Embracing Challenge

Bellows pump series MP®-F

Ⓔx MP-F05/EX, Ⓔx MP-F05/R/EX, Ⓔx MP-F10/EX, Ⓔx MP-F10/R/EX (Valid as of Serial No. 21021130)

Instruction Manual
Version 1.07.01

Dear customer,

Thank you for buying our product. In this manual you will find all necessary information about this M&C product. The information in the manual is fast and easy to find, so you can start using your M&C product right after you have read the manual.

If you have any question regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor. You will find all the addresses in the appendix of this instruction manual.

For additional information about our products, please go to M&C's website www.mc-techgroup.com. There you can find the data sheets and manuals of our products in German and English.

With the release of this version all older manual versions will no longer be valid. The German instruction manual is the original instruction manual. In case of arbitration only the German wording shall be valid and binding.

Version; 1.07.01

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1 Important product information: new drive motor

Our longtime supplier, the company ATB, has stopped the production of our drive motors. For this reason the MP-F/EX pumps will be delivered with a new drive motor from the company ORANGE1 ELECTRIC MOTORS S.p.A. starting with serial No. 21021130.
The new drive motor has a new Ex-protection class. The Ex-protection type changes as follows:

- Old ATB drive motor: II 2 G Ex eq IIC T3
- New ORANGE1 ELECTRIC MOTORS drive motor: II 2 G Ex db eb IIC T4.

The new drive motor, including the operating capacitor, is designed in the "flameproof enclosure" (db) type of protection. The terminal box has the ignition protection type "Increased safety" Ex "eb".

Note

The changed temperature class (T4) has no effect on the temperature class of the entire pump, which remains unchanged T3.

The new motor does not bring any changes for you as a user. One advantage of the new motor is that it is suitable for the frequency range from 50 to 60 Hz.

The options previously offered for 115 V/50 Hz (Part No. 05P1140) and 230 V/60 Hz (Part No. 05P1142) no longer apply.

2 General information

The product described in this instruction manual has been built and tested in our production facility.

All M&C products are packed to be shipped safely. To ensure the safe operation and to maintain the safe condition, all instructions and regulations stated in this instruction manual need to be followed. This instruction manual includes all information regarding proper transportation, storage, installation, operation and maintenance of this product by qualified personnel.

Follow all instructions and warnings closely.

Read this manual carefully before commissioning and operating the device. If you have any questions regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor.

3 Declaration of conformity

CE - Certification

The product described in this operating manual complies with the following EU directives:

ATEX-Directive

The product described in this manual is produced in accordance with the EU directive for devices and protection systems for appropriate use in hazardous areas 2014/34/EU appendix II.

Machinery Directive

The requirements of the EU directive 2006/42/EC are met. The compliance with this EU directive has been examined according to DIN EN 60204-1.

RoHS Directive

The requirements of the RoHS2 ('Restriction of Hazardous Substances 2') directive 2011/65/EU and its annexes are met.

Declaration of conformity

The EU Declaration of conformity can be downloaded from the **M&C** homepage or directly requested from **M&C**.

4 Warranty

In case of a device failure, please contact immediately M&C or your M&C authorized distributor.

We have a warranty period of 12 months from the delivery date. The warranty covers only appropriately used products and does not cover the consumable parts. Please find the complete warranty conditions in our terms and conditions.

The warranty includes a free-of-charge repair in our production facility or the free replacement of the device. If you return a device to M&C, please be sure that it is properly packaged and shipped with protective packaging. The repaired or replaced device will be shipped free of delivery charges to the point of use.

5 Warning signs and definitions

Danger

The 'Danger' warning sign indicates that death, serious injury and/or significant material damage will be the consequence, if the appropriate precautions should not be taken.

Warning

The 'Warning' warning sign indicates that death, serious injury or damage to property may occur, if the relevant precautionary measures are not observed.

Caution

The 'Caution' warning sign indicates that slight personal injury can occur, if the appropriate safety precautions are not observed.

Caution

'Caution' indicates that damage to property can occur, if the appropriate safety precautions are not observed.

Note

'Note' indicates important information relating to the product or highlights parts of the documentation for special attention.

Qualified personnel

These are persons who are familiar with the installation, commissioning, maintenance and operation of the product and have the necessary qualifications through training or instruction. Qualified personnel must have at least the following knowledge:

- Instructed person in EX-protection
- Trained person in the electrotechnical field
- Detailed knowledge of the operating instructions and the applicable safety regulations

'EX' indicates important information about the product or about the corresponding parts in the instruction manual, relating to usage in potentially explosive atmospheres.

High voltages!
Protect yourself and others against damage which might be caused by high voltages.

Toxic!
Acute toxicity (oral, dermal, inhalation)! Toxic when in contact with skin, swallowed or inhaled.

Corrosive!
These substances destroy living tissue and equipment upon contact.
Do not breathe vapors; avoid contact with skin and eyes.

Hot surface!
Contact may cause burn! Do not touch!

Caution, risk of being crushed due to rotating parts.
Do not open the device. Use personal protective equipment (PPE).

Wear protective gloves!
Working with chemicals, sharp objects or extremely high temperatures requires wearing protective gloves.

Wear safety glasses!
Protect your eyes while working with chemicals or pointed objects. Wear safety glasses to avoid getting something in your eyes.

Wear protective clothes!
Working with chemicals, pointed objects or extremely high temperatures requires wearing protective clothes.

Use foot protection

Use safety helmet and full protective goggles

6 Correct operation

Follow these fundamental safety precautions during installation, commissioning and operation of the device:

- Read this instruction manual before commissioning and operating the product. Make sure to follow all warnings and safety instructions.
- Installation and commissioning of electrical devices must be carried out only by qualified skilled personnel in compliance with the current regulations.
- The installation and commissioning of the device must conform to the requirements of VDE 0100 'Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V' and must be in compliance with all relevant regulations and standards.
- Attention should be paid to all relevant national and international regulations and standards regarding the usage of the device in potentially explosive atmospheres.
- Before connecting the device, please make sure to compare the supply voltage with the specified voltage on the product label.
- Protection against contact to components carrying high voltages: Disconnect the power supply before opening the device for access. Make sure that all extern power supplies are disconnected.
- Operate the device only in the permitted temperature and pressure ranges. For details please refer to the technical data sheet or instruction manual.
- Install the device only in protected areas, sheltered from sun, rain and moisture. Avoid heat sources nearby.
- If an operation involves sample gases, which are toxic and hazardous to the health, protective measures need to be taken against any accidental leakage, e.g. unexpected damage of the pump bellows, the related tubing or tube connections.
- To troubleshoot failing or decreasing pump performance, we recommend installing a flow monitoring device downstream from the pump.
- The pump is only designed for sample gases, which are not contaminated with particles. It might be necessary to install a suitable particle filter upstream of the pump.
- The pump is not designed for liquid. To protect the pump against condensate, a cooler might be necessary to be installed upstream of the pump.
- Only gas or gas mixtures can be used, which do not react with each other or with materials of the pump components.
- Installation, maintenance, inspections and any repairs of the devices must be carried out only by qualified skilled personnel in compliance with the current regulations.
- In processes where in the event of a fault condensate is to be expected, turn the pump head downwards and mount the pump at the highest point. If this installation is not possible, the outlet tubing must be installed with a downward slope (see Figure 8) to the downstream components.

7 Wrong operation


Warning

Please make sure to install and operate the pump for the intended use described in this instruction manual only.


Warning

The pump can only be operated within the parameters stated in the technical data of chapter 10.


Warning

The pump is not designed for liquids or particles.

Condensation in the pump is not permissible and can lead to a defect.

Even if condensation could occur in the rarest of cases, the pump head must be turned downwards for normal operation and the sample gas outlet must be laid with a downward slope to the downstream components.

The pump head can be electrostatically charged by particles, liquids and drops of condensate.


Warning

The materials of the pump, which are in contact with the sample gas, need to be suitable for the used sample gas.


Warning

In order to operate the pump, it needs to be securely installed.


Warning

Install the pump only in **weather protected** areas.

Make sure to provide sufficient ventilation.


Warning

It is necessary to protect the pump motor with a suitable motor protection device.


Warning

The permitted maximum pressure within the pump is 1.5 bar (gauge pressure).

Do not close the sample gas output. A sufficient sample gas flow needs to be provided to prevent the pump pressure from exceeding the permitted maximum pressure value.

A sufficient sample gas flow also prevents the temperature of the pump head to increase over the permitted temperature range.


Warning

If components downstream from the pump can block or reduce the sample gas flow, appropriate measure, e.g. a pressure valve, needs to be installed to prevent the process pressure from exceeding the maximum permitted pressure value.

8 Safety instructions for using the pump in potentially explosive atmospheres

The bellows pump MP-F…/EX is designed to be used in potentially explosive atmospheres of zone 1, and belongs to the equipment category 2G.

The explosion protection marking of the equipment is:

Ⓔx II 2 G c IIC T3 X

The type examination certificate of the pump is issued by IBExU Institut für Sicherheitstechnik GmbH, an affiliate institute of the TU Bergakademie Freiberg. You will find a copy of the type examination certificate IBExU 15 ATEX B 005 X, available in the corresponding editions, in the appendix of this instruction manual.

Note

As of serial No. 21021130, the MP-F.../EX is supplied with a new drive motor. The new drive motor has the Ex protection class: II 2 G Ex db eb IIC T4.

The changed temperature class (T4) of the drive motor has no effect on the temperature class of the entire pump, which remains unchanged T3. See also chapter 1 "Important product information: new drive motor".

9 Application

The bellows pump MP-F …/EX is suitable for 100 % oil-free operation of corrosive and flammable gases. The construction and performance of the pump is especially tailored to the requirements of the analysis technique. The pump is gas tight and its operation is maintenance-free.

All parts of the bellows pump MP-F …/EX, which are in contact with the sample gas, are corrosion resistant. To connect the pump head to the tubing, the upper part of the pump head is also available in stainless steel (optional).

The pump operates absolutely lubricant free, this prevents the sample gases from any contamination. Due to a special bellows and valve system, the pump operates maintenance-free and has a long service life. The straightforward valve design ensures low maintenance costs. The pump is available with EX electric motors for 230 V AC or 115 V AC.

Note

As of serial No. 21021130, the MP-F.../EX is supplied with a new drive motor. See also chapter 1 "Important product information: new drive motor".

Two different pump capacities are available. These are the minimum pump capacities the pump is able to achieve:

- MP-F05/EX pump capacity at least 5 Nl/min (approx. 320 Nl/h)
- MP-F10/EX pump capacity at least 10 Nl/min (approx. 600 Nl/h)

Liter capacity with a counter pressure of ±50 mbar on the vacuum and pressure side.

- Option: integrated needle valve to adjust the flow rate in the pump head of the MP F.../R/EX

and/or

- Option: stainless steel pump head with NPT – thread.

The sample gas line can be connected to the top or the side of the pump head. The pump head can be rotated and mounted in 90° steps.

Warning

Bellows pumps series MP-F…/EX are not suitable for liquids or particles. These pumps only operate dry and particle-free gases.

9.1 MP-F05/R/EX and MP-F10/R/EX with integrated needle valve

To ensure that the needle valve works properly, the output of the pump needs to be operated with at least 0.1 bar counter pressure.

To adjust the pump capacity, a needle valve used as an internal pump bypass is integrated into the pump head. The optimized shape of the needle valve makes it possible to adjust the pump capacity over a wide range. All parts of the valve, which are in contact with the sample gas, are made out of PTFE and PVDF. There are no O-rings in the needle valve.

- To open the needle valve completely, turn out the valve until it stays at 35 mm [≈ 1.38"] (lowest pump capacity).
- To close the needle valve completely, turn in the valve, until it stays at 25 mm [≈ 0.98"] (highest pump capacity)

After adjusting the needle valve, the locknut (see position ①) needs to be fastening hand-tight with a wrench. This ensures that the needle valve is gas tight and avoids accidental misalignment of the valve.

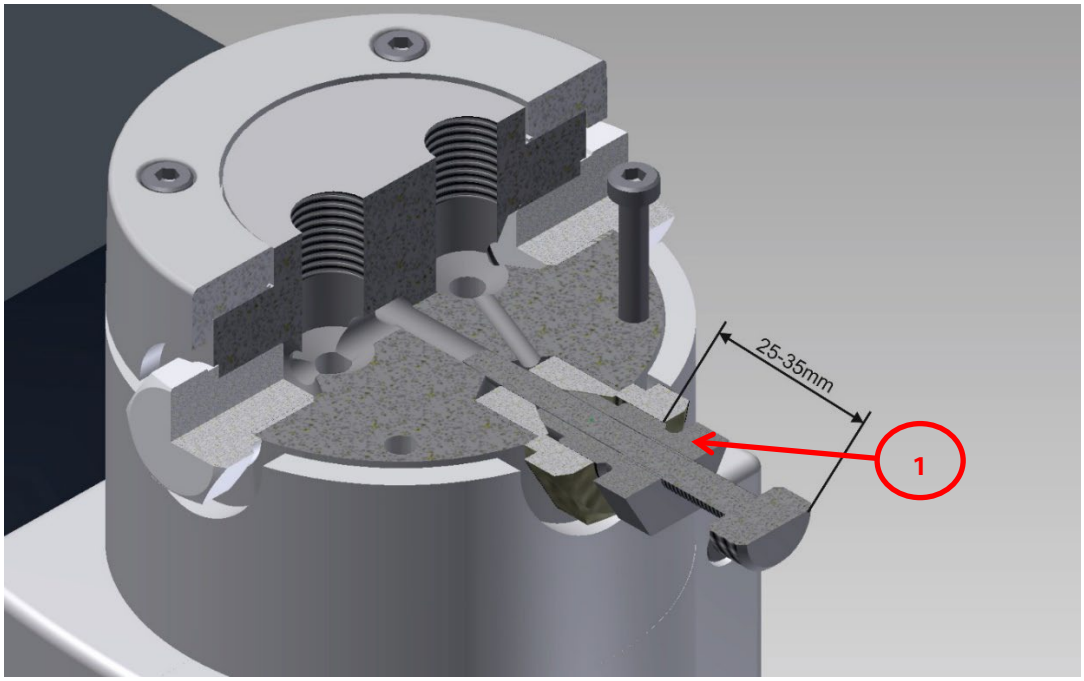


Figure 1 Needle valve in a half-section view with one quarter removed

The reliability of the pump is increased by use of a bypass needle valve. This needle valve protects the pump from unnecessary high loads or overload.

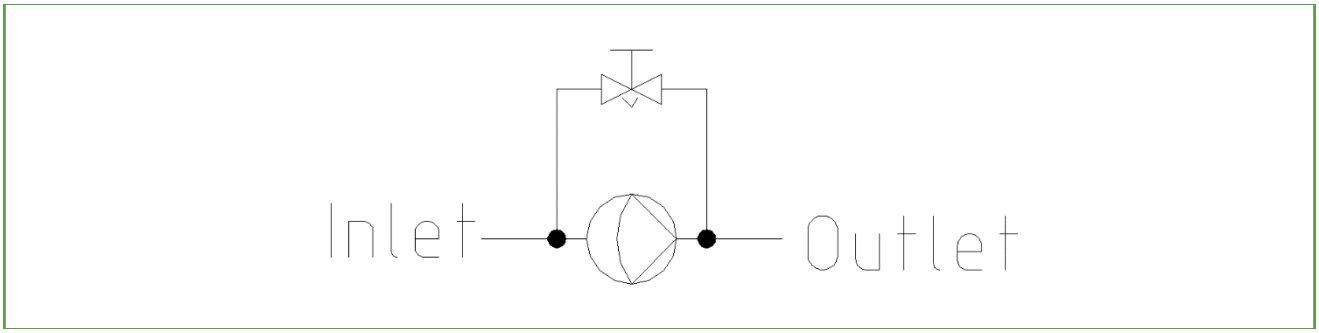


Figure 2 **Pump with bypass needle valve**

10 Technical data

Bellows pump	**MP-F05/EX**		**MP-F05/R/EX**	
Part No.	05P1100	05P1100a	05P1110	05P1110a
Integrated needle valve	No		Yes	
Voltage	230 V	115 V	230 V	115 V
Frequency	50 to 60 Hz			
Voltage tolerance	In accordance with IEC 60034-1 Voltage ±10 % Frequency ±1 %			
Degree of protection	IP54 - DIN 40050			
Pump capacity	At least 320 Nl/h (approx. 5 l/min) Liter capacity with a counter pressure of ±50 mbar on the vacuum and pressure side			
Operating pressure	Max. 0.4 to 2.5 bar abs.			
Marking	Ex II 2 G c IIC T3 X IBExU 15 ATEX B 005 X			
Gas temperature	-20 to +50 °C [-4 to +122 °F] for dry sample gas			
Ambient temperature	-10 to +50 °C [+14 to +122 °F]/0 to +50 °C [+32 to +122 °F] for dry sample gas, installation altitude of < 1000 m [≈ 3281 ft] above sea level			
Storage temperature	-20 to +60 °C [-4 to +140 °F]			
Sample gas connections	G 1/4" female, DIN ISO 228/1*			
Gas tightness of pump head	< 6 x 10^{-3} mbar l/s			
Current consumption @ 50 Hz, I_N	0.8 A	1.6 A	0.8 A	1.6 A
Current consumption @ 60 Hz, I_N	0.8 A	2.2 A	0.8 A	2.2 A
Power consumption	90 W			
cos φ @ 50 Hz	0.97			
cos φ @ 60 Hz	0.97	0.99	0.97	0.99
Cable fittings	M 20 x 1.5 clamp range 6 – 10 mm			
Electrical equipment standard	EN 60204-1, EN 13463-1: 2009, EN 13463-5: 2011, EN 60079-0:2012 + A11:2013			
Material of sample gas contacting parts	PTFE, PFA, FEP		PTFE, PFA, FEP, PVDF	
Weight	7.1 kg [≈ 15.7 lbs]	7.75 kg [≈ 15.8 lbs]	7.1 kg [≈ 15.7 lbs]	7.75 kg [≈ 15.8 lbs]

Bellows pump	**MP-F10/EX**		**MP-F10/R/EX**	
Part No.	05P1105	05P1105a	05P1115	05P1115a
Integrated needle valve	No		Yes	
Voltage	230 V	115 V	230 V	115 V
Frequency	50 to 60 Hz			
Voltage tolerance	In accordance with IEC 60034-1 Voltage ±10 % Frequency ±1 %			
Degree of protection	IP54 - DIN 40050			
Pump capacity	At least 600 Nl/h (approx. 10 l/min) Liter capacity with a counter pressure of ±50 mbar on the vacuum and pressure side			
Operating pressure	Max. 0.3 to 2.5 bar abs.			
Marking	Ⓔx II 2 G c IIC T3 X IBExU 15 ATEX B 005 X			
Gas temperature	-20 to +50 °C [-4 to +122 °F] for dry sample gas			
Ambient temperature	-10 to +50 °C [+14 to +122 °F]/0 to +50 °C [+32 to +122 °F] for dry sample gas, installation altitude of < 1000 m [≈ 3281 ft] above sea level			
Storage temperature	-20 to +60 °C [-4 to +140 °F]			
Sample gas connections	G 1/4" female, DIN ISO 228/1*			
Gas tightness of pump head	< 6 x 10^{-3} mbar l/s			
Current consumption @ 50 Hz, I_N	0.8 A	1.6 A	0.8 A	1.6 A
Current consumption @ 60 Hz, I_N	0.8 A	2.2 A	0.8 A	2.2 A
Power consumption	90 W			
cos φ @ 50 Hz	0.97			
cos φ @ 60 Hz	0.97	0.99	0.97	0.99
Cable fittings	M 20 x 1.5 clamp range 6 – 10 mm			
Electrical equipment standard	EN 60204-1, EN 13463-1: 2009, EN 13463-5: 2011, EN 60079-0:2012 + A11:2013			
Material of sample gas contacting parts	PTFE, PFA, FEP		PTFE, PFA, FEP, PVDF	
Weight	7.1 kg [≈ 15.7 lbs]	7.75 kg [≈ 15.8 lbs]	7.1 kg [≈ 15.7 lbs]	7.75 kg [≈ 15.8 lbs]

Options	
05P1050	Mounting bracket with 4 anti-vibration pads for bellows pump MP-F
05P1060	Extra charge for upper pump head of bellows pump MP-F made out of stainless steel, connecting thread sample gas: 1/4" NPT
05P1070	Extra charge for upper pump head of bellows pump MP-F.../R made out of stainless steel with needle valve made out of PVDF, connecting thread sample gas: 1/4" NPT
90P8100	Mounting bracket for wall mounting

* The dimensions and designation of the screw-in threads correspond to the respective applicable standard. The tolerances of the thread standards are matched to metal threads and cannot be applied to plastic threads.

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

10.1 Pump capacity diagram

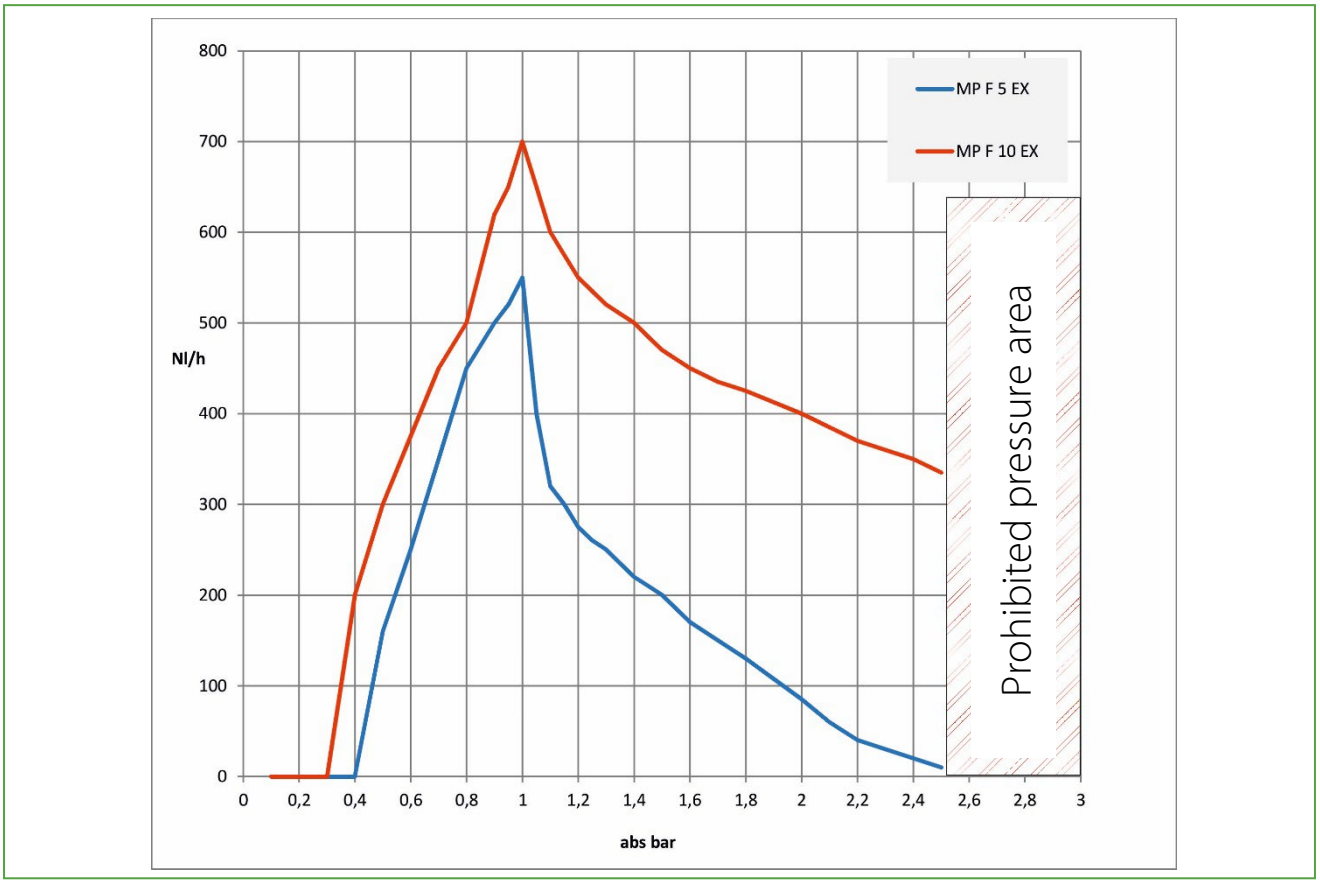


Figure 3 Pump capacity MP-F.../EX

10.2 Dimensions

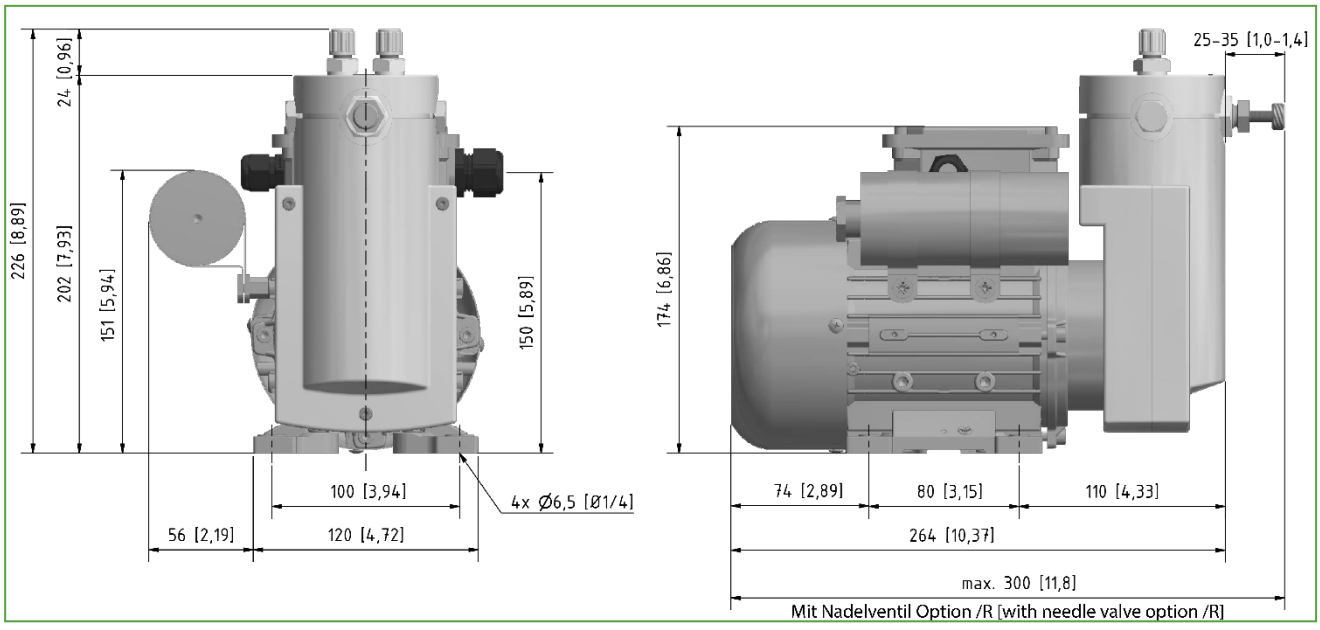


Figure 4 Dimensions MP-F.../R/EX

11 Receiving and storing the bellows pump

1. Please remove the bellows pump carefully from the packaging. Check the scope of the delivery specified on the delivery note. Please make sure that you have received all items stated on the delivery note.
2. Please check the unit for any transport damage after receipt and report any complaints to the transport company immediately.

Note

The bellows pump should be stored in a protected, frost-free room!

12 Installation instructions

All relevant regulations regarding accident prevention and safety need to be met during installation and operation of the pump.

Warning

High voltage!

Working without disconnecting the power supply may cause an electrical shock. Disconnect power supply before any assembly, maintenance or repair work. Secure the pump against accidental restart!

Warning

Protect yourself and others against contact to parts of the pump, e.g. electrical connections, which may be still connected to a power supply. Protect yourself and others against contact to moving parts of the pump. Protect the pump against entering of water and particles.

Note

Make sure to comply with the current safety regulations regarding the sample gas used in the pump.

Install the pump in well ventilated rooms and away from heat sources to prevent any heat accumulation.

For outdoor installation, install the pump in a protective housing. The housing needs to provide protection against frost in winter, and ventilation in summer. Avoid exposure to direct sunlight.

Warning

Pumps have mechanical moving parts which may induce vibrations. An appropriate vibration decoupling system is necessary to protect the pump, peripheral components and facilities from vibration damage. A vibration decoupling system also minimizes the noise level of the operating pump. M&C offers e.g. vibration control air springs to decouple the vibration source from the vibration-free environment.

Especially the connections of the sample gas lines to the pump head need to be decoupled.

Warning

The components, which will be connected to the pump, need to meet the requirements of the pneumatic data of the pump. For details please refer to the technical data sheet or manual.

Make sure to comply with the current safety regulations when connecting the pump to the power supply.

Make sure to comply with the current safety regulations regarding the sample gas used in the pump.

Aggressive condensate possible!

Chemical burns caused by aggressive media possible!

For general electrical and mechanical work on the pump, wear personal protective equipment (PPE) in accordance with the risk assessment.

Warning

Moisture in the pump head will destroy the pump.

Even though condensation could occur in the rarest of cases, e.g. due to the pressure dew point being exceeded or due to a malfunction in the extraction process, the following measures must be taken:

- Turn the pump head downwards so that the gas connections point downwards.
- Mount the pump at the highest point in the system. If this is not possible, route the outlet tubing away from the pump at an incline (see Figure 8).

These measures allow condensate formed in the pump outlet to flow out of the pump head and be safely discharged.

Note

To immediately detect pump malfunctions, we recommend installing a flow monitoring device downstream from the pump.

12.1 Installation in potentially explosive atmospheres

In potentially explosive areas (zones) use only pumps, which are in the corresponding equipment category, explosive group and temperature class!

If the standard configuration is changed by using components or parts not specified and not authorized by M&C, the type examination certificate will no longer be valid. Repair and services with parts not specified by M&C will also lead to the cancellation of the EX certificate.

If you have any questions or doubts about parts, components or repair and services, please don't hesitate to contact M&C or one of our official distributors.

- Markings:
  Motor marking: II 2 G Ex db eb IIC T4. Protection class eb applies to the terminal box.
  Pump marking: II 2 G c IIC T3 X
- The pump is suitable to be installed and operated in zone 1
  Explosion group IIC
  Temperature class T3
- The pump is suitable to operate sample gases from zone 1
  Explosion group IIC
  Temperature class T3

The pump is not suitable to operate particles and liquids.

The pump head can be electrostatically charged by particles, liquids and drops of condensate.

Moisture in the pump head will destroy the pump.

Even though condensation could occur in the rarest of cases, e.g. due to the pressure dew point being exceeded or due to a malfunction in the extraction process, the following measures must be taken:

Warning

- Turn the pump head downwards so that the gas connections point downwards.
- Mount the pump at the highest point in the system. If this is not possible, route the outlet tubing away from the pump at an incline (see Figure 8).

These measures allow condensate formed in the pump outlet to flow out of the pump head and be safely discharged.

Before operating the pump with sample gas, make sure that the sample gas is compatible with the material of the pump head, pump bellows and valves. You will find information about the different materials in chapter 10 Technical data.

There are no solid particles and/or aerosols allowed in the sample gases or gas mixtures. Solid particles or aerosols in combination with the materials of the pump can generate static electricity, and sparks from friction or impact.

Make sure to pay attention to the current version of the explosion protection regulations (EX-RL) regarding the environment of the pump in an explosion protected area (zone):
'A collection of technical regulations on the prevention of hazards caused by an explosive atmosphere with a collection of examples showing how to classify risk areas into zones'(available in German)

For specific cases or if you have any doubt about the correct category of a potentially explosive zone, please inform and seek advice from your appropriate control agency in charge of the regulations.

The following applies to the usage of the pump in potentially explosive areas, which contain flammable gases, vapors and mists:

The lowest ignition temperature of the eligible potentially explosive atmospheres must be higher than the permitted 'maximum surface temperature' of the pump.

The maximum surface temperature is according to EN 60079-0 and EN 13463-1, the maximum temperature, which can be reached during operation under worst case conditions (within the permitted tolerance range) at one part or one surface of the pump.

The maximum surface temperature is determined by the design of the pump, the ambient air and the temperature of the sample gas. The maximum surface temperature is noted at the product label as the temperature class of the pump. During operation with hazardous gases, follow closely the safety regulations regarding the handling of these gases.

Note

As of serial No. 21021130, the MP-F.../EX is supplied with a new drive motor. The new drive motor has the Ex protection class: II 2 G Ex db eb IIC T4.

The changed temperature class (T4) of the drive motor has no effect on the temperature class of the entire pump, which remains unchanged T3. See also chapter 1 "Important product information: new drive motor".

12.2 Mounting bracket (Part No. 90P8100)

The pump can be mounted on a stainless steel mounting bracket. The mounting bracket is designed for various pump models. The following figure shows the hole pattern for the MP-F.../EX pump (right hand side) and the hole pattern for wall mounting (left). In all positions (pump head to the left, right and to the front) it is possible to rotate the pump head 180° downwards.

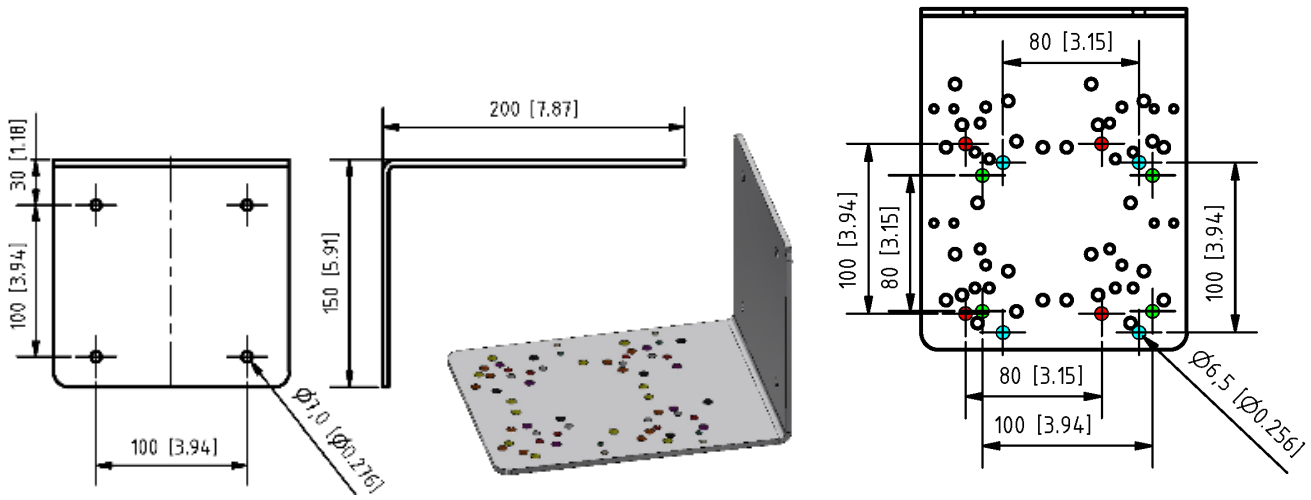


Figure 5 Mounting bracket hole pattern for wall-mount (left) and pump (right)

12.3 Mounting the pump

Warning

Condensate in the pump head will destroy the pump.

Even though condensation could occur in the rarest of cases, e.g. due to the pressure dew point being exceeded or due to a malfunction in the extraction process, the following measures must be taken:

- Turn the pump head downwards so that the gas connections point downwards.
- Mount the pump at the highest point in the system. If this is not possible, route the outlet tubing away from the pump at an incline (see Figure 8).

These measures allow condensate formed in the pump outlet to flow out of the pump head and be safely discharged.

The mounting site needs to comply with the following requirements:

- Ambient temperature range during operation: -10 to +50 °C [+14 to +122 °F]/0 to +50 °C [+32 to +122 °F] for dry sample gas
- The pump is rated IP54 (protection class) and it needs to be protected against water and dust ingress.
- During operation, the pump needs to have an adequate supply of cooling air for heat dissipation.
- If possible, install the pump at the highest elevation point of your system, to make sure that no condensate and no dust will ingress the pump.

- Mount the pump through the four 6.5 mm [≈ 0.26"] holes located in the base of the pump. If vibrations are likely to occur at this location, use vibration control air springs to decouple the vibration source. Screw the pump tightly to the ground. For dimensions, please see Figure 4. For sufficient supply of cooling air, the pump needs to be mounted at least 40 mm [≈ 1.57"] apart from the wall.

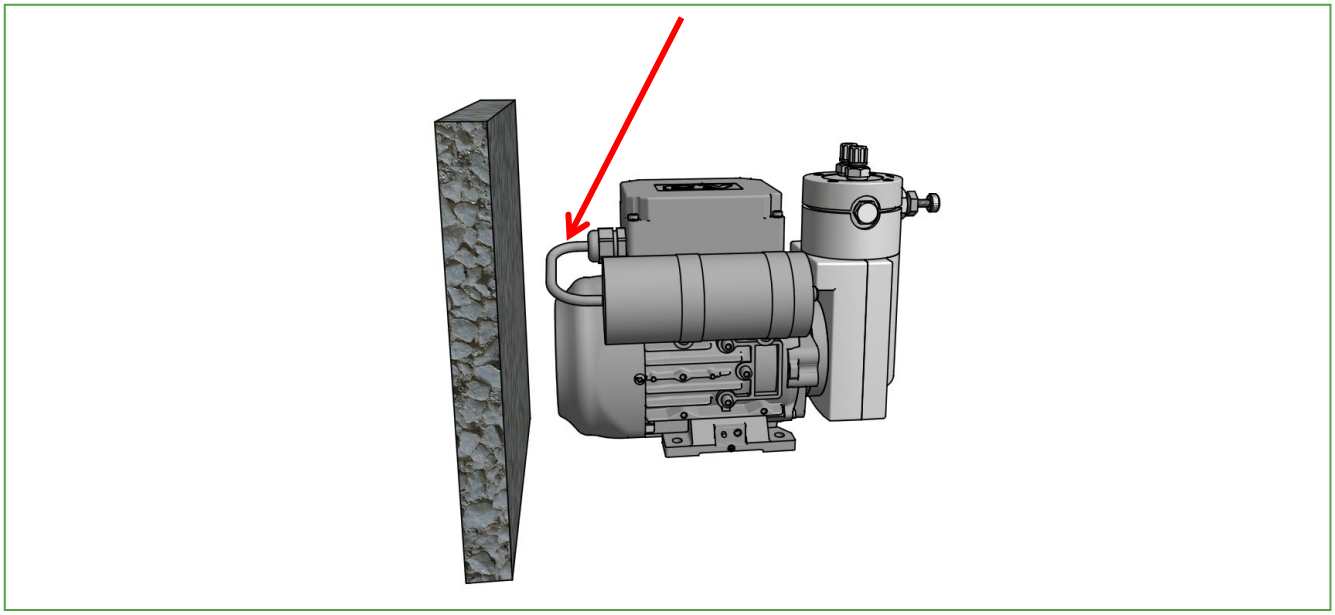


Figure 6 Installing the MP-F.../R/EX

12.4 Rotating the pump head

By loosening the four flange screws, the position of the pump head relative to the motor foot can be changed in 90° steps. Proceed as follows:

- Please unscrew and remove the three lid screws.
- Remove lid.
- Unscrew and remove the four flange screws with the lock washers shown in Figure 7.
- Now you can change the position of the pump head in 90° steps.

Make sure that contact washers are used during installation. The contact washers ensure the potential equalization between the motor and the pump head.

- After rotating the pump head to the selected position, please insert the four flange screws with the lock washers back again and tighten them.
- Put the lid back on and secure the lid by tightening the three lid screws.

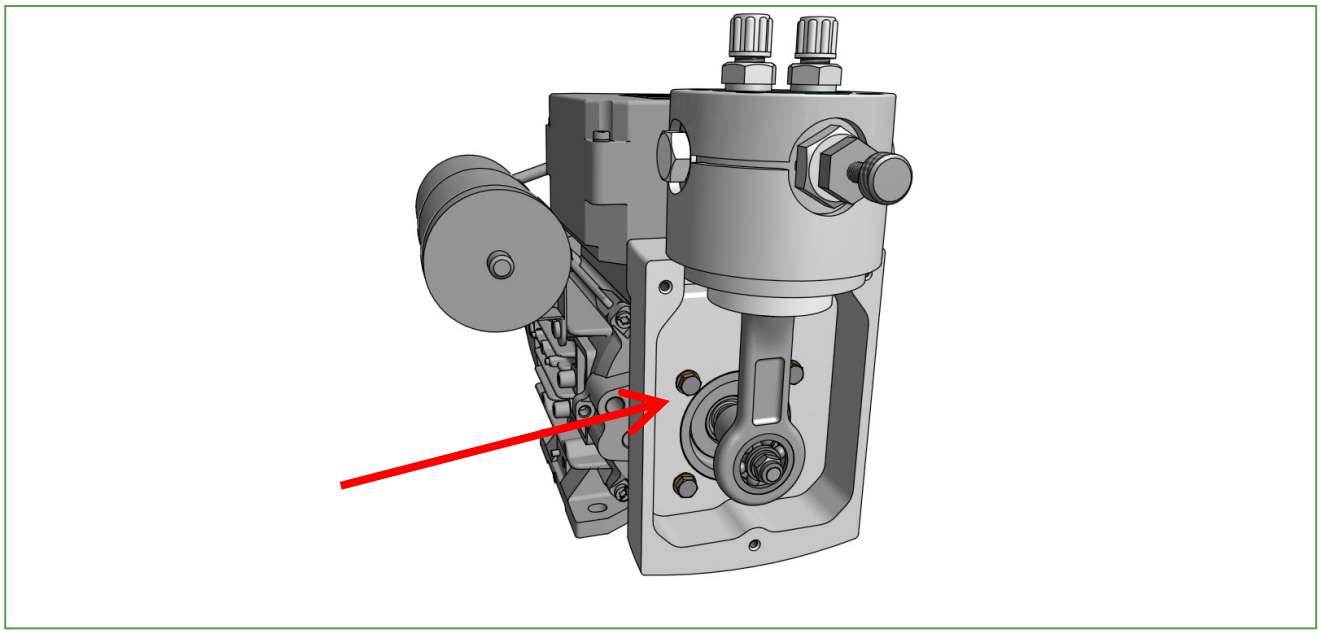


Figure 7 Rotating the pump head

12.5 Routing the gas outlet tubing with a downward slope

If, in the rarest of cases, there is a risk that condensate could form in the output of the pump, e.g. by exceeding the pressure dew point or in the event of a malfunction during the extraction process, then proceed as follows:

- Turn the pump head downwards so that the gas connections point downwards.
- Mount the pump at the highest point in the system. If this is not possible, then lay the sample gas outlet tubing with a downward slope to the downstream components to safely guide the condensate produced away from the pump.

The following figure shows a pump with a rotated pump head and with a sample gas outlet tubing that is installed with a downward slope to the downstream components.

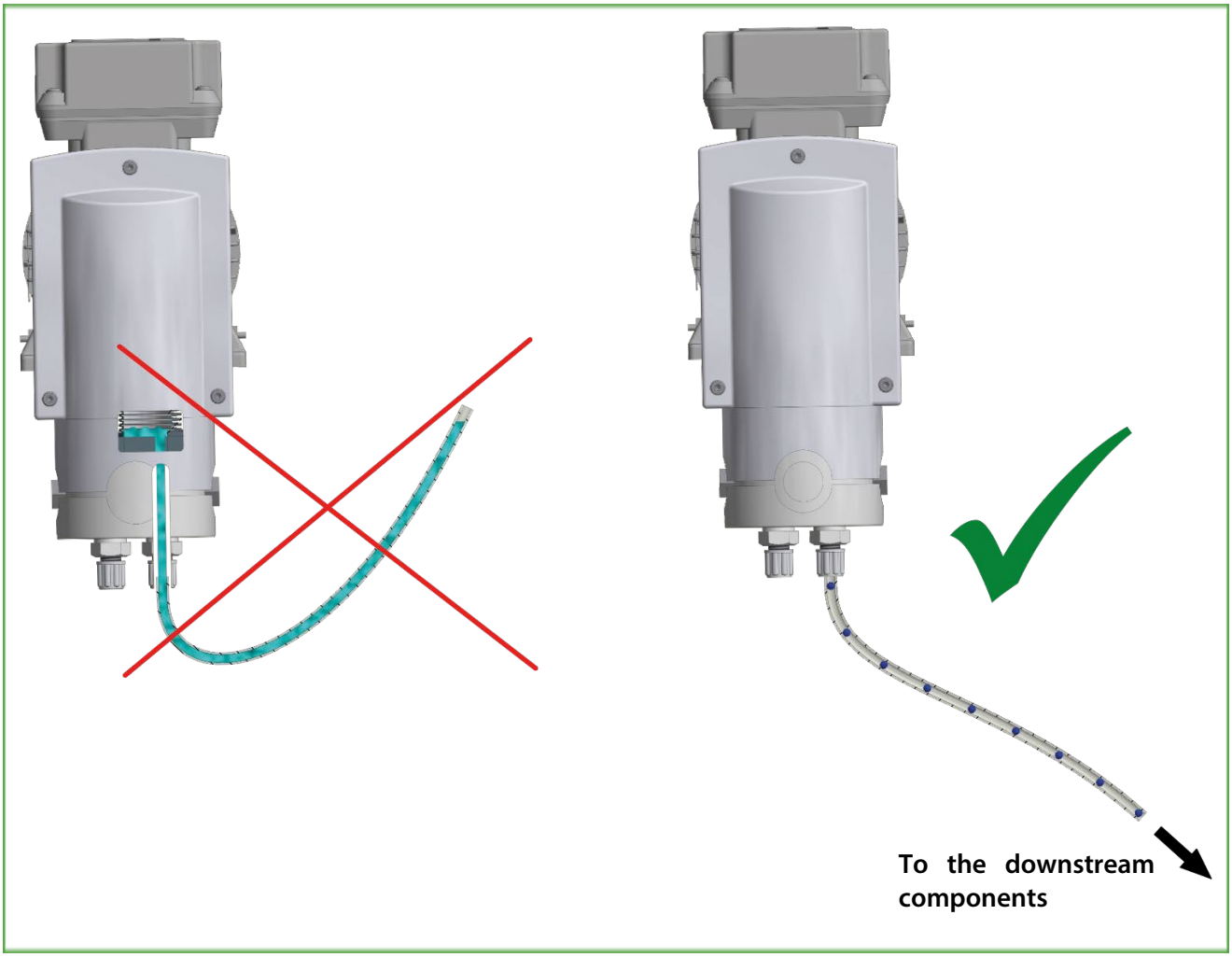


Figure 8 Pump head facing down: install outlet tubing with a downward slope

12.6 Electrical connections

Be sure to observe all relevant safety regulations during the electrical installation of the pump. Before connecting the pump, the electrical supply must be disconnected from the power supply.

Warning

Wrong voltage can destroy the device.

When connecting the equipment, please make sure that the supply voltage is identical with the supply voltage stated on the product label. The supply voltage can only deviate max. ±10 %, and the frequency can only deviate in the range of 50 to 60 Hz ±1 % from the value stated on the product label.

Exceeding the tolerance increases heating of the device and influences the electromagnetic compatibility (EMC).

The air-cooled pump is designed for an ambient temperature range -10 to +50 °C [+14 to +122 °F]/0 to +50 °C [+32 to +122 °F] for dry sample gas and an installation altitude of < 1000 m [≈ 3281 ft] above sea level.


Note

The installation and commissioning of the device must conform to the requirements of VDE 0100 'Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V' and must be in compliance with all relevant regulations and standards!

The current supply circuit of pump type MP-F.../EX (230 V) needs to be equipped with a motor protection circuit breaker 0.80 A for 50 and 60 Hz, which is matched to the corresponding rated motor current (overcurrent protection).

The current supply circuit of pump type MP-F.../EX (115 V) needs to be equipped with a motor protection circuit breaker 1.6 A for 50 Hz and 2.2 A for 60 Hz, which is matched to the corresponding rated motor current (overcurrent protection).

12.7 Motor protection circuit breaker for motor II 2 G Ex db flameproof enclosure


Note

As of serial No. 21021130, the MP-F.../EX is supplied with a new drive motor. The new drive motor including the operating capacitor is designed with protection type "flameproof enclosure" (db).

See also chapter 1 "Important product information: new drive motor".

The pump needs to be protected according to EN 60079-14 against impermissible high temperature due to overload. This overcurrent protection device needs to be provided by the customer. According to EN 60947 the overcurrent protection device protects the pump by disconnecting all poles from the main circuit by current-dependent delayed tripping.


Note

You will find corresponding motor protection circuit breakers in chapter 21.

Motor protection circuit breakers are always located outside the potentially explosive area. When used in the hazardous areas, they must comply with the required type of protection.

Protection and monitoring devices must switch off the plant section after tripping in all external conductors and must not switch it on again automatically.

Installation requirements in addition to the above-mentioned requirements and the installation instructions given below and under "Electrical connection", the following must be observed for the installation and electrical connection of the pump:

- The protective device must not be set higher than the rated current (rated current I_N) of the motor. It must respond within 2 hours at 1.2 times the set current. At 1.05 times the set current, however, it must not respond within 2 hours. These protective measures ensure that the motor does not reach an impermissibly high temperature during continuous operation.
- Current-monitored motors may only be used in continuous operation with light and not frequently recurring starts, during which no significant start-up heating occurs.


Warning

The pump cannot be operated with variable speed while connected to an inverter.

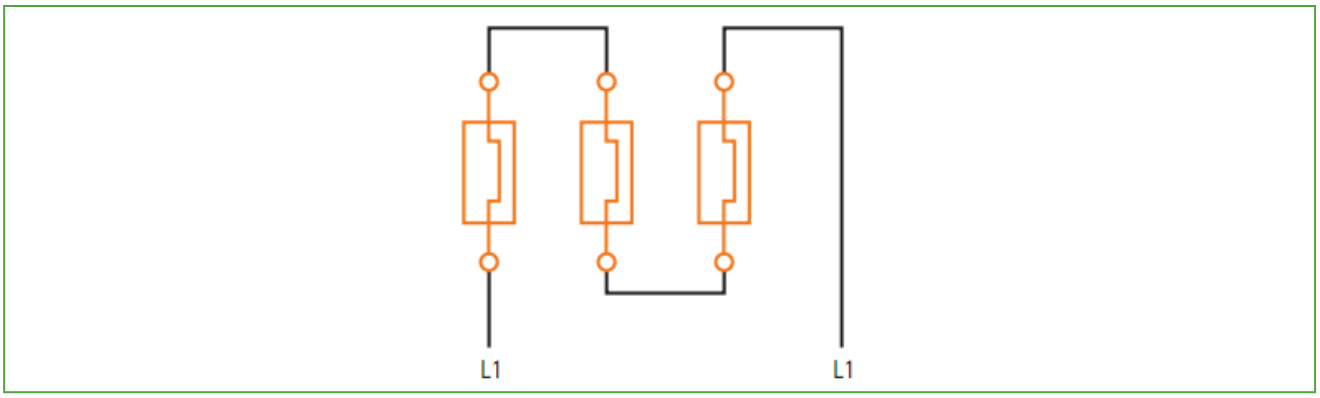


Figure 9 Wiring diagram: 3-phase motor protection circuit breaker connection to 1-phase motor

If you use a 3-phase motor protection circuit breaker for a 1-phase motor, please connect the current-carrying wire L1, like shown in Figure 9.

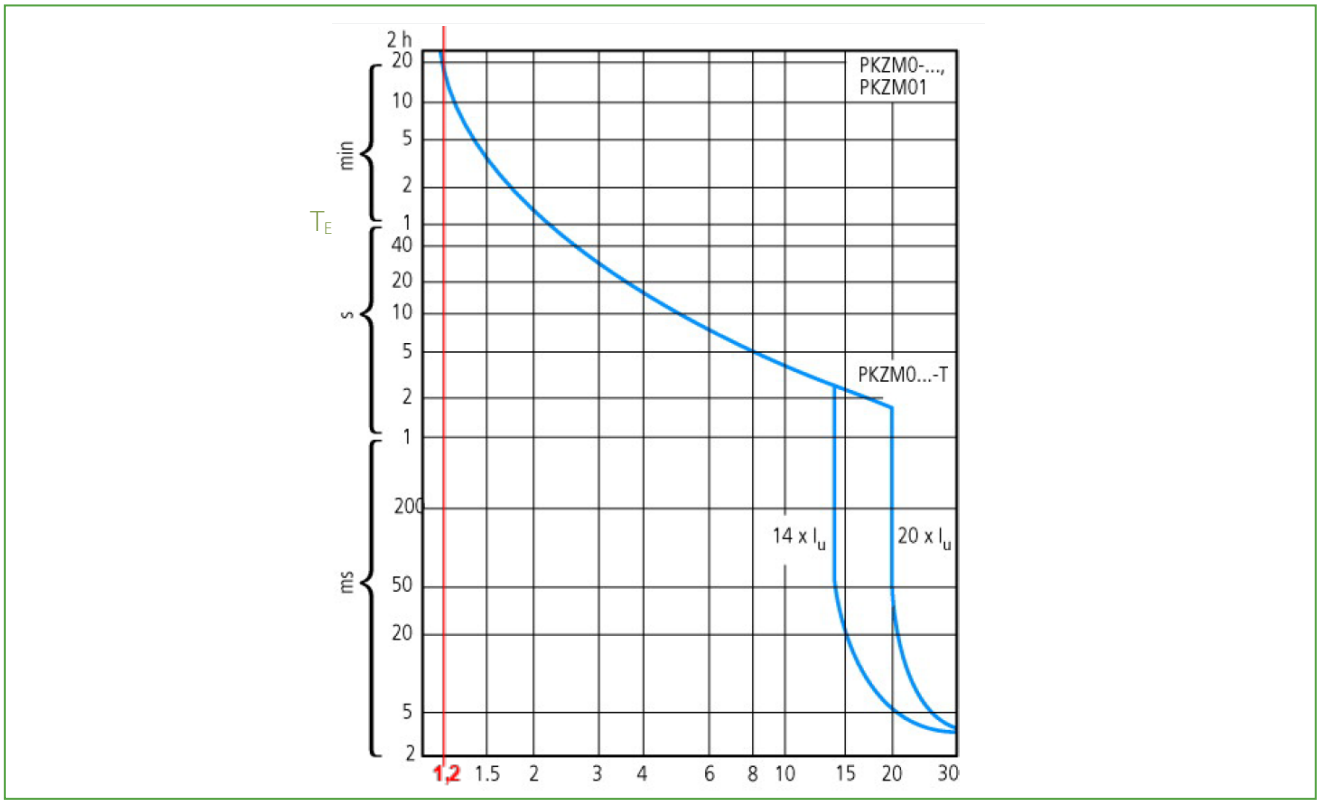


Figure 10 Motor protection characteristic, tripping: 1.2 times setting current, within 2 hrs.

- Install a device to disconnect the pump motor from all poles of the main power supply according to EN 60335-1.
- The pump needs to be installed in such a way, that contact to parts carrying live voltage (e.g. electrical connections) is impossible.

Compare the values of the supply voltage to the data on the product label. For the actual current consumption of the pump, please refer to the product label.

Warning

For your choice of cables and wires, make sure to comply with the general regulations regarding usage in potentially explosive areas (for reference see EN 60079 respectively DIN VDE 01 65). Especially cables and wires need to be chosen to withstand the anticipated mechanical, chemical and thermal strains.

During cable or wire installation, and wiring, the essential conditions and safety regulations need to be complied with (for reference see EN 60079 respectively DIN VDE 01 65).

The cable fittings must be inspected for usage in potentially explosive areas (EX-areas) and approved according to the type examination certificate Ⓔx II 2 G eb IIC. The terminal box has the Ex protection class Ⓔx II 2 G eb IIC.

For wiring the approved cables and wires, please follow these steps:

- Open the lid of the junction box.
- To connect the wires to the power supply, the junction box includes a built-in terminal for joining the wires, and a cable fitting with a thread: M 20 x pitch: 1.5.

  The wire clamp has a range of 6 mm to 10 mm [≈ 0.24" to 0.39"]. The maximum size of the wire cross-section is 2.5 mm^2 [≈ 0.0039 in^2].
- To connect the single wires, please refer to Figure 11.

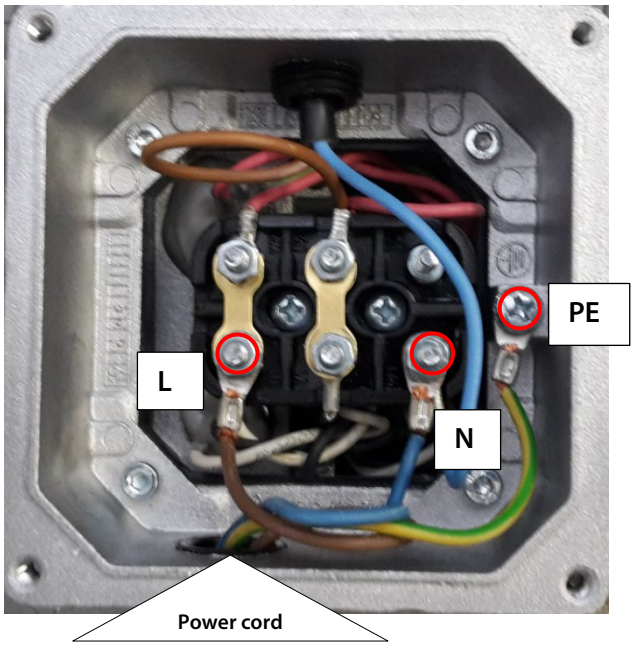


Figure 11 Electrical connection

- You can also connect the single wires with the preassembled compression terminals for max. 2.5 mm^2 [≈ 0.0039 in^2] wire size. Soldering of the wires is not permitted.
- Make sure to comply with EN 60079-01 and 60079-7 by considering the necessary creepage and clearance distance. The screws of the wire connections need to be tightened with a torque value of 1.5 N m. Secure the screws against accidental loosening.
- Connect the ground wire to the motor body.

For connecting the ground wire there is a screw with an earth ground symbol inside the junction box. This 4 mm screw has a clamp which secures the ground wire against rotating. To connect the ground wire to the motor, strip the wire insulation about 20 mm [≈ 0.79"] or use the provided compression lug. Soldering is not permitted. An additional grounding screw of the same design is located on the outside of the housing. The potential equalization must be connected here.

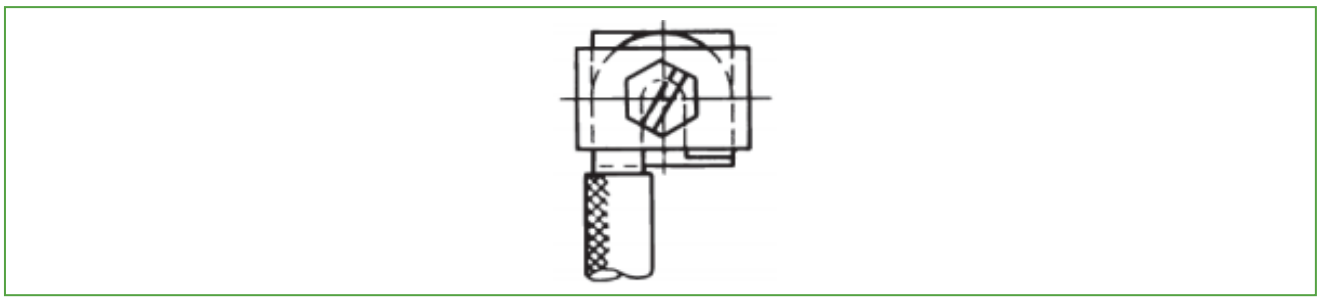


Figure 12 Ground wire connection to the motor

- Keep the inside of the junction box clean.
- Close lid of the junction box.

Make sure that the lid does close correctly, and the sealing of the box is still in good condition.

12.8 Pneumatic connections

1. Remove protective plugs from the gas connection threads (thread size G 1/4").
2. It is possible to screw the tube connection fittings into the pump head either from the top or side. To screw-in the tube connection fittings from the side, please remove protective plugs from the gas connection threads on the side and screw them into the threads on the top.
3. Accessory parts like tube connection fittings are screwed into the connection threads with sealing tape (when using straight M&C connectors, no sealing tape is necessary). Connection fittings for DN 4/6 or DN 6/8 are optional and available at M&C.

Below you will find the description on how to connect the M&C tube connection fittings:

Figure 13 Pneumatic connections

1. Connect the suction and pressure line.

Note

The operating direction is marked with an arrow on the pump head. In Figure 13 the pressure side is on the left and the suction side is on the right.

To connect the suction and pressure line, please loosen the union nut of the compression ring fitting counter clockwise. Be sure to remove the union nut carefully from the fitting. There is a loose clamp ring inside the union nut.

2. Slide the nut over the connecting tube.
3. Slide the clamp ring with the thicker bulge facing the nut, over the connecting tube.
4. Slide the connecting tube on the support nipple of the fitting.
5. Hand-tighten the nut. The connecting tube is now slip-proof and pressure-tight mounted to the tube connection fitting.
6. Suction and pressure lines need to be installed in such a way that the pump is protected against ingress of condensate or dust.

Note

Because of compression of sample gases, it is possible that condensate builds up in the pressure line. This pressure must be reduced. For example, reduce the pressure with a valve in the pressure line upstream of the pump or with the integrated needle valve.

13 Preparations for commissioning

Before initial startup, all plant- and process-specific safety measures must be observed. It is mandatory for the operator to complete the enclosed risk assessment of the product.
The gas exposure risk must be assessed by the operator with regard to the hazards posed by process and calibration gas and the setup at the installation site (e.g. tubing, system cabinet/container/plant). If the risk assessment reveals increased exposure hazards, further measures are required.
A visible label must be attached to the installation site in accordance with the risk assessment provided by the operator.

14 Start up

Before commissioning, be sure to comply with all applicable facility- and process-specific safety measures.

Make sure to use in potentially explosive areas (zones) only approved pumps with the adequate equipment category and temperature class.

Make sure to operate the pump for the intended use described in chapter 6 only.

Before commissioning, be sure to comply with all applicable safety regulations and measures of the involved sample gases. The materials of the pump, which are in contact with the sample gas, need to be suitable for the used sample gas. Before operating the pump make sure that the material of the pump head, bellows and valves (for pump materials: see chapter 10 Technical data) is suitable for the sample gas in use.

The following steps must be observed during initial start-up:

- Ensure that the pump is securely tightened to the surface.
- Only sample gas which withstands the pressure and temperature within the pump and does not built-up condensate is suitable for operation.
- The pumps must not start against pressure or vacuum.
- Before start-up and restarting, atmospheric pressure must be present in the suction and pressure lines. Even when the power has been cut off for only a short period, the suction and pressure lines need to have atmospheric pressure. After a pump standstill, the pressure in the sample gas lines needs to be set back to atmospheric pressure.
- Never exceed the maximum permitted operating pressure of 1.5 bar.
- Only insert a sample gas flow controller or restriction device into the suction line. This protects the pump bellows from damage and prevents the pressure from exceeding the maximum permitted operating value.
- Monitor the pressure, when a sample gas flow controller or restriction device is inserted in the suction line. This prevents the pressure to exceed the maximum permitted operating pressure.
- Monitor the pressure if necessary.
- If there is a chance that components installed downstream of the pump may block or reduce the sample gas flow, it is necessary to install e.g. a pressure relief valve. This prevents the pressure to exceed the maximum permitted operating value.

The bellows, valve plates and O-rings are the only consumable parts of the pump. Wear is usually indicated by a drastic reduction in the pneumatic performance. Valve plates must be replaced when they have reached a total thickness of < 1.6 mm [≈ 0.063"] including spacers. New O-rings ensure the tightness of the pump.
When replacing parts, please have a look at chapter 18 'Maintenance'.

15 Operating the pump

The following ambient conditions are necessary for operating the pump:

- Ambient temperature range during operation: -10 to +50 °C [+14 to +122 °F]/0 to +50 °C [+32 to +122 °F] for dry sample gas
- Operate the pump only in well ventilated rooms, and away from heat sources to prevent any heat accumulation.
- Please check immediately for damage, when the motor makes unusual running noises. Damaged ball bearings could be the cause of these running noises.

16 Decommissioning

Before switching off the pump (decommissioning), the pump needs to be purged with inert gas or air.

Note

The room or area where the pump is installed in must be kept frost-free at all times! The ambient temperature range is -10 to +50 °C [+14 to +122 °F]/0 to +50 °C [+32 to +122 °F] for dry sample gas even after decommissioning the pump.

Aggressive condensate possible!

Chemical burns caused by aggressive media possible!

For general electrical and mechanical work on the pump, wear personal protective equipment (PPE) in accordance with the risk assessment.

17 Disassembly

Note

Before switching off the pump (decommissioning), the pump needs to be purged with inert gas or air.

Aggressive condensate possible!

Chemical burns caused by aggressive media possible!

For general electrical and mechanical work on the pump, wear personal protective equipment (PPE) in accordance with the risk assessment.

Before disassembling the pump, follow these warnings and safety instructions:

Warning

High voltage!

Working without disconnecting the power supply may cause an electrical shock. Disconnect power supply before any assembly, maintenance or disassembly.

Secure the pump against accidental restart.

Danger

There may be harmful sample gases in the pump. Prevent potentially harmful gases from escaping the open sample gas lines during disassembly.

You can disassemble the pump now.

18 Maintenance

It is necessary to schedule maintenance work at least twice a year.

The intervals between servicing are dependent on the process and system conditions in your facility. The facility QA/QC plan should address the frequency for maintenance and should be updated based on your operations.

Danger

Maintenance work on equipment for use in potentially explosive areas needs to comply with the corresponding national standards regarding 'regulations of electrical systems in potentially explosive areas'. It also needs to follow all safety notes and descriptions stated in this manual.

There may be harmful sample gases in the pump. Prevent potentially harmful gases from escaping the open sample gas lines during maintenance. Purge the pump with inert gas or air before servicing.

Warning

High voltage!

Working without disconnecting the power supply may cause an electrical shock. Disconnect power supply before any assembly, maintenance or disassembly.

Secure the pump against accidental restart.

Aggressive condensate possible!

Chemical burns caused by aggressive media possible!

For general electrical and mechanical work on the pump, wear personal protective equipment (PPE) in accordance with the risk assessment.

The four hexagon socket screws see Figure 14 part G, need to be retightened to a value of 4 N m [≈ 2.95 lbf ft] by using a torque wrench. Start to retighten one screw. Tighten the opposite screw to the same amount, then select the adjacent pair. Repeat in the same sequence to reach the value of 4 N m [≈ 2.95 lbf ft].

The bellows, valve plates and O-rings are the only consumable parts of the pump. Valve plates must be replaced when they have reached a total thickness of < 1.6 mm [≈ 0.063"] including spacers. It is recommended to replace the O-rings to ensure the tightness of the pump.

Please refer to the spare parts list in chapter 22 for our recommended spare parts.

Warning

Explosion hazard due to wear and tear!

A periodical inspection of all pump components based on the following servicing plan is necessary.

Inspect the following pump components	Action
Pump	Check pump for damage of the enclosure and any leakage in regular intervals, at least two times per year.
Capacitor	Check the conditions of the adhesive covers of the vents in regular intervals. Replace capacitor with damaged adhesive cover.
Bellows, valve plates and O-rings	Replace at least when performance of the pump decreases. Valve plates must be replaced when they have reached a total thickness of < 1.6 mm [≈ 0.063"] including spacers. It is recommended to replace the O-rings to ensure the tightness of the pump.
Connecting rod bearings	Need to be replaced after 100 000 operating hours or 10 years of operation, whichever occurs first. *1
Motor bearings	Need to be replaced after 100 000 operating hours or 10 years of operation, whichever occurs first.*1
Fittings, connections, inlets	Check in suitable intervals. Replace when damaged with original parts in perfect condition.
Equipotential bonding	Check equipotential bonding between pump enclosure and motor. The equipotential bonding needs to be lower than 0.3 Ohm. Use lock washers for the screws.
Additional components, accessories	During scheduled maintenance work, check any additional components or accessories, e.g. filter installed upstream, separators and gas coolers, if they are in proper working condition.

*1 This applies only to pumps with serial number 1706XXXX or higher. Pumps which were manufactured earlier, need to be replaced after 24 months of operation.

Warning

Components like cable fittings and protective plugs can only be replaced by equal parts with a type examination certificate.

Note

If there are any damage to the connection rod, e.g. a loose threaded pin M 8 or loose ball bearings, the complete unit with connection rod and bearings need to be replaced (see chapter 22 for more details)

The eccentric is glued to the motor shaft by using Loctite 270. This connection is additionally secured by a setscrew.

18.1 Replacing the valve plates

Note

If you replace the valve plates, we also recommend replacing the O-rings C at the same time. New O-rings ensure the tightness of the pump.

For replacing the valve plates, the sample gas fittings don't need to be dismounted.

To replace the valve plates, proceed as follows:

1. Unscrew the crankcase cover. To do this, loosen the 3 hexagon socket screws F (3 mm spanner).
2. Loosen the four hex socket screws G (3 mm spanner).
3. Remove pressure ring H.
4. Remove upper pump head A.

Caution

Turn the pump head A to the right only. This prevents the bellows from detaching from the connecting rod. Then pull the pump head A out upwards.

O-rings C and valve plates B are freely accessible now.

5. The valve plates and O-rings can now be cleaned or replaced.
6. Clean valve seats and pump head with an adequate solvent (e.g. alcohol) and use oil-free compressed air to remove dust particles from the parts.

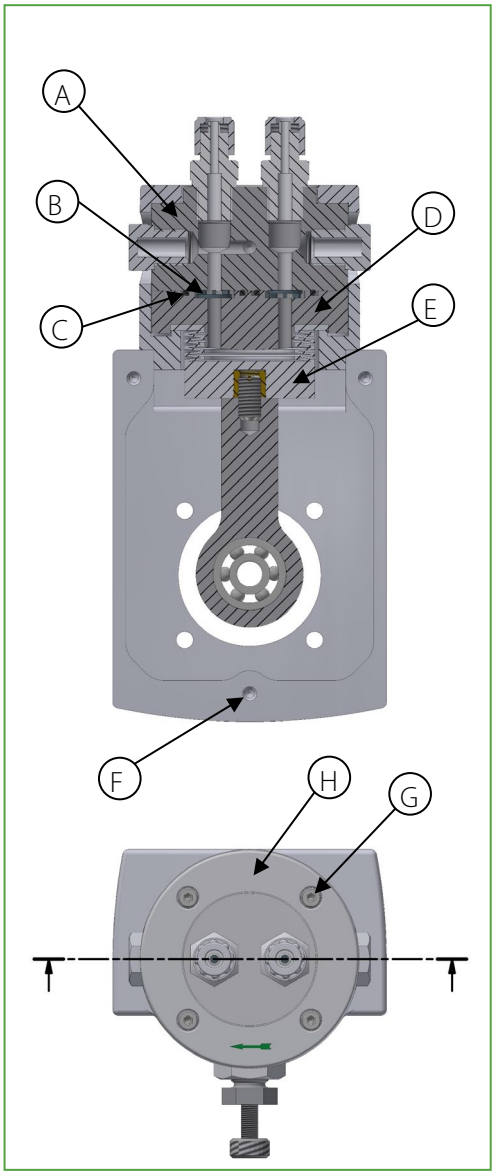


Figure 14 Sectional drawing MP-F../EX

After replacing or cleaning the valve plates and O-rings, follow these steps to reassemble the pump.

1. Insert O-rings C into the grooves, and place valve plates B back into the cleaned valve seats. Make sure that the valve plates are in the correct position.

Note

On the pressure side (on the left), the smooth side of Valve B is facing downwards, and on the suction side (on the right) the smooth side of Valve B is facing upwards. The operating direction is marked with an arrow (from right to left) on the pump head.

2. Install the upper pump head A and then the pressure ring H again. Align both so that the screws fit into the threads in the housing.
3. Check that the bellows are seated correctly. The bellows must be attached to the connecting rod.
4. Fasten the pressure ring H with the four hexagon socket screws G. First tighten the screws by hand. Start lightly to tighten one screw. Tighten the opposite screw to the same amount, then select the adjacent pair. Repeat in the same sequence, going for a hand-tight setting.
5. Then tighten the four hexagon socket screws alternately in the same sequence with a torque to a value of 4 N m [≈ 2.95 lbf ft]
6. Screw the crankcase cover back on again. Tighten the three hexagon socket screws F (wrench 3 mm) by hand.

18.2 Replacing the bellows

Note

If you replace the bellows, we also recommend replacing the O-rings C at the same time. New O-rings ensure the tightness of the pump.

To replace the bellows, proceed as follows:

1. Unscrew the crankcase cover. To do this, loosen the 3 hexagon socket screws F (3 mm spanner).
2. Loosen the four hex socket screws G (3 mm spanner).
3. Remove pressure ring H.
4. Remove upper pump head A.

Caution

Turn the pump head A to the right only. This prevents the bellows from detaching from the connecting rod. Then pull the pump head A out upwards.

5. Remove lower pump head D. For easier removal of the lower pump head D, please close one of the boreholes in the valve seat with your fingers and blow pressured air into the other borehole. This will loosen the lower pump head D.
6. Unscrew the bellows E from the connection rod. Please make sure to leave any spacers which might be there, on the threaded pin.
7. Screw new bellows hand-tight onto the connection rod.

After replacing the bellows and O-rings, please follow these steps to reassemble the pump:

1. Put lower pump head D back into place.
2. Insert new O-rings C into the grooves, and place valve plates B back into the cleaned valve seats. Make sure that the valve plates are in the correct position.

Note

On the pressure side (on the left), the smooth side of Valve B is facing downwards, and on the suction side (on the right) the smooth side of Valve B is facing upwards. The operating direction is marked with an arrow (from right to left) on the pump head.

3. Install the upper pump head A and then the pressure ring H again. Align both so that the screws fit into the threads in the housing.
4. Check that the bellows are seated correctly. The bellows must be attached to the connecting rod.
5. Fasten the pressure ring H with the four hexagon socket screws G. First tighten the screws by hand. Start lightly to tighten one screw. Tighten the opposite screw to the same amount, then select the adjacent pair. Repeat in the same sequence, going for a hand-tight setting.
6. Then tighten the four hexagon socket screws alternately in the same sequence with a torque to a value of 4 N m [≈ 2.95 lbf ft].
7. Screw the crankcase cover back on again. Tighten the three hexagon socket screws F (wrench 3 mm) by hand.

18.3 Cleaning instructions

- When replacing valve plates, bellows and O-rings, check all parts for any possible dirt residue before re-assembling the pump head. Clean these parts if necessary.
- Only use adequate solvents (e.g. alcohol) to prevent corrosion of the plastic parts (PTFE, PFA, FEP). If available use oil-free compressed air to remove dust particles from the parts.

19 Trouble shooting

Warning

High voltage!

Working without disconnecting the power supply may cause an electrical shock. Disconnect power supply before any assembly, maintenance or disassembly.

Secure the pump against accidental restart.

Problem/Indication	Possible cause	Check/Action
Pump produces no gas flow	No main supply	Check power supply; Check power cable for proper connection.
	Connections or lines are blocked.	Remove blockade
	An external valve is closed or a filter is blocked	Open valve or clean dirty/blocked filter.
Capacity, pressure or vacuum too low	The pump is not designed for these operating parameters.	Compare the actual operating parameters: pressure, vacuum and capacity with the data in chapter '10 Technical data'.
	Bellows, valves and/or O-rings are damaged or worn out	Change bellows, valves and/or O-rings. Valve plates must be replaced when they have reached a total thickness of < 1.6 mm [≈ 0.063"] including spacers. It is recommended to replace the O-rings to ensure the tightness of the pump.
	There is overpressure on the pressure side and at the same time vacuum on the suction side	Check the pump with pressure less suction side and compare values with parameter characteristic graph. If ok: check system parameters; not ok: see "Bellows or valves are damaged or worn out".
	Pneumatic lines or connecting parts have a too small cross-section.	To measure the performance values, uncouple the pump from the system; even a line with a too small cross-section or e. g. a valve installed in the system can change the measured value considerably.
	A leak at the gas connectors, lines or pump head. Bellows or valve plates are defective or pump head parts are dirty.	Seal the leak, tighten the fittings, replace defective parts and clean or remove dirty parts.

20 Proper disposal of the device

At the end of the life cycle of our products, it is important to take care of the appropriate disposal of obsolete electrical and non-electrical devices. To help protect our environment, please follow the rules and regulations of your country regarding recycling and waste management.

21 Accessories: motor protection circuit breaker

Part No.	Motor protection circuit breaker
S10002	Motor protection circuit breaker: 0.63 to 1 A for pump version with 230 V
S10022	Motor protection circuit breaker: 1.6 to 2.5 A for pump version with 115 V

These motor protection circuit breaker must always be mounted outside the potentially explosive area.

22 Spare parts list

The replacement interval for spare parts and consumables depends on the specific operating condition of the bellows pump. The quantities recommended in the following table are based on experience. Your replacement intervals will be based on your operating conditions.

Bellows pump MP-F05/EX, MP-F10/EX, MP-F05/R/EX, MP-F10/R/EX

(C) Consumable parts

(R) Recommended spare parts

(S) Spare parts

			Recommended amount based on number of years of operation [years]		
Part No.	**Description**	**C/R/S**	**1**	**2**	**3**
95P0010	Bellows MP-F PTFE	C	-	-	1
90P1110	Valve plate MP-F	C	2	4	6
95P0035	O-ring FEP 18 x 2 MP-F	R	2	4	6
95P0030	Lower pump head MP-F; PTFE	S	-	-	-
95P0025	Upper pump head MP-F; PTFE	S	-	-	-
95P0037	Spare parts kit for bellows pump with 2 x valve plates MP-F, 2 x O-rings FEP 18 x 2 MP-F and 1 x bellows MP-F.	S	-	-	-
95P0039	Spare screws set for mounting the pump head with 4 x spring washers M4 and 4 x allen socket head screws M4 x 55	S	-	-	-
95P0040	Connection rod with eccentric and ball bearing for MP-F05	S	-	-	-

Bellows pump MP-F05/EX, MP-F10/EX, MP-F05/R/EX, MP-F10/R/EX

(C) Consumable parts

(R) Recommended spare parts

(S) Spare parts

			Recommended amount based on number of years of operation [years]		
Part No.	**Description**	**C/R/S**	**1**	**2**	**3**
95P0045	Connection rod with eccentric and ball bearing for MP-F10	S	-	-	-
95P0026	Upper pump head MP-F with borehole for needle valve, material: PTFE	S	-	-	-
90P6030	Needle valve for MP-F../R Sealing ring and needle, material: PTFE	S	-	-	-
90P6015	Spare needle for MP-F.../R, material: PTFE	S	-	-	-
90P6020	Sealing ring for needle valve in MP-F.../R, material: PTFE	S	-	-	-
90P6025	Adapter for needle valve in MP-F/R, material: PTFE	S	-	-	-

PVDF male connectors with G-thread (ISO 1010031)

C) Consumable parts

(R) Recommended spare parts

(S) Spare parts

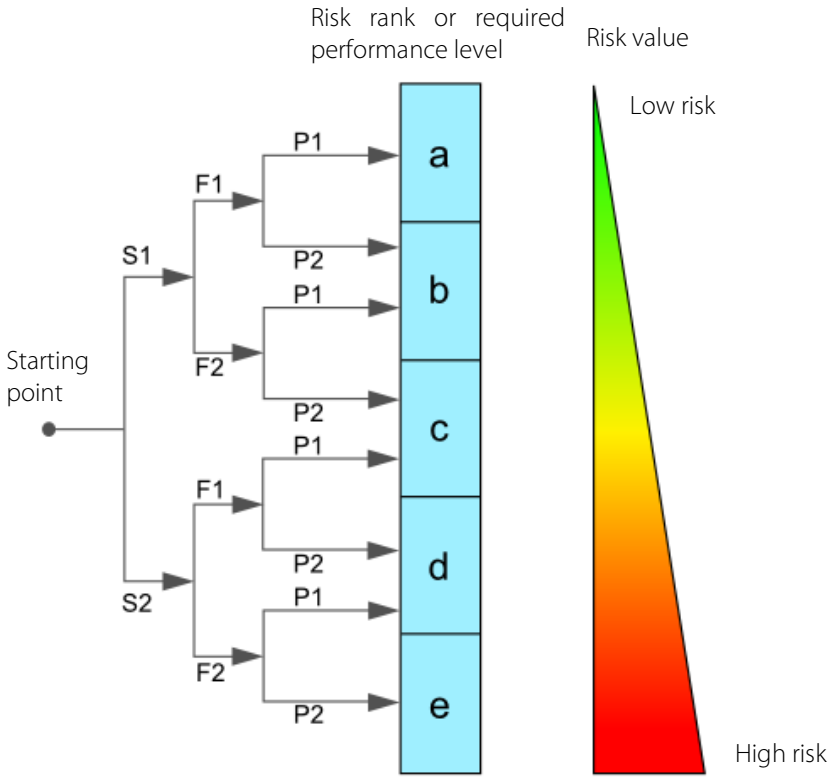
			Recommended amount based on number of years of operation [years]		
Part No.	**Description**	**C/R/S**	**1**	**2**	**3**
05V1060	Straight male connector DN 4/6-G 1/4", material: PVDF	S	-	-	-
05V1065	Straight male connector DN 6/8-G 1/4", material: PVDF	S	-	-	-
05V6600	Ferrule DN 4/6, material: PVDF	S	1	2	3
05V6602	Ferrule DN 6/8, material: PVDF	S	1	2	3
05V6605	Union nut DN 4/6, material: PVDF	S	1	2	3
05V6607	Union nut DN 6/8, material: PVDF	S	1	2	3

23 Risk assessment

The risk assessment provided in this chapter is intended for all work activities on the product. The hazards can occur in the work steps of assembly, commissioning, maintenance, disassembly and in the event of a product fault. During normal operation, the product is protected by a system cabinet or appropriate covers.
Only qualified personnel is permitted to perform the work. The following minimum knowledge is required for the work:

- Employee instruction provided in process engineering
- Employee instruction provided in electrical engineering
- Detailed knowledge of the instruction manual and the applicable safety regulations

The product complies with the current regulations according to state-of-the-art science and technology. Nevertheless, not all sources of danger can be eliminated while observing technical protective measures. Therefore, the following risk assessment and the description of exposure hazards refer to the work steps mentioned above.



Severity of injury:
S1 = 1 = minor (reversible injury)
S2 = 2 = serious (irreversible injury, death)

Frequency and duration:
F1 = 1 = infrequent or short exposure to hazard
F2 = 2 = frequent (more than once per hour/shift)

Possibility of preventing or limiting the damage
P1 = 1 = possible
P2 = 2 = hardly possible

Figure 15 Overview risk assessment

Aggressive condensate possible

Risk rank group A
Chemical burns due to aggressive media possible!
This applies to all liquids in vessels and in the product.
In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.

Caution risk of being crushed by rotating parts

Risk rank - group A
The product contains rotating parts. Do not open covers until the device has been switched off.

Caution hot surfaces

Risk rank - group A
The temperature inside the product can be higher than > 60 °C.
The hot parts are shielded by mechanical devices. Before opening the products, they must be disconnected from the power supply and a cooling time of more than > 20 minutes must be observed. In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.

Caution electric shock

Risk rank group C
When installing high-power systems with nominal voltages of up to 1000 V, the requirements of VDE 0100 and their relevant standards and regulations must be observed!
This also applies to any connected alarm and control circuits. Before opening the products, they must always be disconnected from the power supply.

Gas hazard

Risk rank group A-B-C
The hazard potential mainly depends on the gas to be extracted.
If toxic gases, oxygen displacing or explosive gases are conveyed with the product, an additional risk assessment by the operator is mandatory.
In principle, the gas paths must be purged with inert gas or air before opening the gas-carrying parts.
The escape of potentially harmful gas from the open process connections must be prevented.
The relevant safety regulations must be observed for the media to be conveyed. If necessary, flush the gas-carrying parts with a suitable inert gas. In the event of a gas leakage, the product may only be opened with suitable PPE or with a monitoring system.
Furthermore, the work safety regulations of the operator must be observed.

Caution crushing hazard

Risk rank - group A

The work must be performed by trained personnel only.
This applies to products weighing less than < 40 kg [≈ 88.2 lbs]:
The product can be transported by 1 to 2 person(s). The instructions for appropriate personal protective equipment (PPE) must be observed.
The weight specifications are contained in the technical data of this product.
Furthermore, the work safety regulations of the operator must be observed.

24 Appendix

- IBExU Type Examination Certificate in German and English
- Eurofins EU-Type Examination Certificate

Further product documentation can be seen and downloaded from our home page:

www.mc-techgroup.com

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[1] **TYPE EXAMINATION CERTIFICATE** - Translation

[2] Equipment
of equipment-groups I and II, equipment-categories M2 and 2 plus 3

[3] Type examination certificate number **IBExU15ATEXB005 X** | Issue 1

[4] Product: **Measuring gas pump MP-F .../Ex**
Sizes: 05 and 10 with or without needle valve

[5] Manufacturer: M&C Techgroup Germany GmbH

[6] Address: Rehhecke 79
40885 Ratingen
GERMANY

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014.

The examination and test results are recorded in the confidential test report IB-16-4-181 dated 31 May 2017.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN 13463-1:2009, EN 13463-5:2011, and EN 60079-0:2012 + A11:2013.
Except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This type examination certificate relates only to the design of the specified equipment and not to specific items of equipment subsequently manufactured or supplied.

[12] The marking of the product shall include the following:

Ex II 2G c IIC T3 X

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Tel: + 49 (0) 37 31 / 38 05 0
Fax: + 49 (0) 37 31 / 38 05 10

By order

(Dipl.-Ing. Willamowski)

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg/Sachsen
Telefon (03731) 3805-0
Telefax 38 05 10
Stamp

Certificates without signature and stamp are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2017-05-31

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[13] **Schedule**

[14] **Certificate number IBExU15ATEXB005 X** | Issue 1

[15] **Description of product**
The measuring gas pumps of the types mentioned in [4] are used for the process gas sampling of flammable gas and/or vapour/air mixtures of the Explosion Group IIC. They consist of a housing, a crank drive with crankshaft and connecting rod, a bellow, a lower part of the pump head with bellow seat and valve seat and an upper part with gas inlets and gas outlets. The upper part of the pumps of the MP-F**/R/EX series is equipped with a needle valve which serves as internal bypass.
The connecting rod is activated by the rotation of the crankshaft. It is connected to a bellow of PTFE which is installed in the pump head. The gas is sucked in and discharged by the movement of the bellow. The valves open and close independently due to the pressure or vacuum. They are sealed by means of O-rings between the lower and upper part of the pump head. The housing is flanged on the motor. The crankshaft is connected with the motor shaft.
Object of the type examination is the mechanical part of the equipment up to the crank drive. The drive and all other attaching parts are not part of this type examination.

Variations compared to issue 0 of this certificate:
Variation 1
The pump head can be made of PTFE reinforced with glass fibre (PTFE GF25) or stainless steel and PTFE reinforced with carbon fibre (PTFE CA25).

Variation 2
The ball bearings are stuck into the connecting rod. The operating life of the bearings without any periodic lubrication is increased to ten years.

Further technical details can be found in the test documents which are part of the Test Report IB-16-2-181 dated 31 May 2017.

[16] **Test report**
The test results are recorded in the confidential test report IB-16-2-181 dated 31 May 2017.
The test documents are part of the test report and they are listed there.

Summary of the test results
The components of the measuring gas pumps of the types mentioned in [4] arranged in zone 1 fulfil the requirements for non-electrical equipment of Equipment Group II, Category 2G in type of protection "c" (protection by constructional safety). They fulfil the requirements for use in potentially explosive atmospheres of the Explosion Groups IIA, IIB, and IIC as well as for Temperature Classes T1 to T3.

[17] **Specific conditions of use**
1. The measuring gas pumps with valves may pump only gases or vapours which are free of particles.
2. The pumps must not be installed in areas in which high-charging processes, such as spraying of liquids with low conductivity, are anticipated. They must not be used either in areas in which fast movements of dust particles and/or liquid particles are excepted. More explanations and examples can be found in IEC/TS 60079-32-1.
3. The pumps have to be included in the equipotential bonding of the vessels or plants.
4. The used materials must resist, under the respective operating conditions, the mechanical and/or chemical influences or corrosion so that the explosion protection is always maintained.
5. The maximum ambient temperature and intake temperature must not exceed 50 °C.
6. The maximum permissible working overpressure is 1.5 bar.

[18] **Essential health and safety requirements**
In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:

Clause	*Subject*
-	-

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An-Institut der TU Bergakademie Freiberg

[19] **Drawings and Documents**

Number	*Sheet*	*Issue*	*Date*	*Description*
-	-	-	-	-

The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

By order

(Dipl.-Ing. Willamowski)

Freiberg, 2017-05-31

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[1] BAUMUSTERPRÜFBESCHEINIGUNG

[2] Geräte
der Gerätegruppen I und II, Gerätekategorien M2 und 2 sowie 3

[3] Baumusterprüfbescheinigung Nummer **IBExU15ATEXB005 X** | Ausgabe 1

[4] Produkt: **Messgaspumpe MP-F .../EX**
Baugrößen: 05 und 10 mit sowie ohne Nadelventil

[5] Hersteller: M&C Techgroup Germany GmbH

[6] Anschrift: Rehhecke 79
40885 Ratingen
GERMANY

[7] Dieses Produkt sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Bescheinigung sowie den darin aufgeführten Unterlagen festgelegt.

[8] IBExU Institut für Sicherheitstechnik GmbH bestätigt, dass dieses Produkt die wesentlichen Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Produkten zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen aus Anhang II der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 erfüllt.

Die Untersuchungs- und Prüfergebnisse werden in dem vertraulichen Prüfbericht IB-16-2-181 vom 31.05.2017 festgehalten.

[9] Die Beachtung der wesentlichen Sicherheits- und Gesundheitsanforderungen wurde in Übereinstimmung mit folgenden Normen gewährleistet:
EN 13463-1:2009, EN 13463-5:2011 und EN 60079-0:2012 + A11:2013
Hiervon ausgenommen sind jene Anforderungen, die unter Punkt [18] der Anlage aufgelistet werden.

[10] Ein „X" hinter der Bescheinigungsnummer weist darauf hin, dass das Produkt den besonderen Bedingungen für die Verwendung unterliegt, die in der Anlage zu dieser Bescheinigung festgehalten sind.

[11] Diese Baumusterprüfbescheinigung bezieht sich ausschließlich auf die Konzeption des angegebenen Produkts und nicht auf die Fertigung und Bereitstellung weiterer Produkte.

[12] Die Kennzeichnung des Produkts muss Folgendes beinhalten:

Ex II 2G c IIC T3 X

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Tel: + 49 (0) 37 31 / 38 05 0
Fax: + 49 (0) 37 31 / 38 05 10

Im Auftrag

(Dipl.-Ing. Willamowski)

- Stempel -

Freiberg, 31.05.2017

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[13] **Anlage**

[14] **Bescheinigung Nummer IBExU15ATEXB005 X** | Ausgabe 1

[15] **Beschreibung des Produkts**
Die Messgaspumpen der in [4] genannten Typen dienen zur Prozessgasentnahme von zündfähigen Gas- bzw. Dampf/Luft-Gemischen der Explosionsgruppe IIC. Sie bestehen aus einem Gehäuse, einem Kurbeltrieb mit Kurbelwelle und Pleuel, einem Faltenbalg, einem unteren Teil des Pumpenkopfs mit Faltenbalg- und Ventilsitz sowie einem oberen Teil mit den Gasein- und -auslässen. Die Pumpen der Baureihe MP-F**/R/EX sind im oberen Teil mit einem Nadelventil als internen Pumpenbypass ausgestattet.
Durch die Rotation der Kurbelwelle wird der Pleuel bewegt. Dieser ist mit einem Faltenbalg aus PTFE verbunden, der im Pumpenkopf sitzt und durch die Bewegung Gas einsaugt sowie ausschiebt. Die Ventile öffnen und schließen aufgrund des Über- bzw. Unterdrucks selbstständig. Sie sind durch O-Ringe zwischen unterem und oberem Pumpenkopfteil abgedichtet. Das Gehäuse ist an den Motor geflanscht und die Kurbelwelle mit der Motorwelle verbunden.
Gegenstand der Baumusterprüfung ist der mechanische Teil der Geräte bis zum Kurbeltrieb. Der Antrieb sowie die übrigen Anbaugeräte sind nicht Bestandteil dieser Baumusterprüfung.

Änderungen gegenüber der Ausgabe 0 dieser Bescheinigung:
Änderung 1
Der Pumpenkopf kann neben glasfaserverstärktem PTFE (PTFE GF25) auch aus Edelstahl und kohlenfaserverstärktem PTFE (PTFE CA25) bestehen.

Änderung 2
Die Kugellager werden nun in den Pleuel eingeklebt. Die Lebensdauer ohne wiederkehrende Schmierung der Lager wurde auf zehn Jahre erhöht.

Weitere technische Einzelheiten sind in den Prüfunterlagen festgelegt, die Bestandteil des Prüfberichtes IB-16-2-181 vom 31.05.2017 sind.

[16] **Prüfbericht**
Die Prüfergebnisse sind im vertraulichen Prüfbericht IB-16-2-181 vom 31.05.2017 festgehalten.

Die Prüfunterlagen sind Teil des Prüfberichts und werden darin aufgelistet.

Zusammenfassung der Prüfergebnisse
Die sich in Zone 1 befindenden Teile der Messgaspumpen der in [4] genannten Typen genügen den Anforderungen an nichtelektrische Geräte in der Zündschutzart c (Schutz durch Konstruktive Sicherheit) der Gerätegruppe II, Kategorie 2G. Sie erfüllen die Anforderungen für den Einsatz in der Explosionsgruppe IIA, IIB und IIC sowie Temperaturklasse T1 bis T3.

[17] **Besondere Bedingungen für die Verwendung**
1. Die Messgaspumpen mit den Ventilen dürfen nur partikelfreie Gase oder Dämpfe fördern.
2. Die Pumpen dürfen nicht in Bereichen aufgestellt werden, in denen mit hochaufladenden Prozessen, wie dem Versprühen von Flüssigkeiten geringer Leitfähigkeit oder schnellen Bewegungen von Staub- und / oder Flüssigkeitspartikeln zu rechnen ist. Weitere Ausführungen und Beispiele bietet IEC/TS 60079-32-1.
3. Die Pumpen sind in den Potenzialausgleich der Behälter oder Anlagen einzubeziehen.
4. Die verwendeten Werkstoffe müssen unter den jeweiligen Betriebsbedingungen gegen mechanische und / oder chemische Einflüsse bzw. Korrosion so beständig sein, dass der Explosionsschutz nicht aufgehoben wird.
5. Die maximale Umgebungs- und Ansaugtemperatur von 50 °C darf nicht überschritten werden.
6. Der maximal zulässige Betriebsüberdruck beträgt 1,5 bar.

[18] **Wesentliche Sicherheits- und Gesundheitsanforderungen**
Zusätzlich zu den wesentlichen Sicherheits- und Gesundheitsanforderungen, die in den Anwendungsbereich der unter Punkt [9] genannten Normen fallen, wird Folgendes für dieses Produkt als relevant angesehen und die Konformität wird im Prüfbericht dargelegt:

Klausel	*Thema*
-	-

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[19] **Zeichnungen und Unterlagen**

Nummer	*Blatt*	*Ausgabe*	*Datum*	*Beschreibung*
-	-	-	-	-

Die Dokumente sind im Prüfbericht aufgelistet.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Im Auftrag

(Dipl.-Ing. Willamowski)

Freiberg, 31.05.2017

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[1] **EU-TYPE EXAMINATION CERTIFICATE**

[2] **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU – Annex III**

[3] Certificate Number: **EPT 17 ATEX 2588 X** **issue 5**

[4] Equipment: **Electric motor**
O-M

[5] Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A**

[6] Address: Via Mantova, 93 – 43122 Parma - Italy

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive. The examination and test results are recorded in the confidential Report N°EPT.24.REL.01/2313114

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the following harmonized standards:

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-7:2015+A1:2018, EN 60079-31:2014

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

[12] The equipment shall include the sign Ex and the following strings:

II 2G
Ex db IIC T5 ... T3 Gb *or*

II 2GD
Ex db IIC T5 ... T3 Gb
Ex tb IIIC T125°C Db

Applicable when flameproof terminal compartment is used

II 2G
Ex db eb IIC T5 ... T3 Gb *or*

II 2GD
Ex db eb IIC T5 ... T3 Gb
Ex tb IIIC T125°C Db

Applicable when increased safety terminal compartment is used

-40°C ≤ Tamb ≤ +60°C

Relationships between ambient temperature range and temperature limits are reported in the equipment description

Place and date of issue:
(DD-MM-YYYY)
Torino, 19-03-2024

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director

Eurofins Product Testing Italy
eurofins
Notified Body N. 0477

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
PRD N° 119B
Signatory of EA, IAF and ILAC Mutual Recognition Agreements
CP-ATEX-MOD-26-00

This Certificate has 8 pages and it is reproducible only in its entirety. Conditions of validity are reported below.

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 - 10156 Torino - Italia
Notified Body N. 0477

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[13]
[14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE
N. EPT 17 ATEX 2588 X issue 5

[15] **Equipment description**

The motors are made of aluminium and have separate parts: motor enclosure, terminal box for supply and capacitor enclosure (optional). The motors are suitable for group IIC and group IIIC.
The motor enclosure has types of protection "Ex d" and "Ex t";

The terminal box can have types of protection "Ex d" and "Ex t" or "Ex e" and "Ex t"; in addition, the connection between the motor wires and supply cable can be made in a box without terminals by the use of splicing or head to head connectors

The capacitor enclosure has types of protection "Ex d" and "Ex t";
All the parts of the flameproof enclosures have flameproof joints independent from each other.
The motors can be equipped with auxiliary devices (heaters, thermal protectors).
The anti-condensation heater can be activated only when the motor is not powered.
In case of single phase motors the capacitors have to be placed in the appropriate enclosure or in safe area.

Electrical characteristics

The equipment can be supplied by mains or inverter:
Mains Supply

Maximum rated voltage:	850 V
Maximum rated power:	30 kW
Rated frequency:	50/60 Hz
Insulation class:	F or H
Duty:	S1, S2, S3, S9
Poles:	2, 4, 6, 8, 2/4, 4/8, 4/6, 6/8
Degree of protection:	IP65 (For version with Ex db eb flat box execution) IP66 (Other versions)

Inverter supply

Frequency range: 5-100 Hz
Possibility of supply through inverter exclusively with the use of thermal protectors applied on the windings.
Such protectors may be either PTO and PTC and they shall be connected to an appropriate and reliable control device.

Activation temperature related to the temperature class:
- 90°C for temperature class T5;
- 130°C for temperature class T4;
- 150°C for temperature class T3.

Ambient temperature. -40 ÷ +40 °C (or +60°C for T3, T4 class of temperature)
Temperature classes and Maximum surface temperature:
T5, T4, T3, T125°C as a function of the ambient temperature and of the electrical characteristics (as indicated in the technical note).

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Dionisio Bucchieri
Directive Responsible

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Notified Body N. 0477

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[13]
[14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE
N. EPT 17 ATEX 2588 X issue 5

Ventilation

The motors can be ventilated and not ventilated (with half power in respect to the ventilated corresponding motors so to maintain a T3 temperature class with ambient temperature of 60°C or T4 temperature class with ambient temperature of 40°C).
Ventilation can be made by fan, who is fitted directly on the shaft, or by using an auxiliary motor. The auxiliary motor belongs to O-M series. It will be a two poles 63 motor (for shaft height from 80 to 132) or a two poles 71 motor (for shaft height from 160 to 180).
Impellors for Ex db motors, which have a peripheral speed below 50 m/s, are made of plastic material.
Impellors for Ex tb or Ex db tb or Ex db motors (which have a peripheral speed above 50 m/s) are made of plastic dissipative material or metallic material.
The degree of protection (IP) of ventilation openings are:
- IP 20 on the air inlet side
- IP 10 on the air outlet side

Summary of possible marking strings and allowed ambient temperature range

Ordinary terminal box

Ex db IIC T4 Gb	Ex tb IIIC T125°C	Tamb -40°C + 60°C
Ex db eb IIC T4 Gb	Ex tb IIIC T125°C	Tamb -40°C + 60°C
Ex db IIC T5 Gb	Ex tb IIIC T125°C	Tamb -40°C + 40°C
Ex db eb IIC T5 Gb	Ex tb IIIC T125°C	Tamb -40°C + 40°C

Cable connection by means of flat box

Three phases motors

Ex db eb IIC T3 Gb	Ex tb IIIC T125°C	Tamb -40°C + 60°C
Ex db eb IIC T4 Gb	Ex tb IIIC T125°C	Tamb -40°C + 50°C

Single phase motors from frame size 56 up to frame 100:

Ex db eb IIC T3 Gb	Ex tb IIIC T125°C	Tamb -40°C + 50°C

Cable entries

The cable entries integrated in motor body, terminal box (motor side), capacitor box are part of this certification.
All the other cable entries devices used on the enclosures are already properly ATEX certified.
The accessories used for cable entries and for unused holes must be covered by a separate ATEX certification according to the applicable standards EN 60079-0, EN 60079-1, EN 60079-7 and EN 60079-31.

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[13]
[14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE
N. EPT 17 ATEX 2588 X issue 5

Identification

The three-phase and single-phase asynchronous motors, Series O-M (IE1 Range), are identified by a code as follows

Motor Type Identification				OD	063	A	4
Motor Type							
Single phase motors Efficiency IE1							
MD	1ph Ex db or Ex tb **(ATEX Marking)**	**ME**	1ph Ex db eb or Ex db eb tb **(ATEX Marking)**				
MX	P<0.12Kw 1ph Ex db or Ex db tb **(ATEX + IECEx Marking)**	**MY**	P<0.12Kw 1ph Ex db eb or Ex db eb tb **(ATEX + IECEx Marking)**				
	P>= 0.12Kw 1ph Ex db or Ex db tb **(IECEx Marking only)**		P>= 0.12Kw 1ph Ex db eb or Ex db eb tb **(IECEx Marking only)**				
Three phase motors Efficiency IE1							
OD	3ph Ex db or Ex tb **(ATEX Marking)**	**OE**	3ph Ex db eb or Ex db eb tb **(ATEX Marking)**				
OX	P<0.12 kW all speeds P>= 0.12 kW double speed 3ph Ex db or Ex db tb **(ATEX + IECEx Marking)**	**OY**	P<0.12 kW all speeds P>= 0.12 kW double speed 3ph Ex db ebor Ex db eb tb **(ATEX + IECEx Marking)**				
	P>= 0.12 kW single speed 3ph Ex db or Ex db tb **(IECEx Marking only)**		P>= 0.12 kW single speed 3ph Ex db eb or Ex db eb tb **(IECEx Marking only)**				

Shaft Heigth
56, 63, 71, 80, 90, 100, 112, 132, 160, 180

Main stator dimensions (depending on motor power)	
A,B	**56, 63, 71, 80**
S,L	**90, 132, 160, 180**
K,M	**100, 132, 160, 180**

Poles number	
2, 4, 6	Single phase motors 1 speed
2, 4, 6 , 8	Three phase motors 1 speed
3, 5, 7, 9	3ph double speed 2/4, 4/8, 4/6, 6/8 poles Constant Torque
C, D, E, F	3ph double speed 2/4, 4/8, 4/6, 6/8 poles Quadratic Torque

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19-03-2024

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 - 10156 Torino - Italia
Notified Body N. 0477

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[13]
[14]

ANNEX
EU-TYPE EXAMINATION CERTIFICATE
N. EPT 17 ATEX 2588 X issue 5

The three-phase and single phase asynchronous motors, Series O (IE2-IE3 Range), are identified by a code as follows:

Motor Type Identification				OH	063	A	4
Motor Type							
Three phase and single phase motors Efficiency IE2 – IE3							
MH	1-Phase Ex db or Ex db tb (Atex marking)	MK	1-Phase Ex db eb or Ex db eb tb(Atex marking)				
OH	3 –Phase Ex db or Ex db Ex tb (ATEX Marking)	OK	Ex db Ex eb or Ex db Ex eb Ex tb (ATEX Marking)				
MZ	1-Phase Ex db or Ex db tb (Atex + IECEx marking)	MJ	1-Phase Ex db eb or Ex db tb (ATEX +IECEx marking)				
OZ	Ex db or Ex db Ex tb (ATEX + IECEx Marking)	OJ	Ex db Ex eb or Ex db Ex eb Ex tb (ATEX + IECEx Marking)				

Shaft Heigth
56, 63, 71, 80, 90, 100, 112, 132, 160, 180

Main housing Frame S M L Main stator dimensions (depending on motor power) A B C D E S Z

Poles number	
2, 4, 6, 8	Three phase motors 1 speed
2, 4	Single phase motors 1 speed

Warning label

"Flameproof joints cannot be repaired"

"Use screws quality ≥ 8.8"

"Potential electrostatic charging hazard – Do not rub the surface – Clean only with a damp cloth"

Note: this warning is included only in case of painting with thickness greater than 0.2mm

"Do not open in presence of explosive atmosphere"

"Refer to instruction for cable and cable gland selection"

"Do not open when energized"

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Routine tests

According to clause 7.1 of EN 60079-7 standard, each motor having increased safety "Ex eb" terminal box shall be submitted to the dielectric strength test (carried out in accordance with clause 6.1). The test shall be deemed to have passed if no breakdown or arcing occurs applying a test voltage equals to (1000+ 2U) V.r.m.s. for at least 1 minute, where U is the rated voltage of the motor.

The test can be alternatively carried out at 1.2 times the test voltage for a period of at least 100 ms.

The test voltage shall be applied between each galvanically isolated connection included in the terminal box.

[16] **Assessment Report n° EPT.24.REL.01/2313114**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this certificate performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Special condition for a safe use**

Supply voltage must be within:

- ±5% of the nominal value for temperature class T5;
- ±10% of the nominal value for temperature class T3 or T4.

•Flameproof joints are not intended to be repaired.

•The anti-condensation heater can be activated only when the motor is not powered.

Essential Health and Safety Requirements

[18] Assured by compliance with harmonized standards.

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[19] **Descriptive documents**

The equipment object of this Certificate are described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Type of document	Document identification	Rev.	Date
*Technical note (four attachements included)	Technical note asynchronous motors series O - M sizes 56-180	4	21-11-2023
Sealing rings drawings	Schema gommini	-	19-02-2021
Gland nuts drawings	Schema premistoppa	-	23-02-2021
Washer drawings	Schema rondelle	-	23-02-2021
Safety, installing maintenance instructions (non- flat box motor)	Motors series O-M - Safety, installing maintenance instructions	01	28-06-2021
Safety, installing maintenance instructions (flat box and not flat box motors)	Motors series O-M - Safety, installing maintenance instructions	02	20-05-2022

* New or revised document

[20] **Terms and conditions**

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

- changes in the design or construction of the product;
- changes or amendments to the Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

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[21] **History**

Issue	Description	Date
0	First emission, replacement of the EC-TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350 and its supplements n. 1 and 2.	06-02-2017
1	Constructive change and changing of manufacturer's references	08-02-2019
2	• Inclusion of the high efficiency IE2-IE3 versions (with and without extension ring) • Verification of compliance according to the latest standard editions EN IEC 60079-0:2018 and EN 60079-7:2015+A1:2018	29-06-2021
3	Inclusion of "flat box" version for single phase motors sizes from 56 to 100 and for three phase motors sizes from 56 to 132 (models 132M D2, 71M Z6, 132M E6 are excluded)	15-07-2022
4	The high efficiency version (IE2) for single phase motors has been included in the scope of the certificate	21-12-2022
5	The marking plate of IE1 motors version has been updated. The protection degree has been increased from IP 65 to IP 66, excluding Ex db eb flat box execution that remain IP 65.	19-03-2024

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End of Certificate

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