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Marathon SCV (IE2) & TCV (IE3) Low Voltage Crane Duty Motors

May 2025
India

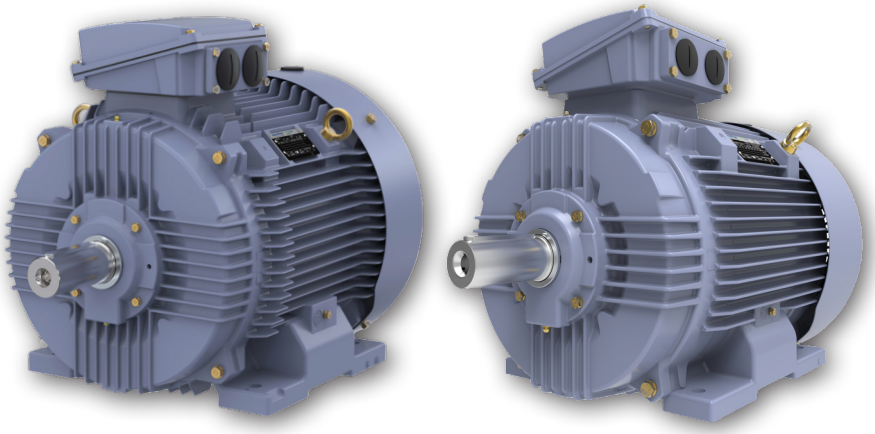
marathon™ WEG Group

Driving efficiency and sustainability

WEG



MARATHON® SCV (IE2) & TCV (IE3) LOW VOLTAGE CRANE DUTY MOTORS



Marathon introduces SCV and TCV motors tailor made for inverter drives having ehanced dielectric strength and adequate thermal margin suitable for variable speed application.

PWM technology involving high switching frequency IGBT drive has enabled AC induction motors to be operated as variable speed drives. However, there had been a documented increase of premature winding failure for standard general purpose motors when operated with inverter drives.

High and steep front voltage spikes (dV/dt) produced by latest generation IGBT drives associated with the phenomenon of voltage wave reflection due to longer cable length imposes stress on the motor winding resulting rapid ageing and deterioration of insulation system.

The rating for Variable speed motors need to be selected based on following aspects:

- Heating due to harmonic content of inverter waveform
- Reduced ventilation due to low speed operation
- Constant torque/ Constant Power/ Variable Torque requirement of load
- Other limiting factors e.g. maximum premissible motor speed, ambient temperature altitude etc.

Whle variable speed drives provide highest energy saving for variable torques (Centrifugal pump, fan) applications, for constant torque and constant power applications, Variable speed drives offer significant process control improvements. Basic inverters permit operation over a typical 20:1 speed range. With closed loop vector control the effective range may be increased to 1000:1.

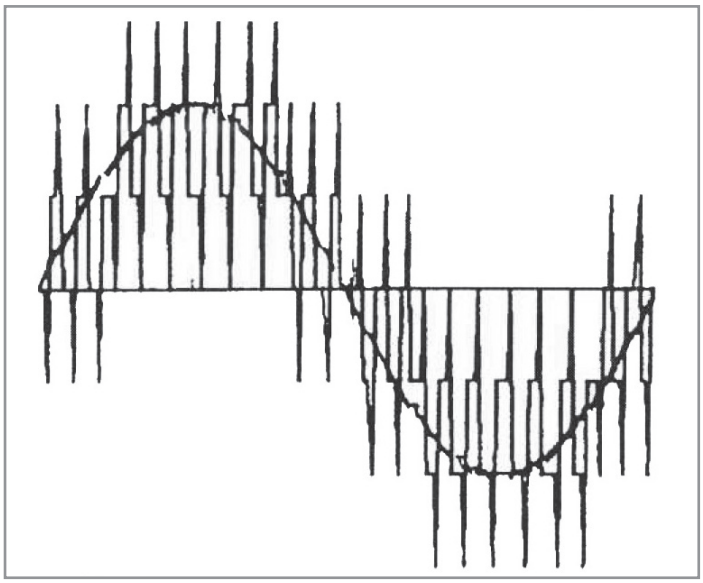


Fig. 1 Typical sine wave generated by inverter pulse

Principle of operation

So far DC motor had been the only choice where precise torque and speed control was required. AC induction motor has no direct control over the currents of the rotor, so a rapid transient response from one steady state to another had been a problem. Through highly sophisticated motor modeling algorithms and internal circuitry, the vector control drive has solved this problem. With quick instantaneous changes in the stator current, quick instantaneous changes occur in the rotor current. Vector drive manipulates the motor toque by indirectly controlling the current of the rotor through the stator windings. Calculating and quantifying the corresponding changes in the rotor current is the genius of the vector drive. Some vector control drives also require position feedback from a shaft mounted encoder. Vector Control associated with space vector modulation techniques for voltage source inverters have enabled to achieve high quality current and torque response using induction motor drives.

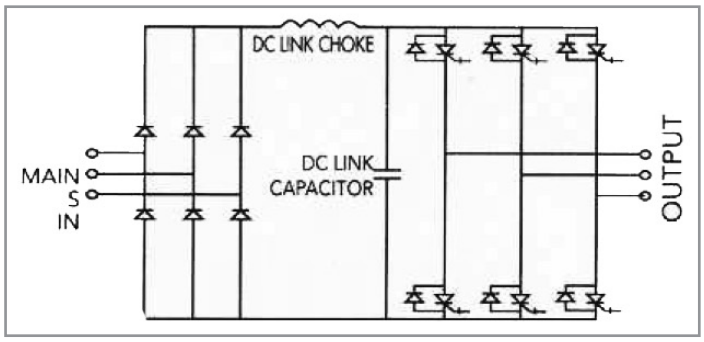


Fig. 2 Typical Voltage Source PWM Inverter

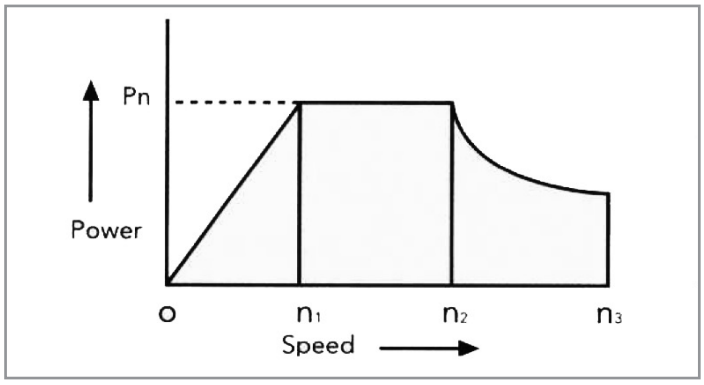


Fig. 3

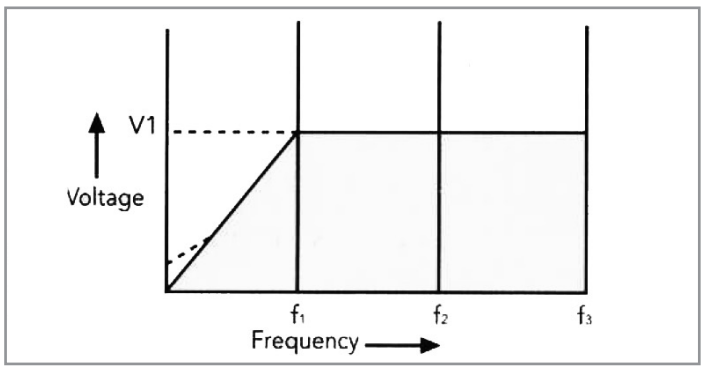


Fig. 4

Mostly voltage source inverters employing PWM control is employed for variable speed drives. PWM voltage source inverters employ a converter section comprising of a rectifier bridge supplying power to DC link filter which operates at a nominal constant voltage. The DC link supply is fed to the inverter section converting DC to AC through a 3 Phase bridge comprising high speed witching devices (IGBT) producing a variable voltage variable frequency sinusoidal supply for the motor.

Inverters would deliver a proportional voltage and frequency up to base voltage (V1) and base frequency f1 (Corresponding base speed n1) set by the user. Beyond base frequency, voltage (V1) remains fixed as per available supply voltage up to maximum permissible frequency f2 (Corresponding speed n2) and f3 (Corresponding speed n3). Motor output rating becomes proportional to frequency up to f1 and motor output remains constant beyond f1 up to f2 and motor operates with reduced output upto maximum permissible frequency f3. f2 is normally decided by limiting motor temperature rise owing to higher iron loss at higher frequency and high windage loss (Self cooled motors) and minimum P.O.T requirement. f3 is decided mainly based on maximum speed limitation imposed by bearing and rotor assembly. Operating flux of the motor remains constant up to base frequency (f1) by keeping V/F as constant. However, at low frequencies (<10Hz). It is necessary to provide boost to maintain required torque at CMR rating.

Speed (n)	Torque (T)	Power (P)	Voltage (V)
o - n_1	Constant	pan	V/f
n_1 - n_2	Ta 1/n	Constant	V_1
n_2 - n_3	Ta $1/n^2$	Pa 1/n	V_1

Table 1

Note:

n_1 = Speed at base frequency (f1)

n_2 = Maximum speed at maximum motor torque

n_3 = Maximum speed at reduced output

Rating

Construction	Frame Size	Output Range
Cast Iron Body	SCV80 - SCV355	4 Pole : 0.37 kW - 375 kW
		6 Pole : 0.37 kW - 315 kW
	TCV80 - TCV355	4 Pole : 0.37 kW - 375 kW
		6 Pole : 0.37 kW - 315kW

Table 2

Standards

SCV and TCV series motors are manufactured to the following national and international standards.

Standards	India	International
		IEC
Dimensions Protection Mounting Performance n_2 - n_3	IS 1231	IEC60072-1
	124691	IEC60034-5
	IS2253	IEC60034-7
	-	IEC/TS-60034-17/ IEC/TS-60034-25
Cooling	IS6362	IEC 60034-6

Table 3

These motors meet in general MG1-Pt.31 requirement for "Definite Purpose Inverter Fed Motors". These motors up to 460V base voltage are designed for:

- Peak voltage 1700V
- Carrier Switching Frequency: 3-5 Hz
- Voltage rise time>0.1 microsec.
- Total harmonic distortion 5% dv/dt - 5600

Motors with still higher base voltage up to 690V are designed suitable for still higher peak voltage.

Supply Voltage and Frequency

These standard motors are suitable for operation for a mains supply of 3 Phase, 415V+/-10%, 50Hz+/-5%. However motors can be offered for any vase voltage from 200V to 690V.

Protection

These motors are provided with IP55 degree of protection as standard. IP56 degree and above of protection can be provided on request.

Duty

These series crane duty motors which are suitable for S4/ S5 duty ratings are available as a separate range. Motor to suit other duty conditions may be offered on request.

Insulation and Temperature Rise

The motors are designed suitable for 50°C ambient temperature and provided with class F insulation with temperature rise limiting to class B limit. Research have shown that thermal margin enhances dielectric performance of inverter fed motors significantly. Class H insulation may be offered on request. Motor re-rating factor due to ambient temperature and altitude is indicated in the motor selection chart. Apart from many other specific design considerations. These motors are provided with special insulation system to withstand voltage stresses imposed by IGBT based drives comprising of the following:

- Special grade of wire insulation depending on motor rating
- Vacuum impregnation/ multi dip treatment
- Tropicalization treatment
- Phase separator/ overhang tape

Cooling

Standard motors are suitable for operation with shaft mounted fan with standard IC411 cooling configuration.

Various forms of cooling is given below:

Code	Arrangement
IC411	Totally Enclosed Fan Cooled (TEFC). Motor cooled by its own shaft driven externally mounted fan. Cooling effect reduces with reduction of speed. Overspeeding increases Windage loss and noise level
IC410	Totally Enclosed Non Ventilated (TENV). Free convection (self cooling), no external mounted fan
IC418	Totally Enclosed Air Over (TEAO) motor cooled by airstream. Cooling effect reduces with reduced airstream velocity.
IC416	Totally Enclosed Force cooled. Motor cooled by independent fan. Constant cooling throughout speed range.

Table 4

Consideration for variable speed operation

Variable speed drives are used for operation both at low and high speed. Cooling for variable speed motors gets affected while operating at lower speed whereas during high speed operation windage losses, bearing lubrication, increase ion noise level, increased temperature due to shaft seals if any require special attention. Maximum permissible speed for these standard motors are indicated in Table 5. At low speed (below 10Hz) loss distribution changes substantially which may lead to higher surface temperature. Temperature rise near bearing location should be periodically checked to ascertain that they are within limit. For sustained operation at low speed separate Force Ventilation (FV) unit is recommended. FV unit is also used to restrict windage loss and motor noise when the motor runs frequently near to highest permissible operating speed of the bearing system. For applications necessitating higher speed than 80Hz refer to us.

Frame	Maximum permissible R.P.M.
80-160	6000
180	4800
200	4500
225 - 280	3600
315 - 2 Pole	3600
315 - 4, 6 Pole	3000
355 - 2 Pole	3600
355 - 4, 6 Pole	2500

Table 5

Force Ventilation Unit

Force ventilation unit replaces integral shaft mounted fan with an independently mounted separately excited motor drive fan. The unit provides constart airflow to the drive motor throughout speed range. Totally Enclosed Air ove motor/ TEFC motor, depending on the design of FV unit, is provided to drive the independent fan. Fan motor rating depends on the rating and size of drive motor. Specially designed axial flow fan with optimized air delivery, low noise level and minimum power input is provided.

Following table provides brief specification of standards FV unit. However, FV unit specification is normally reviewd with drive requirement and is subject to change as required.

Frame	Supply	Current Amps	Input Watts	Increase in Overall Length Without Encoder mm	Air delivery CMH
132	3PH, 415V, 50HZ	0.3	120	167	1700
160		0.3	120	130	1700
180		0.3	100	138	1850
200		0.45	135	148	3380
225		0.45	135	109	3380
250		0.45	135	110	3380
280		0.45	135	113	4450
315		0.45	135	93	4450
355		0.45	135	59	4450

Table 6

Policy: Every care has been taken to ensure the accuracy of the information contained in the publication, but due to a policy of continuous development and improvement, the right is reversed to supply product which may differ slightly from those illustrated and describes in this publication.

Bearing

Metric size ball and roller bearings are used, Double sealed bearings are provided with high temperature grease suitable for operation up to 100°C. Grease relief arrangement is provided for motors having re-greasing facility.

Frame Size	Pole	Drive End	Non-Drive End
80	2P~4P	6204 / C3 / 2Z	6204 / C3 / 2Z
90	2P~8P	6205 / C3 / 2Z	6205 / C3 / 2Z
100	2P~8P	6206 / C3 / 2Z	6206 / C3 / 2Z
112	2P~8P	6306 / C3 / 2Z	6206 / C3 / 2Z
132	2P~8P	6308 / C3 / 2Z	6208 / C3 / 2Z
160	2P~8P	6309 / C3 / 2Z	6209 / C3 / 2Z
180	2P~8P	6311 / C3 / 2Z	6211 / C3 / 2Z
200	2P~8P	6312 / C3	6212 / C3
225	2P~8P	6313 / C3	6213 / C3
250	2P~8P	6314 / C3	6314 / C3
280	2P	6314 / C3	6314 / C3
280	4P~8P	6317 / C3	6317 / C3
315	2P	6316 / C3	6316 / C3
315	4P~8P	6319 / C3	6319 / C3
355	2P	6317 / C3	6317 / C3
355	4P~8P	6322 / C3	6322 / C3

Table 7

Bearing Current

Depending on motor size and supply voltage rating, bearing current may be generated owing to shaft voltage caused by high dV/dT Common Mode Voltage (CMV) and motor parasitic capacitance. Normally bearing fluting caused by such bearing currents are noted from motor rating 100KW upwards. For frame sizes 280 and above insulated bearing housing is provided as standards. Good installation practice can reduce the risk of bearing current. Some recommendations are as follows:

- Effective grounding of drive system components (drive, motor, driven equipment) ensure good HF bonding for potential equalization between drive
- components.
- Use of symmetrical motor cables with armour shield.
- Proper installation of motor cables and connections.

Electromagnetic Compatibility

By following inverter manufacturer's recommendation on earthing, screening, filters and cable layout, emission requirements of EN50081 and immunity level of EN50082 Part1 for domestic and part2 for industrial environments can be achieved.

Motor Protection

These motors in frame sizes 200 and above are recommended with thermistor protection as standard. 3 No.s PTC140 (Class B Rise) provided in winding overhand are connected in series and thermistors terminals are brought out to terminal box. For operation with Class F rise PTC160 thermistor may be provided.

Accessories

Encoders/tachogenerators are requires to provide close loop control between inverter and motor for accurate position control and monitoring. These units are fitted at NDE side on request.

Incremental encoders provide feedback on rotor movement by converting rotational movement into electrical signals used for numerical processing for precise speed control. Incremental encoders operating on photo electric measuring principle provides very high degree of measurement accuracy. AC Tacho-generators using permanent magnet rotor are used for simple speed monitoring and control. They convert the input speed to a three phase voltage whose magnitude and frequency is proportional to speed.

Drive Selection

Drive rating should be selected based on Rated Current of motor. For loads requiring higher acceleration torque a larger drive may be necessary since standard drives provide 150% FLT during acceleration. It should also be noted that motor performance is dependent on drive parameters Eg. Modulation process, carrier frequency, voltage rise time, cable length etc. Accordingly drive parameters as specified during motor selection.

Motor Selection

Selection of motor rating should be based on the following:

- Check the type of load and speed range - Constant Torque, Constant Power or Variable torque. For Constant torque application calculate Torque requirement throughout the speed range. Refer to “Motor selection chart (4 pole and 6 pole)” for selecting recommended motor frame size with Class B temp. Rise. For sustained operation at lower frequencies (<10 Hz) under constant torque condition and for sustained operation beyond base speed (Constant Power operation), force ventilated motor is recommended. For constant torque operation below 5Hz, refer to Marathon Electric for voltage boost details.
- Check and consider ambient temperature, altitude, supply voltage, frequency and variation to check motor rating. Apply re-rating factor as required
- Calculate acceleration time based on 150% motor torque superimposed on load characteristics and check whether this is acceptable. This is particularly important for high inertia drives. (Most drive are rated for a short time current of 150% rated current for 60 seconds).
- Check and ensure that maximum permissible motor speed (Table 5) is not exceeded.
- For constant power operation beyond 80Hz. Refer to Marathon Electric.

Date Required for Motor Selection

Following details are required for selecting motor rating/Frame size for variable speed drives.

- Supply voltage
- Base speed at Mains Frequency
- Motor polarity speed range
- Type of load-variable torque, constant torque, constant power
- Load characteristics and load GC^2 - calculate requires accelerating torque
- Duty details
- Motor enclosure

Altitude/ Ambient Deration

Ambient Temperature	40	45	50	55	60	65	70
% Output	106	103	100	97	93	88	84

Altitude in Metres	1000	1500	2000	2500	3000	3500	4000
% Output	100	97	94	90	86	81	75

Add in accessories

For crane duty motors; IE2 (SCV) & IE3 (TCV) series can be offered with respective equivalent S1 rating & efficiency.

For quick selection of frame & rating, refer to the performance data mention in the following pages.with respect to required CDF and no. of starts and stops.

Note: For better selection of crane application, motors can be offered with external electromagnet break for frame sizel 80M-160L (for offer, refer to Engineering.)

RATING SELECTION CHART - 4 POLE - DOL - IE2

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD^2 (Kg-m^2) Motor	LRA p.u.	LRT p.u.	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%					
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps				
0.37	80M	0.63	2.2	0.53	1.7	0.45	1.4	0.35	1.1	0.54	2.1	0.47	1.7	0.41	1.4	0.33	1.1	0.44	2.1	0.40	1.7	0.36	1.4	0.31	0.7	0.004	5.0	2.5	2.8
0.55	80M	1.0	3.0	0.80	2.4	0.67	1.9	0.53	1.5	0.83	2.9	0.72	2.3	0.62	1.9	0.50	1.5	0.70	2.8	0.63	2.3	0.56	1.9	0.47	1.1	0.005	6.0	2.5	2.7
0.75	80M	1.4	3.1	1.1	2.6	0.93	2.1	0.73	1.7	1.2	2.8	1.0	2.4	0.88	2.0	0.71	1.6	1.1	2.4	0.93	2.1	0.81	1.9	0.67	1.5	0.008	6.0	3.8	3.0
1.1	90S	1.9	4.2	1.6	3.5	1.3	3.0	1.1	2.4	1.6	3.6	1.4	3.1	1.2	2.7	1.0	2.2	1.3	3.0	1.2	2.7	1.1	2.4	0.92	2.1	0.014	5.9	2.9	2.8
1.5	90L	2.7	5.8	2.2	4.8	1.8	4.0	1.5	3.2	2.3	5.1	2.0	4.4	1.7	3.8	1.4	3.0	2.0	4.3	1.7	3.8	1.6	3.4	1.3	2.8	0.016	5.9	3.1	2.8
2.2	100L	3.9	8.3	3.2	6.8	2.7	5.7	2.1	4.5	3.4	7.2	2.9	6.2	2.5	5.3	2.0	4.3	2.9	6.1	2.6	5.4	2.3	4.8	1.9	4.0	0.025	6.2	3.0	3.3
3.0	100L	5.4	11	4.4	8.8	3.7	7.4	2.9	5.8	4.7	9.5	4.0	8.1	3.5	6.9	2.8	5.6	4.0	8.1	3.6	7.2	3.2	6.3	2.6	5.3	0.027	5.8	2.8	3.0
3.7	112M	6.1	12	5.1	9.7	4.4	8.3	3.5	6.6	5.0	9.4	4.4	8.4	3.9	7.4	3.2	6.2	4.0	7.6	3.7	7.0	3.4	6.4	2.9	5.5	0.058	6.5	2.5	2.9
4.0	112M	6.5	12	5.5	10	4.7	8.6	3.8	6.9	5.2	9.7	4.7	8.6	4.1	7.7	3.5	6.4	4.2	7.7	3.9	7.2	3.6	6.6	3.1	5.7	0.058	5.9	2.3	2.6
5.5	132S	9.4	18	7.8	15	6.6	13	5.3	10	7.9	15	6.9	13	6.0	12	5.0	9.5	6.5	13	5.9	11	5.3	10	4.6	8.8	0.091	7.6	3.3	3.5
7.5	132M	12.8	24	10.7	20	9.0	17	7.2	13	10.9	20	9.5	17	8.2	15	6.8	13	8.9	17	8.1	15	7.3	13	6.2	11	0.13	7.8	3.4	3.5
9.3	132M	16.1	30	13.4	25	11.3	21	8.9	17	13.7	26	11.9	22	10.3	19	8.5	16	11.4	21	10.3	19	9.2	17	7.8	15	0.15	6.5	3.4	3.5
11.0	160M	19.5	36	16.1	30	13.5	25	10.6	20	17.0	31	14.6	27	12.5	23	10.2	19	14.4	27	12.8	24	11.4	21	9.5	18	0.24	5.9	1.9	2.6
15.0	160L	27	50	22	41	18.5	34	14.6	27	24	44	20	38	17.5	32	14.1	26	21	38	18.3	34	16.1	30	13.3	24	0.28	6.4	2.2	2.9
18.5	180M	32	55	26	46	22	39	17.7	31	27	47	23	41	20	36	16.7	29	22	39	20.0	35	18.0	32	15.3	27	0.61	5.7	2.2	2.8
22.0	180L	37	66	31	55	26	47	21	37	32	56	28	49	24	42	19.8	35	26	46	24	42	21	37	18.1	32	0.68	6.2	2.6	3.0
30.0	200L	51	90	42	75	36	64	29	51	42	75	37	66	32	58	27	48	34	61	32	56	29	51	24	44	1.21	6.6	2.6	3.3

Note:

1. 225 frame onwards can be offered against enquiry.
2. IE2 efficiency and temperature rise are at S1 duty Kilowatt.
3. LRA, LRT & BDT are at S1 Kilowatt.
4. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

RATING SELECTION CHART - 4 POLE - VVVF DRIVE - IE2

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit
- Drive Type: PWM
- Carrier Switching: 3-5 kHz
- T.H.D.: < 2.5%
- Voltage Rise Tim > 0.1 µs
- Peak Voltage: 1700 V (Max)
- Max Cable Length: 100m (w/o filter)

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD² (Kg-m²) Motor	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%			
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps		
0.37	80M	0.73	2.2	0.58	1.7	0.47	1.4	0.37	1.1	0.70	2.2	0.57	1.7	0.47	1.4	0.37	1.1	0.67	2.2	0.55	1.7	0.46	1.4	0.36	0.9	0.0044	2.8
0.55	80M	1.1	3.0	0.86	2.4	0.71	1.9	0.55	1.5	1.1	3.0	0.85	2.4	0.70	1.9	0.54	1.5	1.0	3.0	0.83	2.4	0.69	1.9	0.54	1.3	0.0052	2.7
0.75	80M	1.5	3.4	1.2	2.7	1.0	2.2	0.75	1.7	1.5	3.4	1.2	2.7	1.0	2.2	0.74	1.7	1.4	3.3	1.1	2.6	0.95	1.7	0.74	1.7	0.0080	3.0
1.1	90S	2.2	4.8	1.7	3.8	1.4	3.2	1.1	2.5	2.1	4.7	1.7	3.8	1.4	3.1	1.1	2.4	2.0	4.5	1.6	3.7	1.4	2.4	1.1	2.4	0.0136	2.8
1.5	90L	3.0	6.5	2.3	5.2	1.9	4.2	1.5	3.3	2.9	6.3	2.3	5.1	1.9	4.2	1.5	3.3	2.8	6.1	2.3	5.0	1.9	3.2	1.5	3.2	0.0156	2.8
2.2	100L	4.3	9.2	3.4	7.3	2.8	6.0	2.2	4.7	4.2	9.0	3.4	7.2	2.8	5.9	2.2	4.6	4.1	8.7	3.3	7.1	2.8	4.6	2.2	4.6	0.025	3.3
3.0	100L	5.9	12	4.7	9.4	3.9	7.7	3.0	6.0	5.8	12	4.6	9.3	3.8	7.6	3.0	5.9	5.6	11	4.6	9.1	3.8	5.9	2.9	5.9	0.027	3.0
3.7	112M	7.2	14	5.8	11	4.7	9.0	3.7	7.0	6.9	13	5.6	11	4.6	8.8	3.6	6.9	6.5	12	5.4	10	4.5	6.8	3.6	6.8	0.058	2.9
4.0	112M	7.8	14	6.2	11	5.1	9.4	4.0	7.3	7.5	14	6.0	11	5.0	9.3	3.9	7.3	7.0	13	5.8	11	4.9	7.1	3.9	7.1	0.058	2.6
5.5	132S	10.8	21	8.6	17	7.0	14	5.5	11	10.5	20	8.4	16	7.0	13	5.4	10	10.0	19	8.2	16	6.8	10	5.4	10	0.091	3.5
7.5	132M	14.7	27	11.7	22	9.6	18	7.5	14	14.3	26	11.5	21	9.5	18	7.4	14	13.7	25	11.2	21	9.3	14	7.3	14	0.13	3.5
9.3	132M	18.3	34	14.5	27	11.9	22	9.3	17	17.8	33	14.3	27	11.8	22	9.2	17	17.1	32	13.9	26	11.6	17	9.1	17	0.15	3.5
11.0	160M	21	38	16.8	31	13.9	26	10.8	20	19.3	36	16.0	29	13.4	25	10.6	20	17.4	32	14.9	27	12.7	19	10.3	19	0.24	2.6
15.0	160L	29	53	23	43	19.0	35	14.9	27	27	50	22	41	18.6	34	14.6	27	25	47	21	39	17.9	26	14.3	26	0.28	2.9
18.5	180M	35	61	28	49	23	41	18.2	32	32	56	26	46	22	39	17.7	31	28	50	24	43	21.0	30	17.0	30	0.61	2.8
22.0	180L	42	74	34	59	28	49	22	38	39	69	32	57	27	48	21	38	35	63	30	53	26	36	21	36	0.68	3.0
30.0	200L	56	100	46	81	38	67	30	53	52	92	43	77	36	65	29	51	46	83	40	71	34	49	28	49	1.21	3.3
37.0	225S	67	116	55	95	46	79	36	63	59	103	50	87	43	75	35	60	50	88	45	78	39	57	33	57	2.12	2.9
45.0	225M	82	141	67	115	56	96	44	76	73	126	62	107	53	91	42	73	63	109	55	95	48	69	40	69	2.35	2.9
55.0	250M	98	167	80	137	67	115	53	91	85	145	73	125	63	107	51	87	72	123	64	109	57	81	48	81	3.26	2.6
75.0	280S	126	215	106	180	89	152	71	122	105	179	93	158	81	138	67	114	86	146	79	134	71	104	61	104	6.32	2.9
90.0	280M	153	257	128	215	108	181	86	144	129	216	113	189	98	165	81	136	106	177	96	161	87	146	74	124	7.37	2.9

Note:
1. IE2 efficiency and temperature rise are at S1 duty Kilowatt.
2. BDT are at S1 on sinusodial supply.
3. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

RATING SELECTION CHART - 6 POLE - DOL - IE2

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD^2 ($Kg\text{-}m^2$) Motor	LRA p.u.	LRT p.u.	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%					
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps				
0.75	090S	1.4	3.6	1.1	3.0	0.9	2.5	0.7	1.9	1.2	3.2	1.0	2.7	0.9	2.3	0.7	1.9	1.0	2.8	0.92	2.5	0.8	2.1	0.7	1.8	0.0144	3.9	2.5	2.6
1.1	090L	2.0	5.2	1.7	4.2	1.4	3.5	1.1	2.7	1.8	4.7	1.5	3.8	1.3	3.3	1.0	2.7	1.6	4.1	1.4	3.6	1.2	3.1	1.0	2.5	0.0192	4.0	2.8	2.7
1.5	100L	2.8	7.5	2.3	6.1	1.9	5.0	1.5	3.9	2.6	7.0	2.2	5.9	1.8	4.9	1.4	3.9	2.4	6.3	2.0	5.4	1.7	4.6	1.4	3.7	0.024	4.6	3.2	3.2
2.2	112M	3.9	8.4	3.2	7.0	2.7	5.8	2.1	4.6	3.3	7.2	2.9	6.3	2.5	5.4	2.0	4.4	2.8	6.1	2.5	5.5	2.2	4.9	1.9	4.1	0.078	5.7	2.3	2.6
3.0	112M	5.3	11	4.3	9.4	3.6	7.9	2.9	6.3	4.5	9.8	3.9	8.5	3.4	7.3	2.8	6.0	3.8	8.2	3.4	7.4	3.0	6.6	2.6	5.5	0.084	5.9	2.7	2.8
3.7	132S	6.6	15	5.4	12	4.5	10	3.6	7.9	5.7	13	5.5	12	4.2	9.4	3.4	7.6	4.8	10.7	4.7	10	3.8	8.5	3.2	7.1	0.10	6.1	2.9	3.1
5.5	132M	9.9	21	8.1	17	6.8	15	5.4	11	8.8	19	7.4	16	6.4	14	5.2	11	7.6	16	6.7	14	5.9	13	4.9	10	0.13	6.1	3.0	3.1
7.5	160M	13.2	29	10.9	24	9.1	20	7.2	16	11.3	25	9.8	22	8.5	19	6.9	15	9.5	21	8.5	19	7.6	17	6.4	14	0.30	6.0	2.4	3.2
9.3	160L	16.4	36	13.5	30	11.3	25	9.0	20	14.2	32	12.2	27	10.5	23	8.6	19	11.9	26	10.7	24	9.5	21	8.0	18	0.34	6.0	2.4	3.2
11	160L	19.4	41	16.0	34	13.4	29	10.6	23	16.8	36	14.5	31	12.5	27	10.1	22	14.1	30	12.6	27	11.2	24	9.4	20	0.38	6.0	2.3	3.1
15	180L	27	54	22	44	18.4	37	14.6	29	24	47	20	40	17.3	35	14.0	28	20	40	17.8	36	15.7	32	13.1	26	0.85	5.4	2.3	2.6
18.5	200L	31	61	26	51	22	43	17.7	34	26	52	23	45	20	39	16.6	32	22	42	19.7	39	17.8	35	15.2	30	1.30	5.2	2.0	2.5

Note:

1. 225 frame onwards can be offered against enquiry.
2. IE2 efficiency and temperature rise are at S1 duty Kilowatt.
3. LRA, LRT & BDT are at S1 Kilowatt.
4. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

RATING SELECTION CHART - 6 POLE - VVVF DRIVE - IE2

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit
- Drive Type: PWM
- Carrier Switching: 3-5 kHz
- T.H.D.: < 2.5%
- Voltage Rise Tim > 0.1 µs
- Peak Voltage: 1700 V (Max)
- Max Cable Length: 100m (w/o filter)

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD² (Kg-m²) Motor	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%			
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps		
0.75	090S	1.5	3.9	1.2	3.1	1.0	2.6	0.7	2.0	1.4	3.8	1.2	3.2	1.0	2.5	0.7	2.0	1.4	3.7	1.1	2.9	0.9	2.5	0.7	2.0	0.0144	2.6
1.1	090L	2.2	5.5	1.7	4.4	1.4	3.6	1.1	2.8	2.1	5.4	1.7	4.3	1.4	3.6	1.1	2.8	2.1	5.3	1.7	4.3	1.4	3.5	1.1	2.8	0.0192	2.7
1.5	100L	3.0	7.9	2.4	6.3	1.9	5.1	1.5	4.0	2.9	7.8	2.3	6.1	1.9	5.1	1.5	4.0	2.9	7.7	2.3	6.1	1.9	5.1	1.5	4.0	0.024	3.2
2.2	112M	4.3	9.4	3.4	7.5	2.8	6.1	2.2	4.8	4.2	9.1	3.4	7.4	2.8	6.1	2.2	4.7	4.0	8.7	3.3	7.2	2.7	5.9	2.1	4.7	0.078	2.6
3.0	112M	5.9	13	4.7	10	3.8	8.3	3.0	6.5	5.7	12	4.6	10	3.8	8.2	3.0	6.4	5.4	12	4.4	9.5	3.7	8.0	2.9	6.3	0.084	2.8
3.7	132S	7.3	16	5.8	13	4.7	10	3.7	8.2	7.1	16	5.7	13	4.7	10	3.7	8.1	6.8	15	5.5	12	4.6	10	3.6	8.0	0.10	3.1
5.5	132M	10.8	23	8.6	18	7.1	15	5.5	12	10.6	23	8.5	18	7.0	15	5.4	12	10.2	22	8.3	18	6.9	15	5.4	12	0.13	3.1
7.5	160M	14.1	31	11.4	25	9.4	21	7.4	17	12.9	29	10.7	24	9.0	20	7.2	16	11.5	26	9.9	22	8.5	19	6.9	16	0.30	3.2
9.3	160L	17.5	39	14.1	31	11.7	26	9.1	20	16.1	36	13.4	30	11.2	25	8.9	20	14.4	32	12.3	27	10.6	24	8.6	19	0.34	3.2
11	160L	21.0	44	16.7	36	13.8	30	10.8	23	19.1	41	15.8	34	13.3	28	10.6	23	17.0	36	14.6	31	12.6	27	10.2	22	0.38	3.1
15	180L	28	57	23	46	18.9	38	14.8	30	26	53	22	44	18.3	37	14.5	29	24	48	20	41	17.4	35	14.0	28	0.85	2.6
18.5	200L	34	67	28	54	23	45	18.1	35	31	60	26	51	22	43	17.6	34	27	53	24	46	20	40	16.7	33	1.30	2.5
22	200L	41	79	33	64	27	53	22	42	37	72	31	60	26	51	21	41	33	63	28	55	25	48	20	39	1.51	2.5
30	225M	54	102	44	84	37	70	29	55	48	90	41	77	35	65	28	53	41	77	36	68	32	60	26	50	3.02	2.5
37	250M	65	118	54	97	45	81	36	64	57	102	49	88	42	76	34	61	48	86	43	77	38	68	32	57	4.35	2.6
45	280S	77	137	64	115	54	97	43	77	65	116	57	101	49	88	41	72	53	95	48	86	44	78	37	66	7.61	2.6
55	280M	94	166	78	138	66	116	53	93	80	140	69	122	60	106	50	87	66	115	60	105	54	94	46	80	8.94	2.5
75	315S	119	213	102	182	87	155	70	125	96	171	86	154	76	137	64	115	76	136	71	127	65	117	57	102	14.6	2.6
90	315M	144	257	122	218	105	186	84	150	116	207	104	185	92	164	77	138	92	164	86	153	79	141	69	123	15.7	2.6
110	315L	174	308	148	263	127	225	102	182	139	246	125	221	111	197	94	166	109	195	102	181	94	168	83	147	19.1	2.5
132	315L	214	379	181	321	154	273	124	220	173	307	155	274	137	243	114	203	139	245	128	228	118	209	103	182	22.4	2.5
160	355M	252	441	215	376	184	322	149	260	202	352	181	316	162	282	136	238	159	278	148	259	137	240	121	211	34.3	2.6
200	355M	320	551	272	468	232	400	187	323	257	443	230	397	205	353	172	296	204	352	190	327	175	301	153	264	39.7	2.6
250	355L	391	666	334	569	287	489	232	395	311	529	280	477	250	426	211	360	244	416	229	389	212	360	187	318	46.8	2.5
280	355L	452	769	383	652	327	556	263	448	366	623	327	556	289	493	242	413	292	497	271	461	248	423	217	369	50.9	2.6

Note:

1. IE2 efficiency and temperature rise are at S1 duty Kilowatt.
2. BDT are at S1 on sinusodial supply.
3. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

RATING SELECTION CHART - 4 POLE - DOL - IE3

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD^2 (Kg-m^2) Motor	LRA p.u.	LRT p.u.	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%					
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps				
0.37	80M	0.60	1.5	0.51	1.3	0.43	1.1	0.35	0.9	0.49	1.3	0.44	1.1	0.39	1.0	0.32	0.8	0.40	1.0	0.37	0.9	0.33	0.9	0.29	0.7	0.010	6.7	2.9	3.7
0.55	80M	0.93	2.1	0.78	1.8	0.7	1.5	0.5	1.2	0.78	1.8	0.69	1.6	0.60	1.4	0.49	1.1	0.64	1.5	0.6	1.3	0.5	1.2	0.45	1.0	0.012	6.8	3.0	3.3
0.75	80M	1.3	2.8	1.1	2.3	0.9	2.0	0.7	1.6	1.1	2.4	0.9	2.1	0.82	1.8	0.68	1.5	0.89	2.0	0.8	1.8	0.7	1.6	0.6	1.4	0.014	6.5	2.9	3.0
1.1	90S	1.9	3.8	1.6	3.2	1.3	2.7	1.1	2.1	1.6	3.2	1.4	2.8	1.2	2.4	1.0	2.0	1.3	2.6	1.2	2.4	1.1	2.2	0.9	1.8	0.018	6.2	2.5	2.9
1.5	90L	2.6	5.1	2.2	4	1.8	3.6	1.4	2.8	2.2	4	1.9	3.8	1.7	3.3	1.4	2.7	1.8	3.6	1.7	3.3	1.5	2.9	1.3	2.5	0.023	6.5	2.6	3.0
2.2	100L	3.6	6.9	3.0	6	2.6	5	2.1	4.0	2.9	6	2.6	5.0	2.3	4.4	1.9	3.7	2.3	4.5	2.1	4.1	2.0	4	1.7	3.3	0.046	7.2	2.4	3.0
3	100L	5.0	9.3	4.2	8	3.5	7	2.8	5.3	4.1	8	3.6	7	3.2	5.9	2.6	4.9	3.3	6.2	3.0	5.7	2.8	5.2	2.4	4.5	0.058	7.3	2.5	2.9
3.7	112M	5.7	10.9	4.9	9	4.2	8	3.4	7	4.4	9	4.0	8	3.6	7	3.1	6	3.5	7	3.3	6	3.0	6	2.7	5.2	0.077	7.5	1.8	2.8
4	112M	6.3	12	5.4	10	4.6	9	3.7	7	5.0	10	4.5	9	4.0	8	3.4	7	4.0	8	3.7	7	3.4	7	3.0	6	0.077	7.5	1.9	2.9
5.5	132S	9.2	17	7.7	14	6.5	12	5.2	10	7.6	14	6.7	13	5.9	11	4.9	9	6.2	12	5.7	11	5.1	10	4.4	15	0.18	6.9	2.4	2.9
7.5	132M	12.9	24	10.7	20	9.0	17	7.2	13	11.0	20	9.5	17	8.3	15	6.8	12	9.0	17	8.2	15	7.4	13	6.3	11	0.22	7.3	2.7	3.0
9.3	132M	16.4	30	13.6	25	11.4	21	9.0	17	14.2	26	12.2	23	10.6	20	8.6	16	12.0	22	10.7	20	9.5	18	8.0	15	0.26	7.7	3.0	3.1
11	160M	17.6	31	14.9	27	12.8	23	10.3	18	14.1	25	12.7	23	11.3	20	9.4	17	11.2	20	10.4	19	9.6	17	8.4	15	0.48	6.9	2.4	3.1
15	160L	24	43	21	36	17.6	31	14	25	20	35	17.7	31	15.6	27	13.1	23	15.9	28	14.7	26	13.5	24	11.7	21	0.64	7.1	2.5	3.2
18.5	180M	30	54	25	46	22	39	17	31	24	43	21	39	19	34	15.9	29	19.0	34	17.6	32	16.2	29	14	26	0.88	7.4	2.5	3.4
22	180L	35	62	30	53	26	45	21	36	28	50	25	45	23	40	18.9	33	22	40	21	37	19.2	34	17	30	1.0	7.3	2.5	3.3
30	200L	44	75	38	66	33	57	27	47	33	58	31	53	28	48	24	42	26	44	24	42	23	40	21	36	2.0	7.1	2.3	3.1
37	225S	53	92	46	81	40	70	33	58	40	70	37	65	34	59	29	51	31	54	29	51	28	48	25	43	2.7	7.3	2.4	3.1
45	225M	66	114	57	99	50	86	41	70	51	87	47	80	42	73	36	62	39	67	37	64	35	60	31	54	3.1	7.5	2.5	3.1
55	250M	90	155	76	131	65	112	52	90	73	127	65	113	58	100	48	83	59	102	54	94	50	86	43	75	5.6	7.3	2.2	3.4
75	280S	117	198	100	169	86	145	70	117	93	157	84	142	75	127	64	107	74	124	69	116	64	107	56	94	8.9	6.5	2.4	2.8
90	280M	142	239	121	204	104	175	84	141	114	191	102	172	91	153	77	129	90	151	84	141	77	130	68	114	11.2	6.8	2.6	2.8

Note:

1. 225 frame onwards can be offered against enquiry.
2. IE3 efficiency and temperature rise are at S1 duty Kilowatt.
3. LRA, LRT & BDT are at S1 Kilowatt.
4. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

RATING SELECTION CHART - 4 POLE - VVVF DRIVE - IE3

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit
- Drive Type: PWM
- Carrier Switching: 3-5 kHz
- T.H.D.: < 2.5%
- Voltage Rise Tim > 0.1 µs
- Peak Voltage: 1700 V (Max)
- Max Cable Length: 100m (w/o filter)

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD² (Kg-m²) Motor	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%			
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps		
0.37	80M	0.70	1.8	0.56	1.4	0.47	1.2	0.36	0.9	0.64	1.6	0.53	1.4	0.45	1.1	0.36	0.9	0.58	1.5	0.49	1.3	0.42	1.1	0.34	0.9	0.010	3.7
0.55	80M	1.0	2.4	0.84	1.9	0.69	1.6	0.54	1.2	1.0	2.2	0.80	1.8	0.67	1.5	0.53	1.2	0.88	2.0	0.75	1.7	0.64	1.5	0.52	1.2	0.012	3.3
0.75	80M	1.4	3.1	1.1	2.5	0.95	2.1	0.74	1.6	1.3	2.9	1.10	2.4	0.92	2.0	0.73	1.6	1.2	2.6	1.0	2.2	0.87	1.9	0.70	1.5	0.014	3.0
1.1	90S	2.1	4.3	1.7	3.4	1.4	2.8	1.1	2.2	2.0	4.0	1.6	3.3	1.4	2.8	1.1	2.2	1.8	3.7	1.5	3.1	1.3	2.6	1.0	2.1	0.02	2.9
1.5	90L	2.9	5.6	2.3	4.5	1.9	3.7	1.5	2.9	2.7	5.3	2.2	4.4	1.9	3.6	1.5	2.9	2.5	4.9	2.1	4.1	1.8	3.5	1.4	2.8	0.02	3.0
2.2	100L	4.1	8.0	3.3	6.5	2.8	5.3	2.2	4.2	3.8	7.4	3.2	6.1	2.7	5.2	2.1	4.1	3.4	6.6	2.9	5.7	2.5	4.9	2.0	3.9	0.05	3.0
3	100L	5.7	11	4.6	8.5	3.8	7.1	3.0	5.5	5.2	9.8	4.3	8.1	3.6	6.8	2.9	5.4	4.7	8.8	4.0	7.5	3.5	6.4	2.8	5.2	0.06	2.9
3.7	112M	6.9	13	5.6	11	4.6	8.9	3.6	7.0	6.4	12	5.3	10.2	4.5	8.6	3.5	6.8	5.7	10.9	4.9	9.3	4.2	8.1	3.4	6.5	0.08	2.8
4	112M	7.5	14	6.1	12	5.0	10	3.9	8	7.0	13	5.8	11.1	4.9	9	3.9	7.4	6.3	12	5.4	10	4.6	8.8	3.7	7.1	0.08	2.9
5.5	132S	10.0	19	8.2	15	6.8	13	5.4	10	8.9	17	7.5	14	6.4	12	5.2	9.7	7.6	14	6.7	13	5.9	11.0	4.9	9	0.18	2.9
7.5	132M	13.8	25	11.2	21	9.3	17	7.3	13	12.4	23	10.4	19	8.9	16	7.1	13.0	10.8	20	9.4	17	8.2	15.1	6.8	12	0.22	3.0
9.3	132M	17.3	32	14.0	26	11.6	21	9.1	17	15.7	29	13.1	24	11.1	21	8.9	16.4	13.8	26	12.0	22	10.4	19.2	8.5	16	0.26	3.1
11	160M	20	35	16.1	29	13.5	24	10.7	19	17.2	31	15	26	12.6	23	10	18.3	14.6	26	13.0	23	11.5	21	9.6	17	0.48	3.1
15	160L	27	47	22	39	18.4	32	14.6	26	24	42	20	35	17.3	30	14	25	20	35	18	31	16	28	13.1	23	0.64	3.2
18.5	180M	33	60	27	49	23	41	17.9	32	29	52	25	45	21	38	17	31	25	44	22	40	19	35	16	29	0.88	3.4
22	180L	39	69	32	57	27	47	21	38	34	60	29	52	25	44	20	36	29	51	26	45	23	40	19	34	1.0	3.3
30	200L	51	88	42	73	36	62	29	49	42	73	37	64	33	56	27	46	35	60	32	55	29	49	24	42	2.0	3.1
37	225S	62	107	52	90	44	77	35	61	51	89	45	78	40	69	33	57	41	72	38	66	34	60	30	52	2.7	3.1
45	225M	76	130	63	109	54	92	43	74	63	108	55	95	49	83	40	69	51	88	47	81	43	73	37	63	3.1	3.1
55	250M	89	153	75	130	64	111	52	89	72	124	64	111	57	98	48	82	57	99	53	92	49	84	42	73	5.6	3.4
75	280S	110	186	96	161	83	140	68	115	85	143	78	131	71	119	61	102	66	110	62	105	58	98	52	88	8.9	2.8
90	280M	132	222	115	193	100	167	82	137	101	170	93	156	84	142	73	122	78	131	74	124	70	117	62	105	11.2	2.8
110	315S	161	268	140	233	122	202	100	165	124	206	114	188	103	171	89	147	96	159	91	150	85	141	76	127	13.8	2.9
132	315M	201	332	173	286	149	247	121	201	157	260	143	236	129	213	110	181	123	203	116	191	108	178	96	158	15.0	3.0
160	315L	239	390	207	338	179	292	146	239	186	303	169	276	153	250	131	214	144	235	136	222	127	207	114	185	17.8	2.8
200	315L	320	527	272	448	232	383	187	308	258	425	231	380	205	338	172	283	205	338	191	314	175	289	153	253	20.2	3.3
250	355M	343	558	303	493	266	434	221	360	256	417	238	387	219	356	191	312	194	316	186	303	176	287	161	262	33.8	2.5
275	355L	377	614	333	542	293	477	243	396	282	459	262	426	241	392	211	343	214	348	205	333	194	316	177	289	37.2	2.5
315	355L	434	699	383	617	336	542	279	449	325	523	301	485	277	446	242	390	246	397	236	380	224	360	204	329	40.7	2.5
355	355L	503	811	441	711	386	621	318	512	381	614	352	567	322	518	279	449	291	469	278	447	262	422	237	382	45.3	2.7
375	355L	526	847	462	744	405	652	334	538	396	638	367	590	336	541	292	471	302	486	288	464	273	439	248	399	49.2	2.6

Note:

1. IE3 efficiency and temperature rise are at S1 duty Kilowatt with sinosodial supply.
2. BDT are at S1 on sinusodial supply.
3. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

RATING SELECTION CHART - 6 POLE - DOL - IE3

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD^2 (Kg-m^2) Motor	LRA p.u.	LRT p.u.	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%					
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps				
0.37	80M	0.64	1.7	0.53	1.4	0.45	1.2	0.36	1.0	0.55	1.5	0.47	1.3	0.41	1.1	0.34	0.9	0.45	1.2	0.41	1.1	0.37	1.0	0.31	0.8	0.012	4.3	2.4	2.5
0.55	80M	0.97	2.4	0.80	2.0	0.7	1.7	0.5	1.3	0.84	2.1	0.72	1.8	0.62	1.6	0.51	1.3	0.71	1.8	0.6	1.6	0.6	1.4	0.47	1.2	0.015	4.4	2.4	2.5
0.75	90S	1.4	3.7	1.1	3.0	0.9	2.5	0.7	2.0	1.3	3.4	1.1	2.9	0.90	2.4	0.72	1.9	1.14	3.0	1.0	2.6	0.8	2.3	0.7	1.8	0.014	4.9	3.0	3.1
1.1	90L	2.0	4.8	1.7	3.9	1.4	3.2	1.1	2.5	1.9	4.4	1.6	3.7	1.3	3.1	1.1	2.5	1.7	3.9	1.4	3.4	1.2	2.9	1.0	2.4	0.018	4.7	2.6	2.7
1.5	100L	2.5	5.5	2.1	5	1.8	3.9	1.4	3.1	2.0	4	1.8	4.0	1.6	3.5	1.3	2.9	1.6	3.6	1.5	3.3	1.4	3.0	1.2	2.6	0.057	5.8	2.1	2.6
2.2	112M	3.9	8.8	3.2	7	2.7	6	2.1	4.8	3.3	8	2.9	6.5	2.5	5.6	2.0	4.6	2.8	6.3	2.5	5.7	2.2	5	1.9	4.3	0.063	5.9	2.5	2.8
3	132S	5.2	11.8	4.3	10	3.6	8	2.9	6.5	4.4	10	3.9	9	3.3	7.5	2.7	6.2	3.7	8.3	3.3	7.5	3.0	6.7	2.5	5.7	0.156	5.4	2.0	2.5
3.7	132S	6.4	13.5	5.3	11	4.5	9	3.6	8	5.4	12	4.7	10	4.1	9	3.4	7	4.5	10	4.1	9	3.7	8	3.1	6.6	0.198	5.6	2.0	2.5
4	132M	7.0	15	5.8	12	4.9	10	3.9	8	6.1	13	5.2	11	4.5	10	3.7	8	5.1	11	4.5	10	4.1	9	3.4	7	0.198	5.6	2.0	2.5
5.5	132M	9.7	20	8.0	17	6.7	14	5.3	11	8.5	18	7.3	15	6.3	13	5.1	11	7.1	15	6.4	13	5.7	12	4.7	15	0.30	6.2	2.3	2.7
7.5	160M	12.3	24	10.4	21	8.8	17	7.1	14	10.1	20	8.9	18	7.9	16	6.6	13	8.1	16	7.5	15	6.8	13	5.9	12	0.54	5.5	1.9	2.5
9.3	160M	15.6	31	13.1	26	11.1	22	8.8	17	13.0	25	11.4	22	10.0	20	8.3	16	10.6	21	9.7	19	8.8	17	7.5	15	0.65	5.7	2.0	2.6
11	160L	18.6	36	15.5	30	13.1	26	10.5	20	15.5	30	13.6	27	11.9	23	9.8	19	12.7	25	11.6	23	10.5	20	9.0	17	0.78	5.9	2.1	2.7
15	180L	24	47	21	39	17.6	34	14	27	20	38	17.7	34	15.7	30	13.1	25	16.0	30	14.8	28	13.5	26	11.8	22	1.21	5.8	2.0	2.5
18.5	200L	28	53	24	46	21	40	17	32	22	42	20	38	18	34	15.3	29	17.1	32	16.1	31	15.0	28	13	25	2.49	6.4	2.2	2.7
22	200L	35	66	30	57	25	48	20	39	28	53	25	48	22	42	18.7	36	22	42	20	39	18.9	36	17	32	3.1	7.1	2.6	3.0
30	225M	47	87	40	74	35	63	28	51	38	69	34	62	30	55	26	47	30	55	28	51	26	47	23	41	4.1	7.3	2.4	3.1
37	250M	55	100	47	86	41	75	34	61	42	77	39	70	35	64	30	55	33	59	31	56	29	53	26	47	6.7	6.9	2.4	3.0
45	280S	72	130	61	111	52	95	42	76	58	105	52	94	46	83	39	70	46	83	43	77	39	71	34	62	9.0	6.0	1.8	2.6
55	280M	89	158	75	134	64	114	52	92	72	128	64	114	57	101	48	85	57	102	53	94	49	87	42	76	10.7	6.0	1.9	2.5

Note:

1. 225 frame onwards can be offered against enquiry.
2. IE3 efficiency and temperature rise are at S1 duty Kilowatt.
3. LRA, LRT & BDT are at S1 Kilowatt.
4. Factor of Inertia = 2 (Load GD^2 = Motor $GD^{2)}$

RATING SELECTION CHART - 6 POLE - VVVF DRIVE - IE3

- Enclosure: TEFC
- Protection: IP 55
- 3 Ph, 415V±10%, 50Hz±5%
- Insulation: Class F
- Ambient: 50°C
- Temp. Rise: Class B Limit
- Drive Type: PWM
- Carrier Switching: 3-5 kHz
- T.H.D.: < 2.5%
- Voltage Rise Tim > 0.1 µs
- Peak Voltage: 1700 V (Max)
- Max Cable Length: 100m (w/o filter)

Equivalent S1 KW	Frame Size	60 Starts / Hour								150 Starts / Hour								300 Starts / Hour								GD² (Kg-m²) Motor	BDT p.u.
		25%		40%		60%		100%		25%		40%		60%		100%		25%		40%		60%		100%			
		kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps	kW	Amps		
0.37	80M	0.70	1.9	0.57	1.5	0.47	1.3	0.37	1.0	0.66	1.8	0.54	1.5	0.45	1.2	0.36	1.0	0.60	1.6	0.51	1.4	0.43	1.2	0.35	0.9	0.012	2.5
0.55	80M	1.1	2.7	0.85	2.1	0.70	1.8	0.54	1.4	1.0	2.5	0.81	2.0	0.68	1.7	0.5	1.3	0.91	2.3	0.77	1.9	0.65	1.6	0.52	1.3	0.015	2.5
0.75	90S	1.5	3.9	1.2	3.1	0.96	2.6	0.75	2.0	1.4	3.8	1.1	3.1	0.94	2.5	0.7	2.0	1.3	3.6	1.1	3.0	0.92	2.5	0.73	1.9	0.014	3.1
1.1	90L	2.1	5.1	1.7	4.0	1.4	3.3	1.1	2.6	2.1	4.9	1.7	3.9	1.4	3.3	1.1	2.5	2.0	4.6	1.6	3.8	1.4	3.2	1.1	2.5	0.02	2.7
1.5	100L	2.8	6.3	2.3	5.1	1.9	4.2	1.5	3.3	2.6	5.8	2.2	4.8	1.8	4.0	1.4	3.2	2.3	5.2	2.0	4.4	1.7	3.8	1.4	3.1	0.06	2.6
2.2	112M	4.2	9.5	3.4	7.7	2.8	6.3	2.2	4.9	4.0	9.0	3.3	7.4	2.7	6.2	2.1	4.8	3.7	8.3	3.1	7.0	2.6	5.9	2.1	4.7	0.06	2.8
3	132S	5.5	12	4.5	10.1	3.7	8.4	2.9	6.6	5.0	11.2	4.2	9.4	3.5	8.0	2.8	6.4	4.3	9.8	3.8	8.5	3.3	7.4	2.7	6.1	0.16	2.5
3.7	132S	6.8	14	5.5	12	4.6	9.7	3.6	7.6	6.1	13	5.1	10.8	4.4	9.2	3.5	7.4	5.3	11.1	4.6	9.8	4.0	8.5	3.3	7.0	0.20	2.5
4	132M	7.4	16	6.0	13	5.0	11	3.9	8	6.7	14	5.6	12.0	4.7	10	3.8	8.1	5.8	12	5.1	11	4.4	9	3.6	7.7	0.20	2.5
5.5	132M	10.2	21	8.3	17	6.9	14	5.4	11	9.2	19	7.7	16	6.5	14	5.2	11	8.1	17	7.0	15	6.1	13	5.0	10	0.30	2.7
7.5	160M	13	26	11.0	22	9.2	18	7.3	14	11.7	23	10.0	20	8.6	17	7.0	14	9.9	20	8.8	17	7.8	15	6.5	13	0.54	2.5
9.3	160M	17	33	14	27	11.5	22	9.0	18	15	29	12.6	25	10.8	21	8.7	17	12.6	25	11.2	22	9.8	19	8.2	16	0.65	2.6
11	160L	20	39	16	32	14	26	10.7	21	18	34	15	29	12.8	25	10.3	20	15.0	29	13.3	26	11.7	23	9.7	19	0.78	2.7
15	180L	26	50	22	42	18	35	14	28	23	44	20	38	17	32	13.8	26	19	37	17	33	15	29	12.8	25	1.21	2.5
18.5	200L	31	58	26	49	22	42	18	33	25	48	22	43	20	37	16	31	21	39	19	36	17	33	15	28	2.49	2.7
22	200L	37	71	31	59	26	50	21	40	31	59	27	52	24	46	20	38	25	49	23	44	21	40	18	34	3.1	3.0
30	225M	51	94	43	78	36	66	29	52	43	79	38	69	33	60	27	49	36	65	32	59	29	53	25	45	4.1	3.1
37	250M	60	109	51	92	43	79	35	63	49	89	43	79	38	70	32	58	39	71	36	66	33	60	29	52	6.7	3.0
45	280S	69	124	59	107	51	92	41	75	54	97	49	88	44	79	37	68	42	76	39	71	37	66	33	59	9.0	2.6
55	280M	84	149	72	128	62	111	51	90	65	117	59	106	54	95	46	81	51	91	48	86	45	80	40	71	10.7	2.5
75	315S	111	205	96	177	84	154	68	126	86	158	79	144	71	131	61	112	66	122	63	116	59	108	53	97	13.5	2.2
90	315M	134	242	116	210	101	182	82	149	104	188	95	171	86	155	73	133	80	145	76	137	71	128	64	115	15.7	2.2
110	315L	167	302	144	260	124	225	101	183	131	236	119	215	107	193	91	165	102	184	96	173	89	161	80	144	19.1	2.3
125	315L	192	341	165	293	142	253	115	205	151	268	137	243	123	218	104	186	118	210	111	197	103	183	91	163	22.4	2.4
132	315L	202	359	174	309	150	266	122	216	158	282	144	256	129	230	110	195	124	220	116	207	108	192	96	171	22.4	2.4
160	315L	247	439	212	377	183	324	148	263	195	347	177	313	158	281	134	238	153	272	144	255	133	236	118	209	27.1	2.4
160	355M	246	436	211	375	182	323	148	262	193	343	175	311	157	279	134	237	151	268	142	252	132	234	117	208	34.3	2.7
180	355M	281	493	241	422	207	362	167	293	224	392	202	353	180	316	152	267	176	308	165	288	152	267	134	235	37.9	2.9
200	355M	312	546	267	468	229	401	186	325	248	434	224	391	200	350	169	296	195	341	182	319	169	296	149	261	41.5	2.8
225	355L	351	606	300	519	258	446	209	361	278	481	251	434	224	388	190	328	219	378	205	354	190	328	167	289	45.0	2.7
250	355L	390	666	334	570	286	489	232	396	309	528	279	476	249	426	211	360	243	415	227	388	211	360	186	318	48.6	2.7
275	355L	427	729	366	625	314	537	255	435	338	577	305	521	273	467	231	395	265	453	248	424	230	393	203	348	51.8	2.6

Note:

1. IE3 efficiency and temperature rise are at S1 duty Kilowatt with sinosodial supply.
2. BDT are at S1 on sinusodial supply.
3. Factor of Inertia = 2 (Load GD^2 = Motor GD^2)

NOTES

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