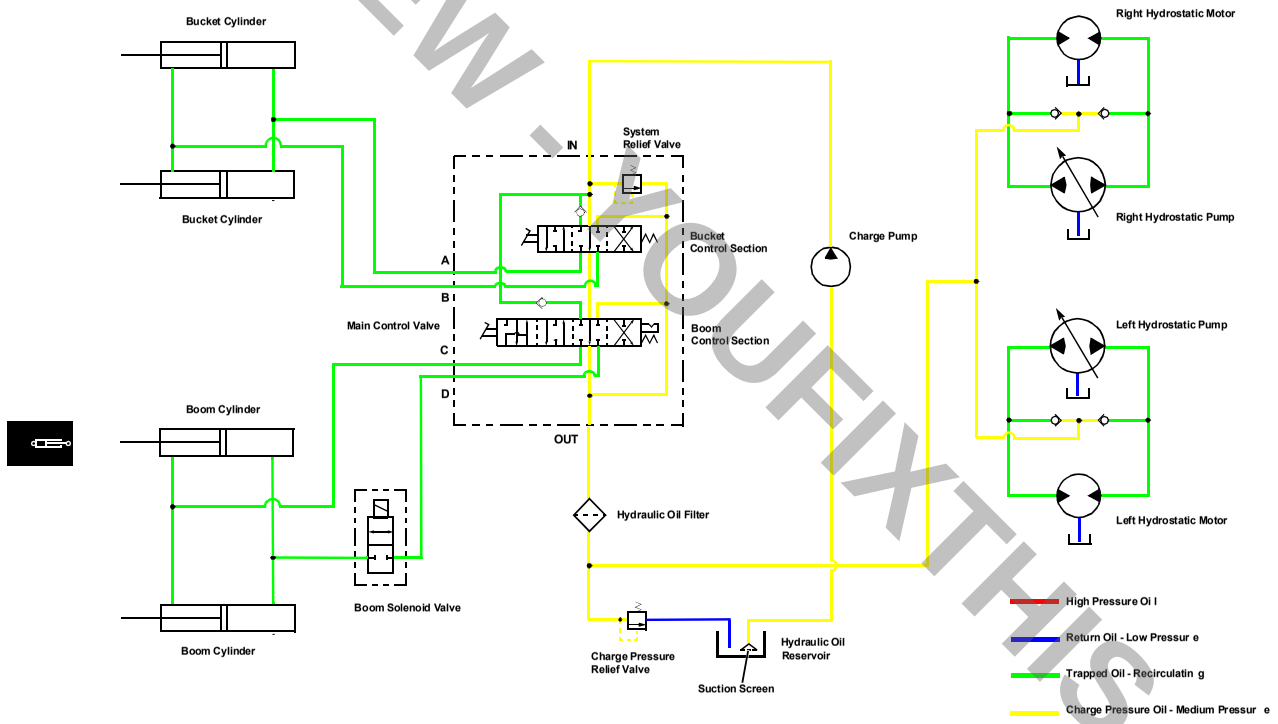
ELECTRICAL SCHEMATIC



SE1-Power and Charging Circuit	SE2-Cranking and Fuel Shutoff Solenoid Circuit	SE3-Fuel Pump and Hourmeter Circuit	SE4-Control Module and Indicator Lights Circuit	SE5-Glow Plug Circuit

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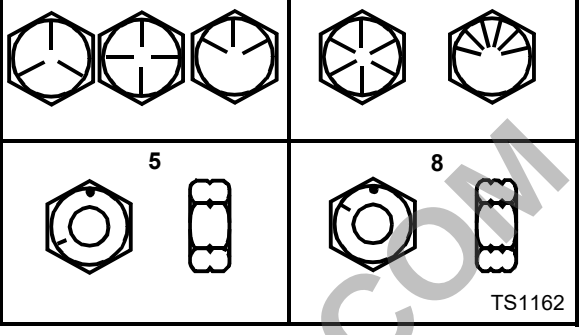
HYDRAULIC SYSTEM SCHEMATI C



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UNIFIED INCH TORQUE VALUES

SAE Grade and Head Markings	No Marks	1 or 2[b]	5 5.1 5.2	8 8.2
SAE Grade and Nut Markings	No Marks	2	5	8



	Grade 1				Grade 2[b]				Grade 5, 5.1 or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
SIZE	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	470	300	510	375	470	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head.

Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication[b]

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

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TESTS AND ADJUSTMENTS

CYLINDER COMPRESSION PRESSURE TEST

Reason:

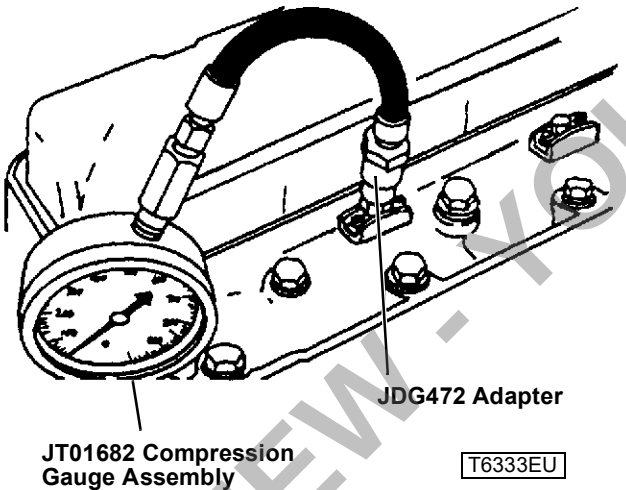
To determine the condition of the pistons, rings, cylinder walls and valves.

Equipment:

- JT01682 Compression Gauge Assembly
- JDG472 Adapter

Procedure:

1. Run engine for 5 minutes to bring to operating temperature. Shut off engine.
2. Remove injection nozzles.



3. Install heat protector from end of injector and install on JDG472 adapter.
4. Install JT01682 Compression Gauge Assembly and JDG472 Adapter in injection port.
5. Disconnect fuel shut-off solenoid connector.

IMPORTANT: DO NOT overheat starter motor during test.

6. Crank engine for three seconds with starter.
7. Record pressure reading for each cylinder.

Specifications:

Compression Pressure . . . . . 2448 kPa (355 psi)

Maximum difference between cylinders . . . . . 490 kPa (71 psi)

Minimum cranking speed . . . . . 250 rpm

NOTE: Pressure listed is for 300m (1000 ft) above sea level. For naturally aspirated engines, reduce specification an additional 4% for each 300m (1000 ft) of altitude.

Results:

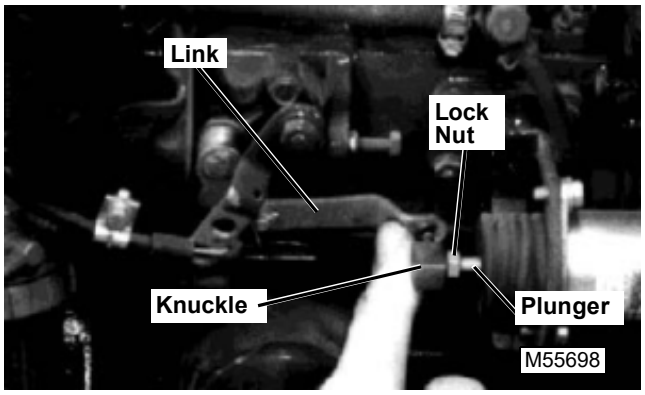
- If pressure reading is below specification, squirt clean engine oil into cylinders through injector ports and repeat test.
- If pressure increases significantly, check piston, rings, and cylinder walls for wear or damage.
- If pressure does not increase significantly after retest, check for leaking valves, valve seats or cylinder head gasket.

FUEL SHUTOFF SOLENOID ADJUSTMENT

Reason:

To ensure that fuel shutoff solenoid retracts fully, moving the injection pump shutoff control lever far enough to allow full rack travel.

Procedure:



1. Loosen lock nut.
2. Disconnect link from solenoid.
3. Hold solenoid plunger bottomed in solenoid body.
4. Move link toward solenoid until it stops.
5. Turn plunger rod in or out of knuckle until knuckle and link holes line up. Turn out two additional turns. The additional turns insure that the solenoid bottoms out before the linkage.
6. Assemble and check for free movement when key switch is turned ON. Also check that linkage returns completely to the STOP position when key switch is turned OFF.

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TROUBLESHOOTING

Problem or Symptom / Check or Solution	Engine will not start	Engine starts but does not continue to run	Low engine output	Exhaust smoke white when under load	Exhaust smoke black when under load	Engine surges at idle	Engine surges under load	High fuel consumption	High oil consumption	Coolant in oil/oil in coolant	Fuel in oil	Low oil pressure	Air intake pressure drop	Air intake pressure rise
Improper intake/exhaust valve clearance	●	●	●											●
Intake/exhaust valve leaking			●		●			●						●
Intake/exhaust valve seized	●	●	●		●		●				●			
Cylinder head gasket leaking			●							●				
Broken or seized piston ring	●	●		●		●			●		●			●
Piston ring, piston or cylinder worn	●	●		●					●		●			
Crankshaft pin or bearing seized	●	●				●	●							
Ring gaps not positioned properly		●	●						●					
Improper piston ring placement			●	●					●					
Crankshaft pin or bearing worn						●	●					●		
Connecting rod bolt loose												●		
Foreign matter trapped in combustion chamber	●								●					
Excessive timing gear backlash						●	●							
Intake/exhaust valve guide worn			●						●					
Governor not functioning properly		●				●	●							
Improper injection timing, intake/ exhaust valves	●		●	●	●									
Engine running too cool				●				●						
Engine running too hot			●											
Coolant level low			●											
Cracked water jacket										●				
Fan belt loose			●											

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GENERAL VEHICLE SPECIFICATIONS

ENGINE

Make and model	John Deere/Yanmar 3TN66
Cooling system	Water Cooled
Fuel	Diesel
Cylinders	3
Horsepower at governed rpm	17 hp @ 3400 rpm (12.7 kW)
Bore	2.6 in. (66 mm)
Stroke	2.53 in. (64.2 mm)
Displacement	41.8 cu in (.658 L)
Fast idle	3600-3670 rpm
Slow idle	1400-1500 rpm
Intake valve clearance (cold)	0.2 mm (0.008 in.)
Exhaust valve clearance (cold)	0.2 mm (0.008 in.)
Gradability (maximum angle for engine operation on intermittent basis	45° all directions
Fuel tank capacity	6 U.S. gal. (22.7 L)
Crankcase capacity	2.5 qt. (2.4 L)
Cooling capacity	4.6 qt. (4.4 L)

ELECTRICAL SYSTEM

Alternator	20 amp
Battery cold capacity amps at 0°F (-18°C)	390 amps
Battery	BCI-71, 12 V
Regulator	Solid state

TRANSMISSION

Type	Hydrostatic
Manufacturer	
—Pumps	Sundstrand
—Motors	Nichols 130 Series
Pump type	Axial piston, variable swash plate
Motor type	Geroller motor
Filter	10 micron (no by-pass)
Capacity	9 U.S. gal (34 L)

TRAVEL SPEED

(Forward/Backward)	0 to 5.8 m.p.h. (0 to 9.3 km/h)

HYDRAULIC SYSTEM

Pump type	Gear
Pump manufacturer	Parker
Output (at governed rpm	8 gpm (30.2 L/min)
Displacement	13 cm^3 (.512 cu in)
Main system relief pressure	1600 psi (11,032 kPa)
Suction screen	100 mesh
Filter (return side no by-pass	10 micron
Hydraulic fluid	JD HY-GARD™ or equivalent SAE J20C oil
Hydraulic system	34 L (9 gal)

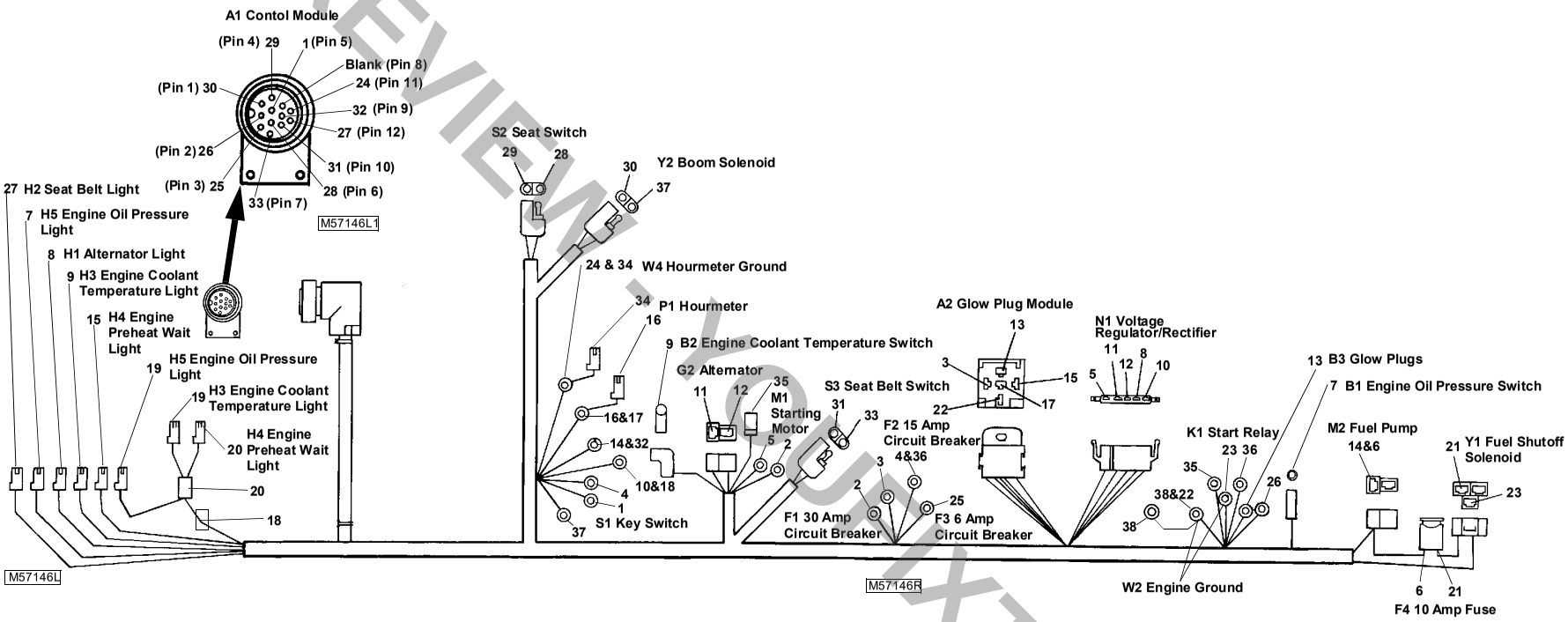
PERFORMANCE RATING

Operating load, SAE (per SAE J818)	675 lb (306 kg)
Tipping load, SAE	1365 lb (619 kg)
Breakout force, (bucket) SAE IEMC	1409 lb (619 kg)
Operating weight, SAE	2200 lb (998 kg)

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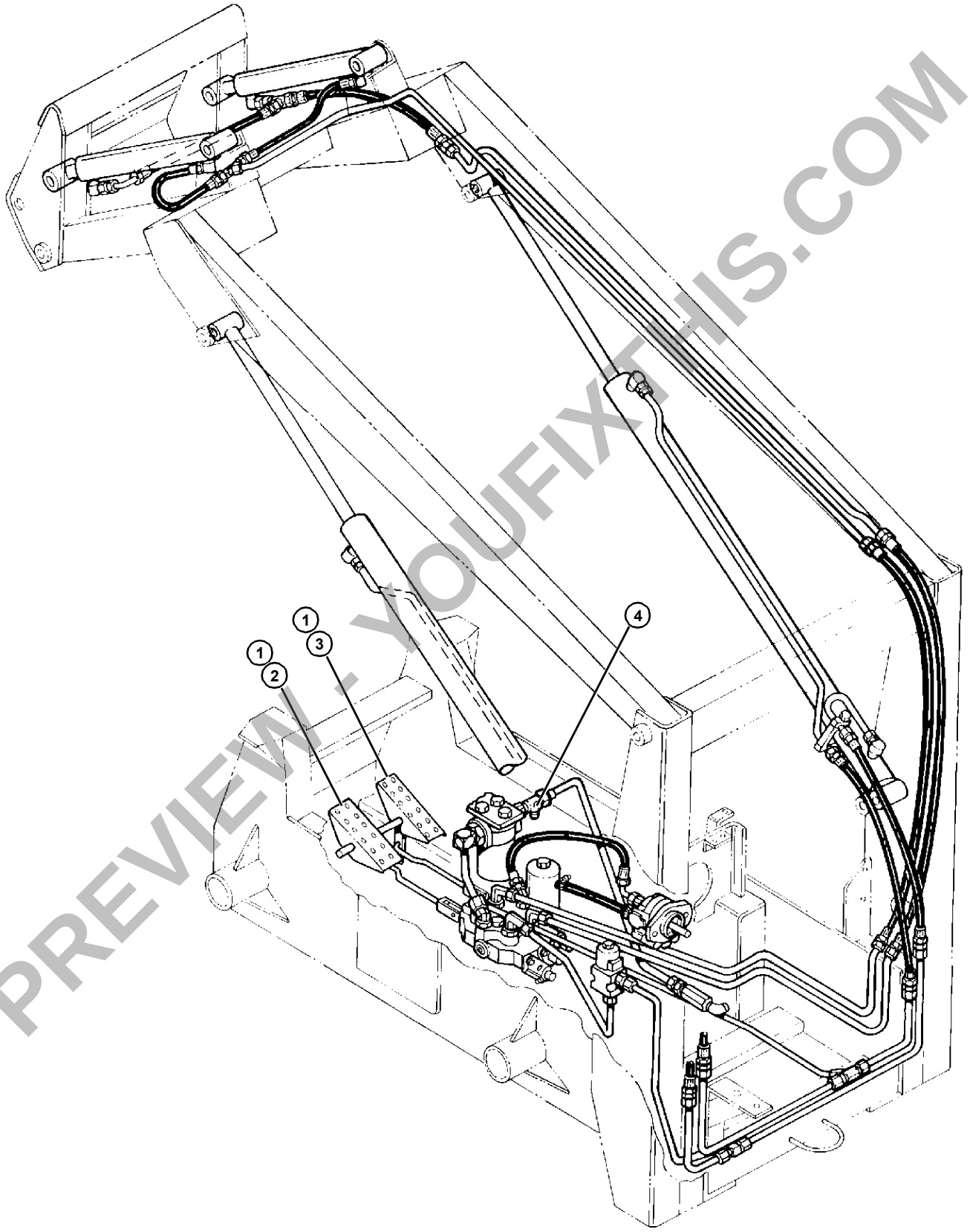
WIRING HARNESS



Number	Gage	Color	Number	Gage	Color	Number	Gage	Color
1	16	Wht	14	16	Lt Blu/Org	27	18	Lt Grn/Wht
2	8	Red	15	16	Lt Blu/Gry	28	16	Tan
3	10	Red/Blk	16	16	Pur	29	16	Tan/Wht
4	14	Red/Wht	17	16	Pur	30	16	Pnk/Lt Blu
5	12	Red/Dk Blu	18	16	Pur/Yel	31	18	Lt Grn/Red
6	16	Org	19	16	Pur/Yel	32	16	Org/Dk Brn
7	16	Yel/Blk	20	16	Pur/Yel	33	18	Lt Grn
8	16	Yel/Dk Blu	21	16	Blk/Red	34	18	Blk
9	16	Yel/Dk Grn	22	16	Blk	35	14	Wht/Red
10	16	Lt Grn/Blk	23	12	Blk	36	14	Red/Wht
11	14	Lt Blu/Org	24	18	Blk	37	16	Blk
12	14	Lt Blu	25	16	Red/Lt Grn	38	16	Blk
13	10	Lt Blu/Yel	26	16	Wht/Dk Blu			

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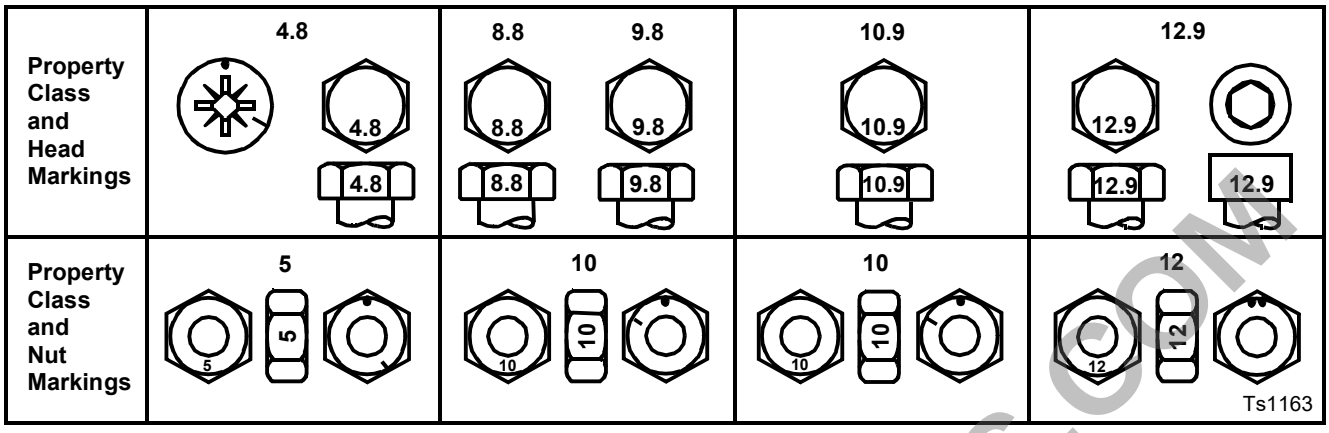
DIAGNOSIS



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METRIC TORQUE VALUES



	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
SIZE	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft
M6	48	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	109
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

[b] *Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.*

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SLOW IDLE ADJUSTMENT

Reason:

To achieve proper slow idle rpm setting. Provides adequate rpm to keep engine running smoothly without stalling.

Equipment:

- JT05719 Hand Held Digital Tachometer

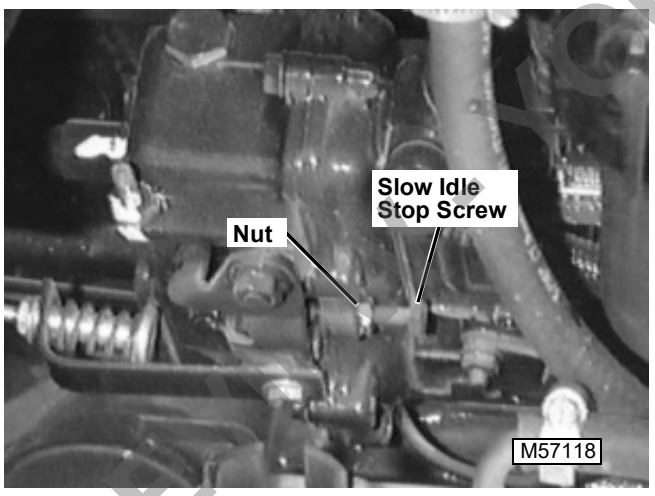
Procedure:

1. Start engine and run for 5 minutes.
2. Move throttle lever to slow idle position.
3. Use JT05719 Hand Held Digital Tachometer to check engine speed at flywheel.
4. Visually check that injection pump throttle lever is against slow idle stop screw. Check slow idle speed.

Specifications:

Slow Idle Speed . . . . . 1450 ± 50 rpm

Results:



- If slow idle rpm is not according to specifications, loosen nut and turn slow idle stop screw. After adjustment, tighten nut.

FAST IDLE ADJUSTMENT

Reason:

To achieve proper fast idle speed setting. This insures that engine is running at proper rpm for peak performance.

Equipment:

- JT05719 Hand Held Digital Tachometer

Procedure:

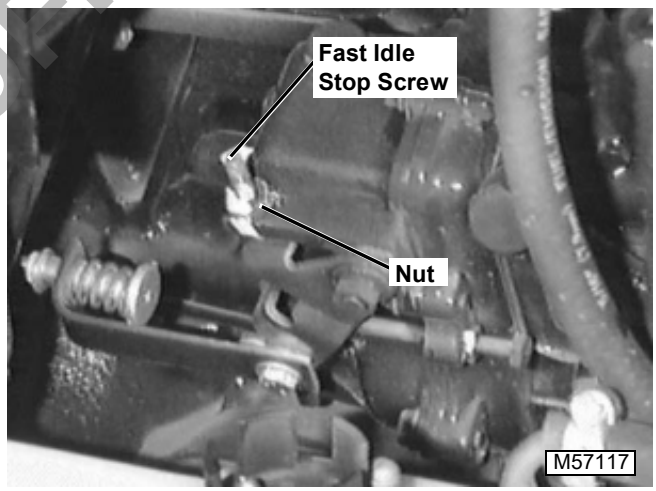
1. Start engine and run for 5 minutes.
2. Move throttle lever to fast idle position.
3. Use JT05719 Hand Held Digital Tachometer to check engine speed at flywheel.
4. Visually check injection pump throttle lever is up against fast idle stop screw. Check fast idle speed.

Specifications:

Fast Idle Speed . . . . . 3635 ± 35 rpm

Results:

NOTE: Some adjustment can be made without removing sealed wire. Attempt to make the adjustment before removing wire.



- If fast idle rpm is not according to specifications, loosen nut. Turn fast idle stop screw until fast idle speed is correct. After adjustment, tighten nut.

NOTE: Make sure air cleaner is clean and not restricted. Replace air cleaner element as necessary.

- If engine still does not meet fast idle speed specifications, have pump inspected by an diesel injection service.

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Problem or Symptom / Check or Solution	Engine will not start	Engine starts but does not continue to run	Low engine output	Exhaust smoke white when under load	Exhaust smoke black when under load	Engine surges at idle	Engine surges under load	High fuel consumption	High oil consumption	Coolant in oil/oil in coolant	Fuel in oil	Low oil pressure	Air intake pressure drop	Air intake pressure rise
Malfunctioning thermostat			●											
Improper engine oil viscosity/type	●	●	●						●			●		
Engine oil leaking									●			●		
Oil pump worn												●		
Oil filter clogged												●		
Pressure control valve worn												●		
Oil quantity low												●		
Advanced fuel injection pump timing				●	●									
Retarded fuel injection pump timing			●	●	●			●						
Wrong type of fuel			●	●	●									
Water in fuel	●	●	●	●		●	●							
Fuel filter clogged	●	●	●											
Air entering fuel system	●	●	●											
Clogged or cracked fuel line	●	●	●											
No fuel	●	●												
Fuel injection pump volume insufficient			●	●	●	●	●							
Fuel injection pump volume excessive					●			●						●
Incorrect spray pattern at fuel injection nozzle			●	●	●	●	●	●						
Air filter clogged		●	●		●								●	
High altitude/temperature operation			●		●			●					●	
Exhaust system restricted			●		●									●
Defective starter motor	●													

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Make	Yanmar
Model	3TNE66
Type	Vertical, 4-cycle Diesel
Output Power	10.4-12.7 kW (14-17 HP)
Cylinders	3
Bore	66 mm (2.6 in.)
Stroke	64.2 mm (2.53 in.)
Displacement	0.658 L (41.8 cu. in.)
Firing Order	1—3—2
Direction of Rotation	Counterclockwise (viewed from flywheel)
Combustion System	Indirect Injection Type
Compression Ratio	23 to 1
Cooling	Liquid
Governor	Centrifugal
RPM at Idle	1450 ±50
RPM at High Idle (no-load)	3625 ±25
Rated RPM	3000

REPAIR SPECIFICATIONS

Rocker Arm Cover:

Special Nut Torque	18 N•m (160 lb-in.)

Rocker Arm Assembly:

Mounting Cap Screw and Nut Torque	26 N•m (226 lb-in.)
Rocker Arm Shaft O.D.	
Standard	9.97 - 9.99 mm (0.3925 - 0.3933 in.)
Wear Limit	9.95 mm (0.3920 in.)
Rocker Arm and Shaft Support I.D.'s	
Clearance	0.14 mm (0.005 in.)
Standard	10.00 - 10.02 mm (0.3937 - 0.3945 in.)
Wear Limit	10.09 mm (0.3972 in.)
Push Rod Length	
Standard	114 - 115 mm (4.488 - 4.528 in.)
Push Rod Bend	
Wear Limit	0.08 mm (0.003 in.)

Cylinder Head and Valves:

Mounting Cap Screw Torque	
First	11 N•m (97 lb-in.)
Second	22 N•m (195 lb-in.)
Final	34 N•m (25 lb-ft)
Piston-to-Cylinder Head Clearance	0.59 - 0.74 mm (0.023 - 0.029 in.)

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