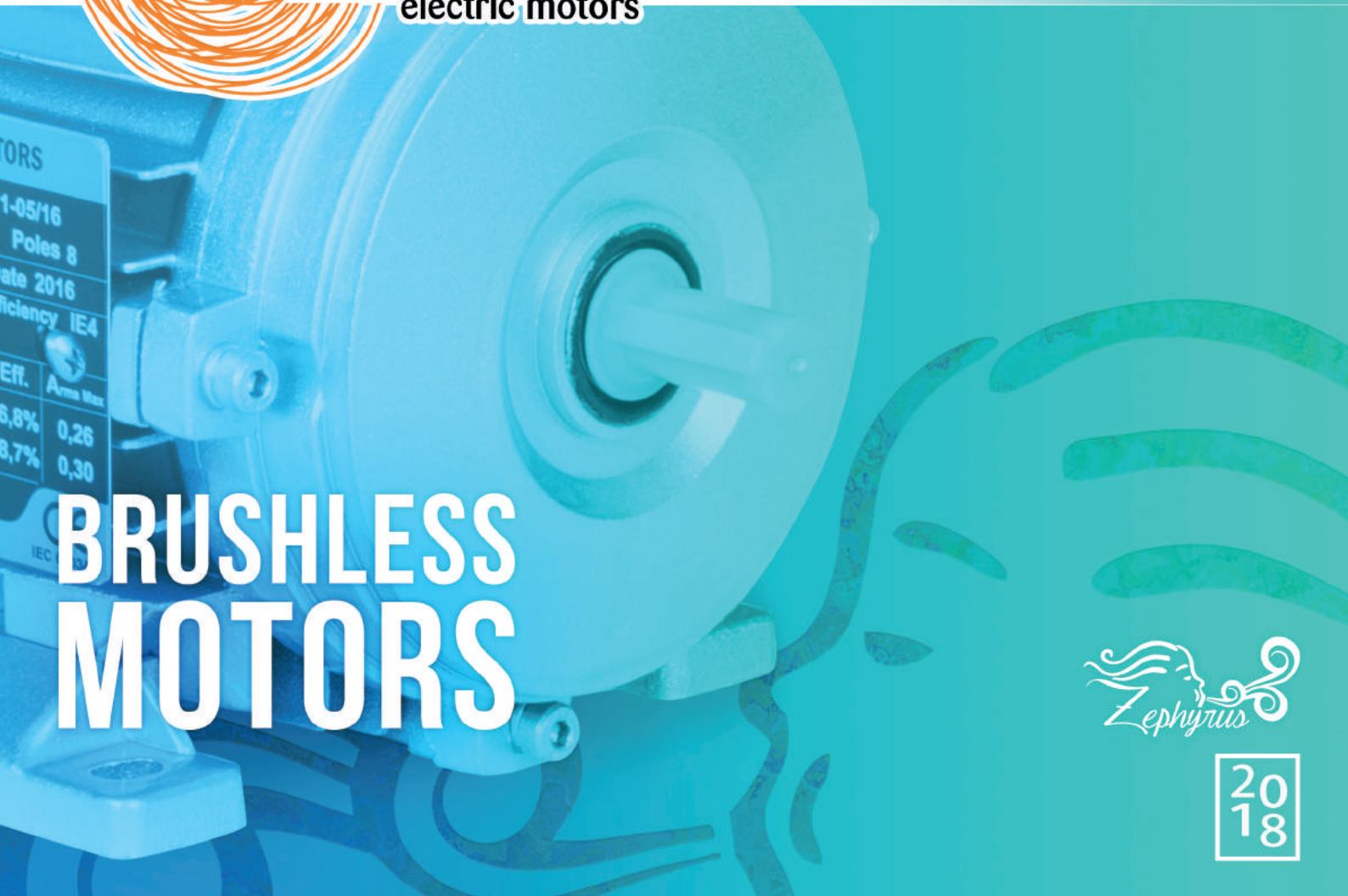
2018

EOS
BRUSHLESS MOTORS

TECHNICAL CATALOG

iMotor
electric motors



BRUSHLESS MOTORS

Zephyrus

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Responsibilities concerning products and their use

The Customer is responsible for the correct selection and use of the product in relation to its industrial and/or commercial needs.

The Customer is always responsible for security in the application of the product.

In drawing up the catalogue, the utmost attention was paid to ensure the accuracy of the information. However, iMotor cannot accept direct or indirect responsibility for any errors, omissions or data that is not updated.

Due to the constant evolution of the state of the art, iMotor reserves the right to make changes to the content of this print at any time which, in any case, are NOT to be considered binding.

CE conformity

iMotor products comply with the applicable Product Directives as required in all countries of the European Community, to ensure an appropriate safety standard.

An "EC declaration of conformity" is issued for each product relating to the following directives: 2006/95/EC "Low Voltage Directive".

Compliance with directives and regulations.
iMotor motors comply with the requirements of the CEI EN 60034 standards for rotating electrical machines and the following directives for which the EC mark is applied on the plate:

- **Directive 2014/35/EU: Low Voltage Directive**
- **Directive 2014/30/EU: Electromagnetic Compatibility Directive (EMC)**

All iMotor motors comply with the requirements of the Machinery Directive (2006/42/EC). According to this Directive, electric motors are components and are solely intended for integration into other machines. The motor can only be put into service after certification, by the end user, of the machine to which the motor is applied.

CE

Index

1. THE MADE IN ITALY SOLUTION THAT COMBINES SIMPLICITY OF USE AND HIGH TECHNOLOGY

The need for energy saving in the most industrialised countries remains a matter of great sensitivity.

Particular attention should be paid to the electrical motors, which account for around 70% of industrial energy consumption. Some directives on electric motors are already in force in this regard and others are ready to be published with increasingly stringent efficiency limits.

For this reason, iMotor has decided to look ahead, proposing on the market a whole range of sensorless brushless permanent magnet synchronous electric motors, with a power range of 0.13kW ÷ 24kW and various rated operating speeds.

iMotor electric motors are able to meet IE4 or "Super Premium Efficiency" efficiency levels, anticipating future limits that will be published in the next Energy Efficiency Directives. Therefore, they allow a considerable reduction in electricity consumption, especially in applications that require many hours of operation.

The payback of the initial investment is fast thanks to the high efficiency of permanent magnet electric motors compared to asynchronous motors in all speed and load conditions applied.

The use of permanent rare earth magnets has allowed the design of IE4 brushless synchronous electric motors with a higher power density than traditional asynchronous motors, with the same size.

With the EOS series, a reduction in overall dimensions of up to two motor-axle height sizes can therefore be obtained.

Speed control of the electric motor in sensorless mode: increased reliability due to the absence of transducers while maintaining excellent speed control performance.

Despite this, in the catalogue, we offer a wide range of options and specialties available, such as different speed sensors that allow you to obtain precise positioning with moderate dynamics.

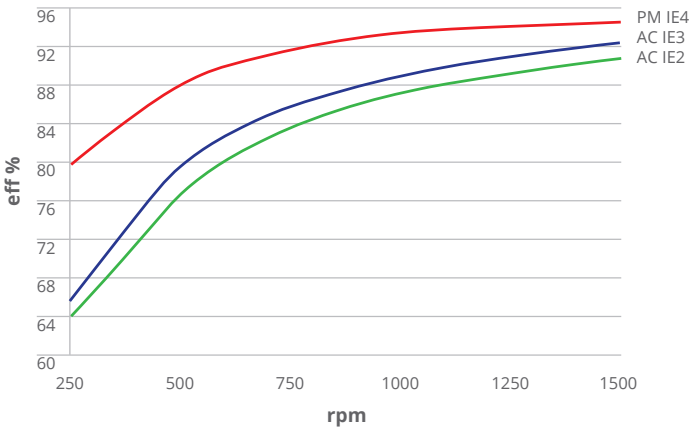
iMotor brushless electric motors are therefore also advantageous in the field of automation or movement control where moderate dynamics and competitive costs are required compared to the standard technologies present in the sector for years.

This solution has led to the following advantages:

- **High-energy efficiency according to current and future standards: IE4 (IEC Technical Specification IEC/TS 60034-31 and draft IEC Standard 60034-30 edition 2)**
- **Reduction of losses compared to traditional asynchronous motors, due to the absence of rotor current with the consequent absence of losses.**
- **Exclusive use with variable speed drive (VSD) which allows a wide range of speed variation.**
- **Ease of programming of the drive for all applications**
- **Constant torque over the whole speed range.**
- **High peak torque values.**
- **Optimized costs and mechanics of proven reliability thanks to the use of the structure of the asynchronous motor, which has been tested for years.**
- **Speed control of the motor in sensorless mode: increased reliability due to the absence of transducers while maintaining excellent speed control performance.**
- **The compact EOS range allows you to reduce weight and dimensions by up to two motor sizes.**
- **ZEPHYRUS offers a range of motors with the same size-power ratio as asynchronous motors, allowing perfect interchangeability.**

2. ECONOMIC ADVANTAGES WITH THE USE OF EOS AND ZEPHYRUS MOTORS

2.1 Working with Efficiency



The advantages of high-efficiency motors include:
Reduction of consumption and costs of electricity;
Greater efficiency at reduced loads, since constant losses are more contained;
Greater efficiency for speeds lower than rated

Example of variation in efficiency by varying the speed for IE2-IE3-IE4 motors

2.2 Calculation of Energy Saving and Costs

Asynchronous motor IE1 or IE2 or IE3:
Energy used in one year [kWh/year]:

$$E_{asynchronous} = \frac{P_{nom} \times \frac{L\%}{100}}{\frac{\eta\%_{asynchronous}}{100}} \times H$$

Annual energy cost [Euro/year]:

$$CA_{asynchronous} = \frac{P_{nom} \times \frac{L\%}{100}}{\frac{\eta\%_{asynchronous}}{100}} \times H \times C$$

iMotor motor:
Energy used in one year [kWh/year]:

$$E_{iMotor} = \frac{P_{nom} \times \frac{L\%}{100}}{\frac{\eta\%_{iMotor}}{100}} \times H$$

Annual energy cost [Euro/year]:

$$CA_{iMotor} = \frac{P_{nom} \times \frac{L\%}{100}}{\frac{\eta\%_{iMotor}}{100}} \times H \times C$$

Savings:
Energy saved in one year [kWh/year]:

$$E = E_{asynchronous} - E_{iMotor}$$

Annual savings [Euro/year]:

$$RA = CA_{asynchronous} - CA_{iMotor}$$

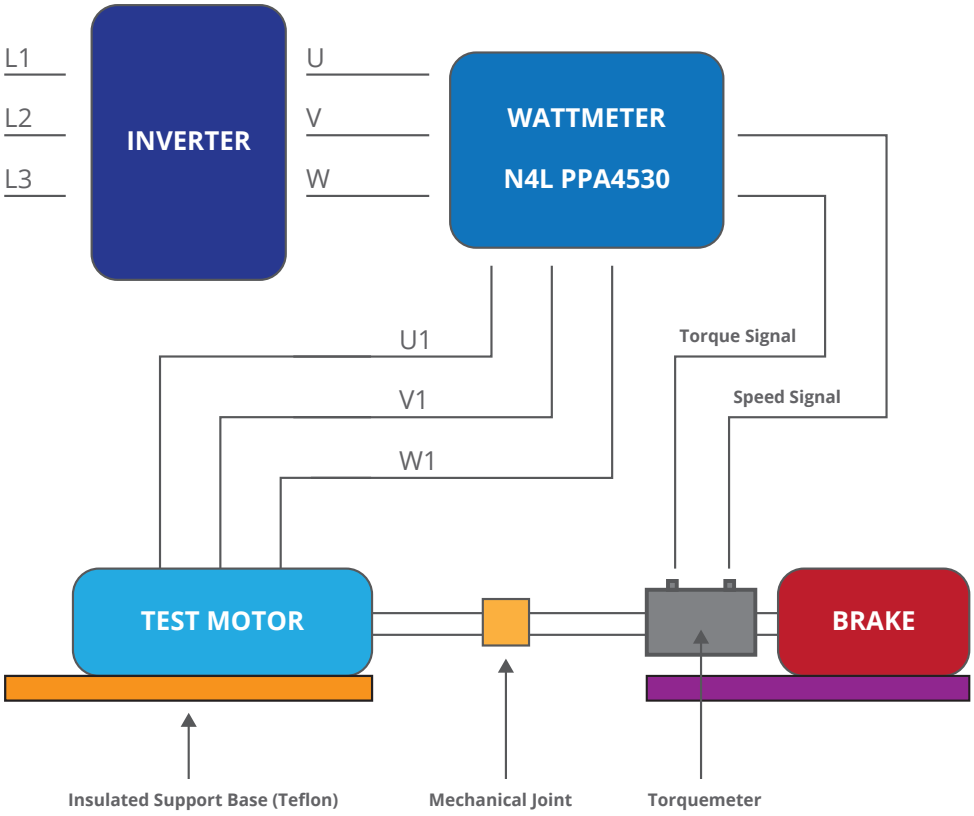
Recovery time for higher motor cost [Months]:

$$TR = \frac{(Pr_{iMotor} - Pr_{asynchronous})}{RA} \times 12$$

Where:

- P_{NOM} [kW]: rated motor power
- L %: Coefficient (%) of use of the rated motor power
- $\eta\%_{ASYNCHRONOUS}$: Efficiency (%) of the asynchronous motor (IE1/IE2/IE3)
- $\eta\%_{iMotor}$: Efficiency (%) of the iMotor brushless motor
- H [h/year]: Annual use of the motor
- C [Euro/kWh]: Cost of kWh
- $Pr_{ASYNCHRONOUS}$ [Euro]: Asynchronous motor price (IE1/IE2/IE3)
- Pri_{Motor} [Euro]: iMotor brushless motor price

Schematic diagram for efficiency calculation



Test Execution Conditions

• **Motor under test:** it is placed under load and at rated speeds without seals on a base that is thermally insulated from the support surface of the brake booster.

• **Wattmeter**

passband: dc-200kHz
filter frequency: 4kHz
Noise Filter : OFF
Selected Harmonic: 3
Efficiency calculation: mech/sum

• **Inverter:** in SENSORLESS mode

Efficiency

The efficiency values vary according to the speed and torque load applied.
The following catalogue shows the efficiency values for the rated torque/power/speed values

For efficiency values with torque/power and speed values that are different than the rated values, contact the iMotor Srl technical office.

3. GENERAL CHARACTERISTICS

Permanent magnet three-phase synchronous motors, designed to operate with variable speed drive (VSD). A direct start-up from the mains is not possible for the iMotor EOS and ZEPHYRUS series brushless motors.
Supply of the variable speed drive (VSD) to the rated voltage value indicated in the "performance cards" of the motors and a maximum permissible voltage variation of ±5%.
Operation with the inverter must comply with the following limits:

- **Vnom power supply voltage <500V;**
- **Umax Voltage peaks <1000V;**
- **Voltage gradients dU/dt<1kV/µs.**

For supply voltage > 500 V contact the iMotor Srl technical office.

Standardized MEC sizes for quick interchangeability with traditional asynchronous motors
Standard speed control in sensorless mode.
Optional: incremental encoder, absolute encoder, resolver.

Not suitable for environments with danger of explosion.
Designed to operate in continuous service (S1) at rated voltage and frequency, general use in industrial applications, externally ventilated.
Cooling method IC 411, optionally IC 416 or IC 410.

Working environment air temperature: -15 ÷ + 40°C with a maximum altitude of 1000m above sea level.

3.1 Variation of the Power Yielded according to the Ambient Temperature

Ambient Air Temperature [°C]	25	30÷40	45	50	55	60
P / P_N	1,07	1,00	0,95	0,90	0,85	0,80

3.2 Variation of the Power Yielded according to the Altitude

Altitude above sea level [M]	0÷1.000	1.500	2.000	2.500	3.000	3.500	4.000
P / P_N	1,00	0,97	0,93	0,89	0,85	0,80	0,74

Winding: class H double enamelled copper wire, impregnation in autoclave with low solvent content, accurate separation of phase windings between them and to ground with insulation class F insulation materials with class B standard overtemperature (optional higher insulation or overtemperature classes). Suitable for operation for rapid voltage variations produced by the motor control drive (frequency converter).

Over-temperature winding protection: All motors are equipped as standard with thermistor (PTC) thermal probes. The terminals of the probes are inside the terminal box.

IP 55 motor casing protection degree: Ithe motor cooling fan, outside the casing, is protected by a special fan cover.

Fan cover: made of sheet steel, ensures protection against contact with the rotating cooling fan

Cooling fan: bi-directional with radial blades, keyed on the crankshaft, made of reinforced polypropylene.

Casing: die-cast aluminium alloy. Excellent thermal conductivity, excellent corrosion resistance, motor lifting eyebolt with EOS100La6 size.

Shields and flanges: die-cast aluminium alloy, reinforced steel bearing seats with 112 size.

Fixing feet: die-cast aluminium alloy, with the possibility of mounting the feet on the 3 sides of the motor in order to have the terminal box on the desired side: IM B3, B5,B35, B14, B34. As standard, the IMB3 motor is supplied with a top terminal box, and a side one on request.

Terminal box: in die-cast aluminium alloy. Adjustable 90° in 90°, standard position at the top and near the control side. Equipped with plastic cable glands supplied as standard on the right side with a view of the shaft output side. Equipped with 6-pin terminal block for star or delta connection and 2 pins for thermal sensor. #1 earth terminal inside the box and #1 external clamp on the casing.

Shaft: 39NiCrMo3 steel, cylindrical ends, threaded hole in head, unified form tab

Rotor: Magnetic laminated structure with permanent NeFeB magnets. Dynamic balancing of the rotor with half key.

Stator: low-loss insulated magnetic laminations.

Bearings: primary-brand single row deep groove ball bearings lubricated for life with lithium grease and working temperature -15÷+110°C, double shield 2RS/DDU - ZZ. No maintenance required for lubrication.

Sealing rings: NBR double lip with spring. They are assembled in both the rear part and the front part of the motor as standard.

Painting: NAL-combined enamel RAL 9006 (pearl gray) and RAL 9005 (semi-gloss black). Suitable to withstand normal industrial environments and to allow additional finishes with synthetic single-component paints-

Standard rated speeds available: 1500-3000rpm rated speeds different from the standard catalogue values are available optionally, by contacting the iMotor technical office.

EOS and ZEPHYRUS series motors are available on request with UL certification for the US and Canadian market.

Wide availability of special executions on request (see "Special Executions" page 50).

4. HOW TO ORDER A MOTOR

EOS/ZEPH	100	La 6	0400	150	B35	400	IC411	Options
Name of the Range	Axle Heigh	Casing Type	Rated Power	Rated Speed	Mounting arrangement	Drive rated Voltage	Cooling down	Miscellaneous Options
	56	b8	Multiply x100 the value in kW read on the catalogue according to the axle height	Divide x10 the value in RPM read on the catalogue according to the axle height and rated power	B3	400*		
	63	b8			B5			
	71	b6			B6			
	80	b6			B7			
	90	S6			B8			
	90	La6			B14			
	100	La6			B34		IC411 (std)	
	112	Ma6			B35		IC416 (opt)	
	132	Mb6			IM V1		IC410 (opt)	
	160	La6			IM V3			
					IM V5			
					IM V6			
					IM V15			
					IM V18			
					IM V19			
					IM V36			

NB: For inverter power voltages different from 400V, specify the desired value when ordering.

OPTIONAL NON-STANDARD EXECUTIONS (You can combine multiple options together)	E01	Resolver
	E02	Incremental Encoder
	E03	Absolute Encoder
	E04	Encoder with hall effect sensors
	T01	Bimetallic thermal probes NC 150°C (PTO)
	T02	Temperature Sensor (PT100)
	T03	Variable resistance silicone temperature Sensor (KTY)
	T04	Anti-condensation Heater
	T05	Condensate Drain Holes
	A01	Additional Wrapping Impregnation
	A02	Class H Insulation
	A03	Tropicalisation
	IP56	IP56 Protection rating
	IP65	IP65 Protection rating
	IP66	IP66 Protection rating
	F01	24V Continuous Current Brake
	F02	230-400V 50Hz AC Brake
	F03	Manual release lever
	F04	IP55 Brake Protection
	R01	Manual rotation
	C1	Painting for C1-C2 environments
	C3	Painting for C3 environments
	C4	Painting for C4 environments
	C5M	Painting for C5M environments
	S01	Terminal box position
	P01	Rain cover
	UL	UL Certified Motor

Further information on options in chapter 15 of this catalogue.

5. EOS MOTOR RANGE

EOS BRUSHLESS MOTORS

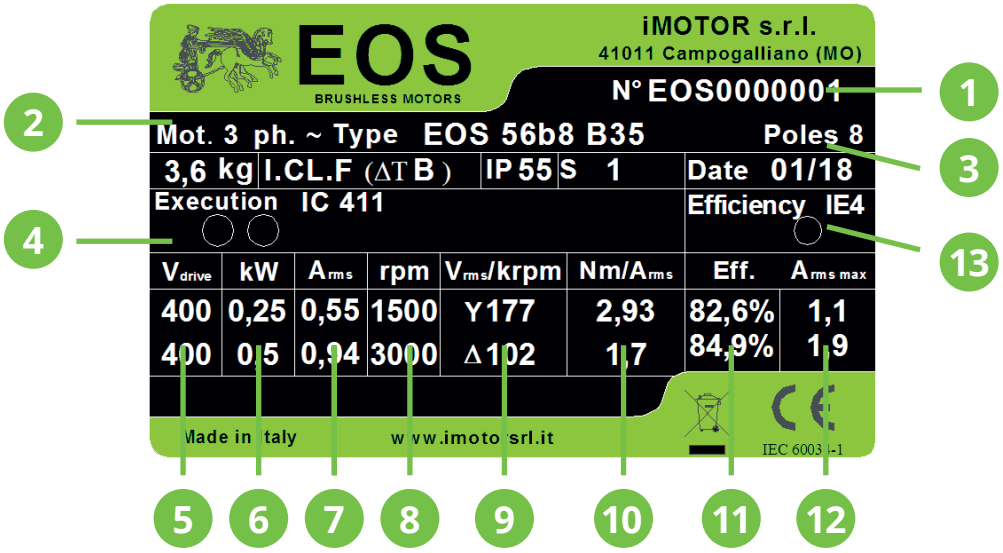
MODEL	P_{NOM} [kW]	RATED SPEED [rpm]	Rated Torque T_{NOM} [rpm]	V_{NOM} STANDARD INVERTER [Vrms]	I_{NOM} MOTOR [Arms]	SPEED TRANSDUCER STANDARD	STANDARD VENTILATION
EOS 56b8 0025 150	0,25	1500	1,6	400	0,67	SENSORLESS	IC411
EOS 56b8 0050 300	0,5	3000	1,6	400	1,16	SENSORLESS	IC411
EOS 63b8 0050 150	0,5	1500	3,2	400	1,25	SENSORLESS	IC411
EOS 63b8 0100 300	1	3000	3,2	400	2,1	SENSORLESS	IC411
EOS 71b6 0110 150	1,1	1500	7	400	2,51	SENSORLESS	IC411
EOS 71b6 0220 300	2,2	3000	7	400	4,5	SENSORLESS	IC411
EOS 80b6 0165 150	1,65	1500	10,5	400	4,0	SENSORLESS	IC411
EOS 80b6 0330 300	3,3	3000	10,5	400	7,0	SENSORLESS	IC411
EOS 90S6 0270 150	2,7	1500	17,2	400	6,5	SENSORLESS	IC411
EOS 90S6 0540 300	5,4	3000	17,2	400	12,0	SENSORLESS	IC411
EOS 90La6 0330 150	3,3	1500	21	400	8,1	SENSORLESS	IC411
EOS 90La6 0660 300	6,6	3000	21	400	14,5	SENSORLESS	IC411
EOS 100La6 0400 150	4	1500	25,7	400	9,9	SENSORLESS	IC411
EOS 100La6 0800 300	8	3000	25,7	400	18,4	SENSORLESS	IC411
EOS 112Ma6 0750 150	7,5	1500	47,7	400	17,3	SENSORLESS	IC411
EOS 112Ma6 1500 300	15	3000	47,7	400	32,0	SENSORLESS	IC411
EOS 132Mb6 1200 150	12	1500	76,4	400	31,8	SENSORLESS	IC411
EOS 132Mb6 2400 300	24	3000	76,4	400	58,8	SENSORLESS	IC411
EOS 160La6 2040 150	20,4	1500	130	400	51,5	SENSORLESS	IC411

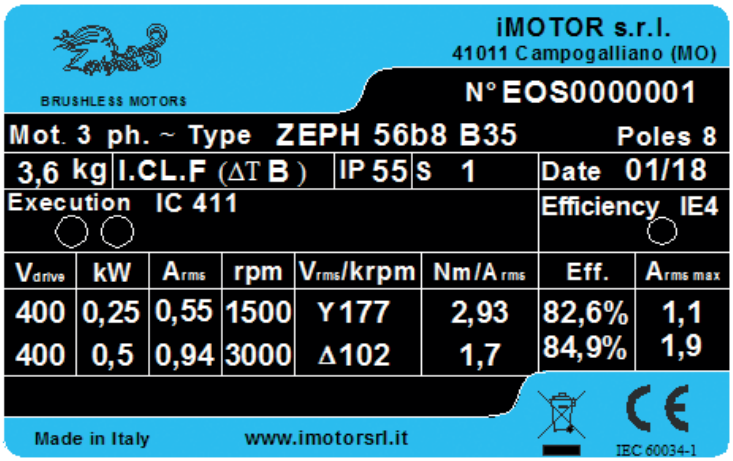
6. ZEPHYRUS MOTORS RANGE

MODEL	P_{NOM} [kW]	RATED SPEED [rpm]	Rated Torque T_{NOM} [rpm]	V_{NOM} STANDARD INVERTER [Vrms]	I_{NOM} MOTOR [Arms]	SPEED TRANSDUCER STANDARD	STANDARD VENTILATION
ZEPH 56b8 0009 150	0,09	1500	0,57	400	0,2	SENSORLESS	IC411
ZEPH 56b8 0012 300	0,12	3000	0,38	400	0,25	SENSORLESS	IC411
ZEPH 63b8 0018 150	0,18	1500	1,15	400	0,4	SENSORLESS	IC411
ZEPH 63b8 0025 300	0,25	3000	0,8	400	0,5	SENSORLESS	IC411
ZEPH 71b6 0037 150	0,37	1500	2,35	400	0,62	SENSORLESS	IC411
ZEPH 71b6 0055 300	0,55	3000	1,75	400	1,1	SENSORLESS	IC411
ZEPH 80b6 0075 150	0,75	1500	4,8	400	1,7	SENSORLESS	IC411
ZEPH 80b6 0110 300	1,1	3000	3,5	400	2,3	SENSORLESS	IC411
ZEPH 90S6 0110 150	1,1	1500	7	400	2,6	SENSORLESS	IC411
ZEPH 90S6 0150 300	1,5	3000	4,8	400	3,1	SENSORLESS	IC411
ZEPH 90L6 0150 150	1,5	1500	9,55	400	3,3	SENSORLESS	IC411
ZEPH 90L6 0220 300	2,2	3000	7	400	4,5	SENSORLESS	IC411
ZEPH 100L6 0220 150	2,2	1500	14	400	4,9	SENSORLESS	IC411
ZEPH 100L6 0300 300	3	3000	9,55	400	6,2	SENSORLESS	IC411
ZEPH 112M6 0400 150	4	1500	25,5	400	8,9	SENSORLESS	IC411
ZEPH 112M6 0550 300	5,5	3000	17,5	400	11,1	SENSORLESS	IC411
ZEPH 132M6 0750 150	7,5	1500	47,8	400	18,4	SENSORLESS	IC411
ZEPH 132M6 1100 300	11	3000	35	400	24,1	SENSORLESS	IC411
ZEPH 160M6 1100 150	11	1500	70	400	26,5	SENSORLESS	IC411
ZEPH 160L6 1850 300	18,5	3000	58,9	400	38,2	SENSORLESS	IC411

7. PLATE

The following are examples of plates of the EOS and ZEPHYRUS motor range





1. Production order, serial number, month and year of production
2. Description of the motor ordered as described in chapter 4 of this technical catalogue
3. Number of motor poles
4. List of the constructive characteristics of the motor
5. Rated power supply voltage of the motor driving inverter [Vrms]
6. Rated power available at the motor shaft [kW]
7. Rated phase current absorbed by the motor [Arms]
8. Rated crankshaft speed [rpm]
9. Motor voltage constant (Ke) in [Vrms/krpm] (see definition in paragraph 8.1 of this catalogue)
10. Motor torque constant (Kt) in [Nm/Arms] (see definition in paragraph 8.1 of this catalogue)
11. Efficiency of the motor at rated power and rated speed
12. Maximum overload current applicable to the motor [Arms]
13. Motor efficiency class

8. TECHNICAL PERFORMANCE DATA

Permanent magnet three-phase synchronous motors, designed to operate with variable speed drive (VSD). A direct start-up from the mains is not possible for the iMotor EOS and ZEPHYRUS series brushless motors.

Supply of the variable speed drive (VSD) to the rated voltage value indicated in the "performance cards" of the motors and a maximum permissible voltage variation of ±5%.
Operation with the inverter must comply with the following limits:

Vnom power supply voltage <500V;

Umax Voltage peaks <1000V;

Voltage gradients dU/dt<1kV/µs.

For supply voltage> 500 V contact the iMotor Srl technical office.

Standardized MEC sizes for quick interchangeability with traditional asynchronous motors
Standard speed control in sensorless mode.
Optional: incremental encoder, absolute encoder, resolver.

Not suitable for environments with danger of explosion.

Designed to operate in continuous service (S1) at rated voltage and frequency, general use in industrial applications, externally ventilated.
Cooling method IC 411, optionally IC 416 or IC 410.
Working environment air temperature: -15 ÷ + 40°C with a maximum altitude of 1000m above sea level

8.1 Definition of the main SIZES

• **Rated torque (Tn):** Torque available on the shaft continuously (service S1) at rated speed and rated current; it is measured in [Nm].

• **Maximum torque (Ts):** Torque available on the shaft for limited periods of time, with current equal to its maximum value; it is measured in [Nm].

• **Rated current (In):** Current supplied to the motor continuously at rated speed, in order to develop the rated torque (Tn); it is measured in [Arms].

• **Current at maximum torque (Is):** Current supplied to the motor for limited periods of time in a wide range of speeds, in order to develop the maximum torque (Ts); it is measured in [Arms].

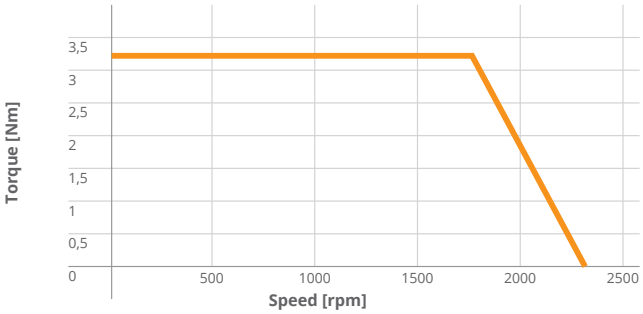
• **Voltage constant (Ke):** voltage generated in the windings from the rotation of the rotor at 1000rpm; it is measured in [Vrms/rpm].

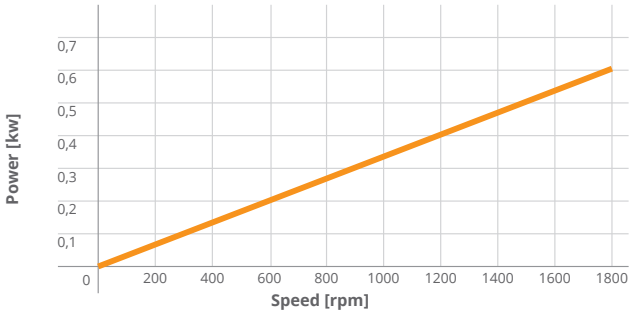
• **Torque constant (Kt):** Ratio between the torque developed on the shaft and the RMS current value; it is measured in [Nm/Arms].

NB: For maximum current values higher than those indicated in the catalogue, contact the iMotor Srl technical office.

8.2 Revs Torque Curves – Turns Power

For every motor size, in the following catalogue, the TORQUE/SPEED and POWER/SPEED graphs are shown considering self-ventilated motors (standard supply).





For information on the performances in configuration IC410 and IC416, contact the iMotor Srl technical office.

Technical specifications

iMotor
electric motors

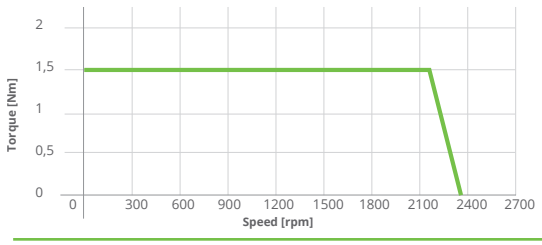
EOS 56b8

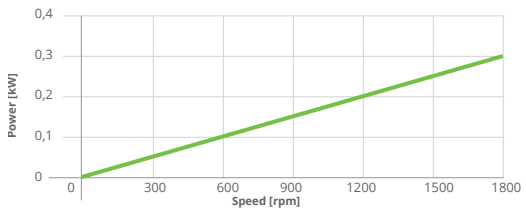
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 0,25 kW 0,5 kW

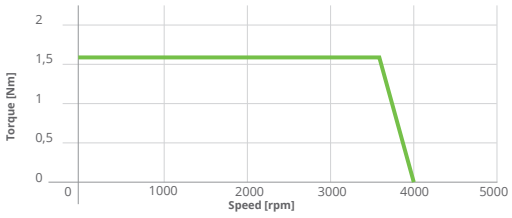
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	100	200
Number of Poles	p		8	8
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	173(Y)	99(Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,86	1,64
Rated torque	T_N	[Nm]	1,6	1,6
Rated current	I_N	[Arms]	0,67	1,16
Efficiency	η	[%]	86,8	86,8
Maximum torque	Ts	[Nm]	3,2	3,2
Current maximum torque	Is	[Arms]	1,3**	2,3**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	34,5	11,5
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	64,73	20,2
Moment of inertia	J	[kgm2]	0,00018	
Motor weight		[kg]	3,6	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

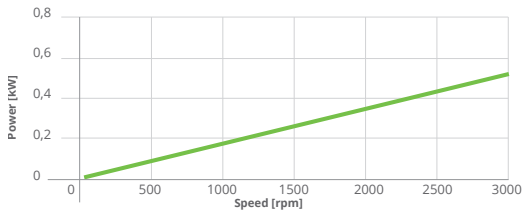
EOS 56b8 0,25kW 1500rpm 400V





EOS 56b8 0,5kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

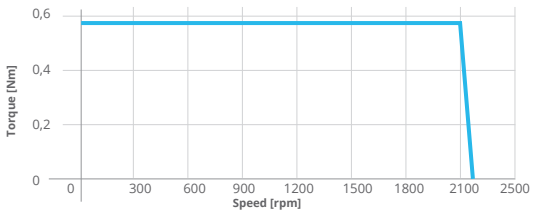
ZEPH 56b8

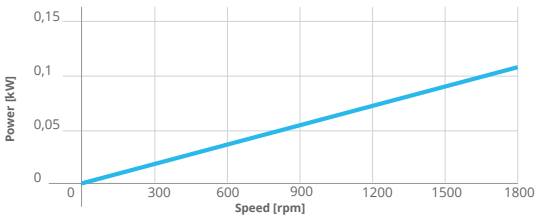
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 0,09 kW 0,12 kW

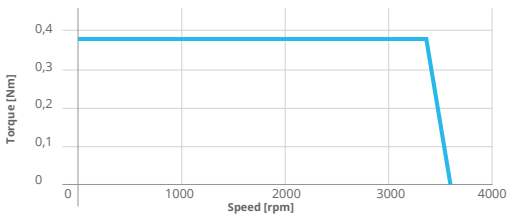
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	100	200
Number of Poles	p		8	8
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	186 (Y)	107 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,08	1,78
Rated torque	T_N	[Nm]	0,57	0,38
Rated current	I_N	[Arms]	0,2**	0,25**
Efficiency	η	[%]	76,8	78,7
Maximum torque	Ts	[Nm]	0,86	0,57
Current maximum torque	Is	[Arms]	0,26**	0,3**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	244,1	81,2
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	281	88
Moment of inertia	J	[kgm2]	65 x 10^{-6}	
Motor weight		[kg]	2,3	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F/B	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

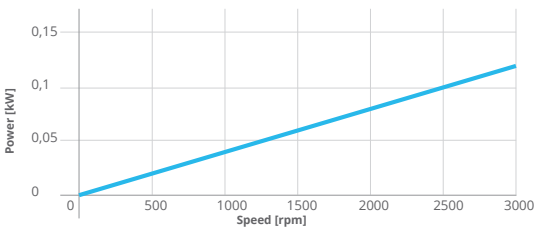
ZEPH 56b8 0,09kW 1500rpm 400V





ZEPH 56b8 0,12kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

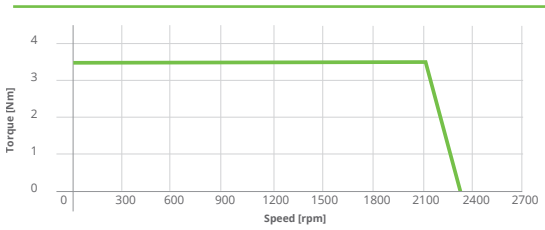
EOS 63b8

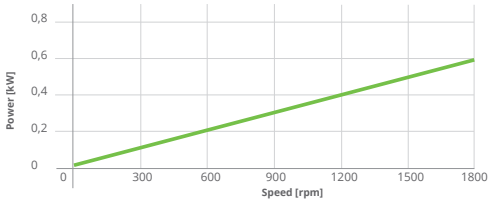
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 0,5 kW 1 kW

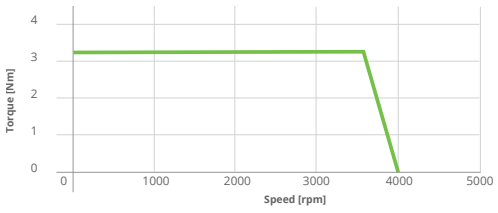
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency (N° Poles)	f	[Hz]	100	200
Number of Poles			8	8
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	176 (Y)	102 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,91	1,7
Rated torque	T_N	[Nm]	3,2	3,2
Rated current	I_N	[Arms]	1,25	2,1
Efficiency	η	[%]	84,5	87,4
Maximum torque	Ts	[Nm]	6,4	6,4
Current maximum torque	Is	[Arms]	2,2**	3,8**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	25,8	8,6
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	56,6	17,2
Moment of inertia	J	[kgm2]	0,00030	
Motor weight		[kg]	4,9	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

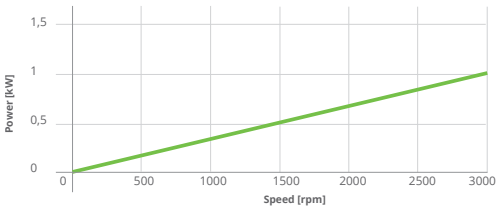
EOS 63b8 0,5kW 1500rpm 400V





EOS 63b8 1kW 3000rpm 400 V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

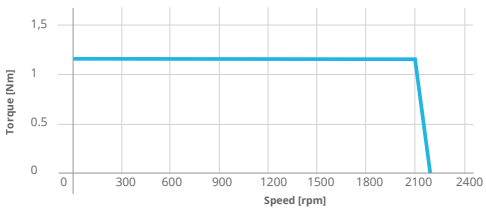
ZEPH 63b8

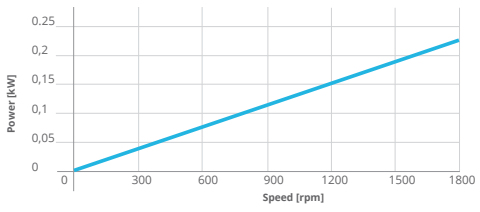
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 0,18kW 0,25kW

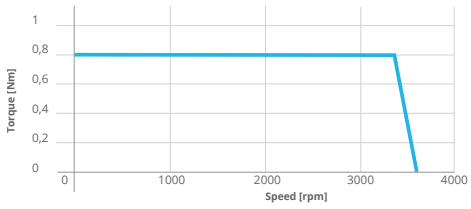
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	100	200
Number of Poles			8	8
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	187 (Y)	108 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,08	1,79
Rated torque	T_N	[Nm]	1,15	0,8
Rated current	I_N	[Arms]	0,4**	0,5**
Efficiency	η	[%]	78,8	80,7
Maximum torque	Ts	[Nm]	1,7	1,2
Current maximum torque	Is	[Arms]	0,5**	0,63**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	171,5	57,8
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	268,1	89
Moment of inertia	J	[kgm2]	100 x 10^{-6}	
Motor weight		[kg]	3,2	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

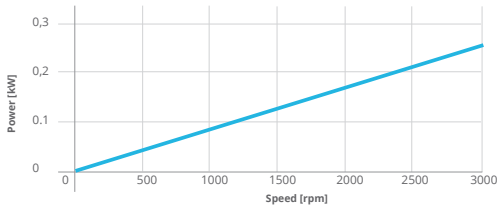
ZEPH 63b8 0,18kW 1500rpm 400V





ZEPH 63b8 0,25kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

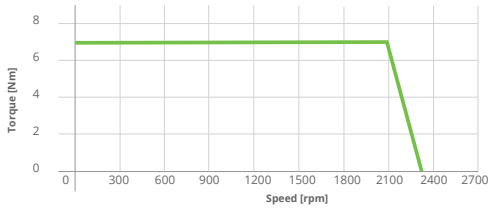
EOS 71b6

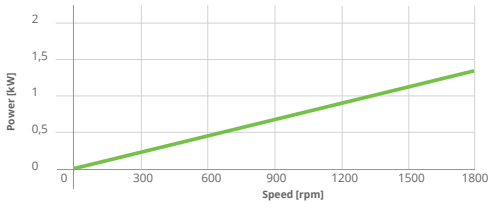
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 1,1 kW 2,2 kW

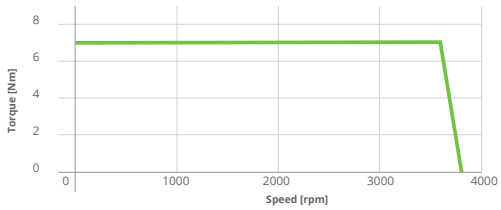
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2300	3800
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	182 (Y)	105 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,0	1,7
Rated torque	T_N	[Nm]	7	7
Rated current	I_N	[Arms]	2,5	4,5
Efficiency	η	[%]	87,4	90,1
Maximum torque	Ts	[Nm]	14	14
Current maximum torque	Is	[Arms]	4,8**	8,2**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	10,0	3,4
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	32,7	9,5
Moment of inertia	J	[kgm²]	0,0012	
Motor weight		[kg]	6,6	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

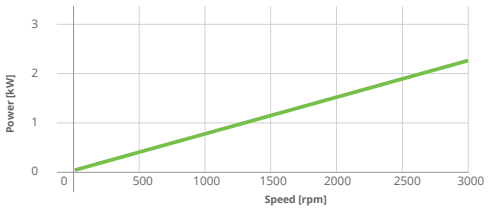
EOS 71b6 1,1kW 1500rpm 400V





EOS 71b6 2,2kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

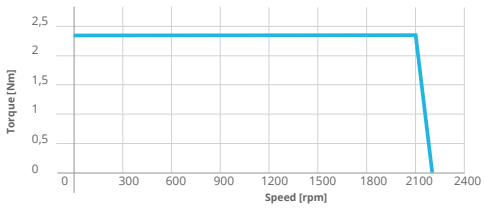
ZEPH 71b6

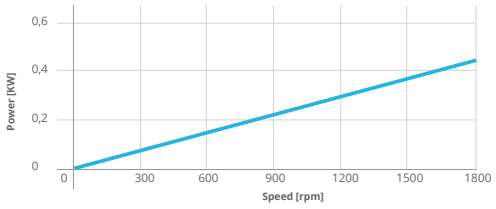
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 0,37 kW 0,55 kW

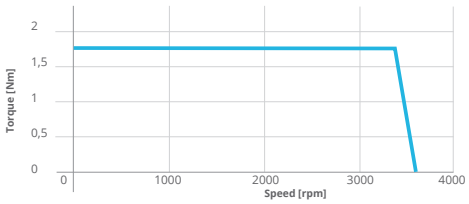
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency (N° Poles)	f	[Hz]	75 (6)	150 (6)
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	193 (Y)	112 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,2	1,9
Rated torque	T_N	[Nm]	2,35	1,75
Rated current	I_N	[Arms]	0,62	1,1
Efficiency	η	[%]	81,9	82,2
Maximum torque	Ts	[Nm]	3,5	2,6
Current maximum torque	Is	[Arms]	1,1**	1,4**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	105,6	35,1
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	217,6	72,5
Moment of inertia	J	[kgm²]	0,00034	
Motor weight		[kg]	4,1	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

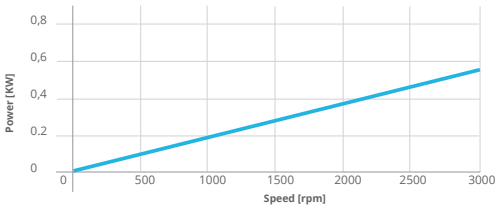
ZEPH 71b6 0,37kW 1500rpm 400V





ZEPH 71b6 0,55kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

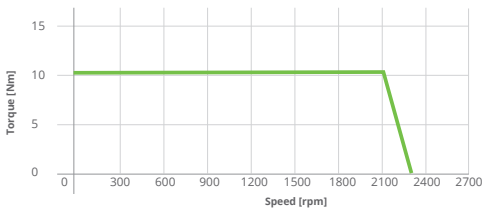
EOS 80b6

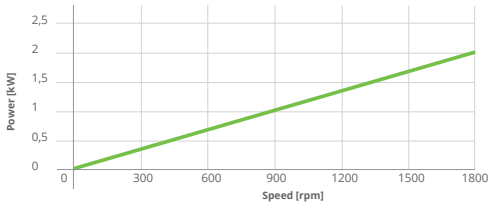
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 1,65 kW 3,3 kW

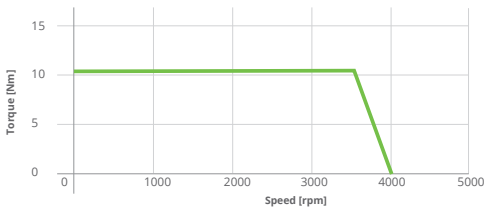
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	173 (Y)	100 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,86	1,65
Rated torque	T_N	[Nm]	10,5	10,5
Rated current	I_N	[Arms]	4,0	7,0
Efficiency	η	[%]	88,2	90,8
Maximum torque	Ts	[Nm]	21	21
Current maximum torque	Is	[Arms]	7,2**	12,4**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	5,2	2,2
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	23,6	6,6
Moment of inertia	J	[kgm²]	0,0015	
Motor weight		[kg]	9,2	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

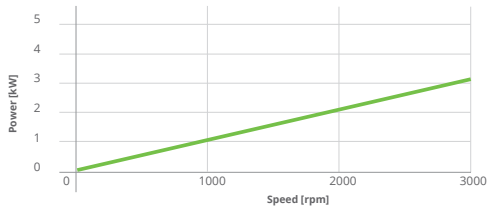
EOS 80b6 1,65kW 1500rpm 400V





EOS 80b6 3,3kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

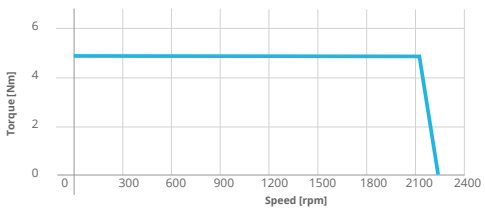
ZEPH 80b6

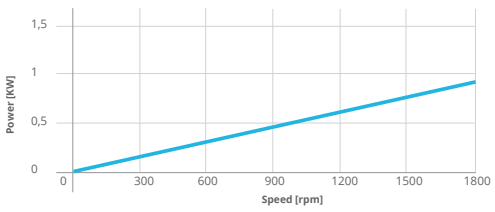
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 0,75 kW 1,1 kW

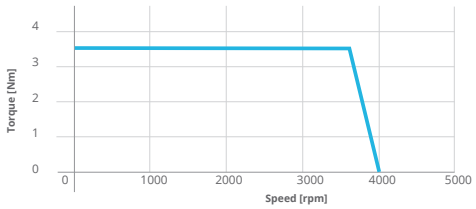
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency (No. of Poles)	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	190 (Y)	110 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,14	1,82
Rated torque	T_N	[Nm]	4,8	3,5
Rated current	I_N	[Arms]	1,7	2,3
Efficiency	η	[%]	85,8	85,9
Maximum torque	Ts	[Nm]	7,2	5,3
Current maximum torque	Is	[Arms]	2,2**	2,8**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	26,7	8,9
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	92,6	31,0
Moment of inertia	J	[kgm²]	0,00064	
Motor weight		[kg]	6,4	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

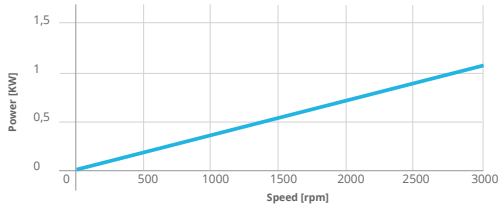
ZEPH 80b6 0,75kW 1500rpm 400V





ZEPH 80b6 1,1kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

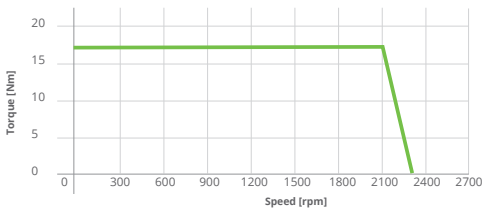
EOS 90S6

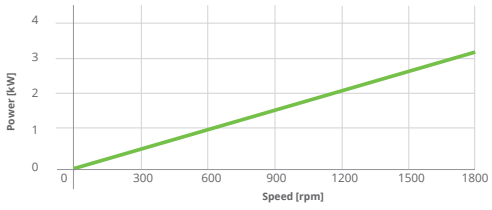
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 2,7 kW 5,4 kW

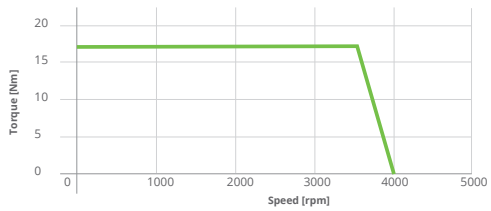
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency (No. of Poles)	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	170 (Y)	99 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,81	1,64
Rated torque	T_N	[Nm]	17,2	17,2
Rated current	I_N	[Arms]	6,5	12,0
Efficiency	η	[%]	90,7	92,9
Maximum torque	Ts	[Nm]	34,4	34,4
Current maximum torque	Is	[Arms]	11,8**	20,2**
Minimum switching frequency from inverter		[kHz]	4***	6***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	2,85	0,98
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	20,8	6,0
Moment of inertia	J	[kgm²]	0,0029	
Motor weight		[kg]	14,4	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

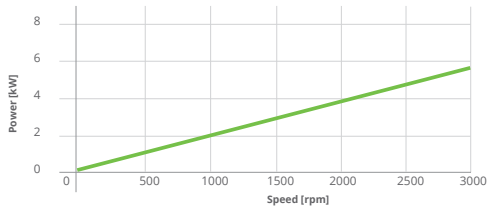
EOS 90S6 2,7kW 1500rpm 400V





EOS 90S6 5,4kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

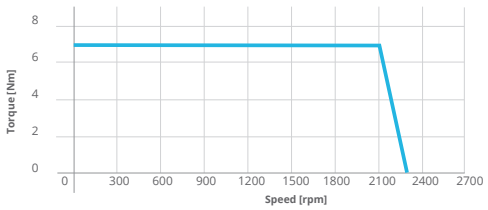
ZEPH 90S6

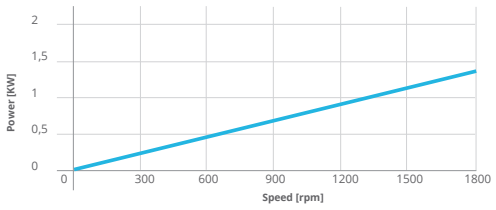
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 1,1 kW 1,5 kW

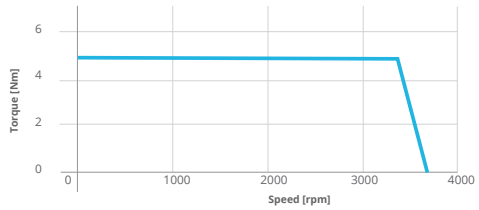
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3700
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	186 (Y)	107 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,1	1,77
Rated torque	T_N	[Nm]	7	4,8
Rated current	I_N	[Arms]	2,6	3,1
Efficiency	η	[%]	87,3	87,8
Maximum torque	Ts	[Nm]	10,5	7,2
Current maximum torque	Is	[Arms]	3,2**	3,8**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	19,5	6,5
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	87,9	29,2
Moment of inertia	J	[kgm²]	0,001	
Motor weight		[kg]	8,6	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

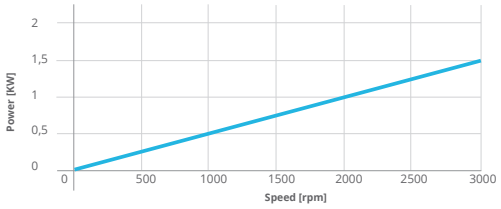
ZEPH 90S6 1,1kW 1500rpm 400V





ZEPH 90S6 1,5kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

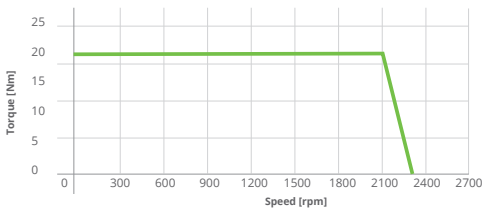
IC 411

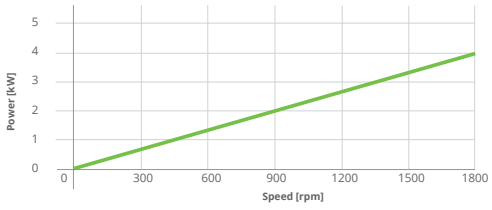
EOS 90La6

Inverter power supply 400 V

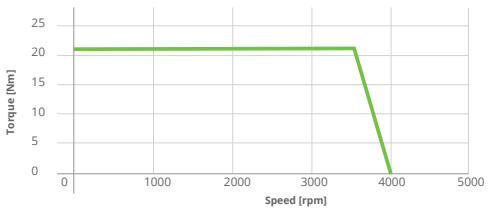
MOTOR IC411 (self-ventilated)			3,3 kW	6,6 kW
			RATED SPEED (n_N)	
Description	Symbol	Unit of measure	1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	171 (Y)	100 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,8	1,65
Rated torque	T_N	[Nm]	21	21
Rated current	I_N	[Arms]	8,1	14,5
Efficiency	η	[%]	91	93,8
Maximum torque	Ts	[Nm]	42	42
Current maximum torque	Is	[Arms]	14**	24,2**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	1,77	0,62
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	10,7	3,77
Moment of inertia	J	[kgm²]	0,0035	
Motor weight		[kg]	19	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

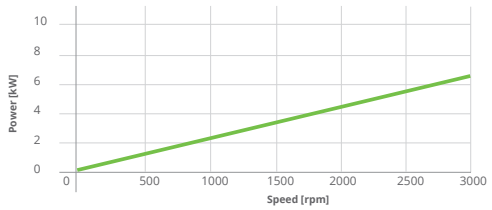
EOS 90La6 3,3kW 1500rpm 400V





EOS 90La6 6,6kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

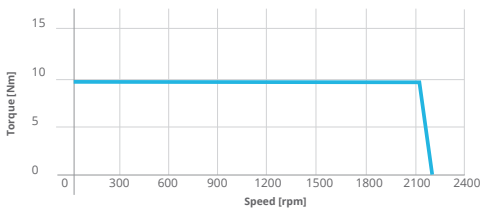
ZEPH 90L6

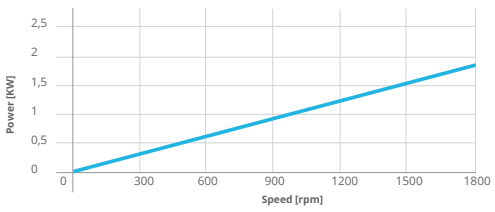
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 1,5 kW 2,2 kW

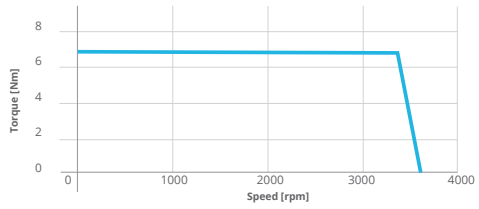
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	192 (Y)	111 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,17	1,84
Rated torque	T_N	[Nm]	9,55	7
Rated current	I_N	[Arms]	3,3	4,5
Efficiency	η	[%]	89,3	91,2
Maximum torque	Ts	[Nm]	14,3	10,5
Current maximum torque	Is	[Arms]	4,3**	5,5**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	6,8	2,3
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	38,6	12,8
Moment of inertia	J	[kgm²]	0,0016	
Motor weight		[kg]	10,3	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

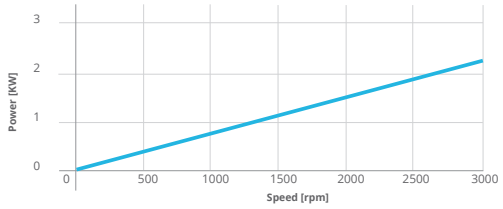
ZEPH 90L6 1,5kW 1500rpm 400





ZEPH 90L6 2,2kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

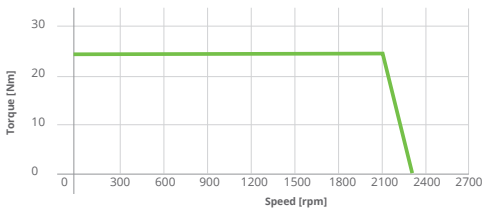
IC 411

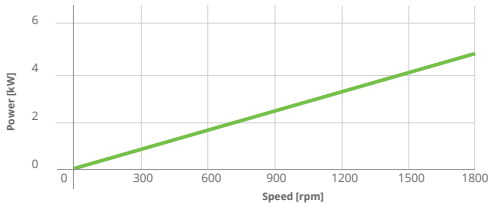
EOS 100La6

Inverter power supply 400 V

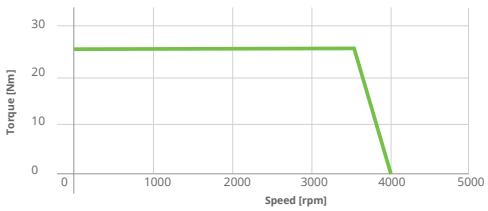
MOTOR IC411 (self-ventilated)			4 kW	8 kW
			RATED SPEED (n_N)	
Description	Symbol	Unit of measure	1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	170 (Y)	98 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,81	1,62
Rated torque	T_N	[Nm]	25,7	25,7
Rated current	I_N	[Arms]	9,9	18,4
Efficiency	η	[%]	91,6	93,1
Maximum torque	Ts	[Nm]	51	51
Current maximum torque	Is	[Arms]	17,6**	30,2**
Minimum switching frequency from inverter		[kHz]	4***	6***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	1,5	0,5
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	11,1	3,34
Moment of inertia	J	[kgm²]	0,0069	
Motor weight		[kg]	22	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

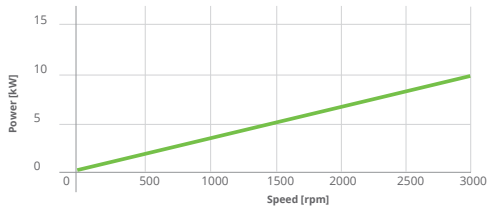
EOS 100La6 4kW 1500rpm 400V





EOS 100La6 8kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

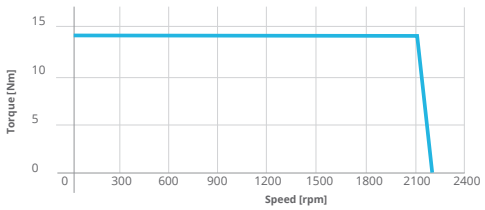
ZEPH 100L6

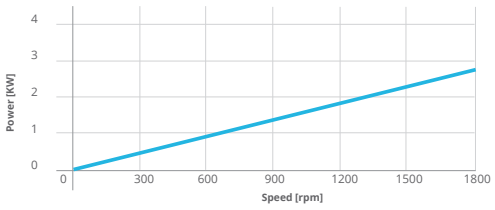
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 2,2 kW 3 kW

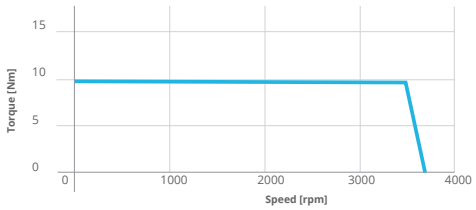
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3500
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	188 (Y)	109 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,11	1,80
Rated torque	T_N	[Nm]	14	9,55
Rated current	I_N	[Arms]	4,9	6,2
Efficiency	η	[%]	89,6	90
Maximum torque	Ts	[Nm]	21	14,3
Corrente coppia massima	Is	[Arms]	6,4**	7,5**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	4,56	1,53
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	27,2	9,1
Moment of inertia	J	[kgm²]	0,0036	
Motor weight		[kg]	15,2	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

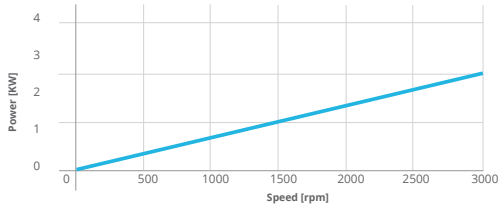
ZEPH 100L6 2,2kW 1500rpm 400V





ZEPH 100L6 3kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

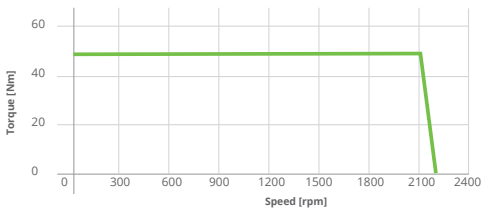
EOS 112Ma6

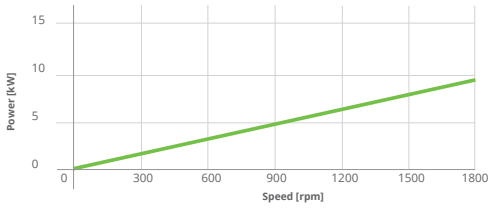
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 7,5 kW 15 kW

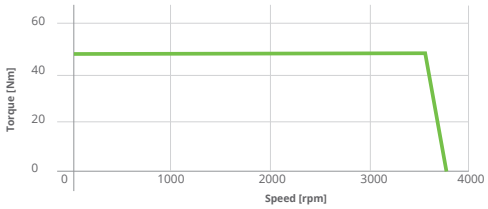
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3800
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	180 (Y)	104 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3	1,72
Rated torque	T_N	[Nm]	47,7	47,7
Rated current	I_N	[Arms]	17,5	32,0
Efficiency	η	[%]	92,9	94
Maximum torque	Ts	[Nm]	95,4	95,4
Current maximum torque	Is	[Arms]	31,8**	54,8**
Minimum switching frequency from inverter		[kHz]	8***	8***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	0,90	0,34
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	6,2	2,63
Moment of inertia	J	[kgm²]	0,014	
Motor weight		[kg]	29	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

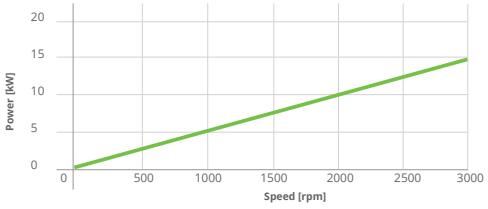
EOS 112Ma6 7,5kW 1500rpm 400V





EOS 112Ma6 15kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

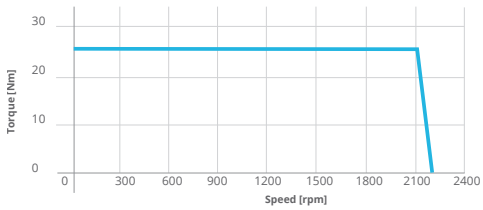
ZEPH 112M6

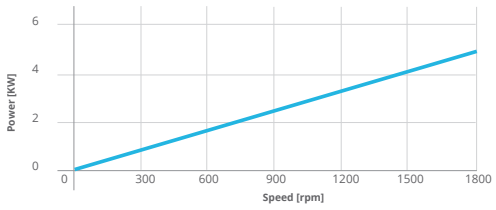
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 4 kW 5,5 kW

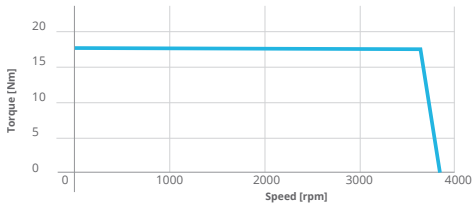
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	189 (Y)	111 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,13	1,84
Rated torque	T_N	[Nm]	25,5	17,5
Rated current	I_N	[Arms]	8,9	11,1
Efficiency	η	[%]	91,2	91,8
Maximum torque	Ts	[Nm]	38,3	26,3
Current maximum torque	Is	[Arms]	11,6**	13,8**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	2,84	0,95
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	26,8	8,9
Moment of inertia	J	[kgm²]	0,007	
Motor weight		[kg]	19,6	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

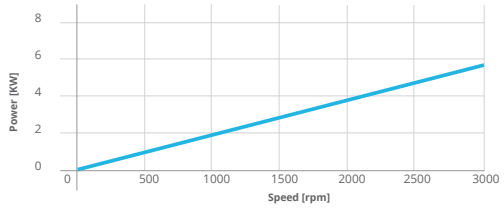
ZEPH 112M6 4kW 1500rpm 400V





ZEPH 112M6 5,5kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

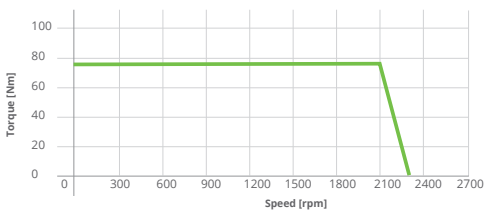
IC 411

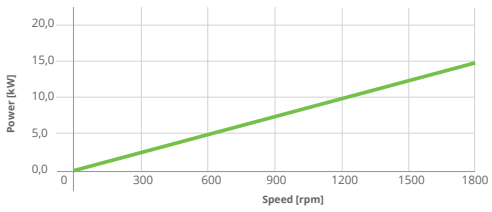
EOS 132Mb6

Inverter power supply 400 V

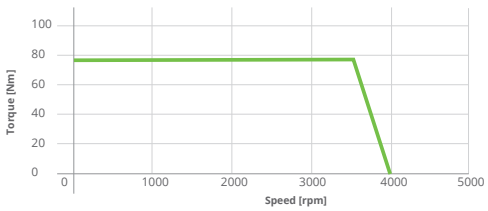
MOTOR IC411 (self-ventilated)			12 kW	24 kW
			RATED SPEED (n_N)	
Description	Symbol	Unit of measure	1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2300	4000
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	167 (Y)	91 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	2,76	1,51
Rated torque	T_N	[Nm]	76,4	76,4
Rated current	I_N	[Arms]	31,8	59,3
Efficiency	η	[%]	94,4	9
Maximum torque	Ts	[Nm]	152,8	152,8
Current maximum torque	Is	[Arms]	53**	111**
Minimum switching frequency from inverter		[kHz]	6***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	0,29	0,12
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	2,84	0,796
Moment of inertia	J	[kgm²]	0,0449	
Motor weight		[kg]	55	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

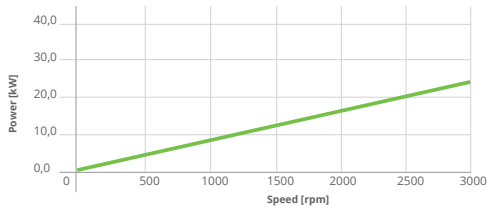
EOS 132Mb6 12kW 1500rpm 400V





EOS 132Mb6 24kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

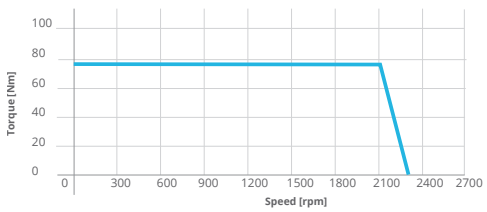
ZEPH 132M6

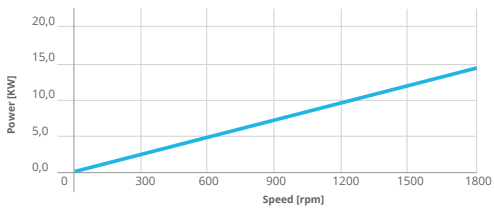
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 7,5 kW 11 kW

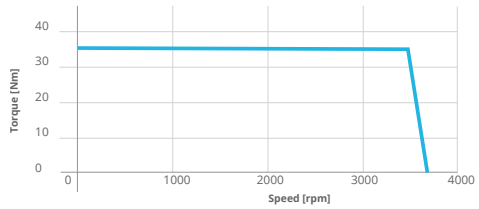
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	192 (Y)	111 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,18	1,84
Rated torque	T_N	[Nm]	47,8	35
Rated current	I_N	[Arms]	18,4	24,1
Efficiency	η	[%]	92,9	93,3
Maximum torque	Ts	[Nm]	71,7	52,5
Current maximum torque	Is	[Arms]	21,7**	27,5**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	0,95	0,37
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	8,6	2,88
Moment of inertia	J	[kgm²]	0,0225	
Motor weight		[kg]	35,5	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

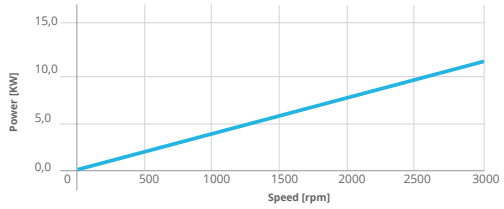
ZEPH 132M6 7,5kW 1500rpm 400V





ZEPH 132M6 11kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

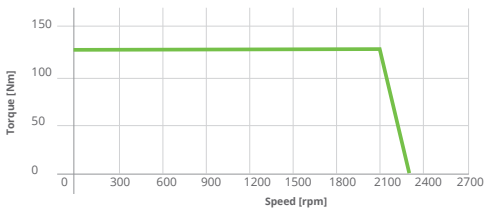
EOS 160La6

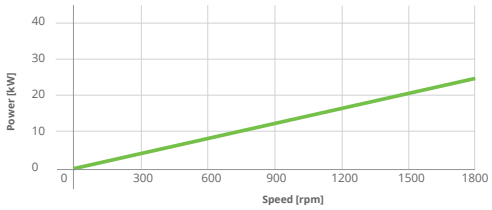
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 20,4 kW

Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	
Frequency	f	[Hz]	75	
Number of Poles			6	
Maximum speed with no load	n_{MAX}	[rpm]	2300	
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	172 (Y)	
Torque constant ±5%	Kt	[Nm/Arms]	2,85	
Rated torque	T_N	[Nm]	130	
Rated current	I_N	[Arms]	51,5	
Efficiency	η	[%]	95,5	
Maximum torque	Ts	[Nm]	260	
Current maximum torque	Is	[Arms]	86,6**	
Minimum switching frequency from inverter		[kHz]	6***	
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	0,18	
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	2,12	
Moment of inertia	J	[kgm²]	0,1160	
Motor weight		[kg]	98	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Overtemperature class			F/B	F/F
Type of service			S1	
Standard thermal protection			PTC – 150°C	

EOS 160La6 20,4kW 1500rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

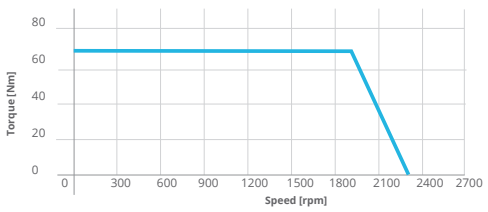
ZEPH 160L6

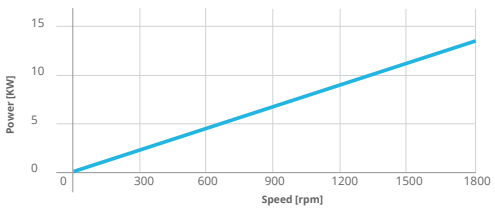
Inverter power supply 400 V

MOTOR IC411 (self-ventilated) 11 kW 18,5 kW

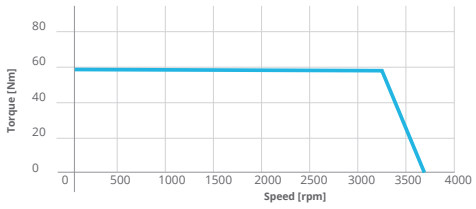
Description	Symbol	Unit of measure	RATED SPEED (n_N) 1500 rpm*	3000 rpm*
Frequency	f	[Hz]	75	150
Number of Poles			6	6
Maximum speed with no load	n_{MAX}	[rpm]	2200	3600
Voltage constant (connected) ±5%	Ke	[Vrms/krpm]	190 (Y)	111 (Δ)
Torque constant ±5%	Kt	[Nm/Arms]	3,14	1,84
Rated torque	T_N	[Nm]	70	58,9
Rated current	I_N	[Arms]	26,5	38,2
Efficiency	η	[%]	93,3	93,5
Maximum torque	Ts	[Nm]	105	88,4
Current maximum torque	Is	[Arms]	32,4**	47,3**
Minimum switching frequency from inverter		[kHz]	4***	4***
Phase-to-phase resistance @20°C dc mode	Rff	[Ω]	0,56	0,18
Phase-to-phase inductance @ 1 kHz	Lff	[mH]	6,42	2,21
Moment of inertia	J	[kgm²]	0,058	
Motor weight		[kg]	59,8	
Operating temperature	θa	[°C]	-15 ÷ +40	
Protection rating	IP		55	
Insulation class			F	
Type of service			S1	
Standard thermal protection			PTC – 150°C	

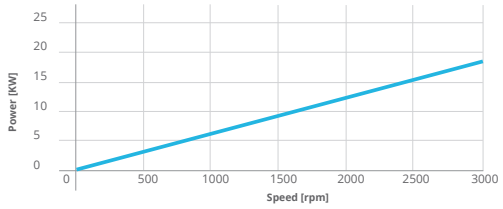
ZEPH 160M6 11kW 1500rpm 400V





ZEPH 160L6 18,5kW 3000rpm 400V





*Preferential winding. **Values declared with current id=0A. ***Value to be entered in the inverter, any automatic frequency adaptation mode MUST be disabled.

IC 411

9. CONNECTIONS

EOS and ZEPHYRUS motors are only suitable for operation with variable speed drive.

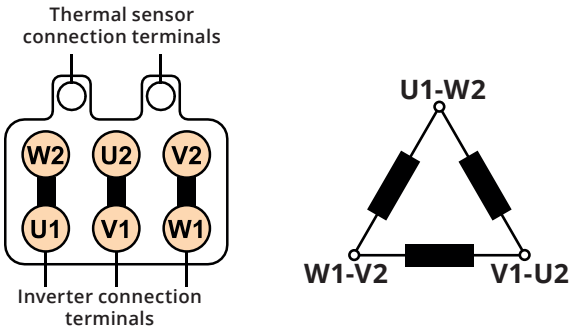
Direct start-up from the mains is not possible.

Before making the electrical connection, make sure that the power supply matches the electrical data shown on the rating plate.

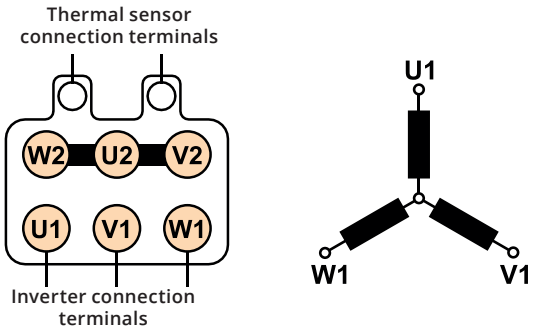
Use cables with a suitable section in order to avoid overheating and/or excessive voltage drop at the motor terminals.

Connect the winding in the Y or Δ configuration to the terminal block according to the data shown on the motor plate or the performances reported in the following manual.

Triangle connection (High speed)



Star connection (Low speed)



Grounding: the metal parts of the motor that are normally not live must be connected to the ground using the appropriate marked terminal, located inside the terminal box (use a cable with a suitable section).

Connection of standard thermal protections (PTC)
Terminals located inside the terminal box.
The protections must be connected to the dedicated inputs on the motor control electronics.

WARNING: failure to connect the thermal probes (when present) will result in the cancellation of the motor warranty.

For optional thermal protections, contact the iMotor Srl technical office.

Anti-condensation heater connection:
Terminals located inside the motor terminal box.
Before connecting, check the characteristics indicated on the adhesive plate located inside the terminal box, which identifies the type of protection (check the power supply data).

The heater must not be powered during while the motor is running.

Axial servo-fan connection
Power terminals placed inside an auxiliary terminal box integral with the fan cover. Before connecting, check the characteristics indicated on the adhesive identification label (check the power supply data).

Parking brake connection
The DC brake must be connected to the dedicated inputs of the motor control electronics, paying attention to the supply voltage value. For further information contact the iMotor Srl technical office.

Speed transducers connection
The transducer can be connected to:
• Dedicated inputs of the motor control electronics; in this case, the encoder is used for the motor speed control;
• External control devices; in this case the encoder is not used for motor speed control.

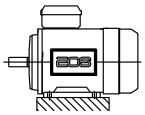
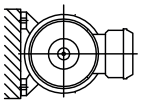
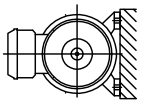
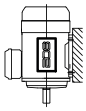
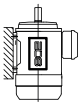
For further information or connection diagrams contact the iMotor Srl technical office.

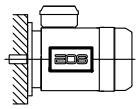
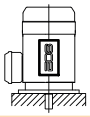
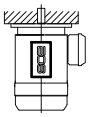
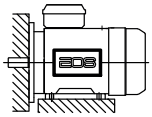
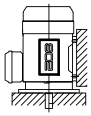
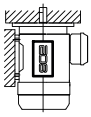
Important: at the end of the connections, check the correct tightening of the electrical terminals, correctly position the gasket and close the terminal box.

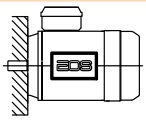
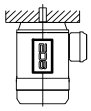
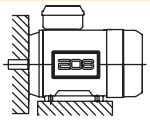
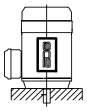
10. DIMENSIONS AND STANDARDIZED

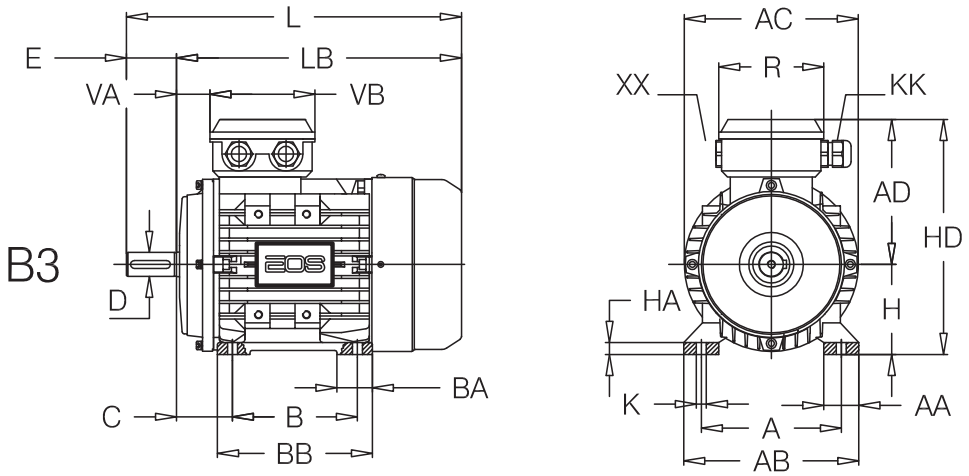
10.1 Construction forms and assembly positions

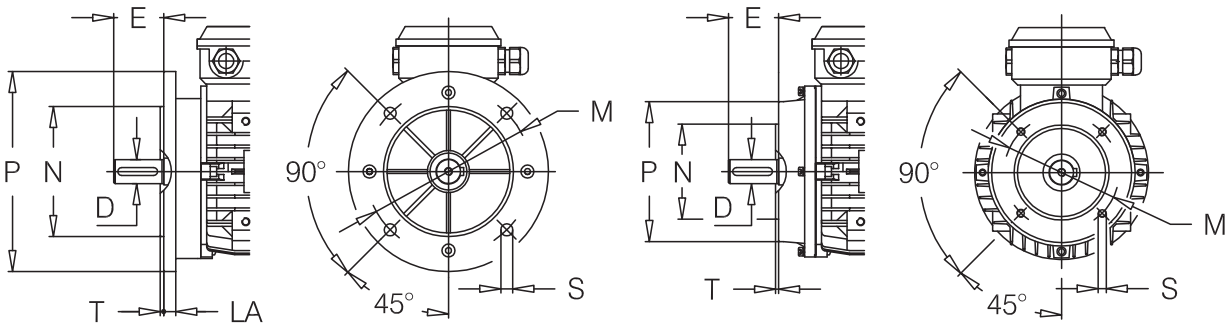
The expected construction forms are IM B3, IM B5, IM B14 and combined forms IM B35 (B3/B5) and IM B34 (B3/B14). The motors can also work in the corresponding vertical axis construction shapes.

MOTORS WITH FIXING FEET		
IM B3 IM 1001		• Horizontal axis • Feet arranged downwards
IM B6 IM 1051		• Horizontal axis • Feet to the left with a view from the command side
IM B7 IM1061		• Horizontal axis • Feet to the right with a view from the command side
IM B8 IM 1071		• Horizontal axis • Feet arranged upwards
IM V5 IM 1011		• Vertical axis • Wall-mounted feet with shaft output downwards
IM V6 IM 1031		• Vertical axis • Wall-mounted feet with shaft output downwards

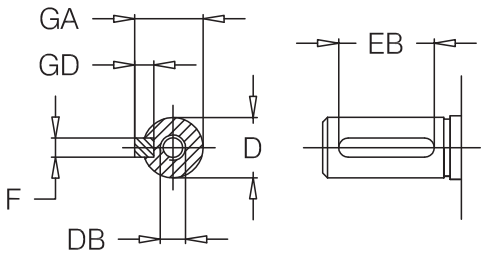
MOTORS WITH FIXING FLANGE WITH THROUGH HOLES		
IM B5 IM 3001		• Horizontal axis • Shaft output side shield with through holes
IM V1 IM 3011		• Vertical axis • Shaft output side shield with through holes • Shaft output pointing downwards
IM V3 IM 3031		• Vertical axis • Shaft output side shield with through holes • Shaft output pointing upwards
IM B35 IM 2001		Horizontal axis Feet arranged downwards Shaft output side shield with through holes Fixing by means of feet and flange
IM V15 IM 2011		Vertical axis Wall-mounted feet with shaft output downwards Shaft output side shield with through holes Fixing by means of feet and flange
IM V36 IM 2031		Vertical axis Wall-mounted feet with shaft output upwards Shaft output side shield with through holes Fixing by means of feet and flange

MOTORS WITH FIXING FLANGE WITH THREADED HOLES		
IM B14 IM 3601		Horizontal axis Shaft output side shield with through holes
IM V19 IM 3631		Vertical axis Shaft output side shield with through holes Shaft output pointing upwards
IM B34 IM 2101		Horizontal axis Feet arranged downwards Shaft output side shield with through holes Fixing by means of feet and flange
IM V18 IM 3611		Vertical axis Shaft output side shield with through holes Shaft output pointing downwards





Estremità d'albero
Shaft end



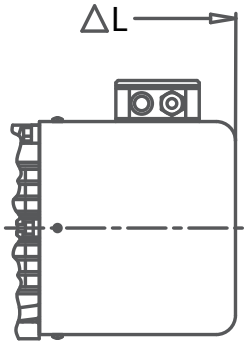
MOTOR	Main dimensions						Feet									Flange						
	AC	AD	H	HD	LB	L	A	B	C	AB	BB	AA	BA	HA	K	IM	M	N j6	P	LA	T	S
EOS/ZEPH 56	112	98	56	154	176	196	90	71	36	110	89	20	20	6	6X9	B5 B14	100 65	80 50	120 80	8 —	3 2,5	7 M5
EOS/ZEPH 63	122	110	63	173	200	223	100	80	40	120	103	28	26	8,5	7X10	B5 B14	115 75	95 60	140 90	9 —	3 2,5	9 M5
EOS/ZEPH 71	139	116	71	187	231	261	112	90	45	133	106	28	23	10	7X10	B5 B14	130 85	110 70	160 105	9 —	3,5 2,5	10 M6
EOS/ZEPH 80	157	135	80	215	254	294	125	100	50	160	130	35	35	11	10X13	B5 B14	165 100	130 80	200 120	10 —	3,5 3	12 M6
EOS/ZEPH 90S	174	143	90	233	258	308	140	100	56	175	130	35	33	12	10X13	B5 B14	165 115	130 95	200 140	12 --	3,5 3	12 M8
EOS 90 L	174	143	90	233	283	333	140	125 *	56	175	155	35	33	12	10X13	B5 B14	165 115	130 95	200 140	12 --	3,5 3	12 M8
ZEPH 90 L	174	143	90	233	258	308	140	125 *	56	175	155	35	33	12	10X13	B5 B14	165 115	130 95	200 140	12 --	3,5 3	12 M8
EOS/ZEPH 100	196	153	100	253	332	392	160	140	63	198	176	50	42	15	12X16	B5 B14	215 130	180 110	250 160	13 --	4 3,5	15 M8
EOS/ZEPH 112	221	174	112	286	334	394	190	140	70	220	180	55	42	15	12X15	B5 B14	215 130	180 110	250 160	14 —	4 3,5	15 M8
EOS/ZEPH 132M	258	193	132	325	390	470	216	178	89	252	213	58	40	15	13X16	B5 B14	265 165	230 130	300 200	14 —	4 3,5	15 M10
EOS/ZEPH 160L	314	235	160	395	530	640	254	254 *	108	291	293	54	90	17	16X20	B5 B14	300 215	250 180	350 250	15 —	5 4	20 M12

* The 90L foot also has a centre distance of 100 mm and the 160L foot also has a centre distance of 210 mm.

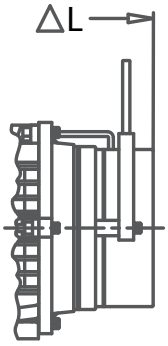
SIZE	Shaft End							Seals on the shaft			Terminal box						
					Tab						Terminals	Cable gland	Plug	Cable			
	D	DB	E	GA	F	GD	EB	Øi	Øe	H	N°-Ø	N°-KK	N°-XX	Ømax	VA	VB	R
56	9 j6	M4	20	10,2	3	3	12	12	22	5	6-M4	1-M16x1,5	1-M16x1,5	8	14	88	88
63	11 j6	M4	23	12,5	4	4	16	12	24	7	6-M4	1-M20x1,5	1-M20x1,5	12	17	95	95
71	14 j6	M5	30	16	5	5	22	15	25	7	6-M4	1-M20x1,5	1-M20x1,5	12	21	94	94
80	19 j6	M6	40	21,5	6	6	32	20	35	7	6-M4	1-M20x1,5	1-M20x1,5	12	27,5	105	105
90S	24 j6	M8	50	27	8	7	40	25	37	7	6-M4	1-M25x1,5	1-M25x1,5	15	32	105	105
90L	24 j6	M8	50	27	8	7	40	25	37	7	6-M4	1-M25x1,5	1-M25x1,5	15	32	105	105
100L	28 j6	M10	60	31	8	7	50	30	42	7	6-M5	1-M25x1,5	1-M25x1,5	15	27	105	105
112M	28 j6	M10	60	31	8	7	50	30	44	7	6-M5	1-M25x1,5	1-M25x1,5	15	32	112	119
132M	38 k6	M12	80	41	10	8	70	40	58	8	6-M5	1-M32x1,5	1-M32x1,5	21	37	112	119
160L	42 k6	M16	110	45	12	8	90	45	65	8	6-M6	1-M40x1,5	1-M16x1,5 1-M40x1,5	30	65	143	146

Motor not ventilated IC 410

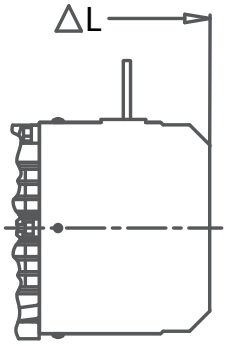
Motor Servo-Ventilated IC 416



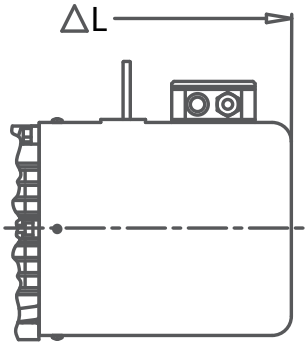
Motor not ventilated IC 410 with brake



Motor Self-Ventilated IC 411 with brake



Motor Servo-Ventilated IC 416 with brake



VERSION	LENGTH INCREASE	56	63	71	80	90S/L	100	112	132	160
NOT VENTILATED IC410	ΔL	-34	-41	-43	-48	-51	-60	-59	-65	-92
SERVO-VENTILATED IC416	ΔL	--	57	119	121	98	83	76	76	182
NON-VENTILATED BFK BRAKE IC410	ΔL	5	0	4	-8	-8	-6	4	10	-10
NON-VENTILATED AC BRAKE IC410	ΔL	--	16	19	11	12	18	20	35	-3
VENTILATED BFK/AC BRAKE IC411	ΔL	40	42	60	60	56	72	78	105	76
BFK/SERVO-VENTILATED BRAKE IC416 - Three-phase	ΔL	--	--	203	196	172	138	171	184	158
BFK/SERVO-VENTILATED BRAKE IC416 - Single-phase	ΔL	--	133	138	131	147	158			

11. POSSIBLE MOTOR CONFIGURATIONS

11.1 Ventilation options

EOS/ZEPHYRUS range motors are supplied, in the standard version, with the following configuration:

- **IC411 cooling system (self-ventilated)**
- **Without parking brake**
- **Sensorless speed control**

Other configurations are shown in the following table and are provided as options, which must be specified when ordering:

Other configurations are shown in the following:

- **• IC416 servo-ventilated: suitable for applications requiring constant load torque at low revs where normally the IC411 self-ventilated motor requires a derating as shown in the graphs of the performance cards of the various motors of the EOS range. The ZEPHYRUS range does not require a servo-ventilated version even at low revs.**
- **• IC410 non-ventilated: suitable for applications that do not allow proper ventilation**

MOTOR	Auxiliary fan characteristics Specifications of the independent axial cooling fan							Weight [kg]
	Phases	V ~ ± 5%	Hz	W ass	A ass	Poles	Protection	
63	1	230	50 / 60	22 / 21	0,14 / 0,12	2	IP55	0,8
71	1	230	50 / 60	22 / 21	0,14 / 0,12	2	IP55	0,9
	3	Y - 400	50 / 60	90	0,24 / 0,19			2,2
80	1	230	50 / 60	22 / 21	0,14 / 0,12	2	IP55	1,4
	3	Y - 400	50 / 60	90	0,24 / 0,19			2,3
90	1	230	50 / 60	39 / 36	0,28 / 0,24	2	IP55	1,5
	3	Y - 400	50 / 60	90	0,24 / 0,19			2,4
100	1	230	50 / 60	39 / 36	0,28 / 0,24	2	IP55	1,9
	3	Y - 400	50 / 60	45 / 43	0,13 / 0,09		IP54	2,1
112	1	230	50 / 60	64 / 78	0,30 / 0,34	2	IP55	2,2
	3	Y - 400	50 / 60	68 / 70	0,17 / 0,13		IP54	2,5
132	1	230	50 / 60	64 / 78	0,30 / 0,34	2	IP54	2,8
	3	Y - 400	50 / 60	68 / 70	0,17 / 0,13			3,2
160	3	Y - 400 / 480	50 / 60	43 / 62	0,31 / 0,35	4	IP55	8,0

11.2 Parking Brake Option

the brake acts in the absence of the power supply due to the force exerted by the springs. By removing the power supply to the electromagnet, the mobile anchor, by acting on the springs, presses the brake disc keyed onto the crankshaft against the rear shield, generating the braking torque.
By powering the brake, the electromagnet, overcoming the force of the springs, attracts the mobile anchor and releases the brake disc and the crankshaft. The construction with multiple springs and the braking in the absence of the power supply make the equipment safe.

- **Alternating current brake: TA series.**
- **Intorq direct current brake: BFK series**
- **Type of service S1.**
- **Class F insulation, class B over-temperature.**
- **IP54 standard protection rating, contact iMotor Srl technical office for superior protection ratings (IP55 protected motor).**
- **Brake connected to an auxiliary terminal block inside the terminal box. Separate brake supply as standard.**

On request:

- **Manual release lever with automatic return (release lever rod in correspondence with the terminal box and removable).**
- **Predisposition for manual rotation. of the crankshaft by means of a hexagonal male key on the opposite side of the control.**

• Brake power supply via the control electronics that must be used with the iMotor motors.
• Operation with inverter: the EOS/ZEPHYRUS self-braking series motors are suitable for operation with the inverter.

11.2.1 TA Series Brakes Characteristics.

- **High switch-on and switch-off speed to allow a completely free starting of the motor, a high braking frequency, a high braking number.**
- **Good heat dissipation through the structure made from die-cast aluminium and through the electric motor fan.**
- **Steel brake disc.**
- **Double friction gasket, silent, without asbestos. Geared steel drive hub with anti-vibration steel O-ring.**
- **The minimum value and the rated value of the braking torque are shown on the motor plate.**
- **Mobile anchor with magnetic lamellar core for greater speed and lower electrical losses.**
- **The electromagnet coil is completely cemented with epoxy resin.**
- **Possibility to adjust the braking torque.**
- **Wide availability of executions, servo-ventilations, encoders, release levers.**
- **Motors supplied as standard with brake set at 80% of the rated value of the braking torque (±15%).**

Brakes recommended for uses in which powerful and very fast braking is required.

MOTOR		Freno Brake	Momento frenante statico Static braking torque		Potenza Power	Corrente Current		Traferro Air gap 3)	Gioco tiranti leva di sblocco Clearance of release lever tie rods g 4)	Spessore minimo del disco freno Minimum thickness of brache disk $_{Smin}$
			M_f Minimo Minimum 1)	M_f Nominale Nominal 2)		Δ 230V 50Hz	Y 400V 50Hz			
			[Nm]	[Nm]	[W]	[A]	[A]	[mm]	[mm]	[mm]
EOS/ZEPH	63	TA1	2	4,5	17	0,13	0,07	0,15÷0,50	0,8	5
EOS/ZEPH	71	TA2	3	10	22	0,16	0,09	0,20÷0,60	0,9	5,5
EOS/ZEPH	80	TA3	5	16	27	0,26	0,15	0,20÷0,60	0,9	6
EOS/ZEPH	90	TA4	8	20	29	0,30	0,17	0,25÷0,70	1	6,5
EOS/ZEPH	100	TA5	15	40	49	0,68	0,39	0,25÷0,70	1	6,5
EOS/ZEPH	112	TA6	20	60	60	0,90	0,52	0,25÷0,70	1	6,5
EOS/ZEPH	132	TA7	30	90	69	1,18	0,68	0,30÷0,70	1	7
EOS/ZEPH	160	TA8	60	200	130	1,40	0,80	0,30÷0,70	1	7,5

11.2.2 BFK series brakes characteristics

- • Aluminium brake disc.
- • Double friction material, particularly silent, without asbestos.
- • Geared steel drive hub.
- • No axial load on the crankshaft during braking.
- • High braking torque.
- • The rated value of the braking torque are shown on the motor plate.
- • High intervention progressivity both when the motor is started and when braking.
- • Maximum silent operation.
- • The coil of the electromagnet is completely cemented with epoxy resin and the mechanical parts are protected by galvanizing treatment.

Brakes recommended for uses in which regular and silent braking and starting are required.

MOTORE MOTOR		Freno Brake	Momento frenante statico Static braking torque		Potenza Power	Tensione di alimentazione Supply Voltage	Corrente Assorbita Absorbed Current	Tempo di Sgancio Release Time	Tempo di Aggancio Engagement Time
			M_f Minimo Minimum 1)	M_f Nominale Nominal 2)					
			[Nm]	[Nm]	[W]	[Vdc]	[A]	[ms]	[ms]
EOS/ZEPH	63	BFK457-06	--	6	20	24	0,82	48	37
EOS/ZEPH	71	BFK457-08	--	12	25	24	1,05	95	42
EOS/ZEPH	80	BFK457-08	--	12	25	24	1,05	95	42
EOS/ZEPH	90 S/L	BFK457-10	--	23	30	24	1,25	95	100
EOS/ZEPH	100	BFK457-12	--	46	40	24	1,67	98	135
EOS/ZEPH	112	BFK457-14	--	95	50	24	2,10	107	240
EOS/ZEPH	132	BFK457-16	--	125	55	24	2,30	121	275
EOS/ZEPH	160	BFK458-18	65	150	85	24	3,55	165	340

12. BEARINGS AND LUBRICATION

All motors in the EOS/ZEPHYRUS range are supplied with 2RS/DDU or ZZ single row deep groove ball bearings. These bearings are lubricated for life with lithium grease and working temperature -15 ÷ + 110°C.

Note: for self-braking motors, the rear bearing differs from the standard for the following sizes
EOS/ZEPH 63: 6202-2RS/DDU
EOS/ZEPH 71: 6203-2RS/DDU
EOS/ZEPH 112: 6207-2RS/DDU

MOTOR SIZE	Front and rear bearings	Bearing dimensions [$Ø_e$ x $Ø_i$ x H]	Sealing rings [$Ø_e$ x $Ø_i$ x H]
EOS/ZEPH 56b	6201-ZZ-C3	32 x 12 x 10	22 x 12 x 5
EOS/ZEPH 63b	6201-ZZ-C3	32 x 12 x 10	24 x 12 x 7
EOS/ZEPH 71b	6202-ZZ-C3	35 x 15 x 11	25 x 15 x 7
EOS/ZEPH 80b	6204-ZZ-C3	47 x 20 x 14	35 x 20 x 7
EOS/ZEPH 90S	6205-ZZ-C3	52 x 25 x 15	37 x 25 x 7
EOS/ZEPH 90L	6205-ZZ-C3	52 x 25 x 15	37 x 25 x 7
EOS/ZEPH 100L	6206-ZZ-C3	62 x 30 x 16	42 x 30 x 7
EOS/ZEPH 112M	6306-ZZ-C3	72 x 30 x 19	44 x 30 x 7
EOS/ZEPH 132M	6308-ZZ-C3	90 x 40 x 23	58 x 40 x 8
EOS/ZEPH 160L	6309-ZZ-C3	100 x 45 x 25	65 x 45 x 8

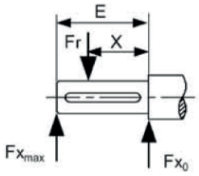
12.1 Maximum applicable radial loads

MOTOR SIZE	Radial forces F_r [N]		
	Dimension E [mm]	X_{max} (X=E)	X_o (X=0)
	20000 hours of work		
EOS/ZEPH 56b	20	200	240
EOS/ZEPH 63b	23	400	490
EOS/ZEPH 71b	30	740	815
EOS/ZEPH 80b	40	970	1120
EOS/ZEPH 90S	50	1050	1210
EOS/ZEPH 90L	50	1050	1210
EOS/ZEPH 100L	60	1800	2280
EOS/ZEPH 112M	60	1800	2280
EOS/ZEPH 132M	80	2100	2600
EOS/ZEPH 160L	110	2740	3540

For longer bearing lives, multiply the table loads by the following factors: 0.87 (30000 hours), 0.79 (40000 hours), 0.74 (50000 hours).

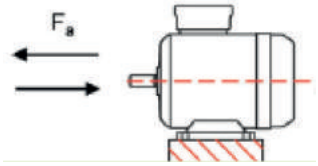
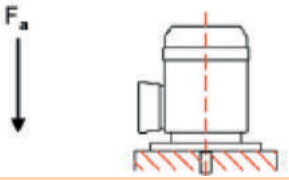
If the radial load is applied between sections XO (X=0) and Xmax (X=E) at a distance X [mm] from section XO, its maximum value Fr max can be assumed equal to:

$$F_{rmax,\,X} = F_{rmax,\,Xo} - \frac{F_{rmax,\,Xo} - F_{rmax,\,Xmax}}{E} \bullet X$$



Where:
Fr $_{max,Xo}$ [N]: Maximum radial load at section XO shown in the table;
Fr $_{max,Xmax}$ [N]: Maximum radial load at the X_{max} section shown in the table
E [mm]: Shaft output shown in the table.

12.2 Maximum applicable axial loads

MOTOR SIZE	Axial forces F_a [N]													
														
	20.000 Hours of Work													
	Rpm speed							Rpm speed						
	750	1000	1500	3000	4000	4500	5000	750	1000	1500	3000	4000	4500	5000
EOS/ZEPH 56b	325	297	267	233	--	--	173	235	211	183	153	--	--	125
EOS/ZEPH 63b	543	493	443	393	--	--	289	407	357	307	257	--	--	216
EOS/ZEPH 71b	723	640	547	410	--	--	374	730	647	550	413	--	--	378
EOS/ZEPH 80b	980	867	732	553	--	525	--	985	878	743	562	--	532	--
EOS/ZEPH 90S	1048	927	788	593	--	561	--	1060	943	800	605	--	571	--
EOS/ZEPH 90L	1048	927	788	593	--	561	--	1060	943	800	605	--	571	--
EOS/ZEPH 100L	1785	1550	1270	883	976	--	--	1793	1562	1278	888	984	--	--
EOS/ZEPH 112M	1780	1547	1265	880	975	--	--	1795	1563	1276	890	985	--	--
EOS/ZEPH 132M	2240	1993	1677	1273	--	--	--	2274	2022	1720	1293	--	--	--
EOS/ZEPH 160L	2450	2090	2100	1910	--	--	--	2500	2127	2130	1920	--	--	--

• For operation at speeds different from those in the table, contact the iMotor Srl technical office.
• For longer bearing lives, multiply the table loads by the following factors: 0.79 (30,000 hours), 0.71 (40,000 hours), 0.66 (50,000 hours).

13. DYNAMIC BALANCING

The dynamic balancing of the rotor is carried out with a half tab, in shape A, inserted in the end of the shaft. Standard "A" vibration grade; on request vibration degree "B".

The limit values for the intensity of mechanical vibrations are shown in the table.
The measured values may deviate from the actual values by ± 10%.

Dynamic balancing				
Vibration degree	Assembly	Displacement [µm]	Speed [mm/s]	Acceleration [m/s^2]
A	Free suspension	25	1,6	2,5
Normal	Rigid assembly	21	1,3	2
B	Free suspension	11	0,7	1,1
Reduced	Rigid assembly	--	--	--

14. SOUND LEVELS

The sound tests must be performed in accordance with ISO 1680. in order to detect the sound power level (LwA) and the sound pressure level (LpA), i.e. the mean value of the levels, measured at 1 meter from the perimeter of the machine located in the free field and on a reflecting surface.

The EN 60034-9 standard defines the acoustic power limits to be respected and indicates the maximum sound power level (LwA).

Sound pressure level L_{pA} [dB(A)] and sound power level L_{wA} [dB(A)] without applied load										
MOTOR SIZE	750rpm		1000rpm		1500rpm		3000rpm		5000rpm	
	L_{pA}	L_{wA}	L_{pA}	L_{wA}	L_{pA}	L_{wA}	L_{pA}	L_{wA}	L_{pA}	L_{wA}
EOS/ZEPH 56b	39	50	40	51	44	54	50	59	55	65
EOS/ZEPH 63b	40	51	41	52	46	55	52	63	58	69
EOS/ZEPH 71b	42	53	43	54	49	58	57	67	64	74
EOS/ZEPH 80b	44	55	46	56	51	60	61	72	70	79
EOS/ZEPH 90S	46	58	49	59	53	63	64	75	73	83
EOS/ZEPH 90L	46	58	49	59	53	63	64	75	73	83
EOS/ZEPH 100L	49	61	52	61	58	67	68	79	79	87
EOS/ZEPH 112M	53	65	54	65	60	70	69	80	80	89
EOS/ZEPH 132M	56	68	60	70	64	73	73	83	--	--
EOS/ZEPH 160L	58	71	59	71	65	76	76	86	--	--

The pressure and power values shown in the table are expressed in dB(A) and refer to the motor running with no load.

The values in the table may also vary significantly depending on the type of inverter used and its programming.

15. SPECIAL EXECUTIONS

(1) Speed transducers (options E01 ÷ E04)

It is possible to manage different types of transducers directly assembled on the motor shaft or it is possible to supply motors with shafts prepared for different types of sensors (e.g. resolvers, incremental encoders, absolute encoders, etc.).

(2) Bimetallic thermal probes (PTO) NC 150°C (option T01)

Characteristics: Vnmax = 250V; Inmax = 1,6A.
Three probes connected in series with normally closed contact (NC) inserted in the motor winding. The contact opens when the winding temperature reaches and exceeds the intervention value

Standard encoder characteristics:

Bidirectional Incremental Optical Encoder	
Protection rating	IP54
Operating Temperature:	- 10 ÷ 85°C
Max Rotation Speed (Continuous Service):	4000 rpm
Resolution [pulses/rev.]:	1024
Electronic Configuration:	PUSH PULL
Supply	5 ÷ 28 [vdc]
Output:	5 ÷ 28 [vdc]
Max current of load / channel:	20 [mA]
Zero Signal:	Yes
Connector:	Mil Type

For further information contact the iMotor Srl technical office.

Terminals located inside the motor terminal box.

(3) PT 100 temperature sensor (resistance thermometer) (option T02)

Compliant with DIN-IEC 751 standards. It is a temperature sensor that exploits the resistivity variation of some materials when the temperature changes. They must be connected to a special equipment (the purchase of this equipment is at the expense of the purchaser of the motor).

Winding: No. 3 PT100 inserted in the winding one per phase.

Terminals located inside the motor terminal box.

(4) KTY variable resistance silicone thermal sensor (option T03)

Temperature sensor dependent on resistance variation with positive temperature coefficient
WARNING: respect the power supply polarity to avoid damage to the sensor itself.

(5) Anti-condensation heater (option T04)

It is recommended for motors operating in environments:
• with high humidity;
• with strong temperature range;
• with low temperature (possible ice formation).

Resistance fixed on coil heads which allows you to heat the stationary electric motor and thus avoid the formation of condensation inside the casing.
Single-phase power supply 230V ac ± 10% 50/60Hz, power consumption:
25 W for size 56 ... 90
26 W for size 100 ... 112
40 W for size 132 ... 160

Terminals located inside the motor terminal box.
Mandatory execution: Condensate drain holes.
If, during installation, the condensation drain holes located on the underside of the electric motor have not been removed, they must be opened approximately every 5 months.
The heater must not be powered while the motor is running.

(6) Condensation drain holes (option T05)
When ordering, always specify the working position of the motor.

(7) Additional winding impregnation (option A01)
It consists of a second impregnation cycle; it is recommended: in humid and corrosive environments (moulds); when a higher winding protection is desired; in the presence of strong stresses (induced mechanical or electromagnetic vibrations);

(7) Class H winding (option A02)
Class H insulation system, made of double-enamelled class H copper wire. Impregnation system with high quality class H resins. Accurate separation of the phase windings (in the groove and in the head), accurate insulation of the "braid" (phase start cables). Other class H materials..

(8) IP56 protection (IP56 option)
Motor protected against dust (first digit) and water jets (second digit). The protection rating on the rating plate becomes IP56.
For further information, please refer to the CEI EN 60034-5 standard.
Protection rating NOT feasible with brake option.

(9) IP65 protection (IP65 option)
Motor hermetically protected against dust (first digit) and water jets (second digit). The protection rating on the rating plate becomes IP65.
For further information, please refer to the CEI EN 60034-5 standard.
Protection rating NOT feasible with brake option.

(10) IP66 protection (IP66 option)
Motor hermetically protected against dust (first digit) and waves of water or very strong jets (second digit). The protection rating on the rating plate becomes IP66.
For further information, please refer to the CEI EN 60034-5 standard.
Protection rating NOT feasible with brake option.

(11) Manual rotation (option R01)
It allows you to turn the crankshaft from the opposite command side. A hexagonal male wrench is inserted into the central hole of the fan cover:
Measure of 3 for sizes 56 and 63
Measure of 4 for 71
Measure of 5 for 80
Measure of 6 for 90 ÷ 132
Measure of 8 for 160

The manual rotation option cannot be performed with the following executions:
Rain cover;
Encoder;
Axial servo-fan.

(12) Special painting (options C01 ÷ C5M)
The choice of painting treatment is a critical phase as it depends on the durability of the electric motor according to the environment in which it is to be placed.
According to the UNI EN ISO 12944-1 standard, durability can be classified according to 3 classes:
Low (L) from 2 to 5 years
Average (M) from 5 to 10 years
High (H) over 15 years

Durability is indicated next to the corrosivity category of the installation environment to allow the definition of the protection cycle able to operate in that environment and to ensure the required durability. The painting cycles that are carried out are fully compliant with the regulations.
Classification of environments:
C1 - C2 = Rural areas, low pollution; heated buildings/neutral atmosphere.
C3 = Urban and industrial atmospheres; moderate sulphur dioxide levels; production areas with high humidity.
C4 = Industrial and coastal areas; chemical processing plants.
C5L = Industrial areas with high humidity and aggressive atmospheres.
C5M = Marine areas, offshore areas, estuaries, coastal areas with high salinity.

(13) Terminal box position (option S01)
It is normally supplied for motors equipped with IM B3 and derivative feet, observing from the shaft output side:
T Position is standard (top);
R position on request (on the right);
L position on request (on the left)

Any brake release lever follows the position of the terminal box.

(14) Rain cover (option P01)
Execution required for outdoor applications or in the presence of water splashes, with vertical shaft pointing downwards, type of construction (IM V5, IM V1, IM V18, IM V15, and IM V17).
The LB dimension increases by:
35 mm size 56÷112
45 mm size 132÷160

(15) ATEX (option EX)
For information, contact the iMotor Srl technical office.

*Exclusively for motor series with brake.

(16) Manual release lever* (option FR02)
It frees the motor from the unpowered brake and returns to its initial position after the manoeuvre (automatic return). Useful for manual rotations in case of power failure and/or during installation. The handle of the lever can be removed and is located in correspondence with the terminal box (standard position). For different positions, contact us.
It is always advisable to remove the handle once the operations have been completed.

(17) Rubber brake protection* (option FR03)
It is used to prevent dust and/or water or other foreign bodies from entering the braking surfaces. It also considerably limits the brake wear dust to the environment. It is applied around the brake in the appropriate slots provided.
This execution is necessary for IP55.

(18) IP55 protection* (option FR03)
Not possible in execution with release lever.

Safety Warnings

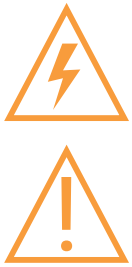
iMotor
electric motors

SAFETY WARNINGS

CAUTION!
Read all warnings and instructions below and consult the Use and Maintenance manual and the Technical Catalogue, available on our website or on request, before proceeding to use the product.

GENERAL WARNINGS

Strictly comply with the laws in force and with all applicable safety and correct installation regulations and with the information given in this manual, as incorrect procedures can result in damage to property, persons and animals. In the event of uncertainty or misunderstanding, immediately stop work and contact the iMotor technical office.



Low-voltage rotating electrical machines contain live parts, rotating or moving parts, surface and interior parts with temperatures above 50°C in normal operation.
All transport, installation, commissioning, maintenance and repair operations must be carried out by qualified personnel and checked by the responsible experts.
Improper use of the motors and/or removal or disconnection of the protective devices can cause serious damage to people, animals and property.

We therefore decline all liability in case of accidents and/or damage due to negligence and/or failure to follow the instructions described and the general safety regulations or use under conditions other than those indicated on the plate.

We also decline all liability for damage caused by improper use of the motors and/or the removal or disconnection of the electrical and mechanical protections.

The three-phase permanent magnet synchronous motors described in this manual cannot function directly connected to the power supply and for this reason it is necessary to use an inverter.

These motors are designed to be used at room temperature -15 ÷ +40°C and with a maximum altitude of 1000m above sea level in accordance with CEI EN 60034-1.
Any conditions other than those described above are indicated on the plate.

Pay attention to the values on the plate, and check that the conditions of use are compatible with the information shown.

EOS & ZEPHYRUS series three-phase permanent magnet synchronous motors are intended to be incorporated, the motor cannot be put into service until the machine in which it is to be incorporated has been declared compliant with the applicable provisions.

This manual refers to the three-phase permanent magnet synchronous motors of the EOS & ZEPHYRUS series which is not allowed to be used in explosive atmospheres.

It is important to pay attention to the difference in operation between the motor and the generator, as described below:

OPERATION AS A GENERATOR

Dragging the crankshaft produces a voltage at the terminals of the stator winding, the value of which is proportional to the dragging speed of the crankshaft.

OPERATION AS A MOTOR

For motor operation, it is necessary to use an inverter that is suitable for controlling motors with permanent magnet rotors. These devices use different methods of control of the motor performance, **therefore according to the type of inverter there may be small thermal variations and deviations from the data shown on the plate.**

Check that the motors are intact and undamaged before using them.
The motors are uniquely identified by the plate on the product that shows the main technical characteristics, the CE marking, the manufacturer's data and the serial number.
The motors must be lifted and handled, **always** using the appropriate safety devices and according to current legislation using, if necessary, **suitable eyebolts** supplied to the motor, taking care not to damage auxiliary equipment and the cables connected to the motor.
Do not lift the motor, when connected to other components, using its eyebolts.
The motor must be positioned away from the humidity, since, in its presence, the insulation of the machine can decrease very rapidly until it becomes almost null.
Always disconnect the motor from the power supply before operating on it or on equipment connected to it.

NOTE

iMotor
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