



TSA TECNOLOGIE
SPECIALI
APPLICATE

M20
Ø 69
Ø 220
Ø 240

PNEUMATIC MOTORS



**PNEUMATIC MOTORS
WITH COMPACT PISTONS**

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TSA

SPECIAL APPLIED TECHNOLOGIES

TSA founded in 1984, for over 30 years has been designing, manufacturing and distributing pneumatic motors, articulated arms for torque reaction, assembling systems and special equipment.

Its technical design office is in charge of studying all of the required characteristics to guarantee maximum reliability and high productivity, according to modern ergonomic principles. Product quality and safety are now a consolidated standard for TSA.

Just-in-time deliveries, a wide, flexible range of products, including diversified motors and arms, an efficient spare parts warehouse and effective before- and after sales: these are the services offered by TSA to its customers. Thanks to its constant commitment and to the professionalism of its technicians,

TSA has gained the trust of major companies on the market. Its aim is to meet customer requirements in all respects: QUALITY, PERFORMANCE AND COST EFFECTIVENESS.

Vista

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APPLICATION

TSA is introducing new compact piston motors with the following advantages:

- High torque with low rotation speed
- Very low air consumption
- Low noise emission
- It can be stopped while loaded, without damage
- Maintenance-free
- Immediately reversible
- Available in aluminium and plastic / stainless steel
- Oil-free
- Silicon-free
- Certified according to ATEX II cat 2 G & D T5

Its acoustic emissions have been calculated based

on the ISO 11202 noise measurement standard and within the framework of ISO 11200. The noise levels detected were below 78 dB for RM012 and RM024. This motor therefore meets the requirements in terms of noise, with no need for individual ear protection devices.

The compact piston pneumatic motor is made of plastic with a stainless steel shaft. This motor has been developed for applications in corrosive environments and for the food industry.

The recommended speed range is between 50 and 350 rpm. The size of the motor shaft may be adjusted as required in case of specific customer needs.

ADVANTAGES

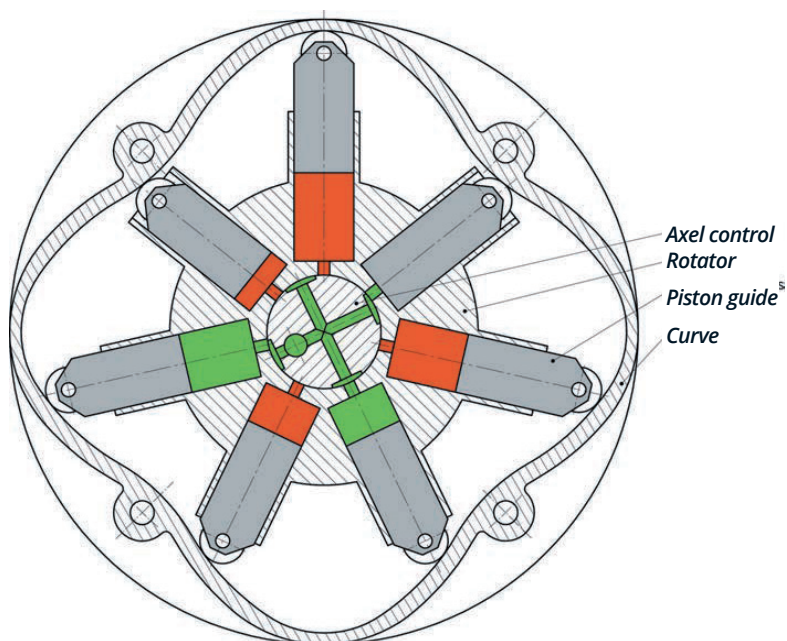
Compact piston motors have a unique shape:

- User friendly and inexpensive checking of speed and torque through a flow regulating valve and/or pressure regulator.
- Intrinsically safe for explosive environments. Compact piston motors are certified according to the European standards of the ATEX II Directive cat. 2 G & D T5.
- Air motors can be stopped indefinitely while loaded without any risk of overheating or burning.
- Long life because of low attrition.
- Immediately reversible, operated simply by using

- a check valve.
- Resistant to dirt, humid conditions and high temperatures.
- Pistons designed for a longer life span.
- Oil-free operation.
- Silicon-free with possibility of use for mixing applications.
- Available with front flange which has an incorporated additional bearing.
- Small size.
- Special version for the food and chemical industry.
- ATEX certified.

WHY CHOOSE A COMPACT PISTON MOTOR?

- High torque with low rotation speed.
- Maximum torque at the starting moment. Pneumatic motors with compact pistons do not have a variable torque at the starting moment like standard Air motors with blades; as a consequence the starting torque value is always guaranteed.
- Possibility of connecting up to three units in series to increase the torque or power.
- Very low air absorption thanks to the use of low attrition pistons and reduced air loss inside.
- Low noise emissions which meet the relevant regulations, therefore no ear protection is required.
- Compact piston motors may be Torqued directly to a wide range of parallel axis, epi-cyclic gearboxes and spiral screws.
- Because of the low rotation speed, compact piston motors are considered especially suitable for applications where pneumatic motors are expected to be constantly stalled.
- Compact structure made of aluminium with steel shaft.
- Available also in the plastic version with stainless steel shaft.
- Integrated brake operation. When both the inlet and exhaust flow are equivalent (pressurized condition), the motor acts as a brake with a torque amounting 50% of the start torque.
- Possibility of operation with no need for any lubricant. Compact piston motors are able to function with minimal lubrication. Totally oil-free operation is possible on several specific applications; for detailed information please refer to our Technical Office.



Both MP012 and MP024 have twelve pistons

APPLICATIONS



Compact piston motors are used for numerous applications.

Innumerable combinations are possible between Pneumatic motors with compact pistons and several gearbox types in case of lower speeds and/or higher torques being required for application.

The most frequent applications for compact pneumatic motors are the following:

- Mixing equipment
- Turntables
- Wrapping equipment
- Packaging machinery
- Conveyor belts
- Screwers
- Flexible pipe coils



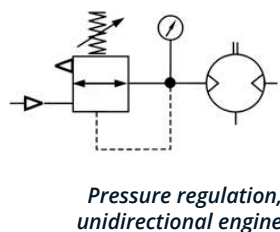
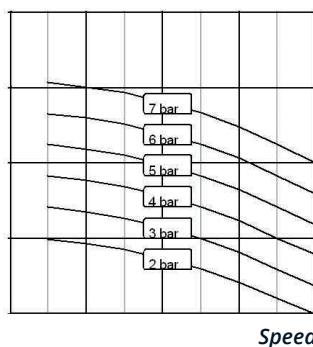
CONTROLS

The speed and torque level in a pneumatic motor can be adjusted by regulating the pressure or throttling the air inlet.

PRESSURE REGULATING

The speed and power can also be reduced by installing a pressure regulator. A pressure regulator, always connected on the entry hole, keeps the inlet air pressure to the motor in check. A pressure regulating system affects the output torque on the shaft, thus making it easier to control the starting torque. If the speed and torque need to be controlled, the best configuration consists in a pressure regulator to the motor inlet and a check valve for the exhaust flow. This means that each point in the speed-torque diagram can be established in a precise way.

Torques Pressure regulating

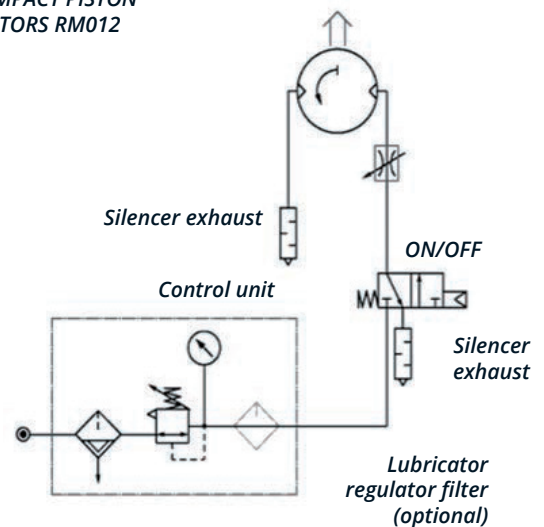


ROTATION INDICATIONS

Pneumatic motors with compact pistons may be used both as unidirectional and reversible pneumatic motors. When pneumatic motors are being used for a non-reversible application, it is sufficient to use a 2/2 or a 3/2 valve.

In the case of a reversible motor it is possible to use one 5/3 valve or two 3/2 valves to achieve directional control.

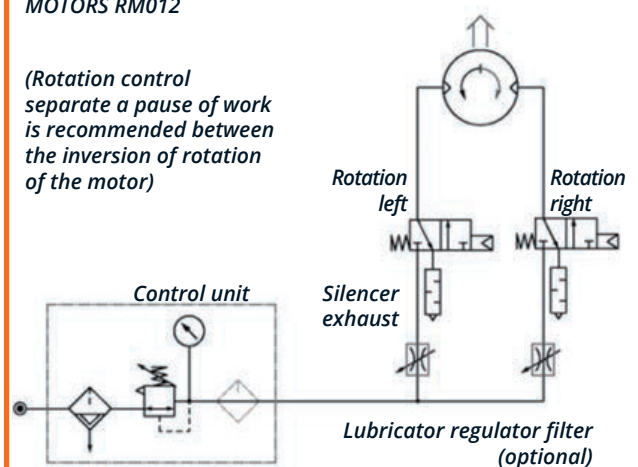
COMPACT PISTON
MOTORS RM012



UNIDIRECTIONAL

COMPACT PISTON
MOTORS RM012

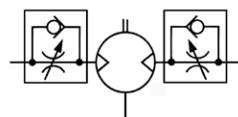
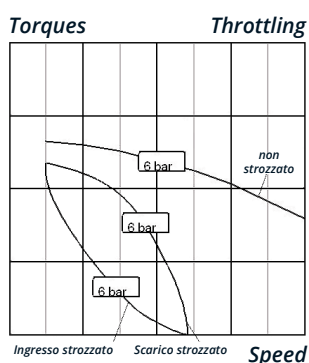
(Rotation control
separate a pause of work
is recommended between
the inversion of rotation
of the motor)



REVERSIBLE

FLOW ADJUSTMENT

A flow regulator allows adjustment of both the inlet and exhaust flow. It is advisable to work on the exhaust flow in order to achieve a slightly higher starting torque. The diagram shows the difference between these two options.



THROTTLING METHOD
INLET CHOKING,
BIDIRECTIONAL MOTOR

AIR QUALITY

In order to ensure optimal working conditions for pneumatic motors it is necessary to guarantee the appropriate air inlet and exhaust at all times. In order to ensure its proper operation it is advisable to install an air treatment unit (5-micron filter, regulator and lubricator, unless the motor required no lubrication), as appropriate for the specific motor.

AIR PIPELINE LIMITATIONS

Any limitations in the air inlet line on the motor are bound to reduce its performance levels. Therefore it is especially important to make sure that the required air pressure is available to the motor at all times while it is being operated. Always check the air inlet because if the pipeline is too narrow this might cause a pressure drop. The air exhaust pipe needs to be larger than the inlet pipe. It is advisable to connect the exhaust pipes to a suitable oil separator filter with an incorporated silencer, in order to allow for appropriate lubrication without the room becoming saturated with polluted air.

PNEUMATIC GEAR MOTORS

A pneumatic motor can be adjusted at a wide range of speed and torque levels: however its output characteristics are not always suitable for the relevant application. In order to achieve the required output speed and torque characteristics it is possible to directly Torque the motor and a gearbox. TSA offers a wide range of parallel axis, epi-cyclic and spiral screw gearboxes.



ORDER CODE

MOTOR TYPE

CW Clockwise
CCW Counterclockwise
R reversible

MP004 - R

MOTOR TYPE

MP006 Ø105X66 6Nm
MP012 Ø135x60 12Nm
MP024 Ø175x80 24Nm

MP006 - SXX
MP012 - SXX
MP024

**MATERIAL
MOTOR BODY**
S Nickel-plated **IP50**
P Plastic **IP64**
I Inox (all MP012
 Not atex) **IP64**

ATEX CERTIFICATE
X No Atex
A ATEX II cat.2 G&D T5

FLANGE
X No flange max. 100N
F Flange max. 2.500N

VERSIONS

MP004R / CW / CCW

MP006-SXX

MP006-SFX

MP006-SXA

MP006-SFA

MP012 / MP024-SXX

MP012 / MP024-SFX

MP012 / MP024-SXA

MP012 / MP024-SFA

MP012-PXX

MP012-PFX

MP024-IXX

MP024-IFX

RM004 Steel body

MP006 Steel body

MP006 Steel body, flange with additional bearing

MP006 ATEX steel body

MP006 Steel body, flange with additional bearing, ATEX

MP012 Steel body

MP012 Steel body, flange with additional bearing

MP012 ATEX steel body

MP012 Steel body, flange with additional bearing, ATEX

MP012 Plastic body, water-resistant, steel shaft

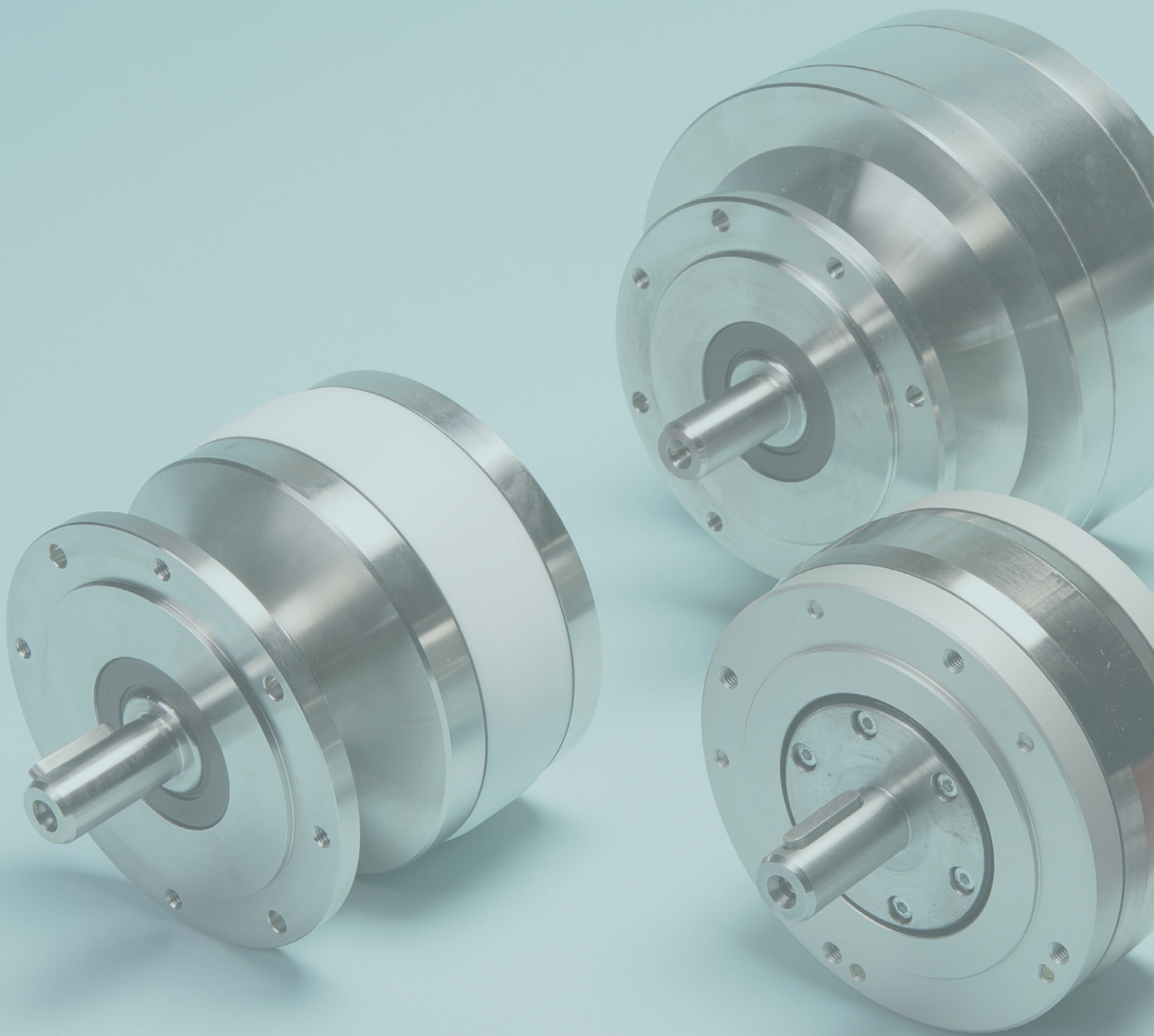
MP012 Plastic body, flange with additional bearing, water resistant, steel shaft

Stainless steel body, water resistant, shaft and stainless steel bottom

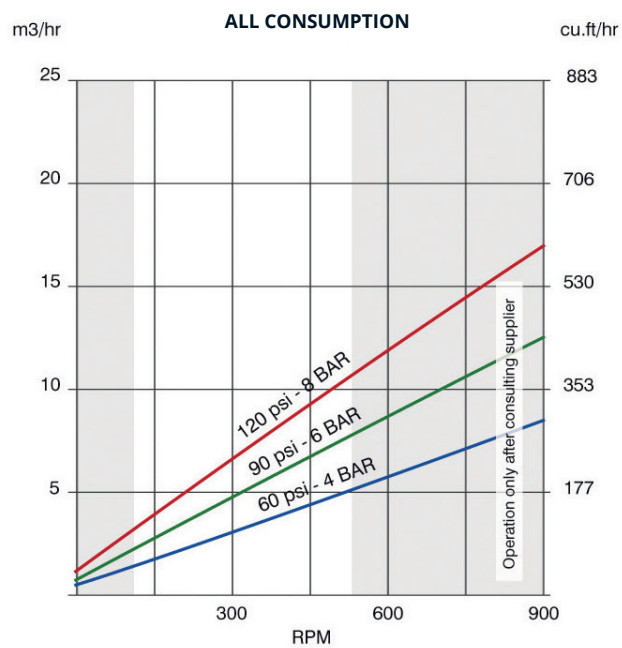
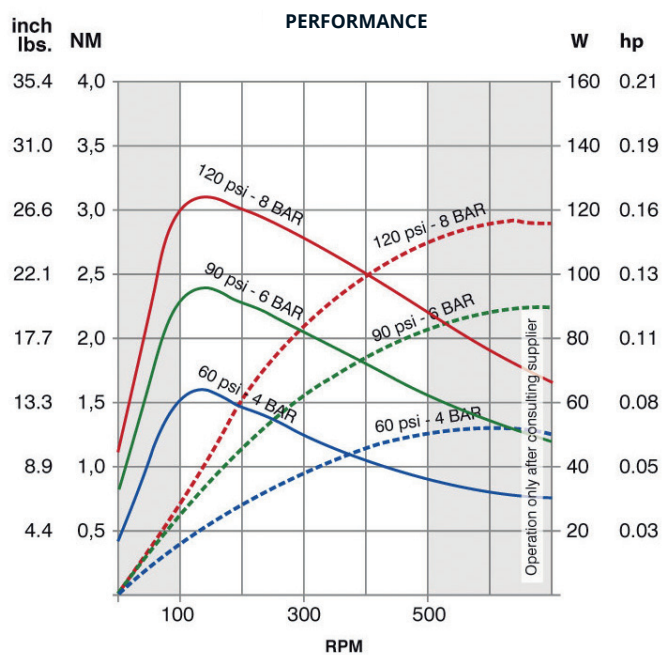
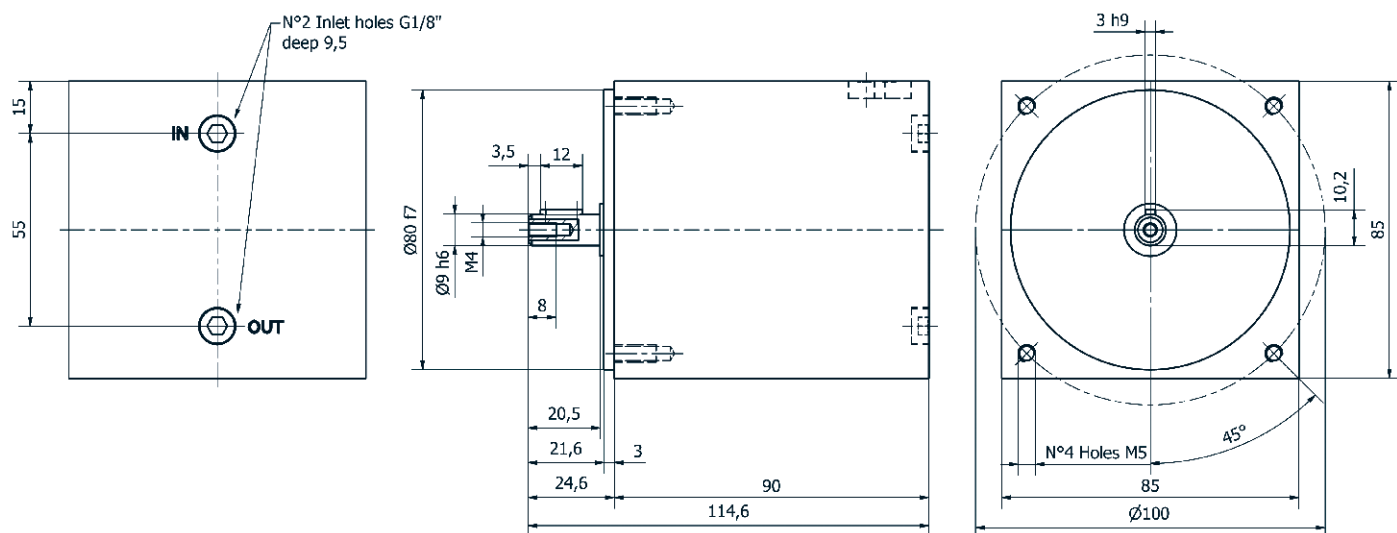
Stainless steel body, water resistant, shaft, stainless steel bottom and flange


PNEUMATIC MOTORS WITH COMPACT PISTONS

Features, dimensions and performance



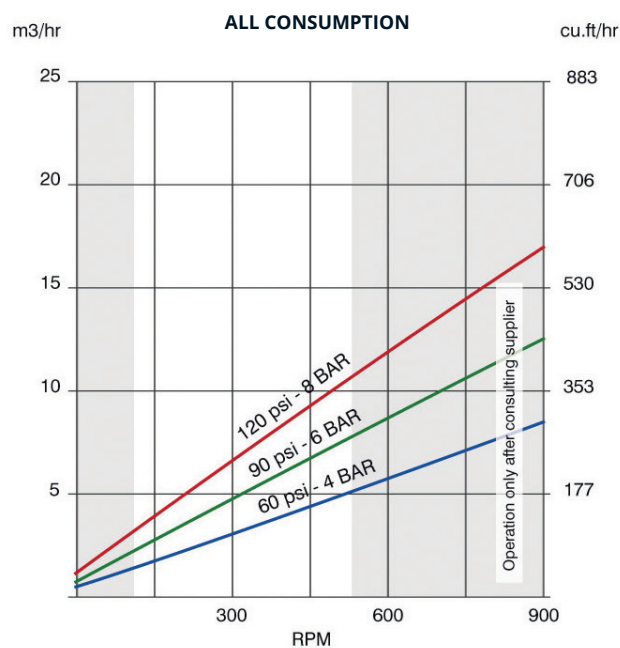
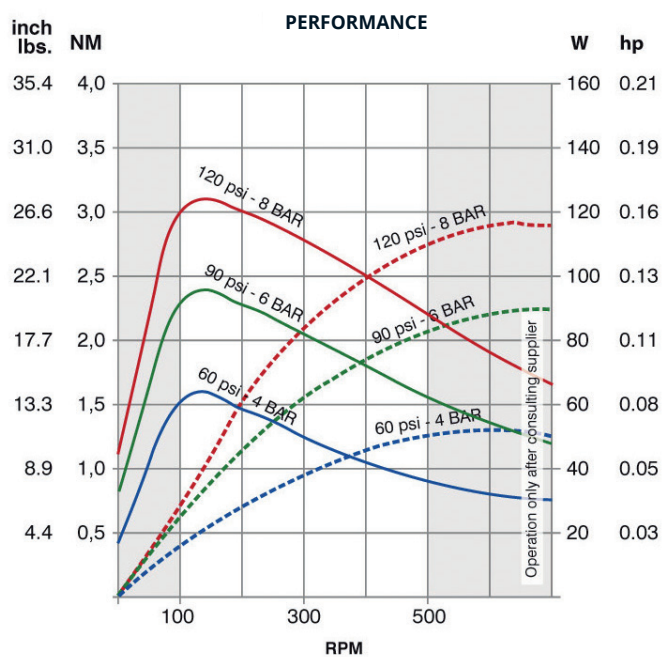
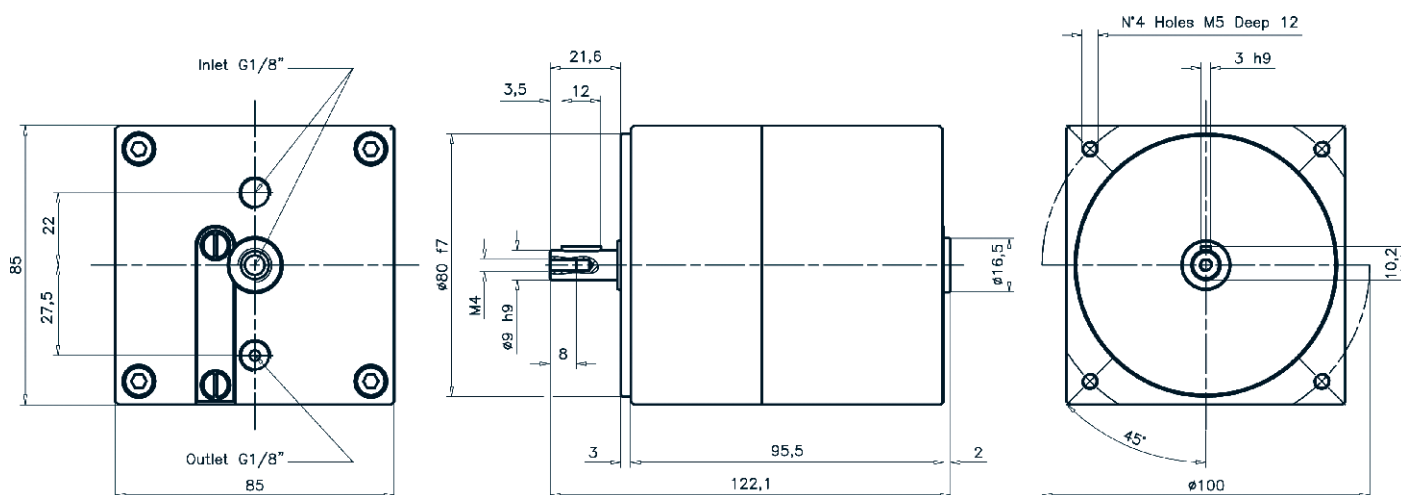
DIMENSIONS MP004 CW,CCW




	Model	Speed-RPM	Torque max	Kg.	IP
	MP004 CW	60-600	0.5 – 3 Nm	2.1	64
	MP004 CCW	60-600	0.5 – 3 Nm	2.1	64

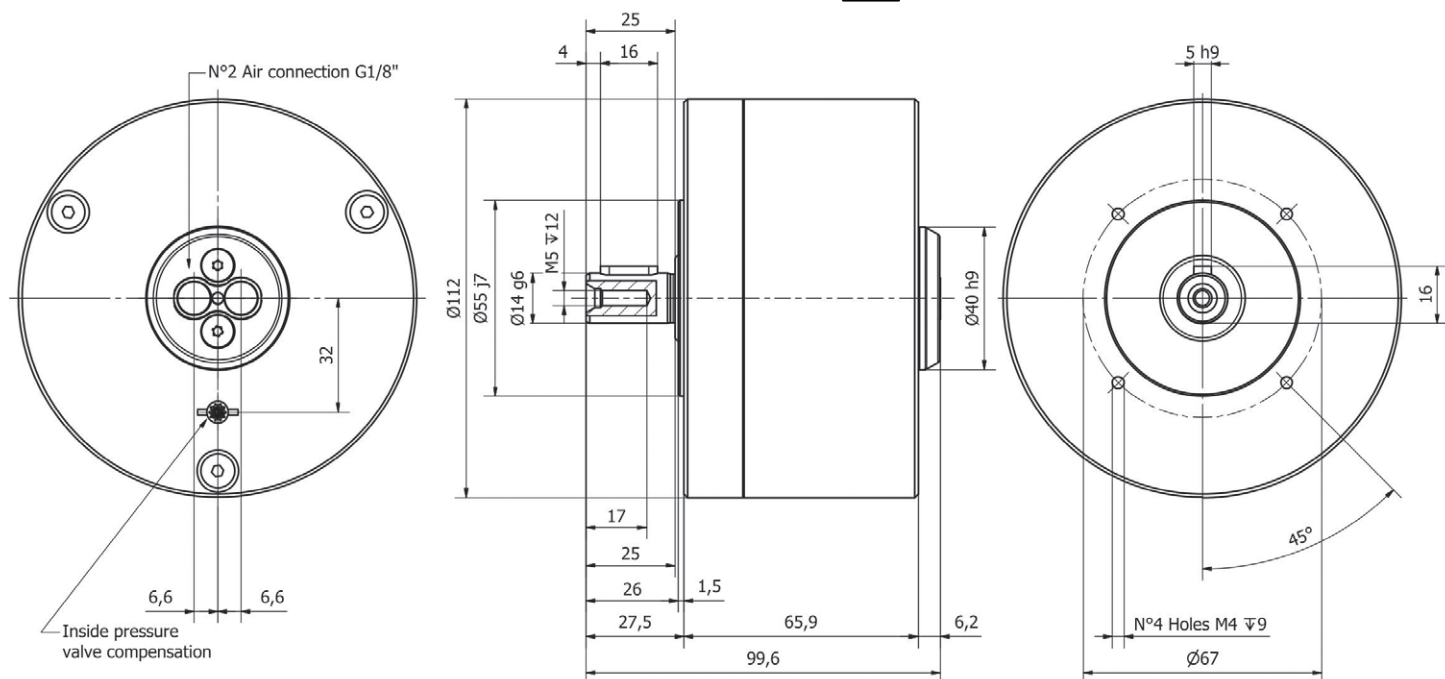


DIMENSIONS MP004 - R

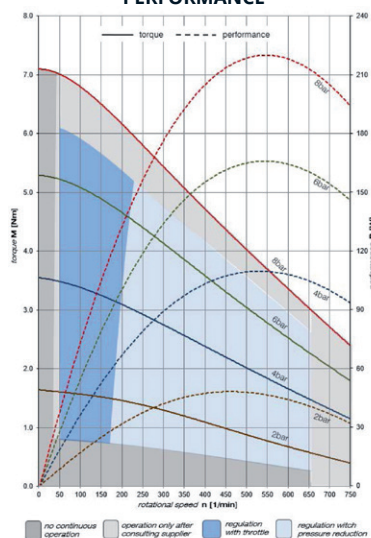


	Model	Speed-RPM	Torque max	Kg.	IP
	MP004 - R	60-500	0.5 - 4 Nm	2.1	64

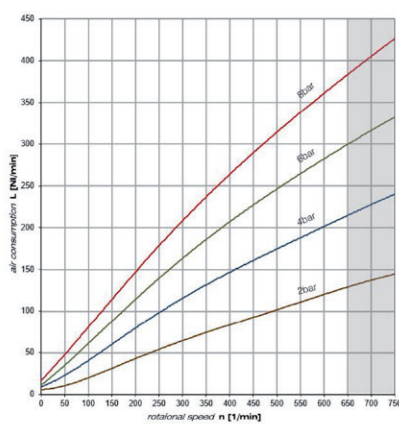
DIMENSIONS MP006 - SXX, IXA, SXA ATEX



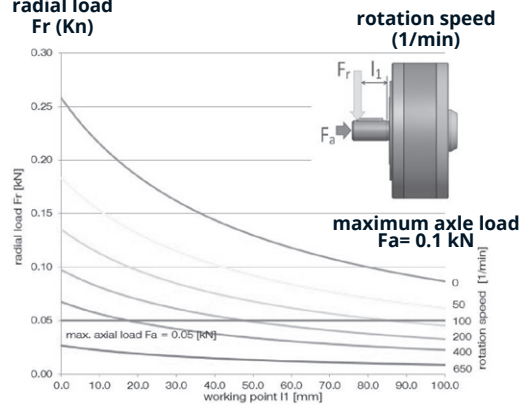
PERFORMANCE



ALL CONSUMPTION



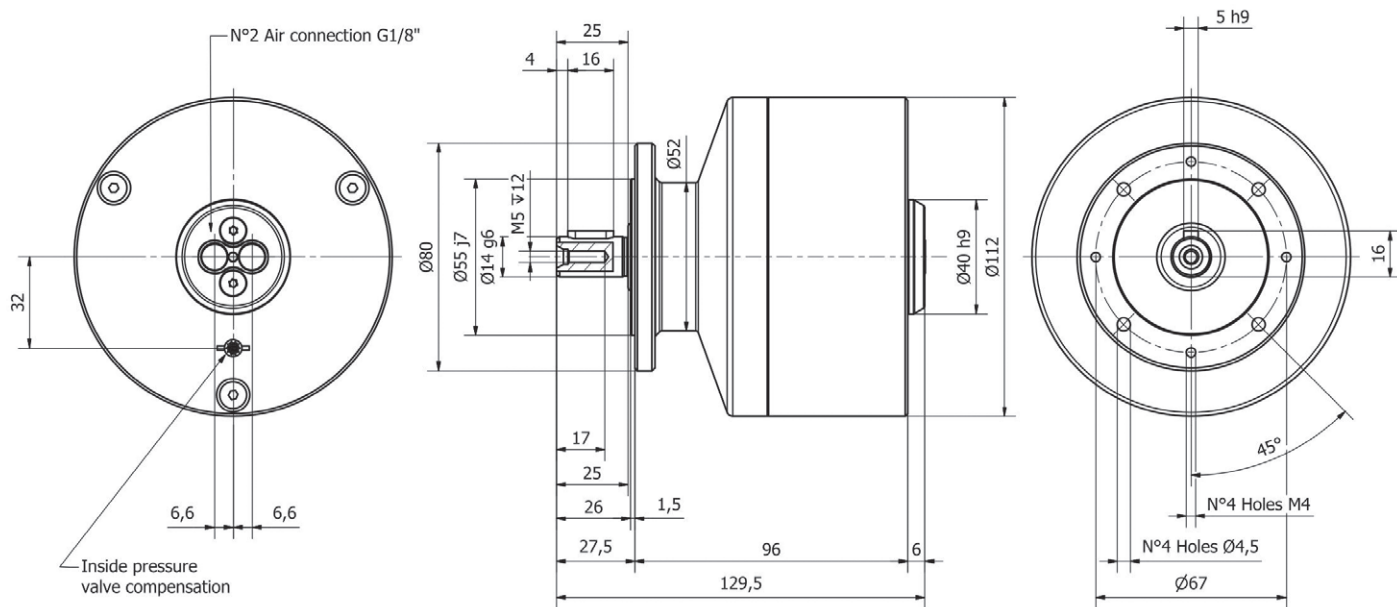
radial load Fr (Kn)



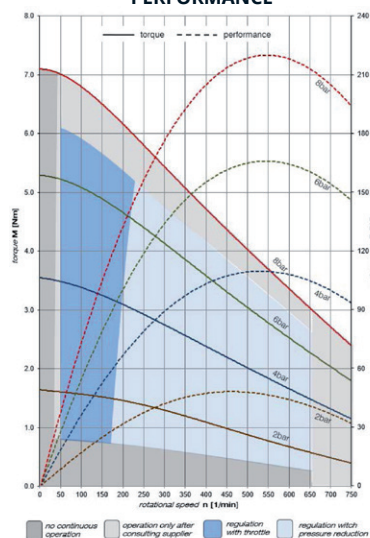
	Model	Speed-RPM	Torque max	Kg.	IP
	MP006-SXX	50-650	6 Nm	2.8	54
	MP006-IXA	50-650	6 Nm	3.3	54
	MP006-SXA ATEX	50-650	6 Nm	2.8	54



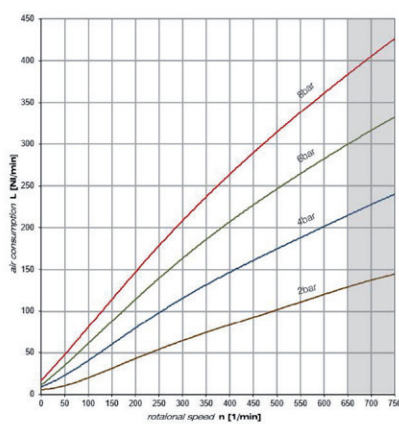
DIMENSIONS MP006 - SFX, IFA, SFA ATEX



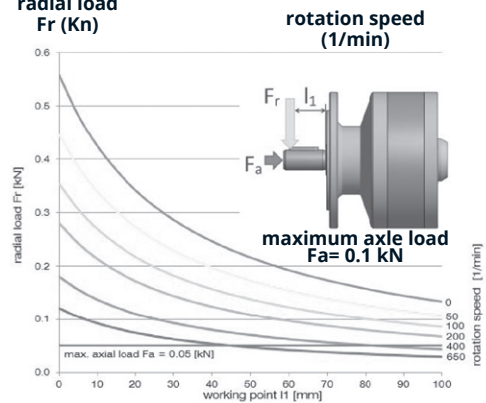
PERFORMANCE




ALL CONSUMPTION

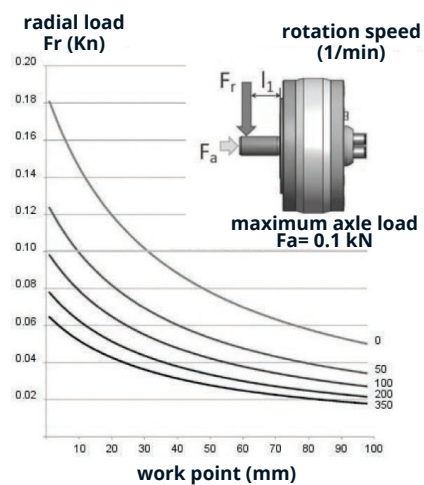
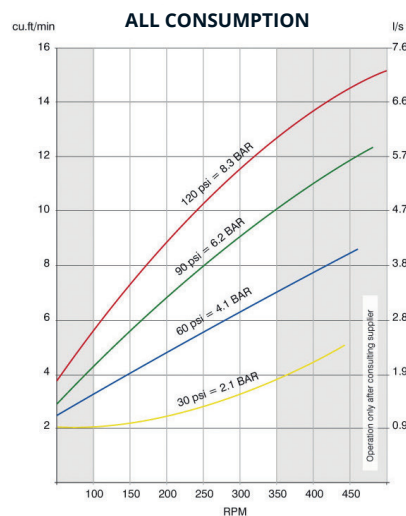
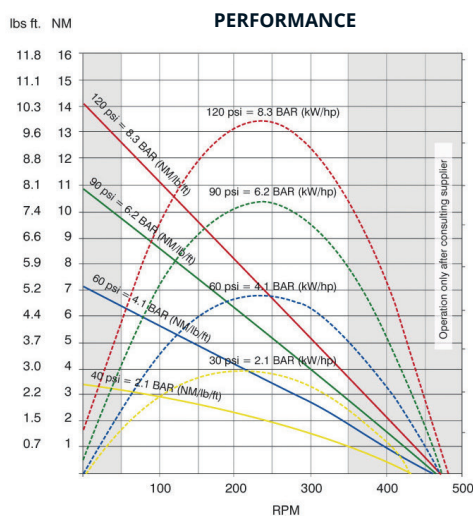
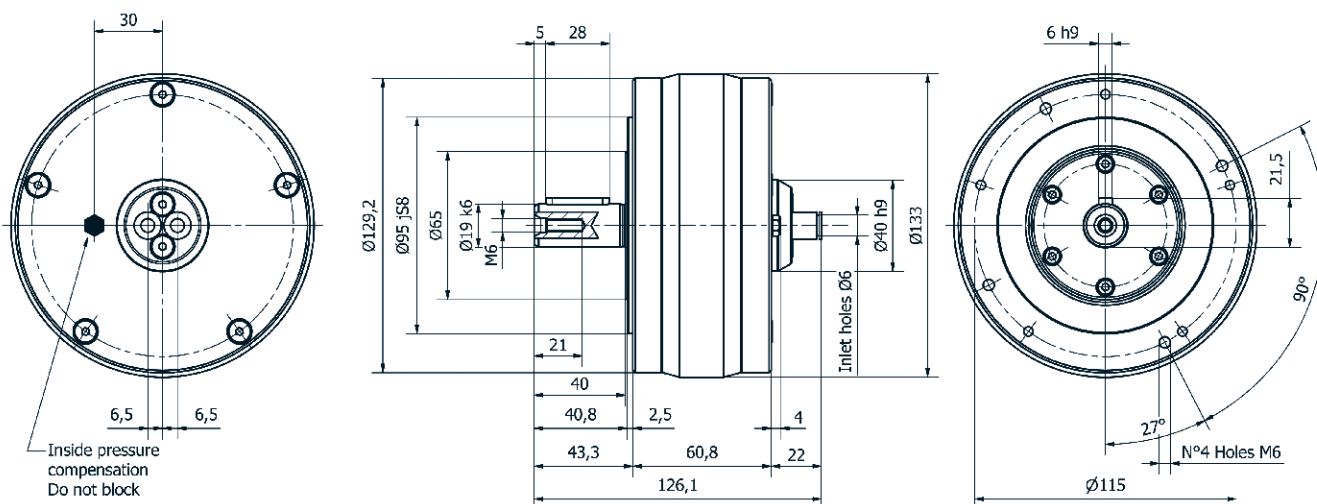



radial load Fr (Kn)



	Model	Speed-RPM	Torque max	Kg.	IP
	MP006-SFX	50-650	0.5-6 Nm	3.1	54
	MP006-IFA	50-650	0.5-6 Nm	3.9	54
	MP006-SFA ATEX	50-650	0.5-6 Nm	3.1	54

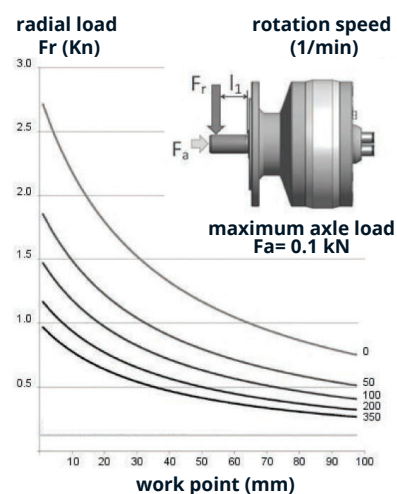
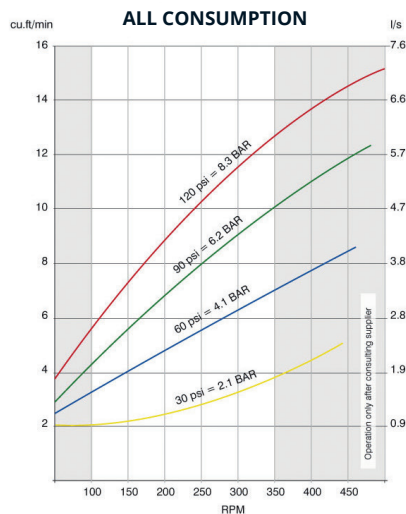
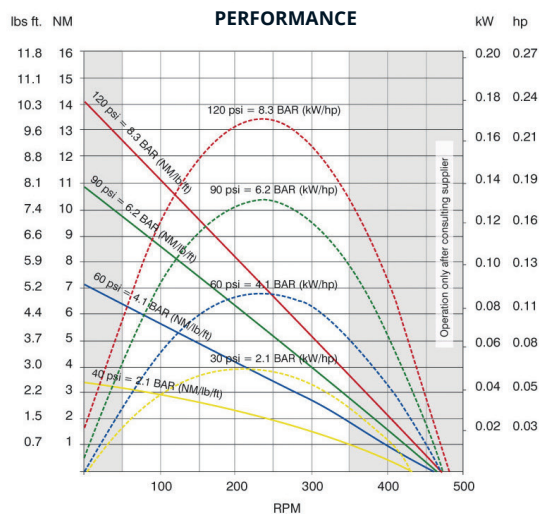
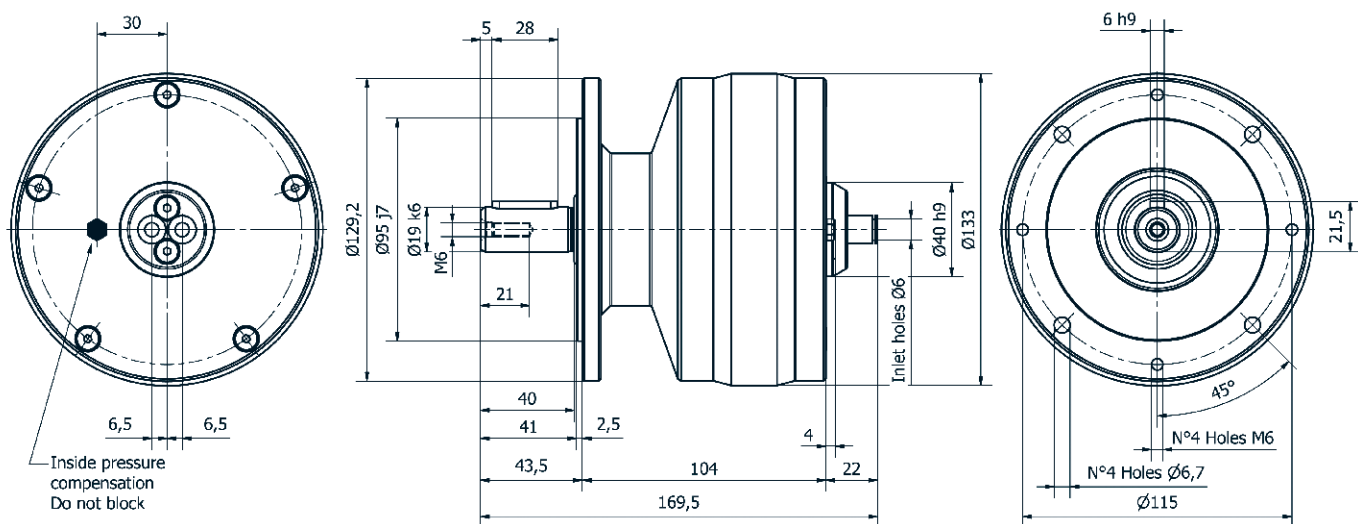
DIMENSIONS MP012 - SXX, PXX, SXA ATEX




	Model	Speed-RPM	Torque max	Kg.	IP
	MP012 - SXX	50 - 350	0.5 - 14 Nm	3.8	50
	MP012 - PXX	50 - 350	0.5 - 14 Nm	4.2	50
	MP012 - SXA ATEX	50 - 350	0.5 - 14 Nm	4.2	64

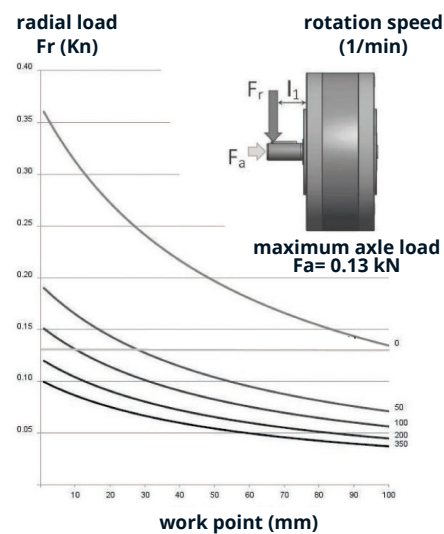
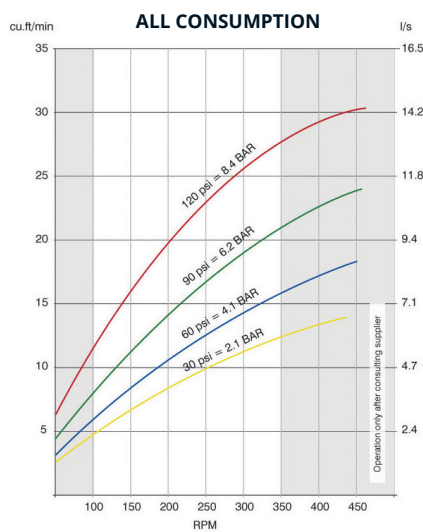
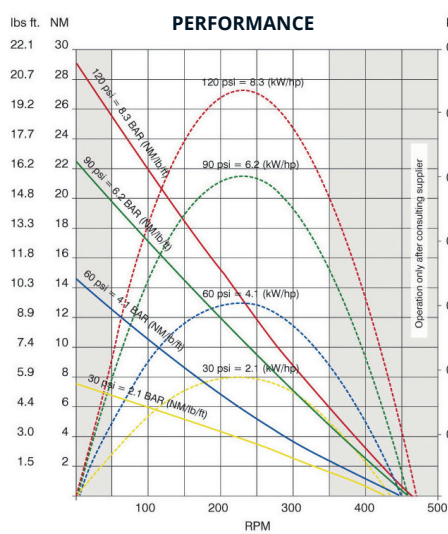
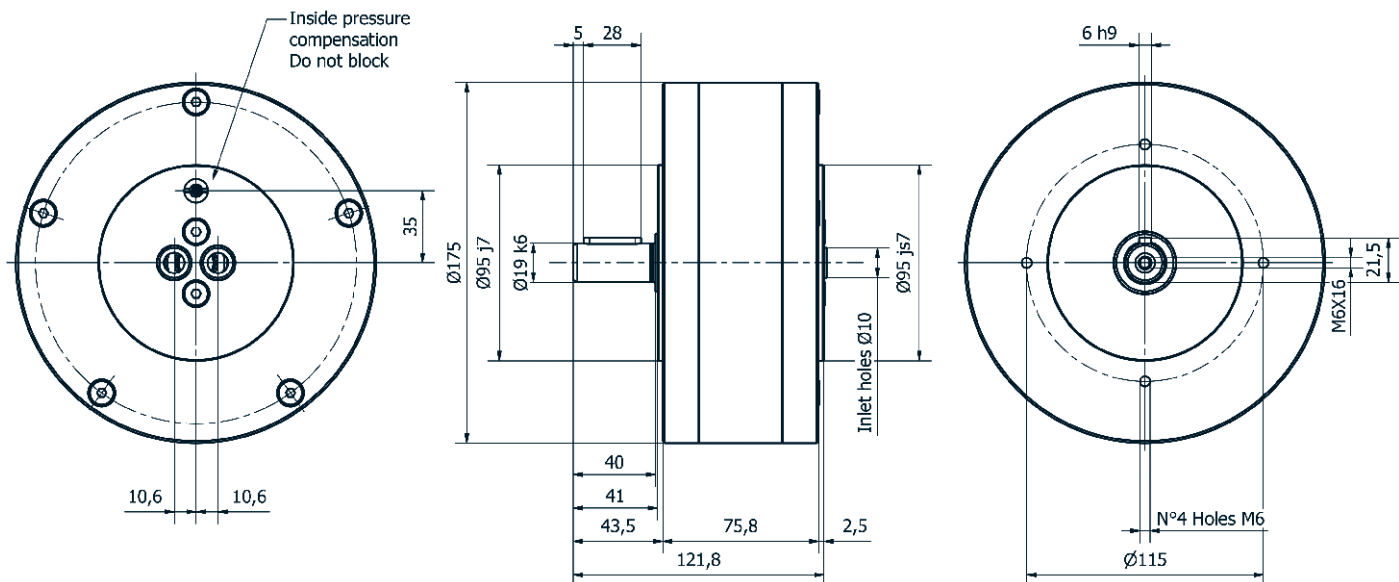



DIMENSIONS MP012 - SFX, PFX, SFA ATEX



	Model	Speed-RPM	Torque max	Kg.	IP
	MP012 - SFX	50 - 350	0.5 - 14 Nm	4.6	50
	MP012 - PFX	50 - 350	0.5 - 14 Nm	5.8	50
	MP012 - SFA ATEX	50 - 350	0.5 - 14 Nm	5.8	64

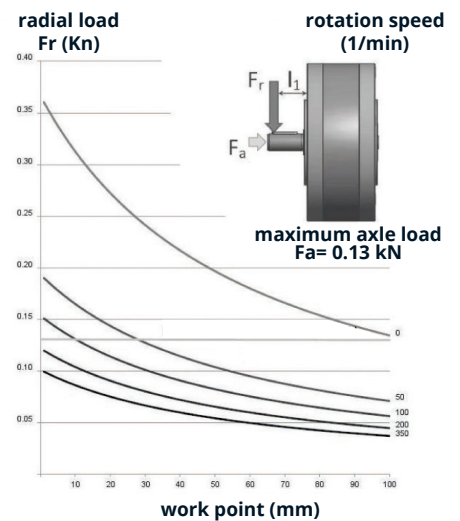
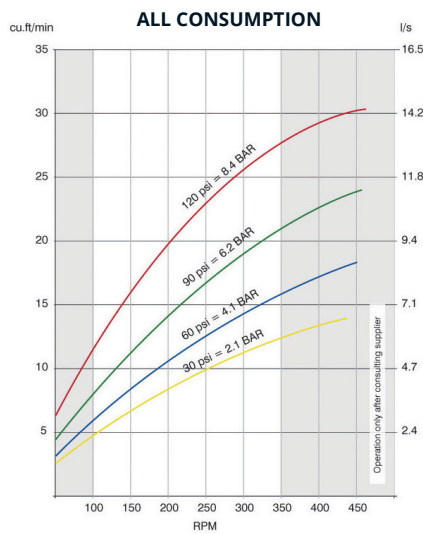
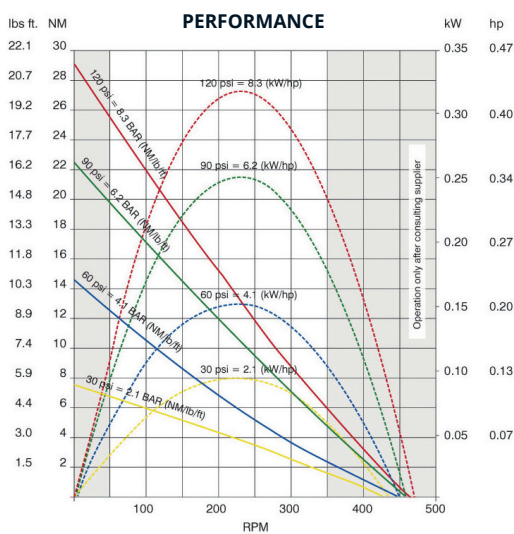
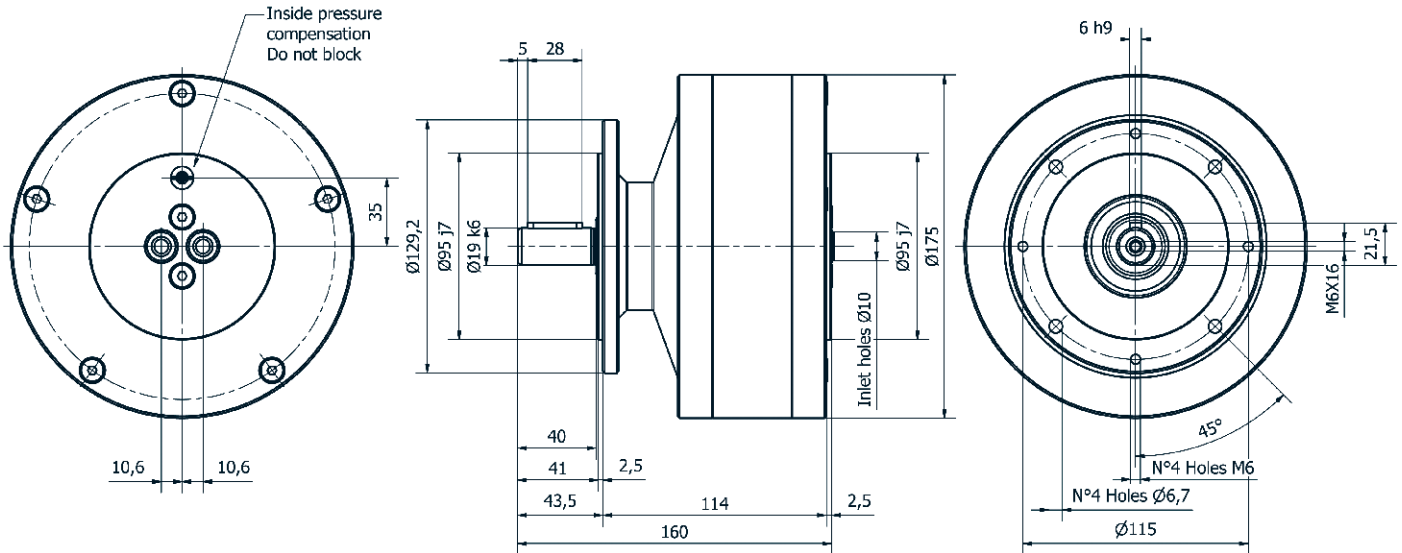
DIMENSIONS MP024 - SXX, IXX, SXA ATEX




	Model	Speed-RPM	Torque max	Kg.	IP
	MP024 - SXX	50 - 350	1 - 28 Nm	7.6	50
	MP024 - IXX	50 - 350	1 - 28 Nm	10.9	64
	MP024 - SXA ATEX	50 - 350	1 - 28 Nm	10.9	64



DIMENSIONS MP024 – SFX, IFX, SFA ATEX



	Model	Speed-RPM	Torque max	Kg.	IP
	MP024 - SFX	50 - 350	1 - 28 Nm	7.6	50
	MP024 - IFX	50 - 350	1 - 28 Nm	10.9	64
	MP024 - SFA ATEX	50 - 350	1 - 28 Nm	10.9	64

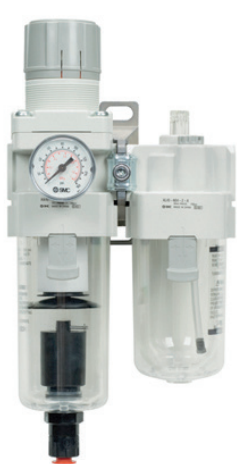
PNEUMATIC ACCESSORIES

TSA offers a pneumatic component programme for air treatment and control of pneumatic motors on premium brands, including SMC, BOSCH, NORGREN, WILKERSON. This programme consists of air treatment units, valves and silencers. The available connections range from G1/4" to G2".

AIR TREATMENT UNITS

All of the filters used have automated condensation discharge, the FRL units are installation-ready and fitted with a pressure gauge.

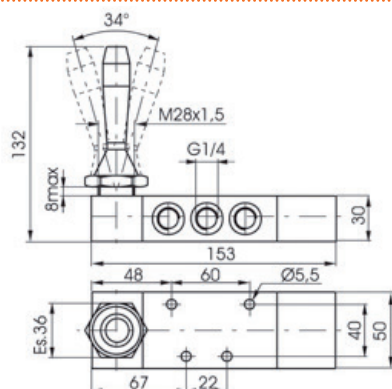
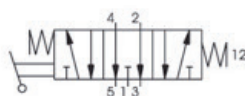
Models	TFRL3/8	TFRL1/2	TFRL3/4	TFRL1	TFRL2
Connection	3/8"	1/2"	3/4"	1"	2"
Max. operating pressure	10 Bar	10 Bar	10 Bar	10 Bar	20 Bar
Max. operating temperature	-5 a +60°C				
Standard filtration rate	8 Micron				
Flow rate in l/sec	56,6	63,2	67,5	149	660



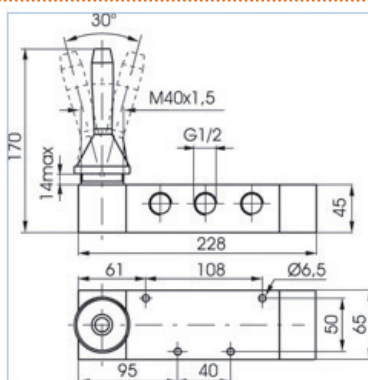
MANUAL OR PNEUMATIC CONTROL VALVES

Easy and quick to install, the default valves fitted on TSA pneumatic motors are 5-way 3-position valves with centres open in idle position, with lever or pneumatic control.

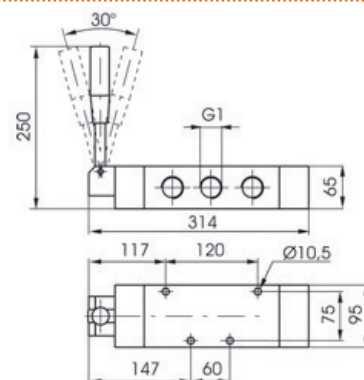
Modelli	VCM1/4	VCM1/2	VCM1	VCP1/4	VCP1/2	VCP1
ConneSSIONE	G1/4"	G1/2"	G1"	G1/4"	G1/2"	G1"
Fluido	Filtered and lubricated air					
Pressione max. d'esercizio	10 bar					
Temperatura	-5°C +70°C					
Portata a 6 bar con $\Delta p = 1$ NI/min	1280	3500	6500	1280	3000	6500
Ø Passaggio nominale	8mm	15mm	20mm	8mm	15mm	20mm
Materiale corpo	Aluminum					
Kg.	0,7	2	5	0,6	1,7	4,2
Pressione minima di pilotaggio	-	-	-	3 bar	3 bar	3 bar
ConneSSIONE pilotaggio	-	-	-	G1/8"	G1/8"	G1/8"



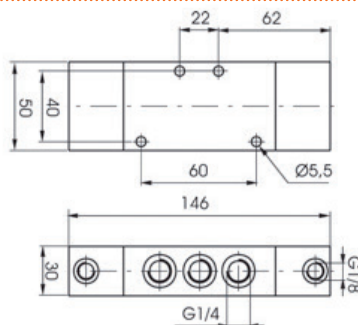
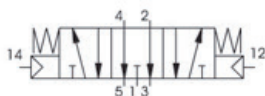
VCM1/4



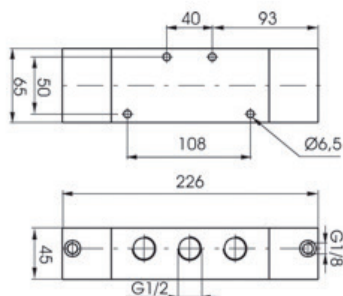
VCM1/2



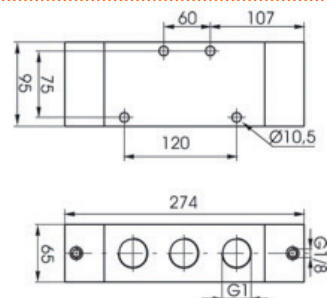
VCM1



VCP1/4



VCP1/2



VCP1

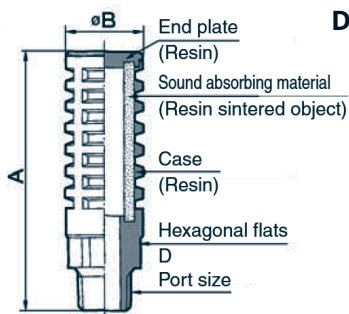
SILENCERS

All motors are fitted with a threaded exhaust gate, which makes it possible to add a silencer in order to reduce the noise level. It is also possible to add another hose between exhaust and silencer which will further reduce the noise level.

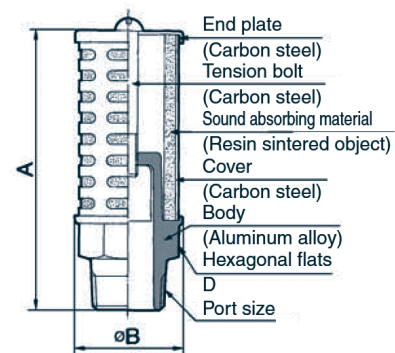


Models	S1/4	S3/8	S1/2	S3/4	S1	S1 1/4
Connection	¼ NPT	3/8 NPT	½ NPT	¾ NPT	1 NPT	1 ¼ NPT
Noise dB reduction	>30 dB(A)					
Fluid	compressed air					
Operating temperature	+5° C – 60° C					
Body	Plastic	Plastic	Plastic	Steel + Plastic	Steel + Plastic	Steel + Plastic

Dimensions S1/4 – S1/2



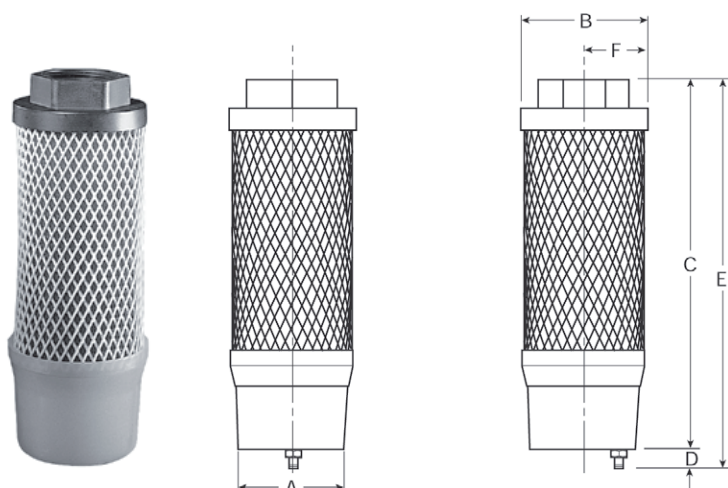
Dimensions S3/4 – S1 1/4



Dimensions	S1/4	S3/8	S1/2	S3/4	S1	S1 1/4
A	63	84	92	107	127	186
B	22	25	30	46	50	74
D	19	22	27	36	41	50

DISSOLATOR / SILENCER FILTER

Models	XMC-C4-000	XMC-C8-000	XMC-CB-000	S3/4	S1	S1 1/4
Connection	½ G	1 G	1 - 1/2 G	107	127	186
Bath capacity	2.2 fl. oz.	5 fl. oz.	5 fl. oz.	46	50	74
Drain	Manual	22	27	36	41	50
oiling	99.9%					
Operating temperature	2° C – 50° C					
Sound reduction	25 dB(A)					
Kg.	0.4					



CONSTRUCTION MATERIALS

Threaded cover	Nylon
Filter element	
Primary	borosilicate cloth
Secondary	PVC fiber
Oil cover of waste	Plastic
Sleeve support	Plastic

Model	A	B	C	D	E	F
XMC-C4-000	51	60	100	10	150.9	30
XMC-C8-000	51	60	148	10	198.9	30
XMC-CB-000	76	87	208	11	284	-

PNEUMATIC MOTORS



GEAR -MOTORS



TELESCOPIC ARMS



ARTICULATED ARMS



ACCESSORIES





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