

RAEL

MOTORI



ELETTRICI

APTITUDE FOR FLAMEPROOF MOTORS



RAEL , founded in Genoa in 1969 as an electric motor repair and rewinding company, has grown to become an established name in projection and manufacture of electric motors for potentially explosive atmospheres.

Since 1986 the company has grown considerably and moved to Predosa (AL) where both production and offices are actually located.

Through constant research of products which can offer a high quality standard and market competitiveness we are geared up with automated production systems like CNC turning and latest generation machining centers , industrial robots , CNC grinding machine, inspection room with CMM machines computer controlled system for inline electrical test and Dynamometric breaking test bench, automated assembly lines.

The total area occupied by the company is about 20000 m² of which 11300 m² are buildings and divided as follows:

- Production and warehouse 10500 m²

- Offices 800 m²

- ▶ In-house:

- ▶ more than 20 CNC machines
 - ▶ automatic winding lines , last one built in 2023
 - ▶ cable preparation & cover assembly
 - ▶ 12 assembly lines – possibilities to work shifts / hire seasonal workers if necessary
 - ▶ 7 automatic warehouses
 - ▶ since 2023 foundry in house with the latest machines on the market .

- ▶ High degree of automation
 - ▶ Proprietary design and certificates
 - ▶ Alluminum motors from 56 to 160 size
 - ▶ 100% quality and performance test on the final products
 - ▶ In-house testing laboratory

We offer a great flexibility in fulfilling special customer requirements.

All of the above helped to place Rael among the leading producers of explosion proof motors.

RL Ex db/ Ex db eb
TUBE MOTORS
SINGLE PHASE / THREE PHASE

MIA SERIES
INCREASE SAFETY MOTORS
MIA1 SERIES
NON - SPARKING MOTORS

RAEL

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APTITUDE FOR FLAMEPROOF MOTORS

BRAKEX
MOTORS WITH INTEGRATED BRAKE

ADPE
DISPENSER MOTORS



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1. INTRODUCTION

1.0 SI Units

Base units

Base quantity	Base quantity symbol	SI Name	SI Symbol
length	<i>l</i>	meter	m
mass	<i>m</i>	kilogram	kg
time	<i>t</i>	second	s
electric current	<i>I, i</i>	ampere	A
thermodynamic temperature	<i>T</i>	Kelvin	K
amount of substance	<i>n</i>	mole	mol
luminous intensity	<i>I_v</i>	candela	cd

Derived units

Derived quantity	Derived quantity symbol	SI Name	SI symbol	Expression in terms of other SI units	Expression in terms of SI base units
frequency	hertz	Hz	-	-	s ⁻¹
force	F	Newton	N	-	kg · m · s ⁻²
pressure, stress	p	Pascal	Pa	N · m ⁻²	kg · m ⁻¹ · s ⁻²
energy, work, quantity of heat	E	joule	J	N · m	kg · m ² · s ⁻²
power	P, W	watt	W	J · s ⁻¹	kg · m ² · s ⁻³
electric charge	q	coulomb	C		A · s
electric potential difference, electromotive force	v	volt	V	J · C ⁻¹	m ² · kg · s ⁻³ · A ⁻¹
electric resistance	R	ohm	Ω	V · A ⁻¹	m ² · kg · s ⁻³ · A ⁻²
electric conductance	G	siemens	S	A · V ⁻¹	s ³ · A ² · m ⁻² · kg ⁻¹
capacitance	C	farad	F	C · V ⁻¹	s ⁴ · A ² · m ⁻² · kg ⁻¹
magnetic flux density	B	tesla	T	V · s · m ⁻²	kg · s ⁻² · A ⁻¹
magnetic flux	Φ(B)	Weber	Wb	V · s	m ² · kg · s ⁻² · A ⁻¹
inductance	L	Henry	H	V · s · A ⁻¹	m ² · kg · s ⁻² · A ⁻²
Celsius temperature	T	degree Celsius	°C	K	
plane angle	φ, θ	radiant	rad	1	m · m ⁻¹
luminance		lux	lx	cd · sr · m ⁻²	

Other derived quantities

area	A				m ²
volume	V				m ³
speed, velocity	v				m · s ⁻¹
angular velocity	ω				s ⁻¹ rad · s ⁻¹
acceleration	a				m · s ⁻²
Torque, moment of force	M			N · m	m ² · kg · s ⁻²
moment of inertia	J				Kg m ²
mass density	ρ				kg · m ⁻³
specific volume					m ³ · kg ⁻¹
dynamic viscosity	ρ			N · s · m ⁻² Pa · s	m ⁻¹ · kg · s ⁻¹



1.1 Standards of reference

RAEL motors are constructed in compliance with the following standards:

Title		EU CENELEC	International IEC
Rotating electrical machines Part 1: Rating and performance		EN 60034-1	IEC 60034-1
Rotating electrical machines Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)		EN 60034-2	IEC 60034-2
Rotating electrical machines. Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code). Classification		EN 60034-5	IEC 60034-5
Rotating electrical machines Part 6: Methods of cooling (IC Code)		EN 60034 -6	IEC 60034 -6
Rotating electrical machines Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM Code)		EN 60034-7	IEC 60034-7
Rotating electrical machines Part 9: Noise limits		EN 60034-9	IEC 60034-9
Rotating electrical machines Part 12: Starting performance of single-speed three-phase cage induction motors		EN 60034-12	IEC 60034-12
Rotating electrical machines Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity		EN 60034-14	IEC 60034-14
General purpose three-phase induction motors having standard dimensions and outputs. Frame numbers 56 to 315 and flange numbers 65 to 740		EN IEC 60072-1	IEC 60072-1
Degrees of protection provided by enclosures (IP Code)		EN 60529	IEC 60529
Electrical apparatus for explosive gas atmospheres Part 0: General requirements		EN 60079-0	IEC 60079-0
Electrical apparatus for explosive gas atmospheres Part 1: Flameproof enclosures "d"		EN 60079-1	IEC 60079-1
Electrical apparatus for explosive gas atmospheres Part 7: Increased safety "e"		EN 60079-7	IEC 60079-7
Electrical apparatus for use in the presence of combustible dust Part 1: Protection by enclosures "t"		EN 60079-31	IEC 60079-31



1.2 Tolerances

Mechanical tolerances according to EN 50347 and IEC 60072-1:

Symbol	Description	Tolerance
A	Distance between centre-lines of fixing holes (end view)	$\pm 1 \text{ mm}$
AB	Overall dimensions across the feet (end view)	$+ 2 \%$
AC	Diameter of the motor (without terminal box)	$+ 2 \%$
B	Distance between centre-lines of fixing holes (side view)	$\pm 1 \text{ mm}$
C - CA	Distance from the shaft end shoulder to the centre-line of nearest mounting holes in the feet	$\pm 3 \text{ mm}$
D - DA	Diameter of the shaft extension.	$\begin{matrix} \varnothing 11 - 28 & j8 \\ \varnothing 32 - 48 & k8 \\ \varnothing \geq 55 & m8 \end{matrix}$
E - EA	Length of the shaft extension from the shoulder	$\begin{matrix} \varnothing < 55 \text{ mm} & - 0,3 \text{ mm} \\ \varnothing > 60 \text{ mm} & + 0,5 \text{ mm} \end{matrix}$
F - FA	Width of the keyway of the shaft extension	H9
GA - GC	Distance from the top of the key to the opposite surface of the shaft extension	$+ 0,2 \text{ mm}$
H	Distance between the centre-line of the shaft to the bottom of the feet	$\begin{matrix} H \leq 250 & - 0,5 \text{ mm} \\ H \geq 280 & - 1 \text{ mm} \end{matrix}$
HD	Distance from the top of the terminal box and to the bottom of the feet	$+ 2 \%$
K	Diameter of the holes or width of the slots in the feet of the motor	$+ 3 \%$
L	Overall length of the motor with a single shaft extension	$+ 1 \%$
M	Pitch circle diameter of the fixing holes	$\pm 0,8 \text{ mm}$
N	Diameter of the spigot	$\begin{matrix} \varnothing < 230 & j8 \\ \varnothing \geq 250 & h8 \end{matrix}$
P	Outside diameter of the flange	$\pm 1 \text{ mm}$
R	Distance from the shaft shoulder to the mounting surface of the flange	$\pm 3 \text{ mm}$
S	Diameter of the fixing holes in the mounting flange or nominal diameter of thread	$+ 3 \%$
	Distance from the shaft shoulder to the mounting surface of the flange with locked bearing	$\pm 0,5 \text{ mm}$
	Mass of the motor	$- 5 \text{ a } + 10 \%$

Electrical tolerances according to EN 60034-1 and IEC 60034-1:

Quantity	Tolerance
Efficiency (η)	$- 0,15 (1-\eta)$ for $P_N \leq 50 \text{ kW}$
Total losses	$+10\%$
Power factor ($\cos \varphi$)	$\frac{1-\cos \varphi}{6}$ minimum absolute value 0,02 maximum absolute value 0,07
Slip (rpm) (at full load and working temperature)	$\pm 30\%$ per $P_N < 1 \text{ kW}$ $\pm 20\%$ per $P_N \geq 1 \text{ kW}$
Locked rotor current (I_A)	$+ 20\%$
Locked rotor torque (T_A)	$-15\% \text{ a } +25\%$
Breakdown torque (T_{max})	-10% (for this tolerance the value T_{max} / T_N should be at least 1,8)
Moment of Inertia (J)	$\pm 10\%$
Sound intensity level (sound pressure)	$+3 \text{ dB (A)}$



1.3 Hazardous places



1.3.1 General information

DIRECTIVE 1989/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

'Explosive atmosphere' means a mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

The directive gives information regarding 'Classification of places where explosive atmosphere may occur'.

The classification of hazardous places in zones competes to the customer whose working centres and activities contain or give place to such dangers.

The safety against explosion can be only reached with the contribution, and the mutual informative exchange, both the manufacturer and the final users.

INDICATIONS REGARDING THE CLASSIFICATION OF PLACES WHERE EXPLOSIVE ATMOSPHERES MAY OCCUR

For the classification of the areas reference to the relative harmonized technical norms regarding the specific fields:

- EN 60079-10 (IEC 60079-10) Electrical apparatus for explosive gas atmospheres.
Part 10: Classification of hazardous areas.
- EN ISO/IEC 80079-20-2 Electrical apparatus for use in the presence of combustible dust
Part 10: Classification of areas where combustible dusts are or may be present.

Zone 0

A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is present continuously or for long periods or frequently.

Note: In general, said conditions, when they present, they interest the inside of tanks, tubes and containers, etc.

Zone 1

A place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally.

Note: such zone can also comprise:

- places in the immediate vicinities of zone 0;
- places in the immediate vicinities of the feeding openings;
- places in the immediate vicinities of the filling openings and emptying;
- places in the immediate vicinities of apparatuses, systems of protection and fragile components of glass, ceramics and analogous materials;
- places in the immediate vicinities of glands not sufficiently sealing, as an example on pumps and valves with glands.

Zone 2

A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Note: such zone can also comprise, surrounding places zones 0 or 1.

Zone 20

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.

Note: In general, said conditions, when they present, they interest the inside of tanks, tubes and containers, etc.

Zone 21

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally.

Note: such zone can also comprise, for example, places in the immediate vicinities of loading points and powder emptying and places in which powder layers are formed or that, during the normal operation, could produce one explosive combustible powder concentration in mixture with the air.

Zone 22

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Note: such zone can also comprise, places in proximity of apparatuses, systems of protection and components containing powders, from which the powders can leak out because of losses and to form layers of powders (for example salt from milling, in which the powder leak from the mills and it is deposited).

Notes:

1. Layers, deposits and heaps of combustible dust must be considered as any other source which can form an explosive atmosphere.
2. 'Normal operation' means the situation when installations are used within their design parameters.



1.3.2 Classification of the equipment for areas where explosive atmosphere may occur

GROUPS AND CATEGORIES OF APPARATUSES

Within the directive 2014/34/EU, the apparatuses, comprised if necessary the devices and the components are divided in two groups.

Group I comprises equipment intended for use in the underground parts of mines, and to those parts of surface installations of such mines, likely to become endangered by firedamp and/or combustible dust.

It is sub-divided into 2 Categories, as shown below:

- Category M1: very high level of protection
- Category M2: high level of protection

Group II comprises equipment intended for use in other places likely to become endangered by explosive atmospheres.

It is sub-divided into 3 Categories, as shown below

- Category 1: very high level of protection
- Category 2: high level of protection
- Category 3: normal level of protection

For the type of protection "d", "i", "nC" and "nL", the electrical apparatus of Group II are subdivided in IIA, IIB and IIC, like prescribed in the relative specific European Norms regarding these types of protection.

How much higher is the possibility that an explosive atmosphere can take place, much higher must be the level of the adopted safety measures.

CRITERIA FOR THE CHOICE OF THE APPARATUSES AND THE SYSTEMS OF PROTECTION

In case the document on the protection against explosion based on the risk assessment does not preview otherwise, in all the areas in which explosive atmospheres can be formed are used apparatuses and systems of protection correspondents to the categories as per directive 2014/34/EU.

In particular, in such areas the following categories of apparatuses are used, provided that adapted, to second of the cases, to gas, vapours or fogs and/or powders:

- in zone 0 or zone 20, apparatuses of category 1;
- in zone 1 or zone 21, apparatuses of category 2;
- in zone 2 or zone 22, apparatuses of category 3;

Below you can find an outline for the choice of means of protection in function of the use zone.

GRUOP	CATEGORY	Means of protection			Explosive atmosphere presence	Zone
		Level	Characteristic of protection (AII. I)	Characteristic of protection (AII. II)		
II	1	Very high	In case of breakdown of means of protection, the level of safety is guaranteed from at least a second independent mean of protection. Moreover, the level of safety is guaranteed even if two independent anomalies are manifested	They must be planned and manufactured so that the sources of ignition are not activated, not even in case of exceptional anomalies of the apparatus	continuously or for long periods	0 1 2 20 21 22
	2	High	The level of safety is guaranteed also in presence of recurrent anomalies or defects of operation of the apparatuses of which it is habitually necessary to hold account.	They must be planned and manufactured so as to avoid sources of ignition, also in case of recurrent anomalies or defects of operation of the apparatuses of which it is habitually necessary to hold account.	Intermediate situation between previous and the successive one	1 2 21 22
	3	Normal	The level of safety is guaranteed in the normal operation.	They must be planned and manufactured so as to avoid sources of ignition expectable during the normal operation.	Scarce probability and if it take place is of short duration	2 22



1.4 Temperature Classes

1.4.1 Explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist (GAS)

Ignition temperature of an explosive gas atmosphere

Lowest temperature of a heated surface which, under specified conditions according to IEC 60079-20, will ignite a flammable substance in the form of a gas or vapour mixture with air.

Maximum surface temperature

Highest temperature which is attained in service under the most adverse conditions (but within the specified tolerances) by any part or surface of an electrical apparatus, which would be able to produce an ignition of the surrounding explosive atmosphere.

Group II electrical apparatus, in function of their maximum surface temperature shall be marked either classified in a temperature class given in Table below:

Classification of maximum surface temperatures
for Group II electrical apparatus

Temperature class	Maximum surface temperature (°C)
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

The maximum surface temperature shall not exceed the lowest ignition temperature of the explosive atmospheres concerned.

As far as the electric motors the maximum surface temperature will be referred to the temperature of:

the **external surface** of the enclosure as far as the *Flameproof enclosures 'd'* (EN 60079-1, IEC 60079-1) and *Equipment protection by pressurized enclosures 'p'* (EN 60079-2, IEC 60079-2)

all the surfaces both external and internal as far as the *Increased safety 'e'* (EN 60079-7, IEC 60079-7) and the *Construction, test and marking of type of protection 'n' electrical apparatus* (EN 60079-15, IEC 60079-15).

Below there is a representing table of the main inflammable gas substances divided by group of gas with relative temperatures of ignition and classes of temperature.



Main inflammable substances subdivided for group of gas (IIA, IIB, IIC) and temperature of ignition.

Inflammable substance	Group of GAS	temperature of ignition	Class of Temperature (°C)	Inflammable substance	Group of GAS	temperature of ignition	Class of Temperature (°C)
2-Methylpentane	IIA	300	T2	Ethyl formate	IIA	440	T2
Amyl acetate	IIA	380	T2	Methyl formate	IIA	450	T1
Butyl-n acetate	IIA	425	T2	Natural gas	IIA	482	T1
Ethyl acetate	IIA	426	T2	Isobutane	IIA	480	T1
Isobutyl acetate	IIA	420	T2	Isoheptane	IIA	220	T3
Methyl acetate	IIA	502	T1	Isohexane	IIA	264	T3
Propyl acetate	IIA	430	T2	Isooctane	IIA	410	T2
Vinyl acetate	IIA	425	T2	Isoprene	IIA	220	T3
Acetone	IIA	465	T1	Methane	IIA	537	T1
Methanol	IIA	464	T1	Methylcyclopentane	IIA	258	T3
Bromethane	IIA	511	T1	Methylamine	IIA	430	T2
Butane	IIA	287	T3	Methylmetacrylate	IIA	430	T2
Butene - 1	IIA	384	T2	Paraldehyde	IIA	239	T3
Butene - 2	IIA	325	T2	Pentane	IIA	258	T3
Cyclohexano	IIA	259	T3	Pyridine	IIA	483	T1
Cyclohexanol	IIA	300	T2	Propane	IIA	470	T1
Cyclohexanone	IIA	419	T2	Propylamine	IIA	318	T2
Cyclohexene	IIA	244	T3	Propylbenzene	IIA	450	T1
Cyclopropane	IIA	498	T1	Propylene	IIA	455	T1
Cymene (p)	IIA	436	T2	Styrene	IIA	490	T1
Chloro-benzene	IIA	637	T1	Toluene	IIA	480	T1
Acetyl chloride	IIA	390	T2	m-Xylene	IIA	522	T1
Allyl chloride	IIA	390	T2	o-Xylene	IIA	464	T1
Chlorbutane	IIA	240	T3	p-Xylene	IIA	528	T1
Chloroethane	IIA	495	T1	1,2 Butadiene	IIB	430	T2
Vinyl chloride	IIA	472	T1	1,3 Butadiene	IIB	430	T2
Dichlorobenzene	IIA	648	T1	Dioxane	IIB	245	T3
Dichloroethylene 1,1	IIA	570	T1	Diethyl ether	IIB	160	T4
Dichloroethylene 1,2	IIA	441	T2	Ethyl vinyl ether	IIB	200	T3
Diethylamine	IIA	312	T2	Methyl vinyl ether	IIB	350	T2
Dimethylamine	IIA	400	T2	Acrylate ethyl	IIB	350	T2
Dimethylaniline	IIA	371	T2	Ethylene	IIB	425	T2
Dimethylbutane 2,3	IIA	405	T2	LPG	IIB	365	T2
Dimethylpentane 2,3	IIA	330	T2	Sulphurated Hydrogen	IIB	260	T3
Heptane	IIA	215	T3	Methylacrylate	IIB	415	T2
Hexane	IIA	233	T3	Carbon monoxide	IIB	605	T1
Heptane	IIA	515	T1	Ethylene oxide	IIB	435	T2
Ethylacetoacetate	IIA	350	T2	Propylene oxide	IIB	430	T2
Ethylamine	IIA	385	T2	Acetylene	IIC	305	T2
Ethylmercaptane	IIA	295	T3	Hydrogen	IIC	500	T1
Butyl formate	IIA	320	T2	Carbon disulfide	IIC	95	T6



1.4.2 Explosive atmosphere in the form of a cloud of combustible dust (DUST)

We take in consideration protection by enclosures "t" (*Ex t*). The ignition protection is based on the limitation of the maximum surface temperature of the enclosure and on other surfaces which could be in contact with dust and on the restriction of dust ingress into the enclosure by the use of "dust-tight" or "dust-protected" enclosures.

The choice of these constructions so to avoid primes due to excessive surface temperatures must be carried out in function of the limits of temperature of ignition for the presence of flammable dust both in form of clouds and layers.

In case of presence of flammable dust cloud, the maximum surface temperature will be

$$T_{\max(1)} = 2/3 \cdot T_{cl} \quad \text{with } T_{cl} \text{ ignition temperature in } ^\circ\text{C} \text{ of the dust cloud.}$$

While in case of presence of a flammable dust layer:

$$T_{\max(2)} = T_l - 75 \text{ } ^\circ\text{C} \quad \text{with } T_l \text{ ignition temperature in } ^\circ\text{C} \text{ of a layer of dust 5 mm thick.}$$

The surface temperature must be smaller or equal to the minimum value between $T_{\max(1)}$ e $T_{\max(2)}$.

Main inflammable substances (DUST) and their own maximum surface temperature

Substance	Medium largeness particles (μm)	LEL (g/m ³)	Cloud ignition temperature T_{cl} ($^\circ\text{C}$)	Layer 5mm thick ignition temperature T_l ($^\circ\text{C}$)
Metals, alloys				
Aluminium	10	60	580	430
Bronze	18	750	390	260
Iron	12	500	580	>450
Graphite	7	30	600	680
Lamp-black (carbon black)	13	15	620	435
Sulphur	20	30	280	260
Wood, products of wood, fibres				
Paper		100	620	370
Cellulose (93% sweet wood, 6% hard wood)	14	15	420	335
wood flour	60		470	305
Wood (50% pear tree and 50% kernel)	35	100	500	340
Wood (beech)	61		490	310
Wood (pear tree)	27	100	500	320
Sawdust of wood	65		470	290
Cork	42	30	470	300
Agricultural products				
Cacao	3	125	460-540	245
Coffee	10	25	360	450
Cereals (mixed powders)	37	125	510	300
Wheat flour	56-125	60	480	>450
Soy flour	20	200	620	280
Gelatine	65	60	560	>450
Wheat		100	470	220
Dry milk	165	60	460	330
Milk sugar	22	60-125	450	>450
Rye			415-470	325
Buttermilk	400		450	420
Tobacco		60	485	290
Black tea	76	125	510	300
Sugar	32	30	360	>450
Powdered sugar	17	60	350	>450



1.5 Electric motor choice

After speaking about classification of areas with explosion atmosphere, motor groups , categories and temperature classes , we can switch to the choice of the type of protection of the motor and the reading of the motor marking.

Explosive atmosphere type			Motor Marking						
Area Classification	Presence of explosive atmosphere	Protection	Group	Category	Type of Protection	Gas Group	Temperature Class	IP degree	
GAS	Zone 1	Probable	High	II	2G	Ex d (Ex de on request)	IIC IIB ^(d)	T4 (T5 e T6 on request)	-
	Zone 2	Improbable	Normal	II	2G	Ex d (Ex de on request)	IIC IIB ^(d)	T4 (T5 e T6 on request)	-
POLVERI	Zone 21	Probable	High	II	2D	Ex t	-	T135°C (T100°C e T85°C on request)	IP6x
	Zone 22	Improbable	Normal	II	2D	Ex t	-	T135°C (T100°C e T85°C on request)	IP6x

	CE	Marking of conformity in compliance with European Directives.
	XXXX	Number of Notified body that issued the Product Quality Assurance Notification
		Marking of conformity to the Directive 2014/34/EU and the relevant technical rules
	II	Explosion Group (surface plants different from mines)
	2	Category
	G	Type of explosive atmosphere: Gas, Vapour or Mist
	D	Type of explosive atmosphere: Dust
	Ex	Symbol for security appliances that meets a certain protection mode
	db e eb	Explosion proof terminal box / Increased safety terminal box
	db	Motors with dust protection zone 21 (and zone 22)
	IIC	Gas group (IIC Hydrogen and Acetylene)
	IIC	Dust group
	T6 ...T4	Motor temperature class suitable for flammable substance temperature class in case of protection G (Gas)
	T85°C ...T135°C	Motor temperature class suitable for flammable substance temperature class in case of protection D (Dust)
	AB xx ATEN yyy	AB : Name of the body that released CE type certificate xx : year of production yyy : certificate number
	IPXX	Protection degree to be marked on the nameplate for D version
	°C amb	Temperature range
	Gb	Gas protection degree
	Ds	Dust protection degree

- Motors for zones 21 and 22 have protection type Ex t (DUST) matched with protection type Ex d (or Ex de) (GAS).
- On request it is possible to have motors Ex de with motor 'd' and increased safety terminal box 'e'.
- Motors marked with gas group IIC are suitable to be used where gas groups IIB or IIA are requested.
- Single-phase motors with internal capacitors can be marked IIC and IIB and are suitable also for IIA (see page 34) .
- Motors with temperature class T4 (gas) are suitable to be used where temperature classes T3, T2, T1 are requested. (On request it is possible to have temperature classes T5 e T6).
- IP degree protection is IP55 for GAS and IP66 for DUST.
- Ambient temperature range is as follows:
 - 20° +60°C for temperature class T4 and surface temperature T135°C (possible to have -40° +60°C IIB version)
 - 20° +50°C for temperature class T5 and surface temperature T100°C (possible to have -40° +60°C IIB version)
 - 20° +40°C for temperature class T6 and surface temperature T85°C (possible to have -40° +60°C IIB version)



2. GENERAL INFORMATION

2.1 Range of Motors

Motors RL series are manufactured in compliance with all the European standards concerning equipment and protective systems for potentially explosive atmosphere in compliance with the European Directive ATEX 2014/34/EU (better known as ATEX).

As we just told in part 2.0 to be in compliance with ATEX Directive are necessary:

- EC type Certificate
- Product Quality assurance Notification

Such certificates are issued by notified bodies qualified to release them.

Motors RL series group II category 2G (GAS) with IP% protection are suitable for zone 1 and zone 2, while the motors group II category 2D (DUST) with protection IP66 are suitable also for zone 21 and zone 22.

Version	Frame size (mm)	Power (kW)	poles	GAS Group	Temperature Class 2G motors	Surface temperature 2D motors	Ambient Temperature
Three phase - 1 speed 2 - 4 - 6 - 8 poles	56 - 160	0,06 - 18,5	2	IIC IIB	T4 ^(a) T4/T5/T6/T6	T 135 °C ^(a) T135-T100-T85 ^{a,c}	-20°C a +60°C (c) -40°C a +60°C
		0,06 - 15	4				
		0,035 - 11	6				
		0,06 - 7,5	8				
Three phase - 2 speeds (Constant Torque), 2/4 - 4/8 - 4/6 - 6/8 poles	63 - 160	0,25/0,18 - 15/12	2/4	IIC IIB	T4 (b) T4/T5	T 135 °C (b) T135-T100	-20°C a +60°C -40°C a +60°C
		0,18/0,09 - 10/6,6	4/8				
		0,2/0,1 - 8,8/5,9	4/6				
		0,08/0,12 - 5,5/4	6/8				
Three phase - 2 speeds (Quadratic Torque), 2/4 - 4/8 - 4/6 - 6/8 poles	63 - 160	0,25/0,06 - 16/4,4	2/4	IIC IIB	T4 (b) T4/T5	T 135 °C (b) T135-T100	-20°C a +60°C -40°C a +60°C
		0,25/0,05 - 12/3,2	4/8				
		0,3/0,1 - 11/3,3	4/6				
		0,33/0,09 - 7,5/4	6/8				
		0,06 - 15	4				
		0,035 - 11	6				
		0,06 - 7,5	8				
Single-phase 2 - 4 - 6 poles	56 - 100	0,06 - 3	2	IIB ^(d) IIB ^(e)	T4 T4	T 135 °C T 135 °C	-20°C a +40°C -40°C a +60°C
		0,06 - 1,6	4				
		0,06 - 1,1	6				

^(a) Available also in version T5 (T100°C) and T6 (T85°C) on request

^(b) Available also in version T5 (T100°C) on request

^(c) Available in version T6 (T85°C) the ambient temperature range is -20°C +40°C

^(d) Available also IIC (frame 56-63-71-80-90-100)

^(e) Available also IIB with increased safety "e" terminal box (frame 56-63-71)



2.2 EQUIPMENT PROTECTION LEVEL (EPL)

IEC 60079 standards now include provision for equipment on the basis of risk.

If the consequences of an explosion are deemed particularly severe, then to decrease the risk, the category/zone relationship can be changed to give a lower possibility of ignition.

So category 2 apparatus could be selected for use in a zone 2 for instance:

GROUP	EPL	INTENDED FOR EQUIPMENT GROUP	GIVING PROTECTION
Group I	Ma	Equipment for mining	High level of protection against becoming an ignition source
	Mb		Level of protection which can be electrically isolated if hazardous atmosphere is known to exist
Group II	Ga	Equipment for explosive gas atmospheres	Very High level of protection against becoming an ignition source
	Gb		High level of protection against becoming an ignition source
	Gc		Assured level of protection against becoming an ignition source in normal operation
Group III	Da	Equipment for explosive dust atmospheres	Very High level of protection against becoming an ignition source
	Db		High level of protection against becoming an ignition source
	Dc		Assured level of protection against becoming an ignition source in normal operation

2.3 Main features

Motors RL comply with the Essential Health and Safety Requirements for potentially explosive atmospheres provided by European Standards: EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31, EN 60529.

- Three-phase and single-phase squirrel cage asynchronous induction motors.
- Aluminium modular motors, flanges and feet can be assembled and disassembled.
- Type of protection  Ex d, Ex de, Ex t.
- Overall dimensions comply with IEC 60072.
- Ventilations IC 411 (Self ventilated).
- Voltage 230/400 V $\pm$ 5% Δ/Y (56 - 112), 400/690 V $\pm$ 5% Δ/Y (132 - 160), frequency 50 Hz $\pm$ 2%.
- Insulation Class F.



- Protection degree IP55 for zone 1 and zone 2, IP66 for zone 21 and zone 22.
- Maximum noise level 80 dB (A).
- Terminal box (see 3.1):
 - Version Ex d IIC
 - Version Ex e IIC
 - Version without terminal box, motor comprehensive of cable
 - Version Ex d IIB terminal box **A**
(for single-phase - 1 capacitor)
 - Version Ex d IIB terminal box **B**
(for high torque single-phase - 2 capacitors, starting system, soft-starter, poles commutation system)
 - Version Ex d IIB terminal box **C**
(Motor provided with contactor system for starting, soft-starter, contactor system for pole commutation)
- Fan cover in sheet steel.
- Low friction dust seals.

2.3 Main Options

Motors Versions

- Motors 2D protection degree IP66 suitable for zone 21 and zone 22.
- Special Powers on frames 132 and 160
- Motors without ventilation (IC 410).
- Motors with forced ventilation (IC 416).
- Single phase version Ex d IIB with high starting torque (1 run capacitor – 1 start capacitor).
- Motors with starting system inside the terminal board.



Electrical and mechanical variants

- Special voltage and frequency.
- Thermal protectors (probe PTC or PTO).
- Anti-condensation heaters.
- Insulation class H.
- Motors tropicalized.
- Motors suitable for frequency inverter drive.
- Double shaft motors.
- Special shaft for ENCODER.
- Special shafts.
- Special flanges.
- Motor without terminal box with cable (length on request).
- Terminal box on the side (right or left).
- Terminal box with special cable glands.
- Increased safety 'e' terminal box.
- Terminal box type A, B, C for special purpose (it is possible to have single-phase motors with frame 112 and box C, please see next page).
- Protection IP66.
- Temperature class T5 e T8.
- Fan cover + rain cover.
- Special bearings.
- Locked front bearing.
- Tube version specially designed for ATEX axial fan (see 3.2)

Tests

All RAEL motors are 100% tested, both at the beginning (winding test) and at the end of production (motor electric test).

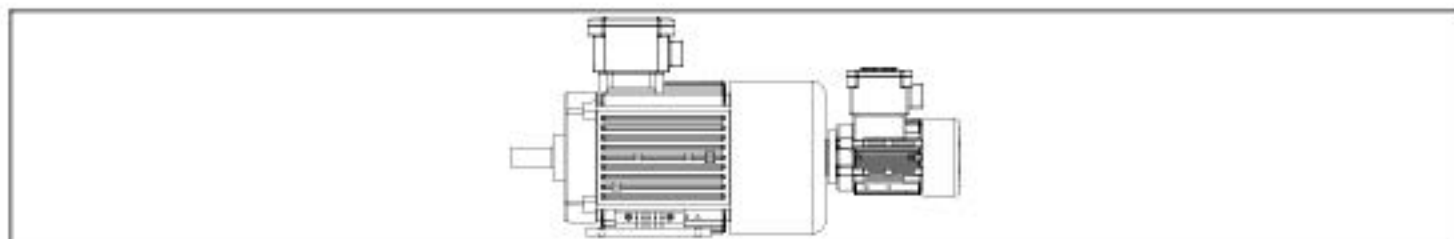
On request additional tests on the motors can be performed:

- Standard test "Routine Test".
- Heating test.

Forced Ventilation (IC416)

Cooling is provided by an auxiliary Ex motor, fitted in the back of the main motor. In RL series it is a 56 frame single or three phase motor.

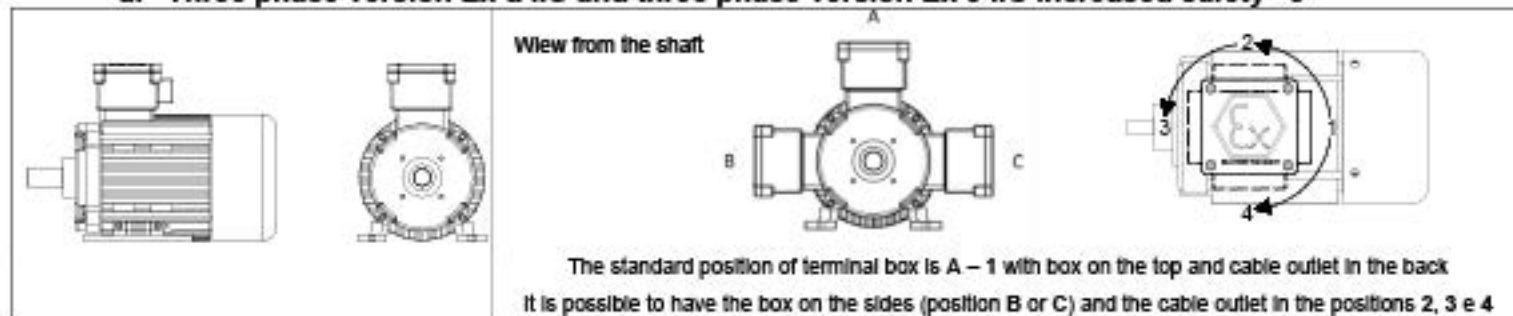
The user shall use an electric device that enables the main motor to run only when the auxiliary motor is already running.



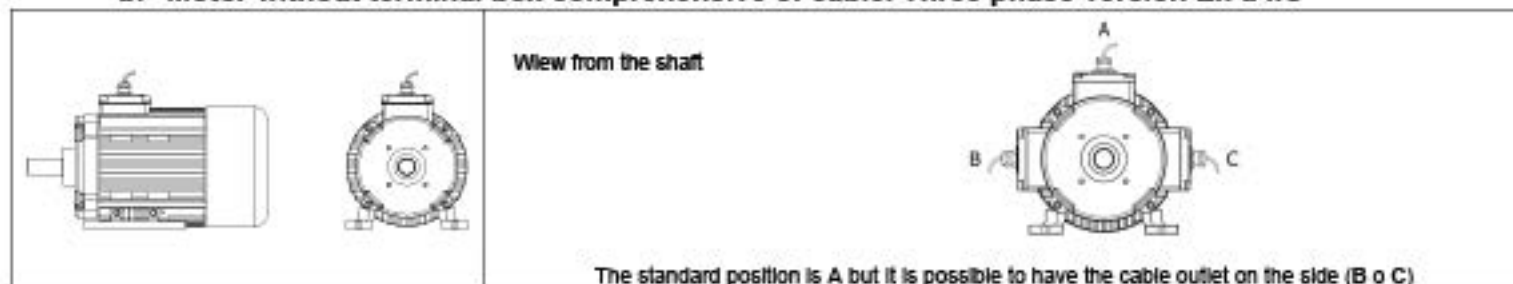
3. TERMINAL BOX

3.1 Versions

a. Three phase version Ex d IIC and three phase version Ex e IIC increased safety "e"

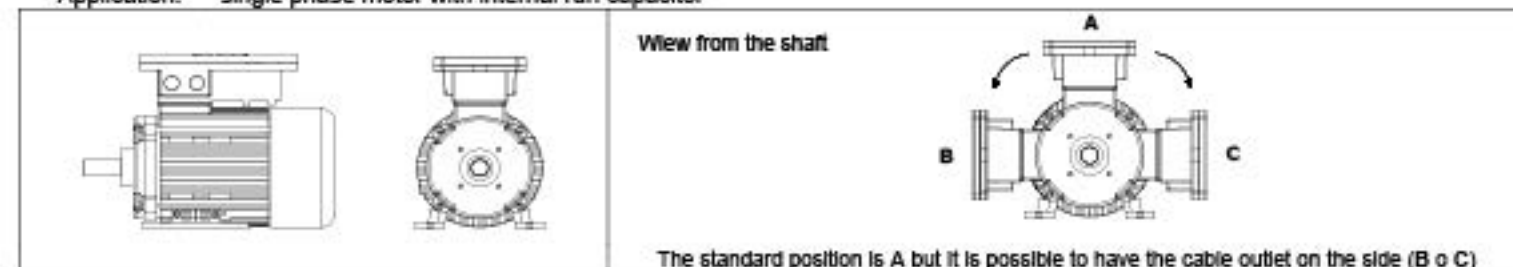


b. Motor without terminal box comprehensive of cable. Three phase version Ex d IIC



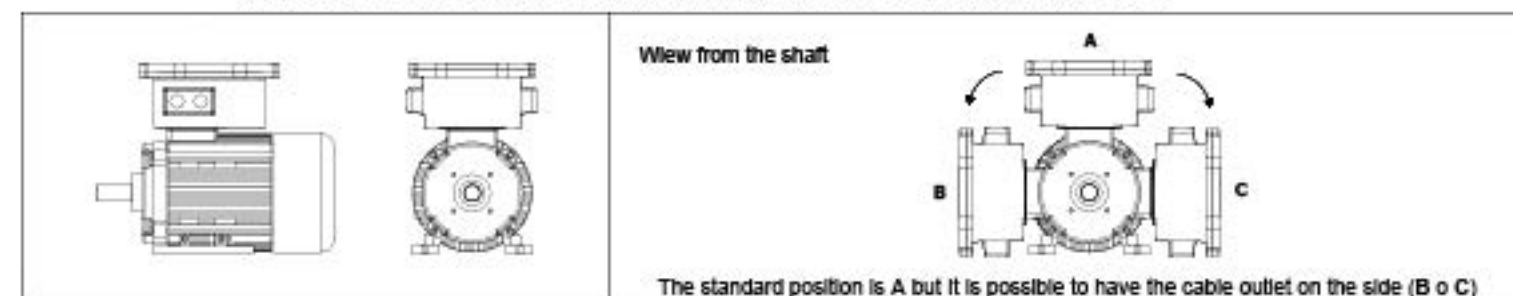
c. Motor with terminal box A Version Ex d IIB

Application: single phase motor with internal run capacitor



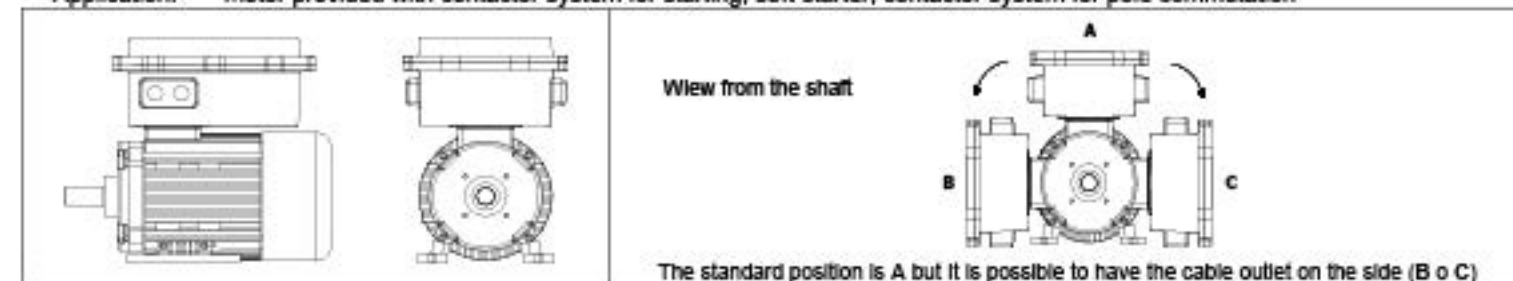
d. Motor with terminal box B Version Ex d IIB

Application: - single phase motor with high starting torque with internal run and start capacitor
- motor provided with contactor system for starting, soft-starter, pole commutation system



e. Motor with terminal box C Version Ex d IIB

Application: motor provided with contactor system for starting, soft-starter, contactor system for pole commutation



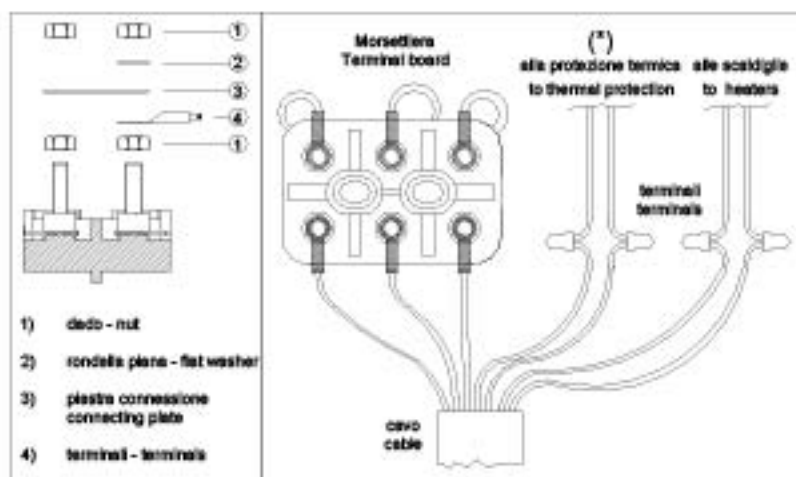
3.3 Cable entries and terminals

Motor version Ex 'd' must be provided with cable entries that comply with EN 60079-1.
 Motor version Ex 'de' must be provided with cable entries that comply with EN 60079-7.
 Motor version Ex t must be provided with cable entries that comply with EN 61241-1.

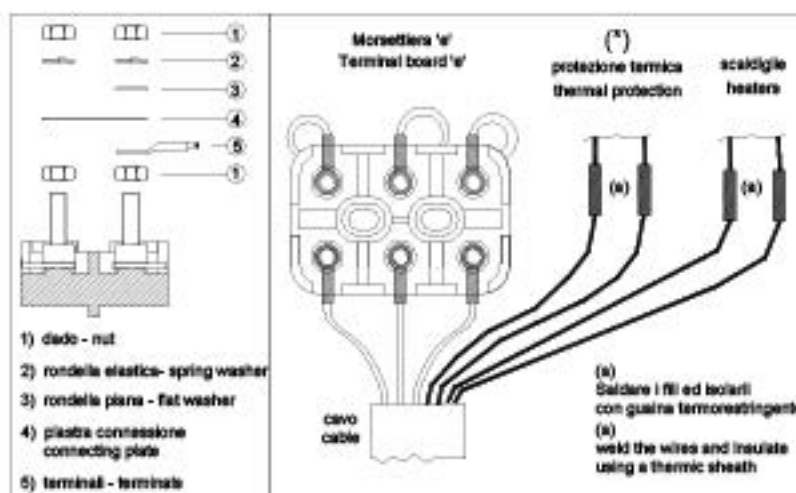
		Cable entries			Terminals
		Frame	Standard	On request	
Three phase version	Mains	56 - 90	1 x M20	1 x NPT 1/2"	M4
		100 - 112	1 x M25	1 x NPT 3/4"	M5
		132-160	2 x M32	2 x NPT 1"	M6
	Auxiliaries	56-160	1 x M20	1 x NPT 1/2"	See (1) and (2)
Version with increased terminal box A, B, C	-	56 - 112	Up to n.4 cable entries M20 o M25	Up to n.4 cable entries NPT 3/4" o NPT 1"	

When the motor is provided with a thermal protection and/or heaters these must have a separate cable entry and the connection shall be done as shown below (depending on the type of terminal box):

(1) Terminal box version Ex 'd'
 (Terminal board 6 pins)

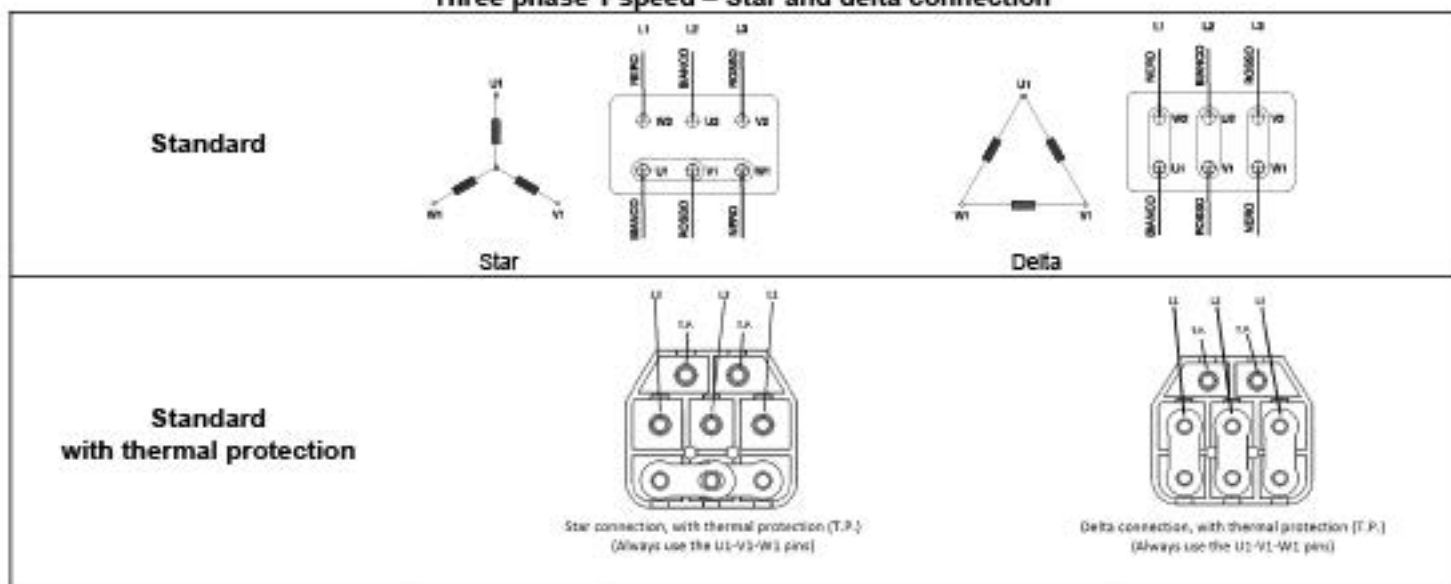


(2) Terminal box version Ex 'e'
 (Terminal board 6 pins increased safety 'e')

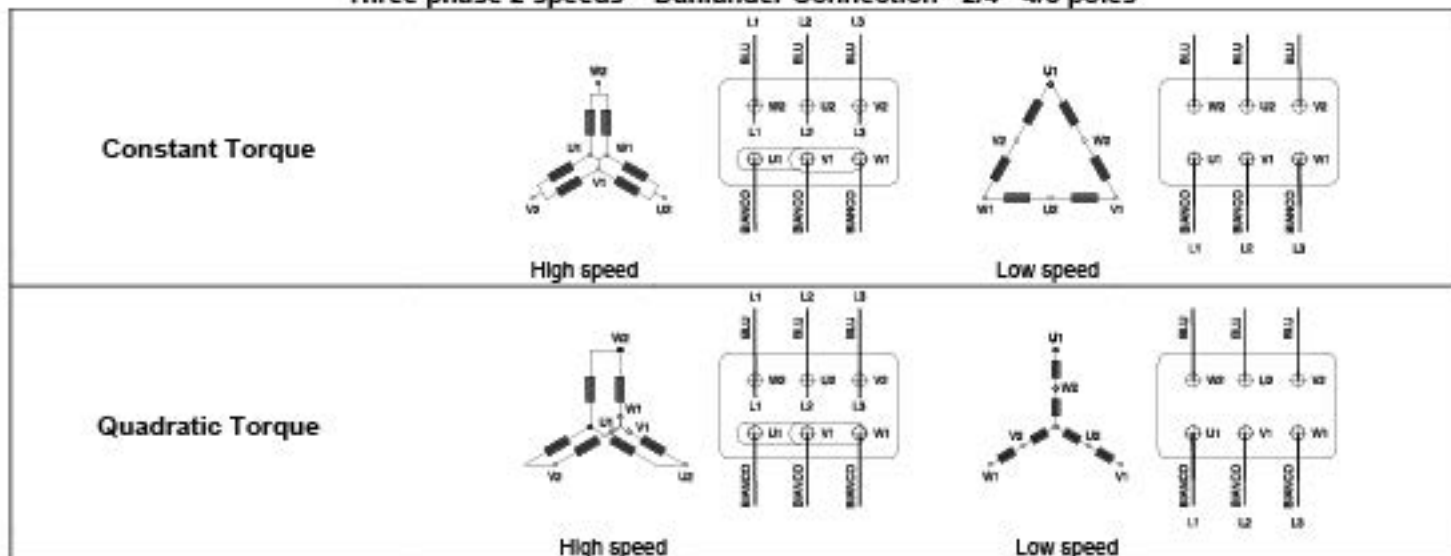


3.4 Connecting diagrams

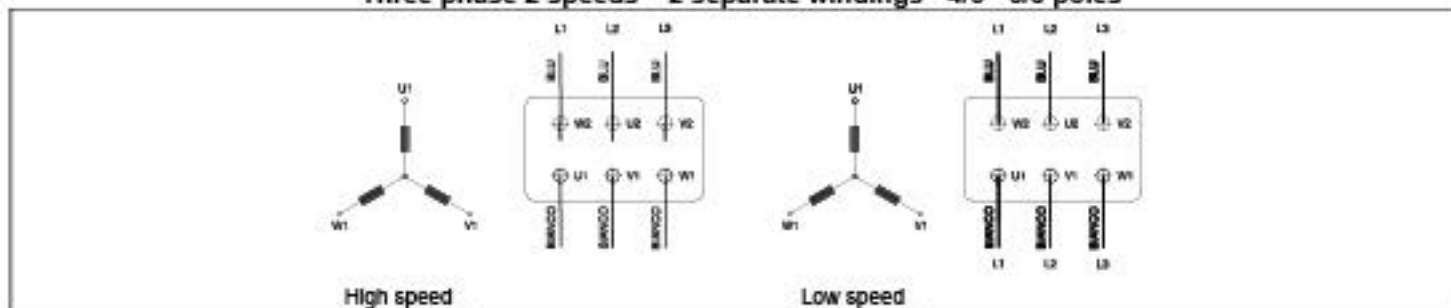
Three phase 1 speed – Star and delta connection



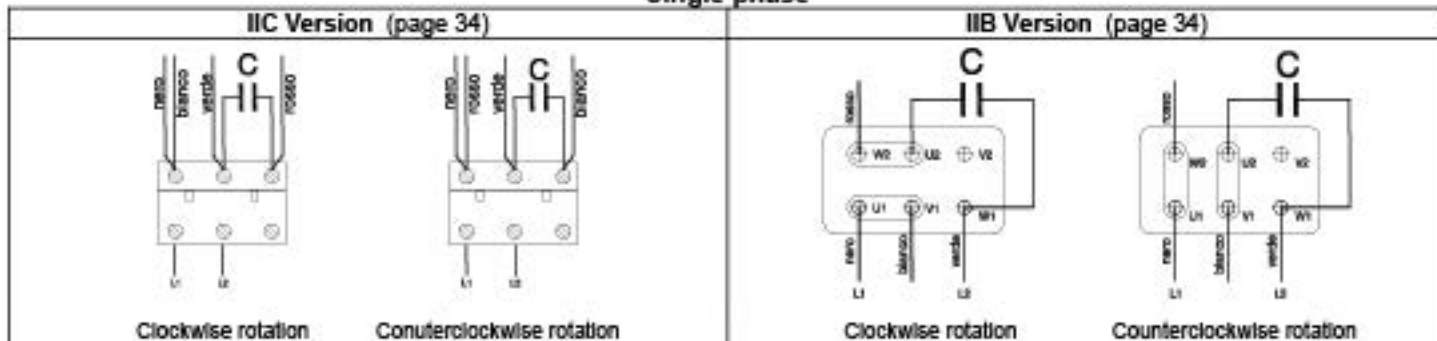
Three phase 2 speeds – Dahlander Connection - 2/4 - 4/8 poles



Three phase 2 speeds – 2 separate windings - 4/6 - 6/8 poles



Single phase





4. MECHANICAL CHARACTERISTIC

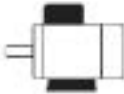
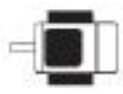
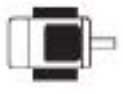
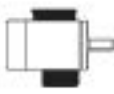
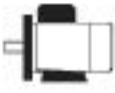
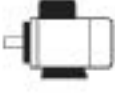
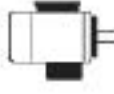
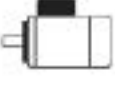
4.1 Mounting arrangements

RL motors can be made in the mounting arrangements as shown in the table.

Such motors are designed and manufactured with modular feet and flanges, so to ease the change of mounting arrangement and to optimize the warehouse management.

The basic mounting arrangements are shown in the standard EN 60034-7. Motors with mounting arrangements IM B3, IM B5, IM B14 can also be used in different mounting positions.

IM B3 IM B6, IM B7, IM B8, IM V5 o IM V8.
 IM B35 IM V15 o IM V36, IM 2051, IM 2061, IM 2071.
 IM B34 IM 2111 o IM 2131, IM 2151, IM 2161, IM 2171.
 IM B5 IM V1 o IM V3. (flange with passing holes).
 IM B14 IM V18 o IM V19. (flange with threaded holes).

Basic mountings			Other mountings		
IM B3 IM 1001	IM V5 IM 1011	IM V6 IM 1031	IM B6 IM 1051	IM B7 IM 1061	IM B8 IM 1071
					
IM B35 IM 2001	IM V15 IM 2011	IM V36 IM 2031	- IM 2051	- IM 2061	- IM 2071
					
IM B34 IM 2101	- IM 2111	- IM 2131	- IM 2151	- IM 2161	- IM 2171
					
IM B5 IM 3001	IM V1 IM 3011	IM V3 IM 3031			
					
IM B14 IM 3601	IM V18 IM 3611	IM V19 IM 3631			
					



4.2 Materials

Materials of the main components.

Type of material								
Shield frames flanges terminal box	Shaft	Rotor	Fan	Fan cover	Tie rods	Screw	Cable glands	Motor Plate
Aluminium	Steel 35S20	Die-cast Aluminium (squirrel cage)	Thermoplastic material or Aluminium	Zinc-plated steel	Steel 4.8	Steel 8.8	nickel-plated brass	Anodized aluminium or on request stainless steel

Bearings

The 2Z series bearings are lubricated for life and required not further lubrication. Nevertheless, we recommend in case of continuous running, long time stop, low temperature, radial and/or axial load, frequency inverter used, to control some time to time the ball bearings (40 000 hours for 4,6,8 pole motors and 20 000 hours for the 2 pole motors).

Motor		Bearing		Lubrication
Frame	Poles	Drive-end shield	Rear shield	
56	2 - 4 - 6 - 8	6201 2Z	6201 2Z	It doesn't need lubrication
63	2 - 4 - 6 - 8	6202 2Z	6202 2Z	It doesn't need lubrication
71	2 - 4 - 6 - 8	6202 2Z	6202 2Z	It doesn't need lubrication
80	2 - 4 - 6 - 8	6204 2Z	6204 2Z	It doesn't need lubrication
90	2 - 4 - 6 - 8	6205 2Z	6205 2Z	It doesn't need lubrication
100	2 - 4 - 6 - 8	6206 2Z	6206 2Z	It doesn't need lubrication
112	2 - 4 - 6 - 8	6306 2Z	6306 2Z	It doesn't need lubrication
132	2 - 4 - 6 - 8	6308 2Z	6308 2Z	It doesn't need lubrication
160	2 - 4 - 6 - 8	6309 2Z	6309 2Z	It doesn't need lubrication

Rotary shaft seals

Motors RL series can be equipped with seals so to guarantee an IP66 degree protection. In such a way the motor is protected from the income of dust and polluting agents.

IP65 or IP66 protection degree is furthermore necessary to warranty the protection type Ex t.

Motor		Rotary shaft seal (DIN 3760)	
Frame	Poles	Front	Rear
56	2 - 4 - 6 - 8	12x22x7A	12x22x7A
63	2 - 4 - 6 - 8	15x24x5A	15x24x5A
71	2 - 4 - 6 - 8	15x24x5A	15x24x5A
80	2 - 4 - 6 - 8	20x30x5A	20x30x5A
90	2 - 4 - 6 - 8	25x37x5A	25x37x5A
100	2 - 4 - 6 - 8	30x50x7A	30x50x7A
112	2 - 4 - 6 - 8	30x50x7A	30x50x7A
132	2 - 4 - 6 - 8	40x72x7A	40x72x7A
160	2 - 4 - 6 - 8	45x72x8A	45x72x8A



5. ELECTRICAL DATA

5.1 Three phase motors - 1 speed

The features of three phase motors for general purpose are as follows:

- Three phase asynchronous motor, squirrel cage rotor, self ventilated (IC411).
- Duty S1, Insulation class "F", IP55, 400V - 50 Hz.

- Connections

Type	Δ	Y
56 – 112	230 V	400V
132 – 160	400 V	690 V
56-160 for INVERTER	230 V	400 V

- For temperature class T5 and T6 and ambient temperature see par 2.1

5.1. Motors for INVERTER duty

In case the motors are driven by **INVERTER** we have to point out some things:

- Motor must be equipped with PTC thermistor.
- Motor driven by inverter means not to have a perfect voltage and current sine wave with increase of losses and heating of the motor.
- Speed variation affects also the ventilation (in case of IC411).
- The stress on the bearings increases and they shall be checked more frequently; for this reason the operating period with a speed above 3600 rpm shall never exceed 10% of the complete working cycle.
- The **best connection** for motors driven by inverter is the **star connection**.
- In case of **constant torque application and with frequency values above 60Hz** it is necessary to use a **delta connection**.

For all these reasons RAEI manufactures special motors for inverter duty so to minimize all the inconveniences described above.

These motors are electrically oversized so to minimize the electrical losses and also reduce the heating and are provided with thermistor PTC120°C for temperature class T4; for this reason the winding of the motor is made on an oversized stator and is fitted with phase-insulators (on request it is possible to have the version T5 with PTC90°C and T6 with PTC70°C).

In case of overheating it is possible to use the forced ventilation option (see page 15).

All the bearings mounted on RAEI motors have the best quality for motors.

In this paragraph we will show the rating of the 1 speed 3-phase motors and the rating of the motors for inverter duty.

The data tables of the motors for inverter duty give an idea of power and current values and are reliable only in the case that the inverter used to drive the motor is an high quality and an high performance one.



1 Speed 3000 Rated data at 400V/50Hz – direct on line start																
Code	Type			P		rpm min ⁻¹	In 400 V Amp.	I _a /I _n	Cos φ	M _n Nm	M _a /M _n	m Kg	Class T	Moment of inertia J 10 ⁻³	Nominal Value of Efficiency	
				kW	hp											
RL0042	RL	56	A	2	0,06	0,08	2730	0,5	4	0,4	0,2	3,5	3,5	T4/T5/T8	0,09	43%
RL0043	RL	56	A	2	0,09	0,12	2730	0,53	4	0,5	0,3	4,0	4	T4/T5/T8	0,09	51,5%
2RL0044	RL	56	B	2	0,12	0,16	2848	0,56	3,5	0,54	0,4	4	4,5	T4/T5/T8	0,1	IE2=53,6%
2RL0001	RL	63	A	2	0,12	0,16	2730	0,4	3,1	0,8	0,4	3,3	7	T4/T5/T8	0,13	IE2=53,6%
2RL0002	RL	63	A	2	0,18	0,25	2850	0,5	3,6	0,74	0,6	3,8	7	T4/T5/T8	0,13	IE2=60,4%
2RL0003	RL	63	B	2	0,25	0,34	2840	0,62	4,3	0,8	0,9	3,5	7,5	T4/T5/T8	0,19	IE2=64,8%
2RL0004	RL	71	A	2	0,37	0,50	2850	0,9	4,8	0,8	1,3	3	7,5	T4/T5/T8	0,36	IE2=69,5%
2RL0005	RL	71	B	2	0,55	0,75	2810	1,5	3,8	0,8	2,1	3	8,5	T4/T5/T8	0,46	IE2=74,1%
3RL0006	RL	80	A	2	0,75	1,00	2820	1,8	5	0,85	2,6	2,4	11	T4/T5/T8	0,76	IE3=80,7%
3RL0007	RL	80	B	2	1,10	1,50	2850	2,4	5,8	0,88	3,8	3	12	T4/T5/T8	0,89	IE3=82,7%
3RL0008	RL	90	S	2	1,50	2,00	2800	3,4	5	0,86	5,2	2,9	19	T4/T5/T8	1,37	IE3=84,2%
3RL0009	RL	90	L	2	2,20	3,00	2860	4,4	5,4	0,84	7,5	3	20,5	T4/T5/T8	1,8	IE3=85,9%
3RL0032	RL	100	LA	2	3,00	4,00	2880	5,5	6	0,84	10,2	2,6	28,5	T4/T5/T8	2,8	IE3=87,1%
3RL0033	RL	112	M	2	4,00	5,50	2880	7,4	5,8	0,89	13,2	2,6	36,8	T4/T5/T8	5,2	IE3=88,1%
3RL0049	RL	132	SA	2	5,50	7,50	2938	10,21	6,7	0,9	18,3	2,6	61	T4/T5/T8	10,63	IE3=89,2%
3RL0050	RL	132	SB	2	7,50	10,00	2920	13,3	6,9	0,91	24,7	2,9	67,2	T4/T5/T8	13,83	IE3=90,1%
3RL0051	RL	132	MB	2	9,00	12,00	2930	16	6,9	0,89	30,5	2,9	73,3	T4/T5/T8	17,31	IE3=90,8%
3RL0053	RL	160	MA	2	11,00	15,00	2930	19,03	7,9	0,9	36	2,8	108	T4/T5/T8	40	IE3=91,2%
3RL0054	RL	160	MB	2	15,00	20,00	2950	26,3	8	0,9	49	3,1	115	T4/T5/T8	51,75	IE3=91,9%
3RL0055	RL	160	L*	2	18,50	25,00	2940	33,04	8,0	0,88	60	3,1	130	T4/T5/T8	64	IE3=92,4%

1 Speed 1500 Rated data at 400V/50Hz – direct on line start																
Code		Type			P		rpm min ⁻¹	In 400 V Amp.	I _a /I _n	Cos φ	M _a Nm	M _a /M _n	m Kg	T Class	Moment of inertia J 10 ⁻³ Kg.m ²	Nominal Value of Efficiency
					kW	hp										
RL0045	RL	56	A	4	0,06	0,08	1360	0,4	3,5	0,68	0,4	4	4	T4/T5/T8	0,14	64%
RL0046	RL	56	B	4	0,09	0,12	1360	0,45	3	0,665	0,6	3,5	4,5	T4/T5/T8	0,14	66,5%
2RL0010	RL	63	A	4	0,12	0,16	1430	0,51	3,3	0,6	0,9	3	6,5	T4/T5/T8	0,25	IE2=59,1%
2RL0011	RL	63	B	4	0,18	0,25	1410	0,5	3,5	0,66	1,3	2,2	7	T4/T5/T8	0,27	IE2=64,7%
2RL0012	RL	71	A	4	0,25	0,34	1415	0,8	3	0,63	1,8	2,2	7	T4/T5/T8	0,63	IE2=68,5%
2RL0013	RL	71	B	4	0,37	0,50	1400	1,1	3,4	0,65	2,6	2,4	8	T4/T5/T8	0,76	IE2=72,7%
2RL0014	RL	80	A	4	0,55	0,75	1410	1,5	4,4	0,7	3,8	2,2	11	T4/T5/T8	1,6	IE2=77,1%
3RL0015	RL	80	B	4	0,75	1,00	1440	2	4,9	0,7	5,2	1,9	13,5	T4/T5/T8	2,1	IE3=82,5%
3RL0016	RL	90	S	4	1,10	1,50	1449	2,7	4,2	0,7	7,7	2,3	19,8	T4/T5/T8	2,5	IE3=84,1%
3RL0017	RL	90	L	4	1,50	2,00	1420	3,3	5	0,8	10,4	3	19,8	T4/T5/T8	3,13	IE3=85,3%
3RL0034	RL	100	LA	4	2,20	3,00	1440	5,5	5	0,8	15,1	2,3	27	T4/T5/T8	4,5	IE3=86,7%
3RL0035	RL	100	LB	4	3,00	4,00	1435	6,55	6	0,8	20,1	2,6	29	T4/T5/T8	5,58	IE3=87,7%
3RL0036	RL	112	M	4	4,00	5,50	1440	8,8	6	0,8	26,8	2,7	39,5	T4/T5/T8	12,2	IE3=88,6%
3RL0056	RL	132	SB	4	5,50	7,50	1450	11,94	6,1	0,8	36	2,4	68	T4/T5/T8	22,4	IE3=89,6%
3RL0057	RL	132	MB	4	7,50	10,00	1450	14,4	6,6	0,84	49,5	2,4	71	T4/T5/T8	32,5	IE3=90,4%
3RL0058	RL	132	ML	4	9,00	12,00	1450	17,5	6,7	0,84	58	2,5	83	T4/T5/T8	37,25	IE3=91%
3RL0059	RL	160	MB	4	11,00	15,00	1460	21,97	5,5	0,85	72	2,6	125	T4/T5/T8	85	IE3=91,4%
3RL0060	RL	160	L*	4	15,00	20,00	1470	29,5	5,8	0,83	97,1	2,6	120	T4/T5/T8	105,75	IE3=92,1%


1 Speed 1000 Rated data at 400V/50Hz – direct on line start

Code	Type				P		rpm min ⁻¹	In 400 V Amp.	I _s /I _n	Cos φ	M _n Nm	M _s /M _n	m Kg	Classe T Class	Moment of inertia J 10 ⁻³ Kg.m ²	Nominal Value of Efficiency
					kW	Hp										
2RL0018	RL	63	B	6	0,12	0,16	930	0,55	2,6	0,5	1,3	2,6	7,5	T4/T5/T6	0,3	IE2=50,6%
2RL0019	RL	71	A	6	0,18	0,25	925	0,76	2,8	0,6	2,0	2,4	7,5	T4/T5/T6	0,6	IE2=56,6%
2RL0020	RL	71	B	6	0,25	0,34	920	1,1	2,9	0,6	2,7	3,1	8,5	T4/T5/T6	0,9	IE2=61,6%
2RL0021	RL	80	A	6	0,37	0,50	935	1,25	3,9	0,61	3,8	2,6	11	T4/T5/T6	1,97	IE2=67,6%
2RL0022	RL	80	B	6	0,55	0,75	930	1,7	3,5	0,7	5,8	2,8	13	T4/T5/T6	2,47	IE2=73,1%
3RL0023	RL	90	S	6	0,75	1,00	940	2,7	3,5	0,7	7,9	2,3	17,5	T4/T5/T6	3,18	IE3=78,9%
3RL0024	RL	90	L	6	1,10	1,50	930	3,1	3,7	0,7	11,6	2,3	21	T4/T5/T6	4,78	IE3=81%
3RL0037	RL	100	LB	6	1,50	2,00	940	3,8	3,8	0,75	15,2	1,7	31	T4/T5/T6	6,73	IE3=82,5%
3RL0038	RL	112	M	6	2,20	3,00	950	5,4	4,7	0,75	22,4	1,8	38	T4/T5/T6	14,18	IE3=84,3%
3RL0061	RL	132	SB	6	3,00	4,00	960	6,75	4,5	0,8	30,3	1,7	64	T4/T5/T6	23,53	IE3=85,6%
3RL0062	RL	132	MB	6	4,00	5,50	950	8,64	4,5	0,78	39,0	1,8	67	T4/T5/T6	29,5	IE3=86,8%
3RL0063	RL	132	ML	6	5,50	7,50	950	11,5	4,6	0,8	55,0	1,8	73	T4/T5/T6	37,75	IE3=88%
3RL0064	RL	160	MB	6	7,50	10,00	965	15,9	4,5	0,8	75,6	1,8	121	T4/T5/T6	81,25	IE3=89,1%
3RL0065	RL	160	L	6	11,00	15,00	955	23,5	4,6	0,75	110	1,8	130	T4/T5/T6	105,75	IE3=90,3%

1 speed 750 rpm Rated data at 400V /50Hz -direct on line start

Code	Type				P		rpm min ⁻¹	In 400 V Amp.	I _s /I _n	Cos φ	M _n Nm	M _s /M _n	m Kg	Classe T Class	Moment of inertia J10 ⁻³ Kg.m ²	Nominal Value of Efficiency
					kW	CV										
RL0025	RL	63	B	8	0,06	0,08	660	0,6	2,3	0,63	0,9	2,8	7	T4/T5/T6	0,8	34%
RL0026	RL	71	A	8	0,09	0,12	660	0,75	2,2	0,63	1,3	2,7	7	T4/T5/T6	0,9	38%
2RL0027	RL	71	B	8	0,12	0,16	640	0,9	2	0,55	1,8	2,3	8,5	T4/T5/T6	0,9	IE2=39,8%
2RL0028	RL	80	A	8	0,18	0,25	690	0,95	2,8	0,7	2,5	2,7	11	T4/T5/T6	1,2	IE2=45,9%
2RL0029	RL	80	B	8	0,25	0,34	700	1,2	2,9	0,55	3,6	2,8	13	T4/T5/T6	1,97	IE2=50,6%
2RL0030	RL	90	S	8	0,37	0,50	680	1,3	3	0,69	5,2	1,6	17,5	T4/T5/T6	3,18	IE2=56,1%
2RL0031	RL	90	L	8	0,55	0,75	670	1,85	3	0,63	7,7	2,4	19	T4/T5/T6	4,78	IE2=61,7%
3RL0039	RL	100	LA	8	0,75	1,00	700	2,6	3,4	0,65	10	2,3	25	T4/T5/T6	6,72	IE3=75%
3RL0040	RL	100	LB	8	1,10	1,50	690	3	3,7	0,73	15,6	1,8	27	T4/T5/T6	15,93	IE3=77,7%
3RL0041	RL	112	M	8	1,50	2,00	705	4,3	4,1	0,65	20,2	1,9	38	T4/T5/T6	16,7	IE3=79,8%
3RL0066	RL	132	SB	8	2,20	3,00	705	5,2	3,8	0,75	30,2	1,8	58	T4/T5/T6	29,5	IE3=81,9%
3RL0067	RL	132	MB	8	3,00	4,00	710	7	4	0,74	40,0	1,9	63	T4/T5/T6	37,75	IE3=83,5%
3RL0068	RL	160	MA	8	4,00	5,50	710	9	4,1	0,78	52,0	1,9	97	T4/T5/T6	89,5	IE3=84,8%
3RL0069	RL	160	MB	8	5,50	7,50	715	12,3	4	0,76	72,5	2,1	109	T4/T5/T6	119,5	IE3=86,2%
3RL0070	RL	160	L	8	7,50	10,00	720	15,9	4,2	0,79	99,8	2,3	121	T4/T5/T6	150,25	IE3=87,3%



5.2 Three-phase Motors 2 speed – Constant Torque (for general purpose)

- Three phase asynchronous motor, squirrel cage rotor, self ventilated (IC411).
- Duty S1, Insulation class "F", IP55, 400V- 50 Hz.

• Connections	Poles	Connections	High Speed	Low Speed
	2/4 – 4/8	(Dahlander)	YY 400 V	Δ 400V
	4/6 – 6/8	(2 Separate windings)	Y 400 V	Y 400V

- For ambient temperature see par 2.1

2 speed 3000/1500 COSTANT TORQUE - Rated data at 400V 50Hz															
Code	Type			Poles	P kW	rpm min ⁻¹	In 400 V Amp.	I _L /I _n	n%	cosφ	M _n Nm	M _s /M _n	m Kg	Class T	Moment of Inertia J 10 ⁻³ Kg.m ²
RL4001	RL 2CT 63	B	2/4		0,25	2800	1	3,5	52	0,7	0,9	1,7	6,5	T4	0,2
					0,18	1380	88	3	58	0,66	1,3	1,7			
RL4002	RL 2CT 71	A	2/4		0,30	2800	1,35	3,2	53	0,71	1,1	1,7	6,5	T4	0,6
					0,20	1400	1,05	3	57	0,66	1,4	1,5			
RL4003	RL 2CT 71	B	2/4		0,45	2805	1,72	3,8	60	0,7	1,6	1,8	7,5	T4	0,9
					0,30	1400	1,2	3,6	68	0,62	2,1	1,8			
RL4004	RL 2CT 80	A	2/4		0,55	2700	1,5	4,1	67	0,85	1,9	1,7	10	T4	0,9
					0,37	1390	1	3,9	68	0,8	2,6	1,7			
RL4005	RL 2CT 80	B	2/4		0,75	2830	2,3	4,4	72	0,81	2,6	1,8	12	T4	1,3
					0,55	1400	2,1	4,1	67	0,71	3,9	1,8			
RL4006	RL 2CT 90	S	2/4		1,25	2830	3,2	5,4	73	0,82	4,4	2,1	16	T4	2
					0,90	1405	2,8	4,6	69	0,72	6,4	1,9			
RL4007	RL 2CT 90	L	2/4		1,60	2820	4,05	4,2	70	0,81	5,6	2,1	17,5	T4	2,6
					1,20	1405	3,3	3,5	69	0,76	8,5	2			
RL4008	RL 2CT 100	LA	2/4		2,35	2820	5,4	6,4	77	0,85	8,3	2,4	23	T4	4,3
					1,85	1420	4,6	5,5	75	0,79	13	2,1			
RL4009	RL 2CT 100	LB	2/4		3,00	2840	6,43	7	77,5	0,84	10,5	2,2	25	T4	5,3
					2,40	1425	4,85	6,1	77	0,85	16,8	2			
RL4010	RL 2CT 112	M	2/4		4,00	2890	9	7,1	77	0,88	13,8	2,2	35	T4	10,3
					3,30	1430	7,5	6,2	78	0,87	23	2,2			
RL4036	RL 2CT 132	S	2/4		5,90	2850	13	7,1	84	0,85	19,5	2,2	60	T4	15
					4,80	1440	10,4	6,3	85	0,87	32,0	2,1			
RL4037	RL 2CT 132	MB	2/4		7,50	2880	13,8	7,3	87	0,91	25,0	2,1	66	T4	17,8
					5,50	1450	11	6,5	87	0,84	44,0	2,1			
RL4038	RL 2CT 132	L	2/4		8,00	2930	15,9	7,4	87	0,89	30,5	2,2	70,5	T4	21,6
					6,00	1460	13	6,2	85	0,86	50,0	2,1			
RL4039	RL 2CT 160	M	2/4		11,00	2915	23	7,2	82	0,89	36,0	2,2	105	T4	62,7
					8,80	1460	18	6,4	88	0,85	58,5	2,2			
RL4040	RL 2CT 160	L	2/4		15,00	2910	29,3	7,4	84	0,91	49,0	2,5	115	T4	80,1
					12,00	1450	24,7	6,5	87	0,84	79,0	2,4			

All motors are certified as follows :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



2 speed 1500/750						COSTANT TORQUE - Rated data at 400V 50Hz										
Code		Type	Poles	P kW	rpm min ⁻¹	In 400 V Amp.	I _p /I _n	η %	cosφ	M _n Nm	M _p /M _n	m Kg	Class T	Moment of Inertia J 10 ⁻³ Kg.m ²		
RL4011	RL 2CT	71	A	4/8	0,18	1380	0,82	3,5	68	0,62	1,3	2,2	6,5	T4	0,07	
					0,09	660	0,65	2,2	40	0,72	1,4	2,7				
RL4012	RL 2CT	71	B	4/8	0,25	1380	0,88	3	70	0,75	1,5	2,2	8	T4	1	
					0,12	660	0,78	2	42	0,71	1,5	2,3				
RL4013	RL 2CT	80	A	4/8	0,37	1400	1	3,4	71	0,75	2,2	2,4	10	T4	2,2	
					0,18	670	0,77	2,8	50	0,67	2,3	2,7				
RL4014	RL 2CT	80	B	4/8	0,55	1400	1,63	4,4	75	0,74	3,1	2,2	12	T4	2,7	
					0,25	670	2,17	2,9	54	0,69	2,9	2,8				
RL4015	RL 2CT	90	S	4/8	0,75	1405	2,05	4,9	71	0,77	4,5	1,9	16	T4	3,4	
					0,37	675	1,43	3	62	0,7	4,4	1,6				
RL4016	RL 2CT	90	L	4/8	1,00	1405	2,7	4,2	77	0,75	6,9	2,3	18	T4	4,9	
					0,55	675	1,9	3	67	0,7	6,8	2,4				
RL4017	RL 2CT	100	LA	4/8	1,30	1420	3,7	4,5	79	0,77	9,1	3	23	T4	8,8	
					0,70	700	2,6	4,9	70	0,68	8,9	1,9				
RL4018	RL 2CT	100	LB	4/8	1,80	1430	4,5	5	80	0,81	11,5	2,5	25	T4	8,8	
					0,90	690	3,1	3,7	72	0,74	12	1,8				
RL4019	RL 2CT	112	M	4/8	2,50	1450	5,5	5,5	81	0,85	17,2	2,1	35	T4	17,2	
					1,25	705	4,2	4,1	78	0,65	16,9	1,9				
RL4041	RL 2CT	132	S	4/8	3,30	1445	7,8	4,9	83	0,85	22,0	1,6	56	T4	32,3	
					1,85	705	5,4	4,1	82	0,75	25,0	1,6				
RL4042	RL 2CT	132	MB	4/8	4,80	1430	10	5,2	85	0,82	32,0	1,7	61	T4	50,6	
					2,40	710	5,5	4,3	82	0,76	33,0	1,7				
RL4043	RL 2CT	132	L	4/8	5,50	1440	11,4	5,5	85	0,82	36,0	1,8	71	T4	50,6	
					3,00	715	7	4,5	84	0,74	39,7	1,8				
RL4044	RL 2CT	160	M	4/8	7,50	1450	17,1	5,7	87	0,84	49	1,9	106	T4	91,9	
					4,80	715	10,7	4,7	86	0,76	63	1,8				
RL4045	RL 2CT	160	L	4/8	10,00	1450	21,7	6,8	83	0,84	66,0	1,9	118	T4	121,8	
					6,60	720	13,8	5,6	86	0,87	88	1,9				

All motors are certified as follows: :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



2 speed 1500/1000				COSTANT TORQUE - Rated data at 400V 50Hz											
Code	Type	Poles		P kW	rpm min ⁻¹	I _n 400 V Amp.	I _s /I _n	η %	cosφ	M _n Nm	M _s /M _n	m Kg	Class T	Moment of inertia J 10 ⁻³ Kg.m ²	
RL4020	RL 2CT	71	B	4/6	0,20	1400	0,75	3,3	70	0,75	1,3	1,4	T4	1	
				4/6	0,10	900	0,58	2,4	53	0,71	1,1	1,4			
RL4021	RL 2CT	80	A	4/6	0,40	1400	1,3	3,4	71	0,75	2,9	1,4	T4	2,7	
				4/6	0,20	905	0,85	2,5	62	0,72	2,1	1,5			
RL4022	RL 2CT	80	B	4/6	0,50	1405	1,58	3,6	71	0,74	3,4	1,5	T4	2,7	
				4/6	0,30	910	2,1	3,1	66	0,73	3,0	1,5			
RL4023	RL 2CT	90	S	4/6	0,65	1405	1,85	5,8	76	0,75	4,5	1,6	T4	3,4	
				4/6	0,45	910	1,46	4,3	70	0,73	4,6	1,5			
RL4024	RL 2CT	90	L	4/6	0,95	1410	2,56	5,5	77	0,76	6,3	1,5	T4	4,9	
				4/6	0,60	910	1,86	3,6	70	0,74	6,4	1,6			
RL4025	RL 2CT	100	LA	4/6	1,40	1415	3,6	5,7	78	0,73	9,4	1,8	T4	8,8	
				4/6	0,90	930	3	4,1	70	0,7	9,3	1,7			
RL4026	RL 2CT	100	LB	4/6	1,85	1415	4,6	5,8	80	0,81	12,4	1,6	T4	8,8	
				4/6	1,10	910	3,4	3,9	74	0,74	12,1	1,6			
RL4027	RL 2CT	112	M	4/6	2,4	1420	5,45	6,1	82	0,85	16,2	1,8	T4	17,2	
				4/6	1,6	940	4,16	4,3	81	0,77	16,5	1,7			
RL4046	RL 2CT	132	S	4/6	3,00	1440	7,0	5,9	82	0,87	20,0	1,9	T4	32,3	
				4/6	2,00	945	5,5	3,9	81	0,80	20,2	1,6			
RL4047	RL 2CT	132	MA	4/6	4,00	1450	9,4	6,1	84	0,82	26,3	2,0	T4	39,5	
				4/6	2,60	940	6,8	4,5	84	0,77	25,9	1,8			
RL4048	RL 2CT	132	MB	4/6	4,40	1445	10,0	6,3	83	0,89	29,0	1,9	T4	50,6	
				4/6	3,00	965	7,6	4,4	80	0,80	30,3	1,7			
RL4049	RL 2CT	132	L	4/6	5,15	1450	11,7	6,8	85	0,82	33,5	1,9	T4	50,6	
				4/6	3,30	945	8,3	4,7	86	0,76	33,0	1,7			
RL4050	RL 2CT	160	M	4/6	6,60	1460	14,4	6,8	86	0,83	43,0	1,9	T4	91,9	
				4/6	4,40	950	10,9	4,4	82	0,79	43,9	1,8			
RL4051	RL 2CT	160	L	4/6	8,80	1460	22,2	6,8	83	0,84	57,7	1,9	T4	121,8	
				4/6	5,90	950	33,6	4,9	81	0,8	58	1,8			

All motors are certified as follows :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



2 speed 1000/750						COSTANT TORQUE - Rated data at 400V 50Hz									
Code	Type		Poles	P kW	rpm min ⁻¹	In 400 V Amp.	I _L /I _n	η %	cosφ	M _n Nm	M _p /M _n	m Kg	Class T	Moment of inertia J 10 ⁻³ Kg.m ²	
RL4028	RL 2CT	71	B	6/8	0,12	900	0,73	2,4	50	0,71	1,3	1,4	8	T4	1
					0,08	690	0,64	2,2	49	0,61	1,1	1,3			
RL4029	RL 2CT	80	A	6/8	0,15	935	0,88	2,6	50	0,71	1,5	1,5	10	T4	2,7
					0,13	690	0,83	2,1	52	0,6	1,9	1,5			
RL4030	RL 2CT	80	B	6/8	0,25	930	1,2	3,2	52	0,72	2,7	1,5	12	T4	2,7
					0,15	685	1,02	2,2	49	0,6	2,2	1,4			
RL4031	RL 2CT	90	S	6/8	0,35	910	1,55	3,8	55	0,74	3,6	1,4	16	T4	3,4
					0,25	650	1,2	3,1	60	0,6	3,8	2,5			
RL4032	RL 2CT	90	L	6/8	0,60	935	2,2	3,8	60	0,76	6,1	1,5	18	T4	4,9
					0,30	685	1,55	3,4	61	0,6	4,3	1,6			
RL4033	RL 2CT	100	LA	6/8	0,80	920	2,85	4	65	0,77	8,2	1,5	23	T4	8,8
					0,55	700	2,4	3,6	68	0,63	7,4	1,6			
RL4034	RL 2CT	100	LB	6/8	1,00	930	3,4	4,1	67	0,75	10,5	1,6	25	T4	8,8
					0,65	700	2,7	3,7	68	0,66	8,8	1,6			
RL4035	RL 2CT	112	M	6/8	1,50	960	4,7	4	75	0,72	15,0	1,7	35	T4	17,2
					1,00	710	3,8	3,9	65	0,7	13,4	1,6			
RL4052	RL 2CT	132	S	6/8	1,85	960	6,2	4,1	74	0,71	18,4	1,6	60	T4	32,3
					1,30	720	5,1	4,0	68	0,65	17,5	1,8			
RL4053	RL 2CT	132	MB	6/8	2,55	965	7,9	4,2	74	0,73	25,1	1,8	66	T4	39,5
					1,85	720	6,9	4,1	69	0,67	24,6	1,8			
RL4054	RL 2CT	132	L	6/8	3,00	980	8,3	4,2	80	0,75	29,5	1,8	71	T4	50,6
					2,00	735	6,9	4,1	74	0,65	26,3	1,9			
RL4055	RL 2CT	160	M	6/8	4,00	980	10,4	4,3	82	0,75	39,3	1,9	106	T4	91,9
					2,80	725	8,5	4,2	78	0,70	37,2	1,9			
RL4056	RL 2CT	160	L	6/8	5,50	985	13,9	4,3	84	0,74	53,5	1,9	118	T4	121,18
					4,00	730	10,9	4,2	78	0,75	53	1,9			

All motors are certified as follows: :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



5.3 Three phase motors 2 speed Quadratic Torque (For centrifugal machines)

- Three phase asynchronous motor, squirrel cage rotor, self ventilated (IC411).
- Duty S1, Insulation class "F", IP55, 400V- 50 Hz.

• Connections	Poles	Connections	High Speed	Low Speed
	2/4 – 4/8	(Dahlander)	YY 400 V	Y 400V
	4/8 – 6/8	(2 Separate windings)	Y 400 V	Y 400V

- For ambient temperature see par 2.1

2 speed 3000/1500						QUADRATIC TORQUE - Rated data at 400V 50Hz											Moment of inertia J 10 ⁻³ Kg.m ²
Code		Type	Poles		P kW	rpm min ⁻¹	In 400 V Amp.	I _u /I _n	η %	cos φ	M _n Nm	M _u /M _n	m Kg	Class T			
RL6001	RL 2QT	63	B	2/4	0,25	2780	1,1	3,3	52	0,7	0,9	2	7	T4	0,1		
					0,06	1410	0,4	2,5	58	0,68	0,4	1,7					
RL6002	RL 2QT	71	A	2/4	0,37	2790	1,3	3,5	59	0,8	1,3	1,8	7	T4	0,4		
					0,09	1410	0,7	2,8	33	0,7	0,6	1,8					
RL6003	RL 2QT	71	B	2/4	0,50	2800	2,1	3,6	60	0,7	1,7	1,8	8	T4	0,4		
					0,14	1410	0,65	2,9	65	0,7	1	1,9					
RL6004	RL 2QT	80	A	2/4	0,75	2800	2,46	4	63	0,76	2,6	1,8	11	T4	0,6		
					0,18	1415	0,7	3,5	66	0,79	1,2	2,2					
RL6005	RL 2QT	80	B	2/4	1,10	2810	3,0	4,1	66	0,81	3,7	1,8	13	T4	0,8		
					0,25	1415	0,64	3,7	70	0,81	1,7	2,2					
RL6006	RL 2QT	90	S	2/4	1,50	2780	4	4,5	66	0,82	5,1	2	17,5	T4	1,2		
					0,37	1420	1,7	3,9	64	0,81	2,5	2,2					
RL6007	RL 2QT	90	L	2/4	2,20	2860	5,0	4,4	70	0,89	7,5	1,9	19	T4	1,5		
					0,55	1400	1,3	4,4	67	0,5	3,7	2,1					
RL6008	RL 2QT	100	LA	2/4	2,60	2820	5,3	5,6	77	0,9	8,8	2,1	25	T4	2,9		
					0,62	1420	1,42	5,3	73	0,8	4,2	2					
RL6009	RL 2QT	100	LB	2/4	3,30	2800	7,14	5,6	78	0,92	11,3	2,1	27	T4	2,9		
					0,75	1415	2,1	5	73	0,9	5,1	2					
RL6010	RL 2QT	112	M	2/4	4,40	2890	9,5	5,4	80	0,8	14,6	2	35	T4	7,4		
					1,10	1440	2,4	5	80	0,8	7,4	1,9					
RL6035	RL 2QT	132	S	2/4	6,50	2920	12,85	6,1	84	0,87	21,4	2,2	60	T4	15		
					2,00	1415	5,4	5,9	81	0,85	13,1	2,1					
RL6036	RL 2QT	132	M	2/4	8,50	2910	16,9	6,7	92	0,83	28,1	2,3	66	T4	17,8		
					2,50	1450	5,9	6,4	90	0,80	16,4	2,3					
RL6037	RL 2QT	132	M	2/4	9,20	2900	18,4	6,8	89	0,85	30,5	2,4	71	T4	21,6		
					2,80	1450	6,6	6,5	86	0,83	18,5	2,3					
RL6038	RL 2QT	160	M	2/4	12,00	2940	26,9	6,1	87	0,9	39,0	3,5	105	T4	36		
					3,00	1450	8,9	4,3	69	0,9	19	2,2					
RL6039	RL 2QT	160	M	2/4	16,00	2930	29,4	7,3	86	0,94	52,0	2,1	115	T4	53,4		
					4,40	1460	11,40	6,9	79	0,8	28,5	2					

All motors are certified as follows: :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



2 speed 1500/750						QUADRATIC TORQUE - Rated data at 400V 50Hz										
Code		Type		Poles	P kW	rpm min ⁻¹	I _n 400 V Amp.	I _L /I _n	η %	Cos φ	M _e Nm	M _s /M _e	m Kg	Class T	Moment of inertia J 10 ⁻³ Kg.m ²	
RL6011	RL 2QT	71	A	4/8	0,25 0,05	1400 700	0,89 0,56	3 2,3	70 28	0,75 0,68	1,7 0,7	2,2 2,8	6.5	T4	0,9	
RL6012	RL 2QT	71	B	4/8	0,37 0,07	1380 680	1,3 0,65	2,5 1,4	59 33	0,8 0,7	2,6 1,1	1,2 1,2	7.5	T4	0,9	
RL6013	RL 2QT	80	A	4/8	0,55 0,10	1405 700	1,63 0,78	4,4 2	75 38	0,74 0,66	3,7 1,4	2,2 2,3	10	T4	1,3	
RL6014	RL 2QT	80	B	4/8	0,75 0,15	1410 690	2,1 0,9	4,1 2,4	70 48	0,76 0,66	5,1 2,1	1,7 1,5	12	T4	1,3	
RL6015	RL 2QT	90	S	4/8	0,90 0,25	1415 710	2,75 0,96	4 2,9	77 54	0,75 0,7	6,1 3,4	2,3 2,8	16	T4	2	
RL6016	RL 2QT	90	L	4/8	1,20 0,30	1420 710	3,4 1,1	4,2 1,3	80 57	0,79 0,7	8,1 4	2,3 3	17.5	T4	2,6	
RL6017	RL 2QT	100	LA	4/8	1,90 0,45	1420 670	4,5 1,5	5 3	78 65	0,8 0,68	13,1 6,1	3 2	23	T4	5,3	
RL6018	RL 2QT	100	LB	4/8	2,20 0,55	1440 720	4,86 1,68	6 3	84 67,5	0,85 0,7	14,6 7,3	2,5 2,4	25	T4	5,3	
RL6019	RL 2QT	112	M	4/8	3,00 0,75	1450 710	6,9 2,4	6 3	80 74	0,8 0,61	19,8 9,9	2,6 2,4	35	T4	10,3	
RL6040	RL 2QT	132	S	4/8	4,40 1,10	1450 710	9,2 3,1	5,8 3,5	85 72	0,82 0,73	29,0 15,00	2,2 1,9	60	T4	25	
RL6041	RL 2QT	132	S	4/8	5,90 1,50	1445 705	11,9 4,33	6,2 3,9	87 79	0,84 0,64	39,0 20,0	2,1 1,8	66	T4	32,4	
RL6042	RL 2QT	132	M	4/8	7,50 1,85	1450 705	15,9 5,9	6,7 4,3	87 80	0,84 0,70	50,0 25,0	2,1 1,9	71	T4	40,5	
RL6043	RL 2QT	160	M	4/8	8,80 2,50	1450 700	17,5 7,0	6,8 3,9	87 78	0,84 0,7	57,3 33,8	2,2 2,9	116	T4	62,7	
RL6044	RL 2QT	160	M	4/8	12,00 3,20	1460 700	23,9 9	6,8 4,0	88 83,5	0,85 0,7	78,6 42,2	2,2 2,1	118	T4	80,1	

All motors are certified as follows: :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



2 speed 1500/1000						QUADRATIC TORQUE - Rated data at 400V 50Hz										
Code		Type		Poles	P kW	rpm min ⁻¹	In 400 V Amp.	I _L /I _n	η %	cos φ	M _n Nm	M _s /M _n	m Kg	Clasa T	Moment of Inertia J 10 ⁻³ Kg.m ²	
RL6020	RL 2QT	71	B	4/6	0,30 0,10	1400 900	0,95 0,50	2,6 1,4	71 63	0,75 0,72	2,1 1,4	2,0 1,8	7,5	T4	0,9	
RL6021	RL 2QT	80	A	4/6	0,44 0,13	1405 900	1,2 0,5	3,2 1,7	59 33	0,8 0,7	3,0 1,4	1,5 1,1	10	T4	1,3	
RL6022	RL 2QT	80	B	4/6	0,59 0,18	1405 905	1,6 0,65	3,5 2,3	76 72	0,8 0,75	3,9 1,9	1,7 1,2	12	T4	1,3	
RL6023	RL 2QT	90	S	4/6	0,90 0,30	1400 900	2,25 0,95	4,1 3,1	77 68	0,8 0,7	6,1 3,1	2,1 1,6	16	T4	2	
RL6024	RL 2QT	90	L	4/6	1,15 0,40	1400 900	3 1,4	4 3,2	71 60	0,8 0,8	7,5 4,2	1,8 1,3	19,5	T4	2,6	
RL6025	RL 2QT	100	LA	4/6	1,80 0,60	1400 920	4,4 1,9	5,1 3,9	75 78	0,83 0,78	12,1 6,1	2,1 1,8	23	T4	5,3	
RL6026	RL 2QT	100	LB	4/6	2,20 0,70	1440 940	4,9 2,1	3,8 3,0	82 80	0,87 0,75	15,2 7,5	1,7 1,5	25	T4	5,3	
RL6027	RL 2QT	112	M	4/6	3,00 0,90	1450 940	6,3 2	5,5 4,0	84 81	0,82 0,79	19,8 9,1	2,0 1,9	35	T4	10,3	
RL6045	RL 2QT	132	S	4/6	4,00 1,20	1450 945	8,4 2,9	6,3 4,9	84 80	0,82 0,75	26,0 11,8	2,1 1,7	55	T4	25	
RL6046	RL 2QT	132	S	4/6	4,80 1,40	1445 940	10 3,36	6,6 5,2	84 80	0,82 0,75	31,2 14,0	1,9 1,9	60	T4	32,4	
RL6047	RL 2QT	132	S	4/6	5,50 1,70	1455 950	12 4,7	5,4 4,8	83 77	0,8 0,7	36,0 17,0	2,1 1,9	70	T4	32,4	
RL6048	RL 2QT	132	M	4/6	6,60 2,00	1460 950	16,30 8,90	6,7 5,2	89 78	0,72 0,55	43,2 20,1	1,9 1,9	71	T4	40,5	
RL6049	RL 2QT	160	M	4/6	7,50 2,50	1460 960	15 5,9	7,2 5,9	87,5 84	0,84 0,7	49,0 24,2	2,2 2,3	106	T4	62,7	
RL6050	RL 2QT	160	L*	4/6	11,00 3,30	1450 960	23 9	6,9 6,1	88 85	0,8 0,7	72,0 32,0	2,2 2,3	120	T4	80,1	

All motors are certified as follows: :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



2 speed 1500/750					QUADRATIC TORQUE -Rated data at 400V 50Hz										
Code		Type	Poles		P kW	rpm min ⁻¹	I _n 400 V Amp.	I _s /I _n	η %	cosφ	M _e Nm	M _s /M _e	m Kg	T Class	Moment of Inertia J 10 ⁻³ Kg.m ²
RL6028	RL 2QT	80	A	6/8	0,33	920	1,52	3,1	55	0,70	3,4	1,8	10	T4	2,7
					0,09	680	0,60	1,9	57	0,62	1,3	1,4			
RL6029	RL 2QT	80	B	6/8	0,40	935	1,68	2,9	58	0,70	4,0	1,8	12	T4	2,7
					0,12	685	0,70	2,1	55	0,63	1,7	1,4			
RL6030	RL 2QT	90	S	6/8	0,48	925	1,98	3,1	61	0,65	4,8	1,9	16	T4	3,4
					0,19	690	1,05	2,1	55	0,62	2,7	1,5			
RL6031	RL 2QT	90	L	6/8	0,66	900	3,00	3,2	60	0,80	7,1	2,0	17.5	T4	4,9
					0,25	700	1,40	2,3	52	0,62	3,5	1,7			
RL6032	RL 2QT	100	LA	6/8	0,90	960	3,35	4,1	67	0,68	8,9	1,9	23	T4	8,8
					0,37	720	2,25	3,5	50	0,65	4,8	1,8			
RL6033	RL 2QT	100	LB	6/8	1,10	940	2,7	4	80	0,75	11,2	1,6	25	T4	8,8
					0,45	710	1,2	3,5	72	0,73	6	1,4			
RL6034	RL 2QT	112	M	6/8	1,50	970	4,40	4,4	75	0,74	15,1	2,1	35	T4	17,2
					0,75	720	3,20	3,5	61	0,68	10,1	1,7			
RL6051	RL 2QT	132	S	6/8	2,20	960	6,60	4,4	75	0,75	22,2	2,2	60	T4	32,3
					0,90	720	4,20	3,7	62	0,66	11,9	1,8			
RL6052	RL 2QT	132	MA	6/8	3,00	970	7,90	4,8	77	0,82	29,7	2,1	66	T4	39,5
					1,20	730	5,80	3,8	61	0,63	15,6	1,8			
RL6053	RL 2QT	132	MB	6/8	3,70	970	9,80	5,1	80	0,77	36,5	2,1	71	T4	50,6
					1,50	720	5,90	3,8	65	0,70	20,1	2,1			
RL6054	RL 2QT	160	M	6/8	5,50	980	13,30	5,5	88	0,75	53,5	2,2	106	T4	91,9
					2,50	730	7,70	4,2	84	0,65	32,5	2,3			
RL6055	RL 2QT	160	L	6/8	7,50	970	15,30	5,7	84	0,85	73,5	2,1	118	T4	12,18
					4,00	720	10,10	3,9	81	0,80	53,2	2,1			

All motors are certified as follows: :

TUV IT 13 ATEX 038X version IIB (T.amb. -40;+60 °C for T4 and T5)

TUV IT 13 ATEX 039X version IIC (T.amb. -20;+60 °C for T4 and -20,+50 for T5)



5.4 Single-phase motors

- Single-phase asynchronous motor, squirrel cage rotor, self-ventilated (IC411).
- Duty S1, Insulation class "F", IP55, 230V - 50 Hz.
- The motors considered in the rating table are single-phase motors with 1 capacitor. In case of single-phase motors with high starting torque it is possible to have a start capacitor complete with electronic switch (on request mechanical).

Rated data at 230V/50Hz																	
Code	Type	Poles	P Kw	Hp	rpm min ⁻¹	In Amp	Ia/In	η%	cos φ	Mn Nm	Ma/Mn	Cap. μF	m Kg	Classe T	Certificate		
RL8001*	RL 56 A	2	0,08	0,08	2710	0,8	2,8	42	0,88	0,15	0,6	5	4	T4	1or2or4	3	
RL8002*	RL 56 B	2	0,09	0,12	2709	0,93	3	43	0,9	0,2	0,6	3	4,5	T4	1or2or4	3	
2RL8003*	RL 63 A	2	0,12	0,16	2770	1,43	3,2	IE2=53,6	0,9	0,3	0,7	6,3	6,5	T4	1or2or4	3	
2RL8004*	RL 63 B	2	0,18	0,25	2710	2	3,7	IE2=60,4	0,8	0,6	0,7	6,3	7	T4	1or2or4	3	
2RL8005*	RL 71 A	2	0,25	0,34	2785	2,2	3,6	IE2=64,8	0,83	0,65	0,7	8	7	T4	1or2or4	3	
2RL8006*	RL 71 B	2	0,37	0,50	2840	2,5	5	IE2=69,5	0,9	1,3	0,7	12,5	8	T4	1or2or4	3	
2RL8007	RL 80 A	2	0,55	0,75	2840	3,4	4	IE2=74,1	0,9	1,8	0,7	16	10,5	T4	4	3	
2RL8008	RL 80 B	2	0,75	1,00	2800	4,7	4	IE2=77,4	0,9	2,5	0,6	20	11,5	T4	4	3	
2RL8009	RL 90 S	2	1,1	1,50	2830	6,8	4	IE2=79,6	0,9	3,7	0,6	25	16,5	T4	4	3	
2RL8010	RL 90 L	2	1,5	2,00	2830	8,9	4,8	IE2=81,3	0,9	5,0	0,7	30	18	T4	4	3	
2RL8011	RL 100 LA	2	2,2	3,00	2820	12,9	4,8	IE2=83,2	0,9	7,2	0,6	50	25	T4	4	3	
2RL8012	RL 100 LB	2	3	4,00	2800	18,00	4	IE2=84,6	0,9	10,2	0,4	75	27	T4	4	3	
RL8013*	RL 56 B	4	0,08	0,08	1285	0,88	2,7	49	0,9	0,4	0,6	3,75	4,5	T4	1or2	3	
RL8014*	RL 63 A	4	0,09	0,12	1390	0,9	3,1	45	0,85	0,6	0,8	3,75	6	T4	1or2	3	
2RL8015*	RL 63 B	4	0,12	0,16	1385	1,3	2,5	IE2=59,1	0,86	2,5	0,7	6,3	6,5	T4	1or2	3	
2RL8016*	RL 71 A	4	0,18	0,25	1390	1,75	4	IE2=64,7	0,75	1,2	0,7	8	7,5	T4	1or2	3	
2RL8017*	RL 71 B	4	0,25	0,34	1440	1,95	4	IE2=68,5	0,8	1,6	0,7	8	7,5	T4	1or2	3	
2RL8018	RL 80 A	4	0,37	0,50	1410	3	4	IE2=72,7	0,85	2,4	0,7	16	10,5	T4	4	3	
2RL8019	RL 80 B	4	0,55	0,75	1420	4,5	5	IE2=77,1	0,8	3,7	0,6	16	11,5	T4	4	3	
2RL8020	RL 90 S	4	0,75	1,00	1400	4,6	4	IE2=79,6	0,9	5	0,8	18	16,5	T4	4	3	
2RL8021	RL 90 L	4	1,1	1,50	1400	6,9	4	IE2=81,4	0,9	7,5	0,8	25	18	T4	4	3	
2RL8022	RL 100 LA	4	1,3	1,75	1385	8,80	3,2	IE2=81,7	0,96	9,0	0,55	32	25	T4	4	3	
2RL8023	RL 100 LB	4	1,6	2,20	1420	11	5,5	IE2=82,9	0,9	11,1	0,55	50	27	T4	4	3	
RL8024*	RL 63 A	6	0,08	0,08	890	0,80	2,4	43	0,85	0,6	0,5	6,3	6	T4	1or2	3	
RL8025*	RL 63 B	6	0,09	0,12	902	1,52	2,3	48	0,82	0,8	0,5	8	6,5	T4	1or2	3	
2RL8026*	RL 71 A	6	0,12	0,16	930	1,3	2,4	IE2=50,6	0,9	1,2	1	6,3	6,5	T4	1or2	3	
2RL8027*	RL 71 B	6	0,18	0,25	900	1,9	2	IE2=56,6	0,9	2	0,7	8	7,5	T4	1or2	3	
2RL8028	RL 80 A	6	0,25	0,34	920	3,00	2,8	IE2=61,6	0,92	2,2	0,6	16	10	T4	4	3	
2RL8029	RL 80 B	6	0,37	0,50	940	3,2	3	IE2=67,6	0,9	3,7	0,6	13,75	12	T4	4	3	
2RL8030	RL 90 S	6	0,55	0,75	930	4	3	IE2=73,1	0,95	5,6	0,7	18	16	T4	4	3	
2RL8031	RL 90 L	6	0,75	1,00	900	5,90	3,1	IE2=75,9	0,90	8,1	0,7	30	17,5	T4	4	3	
2RL8032	RL 100 LA	6	1,10	1,50	920	8,76	3,1	IE2=78,1	0,90	11,5	0,7	45	23	T4	4	3	

1→ II 2 G Ex db IIC or II 2 D Ex tb IIC terminal box for 3 phase motor (version a) TUV IT 13 ATEX 039X (T. amb. -20;+60°C)

2→ II 2 G Ex db IIB or II 2 D Ex tb IIC terminal box for 3 phase motor (version a) TUV IT 13 ATEX 038X (T. amb. -40;+60°C)

3→ II 2 G Ex db IIB or II 2 D Ex tb IIC terminal box for 1 phase motor (type c-d-e) TUV IT 14 ATEX 029X (T. amb. -20;+60°C)

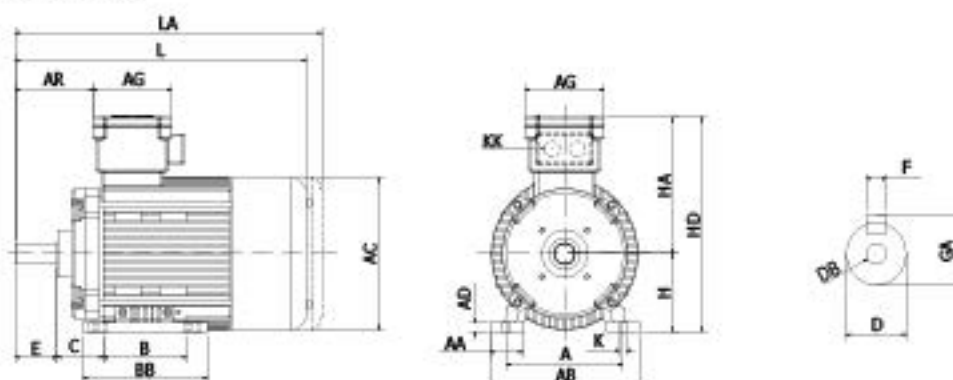
4→ II 2 G Ex db IIC or II 2 D Ex tb IIC terminal box for 1 phase motor (type c) TUV IT 13 ATEX 039X (T. amb. -20;+60°C)

* Available for version TUBE MOTORS TUV IT 12 ATEX 070X version IIC (T. amb. -40;+60 °C for T4 -T5-T6)



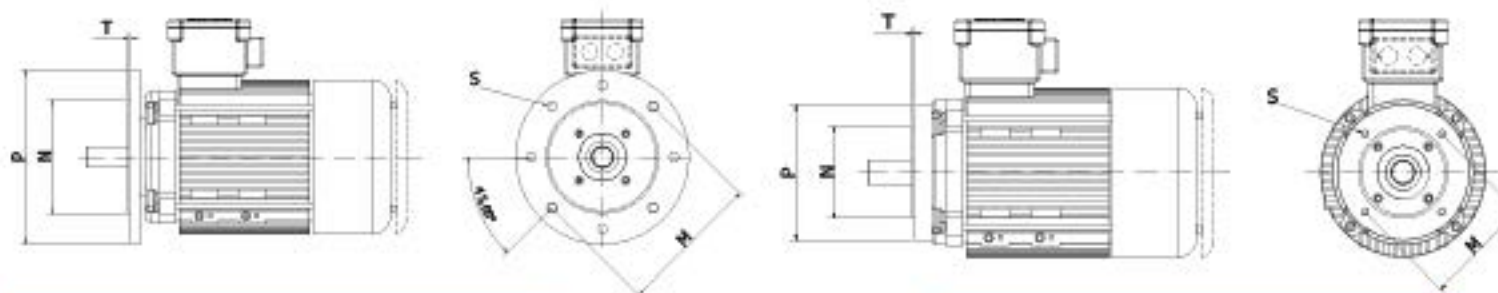
6. OVERALL DIMENSIONS

6.1 Three-phase motors



Mounting B3																	Shaft					
Type	A	AA	AB	AC	AD	AG	AR	B	BB	C	K	KK	H	HA	HD	L	LA	D	DB	E	F	GA
56	90	24	108	110	9	94,2	46,9	71	84	36	6,2	M20x1,5	56	125	181	211,5	223	9/6	M3	20	3	10,2
63	100	25	125	131	6	94,2	63,4	80	108	40	7,0	M20x1,5	63	142	205	270,8	283	11/6	M4	23	4	12,5
71	112	30	142	138	8	94,2	64,4	90	120	45	7,0	M20x1,5	71	142	213	271,8	284	14/6	M5	30	5	16
80	125	30	155	156	8	4,2	80,4	100	125	50	9,0	M20x1,5	80	151	231	299	314	19/6	M6	40	6	21,5
90S	140	40	180	176	10	94,2	93,4	100	150	56	9,0	M20x1,5	90	158	248	350	368	24/6	M8	50	8	27
90L	140	40	180	176	10	94,2	93,4	125	150	56	9,0	M20x1,5	90	158	248	350	368	24/6	M8	50	8	27
100	160	40	200	197	12	123,5	107	140	180	63	12,0	M25x1,5	100	188	288	404	416	28/6	M10	60	8	31
112	190	40	230	218	12	123,5	112,3	140	180	70	12,0	M25x1,5	112	198	310	418	442	28/6	M10	60	8	31
132S	216	63	248	257	16	168	177	140	175	89	12	M32x1,5	132	247	379	553	566	38/6	M12	80	10	41
132M	216	63	248	257	16	168	177	178	213	89	12	M32x1,5	132	247	379	553	566	38/6	M12	80	10	41
160M	254	70	310	310	20	168	215	210	255	108	14	M32x1,5	160	285	445	670	688	42/6	M16	110	12	45
160L	254	70	310	310	20	168	215	254	300	108	14	M32x1,5	160	285	445	670	688	42/6	M16	110	12	45

L* For part number 2RL0055/0060 L/LA- +80mm B-254/BB-300



Mounting B5 4 (8) holes - 45°					
Type	P	N	M	S	T
56	120	80/6	100	7	3
63	140	95/6	115	9	3
71	160	110/6	130	10	3,5
80	200	130/6	165	12	3,5
90S	200	130/6	165	12	3,5
90L	200	130/6	165	12	3,5
100	250	180/6	215	15	4
112	250	180/6	215	15	4
132S	300	230/6	265	15	4
132M	300	230/6	265	15	4
160M	350	250/6	300	18	5
160L	350	250/6	300	18	5

Mounting B14 4 holes - 45°					
Type	P	N	M	S	T
56	76	50/6	65	M5	2,5
63	90	60/6	75	M5	2,5
71	105	70/6	85	M6	2,5
80	120	80/6	100	M6	3
90S	140	95/6	115	M8	3
90L	140	95/6	115	M8	3
100	160	110/6	130	M8	3,5
112	160	110/6	130	M8	3,5
132S	200	130/6	165	M10	3,5
132M	200	130/6	165	M10	3,5
160M	250	180/6	215	M12	4
160L	250	180/6	215	M12	4

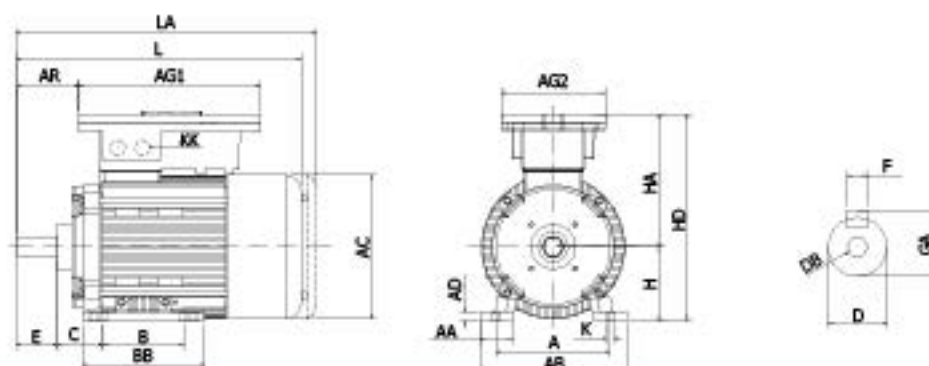


6.2 Forced Ventilation Motors

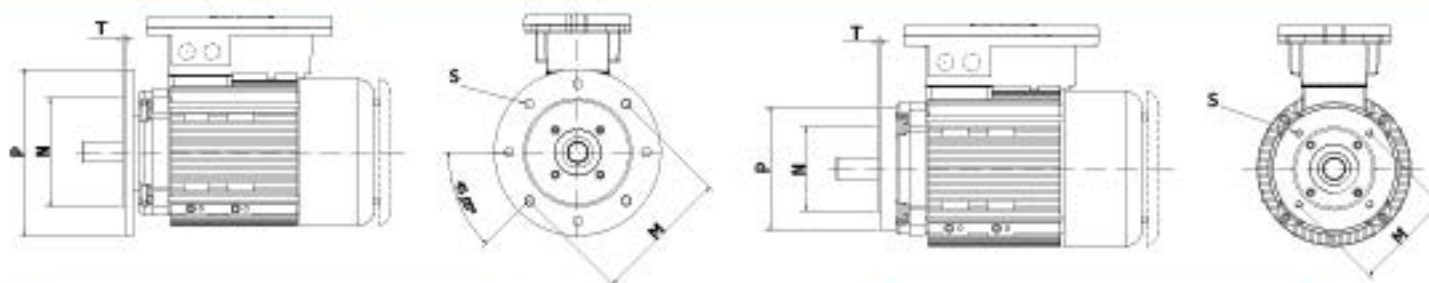
Length of motors complete with forced ventilation (auxiliary motor frame 58)

Frame	63	71	80	90S	90L	100	112	132S	132M	160M	160L
L	519,5	520,5	574	624	624	678	698	865	945	994	1074

6.3 Single-phase motors



Mounting B3														Shaft								
Type	A	AA	AB	AC	AD	AG1 AG2	AR	B	BB	C	K	KK	H	HA	HD	L	LA	D	DB	E	F	GA
56 (IIB)	90	24	108	110	9	223 128	46,9	71	84	36	6,2	M20x1,5	56	125	181	211,5	220	9j6	M3	20	3	10,2
56 (IIC)	90	24	108	110	9	94,2	46,9	71	84	36	6,2	M20x1,5	56	125	181	211,5	223	9j6	M3	20	3	10,2
63 (IIB)	100	25	125	131	6	223 128	46,5	80	108	40	7,0	M20x1,5	63	146,5	209,5	270,8	283	11j6	M4	23	4	12,5
63 (IIC)	100	25	125	131	6	94,2	63,4	80	108	40	7,0	M20x1,5	63	142	205	270,8	283	11j6	M4	23	4	12,5
71 (IIB)	112	30	142	138	8	223 128	47,5	90	120	45	7,0	M20x1,5	71	146,5	217,5	271,8	284	14j6	M5	30	5	16
71 (IIC)	112	30	142	138	8	94,2	64,4	90	120	45	7,0	M20x1,5	71	142	213	271,8	284	14j6	M5	30	5	16
80	125	30	155	156	8	223 128	63,5	100	125	50	9,0	M20x1,5	80	155,5	235,5	299	314	19j6	M6	40	6	21,5
90S	140	40	180	176	10	223 128	76,5	100	150	56	9,0	M20x1,5	90	162,5	252,5	350	368	24j6	M8	50	8	27
90L	140	40	180	176	10	223 128	76,5	125	150	56	9,0	M20x1,5	90	162,5	252,5	350	368	24j6	M8	50	8	27
100	160	40	200	197	12	206 190	96,0	140	180	63	12,0	M20x1,5	100	208	308	404	416	28j6	M10	60	8	31



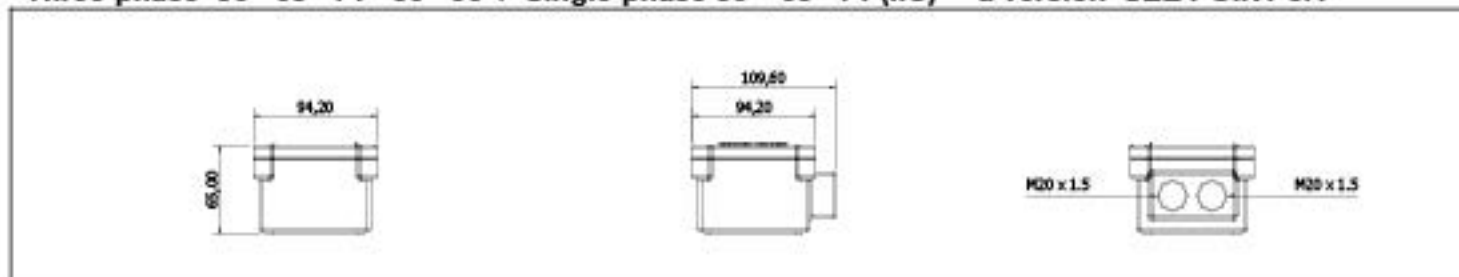
Mounting B5 4 (8) holes - 45°					
Type	P	N	M	S	T
56	120	80j6	100	7	3
63	140	95j6	115	9	3
71	160	110j6	130	10	3,5
80	200	130j6	165	12	3,5
90S	200	130j6	165	12	3,5
90L	200	130j6	165	12	3,5
100	250	180j6	215	15	4

Mounting B14 4 holes - 45°					
Type	P	N	M	S	T
56	76	50j6	65	M5	2,5
63	90	60j6	75	M5	2,5
71	105	70j6	85	M6	2,5
80	120	80j6	100	M6	3
90S	140	95j6	115	M8	3
90L	140	95j6	115	M8	3
100	160	110j6	130	M8	3,5

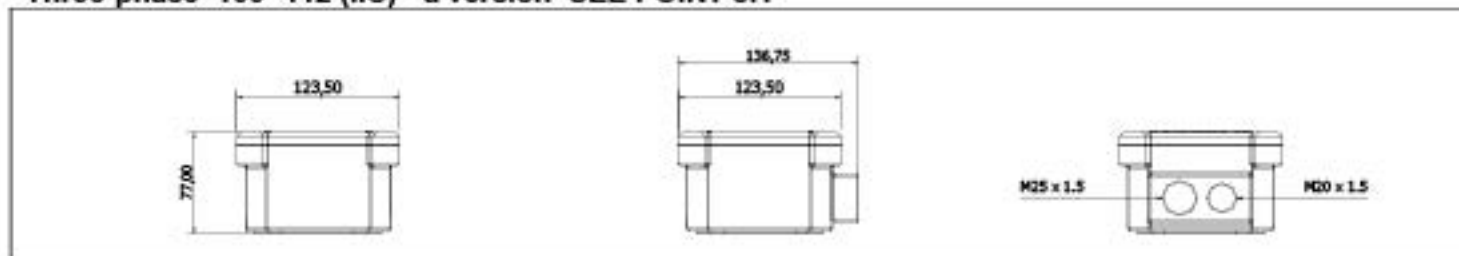


6.3 Terminal box

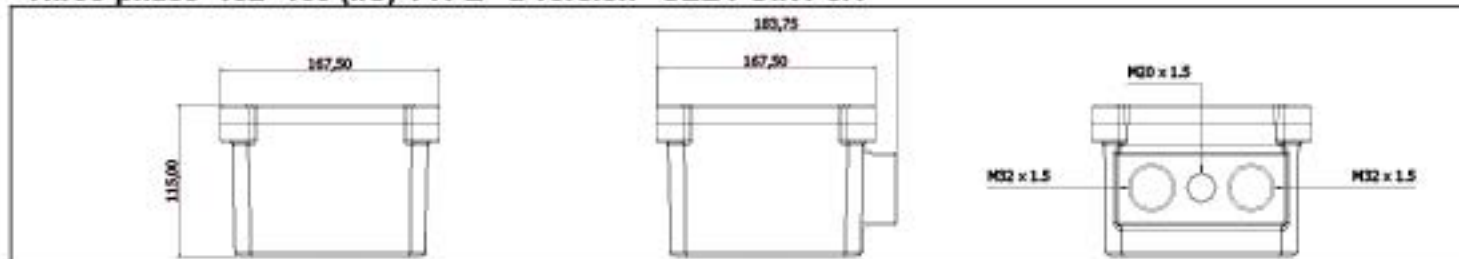
Three-phase 56 - 63 - 71 - 80 - 90 / Single-phase 56 - 63 - 71 (IIC) – 'a version' SEE POINT 3.1



Three-phase 100 -112 (IIC)- 'a version' SEE POINT 3.1



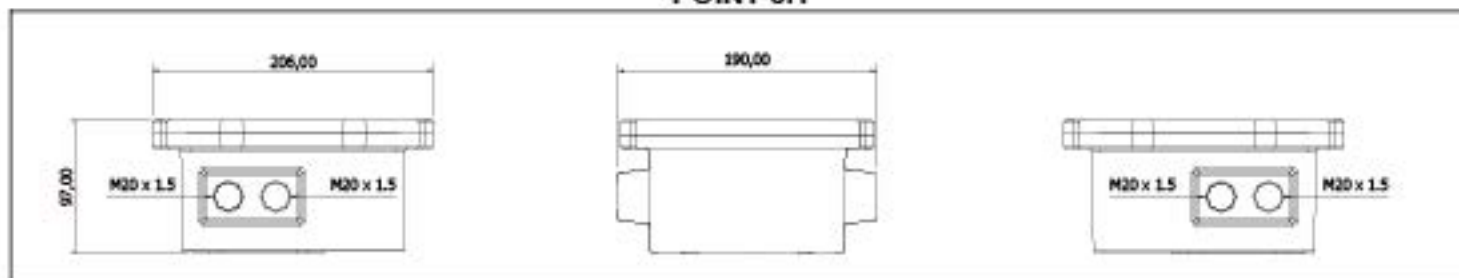
Three-phase 132 -160 (IIC)-TYPE 'a version' SEE POINT 3.1



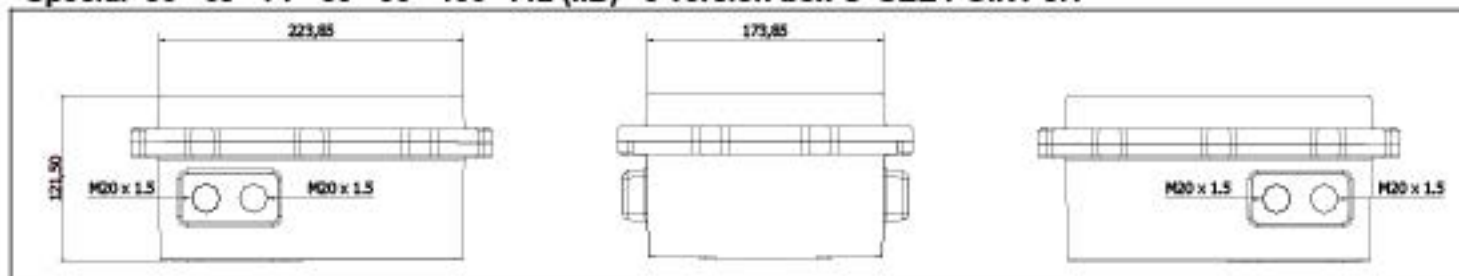
Single-phase 56 - 63 - 71 - 80 - 90 (IIB) –'c version box A' SEE POINT 3.1



Single-phase 2 Capacitors – High starting torque 63 - 71 - 80 - 90 – 100 (IIB) –'d version box B' SEE POINT 3.1



Special 56 - 63 - 71 - 80 - 90 - 100 -112 (IIB) 'e version box C' SEE POINT 3.1





7. SPARE PARTS

7.1 Personnel qualification

Overhauls and repairs must be only realised by qualified people in accordance with the standards EN 60079-17 or national standards (last edition). Qualified people must have knowledge about explosion protection.

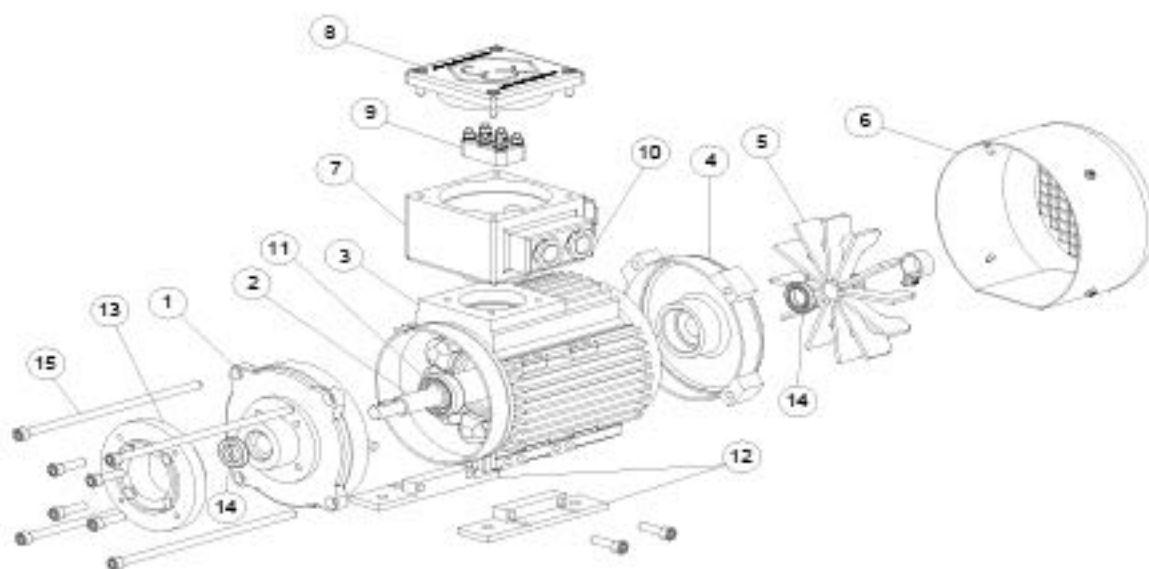
Repairs must be made regarding the rules as define in EN 60079-19 standards.

These repairs can only be done under the control or agreement with Motori Elettrici by a repair shop designed by RAEI or a recognized laboratory.

In case these rules are not respected, liability is released.

7.2 List of spare parts

All motors components must be replaced by original spare parts. In these cases please contact RAEI directly and give the serial number of the motor so to ask the authorization to repair the motor too.



1	DRIVE END SHIELD	6	FAN COVER	11	BALL BEARINGS
2	SHAFT WITH ROTOR	7	TERMINAL BOX	12	MOTOR FEET
3	FRAME	8	TERMINAL BOX COVER	13	FLANGE B14 (or B5)
4	NO-DRIVE END SHIELD	9	TERMINAL BLOCK	14	ABY ANGULAR BEARING
5	COOLING FAN	10	CABLE GLAND	15	TIE RODS (quality 4.8)

	SCREWS Screws quality 8.8								
	56	63	71	80	90	100	112	132	160
FLANGE B14 (o B5)	M5x14	M6x20	M6x16	M6x16	M6x20	M6x20	M6x20	M8x25	M8x25
MOTOR FEET	M5x10	M6x12	M6x14	M6x16	M6x16	M6x20	M8x25	M8x20	M8x25
TERMINAL BOX COVER	M5x14	M5x14	M5x14	M5x14	M5x14	M5x20	M5x20	M8x20	M8x20

	M4	M5	M6	M8	M10
TIGHTENING TORQUE (Nm)	2	3.2	5	12	18

7.3 Warranty

The warranty period extends to 12 months from the motor shipment date, unless different agreements are recorded in written .



RL

series



RL



RL



RL



RL No Tbox



RL



RL Forced ventilation + Encoder



RL Box A



RL Box B



RL with Encoder





СЕРТИФИКАТ СООТВЕТСТВИЯ

№ EACOC RU C-14A873.00023/21

Серия III № 0246020

ОФИС ПО СЕРТИФИКАЦИИ

ОФИС ПО СЕРТИФИКАЦИИ (ОПС) - это профессиональная организация, осуществляющая деятельность по сертификации продукции и услуг в соответствии с требованиями Еurasian Conformity Mark (EACOC) и/или других международных стандартов. ОПС создается на основании решения уполномоченного органа власти. ОПС создается на основании решения уполномоченного органа власти. ОПС создается на основании решения уполномоченного органа власти.

ЗАЯВИТЕЛЬ

Общество с ограниченной ответственностью «Байел Мотор Электрик Рус»
Адрес места нахождения юридического лица и адрес места осуществления деятельности:
Россия, 190558, Санкт-Петербург, город Колпино, улица Фабричная, дом 31, пом. 4Б,
ОГРН: 1107847122239. Телефон: +7 (812) 951 50-00. Адрес электронной почты: info@bms.ru

ИЗГОТОВИТЕЛЬ

BAEL Motor Electric S.r.l.
Адрес места нахождения юридического лица и адрес места осуществления деятельности по изготовлению продукции: Via Per Roberto 7A, 48077 Piosassa (AL), Италия.

ПРОДУКЦИЯ

Вращающиеся электродвигатели серий AB, PE, EE, HLM, MIA и MIAI, TUB и их модификации с частотой вращения (см. таблицу № 002087, 002088).
Документы, в соответствии с которыми изготовлены изделия - см. приложения, бланк № 002089.
Сертификат выдан

КОД ТН ВЭД ЕАЭС 8501 1000, 8501 32 200, 8501 40 200, 8501 40 800

СООТВЕТСТВИЕ ТРЕБОВАНИЯМ

ТР ТС 012/2011 «О безопасности оборудования для работы во вращающемся состоянии»

СЕРТИФИКАТ СООТВЕТСТВИЯ ВЫДАН НА ОСНОВАНИИ

Протоколы испытаний № 250.2021-T от 25.10.2021, № 250.2021-T от 25.10.2021. Испытательный лабораторный комплекс уполномоченной аккредитованной организацией «Национальный исследовательский институт испытаний и метрологический институт» (создан на основании приказа № 43-ЕАЭС от 17.05.2021). Органы по сертификации вращающегося и вращающегося оборудования (ОПС) - Общество с ограниченной ответственностью «Центр по сертификации вращающегося и вращающегося оборудования» (ООО «ЦЕНТР СЕРТИФИКАЦИИ»). Документы, в соответствии с которыми изготовлены изделия - см. приложения, бланк № 002089.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Перечень стандартов, примененных на добровольной основе для соблюдения требований ТР ТС 012/2011 (см. приложения, бланк № 002089). Указаны в срок хранения изделия в соответствии с документацией. Максимальный срок службы - 12 лет. Анализ данных производства продукции в соответствии с требованиями стандарта.

СРОК ДЕЙСТВИЯ С 08.11.2021 ПО 07.11.2030

ВКЛЮЧИТЕЛЬНО

Продукция (продукция)
серия (серия) по сертификации
Документы (документы)
(сертификат (сертификат))



Александр Сергеевич

Александр Сергеевич



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

For rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx-COCV 15388X	Issue No.:	Certificate history Issue No. 0 (2021-12-11)
Issue:	Current	Page:	Page 1 of 5
Date of Issue:	2021.12.11		
Applicant:	BAEL MOTOR ELECTRIC S.r.l. VIA PER ROBERTO 7A, PIOSASSA (AL), ITALY Italy		
Product Approval:	EXPLOSION PROOF ACTUATOR, IS, IS0900, THREE-PHASE AND SINGLE-PHASE, FRAME SIZES 30-132		
Optional accessory:			
Type of Protection:	Flameproof enclosure-d, increased safety-s, protection by enclosure t		
Making:	Ex d IIB T4/T5/T6 Gb or Ex d IIB T4/T5/T6 Gb Ex d IIB T4/T5/T6/T6/T6 Gb IP55/IP65 Ta=40+85 °C Ex d IIB T4/T5/T6 Gb or Ex d IIB T4/T5/T6 Gb Ex d IIB T4/T5/T6/T6/T6 Gb IP55/IP65 Ta=40+85 °C		
Approved for issue on behalf of the IECEx:	Alexander Zolgh		
Certification Body:	Hesol of TMAO TCM		
Product:	Hesol of TMAO TCM		
Signature:			
(or printed version)			
Date:			

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The date and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

8.1 Tube motors

Tube motors have been specifically designed with axial fan manufacturers in mind.

Being a direct evolution of the RL series, they maintain the same features of the main RL series:

-interchangeable and removable mounting arrangements: B3, B5, B14, B30, B34, B35

-Same protection degrees: Ex d, Ex de, Ex t.

Tube motors differ from standard RL series motors due to their lower profile, allowing ideal airflow in a duct fan configuration.

Terminal box has been repositioned in the back side of the motor providing multiple choice in terms of cable output position, both in-axe and perpendicular.

Tube series motors are available in 56, 63 and 71 frames with B3, B5, B14 and B34, B35, B30 mounting arrangements.

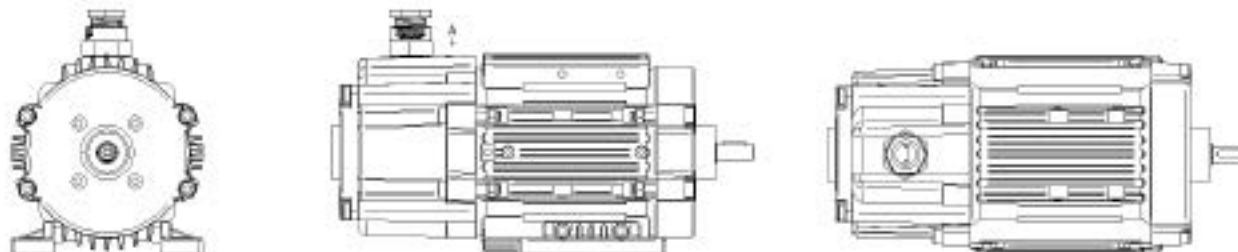
Tube series can be personalized on customer's request.

For electrical data please consult three and single phases RL motors data up to frame size 71.

Cable Output Positions

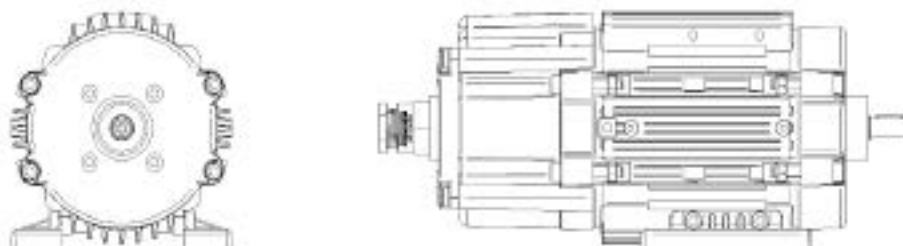
a. Top

With or without cable gland/ cable.

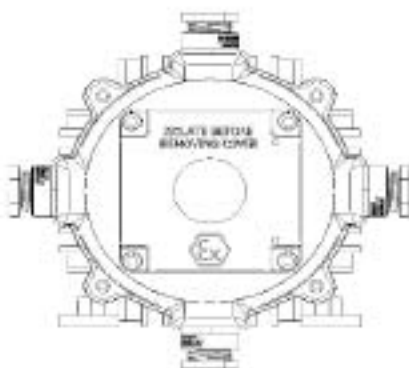


b. Back

With or without cable gland/ cable.



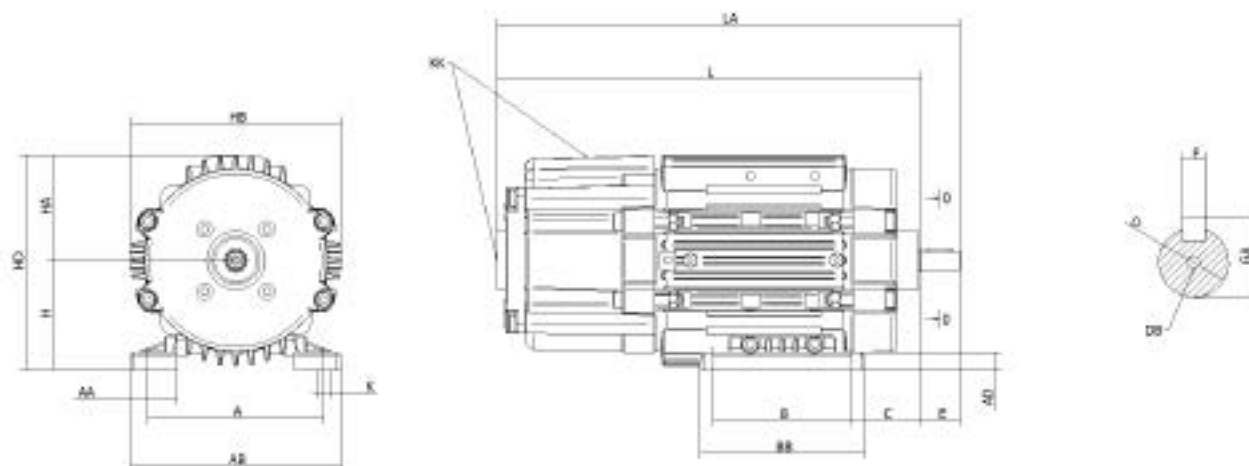
Possible cable output position for feet mounted version





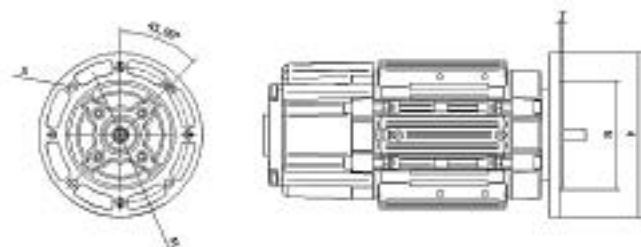
8.2 Tube Series

B3 Mounting



Mounting B3																Shaft				
Type	A	AA	AB	B	BB	AD	C	H	HA	HD	L	LA	HB	KK	K	D	DB	E	F	GA
68	90	24	108	71	84	9	36	56	56	112	217	237	108	M20x1.5	6.2	9 j6	M3	20	3	10.2
83	100	25	125	80	108	6	40	63	65	128	252	275	124	M20x1.5	7	11 j6	M4	23	4	12.5
71	112	30	142	90	120	8	45	71	65	136	245	275	124	M20x1.5	7	14 j6	M5	30	5	16

B5/B14 Mounting



Mounting B5 4 (8) holes - 45°					
Type	P	N	M	S	T
68	120	80 j8	100	7	3
83	140	95 j8	116	9	3
71	160	110 j8	130	10	3.6

Mounting B14 4 holes - 45°					
Type	P	N	M	S	T
68	78	60 j8	66	M6	2.6
83	90	80 j8	76	M6	2.6
71	106	70 j8	86	M8	2.6



TUBE

series



Tube Pad mounting



Tube



Tube



Tube Pad mounting (B30) with ventilator



ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

Еurasian Conformity Certificate

№ РАСС: RU-C-TAA87.0082021
Серия III № 0244000

ОРГАНИЗМ СЕРТИФИКАЦИИ Орган по сертификации «Российский институт испытаний» (ОИИ) является подразделением государственного учреждения «Российский институт испытаний» (ОИИ) и осуществляет деятельность по сертификации продукции в соответствии с требованиями Технического регламента Таможенного союза (ТР ТС 012/2011) «О безопасности оборудования для работы во взрывоопасных средах».

ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «Росгазпром» (ООО «РОСГАЗПРОМ») является владельцем продукции, на которую выдан сертификат, и несет ответственность за соответствие продукции требованиям Технического регламента Таможенного союза (ТР ТС 012/2011) «О безопасности оборудования для работы во взрывоопасных средах».

ИЗГОТОВИТЕЛЬ RIEL Motor Electric S.p.A. является владельцем продукции, на которую выдан сертификат, и несет ответственность за соответствие продукции требованиям Технического регламента Таможенного союза (ТР ТС 012/2011) «О безопасности оборудования для работы во взрывоопасных средах».

ПРОДУКЦИЯ Взрывозащитные электродвигатели серии AD-PE, BE, ELM, MIA и MIAI, TUBE с Ex-параметрами согласно приложению (см. приложение №10 082007, 082008).
Двухфазный, 3-фазный и однофазный с частотой вращения 1500 об/мин - см. приложение, класс № 082009.
Средний размер

КОД ТИПА ТАБЛ. 800 8080, 800 8200, 800 8400, 800 8600

СООТВЕТСТВУЕТ ТРЕБОВАНИЮ
ТР ТС 012/2011 «О безопасности оборудования для работы во взрывоопасных средах»

СЕРТИФИКАТ СООТВЕТСТВИЯ ВЪЕЗДА НА ОСНОВАНИИ
Протокол испытаний № 158.2021-Т от 15.03.2021, № 1601.2021-Т от 25.03.2021. Испытательная лаборатория технического устройства Автоматизированной испытательной организации «Российский институт испытаний» (ОИИ) является подразделением государственного учреждения «Российский институт испытаний» (ОИИ) и осуществляет деятельность по сертификации продукции в соответствии с требованиями Технического регламента Таможенного союза (ТР ТС 012/2011) «О безопасности оборудования для работы во взрывоопасных средах».

Срок действия с 08.11.2021 по 07.11.2026

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STATEMENT ◆ **ERKLÄRUNG** ◆ **DÉCLARATION** ◆ **DECLARACIÓN** ◆ **DICHIAZIONE**

TÜV
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Italia

CERTIFICATE

EU-TYPE EXAMINATION CERTIFICATE

Equipment or Protective System intended for use in potentially explosive atmospheres
Directive 2014/54/EU

(1) EU-Type Examination Certificate number
TUV IT 12ATEX 070 X Rev 3

(2) Equipment or Protective System: Electrical motors TUBE Series

(3) Manufacturer: RIEL motor electric S.p.A.

(4) Address: Via per Padova 7/1
I-15077 Fredolze (AL) - ITALY

(5) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(6) TÜV Italia, notified body no. 0040 in accordance with Article 17 of Directive 2014/54/EU of the European Parliament and of the Council, dated 28 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex I to the Directive.

The examination and test results are recorded in confidential report no. R 12 EX 040 rev 3.

(7) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0: 2018, EN 60079-1: 2014, EN 60079-7: 2014+ A1:2018, EN 60079-11: 2014

(8) If the sign "B" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(9) This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(10) The marking of the product shall include the following:

 **Ex db IIC T4 Gb**
Ex db IIC T4 Gb
Ex db IIC T4 Gb

This certificate may only be reproduced in its entirety and without any change, schedule included.

Issue date: 20F May 2024

ACCREDITED
PRD N° 0818

TÜV Italia S.p.A.
Notified body N° 0040

Alberto Canali
Managing Director

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1 TOLERANCES AND STANDARDS

1.1 For mechanical and electrical tolerances please see RL point 1.2

1.2 For Mia Standards please see RL standards in point 1.1

1.3 EQUIPMENT PROTECTION LEVEL (EPL) for MIA please see RL point 2.2

RAEL motors series MIA and MIA1 have the following types of protection:

-Ex eb IIC Increased safety (GAS) or Ex tb IIIC enclosures (DUST) or both markings

-Ex ec IIC Non-sparking (GAS) or Ex tc IIIC enclosures (DUST) or both markings

MIA Series motor

The motor with increased safety prevents sparking, arcing and hot spots during the service (including start conditions at locked rotor), which could lead to ignition of a potential explosive atmosphere that surrounds both the internal and external parts of the engine.

This is ensured under certain constructional and dimensional information concerning:

-Minimum distances through air and between the surfaces

-Use of high resistance trace-proof insulating materials

-Elimination of sharp edges that may accumulate static electricity and verification of a correct coupling between electrical and mechanical parts.

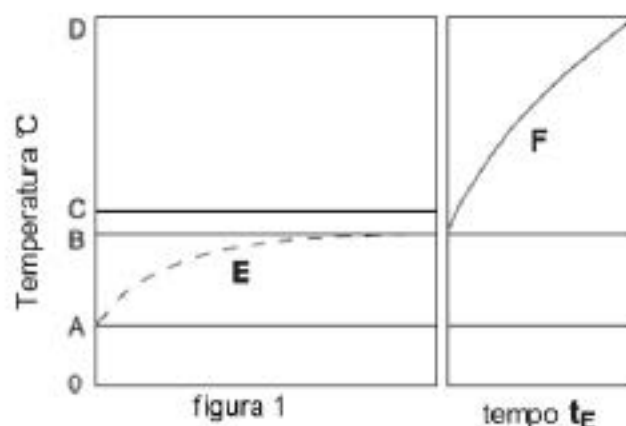
-minimum distance between the fixed and rotating parts (eg. between iron rotor / stator)

-limits of temperature rise, considering the locked rotor situation and normal operation in the most unfavorable thermal condition (power supply voltage to the lower or upper tolerance limit).

Thermal protection

a) When the protection against over temperatures is realized via amperometric device, it will be listed on the plate the ratio between the currents I_A / I_N and the time t_E (t_E must not be less than 5 sec while I_A / I_N should not be than 10)

b) When the protection against over temperatures is achieved via thermal protectors, placed inside the windings and connected to a release device, will be reported in the plate only current ratio I_A / I_N . The time t_E should not be shown on the nameplate



O= temperature at 0°C
A= maximum ambient temperature
B= temperature at rated load and worst voltage conditions
C= max. temperature allowed by the insulation class
D= max limit of temperature(GAS temperature class)
E= Temperature rise curve at rated output and at worst voltage conditions
F= Temperature rise with locked rotor (t_E)

MIA1 Series motor

This type of protection is allowed in hazardous areas classified as Zone 2, which require a normal protection.

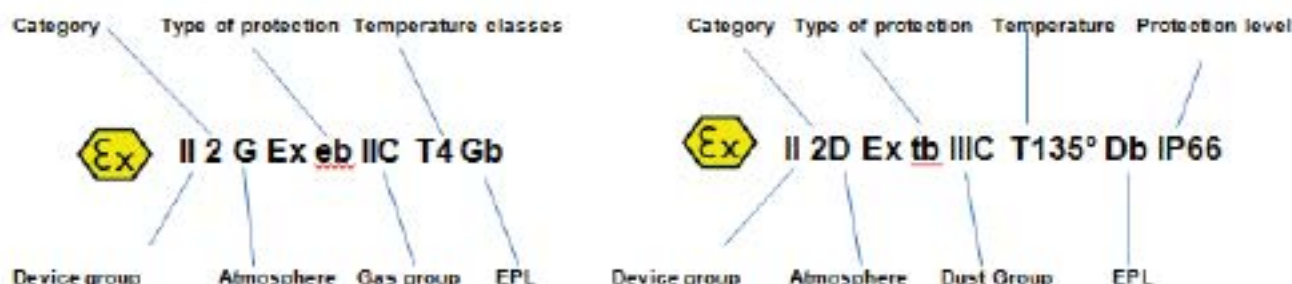
These constructions are known as non-sparking and the motor must be designed so that no spark is formed in the normal operating conditions. For the determination of the maximum allowable temperature are therefore excluding start-up situations with locked rotor



Protection through enclosures Ex tb (MIA) ed Ex tc (MIA1)

This type of protection prevents each transmission of explosive powders because the degree of IP protection prevents the dust from entering inside the motor, the maximum surface temperature of the motor does not exceed the temperature limit and no spark can escape from the housing of the motor.

Marking example



2. EX markings on RAELE electric motors

RAEL Ex motors have been designed to be used in applications with the presence of an explosive atmosphere due both to the presence of gases that the presence of combustible dust.

Motors for zone 1 and 21 (redundant for areas 2 e 22)

						TUV IT 12 ATEX 068X	
N°		0722		Via Per Retofa 7/1 15077 Predosa (AL)		ITALY Tel: +39 01317 1565	
Type		MIA		Kg		Year 20	
PH	INS	cosφ	Th.p.				
VΔ/Y±5%	Hz	KW	A	rpm	te	Is/In	
DO NOT OPEN WHILE ENERGIZED				Ta -40°C / + 60°C		IP 66	
II 2G Ex eb IIC T4 Gb				II 2D Ex tb IIIC T135°C Db			

IP 55 when there is the GAS marking

DUST marking

GAS marking

In case of a gas and dust protected motor the marking is the one on the nameplate above

**Motors for zone 2 and 22**

				RAEL		TUV IT 12 ATEX 069X	
				MOTORI ELETTRICI		Via Per Rotondo 7/119077 Predosa (AL) ITALY Tel: +39 013171563 www.rael.it	
N°				Year	20		
Type	MIA 1			S	Kg		
PH	INS	COSφ		Th.p.			
VΔ/Y±5%	Hz	KW	A	rpm	la/ln		
DO NOT OPEN WHILE ENERGIZED				Ta -40°C / + 60°C		IP 66	
II 3G Ex ec IIC T		Gc		II 3D Ex tc IIIC T135°C Dc			

IP 55 when there is the GAS marking

DUST marking

GAS marking

In case of a gas and dust protected motor the marking is the one on the nameplate above



3 GENERAL INFORMATION

3.1 Motors range

MIA and MIA1 series motors in this catalog are manufactured according to European standards of equipment and protective systems suitable for potentially explosive atmospheres in accordance with ATEX Directive 94/9/EC.

These motors according to ATEX directives are provided:

- Certificate of EC type

- Notification of Quality Assurance Product

These certificates are issued by notified bodies authorized to issue.

Series motors MIA (MIA 1) with IP55 protection are suitable for use in area 1 and area 2, while the IP66 are also suitable for use in zone 21 and zone 22.

Version	Frame size (mm)	Power (kW)	Poles	GAS group	Temperature class motors 2G	Surface temperature motors 2GD	Ambient temperature
Three phase 1 speed 2 - 4 - 6 - 8 Poli	56 – 160	0,06 – 18,5	2	IIC	T4	T 135° C	-40°C a +60°C
		0,06 – 15	4		T5	T 100° C	
		0,035 – 11	6		T6	T 85 °C	
		0,06 - 7,5	8				
Three phase 2 speed Constant torque 2/4 - 4/8 – 4/6 – 6/8 poles	63 – 160	0,25/0,18 - 15/12	2/4	IIC	T4	T 135° C	-40°C a +60°C
		0,18/0,09 – 10/6,6	4/8		T5	T 100° C	
		0,2/0,1 – 8,8/5,9	4/6		T6	T 85 °C	
		0,08/0,12 – 5,5/4	6/8				
Three phase 2 speeds Quadratic torque 2/4 - 4/8 – 4/6 – 6/8 poles	63 – 160	0,25/0,06 – 16/4,4	2/4	IIC	T4	T 135° C	-40°C a +60°C
		0,25/0,05 – 12/3,2	4/8		T5	T 100° C	
		0,3/0,1 – 11/3,3	4/6		T6	T 85 °C	
		0,33/0,09 – 7,5/4	6/8				
Three phase for Inverter 2 - 4 - 6 - 8 Poli	56 – 160	0,06 – 18,5	2	IIC	T4	T 135° C	-40°C a +60°C
		0,06 – 15	4				
		0,035 – 11	6				
		0,06 – 7,5	8				
		0,06 – 1,6	4				
		0,06 – 1,1	6				



3.2 Main features

Motors MIA and MIA1 are in conformity with the Essential Health and Safety Requirements for potentially explosive atmospheres provided by European Standards: EN 60079-0, EN 60079-7, EN 60079-31.

- Three-phase and single-phase squirrel cage asynchronous induction motors.
- Aluminium modular motors, flanges and feet can be assembled and disassembled.
- Type of protection  Ex e, (Ex tb) ,(Ex tc)
- Overall dimensions comply with IEC 60072 .
- Ventilations IC 411 (Self ventilated).
- Voltage 230/400 V $\pm$ 5% Δ /Y (56 - 112), 400/690 V $\pm$ 5% Δ /Y (132 - 180), frequency 50 Hz $\pm$ 2%.
- Insulation Class F.
- Wiring produced using enameled copper wires with double insulating coat, and varnished with a third layer dried in oven.
- Protection degree IP55 for area 1 and area 2, IP66 for area 21 and area 22.
- Maximum noise level 80 dB (A).
- Fan cover in sheet metal
- Low friction dust seals.
- Motor carcass and flanges IEC 60072-1compliant, made using die cast aluminum with high mechanical strength
- Duty cycle S1
- Standard ambient temperature -40°C; +60°C

3.3 Main options

- Motors 2D protection degree IP66 suitable for zone 21 and zone 22(MIA) , and 3D for zone 22 (MIA1)
- Special Powers on frame 132 and 160
- Thermal protections (PTC or PTO probes).
- Heating resistors anti condensation
- Insulation class H.
- Tropicalized motors
- Motors suitable for inverters
- Special shafts
- Special flanges
- Terminal box in right and left position.
- Temperature class T5 and T6.
- Standard painting
- Special painting for marine environment

Tests

All motors RAEL are 100% tested, both at the beginning of production (test of winding) and at the end of production (electrical test).

On request we can conduct specific tests:

- Routine Test- a test to which each individual machine is subjected during or after manufacture to ascertain whether it complies with certain criteria
- Type test – a test of one or more machines made to a certain design to show that the design meets certain specifications
- Specific type test - a bench test performed on a machine with a specific serial number
- Heating test

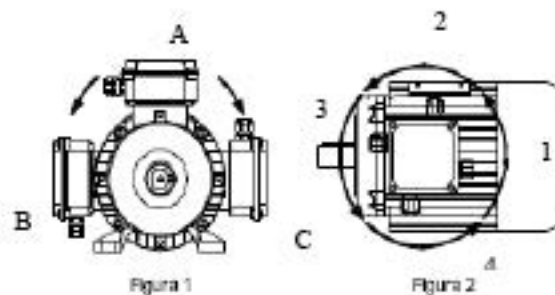
4 CABLE ENTRY, TERMINAL BOX AND WIRING DIAGRAM

4.1 Cable entries and terminal box

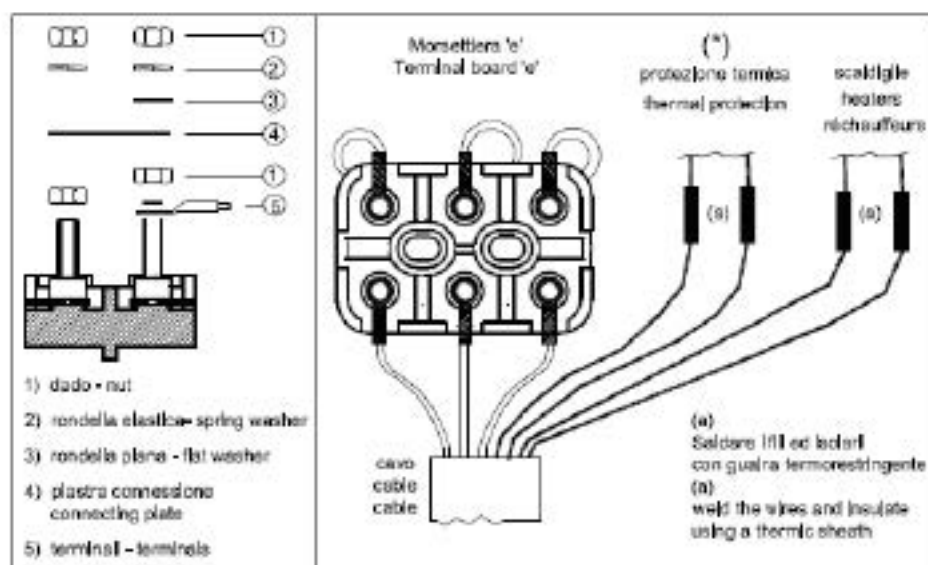
Having the ability of mounting the feet in three different positions (size 63-71) is then possible to have the terminal box is at the top (A) on the right side (C) and on the left side (B) of the motor as shown in figure 1.

The terminal box can be mounted on the motor so as to have the output cables in the four positions shown in Figure 2. Standard installation of the terminal box is in position A-4

Cable entries		
Frame	T-BOX (standard)	CASING(optional)
56 - 71	N.2 M x M16 STD	N.2 M16 + N.2 M20
80 - 112	N.1 x M20 + N.1 x M25 STD	2 x M20 + N.2 x M25
132-180	N. 2 x M32	N/A



Motors with frame size from 56 to 90 use M4 terminals, motors with frame size 100 to 112 use M5 terminal, motors with frame size 132 to 180 use M6 terminals.





4.2 WIRING DIAGRAMS- please see RL point 3.4 (single phase excluded)

5 MECHANICAL CHARACTERISTICS –please see RL point 4

5.1 MAIN COMPONENTS MATERIAL

Material								
Shield fames flanges terminal box	Shaft	Rotor	Fan	Fan cover	Tie rods	Screw	Cable glands	Motor Plate
Aluminium	Steel 35S20	Die-cast Aluminium (squirrel cage)	Thermoplasti c material	Zinc-plated steel	Steel 4.8	Steel 8.8	plastic	Anodized aluminium

For Bearings please see MIA

Rings for shafts

MIA and MIA1motors can be equipped with seals to ensure a degree of protection IP66. In this way the motor is protected from ingress of dust and contaminants.

Motor		Rings	
Frame size	Poles	Front	Rear
56	2 - 4 - 6 - 8	v-ring Ø12	v-ring Ø12
63	2 - 4 - 6 - 8	v-ring Ø14	v-ring Ø14
71	2 - 4 - 6 - 8	v-ring Ø14	v-ring Ø14
80	2 - 4 - 6 - 8	v-ring Ø20	v-ring Ø20
90	2 - 4 - 6 - 8	v-ring Ø25	v-ring Ø25
100	2 - 4 - 6 - 8	v-ring Ø30	v-ring Ø30
112	2 - 4 - 6 - 8	v-ring Ø30	v-ring Ø30
132	2 - 4 - 6 - 8	v-ring Ø40	v-ring Ø40
160	2 - 4 - 6 - 8	v-ring Ø45	v-ring Ø45

5.2 RADIAL FORCE PERMISSIBLE AT THE SHAFT END

The table below shows the permissible radial load (F_R) position in the $L/2$, assuming the engine operating at 50 Hz and a working life of the bearings of at least 20,000 hours for 2-pole motors and engines 40,000 hours for 4 - 6-8 poles.
For operation 60Hz these values should be reduced by 10%. For double speed motors take as a reference the highest speed

Considering the load F_R applied in the X position equal to $L/2$ we have the load limit values shown in the table:

Motor	Bearing type		C Dynamic load (N)	F_R in $X=L/2$ (N)			
	Front	Rear		2 poles	4 poles	6 poles	8 poles
56	6201-ZZ	6201-ZZ	6950	317	317	-	-
63	6202-ZZ	6202-ZZ	7800	356	356	408	449
71	6202-ZZ	6202-ZZ	7800	356	356	408	449
80	6204-ZZ	6204-ZZ	12700	580	580	664	731
90	6205-ZZ	6205-ZZ	14000	639	639	732	806
100	6206-ZZ	6206-ZZ	18300	881	881	1009	1111
112	6306-ZZ	6306-ZZ	29000	1325	1325	1516	1669
132	6308-ZZ	6308-ZZ	42500	1941	1941	2222	2448
160	6309-ZZ	6309-ZZ	53000	2421	2421	2771	3050

Axial forces permissible on the shaft

The table below shows the maximum axial loads (F_A) Permitted on the motor bearings, these values are provided from the bearing manufacturers and learned through experience. The value is about 2% of the dynamic load of the bearing indicated in the above table.

Motor	F_A (N)
56	139
63	156
71	156
80	254
90	280
100	386
112	580
132	850
160	1000

For applications with pulley and belt the maximum radial load F_R is given by

P = weight of the pulley [N]

F = tension of the belt [N] = $(2 \cdot K \cdot M) / D$ where

K = factor for belt tension belt ($K = 3$ for flat belt without belt tensioner, $K = 2.2$ ver V-belt, flat belt for $K = 2$)

D = diameter of pulley [m]

M = torque [Nm] = $9550 P / n$ where

P = shaft power [kW]

n = rotational speed [rpm]



6 ELECTRICAL DATA

1 Speed 3000 Rated data at 400V/50Hz – direct on line start																
Code	Type				P		rpm min ⁻¹	In 400 V Amp.	I _a /I _n	Cos φ	M _n Nm	M _a /M _n	m Kg	Class T	Moment of inertia J 10 ⁻³	Nominal Value of Efficiency
					kW	hp										
MIA0042	MIA	56	A	2	0,06	0,08	2730	0,5	4	0,4	0,2	3,5		T4/T5/T6	0,09	43%
MIA0043	MIA	56	A	2	0,09	0,12	2730	0,53	4	0,5	0,3	4,0		T4/T5/T6	0,09	51,5%
2MIA0044	MIA	56	B	2	0,12	0,16	2848	0,56	3,5	0,54	0,4	4	3,2	T4/T5/T6	0,1	IE2=53,6%
2MIA0001	MIA	63	A	2	0,12	0,16	2730	0,4	3,1	0,8	0,4	3,3	3,9	T4/T5/T6	0,13	IE2=53,6%
2MIA0002	MIA	63	A	2	0,18	0,25	2870	0,6	3,6	0,7	0,6	3,8	3,9	T4/T5/T6	0,13	IE2=60,4%
2MIA0003	MIA	63	B	2	0,25	0,34	2840	0,74	4,3	0,7	0,9	3,5	4,9	T4/T5/T6	0,19	IE2=64,8%
2MIA0004	MIA	71	A	2	0,37	0,50	2850	0,9	4,8	0,8	1,3	3	5,6	T4/T5/T6	0,36	IE2=69,5%
2MIA0005	MIA	71	B	2	0,55	0,75	2810	1,5	3,8	0,8	2,1	3	6,6	T4/T5/T6	0,46	IE2=74,1%
3MIA0006	MIA	80	A	2	0,75	1,00	2820	1,8	5	0,85	2,6	2,4	9,6	T4/T5/T6	0,76	IE3=80,7%
3MIA0007	MIA	80	B	2	1,10	1,50	2850	2,4	5,8	0,88	3,8	3	10,8	T4/T5/T6	0,89	IE3=82,7%
3MIA0008	MIA	90	L	2	1,50	2,00	2800	3,4	5	0,86	5,2	2,9	12,4	T4/T5/T6	1,37	IE3=84,2%
3MIA0009	MIA	90	L	2	2,20	3,00	2860	4,4	5,4	0,84	7,5	3	16,5	T4/T5/T6	1,8	IE3=85,9%
3MIA0032	MIA	100	LA	2	3,00	4,00	2880	5,5	6	0,84	10,2	2,6	25,8	T4/T5/T6	2,8	IE3=87,1%
3MIA0033	MIA	112	M	2	4,00	5,50	2880	7,4	5,8	0,89	13,2	2,6	30,5	T4/T5/T6	5,2	IE3=88,1%
3MIA0049	MIA	132	SA	2	5,50	7,50	2938	10,21	6,7	0,9	18,3	2,6	43,5	T4/T5/T6	10,63	IE3=89,2%
3MIA0050	MIA	132	MB	2	7,50	10,00	2920	13,3	6,9	0,91	24,7	2,9	48,4	T4/T5/T6	13,83	IE3=90,1%
3MIA0051	MIA	132	ML	2	9,00	12,00	2930	16	6,9	0,89	30,5	2,9	57,7	T4/T5/T6	17,31	IE3=90,8%
3MIA0053	MIA	160	MA	2	11,00	15,00	2930	19,03	7,9	0,9	36	2,8	65,8	T4/T5/T6	40	IE3=91,2%
3MIA0054	MIA	160	MB	2	15,00	20,00	2950	26,3	8	0,9	49	3,1	112	T4/T5/T6	51,75	IE3=91,9%
3MIA0055	MIA	160	L*	2	18,50	25,00	2940	33,04	8,0	0,88	60	3,1	128	T4/T5/T6	64	IE3=92,4%

1 Speed 1500 Rated data at 400V/50Hz – direct on line start																
Code	Type				P		rpm min ⁻¹	In 400 V Amp.	I _a /I _n	Cos φ	M _n Nm	M _a /M _n	m Kg	T Class	Moment of inertia J 10 ⁻³ Kg.m ²	Nominal Value of Efficiency
					kW	hp										
MIA0045	MIA	56	A	4	0,06	0,08	1360	0,4	3,5	0,68	0,4	4	3	T4/T5/T6	0,14	64%
MIA0046	MIA	56	B	4	0,09	0,12	1360	0,45	3	0,665	0,6	3,5	3,3	T4/T5/T6	0,14	66,5%
2MIA0010	MIA	63	A	4	0,12	0,16	1430	0,51	3,3	0,6	0,9	3	4	T4/T5/T6	0,25	IE2=59,1%
2MIA0011	MIA	63	B	4	0,18	0,25	1410	0,75	3,5	0,66	1,3	2,2	4,8	T4/T5/T6	0,27	IE2=64,7%
2MIA0012	MIA	71	A	4	0,25	0,34	1415	0,8	3	0,63	1,8	2,2	0,63	T4/T5/T6	0,63	IE2=68,5%
2MIA0013	MIA	71	B	4	0,37	0,50	1400	1,1	3,4	0,65	2,6	2,4	6,8	T4/T5/T6	0,76	IE2=72,7%
2MIA0014	MIA	80	A	4	0,55	0,75	1410	1,5	4,4	0,7	3,8	2,2	7,9	T4/T5/T6	1,6	IE2=77,1%
3MIA0015	MIA	80	B	4	0,75	1,00	1440	2	4,9	0,7	5,2	1,9	11	T4/T5/T6	2,1	IE3=82,5%
3MIA0016	MIA	90	L	4	1,10	1,50	1449	2,7	4,2	0,7	7,7	2,3	15,6	T4/T5/T6	2,5	IE3=84,1%
3MIA0017	MIA	90	L	4	1,50	2,00	1420	3,3	5	0,8	10,4	3	15,6	T4/T5/T6	3,13	IE3=85,3%
3MIA0034	MIA	100	LA	4	2,20	3,00	1440	5,5	5	0,8	15,1	2,3	25	T4/T5/T6	4,5	IE3=86,7%
3MIA0035	MIA	100	LB	4	3,00	4,00	1435	6,55	6	0,8	20,1	2,6	26,7	T4/T5/T6	5,58	IE3=87,7%
3MIA0036	MIA	112	M	4	4,00	5,50	1440	8,8	6	0,8	26,8	2,7	32	T4/T5/T6	12,2	IE3=88,6%
3MIA0056	MIA	132	MB	4	5,50	7,50	1450	11,94	6,1	0,8	36	2,4	46,9	T4/T5/T6	22,4	IE3=89,6%
3MIA0057	MIA	132	ML	4	7,50	10,00	1450	14,4	6,6	0,84	49,5	2,4	50	T4/T5/T6	32,5	IE3=90,4%
3MIA0059	MIA	160	MB	4	11,00	15,00	1460	21,97	5,5	0,85	72	2,6	118	T4/T5/T6	85	IE3=91,4%
3MIA0060	MIA	160	L*	4	15,00	20,00	1470	29,5	5,8	0,83	97,1	2,6	133	T4/T5/T6	105,75	IE3=92,1%

- ◆ Certificate TUV IT12 ATEX 068X FOR MOTORS Ex eb
- ◆ Certificate TUV IT12 ATEX 069X FOR MOTORS Ex ec



1 Speed 1000 P Rated data at 400V/50Hz – direct on line start																
Code	Type				kW	Hp	rpm min ⁻¹	In 400 V Amp.	Ia/In	Cos φ	Mn Nm	Ma/Mn	m Kg	Classe T Class	Moment of inertia J 10 ⁻³ Kg.m ²	Nominal Value of Efficiency
2MIA0018	MIA	63	B	6	0,12	0,16	930	0,55	2,8	0,5	1,3	2,8	6,3	T4/T5/T6	0,3	IE2=50,6%
2MIA0019	MIA	71	A	6	0,18	0,25	925	0,78	2,8	0,6	2,0	2,4	6,5	T4/T5/T6	0,6	IE2=56,6%
2MIA0020	MIA	71	B	6	0,25	0,34	920	1,0	2,9	0,6	2,7	3,1	7	T4/T5/T6	0,9	IE2=61,6%
2MIA0021	MIA	80	A	6	0,37	0,50	935	1,25	3,9	0,61	3,8	2,6	7,7	T4/T5/T6	1,97	IE2=67,6%
2MIA0022	MIA	80	B	6	0,55	0,75	930	1,7	3,5	0,7	5,8	2,8	10,4	T4/T5/T6	2,47	IE2=73,1%
3MIA0023	MIA	90	L	6	0,75	1,00	940	2,7	3,5	0,7	7,9	2,3	16	T4/T5/T6	3,18	IE3=78,9%
3MIA0024	MIA	90	L	6	1,10	1,50	930	3,1	3,7	0,7	11,6	2,3	17,1	T4/T5/T6	4,78	IE3=81%
3MIA0037	MIA	100	LB	6	1,50	2,00	940	3,8	3,8	0,75	15,2	1,7	23	T4/T5/T6	6,73	IE3=82,5%
3MIA0038	MIA	112	M	6	2,20	3,00	950	5,4	4,7	0,75	22,4	1,8	26	T4/T5/T6	14,18	IE3=84,3%
3MIA0061	MIA	132	SB	6	3,00	4,00	960	6,75	4,5	0,8	30,3	1,7	38	T4/T5/T6	23,53	IE3=85,6%
3MIA0062	MIA	132	MB	6	4,00	5,50	950	8,64	4,5	0,78	39,0	1,8	47	T4/T5/T6	29,5	IE3=86,8%
3MIA0063	MIA	132	ML	6	5,50	7,50	950	11,5	4,6	0,8	55,0	1,8	57	T4/T5/T6	37,75	IE3=88%
3MIA0064	MIA	160	L	6	7,50	10,00	965	15,9	4,5	0,8	75,6	1,8	65	T4/T5/T6	81,25	IE3=89,1%
3MIA0065	MIA	160	LL	6	11,00	15,00	955	23,5	4,6	0,75	110	1,8	125	T4/T5/T6	105,75	IE3=90,3%

1 speed 750 rpm Rated data at 400V /50Hz -direct on line start																		
Code			Type		P		kW	CV	rpm min ⁻¹	In 400 V Amp.	I _a /I _n	cos φ	M _n Nm	M _a /M _n	m Kg	Classe T Class	Moment of inertia J10 ⁻³ Kg.m ²	Nominal Value of Efficiency
MIA0026	MIA	71	A	8	0,09	0,12	660	0,75	2,2	0,63	1,3	2,7	6	T4/T5/T6	0,9		38%	
2MIA0027	MIA	71	B	8	0,12	0,16	640	0,7	2	0,7	1,8	2,3	7,8	T4/T5/T6	0,9		IE2=39,8%	
2MIA0028	MIA	80	A	8	0,18	0,25	690	0,95	2,8	0,6	2,5	2,7	10,2	T4/T5/T6	1,2		IE2=45,9%	
2MIA0029	MIA	80	B	8	0,25	0,34	700	1,2	2,9	0,55	3,6	2,8	11,4	T4/T5/T6	1,97		IE2=50,6%	
2MIA0030	MIA	90	S	8	0,37	0,50	680	1,3	3	0,69	5,2	1,6	15,8	T4/T5/T6	3,18		IE2=56,1%	
2MIA0031	MIA	90	L	8	0,55	0,75	670	1,85	3	0,63	7,7	2,4	18,5	T4/T5/T6	4,78		IE2=61,7%	
3MIA0039	MIA	100	LA	8	0,75	1,00	700	2,6	3,4	0,65	10	2,3	20,8	T4/T5/T6	6,72		IE3=75%	
3MIA0040	MIA	100	LB	8	1,10	1,50	690	3	3,7	0,73	15,6	1,8	22,5	T4/T5/T6	15,93		IE3=77,7%	
3MIA0041	MIA	112	M	8	1,50	2,00	705	4,3	4,1	0,65	20,2	1,9	27,6	T4/T5/T6	16,7		IE3=79,8%	
3MIA0066	MIA	132	SB	8	2,20	3,00	705	5,2	3,8	0,75	30,2	1,8	37,5	T4/T5/T6	29,5		IE3=81,9%	
3MIA0067	MIA	132	MB	8	3,00	4,00	710	7	4	0,74	40,0	1,9	47	T4/T5/T6	37,75		IE3=83,5%	
3MIA0068	MIA	160	MA	8	4,00	5,50	710	9	4,1	0,78	52,0	1,9	92,5	T4/T5/T6	89,5		IE3=84,8%	
3MIA0069	MIA	160	MB	8	5,50	7,50	715	12,3	4	0,76	72,5	2,1	102	T4/T5/T6	119,5		IE3=86,2%	
3MIA0070	MIA	160	L	8	7,50	10,00	720	15,9	4,2	0,79	99,8	2,3	118	T4/T5/T6	150,25		IE3=87,3%	

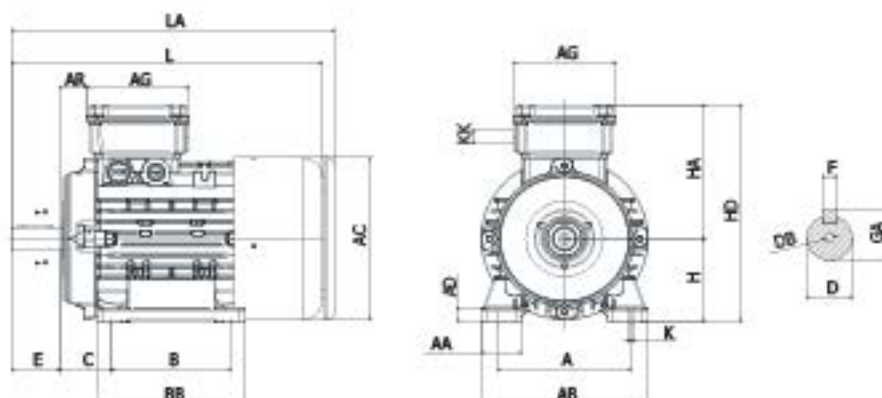
- ◆ Certificate TUV IT12 ATEX 068X FOR MOTORS Ex eb
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6.1 Three phase 2 speed motors Constant Torque - See RL point 5.2

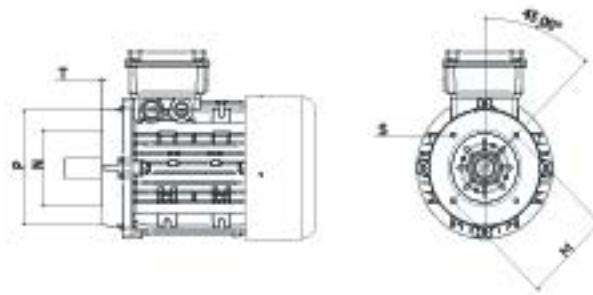
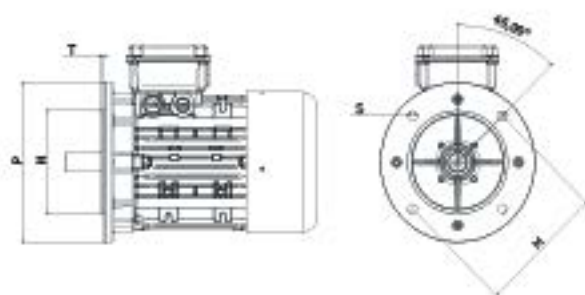
6.2 Three-phase Motors 2 –speed Quadratic torque see RL point 5.3

7. OVERALL DIMENSION

7.1 Three phase motors



Tipo	Mounting B3													Shaft								
	A	AA	AB	AC	AD	AG	AR	B	BB	C	K	KK	H	HA	HD	L	LA	D	DB	E	F	GA
56	90	21	108	110	10	100	12	71	90	36	6	2xM16	56	104	160	187	L+9	9j6	M3	20	3	10,2
63	100	28	120	124	10	100	12	80	105	40	7	2xM16	63	106	169	214	L+12	11j6	M4	23	4	12,5
71	112	30	137	138	12	100	18	90	110	45	7	2xM16	71	119	190	240	L+12	14j6	M5	30	5	16
80	125	32	154	156	13	108	26	100	125	50	9	M20-M25	80	142	222	275	L+11	19j6	M6	40	6	21,5
90S	140	42	178	176	15	108	29	100	130	56	9	M20-M25	90	146	236	304	L+15	24j6	M8	50	8	27
90L	140	42	178	176	15	108	29	125	155	56	9	M20-M25	90	146	236	325	L+15	24j6	M8	50	8	27
100	160	37	192	194	16	108	36	140	175	63	12	M20-M25	100	157	257	368	L+12	28j6	M10	60	8	31
112	190	40	224	218	16	108	38	140	176	70	12	M20-M25	112	167	279	385	L+11	28j6	M10	60	8	31
132S	216	58	258	258	18	121	46	140	180	89	12	2xM32	132	191	323	455	L+15	38k6	M12	80	10	41
132M	216	58	258	258	18	121	46	178	218	89	12	2xM32	132	191	323	495	L+15	38k6	M12	80	10	41
160M	254	72	318	310	22	186	50	210	264	108	14	2xM32	160	245	405	598	L+20	42k6	M16	110	12	45
160L	254	72	318	310	23	186	50	254	306	108	14	2xM32	160	245	405	641	L+20	42k6	M16	110	12	45



Mounting B5					
8 fori - 45°					
Tipo	P	N	M	S	T
56	120	80j6	100	7	3
63	140	95j6	115	9	3
71	160	110j6	130	10	3,5
80	200	130j6	165	12	3,5
90S	200	130j6	165	12	3,5
90L	200	130j6	165	12	3,5
100	250	180j6	215	15	4
112	250	180j6	215	15	4
132S	300	230j6	265	15	4
132M	300	230j6	265	15	4
160M	350	250h6	300	18	5
160L	350	250h6	300	18	5

Mounting B14					
8 fori - 45°					
Tipo	P	N	M	S	T
56	80	50j6	65	M4	2,5
63	90	60j6	75	M5	2,5
71	105	70j6	85	M5	2,5
80	120	80j6	100	M6	3
90S	140	95j6	115	M8	3
90L	140	95j6	115	M8	3
100	160	110j6	130	M8	3,5
112	160	110j6	130	M8	3,5
132S	200	130j6	165	M10	3,5
132M	200	130j6	165	M10	3,5
160M	250	180h6	215	M12	4
160L	250	180h6	215	M12	4

8 SPARE PARTS

8.1 Personnel qualification

Overhauls and repairs must be only realised by qualified people in accordance with the standards EN 60079-17 or national standards (last edition). Qualified people must have knowledge about explosion protection.

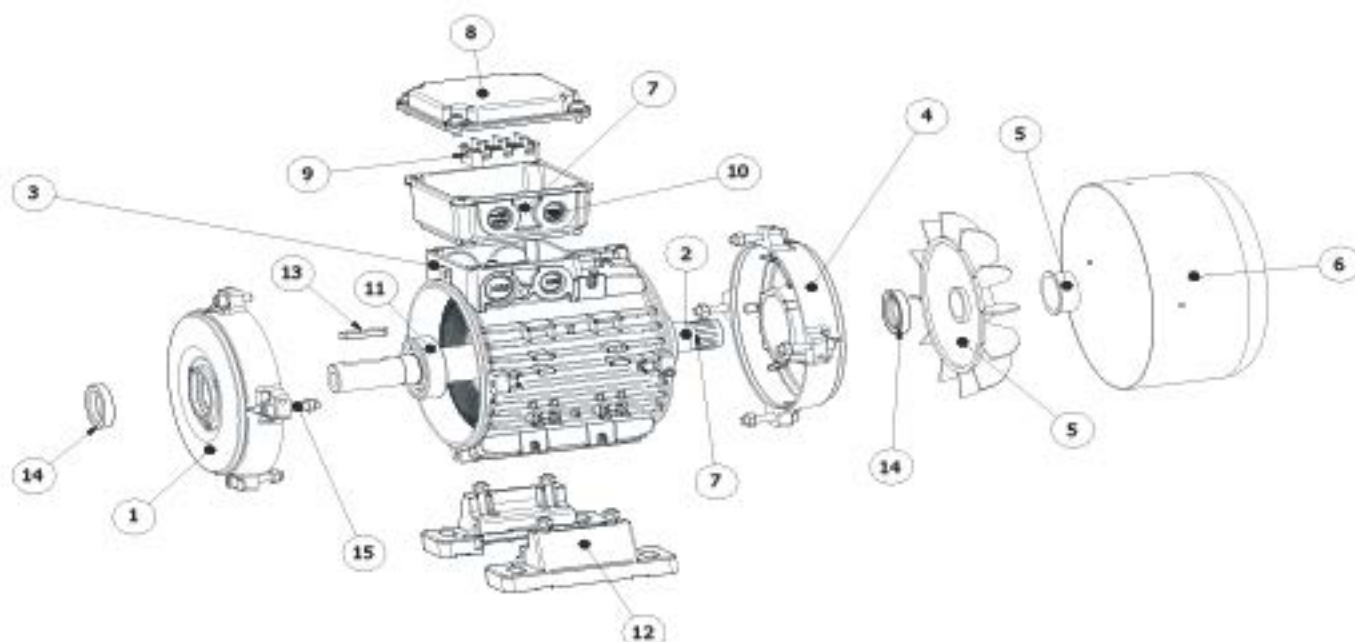
Repairs must be made regarding the rules as define in EN 60079-19 standards.

These repairs can only be done under the control or agreement with RAELE Motori Elettrici by a repair shop designed by RAELE or a recognized laboratory.

In case these rules are not respected, RAELE liability is released.

8.2 List of spare parts

All motors components must be replaced by original spare parts. In these cases please contact RAELE directly and give the serial number of the motor so to ask the authorization to repair the motor too.



1	DRIVE END SHIELD	6	FAN COVER	11	BALL BEARINGS
2	SHAFT WITH ROTOR	7	TERMINAL BOX	12	MOTOR FEET
3	FRAME	8	TERMINAL BOX COVER	13	FLANGE B14 (or B5)
4	NO-DRIVE END SHIELD	9	TERMINAL BLOCK	14	ASY ANGULAR BEARING
5	COOLING FAN	10	CABLE GLAND	15	TIE RODS (quality 4.8)

9.Warranty

The warranty period expends to 12 months from the motor shipment date, unless different agreements are recorded in written .



СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ЕАСС: RU C-ELAA87.00023/21

Серия: 00 № 0344040

Орган по сертификации

Орган по сертификации в соответствии с требованиями к оборудованию
 ООО «ИЗМЕРИТЕЛЬНЫЕ СИСТЕМЫ» (ООО «ИЗМЕРИТЕЛЬНЫЕ СИСТЕМЫ») - адрес места нахождения юридического лица: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10. Адрес места осуществления деятельности в области сертификации: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10. Адрес места осуществления деятельности в области сертификации: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10. Адрес места осуществления деятельности в области сертификации: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10.

Заявитель

Общество с ограниченной ответственностью «Бумажная Печать»
 Адрес места нахождения юридического лица и адрес места осуществления деятельности: Россия, 196656, Санкт-Петербург, город Колпино, ул. Фадеева, д. 21, пом. 48. ОГРН: 1187847122238. Телефон: +7 (812) 951 85-86. Адрес электронной почты: info@bumpaper.ru

Изготовитель

RAEL Motor Electric S.r.l.
 Адрес места нахождения юридического лица и адрес места осуществления деятельности по изготовлению продукции: Via Per Palermo 71, 15077 Piacenza (AL), Италия.

Продукция

Вычислительные электрические цепи A0-PE, B1, B1.34, M1A и M1A1, TUBE с Eu-маркировкой согласно приложению (см. блок № 005097, 005098, 005099, и соответствие с которыми изготовлены изделия) - см. приложение, блок № 005096, Серийный номер

КОД ТН ВЭД ЕАЭС: 8501 8000, 8501 52 200, 8501 40 200, 8501 40 800

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ

ТР ТС 012/2011 «О безопасности оборудования для работы во взрывоопасных средах»

СЕРТИФИКАТ СООТВЕТСТВИЯ ВЫДАН НА ОСНОВАНИИ

Протокол испытаний № 3903871-Т от 25.10.2021, № 390412021-Т от 26.10.2021. Испытательная лаборатория испытывает устройство Автоматический выключатель электрический «Бумажная Печать» и электро-вычислительный комплект оборудования для вычислительных цепей M1A Ex TB (аттестат № РОСС RU.0001.21H0119 выдан 16.10.2015). Акт анализа основных параметров № 43-2A/21 от 25.10.2021. Орган по сертификации в соответствии с требованиями к оборудованию «ИЗМЕРИТЕЛЬНЫЕ СИСТЕМЫ» (ООО «ИЗМЕРИТЕЛЬНЫЕ СИСТЕМЫ») - адрес места нахождения юридического лица: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10. Адрес места осуществления деятельности в области сертификации: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10. Адрес места осуществления деятельности в области сертификации: Россия, 440004, Нижегородская область, г. Нижний Новгород, ул. Мухоморова, д. 10, стр. 1, офис 10.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Перечень стандартов, применяемых на оборудовании для обеспечения требований ТР ТС 012/2011, см. приложение, блок № 005096. Указан в приложении список в записке о соответствии документации. Минимальный срок службы - 12 лет. Акт анализа основных параметров проекта декларации (документов) прилагается.

СРОК ДЕЙСТВИЯ С 08.11.2021 ПО 07.11.2026

Протокол испытаний (протокол испытаний)
 Акт анализа основных параметров (акт анализа основных параметров)
 Серийный номер (серийный номер)



Подпись: Александр Сергеевич
 Подпись: Николай Николаевич

CERTIFICATE

EU-TYPE EXAMINATION CERTIFICATE

Equipment or Protective System intended for use
 in potentially explosive atmospheres
 Directive 2014/54/EU

EU-Type Examination Certificate number

TUV IT 12 ATEX 000 X Rev.3

Equipment or Protective System: Electrical motor Series MX (CAT2)

Manufacturer: RAEL motor electric S.r.l.

Address: Via per Palermo 71
15077 Piacenza (AL) - ITALY

This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

TUV Italia, notified body no. 0940 in accordance with Article 17 of Directive 2014/54/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex I to the Directive.

The examination and test results are recorded in confidential report no. R 12 EX 090

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018, EN IEC 60079-1:2015/A1:2018, EN 60079-31:2018

If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

The marking of the product shall include the following:

Ex II G Ex Ib BC T6...T4 Gb
 Ex II G Ex Ib BC T6...T4 Gb

This certificate may only be reproduced in its entirety and without any change, schedule included.

Issue date: 19P May 2023



Accredia is a member of the European Association of Accredited Bodies (EAAB) and is accredited by the Italian Ministry of Economic Affairs.

TUV Italia S.r.l.
Notified body N° 0940

Signature: Alberto Carli
 Industry Service - Real Estate & Infrastructure
 Managing Director

This notice has been submitted to the competent authorities for the purpose of registration in the public register of notified bodies. The document is not valid without this registration and sign. The notice reference code is: 000000000.

page 1 of 4

CERTIFICATE



TYPE EXAMINATION CERTIFICATE

Equipment or Protective System intended for use
 in potentially explosive atmospheres
 Directive 2014/54/EU

Type Examination Certificate number

TUV IT 12 ATEX 000 X Rev.3

Equipment or Protective System: Electrical motor Series MX (CAT2)

Manufacturer: RAEL motor electric S.r.l.

Address: Via per Palermo 71
15077 Piacenza (AL) - ITALY

This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

TUV Italia certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex I to the Directive.

The examination and test results are recorded in confidential report no. R 12 EX 090

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018, EN IEC 60079-1:2015/A1:2018, EN 60079-31:2018

If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

This TYPE EXAMINATION CERTIFICATE relates only to the design, construction and tests of the specified equipment or protective system in accordance with the Directive 2014/54/EU. Further requirements of the Directive apply to the manufacturing process and supply of the equipment or protective system. These are not covered by this certificate.

The marking of the product shall include the following:

Ex II G Ex Ib BC T6...T4 Gb
 Ex II G Ex Ib BC T6...T4 Gb

This certificate may only be reproduced in its entirety and without any change, schedule included.

Issue date: 19P May 2023



TUV Italia S.r.l.

Notified body N° 0940

Signature: Alberto Carli
 Industry Service - Real Estate & Infrastructure
 Managing Director

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REPORT NO. R 12 EX 090



BrakEx Series Electrical Motors

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1.STANDARDS

NAME	EU-CENELEC	INTERN.-IEC
Rotating electrical machines Part 1: Rating and performance	EN 60034-1	IEC 60034-1
Rotating electrical machines Part 2-3: Specific test methods for determining losses and efficiency of converter-fed AC motors	EN 60034-2	IEC 60034-2
Rotating electrical machines Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification	EN 60034-5	IEC 60034-5
Rotating electrical machines Part 6: Methods of cooling (IC Code)	EN 60034-6	IEC 60034-6
Rotating electrical machines Part 7: Classification of types of construction, mounting arrangements, and terminal box position (IM Code)	EN 60034-7	IEC 60034-7
Rotating electrical machines Part 9: Noise limits	EN 60034-9	IEC 60034-9
Rotating electrical machines Part 12: Starting performance of single-speed three-phase cage induction motors	EN 60034-12	IEC 60034-12
Rotating electrical machines Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity	EN 60034-14	IEC 60034-14
Dimensions and output series for rotating electrical machines Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080	EN 50347	IEC 60072-1
Degrees of protection provided by enclosures (IP Code)	EN 60259	IEC 529
Explosive atmospheres Part 0: Equipment - General requirements	EN IEC 60079-0	IEC 60079-0
Explosive atmospheres Part 1: Equipment protection by flameproof enclosures "d"	EN 60079-1	IEC 60079-1
Explosive atmospheres Part 7: Equipment protection by increased safety "e"	EN IEC 60079-7	IEC 60079-7
Explosive atmospheres Part 31: Equipment dust ignition protection by enclosure "t"	EN 60079-31	IEC 60079-31



2.TOLERANCE

3. ADDITIONAL INFORMATION ON INVERTERS

Description	Tolerance
Distance between feet securing holes (front view)	±1 mm
Distance between feet (front view)	+2%
Motor diameter (without terminal box)	+2%
Distance between feet securing holes (side view)	±1 mm
Distance between the shaft shoulder and the first feet securing hole	±3 mm
Shaft diameter	Ø11-28 mm: j6 Ø32-48 mm: k6 Ø ≥55 mm: m6
Length of the shaft from the shaft shoulder	Ø < 55mm: -0,3 mm Ø > 60mm: +0,5 mm
Keyway width	h9
Distance between the key top and the bottom of the shaft	+0,2 mm
Distance between the shaft axis and the bottom of the motor feet	Hs250 mm: -0,5 mm Hz280 mm: -1 mm
Distance between the top of the terminal box and the bottom of the motor feet	+2%
Feet mounting holes diameter / width of the feet buttonholes	+3%
Motor length (with 1 driveshaft end)	+1%
Distance between the flange mounting holes centers	± 0,8 mm
Flange shoulder diameter	Ø < 230 mm: j6 Ø ≥ 250 mm: h6
Flange external diameter	± 1 mm
Distance between the shaft shoulder and the flange shoulder	± 3 mm
Flange mounting holes diameter or thread diameter	+3%
Distance between shaft shoulder and flange shoulder, with locked bearing	± 0,5 mm
Motor weight	-5% to +10%

Lower Speed limit	-80% Rated speed	Upper speed limit	+74% Rated speed (Maximum 3600rpm)
Current	Rated current	Rated current	Rated current
Lower Voltage limit	-80% rated voltage	Upper voltage limit	+74% rated voltage
Pulse frequency	≥5 kHz		

If RAE-Ex motors are used with converters, in addition to the general selection criteria limit values:

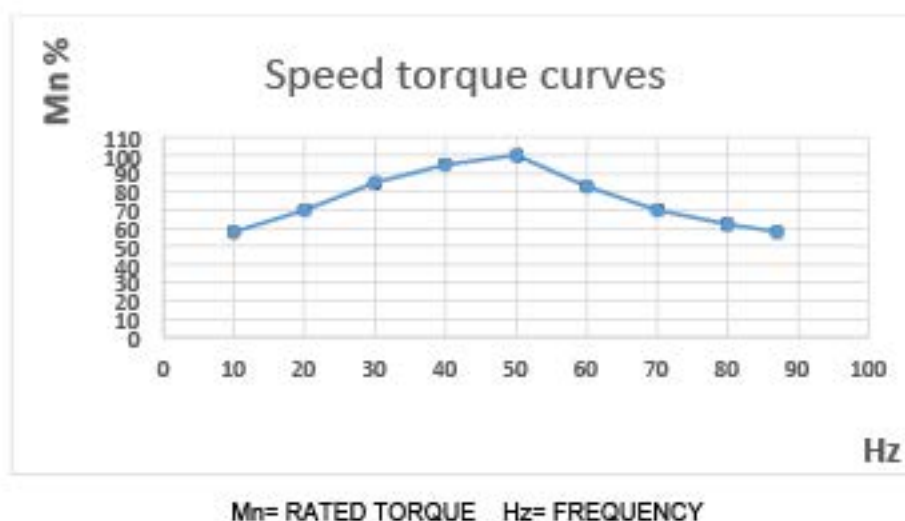
- Rated voltage: ≤800V,
- Peak voltage: ≤1kV
- Voltage gradients: < 2,1 kV /1μs
- "K=V/F" or "vector" driving algorithm

Table 1: Speed/Current/Voltage limits and minimum inverter requirements for inverter-duty motors

- Motors powered by inverter have a voltage (or current) which is not purely sinusoidal. This leads to an increase in losses, vibration, noise, and a different temperature rise.
- Possibility of spikes is connected to the value of the converter power supply voltage and the length of the motor power cable. To limit the phenomenon, it's advisable to use specific filters connected between the converter and the motor (mandatory for motor power cables over 45 mt). All the motors are equipped as standard with a reinforcing insulating film between phases to protect against the voltage peaks.
- The correct grounding of the motor and the driven machine is very important to avoid voltage and stray currents in the bearings. To prevent the current circulation in the bearing if the motor it is not equipped with an insulated bearing, use a proper filter to reduce the high frequency harmonic voltage above 50kHz. It's mandatory connect thermal probes to the converter to safeguard the motor from the overheating which could be generate by a misuse. For inverter power supply the switching frequency must be higher than 5kHz (PWM type), output frequency range 10-87Hz.



- If the motor is used at frequencies lower than 50Hz, please refer to the following graph for the maximum percentage of torque load admitted.



4.ELECTRICAL AND THERMAL PROTECTIONS

Protections must be chosen based on the specific running conditions, according to standards EN 60079-14:2014 and EN 61241-14:2011. For the motor line, the following thermal protection selection is mandatory to ensure a proper safety margin:

Temperature class	T5 (max. outer temp. 100°C)	T6 (max. outer temp. 85°C)
Thermal protector temp. threshold	90° C ±5° C	70° C ±5° C

The temperature threshold of the thermal protectors is chosen according to the specific thermal tests carried out. This will protect the motor against any over-temperature generated by low-quality inverters (poor waveform) / incorrect inverter choice (refer to table 1 for the minimum requirements).

EXTERNAL PROTECTIONS:

- Protection against overcurrent and short-circuits; this protection can be made with a magnetothermal circuit breaker or with fuses; these must be calibrated on the motor current.
- Protection against overload by thermal relay that controls a power line contactor upstream the motor.
- Depending to the application requirements, protection against excessive speed of the electric motor, for example if the mechanical load may drive the electric motor itself and thereby create a hazardous situation.
- If special conditions or synchronized operation with other machines or parts of machines require it, protection against power failures or dips by means of a minimum voltage relay that controls an automatic power breaking switch.

INTERNAL PROTECTIONS:

The electrical protections on the motor power supply may not be sufficient to protect against overloads. The inverter-duty motors have a built-in protection(s) on the windings, mandatory to be connected to a proper safety device. The following probes are used:

- PTO bimetallic probe (normally closed electromechanical device that becomes open when the threshold temperature is reached). The reset of this cut-out must be performed manually only, and not automatically. The user, in compliance with the norms, must use a tripping relay out in compliance with IEC 61508 standard (Fail Safe type).
- PTC thermistor (device that suddenly changes positively its resistance when the threshold temperature is reached).



5. MOTOR NAMEPLATE

RAEL MOTORI ELETTRICI		Via del Robusto 11 15077 Piacenza (AL) ITALY +39 0521 71383 www.rael.it		Prodotto in Italia		CEI 20 ATEX 040X 0722	
PT	N°	Year		20			
Type	BX	Cl.	S	Kg			
VΔ/ Y±5%	Hz	kW	A	rpm	cosφ	IΔ/IN	
Brake V	VDC/B. Torque	Nm	T. Cable	°C			
DO NOT OPEN WHILE ENERGIZED Ta - °C + °C IP							
II 2G Ex db Ex db							

RAEL MOTORI ELETTRICI		Via del Robusto 11 15077 Piacenza (AL) ITALY +39 0521 71383 www.rael.it		Prodotto in Italia		IECEX CES 23.xxxx X	
PT	N°	012345		Year		2023	
Type		Cl.	F	S	Kg		
VΔ/ Y±5%	Hz	kW	A	rpm	cosφ	IΔ/IN	
Brake V	VDC/B. Torque	Nm	T. Cable	°C			
DO NOT OPEN WHILE ENERGIZED Ta -xx °C + xx °C IP xx							
Ex db eb IIX Tx Gb							

The BrakEx nameplate is filled with all the information needed for a proper identification of the motor, as follows:

- PTC: breaking temperature of the thermal protector
- N°: serial number
- Year: manufacturing year
- Cl: winding insulation class
- S: service
- Kg: mass of the motor
- V: power supply voltage, delta/star
- Hz: power supply frequency
- kW: rated output power
- A: current absorption, at rated voltage and output power
- Rpm: motor speed at rated power
- Cosφ:
- IΔ/IN:
- Brake V: brake power supply voltage
- Braking Torque: the torque [Nm] given by the brake
- Ta: environmental working temperature range [°C]
- IP: protection against fluids/dust penetration
- Screw quality of the tightening screws, always reported for "db" motors, eventually on additional / adhesive nameplate.

Moreover, the nameplate includes the CE marking, ATEX and IECEX certificate numbers, and manufacturer's data.



6. NAMEPLATE DATA BELONGING TO SAFETY

0722	European Standard conformity marking: Code number of the certification body that carried out the production system quality assessment *
	Conformity to ATEX 2014/34/UE standard and associated technical notes *
II	Explosion Group (Mines excluded) *
2	Category *
G	Explosive atmosphere type: gases, vapours, fogs *
D	Explosive atmosphere type: dusts *
Ex	Marking for the safety devices that meet one protection mode
db	Explosion-proof housings
db o eb	Explosion-proof terminal box / Enhanced safety terminal box
tb	Zone 20 (and zone 21) dust-protection mode motor
IIB / IIB+H ₂ / IIC	Gas group
IIIC	Combustible dusts group - Conductive dusts
T4 - T5 - T6	Motor temperature rating suitable for the corresponding temperature class of the flammable media (gas) for "G" execution
T85°C	Motor temperature rating suitable for the corresponding temperature class of the flammable media (dust) for "D" execution
AB xx ATEX yyy	AB: name of the laboratory that issued the type certificate; xx: certificate release year; yyy: number of the type certificate
IECEX AB zzz	AB: name of the laboratory that released the certificate according to the IECEX scheme zzz: number of the type certificate
IPXX	Protection grade, to be reported on the nameplate for "D" type motors
°C amb	Environmental temperature range

*: data belonging exclusively to the product marking according to ATEX 2014/34/UE

Additional label, made of self-adhesive plastic, applied to the external of the motor, typically on the fan cover. This label has some important warning information:

WARNING
ATTENZIONE

Only for motor without thermal protection, wait 30 minutes before opening.
 Solo per motori senza protezione termica, attendere 30 minuti prima di aprire.
 To be energized with cable suitable for 80°C or greater.
 Da collegare con cavo adatto per temperatura di 80°C o superiore.
 Only motors suitable for converter / Solo motori idonei per inverter
 Minimum switching frequency 0.5 kHz / Frequenza minima di switch 0.5 kHz
 5-50 Hz (when allowed / quando è consentito) 25-50 Hz
 Constant torque / Coppia costante Constant torque / Coppia costante
 Variable power / Potenza variabile Variable power / Potenza variabile
 51-87 Hz
 Constant power / Potenza costante
 Variable torque / Coppia variabile



7. MOTOR TEMPERATURE CLASS FOR GAS AND DUST AND AMBIENT TEMPERATURES

Motor type	Maximum ambient temperature		
	+40°C	+50°C	+60°C
	Temperature Class (Gas) / Surface Temperature (Dust)		
BX 63 – 2 poli – Pmax. 0.25kW	T6 / T85°C	T6 / T85°C	T6 / T85°C
BX 71 – 2 poli – Pmax. 0.55kW			
BX 80 – 2 poli – Pmax. 1.10kW			
BX 90 – 2 poli – Pmax. 2.20kW			
BX 100 – 2 poli – Pmax. 3.00kW			
BX 112 – 2 poli – Pmax. 4.00kW			
BX 63 – 4 e + poli – Pmax. 0.18kW	T5 / T85°C		
BX 71 – 4 e + poli – Pmax. 0.37kW			
BX 80 – 4 e + poli – Pmax. 0.75kW			
BX 90 – 4 e + poli – Pmax. 1.50kW			
BX 100 – 4 e + poli – Pmax. 3.00kW			
BX 112 – 4 e + poli – Pmax. 4.00kW			

8. SPECIAL WORKING CONDITIONS

Due to protection "Ex db", "Ex db eb" and "Ex tb". Flameproof joints must be kept clean. If any screw, nut, or tie rod has to be replaced, please contact the producer to obtain proper specifications or spare parts.

Tightening torque:

Thread	M4	M5	M6	M8	M10
Torque [Nm]	2	3.2	5	12	18

Thermal protectors applied on the winding ends (3 maximum) and upon request on the brake body (1 maximum); Thermal protectors are optional, except for the following motors:

- Variable speed motors, powered by inverters.
- 3 phase motors, twin speed, constant torque / quadratic torque.
- Single phase motors.
- Motor without fan (IC 410) and with external cooling device (IC 416).

When a thermal protector is installed, it must be connected to a proper safety device in order to force the motor to turn off once the target critical temperature is reached; the safety device rearming shall not be automatic. The end user, according to the 2014/34/UE requirements, shall:

- Install a safety circuit breaker conformal to IEC 61508

Or

- Install a fail-safe circuit breaker capable to switch automatically to a "safe" position if the thermal limit is reached.

Temperature class	T5	T8
Thermal prot. Temp.	90°C±5°C	70°C±5°C

If the motor is not equipped with a thermal protector, the user shall install a thermal protection unit on the outside of the motor.

If the motor is fitted with cable, the end of the cable, not connected to the motor, must be connected in a safe area, or using an explosion proof connection box according to the protection mode required by the area.

- The end user must keep the motor clean from dust and particles to avoid deposits on the unit. The thickness has to be always lower than 5mm.

- If the motor is connected to other parts or devices that may produce sparks or surface heating, all the risks have to be addressed and considered according to 2014/34 EU.
The end user has to follow the requirements of the equipment protection mode for the specific dangerous zone.

9. DESCRIPTION

BrakEx series electrical motors are self-braking motors. All the parts needed for the motor to work are already fitted on the motor (on request). Multiple control options are available, please contact the Producer for more info.

All the brakes are DC and it is possible to drive the brake independently by the motor and/or using a voltage rectifier that can be installed by RAE. The motor is connected to the power supply with a 6 poles terminal block, or an 8 poles terminal block (where 2 are dedicated to the connection of the thermal protector). If the motor is not configured to drive the brake automatically, a separate terminal block for the voltage rectifier is provided. If a direct DC power supply to the brake is requested, a dedicated terminal block is installed, and a dummy unit is fitted into the terminal box. The dummy unit shall not be removed. Multiple mounting, voltage and thermal protector options are available.

The BrakEx motors do not need external cooling units on standard working conditions. The onboard fan is in charge of both brake and motor cooling, even if some heat is generating due to the friction. As an option, a forced ventilation device can be added, using a second motor that is driving the cooling fan.

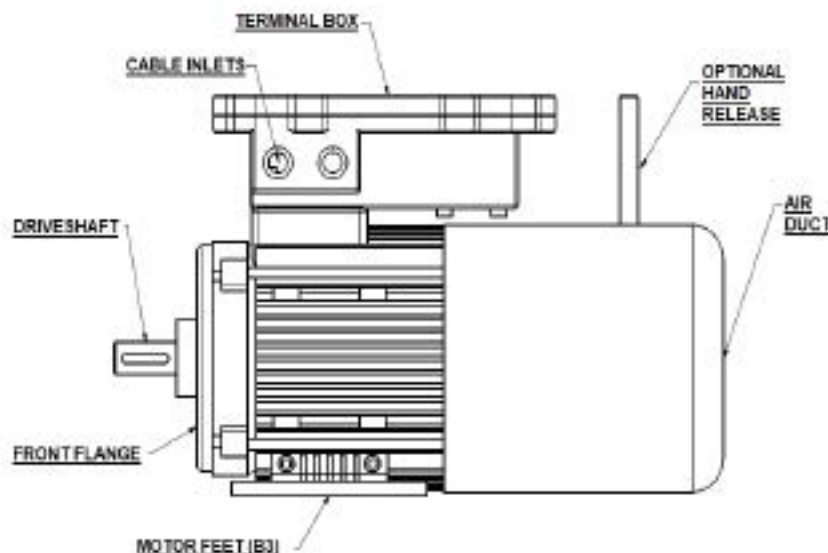
The most common use of self-braking motors is parking brakes. If any kind of motor drag is expected or requested during the braking operation, please be sure that the torque applied to the motor is compatible with the braking torque.

An external hand-release device is available on request.

The available windings are single phase, 3 phases (Inverter Duty also) and dual-speed 3 phases.

10. MOTOR COMPONENTS

The motors are described as follows:

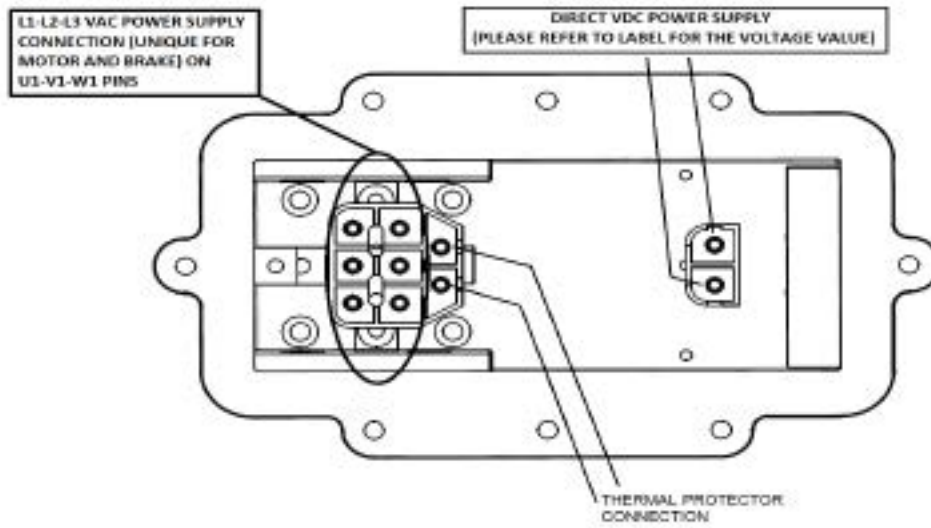


A set of gaskets and sealing devices are used to reach the IP66 protection. For vertical installation, it is available a fan cover with rain cover. The motors can be painted and equipped with stainless steel hardware for marine environments or extremely cold environments.

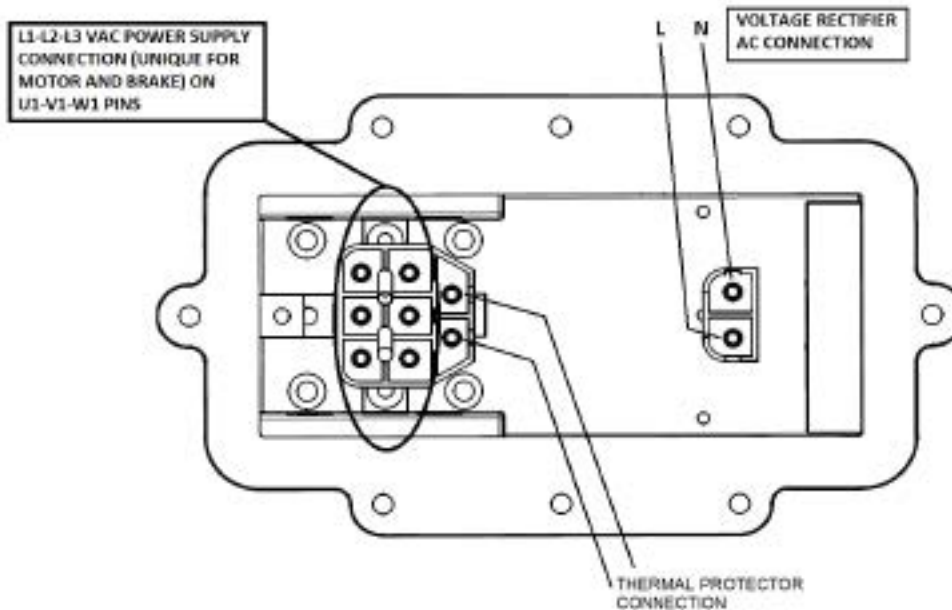


11. TERMINAL BOARD(S)

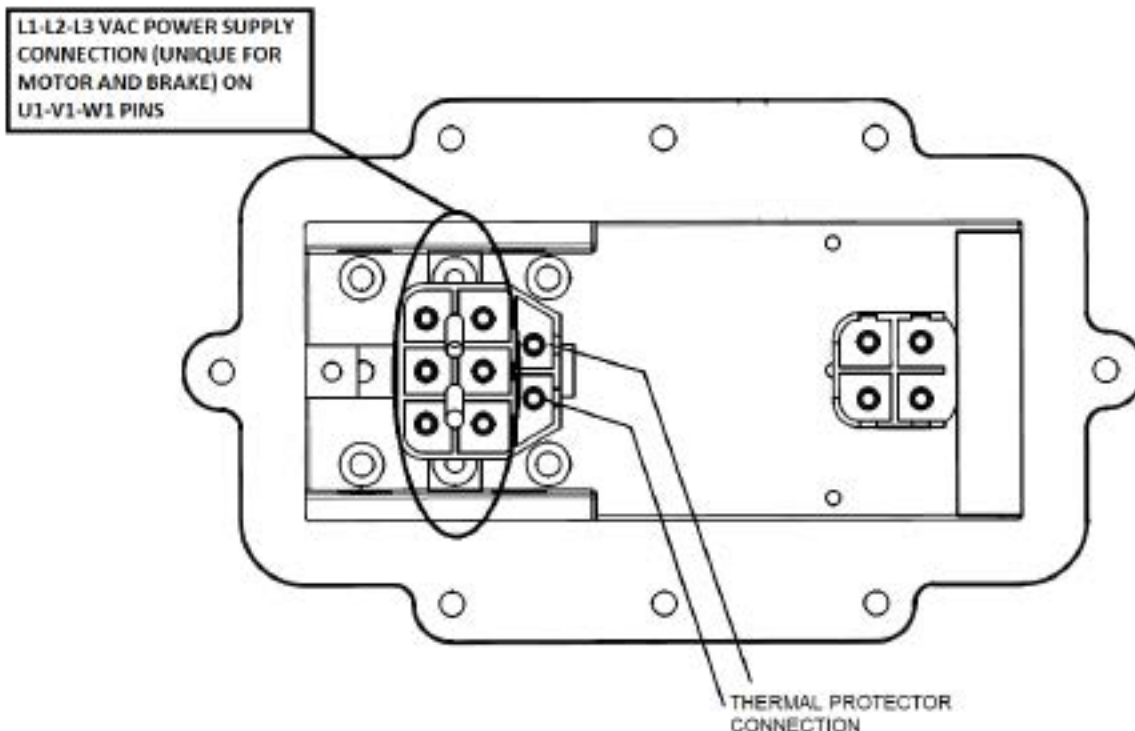
MOTORS WITHOUT VOLTAGE RECTIFIER (SEPARATE VDC POWER SUPPLY)



MOTORS WITH VOLTAGE RECTIFIER (SEPARATE VAC POWER SUPPLY FOR THE BRAKE)



MOTORS WITH VOLTAGE RECTIFIER CONFIGURED FOR AUTOMATIC BRAKE OPERATION



12. BRAKE SPECIFICATIONS

The brakes fitted into the BrakEx motor line are always DC power supplied. The standard voltage is 105VDC. If the motor is not equipped with a voltage rectifier, a plastic dummy is fitted into the terminal box.

Size	63	71	80	90	100	112	112HD
Torque [Nm]	10	10	15	20	40	40	75
Power consumption [W] @105VDC	31	31	30	41	55	55	77
Current consumption[A] @105V	0,3	0,3	0,29	0,39	0,5	0,5	0,73
Coil resistance [Ω] at 105VDC	348	348	362	268	211	211	143

Please note:

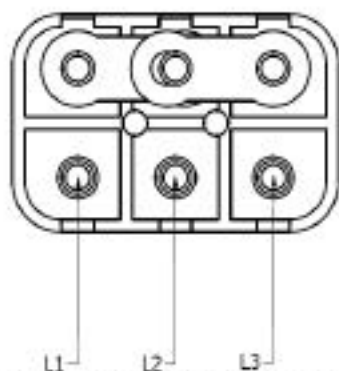
- All the data has to be intended $\pm 10\%$.
- The torque can be adjusted from the factory. If a specific torque is required, contact the Producer
- If the brake was requested with a different voltage, the values have to be calculated for the specific value.

13. PUTTING INTO SERVICE

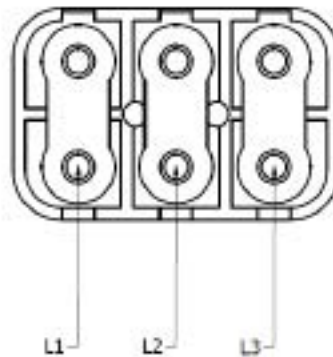
- **STANDARD MOTORS:** the connections must comply with the info provided in this manual. NEVER change the brake connections.
- **INVERTER-DUTY MOTORS:** Always refer to the information provided into this manual.
- **Motors equipped with heaters:** connect the free wires according to nameplate voltage specifications.

14. CONNECTING DIAGRAMS

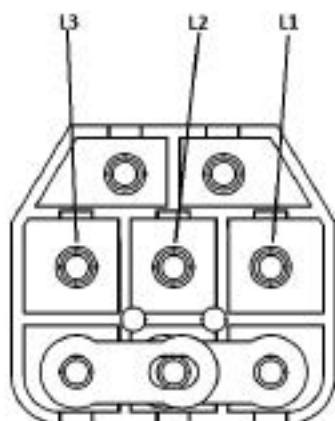
The connection has to be carried out by qualified Personnel. Check insulation first. Follow the pictures reported:



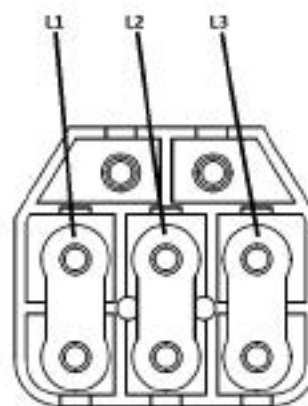
Star connection, without thermal prot.



Delta connection, without thermal prot.

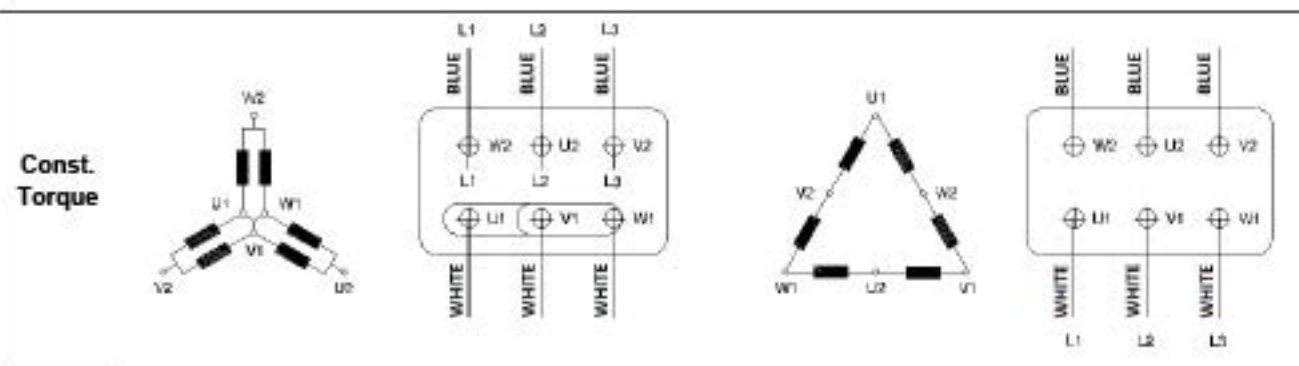


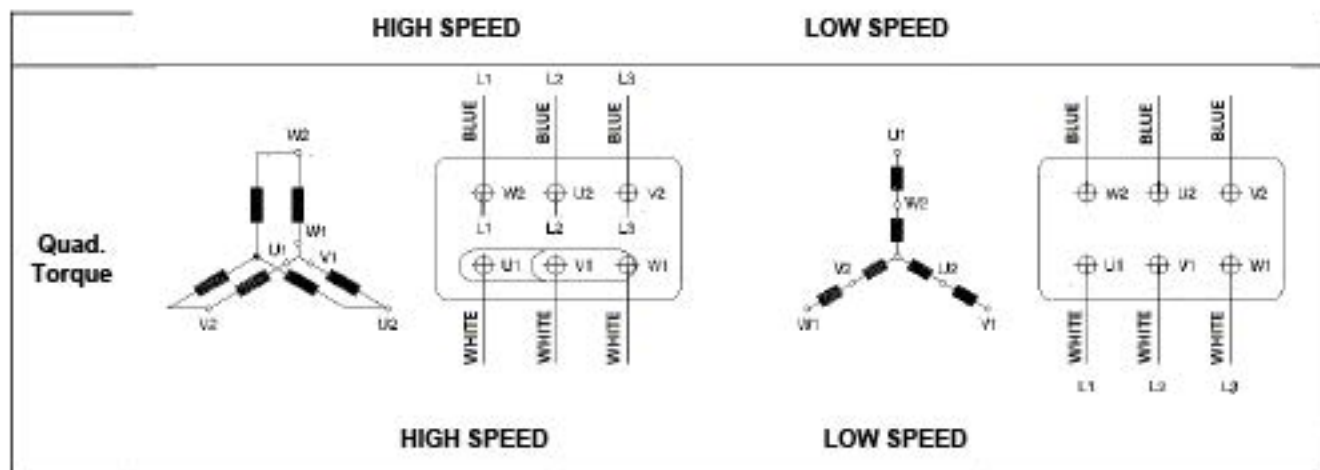
Star connection, with thermal prot.
(Always use the U1-V1-W1 pins)



Delta connection, with thermal prot.
(Always use the U1-V1-W1 pins)

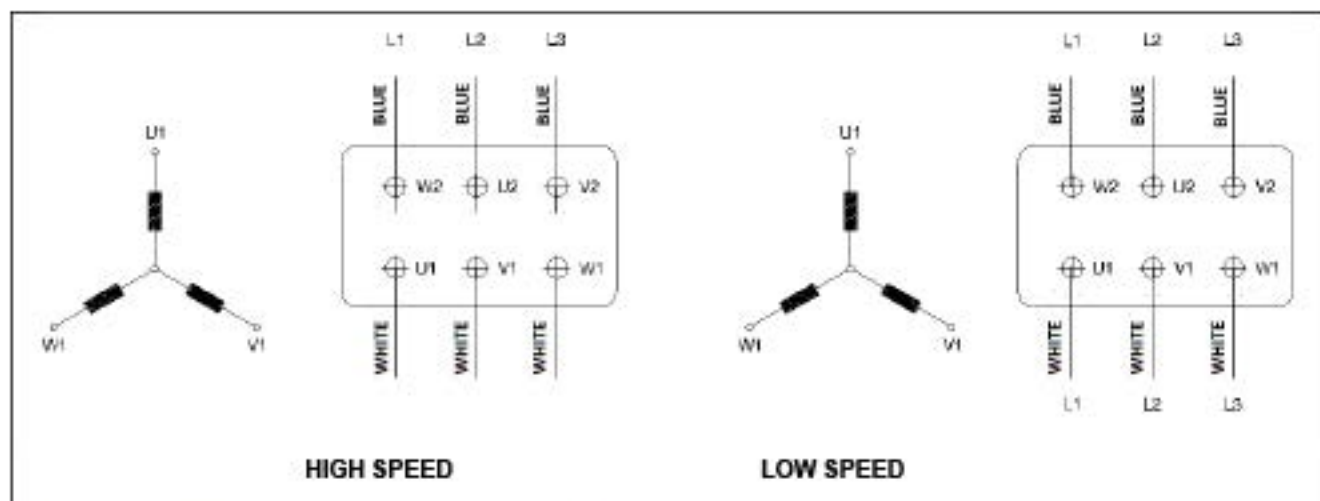
Three phase 2 speeds – Dahlander Connection - 2/4 - 4/8 poles





Note: the blue wires can be replaced with black ones

Three phase 2 speeds – 2 separate windings - 4/6 - 6/8 poles



Note: the blue wires can be replaced with black ones

Ex db motors have to be fitted with cable inlet according EN IEC 60079-1 (IEC 60079-0). The available inlet threaded holes on the terminal box for the cable glands are 4 (maximum), M20x1,5 threaded (6H class, ISO 968-I/III). The standard motor version has 1 of 4 cable inlets opened. The cable inlets thread spec. is M20x1,5

Motors with thermal protector have 2 cable inlets opened.

Motors with thermal protector and dedicated line to power the brake, are available either with or without a 3rd cable inlet open.

If the cable is not certified with the motor, or if it is chosen by the customer, it must be minimum 3 meters long. This is not applied to "de" motors or to motors where a "sealed" certified cable gland is used.

To choose a cable gland, please note that:

- Ex db motors - cable glands according to EN IEC 60079-1 (IEC 60079-0)
- Ex db eb motors - cable glands according to EN IEC 60079-7 (IEC 60079-7)
- Ex tb motors - cable glands according to EN 60079-31 (IEC 60079-31)

If a different thread for the cable gland is needed, it is allowed the use of adapters, only if conformal to EN IEC 60079-0 (IEC 60079-0), EN 60079-1 (IEC 60079-1), EN IEC 60079-7 (IEC 60079-7), or EN 60079-31 (IEC 60079-31), according to the protection grade listed before.

Any unused cable inlet hole must be sealed with a certified plug conformal to the protection grade of the motor.

Tightening torque for the terminal board nuts:

- M4: 2,0 Nm
- M5: 3,2 Nm

15.CONNECTION TYPES

1) dado - nut 2) rondella piana - flat washer 3) piastra connessione - connecting plate 4) terminali - terminals	1) dado - nut 2) rondella elastica - spring washer 3) rondella piana - flat washer 4) piastra connessione - connecting plate 5) terminali - terminals
"Ex db" - motor and terminal box "db" The contact has to be effective and reliable. The connections must be safe, so that no parts at different electric potential can come into contact.	"Ex db eb" - "db" motors "eb" terminal box Increased safety terminal board ("eb") as stated into EN IEC 60079-7 (IEC 60079-7).

According to EN IEC 60079-7 (IEC 60079-7) standard, the electrical connections to external circuits must comply with all the indications regarding the terminal securing and the respect of the air gaps and distances between surfaces as reported into chapters 4.1, 4.2, 4.3, 4.4, 4.5.

16. GROUND CONNECTION

The BrakEx motors are equipped with ground connections both into the terminal box and on the motor body.

Ground connection cable	Connection wire
= S	$S < 25 \text{ mm}^2$
25	$25 \text{ mm}^2 \leq S \leq 50 \text{ mm}^2$
$\geq 0,5 \cdot S$	$S > 50 \text{ mm}^2$

17. INVERTER DUTY MOTORS

All the inverter duty motors are equipped with a thermal protector device. Always connect the thermal protector to a proper power breaker device. The device must be a manual re-arming type.

Please note that the Inverter-duty motors are always designed with the brake powered independently from the motor, and from the inverter.

The frequency, speed, torque, and voltage limits information are attached to the specific order documentation.

18. COOLING SYSTEM

In the following, multiple cooling options are listed.

- SELF-COOLING MOTORS (IC 411)
- NOT-VENTILATED MOTORS (IC410)
- FORCED VENTILATION MOTORS (IC 416): An auxiliary motor is in charge of the forced ventilation, fitted to the fan cover of the main motor. The protection class of the auxiliary motor is equal or better than the class of the main motor. A control device inhibiting the main motor if the auxiliary is not running has to be fitted. In 21 and 22 areas, metallic / conductive plastic fan is used.



19. FLAMEPROOF JOINTS

The flameproof joints are maintenance-free.

Definition	Maximum air gap
Shaft flamepath	0,25mm
Control beams pathway (hand release)	0,10mm
Cylindrical joints	0,10mm / 0,15mm
Flat joints	gap <= 0,04mm

SAFETY NOTE: THE SERVICING / REPAIR OF EXPLOSION-PROOF ENCLOSURES MUST BE CARRIED OUT ONLY BY AUTHORIZED PERSONNEL, UNDERGOING A PRELIMINARY WRITTEN SPECIFIC AUTHORIZATION SUPPLIED BY RAE. ANY UNAUTHORIZED ACTION WILL LEAD TO WARRANTY VOIDING AND RELEASE OF LIABILITY OF RAE.

20. BALL BEARINGS

Bearings are self-lubricated for life. If a replacement is required (20000h for 2P, 40000h for 4-6-8P) contact the producer. The ball bearings are the same of the RL line, except for the BX80 size that is equipped with 1x6204-2Z and 1x6005-2Z.

21. SEALING DEVICES

The sealing devices are specifically designed for the BrakEx motors. The gaskets for shaft, motor frame and flanges are made of NBR70 rubber, C.O.T. -40°C to +100°C. The terminal box cover gasket is made of VMQ80, C.O.T. -60°C to +200°C.

22. MAIN COMPONENTS MATERIALS

Nameplate	Plated aluminium or stainless steel
Cable gland	Nickel plated brass or stainless steel
Screws	8.8 zinc plated steel (up to -20°C); A2 50 / A4 50 stainless steel from -20°C to -40°C)
Tie rods	4.8 (8.8 for 63 and 71 variants) zinc plated steel (up to -20°C); A2 50 / A4 50 stainless steel from -20°C to -40°C)
Fan cover	Zinc plated and/or painted steel
Fan	Thermoplastic polymer / aluminium
Rotor	Squirrel cage, aluminium die-cast
Shaft	C45 steel
Housing	46100 Aluminium alloy

23. MAINTENANCE

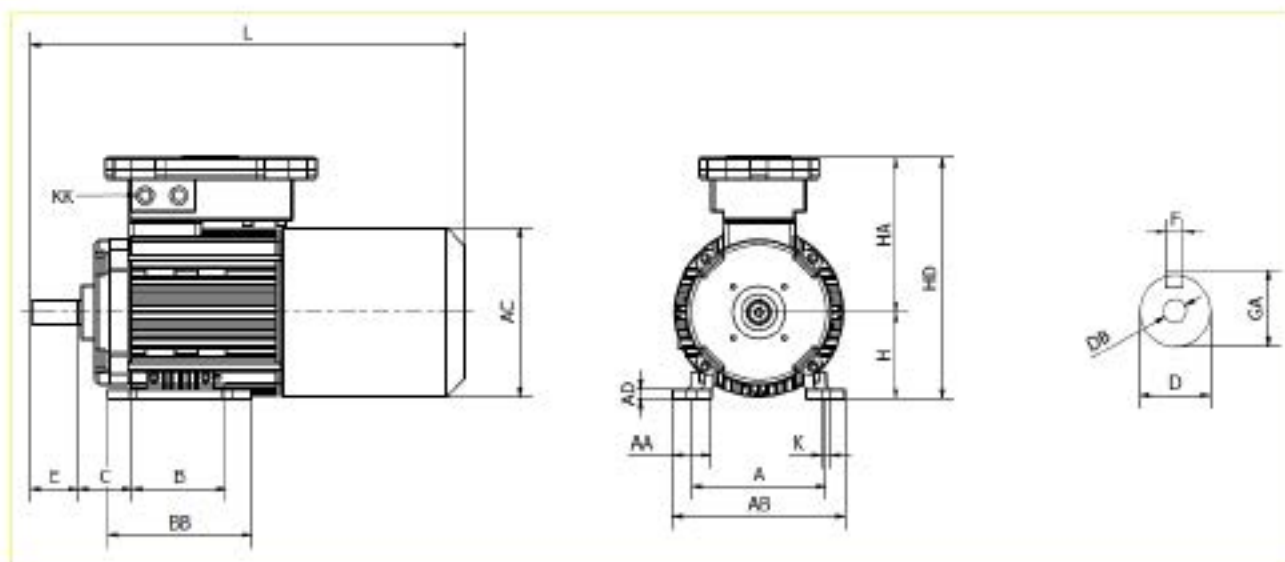
The BrakEx motors do not require any maintenance. The units must be kept clean and dry. If a sealing is missing or damaged, never turn on the motor. If the cooling fan is damaged, remove the motor from service and contact the Producer. The motor under normal working conditions can produce noise. It is normal, due to the brake disc that is free once the brake is on. If any liquid is seeping into the motor, remove it from the service and contact the producer. If the contamination is only on the external parts, dry the motor with a soft cloth. Never pour water or pressurized water on the motor for the cleaning.

24. MOTOR RECYCLING

Always remove the power before dismantling a motor.

- Winding: copper and iron
- Rotor: remove from the shaft and recycle separately
- Explosion proof housing: aluminium
- Terminal block, rectifier, wires and cable: electric/electronic devices
- Fan cover: iron
- Fan: plastic or metal
- Brake: electric/electronic device
- Braking hub: Iron
- Braking disc: composite
- Bearings: iron
- Sealing devices: rubber

25. OVERALL DIMENSIONS



Size	A	AA	AB	AC	AD	B	BB	C	K	KK	H	HA	HD	L	D	DB	E	F	GA
63	100	30	125	131	6	80	108	40	7	M20x1,5 (Up to 4)	63	149	212	357	11j6	M4	23	4	12,5
71	112	30	142	138	8	90	120	45	7	M20x1,5 (Up to 4)	71	149	220	365	14j6	M5	30	5	16,0
80	125	40	155	156	8	100	125	50	9	M20x1,5 (Up to 4)	80	157	237	395	19j6	M6	40	6	21,5
90S	140	40	180	176	10	100	150	56	9	M20x1,5 (Up to 4)	90	164	254	455	24j6	M8	50	8	27,0
90L	140	40	180	176	10	125	150	56	9	M20x1,5 (Up to 4)	90	164	254	455	24j6	M8	50	8	27,0
100	160	40	200	197	12	140	180	63	12	M20x1,5 (Up to 4)	100	185	285	535	28j6	M10	60	8	31,0
112	190	40	230	218	12	140	180	70	12	M20x1,5 (Up to 4)	112	193	305	565	28j6	M10	60	8	31,0

Please note that the dimension "L" is referred to standard BrakEx motors without hand release device, and with standard fan cover (the special rain covers will increase the overall length)

CESI

ISMES

IPPC

EGU

CEI 100
Via Industria 10
20134 Milano (Italy)
Tel: +39 02 57401
Fax: +39 02 57401
Email: info@cesi.it
www.cesi.it

Scheda di Conformità
CESI-ALEX

ACCREDITED
FOR THE
EUROPEAN UNION
CONFORMITY ASSESSMENT
BY THE
EUROPEAN COMMISSION

CERTIFICATE



EU-TYPE EXAMINATION CERTIFICATE

Equipment for Protection Systems intended for use
in potentially explosive atmospheres
Directive 2014/54/EU

EU-Type Examination Certificate number:

CESI 20 A TEX 040 X

Product: Three-phase and single-phase asynchronous motors with electrical leads
series BexTb, type Bx 40 + 112, supplied by motor

Manufacturer: RARE MOTORI ELETTRICI S.r.l.

Address: Via per Batarica, 71, 15077 Predosa (AL) - Italy

This Product and any acceptable variations thereto as specified in the side data to this certificate
and the documents mentioned in:

CEI, notified body n. 0122 in accordance with Article 17 of the Directive 2014/54/EU of the
European Parliament and Council of 16 January 2014, certifies that the Product has been found
to comply with the Essential Health and Safety Requirements relating to the design and
construction of equipment or protective systems intended for use in potentially explosive
atmospheres pursuant to Annex II of the Directive.

The examination and test results are recorded in an archive that is portable. CEI-CEI000003

Compliance with the Essential Health and Safety Requirements has been assessed by compliance
with:

EN IEC 60074-1:2018 EN 60074-1:2014 EN IEC 60074-7:2015/11:2018
EN 60074-21:2014

in respect of those requirements listed in Annex II of the Directive.

If the sign "X" is placed after the certificate number, it indicates that the Product is subject to
type test procedures for use in accordance with the schedule in this certificate.

This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and
test of the specified Product in accordance with the Directive 2014/54/EU. Further requirements
of the Directive apply to the manufacturing process and supply of the Product. These are not
covered by this certificate.

The marking of the Product shall include the following:

- Ⓐ IICG Ex d IIB T6, T5 Gb, or IICG Ex d IIB T6, T5 Gb, or
- Ⓑ IICG Ex d IIB+Gb T6, T5 Gb, or IICG Ex d IIB+Gb T6, T5 Gb, or
- Ⓒ IICG Ex d IIC T6, T5 Gb, or IICG Ex d IIC T6, T5 Gb, or
- Ⓓ IICG Ex d IIC T6 T5 Gb

This certificate may only be reproduced in its entirety and without any change, schedule included.
Date 02.02.2023 - Transmitted on 02.02.2023

Prepared: Valerio Geronzi
Verified: Alessandro Fabbri
Approved: Roberto Pizzi

Giuseppe Vito *Alessandro Fabbri* *Roberto Pizzi*

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IECEx Certificate
of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
For rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx CES 24 00014	Page 1 of 3	Certificate Issued:
Status:	Current	Issue No.:	0
Date of Issue:	2024-01-18		
Applicant:	RARE MOTORI ELETTRICI S.r.l. Via per Batarica 71 15077 Predosa (AL) Italy		
Equipment:	Three-phase and single-phase asynchronous motors with electrical leads series BexTb, supplied by motor or frequency converter. Models Bx 40, Bx 71, Bx 80, Bx 90, Bx 100, and Bx 112		
Optional accessory:			
Type of Protection:	Flameproof enclosure "d", increased safety "i", Dust ignition protection "T"		
Marking:	Bx d IIB T6, T5 Gb, or Bx d IIB+Gb T6, T5 Gb, or Bx d IIC T6, T5 Gb, or Bx d IIB T6, T5 Gb, or Bx d IIB+Gb T6, T5 Gb, or Bx d IIC T6, T5 Gb, or Bx d IIC T6 T5 Gb		
Approved for issue on behalf of the IECEx Certification Body:		Mirko BALAZ	
Position:		Deputy Head of IECEx CB	
Signature: (for printed version)			
Date: (for printed version)			

- This certificate and schedule may only be reproduced in full.
- This certificate is not transferable and remains the property of the issuing body.
- The status and validity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.



Certificate issued by:
CESI
Centro Ricerche e Sviluppo
SpA
Via Rubeana 104
20134 Milano
Italy

CESI

ADPE motors

Explosion proof electric motor
For Fuel dispensing application

RAEL motori elettrici, since its inception in the late 60s, has assembled more than a million of explosion proof electric motors for fuel dispenser sold all over the world.

We like to think of it not as a goal but as of a further step in a process of growth, during which we kept investing in new manufacturing processes and in developing new products to meet the increasing demand and expectations while remaining competitive on the global market.

This journey so far has given us the opportunity to offer today's manufacturers of fuel dispensing equipment a top quality electric motor specifically designed for their application.

Our current range of atex-iecex certified ad-pe motors, totally modernized, comprise single and three phase AC motor, aluminium body, SSR, fully embedded capacitors and centrifugal switch, to name a few, and last but not least are proudly made in Italy.

Main characteristic

Explosion proof motors according to European standards en 60079-0 and en 60079-1

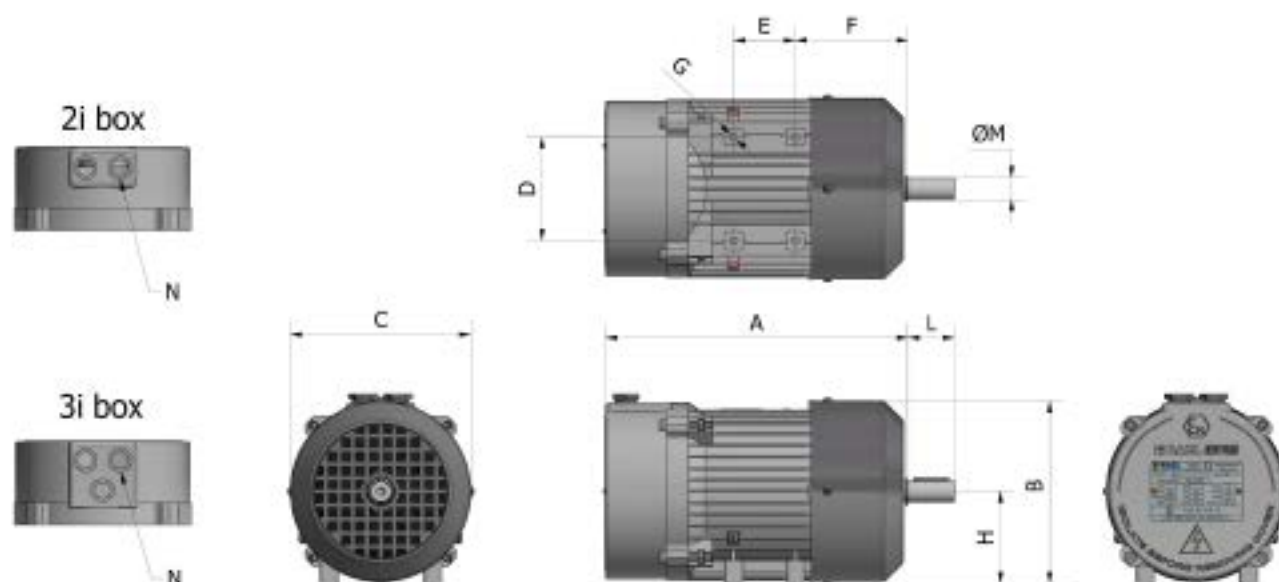
V80 – shaft Height 80mm:

- 3 phase asynchronous motor, squirrel cage
- IP55, s1 or s3 duty (non ventilated)
- SSR/power relay/contactors inside motor housing
- 2 or 3 cable entries
- Rc filters
- Thermal protection with automatic reset
- 2z or sealed 2rs self lubricated ball bearing

V90 – shaft height 90mm:

- Single phase or three phase asynchronous motor, squirrel cage
- IP55, s1 or s3 duty (non ventilated)
- SSR/power relay/contactors inside motor housing
- Start/run capacitor inside motor housing
- Centrifugal switch
- 2 or 3 cable entries
- Rc filters
- Thermal protection with automatic reset
- 2z or sealed 2rs self lubricated ball bearing
- Custom Non ventilated version suitable for vapour recovery pumps

V80 MOTOR – three phase



A	B	C	D	E	F	H	G	L	M	N
264	160	160	90	54	98	80	M8	30/40**	14/19**	M22

* All lengths +/- 1mm

** custom made also, max 19mm diameter

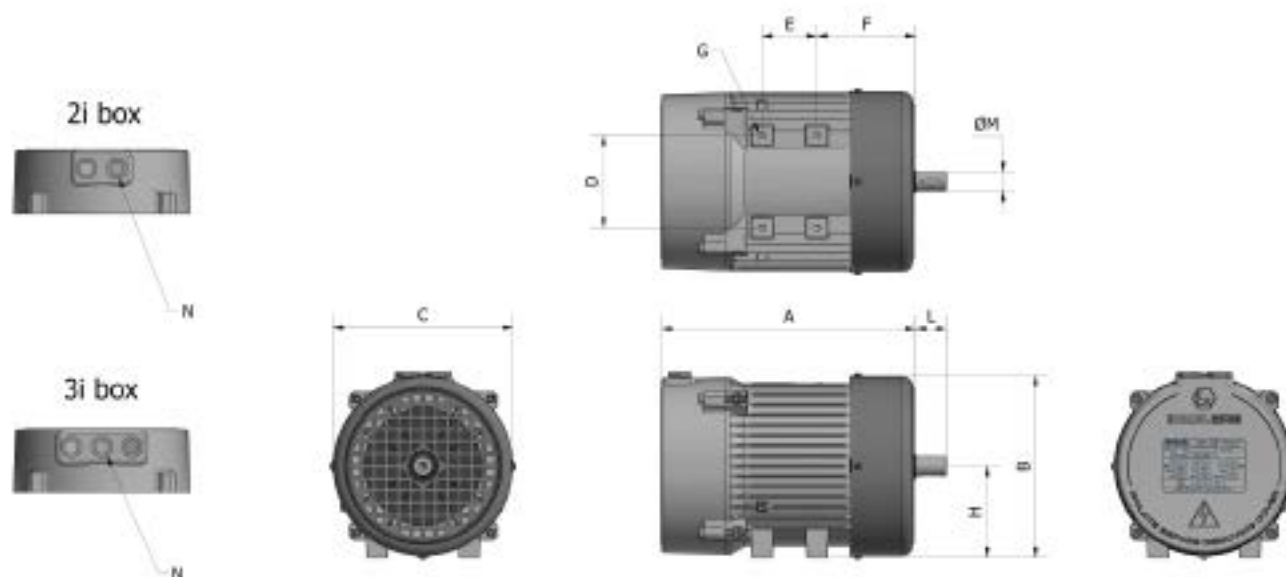
Three Phase AC Electrical Data

Type	Power		poles	V	Hz	A (400V)	A (230V)	RPM	Cosφ	Duty
	kW	Hp								
V80	1,00	1,36	2	230/400	50	2,6	4,5	2790	0,75	S1
V80	0,55	0,75	4	230/400	50	1,7	2,9	1420	0,75	S1
V80	0,65	0,88	4	230/400	50/60	1,95	3,4	1400	0,6	S1
V80	0,75	1,00	4	230/400	50/60	2,2	3,8	1410	0,72	S1
V80	1,00	1,36	4	230/400	50/60	3,3	5,8	1410	0,63	S1

Three phase AC without ventilation

Type	Power		poli poles	V	Hz	A (400V)	A (230V)	RPM	Cosφ	Duty
	kW	Hp								
V80	0,25	0,35	2	230/400	50	0,8	1,4	2800	0,7	S3
V80	0,37	0,50	2	230/400	50	0,9	1,6	1420	0,68	S3
V80	0,25	0,35	4	230/400	50	0,9	1,6	1410	0,7	S3
V80	0,37	0,50	4	230/400	50	1,0	1,8	1420	0,68	S3

V90 MOTOR - three phase



A	B	C	D	E	F	H	G	L	M	N
250	180	180	90	54	98	90	M8	30/40**	14/19**	M22

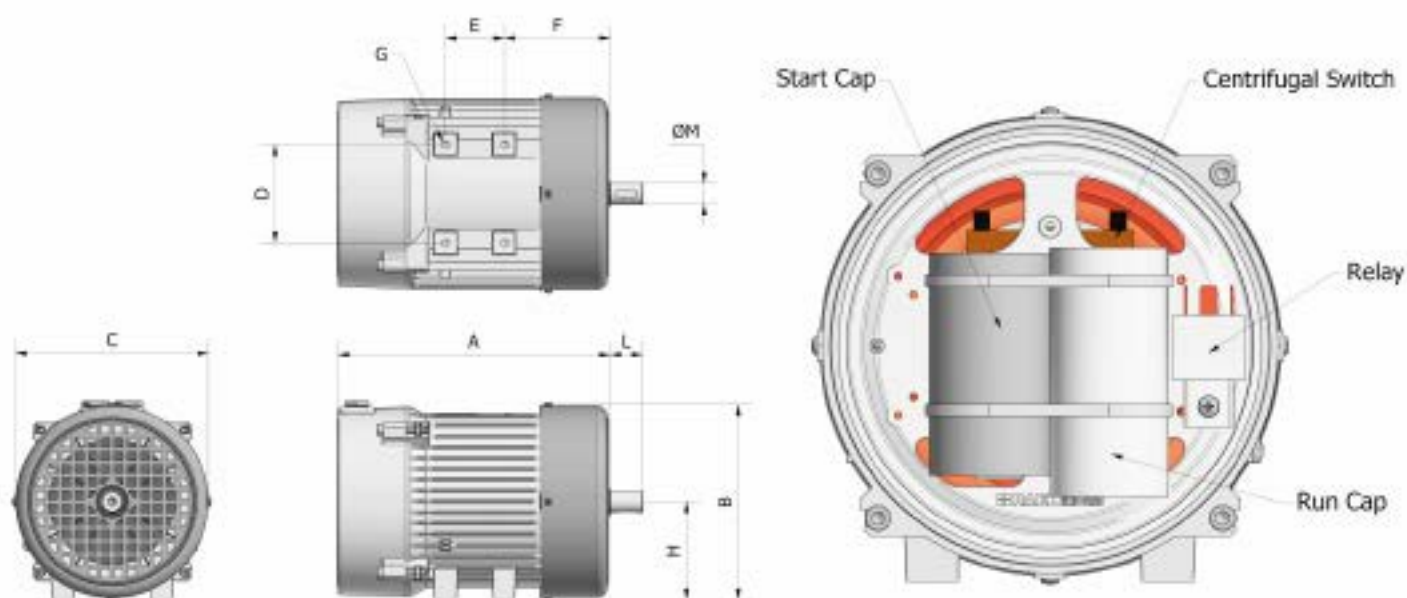
* All lengths +/- 1mm

** custom made also, max 19mm diameter

Three Phase AC Electrical Data

Type	Power		poles	V	Hz	A (400V)	A (230V)	RPM	Cosφ	Duty
	kW	Hp								
V90	1,50	2,00	2	230/400	50/60	3,5	6,0	2810	0,8	S1
V90	2,20	3,00	2	230/400	50/60	5,2	8,9	2850	0,8	S1
V90	0,75	1,00	4	230/400	50/60	1,8	3,1	1420	0,8	S1
V90	1,10	1,50	4	230/400	50/60	2,9	5,0	1420	0,7	S1
V90	1,50	2,00	4	230/400	50/60	3,9	6,7	1390	0,8	S1
V90	0,55	0,75	6	230/400	50/60	1,8	3,1	920	0,7	S1
V90	0,75	1,00	6	230/400	50/60	2,1	3,6	900	0,7	S1
V90	1,00	1,36	6	230/400	50/60	2,8	4,8	930	0,78	S1

V90 motor - single phase



A	B	C	D	E	F	H	G	L	M	N
250	180	180	90	54	98	90	M8	30/40**	14/19**	M22

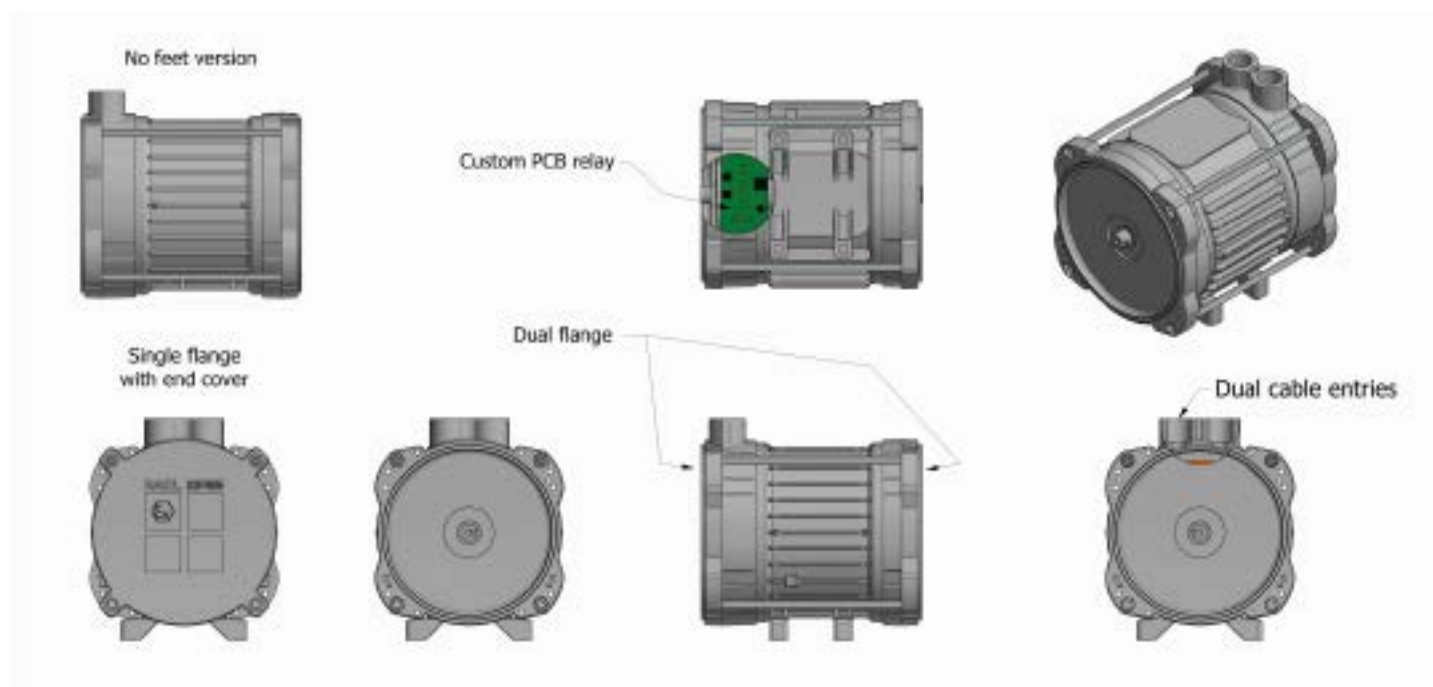
* All lengths +/- 1mm

** custom made also, max 19mm diameter

Single Phase AC Electrical Data

Type	Power		poles	V	Hz	A	Run Cap μf (450V)	Start Cap μF (250V)	RPM	Cosφ	Duty
V90	1,00	1,36	2	230	50/60	6,0	25	200	2900	0,90	S1
V90	1,50	2,0	2	230	50/60	9,0	45	200	2880	0,90	S1
V90	0,55	0,75	4	230	50/60	3,8	20	100	1430	0,95	S1
V90	0,75	1,00	4	230	50/60	4,3	25	100	1410	0,90	S1
V90	1,00	1,36	4	230	50/60	5,7	30	100	1410	0,95	S1
V90	1,5	2,0	4	230	50/60	11,0	30	100	1430	0,90	S1
V90	0,75	1,00	6	230	50/60	6,2	25	60	920	0,90	S1

Custom vapour recovery Solutions or direct coupling



AD-PE motors are customizable, to face the most challenging installation process.

- Special Flange and shaft design based on customer requirement.
- Custom metal bracket in addition to the standard aluminium mounting post
- Custom designed pulley
- For single phase motors, fully integrated start/run capacitors with electronic switch and relay (24vdc or 230vac)

gallery



Motor marking

Explosive atmosphere type			Motor Marking					
Area Classification	Presence of explosive atmosphere	Protection	Category	Group	Type of Protection	Gas Group	Temperature Class	
GAS	Zone 1	Probable	High	II	2G	Ex d	IIB	T3
	Zone 2	Improbable	Normal	II	2G	Ex d	IIB	T3

Motor nameplate


 Predosa (AL) ITALY
 www.rael.it 0722

Ph 3 SN Year 201
 Type ADPE IP 55

ΔV ΔA Ins.Cl. F
 λV λA Cos φ
 Relay Hz 50 / 60 Duty
 kW Rpm Tamb.°C -40/+60

Ex II 2G Ex d IIB T3 Gb

USARE VITI QUALITÀ 8.8
 USE SCREWS QUALITY 8.8

CE	Marking of conformity in compliance with the European Directives
0722	Number of Notified Body that gives the Product Quality Assurance Notification
Ex	Specific marking of explosion protection
II	Group (surface plants different from mines)
2	Category (high protection)
G	Explosive atmosphere for the presence of flammable gas, vapour or mist (GAS)
Ex d	Type of protection for explosive atmosphere for the presence of flammable gas
IIB	GAS Group
T3	Temperature class of the motor (GAS)
Gb	Equipment protection level
Tamb.	Max and Min Ambient Temperature
EPT 14 ATEX 1171	Type ATEX Certificate Number
IECEX EUT 14 0009X	Type IECEX Certificate Number

- Motors marked with gas group IIB are suitable also for gas group IIA.
- Motors with temperature class T3 (gas) are suitable for temperature classes T2, T1.
- Room temperature range: -40°C; +60°C

Markings example

- Motor for surface plant in explosive atmosphere (non mining)
- Zone 1
- explosive atmosphere consisting of a mixture with air of Diethyl ether (gas group IIB ignition temp. 160°C)
- Max ambient temperature 60°C

marking II 2G Ex db IIB T3 Gb is suitable for such application

Certificates

RAEL Motori Elettrici S.r.l. is certified ISO9001:2000 from February 2003 and as we manufacture motors complying with Directive 2014/34/EU we also have both the 'Product Quality Assurance Notification' and the CE certificates regarding the motors .

All motors are ATEX and IECEX certified

All motors are TR-CU(EAC) certified

All motors are UKCA certified

Motor Type	Type certificate number	Type of certificate
V 80 MOTOR	EPT 16 ATEX 2476 X	ATEX
	IECEX EUT 14 0009 X	IECEX
	RU C-IT.AA87.B.008231	TR-CU
V90 MOTOR	EPT 14 ATEX 1171 X	ATEX
	IECEX EUT 14 0009 X	IECEX
	RU C-IT.AA87.B.00823	TR-CU
	EPT 20 ATEX 3951 X	ATEX



EU-TYPE EXAMINATION CERTIFICATE

- (1) Equipment intended for use in potentially explosive atmospheres
Directive 2014/54/EU – Annex II
- (2) Certificate Number: **EPT 14 ATEX 1171 X** Issue 2
- (3) Equipment:
Series: **Asynchronous electric motor
AD-PE 100V2**
- (4) Manufacturer: **RAEL MOTORI ELETTRICI S.R.L.**
- (5) Address: **Via per Ratoia, 7/1 - 10177 Predosa (AL) - Italy**
- (6) This equipment and its accepted variations are specified in the annex to this Certificate.
- (7) Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/54/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex I of the Directive.
- (8) The examination and test results are recorded in the confidential Report N° EPT 21 REL 0252/0140. Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards:
EN 60079-0:2015, EN 60079-1:2015, EN 60079-31:2014
- (9) If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.
- (10) This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/54/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.
- (11) The equipment shall include the sign and at least one of the following strings:
**II 2G Ex eb IIC T4 Gb -40°C ≤ T_{amb} ≤ +60°C
II 2D Ex eb IIC T135°C Db
II 2G Ex eb IIC T3 Gb
II 2D Ex eb IIC T200°C Db**

Place and date of issue:

Turin, 2021-01-28

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EU-TYPE EXAMINATION CERTIFICATE

- (1) Equipment intended for use in potentially explosive atmospheres
Directive 2014/54/EU – Annex II
- (2) Certificate Number: **EPT 20 ATEX 3951 X** Issue 0
- (3) Equipment:
Series: **Asynchronous electric motor
AD-PE TS or AD-80 ML**
- (4) Manufacturer: **RAEL MOTORI ELETTRICI S.R.L.**
- (5) Address: **Via per Ratoia, 7/1 - 10177 Predosa (AL) - Italy**
- (6) This equipment and its accepted variations are specified in the annex to this Certificate.
- (7) Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/54/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex I of the Directive.
- (8) The examination and test results are recorded in the confidential Report N° EPT 20 REL 010015641. Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards:
EN 60079-0:2015, EN 60079-1:2015
- (9) If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.
- (10) This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/54/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.
- (11) The equipment shall include the sign and the following string:
II 2G Ex eb IIC T3 or T4 Gb -40°C ≤ T_{amb} ≤ +60°C

Place and date of issue:

Turin, 2021-09-28

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Eurofins Product Testing Italy S.r.l. - Via Cavour, 21 - 10156 Torino - Italia
Notified Body N. 0477

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ЕАЭС: RU-C-IT-1.087.0.00833/21

Срок: 01.12.2021 № 024-0000

ОПЕРАТОР СЕРТИФИКАЦИИ: ООО «НАБВНО ИСЭО» (Организатор сертификации) и/или участник сертификации (ООО «НАБВНО ИСЭО»). Адрес места нахождения организации: Россия, 140004, Московская область, Люберецкий район, город Люберцы, шоссе БТТЛ АО «Океан» (ООО «НАБВНО ИСЭО»), корпус 6, этаж 3, офис 30. Адрес места сертификации: в месте поставки (Россия, 100004, Московская область, Люберецкий район, город Люберцы, шоссе БТТЛ АО «Океан» (ООО «НАБВНО ИСЭО»), корпус 6, этаж 3, офис 30, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000).

ЗАКАЗЧИК: ООО «НАБВНО ИСЭО» (Организатор сертификации) и/или участник сертификации (ООО «НАБВНО ИСЭО»). Адрес места нахождения организации: Россия, 140004, Московская область, Люберецкий район, город Люберцы, шоссе БТТЛ АО «Океан» (ООО «НАБВНО ИСЭО»), корпус 6, этаж 3, офис 30. Адрес места сертификации: в месте поставки (Россия, 100004, Московская область, Люберецкий район, город Люберцы, шоссе БТТЛ АО «Океан» (ООО «НАБВНО ИСЭО»), корпус 6, этаж 3, офис 30, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775,

EU-TYPE EXAMINATION CERTIFICATE

Equipment intended for use in potentially explosive atmospheres
Directive 2014/54/EU – ATEX II

Certificate Number: **EPT 16 ATEX 2476 X** Issue 1

Equipment: **Asynchronous electric motor**
Series: **AD-PE V80V2A**

Manufacturer: **RAEL MOTORI ELETTRICI S.R.L.**
Address: **Via per Rato, 21 - 10100 Torino (AL) - Italy**

This equipment and its accepted variations are specified in the annex to this Certificate.

Eurofins Product Testing Italy S.r.l., notified body n. 0477 in accordance with Article 21 of the Directive 2014/54/EU of the European Parliament and of the Council of 28th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive.

The examination and test results are recorded in the confidential Report RPT EPT 21 REL 31021014-G. Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards.

EN 60076-2:2018, EN 60076-1:2014

If the sign 'X' is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the construction and the tests of the specified equipment. Further requirements of the Directive 2014/54/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

The equipment shall include the sign  and the following rating:
II 2G Ex dS IIB T3 Gb -40°C ≤ T_{amb} ≤ +85°C

Place and date of issue:
Torino, 2021-07-08


Daniele Bolognini
Director Responsible for notified body n. 0477



The Certificate has 2 pages and it is reproduced only in its entirety. Certificates of validity are reported below.

Eurofins Product Testing Italy S.r.l. - Via Cavour, 21 - 10100 Torino - Italia
Notified Body n. 0477

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

For rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx BUT 26.0027X** Page 1 of 2 Certificate history

Status: **Current** Issue No.: 1

Date of issue: **2021-07-05**

Applicant: **RAEL MOTORI ELETTRICI S.R.L.**
Via per Rato, 21
10100 Torino (AL)
Italy

Equipment: **Asynchronous electric motor AD 90 T6 or AD 90 M6**

Optional accessory:

Type of Protection: **Flameproof enclosure "d"**

Marking: **Ex dS IIB T3 Gb -40°C ≤ T_{amb} ≤ +85°C**

Approved for issue on behalf of the IECEx Certification Body:

Signature: 
Date: **2021-07-05**

Head of IECEx CB

1. The certificate and schedule may only be reproduced in full.
2. The certificate is not transferable and remains the property of the issuing body.
3. The design and conformity of this certificate may be verified by visiting www.iecex.com or use of the QR Code.

Certificate issued by:
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Via Cavour, 21 - 10100 Torino
Italy

 Product Testing

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

For rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx BUT 14.0008** Page 1 of 4 Certificate history

Status: **Current** Issue No.: 2

Date of issue: **2021-07-05**

Applicant: **RAEL MOTORI ELETTRICI S.R.L.**
Via per Rato, 21
10100 Torino (AL)
Italy

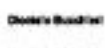
Equipment: **Three phase and single phase asynchronous motors; Series AD-PE V80V2 and AD-PE V80V2A**

Optional accessory:

Type of Protection: **Flameproof enclosure "d"; Equipment dust ignition protection by enclosure "T"**

Marking: **Ex dS IIB T3 Gb -40°C ≤ T_{amb} ≤ +85°C**
Ex dS IIB T3/T4 Gb -40°C ≤ T_{amb} ≤ +85°C (only for AD-PE V80V2)
Ex dS IIB T3/T4/T5 Gb -40°C ≤ T_{amb} ≤ +85°C (only for AD-PE V80V2A)

Approved for issue on behalf of the IECEx Certification Body:

Signature: 
Date: **2021-07-05**

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Eurofins Product Testing Italy S.r.l.
Via Cavour, 21 - 10100 Torino
Italy

 Product Testing



RAEL motori elettrici s.r.l.
Via per Retorto, 7/1, 15077 Predosa (AL)
www.raelsrl.com