



APF series

Model	A1C A2C A3C B1C B2C B3C
Power	Up to 540 kW
Voltages	Up to 690 V
Frame	63 ÷ 355
Poles	2, 4, 6, 8, 10 and 12
Cooling	IC 411 as standard IC 416 and IC 418 available as option
IP	IP 55 as standard IP 56, IP 65 or IP 66 available as option
Enclosure	TEFC MOTORS – Totally Enclosed Fan Cooled
Main Applications	Air conditioning, Compressors, Manufacturing processes, Metals, Mining, Power, Pulp and paper, Sugar mill, Water pumping and treatments
Sector	Industrial

Poles	2 Poles	4 Poles	6 Poles	8 Poles	10 Poles
kW 50 Hz	Up to 450	Up to 450	Up to 355	Up to 315	Up to 160
Poles	2 Poles	4 Poles	6 Poles	8 Poles	10 Poles
kW 60 Hz	Up to 540	Up to 540	Up to 426	Up to 378	Up to 192



Main components

Housing

Motors from size 63 to 180 are made in aluminum or cast iron. Starting from frame 200 and up to 355 the frame is in cast iron only.
(EN 1561-GJL – 200)

Shield

Made of aluminum for aluminum motors.
Made of grey cast-iron (EN 1561 – GJL 200) for cast iron motors.

Shaft

Shaft design
Cylindrical shaft with key.

Material

The table below, show the materials used on the mechanical components for standard motors.

Components	Frame size A_C 63-180	Frame size B_C 63-315	Frame size B1C/B2C 355	Frame size B3C 355	Frame size B_C 355K
Housing	Aluminum	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Endshields D-End					
Endshields N-End					
Fan	FRPP*	FRPP*	Aluminum	FRPP*	Steel
Fan cover	Steel	Steel	Steel	Steel	
Terminal box	Aluminum	Cast iron	Cast Iron	Cast Iron	Cast Iron
Terminal box cover					

FRPP* Flame Retardant Polypropilene



Main terminal box

Mounted on top and made of aluminum or cast iron depending from size.

Degree of protection of standard terminal box is IP 55.

A_C 63-180				
Frame size	Type of terminal	Terminal size	Maximun cable diameter (mm)	Clearance holes formetric cablands
A1C / A2C 63-71	Threaded Terminals	M4	10	M18 x 1.5
A_C 80		M4	12	M20 x 1.5
A_C 90-100		M4		M20 x 1.5 + M16 x 1.5 (aux)
A_C 112-132		M5	12	2-M20 x 1.5 + M16 x 1.5 (aux)
A_C 160-180		M6	25	2-M32 x 1.5 + M16 x 1.5 (aux)

B_C 71-355				
Frame size	Type of terminal	Terminal size	Maximun cable diameter (mm)	Clearance holes formetric cablands
B_C 71-80	Threaded Terminals	M4	18	M25 x 1.5
B_C 90-100		M4	18	M25 x 1.5 + M16 x 1.5 (aux)
B_C 112-132		M5	25	2-M32 x 1.5 + M16 x 1.5 (aux)
B_C 160-180		M6	32	2-M40 x 1.5 + M16 x 1.5 (aux)
B_C 200-225		M8	38	2-M50 x 1.5 + M16 x 1.5 (aux)
B_C 250-280		M10	44	2-M63 x 1.5 + M16 x 1.5 (aux)
B_C 315		M12	44	2-M63 x 1.5 + M16 x 1.5 (aux)
B_C 355		M20	44	2-M63 x 1.5 + M16 x 1.5 (aux)



Construction	
Cooling System	<p>IC 411 as per IEC60034-6</p> <p>Totally enclosed standard motor, frame surface cooled with fan</p> <p>4: Frame surface cooled</p> <p>1: Self circulation of primary coolant</p> <p>1: Self circulation of secondary coolant</p> <p>On request for variable speed application an external ventilation unit can be supplied to get the IC 416 cooling type.</p> <p>Also IC 418 ventilation (ventilation provided by air flowing from the driven system) is available on request.</p>
Degree of protection	<p>Motors are supplied in IP 55 as per IEC60034-5 (IP 56, IP 65 or IP 66 available on request)</p>
Mounting	<p>Mounting and positions are defined according to IEC 60034 - 7</p> <p>See complete list on Industrial motors catalogue.</p>



Technical data

Bearing

General data

Antifriction bearings grease lubricated (ball or roller type).

The theoretical lifetime of bearings, L10h according to ISO 281/1 standard, of standard horizontal construction motors, without external forces (radial and/or axial) is in excess of 50.000 hours.

On request, the lifetime of bearings, L10h can be in excess of 100.000 hours.

Locating bearings are on the D-End side and floating bearings on the ND end side.

On request special bearings are designed where high radial and axial forces are applied.

The motors \leq 132 frame size have double screen prelubricated ball bearings.

The motors from 160 to 180 frame size have single screen prelubricated ball bearings.

The correspondent grease life under normal operating conditions for a motor with horizontal shaft, at 50Hz and maximum ambient temperature of 40°C is
10.000 hours in continuous duty for 2-pole motors,
20.000 hours in continuous duty for 24-pole motors.

The motors from 280 frame size and above have regreasable bearings (with greasenipples Tecalemit UNI type) and the relative exhausted grease drainage.

For initial charge of standard motor bearings a grease with mineral oil as basic oil and lithium soap as thickener, NLGI consistency grade 3, is used.

Motors for unfavourable operating conditions can be lubricated with special grease.

The name plate indicates the type of grease, the quantity and the relubrication intervals.

Impregnation system

VPI with an epoxy resin.

Insulation system

Low voltage

Stator: F class insulated with a synthetic enamel.

(H class insulation available on request)



Protective treatments

External surfaces

The surface treatment categorization of motors is based on the ISO 12944 standard.

ISO 12994-5 divides paint system durability into three categories: low (L), medium (M), and high (H).

Low durability corresponds to a lifetime of 2-5 years, medium to 5-15 years, and high durability to over 15 years.

The durability range is not a guaranteed lifetime. Its purpose is to help the owner of the motor plan for appropriate maintenance intervals. More frequent maintenance may be required because of fading, chalking, contamination, wear and tear, or for other reasons.

The painting treatment of motors in standard configuration is in accordance to C1 low corrosivity category which is suitable for indoor atmospheres (Heated buildings with a clean atmosphere).

Internal surfaces

Motor endwindings can be tropicalized with an insulating enamel to prevent motor corrosion due to humidity and aggressive substances. The standard configuration offers the following solutions:

Aluminum motors (63÷180): tropicalization is optional;
Cast iron motors (63÷355): tropicalization is standard.

Aluminum motors can be supplied with tropicalization on request.



Grounding

Motors in standard configuration are provided with the following grounding terminals:

ALUMINUM MOTORS	Frame size									
-	63	71	80	90	100	112	132	160	180	200-355
IE1	C1		C2							
IE2	C1		C2							
IE3	-	-	C1			C2				

CAST IRON MOTORS	Frame size									
-	63	71	80	90	100	112	132	160	180	200-355
IE1	C1		C2							
IE2	C1		C2							
IE3	-	-	C2							

C1 | Configuration 1 : n°1 terminal in main terminal box

C2 | Configuration 2 : n°2 terminals, one inside the terminal box and one outside

Condensation drainage

When installed outdoors or used for intermittent work in environments with high humidity levels, motors must be provided with holes for condensation drainage.

In order to assure the correct positioning of the holes the operating position of the motors must be specified.

Motors with frame sizes from 280 to 355 have holes for condensation drainage as standard.

Motors can be supplied with drainage holes on request.



Anticondensation heaters

Motors subject to atmospheric condensation, either through standing idle in damp environments or because of wide ambient temperature variations, may be fitted with anticondensation heaters.

Anticondensation heaters are normally switched on automatically when the supply to the motor is interrupted, heating the motor to avoid water condensation.

They are normally mounted on D-End winding heads.

Normal feeding voltage is 220//230/240V.

Motors can be supplied with anticondensation heaters with terminals in main terminal box.

The power values normally used are shown in the table below:

Frame size	Power (W)
63-112	10
132-160	30
180-200	50
225-250	65
280	100
315S	130
315M	200
355/355K	300



Thermal protections

Standard magnetothermal circuit breakers are sufficient to suitably protect the motor from overloading.
Anyway the motors can be supplied with additional thermal protections with the characteristics described in the following table.

Type	Operating principle	Active temperature [°C]
Positive temperature coefficient thermistors PTC	At the active temperature this device quickly changes its resistance value.	155
Platinum resistance thermometer PT100	Variable linear resistance with the winding temperature, particularly suitable for a continuous winding temperature monitoring.	Set up in control panel

Motors from 160 frame size are supplied with N. 3 PTC with terminals in main terminal box, in standard configuration.
Motors from 160 frame size can be supplied with PT100 thermal detectors on the bearings on request.

Optional features

List

Options and configurations

Options available are listed below. Please note some options cannot be selected together.

Key

- (1) Optional for aluminium motors, standard for cast-iron motors
- (2) Optional for 160-250 sizes, standard for 280-355 sizes
- (3) Optional for 160-355 sizes, standard for 355K motor sizes

s = standard
o = optional
x = contact Marelli Motori
n/a = not available

Option	Description	63÷132	160÷355
100	Insulation class H	o	o
102	N° 9 Terminals	o	o
103	N° 12 Terminals	o	o



104	Flying Leads = L 1000mm	n/a	n/a
105	VPI Impregnation	s	s
107	Tropicalisation	o/s(1)	o/s(1)
108	Anticondensation heaters, with terminals in main terminal box	o	o
109	Anticondensation heaters, with terminals in auxiliary terminal box	n/a	n/a
110	Bi-metal cut-out switch with terminals in main terminal box	o	o
111	PTC thermistors with terminals in main terminal box	o	s
112	PT100 thermodetectors with terminals in main terminal box	o	o
113	Bi-metal cut-out switch with terminals in auxiliary terminal box	n/a	n/a
114	PTC thermistors with terminals in auxiliary terminal box	n/a	n/a
115	PT100 thermodetectors with terminals in auxiliary terminal box	n/a	n/a
120	Transducer for thermodetectors PT100	n/a	o
122	PT100 thermodetector in D-End bearing - single element	n/a	o
123	PT100 thermodetector in D-End bearing - double element	n/a	o
124	Protection degree IP66	o	o
125	Protection degree IP56	o	o
126	Protection degree IP65	o	o
127	Second shaft end	o	o
128	Sealed bearings	s	o
129	Roller bearings on D-End	n/a	o
129bis	N-End angular contact bearing for high axial loads (vertical mounting)	n/a	o
130	Oil seal	s	o
131	Drainage hole with tap	o	o/s(2)
133	Vibration level B	o	o
134	Metallic Fan	o	o
136	D-End special shaft extension	o	o
137	Low temperature duty -25°C -40°C	o	o
138	D-End and N-End grease nipples	n/a	s
139	Arrangement for SPM D-End side	n/a	o
140	Complete with vibration transducer D-End side standard type (CEMB)	n/a	o
141	Complete with vibration transducer D-End side Bently Nevada type	n/a	o
160	Arrangement for encoder standard type	o	o
160bis	Arrangement for encoder special type	o	o



161	Complete with encoder standard type	o	o
165	Brake adaption like Precima or Pintsch Bubenzer	o	o
170	Anti rain canopy for IM V1	s	s
171	Anti sun canopy	o	o
174	Locked D-End bearing	s	s
177	3-Phase forced ventilation	x	o
178	Enhanced insulation system for Inverter application < 500V	n/a	n/a
179	Special fan for reduced noise level	o	o
180	Insulated N-End bearing - Horizontal Mounting (≥ 280 frame)	n/a	o
181	Insulated N-End bearing - Vertical Mounting (≥ 280 frame)	n/a	o
188	Enhanced insulation system for Inverter $\geq 500V$ (≥ 280 frame)	n/a	o
221	Special cable entry direction	o	o
222	Lateral terminal box (dedicated housing for B_C motors)	o	o/s ⁽³⁾
304	Special voltage and/or frequency	o	o
312	Special cable entry	o	o
313	Brass cable glands	o	o
317	Additional nameplate for VFD	o	o
318	TAG plate	o	o
319	Additional Rating Nameplate	o	o
320	Nameplate with final customer logo	o	o
321	"Made in" Nameplate	o	o
325	Stainless steel screws	o	o
919	Non standard RAL paint colour	o	o
930	Special painting process for aggressive environments (F96819)	o	o
931	Special painting process for aggressive environments (F96826)	o	o
932	Special painting process for aggressive environments (F96827)	o	o