

Low Voltage Water Cooled Motors



ABB

Low voltage water cooled motors range M3LP, frame sizes 355 to 450

The motor range represents a new generation of water cooled motors developed in response to market demands for improved technical features. The range is available in IEC frame sizes 355 to 450.

Water cooling is a very efficient method of transferring heat away from the motor, and water cooled motors provide high output power per unit of weight. Cooling efficiency is maintained even at lower speeds, which is especially important in constant torque applications.

These advantages make the motors ideal for a range of uses, including marine applications, water and waste water pumping, printing machines, and wind turbine generators. The basic structure of the motors is optimized for variable speed use.



Design

The frames are made of steel with channels for the cooling water around the stator core. The design is modular and allows modifications in line with the variant code list of this catalogue.

Range

Frame sizes IEC 355 to 450
Power Up to 1100 kW
Voltage Up to 690 V
Number of poles 4 to 8
Mounting arrangements ...Foot, flange and foot-flange.



Low Voltage Water Cooled Motors

Sizes 355 to 450

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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 110,000 people.

Mechanical design

Design

The design utilizes the same durable structure as for process performance motors, meeting the toughest demands from of todays process industry. These motors use the best materials and constructions methods to

achive the highest quality and reliability. The motor design is also highly adaptable to allow rapid engineering solutions according to customer's specifications.

Stator

The motor frames including feet are made of steel. Bearing housing and terminal box are made of cast iron. Motors can be supplied for foot mounting, flange mounting and combinations of these. Degree of protection is IP 55, higher degree of protection, IP 56, is available on request.

Motor in frame size 355 is fitted with the bearing fans at both non-drive and drive ends.

Motor in frame sizes 400 and 450 are fitted with a bearing fan, which is normally mounted on the non-drive end.

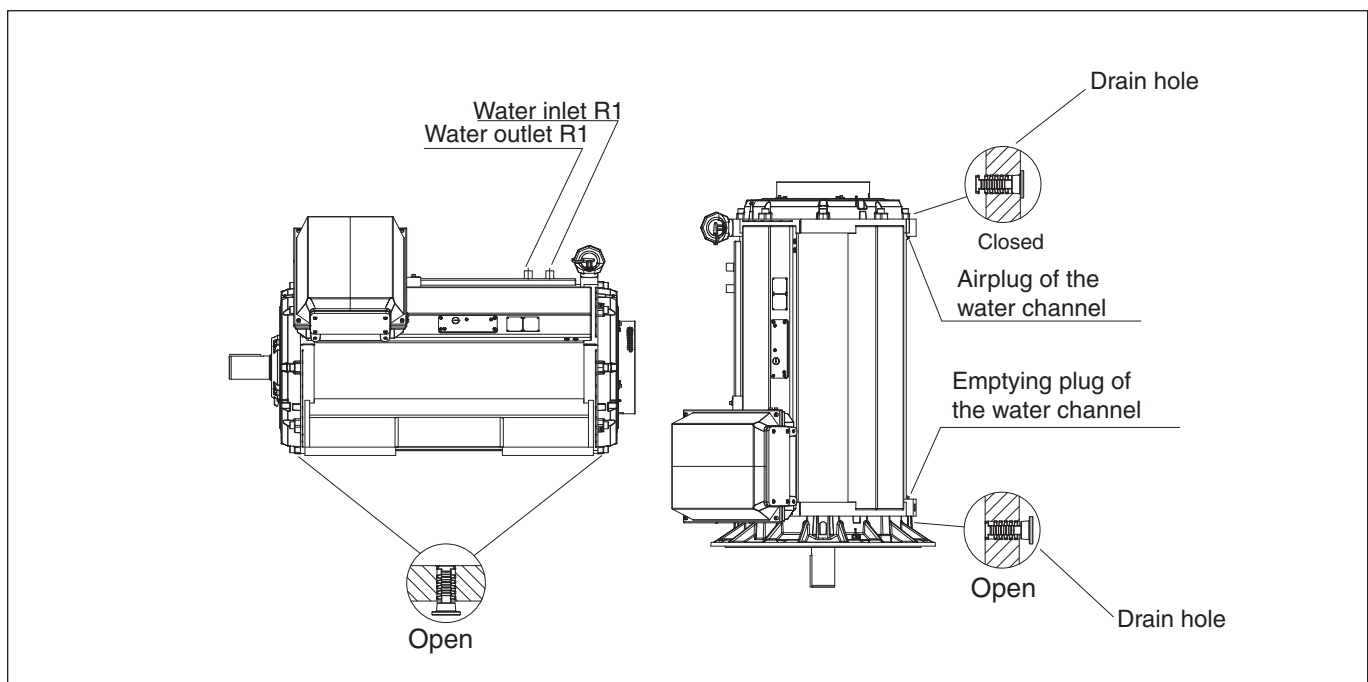
Drain holes

M3LP motors are supplied with drain holes and closable plugs as standard to avoid water from gathering in the windings.

With water cooled motors it is of special importance that the drain holes are in the correct position, as shown in the drawing. When mounting the motor, check to make sure that the drain holes face downwards.

Cooling channel

The cooling channel is equipped with emptying plug in the lowest position and airplug in the highest position at the channel.



Cooling

Cooling water must be tap water quality. Sea water, or water containing more than 120 mg/l of chloride, should not be used. The maximum permitted pressure for the cooling water is 5 bar. The maximum recommended input water temperature is 40°C, the lower the cooling water input temperature, the better the cooling effect will be. If requested by the user, higher input water temperatures may be allowed in some cases provided that they are approved by the manufacturer. The outlet water temperature rise is from 10 to 15 K.

The following table shows the minimum cooling water pressures and flow rates. (If the water flow rate varies, the temperature rise will be inversely proportional to the flow rate.)

Motor type M3LP Frame type	Number of inlets	Cooling water flow rate (l/min)	Water pressure min. (bar)	Water temperature rise (K)
355 ML_	1	30	2.0	10-15
355 LK_	1	35	2.0	10-15
400 L_	1	40	2.0	10-15
450 L_	1	50	2.0	10-15

Cooling designation

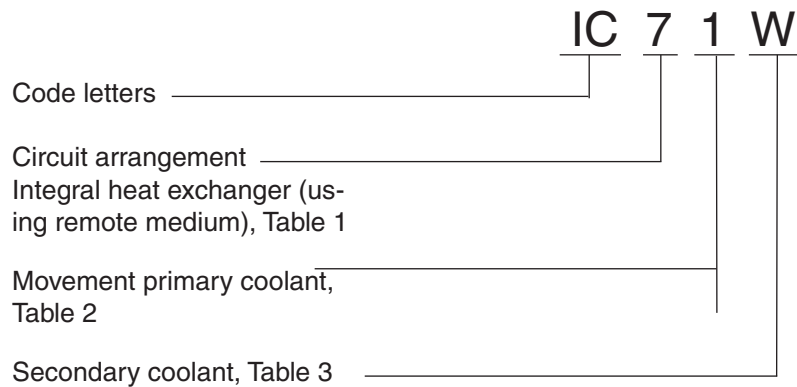


Table 1. Circuit arrangement

Characteristic numeral	Brief description	Definition
7 (see note 2)	Integral heat exchanger (using remote medium)	The primary coolant is circulated in a closed circuit and gives its heat via a heat exchanger, which is built into and forms an integral part of the machine, to the secondary coolant which is the remote medium.

Note 2. The nature of the heat exchanger is not specified (ribbed or plain tubes, etc.).

Table 2. Method of movement (Movement primary coolant)

Characteristic numeral	Brief description	Definition
1	Self-circulation	The coolant is moved dependent on the rotational speed of the main machine, either by action of the rotor alone or by means of a component designed for this purpose and mounted directly on the rotor of the main machine, or by a fan or pump unit mechanically driven by the rotor or the main machine.

Table 3. Coolant (Secondary coolant)

Characteristic letter	Coolant
W	Water

Terminal box

The terminal box in the frame size 355 is mounted on the top of the motor. The terminal boxes in the frame sizes 400 and 450 are mounted in the 45° angle on the motor. Terminal box size 750 can be turned 4x90° and terminal box size 1200 can be turned 2x180°. Degree of protection of standard terminal box is IP 55. The terminal box is normally equipped with cable glands or cable boxes, see following pages.

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 table below.

To ensure that suitable terminations for the motor can be supplied, please state the cable type, quantity and size when ordering. Non-standard terminal box designs - e.g. non-standard size or degree of protection - are available as options. The terminations are suitable for Cu- and Al-cables. The cables are connected to the terminals using cable lugs (not included with the motor).

Please see the variant code pages for options.

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 type and termination parts are supplied according to the following tables. These are supplied when using variant code '230 Standard cable glands' when ordering.

In motor sizes 400 and 450 the terminal box is normally equipped with cable glands or cable boxes according to the tables on the following pages. The table below shows the different alternatives available for cable boxes and cable entries. Other types on request.

Motor size	Voltage/frequency code	Terminal box	Top-mounted flange or adapter	Cable box or cable gland	Cable diameter	Max. connection cable area mm ²
1500 r/min (4 poles)						
355MLA, MLB	D, E	750	3GZF294730-944	3GZF294730-301	2xØ48-60	4x240
355MLC, MLD, MLE, LK	D, E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
400LA, LB, LC	D	1200	see option ¹⁾	see option ¹⁾	see option ¹⁾	6x240
	E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
450LA, LB	D, E	1200	see option ¹⁾	see option ¹⁾	see option ¹⁾	6x240
1000 r/min (6 poles)						
355MLA	D	750	3GZF294730-944	3GZF294730-301	2xØ48-60	4x240
355MLA	E	370	3GZF294730-753	2x3GZF294730-613	2xM63x1.5	2x240
355MLB, MLC	D, E	750	3GZF294730-944	3GZF294730-301	2xØ48-60	4x240
355MLD, LK	D, E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
400LA, LB	D, E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
400LC, LD	D	1200	see option ¹⁾	see option ¹⁾	see option ¹⁾	6x240
	E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
450LA	D	1200	see option ¹⁾	see option ¹⁾	see option ¹⁾	6x240
	E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
750 r/min (8 poles)						
355MLA, MLB	D, E	370	3GZF294730-753	2x3GZF294730-613	2xM63x1.5	2x240
355MLC	E	370	3GZF294730-753	2x3GZF294730-613	2xM63x1.5	2x240
355MLC	D	750	3GZF294730-944	3GZF294730-301	2xØ48-60	4x240
355LK	D, E	750	3GZF294730-944	3GZF294730-301	2xØ48-60	4x240
400LA, LB, LC	D, E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240
450LA, LB	D, E	750	3GZF294730-944	3GZF294730-501	2xØ60-80	4x240

Voltage/frequency codes

D - 380-420 VD 50 Hz, 660-690 VY 50 Hz, 440-480 VD 60 Hz
E - 500 VD 50 Hz, 575 VD 60 Hz

¹⁾ Options - Variant code 444:

Terminal box	Adapter	Cable box or flange	Max. connection cable area mm ²
1200	3GZF294730-944	3GZF294730-301	2xØ48-60
	3GZF294730-944	3GZF294730-501	2xØ60-80
	3GZF294730-945	2x 3GZF294730-301	4xØ48-60
	3GZF294730-945	2x 3GZF294730-501	4xØ60-80
	3GZF293745-1	3x 3GZF294730-301	6xØ48-60
	3GZF293745-1	3x 3GZF294730-501	6xØ60-80
	3GZF293745-2	Flange for cable glands	

Adapter and cable box for terminal box size 1200, to be defined when ordering

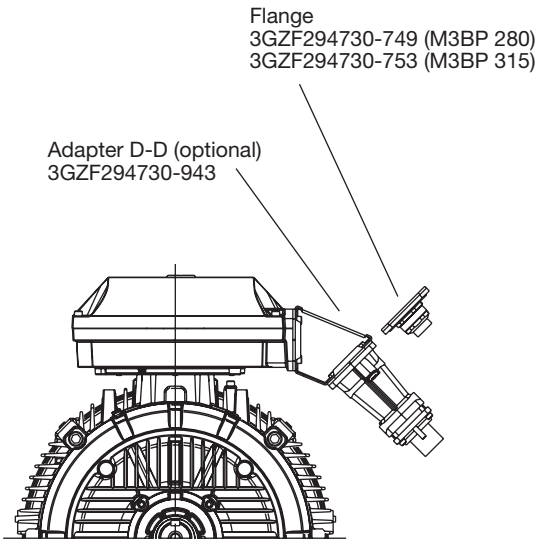
Terminal bolt sizes M12

Earthing bolt size on stator frame M10

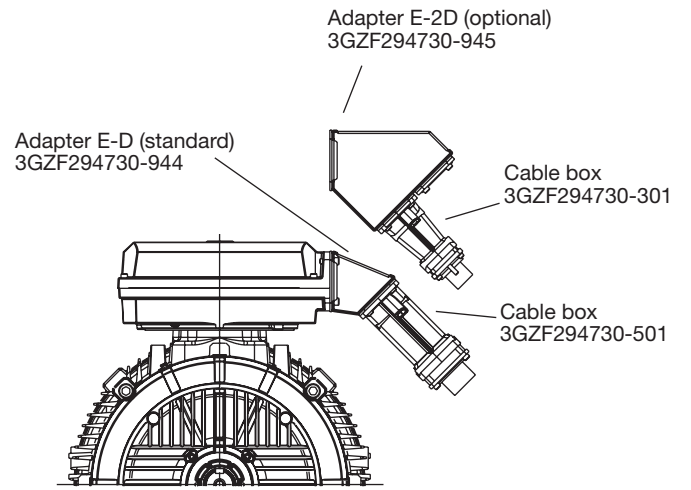
Terminal box	Cable cross-section	Max. rated current		Earthing
		D-connection	Y-connection	
370	70 mm ²	640	370	2xM10
750	2 x 70 mm ²	950	550	2xM10
750	2 x 95 mm ²	1300	750	2xM10
1200	2 x 120 mm ²	1650	950	4xM12
1200	2 x 150 mm ²	2100	1200	4xM12

Cable cross-section area between the winding and the terminal board.

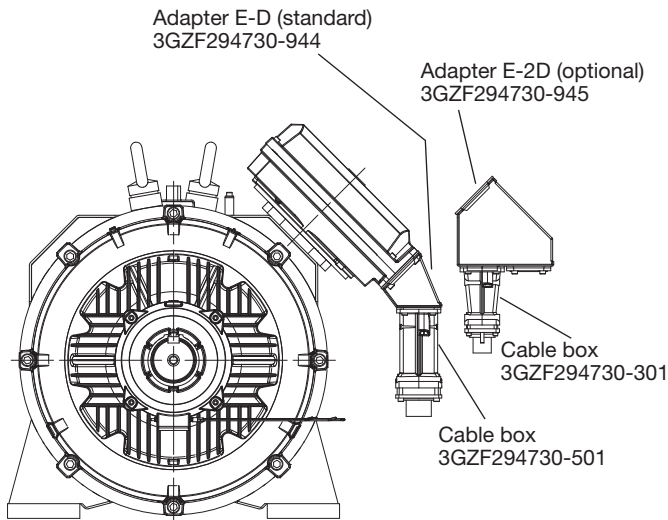
M3LP 355 with terminal box 370



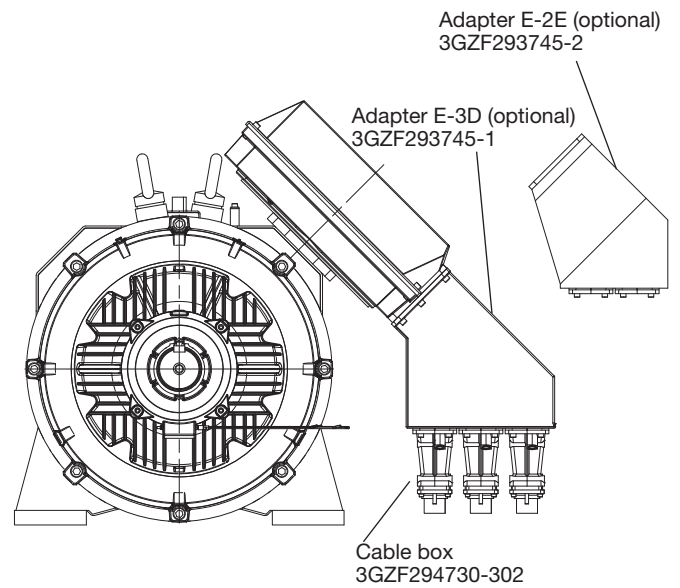
M3LP 355 with terminal box 750



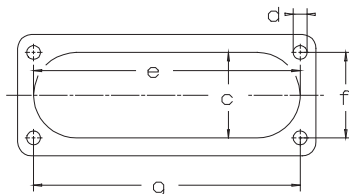
M3LP 400 - 450 with terminal box 750



M3LP 400 - 450 with terminal box 1200



Dimensions for terminal box inlets



Inlet	c	e	f	g	d
D	100	300	80	292	M10
E	115	370	100	360	M12

Bearings

The motors are normally fitted with single-row deep groove ball bearings as listed in the table below. SPM-nipples for bearing vibration monitoring are delivered as standard both at N- and D-end.

If the bearing at the D-end is replaced with a roller bearing (NU), higher radial forces can be handled. Roller bearings are suitable for belt drive applications.

Basic version with deep groove ball bearings

Motor size	Number of poles	Deep groove ball bearings	
		D-end	N-end
355	4-8	6322/C3	6316/C3
400	4-8	6324/C3	6319/C3
450	4-8	6326M/C3	6322/C3

When there are high axial forces e.g. in vertical position, angular contact ball bearings should be used, and direction of forces shall be informed. This option is available on request. When a motor with angular contact ball bearings is ordered, the method of mounting and direction and magnitude of the axial force must be specified. For special bearings, please see the variant codes.

Version with roller bearings, variant code 037

Motor size	Number of poles	Roller bearing, variant code 037
		D-end
355	4-8	NU322/C3
400	4-8	NU324/C3
450	4-8	NU326/C3

Axially-locked bearings

All motors are equipped as standard with an axially-locked bearing at the D-end.

Transport locking

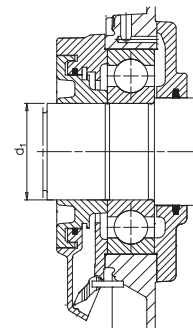
Motors that have roller bearings or angular contact ball bearing are fitted with a transport or angular contact ball bearings are lock before despatch to prevent damage to the bearings during transport. In case of transport locked bearing, motors are provided with a warning sign.

Locking may also be fitted in other cases where transport conditions are suspected of being potentially damaging.

Bearing seals

The size and type of seals for sizes 355 to 450 are in accordance with the table below:

Motor size	Number of poles	Standard design	
		D-end	N-end
355	4-8	Labyrinth seal	Labyrinth seal
400	4-8	Labyrinth seal	Labyrinth seal
450	4-8	Labyrinth seal	Labyrinth seal



Labyrinth seal

Bearing life

The nominal life L_{10} of a bearing is defined according to ISO 281 as the number of operating hours achieved or exceeded by 90% of identical bearings in a large test series under certain specified conditions. 50% of the bearings achieve at least five times this figure.

The calculated bearing life L_{10} for power transmission by means of a coupling (horizontal machine) is $\geq 200,000$ hours. Corresponding life L_{10} for vertical machine in V1 position is $\Rightarrow 40.000$ hours. Other values on request.

Lubrication

On delivery, the motors are ready lubricated with high quality grease. The recommended grease used can be seen from ABB's Low Voltage Motors Manual delivered together with the motor or from the lubrication plate fastened to the motor frame. See example of lubrication plate on page 26.

All motors are equipped with relubrication nipples. The bearing system has been built so that a valve disc can be used to ease the lubrication. Motors are lubricated while running.

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.

Frame size	Amount of grease g	1800 r/min	1500 r/min	1000 r/min	500-750 r/min
Ball bearings: lubrication intervals in duty hours					
355	120	4200	6000	10000	13000
400	130	2800	4600	8400	12000
450	140	2400	4000	8000	8800

Pulley diameter

When the desired bearing life has been determined, the minimum permissible pulley diameter can be calculated using F_R , as follows:

$$D = \frac{1.9 \cdot 10^7 \cdot K \cdot P}{n \cdot F_R}$$

Grease outlet opening has closing valves at both ends. This should be opened before greasing and closed 1-2 hours after regreasing. After lubrication close the valves. This ensures that the construction is tight and dust or dirt cannot get inside the bearing.

As an option, a grease collection method can be used.

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 and the additional manual for Low voltage water cooled motors.

Frame size	Amount of grease g	1800 r/min	1500 r/min	1000 r/min	500-750 r/min
Roller bearings: lubrication intervals in duty hours					
355	120	2000	3000	5000	6500
400	130	1400	2300	4200	6000
450	140	1200	2000	4000	4400

where:

- D = diameter of pulley, mm
- P = power requirement, kW
- n = motor speed, r/min
- K = belt tension factor, dependent on belt type and type of duty. A common value for V-belts is 2.5.
- F_R = permissible radial force

Permissible loadings on shaft

The tables give the permissible radial force in Newtons, assuming zero axial force. The values are based on normal conditions at 50 Hz and calculated bearing lives for motor sizes 355-400 of 20,000 and 40,000 hours.

Motors are foot-mounted IM B3 version with force directed sideways. In some cases the strength of the shaft affects the permissible forces.

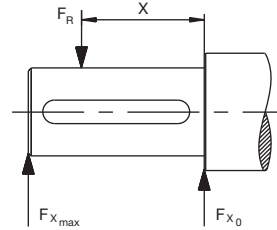
At 60 Hz the values must be reduced by 10%.

Permissible loads of simultaneous radial and axial forces will be supplied on request.

If the radial force is applied between points X_0 and X_{max} , the permissible force F_R can be calculated from the following formula:

$$F_R = F_{X_0} - \frac{X}{E} (F_{X_0} - F_{X_{max}})$$

E = length of shaft extension in basic version



Permissible radial forces

Motor size	Poles	Length of shaft extension E (mm)	Ball bearings				Roller bearings			
			20,000 hours		40,000 hours		20,000 hours		40,000 hours	
			F_{X_0} (N)	$F_{X_{max}}$ (N)	F_{X_0} (N)	$F_{X_{max}}$ (N)	F_{X_0} (N)	$F_{X_{max}}$ (N)	F_{X_0} (N)	$F_{X_{max}}$ (N)
355 ML_	4	210	15200	12900	12000	10100	45600	13600	37000	13600
	6	210	17400	13600	13700	11600	51500	13600	41800	13600
	8	210	19300	13600	15200	12900	56200	13600	45600	13600
355 LK	4	210	15300	13300	1200	10400	46200	13000	37500	13000
	6	210	17500	12800	13700	11900	52100	13000	42300	13000
	8	210	19300	13000	15200	13000	56900	13000	46100	13000
400 L_	4	210	15600	13700	12150	10700	53350	17900	43250	17900
	6	210	17750	15500	13800	12100	60200	15500	48800	15500
	8	210	19650	17000	15350	13500	65650	17000	53250	17000
450 L_	4	210	16900	15100	13000	11600	62350	22700	50550	22700
	6	210	19250	17200	14750	13150	70400	20000	57050	20000
	8	210	21400	19100	16450	14700	76750	19700	62250	19700

Permissible axial forces

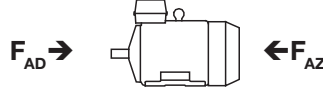
The following tables give the permissible axial forces in Newton, assuming zero radial force. The values are based on normal conditions at 50 Hz with standard bearings and calculated bearing lives of 20,000 and 40,000 hours.

At 60 Hz the values are to be reduced by 10%.

The permissible loads of simultaneous radial and axial forces will be supplied on request.

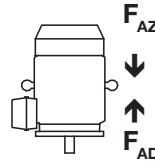
Given axial forces F_{AD} , assumes D-bearing locked by means of locking ring.

Mounting arrangement IM B3



Motor size	20,000 hours				40,000 hours							
	4-pole		6-pole		8-pole		4-pole		6-pole		8-pole	
	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)
355 ML_	8350	12200	10300	14100	12000	15800	5650	9450	7050	10800	8350	12150
355 LK_	8100	11900	9850	13650	11500	15300	5400	9200	6650	10400	7850	11650
400 L_	6950	12950	8600	14600	10250	16250	4200	10200	5350	11350	6600	12600
450 L_	7350	13350	9050	15050	10850	16850	4400	10400	5600	11600	6900	12900

Mounting arrangement IM V1



Motor size	20,000 hours				40,000 hours							
	4-pole		6-pole		8-pole		4-pole		6-pole		8-pole	
	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)	F_{AD} (N)	F_{AZ} (N)
355 ML_	14600	7900	17200	9400	18300	11600	11800	5150	13900	6100	14600	7850
355 LK_	15900	6600	19300	7300	21000	8950	13100	3800	16000	4000	17300	5250
400 L_	16700	6300	20750	6400	22450	8100	13850	3450	17400	3050	18650	4300
450 L_	21100	3850	25850	3700	27800	5400	18050	¹⁾	22200	¹⁾	23700	¹⁾

¹⁾ On request

Optimized for variable speed applications

The basic structure of the M3LP water cooled motors is as standard optimized for variable speed applications.

The basic selection rules below should be considered, please refer to product catalogue for Process performance motors for details.

Motor loadability with ACS 800 frequency converter

The curves in figure 1 are **guidelines** (not guaranteed values) for standard ACS 800 drives with DTC-control. These guidelines present the maximum continuous load torque of a motor as function of frequency (speed) to give the same temperature rise as with rated sinusoidal supply at nominal frequency and full rated load.

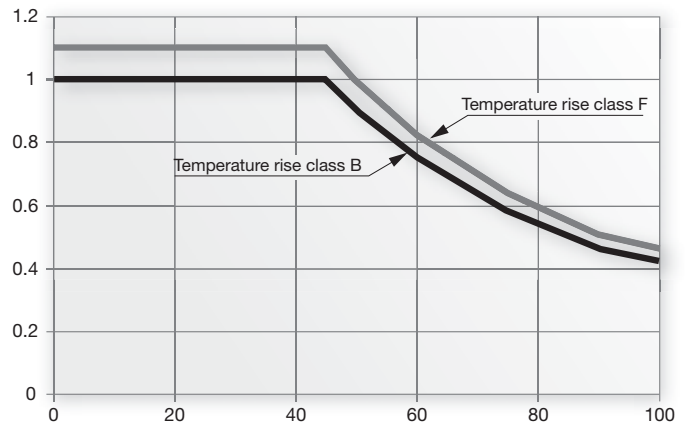


Figure 1. Motor loadability with ACS 800, field weakening point 50Hz.

Insulation protection

The increased voltage stresses of winding insulation in variable speed drive should be considered, therefore the precautions described in the table below must be taken to avoid risks of insulation damage.

Framesize	355	400, 450
$U_N \leq 500V$	Standard motor	Common mode filter
$U_N \leq 600V$	dU/dt filter (reactor) OR Reinforced insulation	dU/dt filter (reactor) and common mode filter OR Reinforced insulation and Common mode filter
$U_N \leq 690V$	Reinforced insulation And dU/dt filter (reactor)	Reinforced insulation, dU/dt filter and Common mode filter

Bearing currents

To avoid bearing currents all water cooled motors in variable speed drive should be equipped with insulated bearing at N-end.

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	M3LP 450L
Pole number	6
Mounting arrangement (IM code)	IM B3 (IM 1001)
Rated output	1050 kW
Product code	3GLP 453 530-RDG
Variant codes if needed	

Motor size

A	B	C															D, E, F, G
M3LP	450 L	3GLP 4 53530															- R 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

3GLP = Totally enclosed water cooled squirrel cage motor with steel frame

Positions 5 and 6

IEC-frame

40 = 400

45 = 450

Position 7

Speed (Pole pairs)

2 = 4 poles

3 = 6 poles

4 = 8 poles

Position 8 to 10

Serial number

Position 11

- (dash)

Position 12

Mounting arrangement

Frame size 355

A = Foot-mounted, top-mounted terminal box

B = Flange-mounted, large flange

H = Foot- and flange-mounted, terminal box top-mounted

V = Flange-mounted, special flange

F = Foot- and flange-mounted. Special flange

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.

Frame sizes 400-450

R = Foot-mounted, terminal box RHS seen from D-end. Please note that the motor with mounting code R means that the terminal box is on right hand seen from D-end. The terminal box is located at 45° angle on the motor.

L = Foot-mounted, terminal box LHS

B = Flange-mounted, large flange

S = Foot- and flange-mounted, terminal box RHS seen from D-end

T = Foot- and flange-mounted, terminal box LHS seen from D-end

V = Flange-mounted, special flange

F = Foot- and flange-mounted. Special flange

Code letters for supplementing the product code - single speed motors

Code letter for voltage and frequency

Direct start or, with Δ -connection, also Y/ Δ -start

Motor size	D	H	E	T	U	X	
	50Hz	60 Hz	50 Hz	60 Hz	50 Hz	50 Hz	
355-450	380, 400, 415 V Δ	440V Δ	500 V Δ	-	660 V Δ	690 V Δ	Other rated voltage, connection, 690 maximum.

Water cooled motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 IC 71W - Insulation class F, temperature rise class B

Output kW	Motor type	Product code	Speed r/min	Efficiency, IEC 60034-2-1: 2007		Efficiency, IEC 60034-2: 1996		Power factor cos φ 100%	Current		Torque				
				Full load 100%	3/4 load 75%	Full load 100%	3/4 load 75%		$\frac{I_N}{A}$	$\frac{I_s}{I_N}$	$\frac{T_N}{Nm}$	$\frac{T_s}{T_N}$	$\frac{T_{max}}{T_N}$		
1500 r/min = 4-poles															
400 V 50 Hz															
315	M3LP	355 MLA	3GLP 352 410-**-G	1488	96.5	96.5	96.5	96.5	0.83	570	6.5	2022	2.1	2.4	
355	M3LP	355 MLB	3GLP 352 420-**-G	1488	96.7	96.8	96.8	96.8	0.85	620	6.7	2278	2.0	2.4	
400	M3LP	355 MLC	3GLP 352 430-**-G	1488	96.8	96.8	96.7	96.7	0.85	700	6.5	2567	2.2	2.5	
450	M3LP	355 MLD	3GLP 352 440-**-G	1488	96.7	96.7	97.0	97.0	0.85	788	7.2	2888	2.4	2.5	
500	M3LP	355 MLE	3GLP 352 450-**-G	1489	96.9	96.9	96.9	96.9	0.85	876	7.5	3207	2.5	2.6	
560	M3LP	355 LKA	3GLP 352 810-**-G	1489	97.1	97.1	97.2	97.1	0.86	968	7.4	3591	2.7	2.7	
630	M3LP	355 LKB	3GLP 352 820-**-G	1488	96.9	96.9	97.2	97.2	0.85	1100	7.3	4043	2.7	2.6	
710	M3LP	400 LA	3GLP 402 510-**-G	1488	96.8	96.9	97.2	97.2	0.86	1225	6.8	4556	2.0	2.3	
780	¹⁾	M3LP	400 LB	3GLP 402 520-**-G	1490	97.0	97.0	97.2	97.2	0.87	1325	7.1	5000	2.0	2.4
850	¹⁾	M3LP	400 LC	3GLP 402 530-**-G	1490	97.1	97.1	97.2	97.2	0.86	1470	7.4	5448	2.0	2.5
1000	M3LP	450 LA	3GLP 452 510-**-G	1490	97.2	97.3	97.0	97.0	0.88	1690	6.6	6409	0.8	2.6	
1100	M3LP	450 LB	3GLP 452 520-**-G	1490	97.2	97.2	97.2	97.1	0.88	1850	6.8	7050	0.8	2.7	
1000 r/min = 6-poles															
400 V 50 Hz															
250	M3LP	355 MLA	3GLP 353 410-**-G	990	95.3	95.6	95.8	95.9	0.84	450	6.1	2411	0.9	2.3	
315	M3LP	355 MLB	3GLP 353 420-**-G	990	95.5	95.8	95.9	96.1	0.85	558	6.3	3038	0.9	2.3	
355	M3LP	355 MLC	3GLP 353 430-**-G	991	95.6	95.9	96.1	96.2	0.84	635	6.6	3421	1.0	2.5	
400	M3LP	355 MLD	3GLP 353 440-**-G	990	95.8	96.0	96.2	96.3	0.85	707	6.5	3858	1.0	2.4	
450	M3LP	355 LKA	3GLP 353 810-**-G	991	96.0	96.2	96.4	96.6	0.85	792	7.1	4336	1.1	2.6	
500	M3LP	355 LKB	3GLP 353 820-**-G	992	96.2	96.4	96.6	96.8	0.85	880	7.8	4813	1.3	2.9	
560	¹⁾	M3LP	400 LA	3GLP 403 510-**-G	992	96.2	96.3	96.6	96.7	0.84	995	6.5	5391	0.9	2.4
630	¹⁾	M3LP	400 LB	3GLP 403 520-**-G	993	96.4	96.4	96.8	96.8	0.84	1120	7.2	6058	1.1	2.7
710	¹⁾	M3LP	400 LC	3GLP 403 530-**-G	993	96.7	96.7	96.8	96.8	0.84	1260	7.7	6828	1.2	2.9
800	¹⁾	M3LP	400 LD	3GLP 403 540-**-G	993	96.5	96.5	96.9	96.9	0.82	1455	7.7	7693	1.2	2.9
850	¹⁾	M3LP	450 LA	3GLP 453 510-**-G	992	96.7	96.9	96.9	97.1	0.87	1450	6.6	8182	0.9	2.6
750 r/min = 8-poles															
400 V 50 Hz															
160	M3LP	355 MLA	3GLP 354 410-**-G	743	94.8	94.8	95.5	95.5	0.80	302	6.7	2056	1.1	2.5	
200	M3LP	355 MLB	3GLP 354 420-**-G	743	95.0	95.1	95.8	95.8	0.81	372	6.8	2570	1.1	2.5	
250	M3LP	355 MLC	3GLP 354 430-**-G	743	94.9	94.9	95.9	95.9	0.79	477	6.9	3213	1.2	2.6	
315	M3LP	355 LKA	3GLP 354 810-**-G	743	95.4	95.4	96.1	96.1	0.80	592	7.4	4048	1.3	2.7	
355	M3LP	355 LKB	3GLP 354 820-**-G	743	95.5	95.5	96.2	96.2	0.81	658	7.4	4563	1.3	2.7	
400	¹⁾	M3LP	400 LA	3GLP 404 510-**-G	742	95.8	96.0	96.3	96.5	0.83	725	6.2	5148	1.1	2.5
450	¹⁾	M3LP	400 LB	3GLP 404 520-**-G	742	95.9	96.1	96.3	96.5	0.84	804	6.5	5791	1.1	2.6
500	¹⁾	M3LP	400 LC	3GLP 404 530-**-G	743	96.0	96.2	96.5	96.6	0.83	900	7.0	6426	1.3	2.8
560	¹⁾	M3LP	450 LA	3GLP 454 510-**-G	742	95.8	96.0	96.2	96.4	0.83	1010	5.8	7207	0.9	2.3
630	¹⁾	M3LP	450 LB	3GLP 454 520-**-G	742	95.9	96.1	96.3	96.5	0.84	1125	6.0	8108	1.0	2.3

¹⁾ Temperature rise class F for 380 V 50 Hz

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

Water cooled motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 IC 71W - Insulation class F, temperature rise class B

Output kW	Motor type	Speed r/min	Efficiency, IEC 60034-2-1: 2007 Full load	Power factor $\cos \varphi$ 100%	Current I_N A	Speed r/min	Efficiency, IEC 60034-2-1: 2007 Full load	Power factor $\cos \varphi$ 100%	Current I_N A	Moment of inertia $J=1/4GD^2$ kgm ²	Weight Foot- mounted kg	
1500 r/min = 4-poles		380 V 50 Hz				415 V 50 Hz						
315	M3LP 355 MLA	1487	96.4	0.85	585	1489	96.5	0.8	568	5.3	1520	
355	M3LP 355 MLB	1487	96.6	0.87	640	1489	96.8	0.83	615	6	1620	
400	M3LP 355 MLC	1487	96.7	0.87	722	1489	96.8	0.84	685	7	1750	
450	M3LP 355 MLD	1487	96.6	0.86	820	1489	96.7	0.84	768	7.8	1900	
500	M3LP 355 MLE	1488	96.9	0.86	910	1490	96.9	0.83	865	8.4	2000	
560	M3LP 355 LKA	1488	97	0.87	1008	1490	97.1	0.84	955	10	2350	
630	M3LP 355 LKB	1488	96.8	0.87	1135	1489	96.9	0.84	1075	10.6	2450	
710	M3LP 400 LA	1487	96.7	0.86	1290	1490	96.9	0.85	1195	15	3200	
780	¹⁾ M3LP 400 LB	1488	96.9	0.88	1390	1490	97	0.86	1300	16	3300	
850	¹⁾ M3LP 400 LC	1489	97	0.87	1530	1491	97.1	0.84	1450	17	3400	
1000	M3LP 450 LA	1488	97.1	0.89	1760	1490	97.3	0.87	1645	23	3750	
1100	M3LP 450 LB	1489	97.1	0.89	1930	1491	97.2	0.87	1810	25	4050	
1500 r/min = 4-poles		380 V 50 Hz				415 V 50 Hz						
250	M3LP 355 MLA	989	95	0.85	468	991	95.4	0.83	438	8	1520	
315	M3LP 355 MLB	989	95.3	0.85	588	991	95.6	0.84	544	9.8	1680	
355	M3LP 355 MLC	990	95.4	0.85	662	992	95.7	0.83	620	10.6	1750	
400	M3LP 355 MLD	989	95.6	0.86	737	991	95.9	0.84	688	12.2	1900	
450	M3LP 355 LKA	990	95.9	0.86	827	992	96.1	0.84	772	14	2200	
500	M3LP 355 LKB	991	96.1	0.86	915	993	96.3	0.84	858	16.5	2450	
560	¹⁾ M3LP 400 LA	991	96	0.85	1035	993	96.2	0.82	982	17	2900	
630	¹⁾ M3LP 400 LB	992	96.3	0.85	1165	993	96.4	0.82	1105	20.5	3150	
710	¹⁾ M3LP 400 LC	992	96.6	0.86	1295	994	96.7	0.82	1245	22	3300	
800	¹⁾ M3LP 400 LD	992	96.4	0.84	1490	994	96.5	0.8	1435	24	3400	
850	¹⁾ M3LP 450 LA	991	96.6	0.88	1515	992	96.8	0.86	1410	31	3850	
1500 r/min = 4-poles		380 V 50 Hz				415 V 50 Hz						
160	M3LP 355 MLA	742	94.7	0.82	310	744	94.9	0.78	298	8	1520	
200	M3LP 355 MLB	742	94.9	0.83	382	744	95.1	0.79	368	9.8	1680	
250	M3LP 355 MLC	742	94.8	0.81	490	744	94.9	0.77	472	10.6	1750	
315	M3LP 355 LKA	743	95.3	0.82	608	744	95.4	0.78	585	15	2270	
355	M3LP 355 LKB	743	95.4	0.82	685	744	95.5	0.78	658	16.5	2450	
400	¹⁾ M3LP 400 LA	741	95.6	0.85	745	742	95.9	0.82	705	17	2900	
450	¹⁾ M3LP 400 LB	741	95.8	0.85	835	743	96	0.82	790	21	3200	
500	¹⁾ M3LP 400 LC	742	95.9	0.85	928	743	96.1	0.81	890	24	3400	
560	¹⁾ M3LP 450 LA	741	95.6	0.85	1040	743	95.9	0.82	990	26	3450	
630	¹⁾ M3LP 450 LB	741	95.7	0.85	1170	743	96	0.82	1105	29	3700	

¹⁾ Temperature rise class F for 380 V 50 Hz

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

Water cooled motors - Variant codes

Code ¹⁾	Variant	M3LP		
		355	400	450
Balancing				
417	Vibration acc. to Grade B (IEC 60034-14).	P	P	P
423	Balanced without key.	P	NA	NA
424	Full key balancing.	P	P	P
Bearings and Lubrication				
036	Transport lock for bearings.	P	P	P
037	Roller bearing at D-end.	P	P	P
040	Heat resistant grease.	P	P	P
041	Bearings regreasable via grease nipples.	S	S	S
042	Locked drive-end.	S	S	S
043	SPM nipples.	S	S	S
058	Angular contact bearing at D-end, shaft force away from bearing.	P	P	P
059	Angular contact bearing at N-end, shaft force towards bearing.	P	P	P
060	Angular contact bearing at D-end, shaft force towards bearing.	P	P	P
061	Angular contact bearing at N-end, shaft force away from bearing.	P	P	P
107	Pt100 2-wire in bearings.	P	P	P
130	Pt100 3-wire in bearings.	P	P	P
420	Bearing mounted PTC thermistors.	P	P	P
433	Outlet grease collector	P	P	P
796	Grease nipples JIS B 1575 PT 1/8 Type A	P	P	P
797	Stainless steel SPM Nipples	P	P	P
798	Stainless steel grease nipples	P	P	P
Brakes				
412	Built-on brake.	NA	R	R
Branch standard designs				
178	Stainless steel / acid proof bolts.	P	P	P
204	Jacking bolts for foot mounted motors.	S	S	S
209	Non-standard voltage or frequency, (special winding).	P	P	P
396	Motor designed for ambient temperature -20°C to -40°C, with space heaters (code 450/451 must be added).	R	R	R
397	Motor designed for ambient temperature -40°C to -55°C, with space heaters (code 450/451 must be added).	R	R	R
398	Motor designed for ambient temperature -20°C to -40°C.	R	R	R
399	Motor designed for ambient temperature -40°C to -55°C.	R	R	R
425	Corrosion protected stator and rotor core.	P	P	P
Cooling system				
075	Cooling method IC418 (without fan).	NA	R	R
Coupling				
035	Assembly of customer supplied coupling-half.	P	P	P

¹⁾ Certain variant codes cannot be used simultaneously.

P = New manufacture only

R = On request

S = Included as standard

Note ! Leakage guard + relay acc. to customer specification on request

Code ¹⁾	Variant	M3LP		
		355	400	450
Documentation				
141	Binding dimension drawing.	P	P	P
Drain holes				
065	Plugged existing drain holes.	P	P	P
448	Draining holes with metal plugs.	P	P	P
Earthing Bolt				
067	External earthing bolt.	S	S	S
Heating elements				
450	Heating element, 100-120V.	P	P	P
451	Heating element, 200-240V.	P	P	P
Insulation system				
014	Winding insulation class H.	P	P	P
405	Special winding insulation for frequency converter supply.	P	P	P
406	Winding for supply >690<=1000 Volts.	P	P	P
Mounting arrangements				
009	IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3).	P	P	P
066	Modified for non-standard mounting position. Specify IM xxxx. Use for all mounting arrangements excluding IM B3 (1001) and IM B5 (3001).	P	P	P
305	Additional lifting lugs.	S	R	R
Painting				
109	Paint thickness = 120 µm.	P	P	P
110	Paint thickness = 160 µm.	P	P	P
111	Offshore two-pack polyamide cured epoxy paint 160 µm.	P	P	P
114	Special paint colour, standard grade.	P	P	P
115	Offshore zink primer painting.	P	P	P
179	Special paint specification.	R	R	R
Protection				
005	Metal protective roof, vertical motor, shaft down.	R	R	R
211	Weather protected, IP xx W	R	R	R
403	Degree of protection IP56.	P	P	P
793	Labyrinth sealing at D-end.	S	S	S
Rating & instruction plates				
002	Restamping voltage, frequency and output, continuous duty.	P	P	P
004	Additional text on std rating plate (max 12 digits on free text line).	P	P	P
095	Restamping output (maintained voltage, frequency), intermittent duty.	P	P	P
135	Mounting of additional identification plate, stainless.	P	P	P
139	Additional identification plate delivered loose.	P	P	P
160	Additional rating plate affixed.	P	P	P
161	Additional rating plate delivered loose.	P	P	P
163	Frequency converter rating plate. Rating data according to quotation.	P	P	P

¹⁾ Certain variant codes cannot be used simultaneously.

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S = Included as standard

Note ! Leakage guard + relay acc. to customer specification on request

Code ¹⁾	Variant	M3LP		
		355	400	450

Shaft & rotor

069	Two shaft extensions as per basic catalogue.	P	P	P
070	One or two special shaft extensions, standard shaft material.	P	P	P
155	Cylindrical shaft extension, D-end, without key-way.	R	R	R
156	Cylindrical shaft extension, N-end, without key-way.	R	R	R
164	Shaft extension with closed key-way.	R	R	R
410	Stainless steel shaft (standard or non-standard design).	P	P	P

Standards and Regulations

421	VIK design (Verband der Industriellen Energie- und Kraftwirtschaft e.V.).	R	R	R
774	Design according to NORSOK (Norwegian Territorial Waters)excluding surface treatment.	P	P	P
775	Design according to SHELL DEP 33.66.05.31-Gen. January 1999 design.	NA	NA	R
778	GOST Export/Import Certificate (Russia).	R	R	R
779	SASO Export/Import Certificate (Saudi Arabia)	R	R	R

Stator winding temperature sensors

120	KTY 84-130 (1 per phase) in stator winding.	P	P	P
121	Bimetal detectors, break type (NCC), (3 in series), 130°C, in stator winding.	P	P	P
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	P	P	P
123	Bimetal detectors, break type (NCC), (3 in series), 170°C, in stator winding.	P	P	P
124	Bimetal detectors, break type (NCC), (3 in series), 140°C, in stator winding.	R	R	R
125	Bimetal detectors, break type (NCC), (2x3 in series), 150°C, in stator winding.	P	P	P
127	Bimetal detectors, break type (NCC), (3 in series, 130°C & 3 in series, 150°C), in stator winding.	P	P	P
435	PTC - thermistors (3 in series), 130°C, in stator winding.	P	P	P
436	PTC - thermistors (3 in series), 150°C, in stator winding.	S	S	S
437	PTC - thermistors (3 in series), 170°C, in stator winding.	P	P	P
439	PTC - thermistors (2x3 in series), 150°C, in stator winding.	P	P	P
441	PTC - thermistors (3 in series, 130°C & 3 in series, 150°C), in stator winding.	P	P	P
442	PTC - thermistors (3 in series, 150°C & 3 in series, 170°C), in stator winding.	P	P	P
445	Pt-100 2-wire in stator winding, 1 per phase	P	P	P
446	Pt-100 2-wire in stator winding, 2 per phase	P	P	P
502	Pt-100 3-wire in stator winding, 1 per phase.	P	P	P
503	Pt-100 3-wire in stator winding, 2 per phase.	P	P	P

Terminal box

019	Larger than standard terminal box.	P	R	NA
021	Terminal box LHS (seen from D-end).	NA	P	P
022	Cable entry LHS (seen from D-end).	P	NA	NA
157	Terminal box degree of protection IP65.	S	R	R
180	Terminal box RHS (seen from D-end).	NA	P	P
187	Cable glands of non-standard design.	R	R	R
231	Standard cable glands with clamping device.	P	P	P
380	Separate terminal box for temperature detectors, std. material	P	P	P
400	4 x 90 degr turnable terminal box.	S	P	P

¹⁾ Certain variant codes cannot be used simultaneously.

P = New manufacture only

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S = Included as standard

Note ! Leakage guard + relay acc. to customer specification on request

Code ¹⁾	Variant	M3LP		
		355	400	450
418	Separate terminal box for auxiliaries, standard material.	P	P	P
444	Adapter and cable box for terminal box size 1200.	-	NA	S
466	Terminal box at N-end.	P	P	P
468	Cable entry from D-end.	P	P	NA
469	Cable entry from N-end.	P	P	NA
567	Separate terminal box material: Cast Iron	P	P	P
568	Separate terminal box for heating elements, std. material	P	P	P
569	Separate terminal box for brakes	P	P	P
729	Cable flanges without holes/ Blank gland plates.	P	P	P
743	Painted flange for cable glands.	P	P	P
744	Stainless steel flange for cable glands	P	P	P
745	Painted steel flange equipped with brass cable glands	P	P	P
746	Stainless steel cable flange equipped with standard brass cable glands	P	P	P

Testing

146	Type test with report for motor from specific delivery batch.	P	P	P
147	Type test with report for motor from specific delivery batch, customer witnessed.	P	P	P
148	Routine test report.	P	P	P
149	Test according to separate test specification.	R	R	R
221	Type test and multi-point load test with report for motor from specific delivery batch.	R	R	R
222	Torque/speed curve, type test and multi-point load test with report for motor from specific delivery batch.	R	R	R
760	Vibration level test	P	P	P
761	Vibration spectrum test.	P	P	P
762	Noise level test.	P	P	P
763	Noise spectrum test.	P	P	P
764	Test with ABB frequency converter available at ABB test field. ABB standard test procedure.	P	P	P

Variable speed drives

062	Tachogenerator.	P	P	P
182	Pulse sensor mounted as specified.	P	P	P
470	Prepared for hollow shaft pulse tacho (L&L equivalent).	P	P	P
471	512 pulse tacho (L&L 861).	NA	R	R
472	1024 pulse tacho (L&L 861).	P	P	P
473	2048 pulse tacho (L&L 861).	P	P	P
479	Mounting of other type of pulse tacho with shaft extension, tacho not included.	P	P	P
701	Insulated bearing at N-end.	P	P	P
704	EMC cable gland.	P	P	P

¹⁾ Certain variant codes cannot be used simultaneously.

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R = On request

S = Included as standard

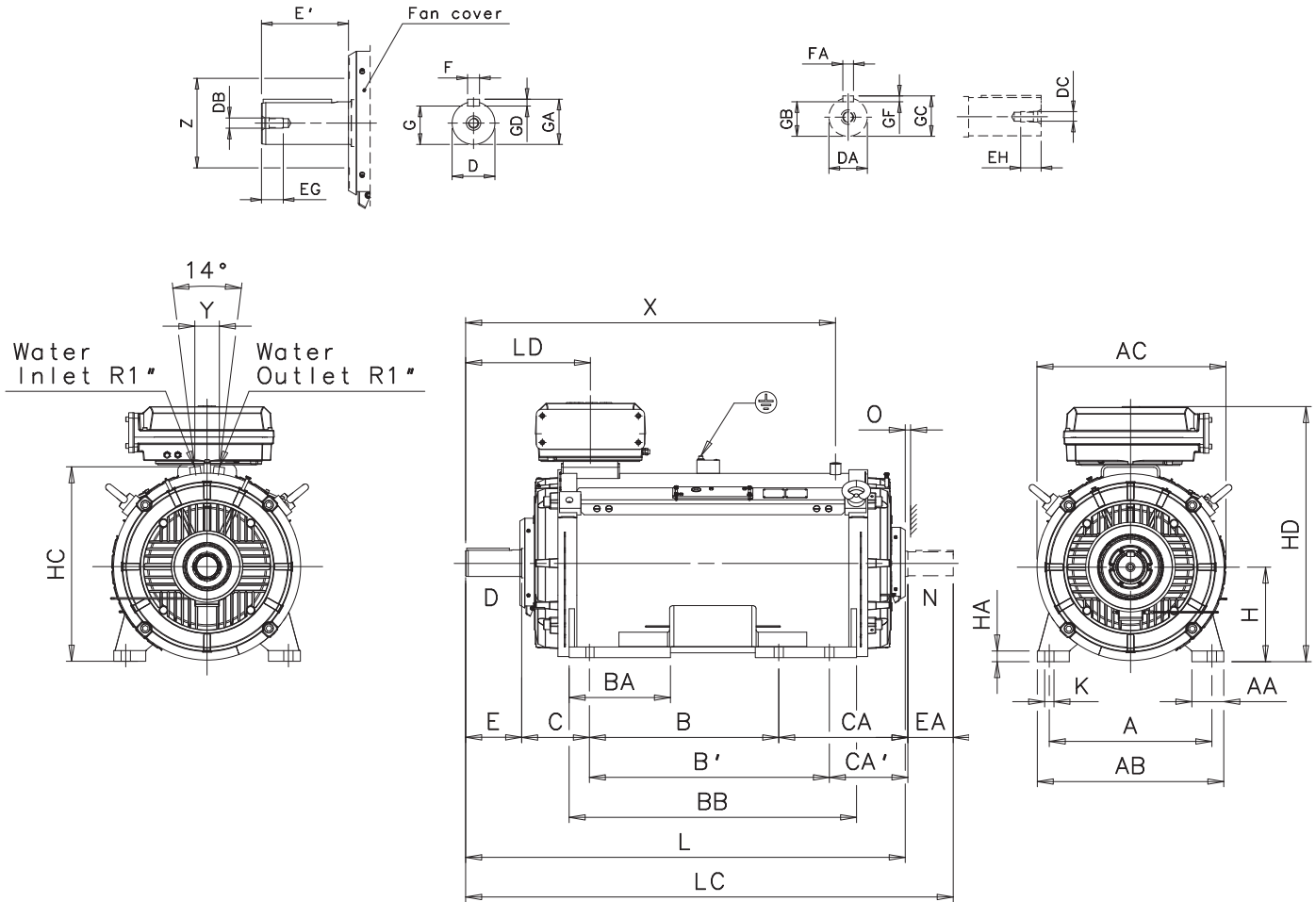
Note ! Leakage guard + relay acc. to customer specification on request

Water cooled motors

M3LP 355

Dimension drawings

Foot-mounted; IM B3 (IM 1001), IM B6 (IM 1051), IM B7 (IM 1061), IM B8 (IM 1071), IM V5 (IM 1011), IM V6 (IM 1031)



Motor size	Poles	A	AA	AB	AC	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	E'	EA	EG	EH
355 ML	4-8	610	120	700	702	560	630	265	848	254	406	336	100	90	M24	M24	210	204	170	51	51
355 LK	4-8	610	120	700	702	710	900	380	1078	254	486	296	100	90	M24	M24	210	204	170	51	51

Motor size	Poles	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD ¹⁾	HD ²⁾	K	L	LC	LD	O	X	Y	Z
355 ML	4-8	28	25	90	106	81	95	16	14	355	40	729	944	958	35	1418	1600	468	10	1157	92	210
355 LK	4-8	28	25	90	106	81	95	16	14	355	40	729	944	958	35	1648	1830	468	10	1387	92	210

Tolerances:

A, B ± 0,8
D, DA ISO m6
F, FA ISO h9

H 0, -1.0
N ISO js6
C ± 0,8

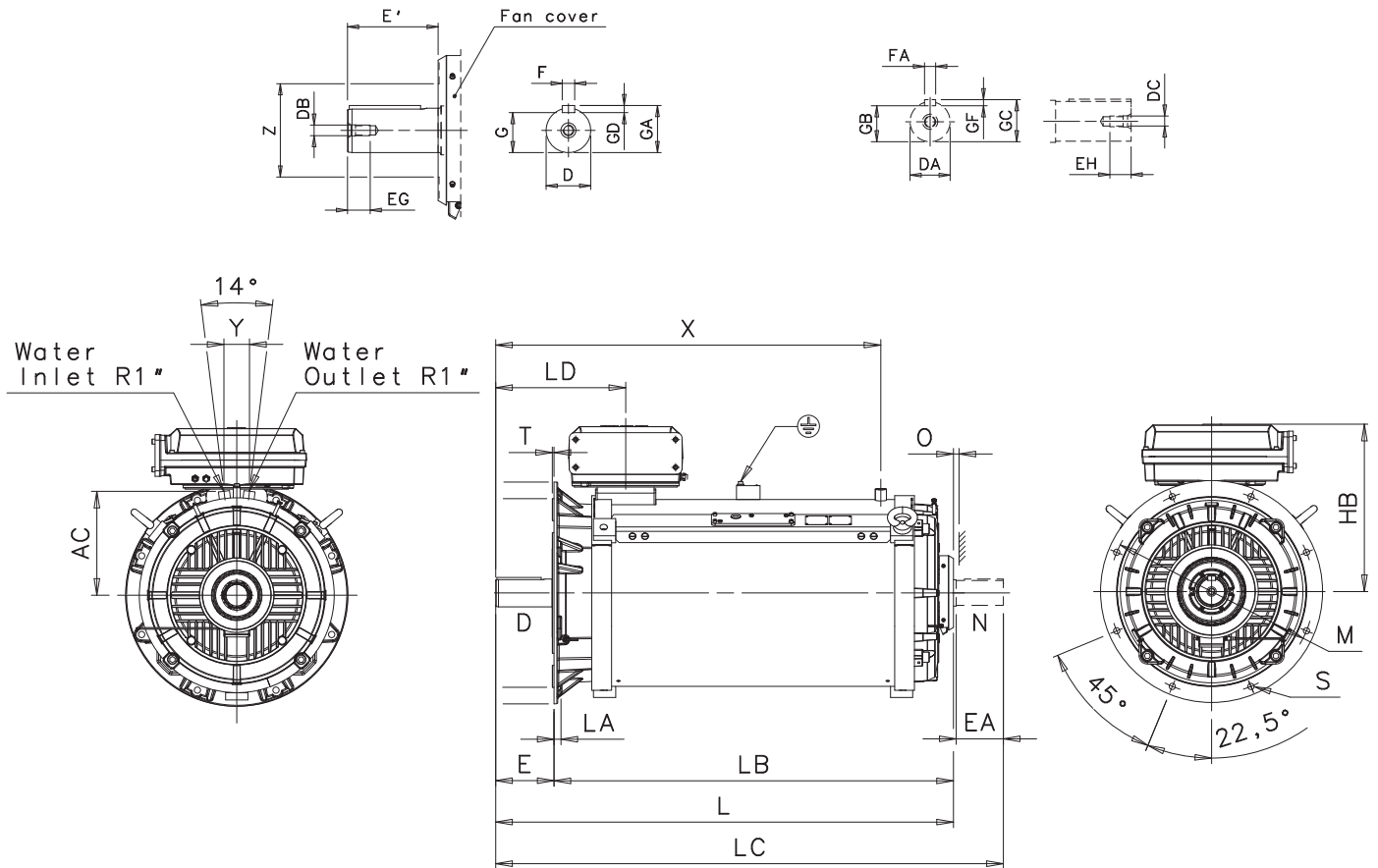
¹⁾ Terminal box 750
²⁾ Terminal box 1200

Water cooled motors

M3LP 355

Dimension drawings

Flange-mounted; IM B5 (IM 3001), V1 (IM 3011), V3 (IM 3031)



Motor size	Poles	AC	D	DA	DB	DC	E	E'	EA	EG	EH	F	FA	G	GA	GB	GC	GD	GF
355 ML	4-8	374	100	90	M24	M24	210	204	170	51	51	28	25	90	106	81	95	16	14
355 LK	4-8	374	100	90	M24	M24	210	204	170	51	51	28	25	90	106	81	95	16	14

Motor size	Poles	HB ¹⁾	HB ²⁾	L	LA	LB	LC	LD	M	N	O	P	S	T	X	Y	Z
355 ML	4-8	589	603	1418	25	1208	1600	468	740	680	10	800	23	6	1157	92	210
355 LK	4-8	589	603	1648	25	1438	1830	468	740	680	10	800	23	6	1387	92	210

Tolerances:

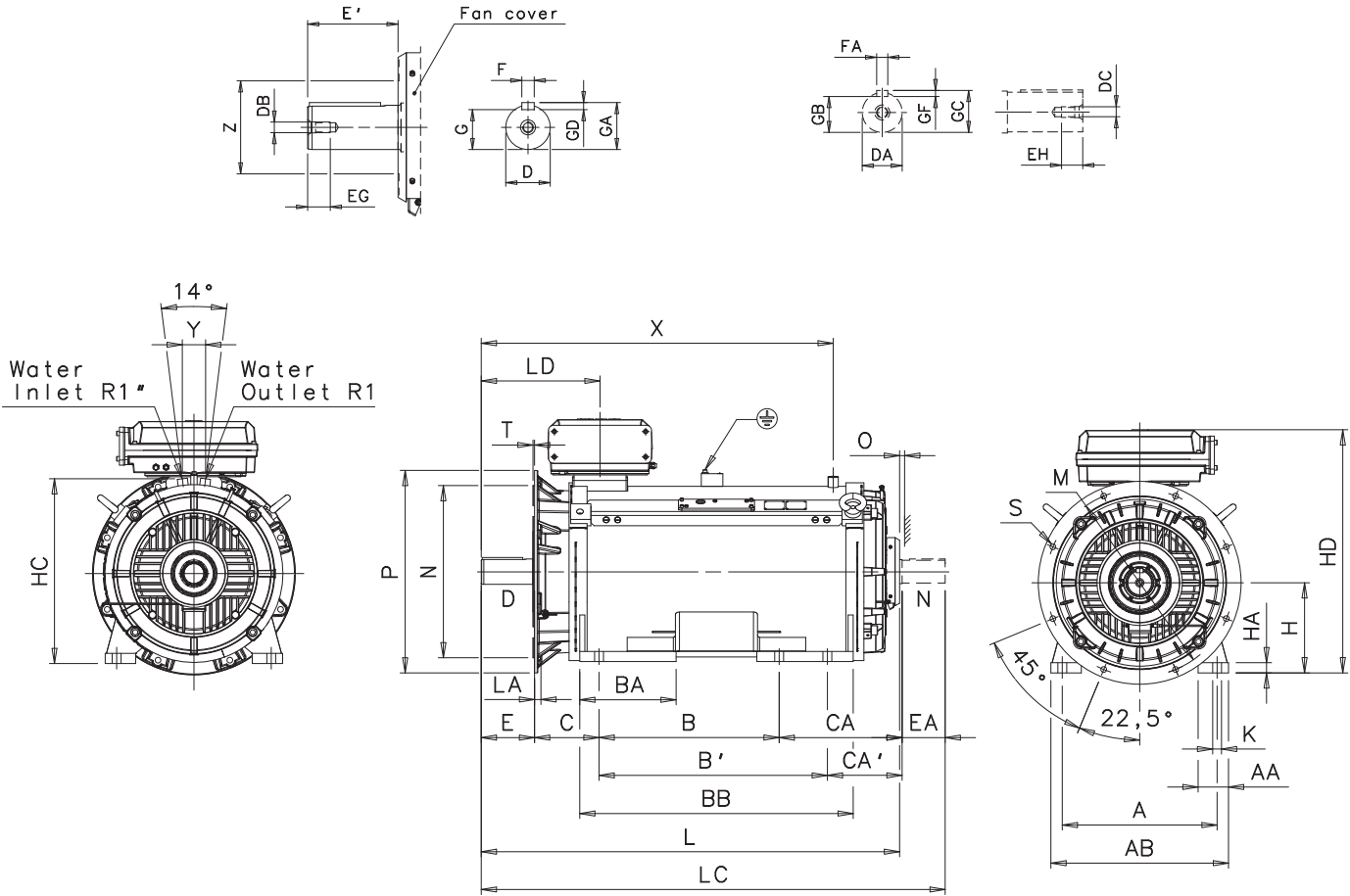
A, B	± 0,8	H	0, -1.0	¹⁾ Terminal box 370
D, DA	ISO m6	N	ISO js6	²⁾ Terminal box 750
F, FA	ISO h9	C	± 0,8	

Water cooled motors

Dimension drawings

M3LP 355

Foot- and flange-mounted; IM B35 (IM 2001), IM V15 (IM 2011), IM V36 (IM 2031)



Motor size	Poles	A	AA	AB	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	E'	EA	EG	EH	F	FA	G	GA
355 ML	4-8	610	120	700	560	630	265	848	254	406	336	100	90	M24	M24	210	204	170	51	51	28	25	90	106
355 LK	4-8	610	120	700	710	900	380	1078	254	486	296	100	90	M24	M24	210	204	170	51	51	28	25	90	106

Motor size	Poles	GB	GC	GD	GF	H	HA	HC	HD ¹⁾	HD ²⁾	K	L	LA	LC	LD	M	N	O	P	S	T	X	Y	Z
355 ML	4-8	81	95	16	14	355	40	729	944	958	35	1418	25	1600	468	740	680	10	800	23	6	1157	92	210
355 LK	4-8	81	95	16	14	355	40	729	944	958	35	1648	25	1830	468	740	680	10	800	23	6	1387	92	210

Tolerances:

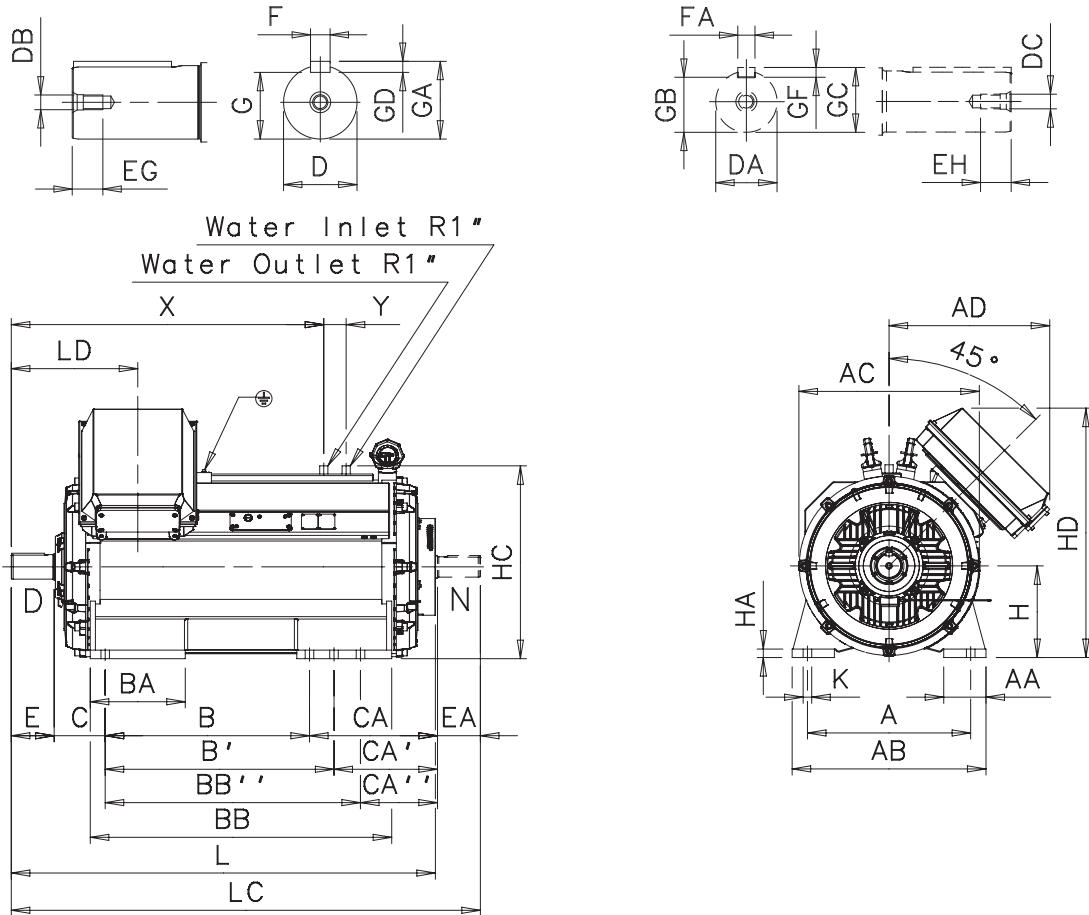
A, B	± 0,8	H	0, -1.0	¹⁾ Terminal box 370
D, DA	ISO m6	N	ISO js6	²⁾ Terminal box 750
F, FA	ISO h9	C	± 0,8	

Water cooled motors

Dimension drawings

M3LP 400 - 450

Foot-mounted; IM B3 (IM 1001), IM B6 (IM 1051), IM B7 (IM 1061), IM B8 (IM 1071),
IM V5 (IM 1011), IM V6 (IM 1031) – terminal box angle mounted



Motor size	Poles ¹⁾	A	AA	AB	AC	AD ¹⁾	AD ²⁾	B	B'	B''	BA	BB	C	CA	CA'	CA''	D	DA	DB	DC	E	EA	EG	EH
400 L	4-8	710	183	840	790	679	752	900	1000	-	400	1292	224	541	441	-	110	90	M24	M24	210	170	50	50
450 L	4-8	800	207	950	884	714	788	1000	1120	1250	465	1476	250	627	507	377	120	100	M24	M24	210	210	50	50

Motor size	Poles ¹⁾	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD ¹⁾	HD ²⁾	K	L	LC	LD	X	Y
400 L	4-8	28	25	100	116	81	95	16	14	400	40	851	1036	1138	35	1865	2045	616	1345	110
450 L	4-8	32	28	109	127	100	116	18	16	450	42	946	1122	1224	42	2077	2297	620	1530	110

Tolerances:

A, B	± 0,8	H	0, -1.0
D, DA	ISO m6	N	ISO js6
F, FA	ISO h9	C	± 0,8

- 1) Terminal box 750
- 2) Terminal box 1200

Above table gives the main dimensions in mm.

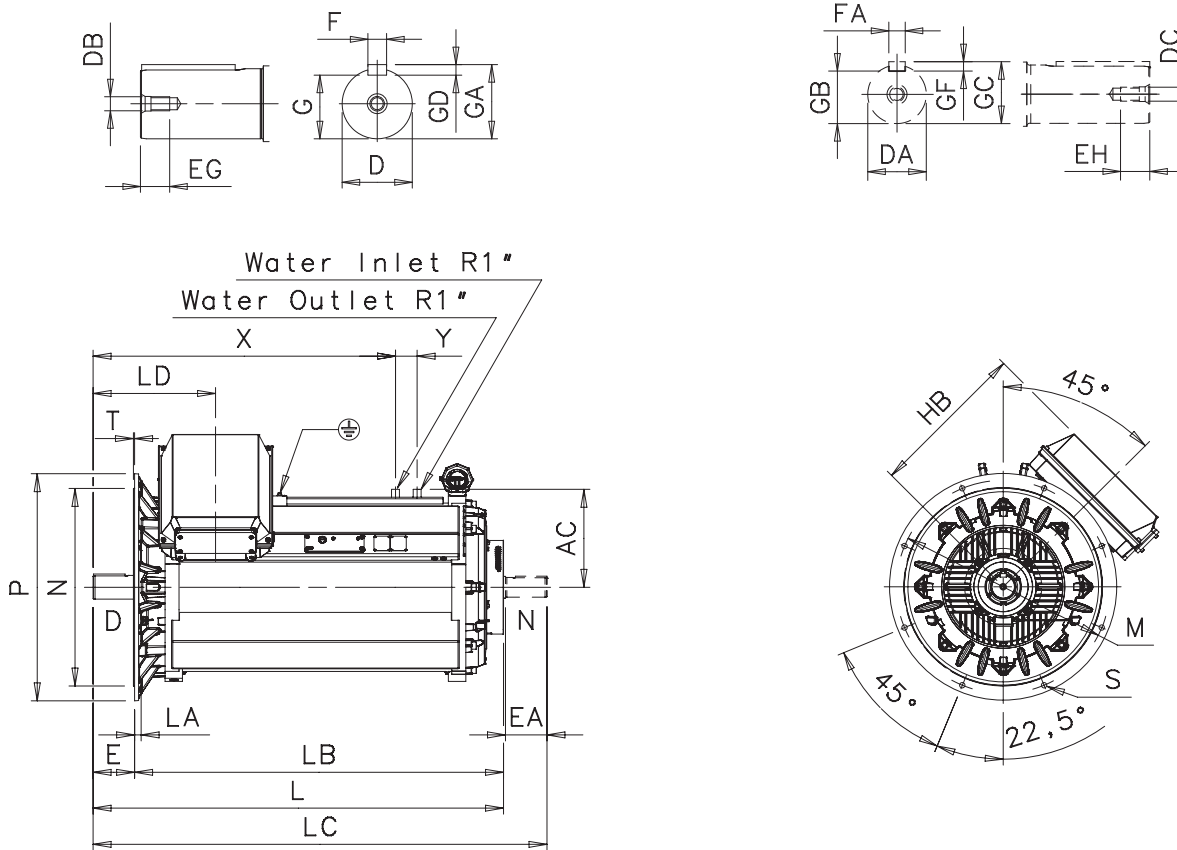
For detailed drawings please see our web site
www.abb.com/motors&generators or contact us.

Water cooled motors

Dimension drawings

M3LP 400 - 450

Flange-mounted; V1 (IM 3011), V3 (IM 3031)
terminal box angle mounted



Motor size	Poles ¹⁾	AC	D	DA	DB	DC	E	EA	EG	EH	F	FA	G	GA	GB	GC	GD	GF
400 L	4-8	451	110	90	M24	M24	210	170	50	50	28	25	100	116	81	95	16	14
450 L	4-8	496	120	100	M24	M24	210	210	50	50	32	28	109	127	100	116	18	16

Motor size	Poles ¹⁾	HB ¹⁾	HB ²⁾	L	LA	LB	LC	LD	M	N	P	S	T	X	Y
400 L	4-8	690	752	1865	26	1655	2045	616	940	880	1000	28	6	1345	110
450 L	4-8	740	802	2077	33	1867	2297	620	1080	1000	1150	28	6	1530	110

Tolerances:

D, DA ISO m6 N ISO js6
F, FA ISO h9

¹⁾ Terminal box 750
²⁾ Terminal box 1200

Above table gives the main dimensions in mm.

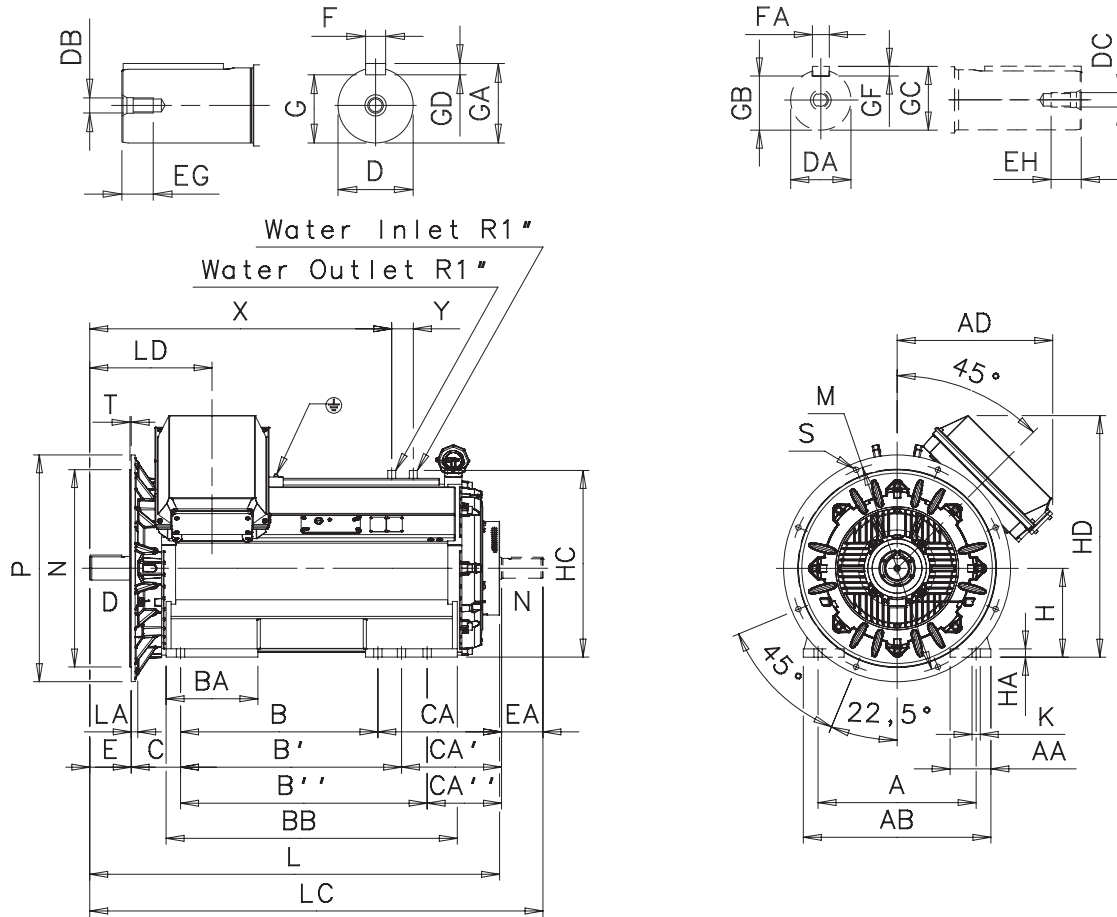
For detailed drawings please see our web site
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Water cooled motors

Dimension drawings

M3LP 400 - 450

Foot- and flange-mounted; IM B35 (IM 2001), IM V15 (IM 2011), IM V36 (IM 2031) – terminal box angle mounted



Motor size	Poles ¹⁾	A	AA	AB	AD ₁₎	AD ₂₎	B	B'	B''	BA	BB	C	CA	CA'	CA''	D	DA	DB	DC	E	EA	EG	EH	F
400 L	4-8	710	183	840	679	752	900	1000	-	400	1292	224	541	441	-	110	90	M24	M24	210	170	50	50	28
450 L	4-8	800	207	950	714	788	1000	1120	1250	320	1476	250	622	502	372	120	100	M24	M24	210	210	50	50	32

Motor size	Poles ¹⁾	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD ¹⁾	HD ²⁾	K	L	LA	LC	LD	M	N	P	S	T	X	Y
400 L	4-8	25	100	116	81	95	16	14	400	40	851	1036	1138	35	1865	26	2045	616	940	880	1000	28	6	1345	110
450 L	4-8	28	109	127	100	116	18	16	450	42	946	1122	1224	42	2077	33	2297	620	1080	1000	1150	28	6	1530	110

Tolerances:

A, B	± 0,8	H	0, -1.0
D, DA	ISO m6	N	ISO js6
F, FA	ISO h9	C	± 0,8

¹⁾ Terminal box 750

²⁾ Terminal box 1200


Above table gives the main dimensions in mm.

For detailed drawings please see our web site www.abb.com/motors&generators or contact us.


Rating plate

The rating plate is in table form giving values current and power factor for six voltages.


Rating plate

ABB Oy, Motors Vaasa, Finland						
3~ Motor M3LP 450 LC 4 B3						
S1				No. 0616-010812345		
				Ins.cl. F		IP 55
V	Hz	kW	r/min	Δ	cos ϕ	Duty
690 Y	50	1200	1491	1170	0,88	
400 D	50	1200	1491	2020	0,88	
660 Y	50	1200	1490	1215	0,89	
380 D	50	1200	1490	2110	0,89	
415 D	50	1200	1492	1970	0,87	
440 D	60	1350	1790	2045	0,89	
Prod. code 3GLP452530-RDG						
						Nmax 2000 r/min
						4400 kg
 IEC 60034-1						

Lubrication plate

					
Regreasing intervals in duty hours					
Bearings D-end 6326, N-end 6322					
Amount of grease D-end 140 g, N-end 120g					
Mounting Horizontal/ Vertical	Ambient temp.	1800 r/min	1500 r/min	1000 r/min	500-900 r/min
Hor	25°C	2400	4000	8000	8800
Hor	40°C	1200	2000	4000	4400
Vert	25°C	1200	2000	4000	4400
Vert	40°C	600	1000	2000	2200
Do not exceed the motor max. speed					
The following or similar high performance grease can be used:					
Esso	Unirex N2, N3 or S2	Mobil	Mobilith SHC 100		
Shell	Albida EMS2	Klüber	Klüberplex BEM 41-132		
SKF		FAG	Arcanol TEMP110		
See the "Low Voltage Motors Manual"					

Instruction plate for cooling water

	
WATER INLET CLOSER ND-END	
WATER OUTLET CLOSER D-END	
INLET WATER: +30... +40 C, 40L/MIN	
Water pressure min 2 bar	
Water pressure max 5 bar	

Water cooled motors in brief, basic design

Motor size		355	400	450
Stator	Material	Steel plate		
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G		
	Paint thickness	Zinc rich primer and two-pack epoxy paint, thickness $\geq 350 \mu\text{m}$		
Bearing end shields	Material	Cast iron EN-GJL200/GG20/GRS 200, EN-GLJ-250 /GG25/GRS 250, EN-GJS-400/GG40/GRP 400		
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G		
	Paint thickness	Two-pack epoxy paint, thickness $\geq 80 \mu\text{m}$		
Bearings	D-end 4-8 pole	6322/C3	6324/C3	6326M/C3
	N-end 4-8 pole	6316/C3	6319/C3	6322/C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end		
Bearing seals		Labyrinth seal		
Lubrication		Regreasable bearings, regreasing nipples, M10x1		
Measuring nipples		As standard		
Rating plate	Material	Stainless steel, EN 10088, thickness 0.5 mm		
Terminal box	Frame material	Cast iron EN-GJL-250/GG 25/GRS 250		
	Cover material	Cast iron EN-GJL-250/GG 25/GRS 250	Steel	
	Cover screws material	Steel 8.8, zinc electroplated		
Connections	Cable-entries 4 pole 6-8 pole	*)2x \varnothing 60/80 *)2x \varnothing 80	*)2x \varnothing 80 *)2x \varnothing 60/80	*)2x \varnothing 60/80
	Terminals	6 terminals for connection with cable lugs (not included)		
	Cable glands	Cable glands included as standard		
Stator winding	Material	Copper		
	Insulation	Insulation class F		
	Winding protection	3 PTC thermistors as standard, 155°C		
Rotor winding	Material	Pressure die-cast aluminum		
Balancing method		Half key balancing as standard		
Key way		Open key way		
Heating elements	On request	2x65 W	2x65 W	2x100 W
Drain holes		Standard, open on delivery		
Enclosure		IP 55, higher protection on request		
Cooling method		IC71W		

*) For detailed information of connections, please see page 6.

ABB Motors' total product offer

ABB offers several comprehensive ranges of AC motors and generators. We manufacture synchronous motors for even the most demanding applications, and a full range of low and high voltage induction motors. Our in-depth knowledge of virtually every type of industrial processing ensures we always specify the best solution for your needs.



Low voltage motors and generators

General purpose motors for standard applications

- Aluminum motors
- Steel motors
- Cast iron motors
- Open drip proof motors
- Global motors
- Brake motors
- Single phase motors

Process performance motors for more demanding applications

- Aluminum motors
- Cast iron motors
- Motors for high ambient temperatures

NEMA motors

Motors for hazardous areas

- Flameproof motors
- Increased safety motors
- Non-sparking motors
- Dust ignition proof motors

Marine motors

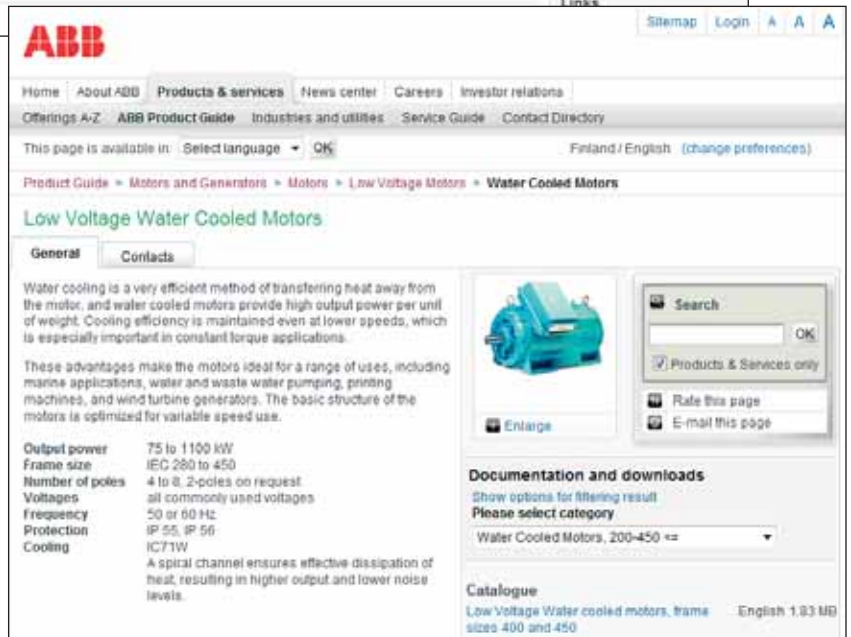
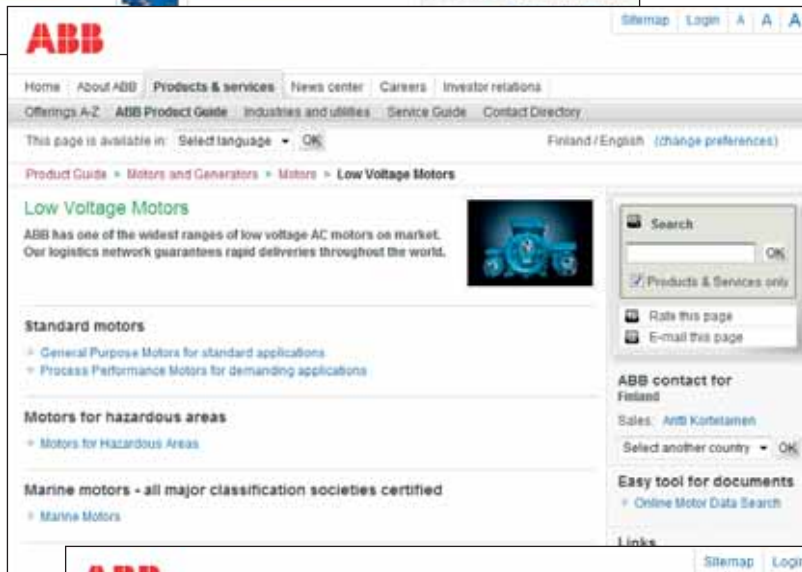
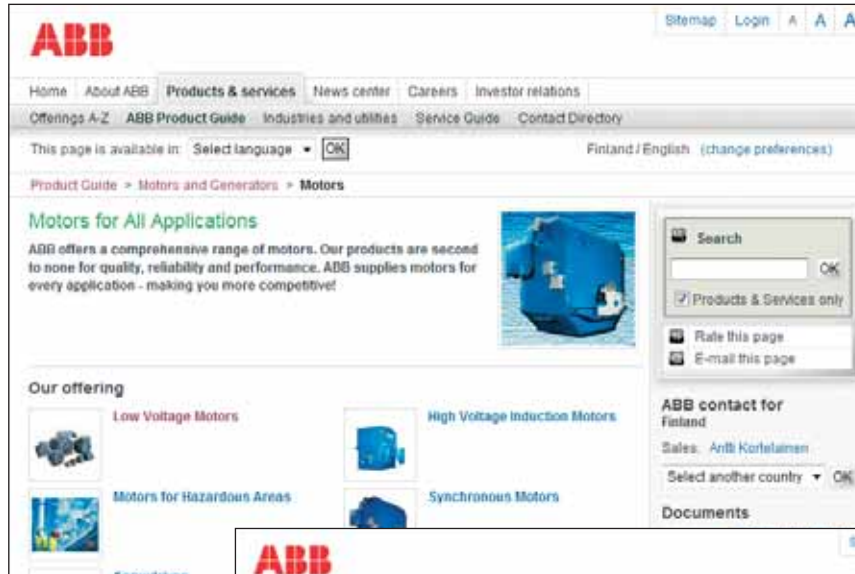
- Aluminum motors
- Steel motors
- Cast iron motors
- Open drip proof motors

Other applications

- Permanent magnet motors
- High speed motors
- Wind turbine generators
- Smoke venting motors
- Water cooled motors
- Motors for roller table drives

High voltage and synchronous motors and generators

- High voltage cast iron motors
- Induction modular motors
- Slip ring motors
- Motors for hazardous areas
- Servomotors
- Synchronous motors and generators
- DC motors and generators



- Motors & Generators**
- > **Motors**
- >> **Low Voltage Motors**
 - General purpose motors
 - Process performance motors
 - Motors for hazardous areas
 - Marine motors
 - Other applications
 - NEMA motors
 - Permanent magnet motors
 - Smoke venting motors
- >>> **Water cooled motors**
 - Fan application motors
 - Roller table motors
- > **Generators**

Low Voltage Motors

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