Low Voltage Roller Table Motors

Motors and frequency converters - solutions for rolling mills that incorporate ABB's wealth of application know-how

ABB meets the demands of the rolling mill environment by combining the expertise of two areas within the Group. By bringing together squirrel cage motors from ABB Motors and frequency converters from ABB Drives, ABB can supply electrical drive systems that are tailored to the needs of the industry.

ABB Motors has been developing and growing for over 100 years and is today one of the world's leading manufacturers of low voltage induction motors. It supplies a full range of industrial electric motors, meeting the needs of most applications with virtually any power rating. At the same time it provides solid value and commitment to its customers through unrivalled service and back-up.

ABB Drives is the leading manufacturer of AC and DC drives for all types of demanding applications. For low voltage multimotor systems, ABB supplies AC drives up to 5600 kW.

Through its unrivalled experience in AC and DC drive design, manufacture, installation and commissioning, ABB has acquired a vast reserve of know-how for specific applications.

One of these applications is the rolling mill, where the extremely harsh environment and tough production process demand the best in AC drive technology. An example of this superior technology is ABB's DTC controlled ACS800 multidrive frequency converter, which has received excellent feedback from users in roller table applications.

ABB has invested heavily in research and development, ensuring that each generation of induction motors and frequency converters keeps pace with the rising needs of the metal industry. The products are known for their efficiency, robustness and reliability – characteristics which combine to deliver the maximum possible value for customers.

Low Voltage Roller Table Motors

Sizes 180 to 450

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ABB reserves the right to change the design, technical specification and dimensions without prior notice.

ABB (www.abb.com) is a leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 104,000 people.

Roller table drives

Roller tables incorporate a number of motors, the speed of which can be steplessly controlled by one or more frequency converters.

The rolling mill environment places severe stress on roller table drives. As plates and billets travel along the roller table at high speeds, the motors driving the rollers are subjected to high torque loads. At the same time, the reliability of the drive system is constantly threatened by the high ambient temperature, humidity, and the risk that fine dust particles from the process could infiltrate the motors.

To meet these rigorous demands, ABB has developed its Roller Table AC Drive System, which comprises the new, robust M3RP induction motors, together with ABB frequency converters.

The totally enclosed construction of the M3RP induction motors renders them immune to the ingress of moisture and dust. The power factor of ABB frequency converters with IGBT supply units is 1.0 under any load conditions. Together the motor and frequency converter provide a competitive solution, with high availability and minimal maintenance costs.

Frequency converters

A single AC drive system typically consists of an input transformer or an electric supply, frequency converter, AC motor, and load machine. The single frequency converter consists of a rectifier, DC link and inverter.

In a multidrive system there is a separate rectifier unit, and the inverters are directly connected to a common DC link. There can be dozens of inverters connected to the common DC link, and the dimensioning of the rectifier unit is based on the simultaneous power requirement from the network.

Figure 1. A single frequency converter consists of 1) rectifier, 2) DC link, 3) inverter unit, and 4) electric supply.

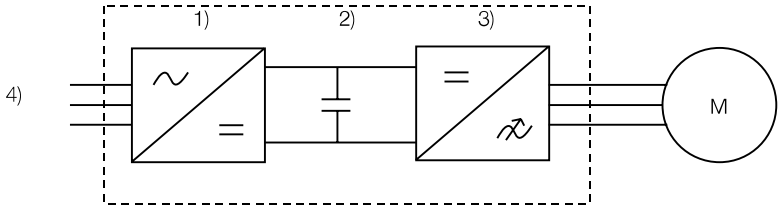
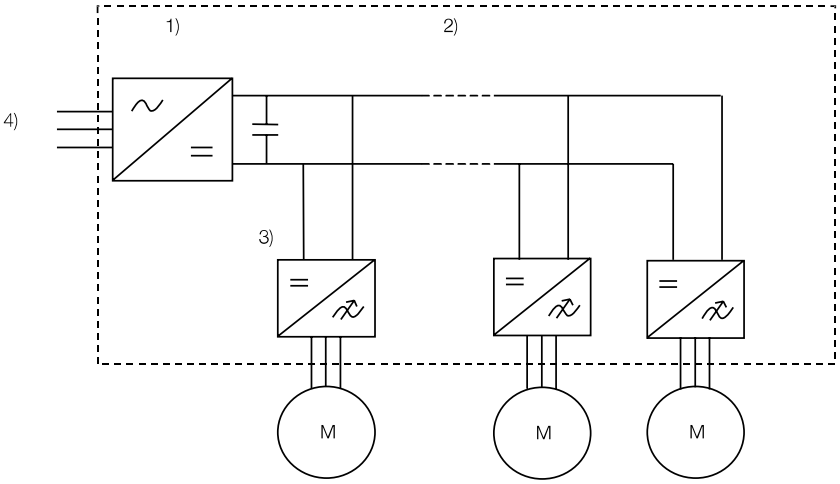


Figure 2. A multidrive system, which has 1) separate supply section, 2) common DC bus, 3) drive sections, and 4) electric supply (normally from transformer).

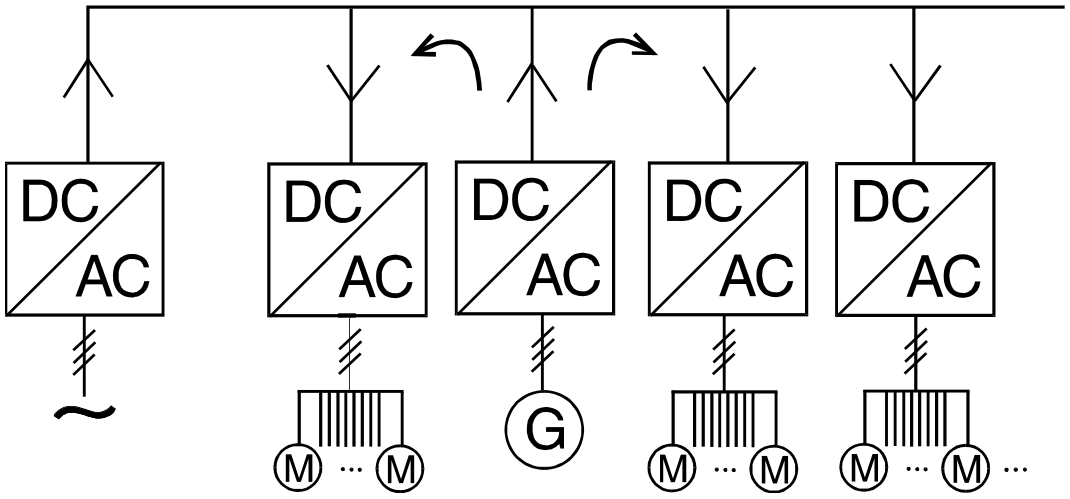


The rectifier converts the mains supply voltage to a constant intermediate DC voltage, which is then inverted back to AC voltage by the inverter.

ABB frequency converters feature Direct Torque Control (DTC), a technology developed by ABB. DTC employs advanced motor theory to calculate the motor torque directly, without modulation and feedback - i.e. no pulse encoder is required. The controlling variables are motor magnetizing flux and motor torque. This technique is so effective that the torque response of DTC controlled drives is typically 10 times faster than that of any other AC or DC drive. At the same time DTC achieves dynamic speed accuracy 8 times better than any open loop AC drive, and comparable to DC drives using feedback. This excellent control performance without the use of pulse encoders is very important for roller table applications.

Common DC bus of ACS800 multidrive

Figure 3. Principle diagram for a common DC bus.



The ACS800 multidrive is based on a common DC bus arrangement, with a single power entry and common braking resources for several drives. There are a number of alternatives on the supply side, ranging from simple diode supply units up to highly sophisticated active IGBT units. The multidrive construction simplifies the total installation and provides many advantages.

In multimotor applications, the common DC bus and single power line connection for a number of drives represents a very efficient solution when compared with separate, single small converters. Each inverter is connected to the DC bus and the motors are connected to the inverter outputs. All the inverters are capable of 4-quadrant operation. When an inverter is used to brake a motor, the energy from the (regenerative) braking operation is sent back to the DC bus and can be used by other motoring sections. This ability to recirculate power produces substantial energy savings.

Benefits of ABB multidrive frequency converter

– reduced line currents and simple braking arrangements
– energy circulation over the common DC busbar, which can be used for motor-to-motor braking without the need of for a braking chopper or regenerative supply unit
– reduced component count and increased reliability when a common supply and DC link are used
– reduced cabling due to the single power entry for several drives
– savings in cabling, installation and maintenance costs (the supply and inverter modules, for example, are fitted with plug connections for fast and easy module changing)
– space savings through modular construction (space savings up to 60% compared to the previous generation of ABB multidrives)
– overall safety and control functions made possible by the common supply.

Figure 4. ACS800 multidrive cubicles

Regenerative IGBT supply unit

An ACS800 multidrive equipped with an IGBT supply unit (ISU) has a power factor of 1.0 under any load conditions. This means that the converter takes only active power from the mains – i.e. supplementary tariffs for reactive power consumption do not need to be paid. By comparison, a thyristor supply has a power factor between 0.97 and 0.99 in motoring mode and 0.88 or higher in regenerative mode.

The unity power factor of the ACS800 multidrive with IGBT supply unit means that there is no need to purchase power factor correction equipment. Low reactive power consumption also means that smaller cables and lower rated transformers can be used.

The total current distortion (THDI) of the IGBT supply unit is less than 5%, which is much less than with a 12-pulse converter.

The IGBT supply provides a constant DC voltage which is very stable even if there are variations in the supply voltage or load. The constant DC voltage guarantees stable process conditions, which is a very important factor in constant torque applications. By contrast, the DC voltage from a thyristor supply, for example, varies according to the supply voltage and load.

An IGBT supply and constant DC voltage ensure the full nominal voltage is available to the motor. With other types of rectifier, which cannot maintain a constant DC voltage, the motor has to be over-dimensioned to allow for the lower output voltage.

A regenerative supply enables the roller table motors to quickly reverse direction. This is essential to accommodate the reversing duty cycle of the table, which involves repetitive motor braking. Regenerative braking of the whole system may also be needed during controlled or emergency stops.

Built-in redundancy

The inverter section of the ACS800 multidrive consists of three-phase modules. The modules – each of which is a complete three-phase inverter – are connected in parallel according to the motor power requirement. Parallel connection of the modules provides built-in redundancy, enabling the system to run with a partial load if one module fails. It also makes for higher drive availability and greater process uptime. These three-phase inverter modules are unique to ABB's ACS800 multidrive, and have not been available in previous generations of ABB drives.

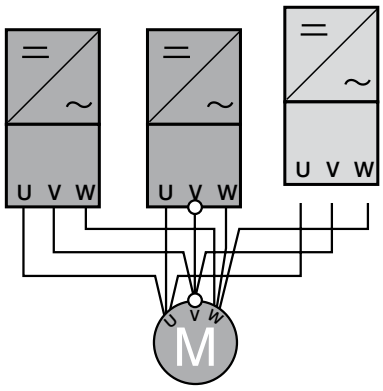


Figure 5. Parallel connected modules

Constant torque

Roller tables represent a typical constant torque application. In this type of application the line current is directly proportional to the motor power consumed, meaning it is small at low speed (see figure).

Rectifier dimensioning: In multidrive systems with a common DC bus, motoring and generating power can occur at same time. The following formula gives an approximate calculation of rectifier power:

$$S_{rectifier} = \Sigma P_{motoring} / 0{,}96 - \Sigma P_{generating} \times 0{,}96$$

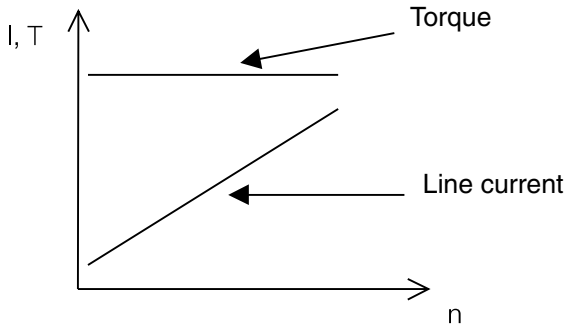


Figure 6. Line current in a contant torque application.

All-round optimum solution

When selecting the right drive solution for roller tables, it is important to take into consideration not only the direct investment costs but also the operating costs. A multidrive delivers savings in investment costs, as it reduces cable work by eliminating the need for supply cabling to individual converters. In addition, the multidrive with its common supply section and compact modular construction helps to save space – a significant factor as space in the electrical room is often limited.

ABB drives with their direct torque control (DTC) feature excellent dynamic performance, which is essential for roller table applications. Even without a tachometer, DTC delivers good motor speed accuracy, superb torque control and full torque at zero speed; this results in less stress on machinery, less process downtime and lower investment costs. Finally, the low harmonics and unity power factor of the regenerative IGBT supply unit enable fast reversing of the roller table and produce savings in operating costs.

More information for frequency converters, see web site www.abb.com/motors&drives.

Roller table motors

General

The roller table motors supplied by ABB are squirrel cage motors which are specially designed for use with frequency converters. Robust in construction, the motors are fully sealed to withstand the tough conditions in rolling mills.

The motors are low speed units intended for direct connection to rollers. The pole number and frequency can be selected, avoiding the need for gearboxes and therefore saving on maintenance costs and increasing the overall efficiency of the drive.

Assembly dimensions and shaft heights are in accordance with IEC 60072-1. The normal motor mounting position is B3/IM1001. Flange mounting (IM B5/IM3001) is possible for frame sizes 180-250 on request.

The enclosure of the motors is protected to IP55. Higher degrees of protection, up to IP 65, are also available. If required, the stator frame of M3RP motors can be pressurized with air to prevent any ingress of water or dust.

ABB offers roller table motors in sizes 180 to 450, with smaller sizes available on request.

Mechanical design

The motors feature a number of mechanical solutions that have been designed for the extreme conditions found in rolling mills.

The standard shaft end is of cylindrical construction. Conical shaft ends, as well as double shaft extensions, are available on request.

Robust, die-cast aluminum squirrel cage rotors, which are highly wear-resistant, are used throughout the motor range. The rotor slot design is optimized for frequency converter applications.

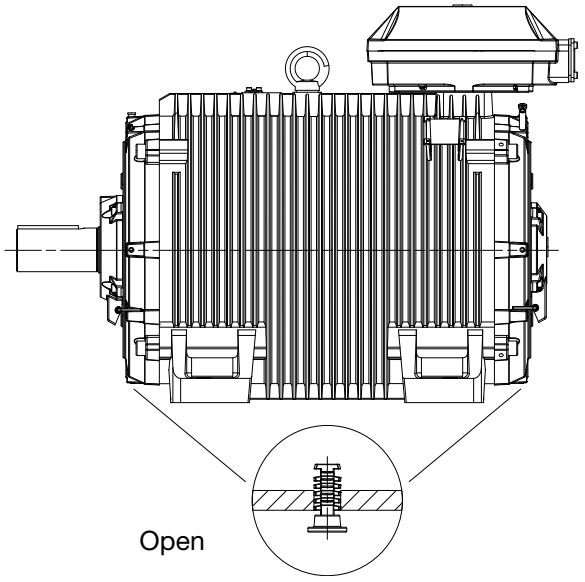
The frames and bearing end shields are made of cast iron. Spheroidal graphite cast iron is used as standard in frame sizes 355-450, and is available on request for smaller frame sizes. All fixing screws and bolts are locked.

The motors are totally enclosed, frame cooled motors, with no external cooling fan, in accordance with IEC 60034-6, IC 410. The stator frames have crosswise vertical cooling ribs, allowing optimum heat flow away from the motor surface.

A water-cooled version is available on request.

Drain holes

All motors are provided with drain holes and plugs which, depending on the motor's mounting position, are located at the lowest point. The plugs are in the open position when the motors are delivered.



Terminal box

The terminal box is located on the top of the motor at the N-end. In frame sizes 180-250 the terminal box is integrated with the stator frame. In larger motors the terminal box can be rotated 4 x 90°, with the cable direction from the N-end as standard. Terminal boxes positioned either on the left or right side of the motor are available on request.

The terminal board has three terminals for the power leads and one terminal for earthing. All the motors are equipped with an external earthing stud on the motor frame.

Co-ordination of terminal boxes and cable entries

If no ordering information on the cable is given, it is assumed to be p.v.c. -insulated and termination parts are supplied according to the following table.

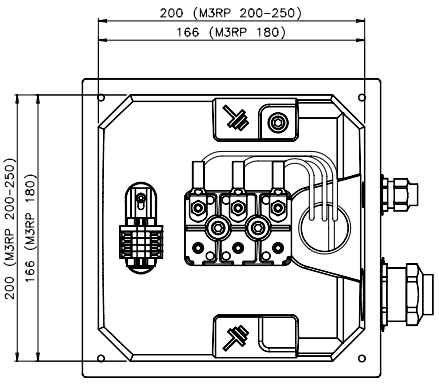
The terminal box is normally equipped with cable glands. To enable us the supply of suitable terminations, **please state cable type, quantity, cable direction and size when ordering**.

Voltage 220 - 690 V

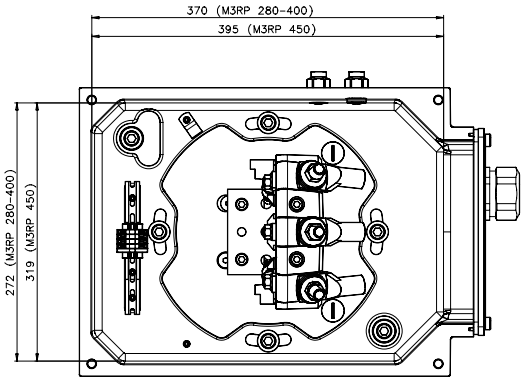
Motor size	Terminal box	Main metric cable entry	Auxliary cable	Cable gland entries diameter mm	Max. connection cable area, mm^2	Max. rated current A (D/Y conn.)	Terminal bolt size
180		1 x M32 x 1.5	1 x M20 x 1.5	Ø14-21	16	25	M5
200 -250	–	1 x M40 x 1.5	1 x M20 x 1.5	Ø18-27	35	63	M6
280-315	–	1 x M50 x 1.5	2 x M20 x 1.5	Ø26-35	1 x 150	210	M12
355-400	–	1 x M63 x 1.5	2 x M20 x 1.5	Ø32-49	1 x 240	370	M12
450	–	2 x M63 x 1.5	2 x M20 x 1.5	Ø32-49	2 x 240	750	M12

Dimensions of terminal boxes

Terminal box M3RP 180-250



Terminal box M3RP 280-450



Bearings

The motors are fitted with 63-series single row deep groove ball bearings. Alternatively, a cylindrical roller bearing can be used at the D-end of the motor, if required.

The bearings are axially spring loaded, thus eliminating the bearing clearance. This improves the bearing resistance to vibrations while allowing for normal thermal expansion. The D-end of the motor is equipped with a fixed bearing.

Bearings are provided with regreasable bearings.

Motor sizes 315-450 are as standard with insulated bearings at N-end.

Bearing types

Motor size	D-end Ball bearing	N-end Ball bearing
M3RP 180	6310/C3	6309/C3
M3RP 200	6312/C3	6310/C3
M3RP 225	6313/C3	6312/C3
M3RP 250	6315/C3	6313/C3
M3RP 280	6316/C3	6316/C3

Motor size	D-end Ball bearing	N-end Ball bearing
M3RP 315	6319/C3	6316/C3 VL0241
M3RP 355	6322/C3	6316/C3 VL0241
M3RP 400	6324/C3	6319/C3 VL0241
M3RP 450	6326/C3	6322/C3 VL0241

Lubrication

Motors are provided with grease nipples so the motor can be lubricated while running. If the bearings cannot be lubricated while running, please follow the procedure as described in the Motor Manual (BU / Add. info Roller table motors). For slowly rotating and/or highly loaded beaings, Lithium Complex (EP-greases) are recommended.

A lubrication instruction plate is fitted to the motor frame, stating the type of grease and lubrication interval. D-end bearing must be lubricated so that the new grease is coming out from the labyrinth channels totally replacing the old grease.

Lubrication intervals

ABB follows the L1-principle in defining lubrication interval. That means that 99% of the motors are sure to make the interval time. The lubrication intervals can also be calculated according to the L10-principle, which are normally doubled compared to L1-values. Values available from ABB at request.

The table below gives lubrication intervals according to the L1-principle for different speeds. The values are valid for horizontal mounted motors (B3), with about 80°C bearing temperature and using high quality grease with lithium complex soap and mineral or PAO-oil.

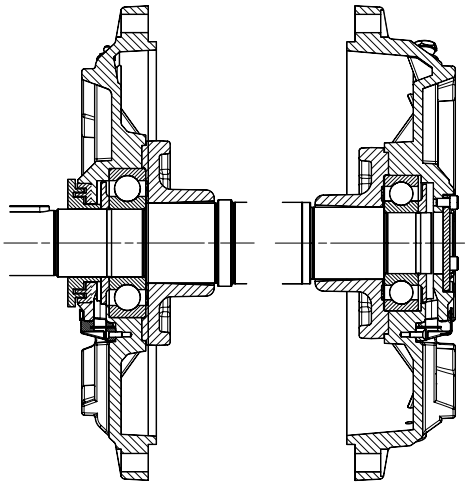
For more information, see ABB's Low Voltage Motors Manual.

Motor size	Bearing	1000 r/min	750 r/min	250-500 r/min	≤ 250 r/min
180	6310	4800	5500	6500	8100
200	6312	4300	5000	6100	7700
225	6313	4000	4800	5800	7500
250	6315	3600	4400	5400	7100
280	6316	3400	4200	5200	7000
315	6319	2900	3700	4700	6500
355	6322	2400	3100	4200	6000
400	6324	2100	2800	3900	5700
450	6326	1900	2600	3700	5500

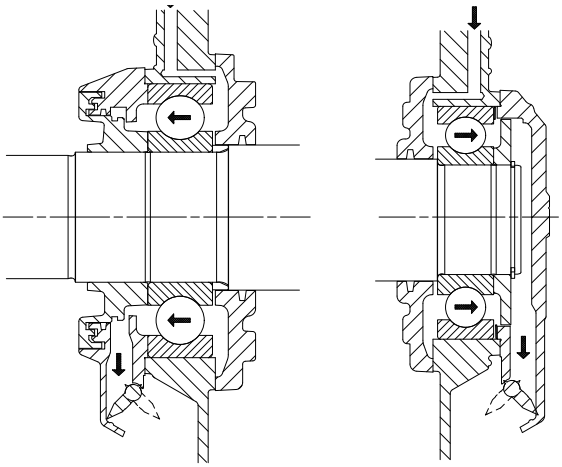
Bearing seals

Motor are equipped with labyrinth sealing at D-end. N–end is totally enclosed. This construction gives a proper protection in demanding environment against water and dust.

Motor sizes 180-250



Motor sizes 280-450



Stator winding

The stator winding is designed for use with frequency converters in the rolling mill environment. The motors are electrically designed for a certain speed range in order to minimize the current and enable use of the smallest possible frequency converter.

Roller table motors typically run at low speeds and have high peak torque demands, but the requirements vary from case to case.

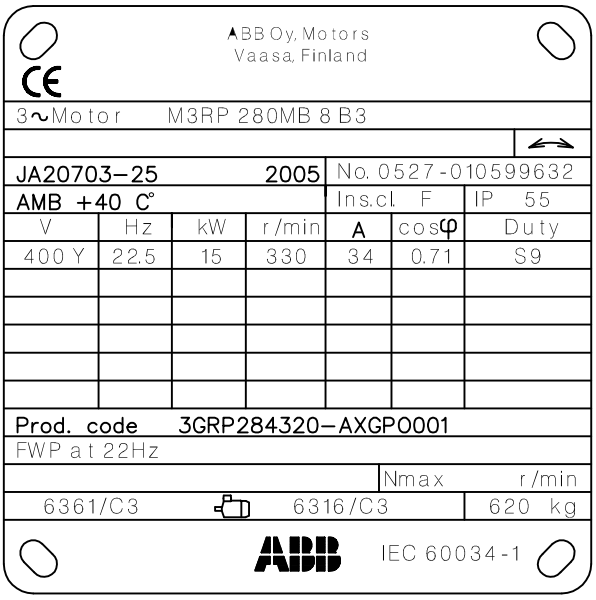
The high number of poles (6 to 12) means the stator winding is extremely strong and mechanically resistant as a result of winding ends being very short and tightly terminated.

The stator winding insulation meets Class F requirements (temperature limit +155°C). Class H insulation (temperature limit 180°C) is available on request.

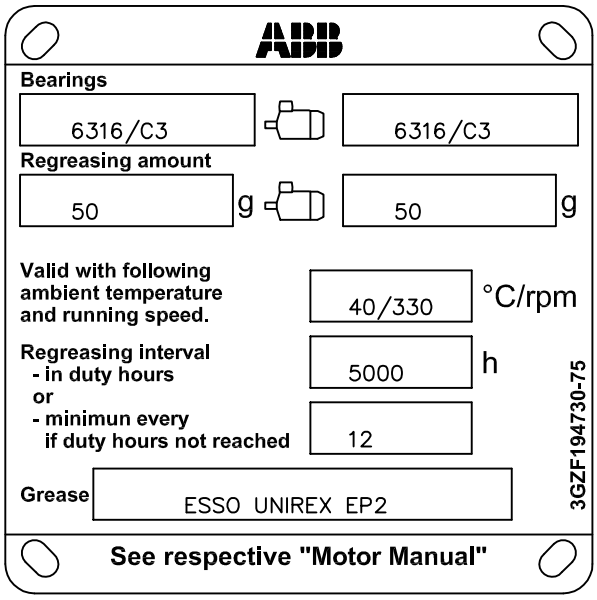
The stators are wound with Class H enamel wire and the winding is then trickle impregnated with polyester or epoxy resin. Gaps between individual conductors are effectively filled with the impregnated material resulting in good thermal conductivity and superior mechanical strength.

An effective way of protecting the stator winding against overheating is by direct monitoring of the winding temperature. As a standard feature the motors are fitted with three PTC thermistors embedded in the stator winding overhang. Six thermistors (for warning and tripping), bimetallic relays or Pt-100 measuring resistors are also available on request.

Rating plates



Example of motor rating plate



Example of motor lubrication plate

Ordering information

When placing an order, please state the following minimum data in the order, as in example.

The product code of the motor is composed in accordance with the following example.

Motor type	M3RP 280 MB
Pole number	6
Mounting arrangement (IM code)	IM B3 (IM 1001)
Rated output	22 kW
Product code	3GRP283 320-ADG
Variant codes if needed	

Motor size

A B C D, E, F, G

M3RP 280MB 3GRP 283 320 - A D G 003 etc.

1 2 3 4 5 6 7 8 9 10 11 12 13 14

A Motor type
B Motor size
C Product code
D Mounting arrangement code
E Voltage and frequency code
F Generation code
G Variant codes

Explanation of the product code:

Positions 1 to 4
3GRP = Totally enclosed fan cooled squirrel cage motor with cast iron frame

Positions 5 and 6
IEC-frame

18 = 180	28 = 380
20 = 200	31 = 315
22 = 225	40 = 400
25 = 250	45 = 450

Position 7
Speed (Pole pairs)
3 = 6 poles
4 = 8 poles
5 = 10 poles
6 = 12 poles

Position 8 to 10
Serial number

Position 11
- (dash)

Position 12
Mounting arrangement
A = Foot-mounted, top-mounted terminal box
B = Flange-mounted, large flange
H = Foot- and flange-mounted, terminal box top-mounted

Position 13
Voltage and frequency code
See table below

Position 14
Generation code
A, B, C...

The product code must be, if needed, followed by variant codes.

Code letters for supplementing the product code - single speed motors

Code letter for voltage

Motor size	A	S	B	D	H	E	T	U	X
160-450	220 V	230 V	380 V	400 V	415 V	500 V	660 V	690 V	Other rated voltage, connection or frequency, 690 V maximum

Roller table motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 410 – Insulation class F, temperature rise class B

Output Prms kW	Motor type		Product code		Speed r/min	Torque			Current			Power factor			Jrt m kgm²	Weight kg
						T_{rms} Nm	T_{max} Nm	T_{acc} Nm	I_0 A	I_n A	I_{acc} A	cos φ_0	cos φ_n	cos φ_{acc}		
1000 r/min = 6-poles					**400 V 50 Hz**											
7	**M3RP**	**180 LA**	3GRP	183 510-••G	979	68	180	135	8	15	28	0.07	0.77	0.81	0.2	175
10	**M3RP**	**200 LA**	3GRP	203 510-••G	985	96	380	285	6	18	57	0.08	0.88	0.87	0.43	245
11	**M3RP**	**200 LB**	3GRP	203 520-••G	987	106	520	390	8	20	78	0.07	0.88	0.87	0.52	270
12.5	**M3RP**	**225 MB**	3GRP	223 320-••G	989	120	640	480	10	23	97	0.07	0.86	0.85	0.66	315
15	**M3RP**	**225 MC**	3GRP	223 330-••G	990	145	850	635	13	27	136	0.07	0.85	0.83	0.78	340
18	**M3RP**	**250 MB**	3GRP	253 320-••G	991	173	1100	825	16	33	164	0.06	0.84	0.85	1.59	455
22	**M3RP**	**280 MB**	3GRP	283 320-••G	993	210	1320	990	18	40	195	0.06	0.85	0.84	2.6	620
30	**M3RP**	**280 MC**	3GRP	283 330-••G	993	288	1530	1145	20	52	224	0.06	0.88	0.84	3	690
37	**M3RP**	**315 LA**	3GRP	313 510-••G	994	355	2020	1515	28	65	300	0.05	0.86	0.84	5.1	870
45	**M3RP**	**315 LB**	3GRP	313 520-••G	994	430	2630	1970	36	80	380	0.05	0.86	0.84	5.9	950
55	**M3RP**	**315 LC**	3GRP	313 530-••G	994	525	3220	2415	42	97	467	0.05	0.86	0.84	6.9	1060
750 r/min = 8-poles					**400 V 50 Hz**											
5.5	**M3RP**	**180 LA**	3GRP	184 510-••G	730	72	240	180	8	12	28	0.06	0.72	0.81	0.2	175
8	**M3RP**	**200 LA**	3GRP	204 510-••G	740	103	420	315	8	16	49	0.07	0.82	0.85	0.43	245
9	**M3RP**	**200 LB**	3GRP	204 520-••G	740	116	560	420	10	18	66	0.06	0.79	0.84	0.52	270
10	**M3RP**	**225 MB**	3GRP	224 320-••G	741	128	610	455	13	21	70	0.06	0.75	0.84	0.66	315
12.5	**M3RP**	**225 MC**	3GRP	224 330-••G	742	161	800	600	17	27	93	0.05	0.74	0.83	0.78	340
15	**M3RP**	**250 MB**	3GRP	254 320-••G	744	192	1110	830	20	32	128	0.05	0.74	0.83	1.59	455
18	**M3RP**	**280 MB**	3GRP	284 320-••G	745	230	1230	920	22	37	138	0.05	0.75	0.83	2.6	620
22	**M3RP**	**280 MC**	3GRP	284 330-••G	746	282	1570	1170	28	46	174	0.05	0.75	0.82	3	690
30	**M3RP**	**315 LA**	3GRP	314 510-••G	746	384	2270	1700	42	64	254	0.04	0.72	0.82	5.1	870
37	**M3RP**	**315 LB**	3GRP	314 520-••G	745	470	2540	1900	45	76	283	0.04	0.75	0.82	5.9	950
45	**M3RP**	**315 LC**	3GRP	314 530-••G	745	576	3160	2370	55	92	357	0.04	0.75	0.82	6.9	1060

[1] Technical data on request.

The two bullets in the product code indicate choice of mounting arrangement, voltage and frequency (see ordering information page).

Roller table motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 410 – Insulation class F, temperature rise class B

Output Prms kW	Motor type		Product code		Speed r/min	Torque			Current			Power factor			Jrt m kgm^2	Weight kg
						T_{rms} Nm	T_{max} Nm	T_{acc} Nm	I_0 A	I_n A	I_{acc} A	cos φ_0	cos φ_n	cos φ_{acc}		
345 r/min = 8-poles					**400 V 23 Hz**											
3.3	**M3RP**	**200 LA**	3GRP	204 510-••G	338	93	420	315	6	8	24	0.08	0.72	0.9	0.43	245
4	**M3RP**	**200 LB**	3GRP	204 520-••G	338	113	580	430	7	9	33	0.07	0.72	0.89	0.52	270
4.5	**M3RP**	**200 LC**	3GRP	204 530-••G	338	127	630	470	7	10	35	0.07	0.75	0.88	0.58	285
5	**M3RP**	**225 MC**	3GRP	224 330-••G	338	141	670	500	8	11	37	0.06	0.72	0.87	0.82	325
6	**M3RP**	**225 MD**	3GRP	224 340-••G	339	169	1020	765	12	15	57	0.05	0.64	0.86	0.87	360
11	**M3RP**	**250 MC**	3GRP	254 330-••G	339	310	1570	1175	16	24	88	0.05	0.73	0.85	1.67	470
15	**M3RP**	**280 MB**	3GRP	284 320-••G	340	421	1920	1440	22	33	107	0.05	0.73	0.84	2.6	620
18.5	**M3RP**	**280 MC**	3GRP	284 330-••G	340	520	2490	1865	26	40	137	0.04	0.74	0.83	3	690
25	**M3RP**	**315 LA**	3GRP	314 510-••G	340	702	3140	2350	33	53	170	0.04	0.75	0.84	5.1	870
30	**M3RP**	**315 LB**	3GRP	314 520-••G	340	840	3770	2820	37	62	203	0.04	0.76	0.83	5.9	950
35	**M3RP**	**315 LC**	3GRP	314 530-••G	341	980	5490	4115	55	79	299	0.03	0.69	0.82	6.9	1060
40	**M3RP**	**355 SA**	3GRP	354 110-••G	342	1110	7320	5485	78	101	402	0.03	0.61	0.79	10	1550
50	**M3RP**	**355 SB**	3GRP	354 120-••G	342	1390	8550	6410	86	118	461	0.03	0.65	0.8	12	1750
60	**M3RP**	**355 LA**	3GRP	354 510-••G	342	1670	11840	8880	118	153	660	0.03	0.61	0.78	14	2000
85	**M3RP**	**400 MA**	3GRP	404 310-••G	343	2360	13600	10200	161	214	701	0.03	0.61	0.81	22	2500
100	**M3RP**	**400 LA**	3GRP	404 510-••G	343	2780	16400	12300	193	254	846	0.03	0.6	0.81	26	2850
120	**M3RP**	**450 LA**	3GRP	454 510-••G	342	3350	17500	13100	173	265	910	0.03	0.69	0.81	26	3400
132	**M3RP**	**450 LB**	3GRP	454 520-••G	342	3686	20000	15000	195	295	1030	0.03	0.68	0.81	29	3650
150	**M3RP**	**450 LC**	3GRP	454 530-••G	342	4188	24500	18300	240	345	1260	0.03	0.66	0.81	35	4000
165	**M3RP**	**450 LD**	3GRP	454 540-••G	343	4594	30500	22800	285	395	1570	0.03	0.63	0.81	41	4450

[1] Technical data on request.

The two bullets in the product code indicate choice of mounting arrangement, voltage and frequency (see ordering information page).

Roller table motors - Variant codes

Code [1]	Variant	Motor size			
		180-250	280	315	355-450
Bearings and lubrication					
037	Roller bearing at D-end.	P	P	P	P
043	SPM-nipples.	S	S	S	S
Insulation system					
014	Winding insulation class H.	P	P	P	P
405	Special winding insulation for frequency converter supply.	P	P	P	P
Painting					
114	Special paint colour, standard grade.	P	P	P	P
179	Special paint specification.	R	R	R	R
Protection					
158	Degree of protection IP65.	P	P	P	P
403	Degree of protection IP56.	P	P	P	P
Shaft & rotor					
070	One or two special shaft extensions, standard shaft material.	P	P	P	P
Stator winding temperature sensors					
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	P	P	P	P
436	PTC-thermistors (3 in series), 150°C, in stator winding.	S	S	S	S
441	PTC-thermistors (3 in series 130°C & 3 in series 150°C, in stator winding.	P	P	P	P
445	Pt100 (1per phase) in stator winding.	P	P	P	P
Terminal box					
418	Separate terminal box for temperature detectors.	P	P	P	P
Testing					
149	Test according to separate test specification.	R	R	R	R
Variable speed drives					
701	Insulated bearing at N-end.	P	P	S	S
472	1024 pulse taho (L&L 861).	P	P	P	P
473	2048 pulse tacho (L&L 861).	P	P	P	P

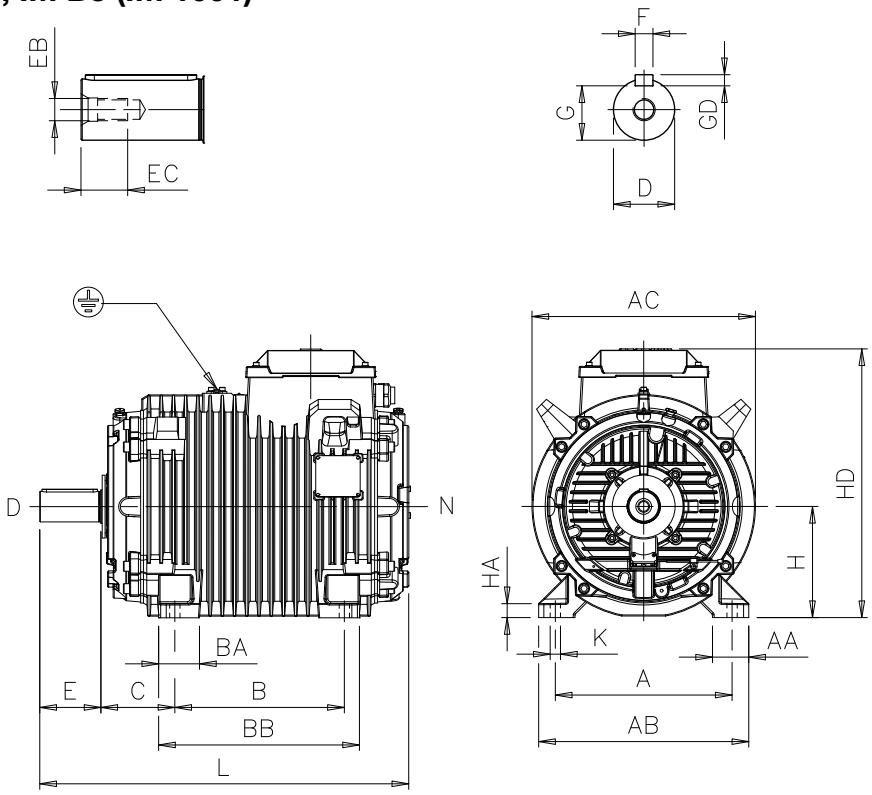
[1] Certain variant codes cannot be used simultaneously.

S = Included as standard
M = On modification of a stocked motor. or on new manufacture, the number per order may be limited.

P = New manufacture only.
R = On request.
NA = Not applicable

Dimension drawings

Foot-mounted; IM B3 (IM 1001)



Motor size	A	AA	AB	AC	B	BA	BB	C	D	E	EB	EC
180	279	60	325	350	279	55	335	121	48	110	M16	36
200	318	65	378	405	305	75	364	133	55	110	M20	40
225	356	80	425	450	311	100	390	149	60	140	M20	40
250	406	80	473	500	349	120	450	168	65	140	M20	40

Motor size	F	G	GD	H	HA	HD	K	L	L'
180	14	42.5	9	180	25	450	14.5	630	-
200	16	49	10	200	25	485	18.5	670	-
225	18	53	11	225	30	530	18.5	765	-
250	18	58	11	250	30	580	24	775	-

Flange-mounted versions for frame sizes 180-250 are also available on request.

Tolerances:

A, B	± 0,8
D,	ISO k6 < Ø 50mm
	ISO m6 > Ø 50mm
F	ISO h9
H	+0 -0.5
C	± 0.8

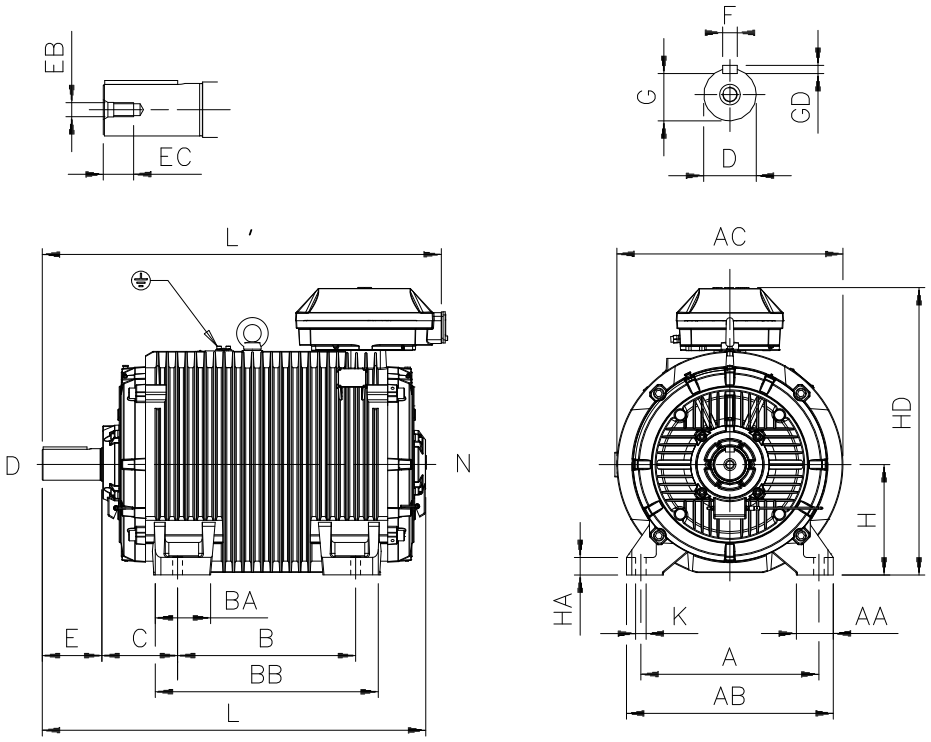
Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

Roller table motors Sizes 280 - 450

Dimension drawings

Foot-mounted; IM B3 (IM 1001)



Motor size	A	AA	AB	AC	B	BA	BB	C	D	E	EB	EC
280	457	85	530	580	419	125	550	190	75	140	M20	40
315	508	105	590	655	508	160	640	216	90	170	M24	50
355S	610	120	700	755	500	175	680	254	100	210	M24	50
355L	610	120	700	755	630	175	810	254	100	210	M24	50
400M	686	140	820	835	630	180	800	280	100	210	M24	50
400L	686	140	820	835	710	180	880	280	100	210	M24	50
450	800	160	950	950	1120	215	1320	250	120	210	M24	50

Motor size	F	G	GD	H	HA	HD	K	L	L'
280	20	67.5	12	280	40	750	24	935	995
315	25	81	14	315	50	825	30	1100	1140
355S	28	90	16	355	55	940	35	1225	1280
355L	28	90	16	355	55	940	35	1380	1435
400M	28	90	16	400	60	1025	35	1420	1460
400L	28	90	16	400	60	1025	35	1560	1605
450	32	109	18	450	60	1165	42	1850	1850

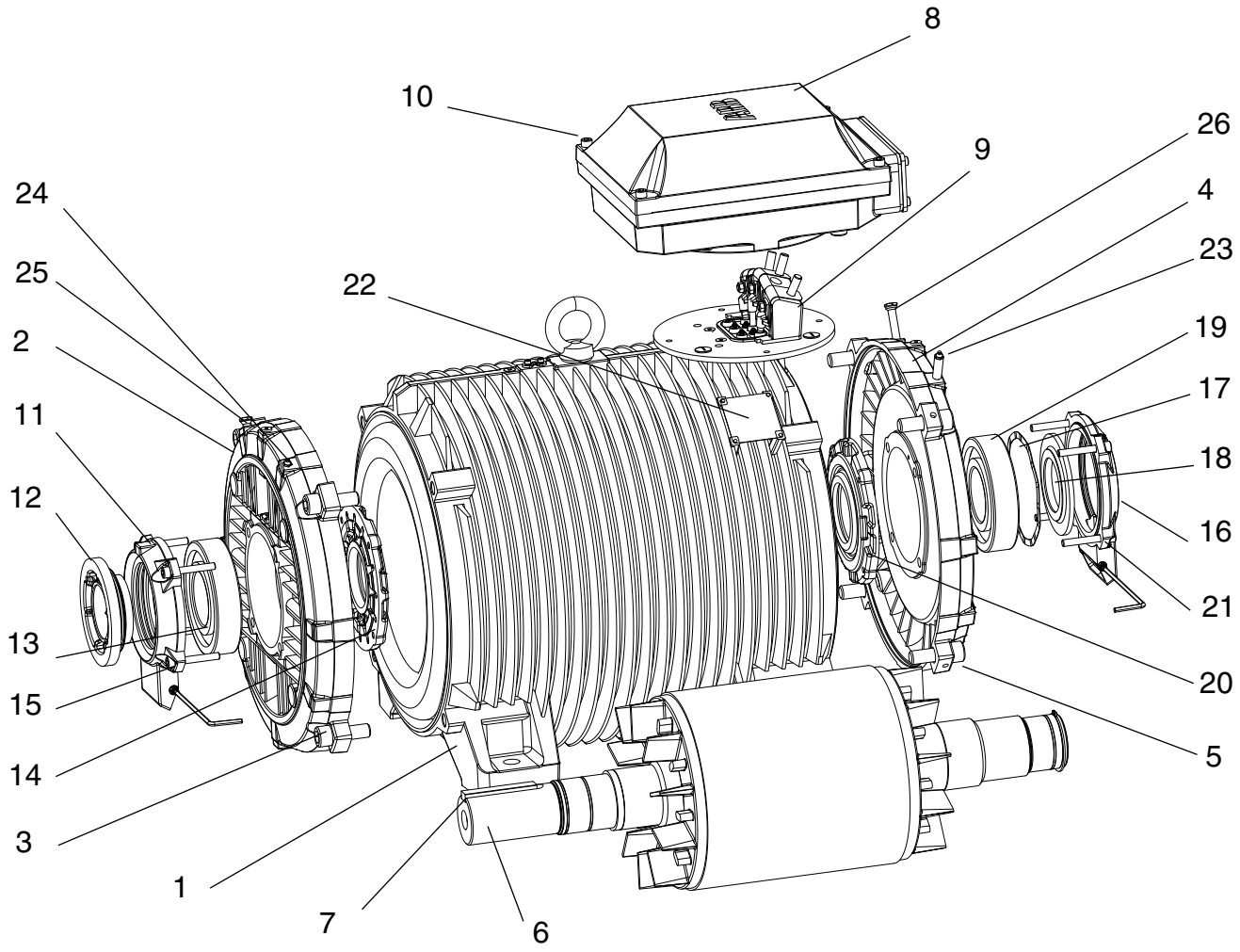
Tolerances:

A, B	± 0,8
D,	ISO k6 < Ø 50mm
	ISO m6 > Ø 50mm
F	ISO h9
H	+0 -0.5
C	± 0.8

Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

Roller table motor construction



1	Stator frame	14	Inner bearing cover, D-end
2	Endshield, D-end	15	Screws for bearing cover, D-end
3	Screws for endshield, D-end	16	Outer bearing cover, N-end
4	Endshield, N-end	17	Wave spring
5	Screws for endshield, N-end	18	Valve disc, N-end
6	Rotor with shaft	19	Bearing, N-end
7	Key, D-end	20	Inner bearing cover, N-end
8	Terminal box	21	Screws for bearing cover, N-end
9	Terminal board	22	Rating plate
10	Screws for terminal box cover	23	Grease nipple, N-end
11	Outer bearing cover, D-end	24	Grease nipple, D-end
12	Valve disc with labyrinth seal, D-end	25	SPM nipple, D-end
13	Bearing, D-end	26	SPM nipple, N-end

Roller table motors in brief, basic design

Motor size		180	200	225	250
Stator	Material	Cast iron EN-GJL-200 / GG 20 / GRS200			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G			
	Paint	Two-pack epoxy paint, thickness ≥ 70 µm.			
Bearing end shields	Material	Cast iron EN-GJL-200 / GG 20 / GRS200			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G			
	Paint	Two-pack epoxy paint, thickness ≥ 70 µm.			
Bearings	D-end	6310/C3	6312/C3	6313/C3	6315/C3
	N-end	6309/C3	6310/C3	6312/C3	6313/C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end			
Bearing seal		Labyrinth seal			
Lubrication		Regreasable bearings, regr. nipples M10x1			
SPM-nipples		As standard			
Rating plate	Material	Stainless steel, EN 10088, thickness 0.5 mm			
Terminal box	Frame material	Integrated with stator frame			
	Cover material	Cast iron EN-GJL-200 / GG 20 / GRS 200			
	Screws	Steel 8.8, zinc electroplated and yellow chromated			
Connections	Cable entries	1xM32 + 1xM20	1 x M40 + 1 x M20		
	Terminals	3 terminals for connection with cable lugs(not included)			
Stator winding	Material	Copper			
	Insulation	Insulation class F			
	Winding protection	3 PTC thermistors as standard, 150 °C			
Rotor winding	Material	Pressure die-cast aluminum			
Balancing method		Half key balancing as standard			
Key ways		Closed keyway			
Heating elements	Optional	50 W			
Drain holes		Standard, open on delivery			
External earthing bolt		As standard			
Enclosure		IP 55, higher protection on request			
Cooling method		IC 410			

Motor size		280	315	355	400	450
Stator	Material	Cast iron EN-GJL-200 / GG 20 / GRS200		Cast iron EN-GJS-400 / GG 40 / GRP400		
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G				
	Paint	Two-pack epoxy paint, thickness ≥ 70 µm.				
Bearing end shields	Material	Cast iron EN-GJL-200 / GG 20 / GRS200		Cast iron EN-GJS-400 / GG 40 / GRP400		
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G				
	Paint	Two-pack epoxy paint, thickness ≥ 70 µm.				
Bearings	D-end	6316/C3	6319/C3	6322/C3	6324/C3	6326/C3
	N-end	6316/C3	6316/C3 VL0241	6316/ C3VL0241	6319/ C3VL0241	6322/ C3VL0241
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end				
Bearing seal		Labyrinth seal				
Lubrication		Regreasable bearings, regr. nipples M10x1				
SPM-nipples		As standard				
Rating plate	Material	Stainless steel, EN 10088, thickness 0.5 mm				
Terminal box	Frame material	Cast iron EN-GJL-200 / GG 20 / GRS 200				
	Cover material	Cast iron EN-GJL-200 / GG 20 / GRS 200				
	Screws	Steel 8.8, zinc electroplated and yellow chromated				
Connections	Cable entries	1 x M50 + 2 x M20		1 x M63 + 2 x M20		2 x M63 + 2 x M20
	Terminals	3 terminals for connection with cable lugs(not included)				
Stator winding	Material	Copper				
	Insulation	Insulation class F				
	Winding protection	3 PTC thermistors as standard, 150°C				
Rotor winding	Material	Pressure die-cast aluminum				
Balancing method		Half key balancing as standard				
Key ways		Closed key way	Open key way			
Heating elements	Optional	50 W	2 x 50 W		2 x 65 W	
Drain holes		Standard, open on delivery				
External earthing bolt		As standard				
Enclosure		IP 55, higher protection on request				
Cooling method		IC 410				

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– Dust ignition proof motors

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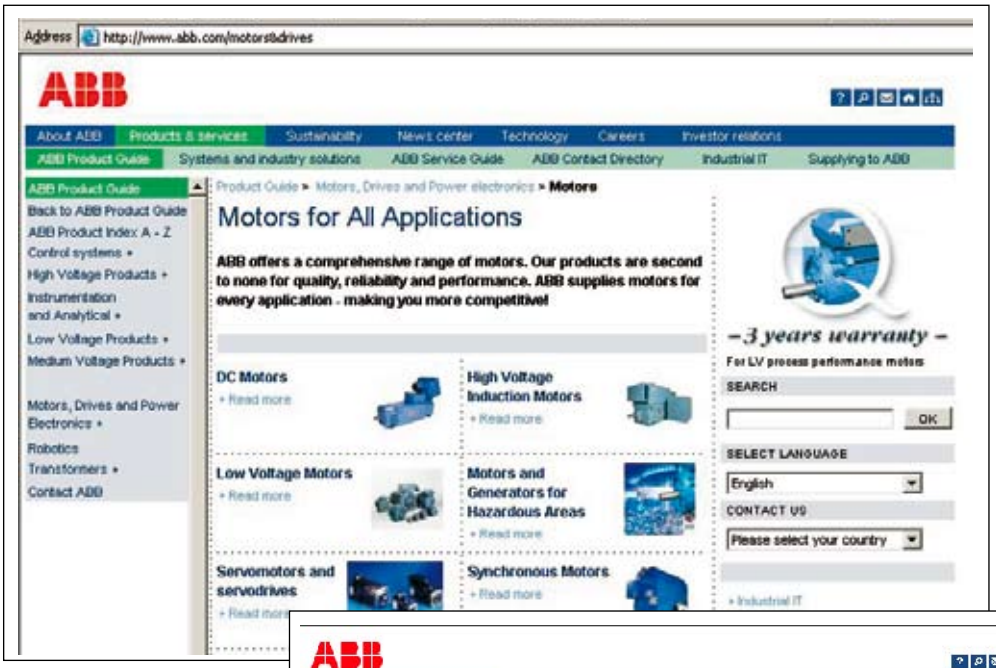

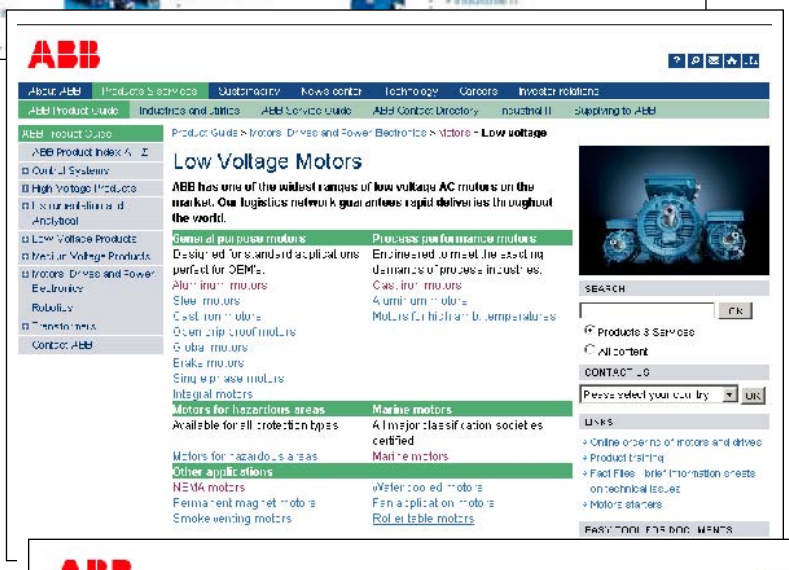

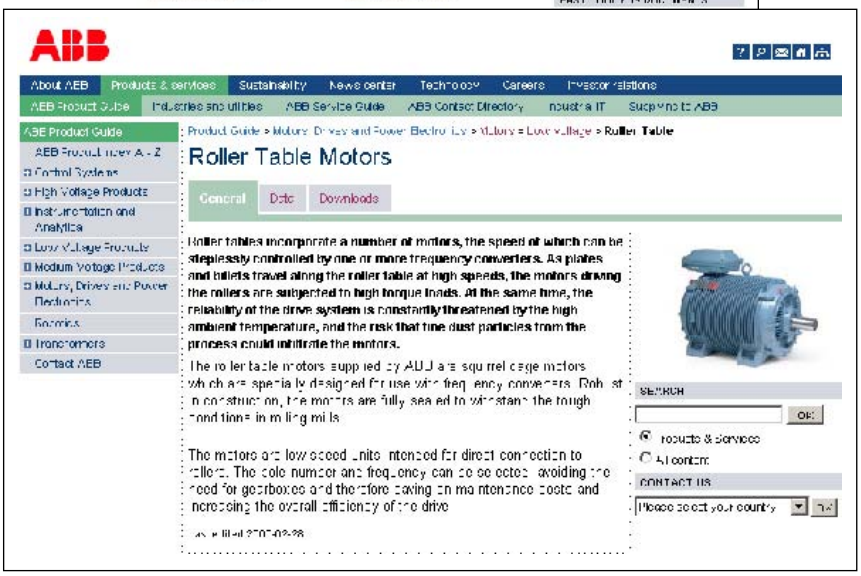

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- Marine motors
- Other applications
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  - Permanent magnet motors
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>>> Roller table motors

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