MONARCH



Low Voltage 3-Phase Induction Motors | Range **0.55kW to 500kW**

TECO

AUSTRALIA & NEW ZEALAND

TOTALLY ENCLOSED FAN-COOLED CAST IRON FRAME SERIES

General Information

MONARCH GX - Three Phase Induction Motors are a range of high quality, Totally Enclosed Fan Cooled (TEFC), Squirrel Cage Induction motors, designed, manufactured and tested to the latest International and Australian Standards.

There are two main motor types -

Types	Enclosure Protection	Insulation Class	Shaft seals	Finish Colour
MONARCH	IP55	F	"V" ring	TEAL
MONARCH *Severe Duty*	*IP66*	*H*	*Gamma*	*BLUE JADE*

Electrical Design and Standards

Altitude
Designed for operation at an altitude up to 1000 metres above sea level (please refer to TECO sales offices for higher altitudes).

Ambient
Motors are designed to operate in ambient conditions of -20°C to +40°C as standard. Operation in adverse ambient conditions should be referred to TECO.

Direction of Rotation
Standard rotation is clockwise when viewed from the drive end with the terminal markings corresponding to incoming line markings.

Duty Rating
All motors have a maximum continuous duty rating of S1 to AS60034.1. Other duty ratings are available on request.

Electric Supply
Stock motors are designed for operation on a 380~415 Volt 3 phase 50 Hz supply and are also suitable for a 440~480 Volt 3 phase 60 Hz supply.
Motors 3 kW and below are 380 - 415 Volt 50 Hz STAR connected and may also be reconnected to 240 Volt 3 phase 50 Hz DELTA configuration for use with single phase input Variable Speed Drives.
Motors 4 kW and larger are 380 – 415 Volt 50 Hz DELTA connected.
Motors can be manufactured for supply systems of up to 1100 Volts, 50 or 60 Hz on a factory made to order basis or by local rewind / wind.

Motor Types / MEPS (Minimum Efficiency Performance Standard)
All motors meet or exceed the Minimum Efficiency level requirements of the Australian / New Zealand Standard "AS/NZS1359.5-2004" to Table B2 where applicable.

Performance
Motors are designed to meet the performance requirements of Design N as per AS60034.1, normal torque for Direct On Line starting.
Motors are also suitable for other means of starting, depending on load characteristics, please refer to TECO.
Motors can be manufactured to provide special performance characteristics to suit specific applications as required.

Standards
Motors are designed, manufactured and tested in accordance with AS1359, AS60034, IEC60072 with Quality Assurance to ISO9001.
Frame sizes are to AS1359.30 CENELEC HD231 allocations. However, there are some exceptions where motors are designed to meet the AS/BS frame allocations AS1359 as detailed in "Performance Data" on pages 5-7, and Dimensions on page 8.

Stator and Windings
High grade insulated cold rolled electro magnetic steel laminations.
Standard insulation is Class F insulation (155°C) with the Severe Duty model utilising full Class H materials (180°C).
Windings are designed with a maximum temperature rise of class B for long motor life and thermal reserve for abnormal conditions.
Windings are random wound double enamelled copper wire, impregnated with a solventless resin and all motors are tropicalised as standard.

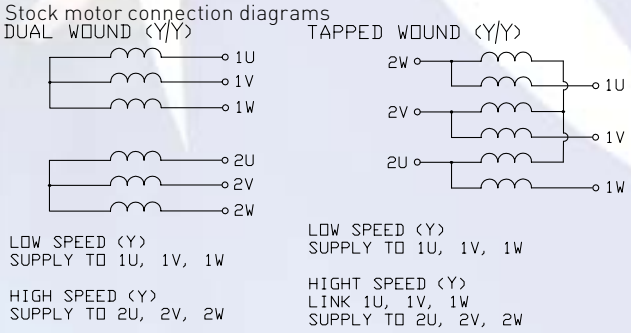
Testing
In addition to a full program of tests during manufacture each motor is subjected to routine tests to AS60034.1 prior to despatch.

Two Speed Motors
Available ex stock are a variety of two-speed motors for variable torque applications (Centrifugal pump / Fan).
Pole configurations

Poles	2 / 4	4 / 8	4 / 6	6 / 8
Winding	Tapped	Tapped	Dual	Dual

Mandatory mounting and shaft dimensions are as per this catalogue, however overall Two Speed dimensions differ for 80 – 132 frames. Please refer TECO for outline drawings.

Stock motor connection diagrams



Refer to page 7 for performance data, other output powers and performance data is on request.

Variable Speed Drive (VSD) suitability
Motors are suitable for VSD duty, subject to torque and speed limitations depending on the load characteristics and correct installation of motor and drive. EDM protection can be provided as a modification when requested.

Winding Protection
Single speed motors frame sizes D160 and larger are fitted with PTC thermistor protection (P140) within the windings, one per phase, connected in series with the leads terminated in the main terminal box.
Thermistors are an optional extra on all two speed motors.

Mechanical Design and Standards

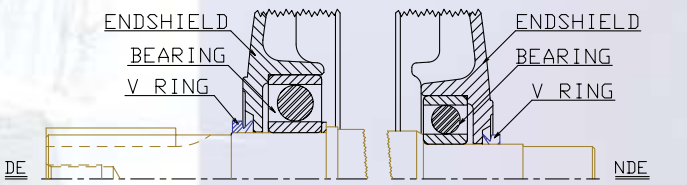
Balance

All rotors are dynamically balanced with a half key to Class N or better, in accordance with AS1359.114.

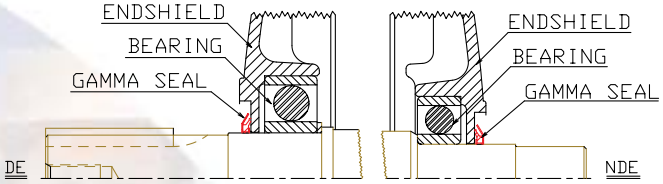
Bearing and Lubrication System

Frame size	Poles	DE Bearing	NDE Bearing	Greasing
D80 ~ D160	All	Ball	Ball	Greased for life
D180 ~ D400	2	Ball	Ball	Grease relief
D180 ~ D225	4 and above	Ball	Ball	Grease relief
D250 ~ D355	4 and above	Roller (Ball)	Ball	Grease relief
D400	All	Ball (Roller)	Ball	Grease relief

Notes:
- (Items in the parentheses are alternatives).
- 2 Pole motors up to D180 are suitable for direct drive or belt drive.
- 2 Pole motors D200 and larger are suitable for direct drive, belt drive above D200 please refer to TECO.
- Stock motors 4 Pole and larger, up to and including D355 are suitable for direct drive or belt drive.
- D400 4 Pole and slower, please refer to TECO with drive details for correct bearing selection.
- Grease Relief system enables motor to be re-greased during operation.
- V-ring shaft seals are standard but metal backed Gamma seals are used on the Severe Duty models.



STANDARD BEARING ARRANGEMENT WITH V RING SEALS



SEVERE DUTY BEARING ARRANGEMENT WITH GAMMA SEALS

Cooling System
- Cooling is Totally Enclosed Fan Cooled (TEFC), with integrally cast cooling fins on frame and is fitted with external fan (IC411) to AS1359.106.
- The cooling fans are bi-directional and low noise as standard (larger 2 pole may have uni-directional fans for low noise).

Finish
- All castings are mechanically cleaned and de-greased.
- Cast Iron components are primed internally and externally with an epoxy red oxide primer.
- Two finish coats of matt acrylic resin are applied providing a high corrosion protected surface. Finish colour TEAL T63 (standard), GLOSS BLUE JADE T24 (Severe Duty), colours are to AS2700.

Hardware
- All hardware is electro zinc plated for better corrosion resistance.
- Stainless steel hardware can be offered as an alternative, please contact TECO for the surcharge to provide this feature.

Mounting
- Motors are available in the following mountings -
- Foot mounted
- Foot and Flange mounted
- Flange mounted
- Foot and C Face mounted
- C Face mounted

Motor Construction
- Cast Iron frame with integrally cast feet and cast iron end shields.
- Castings are machined to close tolerances for accurate alignment and minimum vibration.
- External cooling fan is polypropylene and some larger size motors utilize metallic fans.
- Fan cover is pressed steel.

Rating Plate
- A stainless steel rating plate containing all details as specified in AS1359.4 including bearing sizes is fitted to all motors.

Rotor Assembly

- High grade insulated cold rolled electro magnetic steel laminations.
- Rotor cage is pressure die cast high conductivity aluminium with wafter blades and balance supports integrally cast onto the rotor endrings.
- The rotor is pressed and keyed (on larger motors) to a high tensile steel shaft.

Smoke Spill

- Smoke Spill to AS1668.1:1998 is available on modified stock motors, direct driving axial fan, cooling IC418.
- Motor sizes available are D80 ~ D280, 4 pole and slower, single or multi-speed and have been tested in conjunction with TECO Variable Speed Drives to AS4429-1999 for either dual purpose or emergency use.

Time / temperature ratings

Rating	Time (minutes)	Temperature (°C)	Motor Insulation Class
1	120	200°C	F
2	30	300°C	H

Terminal Box

- Terminal box is top mounted on motor frame with all metal to metal joints provided with neoprene gaskets.
- Base – Lid surfaces are machined and fitted with one-piece neoprene gasket providing terminal boxes with an IP66 rating and has a "wrap over" casting on lid.
- Terminal box can be rotated in 90° steps through 360° for alternate cable entry orientations.

Options

- Some available options in this range are as follows:
- Airstream rated IC418
- Anti-condensation heaters
- Auxiliary terminal boxes for Thermistor / Heater / RTD terminations
- Cooling Tower application
- Double / non standard shaft extensions
- Electromechanical "fail safe" Brake Motors
- Encoder / Tacho
- Force cooling IC416
- Insulated bearing
- IP56, IP65 & IP66 enclosure
- Multi-speed motors, certain 2 speed motors are ex stock
- Resistance temperature detectors (RTD's) winding and / or bearing
- Rotor Groundary brush
- Smoke Spill
- Special paint systems / colours
- Stainless steel fasteners
- Thermistor protection (on motor frames <D160)
- Others on request



MONARCH GX - ***Severe Duty***

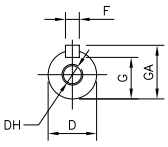
CAST IRON TEFC THREE PHASE SQUIRREL CAGE INDUCTION MOTORS
MONARCH GX RANGE 80 - 400L FRAME (415V 50Hz)

OUTPUT kW	FULL LOAD RPM	FRAME NO.	EFFICIENCY			POWER FACTOR			CURRENT		TORQUE			INERTIA	dB(A)	WEIGHT foot mount (kg)
			FULL LOAD (%)	3/4 LOAD (%)	1/2 LOAD (%)	FULL LOAD (%)	3/4 LOAD (%)	1/2 LOAD (%)	FULL LOAD (A)	LOCKED ROTOR (%)	FULL LOAD Nm	LOCKED ROTOR %FLT	BREAK-DOWN %FLT	ROTOR J = GD2/4 kg-m2		
0.55	1430	80	80.7	80.8	78.2	75.0	65.0	53.0	1.3	650	3.67	220	220	0.0016	50	20
	885	80	65.0	68.5	65.7	71.0	61.0	47.0	1.45	470	5.91	190	210	0.0026	46	21
	710	90L	73.5	74.4	71.3	61.0	51.0	39.0	1.74	400	7.50	180	200	0.0053	48	31
0.75	2855	80	80.5	81.5	79.4	83.0	75.0	62.0	1.56	680	2.51	220	230	0.0010	59	18
	1430	80	82.2	82.2	79.3	75.0	66.0	53.0	1.76	660	5.00	220	220	0.0020	50	21
	950	90S	77.7	78.8	75.7	72.0	59.0	47.0	1.81	590	7.56	200	210	0.0038	49	23
	710	100L	73.5	75.7	72.8	67.0	58.0	44.0	2.33	400	10.2	180	200	0.0078	51	33
1.1	2860	80	82.2	84.8	83.4	83.0	76.0	64.0	2.22	720	3.68	220	230	0.0013	59	20
	1440	90S	83.8	83.8	81.9	77.0	67.0	55.0	2.54	680	7.31	230	230	0.0030	53	26
	950	90L	79.9	82.0	79.2	73.0	63.0	51.0	2.62	590	11.1	200	210	0.0053	49	31
	710	100L	76.3	79.1	76.9	69.0	59.0	45.0	3.18	500	15.0	180	200	0.0107	51	38
1.5	2885	90S	84.1	85.2	83.5	85.0	79.0	69.0	2.95	750	4.96	220	230	0.0020	64	25
	1440	90L	85.0	85.4	83.5	77.0	68.0	55.0	3.32	700	9.96	230	230	0.0038	53	31
	955	100L	81.5	81.3	78.7	75.0	62.0	50.0	3.51	600	15.0	200	210	0.0107	53	38
	700	112M	78.4	80.8	79.4	69.0	61.0	47.0	3.86	500	20.5	180	200	0.0162	53	52
2.2	2875	90L	85.6	86.8	86.0	85.0	81.0	71.0	4.21	760	7.28	220	230	0.0026	64	29
	1450	100L	86.4	86.1	84.3	81.0	73.0	61.0	4.43	740	14.5	230	230	0.0077	56	40
	955	112M	83.4	84.3	83.0	76.0	67.0	56.0	4.96	650	22.0	200	210	0.0151	57	52
	715	132S	80.9	82.9	81.8	71.0	65.0	51.0	5.33	600	29.5	180	200	0.0331	53	67
3	2880	100L	86.7	88.2	88.0	87.0	86.0	78.0	5.53	810	9.96	220	230	0.0042	68	39
	1450	100L	87.4	87.0	84.5	81.0	71.0	59.0	6.12	740	19.8	230	230	0.0093	56	44
	970	132S	84.9	86.0	83.9	76.0	67.0	55.0	6.47	680	29.6	210	210	0.0318	61	67
	715	132M	82.7	84.4	83.1	71.0	62.0	49.0	7.01	550	40.0	200	200	0.0440	56	80
4	2910	112M	87.6	87.4	86.7	88.0	85.0	76.0	7.22	830	13.1	220	230	0.0058	69	50
	1455	112M	88.3	88.0	86.0	82.0	72.0	59.0	8.08	750	26.3	230	230	0.0128	57	58
	970	132M	86.1	88.3	87.7	76.0	69.0	56.0	8.73	690	39.4	210	210	0.0394	61	78
	720	160M	84.2	88.0	87.5	73.0	69.0	60.0	8.9	600	54.6	190	210	0.0771	60	105
5.5	2920	132S	88.5	89.8	89.0	88.0	85.0	77.0	9.94	830	18.0	220	230	0.0128	72	69
	1455	132S	89.2	89.4	88.2	83.0	77.0	68.0	10.6	780	36.1	230	230	0.0285	63	70
	970	132M	87.4	87.7	86.2	77.0	66.0	55.0	12.0	710	54.2	210	210	0.0494	61	87
	715	160M	85.8	88.4	87.8	74.0	70.0	58.0	11.9	600	73.3	200	200	0.0989	60	113
7.5	2920	132S	89.5	90.1	89.2	88.0	86.0	80.0	13.4	770	24.6	220	230	0.0151	72	75
	1455	132M	90.1	90.4	89.4	84.0	78.0	68.0	14.0	740	49.2	230	230	0.0366	63	90
	970	160M	88.5	89.9	89.5	78.0	74.0	64.0	14.9	670	74.1	210	210	0.0964	65	118
	720	160L	87.2	88.6	87.9	75.0	71.0	59.0	16.0	600	99.9	200	200	0.131	60	139
10	1460	132M	90.1	91.1	90.9	84.0	77.0	66.0	18.4	740	60.3	230	230	0.0390	67	94
11	2940	160M	90.6	90.9	90.3	89.0	88.0	83.0	19.5	750	35.7	220	230	0.0489	78	120
	1470	160M	91.0	91.7	91.2	85.0	80.0	71.0	20.0	700	71.8	220	230	0.0771	67	122
	970	160L	89.8	90.5	89.9	79.0	71.0	60.0	21.8	690	108	200	210	0.127	65	140
	730	180L	88.8	89.0	88.6	76.0	72.0	62.0	22.5	660	144	200	200	0.214	62	184
15	2940	160M	91.3	91.6	90.9	89.0	88.0	84.0	26.8	750	48.8	220	230	0.0559	78	128
	1470	160L	91.8	92.1	91.8	85.0	80.0	72.0	26.5	700	97.6	220	230	0.101	67	146
	980	180L	90.7	90.4	88.8	81.0	79.0	70.0	27.6	720	146	200	210	0.201	65	185
	730	200L	90.0	90.3	89.5	76.0	74.0	63.0	30.3	660	197	200	200	0.401	65	260
18.5	2940	160L	91.8	91.6	91.0	89.0	89.0	84.0	32.6	750	60.1	220	230	0.0648	78	142
	1470	180M	92.2	92.0	91.6	86.0	85.0	77.0	32.5	750	120	220	230	0.152	68	179
	985	200L	91.3	91.1	90.6	81.0	78.0	72.0	34.8	720	180	210	210	0.325	68	242
	735	225S	90.7	90.7	89.8	76.0	69.0	57.0	37.7	660	241	190	200	0.529	65	275

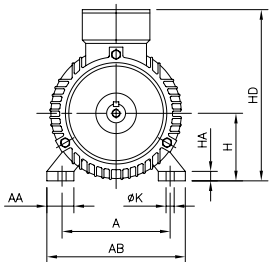
Notes:
1. Output at 415V also suitable for 380V and 400V operation.For 380V multiply full load current by 1.092. For 400V multiply full load current by 1.0375.
2. Test Method : AS1359 , Table 2 , Method B.
3. Tolerance : AS60034.1
4. dB(A): Mean Sound Pressure Level at no load and 1 metre.

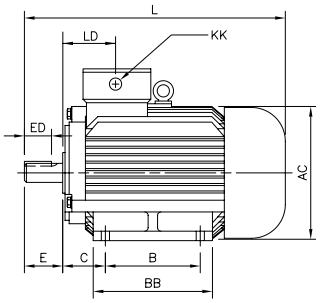
MONARCH GX CAST IRON 3 - PHASE SQUIRREL CAGE INDUCTION MOTORS FRAME 80 - 400 FOOT MOUNT

TOTALLY ENCLOSED FAN COOLED SQUIRREL CAGE ROTOR



SHAFT DETAIL





OUTPUT kW				FRAME SIZE	A	AA	AB	AC	B	BB	C	H	HA	HD
2P	4P	6P	8P											
0.75/1.1	0.55/0.75	0.55	-	80	125	34	160	160	100	130	50	80	10	235
1.5	1.1	0.75	-	90S	140	36	180	175	100	130	56	90	12	255
2.2	1.5	1.1	-	90L	140	36	180	175	125	210	56	90	12	255
3	2.2/3	1.5	0.75/1.1	100L	160	40	200	200	140	235	63	100	14	270
4	4	2.2	1.5	112M	190	45	230	220	140	250	70	112	15	300
5.5/7.5	5.5	3	2.2	132S	216	55	270	275	140	230	89	132	18	345
-	7.5	4/5.5	3	132M	216	55	270	275	178	270	89	132	18	345
11/15	11	7.5	4/5.5	160M	254	65	320	314	210	250	108	160	20	420
18.5	15	11	7.5	160L	254	65	320	314	254	294	108	160	20	420
22	18.5	-	-	180M	279	70	355	348	241	311	121	180	22	455
-	22	15	11	180L	279	70	355	348	279	349	121	180	22	455
30/37	30	18.5/22	15	200L	318	70	395	386	305	369	133	200	25	505
-	37	-	18.5	225S	356	75	435	432	286	368	149	225	28	560
45	-	-	-	225M	356	75	435	432	311	393	149	225	28	560
-	45	30	22	225M	356	75	435	432	311	393	149	225	28	560
55	-	-	-	250M	406	80	490	472	349	445	168	250	30	615
-	55	37	30	250M	406	80	490	472	349	445	168	250	30	615
	75**			250M	406	80	490	472	349	445	168	250	30	615
75	-	-	-	280S	457	85	550	534	368	530	190	280	35	700
-	75	45	37	280S	457	85	550	534	368	530	190	280	35	700
90/110**	-	-	-	280M	457	85	550	534	419	581	190	280	35	700
-	90	55	45	280M	457	85	550	534	419	581	190	280	35	700
-	110**	-	-	280M	457	85	550	534	419	581	190	280	35	700
110	-	-	-	315S	508	120	635	620	406	616	216	315	45	815
-	110	75	55	315S	508	120	635	620	406	616	216	315	45	815
132	-	-	-	315M	508	120	635	620	457	676	216	315	45	815
-	132	90	75	315M	508	120	635	620	457	676	216	315	45	815
160/200	-	-	-	315L	508	120	635	620	508	726	216	315	45	815
-	160/200	110/132	90/110	315L	508	120	635	620	508	726	216	315	45	815
250	-	-	-	355M	610	116	730	710	560	820	254	355	52	1010
-	250(D)	160/200	132/160	355M	610	116	730	710	560	820	254	355	52	1010
-	250(B)	-	-	355M	610	116	730	710	560	820	254	355	52	1010
315	-	-	-	355L	610	116	730	710	630	820	254	355	52	1010
-	315(D)	250	200	355L	610	116	730	710	630	820	254	355	52	1010
-	315(B)	-	-	355L	610	116	730	710	630	820	254	355	52	1010
-	355/400 450/500	315/355 400/450	250/315 355	400L***	686	150	840	810	710	1075	280	400	55	1160

FRAME SIZE					SHAFT EXTENSION							BEARINGS	
	K	KK	L	LD	D	E	ED	F	G	GA	DH	DE	NDE
80	10	M25x1.5	300	75	19	40	22	6	15.5	21.5	M6x12	6204ZZ	6204ZZ
90S	10	M25x1.5	355	75	24	50	32	8	20	27	M8x16	6205ZZ	6205ZZ
90L	10	M25X1.5	385	75	24	50	32	8	20	27	M8x16	6205ZZ	6205ZZ
100L	12	M32x1.5	430	83	28	60	40	8	24	31	M10x20	6206ZZ	6206ZZ
112M	12	M32x1.5	465	87	28	60	40	8	24	31	M10x20	6206ZZ	6206ZZ
132S	12	M32x1.5	510	102	38	80	56	10	33	41	M12x24	6208ZZ	6208ZZ
132M	12	M32x1.5	550	102	38	80	56	10	33	41	M12x24	6208ZZ	6208ZZ
160M	15	M40x1.5	615	142	42	110	80	12	37	45	M16x32	6309ZZ(6209ZZ)	6209ZZ
160L	15	M40x1.5	670	142	42	110	80	12	37	45	M16x32	6309ZZ(6209ZZ)	6209ZZ
180M	15	M40x1.5	700	164	48	110	80	14	42.5	51.5	M16x32	6311(6211)	6211
180L	15	M40x1.5	740	164	48	110	80	14	42.5	51.5	M16x32	6311(6211)	6211
200L	19	M50x1.5	770	191	55	110	80	16	49	59	M20x40	6312(6212)	6212
225S(4-8)	19	M50x1.5	815	191	60	140	100	18	53	64	M20x40	6313	6312
225M(2)	19	M50x1.5	820	197	55	110	80	16	49	59	M20x40	6312	6312
225M(4-8)	19	M50x1.5	845	197	60	140	100	18	53	64	M20x40	6313	6312
250M(2)	24	BLANK	910	215	60	140	100	18	53	64	M20x40	6313	6313
250M(4-8)	24	BLANK	910	215	65	140	100	18	58	69	M20x40	NU314	6313
250M(75kW)	24	BLANK	910	215	70	140	110	20	62.5	74.5	M20x40	NU315	6313
280S(2)	24	BLANK	1000	221	65	140	100	18	58	69	M20x40	6314	6314
280S(4-8)	24	BLANK	1000	221	75	140	100	20	67.5	79.5	M20x40	NU317	6314
280M(2)	24	BLANK	1050	221	65	140	100	18	58	69	M20x40	6314	6314
280M(4-8)	24	BLANK	1050	221	75	140	100	20	67.5	79.5	M20x40	NU317	6314
280M(110kW)	24	BLANK	1050	221	80	170	140	22	71	85	M20x40	NU317	6314
315S(2)	28	BLANK	1178	257	65	140	100	18	58	69	M20x40	6317	6317
315S(4-8)	28	BLANK	1208	257	80	170	130	22	71	85	M20x40	NU319	6319
315M(2)	28	BLANK	1238	257	65	140	100	18	58	69	M20x40	6317	6317
315M(4-8)	28	BLANK	1268	257	80	170	130	22	71	85	M20x40	NU319	6319
315L(2)	28	BLANK	1288	257	65	140	100	18	58	69	M20x40	6317	6317
315L(4-8)	28	BLANK	1318	257	80	170	130	22	71	85	M20x40	NU319	6319
355M(2)	28	BLANK	1500	284	75	140	100	20	67.5	79.5	M20x40	6319	6319
355M(4-8)	28	BLANK	1530	284	95	170	130	25	85	99	M24x48	NU322	6322
355M(250kW)	28	BLANK	1530	284	110	210	170	28	100	116	M24x48	NU324	6322
355L(2)	28	BLANK	1500	284	75	140	100	20	67.5	79.5	M20x40	6319	6319
355L(4-8)	28	BLANK	1530	284	95	170	130	25	86	100	M24x48	NU322	6322
355L(315kW)	28	BLANK	1530	284	110	210	170	28	100	116	M24x48	NU324	6322
400L(4-8)	35	BLANK	1910	425	100	210	170	28	90	106	M24x48	NU324	6324

Notes:

1. Dimensional data subject to change without notice.
2. Lifting facilities provided on motors frame size D100 and larger.
3. For tolerances see page 11.
4. Bearing numbers in brackets apply to 2 pole motors.
5. **AS1359 Australian/British frame allocations available for 110kw 2 pole, 75kw and 110kw 4 pole.
6. Two speed motor mandatory mounting and shaft dimensions are as per this catalogue except for 80 - 132 frame . Refer Teco for two speed motor outline drawings.
7. D = direct drive , B = belt drive.
8. *** = Direct drive only , refer teco for belt drive dimensions.



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