GLOBE AIRMOTORS B.V.

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Manual

Compact Piston Air Motor

RM006

ATEX certified

II 2G Ex h IIC T5 Gb
II 2D Ex h IIIC T100°C Db

globe-benelux.nl

APPROVALS

ATEX CERTIFICATION

The compact piston motors are ATEX certified according to the following (harmonized) standards:

EN-ISO80079-36:2016
EN-ISO80079-37:2016

The motors are marked with the following EX marking:

II 2G Ex h IIC T5 Gb
II 2D Ex h IIIC T100°C Db
Ta = -10° + 60°C

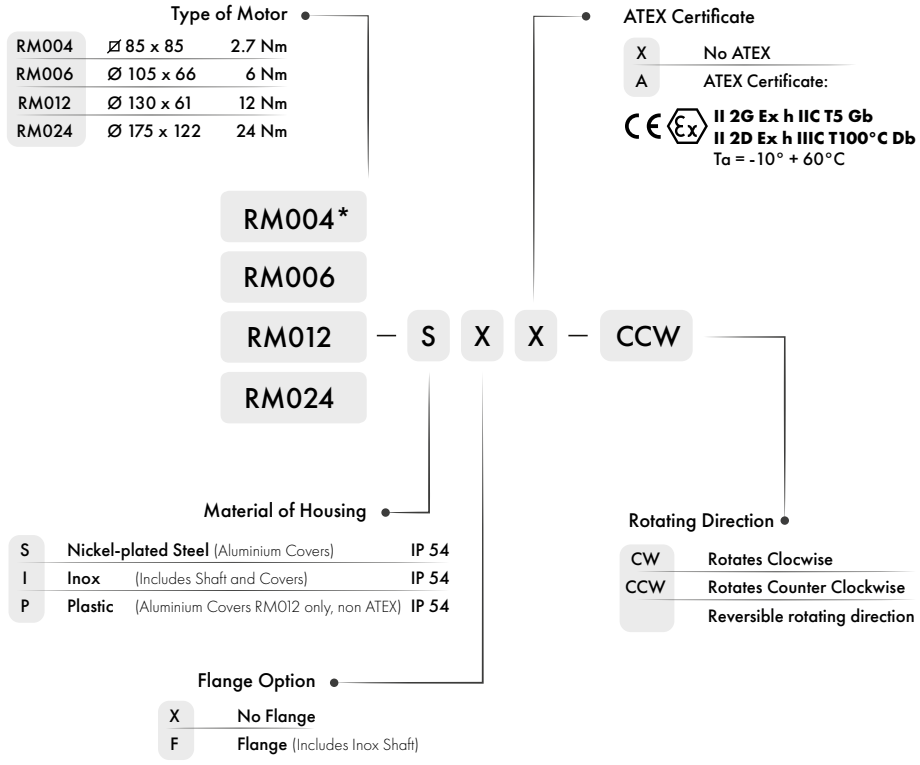
In which:

II	Equipment group II for use above ground
2G	Category 2G for use in Zone 1 or 2
2D	Category 2D for use in Zone 21 or 22
Ex h	Protection by constructional safety "c" Gas
IIC	group IIC
IIIC	Dust group IIIC
T5	Temperature class T5
T100°C	Maximum surface temperature 100°C
Gb	Equipment protection level Gb
Db	Equipment protection level Db
Ta	Ambient temperature range

Inhoud

GLOBE AIRMOTORS B.V.

ORDERING CODE

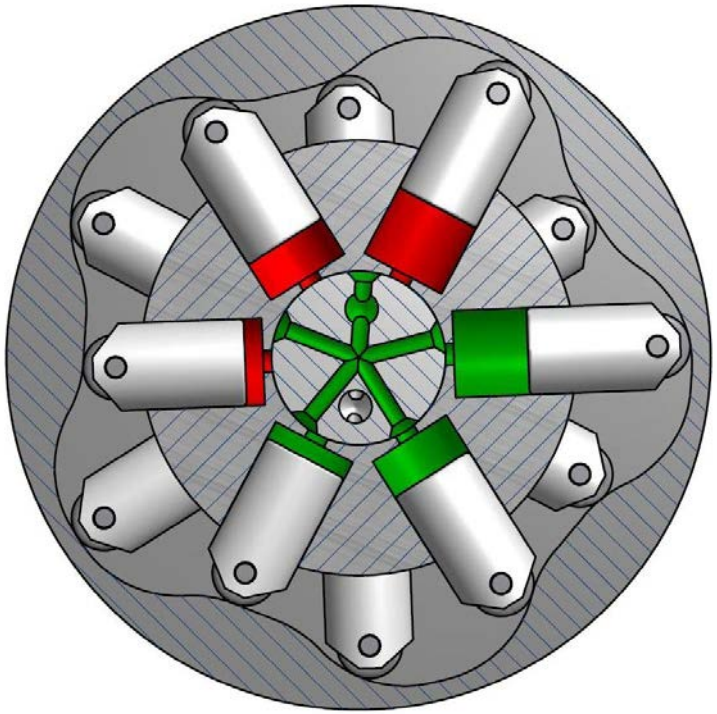


*Standard shaft diameter is Ø9 mm, optional available in Ø14 mm

INFORMATION

OPERATING PRINCIPLE

The radial piston principle presented here operates without rod or crank shaft. The radially arranged driving pistons travel along a curve and are inevitably controlled by the centre.
The static control shaft supplies the driving pistons with the necessary air. Air supply and release openings along the static driving shaft are periodically opened and closed by the rotating shaft to pressurise or depressurise the pistons in an appropriate sequence.
Half of the available driving pistons are actively contributing to the torque at any moment. On reaching the highest point on the curve, the air driving the piston is released by the control unit and the piston is forced into its lowermost position. This operating principle is equivalent to the function of a simple cylinder.



ADVANTAGES AND APPLICATIONS

- A high torque at slow speeds can be generated directly, without any gear transmissions. (cf. electric motors)
- The motor has good characteristics at low speeds and an overload protection. (cf. electric motors)
- The air motor has a maximum starting torque. Variable torque build-up and standstill omit.
- Relatively low air consumption because pistons are the working elements. There is only a low internal friction and the motor has low leakage. (cf. flow air motors)
- Standard connecting dimensions for a combination with a wide range of different gear types.
- Compact construction made of high quality aluminium. The motors are also available as stainless versions with a stainless shaft. For example, for its use in chemically aggressive surroundings.
- The compact piston air motor can be operated with oil free air.
- Low noise emissions. They were determined according ISO 11202 / ISO11200 with a special exhaust air silencer. The noise levels are below 78dB. Hence, there is no requirement for ear protection devices.

Compact piston air motors can be used for a variety of applications. The motors are best suited for medium heavy tasks at low speeds.

Typical applications are:

- agitators
- drive for coils and reels
- rotary table controls
- packaging machines
- power screwdriver
- conveyor drives

CONVEY

STIR

REEL

OPERATION

OPERATING CONDITIONS

Make sure that the following operation conditions are met. These points are very important for the validity of the ATEX certification.

- The ambient temperature is between -10°C and +60°C (14°F and 140°F)
- The loads must not exceed the allowed values in the diagram (cf. page 13).
- The operation pressure ranges between 2 and 7 bar (30 - 105 PSI).
- The maximum rotation speed must be kept below 650 rpm.
- The compressed air is filtered; filtration ≤ 5µm.
- The supply air is sufficiently dried
  The expansion of the air leads to a strong temperature drop on the exhaust air side of the motor. If there is some water left after an inadmissible drainage and/ or if the air is not sufficiently dried, the motor will corrode on its inside due to condensation or ice. Use an air drier and make sure that the exhaust pipe is sloped downwards to prevent water entering the motor when not in use.
- For correct connection of the motor hoses, please consult the air flowchart on page 10. Regulators and valves should be installed near the motor and the supply air lines should be kept short.
  It is recommended to use exhaust air lines with a larger cross section. The motor will be able to deliver its maximum power.
- The motor ventilation on the backside is not blocked and the housing leak air can disperse freely in the ambience.
  Optionally the mounted filter can be replaced by an air hose to transport the leak air separately. It is important to avoid a „knocking sound" when the motor is running. To prevent motor failure make sure that the pressure in the exhaust air line is higher as in the leak air connection. If this is impossible, a throttle has to be installed in the exhaust air line.
- Do not run the motor without load and/or throttle. Risk of overspeeding (higher than 650 rpm) is high. Overspeed will cause in short time major motor failure. If the motor was once run with too high rotation speed on zero load, the motor cannot be used in ATEX surroundings anymore.
- The air supply is checked regularly and the condensed water is drained off.
- A weekly visual inspection is performed by technically qualified personnel.
- Dust and moisture influence takes place according the protection class.
- Please note: The motor should be connected to the ground with a maximum earth resistance of 1 MΩ (ohm). The motor can be earthed by connecting the motor to a base plate/gearbox etc.
- Check that products to be driven by the air motor meet the ATEX or IECEx approval.
- Remove excessive dust and / or debris from motor surface.

WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD

Before use clean only with damp cloth.

- Check the intake air environment for potentially explosive oils, acids, gases, vapours or radiation.
- Check that the motor is not pressurized when not in use (control valves).
- The intake air should always be taken from a non-hazardous area.
- The outlet air should always be guided outside the Ex-Zone. This also helps to provide any oil/grease-leaks from the exhaust openings, which may occur if there is only a silencer mounted.
- The operating time has to be as certained in order that the spare parts are available and can be changed before their breaking point.
- In case that the motor is exposed to high vibrations, during operation and when not in operation, please contact the manufacturer. High vibrations might lead to a reduced inspection interval of the bearings.

- **Mounting positions**
  It is important that no dust or debris can accumulate at the output shaft. This may damage the shaft seal. If the motor is build in a system/construction (closed construction) so that no dust or debris can get in contact with the output shaft the motor can be used in any orientation. If the motor is used in such way that the output shaft is in contact with explosive environment the mounting position is limited from horizontal to vertical downwards. It is not allowed for the shaft to point in any angle upwards.

INSTALLATION

The compact piston air motor RM006 may only be put into operation, if it is determined that the machine, in which the motor is installed, conforms to the provisions of the machinery directive 2006/42/EC. Make sure that:

- The operating conditions (see above) are maintained and can be guaranteed for a long time.
- It should be able to switch off the motor manually with an emergency shut off valve (not supplied with motor). The shut off valve must be signalled and it must be easily accessible.
- The motor is not used in safety-related braking or clamping applications.

The original EC declaration of incorporation according to the machinery directive 2006/42/EC can be obtained from GLOBE air motors. GLOBE Airmotors is committed to forward this document electronically to a reasoned request.

WARRANTY

The GLOBE Compact Piston air motor is designed for reliable operation with low maintenance. This is only guaranteed, if the regulations concerning installation, operation, maintenance and repair are observed. Problems occurring during the guarantee period are corrected in accordance to GLOBE air motors guarantee conditions. All results of unauthorised replacements and alterations are at the operator's expense. In case of unauthorised opening and repair work carried out during the guarantee period by the operator, renders the guarantee invalid.

OPERATION

MAINTENANCE

The motor is designed to withstand an operating time up to 10’000 hours in which the pistons are designed to last up to 2’500 hours. (This operation times are calculated with maximum loads and unfavourable installation conditions.) To make sure that the motor is working properly for Ex-suited tasks, it is necessary that the motor is maintained. The pistons should be replaced every 2’500 hours. After 10’000 hours of operating time, all ball bearings and gaskets have to be changed as well as possible damaged parts.
Do not open when an explosive atmosphere is present.

Summary of the hazards with protective means:

Hot surfaces - misalignment	Check for misalignment which can cause heat up of the bearings
Hot surfaces – bearings	Bearings shall be inspected an replaced according to operation and replacement instructions as mentioned in this manual.
Hot surfaces – deposit	Prior to start up remove all deposit of the surface
Electrostatic charging	The motor shall be bonded together to other metal parts and to earth with a earth resistance of maximum 1 MΩ.
Electrostatic charging	Before use, clean only with damp cloth.

MOTOR TYPES

The RM006 motor is available as a reversible design (standard motor) or not reversible design (directionally optimized motor).

Reversible motors

- Are the standard motors
- Can be controlled in both ways

Not reversible motors

- Are one directionally optimized (CW or CCW version)
- Can only be controlled in one way
- Due to technical optimization the air consumption is reduced
- Have a greater operating range

CW (clockwise): *The motor has a clockwise optimized running direction but can only be controlled in this very direction!*

CCW (counter clockwise): *The motor has a counter clockwise optimized running direction but can only be controlled in this very direction!*

PERFORMANCE REGULATION

With the regulation of the volume flow rate, the performance can be adapted to the individual application. This is made by pressure or throttle regulation. The compressibility of the air generates a dampening effect in all ranges. This allows that the motor also can be started, while it is loaded. With a load reduction, the motor reacts immediately with an increase in speed.

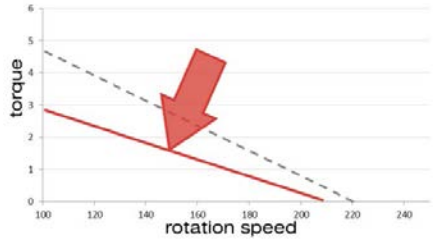
Pressure regulation
When the supply pressure is decreased, the starting torque is reduced proportionally and the torque curve becomes flatter. The loads in the motor are also reduced, which increases its durability.

Throttle regulation
By throttling, the starting torque remains essentially the same but the torque curve is steeper. This means that under the same load fluctuation, the speed fluctuation is smaller in comparison with the pressure regulation. There is a distinction made between the following installation positions:

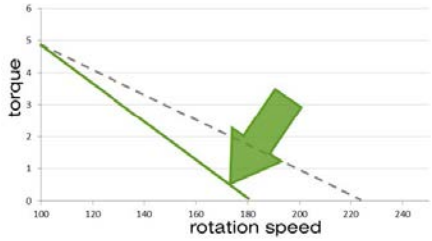
Supply air throttling
The supply air throttling generates better results in relation to the durability, the running smoothness and the air consumption.

Exhaust air throttling
The exhaust air throttling is the less optimal way of throttling relating to the durability and the air consumption. The advantage of this method is that the rotational speed can be regulated constantly in the lower rotation range. In the border area of the rotation range, a combination of supply- and exhaust air throttling should be used. The exhaust throttling should be used for controlling low speed of rotation.

Pressure regulation

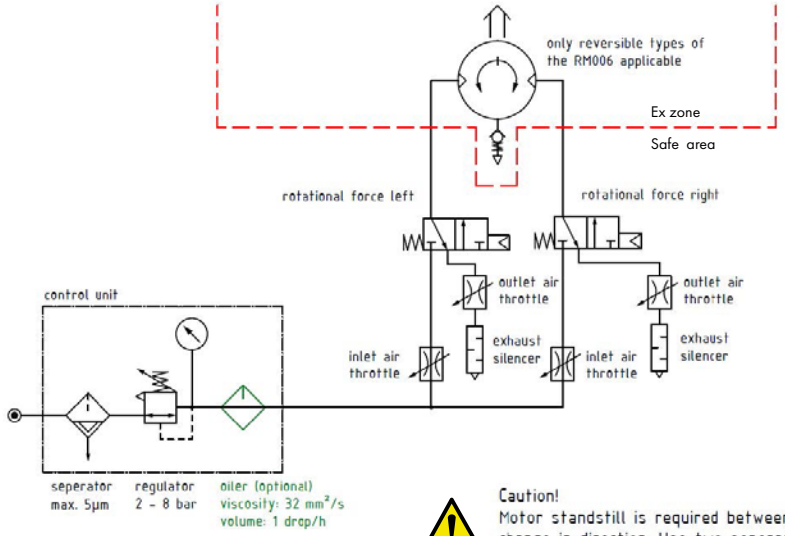


Throttle regulation



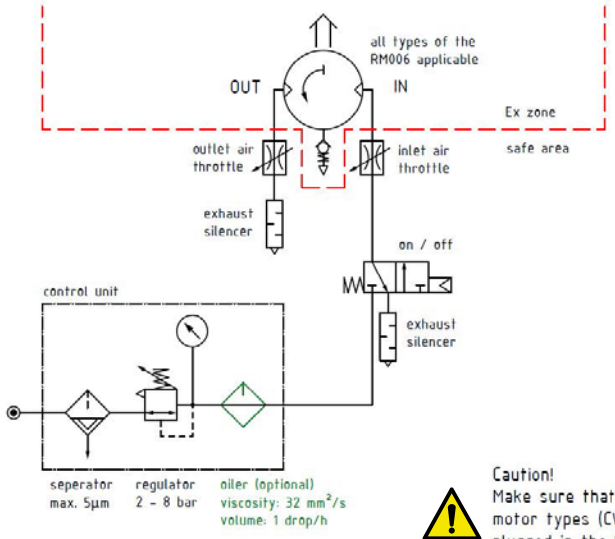
PNEUMATIC CONTROL

REVERSIBLE (standard version)



Caution!
Motor standstill is required between change in direction. Use two seperate direction cotrol valves to provide this!

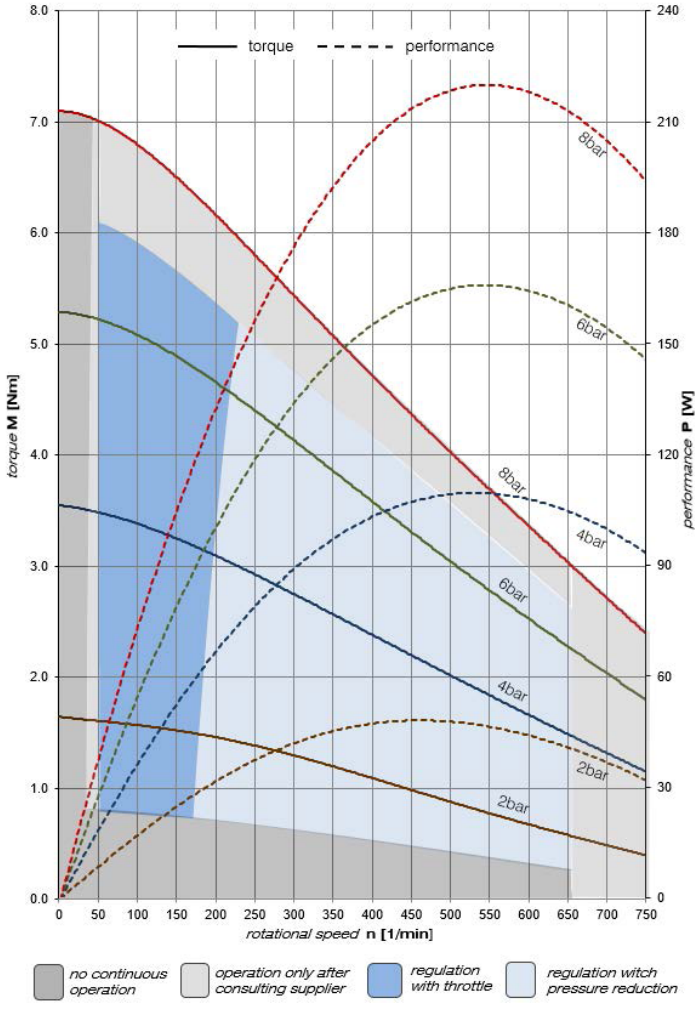
NOT REVERSIBLE (CW / CCW)



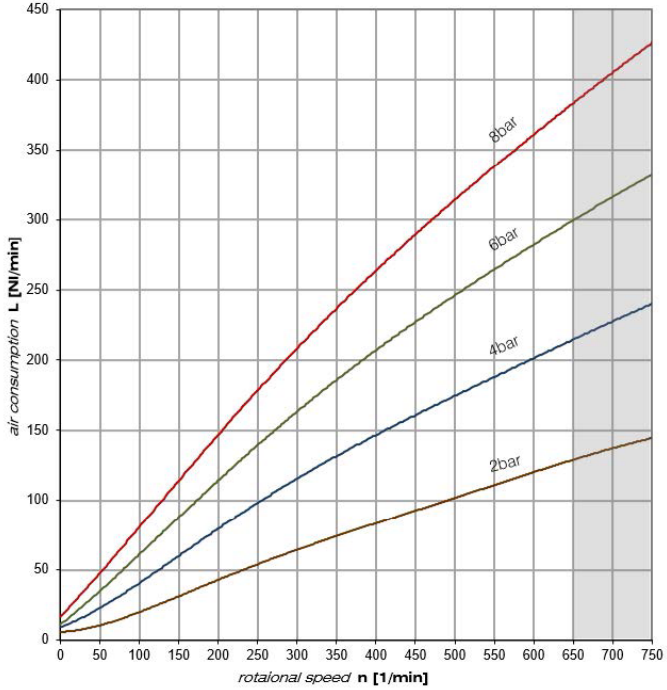
Caution!
Make sure that for the not reversible motor types (CW/CCW) the supply air is plugged in the "IN" marked port.

PERFORMANCE REVERSIBLE

This performance diagram applies for all reversible motor types: RM006-SXA, IXA and RM006-SFA, IFA. The values were determined with the control "not reversible" and an exhaust silencer, which was mounted directly on the motor.



AIR CONSUMPTION



The diameters of the supply tubes must be properly selected to fulfil the air consumption. It must be considered that the flow rate and hence, the achievable performance decrease with increased tube length.
Reference values can be taken from the following table:

airflow rate supply air (6 bar)

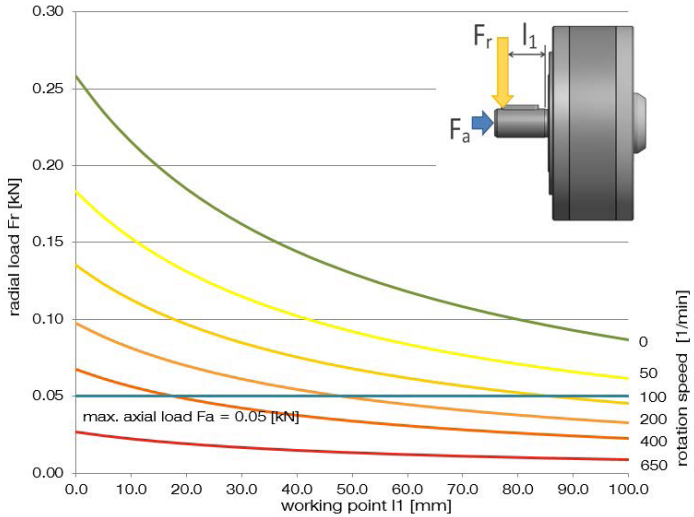
tube length [m]	0.1	0.5	1	2	5
tube 6/4 [$^{Nl}/_{min}$]	>400	>400	>400	300	180

airflow rate exhaust air (0.5 bar)

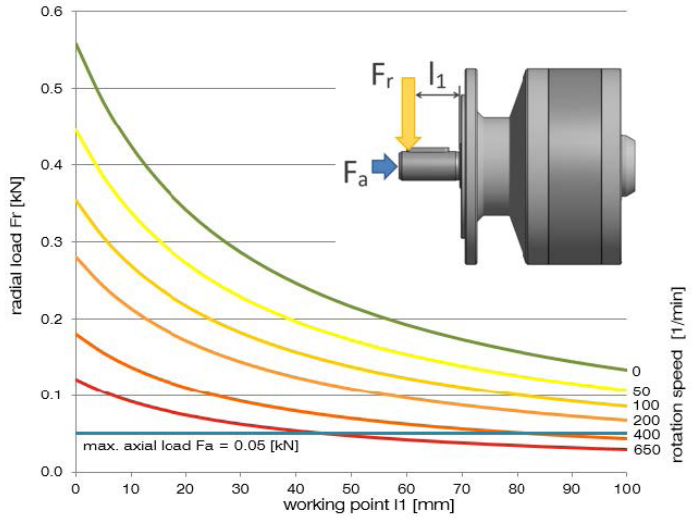
tube length [m]	0.1	0.5	1	2	5
tube 6/4 [$^{Nl}/_{min}$]	230	300	70	50	30
tube 8/6 [$^{Nl}/_{min}$]	>400	300	200	150	100

LOAD DIAGRAMS

RM006-SXA / RM006-IXA



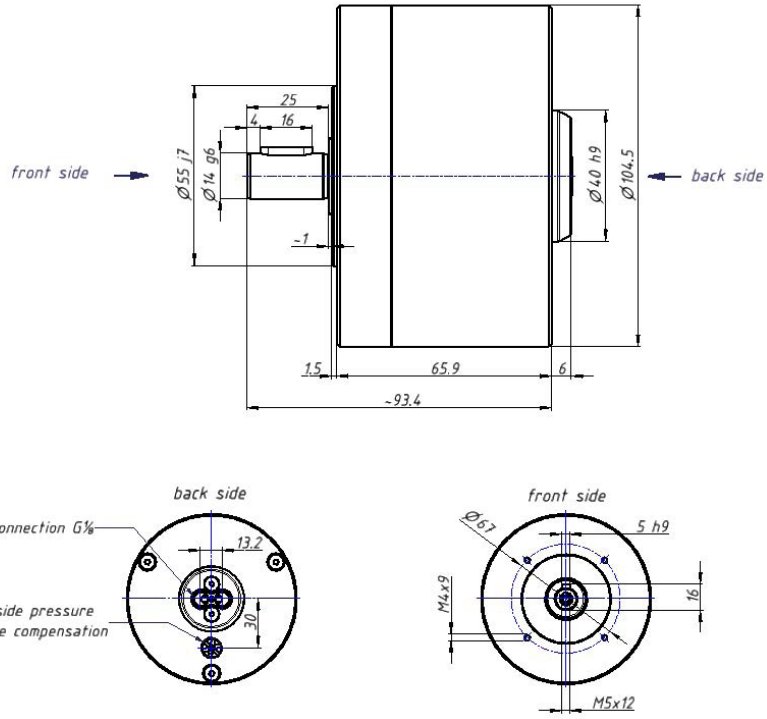
RM006-SFA / RM006-IFA



DIMENSIONS

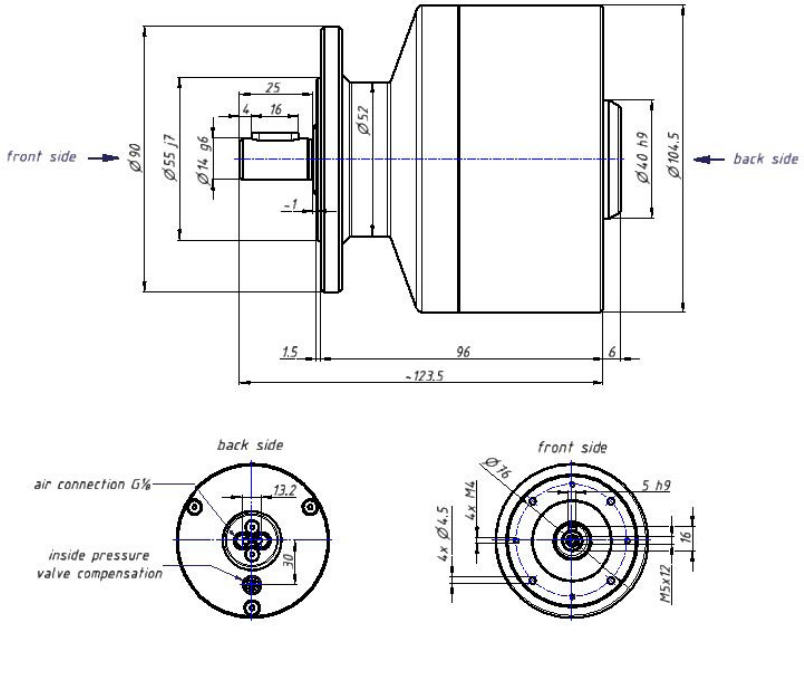
RM006-SXA / IXA REVERSIBLE

type	Rotation speed	torque	weight	IP
RM006-SXA	50 – 650 rpm	6 Nm	2.8 kg	54
RM006-IXA	50 - 650 rpm	6 Nm	3.3 kg	54



RM006-SFA / IFA REVERSIBLE

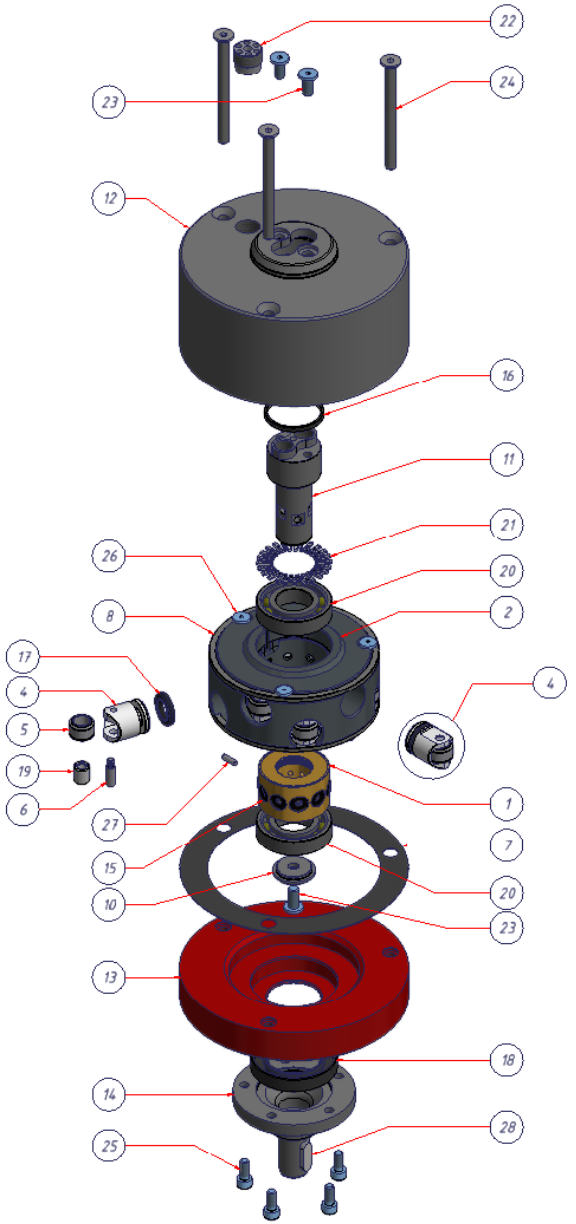
type	Rotation speed	torque	weight	IP
RM006-SFA	50 – 650 rpm	6 Nm	3.1 kg	54
RM006-IFA	50 - 650 rpm	6 Nm	3.9 kg	54



PARTS LIST RM006-SXA

pos.	qty.	item	part number
1	1	control ring	3006-00-02
2	1	rotor	3006-00-05
3	10	piston complete	3006-00-06
4	10	piston	3006-00-04
5	10	unwinding axis	3001-12-07
6	10	axis	3001-12-08
7	1	sealing disc	3006-00-09
8	2	support ring	3006-00-10
9	3	centering	186717
10	1	clamping disc	3006-00-15
11	1	control pin	3006-00-40
12	1	stator	3006-00-44
13	1	case cover	3006-00-06
14	1	drive shaft	3006-00-13
15	10	o-Ring	0113-255931
16	1	o-Ring	0101-001336
17	10	piston seal	11.6241.0101
18	1	radial shaft seal	ASL 24-40-7
19	10	needle bush	HK 0408-G105 GPR
20	2	deep groove ball bearing	16003-2RS
21	1	starspring	1051-034001
22	1	check valve	RVE 6 ETG 100
23	3	cylinder head screw (lower head)	FN190-M5x10-A2
24	3	countersunk screw	DIN 7991-M5x60-A2
25	5	cylinder head screw	DIN 912-M4x10-8.8
26	6	cylinder head screw (lower head)	BN9524-M4x8-8.8
27	1	pin	ISO 2338-2.5 h8x8-St
28	1	key	DIN 6885-A 5x5x16-St

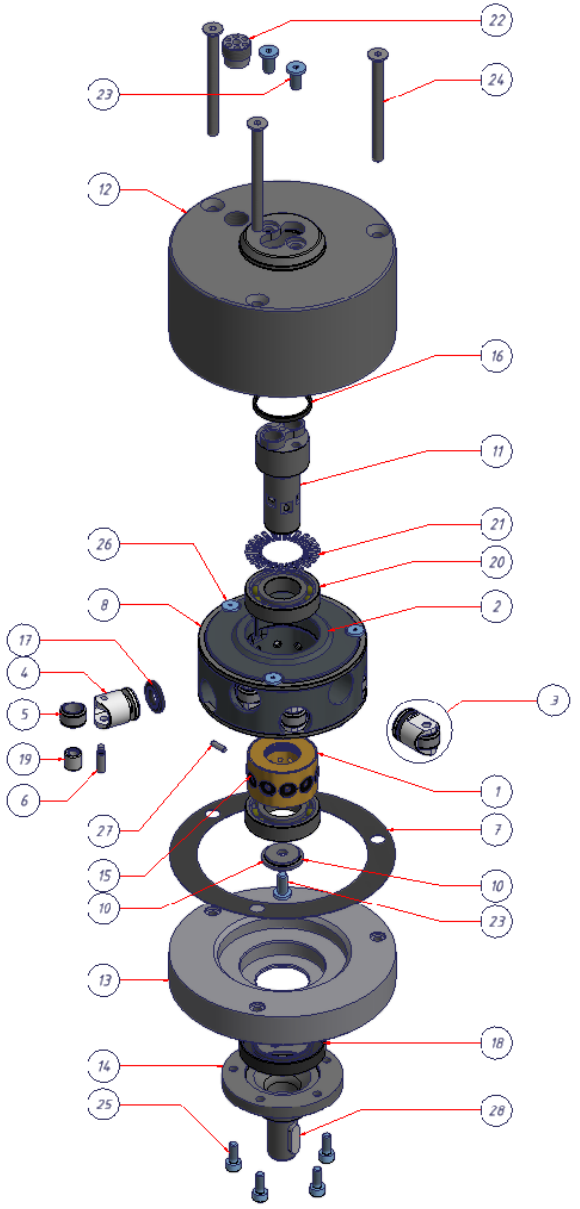
All components of the RM006-SXA, which are listed in the parts list, are depicted and positioned in the graphic below. The representation applies for the reversible as well as the not reversible motor types



PARTS LIST RM006-IXA

pos.	qty.	item	part number
1	1	control ring	3006-00-02
2	1	rotor	3006-00-05
3	10	piston complete	3006-00-06
4	10	piston	3006-00-04
5	10	unwinding axis	3001-12-07
6	10	axis	3001-12-08
7	1	sealing disc	3006-00-09
8	2	support ring	3006-00-10
9	3	centering	186717
10	1	clamping disc	3006-00-15
11	1	control pin	3006-00-40
12	1	stator	3006-00-44
13	1	case cover	3006-00-06
14	1	drive shaft	3006-00-13
15	10	o-Ring	0113-255931
16	1	o-Ring	0101-001336
17	10	piston seal	11.6241.0101
18	1	radial shaft seal	ASL 24-40-7
19	10	needle bush	HK 0408-G105 GPR
20	2	deep groove ball bearing	16003-2RS
21	1	starspring	1051-034001
22	1	check valve	RVE 6 ETG 100
23	3	cylinder head screw (lower head)	FN190-M5x10-A2
24	3	countersunk screw	DIN 7991-M5x60-A2
25	5	cylinder head screw	DIN 912-M4x10-8.8
26	6	cylinder head screw (lower head)	BN9524-M4x8-8.8
27	1	pin	ISO 2338-2.5 h8x8-St
28	1	key	DIN 6885-A 5x5x16-St

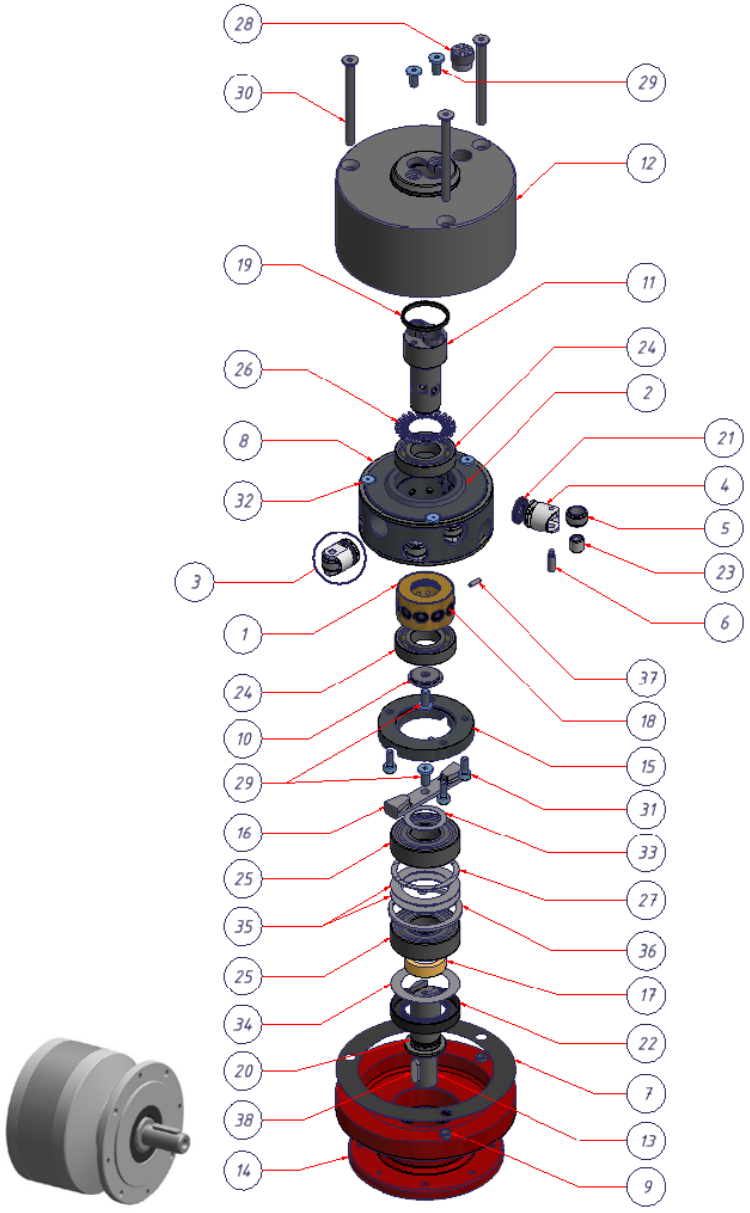
All components of the RM006-IXA, which are listed in the parts list, are depicted and positioned in the graphic below. The representation applies for the reversible as well as the not reversible motor types.



PARTS LIST RM006-SFA

pos.	qty.	item	part number
1	1	control ring	3006-00-02
2	1	rotor	3006-00-05
3	10	piston complete	3006-00-06
4	10	piston	3006-00-04
5	10	unwinding axis	3001-12-07
6	10	axis	3001-12-08
7	2	sealing disc	3006-00-09
8	2	support ring	3006-00-10
9	2	centering	186717
10	1	clamping disc	3006-00-15
11	1	control pin	3006-00-40
12	1	stator	3006-00-44
13	1	drive shaft	3006-00-17
14	1	motor flange	3006-00-51
15	1	flange	3006-00-14
16	1	driver	3006-00-12
17	1	intermediate ring	3006-00-19
18	10	o-Ring	0113-255931
19	1	o-Ring	0101-001336
20	1	o-Ring	0101-001224
21	10	piston seal	11.6241.0101
22	1	radial shaft seal	ASL-24-40-7
23	10	needle bush	HK 0408-G105 GPR
24	2	deep groove ball bearing	16003-2RS
25	2	deep groove ball bearing	6203 LLU-G105
26	1	starspring	1051-034001
27	1	shim	12.5500.0084
28	1	check valve	RVE 6 ETG 100
29	4	cylinder head screw (lower head)	BN1206-M5x10-10.9
30	3	countersunk screw	DIN 7991-M5x60-A2
31	4	cylinder head screw	DIN 912-M4x10-8.8
32	6	cylinder head screw (lower head)	BN9524-M4x8-8.8
33	1	washer	DIN 988-18x25x0.5-St
34	1	washer	DIN 988-28x40x0.2-St
35	1	washer	DIN 988-28x40x0.5-St
36	1	inside circlip	DIN 472-52x2-St
37	1	pin	ISO 2338-2.5 h8x8-St
38	1	key	DIN 6885-A 5x5x16-St

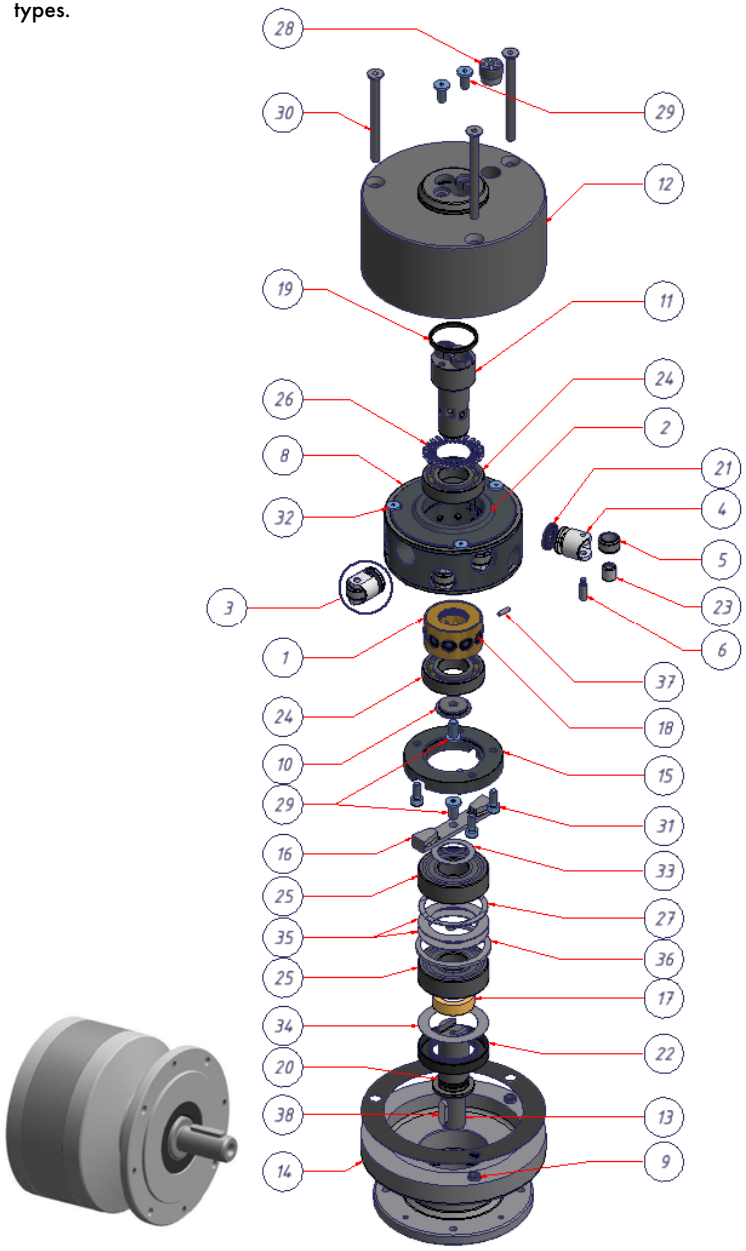
All components of the RM006-SFA, which are listed in the parts list, are depicted and positioned in the graphic below. The representation applies for the reversible as well as the not reversible motor types.



PARTS LIST RM006-IFA

pos.	qty.	item	part number
1	1	control ring	3006-00-02
2	1	rotor	3006-00-05
3	10	piston complete	3006-00-06
4	10	piston	3006-00-04
5	10	unwinding axis	3001-12-07
6	10	axis	3001-12-08
7	2	sealing disc	3006-00-09
8	2	support ring	3006-00-10
9	2	centering	186717
10	1	clamping disc	3006-00-15
11	1	control pin	3006-00-40
12	1	stator	3006-00-44
13	1	drive shaft	3006-00-17
14	1	motor flange	3006-00-51
15	1	flange	3006-00-14
16	1	driver	3006-00-12
17	1	intermediate ring	3006-00-19
18	10	o-Ring	0113-255931
19	1	o-Ring	0101-001336
20	1	o-Ring	0101-001224
21	10	piston seal	11.6241.0101
22	1	radial shaft seal	ASL-24-40-7
23	10	needle bush	HK 0408-G105 GPR
24	2	deep groove ball bearing	16003-2RS
25	2	deep groove ball bearing	6203 LLU-G105
26	1	starspring	1051-034001
27	1	shim	12.5500.0084
28	1	check valve	RVE 6 ETG 100
29	4	cylinder head screw (lower head)	BN1206-M5x10-A2
30	3	countersunk screw	DIN 7991-M5x60-A2
31	4	cylinder head screw	DIN 912-M4x10-8.8
32	6	cylinder head screw (lower head)	BN9524-M4x8-8.8
33	1	washer	DIN 988-18x25x0.5-St
34	1	washer	DIN 988-28x40x0.2-St
35	1	washer	DIN 988-28x40x0.5-St
36	1	inside circlip	DIN 472-52x2-St
37	1	pin	ISO 2338-2.5 h8x8-St
38	1	key	DIN 6885-A 5x5x16-INOX

All components of the RM006-IFA, which are listed in the parts list, are depicted and positioned in the graphic below. The representation applies for the reversible as well as the not reversible motor types.



SPECIAL TYPES

OPTIONS

GLOBE air motors distributes for several years air motors for various customer applications. The existing components can be easily constructed in other housings or adapted to the dimensions of your application. It is also possible to adapt the output shaft to customer specific requirements.
The following options are possible:

- Other materials, for non-magnetic versions, special corrosion protection, applications in high temperature ranges
- Seal options, for applications in a temperature range higher than 60°C
- Housing adaptions, for clean room versions or as an optimization for attachment to an existing system
- Gear, two output shafts, integrated gear unit
- Reinforced bearings, when used as an engine for agitators or other applications with high radial forces
- Output shaft, for a direct connection to other machines

Not all of the above-mentioned versions are suited for ATEX / application areas.
Contact us without obligation. We are happy to advise you.

To Customer Specification

Custom configurations of the drive elements and the housing design

Antimagnetic

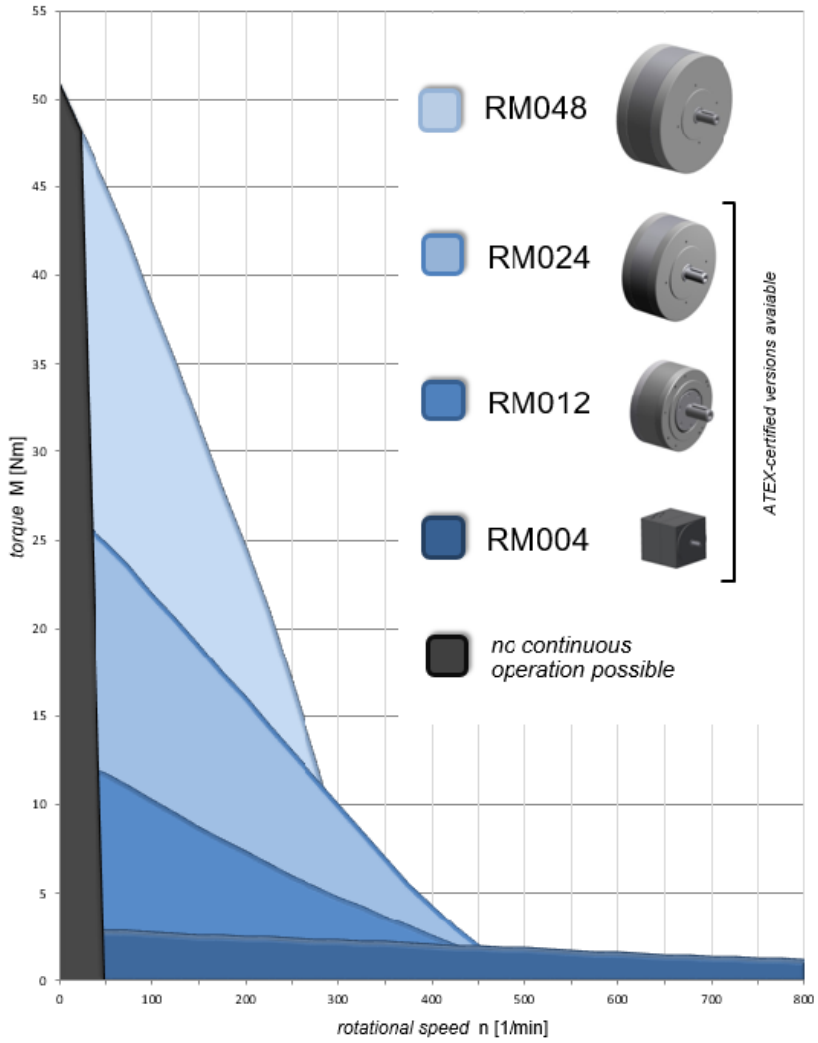
Material combinations with a low magnetic resistance

Connection / Flange

Custom connectors and flange dimensions

BENCHMARKING

With the following diagram, the performance of all available motor size can be compared and the optimal range of use relating to rotation speed and torque can be determined.
The values are valid at a working pressure of 7 bar.



ATEX Certification

GLOBE AIRMOTORS B.V.

Boerhaaveweg 9-11
2408 AD Alphen aan den Rijn
The Netherlands
Tel: +31-172-6608
e-mail: info@globe-benelux.nl
www.globe-benelux.nl

EU-Declaration of Conformity

We, GLOBE Airmotors B.V.:

Hereby declare in our sole responsibility, that the following pneumatic vane motor types:

GLOBE RM... series compact piston air motor

are in accordance with the Directives:

2014/34/EU, Equipment and Protective Systems in Potentially Explosive Atmospheres
2006/42/EC, Machinery Directive

The Equipment has been designed and manufactured to the relevant parts of the following harmonized standards:

EN 1127-1:2019, EN-ISO 80079-36:2016, EN-ISO 80079-37:2016,
EN 12100:2010, EN 82079-1:2012, EN 4414:2010

The ATEX marking of the equipment is:

GLOBE Airmotors B.V.
Boerhaaveweg 9-11, 2408 AD Alphen aan den Rijn
CE model: ..
Serial number: ...
Year build: ....
Ⓔx **II 2G Ex h IIC T5 Gb**
II 2D Ex h IIIC T100°C Db
Ambient temperature range **-10°C .. +60°C**

A complete Technical File is held at the GLOBE Airmotors B.V office in Alphen aan den Rijn (NL).
A copy of the Technical File is archived with file number A635 -19 at FTZU in Czech Republic.

Alphen a/d Rijn 18-10-2019
GLOBE AIRMOTORS BV

GLOBE AIRMOTORS B.V.
Boerhaaveweg 9-11
2408 AD Alphen a/d Rijn
The Netherlands

J.G.G. Wanner
Director

CE Certification

GLOBE AIRMOTORS B.V.

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EC - DECLARATION OF CONFORMITY

According to annex II.1.A of the Machinery directive 2006/42/EC

Complies with the provisions of the following EG-directive* and standards*

GLOBE Compact Piston Motors:
RM004, RM004R, RM004CW, RM004CCW, RM012-SXX, RM012-PXX, RM012-SXA ATEX, RM012-SFX, RM012-PFX, RM012-SFA ATEX, RM024-SXX, RM024-IXX, RM024-SXA ATEX, RM024-SFX, RM024-IFX, RM024-SFA ATEX

Complies with the provisions of the following EG-directive* and standards*

- Machinery directive 2006/42/EC
- Safety of machines – basic terminology — EN-ISO 12100:2010
- Preparation for using the instructions – structure, content en presentation part 1: General assumptions and detailed demands — EN-IEC 82079-1:2012
- Pneumatics – general rules and safety regulations for systems and parts — EN-ISO 4414:2010

* incl. possible changes in the directive and standards during the signing of this declaration.

The technical file is present inside the EER and can be drawn from name and the address of the manufacturer by the undersigned of this declaration.

Netherlands, Alphen aan den Rijn
Date: 18-10-2019

Signature assignee of
GLOBE Airmotors BV

Name: J.G.G. Wanner
Director

GLOBE AIRMOTORS B.V.
Boerhaaveweg 9-11
2408 AD Alphen a/d Rijn
The Netherlands

GLOBE AIRMOTORS B.V.

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Vane Air Motors

Pneumatic Brakes

Compact Vane Air Motors

Planetary Geared Vane Air Motor

Radial Piston Air Motors

Specials: Costum Build

This document, as well as the CAD data of the compact piston air motors is available for download on globe-benelux.nl.

globe-benelux.nl