ME8003

COMPACT EXCAVATOR

SERVICE MANUAL

PART #918170

Revision A - 09/05

Mustang Manufacturing Company, Inc.

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1 Operation

1.1 Important information about this service manual

WARNING!

- Read and understand the excavator operator's manual. Follow warnings and instructions for operation and maintenance in that manual. Failure to follow instructions can result in serious injury.
- Read and understand all safety decals before operating the machine. DO NOT operate the machine unless all factory-installed guards and shields are in place.
- Be sure you are familiar with all safety devices and controls before operating the machine.
- Know how to stop the machine before starting.

This service manual contains important information about safely servicing the machine, correctly and economically. It serves as a reference for experienced users, helps to avoid potentially hazardous situations, and reduces repair costs and downtimes. Additionally, the reliability and the service life of the machine will be increased by following the instructions in this manual.

Proper and careful work is the best protection against accidents.

Operational safety and readiness of the machine depends not only upon operator skill, but also upon proper maintenance and service.

Always use Mustang original equipment service parts when performing maintenance and repair work. This ensures operational safety and readiness of the machine, and maintains its value.

1.2 Abbreviations/symbols

- This symbol stands for a list.
  - Subdivision within lists or an activity. Follow the steps in the sequence in which they appear.

☞ *This symbol requires you to perform out the activity described.*

➥ Description of the effects or results of an activity.

n. s. = not shown.

"Option" = optional equipment. Stated whenever components of the machine are installed as an option.

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1.6 Machine: overview

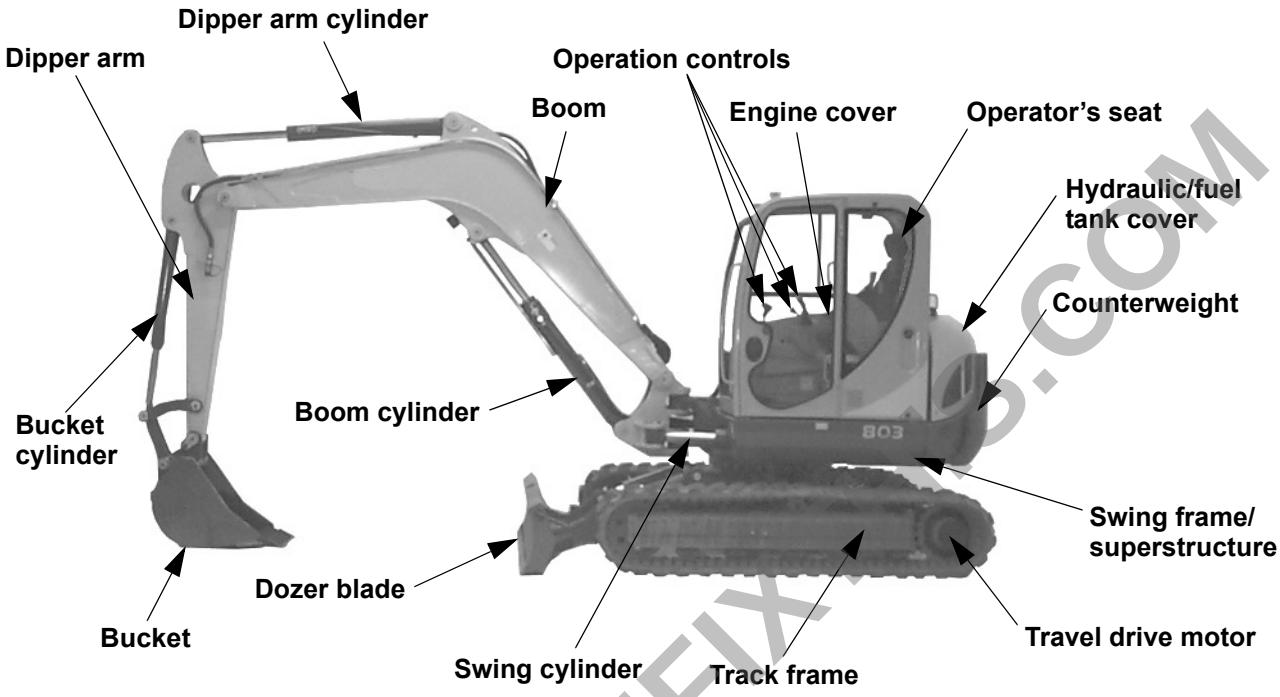
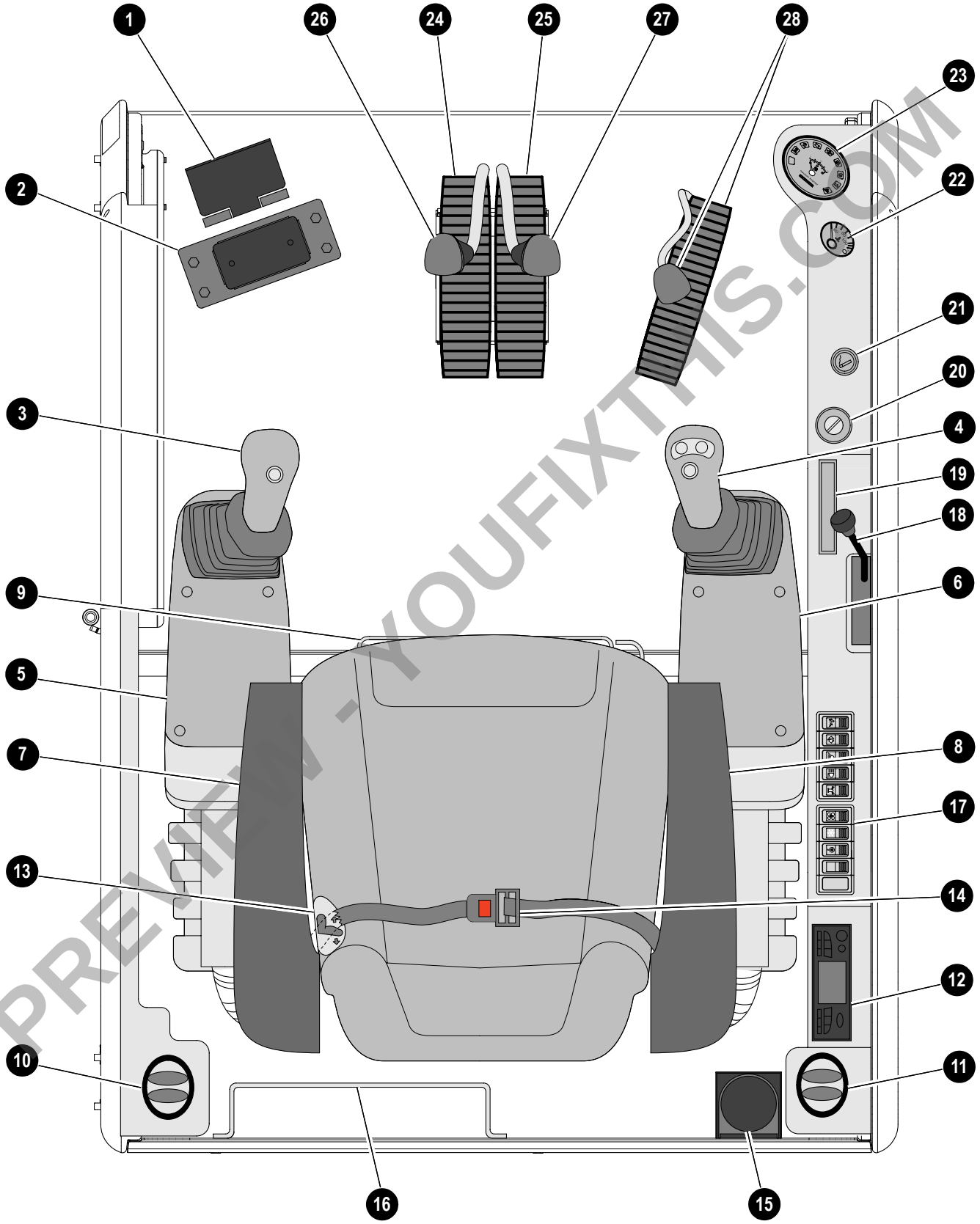


Fig. 7: Component names

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1.7 Cab overview



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Tilting the cab up

1. Follow “Mandatory Safety Shutdown Procedure” in the “Safety Instructions” in the Operator’s Manual.
2. Raise the floor mat (1) at the right front of the cab and remove cab lock-down nut (2). Remove cab lock-down nut (3) at the right rear of the cab.
3. Securely close the cab door.
4. Locate the jack handle tubes (4) from the tool kit in the engine compartment. Insert them into the jack (5), and jack to the limit. The cab will be raised as far as the jack (5) will travel.
5. Pull handle (7) until the cab is completely tilted and supported by safety cables (8).
6. Remove the tilt rod (9) from the storage bracket (10). Slide the tilt rod (9) into the guide bracket (11) and secure with the split pin.

Tilting the cab down

1. Remove the tilt rod (9) from the guide bracket (11) by removing the split pin. Slide the tilt rod (10) out of the guide bracket (9) and secure with the split pin back in the storage bracket (10).
2. Use handle (7) to slowly lower the cab back onto the jack (5).
3. Remove jack handle tubes (4) from the jack (5) and insert the opposite end of the jack handle tubes (4) onto the release pin (6). Slowly turn release pin (6) counterclockwise until the cab is lowered.
4. Turn the release pin (6) clockwise.
5. Reinstall the cab lock-down nuts (2 and 3).
6. Place the jack handle tubes (4) back in the tool kit.

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2 Specifications

2.1 Chassis

Sturdy steel sheet chassis, rubber-mounted engine.

2.2 Engine

Engine	
Product	Yanmar diesel engine
Model	4TNV98-VNS
Design	Water-cooled, 4-stroke diesel engine
No. of cylinders	4
Fuel injection system	Direct injection
Aspiration	Naturally aspirated
Cooling system	Water-cooled/aspirating fan
Lubrication system	Pressurized lubrication with trochoidal pump
Displacement	202 cu. in. (3.3 L)
Nominal bore and stroke	3.858 x 4.33 in. (98 x 110 mm)
Output	57 hp (42.5 kW) @ 2100 RPM
Maximum torque	184 lbf.-ft. (249 Nm) @ 1400 RPM
Maximum engine speed without load	2290 ± 50 RPM
Idling speed	1100 ± 50 RPM
Valve tip clearance (intake = outlet)	0.006–0.010 in. (0.15–0.25 mm) (cold)
Injection pressure	3190–3336 psi (220–230 bar)
Compression	508 ± 14.5 psi (35 ± 1 bar) @ 250 RPM
Engine oil pressure	44–58 psi (3–4 bar)
Pressure switch for engine oil pump	7.3 ± 1.5 psi (0.5 ± 0.1 bar)
Opening temperature of thermostat	157–163°F (69.5–72.5°C)
Thermal switch	225–235°F (107–113°C)
Firing order	1-3-4-2
Direction of rotation	Counterclockwise (as seen from the flywheel)
Starting aid	Intake manifold (preheating time 10–15 sec)
Maximum inclined position (engine still supplied with oil)	25°/46% in all directions 30°/58% three minutes. Follow the machine's hill climbing ability (30°/58%)
Exhaust values according to:	97/68/EC Tier II EPA Tier II

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2.10 General tightening torques

Note: *Use these torque values when tightening hardware (excluding: locknuts and self-tapping, thread-forming and sheet metal screws) unless specified otherwise.*

Hydraulic fittings with various seals (light application). All torque values are in lbf.-ft. (Nm) unless marked otherwise.

Thread	Straight pipe fitting with thread and threaded plug (GE)			Non-return valve with elastic seal	Identification aid outside diameter
	Sealing washer	Elastic seal	O-ring		
M10 x 1.0	7 (9)	13 (18)	11 (15)	13 (18)	0.4 in. (10 mm)
M12 x 1.5	15 (20)	18 (25)	18 (25)	18 (25)	0.5 in. (13 mm)
M14 x 1.5	26 (35)	33 (45)	26 (35)	26 (35)	0.6 in. (15 mm)
M16 x 1.5	33 (45)	41 (55)	30 (40)	37 (50)	0.6 in. (15 mm)
M18 x 1.5	41 (55)	52 (70)	33 (45)	52 (70)	0.7 in. (18 mm)
M22 x 1.5	48 (65)	92 (125)	44 (60)	92 (125)	0.9 in. (23 mm)
M27 x 2.0	66 (90)	133 (180)	74 (100)	107 (145)	1.1 in. (28 mm)
M33 x 2.0	111 (150)	229 (310)	118 (160)	155 (210)	1.3 in. (33 mm)
M42 x 2.0	177 (240)	332 (450)	155 (210)	266 (360)	1.7 in. (43 mm)
M48 x 2.0	214 (290)	398 (540)	192 (260)	398 (540)	1.9 in. (48 mm)
G1/8A	7 (9)	13 (18)	11 (15)	13 (18)	0.4 in. (10 mm)
G1/4A	26 (35)	26 (35)	22 (30)	26 (35)	0.5 in. (13 mm)
G3/8A	33 (45)	52 (70)	33 (45)	37 (50)	0.7 in. (18 mm)
G1/2A	48 (65)	66 (90)	41 (55)	48 (65)	0.8 in. (20 mm)
G3/4A	66 (90)	133 (180)	74 (100)	103 (140)	1.0 in. (25 mm)
G1A	111 (150)	229 (310)	118 (160)	140 (190)	1.3 in. (33 mm)
G1-1/4A	177 (240)	332 (450)	155 (210)	266 (360)	1.7 in. (43 mm)
G1-1/2A	214 (290)	398 (540)	192 (260)	398 (540)	1.9 in. (48 mm)

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3.5 Maintenance schedule

Check, clean or inspect

Service activity	Daily	Every 50 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Customer	Dealer
Check engine oil level. Refill as needed.	x					x	
Check engine coolant level. Refill as needed.	x					x	
Check hydraulic oil level. Refill as needed.	x					x	
Check gearbox oil level. Refill as needed.[1]		x				x	
Clean water ducts.[2]					x		x
Check engine/hydraulic oil radiator and air conditioning for contamination. Clean if necessary.	x					x	
Check cooling system, heating and hoses for leaks and pressure (visual inspection).	x					x	
Replace cab air filter for heating and air conditioning.				x			x
Inspect air filter for damage.	x					x	
Inspect water separator prefilter and drain water.	x					x	
Clean water separator.				x			x
Check V-belt condition and tension.	x					x	
Check exhaust system for damage.	x					x	
Check valve tip clearance. Adjust if necessary.					x		x
Inspect fuel injection pump, injection pressure, injection nozzles and valves.					x		x
Empty diesel fuel tank.				x			x
Check battery electrolyte. Fill with distilled water if necessary.		x		x		x	
Check alternator, starter and electrical connections, bearing play and function.				x			x
Check preheating system and electrical connections.				x			x
Check air filter contamination gauge.				x			x
Perform pressure check of primary pressure relief valves.[3]		x		x			x

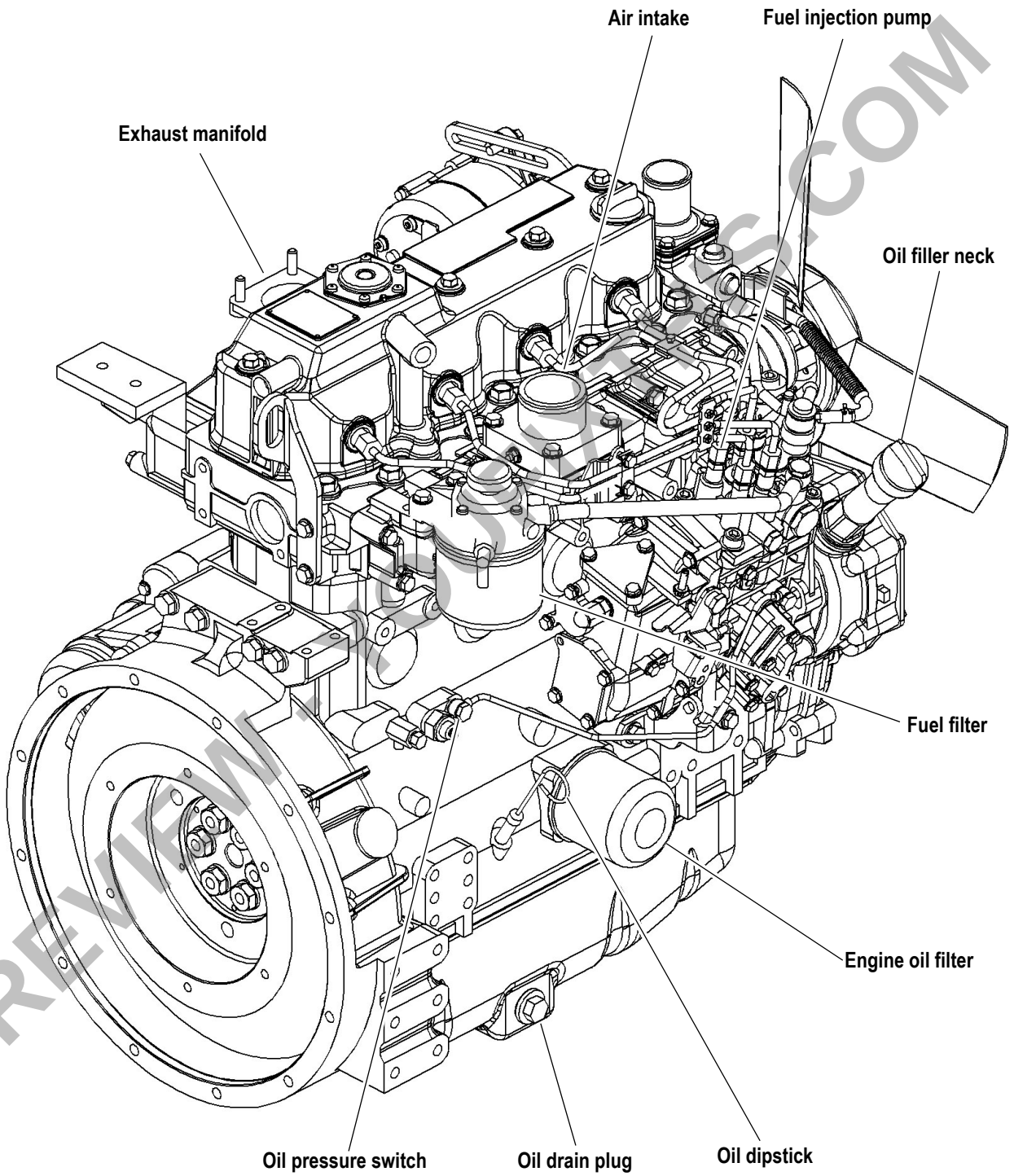
1. Check the gearbox oil every second time 50 s/h servicing is performed.
2. Clean the water ducts every second time 1000 s/h servicing is performed.
3. First check at 50 s/h, then every 500 s/h.

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4 Engine

4.1 4TNV98 engine: overview



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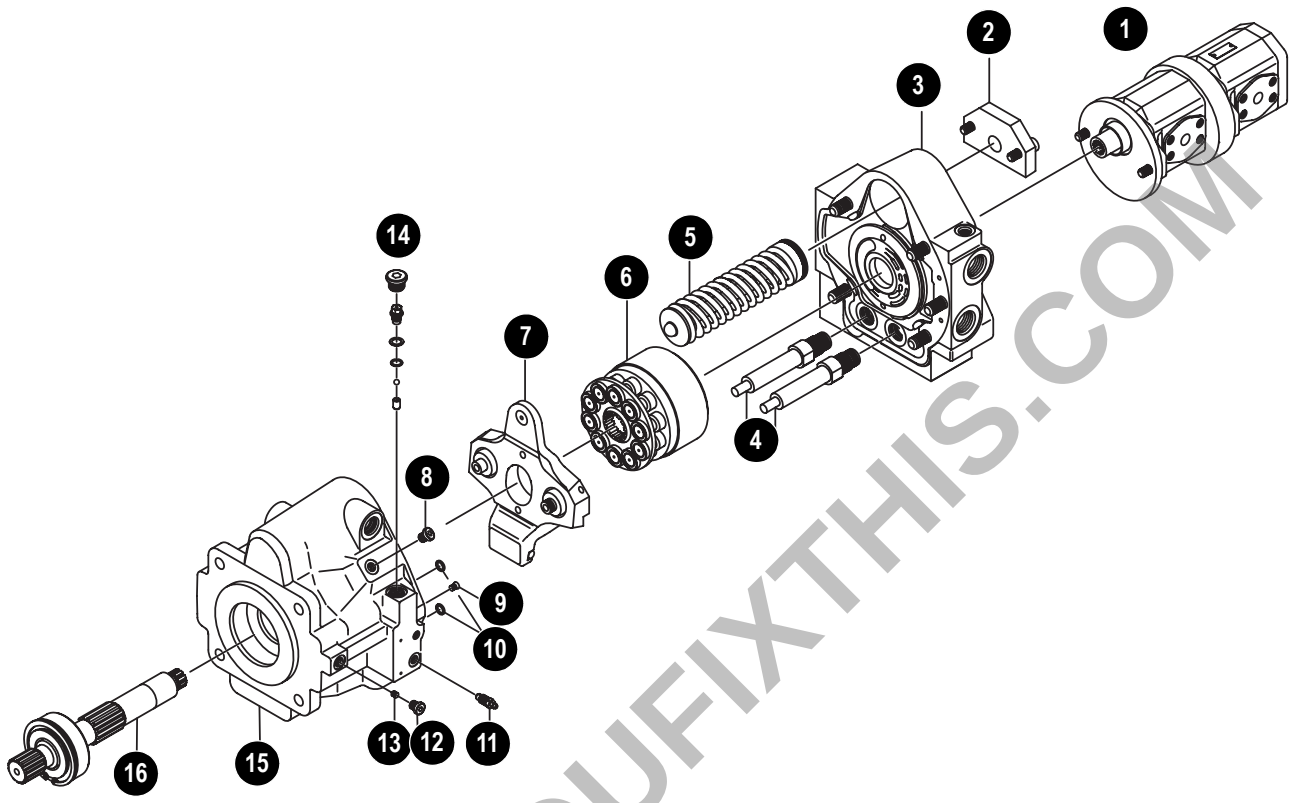
4.15 Engine troubleshooting

Problem	Possible causes
Engine does not start or is not easy to start	Wrong SAE grade of engine lubrication oil
	Fuel grade incorrect
	Defective or dead battery
	Loose or oxidized cable connections in starter circuit
	Starter defective, or pinion does not engage
	Wrong valve tip clearance
	Fuel injector defective
	Starting relay defective
	Glow plug defective
	Solenoid switch defective
	Cut-off solenoid does not engage starter
	Cut-off solenoid without current
	High pressure in hydraulic system preventing engine starting
Engine starts, but does not run smoothly	Fuel grade incorrect
	Wrong valve tip clearance
	Injection line leaks
	Fuel injector defective
Engine overheats. Temperature warning system responds	Oil level too low
	Oil level too high
	Air filter not working
	Oil cooler fins not working
	Fan defective, V-belt torn or loose
	Resistance in cooling system too high, flow capacity too low
	Fuel injector defective
Insufficient engine output	Oil level too high
	Fuel grade incorrect
	Air filter not working
	Air filter maintenance switch or gauge defective
	Wrong valve tip clearance
	Injection line leaks
	Fuel injector defective
Engine does not run on all cylinders	Injection line leaks
	Fuel injector defective
Insufficient or no engine oil pressure	Oil level too low
	Machine inclination too steep (maximum 15°)
	Wrong SAE grade of engine lubrication oil

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Pump unit — exploded view



Ref.	Description
1	Gear pump
2	End plate
3	Pump cover
4	Piston valve
5	Spring
6	Drive unit
7	Cradle
8	Plug
9	Plug
10	O-ring
11	Bleeder valve
12	Plug
13	Nozzle
14	Shuttle valve (for lubrication)
15	Pump housing
16	Shaft

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