Pipeline Duty Motors

WPII and TEFC Vertical A.C. Motors

Product Overview and Features

Rugged, reliable electric motors are critical to pumping applications in crude oil and natural gas pipelines. U.S. MOTORS® brand vertical pump motors have been setting the bar for the vertical turbine pump industry since 1922. Known for their longevity, reliability and ease of use, our pipeline duty motors can be configured to satisfy specific vertical motor application requirements.

Manufactured in our Mena, API®† Q1 certified facility, these medium voltage vertical high thrust pump motors ranging from 150HP through 5000HP, can be designed for use with variable speed drives.

Standard Pipeline Duty Features & Testing:

- WPII or TEFC Enclosure
- 2300/4000V (or 2400/4160V)
- Premium Efficient
- Class F Everseal® insulation system
- Form Wound
- 3.5pu surge withstand (IEEE 522 figure 1)
- 1.00 Service Factor
- Division 2 labeled
- Rated for 40°C ambient at 3,300 ft. altitude
- Class B rise At full load
- 650% max inrush limit
- Aluminum rotor
- Upper oil lubricated thrust bearing
- Lower guide bearing
- Insulated bearing – upper bracket
- Special balance
- CORRO-DUTY®
- INPRO/SEAL®† shaft seal on drive end
- Stainless steel hardware
- Stainless steel screens (on WPII)
- Stainless steel air filters (on WPII)
- Air pressure differential switch (on WPII)
- 115V space heaters – 160°C max temp.
- Accessory conduit box for heater leads
- 100 ohm winding RTDs – 2/phase
- 100 ohm bearing RTDs – 1/bearing
- Accessory conduit box for RTD leads
- Oversized main conduit box
- Grounding pads on frame (qty. 2)
- Epoxy paint system
- Phase sequencing nameplate
- API®† 610 tolerances (where available)
- Non-witnessed short commercial test (NEMA®† MG1-12.55 or Part 20)
- Non-witnessed vibration test (NEMA®† MG1 Part 7)

Optional Features & Testing:

- Inverter duty operation
- Extra high thrust spherical roller bearings
- Oil sump heater
- Copper bar rotor
- NEMA®† Type II main conduit box
- IEEE-841™ features or API®† 547 features
- Sound abatement
- Vibration transmitters or mounting provisions
- Non-witnessed complete test (IEEE®† 112 Method B)
- Non-witnessed sound test (ANSI®† S12.51 & NEMA®† MG1)

NIDEC MOTOR CORPORATION

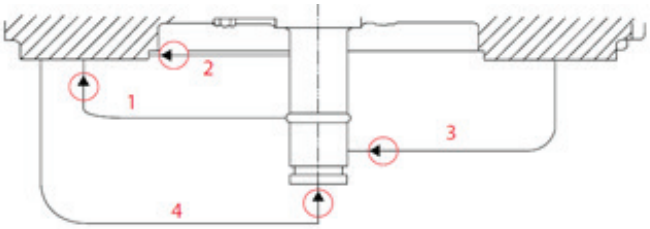
Enclosures

Weather Protected Type II (WPII) – enclosures are constructed for hostile outdoor environments. The WPII ventilation circuit is produces a minimum of three abrupt changes in airflow direction of at least 90° each, which results in an area of reduced velocity in the air intake. The change in airflow reduces the chances of high velocity air, moisture and airborne particles reaching the cooling passages of the motor.

Totally Enclosed Fan Cooled (TEFC) – enclosures prevent the free exchange of air between the outside and inside of the motor, but are not airtight. Each TEFC motor is cooled by a fan that is integral with the motor, but external to the enclosing parts.

API®† 610 Requirements

- Upper Thrust Bearing
- Minimum 25,000 hours L-10 bearing life
- Face runout 0.001” TIR (1)
- Register runout 0.004” TIR (2)
- Shaft runout 0.001” TIR (3)
- Endplay 0.005” TIR (4)



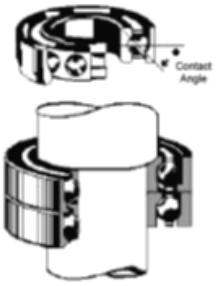
Note: If motor is supplied with 175%, 300% or 500% extra high thrust bearings, API 610 endplay cannot be provided.

High Thrust Bearings

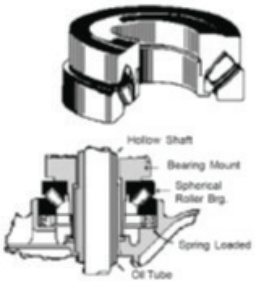
Angular Contact Thrust Bearings are standard on all high thrust ratings. The amount of thrust capacity for a given bearing is determined by the types used and the angle of contact. Turbine Pump motors usually have a 35- to 40-degree angle. Construction of the retainer which guides the balls can influence bearing life. Since thrust bearings maintain a continuous load on each ball, any variation in speed must be corrected by the retainer. Angular contact thrust bearings can handle continuous thrust in only one direction.

Angular contact bearings can be stacked for increased thrust capacity. The bearings must be accurately ground so they will share the load. Two bearings will give approximately 175 percent of the capacity of one bearing.

U.S. MOTORS® brand Spherical Roller Bearings are used when higher bearing life or thrust capacity cannot be provided by angular contact bearings. The spherical roller bearing will take some radial load but only if thrust is applied at all times. Spherical Roller Bearings are spring loaded to insure they will not be damaged during starting and momentary up thrust conditions. The springs push up against the lower race to ensure constant contact. Since the spring pressure may be several thousand pounds, a considerable load is imposed on the guide bearing during start-up. Care must be taken not to specify life factors that would cause bearing failures due to insufficient loading during normal operation. Special consideration and care must also be taken when calculating life factors for variable speed applications, where reduced speed can drop the load and the thrust below minimum acceptable levels.



Angular Contact Bearing



Spherical Roller Bearing

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For more information about the U.S.MOTORS brand, visit www.usmotors.com.

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