INDUSTRY PROCESS
AND AUTOMATION SOLUTIONS

BONFIGLIOLI
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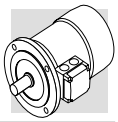
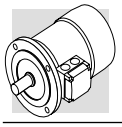


Revisions

Refer to page 14 for the catalogue revision index. Visit www.bonfiglioli.com to search for catalogues with up-to-date revisions.



1.0 - GENERAL INFORMATION

1.1 - PRODUCT DESIGNATION

BS 56A 4 230-50 SC IP55 CLF B5 ...

OPTIONS
D1 - thermal protection
PS - extended shaft at NDE
RC - rain canopy
AE - balanced winding

TYPE OF CONSTRUCTION
B5, B14, B5R, B14R

INSULATION CLASS
CLF, CLH

DEGREE OF PROTECTION
IP55, IP56

CAPACITOR
SC - run capacitor
DC - starting + run capacitor

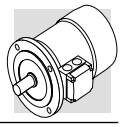
VOLTAGE-FREQUENCY
230-50
230-60
115-60

NUMBER OF POLES
4

FRAME SIZE
56A, 63A, 71A, 80A, 90S
56B, 63B, 71B, 80B, 90L

SERIES
BS

REMARK:
Values marked in **bold** represent the factory standard setting. If not otherwise specified at the time of order, for each variant the configuration marked in bold will be assumed.



1.2 - STANDARDS

1.2.1 - Technical norms

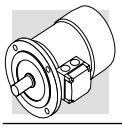
Single-phase motors described in this catalog are of the enclosed type, fan ventilated and with run capacitor permanently connected.
Motors are designed for use in industrial environments and are manufactured in accordance with applicable CEI /EN and IEC standards as listed in the following table:

General requirements for rotating electrical machines	**CEI EN 60034-1**	**IEC 60034-1**
Dimensions and output ratings for rotating electrical machines	**EN 50347**	**IEC 60072**
Classification of degree of protection provided by enclosures for rotating machines	**CEI EN 60034-5**	**IEC 60034-5**
Methods of cooling for electrical machines	**CEI EN 60034-6**	**IEC 60034-6**
Classification of type of construction and mounting arrangements	**CEI EN 60034-7**	**IEC 60034-7**
Terminal markings and direction of rotation of rotating machines	**CEI 2-8**	**IEC 60034-8**
Noise limits	**CEI EN 60034-9**	**IEC 60034-9**
Rated voltage for low voltage mains power	**CEI 8-6**	**IEC 60038**

1.2.2 - European directives CEE 73/23 (LVD) and CEE 89/336 (EMC)

Bonfiglioli single-phase motors meet the requirements of Directives 73/23/EEC (Low Voltage Directive) and 89/336/EEC (Electromagnetic Compatibility Directive) and their nameplates bear the CE mark. As for the EMC Directive, construction is in accordance with standards CEI EN 60034-1 Sect. 12, EN 61000-6, EN 61000-6-2.
Motors also meet the requirements of standard CEI EN 60204-1 “Electrical equipment of machines”.

The responsibility for final product safety and compliance with applicable directives rests with the manufacturer or the assembler who incorporate the motors as component parts.



1.3 - TOLERANCES

1.3.1 - Electrical tolerances

The following tolerances are permitted according to CEI EN 60034-1:

Efficiency	$-0.15 \times (1-\eta)$ $P \leq 50$ kW
Power factor	$-\frac{1-\cos\varphi}{6}$ [min 0.02 max 0.07]
Slip	± 20% (*)
Locked-rotor current	+ 20%
Locked-rotor torque	- 15% …+ 25%
Breakdown torque	- 10%

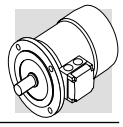
(*) ± 30% for motors with Pn < 1kW

1.3.2 - Mechanical tolerances

Dimensions and tolerances of shaft end, key and flange are in accordance with EN 50347, IEC 60072-1, CEI-UNEL 13501.
Shaft ends feature a threaded hole in accordance with UNI 3221, DIN 332. The shaft key is fitted in the key-way and supplied along with each motor.

The following table lists the tolerances for the different parts:

Part	Drawing letter	Tolerance
Shaft end	D - DA	j6
Key	F - FA	h9
Flange	N	j6



2.0 - ELECTRICAL FEATURES

2.1 - OPERATING CONDITIONS

2.1.1 - Voltage

In their standard configuration motors are designed for 230V-50Hz supply.
Upon request, motors can also be specified for 115V-60Hz or 230V-60Hz supply.

2.1.2 - Type of duty

Motor outputs listed in this catalogue refer to S1 continuous duty.

For motors operated at duties other than S1, as per Norms CEI EN 60034-1, please refer to Bonfiglioli's Technical Service for advise.

Single-phase motors have greater losses when they run idle than in full load operation.
Running idle for a long period is therefore NOT recommended.

2.1.3 - Ambient temperature

Catalog ratings are relevant to 50 Hz operation, under installation conditions as specified by standards CEI EN 60034-1 (temperature between -15 °C and + 40 °C and altitude above sea level $\leq$ 1000 m).

2.1.4 - Cooling

Motors are cooled by external ventilation systems (IC 411 in accordance with CEI EN 60034-6) and are equipped with a plastic radial fan suitable for both directions of rotation.

Installation must take into account a minimum clearance of the fan cowl from the nearest wall so as to ensure unobstructed air circulation. This will also facilitate routine maintenance operations.

2.2 - Capacitors

Configuration with run capacitor

SC

Single-phase motors featuring the run capacitor only feature starting torque considerably lower than rated torque (M_S = 30 - 70 % M_N) and are therefore only suitable for applications calling for low starting torque requirements.

Configuration with start and run capacitor

DC

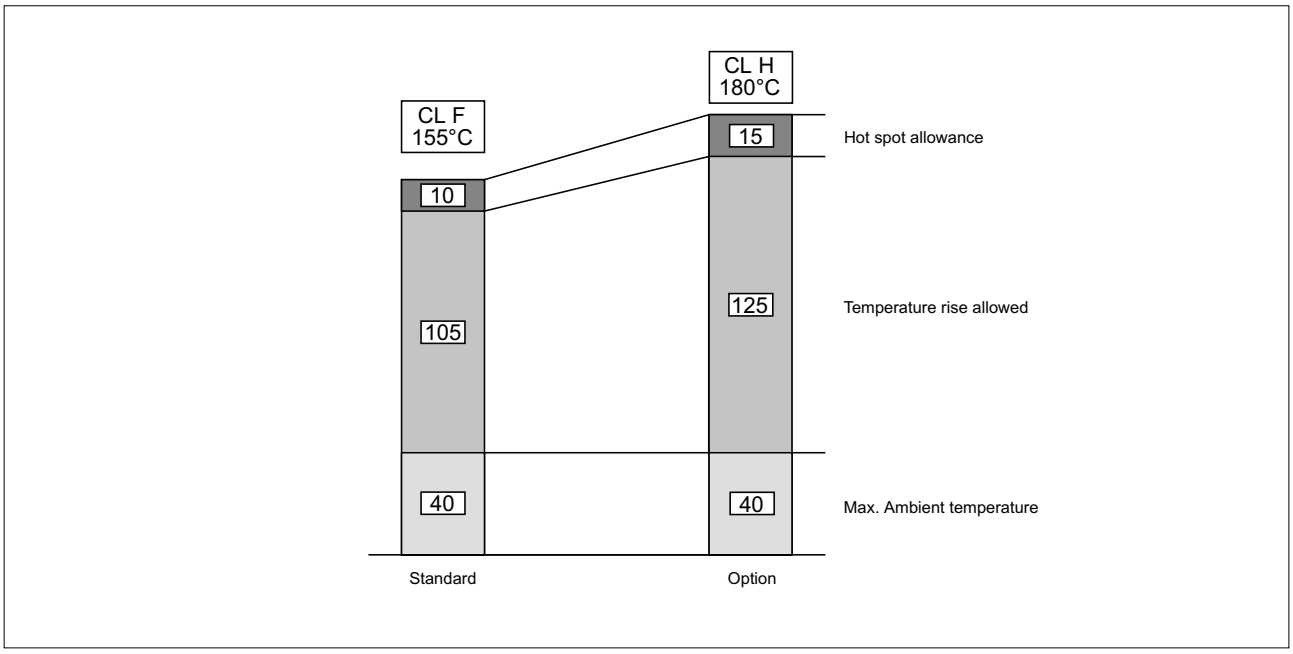
For applications calling for higher starting torques, motors can be supplied with starting and run capacitors attached. In this case a starting torque M_S = 140 - 170% M_N will be allowed.
The starting capacitor is automatically cut off by the starter relay after approximately 1.5 seconds.

For letting the starting capacitor discharging allow for a minimum 6 seconds rest time before reconnecting the motor.

2.3 - INSULATION CLASS

Bonfiglioli motors use, as standard, class **F** insulating materials (enamelled wire, insulators, impregnation resins). For applications in the presence of aggressive chemicals or high humidity, contact Bonfiglioli Technical Service for assistance with product selection.

On request, motors to insulation class **H** can be specified.



2.4 - THERMAL PROTECTION

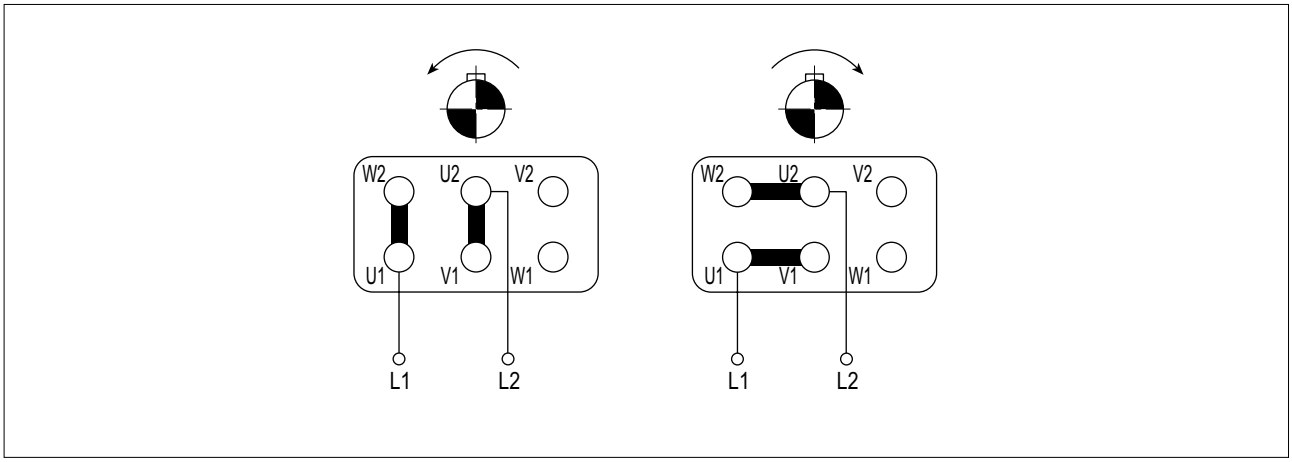
Motors may be supplied with a built-in **thermal protector** preventing the stator windings from overheating due to poor ventilation or highly intermittent duty.
Thermal protectors consist of a bimetal disc that, when the rated temperature (150 °C) is reached, disconnects the contacts.
As the temperature decreases below the set value, the contacts are reconnected automatically.

Specify option **D1** in the ordering code

2.5 - REVERSING

Motors are supplied with run capacitor permanently connected and can be operated in both directions of rotation. Motors can be reversed by switching the wiring, as shown in the diagram below, through a remote control switch.

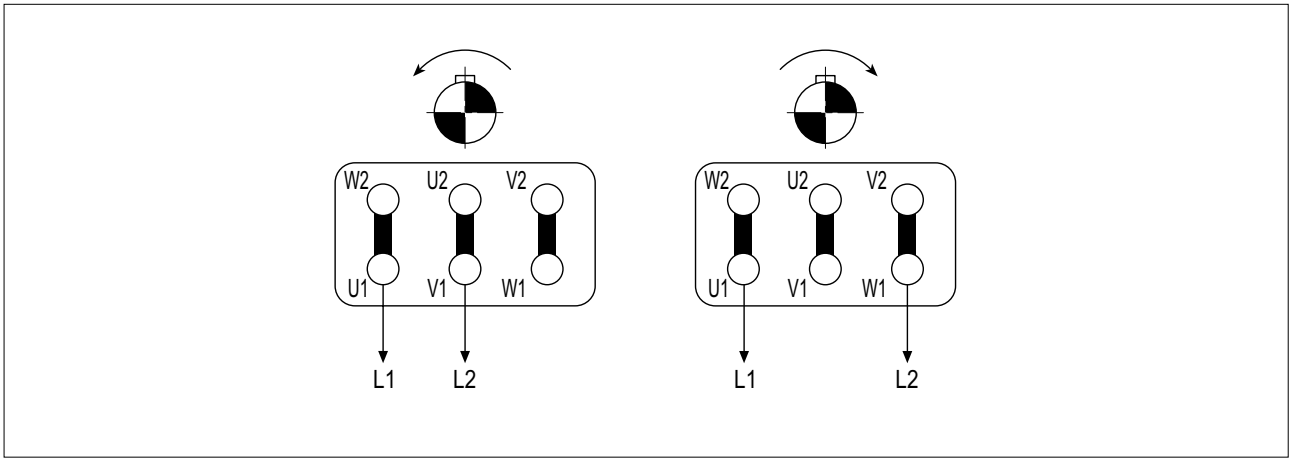
In the diagram below shaft are viewed from the drive end.



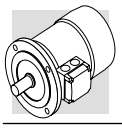
Prior to reversing, make sure the motor is at standstill.

AE

For a facilitated reversing through a simple switch, single-phase motors can be designed with symmetrical windings and run capacitor permanently connected.
For this arrangement specify option **AE** in the ordering code.
This particular design is lower rated as compare to the standard arrangement and advise should be seeked with Bonfiglioli's Technical Service.



Prior to reversing, make sure the motor is at standstill.



3.0 - MECHANICAL DESIGN

3.1 - BEARINGS

Grease-packed, axially locked ball bearings ensure maintenance free operation.
Nominal endurance lifetime L_{10h} exceeds 40,000 hours assuming no overhung load on the shaft, and mounting position horizontal. The types of bearings in use are listed in the table below.

	DE	NDE
BS 56	6201 2Z C3	6201 2Z C3
BS 63	6201 2Z C3	6201 2Z C3
BS 71	6202 2Z C3	6202 2Z C3
BS 80	6204 2Z C3	6204 2Z C3
BS 90	6205 2Z C3	6205 2Z C3

3.2 - TERMINAL BOX

The main terminal box houses 6 terminals for cable lugs connection and the ground terminal for earth connection.
On wiring the motor, refer to the schemes that are either located in the terminal box or in the operating instructions.

3.3 - CABLE ENTRIES

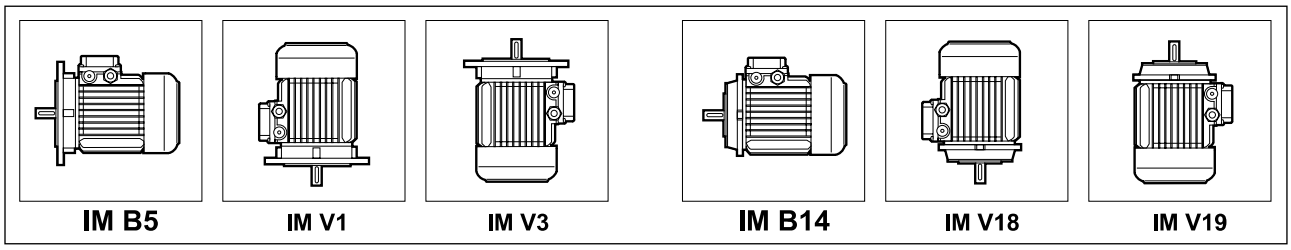
Terminal boxes feature entries for metric-thread cable glands (not supplied) in accordance with standard CEI EN 50262. Dimensions and locations are as listed in the following table.

	cable entries and dimensions		cable ∅ max. [mm]
BS 56 ... BS 63	2 x M20 x 1.5	on opposite sides	13
BS 71 ... BS 90	2 x M25 x 1.5		17

3.4 - MOTOR MOUNTING

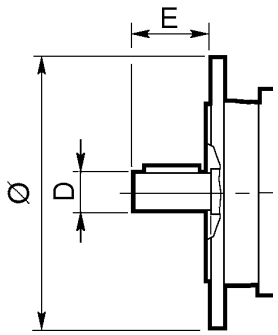
Motors are available in the type of construction IM B5, IM B14 and derived versions in accordance with standard CEI EN 60034-7, as shown in the table below.

Motors may also be specified for vertical mounting, however the name plate will only show the corresponding basic design version:



If motor is to be installed with the shaft end pointing down, the rain canopy is recommended and should be specified through the option **RC**.

Flanged motors can also be requested with reduced shaft and flange dimensions, specifying the design versions **B5R** or **B14R**.
Relevant dimensions are listed in the table below:



	BS 71	BS 80	BS 90
	D x E - ∅		
B5R (1)	11 x 23 - ∅ 140	14 x 30 - ∅ 160	19 x 40 - ∅ 200
B14R (2)	11 x 23 - ∅ 90	14 x 30 - ∅ 105	19 x 40 - ∅ 120

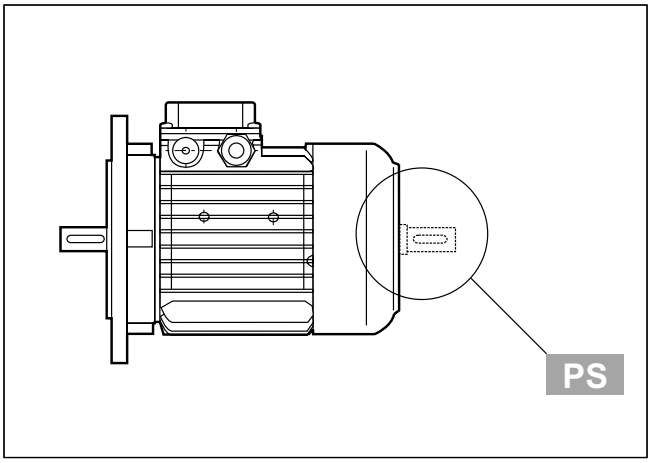
(1) flange con through holes
(2) flange with threaded holes

3.5 - DEGREE OF PROTECTION

Standard motors are IP 55 protected. A higher degree of protection, IP56, is available on request.
Regardless to the degree of protection, motors for outdoors installation require extra protection against direct sunlight and in addition, when they are to be installed vertically down, a canopy protecting the motor from the ingress of water and solid bodies (option **RC**) must be specified.

3.6 - SECOND SHAFT EXTENSION AT NON-DRIVE END

Specify option **PS** in the ordering code

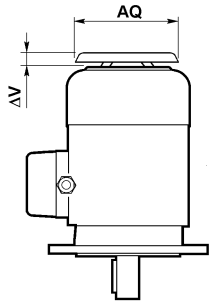


The option PS is not compatible with the rain canopy RC preventing the ingress of water and solid bodies.
Refer to dimensional drawing for relevant shaft dimensions

3.7 - RAIN CANOPY

Option **RC**

The rain canopy is an optional device that protects the motor from the ingress of solid bodies and dripping water. It is highly recommended when motor is to be installed with the shaft end pointing down.
Relevant dimensions are listed in the following table.
The canopy is not compatible with the second shaft extension, option PS.

	**AQ**	**∆V**	
BS 63	118	24	
BS 71	134	27	
BS 80	134	25	
BS 90	168	30	

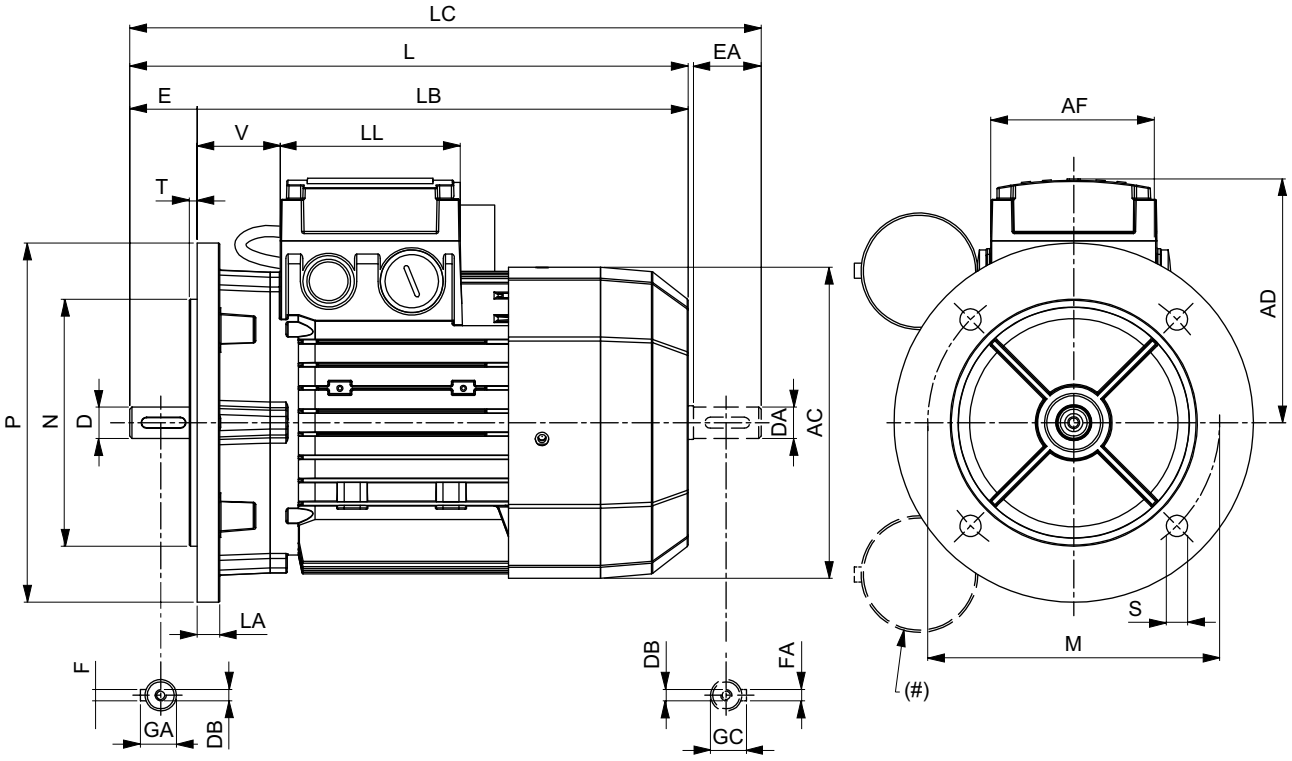
4.0 - RATING CHART

Pn		n	Mn	η	cos φ	I_n (230 V)	M_{max}/M_n	$J_m x 10^{-4}$		SC			DC			
kW		min^{-1}	Nm	%		A		kgm^2	Kg	I_s/I_n	M_s/M_n	C_{run} µF	I_s/I_n	M_s/M_n	C_{run} µF	C_{start} µF
0.06	**BS 56A 4** **BS 44B 4**	1400	0.41	47	0.91	0.61	2	1.6	3.3	2.6	0.9	5	3.0	2.1	5	6.3
0.09	**BS 56B 4** **BS 27C 4** **BS 44C 4**	1350	0.64	51	0.98	0.78	1.6	1.6	3.3	2.0	0.7	6.3	2.3	1.9	6.3	10
0.12	**BS 63A 4**	1340	0.86	48	0.95	1.14	1.9	2.8	4.5	2.1	1.3	8	2.6	2.4	8	6.3
0.18	**BS 63B 4**	1280	1.34	49	0.87	1.84	1.6	3.4	5.1	1.8	0.9	8	2.6	2.0	8	10
0.25	**BS 71A 4**	1330	1.80	54	0.96	2.10	1.9	8.6	7	2.4	1.1	12.5	3.0	2.3	12.5	12.5
0.37	**BS 71B 4**	1310	2.7	56	0.96	2.99	1.7	9.6	7.6	2.2	1.0	16	2.8	2.1	16	16
0.55	**BS 80A 4**	1380	3.8	68	0.92	3.82	1.6	20	9.9	3.0	0.6	16	3.5	1.8	16	25
0.75	**BS 80B 4**	1360	5.3	67	0.95	5.12	1.6	25	11	2.9	0.6	25	3.5	1.7	25	30
1.1	**BS 90S 4**	1300	8.1	64	0.96	7.8	1.5	26	12.6	2.3	0.7	35	2.8	1.8	35	45
1.5	**BS 90L 4**	1300	11.0	64	0.95	10.7	1.5	31	15.1	2.5	0.5	40	3.0	1.6	40	45

Simb.	u.m.	Descrizione
C_{run}	µF	Capacity of run capacitor
C_{start}	µF	Capacity of starting capacitor
cos φ	–	Power factor
η	–	Efficiency
I_n	[A]	Rated current
I_s	[A]	Starting current
J_m	[kgm^2]	Motor moment of inertia

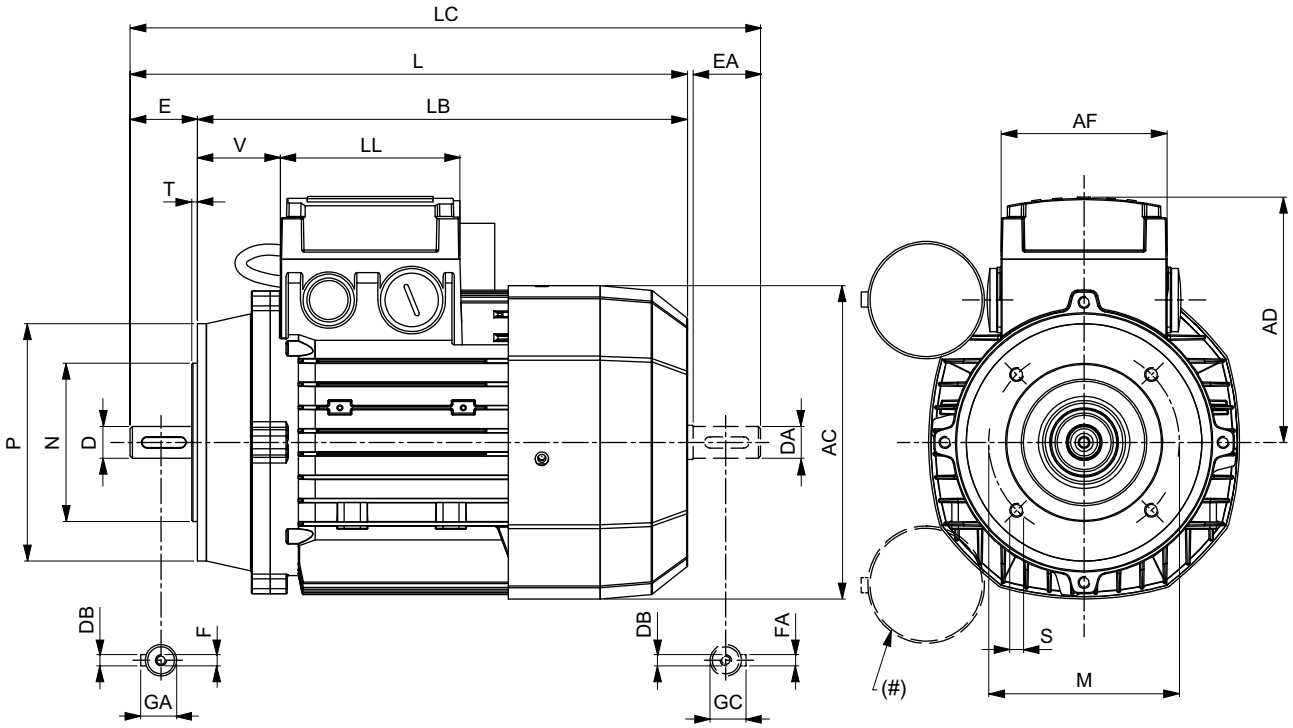
Simb.	u.m.	Descrizione
M_k	[Nm]	Breakdown torque
M_n	[Nm]	Rated torque
M_s	[Nm]	Starting torque
n	[min^{-1}]	Rated speed
Pn	[kW]	Rated power
ta	[°C]	Ambient temperature

5.0 - DIMENSION DRAWINGS



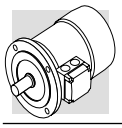
	SHAFT					FLANGE						MOTOR							
	D DA	**E EA**	**DB**	**GA GC**	**F FA**	**M**	**N**	**P**	**S**	**T**	**LA**	**AC**	**L**	**LB**	**LC**	**AD**	**AF**	**LL**	**V**
BS 56	9	20	M3	10.2	3	100	80	120	7	3	8	110	185	165	207	91	74	80	34
BS 63	11	23	M4	12.5	4	115	95	140	9.5		10	121	207	184	232	95			26
BS 71	14	30	M5	16	5	130	110	160		3.5	10	138	249	219	281	108			37
BS 80	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	274	234	315	119			38
BS 90S	24	50	M8	27	8							176	326	276	378	133	98	98	44
BS 90L																			

(#) Starting capacitor - option DC.



	SHAFT					FLANGE					MOTOR							
	D DA	**E EA**	**DB**	**GA GC**	**F FA**	**M**	**N**	**P**	**S**	**T**	**AC**	**L**	**LB**	**LC**	**AD**	**AF**	**LL**	**V**
BS 56	9	20	M3	10.2	3	65	50	80	M5	2.5	110	185	165	207	91	74	80	34
BS 63	11	23	M4	12.5	4	75	60	90			121	207	184	232	95			26
BS 71	14	30	M5	16	5	85	70	105	M6		138	249	219	281	108			37
BS 80	19	40	M6	21.5	6	100	80	120		3	156	274	234	315	119			38
BS 90S	24	50	M8	27	8	115	95	140	M8		176	326	276	378	133	98	98	44
BS 90L																		

(#) Starting capacitor - option DC.



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