

REEL SuPremE® – The IE5* magnet-free synchronous reluctance motor



*IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation). All other sizes are IE4.

The products illustrated as examples are partly fitted with options and accessories incurring a surcharge. The SuPremE motors are painted in blue colour RAL 5002 as standard and can be delivered with KSB label as well. The colour RAL 1036 (pearl gold) is available as option on request.



Saving energy is now easy

The REEL SuPremE® drive system is the most eco-sustainable solution for energy-saving in industrial applications.

The incredibly efficient interaction of the synchronous reluctance motor with REEL frequency converters offers a system of unparalleled efficiency.

■ Energy savings

The speed-controlled REEL-SuPremE® motor works like an energy diet: the large efficiency gain due to the speed control is increased by an energy saving of up to 10% in the motor alone.

■ Far ahead of its time

The IE5 motor (as per IEC/TS 60034-30-2), already exceeds the requirements of the European ErP 2017 regulations.

■ Sustainable

Built completely without magnetic materials, its total environmental footprint is significantly smaller than that of permanent-magnet synchronous and asynchronous motors.

■ Robust

The use of non-critical, durable materials, as well as the fully matured reluctance principle and the high service life of the bearings ensure reliable operation.

■ Compatible

Wherever there is room for an IE2 asynchronous motor, a REEL SuPremE® can also be installed to get the work done efficiently.



A comprehensive motor range - REEL SuPremE® IE5* is available from 0,55 to 450 kW.
Higher sizes available on request.

* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).

The energy diet of the magnet-less motor REEL SuPremE® IE5* immediately shows on your energy bills. The synchronous reluctance motor is operated at variable speed and achieves uniquely stable and high efficiency gains in all load ranges.

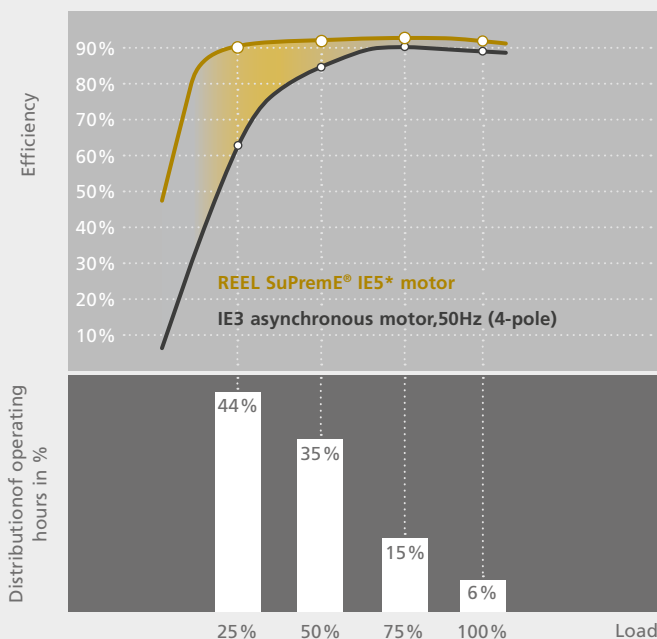
In Europe, motors are normally operated at no more than 60% of their rated load. The efficiency regulations for electric motors initiated by legislators all focus on operation at the rated load point. With its super premium efficiency at full load - but above all with its high efficiency across the entire part-load range - the REEL SuPremE® IE5* motor stands out as the lean alternative drive for most applications.



The diagram shows the efficiency curve plotted over the load of a 7.5 kW, 1500 rpm REEL SuPremE® motor in comparison to a 2-pole IE3 asynchronous motor. Load profile to "Blue Angel" requirements.

Source: Dipl.-Ing. M. Wiele, Prof. Prof. hc. mult. Dr. Ing. Peter Brosch, Hochschule Hannover, University of Applied Sciences and Arts, Faculty I, Drives and Automation Technology.

Unparalleled potential savings due to extremely high efficiency - especially in the part-load range.



* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).



REEL SuPremE® IE5*

DOL starting is not required

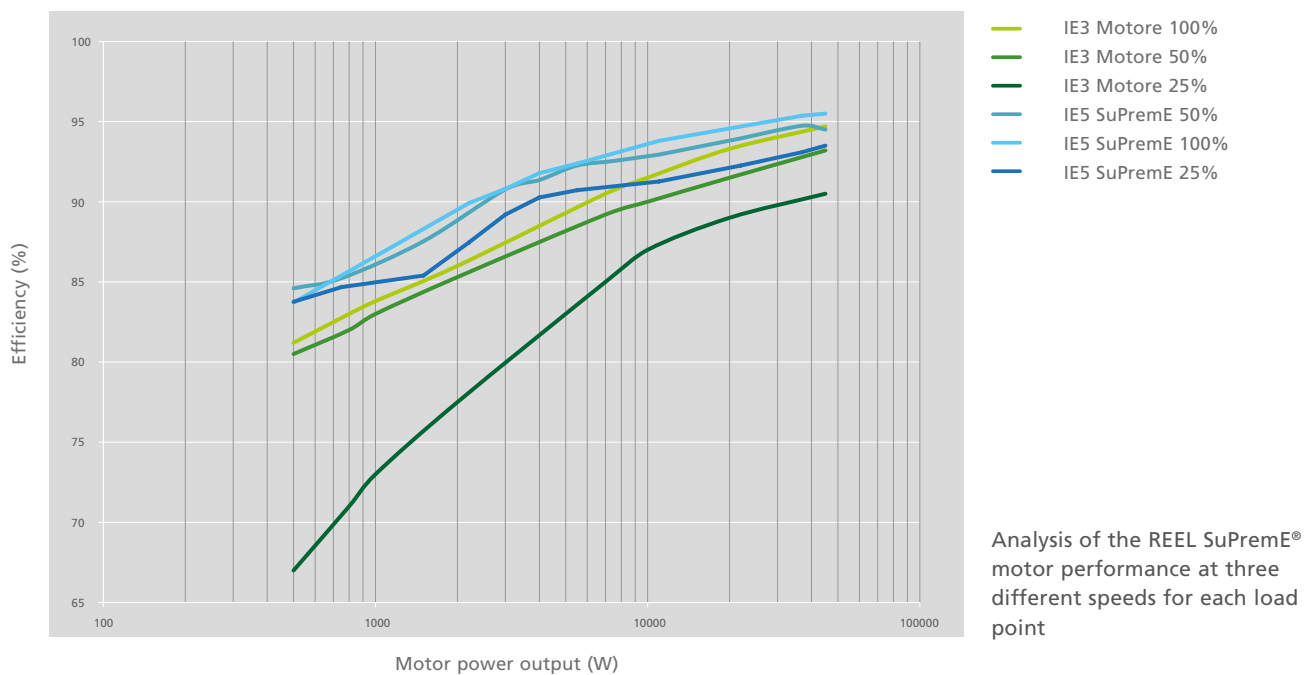
Integration of a speed control system

Variable load profile

The drive solution of the future

The ability to maintain efficiency even when running at partial load makes the REEL SuPremE® drive system the ideal solution for all those applications that do not require the constant use of the motor's rated power and that need to save energy to comply with demanding industry regulations, while at the same time improving the value and the quality of the system.

Partial load efficiency of REEL SuPremE® IE5* vs. IE3 Motor



* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).



ie5

The REEL SuPremE® IE5* motor paves the way

- No DOL starting - no unnecessary losses
- Every bit as robust as asynchronous motors
- Rotor laminations geometry for quiet operation
- Losses associated with the speed control system required are marginal
- Easy maintenance because no magnets are used

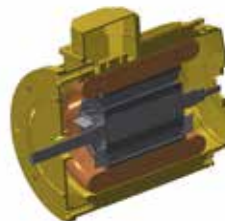
No unnecessary losses attributed to DOL starting

The success of the asynchronous motor largely has to do with its DOL starting capability. This benefit also presents a drawback, however, because DOL starting leads to unnecessary losses caused by rotor current as evidenced in the slip that occurs at this time.

Asynchronous motors will be increasingly fitted with a speed control system in recognition of the fact that maximum torque conditions are not always required. In these scenarios, DOL starting is not necessary. There is a better alternative to this combination setup with a speed control system, however – the synchronous motor. Although synchronous motors cannot start up without a frequency inverter, they achieve considerably higher levels of efficiency during operation as no current is sent to the rotor.

A robust motor

Asynchronous motors have the reputation of being very robust. The same can also be said of the magnet-less IE5* synchronous reluctance motor, REEL SuPremE®, whose probability of failure is reduced thanks to the omission of sensors, while the lower temperature of the rotor extends the service life of the bearings. The REEL SuPremE® IE5* motor also incorporates only non-critical and durable materials to ensure smooth operation for many years at a time.



The synchronous reluctance motor REEL SuPremE® IE5*



Lamination of REEL SuPremE® IE5*

Low-noise operation

One of the ways in which conventional synchronous motors differ from synchronous reluctance motors such as the REEL SuPremE® IE5* motor is the special cut of the laminated rotor core. Formally known as US patent 5.818.140, the invention refers to a rotor geometry with flux-conducting and flux-blocking segments that ensure smooth operation. This geometry provides for an extremely low level of torque ripple (1 to 2 %) that, in turn, keeps operating noise to a minimum.

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One step ahead - including when it comes to **resource efficiency**

The REEL SuPremE® IE5* motors impress with their exceptional overall eco-balance by not only achieving considerable energy savings, but also contributing to a healthier environment as the motors incorporate zero magnetic materials made from rare earths.

Using critical materials is a thing of the past

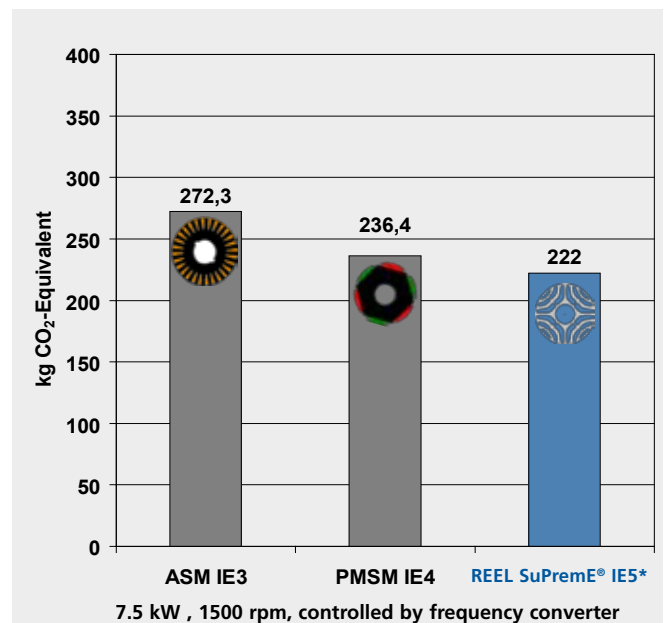
Many modern technologies are almost impossible to realise without using rare earths. The problem with this approach is of course the fact that mining and processing the metals required can severely impact the environment. Further adding to this is the monopoly-like situation that prevails in the global market as China has for years been the largest exporter of rare earth elements and therefore also establishes market prices.

Avoiding the use of rare earths was an absolute must when developing the world's most efficient magnet-less IE5* motor REEL SuPremE®. The solution was to leverage the synchronous reluctance principle so that the highly efficient drive could also meet IE5 efficiency class requirements without the need for magnets. As a result, REEL can manufacture its SuPremE motors independently of global market events while at the same time keeping the environmental impact to a minimum.

An independent PLCA (Product Life Cycle Analysis) study has confirmed this.

Sustainable, magnet-less design principle

REEL SuPremE® IE5* motors use no magnetic materials or increased levels of copper, making their design much more sustainable than that of permanent-magnet synchronous motors and asynchronous motors.



In fact, the total environmental footprint of manufacturing synchronous reluctance motors is 6 percent lower than that of permanent-magnet synchronous motors, despite the higher output per size of the latter, as a result of no magnetic materials being used.

* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).



An efficient team

REEL SuPremE® IE5* is not just a motor, it is a drive system which more than any other on the market deserves to be called a "low energy-consumption drive".

The energy diet offered by SuPremE will make your machines much more streamlined.

We have worked hard to bring you with a high-performance control software optimal for the synchronous reluctance motor.

We can offer a reliable, intelligent control system that makes the most of REEL SuPremE®'s full potential to save energy. It ensures the achievement of high efficiency levels at full- and partial load, without the use of rare earths, as well as optimal sensorless position and speed accuracy. It allows silent operation, making the SuPremE drive ideal for the use in ventilation systems.

REEL SuPremE® IE5* is the only synchronous motor with a motor-mounted speed control system, but can be driven by any REEL speed controller, offering a wide selection of configurations and installations.

We can offer a vast selection of speed regulation solutions for the control of the synchronous reluctance motors REEL SuPremE® IE5*: inverters mounted directly on top of the motor or wall-mounted, inverters installed into electrical cabinets and with different IP ratings for a broad power range.

Just select the configuration that best suits to your need!



KSB202 drive
for wall- or cabinet-mounting - IP00..IP66

FlexiMova® mm decentralised drive
for motor-, wall-, machine-mounting - IP55

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REEL SuPremE® IE5* is a key component of industrial automation systems.

Its high energy saving potential makes the synchronous reluctance motor the ideal solution for power quality and efficiency improvement in industrial systems and for the generation of electrical energy from renewable resources.

SuPremE drives for System Integration

The comprehensive range of REEL SuPremE® motors allows to apply the product to a great variety of systems. Wherever a higher efficiency is required, the speed-controlled SuPremE drive becomes the optimal solution for satisfying the energy saving requirements of the application.



* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).

The energy diet **works**

Molino-Frantoio "G. Fratini"

Application:

Centrifugal separator for the production of extra-virgin olive oil

Measure taken:

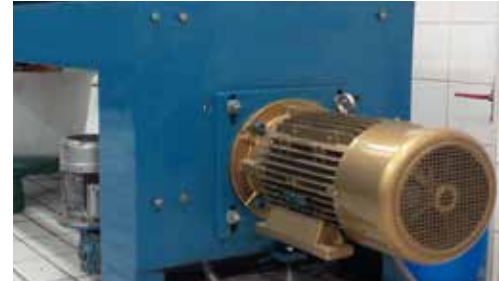
Replacement of:

1 x asynchronous motor, 11 kW, 1500 rpm, efficiency class IE2
with:

1 x REEL SuPremE® motor, 11 kW, 1500 rpm, efficiency class IE5*
controlled by KSB202 drive.

Result:

- **Energy saving of approximately 15%** thanks to the reduction of the electricity consumption by 20%
- Higher reliability of the machine due to a more accurate speed regulation
- Motor bearings last longer, because of the low rotor temperature.



* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).



Faenza Depurazioni Srl (Gruppo Tampieri SpA)

Application:

Aerator pump for wastewater treatment tanks - operation at partial load and speed

Measure taken:

Replacement of:

1 x asynchronous motor, 7.5 kW, 1500 rpm, efficiency class IE3 with

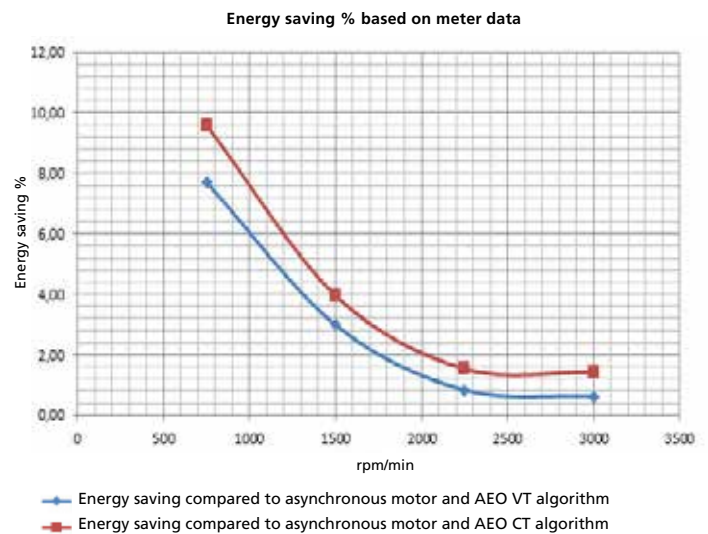
1 x REEL SuPremE® 7.5 kW, 1500 rpm, efficiency class IE5* controlled by KSB202 drive.

Result:

- **Lower energy waste** than asynchronous motors at partial load
- **Less maintenance** on the motor bearings, thanks to the technical features of REEL SuPremE® motor that operates with a „cold“ rotor



Energy savings achieved with the REEL SuPremE® motor compared to an IE3 asynchronous motor



AEO VT algorithm: control algorithm with automatic flow reduction for squared torque systems (pumps, fans, etc...)

AEO CT algorithm: control algorithm for constant torque systems (compressors)

Ear Group

Application:

Generation of electrical energy from hydropower

Action taken:

Installation of 1 x REEL SuPremE® motor (as generator) 90 kW, 1000 rpm, 400 V. The motor is controlled by a control system with active front end and KSB202 drive of 90 kW.

Result:

- **High energy production**, thanks to the constant efficiency over the entire operation of the SuPremE generator.



*IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).

Electrical data and performance

Motors @ 3000 rpm

Degree of protection: : IP55

Cooling method: IC411

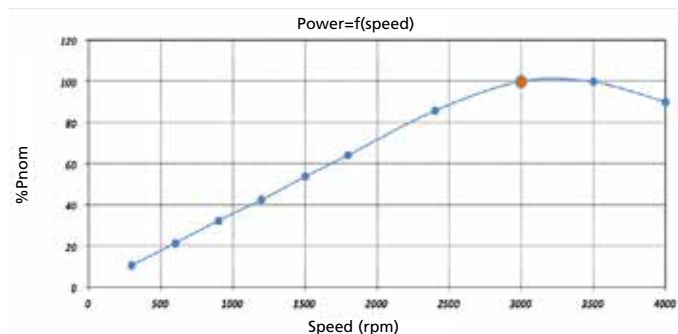
Efficiency class: IE5*

Rated speed: 3000 rpm

Thermal protection: PTC

Insulation class: F/B

Power characteristic curve of SuPremE motors, generation A&B
data @ 400 VAC



P _n kW	Motor type	Nm	V _n V	I _n A	f _n Hz	η 100% %	η 75% %	η 50% %	η 25% %	Eff.	Weight kg	Inverter KSB 202		Inverter FlexiMova® mm	
												Mod.	I _n A	Mod.	I _n A
0.55	A071M2	1,8	350	1.6	100	83.7	83.6	83.3	81.6	IE5	9	PK55	1.8	F0K55	1.8
0.75	A080M2	2,4	360	2.1	100	85.0	84.9	84.6	82.9	IE5	10	PK75	2.4	F0K75	2.5
1.1	A080M2	3,5	360	3	100	86.5	86.4	86.1	84.3	IE5	12	P1K1	3.0	F1K10	3.5
1.5	A090S2	4,8	380	4.1	100	87.6	87.5	87.2	85.4	IE5	15	P1K5	4.1	F1K50	4.9
2.2	A090L2	7,0	360	5.6	100	88.9	88.8	88.4	86.7	IE5	18	P2K2	5.6	F2K20	6.0
3	A100L2	9,5	360	7.6	100	89.8	89.7	89.3	87.6	IE5	24	P4K0	10.0	F3K00	8.0
4	A112M2	12,7	355	9.4	100	90.6	90.5	90.1	88.3	IE5	35	P4K0	10.0	F4K00	10.0
5.5	A132S2	17,5	365	12.5	100	91.4	91.3	90.9	89.1	IE5	43	P5K5	13.0	F5K50	14.0
7.5	A132S2	23,9	370	16.7	100	92.1	92.0	91.6	89.8	IE5	56	P11K	24.0	F7K50	18.0
11	A160M2	35,0	375	23.7	100	92.9	92.8	92.4	90.6	IE5	73	P11K	24.0	F11K0	26.0
15	A160M2	47,7	365	32.0	100	93.5	93.4	93.0	91.2	IE5	82	P15K	32.0	F15K0	34.5
18.5	A160L2	58,9	370	38.8	100	93.8	93.7	93.3	91.5	IE5	102	P22K	44.0	F18K5	44.0
22	A180M2	70,0	355	50.7	100	94.1	94.0	93.6	91.8	IE4*	157	P30K	61.0	F22K0	51.0
30	A200L2	95,5	365	63.5	100	94.6	94.5	94.1	92.2	IE4*	222	P37K	73.0	F30K0	68.0
37	A200L2	117,8	360	77.8	100	94.8	94.7	94.3	92.4	IE4*	257	P45K	90.0	F37K0	84.0
45	A225M2	143,2	360	97.0	100	95.1	95.0	94.6	92.7	IE4*	396	P55K	106	F45K0	101.0
75	SRCa280Sa4	239	340	172	100	95.6	95.1	94.4	90.6	IE4	510	P90K	177	-	-
90	SRCa280Sb4	287	370	190	100	95.7	95.3	94.6	92.0	IE4	530	N110	212	-	-
110	SRCa280M4	350	400	230	100	96.0	95.7	95.0	93.0	IE4	594	N132	260	-	-
132	SRCa315S4	420	390	270	100	96.3	96.0	95.2	93.7	IE4	900	N160	315	-	-
160	SRCa315M4	509	385	315	100	96.4	96.2	95.1	94.2	IE4	1000	N160	315	-	-
180	SRCa315La4	573	370	362	100	96.7	96.4	95.8	94.0	IE4	1100	N200	395	-	-
200	SRCa315Lb4	637	380	392	100	96.7	96.4	95.8	94.0	IE4	1110	N200	395	-	-
250	SRCa355M4	796	380	501	100	97.0	97.0	96.8	95.0	IE4	1610	N315	600	-	-
315	SRCa355L4	1003	380	631	100	97.2	97.1	96.8	95.0	IE4	1810	P355	658	-	-
450	SSRCa355X4	1433	345	925	100	97.1	97.1	96.8	95.0	IE4	1920	P560	990	-	-

* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).

Note:
The technical data may be modified without prior notice.

Electrical data and performance

Motors @ 1500 rpm

Degree of protection: IP55

Cooling method: IC411

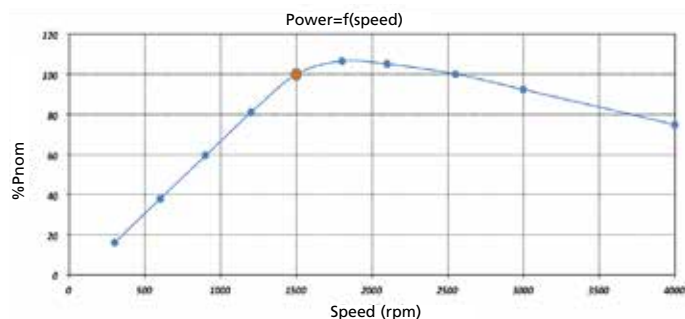
Efficiency class: IE5*

Rated speed: 1500 rpm

Thermal protection: PTC

Insulation class: F/B

Power characteristic curve of SuPremE motors, generation A&B
data @ 400 VAC



P _n kW	Motor type	Nm	V _n V	I _n A	f _n Hz	η 100% %	η 75% %	η 50% %	η 25% %	Eff.	Weight kg	Inverter KSB 202		Inverter FlexiMova® mm	
												Mod.	I _n A	Mod.	I _n A
0.55	A080M4	3,5	350	1.6	50	84.5	84.4	84.1	82.4	IE4*	11	PK55	1.8	F0K55	1.8
0.75	A080M4	4,8	355	2.1	50	85.7	85.6	85.3	83.6	IE4*	13	PK75	2.4	F0K75	2.5
1.1	A090S4	7,0	360	3.0	50	87.2	87.1	86.8	85.0	IE5	15	P1K1	3.0	F1K10	3.5
1.5	A090L4	9,5	365	4.0	50	88.2	88.1	87.7	86.0	IE5	18	P1K5	4.1	F1K50	4.9
2.2	A100L4	14,0	365	5.7	50	89.5	89.4	89.0	87.3	IE4*	25	P3K0	7.2	F2K20	6.0
3	A100L4	19,1	355	7.8	50	90.4	90.3	89.9	88.1	IE4*	30	P4K0	10.0	F3K00	8.0
4	A112M4	25,5	360	9.6	50	91.2	91.1	90.7	88.9	IE4*	37	P4K0	10.0	F4K00	10.0
5.5	A132S4	35,0	350	13.5	50	92.0	91.9	91.5	89.7	IE5	45	P7K5	16.0	F5K50	14.0
7.5	A132M4	47,7	355	17.6	50	92.7	92.6	92.2	90.4	IE5	60	P11K	24.0	F7K50	18.0
11	A160M4	70,0	365	24.2	50	93.5	93.4	93.0	91.2	IE5	81	P15K	32.0	F11K0	26.0
15	A160L4	95,5	355	33.0	50	94.0	93.9	93.5	91.7	IE5	107	P18K	37.5	F15K0	34.5
18.5	A180M4	117,8	350	42.0	50	94.4	94.3	93.9	92.0	IE4*	151	P22K	44.0	F18K5	44.0
22	A180L4	140,1	365	48.5	50	94.6	94.5	94.1	92.2	IE4*	175	P30K	61.0	F22K0	51.0
30	A200L4	191,0	365	65.4	50	95.1	95.0	94.6	92.7	IE4*	239	P37K	73.0	F30K0	68.0
37	A225S4	235,5	360	80.9	50	95.3	95.2	94.8	92.9	IE4*	348	P45K	90.0	F37K0	84.0
45	A225M4	286,5	360	99.3	50	95.6	95.5	95.1	93.2	IE4*	396	P55K	106	F45K0	101.0
55	SRCa280Sa4	350	380	108	50	95.6	95.1	93.7	91.0	IE4	510	P75K	147	F55K0	120.0
75	SRCa280Sb4	478	380	147	50	95.9	95.3	95.0	93.5	IE4	530	P75K	147	-	-
90	SRCa280M4	573	380	185	50	96.2	95.7	95.1	94.4	IE4	594	N110	212	-	-
110	SRCa315S4	700	380	216	50	96.5	96.3	96.0	94.0	IE4	900	N132	260	-	-
132	SRCa315M4	840	380	267	50	96.5	96.5	96.0	94.0	IE4	1000	N160	315	-	-
160	SRCa315La4	1019	380	310	50	96.6	96.6	96.1	95.0	IE4	1100	N160	315	-	-
200	SRCa315Lb4	1273	380	395	50	96.6	96.7	96.5	95.7	IE4	1150	N250	480	-	-
250	SRCa355S6	1592	370	510	75	97.0	97.0	96.8	96.3	IE4	1600	N315	600	-	-
280	SRCa355M6	1783	370	571	75	97.0	97.0	96.8	96.3	IE4	1650	N315	600	-	-
315	SRCa355L6	2006	370	639	75	97.0	97.0	96.8	96.3	IE4	1850	P355	658	-	-
400	SRCa355X6	2547	380	790	75	97.1	97.0	96.8	96.3	IE4	1990	P450	800	-	-

* IE5 acc. to IEC/TS 60034-30-2 up to 15 kW @ 1500 rpm / 18.5 kW @ 3000 rpm (only for 1500 rpm types rated 0.55 kW, 0.75 kW, 2.2 kW, 3 kW, 4 kW: IE5 in preparation).

Note:
The technical data may be modified without prior notice.

Electrical data and performance

Motors @ 1000 rpm

Degree of protection: : IP55

Cooling method: IC411

Efficiency class: IE4*

Rated speed: 1000 rpm

Thermal protection: PTC

Insulation class: F/B

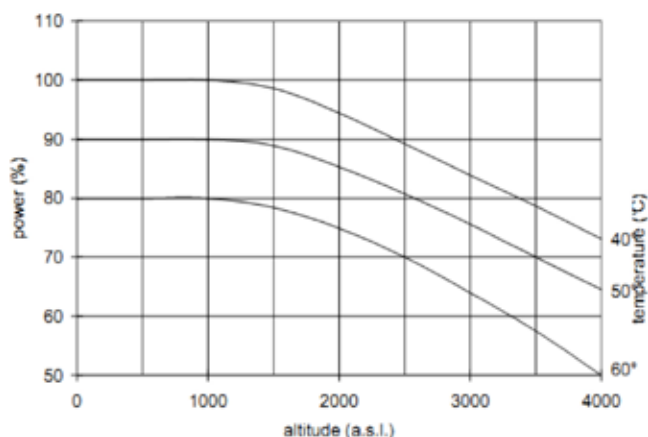
												Inverter KSB 202		Inverter FlexiMova® mm	
P _n kW	Motor type	Nm	V _n V	I _n A	f _n Hz	η 100% %	η 75% %	η 50% %	η 25% %	Eff.	Weight kg	Mod.	I _n A	Mod.	I _n A
37	SRCa280Sa4	353	380	87	33	94.7	94.0	92.5	91.5	IE4	510	P45K	90	F45K0	101.0
45	SRCa280Sb4	430	390	102	33	95.0	94.7	93.9	92.2	IE4	530	P55K	106	F45K0	101.0
55	SRCa280M4	525	380	120	33	95.3	94.7	93.9	92.9	IE4	594	P75K	147	F55K0	120.0
75	SRCa315S4	716	380	156	33	95.3	95.2	94.9	94.0	IE4	900	P90K	177	-	-
90	SRCa315M4	860	380	191	33	95.5	95.3	95.0	94.0	IE4	1000	N110	212	-	-
110	SRCa315La4	1051	385	215	33	96.0	96.0	95.7	94.6	IE4	1100	N132	260	-	-
132	SRCa315Lb4	1261	380	260	33	96.0	96.0	95.6	94.5	IE4	1150	N132	260	-	-
160	SRCa355S6	1528	380	325	50	96.1	96.0	95.5	94.0	IE4	1600	N200	395	-	-
200	SRCa355M6	1910	370	410	50	96.2	96.1	95.5	94.0	IE4	1690	N250	480	-	-
250	SRCa355L6	2388	370	513	50	96.3	96.2	95.3	94.5	IE4	1850	N315	600	-	-
315	SRCa355X6	3005	400	590	50	96.6	96.5	96.4	95.0	IE4	1990	N315	600	-	-

* IE4 in accordance with IEC/TS 60034-30-2



Note:
The technical data may be modified without prior notice.

Derating of motors due to ambient temperature and altitude



Noise level

The special cut of the laminated rotor core allows extremely little torque ripple (1-2%) for extremely quiet operation.

Motor type	Sound pressure level (dBA)		
	3000 rpm	1500 rpm	1000 rpm
A080	70	60	NA
A090	70	60	NA
A100	71	60	NA
A112	71	61	NA
A132	71	61	NA
A160	72	61	NA
A180	72	62	NA
A200	72	62	NA
A225	72	62	NA
SRCa 280	78	69	66
SRCa 315	80	74	71
SRCa 355	82	80	77

NOTE:

The noise level of the SuPremE motor is strictly connected to the drive type used for the regulation and to the structure where it is installed a (as per Table C of CEI TS 60034-25). The measurements are carried out with free suspension method or with motor placed on a rubber support. All values indicated in the table above are subject to a tolerance of ± 3 dBA.

Tolerance limits

The operation features are ensured with the tolerance limits defined by the Standard IEC 60034-1 as shown here below.

Characteristics	Tolerances
Efficiency	Motor power < 1100 kW: -15% of (1- η) Motor power > 1100 kW: -10% of (1- η)
Power factor	-(1- $\cos \phi$)/6 Min 0.02 Max 0.07
Locked rotor current	+20% of guaranteed value
Locked rotor torque	-15% + 25% of guaranteed value (+25% can be achieved by agreement)
Maximum torque	1,6 times the rated torque -10%
Moment of inertia	$\pm 10\%$
Vibration	+10% of vibration class
Noise level	$\pm 3\text{dBA}$

Options and accessories

Option name	Motor frame 71-225	Motor frame 280-355
Encoder mounting for IC411 version	-	✓
IC416 version	-	✓
Encoder mounting for IC416 version	-	✓
Encoder (hollow shaft)	-	✓
Mounting arrangement (IM2001) – B3/B14	✓	✓
Mounting arrangement V1 (IM3011)	✓	✓
Terminal box right side / left side / DE	✓	✓
Rain cover	-	✓
Second power shaft end	-	-
Degree of protection <i>IP56-IP65</i>	-	✓
NDE insulated bearing	-	✓
Additional PTO thermal switch	-	✓
Additional PTC thermistor	-	✓
Pt100 in stator windings	-	✓
Pt100 in bearings	-	✓
DE roller bearings	-	✓
Special balancing (R, S degree)	-	✓
Other supply voltage / frequency	-	✓
Other mounting arrangements (<i>B35-V1</i>)	✓	✓
Anticondensation heaters	-	✓
Special painting for aggressive environment	-	✓

Bearings

The synchronous reluctance motors SuPremE are fitted with rigid radial ball bearings on both sides up to frame size 280, as shown in the table below. In frame size 315 and above the motors are equipped as standard with a roller bearing on the D-end.

The nominal life of a bearing is defined according to ISO 281 in > 20.000 continuous operating hours. The data and operating hours are calculated under normal conditions of operation, without any vibration and with temperatures within the limits imposed by the bearing manufacturer. Thus, in some operating conditions, life of bearings may be shorter.

Motor frame size	Motor generation version	rpm	Mounting arrangements B3 - B35 - B5 and derivated			
			D-end		N-end	N-end insulated bearing
			Ball bearing	Roller bearing	Ball bearing	Ball bearing
71	B	1000-3000	E2.6203-2ZC3	NA	E2.6203-2ZC3	NA
	C	1000-3000	E2.6202-2ZC3	NA	E2.6202-2ZC3	NA
80	B / C	1000-3000	E2.6204-2ZC3	NA	E2.6204-2ZC3	NA
90	B	1000-3000	E2.6205-2ZC3	NA	E2.6205-2ZC3	NA
	C	1000-3000	E2.6205-2ZC3	NA	E2.6205-2ZC3	NA
100	B	1000-3000	E2.6206-2ZC3	NA	E2.6206-2ZC3	NA
	C	1000-3000	E2.6206-2ZC3	NA	E2.6206-2ZC3	NA
112	B	1000-3000	E2.6306-2ZC3	NA	E2.6306-2ZC3	NA
	C	1000-3000	E2.6206-2ZC3	NA	E2.6206-2ZC3	NA
132	B	1000-3000	E2.6308-2ZC3	NA	E2.6308-2ZC3	NA
	C	1000-3000	E2.6208-2ZC3	NA	E2.6208-2ZC3	NA
160	B / C	1000-3000	E2.6309-2ZC3	NA	E2.6309-2ZC3	NA
180	B / C	1000-3000	E2.6310-2ZC3	NA	E2.6310-2ZC3	NA
200	B / C	1000-3000	E2.6312-2ZC3	NA	E2.6312-2ZC3	NA
225	B / C	1000-3000	E2.6313-2ZC3	NA	E2.6313-2ZC3	NA
280	-	1000-3000	6317-C3	NU317	6317-C3	6317-C3 INS
315	-	1000-3000	6319-C3	NU319	6319-C3	6319-C3 INS
355	-	1000-3000	6321-C3	NU321	6321-C3	6321-C3 INS

SuPremE motors up to frame size 225 included are equipped as standard with an axially locked bearing at the D-end.

SuPremE motors in frame size 280 and above are fitted with an axially locked bearing at the N-end. The axially locked bearing on D-end is available on request.

Lubrication

Frame sizes 80 to 225: motors are fitted with permanently rigid ball bearings with double shield and one row of balls.

Frame sizes 280 to 355: motors have regreasable bearings as standard solution and are equipped with a lubricator for periodical re-lubrication.

NOTE:

For high power motors controlled by frequency converters we recommend to have an insulated bearing added at the N-end to avoid that any shaft current could damage the bearing races. Standard IEC EN 60034-17 suggests the use of that bearing from frame size 280 / rated power 75 kW and above. REEL always offers the insulated bearing at the N-end side as option..

Permissible **radial loads** (F_R)

The following tabel shows permissible radial forces on the shaft in Newtons, assuming:

- zero axial force;
- normal ambient temperature (-20°C ; +40°C);
- standard bearings.

The values refer to normal conditions and to the rated speed. For different speeds, the values have to be multiplied by the coefficient resulting from the formula:

(rated speed shown in table / desired speed) * 0,33.

For different bearing life, the values have to be multiplied by the following coefficients: 0,87 (bearing life: 30.000 hours); 0,79 (bearing life: 40.000 hours); 0,74 (bearing life: 100.000 hours).

Speed: 3000 rpm			Bearing life: 20.000 hours		Bearing life: 40.000 hours	
Motor size	D [mm]	E [mm]	$X = X_0$	$X = E$	$X = X_0$	$X = E$
71	14	30	486	414	333	279
80	19	40	662	558	527	441
90	24	50	725	594	531	437
100	28	60	774	626	329	266
112	28	60	783	644	329	270
132	38	80	1548	1260	801	653
160S	42	110	3186	2466	2660	2057
160M	42	110	3186	2466	2660	2043
160L	42	110	3060	2340	2570	1980
180M	48	110	3690	3047	3110	2543
200S	55	110	5040	4217	4230	3533
225M	55	110	5040	4230	4217	3546
280Sb	75	140	6660	5580	5220	4500
280M	75	140	6570	5400	5220	4410
315S	80	170	23760	7020	19395	7020
315M	80	170	23985	8753	19440	8753
315La	80	170	24255	8505	19620	8505
315Lb	80	170	24255	8505	19620	8505

Speed: 1500 rpm			Bearing life: 20.000 hours		Bearing life: 40.000 hours	
Motor size	D [mm]	E [mm]	$X = X_0$	$X = E$	$X = X_0$	$X = E$
71	14	30	612	522	486	410
80	19	40	833	702	661	554
90	24	50	914	752	724	594
100	28	60	1269	1022	774	626
112	28	60	1283	1049	783	639
132	38	80	2088	1701	1548	1260
160M	42	110	3600	2790	2992	2313
160L	42	110	3677	2970	3033	2453
180M	48	110	3843	3137	3172	2597
180L	55	110	3767	3060	3096	2529
200M	55	110	5657	4680	4716	3933
225S	60	140	6570	5310	5539	4473
225M	60	140	6377	5130	5296	4280
280S	75	140	9770	8284	7753	6584
280M	75	140	8280	7020	6570	5580
280L	75	140	8280	7110	6570	5580
315S	80	170	29250	8640	23940	8640
315M	80	170	29250	8640	23940	8640
315La	80	170	29430	12240	23850	12240
315Lb	80	170	29430	12240	23850	12240
355S	100	210	40950	12600	33210	12600
355M	100	210	41310	12240	33480	12240
355L	100	210	41400	11700	33570	11700

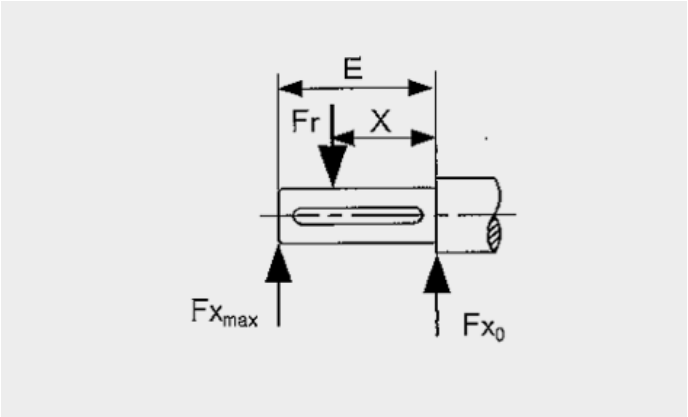
Speed: 1000 rpm			Bearing life: 20.000 hours		Bearing life: 40.000 hours	
Motor size	D [mm]	E [mm]	Frame	D[mm]	E [mm]	Frame
280Sa	75	140	9540	8010	7560	6300
280Sb	75	140	9540	8010	7560	6300
280M	75	140	9450	8100	7470	6390
315S	80	170	33570	12015	27270	12015
315M	80	170	33570	12015	27270	12015
315La	80	170	29430	12240	23850	12240
315Lb	80	170	29430	12240	23850	12240
355S	100	210	46260	12600	37530	12600
355M	100	210	46350	12240	37890	12240
355L	100	210	46800	11700	37800	11700

The permissible force can be calculated with the following formula:

$$F_r = 19.5 \cdot 10^6 \cdot K \cdot \frac{P_n}{D \cdot n_n}$$

- D: diameter of pulley (mm)
- Pn: nominal power of motor (kW)
- nn: nominal speed of motor (rpm)
- k: belt tension factor:
 - 1,25 for toothed belts
 - 2,35 for trapezoidal belts.
- Fr: radial load

In case of higher radial force than the one shown in the table, please contact REEL.



Maximum speed

The synchronous reluctance motor controlled by a frequency converter could be asked to operate at a higher speed than the nominal one. The table shows the maximum mechanical speed achievable by SuPremE motors.

Motor size	Max speed (rpm)
80	4500
90	4500
100	4500
112	4500
132	4500
160	4500
180	4500
200	4500
225	4500
280	3600
315	3600
355	3600

Dimensions

Motor frame sizes: A071M – A225M	Aluminium housing: A071M - A132M Cast iron housing: A160M - A225M
Mounting arrangement: IM1001 - B3	OVERALL DIMENSIONS [mm]

The technical drawings illustrate the motor's dimensions from three perspectives: front, side, and end view. The front view shows the motor's profile with dimensions L (total length), U (frame length), UU (total length including mounting plate), LD (mounting plate length), LL (mounting plate width), BE (mounting plate height), DB (mounting plate thickness), EB (mounting plate width), D (mounting plate diameter), E (mounting plate height), C (mounting plate width), B (mounting plate height), BB (mounting plate width), AC (mounting plate height), and V (mounting plate width). The side view shows the motor's profile with dimensions AD (total length), V (frame length), VV (total length including mounting plate), FC-Adapter (mounting plate), O (mounting plate thickness), AF (mounting plate height), HD (mounting plate height), H (mounting plate height), HA (mounting plate height), AA (mounting plate width), A (mounting plate width), AB (mounting plate width), and HA (mounting plate height). The end view shows the motor's end with dimensions GA (mounting plate width), G (mounting plate width), and F (mounting plate height).

Standard motor with optional mounting plate for FlexiMova® mm

Size	A	AA	AB	AC	AD	AF	B	BB	BE	C	D	DB	E	EB	F	G
71M	112	36	136	136	122	102	90	108	27	45	14 j6	M5	30	22	5	11
80M	125	36	154	154	142	110	100	125	39	50	19 j6	M6	40	32	6	15,5
90S	140	41	174	174	145	113	100	130	39	56	24 j6	M8	50	40	8	20
90L	140	41	174	174	145	113	125	155	39	56	24 j6	M8	50	40	8	20
100L	160	47	192	192	156	126	140	175	39	63	28 j6	M10	60	50	8	24
112M	190	40	224	216	168	138	140	176,5	39	70	28 j6	M10	60	50	8	24
132S	216	60	260	258	195	154	140	180	48,5	89	38 k6	M12	80	70	10	33
132M	216	60	260	258	195	154	178	218	48,5	89	38 k6	M12	80	70	10	33

Size	GA	H	HA	HD	K	L	LD	LL	O	U	UU	V	VV	W
71M	16	71	11	193	7	254,5	68	110	25	22	198	77	154	83,5
80M	21,5	80	13	222	10	273	73	114	25	27	198	77	154	92,5
90S	27	90	14	235	10	320	80	114	25	27	198	77	154	96
90L	27	90	14	235	10	366,5	80	114	25	34	231	84,5	169	97
100L	31	100	14	256	12	390	86	114	25	40	231	84,5	169	108
112M	31	112	14	280	12	419,5	96	114	25	50	231	84,5	169	120
132S	41	132	16	327	12	465	104	124	32	52	278	119	238	138
132M	41	132	16	327	12	507	104	124	32	52	278	119	238	138

NOTE: The technical data may be modified without prior notice.

Motor frame sizes: A071M – A225M	Aluminium housing: A071M - A132M Cast iron housing: A160M - A225M
Mounting arrangement: IM1001 (B3)	OVERALL DIMENSIONS [mm]

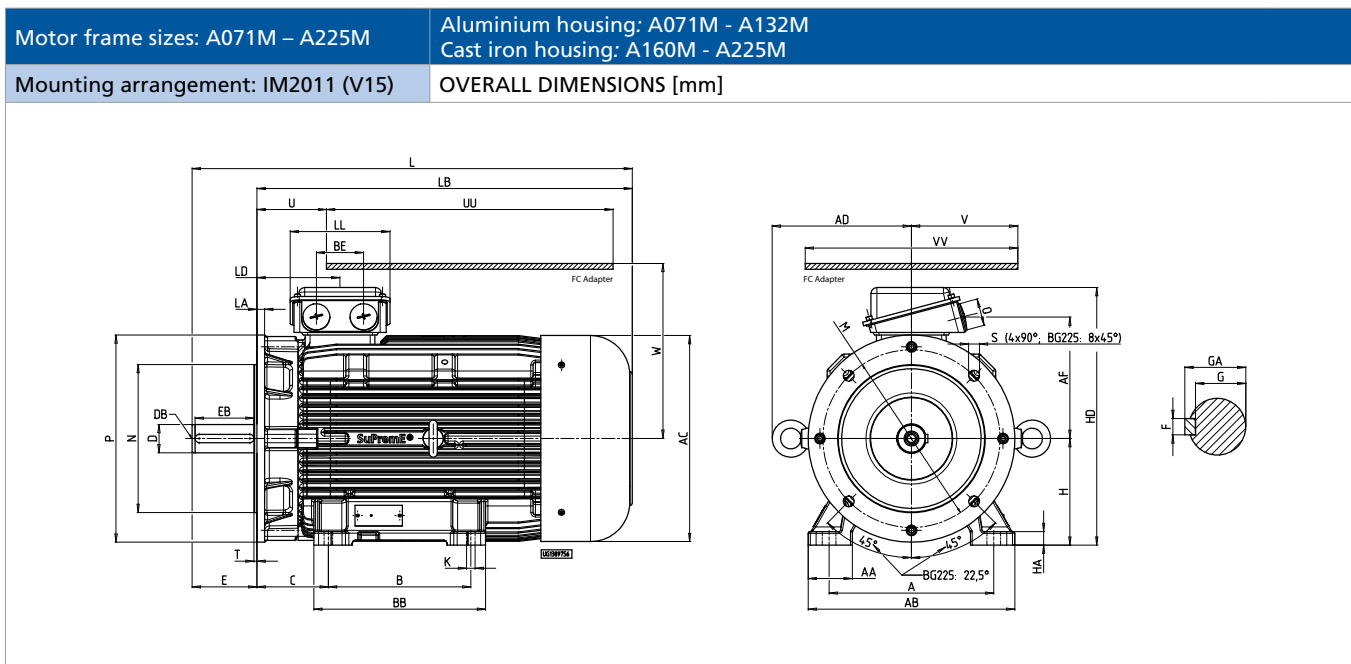
The image contains two technical drawings of a motor. The left drawing is a side view showing dimensions L, U, UU, LD, AC, DB, EB, E, C, B, BB, K, and a label 'FC Adapter'. The right drawing is a front view showing dimensions VV, AD, V, HD, H, HA, A, AB, AA, and a label 'FC Adapter'. A small detail drawing on the far right shows dimensions GA and G.

Ready only for the mounting of FlexiMova® mm

Size	A	AA	AB	AC	AD	AF	B	BB	BE	C	D	DB	E	EB	F	G
160M	254	72	318	310	243	192	210	264	56	108	42 k6	M16	110	90	12	37
160L	254	72	318	310	243	192	254	308	56	108	42 k6	M16	110	90	12	37
180M	279	75	350	347	255	205	241	291	80	121	48 k6	M16	110	100	14	42,5
180L	279	75	350	347	255	205	279	329	80	121	48 k6	M16	110	100	14	42,5
200L	318	71	380	381	303	238	305	365	90	133	55 m6	M20	110	100	16	49
225S	356	92	436	431	323	256	286	346	90	149	60 m6	M20	140	125	18	53
225M 1500rpm	356	92	436	431	323	256	311	371	90	149	60 m6	M20	140	125	18	53
225M 3000rpm	356	92	436	431	323	256	311	371	90	149	55 m6	M20	110	100	16	49

Size	GA	H	HA	HD	K	L	LD	LL	O	U	UU	V	VV	W
160M	45	160	23	403	14,5	615	148	190	32	67	278	119	238	167
160L	45	160	23	403	14,5	660	148	190	32	75	418	160	320	243
180M	51,5	180	23	435	14,5	745	140,5	169	40	43	418	160	320	271,5
180L	51,5	180	23	435	14,5	773	140,5	169	40	59	600	233	466	296,5
200L	59	200	23	503	18,5	846	195,5	224	50	24	600	233	466	311,5
225S	64	225	30	548	18,5	887	212	224	50	14	600	233	466	337,5
225M 1500rpm	64	225	30	548	18,5	912	212	224	50	26,5	600	233	466	337,5
225M 3000rpm	59	225	30	548	18,5	882	212	224	50	26,5	600	233	466	337,5

NOTE: The technical data may be modified without prior notice.



Standard motor with optional mounting plate for FlexiMova® mm

Size	A	AA	AB	AC	AD	AF	B	BB	BE	C	D	DB	E	EB	F	G	GA	H
71M	112	36	136	136	122	102	90	108	27	45	14 j6	M5	30	22	5	11	16	71
80M	125	36	154	154	142	110	100	125	39	50	19 j6	M6	40	32	6	15,5	21,5	80
90S	140	41	174	174	145	113	100	130	39	56	24 j6	M8	50	40	8	20	27	90
90L	140	41	174	174	145	113	125	155	39	56	24 j6	M8	50	40	8	20	27	90
100L	160	47	192	192	156	126	140	175	39	63	28 j6	M10	60	50	8	24	31	100
112M	190	40	224	216	168	138	140	176,5	39	70	28 j6	M10	60	50	8	24	31	112
132S	216	60	260	258	195	154	140	180	48,5	89	38 k6	M12	80	70	10	33	41	132
132M	216	60	260	258	195	154	178	218	48,5	89	38 k6	M12	80	70	10	33	41	132

Size	HA	HD	K	L	LA	LB	LD	LL	M	N	O	P	S	T	V	VV	W
71M	11	193	7	254,5	9	224,5	68	110	130	110	25	160	10	3,5	77	154	83,5
80M	13	222	10	273	10	233	73	114	165	130	25	200	12	3,5	77	154	92,5
90S	14	235	10	320	10	270	80	114	165	130	25	200	12	3,5	77	154	96
90L	14	235	10	366,5	10	316,5	80	114	165	130	25	200	12	3,5	84,5	169	97
100L	14	256	12	390	15	330	86	114	215	180	25	250	14,5	4	84,5	169	108
112M	14	280	12	419,5	15	359,5	96	114	215	180	25	250	14,5	4	84,5	169	120
132S	16	327	12	465	16	385	104	124	265	230	32	300	14,5	4	119	238	138
132M	16	327	12	507	16	427	104	124	265	230	32	300	14,5	4	119	238	138

NOTE: The technical data may be modified without prior notice.

Motor frame sizes: A071M – A225M	Aluminium housing: A071M - A132M Cast iron housing: A160M - A225M
Mounting arrangement: IM2011 (V15)	OVERALL DIMENSIONS [mm]

Ready only for the mounting of FlexiMova® mm

Size	A	AA	AB	AC	AD	AF	B	BB	BE	C	D	DB	E	EB	F	G	GA	H	HA
160M	254	71,5	318	310	230	180	210	260	80	108	42 k6	M16	110	90	12	37	45	160	22
160L	254	71,5	318	310	230	180	254	304	80	108	42 k6	M16	110	90	12	37	45	160	22
180M	279	85	360	348	252	210	241	291	80	121	48 k6	M16	110	100	14	42,5	51,5	180	23
180L	279	75	350	347	255	205	279	329	80	121	48 k6	M16	110	100	14	42,5	59	200	23
200L	318	85,5	394	385	303	238	305	365	90	133	55 m6	M20	110	100	16	49	59	200	23
225S	356	92	436	431	323	256	286	346	90	149	60 m6	M20	140	125	18	53	64	225	30
225M 1500rpm	356	92	436	433	323	256	311	371	90	149	60 m6	M20	140	125	18	53	64	225	30
225M 3000rpm	356	92	436	433	323	256	311	371	90	149	55 m6	M20	110	100	16	49	59	225	30

Size	HD	K	L	LA	LB	LD	LL	M	N	O	P	S	T	U	UU	V	VV	W
160M	403	14,5	615	16	505	148	190	300	250	32	350	18	5	67	278	119	238	167
160L	403	14,5	660	16	550	148	190	300	250	32	350	18	5	-	-	-	-	-
180M	435	14,5	745	13	635	140,5	169	300	250	40	350	18,5	5	-	-	-	-	-
180L	435	18,5	773	13	663	140,5	169	300	250	40	350	18,5	5	-	-	-	-	-
200L	503	18,5	846	15	736	195,5	224	350	300	50	400	18,5	5	-	-	-	-	-
225S	548	18,5	887	16	747	212	224	400	350	50	450	18,5	5	-	-	-	-	-
225M 1500rpm	548	18,5	912	16	772	212	224	400	350	50	450	18,5	5	-	-	-	-	-
225M 3000rpm	548	18,5	882	16	772	212	224	400	350	50	450	18,5	5	-	-	-	-	-

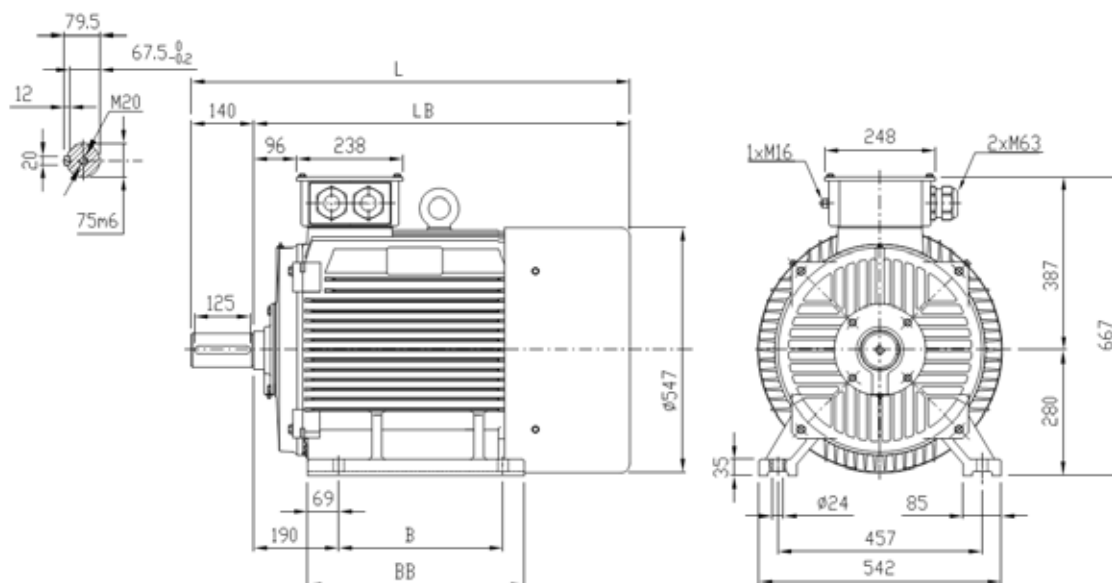
NOTE: The technical data may be modified without prior notice.

Motor frame size: SRCa280

Cast-iron housing

1000 - 3000 IM1001 (B3)

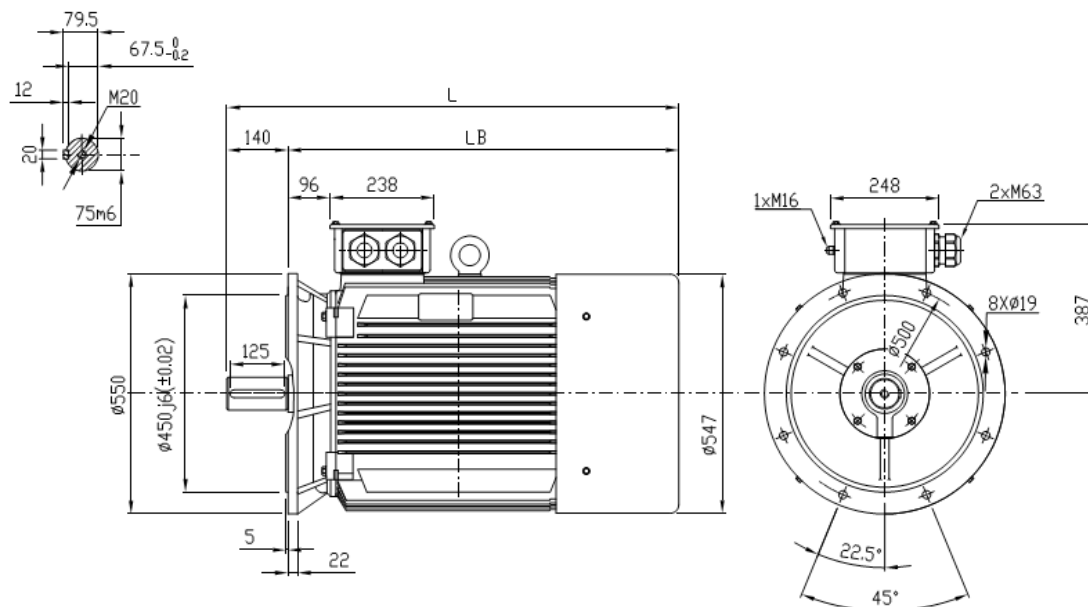
OVERALL DIMENSIONS [mm]



Size	B	BB	LB	L
280Sa4	368	485	815	955
280Sb4	368	485	815	955
280M4	419	536	900	1040

1000 - 3000 IM3001 (B5)

OVERALL DIMENSIONS [mm]



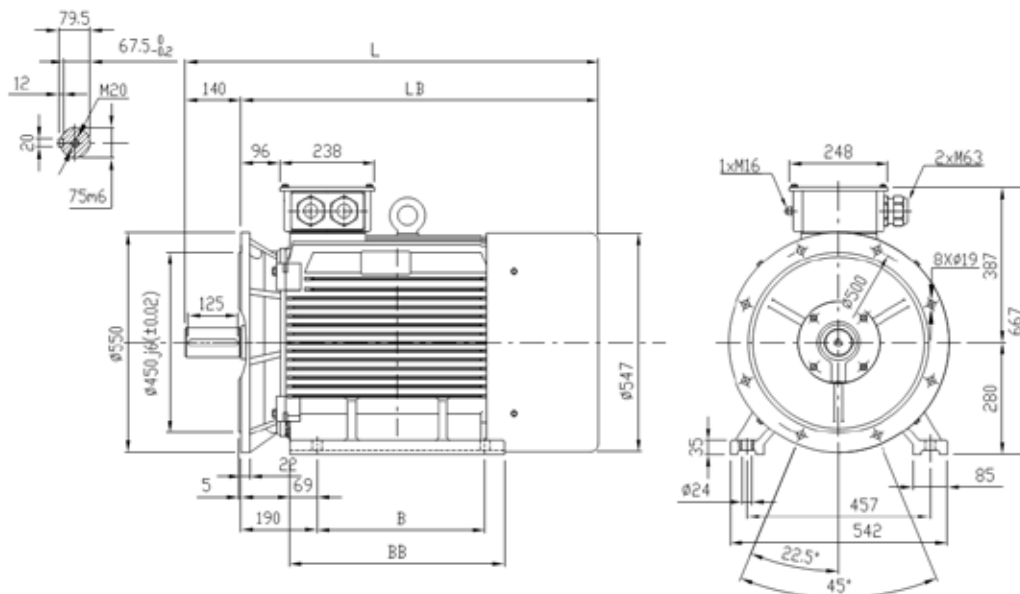
Size	LB	L
280Sa4	815	955
280Sb4	815	955
280M4	900	1040

NOTE: The technical data may be modified without prior notice.

Motor frame size: SRCa280

Cast iron housing

1000 - 3000 IM 2001 (B35) OVERALL DIMENSIONS [mm]

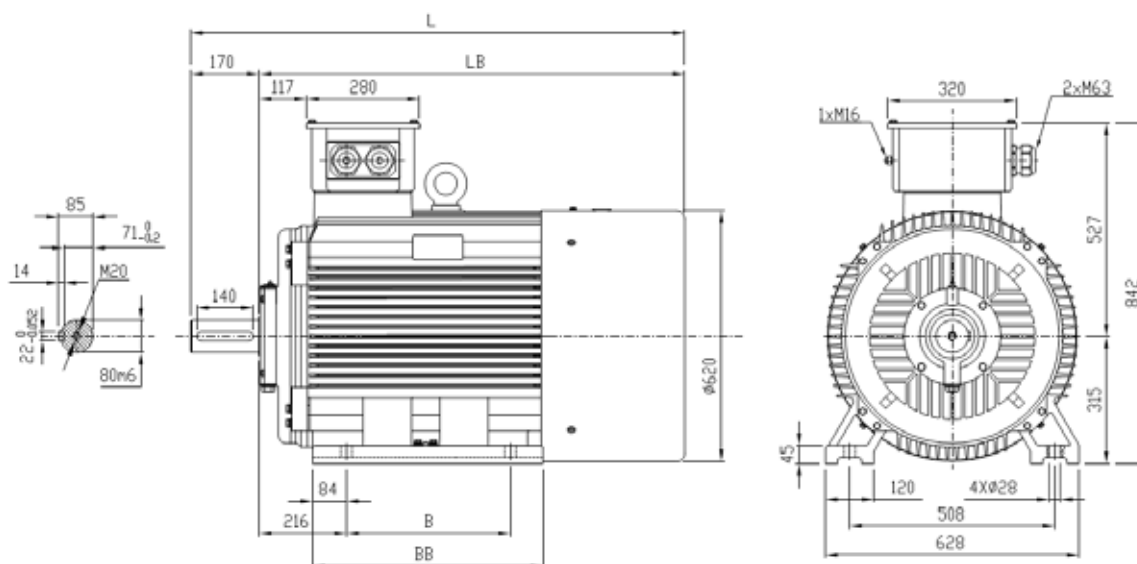


Size	B	BB	LB	L
280Sa4	368	485	815	955
280Sb4	368	485	815	955
280M4	419	536	900	1040

Motor frame size: SRCa315

Cast iron housing

1000 - 3000 IM 1001 (B3) OVERALL DIMENSIONS [mm]



Size	B	BB	LB	L
315S4	475	570	1045	1215
315M4	585	680	1155	1325
315La4	585	680	1155	1325
315Lb4	585	680	1155	1325

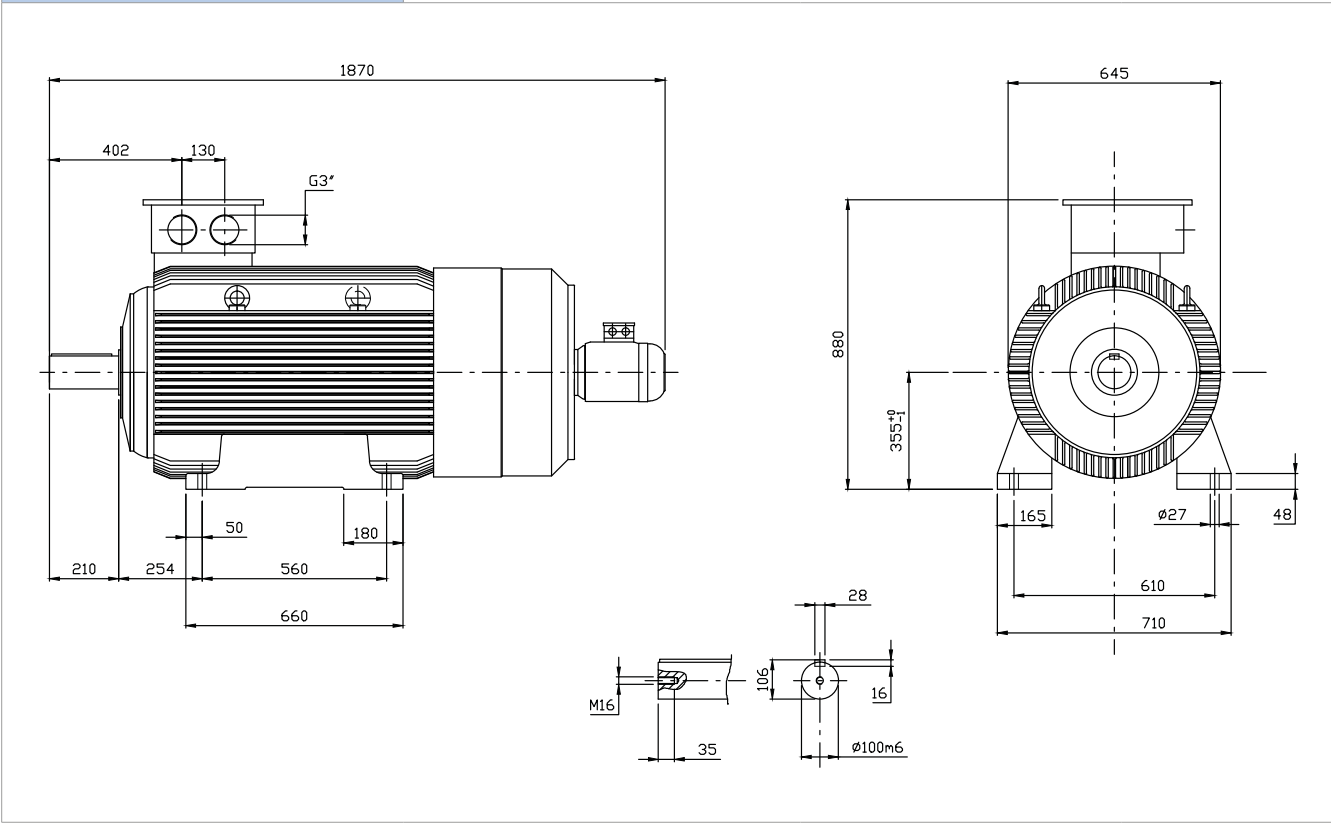
NOTE: The technical data may be modified without prior notice.

Motor frame size: SRCa355 S

Cast iron housing

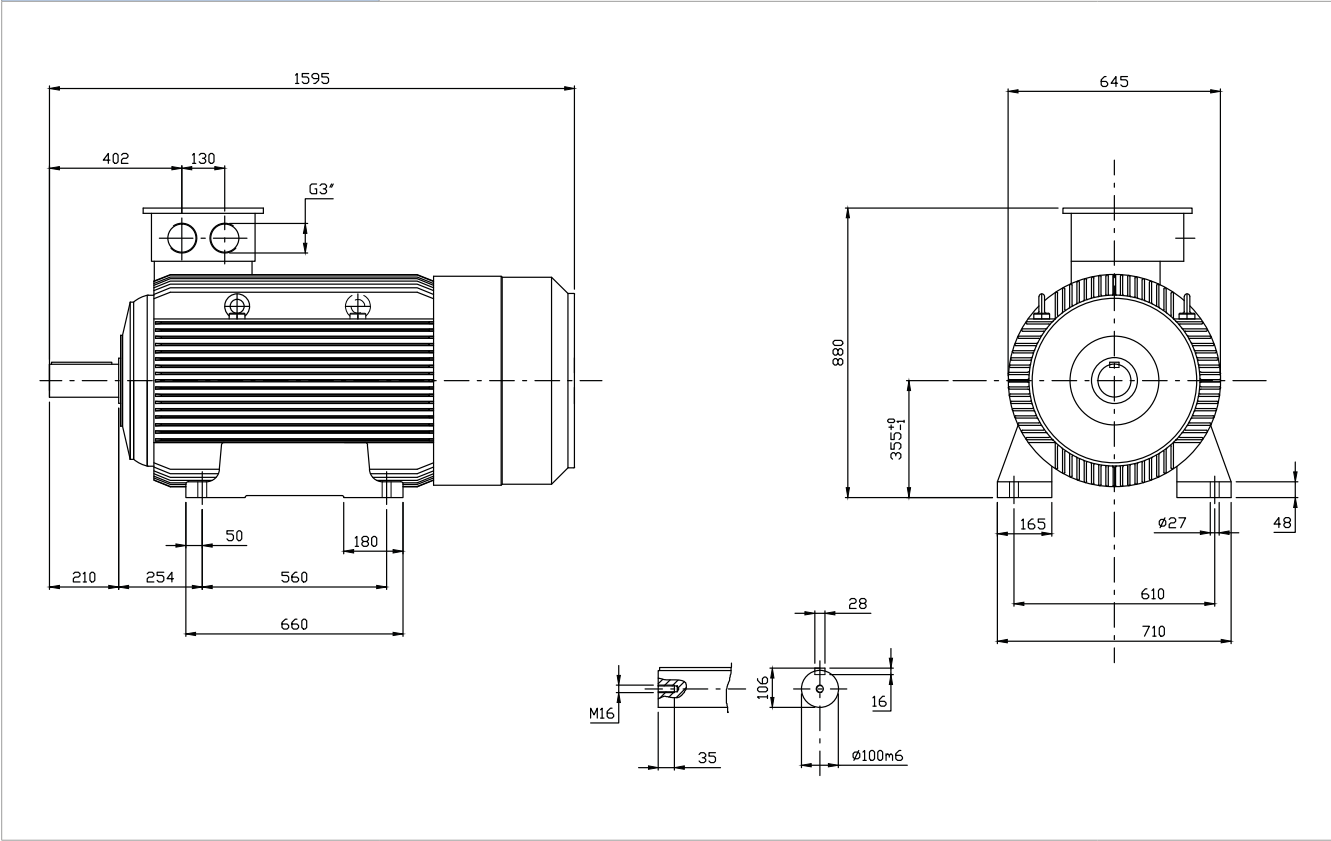
1000 - 3000 IM1001 (B3) IC416

OVERALL DIMENSIONS [mm]



1000 - 3000 IM1001 (B3) IC411

OVERALL DIMENSIONS [mm]



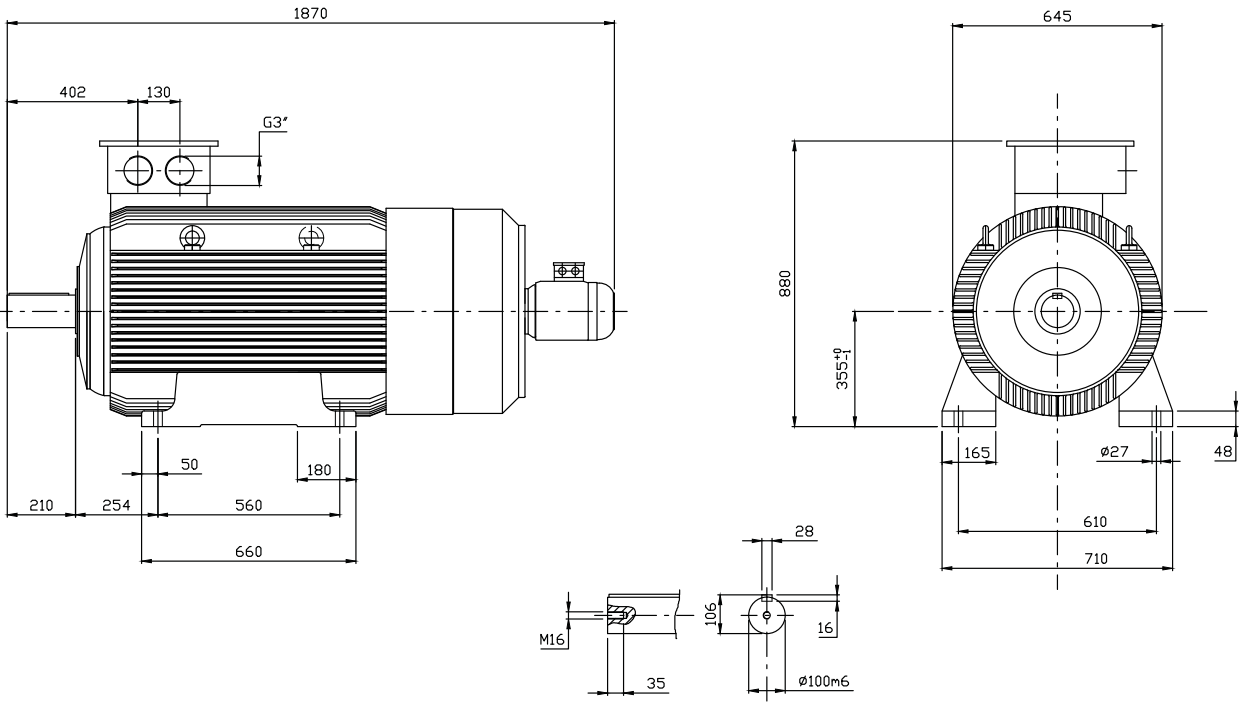
NOTE: The technical data may be modified without prior notice.

Motor frame size: SRCa355 L

Cast iron housing

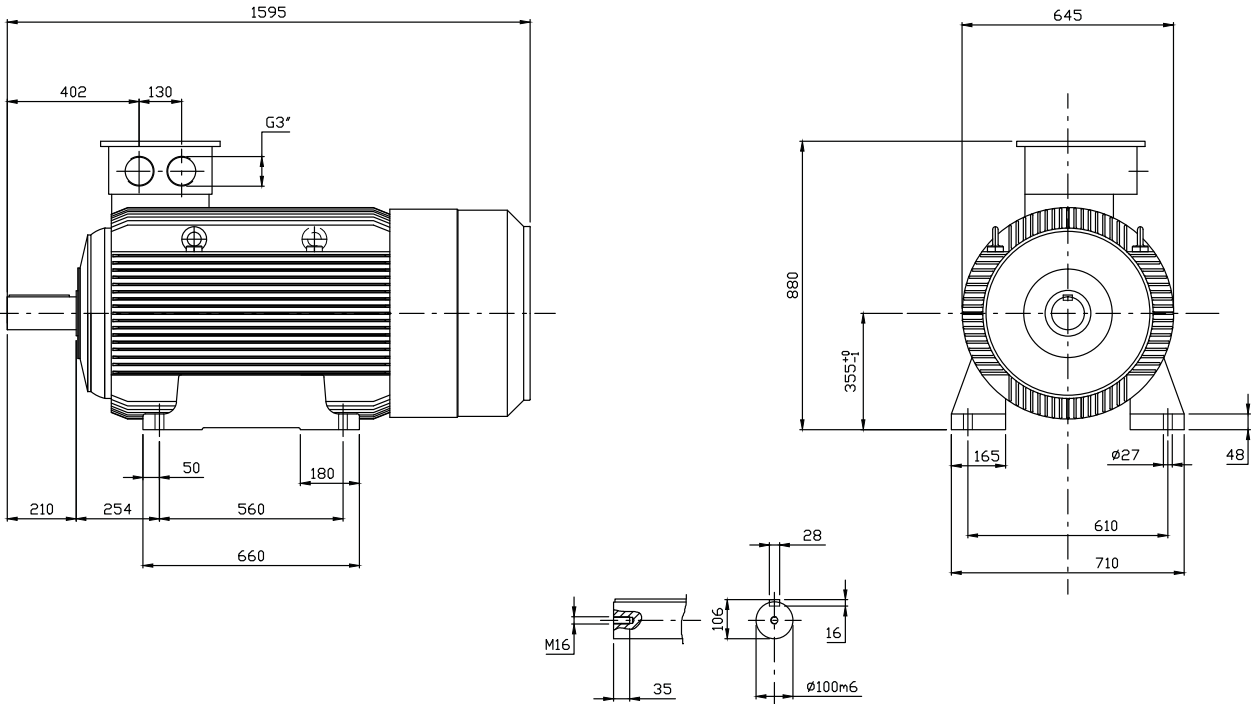
1000 - 3000 IM1001 (B3) IC416

OVERALL DIMENSIONS [mm]



1000 - 3000 IM1001 (B3) IC411

OVERALL DIMENSIONS [mm]



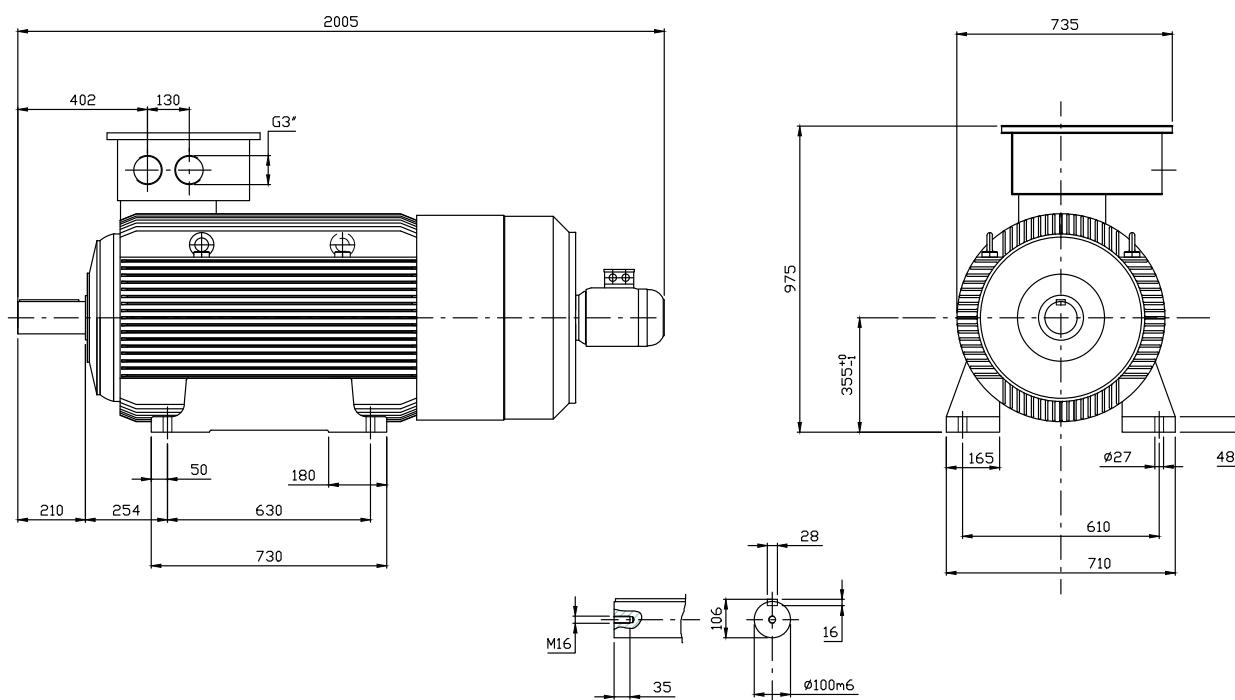
NOTE: The technical data may be modified without prior notice.

Motor frame size: SRCa355 X

Cast iron housing

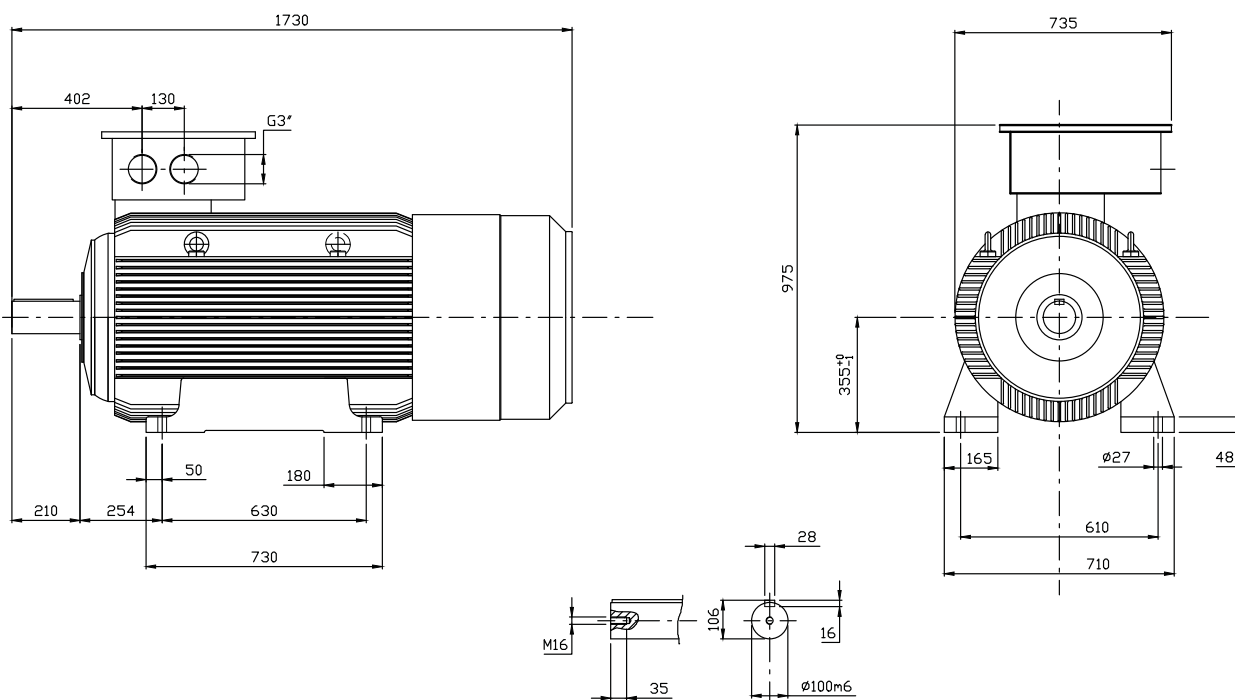
1000 - 3000 IM1001 (B3) IC416

OVERALL DIMENSIONS [mm]



1000 - 3000 IM1001 (B3) IC411

OVERALL DIMENSIONS [mm]



NOTE: The technical data may be modified without prior notice.

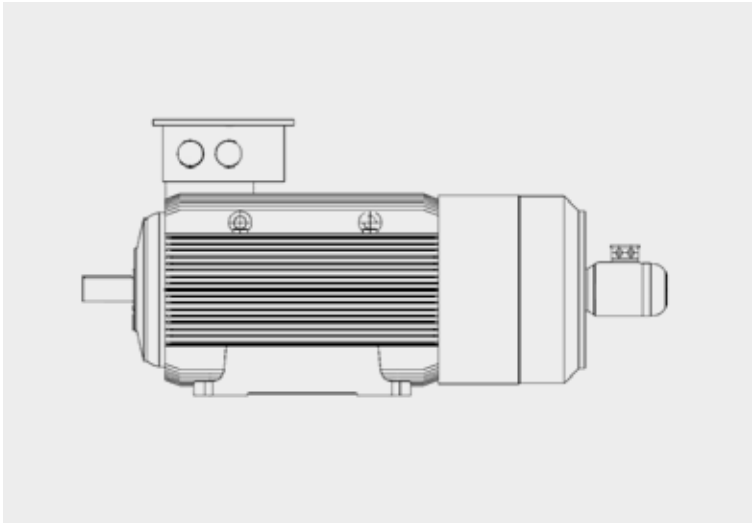
Motors with axial fan IC 416

For constant torque applications we recommend to mount a separated axial fan.

The cooling system is supplied separately to ensure the efficient cooling of the motor at low speed. The terminals of the fan are placed on a separate terminal box.

REEL assures the degree of protection IP55.

Axial fan data								
Size	Poles	Phases	Power W	Voltage ±10%	Current A max	Frequency Hz	Weight kg	ΔL mm
180	NA	NA	NA	NA	NA	NA	NA	NA
225	NA	NA	NA	NA	NA	NA	NA	NA
280	4	3	187/262	400/480	0,64/0,70	50/60	19	230
315	4	3	199/285	400/480	0,64/0,70	50/60	24	210
355	6	3	238/349	400/480	0,64/0,72	50/60	29	215



Mounting arrangements

The REEL SuPremE® motors are available in the standard mounting options IM1001 (B3), IM3001 (B5), IM3601 (B14) and in combined mounting arrangements such as IM2001 (B35) and IM2101 (B34).

Motors can also be installed in the corresponding vertical shaft configuration, as shown in the following table.

Mounting option I - II	Horizontal	Motor size				Mounting option I - II	Vertical	Motor size			
		71 132	160 - 225	280 - 315	355			71 132	160 - 225	280 - 315	355
IM B3 - IM 1001 Feet		●	●	●	●	IM V1 - IM 3011 Flange with through holes		●	○	●	●
IM B35 - IM 2001 Feet + flange with through holes		●	●	●	●	IM V15 - IM 2011 Feet + flange with through holes		●	●	●	●
IM B34 - IM 2101 Feet + flange with threaded holes		○	○	×	×	IM V3 - IM 3031 Flange with through holes		●	○	×	×
IM B5 - IM 3001 Flange with through holes		●	○	●	×	IM V36 - IM 2031 Feet + flange with through holes		●	○	○	×
IM B6 - IM 1051 Feet		●	●	○	×	IM V5 - IM 1011 Feet		●	●	○	×
IM B7 - IM 1061 Feet		●	●	○	×	IM V6 - IM 1031 Feet		●	●	○	×
IM B8 - IM 1071 Feet		●	●	○	×	IM V18 - IM 3611 Flange with threaded holes		○	○	○	×

● Available ○ On request × Not applicable





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