ELECTRIC MOTORS
TYPE DP, MDC, MM

Owner’s manual

Technical caracteristics

The motors described in this catalogue are built according to international standard regulations; each size throughout the construction forms is calculated with reference to the tables of standard IEC 72-1; the shafts have also been designed according to the stated requirements and have dimensions and tolerances as specified in the standards.

The shapes built per IEC 34-7 are B3, B5, B 14.

Upon specified request special shafts may be provided; upon request flanges or shields may also be custom-built per specifications.

Motors series M. MM and DP have standard sizes. Asynchronous three phase motors have standard power values; the power delivered for each size at 3000-1500-1000-750 r.p.m. has been established by the documents UNEL/EC, defining the values.

Asynchronous three-phase motors are closed, externally ventilated, with cage rotor and dynamically balanced.

Rated voltage 230V1400 V, frequency 50 Hz, insulation class F, protection IP 55.

Three-phase multiple voltage asynchronous motors have a rated voltage of 230V/400V/50 Hz with an allowed voltage range of ± 10%.

All motors in the catalogue will be updated in compliance with the standard IEC 38 and CE/ 8-6 on standardized voltages.

CE *MARK*

COMMUNITY DIRECTIVE 89/392/EEC

VOLTAGE DIRECTIVE 73/23/EEC

Based on provisions by the Community Machine Directive, the electric motor is a component which, as a source of mainly electrical hazards, must be subjected to the Low Voltage Directive 73/23/EEC.

The reference standard for safety purposes is the EN-60204-1. The electric motors by CARPANELLI S.p.A. CE marked are in accordance with this standard; they are built :

-according to IEC34-1 for the electrical part, insulation, type tests, thermal service,

- according to EIC72-1 for sizing; according to EN60034-5 regarding shape;

- IP55 regarding the degree of protection.

EMC DIRECTIVE 2004110810E -ELECTROMAGNETIC COMPATIBILITY-

The tests were run on all types of the asynchronous motors that make up the standard production range.

The test method was per EN-55014: surge tests were run on the power terminals (peak surge tests) in the frequency range of 150 kHz -30 MHz and radiation tests within the frequency range of 30 MHz - 1 GHz.

All motors were found to be within the disturbance limits prescribed by this regulation.

International standard, mark (on request)

BEARINGS

he bearings assembled on our motors are of the best European brands. They are radial with one ball crown and as listed in the following table.

ZZ execution includes 2 shields for each bearing plus lubrication provided by the manufacturer. On request, sealed bearings or bearings with increased clearance (C3) are assembled with additional special greasing resistant to high temperature. All our bearings have been pre-loaded on the shafts by means of compensation rings in hardened steel.

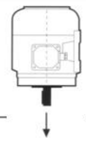
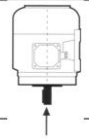
Motor size	Bearings type
M50	6000-ZZ 6201-ZZ
M56	6201-ZZ
M63 - M71	6202-ZZ
MA71	6202-ZZ 6203-2RS
M80	6204-ZZ
M90	6205-ZZ
M100	6206-ZZ
M112	6306-ZZ
M132	6308-ZZ
M160	6309-ZZ

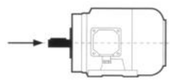
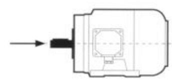
Specifications	Constructed to	Mouting types and installation	Degree of protection	Size power ratio for standard motors, type B3 ans similar	Size power ratio for standard motors, type V1 ans similar
IEC (Internationale)	IEC 34-1	I34-7 (1992)	529(1989)	72-1 (1991)	72-1 (1991)
CEI (Italie)	2-3 ed. I-1974	2-14	70-1	72-1 (1991)	72-1 (1992)
UNEL (Italie)		05513 (1971)	05515(1971)	13113 (1971)	13177(1971)
VDE (Allemagne)	0530T1 (71-72)				
DIN (Germania)		42950 (4-1964)	40050 BL 1 (8-1970) 40050 BL 2 (7-1970)	42673 BL1 (4-1964)	42677 BL1 (11 -1965)
NF (France)	C51-100 (1969) C51-120 (1965)	C51-104 (1969) C51-120 (1969)	C51-115 (1969)	C 51-120 (7-1969) C 51-150 (4-1965)	C 51-120 (7-1969) C 51-150 (4-1965)
BS (GB)	2613 (1970)			3979(1972)	3979(1972)

AXIAL LOADS

The table below shows the maximum applicable axial loads (N) at 50 Hz, calculated for a running life of :

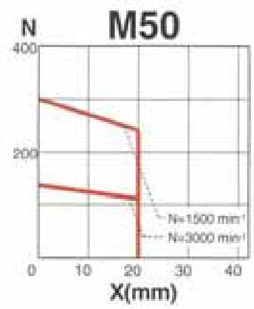
• 25.000 hours.

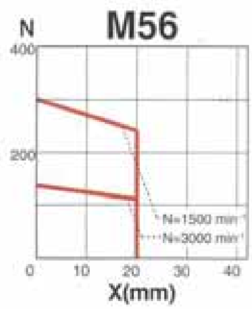
SIZE	Horizontally-mounted motors							
								
	Speed min^{-1}							
	750	1000	1500	3000	750	1000	1500	3000
50	-	-	100	80	-	-	110	90
56	220	160	120	100	230	170	130	110
63	300	290	240	190	320	310	260	210
71	365	345	285	230	395	375	315	250
80	450	400	340	280	510	460	400	320
90	600	550	470	360	700	650	550	440
100	770	670	500	430	930	830	660	570
112	1200	1150	850	620	1100	1000	850	680
132	1600	1500	1150	650	1500	1300	1100	850
160	2500	2300	2000	1500	1600	1500	1300	1000

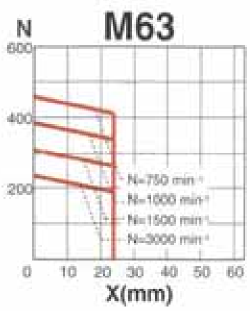
SIZE	Vertically-mounted motors							
								
	Speed min^{-1}							
	750	1000	1500	3000	750	1000	1500	3000
50	-	-	120	100			120	100
56	230	200	160	120	230	200	160	120
63	320	300	250	200	320	300	250	200
71	380	360	300	240	380	360	300	240
80	480	430	370	300	480	430	370	300
90	650	600	510	400	650	600	510	400
100	850	750	580	500	50	750	580	500
112	1300	1250	950	700	1000	900	750	600
132	1800	1700	1350	800	1300	1100	900	700
160	2800	2500	2100	1700	1400	1200	1000	800

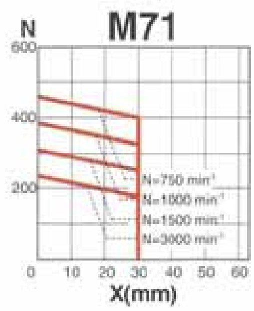
RADIAL LOADS

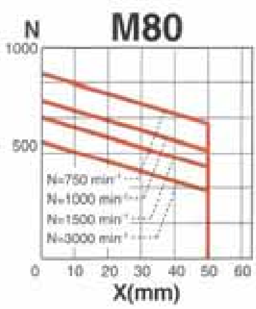
These diagrams make it possible to determine the maximum applicable loads (N) based on measurement X calculatedw for a bearing running life of: 25.000 hour. Admissible radial loads at the end of the main shaft for a Lion running life for 10 hours daily

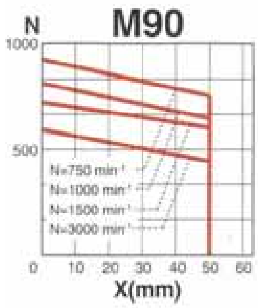


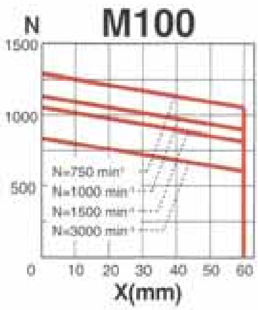


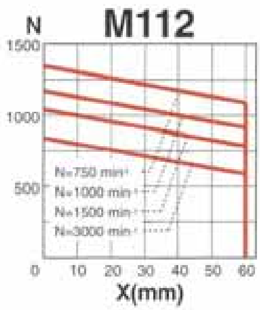


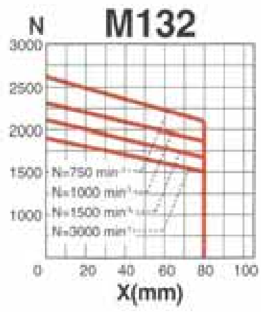


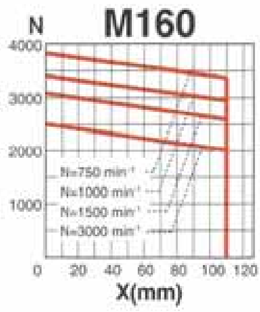








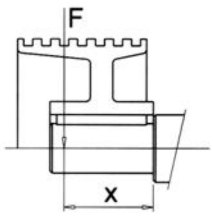




PULLEY

After having established the size of the pulley in relation to the power to be transferred and to the desired transmission ratio, always check that radial load at the end of the shaft is lower than the maximum admissible (see following table).
It is also crucial to bear in mind thet the length of the pulley must never be greater than double the length of the end of the shaft. whereas a gap of roughly 10 mm, must always be left between the pulley and the supporting shield.

$$F = 19.5 \times 10^6 \times \frac{P}{n \times D} \times K$$



Dove :
F = radial load in N
P = power in kW
n = motor rpm in 1st
D = pulley diameter in mm.
K = voltage factor supplied by the pulley manufacturer.
3,5 ÷ 4 for flat normal leather belts
2,2 ÷ 2,5 for belts with special and trapezoidal traction.

VENTILATION

ventilation is achieved through a bidirectional fan with radial blades made of plastic material to resist high temperatures.
Upon request for example for low-speed applications with inverter, servofans may be mounted.

FAN HOUSING

on all motor types it is made of sheet metal ensuring an excellent protection of the fan blades.

ROTORS

rotors are cage type of aluminium or die-casting aluminium alloy and are dynamically balanced. The shafts are made of C40 carbon steel (UNI EN 10083-2A 1 98).
For special versions, we can use alloy and stainless steels, and have both standard and special shapes usual executions have only one shaft and, on request. however, a double shaft end type can be supplied (also according to customer's drawing).

FRAME

frames of all our motors are of first quality die-casting aluminium alloy with high mechanical strength.

FLANGES AND SHIELDS

of die casting aluminium alloy.
On request we can supply flanges and shields according to customer's drawings.

STATOR WINDING

the insulating materials used, with particular reference to copper wire, are of class F (or classe H on request). Thanks to first quality materials and impregnation type these motors can be used in tropical climates, under strong vibration duties and high thermally changing conditions.
On request, additional treatments are provided for very humid environments.
TOLERANCES: shaft end - figure D is subject to following tolerances (IEC 72-1)

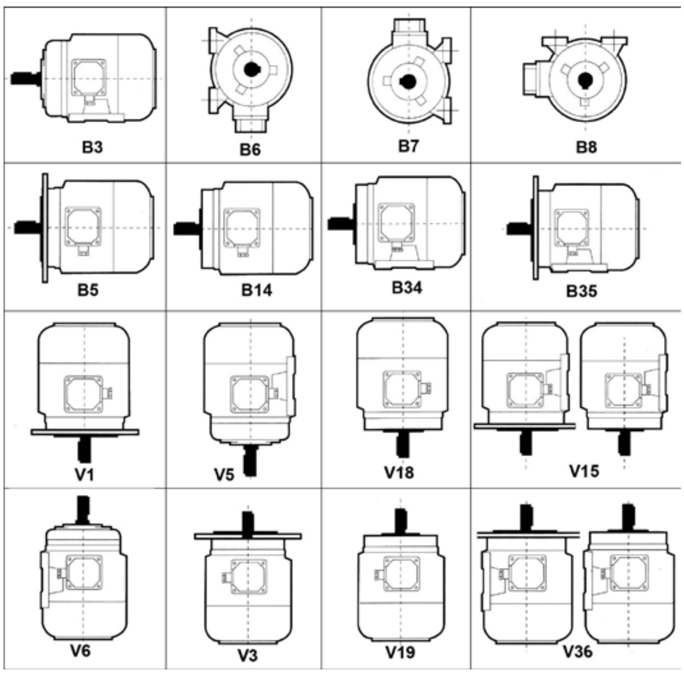
Ø mm	<29	32 à 48	>55
Tolérances	j6	k6	m6

For the tab dimensions corresponding to the diameter of each shaft end and the corresponding tolerances, these are made of C40 steel with dimensions standardized per CEI IEC 72-1. For the meeting on the symbols j6, K6, m6, see UNI 7218-73

FLANGE

figure A is subject to tolerance j6 up to and including a diameter of 230 mm both for B5, 814, and their modified shapes. Also note that the shaft shoulder corresponds to the flange plane. Therefore figure R is equal to zero as specified in IEC 72-1.
SIZES: the axis height marked with H, is subject to tolerance 0-0,5 mm for all sizes included in this catalogue (IEC 72-1).

Mouting types and installation



Degree of protection

The degree of protection against accidental contacts and/or penetration of foreign substances and water is internationally marked (EN 60529) by symbol, made up of 2 letters and 2 numbers.

1st number Protection against solid bodies
IP DEFINITION
0 No Protection
1 Protection against solid bodies larger than 50 mm. (i.e.: accidental touching with hand)
2 Protection against solid bodies larger than 12 mm. (i.e. fingers)
3 Protection against solid bodies larger than 2,5 mm.(i.e.: tools, wires)
4 Protection against solid bodies larger than 1 mm. (i.e.: small wires)
5 Protection against harmful settling of dust (harmful fouling)
6 Complete Protection against the total penetration of dust

2nd number Protection against liquids
IP DEFINITION
0 No Protection
1 Protection against the vertical dropping of drops of water (i.e. condensate)
2 Protection against the dropping of drops of water up to 15° inclination
3 Protection against the dropping of rain water up to 60′ inclination
4 Protection against water sprayed from any direction
5 Protection against water thrown from a nozzle of Ø 6.3 mm. with a flow rate of 12,5 l/min. at distance of 3m. for 3 minutes at least
6 Protection against watre projections similar to sea waves

IP Reference letters indicating the degree of protection.

1st number From 0 to 6 expressed the growing protection levels for people against contact with the hazardous parts, and protection of the materials against the penetration of solid matter.

2nd number From 0 to 6 expresses the growing protection levels for materials against the harmful penetration of water

It is prohibited to use the electric motors in environments with characteristics other than those prescribed based on the rated IP protection, Per EN 60529

Our standard product is : **IP 55 :**
IP: Protection rating
5 Motor protected against dust and against accidental contact.
Test result: no harmful amount of dust settled, no direct contact with the parts moving inside the casting.
5 Motor protected against the projection of water in all directions thrown from nozzle with 12.5 l/min. flow rate, below 0,3 bar, at a distance of 3 m. rom the motor
Test result: no harmful consequence of the water projected on the motor while running.
N.B. On our motors there is always a plate indicating the degree of protection

General electrical specifications

These general definitions are provided to enable our readers to gain a better understanding of the subjects that follow :

Rated power : mechanical power measured at the shaft expressed, according to the latest indications of international Standards Committees, in Watts or Kwatts. However, in the engineering sector it is still common to refer to power in terms of HP.

Rated voltage : the voltage to be applied to the motor terminals in accordance with the specifications in the following tables.
Static torque (or starting torque) : minimum torque that the motor can provide with the rotor at a standstill and at the rated power supply in terms of voltage and frequency.

Saddle torque : minimum value of the torque developed by the motor fed with rated voltage and frequency, between zero rpm and the speed correspond to maximum torque.

Maximum torque : maximum torque that the motor can develop during its operation with rated power supply in terms of voltage and frequency.

Rated torque : torque corresponding to the rated power and rated rpm. Rated torque is calculated through the formula :

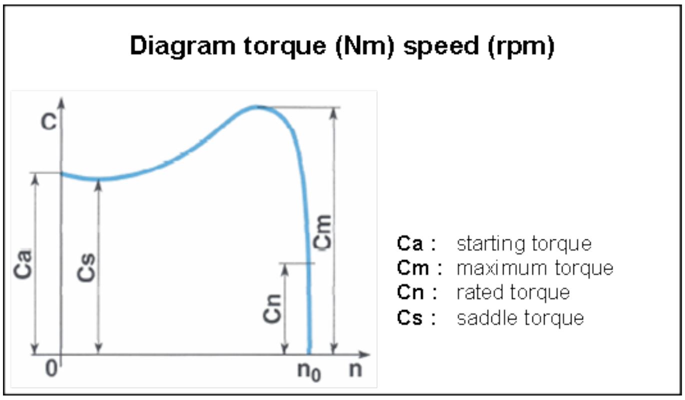
$$\mathbf{Cn = 9.55 \frac{Pn}{n} \quad (Nm)}$$

Pn = rated power expressed in Kw
n= rated rotation speed expressed in rpm

Synchronous speed : synchronous speed (indicated in the graph with no) is obtained through the formula :

$$\mathbf{n_o = 60 \frac{f}{P} \quad (r. p. rn.)}$$

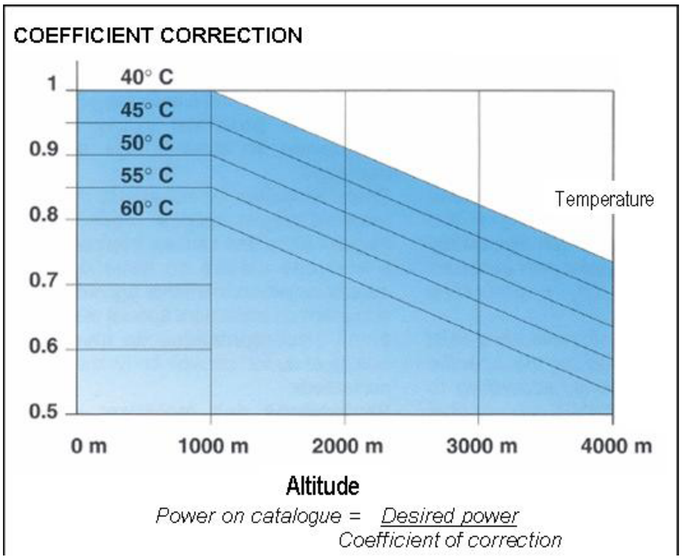
f = the supply frequency expressed in Hz
p= the number of poles pairs



Working conditions

Humidity : the electrical equipment must be able to function with a relative humidity between 30 and 90% (without condensation).
Damaging effects of occasional condensation must be avoided by adequate equipment design or, if necessary, by additional measures (for example, built-in heating or air-conditioning equipment, drainage holes)

Altitude and Temperature : the powers indicated are intended for regular use at altitudes below 1000 mt above sea level and a room temperature between +5°C and +40°C for motors having a rated power below 0.6 kW, or between -15°C and 401C for motors having a rated power equal to or greater than 0.6 kW
For running conditions other than those specified (higher altitude and/or temperature), the characteristics figures vary according to the coefficient shown in the graph:



Temperatures below the values indicated should be agreed upon between the manufacturer and purchaser.

Voltage Frequency : The maximum variation of the supply voltage can be ±10%.
Within this tolerance our motors supply the rated power.
During continuous operation, with the above mentioned voltage limitations, it is possible to have a maximum increase of 10 degrees C of the limit overtemperature.
Normal windings are suitable for voltages of 230 and 400 V and frequency of 50 Hz.
Upon request, we can also provide different types of voltage and frequency.

Speed-torque: except for 4 poles applications are version standard motors; these must be specifically requested by the customer at the time of order.
While torques beyond the rated torque may be supported to a certain degree-per IEC 34-1, they are not recommended.

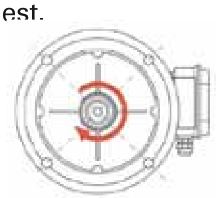
Insulation : the winding of the stator is made of enamelled copper wire (class H 200 degrees C) with modified polyesteramide resins and top of amide resins.
An impregnation treatment carried out with class F resins provides high protection against electrical and mechanical stresses.
Therefore, the winding is thick. with no air locks and with a high value of heat transfer. The other materials used for mass production of our windings have the class B insulation but, upon request. we can provide totally insulated class H windings.

Tropicalization : a highly efficient protection treatment is carried out for the motors to be used in tropical climate, with a high degree of humidity or particularly severe environmental conditions the windings are coated with high quality glycerophthalic paint with excellent coverage and protective characteristics.

Motor protections : protections must be chosen based on the specific running conditions, according to standards EN 60204-1. It is possible to have:
1 - Protection for motors with a shaft power greater than or equal to 0.5 kW with continuous S1 function.
This protection may be achieved by means of a thermal cut-out relay, which automatically control a knife switch. The thermal protection built into the electric motor by means of a thermistor or bimetallic device to be specified at the time of order is recommended when the motor is located in poorly ventilated areas, for example inside a closed machine.
2 - Protection against peak currents by magnetic relay that controls an automatic knife switch, or by fuses: these must be set to the current with the motor rotor blocked.
3 - If the application requires, protection against excessive speed of the electric motor, for example if the mechanical load may drive the electric motor itself and thereby create a hazardous situation.
If a reversed rotation direction of the motor may be hazardous a clearly visible arrow must be mounted near the motor indicating the normal rotation direction If the motor brakes due to a reversal of two power phases; it must not be restarted in the direction opposite the conventional running direction if the could leadto hazardous situations.
4 - Is special conditions or synchronized operation with other machines or parts of machines require it, protection against power failures or dips by means of a minimum voltage relay that controls an automatic power knife switch.
If any case, it is strictly prohibited to automatically reset a protection after it has been tripped, since this may create a hazardous situation. Only trained personnel must be allowed to manually reset the system to which the electric motor belongs or of which it is the primary component.

Two-speed motors : motors with pole changing differ form those with only one speed, exclusively in the stator winding, which is purposely manufactured to have 2 speed.
The two-speed motors with a pole ratio of 1:2 (for instance: 214, 418, etc.) are built with a single changeover winding whereas those with a different ratio (for instance: 416, 618, 218 etc.) have two separate windings.
For further requests and also for information about our three speed motors, you are kindly requested to contact our engineering department.

Three phase or single phase Motors : are supplied wit clokwise rotation. They may supplied with anticlockwise rotation upon request.



Duty service

All motors shown in the catalogue are per S1 standard IEC 34-1.

Below are the various types of service described by the standards CEI 2-3/IEC 34-1. Each service is marked with the letter S followed by a progressive number from 1 to 9.

S1 - Continuous service : operating at constant load of duration N sufficient in order to reach a thermal balance.

S2 - Limited-duration service : operating at constant load of duration N. less than the time necessary to reach a thermal balance followed by a rest period sufficient in order to restore the balance between the machine temperature and that of the cooling fluid, with a tolerance of 2°C.

S3 - Periodic intermittent service : sequence of identical operating cycles, each including a period of operation at constant load N and a rest period R. In this type of service, the cycles is such that start-up does not significantly affect the peak temperature.

$$\text{intermittency ratio} = \frac{N}{N+R} \cdot 100(\%)$$

The brief service indication is given by the percentage ratio of intermittency with respect to the time period in question (generally N+R = 10 minutes).

S4 - Periodic intermittent service with start-up : sequence of identical operating cycles, each including a substantial start-up stage D, a constant-load operating period N and a rest period R.

$$\text{intermittency ratio} = \frac{D+N}{D+N+R} \cdot 100(\%)$$

In this case the brief service indication must be accompanied by the number of starts per hour.

S5 - Periodic intermittent service with electric braking : sequence of operating cycles as for S4, with the addition of rapid electric braking F.

$$\text{intermittency ratio} = \frac{D+N+F}{D+N+F+R} \cdot 100(\%)$$

The indication is the same as for service S4.

S6 - Uninterrupted periodic service with intermittent load : sequence of identical operating cycles, each including a constant load operating period N and a no-load period V No rest time is included.

$$\text{intermittency ratio} = \frac{N}{N+V} \cdot 100(\%)$$

The indication is the same as for service S3.

S7 - Uninterrupted periodic service with electric braking: sequence of operating cycles as for S5, but without a rest period,

intermittency ratio = 100%

The indication is the same as for service S4.

S8 - Uninterrupted periodic service with correlated load and velocity variations: sequence of identical operating cycles, each of which includes a constant-load operating period N corresponding to a pre-set rotation speed, followed by one or more operating periods with other constant loads N2, N3, etc., corresponding to different rotation speeds. There is no rest period.

Intermittency ratio =

$$\frac{D+N1}{D+N1+F1+N2+F2+N3} \cdot 100\ (\%)$$

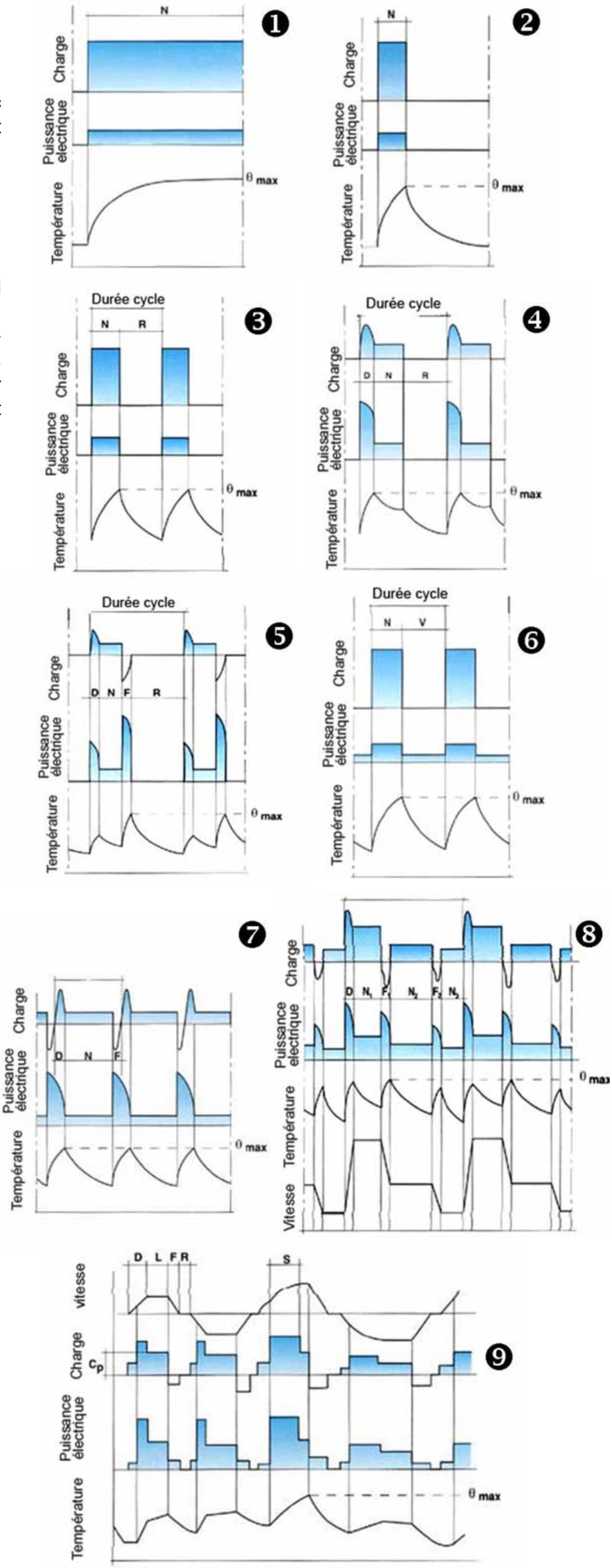
$$\frac{F1+N2}{D+N1+F1+N2+F2+N3} \cdot 100 (\%)$$

$$\frac{F2+N3}{D+N1+F1+N2+F2+N3} \cdot 100 (\%)$$

The brief service definition is given by the operating duration at the various speeds, for example: 3000 rp.m for 15 min + 1500 r.p.m. for 10 minutes, etc.
S9 - Service with non-periodic variations in load and speed: service in which the load and speed generally vary in a non-periodic fashion within the admissible operating field.
This service includes frequently applied overloads which may be greatly superior to the full load (values indicated in the figure, as well as those known :
L=operating time at variable loads. S=operating with overload, Cp=full load).
The type of service is shown on the rating plate.

Graphs of duty

N = Steady load operating time
R = Rest time
D= Starting and accelerating time
F = Electric breaking time
V = No-load operating time
F_1F_2 = Breaking time
$N_1N_2N_3$ = Steady load operating time
θ_{max} = Maximum temperature achieved during the cycle
L = Operating time with varible loads
Cp = Full load
S = Overload operating time



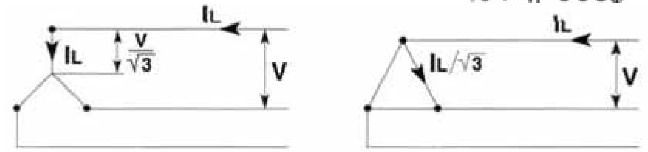
Technical formulas

Pn (W)	rated power
V (V)	voltage between lines
η	efficiency
cos φ	power factor
ω (rad/s)	angular speed
n	rpm
t (s)	time

Jm (Kg.m²)	moment of inertia of the motor
Jl (Kg.m²)	moment of inertia of the load
Cm	motor torque
CL	load torque
tf (s)	desired braking time
m	motor
r	rotary load
t	shifting load

Absorbed current with the mains

$$I_L = \frac{P_n}{\sqrt{3} \cdot V \cdot \eta \cdot \cos\varphi}$$



Apparent power

$$P_a = \sqrt{3} \cdot V \cdot I_L \cdot [VA]$$

Starting time

$$t = \frac{(J_m + J_L) \cdot \omega}{C_{m+CL}}$$

$J_m[\text{kgm}^2]$ $J_r[\text{kgm}^2]$ $m_t[\text{kg}$

$N_t[m/s] =$ velocità lineare

Driving torque

$$T = \frac{P_n}{\omega}[N \cdot m] \qquad T = 0,955 \cdot \frac{P_n}{n}[Kg \cdot m]$$

Couple de freinage

$$Tf[N \cdot m] \qquad Tf = \frac{E}{\omega \cdot tf}$$

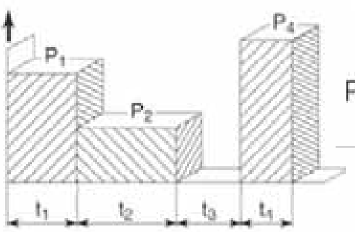
Energia

$$E = P \cdot t\,[\text{Joule}]$$

$$E = E_m + E_r + E_t\,[J] \qquad E_m = \frac{1}{2} \cdot J_m \cdot \omega^2[J]$$

$$E_r = \frac{1}{2} \cdot J_r \cdot \omega^2[J] \qquad E_t = \frac{1}{2} \cdot m_t \cdot N_t^2[J]$$

Power termally equivalent to a continue working in case of intermittent working



$$P_t = \sqrt{\frac{P_1^2 \cdot t_1 + P_2^2 \cdot t_2 + P_4^2 t_4}{t_1 + t_2 + t_4 + t_3/4}}[W]$$

$$0,3 \cdot P_n \le P_{1,2,4} \le 1,5 \cdot P_n$$

Conversions factor table

Force units

Unités	kgf	N
kgf	1	9,8062
N	$1,02 \cdot 10^{-1}$	1

Kilogramme-force (kgf); newton (N)

Mechanic torque units

Unités	dyn cm	kgf m	Nm
dyn cm	1	$1,02 \cdot 10^{-8}$	10^{-7}
kgf m	$9,81 \cdot 10^{7}$	1	9,8062
Nm	10^{7}	$1,02 \cdot 10^{-1}$	1

Dyne centimeter(dyn cm)
kilogram force meter (kgf m)
newton/meter (Nm)

Energy / work units

Unités	J	kgf m	kWh	l atm
J	1	$1,02 \cdot 10^{-1}$	$2,78 \cdot 10^{-7}$	$9,87 \cdot 10^{-3}$
kgf m	9,8062	1	$2,72 \cdot 10^{-6}$	$9,68 \cdot 10^{-2}$
kWh	$3,6 \cdot 10^{-6}$	$3,67 \cdot 10^{5}$	1	$3,55 \cdot 10^{4}$
1 atm	$1,01 \cdot 10^{2}$	10,33	$2,81 \cdot 10^{-5}$	1

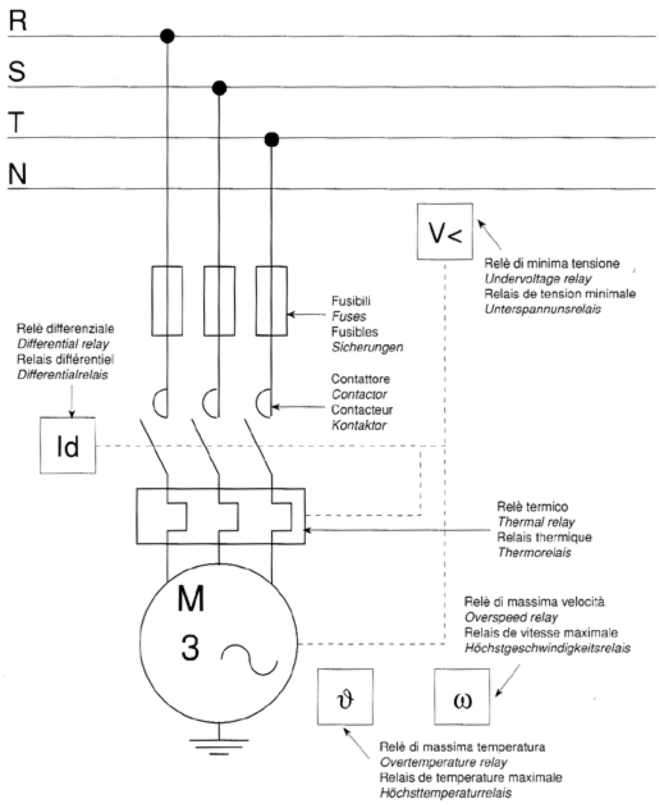
joule (J)
Kilowatt hour (kWh)
kilogramme-force meter (kgf m)
atmosphear (atm)

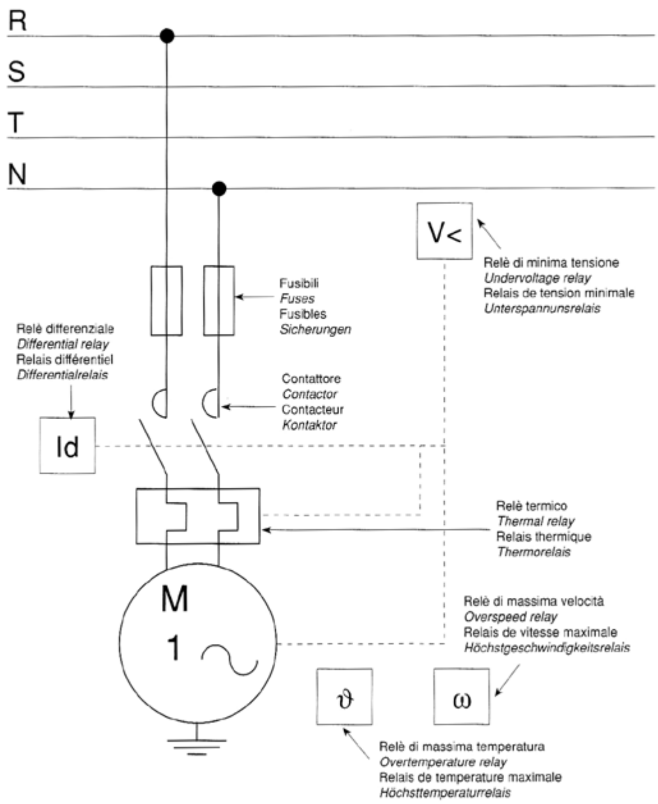
Power units

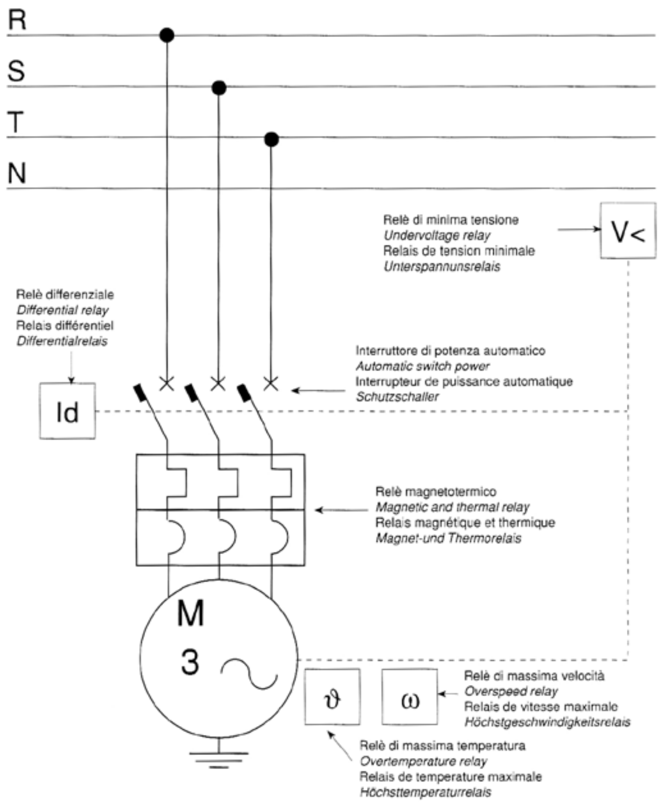
Unités	Ch	hp	kgf m/s	W
CV	1	$9,86 \cdot 10^{-1}$	75	$7,35 \cdot 10^{2}$
hp	1,01	1	76,04	$7,46 \cdot 10^{2}$
kgf m/s	$1,33 \cdot 10^{-2}$	$1,32 \cdot 10^{-1}$	1	9,8062
W	$1,36 \cdot 10^{-3}$	$1,34 \cdot 10^{-3}$	$1,02 \cdot 10^{-1}$	1

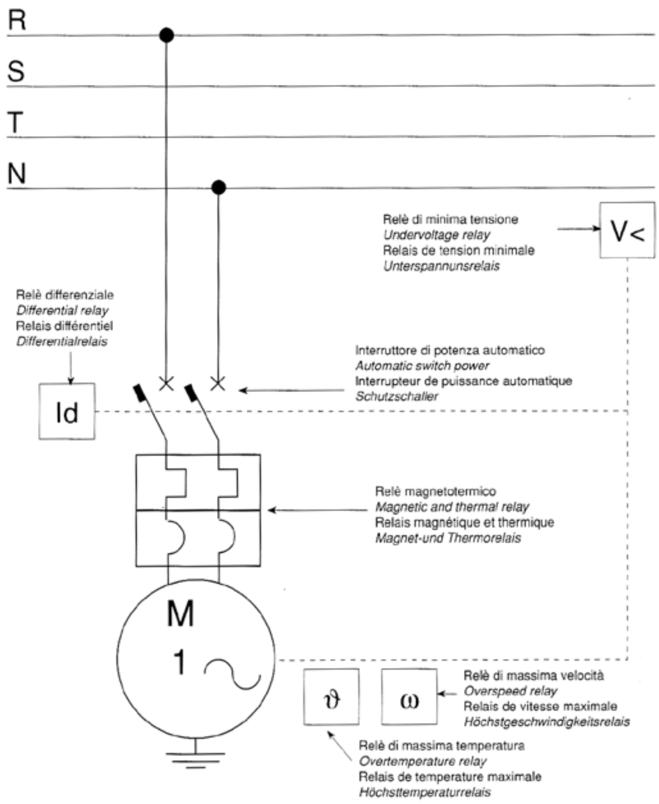
Chevaux vapeur (CV)
Horse power (hp)
Kilogram-force /second (kgf m/s)
Watt (W)

Protection coordination EN 60204-1



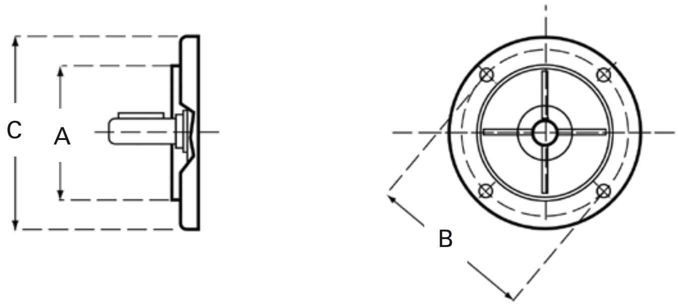






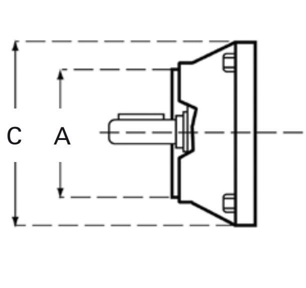
Possible special flange combinations B5

	Ø A	B	Ø C
M56	70	85	105 Ghisa
M63	80	100	120
M71	95	115	140
M80	110	130	160
M90	110	130	160
M90	180	215	250
M100	130	165	200
M112	130	165	200
M132	180	215	250



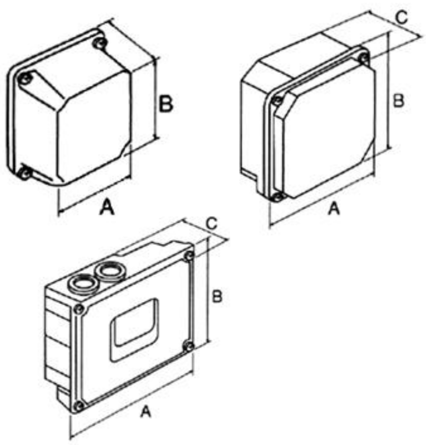
Possible special flange combinations B14

	Ø A	B	Ø C
M56	60	75	90
M56	70	85	105
M63	50	65	90
M63	70	85	105
M63	80	100	120
M71	60	75	90
M71	80	100	120
M71	95	115	140
M80	60	75	140
M80	70	85	120
M80	95	115	140
M80	110	130	160
M90	80	100	120
M90	80	100	140
M90	110	130	160
M100	95	115	140



Terminal box

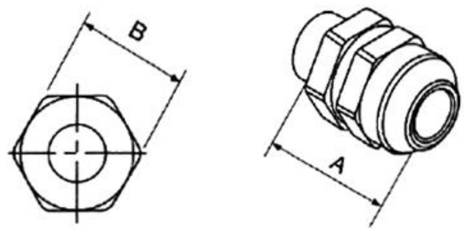
Type	Terminal box IP 55			Terminal box IP 65			Double Terminal box IP 55		
Type	A	B	C	A	B	C	A	B	C
MEC 50	64	64	30						
MEC 56/71	71	71	34	92	92	47	136	92	41
MEC 80/112	89	89	47	110	110	55	153	108	46
MEC 132				124	124	65			
MEC 160				185	172	73			

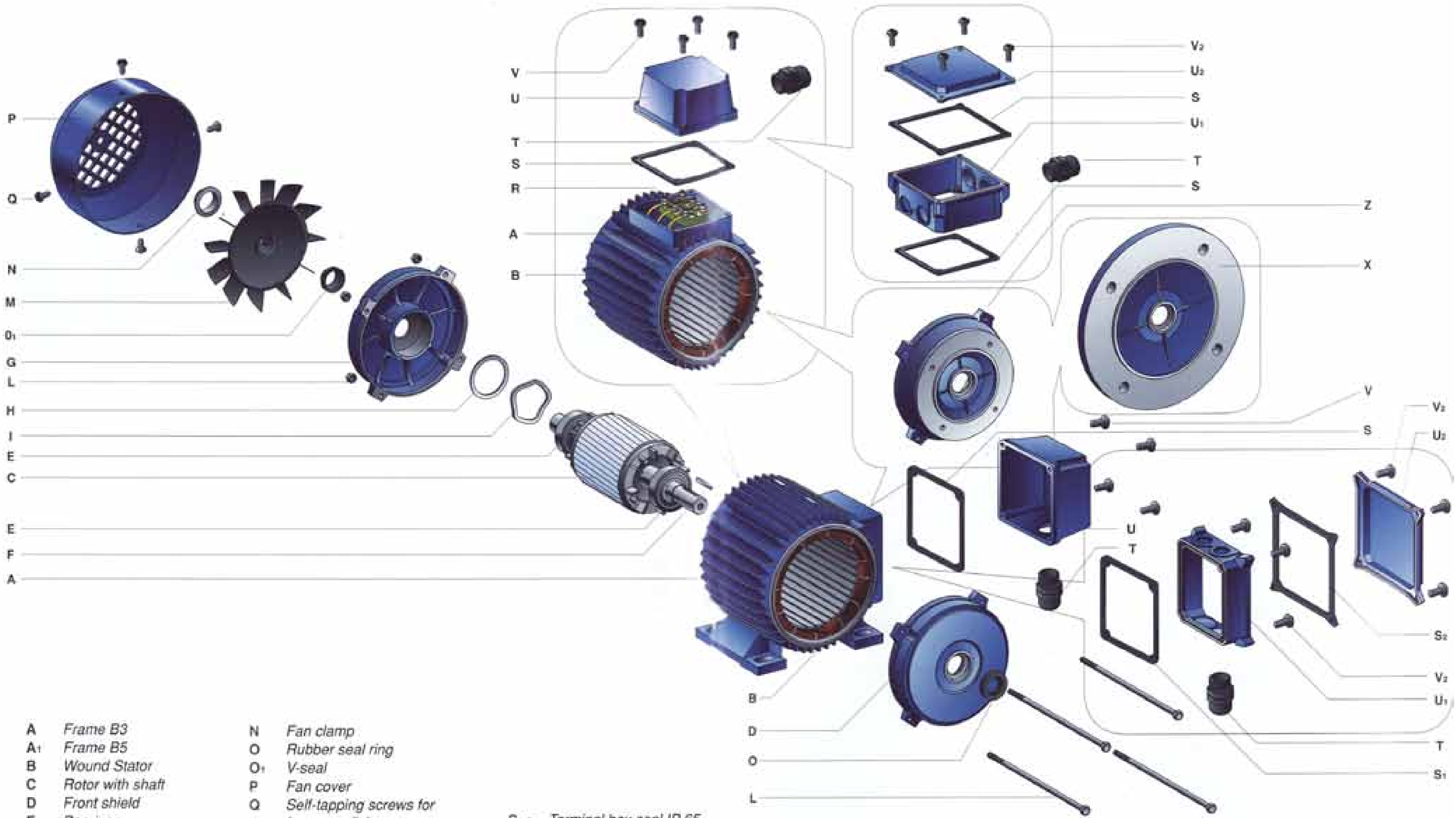


Cable gland

Type	Presse-étoupe	Ø Fil
M50	PM 16	3-8
M56-71	PM 20	4-13
M80-112	PM 20 (M. 25)	4-13(5-15)
M1325-160	PM 32	13-25

	A	B
PM 16	24	19
PM 20	29	24
PM 25	32	27
PM 32	40	42





A	Frame B3
A_1	Frame B5
B	Wound Stator
C	Rotor with shaft
D	Front shield
E	Bearings
F	Key
G	Back side shield
H	Spacer ring
I	Shim
L	Rods and nuts
M	Cooling fan
N	Fan clamp
O	Rubber seal ring
O_1	V-seal
P	Fan cover
Q	Self-tapping screws for fan cover fixing
R	Terminal board complete with metal parts
S	Terminal box seal IP 55
T	Cable inlet
U	Terminal box IP 55
V	Screws for terminal box fixing IP 55
S_{1-2}	Terminal box seal IP 65
U_1	Terminal box IP 65 (base)
U_2	Terminal box IP 65 (cover)
V_2	Screws for terminal box fixing IP 65
Z	Flange B14
X	Flange B5

Vue éclatée DP - MM

Connection diagram