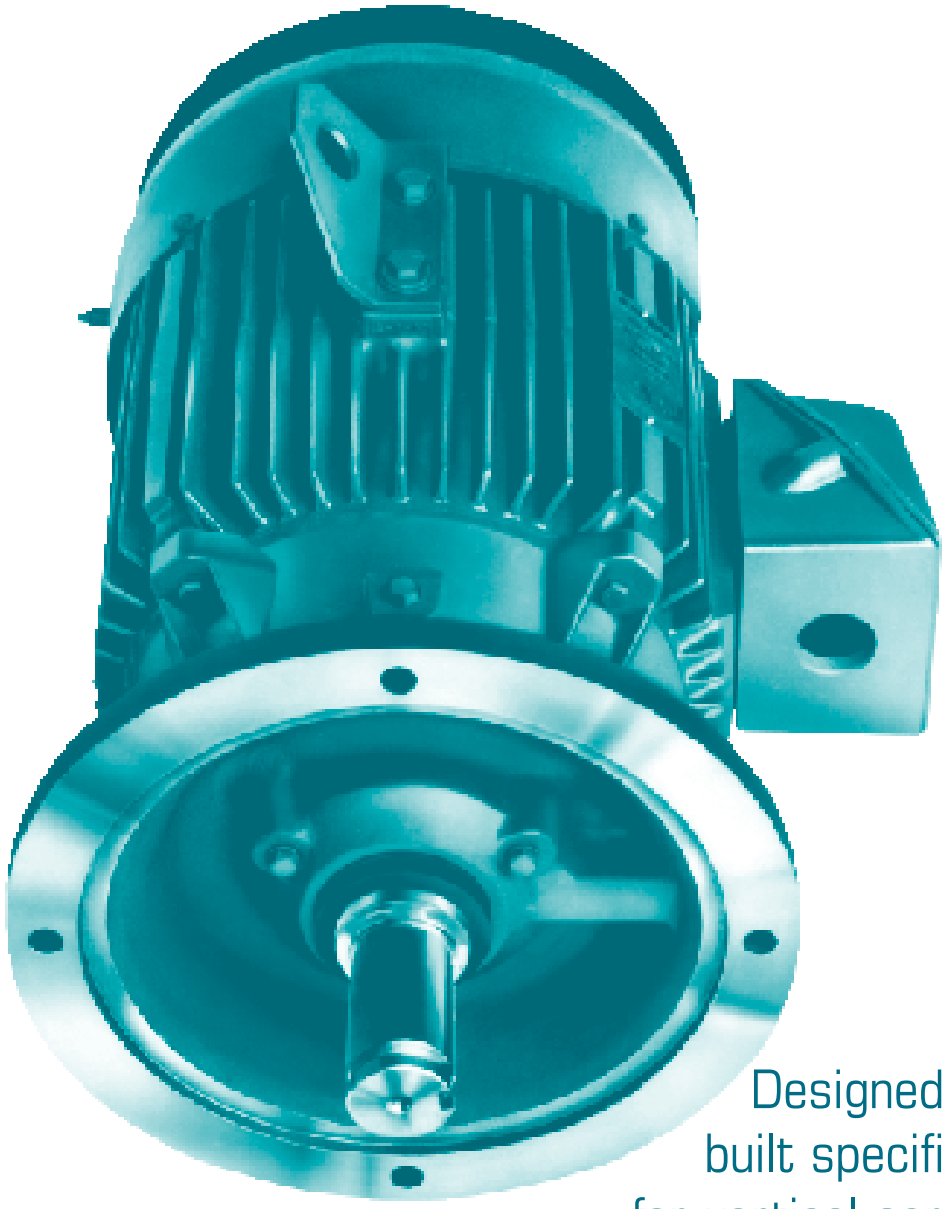
BALDOR • RELIANCE

Vertical AC Motors

1HP-700 HP
140T-5010 FRAMES



Designed and
built specifically
for vertical service!

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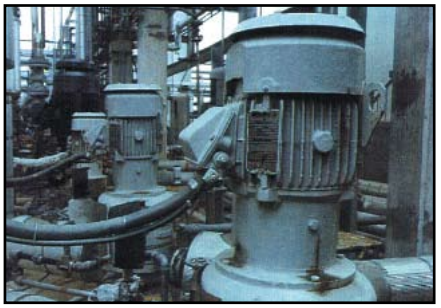
Bearings

Bearing life is related to load as well as to correct handling and assembly procedures. Reliance Electric motors are designed with special care to utilize proper bearing sizes to ensure that motors are capable of handling continuous up or down thrust conditions. Quality control and assembly procedures are adhered to during the manufacturing process to minimize factors that tend to shorten bearing life. All NEMA frame bearing sizes provide a minimum two year L-10 life. Refer to table below for complete thrust capacities with bearing life for NEMA frame sizes.

The standard normal thrust bearing system uses deep groove, single-row ball bearings. The standard in-line NEMA LP system uses a pair of angular contact, single-row ball bearings mounted back to back to carry the thrust load. The bearing construction meets the requirements of A.P.I. Std. 610. The above NEMA high thrust bearing system uses angular contact ball bearings (single-row, duplex single-row, tandem single-row) and spherical roller bearings. All ball bearings are made with vacuum degassed steel for three times life factor, and are suitable for temperatures up to 250°F (121° C).

Single-row ball bearings meet AFBMA C-3 specifications for internal clearances.

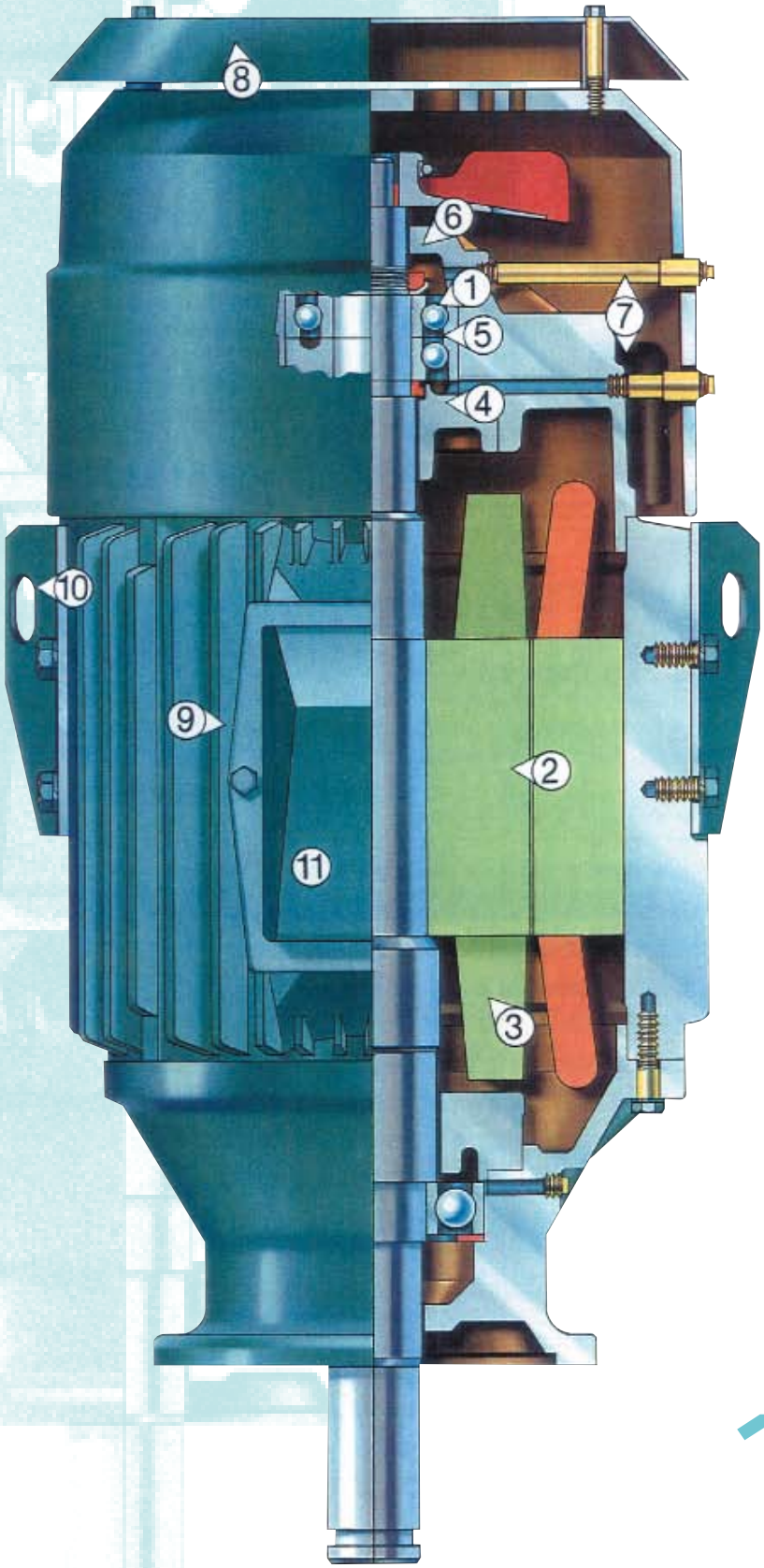


Duty Master XT Vertical Motors drive in-line process pumps in petroleum refining operation.

HP & LP THRUST CAPABILITIES
L-10 BEARING LIFE
DOWN THRUST IN POUNDS

RPM	FRAME SIZE	HP THRUST					LP MEDIUM THRUST					LP EXTENDED THRUST				
		1YR	2YR	3YR	50K HRS	100K HRS	1YR	2YR	3YR	50K HRS	100K HRS	1YR	2YR	3YR	50K HRS	100K HRS
3600	180	140	100	80	50	30	730	570	490	390	300					
	210	200	140	110	70	40	980	770	660	520	400					
	250	640	470	390	280	200	1520	1190	1030	820	640	2470	1950	1700	1360	1060
	280	730	530	440	320	220	1850	1450	1260	1000	780	3030	2390	2080	1660	1300
	320	810	590	480	340	230	1800	1400	1210	950	730	2980	2340	2030	1610	1250
	360	1010	720	580	410	270	2190	1710	1470	1150	880	3630	2840	2460	1950	1520
	400	970	680	540	370	230	2150	1660	1430	1110	840	3580	2800	2420	1910	1470
	440	890	600	460	290	140	2050	1560	1330	1010	740	3500	2720	2340	1830	1390
	447/9	690	400	260			1850	1360	1130	810	540	3300	2520	2140	1630	1190
1800	180	200	140	110	80	40	930	720	630	500	380					
	210	290	200	160	110	70	1250	980	850	670	520					
	250	860	620	520	380	270	1910	1500	1300	1040	810	3120	2460	2140	1710	1340
	280	990	710	590	430	300	2330	1830	1590	1260	980	3820	3010	2620	2090	1640
	320	1091	770	630	450	300	2260	1760	1520	1190	910	3750	2940	2550	2020	1570
	360	1370	980	810	570	380	2780	2160	1870	1470	1120	4580	3600	3120	2480	1920
	400	1280	890	720	480	290	4490	3510	3030	2390	1830	7550	5930	5140	4090	3190
	440	1130	740	570	330	140	4340	3360	2880	2240	1680	7400	5780	4990	3940	3040
	447/9	780	390	220			3990	3010	2530	1890	1330	7050	5430	4640	3590	2690
1200	180	260	190	160	110	80	1080	850	740	590	460					
	210	360	260	210	150	100	1450	1140	990	790	610					
	250	1010	730	610	450	310	2180	1720	1490	1180	920	3560	2810	2440	1950	1530
	280	1160	840	690	510	350	2670	2090	1810	1440	1120	4370	3440	2990	2390	1870
	320	1290	920	750	540	360	2600	2020	1740	1370	1050	4300	3370	2920	2320	1800
	360	1640	1160	950	680	450	3180	2480	2130	1680	1280	5250	4120	3570	2830	2200
	400	1540	1070	850	580	360	5150	4020	3470	2740	2100	8640	6790	5890	4690	3660
	440	1390	910	700	430	200	4980	3850	3300	2570	1930	8470	6620	5720	4520	3490
	447/9	1090	610	400			4680	3550	3000	2270	1630	8170	6320	5420	4220	3190
900	180	300	220	180	130	90	1190	940	810	650	510					
	210	410	300	240	170	120	1590	1250	1090	870	680					
	250	1140	840	700	510	370	2410	1900	1650	1310	1020	3930	3100	2700	2160	1700
	280	1330	980	800	590	420	2960	2320	2020	1610	1250	4830	3810	3320	2650	2080
	320	1490	1080	890	650	450	2910	2270	1970	1560	1200	4780	3760	3270	2600	2030
	360	1860	1340	1100	800	540	3530	2750	2370	1870	1440	5800	4560	3950	3140	2450
	400	1780	1250	1010	710	450	5710	4470	3860	3050	2360	9560	7520	6530	5210	4070
	440	1600	1080	840	540	280	5540	4300	3690	2880	2190	9390	7350	6360	5040	3900
	447/9	1130	600	360			5070	3830	3220	2410	1720	8920	6880	5890	4570	3430

Typical NEMA Frame Construction



1 Top mounted bearing in NEMA LP designs meets the requirements of A.P.I. Spec. # 610.

2 High-grade steel laminations of rotor and stator reduce current densities and losses for greater electrical efficiency.

3 Integrally cast rotor fins provide rapid heat dissipation to assure cool operation for longer life.

4 Bearing cap clamps bearing system in sturdy bracket to help eliminate end play and extend life of both motor and driven equipment.

5 Thrust bearing is designed to withstand upward and downward thrust to minimize shaft movement.

6 Large grease reservoir is located above bearing to assure proper lubrication for maximum motor life.

7 Grease relief occurs by purging through bearing for positive lubrication.

8 Drip cover extends motor life by preventing rain, snow or falling objects from entering motor.

9 Standard conduit box is diagonally split for fast installation and easy servicing; can be rotated for connection from top, bottom, or either side.

10 Steel lifting plates bolted on the frame of totally enclosed fan-cooled enclosures simplify motor lifting per NEMA requirements.

11 Provision for grounding in the conduit box is standard in all frame sizes; assures a positive ground for all electrical connections.

Duty Master Vertical AC Motors

Applications

Duty Master Vertical AC motors are the perfect power mates for centrifugal pumps, sump pumps, turbine pumps, in-line process pumps, fans, aerators, mixers, autoclaves, cooling towers and similar applications in general industrial environments.

Additional performance and protection features are available in standard modification packages for customized applications in special environments such as petroleum refining, chemical, processing and water treatment. Reliance In-Line NEMA LP motors are designed to meet the American Petroleum Institute Standard 610.

Efficiency

There is no need to limit your energy savings to horizontal applications. Significant energy savings and short pay-back periods are also available to you for vertical applications.

Reliance Vertical AC motors are available in premium efficient, XE designs. The same engineering and manufacturing knowledge and experience that go into every horizontal Reliance XE motor also go into every Reliance Vertical XE motor produced. The XE design is capable of inverter operation at 1.0 S.F. For selection and application assistance, call your local Sales Engineer.

A clear water feed pump in a paper processing operation is driven by a Weather-Protected NEMA type 1 Duty Master Vertical Motor.

Enclosures

Duty Master Vertical AC motors are available in a variety of enclosures and thrust values to suit your application.

All frames are cast iron. For the harshest industrial environments, we offer an extra tough (XT) mechanical package especially designed to meet the challenges of severe applications. Premium features protect motor components from chemicals, corrosion, and abrasives, extending motor life and improving performance. Reliance Vertical AC motors are also available with special Arctic Duty motor construction. This enables the motors to operate successfully in temperatures down to -60^0 C. Arctic Duty Vertical motor construction is available in 182T through 449T with UL listing for Class 1, Groups C and D, and through 5000 frame with non-UL Listed construction.

Duty Master Vertical AC motors are available for normal thrust, NEMA HP, normal thrust above NEMA, medium thrust and extended thrust in-line NEMA LP ratings. All motors are manufactured to tolerances which meet or exceed NEMA requirements in every frame size and horsepower rating. Just choose the frame size, horsepower and environmental protection you need from this guide. That's all it takes to put the motor specifically built for vertical service into your application where normal, medium or high thrust capability is required.

Enclosure	HP Range	Frame size
TEFC, TEFC-XP	1-400	180-449
TEFC	150-400	447-5010
ODP ,WPI, WPII	100-700	447-5010

Insulation

A full Class F insulation system consisting of Class F and H materials extends motor life by providing extra protection against high thermal and electrical shock. A full Class H system is available for higher thermal requirements.

Vacuum Pressure Impregnation (VPI) is available in both NEMA and above NEMA frame sizes. The exclusive VPI system, which provides a sealed insulation system, is used in wet, humid, and contaminant-laden conditions.

Form wound or medium voltage motors define three levels for VPI sealed systems. The standard SolidCure system is one VPI cycle while the SolidSeal system uses two VPI cycles plus additional insulation materials and processes to deliver a sealed insulation system in accordance with both IEEE429 and NEMA MG1-20.49.1. The Enduraseal® system is made with the same materials and processes as the SolidSeal system, except each and every Enduraseal® winding receives and passes a water immersion test.

Lubrication

Grease entry passages are located above both the thrust and guide bearings to ensure positive lubrication of the motor. Old grease is purged through grease relief passages.

Each motor is pre-lubricated with grease proven superior for electric motor service. The grease contains corrosion inhibitors and operates effectively through a temperature range of -15^0 F to +300^0 F. Special high and low temperature greases are also available for special applications.

When thrust conditions and bearing selection on above NEMA frames require the use of oil lubrication, it will be provided as standard. Oil lubrication is available on above NEMA frames for other than standard conditions.

One of eight Reliance vertical P-Base motors in use at a wastewater treatment plant.

Advanced Engineering Technology

As a value added manufacturer of modifiable motors for more than 90 years, we are committed to optimizing motor dependability and energy conservation through advanced motor design. We add value in electrical performance, material selection and testing. We add value through advanced manufacturing processes as well as through proper application of our motors to meet your requirements. Every Reliance Electric motor is manufactured in a plant using stringent ISO 9001 certified quality control procedures.

Comprehensive testing and quality control procedures ensure compliance with a broad range of industrial performance standards including NEMA, IEEE, and UL.

Many options are available to customize your motor to meet specific application requirements. Space heaters, thermal overloads, and extra-tough features are just a few of the options available.

Find Out More

To find out how Reliance products can help you meet the productivity and performance demands of your application, contact your Sales Engineer .

Visit us on-line to obtain the latest information about Reliance products and services.
http://www.reliance.com

Reed Frequency Testing

Reed frequency analysis plays a key role in the successful application of vertical machines. The motor reed frequency, as obtained from the motor alone on the seismic mass, along with the motor mass and its location, can be used by the customer as inputs to his system model, in order to better predict equipment behavior during operation. In order to provide accurate data on resonance and vibration, we have equipped our test facilities with apparatus such as seismic bases and modern instrumentation to provide:

- Structural modal analysis
- Vibration spectrum analysis
- Resonance frequency analysis

Reed frequency testing is conducted at the state-of-the-art, Advanced Development Laboratory at Baldor-Dodge/Reliance in Greenville, SC. This testing and research facility expands our ability to provide quality motor products to meet the growing technological needs of our customers.

This state-of-the-art laboratory is located in Greenville, SC

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