



GE Industrial Systems

Troubleshooting Pump Motors

Warning: Turn power off at the electrical service entrance fuse or breaker box before touching motor or removing cover.

SYMPTOM/CAUSE	PROCEDURE
Motor won't start - No hum, no sound	
No power	Check fuse or circuit breaker.
No power to motor	Check power connection. Check for loose connections. Apply power, check voltage at motor terminals with voltmeter. CAUTION: Turn power off again at the electrical service entrance fuse or breaker box before proceeding. Check motor overload continuity. See winding problem (below.)

Motor won't start - Hums	
Locked bearings	Uncouple pump and spin motor shaft. Check for tight pump seal, obstruction in pump housing or bad bearing.
Incorrect connections	Check motor connection diagram. Check control circuit diagram.
Low voltage	Motor terminal voltage must be within $\pm 10\%$ of nameplate voltage.
Excessive load	Clogged pump impeller. Bent shaft or bad bearing.
Winding problem	Check for short, open or ground in wiring, lead connections or winding to motor housing.
Start switch open	Switch should be closed at standstill. Check continuity across contacts.
Start capacitor failure	White residue probably means faulty capacitor.
Loose capacitor connections	Visual inspection
NOTE: See "Capacitor Troubleshooting Procedure."	

Excessive noise, vibration	
Defective motor bearing	Spin unloaded shaft, check noise.
Loose or binding parts	Visual inspection of pump and motor.
Bent shaft	Remove motor & check shaft run-out.
Start switch doesn't open	Start/stop, start/stop - if motor noise disappears, switch may be defective.

SYMPTOM/CAUSE	PROCEDURE
Motor hot, smoking or cycling	
Motor overloaded	Full-load current greater than nameplate can mean excessive pump load.
Clogged air openings	Visual/manual inspection.
Voltage too high/low	Must be within $\pm 10\%$.
Incorrect connection	Check nameplate and control diagrams.
Winding shorted or grounded	Check winding for damage. Check for ground condition. Measure winding resistance.
Start switch fails to open	Check for welded contacts. Check for broken mech spring. Replace switch.
Run capacitor failure	Bulged capacitor indicates failure.

Hot or noisy bearings	
Endshields loose or cocked	Check thru-bolts for tightness. Check frame-to-endshield rabbet fit. Spin motor shaft, should turn freely.
Bent shaft	Measure shaft run-out (straightness).
Defective bearing	Spin shaft, check for noise, endplay.

Capacitor Troubleshooting Procedure

- To check capacitor with ohmmeter, remove all power from motor.
- Use insulated screwdriver to discharge capacitor by shorting across terminals
- Set ohmmeter to highest value, put clips on capacitor terminals. Check for following indications:
 1. Needle drops to zero range and slowly rises, capacitor probably good.
 2. Needle drops to and stays at zero, capacitor probably shorted.
 3. Needle remains at high value, capacitor probably has open circuit.



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BEARING LUBRICATION

Ball bearing motors are shipped with sufficient grease for a long operating period. Relubrication at intervals consistent with the type of service shown in the following table will provide longer bearing life. Excessive, too frequent lubrication or the use of noncompatible lubrication may damage the motor. Follow relubrication type and use procedures provided in the instructions shipped with motors.

Table 19. Relubrication Intervals

Type of Service	Typical Examples	Hp Range	Relubrication Interval (yrs)	
			Horizontal	Vertical
Easy	Valves, door openers, portable floor sanders, motor operating infrequently (one hour per day)	1.0-7.5	10	9
		10-40	7	3
		50-150	4	1.5
		200-350	3	9 Mo.
		400-800	1	–
Standard	Machine tools, air-conditioning apparatus, conveyors, one or two shifts, garage compressors, refrigeration machinery, laundry machinery, oil well pumps, water pumps, wood working machinery.	1.0-7.5	7	3
		10-40	4	1
		50-150	1.5	6 Mo.
		200-350	1	3 Mo.
		400-800	6 Mo.	–
Severe	Motor for fans, M-G sets, etc. that run 24 hours per day, 365 days per year, coal and mining machinery, motors subject to severe vibration, steel mill machinery.	1.0-7.5	4	1.5
		10-40	1.5	6 Mo.
		50-150	9 Mo.	3 Mo.
		200-350	6 Mo.	1.5 Mo.
		400-800	3 Mo.	–
Very Severe	Dirty, vibrating applications, where end of shaft is hot (pumps and fans), high ambient temperatures	1.0-7.5	9 Mo.	6 Mo.
		10-40	4 Mo.	3 Mo.
		50-150	4 Mo.	2 Mo.
		200-350	3 Mo.	1 Mo.
		400-800	2 Mo.	–