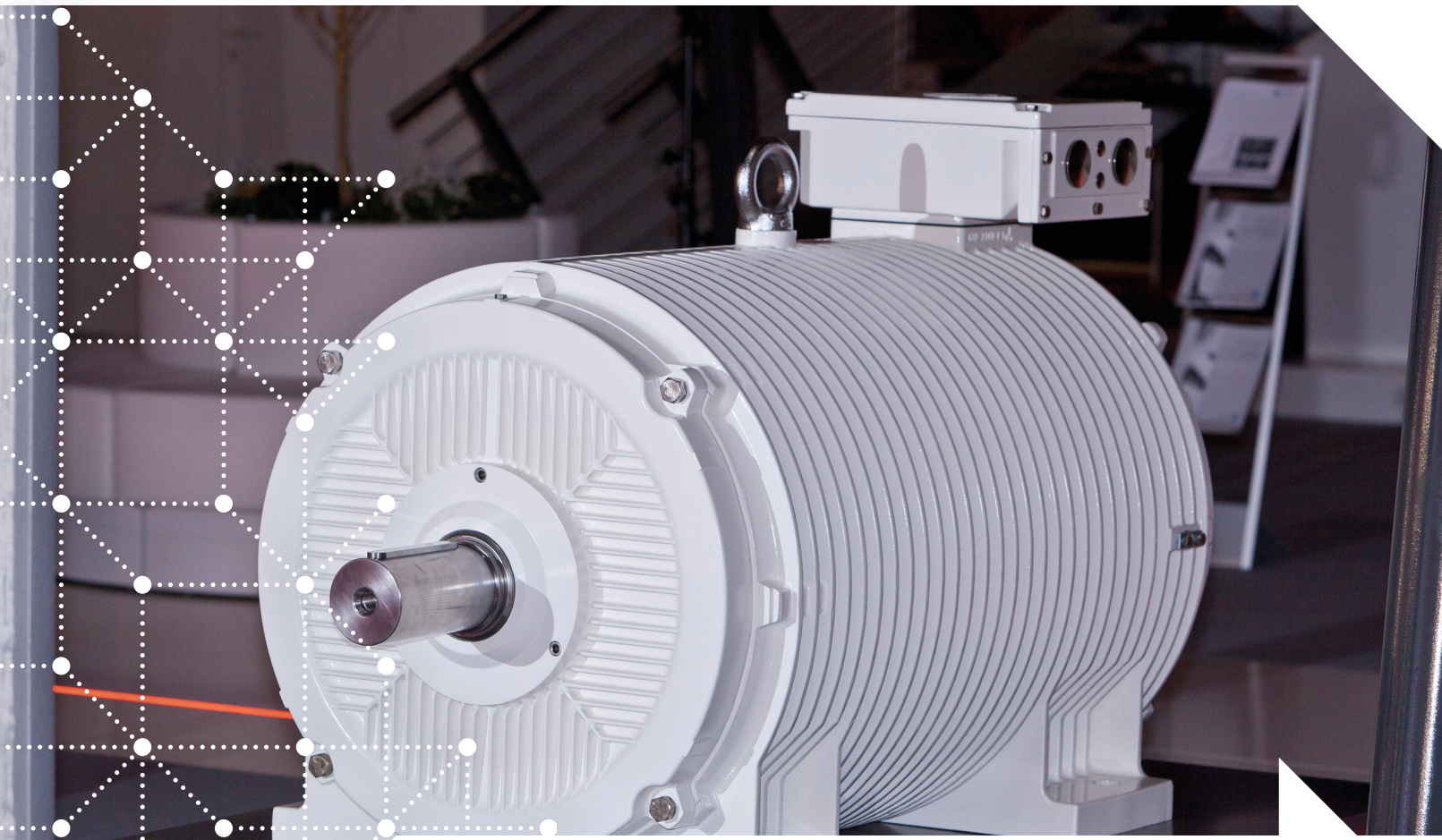
ELECTRIC DRIVES
FOR EVERY DEMAND



Low-voltage asynchronous motors

Three-phase roller table motors with squirrel-cage rotor for mains and converter-fed operation

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The products featured in this catalogue are also presented in the VEM interactive electronic catalogue.
Further information about the company and the VEM product range can be found on the Internet at www.vem-group.com.
This online information assists you in your selection and configuration of a drive solution and incorporates functions to print out data sheets and product enquiries. In addition, scale and dimensioned product drawings can be displayed or exported in various 2D and 3D formats.
Alongside general information about the VEM group, direct access is provided to catalogues, spare parts lists, operating manuals and maintenance instructions for the individual product groups.

Note:
We are at all times committed to constant further improvement of our products. Design details, technical data and illustrations are thus subject to change and may only be deemed binding after written confirmation by the manufacturer.

Introduction

VEM is an innovative, dependable and internationally recognised manufacturer of technically sophisticated system and drive solutions, as well as special drives and individual components. The product range covers practically the complete spectrum of electric motors and drives for industrial use. Through many years of experience in three-phase drive design, manufacturing, assembly and project development, VEM has gathered a wealth of know-how in many special fields of application. One of these fields is the steel and rolling mill industry, with its extremely challenging demands and operating conditions. VEM has developed a full, complex package of drive solutions tailored to the specific requirements of this sector. This package includes not only "classic" roller table motors, but also geared table motors in numerous versions and "special motors" for particular applications in the rolling mill industry.

	Light-duty VEM roller table motors				Heavy-duty VEM roller table motors		
Series	(IEx-)A..R	(IEx-)A..F	(IEx-)A..O	(IEx-)A..B	ARB	ARC	DS..
Type of cooling	IC 411 Self-ventilated	IC 416 Forced-ventilated	IC 410 Non-ventilated	IC 31 W Water-cooled	IC 410 Non-ventilated	IC 410 Non-ventilated	IC 410, IC 411,IC 416, 31 W -
Power supply	Mains or converter-fed				Mains	Converter-fed	Mains or converter-fed
Sizes	63 … 400		63 … 400	225 … 280 / 280 … 400	22, 33, 54, 65	112 … 400	355 … 630
Efficiency class to EN 60034-30	without, IE1, IE2 or IE3				without		
Output range [kW]	0.06 … 710		0.06 … 235	37… 90 / 110 … 710	0.4 … 5.5	1.1… 290	100 … 1,500
Duty types	S1, S3, S6, S7, S9				S4	S3, S6, S7, S9	S1, S3, S6, S7, S9
Rated torque [Nm]	1 … 4,550		0.3 … 1,515	240 … 600 / 700 … 4,550	2.5 … 35	10 … 2,500	1,000 … 15,000
Acceleration torque [Nm]	1.6 … 7,000		0.5 … 2,700	490 … 1,000 / 1,260 … 8,200	22 … 240	45 … 7,500	1,000 … 25,000
Housing material	EN-GJL-200, optionally EN-GJS 500			Sheet steel	EN-GJL-200	EN-GJL-200 optionally EN-GJS 500	Sheet steel
Housing type	Ribbed (horizontal/ vertical)		Smooth surface		Ring-ribbed		Smooth/ ribbed
Thermal class	Thermal class 155, optionally 155 (F(B)), 180						
Transponder	Optional RFID system iID®2000 (13.56 MHz based on ISO 15693), (size A42. 400 as standard)						

Light-duty roller table motors, series A4.R, A4.O, A4.F for mains and converter-fed operation

Output range	0.09 – approx. 710 kW
Type of protection	IP 55 to DIN EN 60034-5, higher protection ratings as an option
Types of cooling	IC 410, IC 411, IC 416 and water-jacket cooling to DIN EN 60034-6
Construction types	IM B3, IM B35, IM B5 and derived types to DIN EN 60034-7

The series AA4.R (IC 411), A4.O (IC410) and A4.F (IC 416) are derived from the VEM standard motor series and are mechanically identical in their principle design elements. The motor windings have been adapted to the particular application of roller table drive. All screwed connections are additionally secured and the corrosion protection is similarly adapted for use in rolling mills.

Heavy-duty roller table motors, series ARC for converter-fed operation

Sizes	112 – 400
Output range	0.4 – approx. 240 kW
Type of protection	IP 55 to DIN EN 60034-5, higher protection ratings as an option
Types of cooling	IC 410, IC 411, IC 416 and water-jacket cooling to DIN EN 60034-6
Construction types	IM B3, IM B35, IM B5 and derived types to DIN EN 60034-7

The series ARC (IC 410) is designed for converter-fed operation in rolling mill applications. It represents a combination of the positive features of a converter-fed double squirrel-cage rotor, with its torque characteristic geared to optimum acceleration (MK/MB approx. 3), and the mechanically robust construction of a heavy-duty roller table motor. The overall design is identical to that of a VEM standard motor, with the exception of the housing form (circumferential ribs) and the bearing/seal arrangement on the D end.

Heavy-duty roller table motors, series ARB for mains operation

Sizes	22 (132), 33 (125), 54 (180), 65 (200)
Output range	0.4 – 5.5 kW
Type of protection	IP 55 to DIN EN 60034-5, higher protection ratings as an option
Type of cooling	IC 410 to DIN EN 60034-6
Construction types	IM B3, IM B35, IM B5 and derived types to DIN EN 60034-7

The heavy-duty roller table motor ARB (IC 410) is designed for mains operation. As with the ARC series, the housing is provided with circumferential cooling ribs. It is manufactured from grey-cast iron with ribs running transverse to the shaft direction. The conventional motor design achieves a soft torque characteristic and long blocking times.

Transnorm motors, series DS, DSf, DSo, DSWM for mains and converter-fed operation

Sizes	355 – 630
Output range	100 – approx. 1400 kW
Type of protection	IP 55 to DIN EN 60034-5, higher protection ratings as an option
Types of cooling	IC 410, IC 411, IC 416 and water-jacket cooling to DIN EN 60034-6
Construction types	IM B3, IM B35, IM B5 and derived types to DIN EN 60034-7

Robust to meet the toughest demands

The motors are designed as welded steel constructions and can be adapted to specific project demands.
The drive elements of the mill and driving tables in rolling mills are subjected to particularly exacting electrical and mechanical demands. They must cope with a diversity of operating modes, such as continuous, intermittent and short-time duty, as well as start-up, braking and reversing functions. Furthermore, the motors must withstand the high ambient temperatures arising from the molten steel and the overloads which may occur if jammed stock blocks the transport system. Exposure to water must frequently be expected, and this must be taken into account by the mechanical design of the motor. VEM roller table motors are ideally prepared to handle all such extreme operating conditions.

Figure 1: Wide hot strip mill train, ARC 315

Proven quality – modern design

VEM roller table motors of the classic series ARB 22 – 65 have been demonstrating their function capabilities and reliability under often extreme ambient conditions for many decades.
On the basis of this experience, VEM has developed several variants of roller table motors, which are each adapted to the special requirements of modern drive technologies for use in conjunction with a frequency converter. The motor windings are designed specifically for converter-fed operation. In contrast to a classic roller table motor design with soft torque characteristic and long blocking times, roller table motors for converter-fed operation feature a specially tailored characteristic, as is typical for a double squirrel-cage rotor. This ensures reliable synchronous operation with grouped drives, even under changing loads, which in turn is a prerequisite for high rolling quality.

Figure 2: Motor of the ARB series for mains operation

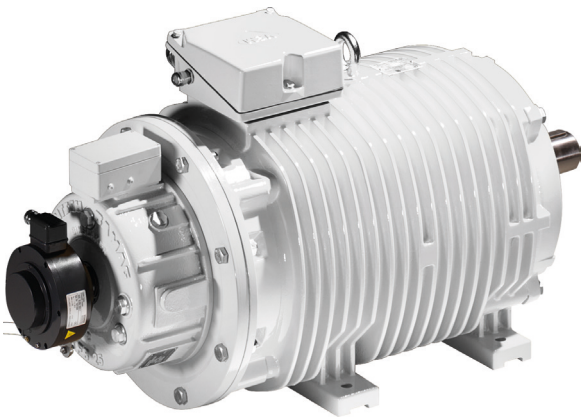


Figure 3: Motor of the ARC series with built-on holding brake and incremental encoder

Versatile applications – individual adaptation

With regard to their mechanical design, the motors are available either as robust grey-cast constructions with horizontal/vertical ribbing, in versions with self- or forced ventilation as series IE3-A4.R/A4.F or in a non-ventilated version as series IE3-A4.0, or else on the basis of a ring-ribbed housing in the case of series ARC and ARB.
In converter-fed operation, the operating speeds can be matched perfectly to the individual drive requirements. As control is realised primarily in the lower frequency range, project-specific adaptation of the windings and the use of a frequency converter with automatic voltage boost or field-oriented control are recommended. The windings are designed specifically for converter-fed operation.
Detailed operating data sheets are available to assist project planning. They are based on windings for thermal class 155. Designs for thermal class 180 are also possible as an option, for example as a means to increase the frequency of switching operations.
For existing installations, it is still possible to choose the heavy-duty series ARB, which is designed specifically for mains operation and can withstand a blocking period of several minutes without damage (soft torque characteristic, additional heat sinks on the rotor).

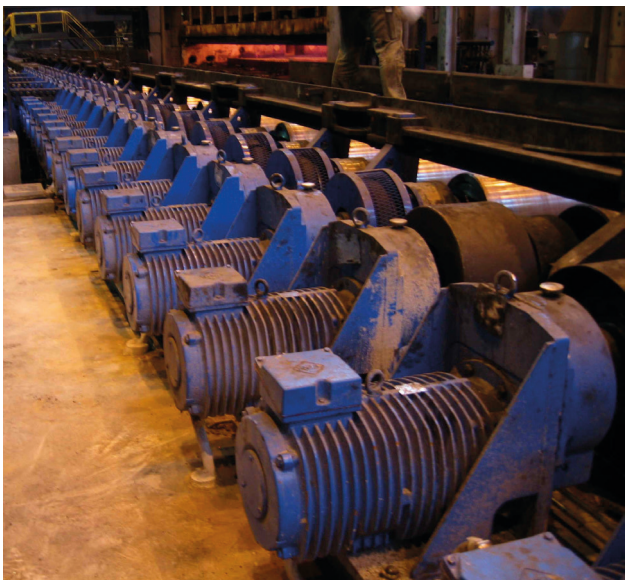


Figure 4: Furnace table with ARG 200L 12, M_{max}=1888 Nm

Geared roller table motor version

The single- and multi-stage gearing arrangements used by VEM motors GmbH are developed in cooperation with leading gear manufacturers and designed specifically for operation in continuous casting, furnace and rolling mill plant.
All individual components meet the tough demands posed by such environments. The gear housings are manufactured as grey cast iron (GG), spheroidal cast iron (GGG) or welded steel constructions, depending on the motor type and version. The dimensioning of the wall thickness ensures that ample space is available for the bearings and seals required at a particular place of installation. The actual gears are likewise matched in their dimensions to the individual demands. The gear teeth are designed as corrected involute helical teeth and have been case-hardened and honed. The quality complies with the stipulations of DIN quality class 7. The material used is 16MnCr5, 20MnCr5 or 17CrNiMo6. The drive shaft is sealed to the outside with a VITON sealing ring running on a hardened and ground bushing and with an additional labyrinth seal in order to prevent the penetration of dust, scale or water.
The gearing is oil-lubricated (immersion lubrication). For special applications, for example in continuous casting plant (high ambient temperatures), we recommend lubrication with synthetic oils. In certain cases, fluid grease may be sufficient.
The torques specified in the data sheet are firstly the nominal torque and secondly the acceleration or breakdown torque. The breakdown torque generally lies 20 – 30% above the acceleration torque. The nominal torque can be delivered 24 hours a day without influencing service life. The acceleration torque can occur for a duration of 5 seconds approx. 100 times per hour without influencing the service life of the gearing. The maximum loading of the gears is designed such that the acceleration torque can be exceeded by 2.5 times occasionally (also several times per day, but not more than 10 times per hour for 2 seconds in each case), without influencing the service life of the gearing. The gearing is durable at acceleration torque. The motors are integrated with the gearing by way of at least four bolts. They can thus be separated from the gearing at any time, for example for maintenance purposes. It is merely necessary to drain the oil from the gearing before separation. The motors always possess an oil-tight seal at the drive end. The bearing on the non-drive end is generally provided with lifetime lubrication.

Figure 5: Roller table version, SG200 ARG 200L 8, M_{max}= 1655 Nm

Figure 6: Delay table with S141–1A ARG 160L 4, M_{max}=1039 Nm

VEM – your competent partner for drive questions

Wherever our customers need electric machines, we are at hand as a partner and offer every necessary support at all phases of a project. It is not important whether you are doing business in Europe, the Middle East, Asia or America. As the VEM market share increases also outside Germany, we are also expanding our sales network with a combination of own subsidiary companies and strategic alliances. Already today, our customers can address their questions to competent and experienced local partners all over the world. The dense network of sales and service contacts comprises agents and representatives in more than 40 countries.

Standards and regulations

The motors comply with all relevant standards and regulations, in particular with the following:

Title	International IEC	Europe EN
Rotating electrical machines. Rating and performance	IEC 60034-1	EN 60034-1
Methods for determining losses and efficiency of rotating electrical machinery from tests	IEC 60034-2-1	EN 60034-2-1
Efficiency classes of single-speed, three-phase, cage-induction motors	IEC 60034-30-1	EN 60034-30-1
Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification	IEC 60034-5	EN 60034-5
Methods of cooling (IC code)	IEC 60034-6	EN 60034-6
Classification of types of construction, mounting arrangements and terminal box position (IM code)	IEC 60034-7	EN 60034-7
Terminal markings and direction of rotation	IEC 60034-8	EN 60034-8
Noise limits	IEC 60034-9	EN 60034-9
Starting performance of single-speed three-phase cage induction motors	IEC 60034-12	EN 60034-12
Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity	IEC 60034-14	EN 60034-14
Balance quality requirements	ISO 1940	-
IEC standard voltages	IEC 60038	-
Electrical insulation – Thermal evaluation and designation	IEC 60085	-
General purpose three-phase induction motors	IEC 60072-1	EN 50347

VEM motors comply furthermore with various foreign regulations which are either based on IEC 60034-1 or else transpose the latter's stipulations as European standard EN 60034-1.

The following temperature-rise limits apply in conjunction with the aforementioned standards and regulations:

Regulation	Cooling air temperature	Permissible temperature-rise limit in K measured by resistance method)				
Thermal class acc. to EN 62114	°C	105 [A]	120 [E]	130 [B]	155 [F]	14,80 [H]
EN 60034-1	40	60	75	80	105	125
IEC 60034-1	40	60	75	80	105	125
Great Britain	40	60	75	80	105	125
Italy	40	60	70	80	105	125
Sweden	40	60	70	80	105	125
Norway	40	60	-	80	105	125
Belgium	40	60	75	80	105	125
France	40	60	75	80	105	125
Switzerland	40	60	75	80	105	125

Type designation

The type designation comprises 7 basic parts + a code for special versions, namely

- the energy efficiency class,
- the motor version,
- the series code,
- the type of cooling,
- the size/ shaft height,
- the foot length and a supplementary code for output definition
- the number of poles, and
- the special version code, which are strung together to form a complete motor designation. It is not imperative for each of the 8 elements to be present. In the following, the individual elements are explained together with their possible combinations. Deviations from the type designation are only permissible for certified series, for example CSA-certified moors are only available as K11R.

The type code is valid for newly determined ID numbers from the date of publication.

IE2	-	A	E	1	R	160	M	X	2	IL	…	HW
1		2		3	4	5	6		7	8	…	9

1. Energy efficiency class

	Designation	Standard
(none)	Not classified	-
IE2	High Efficiency	IEC/EN 60034-30-1
IE3	Premium Efficiency	IEC/EN 60034-30-1

2. Motor version

	Designation
A	Roller table motor
B	Brake motor (squirrel-cage rotor)
DS	Three-phase transnorm motor as welded steel construction

3. Series

	Designation
	Not specified in case of three-phase transnorm motors as welded steel construction
E1	Energy-saving series with efficiency class IE2, design generation 1
E2	Energy-saving series with efficiency class IE2, design generation 2 (all sizes/numbers of poles)
RB	In combination with 2nd code element A: Roller table motor for mains operation, type of cooling IC 410, 4th code element not applicable
RC	Ring-ribbed housing In combination with 2nd code element A: Roller table motor for converter-fed operation, type of cooling IC 410, 4th code element not applicable
RG	Ring-ribbed housing In combination with 2nd code element A: Geared roller motor for converter-fed operation, type of cooling IC 410

4. Type of cooling

4.1 Standard series

	Designation	Type of cooling
B	Water cooling	IC 71W, (IC 31W)
WM	Water jacket cooling for three-phase transnorm motors as welded steel construction	
F	Rib cooling with built-on forced-ventilation fan	IC 416
f	Rib cooling with built-on forced-ventilation fan for three-phase transnorm motors as welded steel construction	
0	Rib cooling without own fan	IC 410
o	Rib cooling without own fan for three-phase transnorm motors as welded steel construction	
R	Rib cooling with own fan	IC 411

5. Size

63, 71, 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500, 560, 630
ARB: 22 (132), 33 (125), 54 (170) and 65 (200) – Figures in brackets: Shaft height in mm

6. Foot length/supplementary code for output definition

Foot length	Designation	Supplementary code	Designation
S	short	X	Higher output in case of two outputs/foot length
M	medium	Y	Reduced output *)
L	long	Z	Higher output in case of three outputs/ foot length

*) increased output for size 315

7.	Number of poles	
	2p=	Synchronous speed n (at 50 Hz) [rpm]
	2	3,000
	4	1,500
	6	1,000
	8	750
	10	600
	12	500
	16	375
	20	300
	24	250

Hyphen as separator in case of pole-switching motors, descending number of poles

Codes for special versions

TWH	Thermal winding protection with NTC thermistor
TPM	Thermal winding protection with PTC thermistor
WE	Special shaft
….	….

For further details, see overview of modifications

Name plate

In the normal standard version, the motor name plate displays information in the German and English languages. Other languages are possible, though an extra charge must be made for non-EU languages. The name plate displays the most important rating data, such as the type designation and motor number, output, rated voltage and frequency, rated current, type of construction, type of protection, power factor, speed and thermal class.

The scope of information may vary according to motor type. In the case of motors with relubrication system, the relubrication interval and the grease amount per lubrication cycle are also specified either on the name plate itself or on an additional plate. Name plates are attached to the housing using grooved pins such that they are permanently secure. They can be made of aluminium or stainless steel (extra charge). Consultation is necessary if additional plates are required.

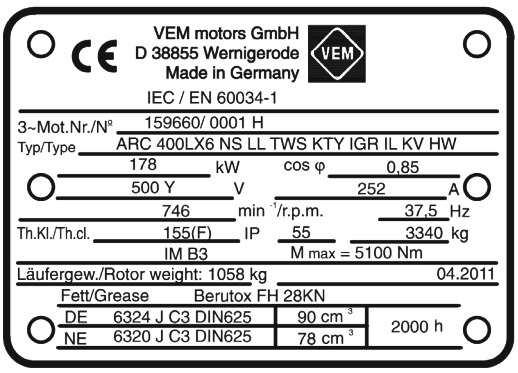


Figure 7: Example of a name plate for roller table motors

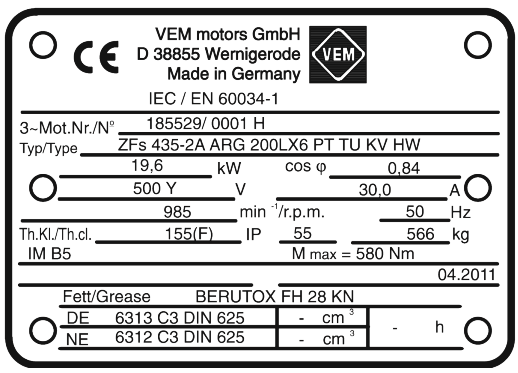
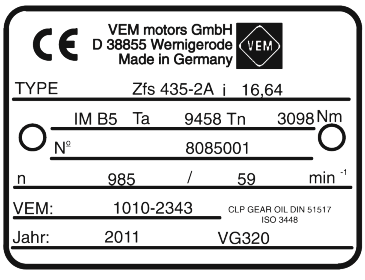


Figure 8: Example of a name plate for geared roller table motors



Cooling and ventilation

Roller table motors of the heavy-duty series ARB and ARC are designed without ventilation fans for type of cooling IC 410.
Light-duty roller table motors of series A4.R are fitted with radial fans made from plastic or cast aluminium alloy, which provide cooling independently of the running direction of the motor (IC 411 to EN 60034-6). For noise reasons, 2-pole motors with shaft height 355 can only be supplied with low-noise, direction-dependent fans. When installing the motors, a minimum clearance between the fan hood and the wall (dimension BI) must be observed to ensure correct cooling.
The fan hood is always manufactured in sheet steel. This series can also be supplied without ventilation (A4.0…) or with forced ventilation (A4.F …) as an option.

Design versions

The housings of the light-duty series A4.0 possess horizontal/vertical ribbing, those of the heavy-duty series ARB, ARC cooling ribs transverse to the shaft direction. Both housing designs are characterised by their high mechanical strength and very good thermal capacity. The terminal box for motors of the series A4.0 can be mounted either at the top, on the right or on the left, as is the case for the standard motor series K21R, K20R.
The terminal box for series ARB is mounted on the right, while that for series ARC is positioned either on the top at the non-drive end or optionally on the non-drive-end shield.

Shaft height	Series	Housing	Material for bearing end shields	Feet	Foot mounting
132 to 280	A4.R A4.0 A4.F	Grey cast iron	Grey cast iron	Grey cast iron	Bolted
315					Cast-on
355, 400	A42R,A420,A42F				
112 to 400	ARC				Cast-on
22 to 65	ARB				Cast-on
355 to 630	DS, DSf, DSo, DSWM	Steel	Steel	Steel	Welded

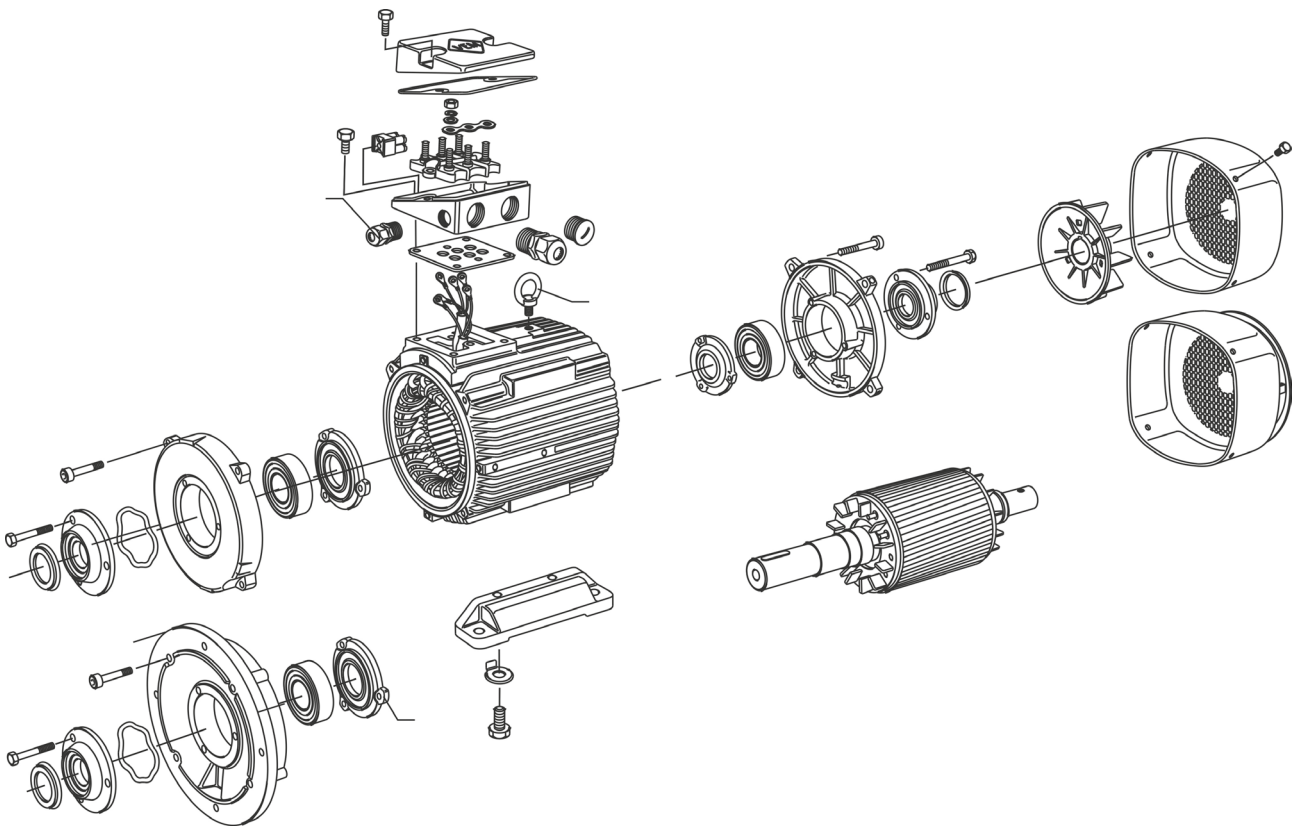


Figure 9: Design of an IE3-A4.R motor, schematic representation

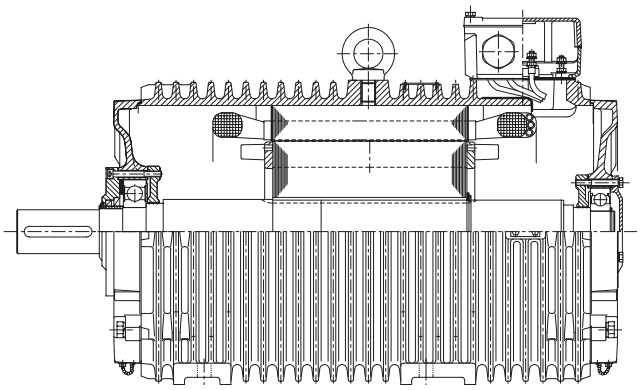


Figure 10: Design example for series ARC, with top-mounted terminal box

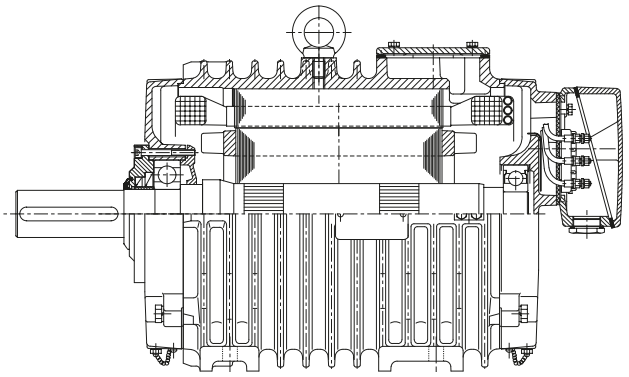


Figure 11: Design example for series ARC, terminal box on non-drive-end shield

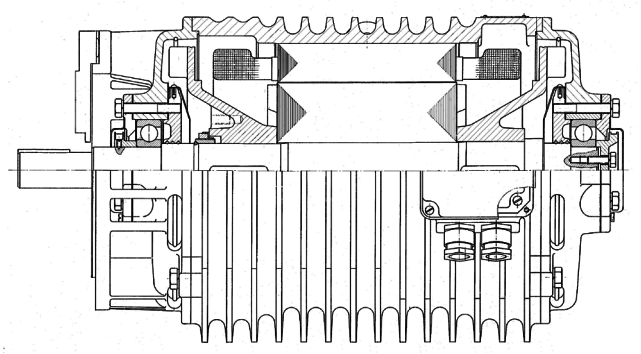


Figure 12: Design example for series ARB, terminal box mounted on the right

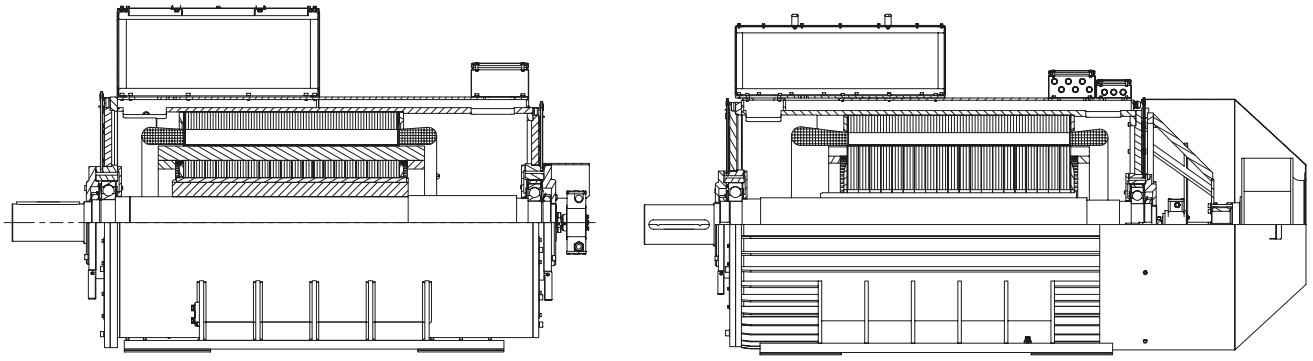


Figure 13: Design examples for welded-steel transnorm motors, types of cooling IC 411 and IC 416

Type of protection

The motors possess condensation drain holes in their end shields (by request only for shaft heights up to 132 T). These holes are closed with plastic plugs.

In case of motors with a shaft end pointing upwards, the user must take appropriate precautions to prevent the penetration of water along the shaft.

On flange motors of construction types IM V3 / IM V36, a drain hole is provided as standard to prevent the collecting of liquid in the flange end. Where motors are to be used or stored outdoors, a corresponding roof or additional covers are recommended in order to avoid long-term exposure to direct sunlight, rain, snow and dust, and to eliminate the risk of the fan freezing up due to direct snowfall or icing. In such cases, it is recommended to consult the manufacturer for technical clarification. The use of non-rusting bolts and screws (option) is recommended if the motor is to be used outdoors or in a corrosive environment. Any deviating ambient conditions are specified on the motor name plate.
The specifications on the name plate shall then apply.

Types of construction

The most common types of construction are shown in the list below. Further types of construction can be supplied upon request. The type of construction is indicated on the name plate in accordance with Code I, EN 60034-7. Standard motors which are ordered in a basic type in sizes 56 to 200 can also be operated with the following derived types of construction.

- IM B3 in IM B5, IM B7, IM B8 and IM V6
- IM B35 in IM 2051, IM 2061, IM 2071 and IM V36
- IM B34 in IM 2151, IM 2161, IM 2171 and IM2131
- IM B5 in IM V3
- IM B14 in IM V19

Motors of types IM V5, IM V1 or IM V18 can be designed with an optional protective canopy to prevent small parts falling into the motor. With types of construction with the shaft end pointing upwards, it is the responsibility of the user to provide a suitable cover to prevent small parts falling into the fan shroud (see also standard IEC/EN 60079-0). The cooling air flow must not be hindered by the cover. From size 225, it is necessary to consult the manufacturer regarding types of construction IM V5, IM V6, IM B6, IM B7 and IM B8. The types of construction IM B5 and IM V3 are not available for frame sizes from 315 L. To facilitate connection to the mains power supply, the terminal box can be rotated by 90° with all types of construction (with the exception of motors with terminal box 630 or 1000, inclined – in these cases, the terminal box can only be rotated by 180°).

Vibration response and balancing

The permissible vibration severities for electric motors are specified in standard EN 60034-14.
VEM motors already meet or remain below the limit values specified for vibration severity grade A (normal, with designation on the name plate) in their basic versions. Vibration severity grade B (special code “SGB” in the type designation) can be supplied at extra charge.

EN 60034-14 recommends the following values:

Vibration severity grade	Shaft height H	56 ≤ H ≤ 132			132 ≤ H ≤ 280			280 > H		
	Machine installation	s_{eff} [µm]	v_{eff} [mms^{-1}]	a_{eff} [ms^{2}]	s_{eff} [µm]	v_{eff} [mms^{-1}]	a_{eff} [ms^{2}]	s_{eff} [µm]	v_{eff} [mms^{-1}]	a_{eff} [ms^{2}]
A	Free suspension	25	1.6	2.5	35	2.2	3.5	45	2.8	4.4
	Rigid mounting	21	1.3	2.0	29	1.8	2.8	37	2.3	3.6
B	Free suspension	11	0.7	1.1	18	1.1	1.7	29	1.8	2.8
	Rigid mounting	-	-	-	14	0.9	1.4	24	1.5	2.4

Grade A is applicable for machines with no special vibration requirements.
This grade is essentially equivalent to the old grade N in case of free suspension. For motors from size 250, the limit values are tightened from 3.5 mm/s to 2.8 mm/s. This corresponds to the former limit value for R at speeds > 1800 rpm.

Grade B is applicable for machines with special vibration requirements.
This grade is essentially equivalent to the old grade S in case of free suspension. The corner frequencies for vibration displacement/vibration velocity and vibration velocity/vibration acceleration are 10 Hz and 250 Hz, respectively. It must be noted that the measured values may deviate from the actual values by ± 10% due to the tolerances of the measuring devices.

With regard to the routine testing of machines with speeds between 600 and 3600 rpm, EN 60034-14 states that it is sufficient to measure the vibration velocity.

All rotors are balanced dynamically with a half-key in place. This balancing is documented on the name plate by way of the letter “H” after the motor number. Upon request, it is possible to perform balancing with a full key. This is subsequently indicated by the letter “F” after the motor number.
In case of converter-fed operation with frequencies greater than 60 Hz, special balancing is required to observe the specified limit values (high-speed version, special code “HS” in the type designation).

Bearings

VEM motors are fitted with anti-friction bearings from leading manufacturers. The nominal service lifetime of the bearings is at least 10,000 hours for 2-pole motors or 20,000 hours for motors with 4 or more poles, assuming full exploitation of the maximum permissible load. The nominal service lifetime of the bearings for motors installed in a horizontal position without additional axial load is 40,000 hours in coupled operation. Under average operating conditions, with loads below the maximum permissible load, a nominal service life Lh10 of 10,000 hours can be achieved. Detailed specifications are to be found in the Main Catalogue.

Bearing monitoring

To permit monitoring of the condition of the bearings, motors can be fitted with or prepared for the fitting of temperature, shock pulse and vibration sensors. PT100-type temperature sensors can be mounted at the bearing points in 2-, 3- or 4-wire configurations. The sensors are connected at the main terminal box or else in a separate box mounted either on the main terminal box or on the motor housing, depending on the individual design.
For monitoring of the wear of the anti-friction bearings, shock pulse sensors [SPM] can be mounted on the end shields from size 132. This permits monitoring by way of mobile recording units. It is also possible to use hard-wired shock pulse or vibration sensors to enable remote monitoring.

Use of insulated bearings

When motors are operated on the mains, magnetic asymmetries result in a voltage along the shaft. This shaft voltage causes compensating currents to flow between the rotor and stator via the anti-friction bearings. If the voltage exceeds a threshold of 500 mV, the bearings may be damaged. The design of VEM standard motors ensures that this value can never be exceeded.
The effects may be intensified in case of converter-fed operation. The converter design is a decisive influencing factor. Pulse-controlled converters produce especially high-frequency voltages and currents dependent on the pulse frequency and the pulse modulation. Output filters in the converter minimise these effects. To avoid bearing damage, motors for converter-fed operation from size 315 MY are always fitted with an insulated bearing on the non-drive end.
In addition to this measure, it is always imperative to provide for proper earthing of the motor housing in order to drain the currents circulating between the converter and stator.

Shaft ends

IEC 60034-7 defines the two sides of a motor as follows:

D-end (DS): Drive side of the motor (drive end)
N-end (NS): Side of the motor opposite the drive (non-drive side)
Centre holes in accordance with DIN 332, sheets 1 and 2, form DS.

The keys and keyways are machined in accordance with DIN 6885 sheet 1, form A or B for frame sizes 56 – 112 and in accordance with DIN 6885 sheet 1, form A for frame sizes 132 – 355. The lengths of the keys comply with EN 50347 for shaft heights 132 – 355.

Threads for fitting and pulling fixtures

Shaft end diameter	Thread
from 7 to 10 mm	M3
from 10 to 13 mm	M4
from 13 to 16 mm	M5
from 16 to 21 mm	M6
from 21 to 24 mm	M8
from 24 to 30 mm	M10
from 30 to 38 mm	M12
from 38 to 50 mm	M16
from 50 to 85 mm	M20
from 85 to 130 mm	M24

The motors are always supplied with the shaft key inserted.

The second shaft is able to transmit the full nominal output in the case of a coupled drive. The output transmitted by the second shaft end in the case of belt, chain and pinion drives can be notified upon request. Slotted drive elements, such as belt pulleys or couplings, must be balanced with a half-key to at least balance quality grade G 6.3 according to DIN ISO 1940-1.

True running of the shaft ends
The true running of the shaft ends complies with the requirements of EN 50347. The relevant values can be reduced by 50% as an option (extra charge).

Noise ratings

Noise levels are measured at rated output, rated voltage and rated frequency in accordance with EN ISO 3741. EN 60034-9 stipulates that the noise level in dB(A) is to be specified as the spatial mean value of the sound pressure level LpA measured at a distance of 1 metre from the machine contour.
The A-weighted sound power level L_{WA} over the measuring surface L_S (d = 1 m) is calculated with

$$L_{WA} = L_{pA} + L_S \quad (dB)$$

The measuring surface level is dependent on the machine geometry and is for

		L_S (dB)
Frame size	56 – 132	12
	160 – 225	13
	250 – 315	14
	355	15

The noise values for the main series are presented in tabular form. For machines in 60 Hz versions, a value 4 dB(A) higher than the table value can be taken as a guideline. Binding specifications for 60 Hz upon request. Consultation is necessary with regard to special series.

Winding and insulation

VEM motors of the series K21./K20. are designed for thermal class 155 [F] as standard. High-quality enamelled wires and insulating sheet materials are used in conjunction with low-solvent resin impregnation. The standard insulation system accommodates rated voltages up to 725 V [mains infeed]. It guarantees high mechanical and electrical strength, and provides for a long service life.

Motors are available in three versions:

- For converter-fed operation without filter up to 420 V converter output voltage
- For converter-fed operation without filter up to 500 V converter output voltage, curve A to DIN VDE 0530-25:2009
- For converter-fed operation without filter up to 690 V converter output voltage, curve B to DIN VDE 0530-25:2009

Rated voltage and frequency

In their basic versions, motors are supplied for the following rated voltages and frequencies:

230/ 400 V Δ/Y, 50 Hz	220…240 V Δ/ 380…420 V Y, 50 Hz
400/ 690 V Δ/Y, 50 Hz	380…420 V Δ/ 660…725 V Y, 50 Hz
500 V, 50 Hz	475…525 V, 50 Hz
275/ 480 V Δ/Y, 60 Hz	265…290 V Δ/ 460…500 V Y, 60 Hz
600 V, 60 Hz	570…630 V, 60 Hz

The motors can be operated without modification of the rated output on mains systems where the voltage at rated frequency deviates by up to + 5% from the nominal value (rated voltage range A). At rated voltage, the frequency in these mains systems may deviate by ± 2% from the nominal value. The aforementioned standard voltages to DIN IEC 60038 are taken to define the design point.
Special voltages and frequencies are possible by customer request.

Motors which are to be suitable for a mains voltage to DIN IEC 60038 with an overall tolerance of ± 10% are selected according to the corresponding rated voltage as listed in the technical tables. The rated voltage range limited by U_U and U_0 is similarly specified there.

If the motors are fed with voltages between 95% and 105% of the rated voltage range (corresponding to the relevant mains voltage to DIN IEC 60038 ± 10%), then it is permissible – in accordance with EN 60034-1 – for the temperature-rise limit of the stator winding to be exceeded by approximately 10 K already at the voltage and frequency limits of the rated range, without taking into account the tolerances.

For motors of sizes 56 to 112 (DIN)/56 to 100 (progressive series), the current for the upper voltage range U_0 is set such that, given normal setting of the motor circuit-breaker to 1.05 x I_n, the breaker will also not be tripped in no-load operation and at ± 5% tolerance.

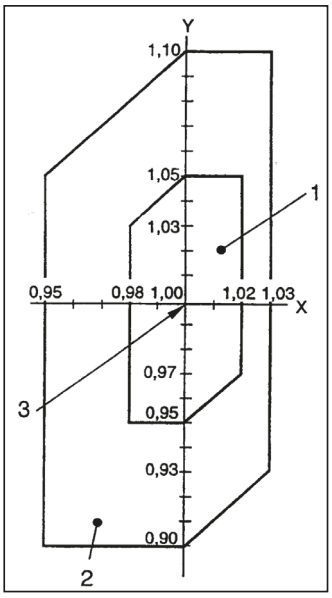


Figure 14: Voltage and frequency limits for motors in accordance with EN 60034-1

1 Range A
2 Range B
3 Design point
x Relative frequency f/f_N
Y Relative voltage U/U_N

Rated output

The specified rated output applies for continuous operation to EN 60034-1 and refers to a coolant temperature of 40 °C, installation at an altitude ≤ 1,000 m above sea level, operating frequency 50 Hz and rated voltage. The series A4.R possess thermal reserves which permit the following type-dependent continuous loads:

- Output up to 10% above rated output at coolant temperature 40 °C
- Rated output up to coolant temperature 50 °C
- Rated output at altitudes up to 2500 m

The above alternative conditions are mutually exclusive. If more than one condition applies, it is necessary to reduce the output. In such cases, consultation with the manufacturer is recommended.

Motor torque

The rated torque (in Nm) delivered at the motor shaft amounts to

$$M = 9550 \cdot \frac{P}{n}$$

where P = Rated output in kW
n = Speed in rpm

In the motor selection data, the starting, pull-up and breakdown torques are given as multiples of the rated torque.
If the voltage deviates from its rated value, this results in an approximately quadratic change in the torque.

Ambient temperature

All VEM motors are suitable for ambient temperatures from -20 °C to +40 °C in their basic versions. Motors can be used at ambient temperatures down to -40 °C, provided they have been ordered specifically for such conditions. In case of deviating ambient temperatures at installation sites below 1,000 m above sea level, the following factors are applied to determine the permissible output, depending on the thermal class:

Coolant temperature °C	10	15	20	25	30	35	40	45	50	55	60	70
Thermal class factor F	1.21	1.17	1.14	1.10	1.07	1.03	1.00	0.95	0.90	0.85	0.80	0.68

Table 5: Factors for adjustment of the permissible output in case of deviating coolant temperatures

If frequent moisture condensation is to be expected at the place of motor installation, we recommend the use of a space heater or other suitable precautions.

Installation altitude

Unless specified otherwise by the customer, it is assumed that the place of installation is not more than 1,000 m above sea level. If the machine is to be operated at an altitude above 1,000 m but below 4,000 m above sea level, the limit values for the temperature rise remain unchanged. The rated output, however, is subject to the following adjustment factors:

In case of installation at altitudes > 4,000 m, the limit values for temperature rise must be agreed separately between the manufacturer and the customer.

Altitude above sea level in m	Coolant temperature in °C					
	< 30	30 – 40	45	50	55	60
1000	1.07	1.00	0.95	0.90	0.85	0.80
1500	1.04	0.97	0.93	0.89	0.84	0.79
2000	1.00	0.94	0.90	0.86	0.82	0.77
2500	0.96	0.90	0.86	0.83	0.78	0.74
3000	0.92	0.86	0.82	0.79	0.75	0.70
3500	0.88	0.82	0.79	0.75	0.71	0.67
4000	0.82	0.77	0.74	0.71	0.67	0.63

Table 6: Adjustment factors for altitude/coolant temperature

Overload capacity

In accordance with EN 60034-1, all motors can be subjected to the following overload conditions:

- 1.5 x rated current for a duration of 2 minutes
- 1.6 x rated torque for a duration of 15 seconds

Both conditions apply for rated voltage and rated frequency.

Rated efficiency and power factor

The efficiency η and the power factor cos ϕ are given in the lists of motor selection data.

Restarting with residual field and phase opposition

When an electric machine is switched off, a voltage system remains effective in its winding for a short time on account of the decaying magnetic field. Restarting could result in transient electrodynamic reactions in the machine. VEM motors can be restarted against a 100% residual field and phase opposition after mains failure.

Motor protection

Upon request, the following motor protection variants are possible:

- Motor protection with PTC thermistors as temperature sensors in the stator winding
- Bi-metal temperature sensor as normally closed or normally open contact in the stator winding
- KTY silicon sensors
- Resistance thermometer for winding or bearing temperature monitoring
- Bearing vibration diagnosis

Duty type

Special duty type for switched operation, short-time operation or electric braking are possible upon request.
EN 60034-1 defines the following nominal duty type, which take into account thermal and mechanical conditions:

Duty type S1 – Continuous duty
Operation with a constant load which remains effective for a sufficient duration for the machine to reach thermal equilibrium. If no duty type is indicated on the name plate, the motor is designed for continuous duty S1. In the motor selection data lists, the rated data are specified for this duty type.

Duty type S2 – Short-time duty
Operation with a constant load which does not remain effective for a sufficient duration for the machine to reach thermal equilibrium, and a subsequent period of standstill with de-energised windings which is sufficient for the machine temperature to fall back to a level which deviates from the temperature of the coolant by less than 2 K. In case of duty type S2, the duration of operation must be specified.

Duty type S3 – Intermittent periodic duty
Operation which comprises a succession of identical type, each of which consists of a period of operation with constant load and a period of standstill with de-energised windings, where the starting current does not significantly influence the temperature rise. The specification of this duty type must be accompanied by indication of the cyclic duration factor. Periodic duty means that the state of thermal equilibrium is not reached during the period of the load.

Duty type S4 – Intermittent periodic duty with starting
Operation which comprises a succession of identical type, each of which consists of a distinct starting period, a period of operation with constant load and a period of standstill with de-energised windings. The specification of this duty type must be accompanied by indication of the cyclic duration factor, the mass moment of inertia of the motor and the mass moment of inertia of the load, with the latter both referring to the motor shaft. Periodic duty means that the state of thermal equilibrium is not reached during the period of the load.

Duty type S5 – Intermittent periodic duty with electric braking
Operation which comprises a succession of identical type, each of which consists of a starting period, a period of operation with constant load, a period of electric braking and a period of standstill with de-energised windings. The specification of this duty type must be accompanied by indication of the cyclic duration factor, the mass moment of inertia of the motor and the mass moment of inertia of the load, with the latter both referring to the motor shaft. Periodic duty means that the state of thermal equilibrium is not reached during the period of the load.

Duty type S6 – Continuous operation with intermittent load
Operation which comprises a succession of identical type, each of which consists of a period of operation with constant load and a period of no-load operation. No standstill with de-energised windings occurs. The specification of this duty type must be accompanied by indication of the cyclic duration factor. Periodic duty means that the state of thermal equilibrium is not reached during the period of the load.

Duty type S7 – Continuous periodic duty with electric braking
Operation which comprises a succession of identical type, each of which consists of a starting period, a period of operation with constant load and a period of electric braking. No standstill with de-energised windings occurs. The specification of this duty type must be accompanied by indication of the mass moment of inertia of the motor and the mass moment of inertia of the load (both referring to the motor shaft).

Duty type S8 – Continuous operation with periodic changes in load and speed
Operation which comprises a succession of identical
type, each of which consists of a period of operation with constant load and at a certain speed, followed by one or more periods of operation with other constant loads in
accordance with different speeds. (This may be the case with pole-changing asynchronous motors, for example.)
No standstill with de-energised windings occurs. The specification of this duty type must be accompanied by indication of the mass moments of inertia of the motor and load (both referring to the motor shaft), as well as the load, speed and cyclic duration factor for each relevant speed.

Duty type S9 – Continuous operation with non-periodic load and speed variation
Operation during which the load and speed generally vary non-periodically within a permissible operating range. This duty type frequently leads to overloads which far exceed the reference load. A suitable constant load corresponding to duty type S1 must be selected as the reference value for overload.

Duty type S10 – Operation with discrete constant loads
Operation characterised by no more than four discrete loads (or equivalent loads), each of which remains effective for a sufficient duration for the machine to reach thermal equilibrium. The smallest load within this duty type may be zero (no-load operation or standstill with de-energised windings).
For this duty type, a suitable constant load corresponding to duty type S1 must be selected as the reference value for the individual loads.

Forced ventilation, type of cooling IC 416

Motors with forced ventilation can be used to improve the cooling effect during periods of standstill in case of switched operation (duty type S2 to S5). The use of such motors is similarly recommended to increase the available motor output in the low speed range in converter-fed operation (setting range 1:5, 1:10) or to reduce the noise level when operating motors on a converter at frequencies > 60 Hz. Depending on the required type of protection, either radial fans (protection from IP 55) or axial fans protection up to IP 55) may be used, though reductions in the type of protection may apply in individual cases. A separate rating plate with corresponding type data is attached to the forced ventilation unit. When connecting axial fan units, it is imperative to observe the direction of rotation!
Forced ventilation units with electrical inputs greater than 125 W are compliant with Commission Regulation (EU) No. 327/2011 (Ecodesign requirements for fans).

Non-ventilated motors, type of cooling IC 410

These motors are designed without their own fan and without fan shroud. The motors are fully enclosed at the N-end up to shaft height 250; from shaft height 280, the sealing at the N-end is realised with grey-cast bearing covers as in the basic version. The rated output is reduced in accordance with the reduced cooling, and the motor windings are adapted to this reduced output. If non-ventilated motors are installed in a cooling air flow, higher outputs may be possible upon request, depending on the cooling effect achieved.

Brake motors

VEM brake motors comprise a three-phase squirrel-cage motor and a built-on brake from the relevant manufacturer. The brakes are designed as double-face brakes and function according to the fail-safe principle. The brake system is supplied as a compact unit ready for connection and assembly, for which the most varied brake torques and versions can be realised, depending on the version ordered. The holding torque of a brake motor is always effective when the motor is in a no-voltage state. Compression springs exert a force on the axially movable armature disc and establish the brake torque by way of friction linings. The brake torque is transferred to the shaft via the keyed mounting of the lining carrier or a toothed driver hub. When a voltage is applied to the brake coil, the armature disc is pulled back and the friction linings are released to enable to motor to turn.

Note
A number of different circuit variants are possible to influence the switching time of the brake. In the basic version, the brake coil is controlled either directly with the corresponding (DC) coil voltage via a two-pole terminal in the motor terminal box, or else with an appropriate AC voltage by way of the separately supplied rectifier module. For the special version “ready for connection”, the brake coil may be wired parallel to one phase of the motor winding by way of a rectifier module in the motor terminal box, depending on the frame size.

Special output assignments apply for brake motors for use in hoists and lifting gear (duty type S3), depending on the individual operating time. The relevant values can be taken from the special tables.

Paint finish

Paint finishes must withstand the most diverse stresses and influences in order to ensure long-term reliable protection. With the switch to low-solvent paint systems, VEM has adapted its production to the tightened demands of the 31st Ordinance on Implementation of the Federal Immission Control Act (Ordinance regarding the reduction of VOC emissions resulting from the use of organic solvents in specific installations – German Solvent Ordinance) [31. BImSchV] and is thus making an active contribution to the improvement of environmental protection.

Normal paint finish
Suitable for climate group "moderate" in accordance with IEC 60721-2-1: Indoor and outdoor installation, moderate climate (short-time exposure to relative humidity up to 100% at temperatures up to +30 °C; continuous exposure to relative humidity up to 85% at up to +25 °C)

Special paint finish
Suitable for climate group "worldwide" in accordance with IEC 60721-2-1: Outdoor installation in atmospheres with a general tendency to increased stress, tropical climate (short-time exposure to relative humidity up to 100% at temperatures up to +35 °C; continuous exposure to relative humidity up to 98% at up to +30 °C

01 Moderate WK F/H RAL 7031	01 S Moderate WK F	02 Worldwide WK F/H RAL 7031	02 S Worldwide WK F Special colour*	03 Customer request	04 Special finish	06 Moderate/ Worldwide WK H Special colour*	07 Special finish	08 Primed	09 L Light-duty offshore finish	09 S Heavy-duty offshore finish
Heat, indoors, outdoors under cover	Heat, indoors, outdoors under cover	Heat, outdoors, indoors with high humidity	Heat, outdoors, indoors with high humidity		Marine climate, ports	Heat, humidity, outdoors	Chemicals, heat, humidity, high corrosion protection	Prepared for further painting	UV-resistant, outdoors, high corrosion protection	Offshore marine climate, further enhanced corrosion protection
≥ 70 µm	≥ 70 µm	≥ 110 µm	≥ 110 µm		≥ 150 µm	≥ 110 µm	≥ 150 µm	≥ 70 µm	≥ 210 µm	≥ 240 µm
up to 120 °C short-time 180 °C	up to 100 °C short-time 120 °C	up to 120 °C short-time 180 °C	up to 100 °C short-time 120 °C		up to 80 – 90 °C short-time 130 °C	up to 120 °C short-time 180 °C	up to 120 °C short-time 180 °C		up to 100 °C short-time 140 °C	up to 100 °C short-time 140 °C
KK C2	KK C2	KK C2 – C3	KK C2 – C3			KK C2 – C3	KK C3		KK C3	KK C4/5
										2K-PUR TC 80 µm
									2K-PUR TC 80 µm	2K-EP primer 110 µm
							2K-EP TC 40 µm			
		2K-EP TC (water-based) 40 µm	2K-PUR TC 40 µm	Customer request	2K-EP, ceramic-filled 120 µm	2K-EP TC 40 µm				
2K-EP TC (water-based) 40 µm	2K-PUR TC 40 µm	2K-EP primer (water-based) 40 µm	2K-EP primer (water-based) 40 µm			2K-EP primer (water-based) 40 µm	2K-EP primer (water-based) 80 µm	2K-EP primer (water-based) 40 µm		2K-EP-zinc dust 50 µm
Grey cast iron/fan shrouds: Water-thinned primers, approx. 30 µm Sheet-metal terminal boxes: Powder-coated										
Grit blasting with SA 2.5/SIS 055900 for grey cast iron parts Cleaning/pickling for sheet metal parts										

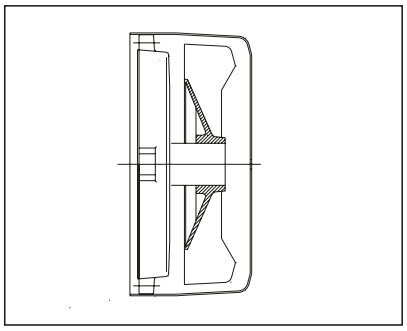
Special colour*: Paint finish 01 not available in RAL 1000 to 2011, RAL 7047, 9001, 9002, 9005, 9010, 9011, 9016, 9017 and light ivory textured paint 1015, KK

Figure 15: Paint finishes after switch to water-soluble paint systems

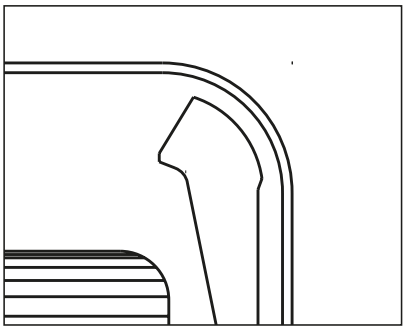
If no colour is specified, all motors are supplied in **RAL 7031 "Blue grey"**. If a different colour is required, the corresponding RAL number and colour designation must be specified at the time of ordering. VEM paint systems provide lasting, high-performance corrosion protection. Their functional capabilities have been proven in exacting and comprehensive test series. Customer-specific paint systems are always subject to prior consultation.

Modular construction of different series and modifications

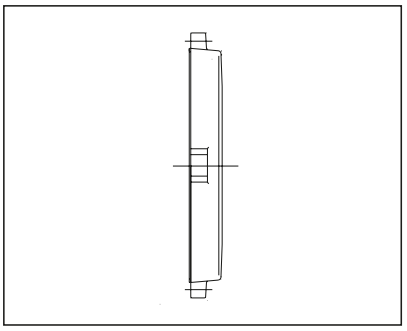
The design concepts of the different series provide for the optional incorporation of components such as pulse generators, tacho generators, brakes, speed monitors or forced ventilation units to solve the customer's individual control tasks.



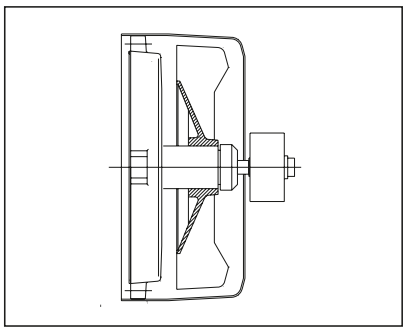
Standard version
Type of cooling IC 411, self-ventilated



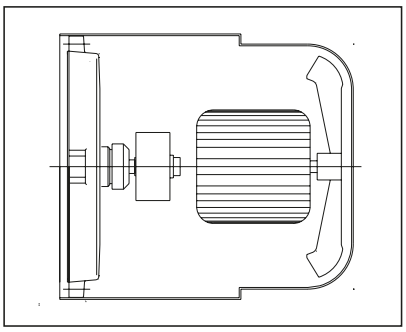
Special version
Type of cooling IC 416, forced ventilation



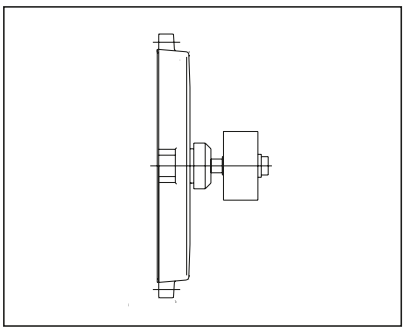
Special version
Type of cooling IC 410, non-ventilated



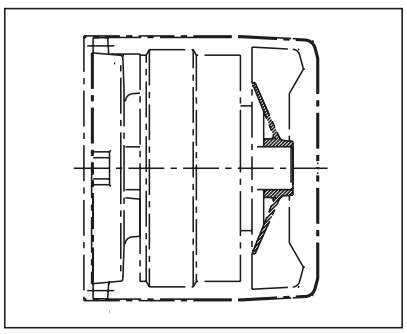
Special version
Type of cooling IC 411, self-ventilated
with built-on incremental encoder



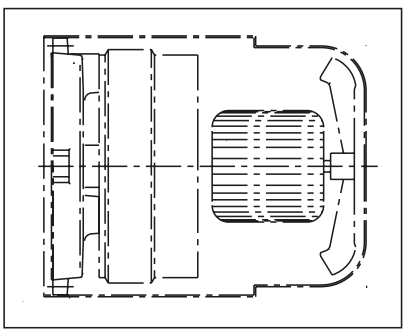
Special version
Type of cooling IC 416, forced ventilation
with built-on incremental encoder



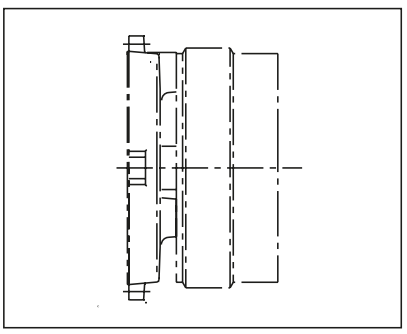
Special version
Type of cooling IC 410, non-ventilated
with built-on incremental encoder



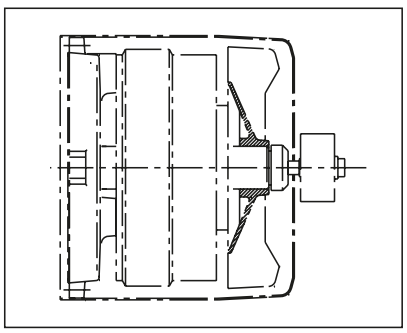
Special version
Type of cooling IC 411, self-ventilated
with built-on brake



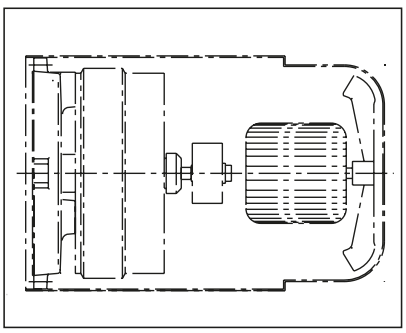
Special version
Type of cooling IC 416, forced ventilation
with built-on brake



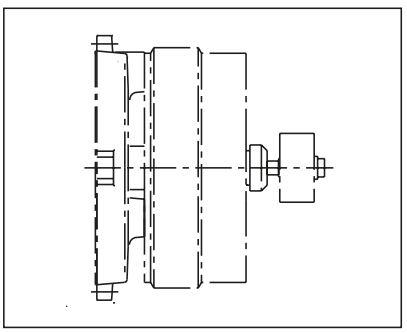
Special version
Type of cooling IC 410, non-ventilated
with built-on brake



Special version
Type of cooling IC 411, self-ventilated
with built-on brake and incremental encoder



Special version
Type of cooling IC 416, forced ventilation
with built-on brake and incremental encoder



Special version
Type of cooling IC 410, non-ventilated
with built-on brake and incremental encoder

Maintenance

Attention is drawn expressly to the safety notes and instructions, and here in particular to the procedures for safe isolation, safeguarding against accidental restarting, and checking the proper disconnection of all components connected to a voltage source. When a motor is disconnected from the mains supply for maintenance purposes, particular care must be taken to ensure that any auxiliary circuits, e.g. space heaters, forced ventilation fans or brakes, are similarly disconnected from their power supply. If it is necessary to dismantle the motor to perform maintenance work, the sealing compound left on the centring edges must be removed. New sealing compound of a suitable type is to be used for sealing when the motor is reassembled. Any copper sealing rings must always be refitted.

Careful and regular maintenance and inspection is imperative, so as to be able to detect and rectify any arising problems in good time before further damage is caused. As the operating conditions are not exactly defined, it is only possible to specify general maintenance intervals, under the assumption of trouble-free operation. These intervals must always be adapted in accordance with the local circumstances (contamination, loads, etc.).

What is to be done?	Regular interval	Max. interval
Initial inspection	After approx. 500 operating hours	At the latest after six months
Check of air passages and motor surface	Depending on degree of local contamination	
Relubrication (option)	See name plate or lubrication plate	
Main inspection	Approx. 10,000 operating hours	Once a year
Drain condensation	Depending on climatic conditions	

Inspections

Initial inspection
In accordance with the specifications, an initial inspection of the motor should be performed after approx. 500 operating hours, but at the latest after six months.

The following checks are to be performed with the motor at standstill:
a) Check the foundation. There must be no cracks or other damage such as depressions or the like.

The following checks are to be performed with the motor running:
a) Check the electrical parameters.
b) Check the bearing temperatures. It is to be determined whether the permissible bearing temperatures are exceeded during operation of the motor.
c) Check for unusual noises during operation. An acoustic check is performed to determine whether the quiet running of the motor has deteriorated.

If the checks reveal any deviations from the values specified in the operating and maintenance manual, or any other defects or errors, these deviations and defects must be rectified immediately.

Main inspection
In accordance with the specifications, a main inspection should be performed once a year or after approx. 10,000 operating hours.

The following checks are to be performed with the motor at standstill:
a) Check the foundation. There must be no cracks or other damage such as depressions or the like.
b) Check the alignment of the motor. The alignment must lie within the specified tolerances.
c) Check the mounting screws and bolts. All screws and bolts which are used to make mechanical and electrical joints and connections must be properly tight (see also the table of tightening torques for screws and bolts under Section 11 “Commissioning” of the operating and maintenance manual).
d) Check the cables and the insulation materials. It is to be checked whether the cables and the insulation materials used are in a good and proper condition. They must not display discolouration, and in particular not burn marks, and must not be broken, cracked or otherwise damaged.
e) Check the insulation resistance. When checking the insulation resistance of the winding, observe the specifications given in the operating and maintenance manual (Section 9).
f) Depending on the grease quality and the bearings of the motor, it may also be necessary to replace the grease of the anti-friction bearings after 10,000 operating hours (see also Section 13 “Bearings and lubrication” of the operating and maintenance manual). Otherwise, the specified relubrication intervals for the anti-friction bearings must be observed separately, as they deviate from the inspection intervals.

The following checks are to be performed with the motor running:
a) Check the electrical parameters.
b) Check the bearing temperatures. It is to be determined whether the permissible bearing temperatures are exceeded during operation of the motor.
c) Check for unusual noises during operation. An acoustic check is performed to determine whether the quiet running of the motor has deteriorated.

If the checks reveal any deviations from the values specified in the operating and maintenance manual, or any other defects or errors, these deviations and defects must be rectified immediately.

Long-term storage (over 12 months)

If long-term storage is necessary, motors must be protected from vibration and kept in closed, dry rooms at temperatures between -20 and +40 °C and in an atmosphere free from aggressive gases, vapours, dusts and salts. Motors should preferably be transported and stored in their original packaging. Storage and transport resting on the fan shrouds is not permissible. Unprotected metal surfaces, for example shaft ends and flanges, are to be provided with long-term corrosion protection, in addition to the temporary corrosion protection applied before motors leave the factory.

If the motors are subject to condensation under the given ambient conditions, precautions are to be taken to protect the motors against moisture. In such cases, the motors must be specially packed in airtight welded foil or under plastic foil with appropriate desiccants. Desiccant sachets are also to be placed in the motor terminal boxes.

For transport, the ring bolts/load beams of the motors are to be used together with appropriate lifting tackle. The ring bolts/load beams are only intended for lifting of the bare motor without additional built-on parts such as base plate, gearing, etc.

Motors with reinforced bearings are supplied with a transport brace. The transport brace on the shaft end should only be removed after assembly of the motor and prior to the first starting.

Disposal

The applicable national regulations are to be observed with regard to disposal of the machines.

It is furthermore to be ensured that oils and greases are collected for disposal in accordance with the corresponding regulations on waste oils. They must not be contaminated with solvents, cold cleaners and paint residues.

The individual materials should be segregated for recycling. The most important components are grey cast iron (housing), steel (shaft, stator and rotor lamination, small parts), aluminium (rotor), copper (windings) and plastics (insulation materials, such as polyamide, polypropylene, etc.). Electronic components such as circuit boards (converter, sensors, etc.) are recycled separately.

Warranty, repairs, spare parts

Our authorised service workshops are responsible for all warranty repairs, unless expressly agreed otherwise. They can also be contacted in connection with any other repairs which may become necessary. Information on our customer service network can be requested from our central offices. Maintenance in accordance with the instructions given in the section “Maintenance” is not considered a breach of the warranty stipulations. It thus cannot be deemed to release the manufacturer from any agreed warranty obligations.

Long-term storage (over 12 months)

Series ARC

Type	D-end								N-end	
	Anti-friction bearing	Gamma ring	Radial shaft seal 1	Sealing grease amount in g	Radial shaft seal 2	Bushing	Bushing	Cup spring	Anti-friction bearing	Fixed bearing
ARC 112 M, MX	6207 C3	9RB 35 FKM	40 x 62 x 7		-	IR 35 x 40 x 17 EGS	72	-	6207 C3	
ARC 132 S, M	6308 C3	9RB 40 FKM	45 x 65 x 8	50	-	IR 40 x 45 x 17 EGS	90	-	6308 C3	
ARC 160 S, M	6310 C3	9RB 50 FKM	55 x 75 x 7	70	55 x 85 x 8	IR 50 x 55 x 20 EGS	110		6309 C3	
ARC 180 S, M	6312 C3	9RB 60 FKM	70 x 90 x 7	80	70 x 100 x 10	IR 60 x 70 x 25 EGS		130	6310 C3	
ARC 200 S, M, L, LX	6313 C3	9RB 65 FKM	72 x 95 x 10	90	72 x 100 x 10	IR 65 x 72 x 25 EGS		140	6312 C3	
ARC 225 M	6314 C3	9RB 70 FKM	80 x 100 x 7	100	80 x 110 x 10	IR 70 x 80 x 30 EGS		150	6313 C3	N-end
ARC 250 S, M	6316 C3	9RB 80 FKM	90 x 110 x 7,5	110	90 x 120 x 12	IR 80 x 90 x 30 EGS	-	170	6314 C3	
ARC 280 S, M	6317 C3	9RB 85 FKM	95 x 120 x 12	120	95 x 125 x 12	IR 85 x 90 x 36 EGS		180	6316 C3	
ARC 315 M, MX ARC 315 L, LX	6320 C3	9RB 95 FKM	105 x 130 x 12	130	105 x 140 x 12	IR 95 x 105 x 36 x EGS		215	6317 C3	
ARC 355 M, MX, LY, L	6324 C3	9RB 110 FKM	125 x 150 x 15	150	125 x160x12	IR 110 x 125 x 40 EGS		260	6317 C3	
ARC 400 L, LX	6324 C3	9RB 110 FKM	125 x 150 x 15	150	125 x160x12	IR 110 x 125 x 40 EGS		260	6321 C3	

Lubricating grease Berutox FH28KN (KHC1R-30 DIN 51825)
Insulated bearing N-end from shaft height 315

Series ARB

Type	Anti-friction bearings D-end and N-end	Fixed bearing
ARB 22, ARB 33	6306 S1 C5	N-end
ARB 54, ARB 65	6310 S1 C5	

Lubricating grease Berutox FH28KN (KHC1R-30 DIN 51825)

Limit speeds

If motors are operated at above the rated speed, the limit values of the anti-friction bearings, the strength of the rotating parts, critical rotor speeds and the circumferential speed of the fans must be observed.

The limit speeds specified in the table below may already require precautionary measures such as special fans, special bearings or special balancing.

Type	Synchronous speed at 50 Hz		
	1,500 rpm	1,000 rpm	750 rpm
ARC 112	3,600	2,400	1,800
ARC 132	3,600	2,400	1,800
ARC 160	3,000	2,000	1,500
ARC 180	3,000	2,000	1,500
ARC 200	3,000	2,000	1,500
ARC 225	3,000	2,000	1,500
ARC 250	3,000	2,000	1,500
ARC 280	3,000	2,000	1,500
ARC 315	3,000	2,000	1,500
ARC 355	3,000	2,000	1,500
ARC 400	3,000	2,000	1,500
ARB 22, 33	3,600	2,400	1,800
ARB 54, 65	3,000	2,000	1,500

Tolerances

Electrical parameters

According to DIN EN 60034-1, the following tolerances are permissible:

Efficiency (when determined indirectly)	- 0.15 (1-η) at $P_N \leq 150$ kW - 0.1 (1-η) at $P_N > 150$ kW
Power factor	$\frac{1-\cos\varphi}{6}$ min. 0.02 max. 0.07
Slip (with nominal load and at operating temperature)	±20 % at $P_N \geq 1$ kW ±30 % at $P_N < 1$ kW
Starting current (with intended starting circuit)	+20 % no lower limit
Starting torque	-15 % and +25 %
Pull-up torque	-15 %
Breakdown torque	-10 % (M_K/MN still at least 1.6 after application of this tolerance)
Moment of inertia	±10 %
Noise level (sound pressure level at measuring surface)	+3 dB (A)

These tolerances are applicable to the guaranteed values for three-phase asynchronous motors, taking into account necessary manufacturing tolerances and possible deviations in the raw materials used. The standard includes the following notes:

1. It is not intended that guarantees necessarily have to be given for all or any of the items involved. Quotations including guaranteed values subject to tolerances should say so, and the tolerances should be in accordance with the table.
2. Attention is drawn to the different interpretation of the term “guarantee”. In some countries, a distinction is made between guaranteed values and typical or declared values.
3. Where a tolerance is stated in only one direction, the value is not limited in the other direction.

Mechanical parameters – Usual tolerances

Dimension symbol to DIN EN 50347	Meaning of dimension	Fit or tolerance
B [a]	Spacing of fixing holes for housing feet in axial direction	±1 mm
P [a_1]	Diameter or width across corners of flange	-1 mm
A [b]	Spacing of fixing holes for housing feet transverse to axial direction	±1 mm
N [b_1]	Diameter of centring edge of mounting flange	up to diameter 230 mm j6 from diameter 250 mm h6
D, DA [d, d_1]	Diameter of cylindrical shaft end	up to diameter 48 mm k6 from diameter 55 mm m6
M [e_1]	Pitch circle diameter of mounting flange	±0.8 mm
AB [f], AC [g]	Greatest width of motor (without terminal box)	+2 %
H [h]	Shaft height (bottom edge of foot to centre of shaft end)	up to 25 -0.5 mm over 250 -1 mm
L, LC [k, k_1]	Total motor length	+1 %
HD [p]	Total motor height (bottom edge of foot, housing or flange to highest point of motor)	+2 %
K, K’ [s, s_1]	Diameter of mounting holes of foot or flange	+3 %
GA, GC [t, t_1]	Bottom edge shaft end to top edge key	+0.2 mm
F, FA [u, u_1]	Width of key	h9
C, CA [w_1, w_2]	Distance from centre of first foot mounting hole to shaft shoulder or flange face Distance from shaft shoulder to flange face with fixed bearing at D-end Distance from shaft shoulder to flange face	±3.0 mm ±0.5 mm ±3.0 mm
m	Motor mass	-5 bis +10 %

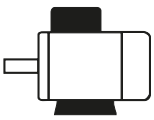
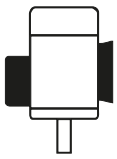
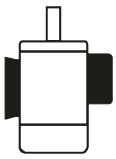
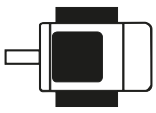
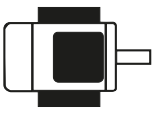
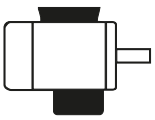
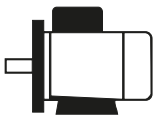
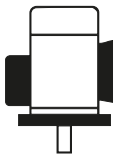
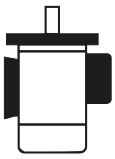
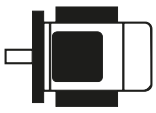
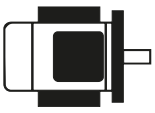
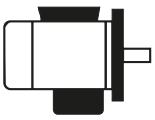
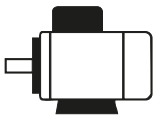
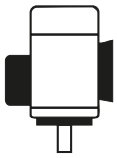
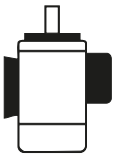
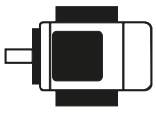
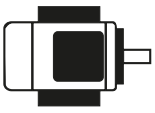
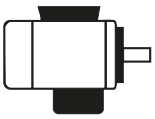
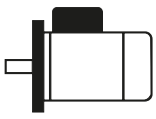
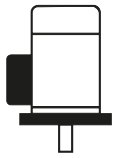
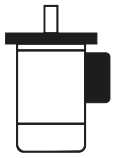
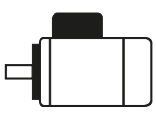
Usual fits for shaft ends		
Shaft ends	up to Ø 48 from Ø 55	k6 m6
Mating part		H7

Types of construction

The most common types of construction are shown in the table below. Further types of construction can be supplied upon request. The type of construction is indicated on the name plate in accordance with Code I, EN 60034-7. Standard motors which are ordered in a basic type in sizes 56 to 200 can also be operated with the following derived types of construction.

- IM B3 in IM B5, IM B7, IM B8 and IM V6
- IM B35 in IM 2051, IM 2061, IM 2071 and IM V36
- IM B34 in IM 2151, IM 2161, IM 2171 and IM2131
- IM B5 in IM V3
- IM B14 in IM V19

Motors of types IM V5, IM V1 or IM V18 can be designed with an optional protective canopy to prevent small parts falling into the motor. With types of construction with the shaft end pointing upwards, it is the responsibility of the user to provide a suitable cover to prevent small parts falling into the fan shroud (see also standard IEC/EN 60079-0). The cooling air flow must not be hindered by the cover. From size 225, it is necessary to consult the manufacturer regarding types of construction IM V5, IM V6, IM B6, IM B7 and IM B8. The types of construction IM B5 and IM V3 are not available for frame sizes from 315 L. To facilitate connection to the mains power supply, the terminal box can be rotated by 90° with all types of construction.

Basic type of construction	Derived types of construction				
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			
					

Terminal boxes

Motor type	Terminal box	Material	Length	Width	Height	Standard cable gland	Max. cable diameter	Terminal mounting	Thread of terminal stud	Thread of protective conductor	Figure
			AG	LL	-	o	0 max.				
ARC 112	25 A	GG15	143	134	70	M32 x 1.5	Ø 21 mm	K1M5	M5	KB*	01
ARC 132	25 A	GG15	143	134	70	M32 x 1.5	Ø 21 mm	K1M5	M5	KB*	01
ARC 160	25 A	GG15	143	134	70	M32 x 1.5	Ø 21 mm	K1M5	M5	KB*	01
ARC 180	63 A	GG15	175	162	81	M40 x 1.5	Ø 28 mm	K1M6	M6	KB*	01
ARC 200	100 A	GG15	213	207	101	M50 x 1.5	Ø 35 mm	K1M8	M8	M8	01
ARC 225	100 A	GG15	213	207	101	M50 x 1.5	Ø 35 mm	K1M8	M8	M8	01
ARC 250	200 A	GG15	282	242	131	M63 x 1.5	Ø 45 mm	K1M10	M10	M10	01
ARC 280	200 A	GG15	282	242	131	M63 x 1.5	Ø 45 mm	K1M10	M10	M10	01
ARC 315	200 A	GG15	282	242	131	M63 x 1.5	Ø 45 mm	K1M10	M10	M10	01
ARC 355	400 A	GG15	311	297	152	M63 x 1.5	Ø 45 mm	K1M12	M12	M10	02
ARC 400	400 B	GG15	415	340	176	M63 x 1.5	Ø 45 mm	K1M16	M17	tab	02
ARB		GG15	130	130		M32 x 1.5	Ø 21 mm	KBS6	M6	M6	none

KB* ... Terminal clamp

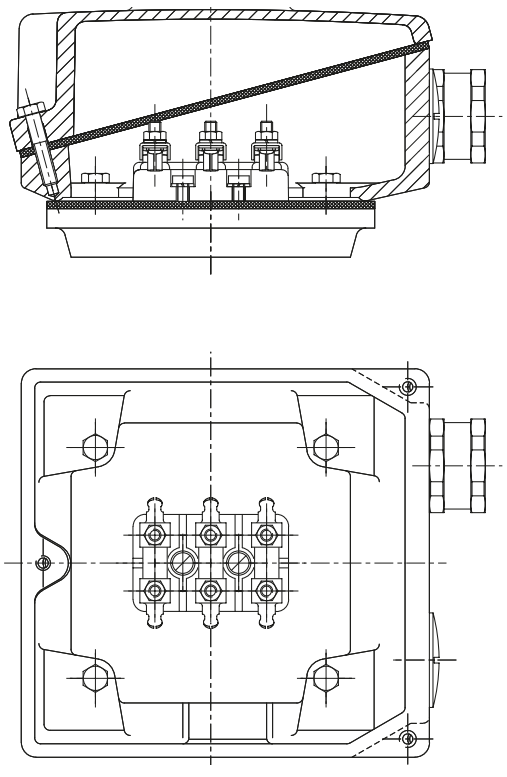
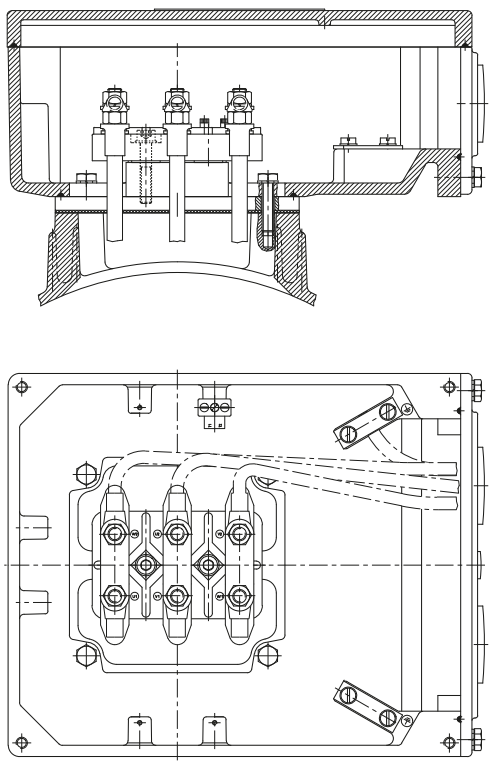


Figure 01



Figrure 02

General technical data

Series ARB for mains operation
Series ARC for converter-fed operation

The most important technical data are summarised in the following table. Further information can be taken from the catalogue section “Technical explanations”.

Product group	Roller table motors, squirrel-cage rotor, IEC/DIN
Series	ARB... version for mains operation ARC... version for converter-fed operation, IEC 60034-17, converter output voltage up to 420 V Curve A, IEC TS 60034-25, converter output voltage > 420 up to 500 V Curve B, IEC TS 60034-25, converter output voltage > 500 up to 690 V
Rated output	ARB... 0.4 kW to 5.5 kW ARC... 0.4 kW to 290 kW
Sizes	ARB... 22 (132), 33 (125), 54 (170) and 65 (200) ARC... 112 to 400
Housing material	Grey cast iron
Rated torque	ARB... 8 to 77 Nm ARC... 8 to 2,560 Nm
Method of connection	Single-speed motors are designed in star-delta configuration as standard
Stator winding insulation	Thermal class 155, optional 155 [F(B)], 180 to EN 60034-1 (IEC 60034-1)
Type of protection	IP 55 acc. to EN 60034-5 (IEC 60034-5) optionally IP 56 and higher
Type of cooling	IC 410 [non-ventilated] acc. to EN 60034-6 (IEC 60034-6)
Coolant temperature/ installation altitude	Standard -20 °C to +40 °C, Altitude 1,000 m above sea level
Rated voltage	Rated voltage range A to EN 60034-1 (IEC 60034-1) Standard voltages to EN 60038 50 Hz, 230 V, 400 V, 500 V, and 690 V 60 Hz, 275 V, 480 V and 600 V
Types of construction	IM B3, IM B35, IM B5 and derived types complying with DIN EN 60034-7
Paint finish	Normal finish “Moderate”, colour RAL 7031, blue-grey Special finish “Worldwide”, colour RAL 7031, blue-grey
Vibration severity grade	Grade “A” as standard for machines with no special vibration requirements
Shaft ends	acc. to DIN 748 (IEC 60072), balanced with half-key
Sound pressure level	acc. to DIN EN ISO 1680, tolerance +3 dB, see technical explanations for values
Limit speeds	See section “Limit speeds” in the chapter “Technical explanations”
Bearing design	See section “Bearings” in the chapter “Technical explanations”
Motor mass	See technical selection lists
Terminal box	See section “Terminal boxes” in the chapter “Technical explanations”
Documentation	An operating and maintenance manual, a terminal plan and a safety data sheet are supplied with each motor.
Tolerances	See section “Tolerances” in the chapter “Technical explanations”
Options	See “Overview of modifications” of the main catalogue 2017 in the chapter “Technical explanations”

Three-phase roller table motors with squirrel-cage rotor for direct-on-line starting, series ARB

Non-ventilated with surface cooling, type of cooling IC 410, duty type S1, continuous duty, thermal class H, types of protection IP 44/IP 54, 50 Hz

Type	P	M_n	n	I_a at 400 V	B IP 44	IP 54	M_a	tk	J	m
	kW	Nm	rpm	A	kgm²/h	kgm²/h	Nm	min	kgm²	kg
Synchronous speed 1,500 rpm – 4-pole version										
ARB 22/4	1.1	8	1,330	12	200	150	22.5	7.0	0.0140	60
ARB 33/4	2.2	15	1,430	37	260	200	56.0	4.0	0.0430	90
Synchronous speed 1,000 rpm – 6-pole version										
ARB 22/6	0.8	9	850	7	330	250	18.5	13.0	0.0140	60
ARB 33/6	1.5	15	940	21	570	440	53.0	10.0	0.0430	90
ARB 54/6	5.5	56	930	76	1,400	1,000	240.0	5.5	0.2330	200
Synchronous speed 750 rpm – 8-pole version										
ARB 22/8	0.6	9	650	7	480	370	22.5	20.0	0.0140	60
ARB 33/8	1.1	15	690	13	740	580	42.0	14.0	0.0430	90
ARB 54/8	4.0	56	680	49	1,700	1,300	190.0	5.5		
ARB 65/8	5.5	75	700	67	2,450	1,900	210.0	10.0	0.5750	290
Synchronous speed 600 rpm – 10-pole version										
ARB 33/10	0.8	14	530	8	1,100	860	28.0	40.0	0.0430	90
ARB 54/10	3.0	52	555	36	2,600	2,000	170.0	18.0	0.2330	200
ARB 65/10	4.0	68	560	58	3,600	2,800	250.0	7.5	0.5750	290
Synchronous speed 500 rpm – 12-pole version										
ARB 33/12	0.4	8	460	7	1,600	1,200	29.0	55.0	0.0430	90
ARB 54/12	2.2	47	450	24	4,000	3,100	140.0	27.0	0.2330	200
ARB 65/12	3.0	63	455	32	5,100	4,000	200.0	20.0	0.5750	290
Synchronous speed 375 rpm – 16-pole version										
ARB 54/16	1.1	31	340	18	5,100	4,000	115.0	30.0	0.2330	200
ARB 65/16	2.2	60	350	33	8,500	6,600	200.0	28.5	0.5750	290
Synchronous speed 250 rpm – 24-pole version										
ARB 54/24	0.8	40	190	12	7,000	5,400	100.0	80.0	0.2330	200
ARB 65/24	1.5	68	210	25	13,500	10,600	175.0	50.0	0.5750	290
Synchronous speed 500/ 1,000 rpm – 12/6-pole version										
ARB 54/12	2.5	54	440	26	3,000	2,300	135	10.0	0.2330	200
-6	4.0	42	920	43	750	600	100	2.2		
ARB 65/12	3.7	77	460	43	5,200	4,000	210	12.0	0.5750	290
-6	5.0	50	950	41	1,500	1,100	170	3.5		

t_K… max. permissible blocking period
B…Acceleration factor
$B = J_G \times z \times k$ [kgm²/h]
J_G…Total moment of inertia in kgm² for motor + roller + load, referred to the motor shaft
z… Switching frequency in starts per hour
k… Factor to account for switched operation, k = 1 for simple starting, k = 4 for reversing

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.35 kV; du/dt max. 1.5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 400 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max}	η_{max} referred to M_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm^2	kg
Synchronous speed 1,500 rpm – 4-pole version															
ARC 112 M4	2.3	15	4.7	1,465	85.0	0.83	47	3.1	17	79.0	0.85	2.5	0.11	0.015	56
ARC 112 MX4	2.5	16	5.0	1,465	85.0	0.85	49	3.0	18	77.0	0.87	2.5	0.10	0.017	63
ARC 112 MZ4	3.0	20	5.9	1,460	86.0	0.85	60	3.0	19	75.0	0.88	2.8	0.11	0.020	67
ARC 132 S4	3.0	19	6.6	1,480	85.0	0.77	61	3.2	20	84.0	0.81	3.8	0.13	0.028	82
ARC 132 M4	4.4	28	9.2	1,475	87.5	0.79	93	3.3	30	82.0	0.89	5.3	0.10	0.035	95
ARC 132 MX4	6.2	40	12.5	1,475	88.5	0.80	120	3.0	38	82.0	0.84	6.8	0.08	0.044	105
ARC 160 S4	5.5	35	11.5	1,480	88.0	0.80	105	3.0	32	85.0	0.84	6.0	0.13	0.078	130
ARC 160 M4	7.7	50	16.0	1,480	89.0	0.79	150	3.0	52	85.0	0.84	8.5	0.11	0.090	144
ARC 160 MX4	8.0	52	17.0	1,480	89.5	0.77	160	3.1	52	85.0	0.84	9.5	0.11	0.104	160
ARC 160 L4	10.2	66	20.0	1,480	88.5	0.83	200	3.0	68	86.0	0.85	10.0	0.13	0.116	170
ARC 180 S4	8.8	57	18.5	1,480	86.0	0.80	175	3.1	55	84.5	0.83	12.0	0.07	0.138	170
ARC 180 M4	11.0	71	22.0	1,485	90.5	0.80	215	3.0	72	90.0	0.85	15.0	0.07	0.168	215
ARC 180 L4	14.0	90	27.5	1,480	90.5	0.81	270	3.0	80	88.0	0.85	17.0	0.09	0.203	250
ARC 200 M4	15.0	100	29.5	1,475	91.0	0.80	307	3.1	94	91.1	0.85	15.0	0.08	0.275	270
ARC 200 L4	18.5	119	35.0	1,485	92.5	0.82	367	3.1	115	91.5	0.82	16.0	0.09	0.313	335
ARC 200 LX4	20.0	128	39.5	1,485	91.5	0.80	380	3.0	121	83.0	0.84	20.5	0.09	0.356	350
ARC 225 M4	22.0	141	43.0	1,485	92.0	0.80	425	3.0	140	92.5	0.86	16.0	0.09	0.525	375
ARC 225 MX4	25.0	161	48.5	1,485	91.0	0.82	480	3.0	145	89.0	0.82	20.0	0.09	0.638	420
ARC 250 S4	32.0	205	64.5	1,490	93.0	0.77	624	3.0	181	92.5	0.86	31.5	0.07	0.950	520
ARC 250 M4	40.0	257	79.5	1,485	93.0	0.78	778	3.0	245	93.7	0.86	33.5	0.08	1.100	580
ARC 280 S4	50.0	319	102.0	1,495	93.5	0.76	968	3.0	330	95.0	0.85	40.0	0.08	1.960	830
ARC 280 M4	60.0	384	117.0	1,492	94.0	0.79	1,169	3.0	380	94.0	0.84	43.5	0.07	2.270	895
ARC 280 MX4	70.0	449	136.0	1,490	94.0	0.79	1,330	3.0	480	94.0	0.85	58.0	0.05	2.730	1,015
ARC 315 M4	95.0	607	172.0	1,495	96.0	0.83	1,780	2.9	580	95.0	0.87	62.5	0.05	4.820	1,300
ARC 315 L4	132.0	845	239.0	1,492	96.0	0.83	2,040	2.4	680	95.5	0.88	72.0	0.05	5.930	1,450
ARC 315 LX4	150.0	961	268.0	1,490	96.0	0.84	2,884	3.0	980	95.5	0.88	98.0	0.04	6.820	1,630
ARC 355M4	160.0	1,022	293.0	1,495	95.0	0.83	3,066	3.0	1,050	95.0	0.79	127.0	0.05	10.000	2,500
ARC 400 L4	240.0	1,534	1,494.0		data on request		6,340	4.1						20.000	3,210
ARC 400 LX 4	290.0	1,854	1,494.0		data on request		7,500	4.0						25.000	3,460
Synchronous speed 1,000 rpm – 6-pole version															
ARC 112 M6	1.5	15	4.1	975	78.5	0.68	45	3.1	11	74.1	0.84	3.0	0.12	0.018	52
ARC 112 MX6	1.9	19	4.6	975	81.0	0.74	57	3.1	13	77.0	0.82	3.5	0.12	0.023	60
ARC 112 MZ6	2.2	22	5.6	970	81.0	0.70	66	3.1	15	74.0	0.84	4.2	0.10	0.029	62
ARC 132 S6	2.6	25	6.3	980	83.5	0.71	79	3.1	16	78.5	0.83	4.3	0.11	0.043	90
ARC 132 M6	3.5	34	9.3	980	82.5	0.66	103	3.0	24	83.6	0.77	6.5	0.11	0.053	95
ARC 132 MX6	4.2	41	10.5	978	84.0	0.70	130	3.2	28	82.8	0.80	7.0	0.11	0.066	110
ARC 160 S6	4.8	47	11.0	980	85.5	0.75	145	3.1	29	82.8	0.87	6.5	0.11	0.113	120
ARC 160 M6	6.5	63	14.0	985	86.0	0.79	195	3.1	40	84.0	0.84	7.7	0.13	0.145	145
ARC 160 L6	7.0	68	15.5	980	86.5	0.75	205	3.0	43	83.0	0.83	8.0	0.13	0.166	160
ARC 180 S6	7.6	74	15.0	985	89.5	0.81	228	3.1	46	85.6	0.87	7.9	0.15	0.228	190
ARC 180 M6	9.5	92	19.5	985	86.5	0.81	283	3.1	65	84.2	0.87	9.5	0.11	0.268	215
ARC 180 L6	11.0	107	23.0	985	86.0	0.80	320	3.0	70	84.0	0.85	12.0	0.12	0.324	250
ARC 200 M6	12.5	121	25.0	985	89.5	0.81	373	3.1	75	88.7	0.88	13.0	0.11	0.443	315
ARC 200 L6	15.0	145	30.0	985	89.5	0.80	450	3.1	90	88.5	0.88	14.0	0.11	0.514	330
ARC 200 LX6	19.5	189	37.5	985	90.0	0.83	580	3.1	115	88.7	0.88	20.0	0.11	0.620	360
ARC 225 M6	16.5	159	33.0	990	91.0	0.79	496	3.1	95	89.6	0.88	17.0	0.09	0.825	390
ARC 225 MX6	18.0	174		990			535	3.1						0.920	440
ARC 250 S6	22.0	212	43.0	991	91.0	0.81	540	2.5	110	90.7	0.88	24.0	0.08	1.280	465
ARC 250 M6	27.0	260	51.5	991	92.0	0.82	706	2.7	140	91.3	0.88	26.0	0.08	1.480	520
ARC 280 S6	37.0	356	71.5	992	93.5	0.83	1,075	3.0	235	89.0	0.80	30.0	0.08	2.630	780
ARC 280 M6	44.0	423	84.0	993	93.5	0.81	1,265	3.0	260	92.5	0.87	37.5	0.08	3.330	855
ARC 280 MX6	48.0	461	90.5	995	93.5	0.82	1,608	3.5	320	92.5	0.86	45.0	0.07	3.600	890
ARC 315 M6	75.0	721	138.0	993	94.5	0.83	1,945	2.7	380	93.9	0.87	55.0	0.06	6.000	1,050
ARC 315 L6	90.0	866	164.0	993	94.5	0.84	2,140	2.5	450	93.0	0.88	61.0	0.08	6.670	1,250
ARC 315 LX6	100.0	962	183.0	993	95.0	0.83	2,800	2.9	541	94.0	0.87	72.0	0.06	8.600	1,460
ARC 355M6	140.0	1,344	263.0	995	96.0	0.80	4,031	3.0	815	94.5	0.80	120.0	0.05	8.200	1,650
ARC 355MX6	160.0	1,536	301.0	995	96.0	0.80	4,607	3.0	885	96.5	0.80	147.0	0.04	12.800	2,200
ARC 400 L6	210.0	2,030		995	data on request		6,400	3.2						25.000	3,120
ARC 400 LX6	240.0	2,310		995	data on request		7,460	3.2						27.000	3,340

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.35 kV; du/dt max. 1.5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 400 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max} referred to M_{max}	η_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm²	kg
Synchronous speed 750 rpm – 8-pole version															
ARC 112 M8	1.1	14	4.1	725	72.5	0.54	38	2.6	7	71.0	0.78	3.5	0.11	0.018	46
ARC 112 MX8	1.5	20	4.7	725	75.5	0.61	54	2.7	10	72.3	0.81	3.8	0.11	0.023	53
ARC 112 MZ8	1.7	22	5.4	725	75.5	0.60	65	3.0	12	66.0	0.80	4.3	0.11	0.029	62
ARC 132 S8	1.8	24	5.3	730	78.5	0.62	57	2.4	12	77.5	0.78	4.2	0.11	0.043	90
ARC 132 M8	2.5	33	9.0	734	76.0	0.53	87	2.7	15	74.0	0.77	6.0	0.10	0.053	95
ARC 132 MX8	3.0	39	9.4	730	77.0	0.60	110	2.8	20	72.0	0.78	7.0	0.10	0.066	110
ARC 160 S8	3.6	47	9.2	735	83.5	0.68	117	2.5	20	81.0	0.78	6.5	0.10	0.113	120
ARC 160 M8	5.0	65	12.5	730	83.0	0.69	174	2.7	29	82.0	0.79	9.0	0.11	0.145	145
ARC 160 L8	6.5	84	17.5	735	83.0	0.65	225	2.7	38	82.0	0.79	12.0	0.08	0.166	160
ARC 180 S8	6.5	84	16.5	740	87.0	0.66	257	3.1	41	84.0	0.81	12.0	0.08	0.228	180
ARC 180 M8	7.5	97	19.5	740	86.0	0.65	316	3.3	49	86.0	0.82	15.0	0.09	0.268	215
ARC 180 L8	8.0	103	20.0	740	87.0	0.67	325	3.2	55	82.0	0.80	14.0	0.08	0.324	250
ARC 200 M8	9.0	116	20.5	740	87.5	0.72	390	3.4	62	86.0	0.84	13.0	0.09	0.443	315
ARC 200 L8	11.0	143	22.5	735	89.5	0.78	410	2.9	63	87.0	0.84	13.0	0.08	0.514	330
ARC 225 M8	13.0	167	28.0	743	86.3	0.78	480	2.9	74	88.8	0.80	19.0	0.08	0.825	390
ARC 225 MX8	14.0	180					540	3.0						0.920	440
ARC 250 S8	17.5	226	38.0	740	90.5	0.73	590	2.6	90	89.8	0.81	22.0	0.07	1.350	510
ARC 250 M8	22.0	284	47.5	740	90.5	0.74	715	2.5	118	90.7	0.77	28.0	0.07	1.550	560
ARC 280 S8	28.0	359	62.0	745	92.0	0.71	1,040	2.9	190	91.8	0.79	36.0	0.06	2.63	780
ARC 280 M8	35.0	449	76.5	745	93.0	0.71	1,320	2.9	250	91.6	0.81	48.0	0.06	3.33	855
ARC 280 MX8	37.0	474	82.0	746	92.0	0.71	1,685	3.6	290	92.3	0.80	72.0	0.05	3.60	890
ARC 315 M8	55.0	710	113.0	741	93.6	0.75	2,100	3.0	306	91.1	0.82	68.0	0.05	6.000	1,050
ARC 315 L8	68.0	875	146.0	745	94.4	0.71	2,140	2.4	309	94.1	0.82	90.0	0.05	6.760	1,250
ARC 315 LX8	85.0	1,090	176.0	745	93.0	0.75	2,724	2.5	385	92.0	0.82	88.0	0.06	8.710	1,460
ARC 355 M8	90.0	1,154	187.0	745	94.0	0.74	3,461	3.0	520	93.5	0.80	95.0	0.05	9.500	1,600
ARC 355 MX8	110.0	1,410	228.0	745	94.0	0.74	4,230	3.0	630	94.0	0.80	115.0	0.05	13.400	2,200
ARC 400 L8	170.0	2,176		746	data on request		6,450							32.000	3,120
ARC 400 LX8	200.0	2,560		746	data on request		7,750							39.000	3,460
Synchronous speed 600 rpm – 10-pole version															
ARC 112 M10	0.55	9		570	data on request		25	2.7						0.018	46
ARC 112 MX10	0.8	12	2.9	575	66.5	0.56	35	2.8	6	55.0	0.80			0.023	60
ARC 112 MZ10	0.85	14		570	data on request		40	2.8						0.029	62
ARC 132 S10	1.1	18		575	data on request		49	2.7						0.043	90
ARC 132 M10	1.5	25	5.2	575	78.0	0.53	60	2.4	10	80.0	0.65	4.5	0.09	0.053	95
ARC 132 MX10	1.8	30		575	data on request		75	2.5						0.066	110
ARC 160 S10	2.8	46		575	data on request		115	2.5						0.113	120
ARC 160 M10	3.0	50	8.7	575	80.0	0.62	120	2.4	18	80.0	0.75	6.5	0.11	0.145	145
ARC 160 L10	4.0	66		575	data on request		165	2.5						0.166	155
ARC 180 S10	4.5	73	15.5	590	82.0	0.50	225	3.0	33	82.0	0.75	12.5	0.07	0.228	180
ARC 180 M10	6.5	105	22.0	590	83.5	0.51	315	3.0	47	80.0	0.76			0.268	215
ARC 180 L10	7.0	116	20.5	575	83.0	0.59	300	2.6	44	81.5	0.75	16.0	0.09	0.324	340
ARC 200 M10	8.5	140		580	data on request		380	2.7						0.443	315
ARC 200 L10	9.0	148		580	data on request		400	2.7						0.514	330
ARC 225 M10	11.0	178	33.0	590	86.5	0.56	480	2.7	84	85.5	0.73	23.5	0.07	0.825	390
ARC 225 MX10	12.0	198		580	data on request		535	2.7						0.920	440
ARC 250 S10	13.5	220		585	data on request		595	2.7						1.280	510
ARC 250 M10	17.0	278		585	data on request		750	2.7						1.480	560
ARC 280 S10	22.5	364		590	data on request		980	2.7						2.630	780
ARC 280 M10	27.5	445		590	data on request		1,200	2.7						3.330	855
ARC 280 MX10	37.5	607		590	data on request		1,640	2.7						3.600	935
ARC 315 M10	45.0	722	143.0	595	92.5	0.49	2,190	3.0	295	93.0	0.70			6.000	1,050
ARC 315 L10	55.0	890		590	data on request		2,670	3.0						6.670	1,250
ARC 315 LX10				590	data on request									6.670	1,460
ARC 355 M10	68.0	1,091		595	data on request		3,274	3.0						9.500	1,600
ARC 355 MX10	80.0	1,284		595	data on request		3,852	3.0						13.400	2,200

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.35 kV; du/dt max. 1.5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	In 400 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max}	η_{max} referred to M_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm^2	kg
Synchronous speed 500 rpm – 12-pole version															
ARC 112 M12	0.4	8		475	data on request		20	2.7						0.018	46
ARC 112 MX12	0.6	11		470	data on request		30	2.7						0.023	60
ARC 112 MZ12	0.7	14		470	data on request		40	2.8						0.029	62
ARC 132 S12	0.8	15		480	data on request		40	2.7						0.043	90
ARC 132 M12	1.1	22		480	data on request		60	2.7						0.053	95
ARC 132 MX12	1.3	26	7.5	485	66.0	0.38	67	2.6	12	74.0	0.60	8.0	0.11	0.053	110
ARC 160 S12	1.5	30		475	data on request		80	2.7						0.113	120
ARC 160 M12	2.75	54	13.5	488	71.0	0.42	160	3.0	24	79.5	0.64	12.6	0.10	0.145	145
ARC 160 L12	3.0	60		480	data on request		160	2.7						0.166	155
ARC 180 S12	3.0	60		480	data on request		160	2.7						0.228	180
ARC 180 M12	4.5	90	21.0	480	76.5	0.40	270	3.0	33			20.0	0.08	0.268	215
ARC 180 L12	5.5	109	24.0	480	81.5	0.41	330	3.0	70			19.5	0.07	0.324	340
ARC 200 M12	6.5	129		480	data on request		350	2.7						0.443	315
ARC 200 L12	7.0	139		480	data on request		375	2.7						0.514	330
ARC 225 M12	8.5	169	35.0	480	81.0	0.43	510	3.0	67			32.5	0.07	0.825	390
ARC 225 MX12	9.0	179		480	data on request		480	2.7						0.920	440
ARC 250 S12	10.0	199		480	data on request		535	2.7						1.280	510
ARC 250 M12	12.0	232	49.0	495	84.5	0.42	625	2.7						1.480	560
ARC 280 S12	18.5	364		485	data on request		985	2.7						2.630	780
ARC 280 M12	22.5	443		485	data on request		1,195	2.7						3.330	855
ARC 280 MX12	27.5	541		485	data on request		1,460	2.7						3.600	935
ARC 315 M12	37.5	738		485	data on request		1,995	2.7						6.000	1,050
ARC 315 L12				485	data on request									6.670	1,250
ARC 315 LX12	45.0	886		485	data on request		2,390	2.7						6.670	1,460
ARC 355 M12	55.0	1072		490	data on request		2,895	2.7						9.500	1,600
ARC 355 MX12	66.0	1286		490	data on request		3,475	2.7						13.400	2,200
ARC 400 L12	110.00	2,110		497	data on request		6,000	2.8						37.000	3,000
ARC 400L X12	132.00	2,550		497	data on request		7,320	2.9						45.000	3,320

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.35 kV; du/dt max. 1.5 kV/µs

	Transient peak load (max. 10 s)													
	50 Hz			40 Hz			30 Hz			20 Hz				
ARC	M_{eff}	M_{max}	I_{eff} 400 V	M_{eff}	M_{max}	I_{eff} 400 V	M_{eff}	M_{max}	I_{eff} 400 V	M_{eff}	M_{max}	I_{eff} 400 V	J	m
	Nm	Nm	A	Nm	Nm	A	Nm	Nm	A	Nm	Nm	A	kgm^2	kg
Synchronous speed	1,500 rpm			1,200 rpm			900 rpm			600 rpm				
ARC 112 M4	15	47	4.7	16	49	4.0	17	52	3.2	18	56	2.3	0.015	56
ARC 112 MX4	16	49		17	51		18	54		19	59		0.017	63
ARC 112 MZ4	20	60		21	63		22	66		24	72		0.020	67
ARC 132 S4	19	61	6.6	20	64	5.5	21	67	4.3	23	73	3.1	0.028	82
ARC 132 M4	28	93	9.2	29	98	7.5	31	102	6.0	34	112	4.4	0.035	95
ARC 132 MX4	40	120		42	126		44	132		48	144		0.044	105
ARC 160 S4	35	105	11.5	36	110	92	39	116	7.4	42	126	5.3	0.078	130
ARC 160 M4	50	150	16.0	52	158	13.2	55	165	10.5	60	180	7.6	0.090	144
ARC 160 MX4	52	160	16.5	54	168	13.9	57	176	11.0	62	192	8.0	0.104	150
ARC 160 L4	66	200	20.0	69	210	16.8	73	220	13.3	79	240	9.6	0.116	170
ARC 180 S4	57	175	18.5	59	184	15.3	63	193	12.3	68	210	8.8	0.138	170
ARC 180 M4	71	215	22.0	74	226	18.4	78	237	14.5	85	258	10.5	0.168	215
ARC 180 MX4	90	270		94	284		99	297		108	324		0.203	250
ARC 200 M4	100	307	29.5	104	322	25.5	110	338	20.2	120	368	14.7	0.275	270
ARC 200 L4	119	367	35.0	124	385	29.5	131	404	23.3	143	440	17.0	0.313	335
ARC 200 LX4	128	380	39.5	133	399	32.7	141	418	26.0	154	456	19.0	0.356	350
ARC 225 M4	141	425	43.0	147	446	35.9	155	468	28.4	169	510	20.6	0.525	375
ARC 225 MX4	161	480		167	504		177	528		193	576		0.638	420
ARC 250 S4	205	624	59.0	213	655	49.1	226	686	39.0	246	749	28.3	0.950	520
ARC 250 M4	257	778	73.0	267	817	60.6	283	856	48.2	308	934	35.0	1.100	580
ARC 280 S4	319	968	102.0	332	1,016	84.5	351	1,065	67.0	383	1,162	48.7	1.960	830
ARC 280 M4	384	1,169	117.0	399	1,227	96.9	422	1,286	76.9	461	1,403	56.0	2.270	895
ARC 280 MX4	449	1,330	136.0	467	1,397	113.3	494	1,463	89.9	539	1,596	65.4	2.730	1,015
ARC 315 M4	607	1,780	172.0	631	1,869	143.1	668	1,958	113.7	728	2,136	82.6	4.820	1,300
ARC 315 L4	845	2,040	239.0	879	2,142	199.0	930	2,244	157.9	1,014	2,448	114.8	5.930	1,450
ARC 315 LX4	961	2,884	268.0	1,000	3,028	223.4	1,058	3,172	177.3	1,154	3,461	128.9	6.820	1,630
ARC 355 M4	1,022	3,066	291.0	1,063	3,219	243.7	1,124	3,373	193.3	1,226	3,679	140.5	10.000	2,500
ARC 400 L4	1,534	6,340	415.0	1,596	6,657	344.8	1,688	6,974	273.5	1,841	7,608	198.9	20.000	3,210
ARC 400 LX 4	1,854	7,500	500.0	1,928	7,875	416.1	2,039	8,250	330.1	2,224	9,000	240.0	25.000	3,460
Synchronous speed	1,000 rpm			800 rpm			600 rpm			400 rpm				
ARC 112 M6	15	45	4.1	15	47	3.3	16	50	2.7	18	54	2.0	0.018	52
ARC 112 MX6	19	57	4.6	19	60	3.7	20	63	3.0	22	68	2.2	0.023	60
ARC 112 MZ6	22	66		22	69		24	73		26	79		0.029	62
ARC 132 S6	25	79	6.3	26	83	5.2	28	87	4.2	30	95	3.0	0.043	90
ARC 132 M6	34	103	9.3	35	108	7.6	38	113	6.2	41	124	4.5	0.053	95
ARC 132 MX6	41	130	10.5	43	137	8.6	45	143	6.8	49	156	4.9	0.066	110
ARC 160 S6	47	145	11.0	49	152	9.1	51	160	7.1	56	174	5.2	0.113	120
ARC 160 M6	63	195	14.0	66	205	11.6	70	215	9.2	76	234	6.7	0.145	145
ARC 160 L6	68	205		71	215		75	226		82	246		0.166	155
ARC 180 S6	74	228	15.0	77	239	12.6	81	251	10.0	88	274	7.2	0.228	180
ARC 180 M6	92	283	19.5	96	297	16.4	101	311	12.9	111	340	9.5	0.268	215
ARC 180 MX6	107	320		111	336		117	352		128	384		0.324	340
ARC 200 M6	121	373	25.0	126	392	20.7	133	410	16.4	145	448	11.9	0.443	315
ARC 200 L6	145	450	30.0	151	473	25.1	160	495	20.0	175	540	14.6	0.514	330
ARC 200 LX6	189	580	37.0	197	609	31.0	208	638	24.6	227	696	17.9	0.620	360
ARC 225 M6	159	496	33.0	166	521	27.6	175	546	21.9	191	595	15.9	0.825	390
ARC 225 MX6	174	535		181	562		191	589		208	642		0.920	440
ARC 250 S6	212	540	43.0	220	567	35.9	233	594	28.5	254	648	20.7	1.280	465
ARC 250 M6	260	706	51.5	271	741	43.0	286	777	34.1	312	847	24.8	1.480	520
ARC 280 S6	356	1,075	71.5	370	1,129	59.5	392	1,183	47.3	427	1,290	34.4	2.630	780
ARC 280 M6	424	1,265	83.0	441	1,328	69.0	466	1,392	54.7	508	1,518	39.7	3.330	855
ARC 280 MX6	461	1,608	90.5	479	1,688	75.2	507	1,769	59.7	553	1,930	43.4	3.600	935
ARC 315 M6	721	1,945	138.0	750	2,042	114.8	793	2,140	91.0	866	2,334	66.3	6.000	1,050
ARC 315 L6	866	2,140	167.0	900	2,247	139.2	952	2,354	110.4	1,039	2,568	80.3	6.670	1,250
ARC 315 LX6	960	2,800	191.0	998	2,940	158.8	1,056	3,080	126.0	1,152	3,360	91.7	8.600	1,460
ARC 355 M6	1,344	4,031	263.0	1,397	4,233	218.8	1,478	4,434	173.6	1,612	4,837	126.3	8.200	1,650
ARC 355 MX6	1,536	4,607	301.0	1,597	4,837	250.2	1,689	5,068	198.4	1,843	5,528	144.4	12.800	2,200
ARC 400 L6	2,030	6,400	380.0	2,111	6,720	319.4	2,233	7,040	253.4	2,436	7,680	184.3	25.000	3,120
ARC 400 LX6	2,310	7,460	440.0	2,402	7,833	367.9	2,541	8,206	291.9	2,772	8,952	212.3	27.000	3,340

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.35 kV; du/dt max. 1.5 kV/µs

	Transient peak load (max. 10 s)													
	50 Hz			40 Hz			30 Hz			20 Hz				
ARC	M_{eff}	M_{max}	I_{eff} 400 V	M_{eff}	M_{max}	I_{eff} 400 V	M_{eff}	M_{max}	I_{eff} 400 V	M_{eff}	M_{max}	I_{eff} 400 V	J	m
	Nm	Nm	A	Nm	Nm	A	Nm	Nm	A	Nm	Nm	A	kgm^2	kg
Synchronous speed	1,500 rpm			1,200 rpm			900 rpm			600 rpm				
ARC 112 M8	14	38	4.1	15	40	3.4	16	42	2.7	17	46	1.9	0.018	46
ARC 112 MX8	20	54	4.7	20	57	3.8	21	59	3.0	23	65	2.2	0.023	60
ARC 112 MZ8	22	65		23	68		24	72		26	78		0.029	62
ARC 132 S8	24	57	5.3	24	60	4.4	26	63	3.5	28	68	2.5	0.043	90
ARC 132 M8	33	87	9.0	34	91	7.5	36	96	5.9	39	104	4.3	0.053	95
ARC 132 MX8	39	110		41	116		43	121		47	132		0.066	110
ARC 160 S8	47	117	9.2	49	123	7.7	52	129	6.1	56	140	4.4	0.113	120
ARC 160 M8	65	174	12.5	68	183	10.5	72	191	8.3	78	209	6.0	0.145	145
ARC 160 L8	95	255		99	268		105	281		114	306		0.166	155
ARC 180 S8	84	257	16.5	87	270	13.6	92	283	10.8	101	308	7.9	0.228	180
ARC 180 M8	97	316	19.5	101	332	16.2	107	348	12.8	116	379	9.3	0.268	215
ARC 180 MX8	103	325		107	341		113	358		124	390		0.324	340
ARC 200 M8	116	390	20.5	121	410	17.2	128	429	13.6	139	468	9.9	0.443	315
ARC 200 L8	143	410	22.5	149	431	19.0	157	451	15.0	172	492	10.9	0.514	330
ARC 225 M8	167	480	28.0	174	504	23.2	184	528	18.4	200	576	13.3	0.825	390
ARC 225 MX8	180	540		187	567		198	594		216	648		0.920	440
ARC 250 S8	226	590	38.0	235	620	31.8	249	649	25.3	271	708	18.4	1.350	510
ARC 250 M8	284	715	47.5	295	751	39.4	312	787	31.3	341	858	22.8	1.550	560
ARC 280 S8	359	1,040	62.0	373	1,092	51.4	395	1,144	40.9	431	1,248	29.7	2.63	780
ARC 280 M8	449	1,320	76.5	467	1,386	63.7	494	1,452	50.5	538	1,584	36.7	3.33	855
ARC 280 L8	474	1,685	82.0	493	1,769	68.1	521	1,854	54.0	568	2,022	39.2	3.60	935
ARC 315 M8	710	2,100	113.0	738	2,205	94.2	781	2,310	74.8	852	2,520	54.4	6.000	1,050
ARC 315 L8	875	2,140	145.0	910	2,247	122.3	963	2,354	97.1	1,050	2,568	70.6	6.760	1,250
ARC 315 LX8	1,090	2,724		1,133	2,860		1,199	2,996		1,308	3,269		8.710	1,460
ARC 355 M8	1,154	3,461	145.0	1,200	3,634	155.4	1,269	3,807	123.2	1,384	4,153	89.6	9.500	1,600
ARC 355 MX8	1,410	4,230	145.0	1,466	4,442	189.8	1,551	4,653	150.6	1,692	5,076	109.6	13.400	2,200
ARC 400 L8	2,176	6,450	345.0	2,263	6,773	286.5	2,394	7,095	227.3	2,612	7,740	165.3	32.000	3,120
ARC 400 LX8	2,560	7,750	405.0	2,663	8,138	336.8	2,816	8,525	267.1	3,072	9,300	194.2	39.000	3,460

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.8 kV; du/dt max. 5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 500 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max}	η_{max} referred to M_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm^2	kg
Synchronous speed 1,500 rpm – 4-pole version															
ARC 112 M4 TU	2.3	15	3.8	1,460	83.5	0.84	43	2.9	10	78.0	0.86	2.0	0.12	0.015	56
ARC 112 MX4 TU	2.5	16	4.0	1,465	84.0	0.85	46	2.8	15	77.0	0.87	2.1	0.11	0.017	63
ARC 112 MZ4 TU	2.8	18	4.5	1,470	85.0	0.84	55	3.0	17	69.0	0.87	3.3	0.11	0.020	67
ARC 132 S4 TU	3.0	19	5.2	1,475	85.0	0.78	61	3.1	16	84.0	0.81	2.9	0.12	0.028	82
ARC 132 M4 TU	4.4	28	7.4	1,475	87.0	0.79	93	3.3	24	82.0	0.89	4.5	0.10	0.035	95
ARC 132 MX4 TU	5.5	36	9.1	1,470	87.0	0.80	110	3.1	27	80.0	0.87	4.8	0.10	0.044	105
ARC 160 S4 TU	5.5	35	8.8	1,480	88.0	0.82	105	3.0	28	82.0	0.85	5.0	0.13	0.078	130
ARC 160 M4 TU	7.7	50	12.5	1,480	89.0	0.79	150	3.0	42	85.0	0.84	8.5	0.11	0.090	144
ARC 160 MX4 TU	8.0	52	13.5	1,480	89.5	0.77	160	3.1	50	85.0	0.83	7.5	0.11	0.104	160
ARC 160 L4 TU	10.2	66	16.0	1,480	88.5	0.83	200	3.0	55	86.0	0.85	8.0	0.13	0.116	170
ARC 180 S4 TU	8.8	57	15.0	1,480	86.0	0.80	175	3.1	44	84.5	0.83	10.0	0.07	0.138	170
ARC 180 M4 TU	11.0	71	17.5	1,485	90.5	0.80	215	3.0	58	90.0	0.85	12.5	0.07	0.168	215
ARC 180 L4 TU	14.0	90	22.0	1,480	91.0	0.82	270	3.0	79	88.0	0.85	13.5	0.10	0.203	250
ARC 200 M4 TU	15.0	100	24.0	1,475	91.0	0.80	307	3.1	76	91.1	0.85	12.5	0.08	0.275	270
ARC 200 L4 TU	18.5	119	28.0	1,485	92.5	0.82	367	3.1	87	91.5	0.82	13.5	0.09	0.313	335
ARC 200 LX4 TU	20.0	128	31.5	1,485	91.5	0.80	380	3.0	97	83.0	0.84	17.0	0.09	0.356	350
ARC 225 M4 TU	22.0	141	34.5	1,485	92.0	0.80	425	3.0	112	92.5	0.86	13.5	0.09	0.525	375
ARC 225 MX4 TU	25.0	161	38.5	1,485	91.0	0.82	480	3.0	116	89.0	0.82	16.5	0.09	0.638	420
ARC 250 S4 TU	32.0	205	51.5	1,490	93.0	0.77	624	3.0	145	92.5	0.86	26.3	0.07	0.950	520
ARC 250 M4 TU	40.0	257	63.5	1,485	93.0	0.78	778	3.0	196	93.7	0.86	28.0	0.08	1.100	580
ARC 280 S4 TU	50.0	319	81.0	1,495	93.5	0.76	968	3.0	264	95.0	0.85	33.5	0.08	1.960	830
ARC 280 M4 TU	60.0	384	93.5	1,492	94.0	0.79	1,169	3.0	304	94.0	0.84	36.5	0.07	2.270	895
ARC 280 MX4 TU	70.0	449	109.0	1,490	94.0	0.79	1,330	3.0	384	94.0	0.85	48.5	0.05	2.730	1,015
ARC 315 M4 TU	95.0	607	138.0	1,495	96.0	0.83	1,780	2.9	464	95.0	0.87	52.0	0.05	4.820	1,300
ARC 315 L4 TU	132.0	845	191.0	1,492	96.0	0.83	2,040	2.4	544	95.5	0.88	60.0	0.05	5.930	1,450
ARC 315 LX4 TU	150.0	961	215.0	1,490	96.0	0.84	2,884	3.0	784	95.5	0.88	82.0	0.04	6.820	1,630
ARC 355M4 TU	160.0	1,022	234.0	1,495	95.0	0.83	3,066	3.0	850	95.0	0.79	106.0	0.05	10.000	2,500
ARC 400 L4 TU	240.0	1,534		1,494	data on request		6,340	4.1						20.000	3,210
ARC 400 LX 4 TU	290.0	1,854		1,494	data on request		7,500	4.0						25.000	3,460
Synchronous speed 1,000 rpm – 6-pole version															
ARC 112 M6 TU	1.5	15	3.3	975	77.0	0.69	52	2.9	9	74.1	0.84	2.4	0.12	0.018	52
ARC 112 MX6 TU	1.9	19	3.9	975	78.0	0.73	50	2.7	10	77.0	0.82	2.7	0.12	0.023	60
ARC 112 MZ6 TU	2.2	22	4.2	970	81.0	0.74	60	2.8	11	74.0	0.84	3.1	0.11	0.029	62
ARC 132 S6 TU	2.6	25	5.7	980	80.0	0.66	79	3.1	14	76.0	0.85	4.2	0.13	0.043	90
ARC 132 M6 TU	3.5	34	6.5	975	81.0	0.77	103	3.1	19	83.6	0.77	4.5	0.13	0.053	95
ARC 132 MX6 TU	4.2	41	8.0	975	83.0	0.73	130	3.0	23	82.8	0.80	5.0	0.11	0.066	110
ARC 160 S6 TU	4.8	47	8.6	980	85.5	0.75	145	3.1	25	82.8	0.87	5.5	0.11	0.113	120
ARC 160 M6 TU	6.5	63	11.0	980	86.0	0.78	195	3.1	32	84.0	0.84	6.5	0.12	0.145	145
ARC 160 L6 TU	7.0	68	12.5	980	85.5	0.75	205	3.0	35	83.0	0.81	6.7	0.13	0.166	160
ARC 180 S6 TU	7.6	73	12.5	980	85.5	0.82	200	2.7	32	84.0	0.88	6.5	0.15	0.228	180
ARC 180 M6 TU	9.5	92	16.0	985	86.5	0.80	283	3.1	48	84.2	0.87	8.0	0.12	0.268	215
ARC 180 L6 TU	11.0	107	18.5	985	86.0	0.80	320	3.0	56	84.0	0.85	10.0	0.12	0.324	250
ARC 200 M6 TU	12.5	121	20.0	985	89.5	0.81	373	3.1	60	88.7	0.88	11.0	0.11	0.443	315
ARC 200 L6 TU	15.0	145	24.0	985	89.5	0.80	450	3.1	72	88.5	0.88	12.0	0.11	0.514	330
ARC 200 LX6 TU	19.5	189	31.0	985	90.0	0.83	580	3.1	92	88.7	0.88	17.0	0.12	0.620	360
ARC 225 M6 TU	16.5	159	26.5	990	91.0	0.79	496	3.1	76	89.6	0.88	14.0	0.09	0.825	390
ARC 225 MX6 TU	18.0	174		990			535	3.1						0.920	440
ARC 250 S6 TU	22.0	212	34.5	991	91.0	0.81	540	2.5	88	90.7	0.88	20.0	0.08	1.280	465
ARC 250 M6 TU	27.0	260	41.5	991	92.0	0.82	706	2.7	112	91.3	0.88	22.0	0.08	1.480	520
ARC 280 S6 TU	37.0	356	71.5	992	93.5	0.83	1,075	3.0	235	89.0	0.80	30.0	0.08	2.630	780
ARC 280 M6 TU	44.0	424	66.5	992	93.5	0.82	1,265	3.0	208	92.5	0.87	34.0	0.07	3.330	855
ARC 280 MX6 TU	48.0	461	72.5	995	93.5	0.82	1,608	3.5	256	92.5	0.86	37.5	0.07	3.600	890
ARC 315 M6 TU	75.0	721	110.0	993	94.5	0.83	1,945	2.7	304	93.9	0.87	46.0	0.06	6.000	1,050
ARC 315 L6 TU	90.0	866	131.0	993	94.5	0.84	2,140	2.5	360	93.0	0.88	51.0	0.08	6.670	1,250
ARC 315 LX6 TU	100.0	962	146.0	993	95.0	0.83	2,800	2.9	433	94.0	0.87	60.0	0.06	8.600	1,460
ARC 355 M6 TU	140.0	1,344	210.0	995	96.0	0.80	4,031	3.0	652	94.5	0.80	100.0	0.05	8.200	1,650
ARC 355 MX6 TU	160.0	1,536	241.0	995	96.0	0.80	4,607	3.0	708	96.5	0.80	123.0	0.04	12.800	2,200
ARC 400 L6 TU	210.0	2,030		995	data on request		6,400	3.2						25.000	3,120
ARC 400 LX6 TU	240.0	2,310		995	data on request		7,460	3.2						27.000	3,340

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.8 kV; du/dt max. 5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 500 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max}	η_{max} referred to M_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm^2	kg
Synchronous speed 750 rpm – 8-pole version															
ARC 112 M8 TU	0.9	12	2.7	725	70.5	0.55	32	2.7	8	70.0	0.79	2.3	0.13	0.018	46
ARC 112 MX8 TU	1.3	17	3.2	725	73.5	0.63	45	2.6	9	71.5	0.82	2.6	0.13	0.023	53
ARC 112 MZ8 TU	1.5	20	3.7	720	74.5	0.63	48	2.4	10	64.0	0.81	3.0	0.12	0.029	62
ARC 132 S8 TU	1.8	24	4.4	730	75.0	0.63	57	2.4	10	77.5	0.78	3.0	0.11	0.043	90
ARC 132 M8 TU	2.5	33	6.0	730	74.5	0.65	87	2.7	13	74.0	0.77	4.5	0.11	0.053	95
ARC 132 MX8 TU	3.0	39	7.7	730	75.0	0.60	110	2.8	16	72.0	0.78	6.0	0.11	0.066	110
ARC 160 S8 TU	3.6	47	7.6	735	83.0	0.66	117	2.5	25	81.0	0.78	6.5	0.10	0.113	120
ARC 160 M8 TU	5.0	65	10.5	735	83.5	0.65	174	2.7	23	79.0	0.80	7.5	0.10	0.145	145
ARC 160 L8 TU	6.5	85	13.5	730	83.0	0.66	225	2.6	31	78.0	0.79	9.0	0.09	0.166	160
ARC 180 S8 TU	6.5	84	13.0	740	87.0	0.66	257	3.1	33	84.0	0.81	10.0	0.08	0.228	190
ARC 180 M8 TU	7.5	97	15.5	740	86.0	0.65	316	3.3	39	86.0	0.82	12.5	0.09	0.268	215
ARC 180 L8 TU	8.0	103	16.0	740	87.0	0.67	325	3.2	44	82.0	0.80	11.5	0.08	0.324	250
ARC 200 M8 TU	9.0	116	16.5	740	87.5	0.72	390	3.4	50	86.0	0.84	11.0	0.09	0.443	315
ARC 200 L8 TU	11.0	143	18.0	735	89.5	0.78	410	2.9	51	87.0	0.84	11.0	0.08	0.514	330
ARC 225 M8 TU	13.0	167	22.5	743	86.3	0.78	480	2.9	60	88.8	0.80	17.0	0.08	0.825	390
ARC 225 MX8 TU	14.0	180					540	3.0						0.920	440
ARC 250 S8 TU	17.5	226	30.5	740	90.5	0.73	590	2.6	72	89.8	0.81	18.5	0.07	1.350	510
ARC 250 M8 TU	22.0	284	38.0	740	90.5	0.74	715	2.5	95	90.7	0.77	24.0	0.07	1.550	560
ARC 280 S8 TU	28.0	359	49.5	745	92.0	0.71	1,040	2.9	152	91.8	0.79	30.0	0.06	2.63	780
ARC 280 M8 TU	35.0	449	61.0	745	93.0	0.71	1,320	2.9	200	91.6	0.81	40.0	0.06	3.33	855
ARC 280 MX8 TU	37.0	474	65.5	746	92.0	0.71	1,685	3.6	232	92.3	0.80	60.0	0.05	3.60	890
ARC 315 M8 TU	55.0	710	90.5	741	93.6	0.75	2,100	3.0	245	91.1	0.82	57.0	0.05	6.000	1,050
ARC 315 L8 TU	68.0	875	117.0	745	94.4	0.71	2,140	2.4	248	94.1	0.82	75.0	0.05	6.760	1,250
ARC 315 LX8 TU	85.0	1,090	141.0	745	93.0	0.75	2,724	2.5	308	92.0	0.82	73.5	0.06	8.710	1,460
ARC 355 M8 TU	90.0	1,154	149.0	745	94.0	0.74	3,461	3.0	416	93.5	0.80	79.0	0.05	9.500	1,600
ARC 355 MX8 TU	110.0	1,410	183.0	745	94.0	0.74	4,230	3.0	504	94.0	0.80	96.0	0.05	13.400	2,200
ARC 400 L8 TU	170.0	2,176		746	data on request		6,450							32.000	3,120
ARC 400 LX8 TU	200.0	2,560		746	data on request		7,750							39.000	3,460
Synchronous speed 600 rpm – 10-pole version															
ARC 112 M10 TU	0.45	8		570	data on request		22	2.7						0.018	46
ARC 112 MX10 TU	0.61	10		575	data on request		28	2.8						0.023	60
ARC 112 MZ10 TU	0.70	12		570	data on request		33	2.8						0.029	62
ARC 132 S10 TU	1.0	17		575	data on request		46	2.7						0.043	90
ARC 132 M10 TU	1.30	22		575	data on request		60	2.5						0.053	95
ARC 132 MX10 TU	1.6	27		575	data on request		67	2.5						0.066	110
ARC 160 S10 TU	2.8	46		575	data on request		115	2.5						0.113	120
ARC 160 M10 TU	3.00	50	8.7	575	80.0	0.62	120	2.4	18	80.0	0.75	6.5	0.11	0.145	145
ARC 160 L10 TU	4.0	66		575	data on request		165	2.5						0.166	155
ARC 180 S10 TU	4.50	73	15.5	590	82.0	0.50	225	3.0	33	82.0	0.75	12.5	0.07	0.228	180
ARC 180 M10 TU	6.50	105	22.0	590	83.5	0.51	315	3.0	47	80.0	0.76			0.268	215
ARC 180 L10 TU	7.00	116	20.5	575	83.0	0.59	300	2.6	44	81.5	0.75	16.0	0.09	0.324	340
ARC 200 M10 TU	8.5	140		580	data on request		380	2.7						0.443	315
ARC 200 L10 TU	9.0	148		580	data on request		400	2.7						0.514	330
ARC 225 M10 TU	11.0	178	33.0	590	86.5	0.56	480	2.7	84	85.5	0.73	23.5	0.07	0.825	390
ARC 225 MX10 TU	12.0	198		580	data on request		535	2.7						0.920	440
ARC 250 S10 TU	13.5	220		585	data on request		595	2.7						1.280	510
ARC 250 M10 TU	17.0	278		585	data on request		750	2.7						1.480	560
ARC 280 S10 TU	22.5	364		590	data on request		980	2.7						2.630	780
ARC 280 M10 TU	27.5	445		590	data on request		1,200	2.7						3.330	855
ARC 280 MX10 TU	37.5	607		590	data on request		1,640	2.7						3.600	935
ARC 315 M10 TU	45.0	722	143.0	595	92.5	0.49	2,190	3.0	295	93.0	0.70			6.000	1,050
ARC 315 L10 TU	55.0	890		590	data on request		2,670	3.0						6.670	1,250
ARC 315 LX10 TU				590	data on request									6.670	1,460
ARC 355 M10 TU	68.0	1,091		595	data on request		3,274	3.0						9.500	1,600
ARC 355 MX10 TU	80.0	1,284		595	data on request		3,852	3.0						13.400	2,200

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 1.8 kV; du/dt max. 5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 500 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max} referred to M_{max}	η_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm^2	kg
Synchronous speed 500 rpm – 12-pole version															
ARC 112 M12 TU	0.3	6		475	data on request		16	2.7						0.018	46
ARC 112 MX12 TU	0.5	10		470	data on request		27	2.7						0.023	60
ARC 112 MZ12 TU	0.6	12		470	data on request		33	2.8						0.029	62
ARC 132 S12 TU	0.8	16		480	data on request		43	2.7						0.043	90
ARC 132 M12 TU	1.0	20		480	data on request		54	2.7						0.053	95
ARC 132 MX12 TU	1.2	24		485	data on request		65	2.7						0.053	110
ARC 160 S12 TU	1.5	30		475	data on request		80	2.7						0.113	120
ARC 160 M12 TU	2.75	54	10.5	488	71.0	0.42	160	3.0	24	79.5	0.64	12.6	0.10	0.145	145
ARC 160 L12 TU	3.0	60		480	data on request		160	2.7						0.166	155
ARC 180 S12 TU	3.0	60		480	data on request		160	2.7						0.228	180
ARC 180 M12 TU	4.5	90	17.0	480	76.5	0.40	270	3.0	33			20.0	0.08	0.268	215
ARC 180 L12 TU	5.5	109	19.0	480	81.5	0.41	330	3.0	70			19.5	0.07	0.324	340
ARC 200 M12 TU	6.5	129		480	data on request		350	2.7						0.443	315
ARC 200 L12 TU	7.0	139		480	data on request		375	2.7						0.514	330
ARC 225 M12 TU	8.5	169	28.0	480	81.0	0.43	510	3.0	67			32.5	0.07	0.825	390
ARC 225 MX12 TU	9.0	179		480	data on request		480	2.7						0.920	440
ARC 250 S12 TU	10.0	199		480	data on request		535	2.7						1.280	510
ARC 250 M12 TU	12.0	232	39.0	495	84.5	0.42	625	2.7						1.480	560
ARC 280 S12 TU	18.5	364		485	data on request		985	2.7						2.630	780
ARC 280 M12 TU	22.5	443		485	data on request		1,195	2.7						3.330	855
ARC 280 MX12 TU	27.5	541		485	data on request		1,460	2.7						3.600	935
ARC 315 M12 TU	37.5	738		485	data on request		1,995	2.7						6.000	1,050
ARC 315 L12 TU				485	data on request									6.670	1,250
ARC 315 LX12 TU	45.0	886		485	data on request		2,390	2.7						6.670	1,460
ARC 355 M12 TU	55.0	1,072		490	data on request		2,895	2.7						9.500	1,600
ARC 355 MX12 TU	66.0	1,286		490	data on request		3,475	2.7						13.400	2,200
ARC 400 L12 TU	110.00	2,110	240	497	93.0	0.57	6,000	2.8	630	93.5	0.74	215.0	0.04	37.000	3,000
ARC 400L X12 TU	132.00	2,550	287	497	93.0	0.57	7,320	2.9	770	92.4	0.75	260.0	0.04	45.000	3,320

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 2.5 kV; du/dt max. 5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 690 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max}	η_{max} referred to M_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm²	kg
Synchronous speed 1,500 rpm – 4-pole version															
ARC 112 M4 TV	1.5	10	1.8	1,470	82.0	0.85	27	2.8	5	69.5	0.90	1.1	0.13	0.015	56
ARC 112 MX4 TV	1.9	12		1,478			43	3.5						0.017	63
ARC 112 MZ4 TV	2.3	15		1,475			52	3.5						0.020	67
ARC 132 S4 TV	2.5	16	3.4	1,477	82.0	0.76	49	3.0	10	75.0	0.89	2.0	0.14	0.028	82
ARC 132 M4 TV	3.5	23	4.4	1,477	84.5	0.78	70	3.1	12	80.0	0.90	2.6	0.12	0.035	95
ARC 132 MX4 TV	4.4	28		1,475			90	3.2						0.044	105
ARC 160 S4 TV	4.4	28	5.4	1,480	86.0	0.80	90	3.2	16	84.0	0.85	3.2	0.15	0.078	130
ARC 160 M4 TV	5.5	35	6.7	1,480	87.5	0.79	105	3.0	19	85.0	0.85	3.5	0.13	0.090	144
ARC 160 MX4 TV	6.5	42	8.0	1,480	87.0	0.78	125	3.0	23	83.0	0.83	4.5	0.12	0.104	150
ARC 160 L4 TV	7.5	48	8.6	1,480	87.0	0.84	150	3.1	26	86.0	0.84	4.0	0.16	0.116	170
ARC 180 S4 TV	8.0	51	9.5	1,485	90.0	0.78	160	3.1	28	87.0	0.85	5.0	0.08	0.138	170
ARC 180 M4 TV	10.0	64	12.0	1,485	89.0	0.78	190	3.0	33	87.0	0.85	7.0	0.10	0.168	215
ARC 180 L4 TV	12.0	77		1,480			230	3.0						0.203	250
ARC 200 M4 TV	14.0	90	15.5	1,485	91.5	0.82	270	3.0	46	88.0	0.85	7.5	0.09	0.275	270
ARC 200 L4 TV	15.0	96	16.5	1,485	92.0	0.82	285	3.0	49	88.0	0.84	8.0	0.09	0.313	335
ARC 200 LX4 TV	18.5	119	22.0	1,490	90.0	0.79	365	3.1	64	88.0	0.84	10.5	0.10	0.356	350
ARC 225 M4 TV	20.0	129	22.5	1,485	92.0	0.81	380	3.0	67	89.0	0.84	10.5	0.08	0.525	375
ARC 225 MX4 TV	22.0	141		1,485			425	3.0						0.638	420
ARC 250 S4 TV	25.0	160	29.0	1,490	92.5	0.78	480	3.0	85	91.0	0.79	13.0	0.09	0.950	520
ARC 250 M4 TV	32.0	205	38.5	1,490	93.0	0.75	624	3.0	110	92.5	0.79	19.0	0.07	1.100	580
ARC 280 S4 TV	40.0	256	45.5	1,490	93.0	0.79	778	3.0	139	93.0	0.80	22.5	0.06	1.960	830
ARC 280 M4 TV	50.0	320	55.0	1,490	93.5	0.81	968	3.0	175	92.0	0.78	24.0	0.07	2.270	895
ARC 280 MX4 TV	60.0	385	68.5	1,490	93.0	0.79	1,169	3.0	199	91.0	0.85	34.0	0.06	2.730	1,015
ARC 315 M4 TV	70.0	449	72.5	1,490	95.0	0.85	1,330	3.0	280	93.0	0.80	25.5	0.07	4.820	1,300
ARC 315 L4 TV	95.0	607	98.0	1,495	95.5	0.85	1,780	2.9	310	93.0	0.80	30.0	0.06	5.930	1,450
ARC 315 LX4 TV	110.0	705	112.0	1,490	95.5	0.86	2,040	2.9	350	93.0	0.81	36.0	0.06	6.820	1,630
ARC 355M4 TV	132.0	843	134.0	1,495	95.5	0.86	2,530	3.0	430	84.5	0.80	56.0	0.06	10.000	2,500
ARC 400 L4 TV	150.0	959		1,494	data on request		6,340	4.1						20.000	3,210
ARC 400 LX 4 TV	160.0	1,023		1,494	data on request		7,500	4.0						25.000	3,460
Synchronous speed 1,000 rpm – 6-pole version															
ARC 112 M6 TV	1.0	10	1.9	980	68.5	0.63	27	2.7	5	63.0	0.87	1.7	0.15	0.018	52
ARC 112 MX6 TV	1.3	13	2.3	980	73.0	0.64	38	3.0	6	65.0	0.87	1.9	0.13	0.023	60
ARC 112 MZ6 TV	1.7	17		975			43	2.6						0.029	62
ARC 132 S6 TV	2.2	21	3.5	985	77.0	0.68	66	3.1	10	69.0	0.83	2.7	0.13	0.043	90
ARC 132 M6 TV	2.6	25	3.8	980	78.0	0.73	79	3.1	11	71.0	0.85	2.6	0.16	0.053	95
ARC 132 MX6 TV	3.5	34	5.1	975	81.5	0.71	103	3.0	14	73.5	0.84	3.5	0.12	0.066	110
ARC 160 S6 TV	4.2	41	5.9	980	82.0	0.73	130	3.2	17	76.0	0.87	3.8	0.13	0.113	120
ARC 160 M6 TV	4.8	47	7.0	985	82.0	0.70	145	3.1	18	80.0	0.87	4.3	0.15	0.145	145
ARC 160 L6 TV	5.5	54	7.4	980	83.5	0.74	160	3.0	20	80.0	0.88	4.0	0.15	0.166	155
ARC 180 S6 TV	7.0	68	8.8	985	84.5	0.79	205	3.0	25	80.0	0.88	4.2	0.13	0.228	180
ARC 180 M6 TV	7.6	74	9.4	985	85.0	0.80	228	3.1	27	79.5	0.88	5.6	0.13	0.268	215
ARC 180 L6 TV	8.5	82	10.5	985	85.0	0.80	250	3.0	31	77.0	0.88	6.3	0.12	0.324	340
ARC 200 M6 TV	11.0	107	13.5	985	86.0	0.80	320	3.0	37	84.0	0.88	7.0	0.13	0.443	315
ARC 200 L6 TV	12.5	121	14.5	985	88.0	0.82	373	3.1	43	83.0	0.88	7.5	0.13	0.514	330
ARC 200 LX6 TV	15.0	145	17.0	985	88.0	0.85	450	3.1	66	83.0	0.88	12.0	0.11	0.620	360
ARC 225 M6 TV	15.0	145	17.5	990	89.0	0.81	450	3.1	55	84.0	0.85	9.0	0.09	0.825	390
ARC 225 MX6 TV	16.5	159		990			535	3.4						0.920	440
ARC 250 S6 TV	22.0	212	34.5	991	91.0	0.81	540	2.5	88	90.7	0.88		0.08	1.280	465
ARC 250 M6 TV	27.0	260	41.5	991	92.0	0.82	706	2.7	112	91.3	0.88	22.0	0.08	1.480	520
ARC 280 S6 TV	37.0	356	57.5	992	94.0	0.79	1,075	3.0	184	93.1	0.88	27.0	0.05	2.630	780
ARC 280 M6 TV	44.0	424	66.5	992	93.5	0.82	1,265	3.0	208	92.5	0.87	34.0	0.07	3.330	855
ARC 280 MX6 TV	48.0	461	72.5	995	93.5	0.82	1,608	3.5	256	92.5	0.86	37.5	0.07	3.600	890
ARC 315 M6 TV	75.0	721	110.0	993	94.5	0.83	1,945	2.7	304	93.9	0.87	46.0	0.06	6.000	1,050
ARC 315 L6 TV	90.0	866	131.0	993	94.5	0.84	2,140	2.5	360	93.0	0.88	51.0	0.08	6.670	1,250
ARC 315 LX6 TV	100.0	962	146.0	993	95.0	0.83	2,800	2.9	433	94.0	0.87	60.0	0.06	8.600	1,460
ARC 355M6 TV	140.0	1,344	210.0	995	96.0	0.80	4,031	3.0	652	94.5	0.80	100.0	0.05	8.200	1,650
ARC 355MX6 TV	160.0	1,536	241.0	995	96.0	0.80	4,607	3.0	708	96.5	0.80	123.0	0.04	12.800	2,200
ARC 400 L6 TV	210.0	2,030		995	data on request		6,400	3.2						25.000	3,120
ARC 400 LX6 TV	240.0	2,310		995	data on request		7,460	3.2						27.000	3,340

Three-phase roller table motors with squirrel-cage rotor for converter-fed operation, series ARC

Non-ventilated with surface cooling, IC 410
Planning data for switched operation calculations/motor pre-selection
Duty type S9, thermal class F, type of protection IP 55, rated frequency 50 Hz
Insulation system for Û max. 2.5 kV; du/dt max. 5 kV/µs

	Equivalent S1 output						Transient peak load (max. 10 s)					No-load			
ARC	P_{eff} (S1)	M_{eff}	I_n 690 V	n_n referred to P_{eff}	η_n	$\cos\phi_n$	M_{max}	M_{max}/M_{eff}	I_{max}	η_{max} referred to M_{max}	$\cos\phi_{max}$	I_0	$\cos\phi_0$	J	m
	kW	NM	A	rpm	%	-	Nm		A	%	-	A	-	kgm^2	kg
Synchronous speed 500 rpm – 12-pole version															
ARC 112 M8 TV					data on request									0.018	46
ARC 112 MX8 TV					data on request									0.023	53
ARC 112 MZ8 TV					data on request									0.029	62
ARC 132 S8 TV					data on request									0.043	90
ARC 132 M8 TV					data on request									0.053	95
ARC 132 MX8 TV					data on request									0.066	110
ARC 160 S8 TV	3.0	39	4.5	735	82.0	0.68	110	2.8	12	81.0	0.78	3.7	0.10	0.113	120
ARC 160 M8 TV	3.6	47	5.6	736	82.0	0.66	117	2.5	12	81.5	0.80	4.1	0.11	0.145	145
ARC 160 L8 TV	4.0	52		735			140	2.7						0.166	155
ARC 180 S8 TV	5.5	71	8.7	740	83.0	0.64	210	3.0	21	79.0	0.82	6.5	0.11	0.228	190
ARC 180 M8 TV	6.5	84	9.5	735	83.0	0.69	240	2.8	22	80.0	0.85	6.5	0.09	0.268	215
ARC 180 L8 TV	7.5	97		740			316	3.2						0.324	340
ARC 200 M8 TV	8.0	103	11.0	740	86.0	0.70	325	3.1	29	83.0	0.84	7.5	0.09	0.443	315
ARC 200 L8 TV	9.0	116	12.0	740	88.0	0.70	390	2.9	33	84.0	0.85	8.5	0.08	0.514	330
ARC 225 M8 TV	13.0	167	22.5	743	86.3	0.78	480	2.9	60	88.8	0.80	17.0	0.08	0.825	390
ARC 225 MX8 TV	14.0	180					540	3.0						0.920	440
ARC 250 S8 TV	17.5	226	30.5	740	90.5	0.73	590	2.6	72	89.8	0.81	18.5	0.07	1.350	510
ARC 250 M8 TV	22.0	284	38.0	740	90.5	0.74	715	2.5	95	90.7	0.77	24.0	0.07	1.550	560
ARC 280 S8 TV	28.0	359	49.5	745	92.0	0.71	1,040	2.9	152	91.8	0.79	30.0	0.06	2.63	780
ARC 280 M8 TV	35.0	449	61.0	745	93.0	0.71	1,320	2.9	200	91.6	0.81	40.0	0.06	3.33	855
ARC 280 MX8 TV	37.0	474	65.5	746	92.0	0.71	1,685	3.6	232	92.3	0.80	60.0	0.05	3.60	890
ARC 315 M8 TV	55.0	710	90.5	741	93.6	0.75	2,100	3.0	245	91.1	0.82	57.0	0.05	6.000	1,050
ARC 315 L8 TV	68.0	875	117.0	745	94.4	0.71	2,140	2.4	248	94.1	0.82	75.0	0.05	6.760	1,250
ARC 315 LX8 TV	85.0	1,090	141.0	745	93.0	0.75	2,724	2.5	308	92.0	0.82	73.5	0.06	8.710	1,460
ARC 355 M8 TV	90.0	1,154	149.0	745	94.0	0.74	3,461	3.0	416	93.5	0.80	79.0	0.05	9.500	1,600
ARC 355 MX8 TV	110.0	1,410	183.0	745	94.0	0.74	4,230	3.0	504	94.0	0.80	96.0	0.05	13.400	2,200
ARC 400 L8 TV	170.0	2,176		746	data on request		6,450							32.000	3,120
ARC 400 LX8 TV	200.0	2,560		746	data on request		7,750							39.000	3,460

General technical data

Transnorm motors, series DS, DSf, DSo, DSWM for mains and converter-fed operation

The most important technical data are summarised in the following table.
Further information can be taken from the catalogue section “Technical explanations”.

Product group	Roller table motors, squirrel-cage rotor, IEC/DIN
Series	DS..
Rated output	100 kW to 1,500 kW
Sizes	355 to 630
Housing material	Sheet steel, with welded radial ribs or double jacket for type of cooling IC 31, IC 71
Rated torque	1,000 Nm to 15,000 Nm
Method of connection	Single-speed motors are designed in star-delta configuration as standard
Stator winding insulation	Thermal class 155, optional 155 [F(B)], 180 to EN 60034-1 (IEC 60034-1)
Type of protection	IP 55 acc. to DIN EN 60034-5 (IEC 60034-5), optionally IP 56 and higher
Type of cooling	IC 411 [self-ventilated], IC 416 [forced ventilation], IC 410 [non-ventilated] or IC 31 [water-jacket cooling] acc. to EN 60034-6 (IEC 60034-6)
Coolant temperature/ installation altitude	Standard -20 °C to +40 °C, Altitude 1,000 m above sea level
Rated voltage	Rated voltage ranges A and B acc. to DIN EN 60034-1 (IEC 60034-1), Standard voltages to EN 60038 50 Hz, 230 V, 400 V, 500 V, and 690 V 60 Hz, 275 V, 480 V and 600 V
Types of construction	IM B3, IM B35, IM B5 and derived types complying with EN 60034-7
Paint finish	Normal finish “Moderate”, colour RAL 7031, blue-grey Special finish “Worldwide”, colour RAL 7031, blue-grey
Vibration severity grade	Grade “A” as standard for machines with no special vibration requirements
Shaft ends	acc. to DIN 748 (IEC 60072), balanced with half-key
Sound pressure level	acc. to DIN EN ISO 1680, tolerance +3 dB, see technical explanations for values
Limit speeds	Details upon request
Bearing design	Details upon request
Motor mass	See technical selection lists
Terminal box	Details upon request
Documentation	An operating and maintenance manual, a terminal plan and a safety data sheet are supplied with each motor
Tolerances	See section “Tolerances” in the chapter “Technical explanations”
Options	See “Overview of modifications” of the main catalogue 2017 in the chapter “Technical explanations”

Welded steel three-phase asynchronous motors for rolling mills
Overview of sizes and outputs

Types of cooling IC 411 [self-ventilated], IC 416 [forced ventilation], IC 410 [non-ventilated] and IC 31 [water-jacket cooling]
Duty type S1, thermal class 155 [F], type of protection IP 55,
rated voltage 690 V, rated frequency 50 Hz

Type of cooling	IC 411		IC 416		IC 410		IC 31	
	P_B [kW]	Type	P_B [kW]	Type	P_B [kW]	Type	P_B [kW]	Type
Synchronous speed 1,500 rpm – 4-pole version								
355 M	340	DS 355 M…-4	340	DSf 355 M…-4	155	DSo 355 M…-4	340	DSWM 355 M…-4
355 L	400	DS 355 L…-4	400	DSf 355 L…-4	190	DSo 355 L…-4	400	DSWM 355 L…-4
400 M	490	DS 400 M... -4	490	DSf 400 M... -4	220	DSo 400 M…-4	490	DSWM 400 M…-4
400 L	550	DS 400 L…-4	550	DSf 400 L…-4	265	DSo 400 L…-4	550	DSWM 400 L…-4
450 S	610	DS 450 S... -4	610	DSf 450 S... -4	275	DSo 450 S…-4	610	DSWM 450 S…-4
450 M	770	DS 450 M…-4	770	DSf 450 M…-4	325	DSo 450 M…-4	770	DSWM 450 L…-4
450 L	840	DS 450 L…-4	840	DSf 450 L…-4	360	DSo 450 L…-4	840	DSWM 450 L…-4
500 M	960	DS 500 M…-4	960	DSf 500 M…-4	385	DSo 500 M…-4	960	DSWM 500 M…-4
500 L	1,200	DS 500 L…-4	1,200	DSf 500 L…-4	480	DSo 500 L…-4	1,200	DSWM 500 L…-4
Synchronous speed 1,000 rpm – 6-pole version								
355 M	280	DS 355 M…-6	280	DSf 355 M…-6	130	DSo 355 M…-6	280	DSWM 355 M…-6
355 L	330	DS 355 L…-6	330	DSf 355 L…-6	160	DSo 355 L…-6	330	DSWM 355 L…-6
400 M	410	DS 400 M... -6	410	DSf 400 M... -6	180	DSo 400 M…-6	410	DSWM 400 M…-6
400 L	460	DS 400 L…-6	460	DSf 400 L…-6	220	DSo 400 L…-6	460	DSWM 400 L…-6
450 S	510	DS 450 S... -6	510	DSf 450 S... -6	230	DSo 450 S…-6	510	DSWM 450 S…-6
450 M	640	DS 450 M…-6	640	DSf 450 M…-6	270	DSo 450 M…-6	640	DSWM 450 L…-6
450 L	700	DS 450 L…-6	700	DSf 450 L…-6	300	DSo 450 L…-6	700	DSWM 450 L…-6
500 M	800	DS 500 M…-6	800	DSf 500 M…-6	320	DSo 500 M…-6	800	DSWM 500 M…-6
500 L	1,000	DS 500 L…-6	1,000	DSf 500 L…-6	400	DSo 500 L…-6	1,000	DSWM 500 L…-6
560 L	1,120	DS 560 L…-6	1,120	DSf 560 L…-6			1,350	DSWM 560 L…-6
630 L							1,500	DSWM 630 L…-6
Synchronous speed 750 rpm – 8-pole version								
355 M	210	DS 355 M…-8	210	DSf 355 M…-8	100	DSo 355 M…-8	210	DSWM 355 M…-8
355 L	250	DS 355 L…-8	250	DSf 355 L…-8	120	DSo 355 L…-8	250	DSWM 355 L…-8
400 M	310	DS 400 M…-8	310	DSf 400 M…-8	135	DSo 400 M…-8	310	DSWM 400 M…-8
400 L	350	DS 400 L…-8	350	DSf 400 L…-8	165	DSo 400 L…-8	350	DSWM 400 L…-8
450 S	380	DS 450 S…-8	380	DSf 450 S…-8	175	DSo 450 S…-8	380	DSWM 450 S…-8
450 M	480	DS 450 M…-8	480	DSf 450 M…-8	205	DSo 450 M…-8	480	DSWM 450 L…-8
450 L	530	DS 450 L…-8	530	DSf 450 L…-8	225	DSo 450 L…-8	530	DSWM 450 L…-8
500 M	600	DS 500 M…-8	600	DSf 500 M…-8	240	DSo 500 M…-8	600	DSWM 500 M…-8
500 L	750	DS 500 L…-8	750	DSf 500 L…-8	300	DSo 500 L…-8	750	DSWM 500 L…-8
560 L	840	DS 560 L…-8	840	DSf 560 L…-8			1,010	DSWM 560 L…-8
630 L							1,120	DSWM 630 L…-8

General technical data

Three-phase roller table motors with squirrel-cage rotor
Series IE3-A4.R for mains and converter-fed operation

The most important technical data are summarised in the following table.
Further information can be taken from the catalogue section “Technical explanations”.

Product group	Squirrel-cage rotor, IEC/DIN
Series	IE3-A4.R roller table motors self-ventilation, IE3 Premium Efficiency 2, 4, 6 and 8 poles
Rated output	0,12 kW to 710 kW
Sizes	56 to 400
Housing material	Grey cast iron
Rated torque	0,4 Nm to 5,334 Nm
Efficiency determination	EN 60034-2-1, ≤ 1 kW direct measurement, > 1 kW residual loss method
Method of connection	Single-speed motors are designed in star-delta configuration as standard
Stator winding insulation	Thermal class 155, optional 155 [F(B)], 180 to EN 60034-1 (IEC 60034-1)
Type of protection	IP 55 acc. to EN 60034-5 (IEC 60034-5)
Type of cooling	IC 411 acc. to EN 60034-6 (IEC 60034-6)
Coolant temperature/ installation altitude	Standard -20 °C to +40 °C, Altitude 1,000 m above sea level
Rated voltage	Standard voltages acc. to EN 60038 50 Hz, 400 V 60 Hz, 460 V
Types of construction	IM B3, IM B35, IM B5 and derived types complying with DIN EN 60034-7
Paint finish	Normal finish “Moderate”, colour RAL 7031, blue-grey Special finish “Worldwide”, colour RAL 7031, blue-grey
Vibration severity grade	Grade “A” as standard for machines with no special vibration requirements
Shaft ends	acc. to DIN 748 (IEC 60072), balanced with half-key
Limit speeds	See tables of limit speeds
Bearing design	See tables of bearing design data
Motor mass	See technical selection lists
Terminal box	See section “Terminal boxes” in the chapter “Technicalexplanations” of the basic catalogue for low-voltage asynchronous motors/IEC squirrel-cage motors
Documentation	An operating and maintenance manual, a terminal plan and a safety data sheet are supplied with each motor.
Tolerances	See section “Tolerances” in the chapter “Technical explanations”
Options	See “Overview of modifications” in the basic catalogue for low-voltage asynchronous motors/IEC squirrel-cage motors

Three-phase motors with squirrel cage rotor, roller table motors, light version
Efficiency class „Premium Efficiency“ (IE3)

With surface cooling, duty type S1, continuous duty, thermal class 155, type of protection IP 55

Motor selection data																Design point 400 V. 50 Hz/ 460 V. 60 Hz
Type	U_B	f_B	P_B	M_B	n_B		η		$\cos\phi_B$	I_B	I_A/I_B	M_A/M_B	M_S/M_B	M_K/M_B	J	m
	V	Hz	kW	Nm	min^{-1}	1.00	0.75	0.50	-	A	-	-	-	-	kgm^2	kg
Synchronous speed 3.000/ 3.600 rpm – 2-pole version																
IE3-A41R 56 G2	400	50	0.12	0.4	2,830	60.8	59.4	55.9	0.77	0.32	4.5	2.1	2.1	2.3	0.00013	4.5
	460	60	0.14	0.39	3,410	71.4	62	66.5	0.82	0.3	5.2	2	2	2.3		
IE3-A41R 63 K2	400	50	0.18	0.61	2,840	65.9	64.6	59.8	0.84	0.44	5.5	2.5	2.4	2.9	0.00025	6.3
	460	60	0.21	0.58	3,430	65.6	on request		0.83	0.44	5.5	2.6	2.5	3.1		
IE3-A41R 63 G2	400	50	0.25	0.85	2,825	69.7	70.1	67.1	0.83	0.58	4.9	2.4	2.2	2.7	0.00025	6.3
	460	60	0.3	0.84	3,410	69.5	70	67.8	0.84	0.58	5.3	2.3	2.2	2.8		
IE3-A42R 71 K2	400	50	0.37	1.24	2,840	73.8	78.2	75.5	0.82	0.83	5.4	2.4	2.3	2.9	0.00032	7.6
	460	60	0.44	1.23	3,430	73.4	79.5	76.8	0.84	0.83	5.9	2.6	2.3	3.1		
IE3-A41R 71 K2	400	50	0.37	1.24	2,860	73.8	71.7	70.3	0.87	0.78	7.1	2.9	2.7	3.1	0.00057	10
	460	60	0.44	1.21	3,460	73.4	83.9	82.4	0.86	0.78	7.3	3	2.8	3.2		
IE3-A41R 71 GY2	400	50	0.55	1.83	2,870	77.8	77.5	74.4	0.79	1.23	6.3	2.9	2.9	3.5	0.00057	10
	460	60	0.65	1.79	3,460	77	76.7	73.9	0.81	1.2	6.9	2.9	2.9	3.6		
IE3-A41R 71 G2	400	50	0.55	1.83	2,870	77.8	77.4	74.5	0.86	1.14	7.4	3	2.7	3.3.	0.00072	11.2
	460	60	0.65	1.79	3,465	77	82.4	82	0.87	1.13	7.8	2.8	2.5	2.9		
IE3-A42R 80 K2	400	50	0.75	2.5	2,870	80.7	80.7	78.2	0.81	1.65	6.4	2.6	2.6	3.5	0.00072	11.5
	460	60	0.9	2.48	3,460	77	76.9	74.7	0.83	1.65	6.9	2.7	2.7	3.6		
IE3-A41R 80 K2	400	50	0.75	2.49	2,880	80.7	83.6	81.6	0.88	1.48	7.7	2.2	2.1	2.7	0.00132	15
	460	60	0.9	2.48	3,470	77	80.2	77.9	0.89	1.54	7.3	2.1	1.8	2.4		
IE3-A41R 80 GY2	400	50	1.1	3.66	2,870	82.7	83.8	82.6	0.86	2.22	7	2.8	2.7	3.4	0.00132	15
	460	60	1.1	3.01	3,490	84	83.3	80.3	0.84	1.94	8.6	3.6	3.6	4.4		
IE3-A41R 80 G2	400	50	1.1	3.64	2,885	82.7	82.1	81.2	0.89	2.15	7.8	2.5	2.3	2.8	0.0017	18
	460	60	1.3	3.58	3,470	85.5	85.1	81.9	0.89	2.15	8	2.4	2.2	2.7		
IE3-A42R 90 S2	400	50	1.5	4.94	2,900	84.2	85.4	83.2	0.81	3.12	7.9	3.5	3.5	4.4	0.0017	19
	460	60	1.8	4.93	3,490	85.5	85.5	83.5	0.83	3.15	8.4	3.3	3.3	4.2		
IE3-A41R 90 S2	400	50	1.5	4.92	2,910	84.2	86.6	84.5	0.87	2.9	9	2.8	2.4	3.4	0.00275	23.5
	460	60	1.8	4.9	3,510	85.5	87.3	84.3	0.88	2.9	8.1	2.1	2	3.1		
IE3-A41R 90 LY2	400	50	2.2	7.29	2,880	85.9	85.7	83.9	0.88	4.25	8	2.5	2.3	2.9	0.00275	23.5
	460	60	2.6	7.16	3,470	86.5	87.2	88.1	0.88	4.3	7.2	2.1	1.8	2.7		
IE3-A41R 90 L2	400	50	2.2	7.23	2,905	85.9	87.7	86	0.89	4.05	8.6	2.7	2.3	3.7	0.00333	29
	460	60	2.6	7.1	3,495	86.5	87.4	85.6	0.9	4.15	8.4	2.4	2.1	3.5		
IE3-A41R 100 LY2	400	50	3	9.81	2,920	87.1	86.9	84.7	0.82	6	7.7	2.3	2.2	3.5	0.0045	31
	460	60	3	8.12	3,530	87.5	86.7	84	0.82	5.25	8.8	2.4	2.1	4		
IE3-A41R 100 L2	400	50	3	9.74	2,940	87.1	86.4	83.5	0.8	6.2	10.1	3.3	2.9	4.8	0.0055	38
	460	60	3.6	9.71	3,540	88.5	88	85.7	0.82	6.2	9.8	2.8	2.3	4.4		
IE3-A41R 112 MY2	400	50	4	13.1	2,920	88.1	87.5	86.9	0.84	7.9	8.3	2.3	2.1	3.3	0.0055	38
	460	60	4.8	13.06	3,510	89.5	89.9	89.2	0.86	7.8	7.1	1.6	1.4	2.7		
IE3-A41R 112 M2	400	50	4	13.04	2,930	88.1	89.3	88.1	0.85	7.6	9	2.7	2.4	3.7	0.0068	46
	460	60	4.8	13.02	3,520	89.5	89.3	87.5	0.86	7.8	8.7	2.4	2.2	3.5		
IE3-A41R 132 S2T	400	50	5.5	18.05	2,910	89.2	90.3	89.9	0.83	10.7	8	2.7	2.5	3.6	0.0068	48
	460	60	6.4	17.41	3,510	89.5	90.6	89.8	0.84	10.6	8	2.2	1.9	3.4		
IE3-A43R 132 SX2	400	50	7.5	24	2,930	90.5	90.9	90.2	0.84	14	8.7	2.2	1.3	4	0.0138	66
	460	60	9	24	3,525	91.4	91.7	91.2	0.86	14.5	8.1	2	1.2	3.6		
IE3-A43R 160 M2	400	50	11	36	2,930	91.6	92.3	92.1	0.91	19	7.8	2.5	1.9	3.4	0.0339	101
	460	60	13.2	35	3,530	92	92.7	92.3	0.92	19.5	7.3	2.3	1.8	3.2		
IE3-A43R 160 MX2	400	50	15	49	2,940	91.9	92.5	92.3	0.88	27	7.1	2.1	1.8	3.1	0.0575	117
	460	60	18	48	3,540	92.4	92.8	92.3	0.9	27	6.7	1.9	1.7	2.8		
IE3-A43R 160 L2	400	50	18.5	60	2,945	92.4	92.9	92.5	0.87	33	7.9	2.4	2	3.4	0.0575	136
	460	60	22	59	3,550	93	93.4	92.9	0.89	33.5	7.4	2.2	1.8	3.1		
IE3-A43R 180 M2	400	50	22	71	2,945	92.7	93.3	92.9	0.89	38.5	8.5	2.6	2.1	3.4	0.078	155
	460	60	26	70	3,545	93.1	93.7	93.4	0.9	39	7.8	2.4	2	3.1		
IE3-A43R 200 L2	400	50	30	97	2,950	93.3	93.5	92.2	0.88	52.5	8	2.2	1.8	3.4	0.128	200
	460	60	36	97	3,550	93.2	93.5	92.9	0.9	54	7.4	2	1.6	3.1		
IE3-A43R 200 LX2	400	50	37	120	2,955	93.8	94.2	93.9	0.9	63.5	7.4	1.8	1.5	2.9	0.22	285
	460	60	44	118	3,555	93.7	93.9	93.3	0.9	65.5	6.8	1.7	1.4	2.7		
IE3-A43R 225 M2	400	50	45	145	2,960	94	94.2	93.7	0.87	79.5	7.4	1.9	1.6	3	0.22	285
	460	60	54	145	3,555	93.6	93.9	93.3	0.89	81.5	6.8	1.7	1.4	2.8		
IE3-A43R 250 M2	400	50	55	177	2,960	94.3	94.6	94.2	0.88	95.5	8	2.3	2.1	2.9	0.375	375
	460	60	64	172	3,545	93.6	93.9	93.6	0.88	96.5	7.5	2.2	2	2.7		
IE3-A41R 280 S2	400	50	75	241	2,967	94.7	94.5	93.9	0.89	128	8.1	1.9	1.9	2.8	0.65	510
	460	60	82	219	3,566	94.5	94	92.5	0.9	121	8.1	2	1.8	3		
IE3-A43R 280 M2	400	50	90	289	2,970	95.3	95.5	95.1	0.91	150	8	2.1	1.9	3	0.675	540
	460	60	105	281	3,570	95.3	95.3	94.7	0.91	152	7.5	2	1.8	2.8		
IE3-A41R 315 S2	400	50	110	353	2,970	95.2	94.5	93.5	0.89	187	10	1.9	1.7	3	1.21	750
	460	60	110	294	3,570	95	94	92.5	0.89	163	10	2	1.8	3.2		
IE3-A43R 315 M2	400	50	132	424	2,973	95.7	95.9	95.7	0.89	224	7.5	1.3	1.2	2.3	1.21	770
	460	60	145	387	3,573	95.7	95.7	95.1	0.89	214	7.5	1.2	1.3	2.3		
IE3-A43R 315 MX2	400	50	160	513	2,975	96.1	96.1	96.1	0.9	267	8.8	1.6	1.5	2.6	1.76	940
	460	60	192	513	3,575	96.1	96.1	95.8	0.9	279	8	1.5	1.4	2.3		
IE3-A41R 315 MY2	400	50	200	640	2,980	95.8	95.9	95.5	0.91	331	8.3	2.6	1.6	2.4	2.82	1,200
	460	60	220	586	3,580	95.8	95.3	94.5	0.91	317	8.5	2.8	1.7	2.7		
IE3-A41R 315 L2	400	50	250	799	2,985	96	96	95.9	0.92	409	8.4	2.5	1.4	2.3	3.66	1,460
	460	60	280	746	3,580	96	96	95.5	0.92	398	8.2	2.5	1.4	2.3		
IE3-A41R 315 LX2	400	50	315	1,007	2,985	95.8	95.8	95.8	0.92	516	8.5	2.8	1.6	2.5	4.43	1,700
	460	60	340	905	3,585	95.8	95.8	95.5	0.92	484	9.1	2.9	1.6	2.5		
IE3-A41R 355 MY2G	400	50	315	1,006	2,990	96	96	95.5	0.9	526	8.5	1.4	1	2.7	4.1	1,900
	460	60						on request								
IE3-A41R 355 M2G	400	50	355	1,135	2,985	96	96	96	0.92	580	7.7	1.9	1.5	3.8	4.2	2,000
	460	60						on request								
IE3-A42R 355 MX2G	400	50	400	1,278	2,988	96	96	96	0.92	654	8.5	1.8	1.1	2.5	5.5	2,275
	460	60	440	1,170	3,590	96	96	96	0.92	625	9.1	1.9	1.1	2.7		
IE3-A42R 355 L2G	400	50	500	1,596	2,990	96.2	96.2	96.2	0.9	834	11	2.2	1.4	3.2	7.1	2,450
	460	60						on request								
IE3-A42R 400 M2G	400	50	560	1,785	2,995	96	96	95.5	0.83	1,014	9	2.8	a. A.	3	8.44	3,000
	460	60						on request								
IE3-A42R 400 MX2G	400	50	630	2,010	2,993	96.7	96	96.5	0.9	1,045	8.8	2.5	1.5	2.7	9.41	3,200
	460	60						on request								
IE3-A42R 400 L2G	400	50	710	2,271	2,985	96	96	95.5	0.9	1,186	7.7	2.2	1.1	2.8	10.41	3,400
	460	60						on request								

Three-phase motors with squirrel cage rotor, roller table motors, light version
Efficiency class „Premium Efficiency“ (IE3)

With surface cooling, duty type S1, continuous duty, thermal class 155, type of protection IP 55

Motor selection data																Design point 400 V, 50 Hz/ 460 V, 60 Hz	
Type	U_B	f_B	P_B	M_B	n_B		η		$\cos\phi_B$	I_B	I_A/I_B	M_A/M_B	M_S/M_B	M_K/M_B	J	m
	V	Hz	kW	Nm	min^{-1}	1.00	0.75	0.50	-	A	-	-	-	-	kgm^2	kg
Synchronous speed 1,500/ 1,800 rpm – 4-pole version																
IE3-A41R 63 K4	400	50	0.12	0.82	1,400	64.8	63.4	58.7	0.71	0.35	3.8	2	1.9	2.3	0.0004	6.3
	460	60	0.14	0.79	1,700	66	70.6	66.1	0.71	0.35	4.1	2	1.9	2.4		
IE3-A41R 63 G4	400	50	0.18	1.21	1,415	69.9	69.5	64.3	0.67	0.55	4.4	1.8	1.8	2.7	0.0005	7.1
	460	60	0.21	1.16	1,725	69.5	68.8	62.9	0.66	0.56	4.8	2.6	2.6	2.9		
IE3-A41R 71 K4	400	50	0.25	1.67	1,430	73.5	76.6	73	0.71	0.66	5.6	2.5	2.3	2.9	0.00087	9.9
	460	60	0.3	1.66	1,725	73.4	76.5	72.8	0.74	0.66	5.2	2.1	2	2.7		
IE3-A41R 71 GY4	400	50	0.37	2.48	1,425	77.3	76.8	73	0.69	1	4.9	2.4	2.4	3	0.00087	9.9
	460	60	0.44	2.44	1,720	78.2	77.7	74.1	0.71	0.98	5.2	2.1	2.1	2.9		
IE3-A41R 71 G4	400	50	0.37	2.5	1,430	77.3	78.2	73.1	0.69	0.98	6.2	2.8	2.6	3.2	0.00107	11
	460	60	0.44	2.44	1,725	78.2	77.8	74.3	0.72	0.96	6.1	2.5	2.4	3.2		
IE3-A41R 80 K4	400	50	0.55	3.65	1,440	80.8	80.1	76.7	0.77	1.27	6.6	3	2.9	3.6	0.00207	14.5
	460	60	0.55	3	1,750	81.1	80.9	76.6	0.74	1.14	7.7	3.3	3.3	4.3		
IE3-A41R 80 G4	400	50	0.75	4.96	1,445	82.5	82.3	79.6	0.77	1.7	7	3.1	3.1	3.7	0.0026	17
	460	60	0.9	4.94	1,740	83.5	83.3	80.5	0.79	1.7	7.1	2.8	2.8	3.6		
IE3-A41R 80 GX4	400	50	0.75	4.95	1,445	82.5	82.3	79.6	0.74	1.75	7.1	3.4	3.3	4.2	0.0028	17.5
	460	60	0.9	4.94	1,740	83.5	83.3	80.5	0.79	1.77	7.4	3.3	3.2	4.2		
IE3-A41R 90 SX4	400	50	1.1	7.24	1,450	84.1	85.4	82.9	0.71	2.6	7.3	3.6	3.5	4.3	0.0045	28
	460	60	1.3	7.11	1,745	86.5	86.6	84.3	0.73	2.55	7.6	3.3	3.3	4.2		
IE3-A41R 90 LX4	400	50	1.5	9.84	1,455	85.3	83.6	80.2	0.75	3.4	9.5	4.5	3.8	4.9	0.0058	31
	460	60	1.8	9.82	1,750	86.5	85.3	82.1	0.77	3.4	8.8	3.8	3.4	4.7		
IE3-A41R 100 LV4	400	50	2.2	14.3	1,465	86.7	88.6	86.4	0.74	4.8	9.6	3.7	3.4	5.2	0.013	50
	460	60	2.6	14.1	1,765	89.5	89.2	87	0.76	4.8	9.5	3.3	2.9	5		
IE3-A41R 100 LU4	400	50	3	19.6	1,460	87.7	88.5	86.6	0.76	6.4	9	3.5	3.1	4.8	0.013	50
	460	60	3.6	19.6	1,755	89.5	89.4	87.8	0.78	6.45	8.8	2.9	2.6	4.4		
IE3-A42R 112 M4	400	50	4	26	1,460	88.6	89.1	87.9	0.83	7.9	7.9	2.5	1.9	3.8	0.015	55
	460	60	4.5	24	1,765	89.6	89.9	88.5	0.84	7.5	8	2.5	1.9	3.8		
IE3-A42R 132 S4	400	50	5.5	36	1,465	90.2	91	90.6	0.87	10	7.1	2.1	1.3	3.27	0.035	90
	460	60	6.6	35	1,765	91.7	92	91.6	0.87	10.5	6.7	1.9	1.2	3		
IE3-A43R 132 M4	400	50	7.5	49	1,470	90.5	90.5	89.2	0.75	16	7.6	3	2.6	3.9	0.035	88
	460	60	9	48	1,770	91.7	91.6	90.5	0.77	16	7.3	2.7	2.4	3.6		
IE3-A43R 160 M4	400	50	11	72	1,465	91.4	91.9	91.5	0.82	21	7	2.3	1.8	3.4	0.043	105
	460	60	12.5	67	1,765	92.4	92.6	92.1	0.83	20.5	6.9	2.2	1.8	3.3		
IE3-A41R 160 L4	400	50	15	97	1,475	92.2	92.4	91.6	0.85	27.5	8.7	3.1	2.6	3.5	0.115	165
	460	60	16.5	88	1,775	93	92.6	91.4	0.86	26	8.9	3.2	2.6	3.6		
IE3-A43R 180 M4	400	50	18.5	120	1,475	92.6	92.7	91.9	0.84	34.5	7.8	2.9	2.3	3.3	0.115	160
	460	60	22	118	1,775	93.6	93.3	92.6	0.85	34.5	7.5	2.7	2.1	3.1		
IE3-A43R 180 L4	400	50	22	142	1,475	93	93.3	92.7	0.83	41	6.9	2	1.9	3	0.168	206
	460	60	25	134	1,775	93.6	93.8	93.2	0.83	40.5	6.8	1.9	1.8	2.9		
IE3-A43R 200 L4	400	50	30	194	1,480	93.6	94	93.7	0.86	54	6.4	1.8	1.6	2.5	0.313	304
	460	60	33	177	1,780	94.1	94.1	93.4	0.86	51	6.5	1.8	1.6	2.5		
IE3-A43R 225 S4	400	50	37	240	1,475	93.9	94.4	94.2	0.85	67	6.4	2.2	1.7	2.6	0.356	341
	460	60	40	215	1,780	94.5	94.8	94.2	0.85	62.5	6.6	2.3	1.7	2.7		
IE3-A43R 225 M4	400	50	45	291	1,475	94.3	94.8	94.7	0.83	83	7.2	2.5	2	2.4	0.525	377
	460	60	49	263	1,780	95	95.1	94.7	0.83	78	7.4	2.6	2	2.5		
IE3-A43R 250 M4	400	50	55	354	1,482	94.6	94.9	94.4	0.81	104	7.6	2.7	1.9	2.6	0.619	435
	460	60	55	295	1,782	95.4	94.9	94	0.81	89.5	8.3	3	2.1	2.8		
IE3-A43R 280 S4	400	50	75	483	1,482	95	95.3	95	0.82	139	7.6	2.1	1.9	2.5	0.95	545
	460	60	90	482	1,783	95.4	95.3	95	0.82	139	7.6	2.1	1.9	2.5		
IE3-A43R 280 M4	400	50	90	579	1,482	95.2	95.5	95.3	0.83	164	8	2.1	1.9	2.5	1.1	600
	460	60	99	530	1,783	95.4	95.6	95.2	0.83	157	8.1	2.1	1.9	2.5		
IE3-A41R 315 S4	400	50	110	706	1,487	95.4	95	94.3	0.82	203	9.5	1.9	1.7	2.7	1.96	760
	460	60	125	667	1,788	95.8	95.2	94.3	0.83	197	9.2	2.1	2	2.7		
IE3-A43R 315 M4	400	50	132	848	1,485	96	96	95.5	0.8	248	8.3	2	1.9	2.7	1.96	790
	460	60	150	802	1,785	96.2	96.2	95.6	0.82	239	8	1.9	1.8	2.5		
IE3-A43R 315 MX4	400	50	160	1,028	1,485	95.9	96.1	95.8	0.82	294	8.2	1.8	1.6	2.5	2.27	850
	460	60	175	936	1,785	96.2	96.2	95.8	0.83	275	8.2	1.8	1.6	2.5		
IE3-A43R 315 MY4	400	50	200	1,286	1,485	96	96.2	95.9	0.82	367	8.3	1.8	1.8	2.4	2.73	970
	460	60	225	1,203	1,785	96.2	96.2	95.8	0.83	354	8.3	1.8	1.7	2.4		
IE3-A41R 315 L4	400	50	250	1,602	1,490	96.2	96.2	96	0.87	431	9.4	2.2	1.8	2.7	5.93	1,450
	460	60	280	1,493	1,790	96.2	96.1	95.7	0.87	420	9.3	2.2	1.8	2.7		
IE3-A41R 315 LX4	400	50	315	2,018	1,490	96	96	96	0.87	544	9.5	2.3	1.7	2.9	6.82	1,630
	460	60	315	1,680	1,790	96.2	96.2	95.5	0.87	472	10.5	2.6	1.9	3.2		
IE3-A41R 355MY 4	400	50	315	2,016	1,492	96	96	95.5	0.85	551	7	1	0.8	2.3	5.6	1,950
	460	60							on request							
IE3-A41R 355 M4	400	50	355	2,270	1,493	96.2	96.2	95.5	0.87	612	8.1	1.3	1	2.7	7.9	2,150
	460	60	375	2,000	1,790	96.2	95.8	95	0.87	647	8.7	1.2	1	2.8		
IE3-A42R 355 MX4	400	50	400	2,563	1,490	96.2	96.2	96.2	0.84	714	8.2	1.7	1.4	2.4	9.5	2,410
	460	60	440	2,343	1,793	96.2	95.8	95	0.84	683	8.2	1.9	1.5	2.4		
IE3-A42R 355 L4	400	50	500	3,204	1,490	96.4	96.4	96	0.84	891	7.4	2.5	1.2	2.3	10	2,500
	460	60							on request							
IE3-A42R 400 M4	400	50	560	3,579	1,494	96.5	96.3	96	0.87	963	10	2.1	on request	3.1	12.6	3,060
	460	60							on request							
IE3-A42R 400 MX4	400	50	630	4,027	1,494	96.5	96.5	96.5	0.86	1,096	10	3.1	on request	3.3	14.33	3,100
	460	60							on request							
IE3-A42R 400 L4	400	50	710	4,541	1,493	96.5	96.5	96.5	0.86	1,235	11	2	on request	3.6	16.29	3,400
	460	60							on request							

Three-phase motors with squirrel cage rotor, roller table motors, light version
Efficiency class „Premium Efficiency“ (IE3)

With surface cooling, duty type S1, continuous duty, thermal class 155, type of protection IP 55

Motor selection data															Design point 400 V, 50 Hz/ 460 V, 60 Hz	
Type	U_B	f_B	P_B	M_B	n_B		η		$\cos\phi_B$	I_B	I_A/I_B	M_A/M_B	M_S/M_B	M_K/M_B	J	m
	V	Hz	kW	Nm	min^{-1}	1.00	0.75	0.50	-	A	-	-	-	-	kgm^2	kg
Synchronous speed 1,000/ 1,200 rpm – 6-pole version																
IE3-A41R 63 G6	400	50	0.12	1.23	930	57.7	60	54	0.56	0.5	2.8	1.9	1.8	2.1	0.00045	6.7
	460	60	0.14	1.18	1,130	64	62.1	56.2	0.54	0.5	3.1	1.8	1.8	2.2		
IE3-A41R 71 K6	400	50	0.18	1.85	930	63.9	62.9	57.5	0.68	0.57	3.4	2	2	2.2	0.0013	11
	460	60	0.21	1.78	1,125	67.5	a. A.	a. A.	0.68	0.55	3.6	2.1	2	2.3		
IE3-A41R 71 G6	400	50	0.25	2.55	935	68.6	66.9	62.2	0.67	0.75	3.9	2.3	2.3	2.5	0.00175	12.5
	460	60	0.3	2.55	1,125	71.4	on request		0.7	0.73	4.4	2.4	2.4	2.7		
IE3-A41R 80 K6	400	50	0.37	3.72	950	73.5	72.9	69.2	0.7	1.03	4	1.9	1.9	2.4	0.00325	15
	460	60	0.44	3.67	1,145	75.3	74.8	71.2	0.7	1.03	4.1	1.8	1.8	2.3		
IE3-A41R 80 G6	400	50	0.55	5.53	950	77.2	75.9	72.4	0.69	1.5	4.1	2.1	2.1	2.5	0.00425	18
	460	60	0.45	3.67	1,170	75.3	75	69.4	0.58	1.25	5.1	3	3	3.6		
IE3-A41R 90 S6	400	50	0.75	7.54	950	78.9	79.7	77.5	0.73	1.87	5.3	2.4	2.2	2.9	0.0072	30
	460	60	0.9	7.41	1,160	82.5	82.7	79.7	0.72	1.88	6	2.5	2.2	3.2		
IE3-A41R 100 LX6	400	50	1.5	15	955	82.5	83.5	81.5	0.76	3.45	5.9	2.3	2.2	2.8	0.0139	36
	460	60	0.92	7.45	1,180	82.8	80	79.7	0.57	2.45	7.7	3.6	3.6	5.1		
IE3-A43R 132 S6	400	50	3	29	975	88	88.1	86.4	0.77	6.4	5.7	2.1	1.8	2.9	0.029	74
	460	60	3.6	29	1,175	89.5	89.4	88.1	0.78	7.4	5.5	2	1.7	2.7		
IE3-A43R 132 M6	400	50	4	40	965	87.2	89.3	87.6	0.79	8.4	4.9	1.7	1.5	2.4	0.043	74
	460	60	4.5	36	1,170	89.5	89.1	88.1	0.8	7.9	4.9	1.7	1.5	2.4		
IE3-A41R 132 MX6	400	50	5.5	54	970	88.6	88.6	87.2	0.8	11	6	2.1	1.7	3	0.053	105
	460	60	5.7	46	1,175	91	89.8	87.5	0.79	10	6.5	2.2	1.9	3.2		
IE3-A43R 160 M6	400	50	7.5	73	975	89.6	89.4	87.8	0.82	14.5	5.8	2.5	1.9	2.8	0.113	116
	460	60	9	73	1,175	91	90.3	88.7	0.84	15	5.6	2.3	1.8	2.6		
IE3-A41R 160 L6	400	50	11	108	975	90.4	90.8	89.8	0.85	20.5	7.1	2.7	2.2	2.9	0.166	157
	460	60	13	105	1,175	91.7	91.6	90.6	0.86	20.5	6.1	2.5	2	2.7		
IE3-A43R 180 L6	400	50	15	147	975	91.2	91.4	90.5	0.85	28	6.4	2.3	2	3	0.268	201
	460	60	16.7	135	1,180	91.9	91.8	90.6	0.86	26.5	6.4	2.2	2	2.9		
IE3-A43R 200 L6	400	50	18.5	180	980	91.8	91.6	90.2	0.84	34.5	6.9	2.4	2.2	3.2	0.324	237
	460	60	22	178	1,180	93	92.5	91.2	0.85	35	6.6	2.3	2.1	3		
IE3-A43R 200 LX6	400	50	22	214	980	92.5	92.8	92.2	0.88	39	6.7	2.5	1.9	2.8	0.514	298
	460	60	25	202	1,180	93	93	92.2	0.89	38	6.5	2.4	1.9	2.8		
IE3-A43R 225 M6	400	50	30	291	983	93	93.2	92.5	0.84	55.5	6.4	2.67	2.06	2.67	0.825	360
	460	60	30	242	1,186	94.1	93.6	92.4	0.83	48	7.06	2.95	2.27	2.95		
IE3-A43R 250 M6	400	50	37	359	985	93.4	93.5	92.7	0.85	67.5	6.6	2.6	2	2.7	1.28	460
	460	60	40	322	1,185	94.1	93.5	92.4	0.85	63	6.7	2.6	2	2.7		
IE3-A43R 280 S6	400	50	45	436	985	93.7	93.9	93.3	0.86	80.5	6.6	2.4	2	2.6	1.48	553
	460	60	45	362	1,187	94.5	94	92.7	0.85	70.5	7.2	2.6	2.2	2.8		
IE3-A43R 280 M6	400	50	55	530	990	94.6	95	94.7	0.86	97.5	7	1.8	1.7	2.5	2.63	720
	460	60	64	514	1,187	94.7	95	94.6	0.86	98.5	6.5	1.7	1.5	2.3		
IE3-A43R 315 S6	400	50	75	723	990	95.1	95.3	95	0.86	132	8	2.1	1.9	2.8	3.33	815
	460	60	90	723	1,188	95.3	95.5	95.2	0.86	138	7.3	1.9	1.7	2.5		
IE3-A43R 315 M6	400	50	90	868	990	94.9	94.9	94	0.84	163	8.5	2.3	2.1	3	3.6	850
	460	60	99	794	1,190	95.2	95	94	0.84	155	8.5	2.3	2.1	3		
IE3-A41R 315 MX6	400	50	110	1,061	990	95.1	95	94.5	0.86	194	8.5	2.5	1.7	2.7	6.67	1,210
	460	60						on request								
IE3-A41R 315 L6	400	50	132	1,266	995	95.4	95	94.5	0.87	230	9	2.8	2	3.2	10	1,550
	460	60	132	1,054	1,195	95.8	95.3	94.4	0.84	206	9.5	3	2.2	3.5		
IE3-A41R 355 MY6	400	50	132	1,266	995	95.5	95.5	94.5	0.83	240	9	2	1.6	3	8.2	1,550
	460	60						on request								
IE3-A41R 355 M6	400	50	160	1,535	995	95.6	95.6	95.2	0.86	281	7.5	1.6	1.3	2.4	8.2	1,850
	460	60	160	1,278	1,195	95.8	95.5	94.5	0.86	244	8.2	1.7	1.3	2.5		
IE3-A41R 355 MX6	400	50	200	1,919	995	95.8	95.5	95	0.86	350	9	1.9	1.7	2.7	12.1	2,200
	460	60	200	1,598	1,195	95.8	95.1	94	0.85	355	9.5	2	1.5	2.9		
IE3-A42R 355 MX6	400	50	200	1,919	995	95.8	95.5	95	0.84	359	9.6	2.2	1.7	2.8	12.1	2,350
	460	60	225	1,797	1,195	95.8	95.5	94.5	0.84	351	9.5	2.1	1.7	2.7		
IE3-A42R 355 LY6	400	50	250	2,399	995	95.8	95.5	95	0.82	459	8.8	1.8	1.5	2.5	14	2,450
	460	60						on request								
IE3-A42R 355 L6	400	50	315	3,023	995	95.8	96	95.7	0.84	565	7.8	2	1.5	2.2	14	2,450
	460	60						on request								
IE3-A42R 355 LX6	400	50	355	3,407	995	95.8	95.8	95.4	0.81	660	8.4	2.1	1.4	2.7	14	2,450
	460	60						on request								
IE3-A42R 355 LZ6	400	50	400	3,843	994	95.8	95.8	95.4	0.83	726	7.6	2.1	1.3	2.3	14	2,450
	460	60						on request								
IE3-A42R 400 MY6	400	50	355	3,407	995	96	96	95.8	0.83	643	7.5	1.2	1.2	2.1	16.54	3,000
	460	60						on request								
IE3-A42R 400 M6	400	50	400	3,839	995	96.2	96.2	96	0.83	723	8	1.5	1.3	2.5	16.54	3,000
	460	60	480	3,835	1,195	96	96	95.8	0.84	747	7.3	1.4	1.2	2.3		
IE3-A42R 400 MX6	400	50	450	4,319	995	96.5	96.5	96.5	0.83	811	6.9	1.5	on request	2.2	18.44	3,200
	460	60						on request								
IE3-A42R 400 L6	400	50	500	4,794	996	96.3	96.3	96	0.84	892	7.5	1.7	on request	2.2	20.63	3,320
	460	60						on request								
IE3-A42R 400 LX6	400	50	560	5,369	996	96.4	96.4	96.4	0.82	1,023	7.5	1.7	on request	2.2	20.63	3,320
	460	60						on request								

Three-phase motors with squirrel cage rotor, roller table motors, light version
Efficiency class „Premium Efficiency“ (IE3)

With surface cooling, duty type S1, continuous duty, thermal class 155, type of protection IP 55

Motor selection data																Design point 400 V, 50 Hz/ 460 V, 60 Hz
Type	U_B	f_B	P_B	M_B	n_B		η		$\cos\phi_B$	I_B	I_A/I_B	M_A/M_B	M_S/M_B	M_K/M_B	J	m
	V	Hz	kW	Nm	min^{-1}	1.00	0.75	0.50	-	A	-	-	-	-	kgm^2	kg
Synchronous speed 750/ 900 rpm – 8-pole version																
IE3-A41R 71 G8	400	50	0.12	1.67	685	50.7	48.8	43	0.64	0.48	2.6	1.7	1.7	2	0.0013	9.9
	460	60	0.14	1.59	840	59.5	59.1	52.7	0.61	0.47	2.8	1.8	1.8	2.1		
IE3-A41R 80 K8	400	50	0.18	2.46	700	58.7					on request					14
	460	60	0.21						on request							
IE3-A41R 80 GX8	400	50	0.25	3.39	705	64.1	on request		0.58	0.92			on request			17
	460	60	0.3						on request							
IE3-A41R 90 S8	400	50	0.37	4.98	710	69.3	69	64.4	0.63	1.2	3.6	2.1	2.1	2.3	0.00625	25
	460	60	0.44	4.91	855	72	69.3	64.8	0.63	1.22	3.2	1.6	1.6	1.9		
IE3-A41R 90 LX8	400	50	0.55	7.4	710	73	74	70	0.64	1.65	3.7	1.7	1.7	2.4.	on request	30
	460	60	0.65	7.26	855	75.5	76.5	72.9	0.65	1.63	3.9	1.7	1.7	2.4		
IE3-A41R 100 L8	400	50	0.75	10	715	75	75.9	71.3	0.63	2.25	4.4	2.5	2.5	2.8	0.0123	33.5
	460	60	0.9	9.95	865	75.5	78.8	75.5	0.66	2.12	4.8	2.3	2.3	2.8		
IE3-A41R 100 LW8	400	50	1.1	14.69	715	77.7	76.8	73	0.66	3.09	4.7	2.3	2.3	3	0.009	35
	460	60	1.25	13.8	865	78.5	77.4	73.5	0.65	2.98	5.1	2.3	2.3	3.2		
IE3-A41R 100 LX8	400	50	1.1	14.8	710	77.7	77.5	73.7	0.63	3.2	4.2	1.9	1.8	2.5	0.0139	36
	460	60	1.25	13.9	860	78.5	79.8	76.3	0.63	3.1	4.2	1.7	1.5	2.4		
IE3-A41R 112 MX8	400	50	1.5	19.76	725	79.7	82.7	79.6	0.66	3.95	5.5	2.5	2.3	3.4	on request	61
	460	60	1.8	19.76	870	84	84.2	81.4	0.68	3.95	5.5	2.2	2	3.3		
IE3-A41R 132 S8	400	50	2.2	29	725	84.4	84.5	82.4	0.7	5.4	4.1	1.6	1.5	2.3	0.043	75
	460	60	2.6	28	875	85.6	85.7	83.7	0.71	5.4	4	1.5	1.4	2.2		
IE3-A41R 132 M8	400	50	3	40	720	83.5	83.5	81.4	0.72	7	3.9	1.6	1.4	2.1	0.043	75
	460	60	3						on request							
IE3-A43R 160 M8	400	50	4	53	720	84.8	85	83	0.69	9.9	4.1	1.7	1.4	2.3	0.053	86
	460	60	4.8	52	870	86.8	87.1	85.6	0.71	9.8	3.9	1.5	1.3	2.1		
IE3-A43R 160 MX8	400	50	5.5	72	725	87.9	88.6	87.6	0.76	12	4.3	1.8	1.7	2.2	0.113	116
	460	60	6.4	69	880	89.5	89.9	88.9	0.76	12	4.1	1.7	1.6	2.1		
IE3-A43R 160 L8	400	50	7.5	97	735	87.3	87.2	85.1	0.71	17.5	4.2	1.9	1.8	2.3	0.113	116
	460	60	9	98	875	89.5	88.9	87.4	0.74	17	4	1.7	1.6	2.1		
IE3-A43R 180 L8	400	50	11	143	725	88.7	89.4	88.6	0.76	23.5	4.3	1.7	1.5	2.2	0.166	154
	460	60	12.9	141	875	89.5	90.1	89.3	0.77	23	4.3	1.6	1.5	2.1		
IE3-A43R 200 L8	400	50	15	196	730	90.2	90.7	90	0.78	31	4.7	1.7	1.5	2.3	0.268	206
	460	60	18	196	875	90.7	91.2	90.4	0.79	31.5	4.4	1.6	1.4	2.2		
IE3-A43R 225 S8	400	50	18.5	244	725	90.2	91	90.7	0.79	37.5	4.6	1.8	1.4	2.2	0.44	275
	460	60	18.5	200	880	91.7	92.1	91.6	0.79	38	4.6	1.7	1.3	2		
IE3-A43R 225 M8	400	50	22	288	730	90.6	91	90	0.76	46	4.6	1.9	1.5	2.2	0.44	275
	460	60	22	238	880	91.7	91.3	90.1	0.76	39.5	5.1	2.1	1.6	2.4		
IE3-A43R 250 M8	400	50	30	392	730	91.4	91.8	91.2	0.74	64	5.2	2.2	2	2.5	0.825	365
	460	60	30	325	880	92.4	92.5	92	0.76	66	4.9	2	1.9	2.3		
IE3-A43R 280 S8	400	50	37	480	735	92.4	92.6	91.8	0.75	77	5.2	2.3	1.8	2.4	1.35	480
	460	60	45	485	885	92.9	93.1	92.4	0.76	80	4.9	2	1.6	2.1		
IE3-A43R 280 M8	400	50	45	583	737	92.8	93	92.1	0.76	92	5.6	2.3	1.9	2.5	1.55	550
	460	60	55	593	885	93.6	93.5	92.8	0.77	96	5.2	2.1	1.7	2.3		
IE3-A43R 315 S8	400	50	55	709	740	93.6	93.6	93.6	0.79	107	5.6	1.6	1.4	2.1	2.63	700
	460	60	66	708	890	94.2	94.5	94.5	0.8	110	5.3	1.5	1.3	2		
IE3-A43R 315 M8	400	50	75	967	740	94	94.5	94.5	0.79	146	6	1.7	1.5	2.2	3.33	805
	460	60	90	965	890	94.6	95.1	95	0.8	149	5.6	1.5	1.4	2		
IE3-A43R 315 MX8	400	50	90	1,164	738	94.2	94.8	94.5	0.78	177	6	1.8	1.6	2.3	3.6	850
	460	60	108	1,158	890	94.8	95	95	0.79	181	5.6	1.7	1.5	2.1		
IE3-A41R 315 MY8	400	50	110	1,419	740	93.8	94	93.8	0.82	206	6.5	1.9	1.5	2.1	6.76	1,250
	460	60	120	1,287	890	94.2	94.2	94.2	0.82	195	6.6	1.8	1.6	2.2		
IE3-A41R 315 L8	400	50	132	1,703	740	94.2	94.2	93.5	0.8	253	8	2.4	1.9	2.7	8.71	1,450
	460	60	158	1,691	892	94.6	94.6	94.2	0.8	262	7.3	2.1	1.7	2.4		
IE3-A41R 355 MY8	400	50	160	2,051	745	94.3	94.3	94	0.82	299	6.6	1.2	1	2.6	9.3	1,700
	460	60	160	1,707	895	94.5	94.5	93.5	0.8	266	7.5	1.2	1	2.9		
IE3-A41R 355 M8	400	50	200	2,563	745	94.7	94.9	94.2	0.81	376	7	1	1	2.7	9.5	1,890
	460	60	220	2,347	895	95	95	94.5	0.81	359	7.2	1	0.9	2.7		
IE3-A42R 355 MX8	400	50	250	3,204	745	94.6	94.4	93.5	0.68	561	5.2	1.4	1.3	2	13.4	2,300
	460	60	280	2,987	895	95	94.8	94	0.7	528	5.4	1.4	1.3	2		
IE3-A42R 355 L8	400	50	315	4,037	745	95	95	95	0.73	656	5.7	2	1.5	2.2	15.8	2,450
	460	60	340	3,296	985	95.5	95.5	95	0.72	624	6	2.1	1.6	2.3		
IE3-A42R 400 M8	400	50	355	4,550	745	95	95	95	0.74	729	6.5	1.5	1.3	1.8	17.94	2,800
	460	60						on request								
IE3-A42R 400 MX8	400	50	400	5,127	745	95.6	95.5	95	0.69	875	5.6	1.3	1	2	19.99	3,170
	460	60						on request								
IE3-A42R 400 L8	400	50	450	5,768	745	95	95	95	0.74	924	6	1.5	1.3	1.8	22.34	3,320
	460	60	500	5,334	895	95.5	95.5	95.5	0.75	876	5.8	1.4	1.3	1.7		

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