

W22 Magnet Drive System

Permanent magnet motors



Motors | Automation | Energy | Transmission & Distribution | Coatings

W22 Magnet Drive System

The W22 Magnet Drive System composes Super Premium and Ultra Premium efficiency motors with permanent magnets driven by variable frequency inverters. Perfect for applications where speed variation, precise control at low speeds, low noise levels and compact design are critical.



The highest efficiencies on the market

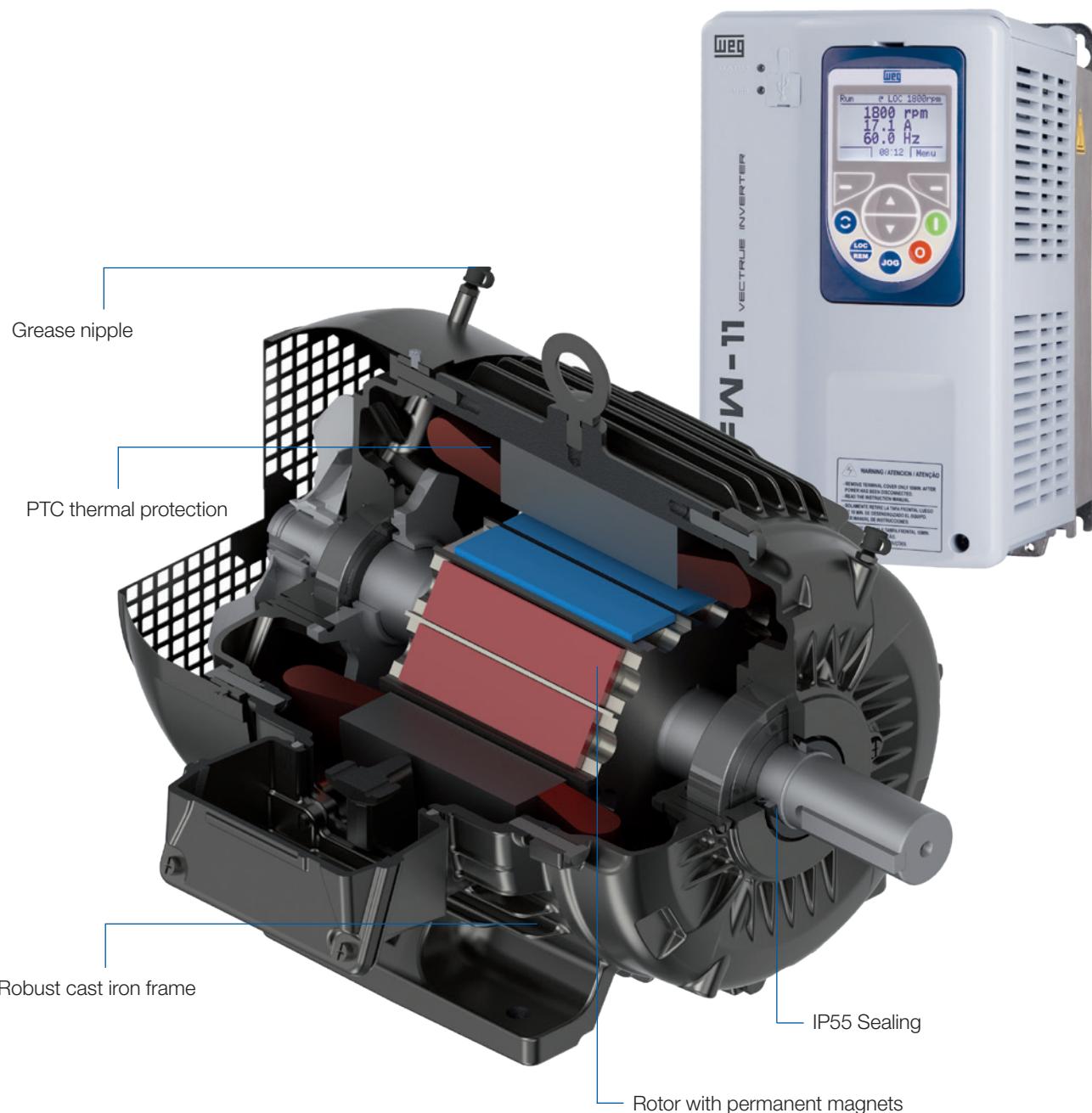
W22 Magnet motors feature rotors with permanent magnets. This technology provides the motor with significant advantages such as higher efficiency and a greater power density per frame. They are driven by WEG CFW11 frequency inverters, which offer constant torque across a wide speed range, operating even at low speeds with efficiency levels above induction motors without requiring forced ventilation. W22 Magnet motors are available in Super Premium (IE4) and Ultra Premium (IE5) versions – the highest efficiency available on the market today.

Drive System

Due to the dedicated software application which incorporates the vector control technology for driving permanent magnet motors, the use of the WEG CFW11 frequency inverter together with the W22 Magnet motor is recommended.

Applications

Cooling towers, bag filters, paper machines, paper coil winders, conveyors, pumps, looms, direct current (DC) motor replacements, extruders, compressors, fans, etc.



Features of the W22 Magnet Motor

- Output: 10 up to 450 HP
- Frame: 215T up to 449T
- Speed: 3600, 1800 and 1200 rpm (Special RPM/Hz available)
- Voltage: 460 V (200-600 V available)
- Degree of protection: IP55
- Bearing seal:
- V-ring (frames 215T up to 326T(S))
- WSeal (from frame 364/5T(S) and above)
- Insulation: F (ΔT 80K)
- Service factor: 1.00
- Thermal protection: PTC Thermistor
- Insulated NDE bearing hub and AEGIS shaft grounding (from frames 364/5T(S) and above)
- Mounting: F1, F2 or F3 available
- TEFC (IC 411) per NEMA MG1 / IEC 60034-6
- Possibility of operation in overspeed
- Optional characteristics on request

Features of the CFW11 Inverter

- Power supply: 380 up to 480 V
- Sensorless vector control: it allows the CFW11 to control the speed motor from zero up to its rated speed
- Remote Operating Interface (HMI) with backlight, soft keys, graphic display and real time clock.
- Inductors incorporated on the DC Link to improve harmonic mitigation
- Communication protocol and accessories: Profibus, DeviceNet, CANopen, Ethernet / IP, Modbus-RTU and Profinet
- IP54 available as optional item up to 100A (55 kW)
- Adaptable to all kinds of load
- USB port
- FLASH memory

W22 Magnet Super Premium and Ultra Premium

The W22 Magnet motor line offers two efficiency levels: Super Premium (IE4) and Ultra Premium (IE5). The high technology utilised in permanent magnet motors results in innovation, efficiency and reliability.

W22 Magnet Super Premium

Greater power density - Reduced mass and volume

W22 Magnet Super Premium motors meet the IE4 efficiency levels according to IEC standard 60034-30-1.

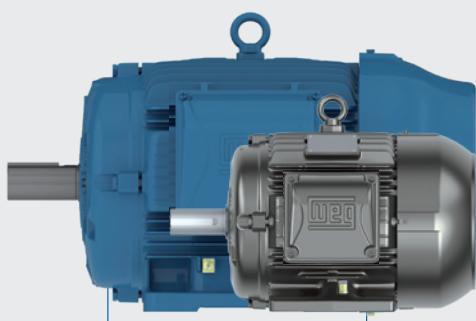
The magnets inserted into the rotor ensure a significant reduction in electric losses, and thus the motor temperature, enabling smaller frame sizes to be utilized. Compared to induction motors of the same output and speed, the weight and volume of the equivalent W22 Magnet Super Premium motors is reduced by as much as 77% (refer to example below).

The W22 Magnet motors operate with lower temperature rise even at low speeds.

Frame size comparison between 1800 rpm W22 Magnet IE4 and W22 IE3 Induction Motors.

Output Power (HP)	Frame	
	W22 (Induction)	W22 Magnet
15	254T	213T
20	256T	215T
25	284T	215T
30	286T	256T
40	324T	286T
50	326T	286T
60	364T	324T
75	365T	326T
100	405T	365T
125	444T	405T
150	445T	405T
200	447T	445T
250	449T	445T
300	449T	445T
350	L449T	447T

Volume reduction



Induction Motor

Output: 40 HP
Speed: 3600 rpm
Frame: 324T
Mass: 584 lbs
Volume: 4394 in³
Efficiency: 92.4%

W22 Magnet Motor

Output: 40 HP
Speed: 3600 rpm
Frame: 215T
Mass: 168 lbs
Volume: 1464 in³
Efficiency: 94.1%

Mass reduction



W22 MAGNET ULTRA PREMIUM

THE HIGHEST EFFICIENCY LEVEL
INTERCHANGEABILITY AND HIGH
PERFORMANCE



When replacing a NEMA Premium induction motor with a W22 Magnet Ultra Premium, the energy saved in one year would power a 60 W light bulb for 20 years.

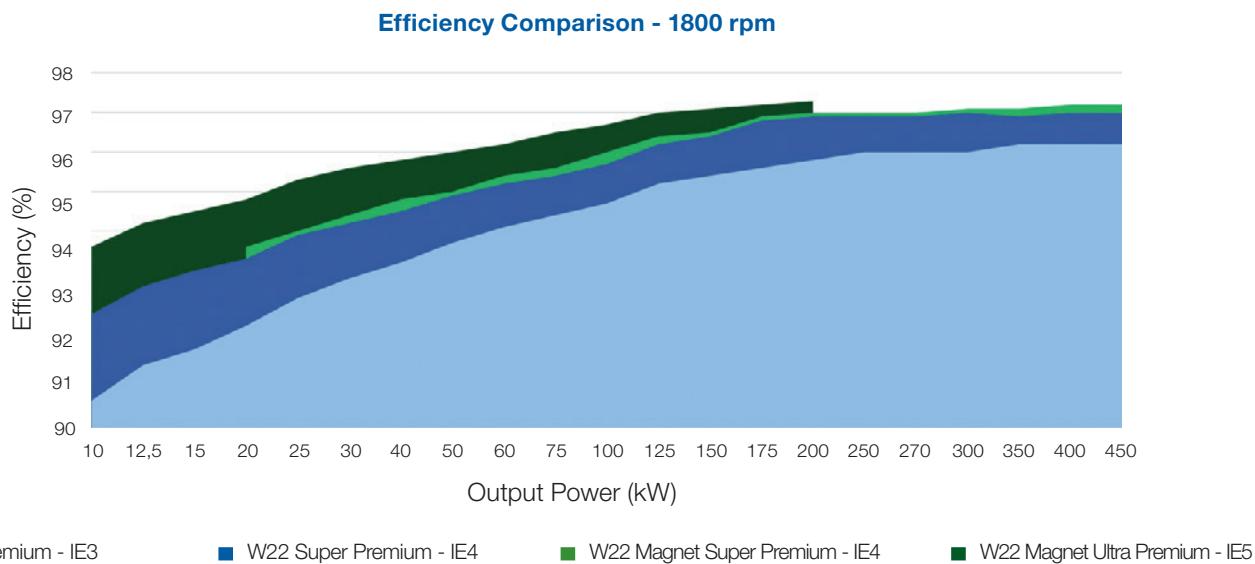
Comparison between 50HP 1800 rpm motors.

W22 Magnet Ultra Premium motors offer the highest efficiency levels in the market and meet the envisaged levels for IE5 as defined in the IEC standard 60034-30-1:2014.

With a loss reduction of 20% when compared to the Super Premium, W22 Magnet Ultra Premium motors feature the same frame size to HP ratio as equivalent induction motors, combining therefore interchangeability with existing installed motors and the benefit of improved product performance. W22 Magnet Ultra Premium is one more example of WEG technology providing to Industry high efficiency, quality, energy saving and lower overall cost of ownership.

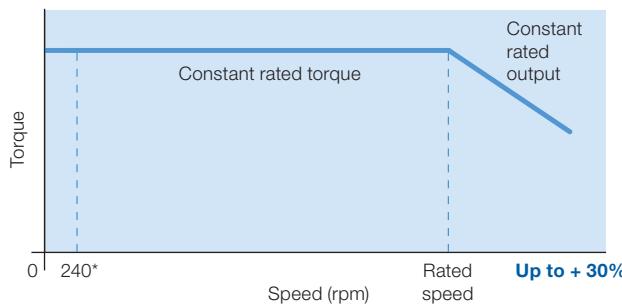
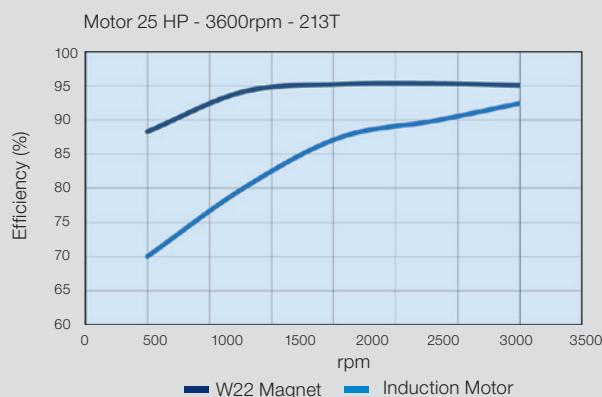


Attributes and advantages of the W22 Magnet Motor



Efficiency x Speed

W22 Magnet motors present superior efficiency regardless of speed or load, saving up to 30% in comparison to induction motors driven by frequency inverters.



*Continuous duty at speeds lower than 240 rpm under request

Torque x Speed

W22 Magnet motors can operate over a wide speed range at constant torque, without the use of forced ventilation. This characteristic makes them ideal for applications requiring speed variation and constant torque, even at low speeds, without the need for an encoder.

W22 Magnet motors (1200 rpm and 1800 rpm) are able to operate at up to 30% above their rated speed without the necessity to utilize special components.

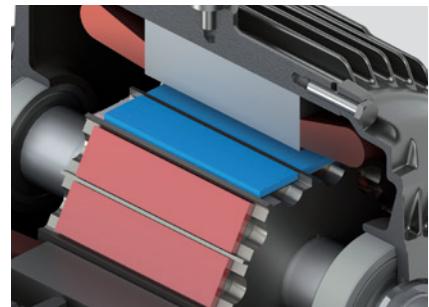
WISE Insulation System

Exclusive WISE insulation system (WEG Insulation System Evolution). Aiming at maximizing the durability and reliability of the motors when operated with a frequency inverter, WEG developed the WISE system, resulting in improvement of the materials in all components and processes related to the motor insulation system, such as wires, insulating films, impregnation system, impregnating material, cables and other components present in the process.

Permanent Magnets

The W22 Magnet utilises powerful permanent magnets made from a combination of neodymium, iron and boron (NdFeB), and commonly referred to as rare-earths magnets. These magnets are eighteen times stronger than traditional Ferrite Magnets.

In order to provide superior mechanical strength and corrosion resistance, the Neodymium/Iron/Boron magnets are covered with a protective epoxy coating.



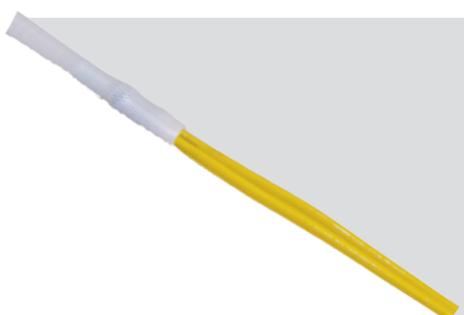
W22 Platform

The W22 Magnet incorporates the same innovative features of the highly successful W22 induction motor line:

- Frame structure that reduces air dispersion and improves the cooling
- Terminal box with greater internal space for easier cable management
- Solid feet that simplify the motor alignment and installation
- Robust cast iron construction providing high mechanical strength and low vibration levels

Endshields / Lubrication

The W22 Magnet motors are equipped with bearings offering an L10 life of up to 100,000 hours. All motors feature open bearings and endshields with grease nipples which permit re-lubrication for long motor life.



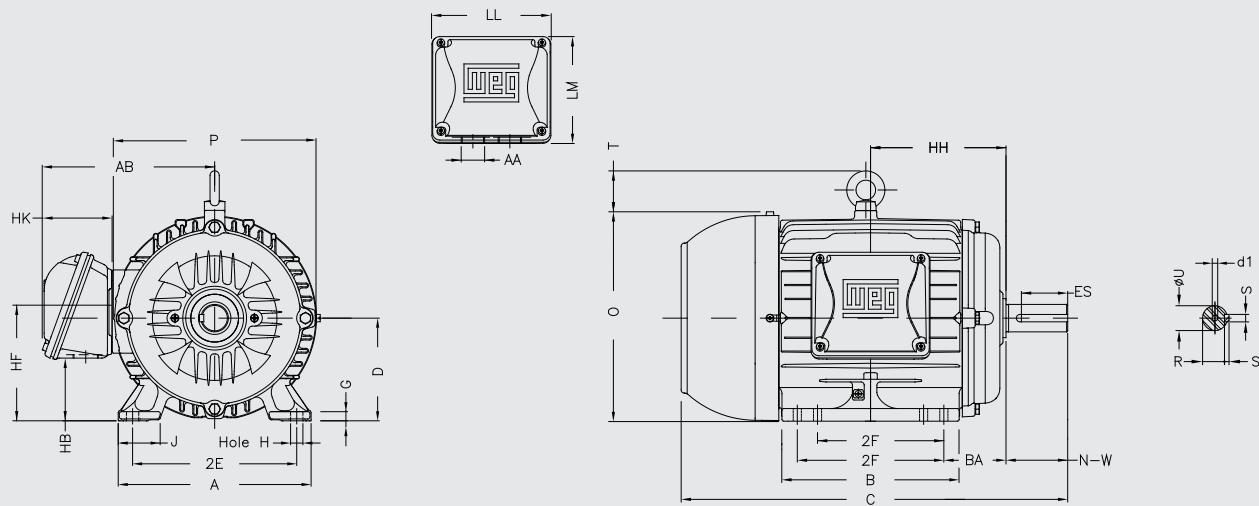
Thermal Protection

W22 Magnet motors have PTC (Positive Temperature Coefficient) thermistors embedded in their windings which offer full protection against overheating produced by overload and under or overvoltage.

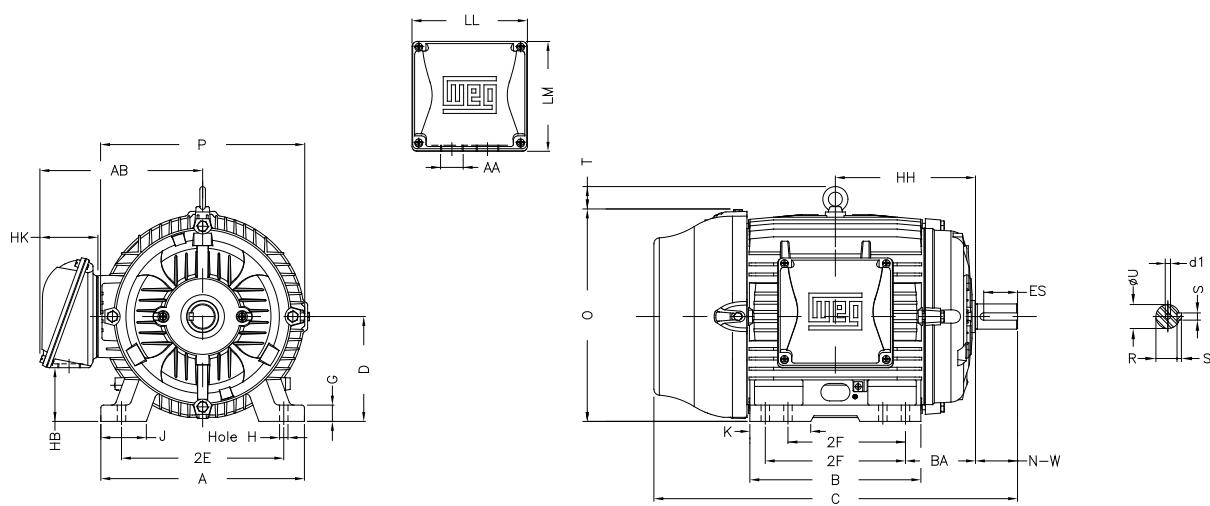
Motor Mechanical Data

(Dimensions in inches)

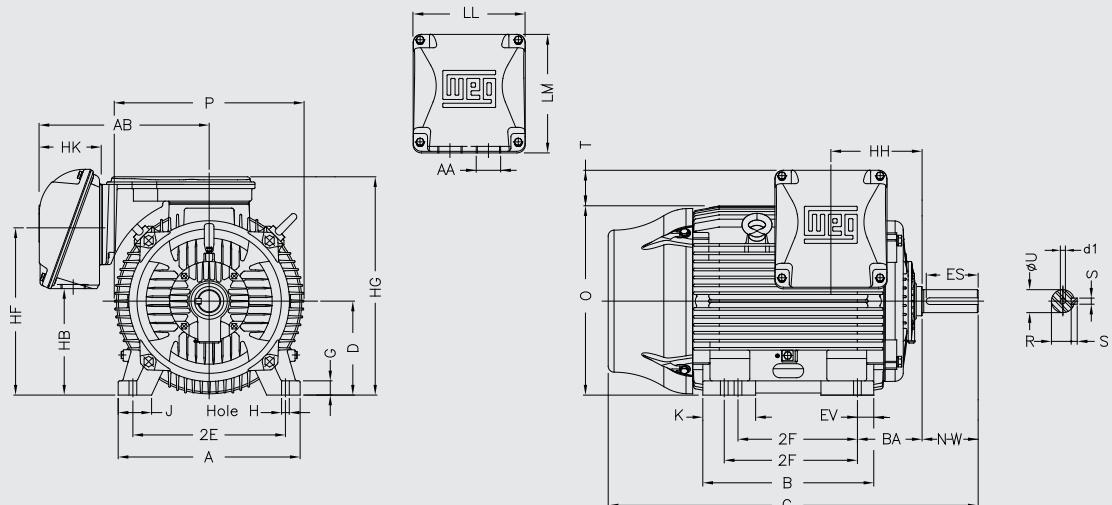
Frame 213/5T



Frames 254/6T to 444/5T



Frame 504/5T



Frame	Mounting				A	B	C	D	G	J	O	K	P	T	Keyway		
	2E	2F	H	BA											S	R	ES
213/5T	8.500	5.500/7.000	0.410	3.500	9.764	8.858	19.528	5.250	0.669	1.791	10.840	2.165	10.787	1.773	0.313	1.203	2.480
254/6T	10.000	8.252/10.000	0.531	4.250	11.496	11.732	24.961	6.250		1.787	12.953	2.559	12.953	1.958	0.375	1.416	2.756
284/6T	11.000	9.500/11.000		4.750	13.780	13.071	27.913	7.000	1.023	3.110	14.292	3.600	14.173	1.862	0.500	1.594	3.149
324/6T	12.500	10.500/12.000	0.657	5.250	15.157	14.567	31.102	8.000	1.300	3.189	15.953	4.055	15.827	2.441		1.844	3.937
364/5T	14.016	11.260/12.244	0.660	5.875	17.165	15.512	34.252	9.000	1.480	3.150	17.957	4.138	17.914	6.255	0.625	2.019	4.330
404/5T	15.984	12.244/13.740	0.810	6.625	19.921	18.386	39.724	10.000	1.811	3.937	19.566	5.669	19.134	3.544	0.750	2.449	5.512
444/5T	18.000	14.500/16.500		7.500	21.929	20.315	45.157	11.000	1.630		22.795	5.866	23.583	-	0.875	2.880	7.087
504/5T	20.000	16.000/18.000	1.250	8.500	24.724	24.449	54.094	12.500	1.870	4.724	25.425	7.228	25.866	4.781		3.134	8.661

Frame	Terminal box									d1	Bearings		Shaft Extension		
	AB	HB	HF	HG	HH	HK	LL	LM	AA		DE	NDE	N-W	U	
213/5T	8.606	2.985	5.250	-	7.000	3.150	5.512	5.236	NPT 1"	A4	6308 ZZ	6207 ZZ	3.375	1.375	
254/6T	10.483	3.061	6.565		9.250	3.976	7.815	7.480	NPT 1 1/2"		6309 C3	6209 C3	4.000	1.625	
284/6T	11.073	3.535	7.000		10.250						6311 C3	6211 C3	4.622	1.875	
324/6T	12.575	4.811	8.708		11.250	4.705	9.055	8.661	NPT 2"		6312 C3	6212 C3	5.250	2.125	
364/5T	16.016	4.251	-		11.988	6.023	10.591	11.220	NPT 3"	DUNC 3/4"-10	6314 C3	6314 C3	5.874	2.375	
404/5T		5.252			13.496						6319 C3	6316 C3	7.250	2.875	
444/5T	18.570	5.687			15.748	5.970	12.362	12.283	2xNPT 3"				8.500	3.375	
504/5T	20.559	15.167	24.291	29.502	10.374	6.929	14.921	15.039					10.630	3.625	



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