



Sample gas pumps

P2.x ATEX



Installation and Operation Instructions

Original instructions





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Read this instruction carefully prior to installation and/or use. Pay attention particularly to all advises and safety instructions to prevent injuries. Bühler Technologies can not be held responsible for misusing the product or unreliable function due to unauthorised modifications.

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Document information

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1 Introduction

1.1 Intended Use

P2.x ATEX sample gas pumps are intended for installation in gas analysis systems for industrial applications to transport gaseous media only. They are not suitable for liquids. The sample gas pumps are not designed to be used outdoors without protection from weather effects.

ATEX versions are suitable for use in equipment group II, equipment category 2G, explosion group IIC, temperature classes T3 or T3/T4 and must not be used in dusty areas.

The complete designation of the P2.x ATEX sample gas pump is:

P2.2 ATEX/P2.4 ATEX  II 2G Ex h IIC T3/T4 Gb X

P2.72 ATEX/P2.74 ATEX  II 2G Ex h IIC T3 Gb X

DANGER! Explosion hazard when used in explosive areas

The sample gas pumps must not be used in dusty areas or in areas other than the designated explosive area.

If the specifications in these operating instructions are observed, in particular the temperature parameters in the technical data, the P2.x ATEX sample gas pumps can convey non-flammable and also flammable gaseous media, which can occasionally be explosive in normal operation.

The delivery of highly particle-laden, explosive gas mixtures can lead to a dangerous electrostatic charge in the bellows/pump body. Install particle filtration with the appropriate fineness upstream from the pump gas input. For the P2.x ATEX-O2 versions in particular, we recommend a filter fineness of <10 µm.

The maximum surface temperature varies according to the medium and ambient temperatures. Please refer to the technical data in the [Appendices](#) [> page 31] to see the correlation between media temperature, ambient temperature and the pump's temperature class.

The pump head and the drive motor on the P2.4 ATEX/P2.74 ATEX sample gas pump are isolated for use in hot applications. The sample gas pump has a split adapter which can be mounted with one half inside a heated cabinet while the other half mounted on the outside supports the drive motor. In doing so, wall thicknesses of up to 30 mm can be bridged without additional modifications.

Applications where sample gas is still moist can result in condensation in the lines and the pump body. In these cases, the pump head must be suspended (see item Alteration of hanging pump bodies).

Sample gas pumps P2.x ATEX-O2 (item no.: 42.....-O2) are optimised especially for use with increased oxygen concentrations with regard to the parts in contact with the medium. Only BAM (Federal Institute for Materials Research) tested materials are used. Special cleaning of the components to minimise organic and inorganic contamination is mandatory. Manufacturing the products under controlled cleanliness conditions ensures compliance with the limit values in accordance with EIGA Doc 33/18.

Sample gas pumps P2.x ATEX-H2 (item no.: 42.....-H2) are specially refined using advanced manufacturing measures, in particular to prevent hydrogen-induced component damage. In addition, the parts in contact with the media are subjected to an additional visual inspection to remove any residual metallic contamination, such as chips and particles. Finally, a leak test is carried out as standard.

Please note the specifications in the [Appendices](#) [> page 31] to this manual on the specific intended use, existing material combinations, as well as pressure and temperature limits. In addition, please also note the specifications and markings on the nameplates.

1.2 Item number structures

This unit is available in various versions. Please refer to the type plate for the specific version.

In addition to the order number or ID number, the type plate also contains the item number with a code, where each character (x) represents specific equipment:

P2.2 ATEX, P2.4 ATEX

42	xx	x	x	x	x	x	9	0	0	0	Product characteristics
	61										Base model
											P2.2 ATEX 400 l/h (direct operation without intermediate flange)
	62										P2.4 ATEX 400 l/h (with intermediate flange)
											Motor voltage
											230 V 50/60 Hz; 0.78/0.86 A
											115 V 50/60 Hz; 1.56/1.72 A
											380–420 V 50 Hz; 0.46 A
											500 V 50 Hz; 0.36 A
											Pump head position
											Normal position vertical
											turned by 180° ¹⁾
											Pump body material
											PTFE
											Stainless steel 1.4571
											PTFE with bypass valve ¹⁾
											Stainless steel 1.4571 with bypass valve ¹⁾
											Valve material
											up to 100 °C; PTFE/PVDF ¹⁾
											up to 140 °C; PTFE/PEEK
											Screw-in connections (depending on pump body)
											PTFE pump body
											Stainless steel pump body
											DN 4/6 (standard)
											6 mm (standard)
											DN 6/8
											8 mm
											3/8"–1/4"
											3/8"
											1/4"–1/8"
											1/4"
											1/4"–1/6"
											Mounting accessories
											incl. mounting bracket and bumpers ¹⁾

¹⁾ not possible with P2.4 ATEX.

P2.72 ATEX, P2.74 ATEX

42	xx	x	x	x	x	x	9	0	0	0	Product characteristics
											Base model
65											P2.72 ATEX 700 l/h (direct operation without intermediate flange)
66											P2.74 ATEX 700 l/h (with intermediate flange)
											Motor voltage
7											230 V 50/60 Hz; 0.78/0.86 A
8											115 V 50/60 Hz; 1.56/1.72 A
9											380–420 V 50 Hz; 0.46 A
0											500 V 50 Hz; 0.36 A
											Pump head position
1											Normal position vertical
2											turned by 180° ¹⁾
											Pump body material
2											Stainless steel 1.4571
4											Stainless steel 1.4571 with bypass valve ¹⁾
											Valve material
2											up to 140 °C; PTFE/PEEK
											Screw-in connections
9											6 mm (standard)
1											8 mm
2											3/8"
4											1/4"
											Mounting accessories
9											incl. mounting bracket and bumpers ¹⁾

¹⁾ not possible with P2.74 ATEX.

P2.2 ATEX-H2/-O2, P2.72 ATEX-H2/-O2, P2.4 ATEX-H2/-O2, P2.74 ATEX-H2/-O2

42	xx	x	x	x	2	x	9	0	0	0	x	Product characteristics
												Base model
61												P2.2 ATEX 400 l/h (direct operation without intermediate flange)
62												P2.4 ATEX 400 l/h (with intermediate flange)
65												P2.72 ATEX 700 l/h (direct operation without intermediate flange)
66												P2.74 ATEX 700 l/h (with intermediate flange)
												Motor voltage
7												230 V 50/60 Hz; 0.78/0.86 A
8												115 V 50/60 Hz; 1.56/1.72 A
												Pump head position
1												Normal position vertical
2												turned by 180° ¹⁾
												Pump body material
2												Stainless steel 1.4571
4												Stainless steel 1.4571 with bypass valve ^{1) 2)}
												Valve material
2												PTFE/PEEK ²⁾
												Screw-in connections (varies by application)
												For -H₂ (stainless steel)
												For -O₂ (stainless steel) ³⁾
0												N/A
9												no screw-in connection
1												6 mm
4												8 mm
												8 mm
												1/4"
												1/4"
												Mounting accessories
9												incl. mounting bracket and bumpers ¹⁾
												Area of application
												-H2 optimised for high-purity hydrogen
												-O2 optimised for high-purity oxygen

¹⁾ not possible with P2.4 ATEX or P2.74 ATEX.

²⁾ For O₂ version: BAM-tested materials.

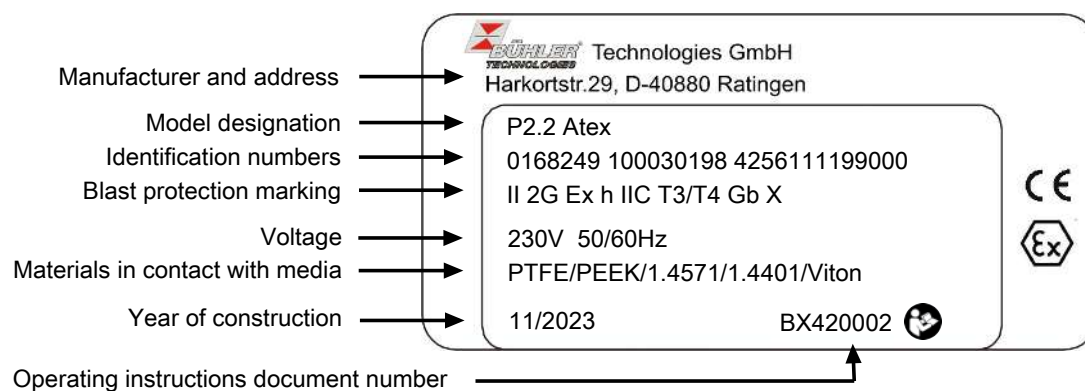
³⁾ With the O₂ version, cleaned fittings are enclosed in a separate bag. BAM-tested PTFE sealing tape required [see accessories].

Any special features applicable to a pump model are described separately in the operating manual.

When connecting, please note the specific values of the pump, and the correct version when ordering spare parts (e.g.: valve).

1.3 Type plate

Example:



1.4 Scope of delivery

P2.2 ATEX/P2.72 ATEX

1 x Sample gas pump with motor
4 x Rubber-metal bumpers
1 x Mounting bracket
Product documentation

P2.4 ATEX/P2.74 ATEX

1 x Pump head with intermediate flange
1 x Motor
1 x Coupling flange
1 x Coupling
1 x Mounting ring
Product documentation

2 Safety instructions

2.1 Important advice

This unit may only be used if:

- the product is being used under the conditions described in the operating- and system instructions, used according to the nameplate and for applications for which it is intended. Any unauthorized modifications of the device will void the warranty provided by Bühler Technologies GmbH,
- complying with the specifications and markings in the type plate,
- complying with the threshold values specified in the data sheet and the instructions,
- monitoring equipment / protection devices are connected correctly,
- service and repair work not described in these instructions are performed by Bühler Technologies GmbH,
- genuine spare parts are used.

These operating instructions are a part of the equipment. The manufacturer reserves the right to change performance-, specification- or technical data without prior notice. Please keep these instructions for future reference.

Signal words for warnings

DANGER

Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.

WARNING

Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.

CAUTION

Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.

NOTICE

Signal word for important information to the product.

Warning signs

These instructions include the following warnings:



General warning sign



Warning against hand injuries



Voltage warning



General mandatory sign



Warning not to inhale toxic gases



Unplug from mains



Warning of corrosive substances



Wear respiratory equipment



Warning of explosion hazard



Wear a safety mask



Warning of hot surfaces



Wear gloves

2.2 General hazard warnings

This product has no dangerous ignition sources when observing regulations and operating parameters in these operating instructions. Installation into a complete system can pose new hazards the manufacturer of this sample gas pump has no control over. If necessary, perform a risk assessment of the complete system this product will be installed into.

Observe the relevant national safety regulations for the installation site and the generally applicable state of the art when configuring and building the complete system. These can be determined through applicable harmonised standards, e.g. **EN 60079-14** among others. Additional national regulations pertaining to initial operation, operation, maintenance, repairs, and disposal must be observed.

Avoid any exothermic reactions in your system, do not use materials with a catalytic effect in the conveyor lines. Dangerous rises in temperature may otherwise occur. Sample gas pump materials in contact with media are specified in this operating manual to facilitate the safety assessment.

Adiabatic compression is part of the physical operating principle of bellows pumps. Dangerous rises in temperature cannot be ruled out when exceeding the operating parameters.

Avoid these dangerous conditions. If necessary, protect the entire system against flashback. Follow these notes and the applicable national regulations and prevent malfunctions to avoid personal injury and property damage.

The operator of the system must ensure:

- The equipment is installed by a professional familiar with the safety requirements and risks,
- Safety notes and operating instructions are available and observed,
- The permissible data and operating conditions are observed,
- Protective devices are used and the required maintenance is performed,
- The unit is disposed according to the law.

Maintenance, Repair

Please note during maintenance and repairs:

- Repairs to the unit must be performed by Bühler authorised personnel.
- Only perform conversion-, maintenance or installation work described in these operating and installation instructions.
- Always use genuine spare parts.
- Do not install damaged or defective spare part. If necessary, visually inspect prior to installation to determine any obvious damage to the spare parts.

Always observe the applicable safety and operating regulations in the respective country of use when performing any type of maintenance.

DANGER

Electrical voltage

Electrocution hazard.



- a) Disconnect the device from power supply.
- b) Make sure that the equipment cannot be reconnected to mains unintentionally.
- c) The device must be opened by trained staff only.
- d) Regard correct mains voltage.



DANGER

Danger of explosions, danger of poisoning from poisonous corrosive gases

During maintenance work, depending on the medium used, explosive and/or poisonous corrosive gases could escape, and this could lead to a danger of explosion or could be hazardous to health.



- a) Inspect the leak tightness of your sampling system before putting the device into operation.
- b) Ensure that gases that are hazardous to health are discharged safely.
- c) Turn off the gas supply before beginning any maintenance or repair work and flush the gas lines with inert gas or air. Secure the gas supply so that it cannot be turned on unintentionally.
- d) Protect yourself during maintenance from poisonous / corrosive gases. Wear appropriate protective equipment.



DANGER**Explosion hazard**

Life and explosion risk may result from gas leakage due to improper use.

- a) Use the devices only as described in this manual.
- b) Regard the process conditions.
- c) Check tubes and hoses for leakage.

DANGER**Adiabatic compression (explosion hazard)!**

In case of adiabatic compression, high gas temperatures may occur. The operator is responsible to consider this situation.

Make sure to obey the allowed technical specifications and ambient conditions (see data sheet), take special attention to the media temperature with respect to temperature class T3 or T4. These vary in addition to gas composition and ambient conditions. Where necessary, the operator must install temperature sensors for monitoring and must automatically shut down the sample gas pump should the temperature exceed the limits.

DANGER**DANGER - Explosion danger in case of high temperatures**

Temperature of the device depends on the media temperatures. Correlation between media temperature and **temperature classes** is given in the data sheets.

Observe maximum temperature classes T3 or T4 for the pumps and the allowed ambient temperatures and media temperatures.

DANGER**Diffusing pumped media****Explosion hazard! Formation of explosive atmosphere due to escaping flammable gases.**

When operating the sample gas pumps with media that tend to diffuse strongly, such as hydrogen (H₂) in high concentrations, it is essential to note that these are not permanently technically leak-proof due to their design. To ensure safe operation, the official regulations for installation and operation must be observed. In addition to regular leakage checks, suitable technical measures such as gas monitoring devices, technical ventilation, etc. must be provided depending on the installation situation.

DANGER**Danger of explosion due to exothermic reactions**

Avoid catalytic materials in the conveyor pipelines and other materials, e.g. male stud couplers, connecting to the sample gas pump.

Depending on the particular medium conveyed (e.g. ethylene oxide), a polymerisation of the medium may occur. Heat build-ups are possible and constitute an ignition source. If necessary, for clarification consult a technical department that possesses sufficient chemical expertise.

CAUTION**Hot surface**

Burning hazard

According to the product type and operation conditions, the temperature of the housing may exceed 50 °C during operation.

Depending on the conditions at the installation site it may be necessary to provide these areas with appropriate warning signs.

CAUTION**Tipping hazard**

Equipment damage.

Secure the device against tipping, sliding and falling.

3 Transport and storage

Only transport the product inside the original packaging or a suitable alternative.

The equipment must be protected from moisture and heat when not in use. It must be stored in a covered, dry and dust-free room at a temperature between -20 °C and +40 °C (-4 °F to 104 °F). To avoid bearing damage, ensure a vibration-free environment ($v_{eff} < 0.2 \text{ mm/s}$).

Outdoor storage is **not** permitted. In principle, the operator must meet all applicable standards with respect to preventing damage due to lightning, which could result in damage to the sample gas pump.

In particular for P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), any contamination of components in contact with the media must be ruled out.

Storage areas must not contain any equipment generating ozone, e.g. fluorescent lighting, mercury vapour lamps, high-voltage electrical equipment.

After prolonged storage or downtimes, test the insulation resistance of the winding, phase against phase and phase against mass, prior to initial operation. Moist windings can cause current leaks, flashovers and breakdown. The insulation resistance of the stator winding must be at least 1.5 MΩ measured at a winding temperature of 20 °C (68 °F). Values below this require the winding to be dried.

The motor shaft should be turned occasionally to ensure the entire bearing remains lubricated. To do so, remove the three cross-tip screws (9) from the console cover (8). This exposes the crank gear (10). You can now turn the motor shaft on it.

For the item numbers, please refer to the assembly drawing 42/025-Z02-01-2 in the appendix.

CAUTION



Contusion hazard

Contusion of the fingers

Don't have your fingers caught between eccentric and slide.

4 Installation and connection

Check the equipment for damage before installation. Among other things, this could be a damaged housing, supply cables, etc.. Never use equipment with obvious damage.

DANGER



Diffusing pumped media

Explosion hazard! Formation of explosive atmosphere due to escaping flammable gases.

When operating the sample gas pumps with media that tend to diffuse strongly, such as hydrogen (H₂) in high concentrations, it is essential to note that these are not permanently technically leak-proof due to their design. To ensure safe operation, the official regulations for installation and operation must be observed. In addition to regular leakage checks, suitable technical measures such as gas monitoring devices, technical ventilation, etc. must be provided depending on the installation situation.

CAUTION



Use appropriate tools

According to DIN EN 1127-1, the operator is responsible to select and use appropriate tools.

CAUTION



Contamination of cleaned components

For P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), contamination with oil, grease, dust, particles, lint, hair, etc. must be ruled out for fire protection reasons when working on components that come into contact with media. If necessary, adapt your operational and organisational measures with regard to the work clothing to be used, hygiene regulations, etc. If necessary, move such work to a suitable, cleaner work area.



CAUTION



Unit leakage rate

With P2.x ATEX-H2 sample gas pumps (item no.: 42.....-H2), the leakage rate is tested at the factory to verify compliance with defined limit values. This may deviate after loosening or retightening cap screws and/or pipe fittings. Carry out a new test if necessary.

4.1 Requirements to the installation site

CAUTION



Equipment damage

Protect the equipment, particularly gas connections and gas lines, from dust, falling objects, as well as external blows.

Lightning

On principle, the operator must meet all applicable standards with respect to preventing damage to the equipment due to lightning, which could result in equipment damage.

CAUTION



Avoid vibrations and resonances

The operator is responsible to mount the pump in a way that vibrations and resonance do not cause premature failure resulting in creating an effective ignition source.

The sample gas pump must only be assembled, connected and disassembled in a non-Ex zone with the unit cooled down.

Never block the vent. The exhaust air, including from adjacent units, must not be immediately suctioned in.

When installing without a Bühler mounting bracket, ensure adequate distance between the motor and the back panel (at least 40 mm).

The sample gas pumps are rated for altitudes ≤ 1000 m. They're available in various styles, and the specific technical data may vary. Therefore, you should always note all of the device-specific data on the pump and motor type plate, along with their specific limits – see Technical Data.

4.1.1 Outdoor installation

The sample gas pumps were not specifically designed for outdoor setup. The operating and environmental conditions are crucial for the required types of protection and any additional measures required, such as:

- adequate protection from the weather
- Adjusting the maintenance intervals (e.g. cleaning and replacing wear parts)

Use suitable measures and regular inspections to prevent damage to the equipment from e.g.:

- Corrosion
- Sunlight (temperature peaks and damage from UV rays)
- Moisture from condensation (e.g. due to rapid temperature changes or downtimes)
- Icing
- Insects and microbes
- other animals, e.g. martens, etc.

Please remember that all technical operating parameters of the equipment must also be met with outdoor installation. Specifically:

- Maximum or minimum operating temperatures
- Degree of protection

4.2 Installation

CAUTION



Damage to the device

Protect the device, especially the gas inlets and tubes, against dust, falling parts and external impact.

P2.2 ATEX/P2.72 ATEX

When installing the P2.2 ATEX/P2.72 ATEX on mounting plates, use the included mounting bracket and only the included rubber/metal bumpers. Operation without rubber/metal bumpers is prohibited. These must also be used when installing the pump on an existing substructure. For the hole pattern in the mounting bracket and the motor foot, please refer to the technical data at the end of the operating and installation instructions.

P2.4 ATEX/P2.74 ATEX

When installing the P2.4 ATEX/P2.74 ATEX sample gas pump, please note the assembly drawing **42/025-Z02-02-2**. Before beginning the installation, ensure that the sample gas pump is complete. You will also require 6 x M6 bolts of suitable length and nuts for installation.

The pump head on all pump types can only be aligned turned by 0° or 180°.

4.3 Special condition moist sample gas

Applications where the sample gas is still moist may result in condensate forming in line and the pump body. In these events the pump head must be suspended (pump body facing down).

If the pump was not ordered this way, it can easily be converted on site.

Install the line between the gas output and condensate drain with a grade so the condensate can drain and does not collect inside the pump or the lines.

4.3.1 Alteration of hanging pump head

CAUTION

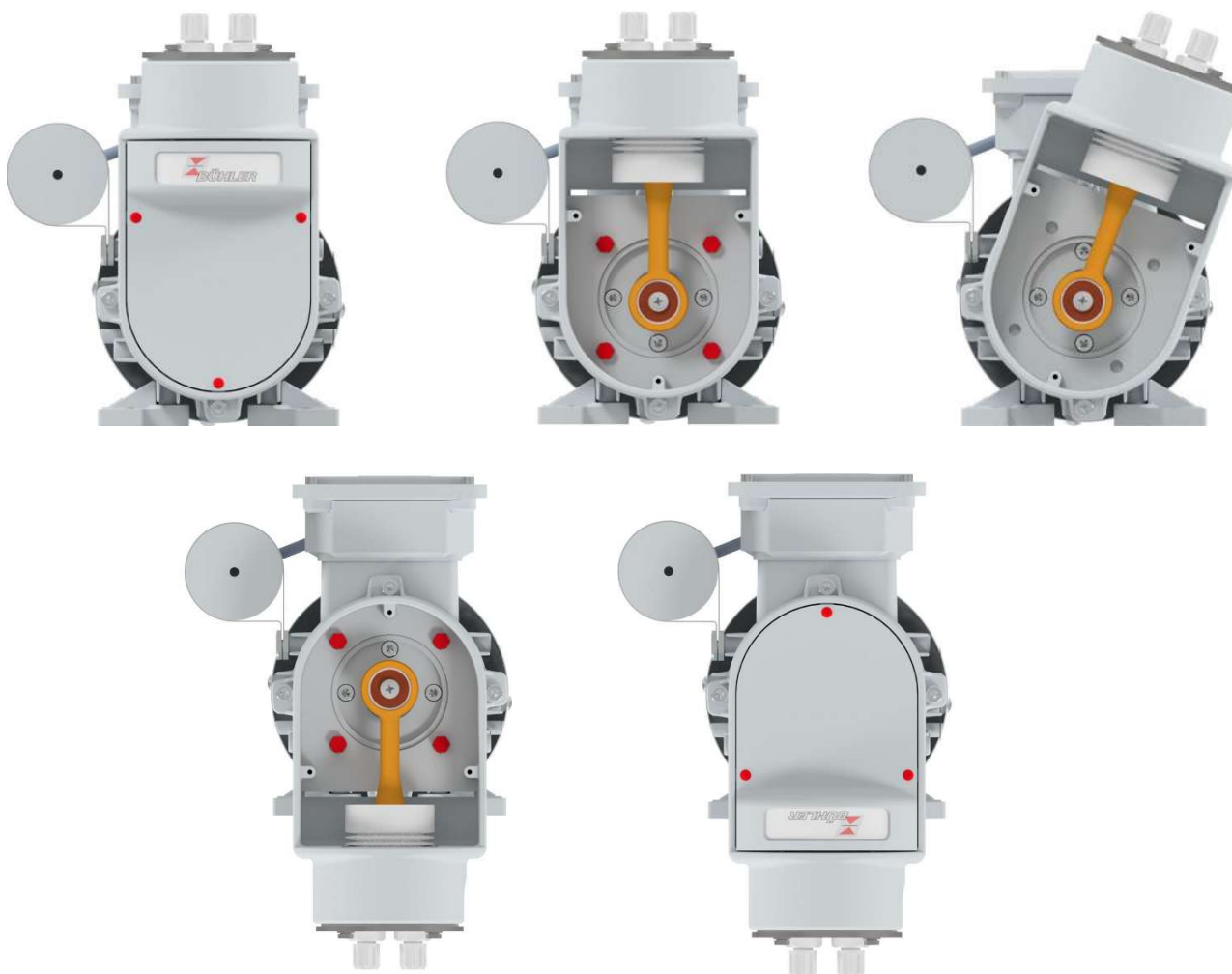
Damage to the device

Especially with pump head pointing down, make sure that no dust or small parts can intrude the pump through the ventilations slot. Nevertheless, the slot must not be covered directly. If this is not possible, the pump must not be mounted with pump head pointing downward.

Please refer to assembly drawing 42/025-Z02-01-2 in the appendix for the conversion.

- Remove the three cross-tip screws (9) and remove the console cover (8) from the pump console (5). This exposes the crank gear (10) and the Motor flange or, depending on pump model, the intermediate flange.
- The Pump console attaches to the flange with four hexagon screws (7) and lock washers (6). Completely unscrew these, holding the pump console, and rotate it 180° on the centring of the flange.
- Reinstall all parts in the reverse order. Please note the torque of the hexagon screws (7) is 3 Nm.

Installing the pump head offset by 90° is prohibited!



4.4 Connecting the gas tubes

The pumps are fitted with the connections you have selected (not pre-assembled for sample gas pumps P2.x ATEX-O2). Compare the item number on the type plate with the item number structure in the [Introduction](#) [> page 2]

Avoid mixed-material installation, i.e. piping on plastic bodies. If this cannot be avoided in isolated applications, screw the metal connections into the PTFE pump body with care, taking care to avoid use of force.

Lay the lines so that the line at the inlet and outlet remains flexible for an adequate distance (pump vibrates).

The pumps are marked “**In**” for inlet and “**Out**” for outlet. Ensure that the gas line connections are tight.

For P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), only RT fittings (tapered thread) are supplied by the factory as separately packaged accessories. These must be fitted with H_2 PTFE sealing tape approved for O applications (see [Spare parts and accessories](#) [> page 29]).

4.4.1 Monitoring the sample gas pump

NOTICE



When following preventive maintenance according to the maintenance plan, a crack in the bellows is a rare malfunction, but cannot be completely eliminated.

NOTICE



If the bellow cracked, turn the pump off immediately!

NOTICE



If flammable gases (even above upper explosion limit (UEL)) or toxic gases are supplied, continuous monitoring of the pump is mandatory.

DANGER



Explosion hazard, danger of poisoning!

A crack in the bellows when conveying flammable or poisonous gasses may allow explosive or poisonous gas mixtures to leak or develop.
Monitor the pump with a flow- and/or vacuum monitoring system (see flow diagram).
If a pump defect occurs, shut it off immediately.

4.4.1.1 General monitoring measures

Since a crack **in the bellow allows** the ambient atmosphere to be sucked in and the sample gas pump continues to generate pressure, **the bellows of the sample gas pumps must be inspected regularly.**

In addition, the flow rate of the pump (to the sample gas outlet) must be monitored with a suitable flow meter.

For more information or [Inspecting the bellow](#) [> page 22] the maintenance schedule, please refer to the chapter Maintenance at the end of the operating and installation instructions.

4.4.1.2 Monitoring measures when conveying flammable and/or toxic gasses

Conveying flammable and/or toxic gasses **further requires** continuous monitoring **of the sample gas pump** during operation. This can be done as follows (1) or (2).

1. Flow rate monitor before the pump's gas inlet and after the gas outlet. A sudden reduction of the suction volume / flow volume ahead of the pump and consistent or suddenly increased flow volume after the pump indicates a defective bellow (the pump can convey ambient air suctioned in due to the tear).
2. Vacuum monitoring before the pump's gas inlet and flow monitoring after the gas outlet (see illustration). A sudden drop in the vacuum before the gas inlet indicates a defective bellow.

When conveying flammable gasses above the upper explosive limit (UEL) we further recommend monitoring the lower explosive limit (LEL) in the installation location.

When conveying toxic gasses we recommend MAC monitoring (MAC: Maximum Workplace Concentration) at the installation site.

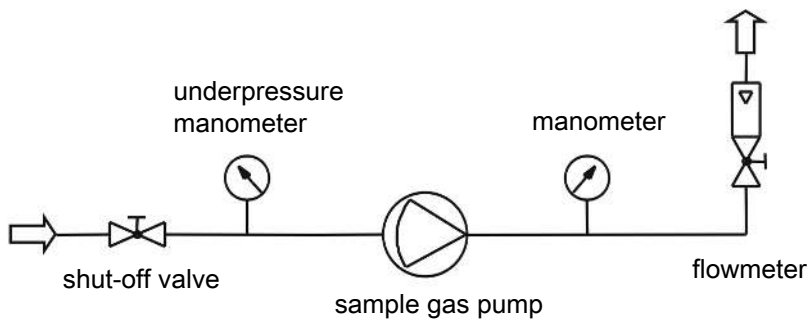


Fig. 1: Sample flow diagram of suitable monitoring

4.5 Electrical connections

WARNING



Hazardous electrical voltage

The device must be installed by trained staff only.

WARNING



Inverter operation is forbidden!

WARNING



Regard National directives concerning installation and operation of electrical devices in hazardous areas when installing and commissioning the motor (e. g. EN 60079-14).

CAUTION



Wrong mains voltage

Wrong mains voltage may damage the device.
Regard the correct mains voltage as given on the type plate.

Only operate the unit with the factory installed motor. The user must not exchange the unit or replace it with a different motor. The sample gas pump must be protected against prohibited heating with suitable overload protection (motor protection switch per approval).

Please note the rated current for the motor protection switch settings (see motor type plate).

Verify the pump motor has the correct voltage and frequency: Voltage tolerance $\pm 5\%$, frequency tolerance $\pm 2\%$ - from rated value.

Properly connect the sample gas pump per the respective wiring diagram (see below). If the wiring diagram inside the cover of the terminal box is different, observe that instead. The required tightening torque for the nuts on the terminal board is 1.5 Nm.

Ensure the connecting cable has adequate cable relief. The clamping area of the cable gland is 6-12 mm. The required tightening torque for the cable gland is 5 Nm.

The supply line and earthing cross-sections must be aligned with the rated current. Use a minimum line cross-section of 1.5 mm².

Be sure to connect the following protective earth terminals to your on-site earth conductor per local regulations:

- Protective earth terminal inside the motor terminal box.
- Protective earth terminal on the outside of the motor housing.
- Protective earth terminal on the mounting bracket. (The earth bolt on the mounting bracket may alternatively be connected to the protective earth connection on the outside of the motor housing via cable bridge.)

Stray electric currents may not flow through this connection.

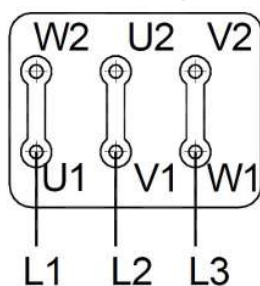
No foreign objects, contaminants or moisture may be inside the junction box. Any unused cable gland openings must be sealed with plugs approved for the application (if necessary ATEX, IECEx).

To maintain the IP rating specified by the manufacturer, when sealing the terminal box with the cover ensure the original seal is correctly seated and tighten the bolts at 5 Nm.

Be sure to observe any varying information in the rating plate. The conditions at the site must correspond with all rating plate information.

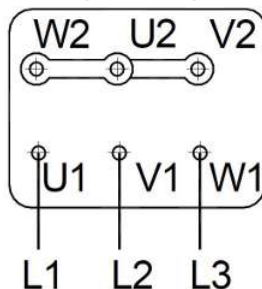
Three-phase motors

Delta connection
lower voltage

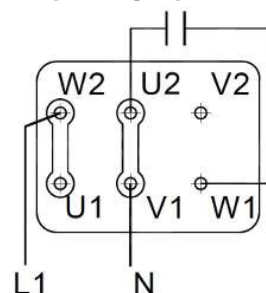


Three-phase motors

star connection
higher voltage



AC motors with operating capacitor



5 Operation and control

NOTICE



The device must not be operated beyond its specifications.

DANGER



Danger of explosions, danger of poisoning from poisonous corrosive gases

During maintenance work, depending on the medium used, explosive and/or poisonous corrosive gases could escape, and this could lead to a danger of explosion or could be hazardous to health.

- Inspect the leak tightness of your sampling system before putting the device into operation.
- Ensure that gases that are hazardous to health are discharged safely.
- Turn off the gas supply before beginning any maintenance or repair work and flush the gas lines with inert gas or air. Secure the gas supply so that it cannot be turned on unintentionally.
- Protect yourself during maintenance from poisonous / corrosive gases. Wear appropriate protective equipment.



DANGER



Adiabatic compression (explosion hazard)!

In case of adiabatic compression, high gas temperatures may occur. The operator is responsible to consider this situation.

Make sure to obey the allowed technical specifications and ambient conditions (see data sheet), take special attention to the media temperature with respect to temperature class T3 or T4. These vary in addition to gas composition and ambient conditions. Where necessary, the operator must install temperature sensors for monitoring and must automatically shut down the sample gas pump should the temperature exceed the limits.

DANGER



Dangerous electrostatic charge (explosion hazard)

Transporting materials such as very dry, particle-loaded gases can cause incendive electrostatic charges in the bellow / pump body.

Install particle filtration with the appropriate fineness upstream from the pump gas input. For the P2.x ATEX-O2 versions in particular, we recommend a filter fineness of <10 µm.

DANGER



Diffusing pumped media

Explosion hazard! Formation of explosive atmosphere due to escaping flammable gases.

When operating the sample gas pumps with media that tend to diffuse strongly, such as hydrogen (H₂) in high concentrations, it is essential to note that these are not permanently technically leak-proof due to their design. To ensure safe operation, the official regulations for installation and operation must be observed. In addition to regular leakage checks, suitable technical measures such as gas monitoring devices, technical ventilation, etc. must be provided depending on the installation situation.

CAUTION



Hot surface

Burning hazard

According to the product type and operation conditions, the temperature of the housing may exceed 50 °C during operation.

Depending on the conditions at the installation site it may be necessary to provide these areas with appropriate warning signs.

5.1 Switching on the sample gas pump

Before switching on the unit, check that:

- the hose and electrical connections are correctly installed and not damaged.
- no parts of the sample gas pump have been removed (e.g. the cover).
- the gas inlet and outlet of the sample gas pump are not closed.
- the pre-pressure is below 0.5 bar (g).
- a bypass is installed for continuous operation for throttling below 150 l/h (P2.x ATEX) or 400 l/h (P2.7x ATEX).
- ambient parameters are complied with.
- rating plate information is observed.
- the voltage and frequency of the motor match the mains values.
- electrical connections are securely connected and monitoring devices are connected and set correctly!
- air inlets and cooling surfaces are clean.
- precautions have been taken; earthing!
- the pump is properly secured!
- the junction box cover is closed and the cable glands sealed properly.
- the elastomer ring gear on the coupling (only P2.4 ATEX/P2.74 ATEX) is mounted correctly and free of damage.
- the necessary safety and monitoring devices (depending on the application) are installed and functional (e.g. protective motor switch, pressure gauge, flame arrester, temperature monitor, depending on pump type).
- the sample gas pump is sufficiently tight, as specified in your operator specifications. If necessary, tighten the 4 cap screws to 3 Nm.

When switching on the unit, check that:

- there is no unusual noise or vibration.
- the flow rate is not elevated or low. This can indicate a bellow defect.

5.2 Operating the sample gas pump

The sample gas pump is only intended to convey gaseous media. It is not suitable for liquids.

The sample gas pump should be operated without primary pressure. Primary pressures over 0.5 bar are prohibited. Never block the gas outlet. The flow rate must be at least 50 l/h for P2.x ATEX and at least 200 l/h for P2.7x ATEX pumps. With continuous operation throttled to below 150 l/h for P2.x ATEX and under 400 l/h for P2.7x ATEX pumps the flow rate must be regulated via bypass. In this case you should choose a version with a bypass valve.

NOTICE



Extreme throttling reduces the life time of the bellow.

For pumps with an integrated bypass valve, the output power can be adjusted. Do not expend a great amount of power when turning the valve as otherwise the valve could be damaged! The turning range of the valve is around seven rotations.

NOTE: Read and observe the maintenance plan!

6 Maintenance

When performing maintenance work on the unit, the unit must be cooled down and in a non-Ex zone. In particular, cleaning work with compressed air may only be carried out in a non-Ex zone.

During maintenance, remember:

- The equipment must be maintained by a professional familiar with the safety requirements and risks.
- Only perform maintenance work described in these operating and installation instructions.
- Observe the respective safety regulations and operating specifications when performing any type of maintenance.
- Always use genuine spare parts.

With regard to P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), there are special requirements for avoiding contamination when carrying out maintenance work:

- Only use cleaned and undamaged tools. We recommend cleaning with a lint-free cloth, ideally pre-soaked with a mixture of isopropanol and demineralised water for residue-free degreasing.
- Only use cleaned, original spare parts (see sections [Spare Parts](#) [> page 29] and [Spare parts and accessories](#) [> page 29]).
- Do not use any parts whose original packaging is damaged.
- The use of compressed air is only permitted if it corresponds to at least class 2 in accordance with ISO 8573-1:2010.

NOTICE



Please refer to the assembly drawings in the appendix when carrying out maintenance.

DANGER



Electrical voltage

Electrocution hazard.

- Disconnect the device from power supply.
- Make sure that the equipment cannot be reconnected to mains unintentionally.
- The device must be opened by trained staff only.
- Regard correct mains voltage.



DANGER



Danger of explosions, danger of poisoning from poisonous corrosive gases

During maintenance work, depending on the medium used, explosive and/or poisonous corrosive gases could escape, and this could lead to a danger of explosion or could be hazardous to health.

- Inspect the leak tightness of your sampling system before putting the device into operation.
- Ensure that gases that are hazardous to health are discharged safely.
- Turn off the gas supply before beginning any maintenance or repair work and flush the gas lines with inert gas or air. Secure the gas supply so that it cannot be turned on unintentionally.
- Protect yourself during maintenance from poisonous / corrosive gases. Wear appropriate protective equipment.



DANGER**Use appropriate tools**

According to DIN EN 1127-1, the operator is responsible to select and use appropriate tools.

Application in explosive atmosphere

Combustible gases and dust may inflame or explode. Avoid the following hazardous situations:

Electrostatic charge (spark formation)

Clean plastic parts and labels with damp cloth only.

Spark formation

Protect the equipment against external impact.

Install a flame arrester in case of a flashback hazard.

Inflame of dust

If the device is used in dust ambience, remove the layer from the components regularly.

Also remove the dust layer in areas difficult to access (see chapter "Cleaning").

Conserve the protective effect of the coating

To avoid potential ignition hazard, the protective effect of the coating must not be derogated by abrasion or corrosive media and must be conserved in any case.

Refinishing or repainting is not allowed!

Do not use sharp or pointed tools.

**DANGER****Explosion hazard due to incorrect replacement of components**

The replacement of the components requires carefulness. Inexpert operation could lead to explosion.

If you feel uncertain about any details of the operation, please bear in mind that the replacement should be done by the manufacturer only.

**DANGER****Diffusing pumped media****Explosion hazard! Formation of explosive atmosphere due to escaping flammable gases.**

When operating the sample gas pumps with media that tend to diffuse strongly, such as hydrogen (H₂) in high concentrations, it is essential to note that these are not permanently technically leak-proof due to their design. To ensure safe operation, the official regulations for installation and operation must be observed. In addition to regular leakage checks, suitable technical measures such as gas monitoring devices, technical ventilation, etc. must be provided depending on the installation situation.

**CAUTION****Hot surface**

Burning hazard

According to the product type and operation conditions, the temperature of the housing may exceed 50 °C during operation.

Depending on the conditions at the installation site it may be necessary to provide these areas with appropriate warning signs.

**CAUTION****Tipping hazard**

Equipment damage.

Secure the device against tipping, sliding and falling.

**CAUTION****Gas leakage**

The sample gas pump should not be dismantled under pressure.



CAUTION**Contamination of cleaned components**

For P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), contamination with oil, grease, dust, particles, lint, hair, etc. must be ruled out for fire protection reasons when working on components that come into contact with media. If necessary, adapt your operational and organisational measures with regard to the work clothing to be used, hygiene regulations, etc. If necessary, move such work to a suitable, cleaner work area.



Depending on the quality of the sample gas being transported, you may need to occasionally replace the inlet and outlet valves (see [Replacing the inlet and outlet valves](#) [> page 24]).

If the valves are very dirty, particularly after just a short period of operation, you should install a particle filter upstream from the pump. This will significantly extend service life.

Depending on the operating conditions, the following maintenance tasks be performed at suitable intervals (see [Maintenance schedule](#) [> page 21])

- check the cleanliness of terminal compartments and terminals, and clean if necessary.
- ensure the electrical connections are tight.
- clean the cooling air ducts of the motor.
- perform a circumferential backlash test and a visual inspection of the ring gear.

The motor's suction intakes and cooling surfaces must be protected from clogging and dirt.

6.1 Maintenance schedule

Component	Interval	Work to be performed	To be performed by
Pump body screws	After 500 h	Tighten screws to 3 Nm	Customer
Complete pump	Every 500 h	Check hose connections, protective and control devices, proper function, dirt, tightness. Replace if damaged or have them repaired by Bühler Technologies.	Customer
Complete pump	Every 8,000 h or under high dust load	Clean the entire pump, see Cleaning the pump console [> page 24].	Customer
Valves	Every 8,000 h or if pressure drops	Check valves, replace valves if necessary, see Replacing the inlet and outlet valves [> page 24].	Customer
Bellow	Every 4,000 h or 6 months	Check by shutting off the suction pipe. Repair if damaged, see Inspecting the bellow [> page 22] + Replacing bellow and connecting rod-eccentric-combination.	Customer
Complete pump	After 43,800 h or 5 years	Inspection by Bühler Technologies Item number see Order number for the 43.800h inspection [> page 26].	Service technician / Bühler Technologies
Coupling (P2.4-/P2.74-ATEX)	After 2,000 h or 3 months, then every 4,000 h or 6 months	Initial elastomer ring gear inspection, see Inspecting and replacing the flexible spider .	Customer

Also observe the motor manufacturer's maintenance instructions. The manufacturer information can be found in the enclosed documents.

Important information about sample gas pumps for O₂ applications

P2.x ATEX-O2 (item no.: 42.....-O2):

Despite all precautions (gloves, cleaned tools, etc.) and the greatest possible care, it cannot be guaranteed when maintenance work is carried out by a Bühler service technician in the field that the product will be made equivalent to a newly manufactured O₂ unit. In addition to the individual environmental conditions that we cannot assess, we cannot assess the actual condition of the products to be serviced. For a full warranty, all parts in contact with the media must be replaced under defined production conditions at the Bühler-Technologies GmbH plant.

6.2 Inspecting the bellow

NOTICE



When following preventive maintenance according to the maintenance plan, a crack in the bellows is a rare malfunction, but cannot be completely eliminated.

NOTICE



If the bellow cracked, turn the pump off immediately!

NOTICE



If flammable gases (even above upper explosion limit (UEL)) or toxic gases are supplied, continuous monitoring of the pump is mandatory.

DANGER



Explosion hazard, danger of poisoning!

A crack in the bellows when conveying flammable or poisonous gasses may allow explosive or poisonous gas mixtures to leak or develop.
Monitor the pump with a flow- and/or vacuum monitoring system (see flow diagram).
If a pump defect occurs, shut it off immediately.

Since a crack **in the bellow allows** the ambient atmosphere to be sucked in and the sample gas pump continues to generate pressure, **the bellow on the sample gas pump must be inspected regularly**.

This is done by connecting a suitable shut-off unit and a suitable vacuum pressure gauge ahead of the sample gas input (see illustration). If during operation, after closing the suction line, no negative pressure is produced, the bellows is defective and must be replaced.

Please refer to the [Maintenance schedule](#) [> page 21] for maintenance intervals.

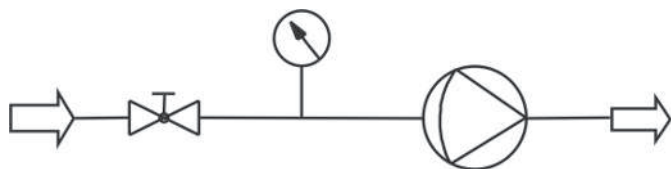


Fig. 2: Inspecting the bellow

6.3 Replacing bellow and connecting rod-eccentric-combination

NOTICE



Restrictions for connecting rod-eccentric replacement

The individual replacement of the eccentric, connecting rod or bearings is not allowed. Only the factory pre-assembled connecting rod-eccentric combination is suitable for replacement by the operator.

Please refer to assembly drawing 42/025-Z02-01-2 in the appendix for this help with this maintenance.

1. Remove the three cross-tip screws (9) and remove the console cover (8) from the pump console (5)
2. Clean any dust and other dirt off the sample gas pump. Wipe off stubborn dirt with a damp, clean cloth (do not use solvent-containing cleaning products).
Be sure to observe all of the information in the Cleaning section. [Cleaning](#) [> page 24].
3. Remove the 4 hexagon screws (16) and the spring washers (15) at the top of the pump body (13). PTFE pump bodies also have a mounting ring (14) installed for improved seating stress.
4. Carefully pull the pump body up and out of the pump console. Be careful not to overstretch the bellow (12). If the pump body is stuck to the bellow, try carefully turning it to release it.
5. Hold the bellow just above the follower (10) and unscrew it anti-clockwise. When only changing the bellow, skip to step 14.
6. Remove the 4 hexagon screws (7) and lock washers (6) and remove the pump console from the flange.
7. Loosen and remove the set screw (11) from the eccentric of the crank gear (10). This may either be hexagon socket (SW 2) or star drive (TX 8). Use the appropriate tool.
8. Now carefully remove the crank gear from the shaft. This is best done with 2 large slot screwdrivers.
9. Clean the shaft and, if necessary, remove any residue such as frictional corrosion, etc.
Check the fit size of 11k6.
10. Dampen the shaft with resin-free oil prior to assembly.
11. Attach the new crank gear to the shaft and align the locking bore for the set screw with the corresponding bore in the shaft. Avoid using striking tools, as these may damage the ball bearings.
12. Insert the set screw with medium-strength threadlock (min. continuous operating temperature: 150 °C) and tighten to 1.5 Nm. Ensure that the flat point of the set screw is properly seated in the bore on the shaft.
13. Now place the pump console over the crank gear again and either align it upward or rotated by 180°, then secure with the hexagon screws (7) and lock washers (6) – tightening torque 3 Nm.
14. Check the sealing surface and the pleats of the bellow for damage and dirt.
15. Insert the bellow through the pump console from above and twist it clockwise onto the plunger of the crank gear until hand-tight.
16. Clean the pump body and check the sealing face for damage.
17. Attach the pump body to the bellow and turn into the desired position in relation to the gas inlet and outlet. In principle, the alignment of the pump body is irrelevant.
However, it's important to ensure the marking on the mounting ring or pump body fits the installed valve and its function. There is no difference between inlet valve and outlet valve. Their installation position determines the function. The valves are always labelled "EIN" or "IN" for inlet and "AUS" or "OUT" for outlet.
18. Reattach the pump body with the 4 hexagon screws (16) and spring washers (15) – and with the mounting ring for PTFE bodies – and tighten the bolts crosswise, first at 1 Nm, then 3 Nm.
19. Finally, reattach the console cover with the 3 cross-tip screws.
20. Check the sample gas pump for leaks.
21. Perform a test run. It must reach the following values at minimum:
Excess pressure: P2.2/P2.4 ATEX = 1.7 bar; P2.72/P2.74 ATEX = 1.8 bar
Negative pressure: P2.2/P2.4 ATEX = -0.65 bar; P2.72/P2.74 ATEX = -0.6 bar
Flow rate: P2.2/P2.4 ATEX = 400 l/h; P2.72/P2.74 ATEX = 700 l/h

Record the maintenance, including test values, in the Operating Log (template) of the sample gas pump.

6.4 Replacement of the O-ring of the bypass valve (optional)

Please refer to assembly drawing 42/025-Z02-01-2 in the appendix for help with this maintenance.

- Loosen the two bolts (24) and carefully pull the entire unit consisting of valve plate (23), spindle (22) and O-ring (21) on the knob (26), out of the pump body (13). On VA pump bodies, unscrew the spindle holder (25) with a SW13 open-end spanner, turning clockwise, and remove the entire unit.
- Remove the old O-ring from the spindle.
- Moisten a new O-ring with suitable O-ring grease (min. continuous operating temperature: 215 °C, e.g. Fluoronox S90/2) and carefully attach it to the spindle. For P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), only lubricants that are suitable for oxygen applications (e.g. Krytox NRT 8908) may be used.
- Carefully reinsert the entire unit into the pump body in a turning motion and tighten the bolts or spindle holder.
- Check the sample gas pump for leaks.

6.5 Replacing the inlet and outlet valves

Please refer to assembly drawing 42/025-Z02-01-2 in the appendix for this help with this maintenance

- Remove the screw-in connections (18) from the pump body (13).
- Unscrew the valves (17) with a wide slot screwdriver. Stainless steel pump bodies have displacers (20) under the valves. These reduce the dead volume and must remain installed on these pump bodies.
- Screw the new valves into the pump body and tighten to max. 1 Nm. Ensure that the valve is installed the correct direction. Valves for a permitted gas inlet temperature of max. 100 °C are black/red, and grey/orange for max. 160 °C. The valves of the P2.x ATEX-O2 sample gas pumps are not coloured.
- Here, the red or orange end corresponds to the gas inlet and the black or grey end corresponds to the gas outlet. The valves at the gas inlet are marked "EIN" and "IN" and "AUS" and "OUT" at the gas outlet. The marking that you see looking into the pump body from above determines the valve function.
- Lastly, reinstall the screw-in connections in the pump body. In the case of stainless steel screw-in connections, replace any damaged seals (19).
- Check the sample gas pump for leaks.
- Perform a test run. It must reach the following values at minimum:
Excess pressure: P2.2/P2.4 ATEX = 1.7 bar; P2.72/P2.74 ATEX = 1.8 bar
Negative pressure: P2.2/P2.4 ATEX = -0.65 bar; P2.72/P2.74 ATEX = -0.6 bar
Flow rate: P2.2/P2.4 ATEX = 400 l/h; P2.72/P2.74 ATEX = 700 l/h

Record the maintenance, including test values, in the Operating Log (template) of the sample gas pump.

6.6 Cleaning

6.6.1 Cleaning the pump console

DANGER



Electrostatic charge (Spark formation)

Clean plastic parts and labels with damp cloth only.

Inflame of dust

If the device is used in dust ambience, remove the layer from the components regularly. Also remove the dust layer in areas difficult to access.

Conserve the protective effect of the coating

To avoid potential ignition hazard, the protective effect of the coating must not be derogated by abrasion or corrosive media and must be conserved in any case.

Refinishing or repainting is **not** allowed!

Do not use sharp or pointed tools.

- To clean the inside of the pump console, unscrew the three cross-tip screws (9) of the console cover (8) and remove the cover.
- You can now clean dust and other dirt inside the pump console. Wipe off stubborn dirt with a damp, clean cloth. Do not use cleaning products containing solvents.
- Now reattach the console cover and tighten the three bolts.

For the item numbers, please refer to the assembly drawing 42/025-Z02-01-2 in the appendix.

6.6.2 Cleaning the motor

Depending on the operating conditions of the pump, the following routine work is required:

- Check the terminal compartments and terminals are clean.
- Verify the electrical connections are tight.
- Clean ventilation paths.
- Verify the motor runs freely and vibration-free and check for noise. If you notice anything unusual, please contact our Service Department.

The cooling surface and suction intakes must be protected from clogging and dirt.

6.7 Inspecting and replacing the flexible spider

NOTICE

Restrictions for maintaining the coupling



Only replacement of the flexible spider is allowed. Loosening, re-tightening and replacing the coupling hub is allowed only by Bühler Technologies GmbH. The hexagon socket screws are marked with locking varnish which must not be damaged.

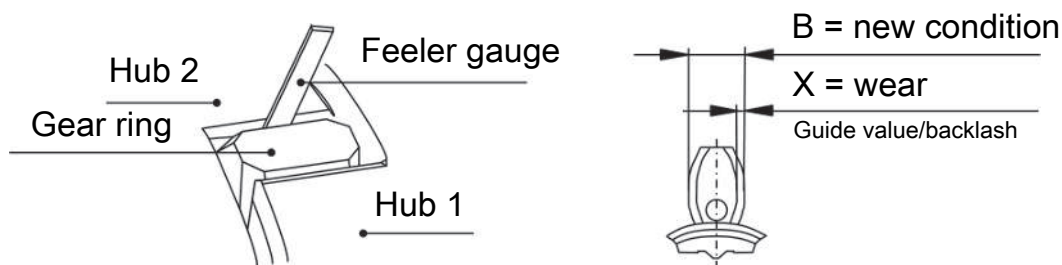


Fig. 3: Sample gas pump coupling

Please refer to assembly drawing 42/025-Z02-02-2 in the appendix for this maintenance.

The coupling we use (on type P2.4 Atex / P2.74 Atex) is a zero-play coupling!

Check the play between the coupling cam (28a/28b) and the ring gear (28c). As soon as there is play, the ring gear must be replaced immediately regardless of the inspection intervals.

To do so, disconnect the pump head and intermediate flange (X/28) assembly by removing the hexagon screws (32) and washers (31) from the rest. Remove the worn ring gear and clean any dust and other dirt off the coupling- and intermediate flange. Wipe off stubborn dirt with a damp, clean cloth (do not use solvent-containing cleaning products).

Install a new ring gear on the hub side facing the motor. The required installation force can be reduced by slightly greasing or lubricating the elastomer. Only use mineral oil based oils and greases without additives for this purpose.

Now reinsert the pump head and intermediate flange assembly in the coupling flange and reattach with the hexagon screws and washers. A sight hole in the coupling flange allows you to verify proper installation.

Perform a test run and record the maintenance in the „operating log (template)“ of the pump.

6.8 Order number for the 43.800h inspection

Please indicate the relevant item number in the inspection order.

The inspection item numbers are structured similarly to the pump item numbers. Select the item number according to the pump features.

Replace the x with the respective version. The other features are omitted and are represented by a 0 in item number.

For P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2), it is not possible to order an inspection using the following item numbers. Please contact us for an individual offer.

P2.2 ATEX pump inspection item numbers

4261	X	0	0	X	00	
	7					230 V, 50/60 Hz
	8					115 V, 50/60 Hz
	9					380–420 V / 50 Hz
	0					500 V / 50 Hz
				1		100 °C valves
				2		140 °C valves

P2.4 ATEX pump inspection item numbers

4262	X	0	0	0	00	
	7					230 V, 50/60 Hz
	8					115 V, 50/60 Hz
	9					380–420 V / 50 Hz
	0					500 V / 50 Hz

P2.72 ATEX pump inspection item numbers

4265	X	0	0	2	00	
	7					230 V, 50/60 Hz
	8					115 V, 50/60 Hz
	9					380–420 V / 50 Hz
	0					500 V / 50 Hz

P2.74 ATEX pump inspection item numbers

4266	X	0	0	0	00	
	7					230 V, 50/60 Hz
	8					115 V, 50/60 Hz
	9					380–420 V / 50 Hz
	0					500 V / 50 Hz

Example: P2.2 ATEX pump, 230 V 50/60 Hz, connections up, PTFE pump body and 140 °C valves.

Pump item number: 4261711299000 (this number is located in the pump name plate, also see Item number structures and [Type plate](#) [> page 6]).

Inspection item number: 4261 1002 00

7 Service and repair

This chapter contains information on troubleshooting and correction should an error occur during operation.

Repairs to the unit must be performed by Bühler authorised personnel.

Please contact our Service Department with any questions:

Tel.: +49-(0)2102-498955 or your agent

For further information about our services and customised maintenance visit <http://www.buehler-technologies.com/service>.

If the equipment is not functioning properly after correcting any malfunctions and switching on the power, it must be inspected by the manufacturer. Please send the equipment inside suitable packaging to:

Bühler Technologies GmbH

- Reparatur/Service -

Harkortstraße 29

40880 Ratingen

Germany

Please also attach the completed and signed RMA decontamination statement to the packaging. We will otherwise be unable to process your repair order.

You will find the form in the appendix of these instructions, or simply request it by e-mail:

service@buehler-technologies.com.

7.1 Troubleshooting

CAUTION



Risk due to defective device

Personal injury or damage to property

- a) Switch off the device and disconnect it from the mains.
- b) Repair the fault immediately. The device should not be turned on again before elimination of the failure.



CAUTION



Hot surface

Burning hazard

According to the product type and operation conditions, the temperature of the housing may exceed 50 °C during operation.

Depending on the conditions at the installation site it may be necessary to provide these areas with appropriate warning signs.

Malfunction	Cause	Action
Pump doesn't start up	– Broken or incorrectly connected lead – Defective	– Check connection or fuse and switch – have repaired by Bühler service technician
Pump doesn't convey	– Defective or dirty valves – Bypass valve open – Defective bypass valve O-ring – Torn bellow – Coupling hub broken – Broken/worn ring gear	– Carefully blow out or replace valves or see chapter Replacing the inlet and outlet valves [> page 24]. – Close bypass valve – have repaired by Bühler service technician or see Replacement of the O-ring of the bypass valve (optional) [> page 24]. – have repaired by Bühler service technician or see Replacing bellow and connecting rod-eccentric-combination. – have repaired by Bühler service technician – have repaired by Bühler service technician or see Inspecting and replacing the flexible spider.
Noisy pump operation	– Crankshaft out of alignment – Work ring gear – Loose coupling hub – Engine bracket damaged	– have repaired by Bühler service technician or see Replacing bellow and connecting rod-eccentric-combination. – have repaired by Bühler service technician or see Inspecting and replacing the flexible spider. – have repaired by Bühler service technician – have repaired by Bühler service technician
Premature ring gear wear	– e.g. contact with ozone influences or similar, causing a physical change to the ring gear	– Eliminate any physical changes to the ring gear
Protective device is triggering	– Coil- and terminal short circuit – Start-up time exceeded	– Measure insulation resistance – Check start-up requirements (see chapter Switching on the sample gas pump [> page 18]).
Poor performance	– Leakage – Torn bellow – Defective or dirty valves	– Tighten head screws, note torque (see chapter Maintenance). – have repaired by Bühler service technician or see Replacing bellow and connecting rod-eccentric-combination. – Carefully blow out or replace valves or see chapter Replacing the inlet and outlet valves [> page 24].

Tab. 1: Troubleshooting

For information about replacing spare parts, please refer to chapter Maintenance.

7.2 Spare Parts

Please also specify the model and serial number when ordering parts.

Upgrade and expansion parts can be found in our catalog.

Available spare parts:

Sample gas pump	Spare part	Item no.	Position in assembly drawings 42/025-Z02-01-2 & 42/025-Z02-02-2
P2.2/P2.4 ATEX	Bellow	4200015	12a
	Plunger / eccentric combination	4200075	10a, 11
	Coupling ring gear	4220011	28c
	Set of 100 °C valves	4201002	2x 17a
	Set of 160 °C valves	4202002	2x 17b
	Bypass valve O-ring (Viton)	9009115	21a
P2.72/P2.74 ATEX	Bellow	4200071	12b
	Plunger / eccentric combination	4200097	10b, 11
	Coupling ring gear	4220011	28c
	Set of 160 °C valves	4202002	2x 17b
	Bypass valve O-ring (Viton)	9009115	21a

Spare parts, especially for P2.x ATEX-O2 sample gas pumps (item no.: 42.....-O2):

Sample gas pump	Spare part	Item no.	Position in assembly drawings 42/025-Z02-01-2 & 42/025-Z02-02-2
P2.2/P2.4 ATEX-O2	Bellow	4200015-O2	12a
	Plunger / eccentric combination	4200075	10a, 11
	Coupling ring gear	4220011	28c
	PTFE/PEEK valve (1 piece)	4202014-O2	2x 17b
	Bypass valve O-ring (Viton)	9009458-O2	21a
P2.72/P2.74 ATEX-O2	Bellow	4200071-O2	12b
	Plunger / eccentric combination	4200097	10b, 11
	Coupling ring gear	4220011	28c
	PTFE/PEEK valve (1 piece)	4202014-O2	2x 17b
	Bypass valve O-ring (Viton)	9009458-O2	21a

7.2.1 Spare parts and accessories

Item no.	Description
9022325	BAM-approved PTFE sealing tape (Roll of 4,5 m)

8 Disposal

The applicable national laws must be observed when disposing of the products. Disposal must not result in a danger to health and environment.

The crossed out wheelie bin symbol on Bühler Technologies GmbH electrical and electronic products indicates special disposal notices within the European Union (EU).



The crossed out wheelie bin symbol indicates the electric and electronic products bearing the symbol must be disposed of separate from household waste. They must be properly disposed of as waste electrical and electronic equipment.

Bühler Technologies GmbH will gladly dispose of your device bearing this mark. Please send your device to the address below for this purpose.



We are obligated by law to protect our employees from hazards posed by contaminated devices. Therefore please understand that we can only dispose of your waste equipment if the device is free from any aggressive, corrosive or other operating fluids dangerous to health or environment. **Please complete the "RMA Form and Decontamination Statement", available on our website, for every waste electrical and electronic equipment. The form must be applied to the packaging so it is visible from the outside.**

Please return waste electrical and electronic equipment to the following address:

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

Please also observe data protection regulations and remember you are personally responsible for the returned waste equipment not bearing any personal data. Therefore please be sure to delete your personal data before returning your waste equipment.

9 Appendices

9.1 P2.2/P2.4 ATEX technical data

Technical data

Nominal voltage:	see ordering information
Marking:	II 2G Ex h IIC T3/T4 Gb X
IP rating:	electrical IP65 mechanical IP20
Dead volume:	8.5 ml
Weight:	approx. 7.5 kg (P 2.2 ATEX) approx. 8.5 kg (P 2.4 ATEX)
Materials in contact with media varies by configuration:	PTFE, PVDF (standard pump with 100 °C valves) + PEEK (standard pump with 140 °C valves) + FKM (standard pump with 100 °C valves and bypass valve) + PCTFE, FKM (standard pump with 140 °C valves and bypass valve) + 1.4571 (VA pump body) + 1.4401, FKM (VA pipe fittings) + FKM (VA pump body with bypass valve)

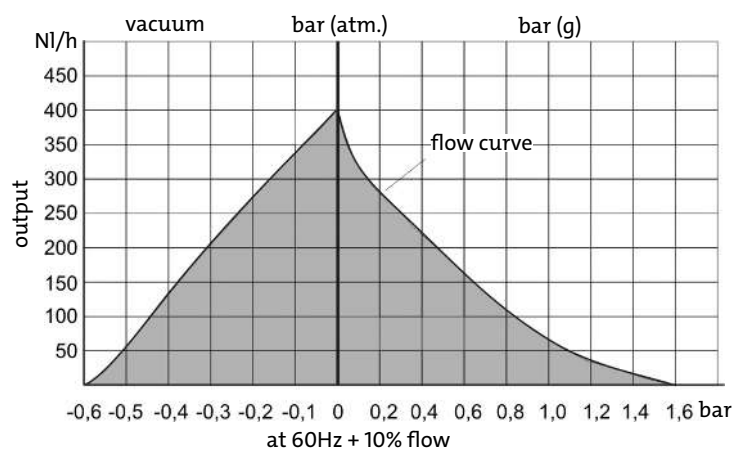
The following table describes the temperature characteristics and the resulting limits for the permissible operation of the sample gas pumps. The temperature classes apply both to the gas in the installation area (zone) and to the explosive pumped medium in the gas path:

Temperature class	Motor ambient temperature	Pump head ambient temperature	P2.2		P2.4	
			Media temperature ¹⁾		Pump head ambient temperature ¹⁾	Media temperature ¹⁾
			without bypass valve	with bypass valve		
T3	-20 °C...50 °C	max. 50 °C	max. 140 °C	max. 135 °C ²⁾	max. 100 °C	max. 140 °C
T4			max. 90 °C	max. 85 °C	max. 90 °C	max. 90 °C

¹⁾ Due to the maximum continuous operating temperature of the factory-installed plastic screw-in fittings, the maximum permitted media and ambient temperature for these versions is limited to ≤ 80 °C for pumps without a bypass valve and ≤ 75 °C for pumps with a bypass valve.

²⁾ At a media temperature of > 85 °C, operation with a bypass valve is only permitted in the stainless steel version.

Feed curve 400 l/h



9.2 Technical Data P2.72/P2.74 ATEX

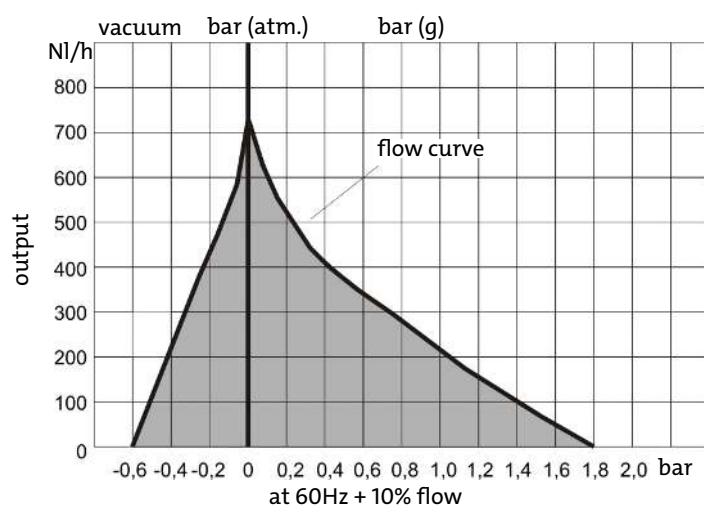
Technical data

Nominal voltage:	see ordering information
Marking:	II 2G Ex h IIC T3 Gb X
IP rating:	electrical IP65 mechanical IP20
Dead volume:	8.5 ml
Weight:	approx. 7.5 kg (P 2.72 ATEX) approx. 8.5 kg (P 2.74 ATEX)
Materials in contact with media:	PTFE, PEEK, 1.4571 (used in all models) + FKM (bypass valve) + 1.4401, FKM (VA pipe fitting)

The following table describes the temperature characteristics and the resulting limits for the permissible operation of the sample gas pumps. The temperature class applies both to the gas in the installation area (zone) and to the explosive pumped medium in the gas path:

Temperature class	Motor ambient temperature	Pump head ambient temperature	P2.72		P2.74	
			Media temperature		Pump head ambient temperature	Media temperature
			without bypass valve	with bypass valve		
T3	-20 °C...50 °C	max. 50 °C	max. 115 °C	max. 105 °C	max. 100 °C	max. 115 °C

Flow curve 700 l/h



9.3 Technical Data P2.x ATEX-H2/-O2

Nominal voltage:	see ordering information
Marking:	II 2G Ex h IIC T3/T4 Gb X (P2.2/P2.4 ATEX) II 2G Ex h IIC T3 Gb X (P2.72/P2.74 ATEX)
IP rating:	electric IP65 mechanical IP20
Dead volume:	8,5 ml
Weight:	approx. 7,5 kg (P2.2/P2.72 ATEX) approx. 8,5 kg (P2.4/P2.74 ATEX)
Materials in contact with media vary by configuration:	PTFE, PEEK, 1.4571 (contained in all models) + FKM (bypass valve) + 1.4401, FKM (VA pipe fittings for H ₂ variant) + 1.4401 (VA RT pipe fittings for O ₂ variant, BAM-tested PTFE sealing tape required [see accessories])

The following tables describe the temperature characteristics and the resulting limits for the permissible operation of the sample gas pumps. The temperature classes apply to the gas in the installation area (zone) as well as to the explosive medium in the gas path:

Temperature characteristics P2.x ATEX-H2 variants

		P2.2			P2.4	
Temperature class	Ambient temperature motor	Ambient temperature pump head	Media temperature		Ambient temperature pump head	Media temperature
			without bypass valve	with bypass valve		
T3	-20 °C...50 °C	max. 50 °C	max. 140 °C	max. 135 °C	max. 100 °C	max. 140 °C
T4			max. 90 °C	max. 85 °C	max. 90 °C	max. 90 °C

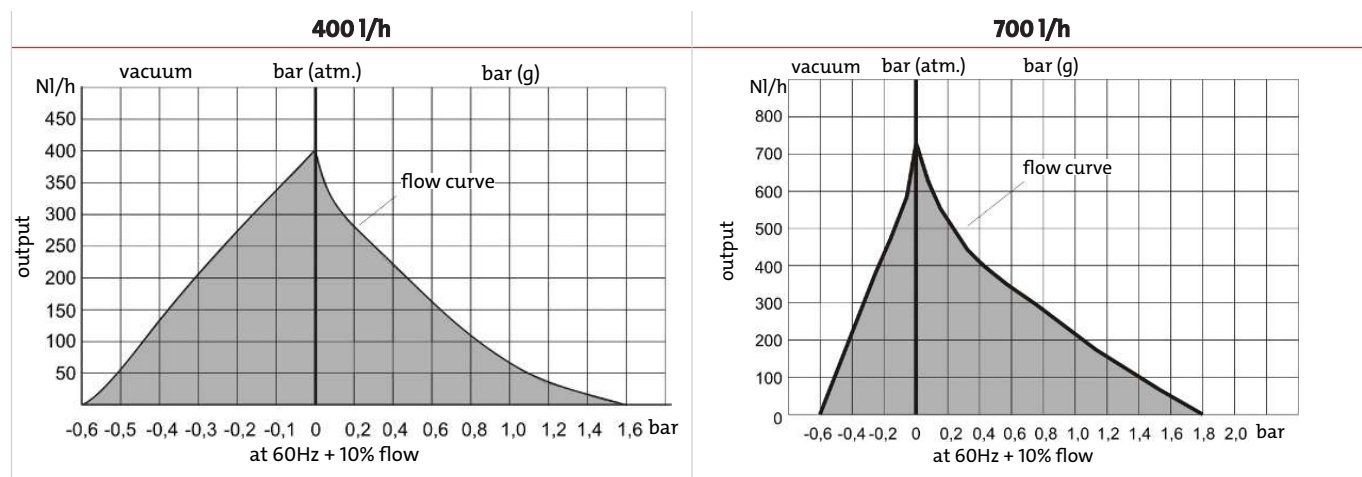
		P2.72			P2.74	
Temperature class	Ambient temperature motor	Ambient temperature pump head	Media temperature		Ambient temperature pump head	Media temperature
			without bypass valve	with bypass valve		
T3	-20 °C...50 °C	max. 50 °C	max. 115 °C	max. 105 °C	max. 100 °C	max. 115 °C

Temperature characteristics P2.x ATEX-O2 variants

		P2.2		P2.4	
Temperature class	Ambient temperature motor	Ambient temperature pump head	Media temperature	Ambient temperature pump head	Media temperature
T3	-20 °C...50 °C	max. 50 °C	max. 75 °C	max. 75 °C	max. 75 °C
T4					

		P2.72/P2.74	
Temperature class	Ambient temperature motor	Ambient temperature pump head	Media temperature
T3	-20 °C...45 °C	max. 45 °C	max. 45 °C

Flow curves



9.4 Important motor notices

Motors used in EX areas require a protection device!

Installing the motor protection switch outside the EX area

Motor voltage		Item no.
7 = 230 V 50/60 Hz	0,7 - 1 A	9132020041
8 = 115 V 50/60 Hz	1,4 - 2 A	9132020057
9 = 380-420 V 50 Hz	0,45 - 0,63 A	9132020055
0 = 500 V 50 Hz	0,35 - 0,5 A	9132020071

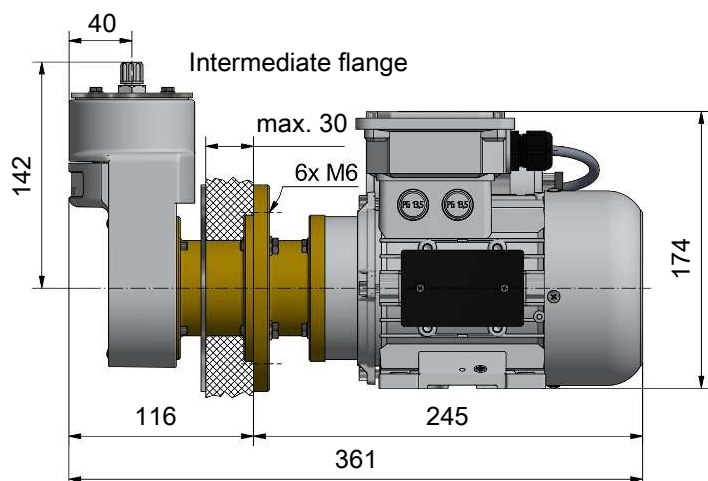
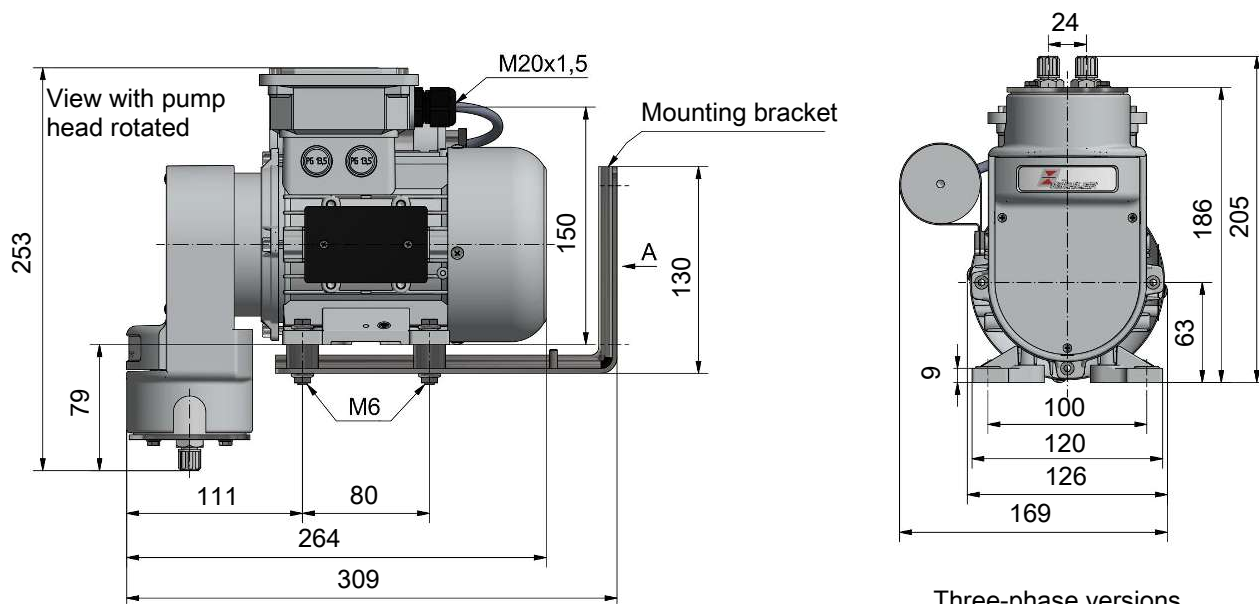
Installing the motor protection switch inside the EX area Zone 1 or 2 (ATEX only)

Motor voltage		Item no.
7 = 230 V 50/60 Hz	0,63 - 1 A	9132020036
8 = 115 V 50/60 Hz	1,6 - 2,5 A	9132020033
9 = 380-420 V 50 Hz	0,4 - 0,63 A	9132020073
0 = 500 V 50 Hz	0,25 - 0,4 A	9132020074

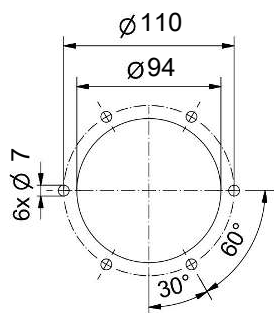
9.5 Dimensions

P2.2 ATEX, P2.72 ATEX – standard versions

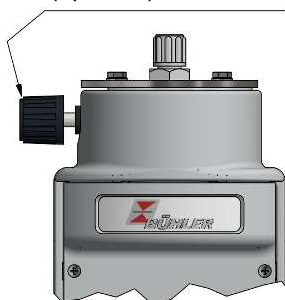
P2.4 ATEX, P2.74 ATEX – versions with intermediate flange



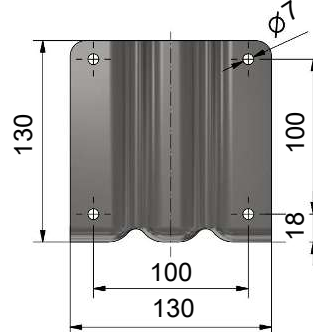
Cabinet cut-out for pumps with intermediate flange



Adjustable bypass valve (optional)



View A



Installation notices:

- 1) This pump should be installed horizontally
- 2) If necessary, rotate the pump head during installation. When conveying gasses with condensate content it must be installed valves down.

9.6 List of chemical resistance

The materials of your device that come into contact with media are printed on the type plate.

Formula	Medium	Concentration	Teflon® PTFE	PCTFE	PEEK	PVDF	FFKM	Viton® FPM	V4A
CH ₃ COCH ₃	Acetone		1/1	1/3	1/1	3/4	1/1	4/4	1/1
C ₆ H ₆	Benzol		1/1	1/3	1/1	1/3	1/1	3/3	1/1
Cl ₂	Chlorine	10% wet	1/1	0/0	4/4	2/2	1/1	3/0	4/4
Cl ₂	Chlorine	97%	1/0	1/3	4/4	1/1	1/0	1/1	1/1
C ₂ H ₆	Ethane		1/0	0/0	1/0	2/0	1/0	1/0	2/0
C ₂ H ₅ OH	Ethanol	50%	1/1	1/3	1/1	1/1	1/1	2/2	1/0
C ₂ H ₄	Ethylene		1/0	0/0	0/0	1/0	1/0	1/0	1/0
C ₂ H ₂	Ethyne		1/0	0/0	0/0	1/0	1/0	2/0	1/0
C ₆ H ₅ C ₂ H ₅	Ethylbenzene		1/0	0/0	0/0	1/1	1/0	2/0	1/0
HF	Hydrofluoric acid		1/0	0/0	0/0	2/2	2/0	4/0	3/4
CO ₂	Carbon dioxide		1/1	0/0	1/0	1/1	1/0	1/1	1/1
CO	Carbon monoxide		1/0	0/0	1/1	1/1	1/0	1/0	1/1
CH ₄	Methane	technically pure	1/1	0/0	1/1	1/0	1/0	1/1	1/1
CH ₃ OH	Methanol		1/1	1/1	1/1	1/1	1/1	3/4	1/1
CH ₃ Cl ₂	Methylene chloride		1/0	2/0	1/0	1/0	1/0	3/0	1/1
H ₃ PO ₄	Phosphoric acid	1–5%	1/1	1/1	1/1	1/1	1/1	1/1	1/1
H ₃ PO ₄	Phosphoric acid	30%	1/1	1/1	1/1	1/1	1/1	1/1	1/1
C ₃ H ₈	Propane	gaseous	1/1	0/0	1/0	1/1	1/0	1/0	1/0
C ₃ H ₆ O	Propylene oxide		1/0	0/0	0/0	2/4	2/0	4/0	1/0
HNO ₃	Nitric acid	1–10%	1/1	1/0	1/1	1/1	1/0	1/1	1/1
HNO ₃	Nitric acid	50%	1/1	1/0	3/3	1/1	1/0	1/0	1/2
HCl	Hydrochloric acid	1–5%	1/1	1/1	1/0	1/1	1/1	1/1	2/4
HCl	Hydrochloric acid	35%	1/1	1/1	1/0	1/1	1/1	1/2	2/4
O ₂	Oxygen		1/1	0/0	1/0	1/1	1/1	1/2	1/1
SF ₆	Sulphur hexafluoride		1/0	0/0	1/0	0/0	1/0	2/0	0/0
H ₂ SO ₄	Sulfuric acid	1–6%	1/1	1/1	2/2	1/1	1/1	1/1	1/2
H ₂ S	Hydrogen sulphide		1/1	1/1	0/0	1/1	1/1	4/4	1/1
N ₂	Nitrogen		1/1	0/0	1/0	1/1	1/0	1/1	1/0
C ₆ H ₅ C ₂ H ₃	Styrene		1/1	0/0	1/0	1/0	1/0	3/0	1/0
C ₆ H ₅ CH ₃	Toluol (methylbenzene)		1/1	0/0	1/0	1/1	1/1	3/3	1/1
H ₂ O	Water		1/1	0/0	1/1	1/1	1/1	1/1	1/1
H ₂	Hydrogen		1/0	1/0	1/0	1/0	1/0	1/0	1/0

Tab. 2: Durability list

0 – no information available

1 – durability/suitability very good

2 – durability/suitability good

3 – limited suitability

4 – not suitable

Two values are specified per medium. Left number = value at 20 °C, right number = value at 50 °C.

Important information

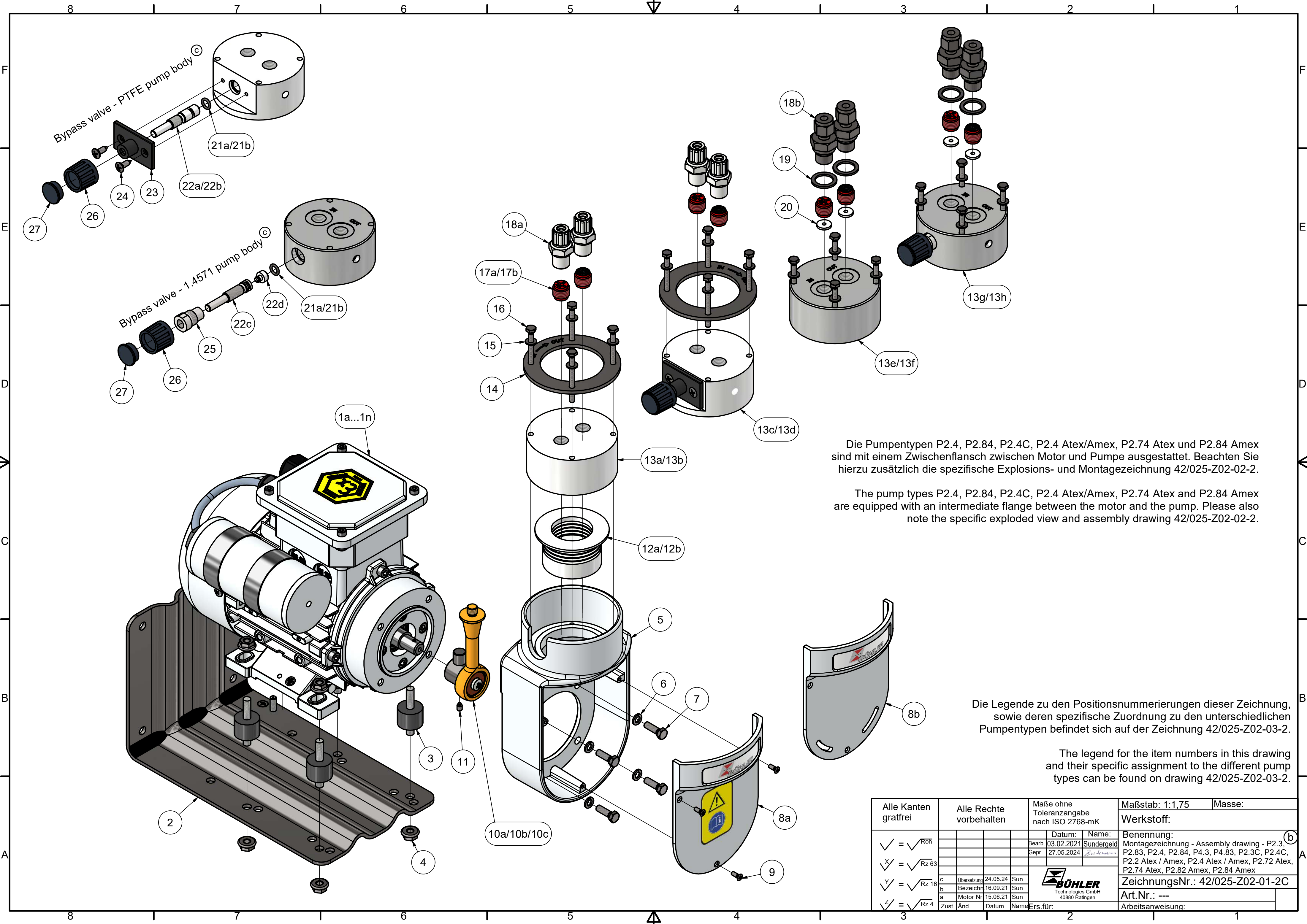
The tables were listed based on specifications from various raw material manufacturers. The values solely refer to laboratory tests using raw materials. Components made from these are often subject to impacts which cannot be determined in laboratory testing (temperature, pressure, material strain, impacts of chemical agents, design features, etc.). The values specified can therefore only serve as a guide. When in doubt, we recommend performing a test. These specifications do not infer a legal claim, we exclude any warranty and liability. The chemical and mechanical durability alone do not suffice to determine the serviceability of a product. In particular the regulations for liquid fuels (Ex-protection) must be observed, among others.

Durability to other mediums available upon request.

9.7 User book (Please make copies)

10 Attached documents

- Drawings: 42/025-Z02-01-2, 42/025-Z02-02-2; 42/025-Z02-03-2
- Declaration of Conformity: KX420010
- O₂declaration B#420025
- Operation instructions: Electric motor
- Certificates: Motor manufacturer declaration of conformity
EPT 17 ATEX 2588 X
IECEX EUT 14.0001X
- RMA – Decontamination Statement

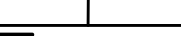


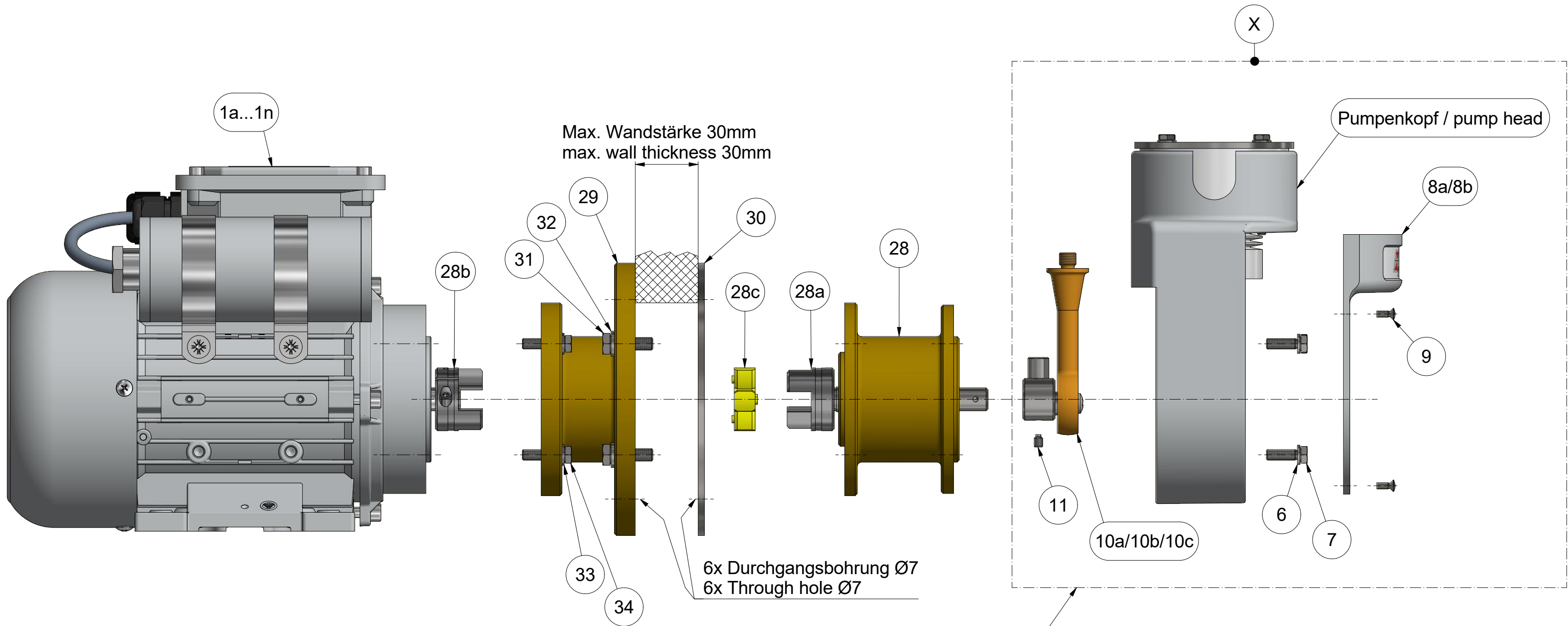
Die Pumpentypen P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex und P2.84 Amex sind mit einem Zwischenflansch zwischen Motor und Pumpe ausgestattet. Beachten Sie hierzu zusätzlich die spezifische Explosions- und Montagezeichnung 42/025-Z02-02-2.

The pump types P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex and P2.84 Amex are equipped with an intermediate flange between the motor and the pump. Please also note the specific exploded view and assembly drawing 42/025-Z02-02-2.

Die Legende zu den Positionsnummerierungen dieser Zeichnung, sowie deren spezifische Zuordnung zu den unterschiedlichen Pumpentypen befindet sich auf der Zeichnung 42/025-Z02-03-2.

The legend for the item numbers in this drawing and their specific assignment to the different pump types can be found on drawing 42/025-Z02-03-2.

Alle Kanten gratfrei		Alle Rechte vorbehalten		Maße ohne Toleranzangabe nach ISO 2768-mK		Maßstab: 1:1,75		Masse:			
						Werkstoff:					
✓ = √R0H					Datum:	Name:	Benennung: Montagezeichnung - Assembly drawing - P2.3, P2.83, P2.4, P2.84, P4.3, P4.83, P2.3C, P2.4C, P2.2 Atex / Amex, P2.4 Atex / Amex, P2.72 Atex, P2.74 Atex, P2.82 Amex, P2.84 Amex ZeichnungsNr.: 42/025-Z02-01-2C Art.Nr.: ---				
					Bearb.	03.02.2021				Sundergeld	
✓x = √Rz 63					Gepr.	27.05.2024					
✓y = √Rz 16	c	Übersetzung	24.05.24	Sun							
	b	Bezeichn	16.09.21	Sun							
✓z = √Rz 4	a	Motor Nr	15.06.21	Sun	Ers.für:		Arbeitsanweisung:				
	Zust.	Änd.	Datum	Name							



Montagehinweise:

- Wandausschnitt nach Zeichnung herstellen (max. Wandstärke 30mm)
- Verbindungsschrauben (31/32) lösen und die Einheit "Pumpenkopf-Zwischenflansch" (28/28a/28c/X) vom Kupplungsflansch (29) trennen/abziehen
- Montage der Einheit "Motor-Kupplungsflansch" (1a-g/28b/29) von Außen (z.B. an einen Schaltschrank) und Montagering (30) von Innen (z.B. innerhalb eines Schaltschranks) mit passenden Schrauben und Muttern (M6)
- Die Einheit "Pumpenkopf-Zwischenflansch" auf das Gegenstück (28b) schieben und wieder mit den Verbindungsschrauben (31/32) montieren - an dieser Stelle kann der Pumpenkopf auch um 180° gedreht montiert werden - der Pumpenkopf zeigt dann nach unten
- Die zusätzliche Befestigung des Motors mit z.B. der Bühler Montagekonsole ist bei Pumpen mit Zwischenflansch weder notwendig noch zulässig. Dies könnte sich aufgrund einer Systemüberbestimmung negativ auf die Kugellager auswirken.

Wichtiger Hinweis zur Kupplung bei Atex/Amex Pumpentypen:

Die Kupplungsablen 28a und 28b werden mit einer Klemmschraube auf den jeweiligen Wellen montiert. Diese Klemmschraube wird mit einem Schraubensicherungskleber und einem speziellen Drehmoment montiert und dürfen nur durch einen Bühler Servicetechniker gelöst werden. Bei dem Ersatzteil "Zwischenflanschbaugruppe (28/28a)" ist die Kupplungsablen bereits vormontiert und kann demnach auch betreiber-seitig ausgetauscht werden.

Assembly instructions:

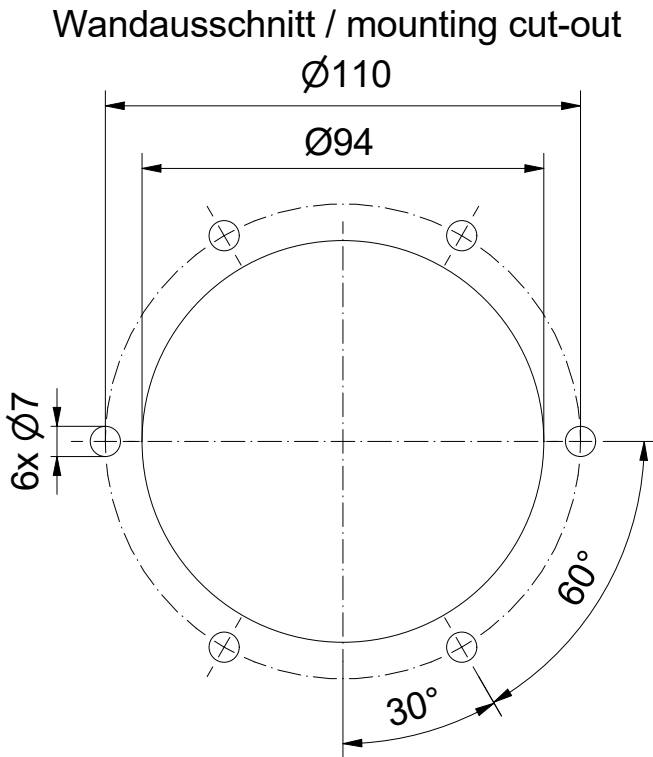
- Create a wall cut-out according to the drawing (max. wall thickness 30mm)
- Loosen the connecting screws (31/32) and remove the unit "pump head-intermediate flange" (28/28a/28c/X) from the coupling flange (29)
- Assemble the unit "Motor-coupling flange" (1a-g/28b/29) from the outside (e.g. to a cabinet) and the mounting ring (30) from the inside (e.g. inside a cabinet) with suitable screws and nuts (M6)
- The unit "pump head-intermediate flange" slide onto the counterpart (28b) and re-assembled with the connecting screws (31/32) - at this point the pump head can also be rotated by 180° installed - the pump head then points downwards
- The additional fastening of the motor with e.g. the Bühler mounting bracket at pumps with Intermediate flange is neither necessary nor allowed. This could be due to system over-determination and have a negative effect on the ball bearings.

Important note for the coupling at Atex/Amex pump types:

The coupling hubs 28a and 28b are mounted onto the shafts using clamping screws. This clamping screws are mounted with a screw lock adhesive and a special torque and shall only be released by a Bühler service technician. In case of the "intermediate flange assembly" (28/28a) as a replacement part, the coupling hub is already pre-assembled and can therefore also be exchanged by the operator.

Alle Details zu den pumpenspezifischen Bauteilen können der Explosions- und Montagezeichnung 42/025-Z02-01-2 entnommen werden

All details about the pump-specific components can be found in the Exploded and assembly drawing 42/025-Z02-01-2



Die Legende zu den Positionsnummerierungen dieser Zeichnung, sowie deren spezifische Zuordnung zu den unterschiedlichen Pumpentypen befindet sich auf der Zeichnung 42/025-Z02-03-2.

The legend for the item numbers in this drawing and their specific assignment to the different pump types can be found on drawing 42/025-Z02-03-2.

Alle Kanten gratfrei		Alle Rechte vorbehalten		Maße ohne Toleranzangabe nach ISO 2768-mK		Maßstab: 1:1,75		Masse:	
						Werkstoff:			
✓ = √ Røh				Datum: 04.02.2021		Name: Sundergeld		Benennung: Montagezeichnung - Assembly drawing - P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex, P2.84 Amex	
X/ = √ Rz 63				Bearb. Gepr.				ZeichnungsNr.: 42/025-Z02-02-2A	
Y/ = √ Rz 16								Art.Nr.: ---	
Z/ = √ Rz 4		a Motor Nr. 15.06.21 Sun		Zust. Änd. Datum Name		Ers.für:		Arbeitsanweisung:	

Zeichnungsnummer/Drawing no. 42/025-Z02-03-2 Rev.C Date: 24.05.2024 Autor: Sundergeld			Legende und spezifische Zuordnung der Positionsnummern aus den Montagezeichnungen Legend and specific assignment for the item numbers of the assembly drawings															
Änderung: C = Übersetzungskorrektur => pump "head">"body" Geprüft am: 27.05.2024 Prüfer: <i>B. Kötter</i>			42/025-Z02-01-2 & 42/025-Z02-02-2															
Pos. No.	Description	Beschreibung	P2.3	P2.83	P2.4	P2.84	P4.3	P4.83	P2.3C	P2.4C	P2.2 Atex	P2.2 Amex	P2.4 Atex	P2.4 Amex	P2.72 Atex	P2.74 Atex	P2.82 Amex	P2.84 Amex
1a	Motor 230V 50/60Hz	Motor 230V 50/60Hz	X	X	X	X	---	---	X	X	---	---	---	---	---	---	---	---
1b	Motor 115V 50/60Hz	Motor 115V 50/60Hz	X	X	X	X	---	---	X	X	---	---	---	---	---	---	---	---
1c	Motor 230/400V 50/60Hz	Motor 230/400V 50/60Hz	X	X	X				X	X	---	---	---	---	---	---	---	---
1d	Motor 230V 50/60Hz with two shaft ends	Motor 230V 50/60Hz mit 2 Wellenenden	---	---	---	---	X	X	---	---	---	---	---	---	---	---	---	---
1e	Motor 115V 50/60Hz with two shaft ends	Motor 115V 50/60Hz mit 2 Wellenenden	---	---	---	---	X	X	---	---	---	---	---	---	---	---	---	---
1f	Motor 230V 50/60Hz Atex, IECEx	Motor 230V 50/60Hz Atex, IECEx	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1g	Motor 115V 50/60Hz Atex, IECEx	Motor 115V 50/60Hz Atex, IECEx	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1h	Motor 380-420V 50Hz Atex, IECEx	Motor 380-420V 50Hz Atex, IECEx	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1i	Motor 500V 50Hz Atex, IECEx	Motor 500V 50Hz Atex, IECEx	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1j	Motor 230V 50/60Hz Cl.I, Div.2	Motor 230V 50/60Hz Cl.I, Div.2	---	---	---	---	---	---	---	---	---	X	---	X	---	---	X	X
1k	Motor 115V 50/60Hz Cl.I, Div.2	Motor 115V 50/60Hz Cl.I, Div.2	---	---	---	---	---	---	---	---	---	X	---	X	---	---	X	X
2	Montagekonsole	Mounting bracket	X	X	---	---	X	X	X	---	X	X	---	---	X	---	X	---
3	Gummi-Metall-Puffer	Shock absorber	X	X	---	---	X	X	X	---	X	X	---	---	X	---	X	---
4	Mutter DIN 6923 - M6	Nut DIN 6923 - M6	X	X	---	---	X	X	X	---	X	X	---	---	X	---	X	---
5	Pumpenkonsole	Pump housing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	Federring DIN 127 B5,1	Spring washer DIN 127 B5,1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	Schraube DIN 933 M5x16	Screw DIN 933 M5x16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8a	Konsolendeckel - standard	Cover - standard	X	X	X	X	X	X	---	---	X	X	X	X	X	X	X	X
8b	Konsolendeckel mit Schlitzten	Cover with slots	---	---	---	---	---	---	X	X	---	---	---	---	---	---	---	---
9	Schraube DIN 966 M3x8	Screw DIN 966 M3x8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10a	Kurbeltrieb für 400l/h Pumpen (Stößel gold)	Crank drive for 400l/h pumps (plunger gold)	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
10b	Kurbeltrieb für 700l/h Pumpen (Stößel grün)	Crank drive for 700l/h pumps (plunger green)	---	---	---	---	---	---	---	---	---	---	---	---	X	X	---	---
10c	Kurbeltrieb für 800l/h Pumpen (Stößel schwarz)	Crank drive for 800l/h pumps (plunger black)	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
11	Schraube DIN 915 M4x6 oder ISO 4028 M4X6 TX 8	Screw DIN 915 M4x6 or ISO 4028 M4X6 TX 8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12a	Faltenbalg für 400l/h Pumpen (4 Falten)	Below for 400l/h pumps (4 folds)	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
12b	Faltenbalg für 700l/h und 800l/h Pumpen (8 Falten)	Below for 700l/h and 800l/h pumps (8 folds)	---	X	---	X	---	X	---	---	---	---	---	---	X	X	X	X
13a	Pumpenkörper - PTFE für 400l/h Pumpen	Pump body - PTFE for 400l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
13b	Pumpenkörper - PTFE für 800l/h Pumpen	Pump body - PTFE for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
13c	Pumpenkörper - PTFE mit Bypassventil für 400l/h Pumpen	Pump body - PTFE with bypass valve for 400l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
13d	Pumpenkörper - PTFE mit Bypassventil 800l/h Pumpen	Pump body - PTFE with bypass valve for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
13e	Pumpenkörper - 1.4571 für 400l/h und 700l/h Pumpen	Pump body - 1.4571 for 400l/h and 700l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	X	X	---	---
13f	Pumpenkörper - 1.4571 für 800l/h Pumpen	Pump body - 1.4571 for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
13g	Pumpenkörper - 1.4571 mit Bypassventil für 400l/h und 700l/h Pumpen	Pump body - 1.4571 with bypass valve for 400l/h and 700l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	X	X	---	---
13h	Pumpenkörper - 1.4571 mit Bypassventil für 800l/h Pumpen	Pump body - 1.4571 with bypass valve for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
14	Montagering - nur für PTFE Pumpenkörper	Mounting ring - only for pump bodys made of PTFE	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
15	Spannscheibe DIN 6796 d=4	Clamping washer DIN 6796 d=4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	Schraube DIN 933 M4x45	Screw DIN 933 M4x45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17a	Ventil - geeignet bis zu 100°C Gaseingangstemperatur	Valve - suitable up to 100°C gas inlet temperature	X	---	---	---	X	---	X	---	X	X	---	---	---	---	---	---
17b	Ventil - geeignet bis zu 160°C Gaseingangstemperatur	Valve - suitable up to 160°C gas inlet temperature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18a	Kunststoff Einschraubverschraubung - diverse Typen - siehe Pumpendatenblätter	Plastic fitting - various types - see pump data sheets	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
18b	Edelstahl Rohrverschraubung - diverse Typen - siehe Pumpendatenblätter	Stainless steel fitting - various types - see pump data sheets	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19	Dichtring - nur für Edelstahl Pumpenkörper	Sealing ring - only for pump bodys made of 1.4571	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	Verdränger - nur für Edelstahl Pumpenkörper	Displacer - only for pump bodys made of 1.4571	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21a	O-Ring - FKM	O-Ring made of FKM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21b	O-Ring - FFKM	O-Ring made of FFKM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22a	Spindel für Bypassventil - geeignet bis zu 100°C Gaseingangstemperatur	Spindle for PTFE bypass valve - suitable up to 100°C gas inlet temperature	X	---	---	---	X	---	X	---	X	X	---	---	---	---	---	---
22b	Spindel für Bypassventil - geeignet bis zu 160°C Gaseingangstemperatur	Spindle for PTFE bypass valve - suitable up to 160°C gas inlet temperature	---	X	X	X	---	X	---	X	---	---	X	X	X	X	X	X
22c	Spindel für Edelstahl Bypassventil	Spindle for 1.4571 bypass valve	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22d	Spindelspitze	Spindle tip	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	Montageplatte Bypassventil	Mounting plate bypass valve	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
24	Schraube DIN 7982 4,2x13	Screw DIN 7982 4,2x13	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
25	Spindelaufnahme	Spindle holder	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	Drehknopf	Knob	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	Deckel	Cover	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28	Zwischenflansch	Intermediate flange	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
28a/28b	Kupplungsnahe	Coupling hub	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
28c	Kupplungsstern	Spider	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
29	Kupplungsflansch	Coupling flange	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
30	Montagering	Mounting ring	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
31	Schraube DIN 933 M6x20	Screw DIN 933 M6x20	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
32	Unterlegscheibe DIN 125 A6,4	Washer DIN 125 A6,4	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
33	Unterlegscheibe DIN 125 A5,3	Washer DIN 125 A5,3	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
34	Schraube DIN 933 M5x20	Screw DIN 933 M5x20	---	---	X	X			---	X	---	---	X	X	---	X	---	X
X	Kompletter Pumpenkopf - diverse Kombinationsmöglichkeiten	Complete pump head - various combinations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

EG-/EU-Konformitätserklärung EC/EU Declaration of Conformity



Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte „Geräte“ im Sinne der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products are "equipment" according to Directive

2014/34/EU
(Atex)

in ihrer aktuellen Fassung sind.

in its actual version.

Die Produkte sind Maschinen im Sinne der Richtlinie

The products are machines according to Directive

2006/42/EG

2006/42/EC

(MRL)

(MD)

Artikel 2 a)

Article 2 (a)

und erfüllen alle einschlägigen Anforderungen.

and fulfill all relevant requirements.

Folgende weitere Richtlinien wurden berücksichtigt:

The following directives were regarded:

2011/65/EU (RoHS)

Produkt / products: Messgaspumpe / Sample gas pump
Typ / type: P2.2 ATEX, P2.4 ATEX, P2.72 ATEX, P2.74 ATEX (-H2/-O2)

Die Produkte werden entsprechend der derzeit gültigen Atex-Richtlinie innerhalb der internen Fertigungskontrolle folgendermaßen gekennzeichnet:

The products are marked according to the currently valid Atex directive during internal control of production:

II 2G Ex h IIC T3/T4 Gb X

Typ / type: P2.2 ATEX, P2.4 ATEX (-H2/-O2)

II 2G Ex h IIC T3 Gb X

Typ / type: P2.72 ATEX, P2.74 ATEX (-H2/-O2)

Zur Beurteilung der Konformität gemäß Atex-Richtlinie wurden folgende harmonisierte Normen herangezogen:
For the assessment of conformity according to the Atex directive the following standards have been used:

EN ISO 80079-36:2016

EN 809:1998+A1:2009 + AC:2010

EN 60204-1:2018

Zusätzlich wurden berücksichtigt
In addition, the following standards have been used:
EN ISO 12100:2010

CE-Erklärung Zulieferer:
CE-Declaration Supplier

Orange1 Electric Motors S.P.A.
Via Mantova 93
43122 Parma Italy

Eingeschaltete Benannte Stelle:

Eurofins Produkt Testing Italy S.r.l.

Engaged Notified Body:

Nummer 0477

Nr. der Konformitätsbescheinigung:

EPT 17 ATEX 2588 X

No. of Certificate

Die Vorschriften zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten und die Änderung 2015/863 wurden berücksichtigt.

The product is in conformity with the restriction of the use of certain hazardous substances in electrical and electronic equipment and the amending through the directive 2015/863 was regarded.

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Dokumentationsverantwortlicher für diese Konformitätserklärung ist Herr Stefan Eschweiler mit Anschrift am Firmensitz.

The person authorised to compile the technical file is Mr. Stefan Eschweiler located at the company's address.

Ratingen, den 25.04.2024

Stefan Eschweiler

Geschäftsführer – Managing Director

Frank Pospiech

Geschäftsführer – Managing Director

O2-Erklärung *O2 Declaration*

**Messgaspumpen für den Einsatz mit
hochreinem Sauerstoff optimiert**

*Sample Gas Pumps optimised for use with
high-purity oxygen*

Applikationen mit Sauerstoff: Partikel-, Öl- und Fettfreiheit

Mit dieser Erklärung bestätigen wir, dass alle medienberührenden Flächen der nachfolgenden Produkte in Anlehnung an die Vorgaben der EIGA Doc 33/18 und des VDA-Band 19 gereinigt und gefertigt sind.

Applications with oxygen: free of particles, oil and grease

With this declaration, we confirm that all surfaces of the following products that come into contact with media have been cleaned and manufactured in accordance with the specifications of EIGA Doc 33/18 and VDA Volume 19.

Produkt / Products	Messgaspumpen / Sample Gas Pumps
Typen / Types:	P2.x ATEX-O2 P2.x AMEX-O2 P1.3-O2
Art-Nr. / Item no.:	42-O2

Ratingen, den 25.04.2024

Bühler Technologies GmbH



Sample gas pumps optimized for use with high-purity oxygen

Applications with oxygen: Free from particles, oil and grease



For use with high-purity oxygen, the product requires special cleaning to ensure that it is free from oil and grease, as oxygen is a strong oxidising agent. Under unfavourable conditions, oxygen can cause spontaneous combustion of organic substances such as particles, oils and fats, and generally promotes the combustion of substances. Oils and fats can even react explosively on contact with oxygen. We use special cleaning and production processes to ensure the safe use of our products with high-purity oxygen and avoid the above-mentioned undesirable reactions.

With this declaration, we confirm that all surfaces of the following products that come into contact with media have been cleaned and manufactured in accordance with the requirements of EIGA Doc 33/18 and VDA Volume 19.

Product:	Sample gas pumps
Models:	P2.x ATEX-O2 P2.x AMEX-O2 P1.3-O2
Item no.:	42-O2

For the "O2" measuring gas pumps, only materials that have been tested by the Federal Institute for Materials Research and Testing (BAM) for oxygen applications, taking into account the relevant application parameters, are used for the components in contact with the medium.

All components in contact with the medium undergo a special cleaning process to reliably remove impurities (such as oil, grease and particles). This process is documented by a comprehensive delivery specification to the service provider and compliance with the limit values is verified with regular analyses by an independent, accredited laboratory.

The contamination limits of the surfaces in contact with media are defined as follows (as in EIGA Doc 33/18 Cleaning of Equipment for oxygen service):

	Contamination limits
Non-volatile organic or inorganic impurities:	$\leq 220 \text{ mg/m}^2$ for non-volatile impurities
Particles:	$\leq 22 \text{ particles/m}^2$ between $500 \mu\text{m}$ and $1000 \mu\text{m}$

The "O2" measuring gas pumps are manufactured in a structurally separated clean room in accordance with VDA Volume 19.

Compliance with the production and assembly specifications is documented by the trained specialist by means of a test report. After cleaning, the sample gas pumps are packed in airtight and dustproof packaging and clearly labeled "Cleaned for oxygen service. Do not open until ready for use".

All described cleaning properties are lost if the product comes into contact with oily or greasy media or is otherwise contaminated from the outside.





1. INFORMAZIONI GENERALI DI SICUREZZA

EX Queste istruzioni di sicurezza si riferiscono all'installazione, utilizzo e manutenzione dei motori serie O-M utilizzabili in aree potenzialmente esplosive per la presenza di GAS e POLVERI combustibili. Le informazioni riportate sono ad uso di personale qualificato. Fatta eccezione per l'apertura della scatola morsettiera, l'apertura di ogni altra parte cancella le condizioni di garanzia dei motori.

Riportiamo qui sotto le differenti marcature e le zone (ATEX) di utilizzo dei differenti motori:

GAS	II 2G Ex db IIC T3 Gb T.amb -40°C , +60°C	Zone 1, 2
	II 2G Ex db IIC T4 Gb T.amb -40°C , +60°C	
	II 2G Ex db IIC T5 Gb T.amb -40°C , +40°C	
	II 2G Ex db eb IIC T3 Gb T.amb -40°C , +60°C	
	II 2G Ex db eb IIC T4 Gb T.amb -40°C , +60°C	
POLVERI	II 2G Ex db eb IIC T5 Gb T.amb -40°C , 40°C	Zone 21, 22
	II 2D Ex tb IIIC T125°C T.amb -40°C , +60°C (spessore max layer 5mm)	

I motori sono conformi con I Requisiti Essenziali di Salute e Sicurezza per le zone potenzialmente esplosive riportati nelle normative Europee:

IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7, IEC/EN60079-31

! Le macchine elettriche rotanti presentano parti sotto tensione o in movimento e parti molto calde. Il trasporto, il collegamento per la messa in funzione e la manutenzione devono essere eseguiti da personale qualificato e responsabile (vedere IEC 364). Interventi inadeguati possono causare danni a persone e cose.

! Controllare attentamente i dati indicati sulla targa prima della messa in funzione del motore. I motori in bassa tensione sono considerati come componenti da installare in altre macchine ai sensi della Direttiva Comunitaria sulle macchine 2006/42/EC. La messa in funzione è proibita fino ad avvenuto accertamento della conformità finale a tale direttiva. Le macchine elettriche rotanti alimentate da rete sono conformi alle norme EN 61000-6-1,2,3,4 riguardanti fenomeni di compatibilità elettromagnetica - Direttiva 2004/108/CE e non sono necessari particolari accorgimenti di schermatura. Nel caso di funzionamento intermittente, gli eventuali disturbi generati dai dispositivi di inserzione devono essere limitati mediante adeguati cablaggi.

! I lavori sulla macchina elettrica devono avvenire a macchina ferma e scollegata dalla rete (compresi gli equipaggiamenti ausiliari). Se sono presenti protezioni elettriche, eliminare ogni possibilità di avviamento improvviso attenendosi alle specifiche raccomandazioni sull'impiego delle varie apparecchiature.

2. TRASPORTO, IMMAGAZZINAMENTO

! Al ricevimento della fornitura accertarsi che non sussistano danni imputabili al trasporto e nell'eventualità darne comunicazione immediata, contestandoli allo spedizioniere ed astenendosi dalla messa in funzione.

Quando sono forniti con il motore, serrare saldamente i golfari a vite; poiché essi servono per il sollevamento del solo motore, non si devono sollevare macchine o accessori aggiuntivi ad esso accoppiati.

Se necessario, fare ricorso a mezzi di trasporto adeguati e sufficientemente dimensionati. Se sul motore sono presenti due golfari utilizzare sempre entrambi per il sollevamento. Se i motori vengono immagazzinati accertarsi che l'ambiente sia asciutto, senza polvere ed esente da vibrazioni (v eff. <0,2 mm/s) al fine di evitare danneggiamenti ai cuscinetti. Prima della messa in funzione misurare la resistenza di isolamento. Se si misurano valori di resistenza <1,5MΩ□□essicare l'avvolgimento. Per la procedura di essiccazione rivolgersi direttamente al nostro ufficio tecnico.

3. INSTALLAZIONE

! L'installazione deve essere conforme alle regole riportate nella norma IEC/EN 60079-14 o con le normative nazionali (edizione in vigore).

Prima di iniziare l'installazione in atmosfera esplosiva, l'installatore deve assicurarsi che il motore sia idoneo all'utilizzo nella rea classificata tenendo in considerazione le differenti sostanze infiammabili presenti (verificare la marcatura riportata sul motore prima di installarlo).

Il motore verrà installato solo da personale qualificato con conoscenza riguardante l'installazione di apparecchiature elettriche per atmosfere esplosive e ciò si può procedere solo nel caso in cui sia il motore sia la macchina applicata sia perfettamente fermi, non alimentati elettricamente ed assicurati contro partenze improvvise.

La targa motore riporta tutti i dati quali tensione, potenza e tutti gli altri dati elettrici e meccanici, inoltre sulla targa sono riportate tutte le informazioni di sicurezza (tipo di protezione, classe di temperatura, temperatura ambiente etc.).

ATTENZIONE: NON APRIRE IN PRESENZA DI ATMOSFERA ESPLOSIVA

Gli organi di accoppiamento devono essere equilibrati con mezza chavetta su mandrino liscio. Giunti e pulegge devono essere montati mediante apparecchiature apposite al fine di non danneggiare i cuscinetti del motore. Dopo il montaggio controllare che gli organi di accoppiamento siano ben fissi sull'estremità albero e spinti contro l'arresto. Se il mozzo dell'organo di accoppiamento fosse più corto dell'estremità d'albero la differenza dovrà essere compensata mediante bussola distanziatrice. Pulegge troppo piccole o troppo larghe compromettono il buon funzionamento dei cuscinetti.

I motori devono essere installati in posizione tale che l'aria di raffreddamento possa entrare ed uscire facilmente. La ventilazione non deve essere impedita e l'aria di scarico, anche di gruppi adiacenti, non deve essere aspirata dalla ventola. Evitare di avere fonti di calore tali da influenzare la temperatura sia dell'aria sia del motore.

In caso di installazione all'aperto proteggere il motore con opportuni accorgimenti dall'irraggiamento solare e dalle intemperie. In caso di posizione verticale con albero in basso usare copriventola con tettuccio parapigioggia. Si consiglia di proteggere il motore con dispositivi salvamotore, limitatori elettronici di coppia qualora il motore non sia dotato di termistori.

Nel caso di ambienti con forti escursioni termiche ed ove si preveda la formazione di condensa, Orange1 EM potrà dotare il motore di apposite scaldiglie anticondensa.

Invece di utilizzare riscaldatori anticondensa, è possibile alimentare il motore sui pin U1-V1 con una tensione del 4-10% della tensione di fase nominale del motore; il 20-30% della corrente nominale è sufficiente per riscaldare il motore.

! Controllare il senso di rotazione a motore non accoppiato facendo attenzione di assicurare la linguetta al fine di evitarne un distacco violento durante la rotazione. Se il senso di rotazione non è quello voluto, togliere tensione e quando il motore si sarà fermato:

- nel caso di motore trifase scambiare tra loro due delle tre fasi
- nel caso di motore monofase scambiare tra loro i cavetti dell'avvolgimento ausiliario

Entrate cavo

! A seconda del tipo di protezione del motore gli ingressi cavo dovranno essere certificate in conformità con le normative riportate in tabella ed avere l'intervallo di temperatura ambiente del motore medesimo:

Tipo di protezione della scatola morsetti	Tipo di protezione del passacavo	Temperatura operativa
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

Le sezioni dei cavi ammissibili a seconda del tipo di filettatura sono i seguenti:

Filetto pressacavo	Grandezza Motore	Diametro cavi (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12,5-20,5
M32X1.5	160-180	17-26

I pressacavi e/o tappi di chiusura, se non forniti con il motore dovranno essere con filetto come da tabella sopra.

I passacavi montati sulla scatola morsetti devono essere coperti da un certificato ATEX e IECEx in accordo con il tipo di protezione della scatola morsetti (Ex db e/o Ex db eb e/o Ex tb).

Devono avere un grado di protezione minimo di IP66 in accordo con EN/IEC 60529 e EN/IEC 60079-0; la temperatura di esercizio del passacavo deve essere inclusa nel campo di temperatura ambiente definito sulla targa, dalla minima temperatura fino alla massima temperatura riportata +25°C.

I passacavi devono essere completamente avvitati al corpo della custodia con una coppia di serraggio di 5Nm.

La connessione elettrica deve essere realizzata utilizzando cavi che hanno una temperatura di esercizio della guaina almeno uguale alla massima temperatura ambiente indicata sulla targa +25°C e una temperatura dell'isolante del conduttore almeno uguale alla massima temperatura ambiente indicata sulla targa +35°C.

I pressacavi dell'alloggiamento del condensatore e i pressacavi dei cavi del motore all'interno delle custodie Ex sono installati in fabbrica. Non è consentito svitare o modificare l'installazione di fabbrica.

Essendo piedi applicabili al corpo motore è possibile montarli in 3 diverse posizioni in modo da avere la scatola sulla parte superiore del motore oppure sui lati destro o sinistro.

Allo stesso tempo la scatola morsettiera può essere montata con l'uscita cavo posizionata dove necessario (ripristinare in tal caso le guarnizioni).

Questa operazione deve essere effettuata prima della connessione rimuovendo il coperchio, svitando le viti che fissano la scatola al motore e riavvitandole nel rispetto della coppia di serraggio (vedi la tabella con le coppie di serraggio). Avvitare completamente rispettando le coppie di serraggio consultando la tabella COPPIE DI SERRAGGIO

4. COLLEGAMENTO ALLA RETE ELETTRICA

EX Solo personale qualificato è autorizzato al collegamento del motore alla rete elettrica.

Il collegamento alla rete di alimentazione deve essere effettuato tramite ingressi cavo forniti con il motore o tramite altri ingressi cavo purché certificate in accordo con le normative europee come riportato sopra, in conformità alla Direttiva ATEX 2014/34/UE e approvati IECEx.

Nel caso di motore completo di cavo, la parte libera del cavo dovrà essere collegata in zona sicura oppure all'interno di una custodia Ex avente modo di protezione idoneo all'atmosfera esplosiva circostante.

! Fare sempre riferimento ai dati stampati sulla targa di tensione e frequenza per assicurarsi un corretto accoppiamento alla rete di alimentazione. Tolleranze di ±5% sulla tensione e ±1% sulla frequenza (la X sul numero del certificato). Per motori con classe di temperatura T3 e T4 è possibile avere ±10% sulla tensione I diagrammi di collegamento vengono normalmente forniti con il motore o sono stampati nella scatola morsettiera. Qualora mancassero, fare riferimento a quelli forniti nel presente manuale.

Assicurarsi che, nel caso di avviamento stella/triangolo, il passaggio da stella a triangolo sia eseguito solo quando la corrente di avviamento sia diminuita al valore corrispondente a quello di stella: ciò è importante per evitare il rischio di sovraccarichi non ammessi.

La scelta del cavo deve essere adeguata alla potenza del motore ed al tipo di impianto in cui è installato.

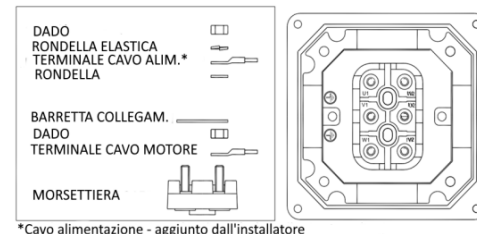
Il motore deve essere protetto da un dispositivo di protezione, che nel caso di guasto tolga alimentazione prima che la temperatura superficiale superi il valore di innesco dell'atmosfera circostante.

EX I motori con scatola Ex d sono dotati di una morsettiera standard.

TABELLA COPPIE DI SERRAGGIO

Filettatura	M4	M5	M6	M8
Copie di serraggio (Nm)	1,5	2	3	6

Le connessioni di potenza devono essere realizzate come in figura. I collegamenti devono essere sufficientemente stretti in modo da evitare ogni tipo di allentamento in accordo con la tabella COPPIE DI SERRAGGIO .



IMPORTANTE: Motori con scatola morsetti Ex eb: RIPOSIZIONARE LA GUARNIZIONE NELLA CORRETTA POSIZIONE PRIMA DI RICHIEDERE LA SCATOLA E RIAVVITARE COMPLETAMENTE LE VITI

Collegamento di terra

⚠ In aggiunta al collegamento di terra effettuato all'interno della scatola morsettiera, un altro collegamento esterno deve essere effettuato sul corpo motore. Se i conduttori di linea hanno sezione S il conduttore di terra sarà:

Conduttore di terra	Conduttori di linea
= S	$S \leq 16 \text{ mm}^2$
16	$16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$
$\geq 0,5 S$	$S > 35 \text{ mm}^2$

Protezione termica

⚠ Il motore deve essere protetto tramite un dispositivo di sgancio che, in caso di guasto, tolga tensione al motore in modo da evitare che la temperatura superficiale delle parti a contatto con l'atmosfera esplosiva non raggiunga il valore di innesco.

Motori Alimentati tramite inverter

⚠ Nel caso in cui i motori vengano alimentati tramite inverter (VFD) , essi devono essere provvisti di protettori termici (normalmente PTC), all'interno degli avvolgimenti, in grado di garantire i limiti della classe di temperatura.

Tali dispositivi di controllo della temperatura devono essere a loro volta collegati a dispositivi di sgancio dell'alimentazione del motore nel caso di raggiungimento della temperatura. Le caratteristiche operative consentite in questa modalità sono riportate sulla targa dati o su un'etichetta aggiuntiva. I filtri di uscita devono essere installati in base alla lunghezza del cavo sul lato motore del VFD. La scelta del filtro e la lunghezza massima del cavo dipendono dalle istruzioni e dai dati forniti dal produttore del VFD. Per prevenire le correnti vaganti circolanti, si raccomanda di adottare opportuni accorgimenti sull'alimentazione che permettano di ridurne sensibilmente la causa. A tal fine, contattare il fornitore VFD locale.

Scaldiglie

⚠ Le scaldiglie non devono essere alimentate in alcun caso quando il motore è sotto tensione. I cavi di collegamento dovranno essere adeguati ad una potenza di 25W con tensione di alimentazione con range 110V-240V (±10%).

Carichi ammissibili

Supponendo una durata di 20.000h per motori 2P e 40.000h per motori 4/6/8P:

	Taglia Motore	Cuscinetti	Max carico radiale in L/2	Max carico assiale Spinta	Max carico assiale Tiro
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

Servizi ammissibili

S1: servizio continuo, il motore raggiunge la temperatura di equilibrio termico.

S2: servizio intermittente: periodo funzionamento carico costante di durata tale da non raggiungere l'equilibrio termico seguito da periodo di riposo fino al raggiungimento della temperatura ambiente (del fluido scambiatore).

S3: servizio intermittente: sequenza di cicli di funzionamento identici comprendenti un periodo di funzionamento a carico seguito da un periodo di riposo; il ciclo è tale che la corrente di avviamento non influenza la sovratemperatura in maniera significativa.

S9: servizio in cui carico e velocità variano in modo non periodico. Tipico del motore funzionante tramite inverter in cui all'interno degli avvolgimenti devono essere montate protezioni termiche adeguate (vedi sopra).

Motori Servoventilati (IC416)

Nel caso di motori aventi ventilazione forzata (IC416) il motore principale dovrà essere alimentato solo quando la ventilazione ausiliaria è funzionante.

5. MARCATURA

CE (*)		Marcatura di conformità alle direttive Europee
Ex (*)		Marcatura per le protezioni contro le esplosioni
II (*)		Motori per impianti di superficie (diversi dalle miniere)
2 (*)		Categoria 2: livello di protezione elevato
GAS	G (*)	Atmosfera esplosiva per la presenza di gas vapori o nebbie infiammabili
	Ex db	Motore e scatola antideflagranti
	Ex dbeb	Motore antideflagrante, scatola a sicurezza aumentata
	IIC	Gruppo del Gas, idoneo anche per IIB e IIA
POLVERE	T3, T4, T5	Classe di temperatura
	D (*)	Atmosfera esplosiva per la presenza di polveri combustibili
	Ex tb IIC	Custodie tb idonee per zona 21 (cat. 2D)
	T125°C	Max temperatura superficiale
T.amb		Temperatura ambiente
AB xx yyy		AB : laboratorio che rilascia il certificato CE di tipo xx : anno di rilascio del certificato yyy : numero del certificate CE di tipo
ZZZZ (*)		Numero dell'O.N. che rilascia la Notifica della Garanzia di Qualità dei Prodotti
(*) Solo per marcatura ATEX		

6. MANUTENZIONE E RIPARAZIONI

⚠ ⚠ La MANUTENZIONE sarà effettuata solo da personale qualificato in accordo con la normative EN 60079-17 o norme nazionali (ultima edizione in vigore).

Il personale qualificato deve avere conoscenza riguardante l'installazione di apparecchiature elettriche per atmosfere potenzialmente esplosive.

Ogni 3000 h di servizio verificare e ripristinare, se necessario il grasso sulle tenute radiali (ad esempio i V-ring) Periodicamente (in funzione dell'ambiente e del tipo di impiego) verificare:

- pulizia del motore (olio, POLVERE, sporco e residui di lavorazioni) e che non sia ostruito il passaggio dell'aria di raffreddamento.
- corretto fissaggio e connessione dei collegamenti elettrici
- il livello di vibrazione del motore (veff<3,5 mm/s per Pn<15KW veff<4,5 mm/s per Pn>15KW) il livello di rumore e nel caso questo si presenti anormale verificare il fissaggio motore, l'equilibratura della macchina accoppiata o l'esigenza di sostituzione dei cuscinetti.

⚠ Le RIPARAZIONI devono essere fatte in accordo con la normative IEC/EN 60079-19.

Tali riparazioni possono essere effettuate solo sotto il controllo e l'autorizzazione di Orange1 EM oppure da parte di un'officina certificata.

Nel caso in cui la riparazione venga realizzata da parte di un'officina autorizzata, questa deve rispettare le caratteristiche originali del motore ed utilizzare solo parti di ricambio originali.

Inoltre sarà loro dovere mettere sul motore una targa aggiuntiva con un simbolo che identifichi la riparazione, il nome dell'azienda, la certificazione, numero e data della riparazione effettuata.

Nulla riguardante il modo di protezione può essere modificato. Nel caso in cui tali regole non vengano rispettate il motore perderà tutte le sue caratteristiche di certificato.

I GIUNTI NON POSSONO ESSERE RIPARATI

7. COMPONENTI MODULARI

I motori sono completamente modulari. Piedi e flange possono essere montati senza alterare la certificazione ATEX, essendo esterni e non facendo parte del tipo di protezione Ex. Nella tabella sottostante mostriamo le viti da utilizzare per il montaggio dei diversi componenti modulari.

Taglia Motore	Flange	Piedi	Coperchio scatola morsetti
63-71	M5x16	M6x16	M5x14
80-90	M6x20	M6x20	M5x14
100	M8x20	M8x30 DADO M8	M5x14
112	M8x20	M8x35 DADO M8	M5x14
132	M10x20	M10X50 DADO M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Viti classe 8.8			

8.DATA DI PRODUZIONE

La data di produzione viene riportata sulla targa del motore indicando Mese ed Anno di fabbricazione : MM-AA



1. GENERAL SAFETY INFORMATION

⚠ These safety instructions refer to the installation, utilization and maintenance of motors O-M series to be used in potentially explosive areas with presence of combustible GAS and/or DUST. The information of these instructions are only for qualified personnel. Except for the opening of terminal cover, any other opening cancels the warranty conditions of the motors.

Here below you can see the different markings of the motors and the different zones where they can be used:

GAS	II 2G Ex db IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db IIC T5 Gb T.amb -40°C , +40°C II 2G Ex db eb IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T5 Gb T.amb -40°C , +40°C	Zones 1, 2
DUST	II 2D Ex tb IIC T125°C T.amb -40°C , +60°C (maximum thickness of dust layer 5mm)	Zones 21, 22

The motors comply with the Essential Health and Safety Requirements for potentially explosive atmospheres provided by European Standards:

IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7,
IEC/EN 60079-31

⚠ Electric rotating machines present dangers from live and rotating parts, and probably very hot surfaces. All work on them including transportation, connection, commissioning and maintenance must be by qualified and responsible specialists (IEC 364 must be observed). Inadequate work can lead to severe damage to persons and property.

⚠ It is imperative to observe the data printed on the nameplate before operating the motor. Low voltage motors are components to be installed into machines in accordance with Directive 2006/42/EC.

Commissioning is not allowed until the conformity of the end product with this directive has been established.

These asynchronous motors comply the EMC (2014/30/EU) Directive and no particular shielding is necessary when connected to a pure sinewave voltage supply.

⚠ Before working on the motor, ensure it has stopped and is disconnected from the power supply (including auxiliary equipment). If there is any form of automatic starting, automatic resetting, relays or remote starting, avoid any possibility of unexpected re-starting, paying attention to specific recommendations on equipment application.

2. TRANSPORT, STORAGE

⚠ On receipt verify that the motor has not been damaged during transport and in this case avoid any installation and communicate immediately to the transport service.

Eyebolts, when provided with the motor, must be tightened properly as they are suitable only for lifting the motor, no additional loads are allowed to be attached. If necessary use sufficiently dimensioned devices as a means of transport.

Do not use any projection of the motor body to hang the motor for transport purposes.

If two eyebolts are present on the motor use both for lifting.

Store low voltage motors in a dry, dust free and low vibration (v eff <0.2 mm/s) area to prevent bearing damage. Before commissioning, the insulation resistance must be measured. In case of values < 1,5 MΩ the winding must be dried. Contact our technical department directly for information on the drying procedure.

3. INSTALLATION

⚠ Installation must comply with the rules of the standard IEC/EN 60079-14 or with the national standards (edition into effect).

Before the installation in an explosive atmosphere, the installer must ensure that the motor is suitable for the classified area in consideration of the different inflammable substances present in the installation area (**please verify the marking on the motor plate before installation**).

The motor must be installed only by qualified people with knowledge about electrical apparatus for explosive gas atmospheres and electrical installations in hazardous areas and has to be done with the motor and driven machine at standstill, electrically dead and locked against restart.

The rating on the nameplate corresponds to voltage and frequency of the power supply and all other electrical and mechanical data, as well as the safety data regarding the motor (protection type, temperature class, ambient temperature etc.).

WARNING: DO NOT OPEN IN PRESENCE OF EXPLOSIVE ATMOSPHERE

. The coupling components must also be balanced with a half key on a smooth mandrel. Coupling belts and pulleys must be assembled by suitable tools to protect the bearings.

After assembly check that the coupling components are well fixed on the shaft end; they must be properly pushed against the shaft shoulder. Where the hub of the coupling gear is shorter than the shaft end, compensate the difference by use of a bush spacer.

Too large or too small pulleys can impair the shaft bearing life; similarly excessive belt tension can cause low bearing life or shaft breakage.

The motors must be installed in a proper position so that cooling air can go in and out easily. The ventilation must not be hindered and the outgoing air - also from adjacent units - must not be directly sucked in again. To keep a good cooling of the motor, there must be a minimum distance of 40mm between the fan cover and another element capable to reduce the air aspiration of the ventilation. Avoid heat sources near the motor that might affect the temperatures both of cooling air and of the motor.

In case of outdoor installation protect the motor from solar radiation and extremes of weather. In case of vertical mounting with shaft down use fan cover with rain roof. It is advisable to protect the motor with such as overcurrent devices and torque limiters where it is not protected by winding temperature transducers connected to appropriate switchgear.

In case of environments with wide thermal excursions and when can be preview the presence of moisture, Orange1 EM will equip the motor with heaters.

Instead of use anti-condensation heaters, is possible to supply the motor on pins U1-V1 with a voltage 4-10% of the rated motor phase-voltage; 20-30% of the rated current is enough to heat the motor.

⚠ Check the direction of rotation with the motor not coupled fastening the shaft key to avoid its violent ejection during rotation.

If the direction of rotation is not as desired, disconnect the motor and wait until the motor is completely stopped:

- in case of three phase motors interchange two phases at the terminals.
- in case of single phase motors refer to the diagram supplied with the motor

Cable entries

⚠ Depending on the type of protection of the motor the cable entries shall comply with the standards written in the table and having the range of temperature of the motor itself:

Type of protection of the terminal box	Type of protection of the cable gland	Operative Temp.
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

The cable diameter for each size of cable gland are like below:

Cable gland thread	Motor size	Range of cable diameter (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20x1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25x1.5	132	12,5-20,5
M32x1.5	160-180	17-26

Cable glands and plugs if not supplied with the motor shall be like above.

The cable gland mounted on the terminal box shall be covered by a valid ATEX and IECEx certificate according to the type of protection of the terminal compartment (Ex db and or Ex eb and or Ex tb). It shall have a minimum protection degree IP66 according to EN/IEC 60529 and EN/IEC 60079-0; the operating temperature of the cable gland shall be included in the temperature range defined by the minimum ambient temperature reported on the Ex Label of the motor and the maximum ambient temperature + 25°C.

The cable glands shall be completely screwed to the motor with a tightening torque of 5Nm

- The field wiring shall be carried out using cables having an overall sheath operating temperature at least equal to the maximum ambient temperature of the motor +25°C and conductor insulation temperature at least equal to the maximum ambient temperature of the motor +35°C. Capacitor housing cable glands and motor wires cable glands inside Ex enclosures are factory installed. It is not allowed to unscrew or modify the factory installation.

As the feet can be mounted on the frame it is possible to fix them in 3 different positions so to have the possibility to have the terminal box on the top or on the right and left sides of the motor.

At the same time the terminal box can be mounted on the motor so to have the cable entries where it is necessary. So the cable entries can be in the four different positions. This operation has to be done before connection, removing the box cover, unscrewing the 4 screws that fix the box to the motor. Screw completely in respect of the tightening torque of TIGHTENING TORQUE TABLE

4. CONNECTION TO THE POWER SUPPLY

⚠ Only qualified people are allowed to connect the motor to the power supply. The connection to the electric supply must be done by through the cable entry supplied with the motor or through another type of cable entry certified in accordance with the European Standards showed above in compliance with Directive 2014/34/EU and IECEx approved.

In case of motor complete with cable, the free end of the cable should be connected in a safe zone or inside an Ex enclosure with a type of protection suitable for the explosive atmosphere.

⚠ Always refer to the data printed on the nameplate for voltage and frequency to ensure the motor is appropriate for the mains supply.

If not specified it is possible to assume tolerances of ±5% on voltage and ±1% on frequency indicated on the nameplate (X on the certificate number).

For motor with temperature class T3 and T4 is possible to have ±10% on voltage. The connection diagrams are normally supplied together with the motor or are printed in the terminal box. If they are missing please refer to this manual or contact directly to our technical office.

Check and make sure that, in the case of star /delta start, the switching from star to delta can only be executed after the starting current of the star step has fallen; this is important because of the risk of not allowed operational loads.

The cable size choice must be suitable to the motor ratings and the plant type.

The motors shall be protected by a tripping device, which in case of breakdown could cut off the power supply before the surface temperature exceeds the ignition temperature of the explosive atmosphere.

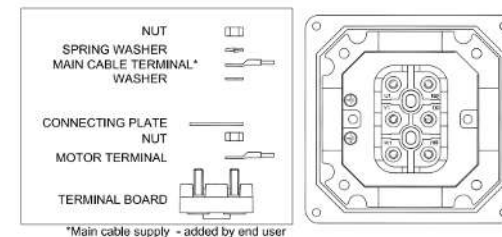
⚠ The motors with increased safety terminal box ("eb") are built with a special terminal board with improved insulation and distances.

⚠ The Ex d motors have a normal terminal board.

TIGHTENING TORQUE TABLE

Thread	M4	M5	M6	M8
Tightening Torque (Nm)	1,5	2	3	6

The power connection shall be made as in the picture. The nuts shall have to be tightened according to TIGHTENING TORQUE TABLE to avoid any loosening.



IMPORTANT: Motors with Ex eb terminal box REPLACE THE GASKET (SEAL) IN THE RIGHT POSITION BEFORE CLOSING THE TERMINAL BOX AND SCREW COMPLETELY ALL THE SCREWS.

Earth connection

⚠ In addition to the earth screw terminal fitted inside the terminal box, another external one must be on the motor frame. If the line conductors have a section S the earth connections have to be:

Earth conductor	Line conductors
= S	S ≤ 16 mm ²
16	16 mm ² < S ≤ 35 mm ²
≥ 0,5 S	S > 35 mm ²

Connection of auxiliary cables ("e" terminal box)

⚠ If the motor is provided with terminal board with auxiliary pins the connection of thermal protection and/or heaters can be made in such pins.

If the motor is provided with just a terminal board having just the 6 mains pins the connection of thermal protection and heaters have to be made by welding the wires of auxiliary devices with the wires of the cable and insulate using a heat-shrink sheath.

Protection

⚠ The motor must be protected by a tripping device that in case of breakdown, cut off the supply of the motor so that the surface temperature of the parts in contact with the explosive atmosphere doesn't reach the ignition temperature.

Motors for inverter duty

⚠ In case the motors are supplied by inverter, they shall be provided with protectors inside the windings (normally PTC thermistors), capable of assuring the respect of temperature class limits. Such devices shall be connected to a control device able to cut off power to the motor in case of reaching of the limit temperature. The permissible operating characteristics in this mode are stated on the nameplate or an additional label. Output filters must be installed based upon the length of the cable on the motor side of the VFD. Filter selection and the maximum cable length depend on the instructions and data provided by the VFD manufacturer. To prevent stray circulating currents, it is recommended to use appropriate measures on the power supply that allow to significantly reduce the triggering cause. For this purpose contact your local VFD supplier.

Heaters

⚠ The heaters shall be supplied only when the motor is not under power. The cables have to be adequate for a power of 25W with supply that can be from 110V up to 240V (±10%).

Permissible load

Assuming a life-span of 20.000h for 2P motors and 40.000h for 4,6,8P motors:

F_A ← Thrust F_R ↓ Pull $L/2$ L	Motor size	Bearing	*Max radial load in L/2	*Max axial load Thrust	*Max axial load Pull
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

* Values in [N]

Allowed duty services

S1: Continuous duty the motor works at a constant load until thermal equilibrium is reached.

S2: Intermittent duty: Once started, the motor works at a constant load for a limited period and thermal equilibrium is not reached. Motor will be started a second time then when its temperature has decreased to room temperature.

S3: Intermittent duty: A sequence of identical duty cycles, made up with a time of operation at constant load and a time at rest. When at rest, the motor is not fed. Starting current does not significantly influence temperature rise.

S9: Load and speed vary periodically within the permissible operating range. Frequent overloading may occur. Typical of motors supplied by inverter.

Motors with forced ventilation (IC416)

In case of motors with forced ventilation, the main motor can be supplied only when the auxiliary ventilation is already working.

5. MARKING

CE (*)		Marking of conformity to the European Directives
Ex (*)		Specific marking of explosion protection
II (*)		Motor for surface plants (different from mines)
2 (*)		Category 2: high level of protection
GAS	G (*)	explosive atmosphere due to presence of combustible gas vapour or mist
	Ex db	Flameproof motor and terminal box
	Ex dbeb	Flameproof motor, increased safety terminal box
	IIC	Gas group, suitable for IIB and IIA
	T3, T4, T5	Temperature class
DUST	D (*)	explosive atmosphere due to presence of combustible dust
	Ex tb IIC	tb enclosures suitable for zone 21 (cat. 2D)
	T125 °C	Max surface temperature
T.amb		Ambient temperature
AB xx yyy		AB : laboratory which issues the CE type certificate xx : year of issue of certificate yyy : number of CE type certificate
ZZZZ (*)		Notified Body that gives the Product Quality Assurance Notification
(*) Only for ATEX marking		

6. MAINTENANCE AND REPAIR

⚠ **⚠** **Ex** **MAINTENANCE** shall be performed only by qualified people in accordance with the standard IEC/EN 60079-17 or national standards (last edition). Qualified people must have knowledge about electrical apparatus for explosive atmospheres and electrical installations in hazardous areas.

- Every 3000 hours of service verify and restore, if necessary, the grease on the radial seals (for example V-rings).

Periodically (depending on the environment and duty) verify:

- motor cleanliness (oil, DUST, dirt and machining residuals absence) and free passage of cooling air
- correct tightening of electrical connections, of fastening screws
- free motor running with low vibration ($v_{eff} < 3,5 \text{ mm/s}$ for $P_n < 15 \text{ KW}$ $v_{eff} < 4,5 \text{ mm/s}$ for $P_n > 15 \text{ KW}$) and absence of anomalous noises; where there is high vibration and/or noise verify the motor fastenings, machine balancing and that the bearings are in good condition.
- The bearings must be inspected once per 3000h operation.

⚠ **Ex** **REPAIRS** shall be made in accordance with the rules as defined in EN 60079-19 standard. These repairs can only be done under the control and authorization of Orange1 EM or by certified repair workshop. When the repair is made by a certified repair workshop, they must respect all the original characteristic of the motor and use only original spare parts. Furthermore they have to place an additional nameplate on the motor with written a symbol to identify the **Repair**, company name and certification, repair operation number and date. Nothing regarding the type of protection can be modified. In case all these rules are not respected, the motor loses all its characteristic of certification.

FLAMEPROOF JOINTS CANNOT BE REPAIRED

7. MODULAR COMPONENTS

The motors are completely modular. Feet and flanges can be mounted without affecting the ATEX certificate, as they are external and are not part of the type of protection. In the table here below we show you the screws to be used to mount the different modular components.

Motor Size	Flange	Feet	Terminal box Cover
63-71	M5x16	M6x16	M5x14
80-90	M6x20	M6x20	M5x14
100	M8x20	M8x30 DADO M8	M5x14
112	M8x20	M8x35 NUT M8	M5x14
132	M10x20	M10x50 NUT M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + NUT M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + NUT M10	M6X20
Screws class 8.8			

8. MANUFACTURING DATE

The manufacturing date is shown on the motor nameplate indicating Month and year of manufacture: MM-YY



1. ALLGEMEINE SICHERHEITSHINWEISE

⚠ Diese Anleitung betrifft die Installation, den Betrieb und die Wartung der Motoren der O-M Serie zum Einsatz in explosionsgefährdeten Bereichen durch GAS und/oder STÄUBE.

Die Informationen zu dieser Anleitung sind nur für entsprechend qualifiziertes Personal bestimmt. Alle Eingriffe die über das Öffnen des Klemmkastens hinaus gehen, haben ein Erlöschen der Motorgarantie zur Folge! Nachfolgend die Motorkennzeichnungen, welche für die entsprechenden Zonen maßgeblich sind.

GAS	II 2G Ex db IIC T3 Gb T.amb –40°C , +60°C II 2G Ex db IIC T4 Gb T.amb –40°C , +60°C II 2G Ex db IIC T5 Gb T.amb –40°C , +40°C II 2G Ex db eb IIC T3 Gb T.amb –40°C , +60°C II 2G Ex db eb IIC T4 Gb T.amb –40°C , +60°C II 2G Ex db eb IIC T5 Gb T.amb –40°C , +40°C	Zones 1, 2
	II 2D Ex tb IIC T125°C T.amb –40°C , +60°C (maximale Dicke der Staubschicht 5mm)	Zones 21, 22
STAUB		

Für diese Motoren gelten die Gesundheit- und Sicherheitsbestimmungen für explosionsfähige Atmosphäre nach Europeanorm:

IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7,
IEC/EN60079-31

⚠ Elektrisch drehende Maschinen stellen durch Spannung, drehende Teile und evt. erhitzte Oberflächen eine Gefahr dar. Alle Arbeiten daran, einschließlich Transport, Anschluss, Inbetriebnahme und Wartung hat durch qualifiziertes Fachpersonal zu erfolgen (unter Beachtung der IEC 364). Unsachgemäße Arbeiten können zu ernststen Personen- und Sachschäden führen.

⚠ Die auf dem Leistungsschild vermerkten Daten müssen unbedingt beachtet werden. Niederspannungsmotoren sind Komponenten zum Einbau in Maschinen gemäß Bestimmung 2006/42/EC. Die Inbetriebnahme darf erst dann erfolgen, wenn die Konformität des Endprodukts mit diesen Bestimmungen sicher gestellt wurde. Diese Asynchronmotoren entsprechen der EMC Bestimmung(2014/30/UE) und bedürfen keiner besonderen Abschirmung beim Anschluss an eine reine Sinuswellen-Spannungsversorgung. Die gesamte Inbetriebnahme darf erst erfolgen, nachdem diese Bestimmungen für das komplette Endprodukt umgesetzt worden sind.

⚠ Vor Arbeiten an dem Motor vergewissern Sie sich, dass sich dieser nicht mehr dreht und auch die Stromversorgung abgestellt ist. (dies gilt auch für Zusatzeinrichtungen!). Jegliche Art von automatischem Start sowie automatischem Relais- oder ferngesteuertem Start der Anlage ist vorher zu überprüfen

und auszuschalten um einen versehentlichen Anlauf zu verhindern

2. TRANSPORT UND LAGERUNG

⚠ Nach Erhalt ist der Motor auf eventuelle Transportschäden zu untersuchen und gegebenenfalls der Spediteur davon zu unterrichten - der Motor darf dann auf keinen Fall eingebaut werden.

Wenn vorgesehen, müssen die Hebeösen sorgfältig am Motor befestigt werden und dürfen nur die Last des Motors tragen. Eine zusätzliche Belastung ist nicht gestattet und muss gegebenenfalls gesondert gesichert werden. Verwenden Sie zu Transportzwecken nie irgendwelche Vorsprünge des Motorgehäuses. Wurden zwei Hebeösen mitgeliefert sind diese auch zu benutzen.

Lagern Sie Niederspannungsmotoren in trockener, staub- und vibrationsfreier Umgebung (v eff<0,2mm/s) um Lagerschäden zu vermeiden. Vor Inbetriebnahme messen Sie den Isolationswiderstand. Bei Werten < 1,5 MΩ muss die Wicklung getrocknet werden. Setzen Sie sich direkt mit unserer Technikabteilung in Verbindung um Informationen über die Vorgehensweise zu erhalten.

3. INSTALLATION

⚠ Die Installation erfolgt gemäß den Bestimmungen nach EN 60079-14 oder nach nationalen Standards (neuester Stand). Vor dem Einbau in einen explosionsgefährdeten Bereich ist sicher zu stellen, dass der Motor auch für diesen Einsatz entsprechend der Klassifizierung der auftretenden Stoffe denen er ausgesetzt sein wird, ausgelegt ist (**prüfen Sie vor der Installation die Kennzeichnung auf dem Leistungsschild!**)

Der Einbau darf nur durch Fachpersonal mit fundierten Kenntnissen zu elektrischen Geräten in explosionsgefährdeten Bereichen und deren elektrischen Installation in diesem Bereich erfolgen. Hierbei ist der Motor / die Anlage außer Betrieb, die Stromversorgung abgeschaltet und ein versehentlicher Neustart ausgeschlossen. Alle Angaben auf dem Leistungsschild entsprechen der Spannung und Frequenz des Netzanschlusses und allen anderen darauf vermerkten elektrischen und mechanischen Daten, sowie den Sicherheitsangaben zum Motor (Schutzart, Temperaturklasse, Umgebungstemperatur etc.).

WARNUNG: NICHT ÖFFNEN BEI EXPLOSIONGEFÄHRDETEN

Die Anschlusssteile sind ebenso mit einer halben Passfeder auf einem glatten Dorn auszuwuchten. Antriebsriemen und Riemenscheiben werden mit einem geeigneten Werkzeug montiert um die Lager zu schützen. Nach dem Zusammenbau überprüfen Sie den festen Sitz der Bauteile. Sie müssen sorgfältig gegen die Wellenschulter geschoben werden. Ist die Kupplungsnahe kürzer als das Wellenende wird der Unterschied mit einem Zwischenstück ausgeglichen. Zu große oder zu kleine Riemenscheiben können die Lebensdauer der Wellenlager beeinträchtigen; desgleichen reduziert eine zu hohe Riemenspannung die Lebensdauer des Lagers oder verursacht einen Bruch der Welle. Der Motor wird so eingebaut, dass eine ungehinderte Luftzirkulation gewährleistet ist und die abgeführte Wärme, auch die benachbarter Geräte, nicht wieder als Kühlluft angesaugt wird. Zur Kühlung des Motors ist ein Mindestabstand von 40 mm von der Lüfterhaube zu anderen Teilen, welche den Luftstrom zum Lüfter beeinträchtigen könnten, einzuhalten. Vermeiden Sie Wärmequellen in der Nähe des Motors, welche sowohl den Motor als auch die zur Kühlung benötigte Luft erhitzen könnten.

Bei der Aufstellung im Freien ist der Motor vor direkter Sonneneinstrahlung und Wetterextremen zu schützen. Ist die Wicklung des Motors nicht mit einem an einer entsprechenden Schaltanlage angeschlossenen Temperaturmesswandler ausgestattet, ist es ratsam den

Motor gegen Überstrom und mit einen Drehmomentbegrenzer zu schützen.

Bei einer Umgebung mit starken Temperaturschwankungen oder hoher Luft-feuchtigkeit, kann Orange1 EM den Motor mit einer Stillstandheizung ausstatten. Dichtungen und Schrauben sind so ausgelegt, dass die IP Klassifizierung gewährleistet ist. Anstelle der Verwendung von Antikondensationsheizungen ist es möglich, den Motor an den Stiften U1-V1 mit einer Spannung von 4-10% der Nenn-Motorphasenspannung zu versorgen; 20-30% des Nennstroms reichen aus, um den Motor zu erwärmen.

⚠ Überprüfen Sie die Drehrichtung des Motors ohne montierte Wellenpassfeder um eine spätere Beschädigung zu vermeiden.

Sollte der Motor nicht die gewünschte Drehrichtung haben schalten Sie den Motor aus und warten bis zu dessen vollständigem Stillstand.

- Bei einem 3-ph Motor tauschen Sie 2 Phasen an der Klemme.
- bei einem 1-ph Motor folgen Sie dem mitgelieferten Diagramm

⚠ Kabeleingänge

Je nach Schutzart des Motors sollen die Kabeleingänge den in nachfolgender Tabelle festgelegten Normen und dem Temperaturbereich des Motors entsprechen.

Schutzart des Klemmkasten	Schutzart der Kabelverschraubung	Betriebstemp.
Ex eb tb	Ex eb tb	–40 °C , +100 °C
Ex db tb	Ex db tb	–40 °C , +100 °C

Der Kabeldurchmesser für jede Größe der Kabelverschraubung ist wie folgt:

Kabelverschraubung Gewinde	Motor Größe	Kabeldurchmesser (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12.5-20.5
M32X1.5	160-180	17-26

Kabelverschraubungen und Stecker, wenn sie nicht mit dem Motor geliefert werden, müssen wie oben ausgeführt sein. Die am Anschlusskasten montierte Kabelverschraubung muss gemäß der Schutzart des Anschlussraums (Ex db und/oder Ex eb und/oder Ex tb) durch ein gültiges ATEX- und IECEx-Zertifikat abgedeckt sein. Sie muss mindestens die Schutzart IP66 aufweisen nach EN/IEC 60529 und EN/IEC 60079-0 zertifiziert sein. Die Betriebstemperatur der Kabelverschraubung muss innerhalb des Temperaturbereiches liegen, der durch die auf dem Ex-Etikett des Motors angegebene minimale Umgebungstemperatur und die maximale Umgebungstemperatur + 25 °C definiert ist. **Die Kabelverschraubungen sind gut an den Motor festzuschrauben mit einem Anzugsdrehmoment von 5 Nm.**

- Die Feldverdrahtung muss mit Kabeln durchgeführt werden, deren Gesamtmantel-Betriebstemperatur mindestens gleich der maximalen Umgebungstemperatur des Motors +25 °C und die Leiterisolationstemperatur mindestens gleich der maximalen Umgebungstemperatur des Motors +35 °C sein. Kondensatorgehäuse-Kabelverschraubungen und Motorkabelverschraubungen in Ex-Gehäusen werden werkseitig installiert. Die werkseitige Installation darf nicht abgeschraubt oder verändert werden! Da die Füße am Motor Gehäuse montiert werden, ist es möglich, sie in 3 verschiedenen Positionen zu befestigen, um die Möglichkeit zu haben, den Klemmenkasten auf der Oberseite oder auf der rechten bzw. linken Seite des Motors anzubringen. Gleichzeitig kann der Klemmenkasten am Motor unterschiedlich ausgerichtet werden, um die Kabeleinführungen dort zu haben, wo es notwendig ist. So

können die Kabeleinführungen in den vier verschiedenen Richtungen positioniert werden. Dieser Vorgang muss vor dem Anschluss durchgeführt werden, indem der Klemmkastendeckel entfernt wird und die 4 Schrauben gelöst werden, mit denen der Kasten am Motor befestigt ist. Schrauben Sie vollständig unter Beachtung des Anzugsdrehmoments der ANZUGSMOMENT-TABELLE diese wieder fest.

4. ANSCHLUSS AN DIE STROMVERSORGUNG

Der Motor darf nur von Fachpersonal an die Stromversorgung angeschlossen werden.

Der Anschluss an die Stromversorgung erfolgt über den mitgelieferten Kabeleingang oder einen entsprechenden Eingang nach o.g. Liste, gemäß den Richtlinien zu 2014/34/EU.

Wird der Motor mit Kabel geliefert, erfolgt der Anschluss in einem sichern Bereich oder in einem extra dafür ausgelegtem explosionsgeschützten Gehäuse.

⚠ Prüfen Sie immer die Daten zur Spannung und Frequenz um sicher zu stellen, dass der Motor auch wirklich für diese Stromversorgung ausgelegt ist. Wenn nicht anders angegeben, ist eine Toleranz von ±5% bei der Spannung und ± 1 % bei der Frequenz zu den gestempelten Daten zulässig (das X auf der Zertifikatsnummer). Bei Motoren der Temperaturklassen T3 und T4 ist eine Spannungsabweichung von ±10 % möglich. Die Anschlussdiagramme werden entweder zusammen mit dem Motor geliefert oder sind im Klemmkasten aufgedruckt. Sollten diese doch einmal fehlen, folgen Sie dem Diagramm in diesem Handbuch oder wenden sich an unsere Technikabteilung.

Überprüfen und stellen Sie sicher, dass bei einer Stern/Dreieckschaltung der Wechsel von Stern zu Dreieck nur dann stattfinden kann, nachdem der Anlaufstrom der Sternschaltung gefallen ist. Dies ist notwendig um eine nicht zulässige Betriebslast zu vermeiden.

Die Auswahl der Kabelstärke erfolgt nach den Vorgaben von Motor und Anlage.

Die Motoren müssen mit einem Auslöser geschützt werden, damit im Falle einer Störung die Stromzufuhr unterbrochen wird, bevor die Oberflächentemperatur die zulässige Entzündungstemperatur innerhalb der explosionsgeschützten Umgebung überschreitet

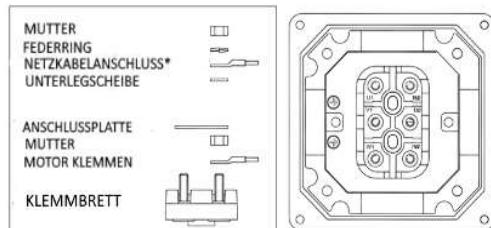
⚠ Die Ex e Motoren – erhöhte Sicherheit verfügen über spezielle Klemmkästen mit besserer Isolation und Zwischenräumen.

⚠ Die Ex d Motoren haben ein normales Klemmenbrett. Der Stromanschluss erfolgt nach Anschlussplan. Die Muttern sind entsprechend fest anzuziehen um ein Lockern auszuschließen.

ANZUGSMOMENTTABELLE

Gewinde	M4	M5	M6	M8
Anzugsmoment (Nm)	1,5	2	3	6

Der Stromanschluss erfolgt wie auf dem Bild. Die Muttern müssen gemäß der ANZUGSMOMENTTABELLE angezogen werden, um ein Lockern zu verhindern.



*Vom Benutzer hinzugefügtes Netzkabel

WICHTIG: Motoren mit Klemmkasten Ex eb: Achten Sie auf den korrekten Sitz der Dichtung am Klemmkasten und ziehen Sie sorgfältig sämtliche Schrauben an.

Erdung

⚠ Zusätzlich zum Schutzleiteranschluss innerhalb des Klemmkastens muss ein entsprechender weiterer Erdungsanschluss außen am Motorgehäuse angebracht werden.

Bei einem Schnitt S bei der Schleifleitung ist das Erdungskabel wie folgt auszuführen:

Schutzleitung	Schleifleitung
$\approx S$	$S \leq 16 \text{ mm}^2$
16	$16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$
$\geq 0,5 S$	$S > 35 \text{ mm}^2$

Anschluss zusätzlicher Kabel (Exe Klemmkasten):

⚠ Besitzt der Motor zusätzliche Kontakte auf dem Klemmbrett, kann dort ein Thermoschutz und/oder eine Stillstandheizung angeschlossen werden.

Sollte das Klemmbrett nur über 6 Kontakte verfügen, erfolgt der Anschluss des Thermoschutzes und der Stillstandheizung indem man deren Drähte mit den Kabeldrähten verlötet und einer geschrumpften Schlauchhülle isoliert.

Thermoschutz

⚠ Die Motoren müssen mit einem Auslöser geschützt werden, damit im Falle einer Störung die Stromzufuhr unterbrochen wird. Dadurch wird verhindert, dass die Flächen innerhalb der explosionsgefährdeten Umgebung die zulässige Oberflächentemperatur nicht erreicht.

Motoren für Umrichterbetrieb.

⚠ Wird der Motor mit einem Umrichter (VFD) betrieben ist die Wicklung mit PTCs auszustatten um die angegebene Temperaturklasse zu gewährleisten. Diese Wärmeschalter sind an eine entsprechende Kontrollschaltung anzuschließen um den Motor bei Erreichung des Temperaturlimits abzuschalten.

Die zulässigen Betriebseigenschaften in diesem Modus sind auf dem Typenschild oder einem zusätzlichen Aufkleber angegeben. Ausgangsfilter müssen basierend auf der Länge des Kabels auf der Motorseite des VFD installiert werden. Die Filterauswahl und die maximale Kabellänge hängen von den Anweisungen und Daten des VFD-Herstellers ab. Um umlaufende Ströme / Peaks zu vermeiden, wird empfohlen, geeignete Maßnahmen an der Stromversorgung zu treffen, die es ermöglichen, die Auslöseursache deutlich zu reduzieren. Wenden Sie sich zu diesem Zweck an Ihren VFD-Händler vor Ort.

Stillstandheizung

⚠ Diese Heizung ist nur bei ausgeschaltetem Motor in Betrieb.

Zulässige Belastung:

Bei einer angenommenen Lebenszeit von 20.000 h bei 2-Pol Motoren und 40.000 für 4,6,8-Pol Motoren.

	BG	Lager	*Max radial Last in L/2	*Max axial Last Schub	*Max axial Last Druck
$F_A \rightarrow \text{Druck}$	63	6202	365	230	120
$F_B \rightarrow X$	71	6202	450	280	160
$L/2$	80	6204	590	370	220
$\leftarrow F_A \text{ Zug}$	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

*Maßeinheit IN [N]

Erlaubte Zolldienste

S1: Dauerbetrieb Der Motor arbeitet mit konstanter Last, bis das thermische Gleichgewicht erreicht ist.

S2: Aussetzbetrieb: Nach dem Start arbeitet der Motor für eine begrenzte Zeit mit konstanter Last und das thermische Gleichgewicht wird nicht erreicht. Der Motor wird dann ein zweites Mal gestartet, wenn seine Temperatur auf Raumtemperatur abgesunken ist.

S3: Aussetzbetrieb: Eine Abfolge identischer Lastspiele, die sich aus einer Betriebszeit bei konstanter Belastung und einer Ruhezeit zusammensetzt. Im Ruhezustand wird der Motor nicht gespeist. Der Anlaufstrom hat keinen wesentlichen Einfluss auf den Temperaturanstieg.

S9: Last und Drehzahl ändern sich periodisch innerhalb des zulässigen Betriebsbereichs. Es kann zu häufigen Überlastungen kommen. Typisch für Motoren, die vom Umrichter versorgt werden.

Servolüftete Motoren (IC416)

Bei Motoren mit Fremdbelüftung (IC416) muss der Hauptmotor nur bei Betrieb der Zusatzlüftung eingeschaltet sein.

5. KENNZEICHNUNGEN

CE (*)		Konformität zu Europäischen Direktiven
Ex (*)		Kennzeichen für Explosionsschutz
II (*)		Motor für oberirdische Anlagen (kein Bergbau)
2 (*)		Kategorie 2: hoher Schutzgrad
Gas	G (*)	Explosionsfähige Atmosphäre durch Dampf oder Nebel
	Ex db	Explosionsschutz. Motor und Klemmkasten
	Ex dbeb	Explosionsschutz. Motor und Klemmkasten, erhöhte Sicherheit
	IIC	Gasgruppe, auch geeignet für IIB und IIA
	T3, T4, T5	Temperaturklasse
Staub	D (*)	Explosionsfähige Atmosphäre durch brennbare Stäube
	Ex tb IIC	Gehäuse tD Verfahren A für Zone 21 (Kat. 2D)
	T125°C	maximale Oberflächentemperatur
T.amb		Umgebungstemperaturbereich
AB xx ATEX yyy		AB : Zertifizierungsstelle für CE Type xx : Jahr der Zertifizierung yyy : Zertifizierungsnummer
ZZZZ (*)		Prüfstelle für Baumusterprüfbescheinigung
		(*) Nur für ATEX-Kennzeichnung

6. WARTUNG UND REPARATUR

⚠ **WARTUNG:** Darf nur von entsprechend qualifiziertem Personal unter Beachtung der aktuellen europäischen Standards und IEC/EN 60079-17 Bestimmungen ausgeführt werden. Dieses Personal muss über spezielles Wissen für die Installation elektrischer Betriebsmittel in explosionsgefährdeter Umgebung verfügen.

- Alle 3000 Betriebsstunden ist das Fett an den radialen Dichtungen (V-Ringe) zu überprüfen und gegebenenfalls nachzuschmieren.

Je nach Einsatz und Umgebung sind regelmäßig folgende Wartungen auszuführen:

- Motor säubern (von STAUB, ÖL und Maschinenablagerungen) und die Durchgänge zur Kühlung freihalten

- korrekten Sitz der elektrischen Anschlüsse und aller Befestigungen prüfen.

- auf einen freien, vibrationsarmen Motorlauf

(v eff < 3,5 mm/s für Pn < 15 kW)

(v eff < 4,5 mm/s für Pn > 15 kW)

überprüfen und auf außergewöhnliche Laufgeräusche achten.

Sollten o.g. Probleme auftreten, sind die Motorbefestigungen, die Maschinenwucht oder der Zustand der Lager zu kontrollieren.

⚠ **REPARATUREN:** sind gemäß den Bestimmungen nach IEC/EN 60079-19 Standards durchzuführen.

Diese Reparaturen können nur unter der Kontrolle und mit der Genehmigung von Orange1 EM oder einer entsprechend zertifizierten Werkstatt ausgeführt werden.

Wird die Reparatur von einer solchen Werkstatt ausgeführt, hat diese alle ursprünglichen Eigenschaften des Motors zu beachten. Es dürfen nur originale Ersatzteile verwendet werden. Darüber hinaus ist ein zusätzliches Schild am Motor anzubringen, welches das Reparatursymbol **R** aufweist, sowie den Firmennamen, und deren Zertifizierung, die Reparatur-Vorgangsnummer und das Datum.

An der Schutzart dürfen keine Veränderungen vorgenommen werden!

Sollten diese Vorschriften nicht eingehalten werden, verliert der Motor sämtliche Zertifizierungskriterien.

VERBINDUNGEN KÖNNEN NICHT REPARIERT WERDEN

7. MODULARE KOMponenten

Diese Motoren sind komplett modular, das heißt Füße und Flansche können vom Kunden selbst montiert werden ohne dabei gegen das ATEX Zertifikat zu verstoßen, da es sich hier um außen liegende Teile handelt, welche nicht die Schutzart betreffen. Nachfolgende Tabelle zeigt die zu verwendenden Schraubengrößen um die verschiedenen Teile zu befestigen.

BG	Flansche	Füße	Klemmkasten-deckel
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 NUSS M8	M5x14
112	M8x20	M8x35 NUSS M8	M5x14
132	M10x20	M10x50 NUSS M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + NUSS M10	M6x20
180	n.3 M10x95 n.1 M10x70	M10x70 + NUSS M10	M6x20
Schraubengüte 8.8			

8. HERSTELLUNGSDATUM

Das Herstellungsdatum ist auf dem Typenschild des Motors angegeben

Angabe von Herstellungsmonat und -jahr: MM-JJ



1. INFORMACIÓN DE SEGURIDAD GENERAL

⚠ Estas instrucciones de seguridad se refieren a la instalación, utilización y mantenimiento de los motores de la serie OM para ser utilizado en zonas con peligro de explosión con presencia de gas y / o polvo combustible. La información de estas instrucciones son sólo para personal cualificado. A excepción de la apertura de la tapa del terminal, cualquier otra apertura anula las condiciones de garantía de los motores.

A continuación se pueden ver los diferentes marcados de los motores y las diferentes zonas en las que se pueden utilizar:

GAS	II 2G Ex db IIC T3 Gb	T.amb -40°C , +60°C	Zones 1, 2
	II 2G Ex db IIC T4 Gb	T.amb -40°C , +60°C	
	II 2G Ex db IIC T5 Gb	T.amb -40°C , +40°C	
	II 2G Ex db eb IIC T3 Gb	T.amb -40°C , +60°C	
	II 2G Ex db eb IIC T4 Gb	T.amb -40°C , +60°C	
	II 2G Ex db eb IIC T5 Gb	T.amb -40°C , +40°C	
POLVO	II 2D Ex tb IIIC T125°C	T.amb -40°C , +60°C	Zones 21, 22
	(espesor máximo de la capa de polvo de 5 mm)		

Los motores cumplen con los requisitos de seguridad para atmósferas potencialmente explosivas proporcionadas por las normas europeas:

IEC/EN 60079-0, EN 60079-1, EN 60079-7, EN60079-31

⚠ Las máquinas rotativas eléctricas pueden presentar un peligro por abrasión debido a las altas temperaturas de su superficie así como un peligro físico debido a las partes móviles. Todos los trabajos en las mismas, incluyendo el transporte, conexión, puesta en servicio y mantenimiento, deben realizarse por personal cualificado (Acorde con el IEC 364). Una manipulación inadecuada puede conducir a graves daños a personas y/o equipos.

⚠ Es imprescindible revisar y comprobar los datos impresos en la placa de identificación antes de hacer funcionar el motor. Los motores de baja tensión cumplen con la Directiva 2006/42/EC. La puesta en marcha no está permitida hasta conformidad del producto final con dicha directiva. Los motores asíncronos cumplen la Directiva EMC(2014/30/UE) por lo que no es necesaria ninguna protección especial en caso de conectarse a una fuente de tensión sinusoidal pura.

⚠ Antes de trabajar en el motor, asegúrese de que se ha detenido y está desconectado de la fuente de alimentación (incluyendo equipos auxiliares). Si hay instalado cualquier forma de arranque automático, relés o arranque remoto, evite toda posibilidad de arranque inesperado, prestando atención a las recomendaciones específicas sobre la aplicación del equipo.

2. TRANSPORTE, ALMACENAMIENTO

⚠ A la recepción ,verifique que el motor no ha sido dañado durante el transporte. En caso de daños en el motor debe evitarse la instalación y debe comunicarse la incidencia de inmediato al servicio de transporte. Los cáncamos, deben estar bien apretados al suministrarse del motor, ya que sirven para elevar el mismo, y no debe haber cargas adicionales en el momento de la fijación. Utilice si es necesario dispositivos que ayuden a su transporte. No utilice otras partes del motor que no sean los cáncamos para colgarlo con la finalidad de transportarlo. En caso de que hayan 2 cáncamos, use ambos para un transporte óptimo. Almacene los motores en un lugar seco, libre de polvo y sin vibraciones (v eff <0.2 mm / s) para evitar daños en los rodamientos. Antes de la puesta en marcha, se debe comprobar la resistencia de aislamiento. En caso de que la resistencia dé valores de <1,5 MΩ el bobinado debe secarse. Póngase en contacto con nuestro departamento técnico directamente para obtener información sobre el procedimiento de secado.

3. INSTALACIÓN

⚠ La instalación del motor debe cumplir con la norma EN 60079-14 o bien las normas nacionales en vigor donde vaya a ser instalado. Antes de la instalación en un entorno explosivo, el instalador debe asegurarse de que el motor es el adecuado para el área clasificada teniendo en consideración las diferentes sustancias inflamables presentes en el área de la instalación (por favor, compruebe la placa de características antes de la instalación). El motor debe ser instalado exclusivamente por personal cualificado con conocimientos sobre aparatos eléctricos para atmósferas de gas explosivas e instalaciones eléctricas en áreas peligrosas y tiene que hacerse con el motor y la máquina accionada parada, desconectada y protegida contra re-arranque.

El marcado de la placa de características se corresponde al voltaje y frecuencia de la fuente de alimentación y todos los demás datos eléctricos y mecánicos, así como los datos de seguridad en relación con el motor (tipo de protección, clase de temperatura, temperatura ambiente, etc).

ADVERTENCIA: NO ABRIR EN PRESENCIA DE ATMÓSFERA EXPLOSIVA

Los componentes de acoplamiento deben ser también equilibrados con una media chaveta en una superficie completamente plana. Las correas y poleas de acoplamiento deben ser montadas con las herramientas adecuadas para proteger los cojinetes. Después del montaje compruebe que los enganches están bien fijados en el extremo del eje; deben estar debidamente sujetos al mismo. Cuando el engranaje de la rueda dentada de acoplamiento es más corto que el extremo del eje, se debe compensar la diferencia mediante el uso de un casquillo distanciador. Poleas demasiado grandes o demasiado pequeñas pueden perjudicar la vida de los rodamientos y del eje; Tener una tensión excesiva en la correa puede acortar la vida del rodamiento e incluso puede provocar la rotura del eje. Los motores deben instalarse en una posición adecuada para que el aire de refrigeración pueda entrar y salir fácilmente. La ventilación no debe obstaculizarse y el aire de salida - también de agregados - no puede ser insertarse directamente de nuevo. Para mantener una buena refrigeración del motor, debe haber una distancia mínima de 40 mm entre la tapa del ventilador y cualquier elemento capaz de reducir la aspiración de aire de la ventilación. Evitar fuentes de calor cerca del motor que podrían afectar a las temperaturas del aire de enfriamiento y del motor. En caso de instalación al aire libre proteger el motor de la radiación solar y las inclemencias del tiempo. En caso de montaje vertical con el eje hacia abajo, utilice la tapa del

ventilador con protector de lluvia (sombbrero). Es aconsejable proteger el motor con dispositivos contra sobretensión como limitadores de par allá donde no hayan protecciones térmicas o interruptores de protección. En caso de ambientes con constantes cambios ambientales o con previsión de presencia de humedad, Orange1 EM equipará el motor con resistencias de caldeo. En lugar de usar resistencias de caldeo, es posible suministrar el motor a los pines U1-V1 con un voltaje del 4-10% del voltaje nominal de fase del motor; 20-30% de la corriente nominal es suficiente para calentar el motor.

⚠ Compruebe el sentido de giro con el motor no acoplado, sujetando el eje para evitar una expulsión violenta durante la rotación. Si el sentido de giro no es el deseado, desconecte el motor y espere hasta que el motor se detenga por completo: - en caso de motores trifásicos debe intercambiar dos fases en los terminales. - en caso de motores monofásicos consulte el diagrama suministrado con el motor.

Entrada de cable

⚠ Dependiendo del tipo de protección del motor, las entradas de los cables deberán cumplir con las normas escritas en la siguiente tabla y con el mismo rango de temperatura del motor:

Tipo de protección de la tapa del terminal	Tipo de protección de Prensaestopas	Temperatura de funcionamiento
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

El diámetro del cable para cada tamaño de prensaestopas es el siguiente:

Prensaestopas hilo	Tamaño del Motor	Diámetro del cable (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12,5-20,5
M32X1.5	160-180	17-26

Los prensaestopas y los tapones, si no se suministran con el motor, deben ser como se indica arriba. El prensaestopas montado en la caja de bornes deberá estar cubierto por un certificado ATEX e IECEx válido según el tipo de protección de la caja de bornes (Ex db y/o Ex eb y/o Ex tb), deberá tener un grado de protección mínimo IP66 según normativa EN/IEC 60529 y EN/IEC 60079-0; la temperatura de funcionamiento del prensaestopas debe estar incluida en el rango de temperatura definido por la temperatura ambiente mínima indicada en la etiqueta Ex del motor y la temperatura ambiente máxima + 25 °C.

Los prensaestopas se atornillarán completamente al motor con un par de apriete de 5Nm

El cableado debe realizarse con cables que tengan una temperatura de funcionamiento de la cubierta al menos igual a la temperatura ambiente máxima del motor +25 °C y una temperatura de aislamiento del conductor al menos igual a la temperatura ambiente máxima del motor +35 °C . Los prensaestopas del cable de la carcasa del condensador y los prensaestopas de los cables del motor dentro de la carcasa Ex se instalan en fábrica. No está permitido desatornillar ni modificar la instalación de fábrica. Como las patas son desmontables es posible fijarlas en 3 posiciones diferentes para tener la posibilidad de tener la caja de bornes en la parte superior o en los lados derecho e izquierdo del motor. Al mismo tiempo la caja de bornes se puede montar directamente en el motor para tener las entradas de cables que sea necesario. Así que las entradas de los cables pueden estar en las cuatro posiciones diferentes. Esta operación se tiene que hacer antes de la conexión. Para quitar la cubierta de la caja de bornes, debe desatornillarse

los 4 tornillos que fijan la caja al motor y para colocarla de nuevo se debe enroscar por completo teniendo en cuenta el par de apriete (ver la tabla de los pares de apriete). Atornillar completamente respetando el par de apriete de la TABLA DE PARES DE APRIETE

4.CONEXIÓN A LA RED ELÉCTRICA

⚠ La conexión a la red eléctrica debe hacerse sólo por personal debidamente cualificado por medio de la entrada del cable suministrado con el motor o bien por medio de otro tipo de entrada de cables certificada, de conformidad con las normas europeas mostradas anteriormente en cumplimiento con la Directiva 2014/34/EU. En caso de motor con cable ya instalado, el extremo libre del cable debe estar conectado en una zona de seguridad o en el interior de un recinto, con un tipo de protección adecuado para el ambiente explosivo. Consulte siempre los datos de tensión y frecuencia impresos en la placa para asegurar que el motor esta adecuado a la alimentación de red. Si no se especifica, se puede suponer una tolerancia de $\pm 5\%$ de la tensión y de $\pm 1\%$ en la frecuencia indicada en la placa de características (X en el número de certificado). Para motores con clase de temperatura T3 y T4 es posible tener $\pm 10\%$ en el voltaje. Los diagramas de conexión se suministran normalmente junto con el motor o se imprimen en la caja de bornes. Si faltan, por favor consulte este manual o póngase en contacto directamente con nuestra oficina técnica. Compruebe y asegúrese de que, en el caso de arranque estrella / triángulo, el paso de estrella a triángulo solo puede ser ejecutado después de que el paso del arranque estrella haya finalizado; este punto importante ya que puede haber un riesgo de cargas no permitidas.

El tamaño de cable debe ser adecuado a las características del motor y del tipo de planta. Los motores deberán estar protegidos por un dispositivo de disparo, que en caso de avería debe cortar el suministro de energía antes de que la temperatura de la superficie sea superior a la temperatura de ignición de la atmósfera explosiva.

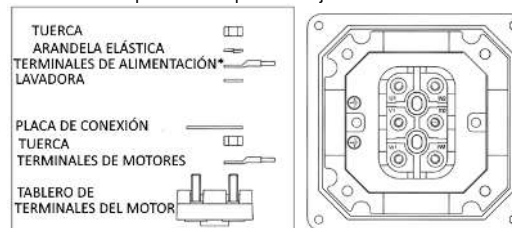
⚠ Los motores con caja de bornes de seguridad aumentada ("eb") se fabrican con una tarjeta de terminales especial y con un mejor aislamiento y mayor distancia.

⚠ Los motores Ex d tienen una tarjeta de terminales estándar. La conexión de alimentación se hará como en la imagen. Las tuercas tendrán que apretarse lo suficiente para evitar un afloje futuro.

TABLA DE PARES DE APRIETE

Rosca	M4	M5	M6	M8
Par de apriete (Nm)	1,5	2	3	6

La conexión de alimentación se realizará como en la imagen. Las tuercas deberán apretarse según la TABLA DE PARES DE APRIETE para evitar que se aflojen.



*Cable de motor - agregado por el instalador

IMPORTANTE: Motores con caja de bornes Ex eb, SÍTUE LA JUNTA (SEAL) EN LA POSICIÓN CORRECTA ANTES

DE CERRAR LA CAJA DE BORNES Y DESTORNILLAR TOTALMENTE TODOS LOS TORNILLOS. CONEXIÓN A TIERRA

Además del tornillo de la terminal de tierra instalado en el interior de la caja de bornes, debe haber otro terminal externo en la carcasa del motor. Si los conductores de la línea tienen una sección S las conexiones a tierra tiene que ser::

Conductor de tierra	Conductores de línea
= S	S ≤ 16 mm²
16	16 mm² < S ≤ 35 mm²
≥ 0,5 S	S > 35 mm²

Conexión de cables auxiliares (Caja de terminales “e”)

Si el motor está provisto de caja de bornes auxiliares, la conexión de protecciones térmicas y / o resistencias de caldeo se puede hacer en las mismas borneras. Si el motor está provisto de una caja de bornes que tiene sólo las 6 principales borneras, la conexión de la protección térmica y calentadores, tiene que ser realizada mediante soldadura de los alambres de los dispositivos auxiliares con los hilos del cable, y aislar usando una funda termorretráctil.

Protección

El motor debe estar protegido por un dispositivo de disparo que, en caso de avería, corte la alimentación del motor de manera que la temperatura de la superficie de las partes en contacto con la atmósfera explosiva no alcance la temperatura de ignición.

Acondicionamiento para convertidor

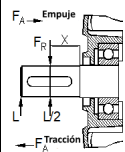
En caso de que los motores vayan a trabajar con convertidor de frecuencia (VFD) , deberán estar provistos de protectores en los bobinados (normalmente termistores PTC), capaces de asegurar su funcionamiento dentro de los límites de las clases de temperatura. Dichos dispositivos deberán estar conectados a un dispositivo de control capaz de cortar el suministro de energía al motor en caso de llegar de la temperatura límite. Las características de funcionamiento admisibles en este modo se indican en la placa de características o en una etiqueta adicional. Los filtros de salida deben instalarse según la longitud del cable en el lado del motor del VFD. La selección del filtro y la longitud máxima del cable dependen de las instrucciones y los datos proporcionados por el fabricante del VFD. Para evitar corrientes de circulación parásitas, se recomienda utilizar medidas adecuadas en la fuente de alimentación que permitan reducir significativamente la causa de activación. Para ello, póngase en contacto con su proveedor local de VFD.

Resistencias de caldeo

Las resistencias de caldeo funcionan únicamente cuando el motor está en marcha o conectado a la red.

Carga permitida

Suponiendo una vida útil de 20.000h para motores 2P y 40.000h para motores 4,6,8 P:

	Tamaño del Motor	Rodamientos	*Max radial carga in L/2	*Max axial carga (Empuje)	*Max axial Carga (tracción)
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

*unidad de medida in [N]

Servicios permitidos

S1: trabajo continuo, el motor funciona a una carga constante hasta que se alcanza el equilibrio térmico.
S2: Servicio intermitente: una vez encendido, el motor trabaja a una carga constante durante un período limitado y no se alcanza el equilibrio térmico. El motor se iniciará una segunda vez, luego cuando su temperatura haya disminuido a temperatura ambiente.
S3: servicio intermitente: secuencia de ciclos de trabajo idénticos, compuesta por un tiempo de funcionamiento a carga constante y un tiempo de reposo. Cuando está en reposo, el motor no se alimenta. La corriente de arranque no influye significativamente en el aumento de la temperatura.
S9: la carga y la velocidad varían periódicamente dentro del rango de funcionamiento permitido. Sobrecarga frecuente puede ocurrir. Típico de los motores suministrados por el inversor (ver arriba).

Motores con ventilación forzada (IC416)

En el caso de motores con ventilación forzada, el motor principal solo se puede suministrar cuando la ventilación auxiliar ya está funcionando.

5. MARCADO

CE (*)		Marcado de conformidad con las directivas Europeas
Ex (*)		Marcado específico de protección contra explosiones
II (*)		Motor para plantas en superficie (no para minas)
2 (*)		Categoría 2: Alto nivel de protección
GAS	G (+)	Atmosfera explosiva, por la presencia de vapor de gas combustible o vaho
	Ex db	Motor y caja de bornes antideflagrante
	Ex dbeb	Motor y caja de bornes antideflagrante de seguridad aumentada.
	IIC	Grupo gas, incluye las zonas IIB and IIA
	T3, T4, T5	Clase de temperatura
DUST	D (*)	Atmosfera explosiva, debido a la presencia de polvo combustible
	Ex tb IIC	Aptos para zona 21 (cat. 2D)
	T125°C	Max temperatura superficial
T.amb		Temperatura ambiente
AB xx ATEX yyy		AB : laboratorio que emite certificado de tipo CE xx : año de expedición del certificado yyy : numero de tipo de certificado CE
zzzz (*)		Organismo certificador, que notifica la garantía de calidad producto.
(*) Solo para marcado ATEX		

6. MANTENIMIENTO Y REPARACIÓN

EL MANTENIMIENTO debe ser realizado únicamente por personal cualificado de acuerdo con la norma EN 60079-17 o bien las normas nacionales donde esté instalado el motor. El personal cualificado deben tener conocimiento sobre aparatos eléctricos en atmósferas explosivas e instalaciones eléctricas en áreas peligrosas.
- Cada 3000 horas de servicio verificar y restablecer, si es necesario, la grasa en las juntas radiales (por ejemplo, los anillos en V). Periódicamente (en función del entorno y el deber) verificar:
- Limpieza del motor (aceite, polvo, suciedad y residuos) y el libre paso de aire de refrigeración
- El correcto ajuste de los tornillos de fijación de las conexiones eléctricas.
- Niveles de vibración admitidos (v ef <3,5 mm / s para Pn <15KW v ef <4,5 mm / s para Pn> 15KW) y ausencia de ruidos anómalos; en caso un alto nivel de vibraciones y / o ruido

verificar la fijaciones de motor y que el equilibrio de la máquina y los rodamientos estén en buenas condiciones.

Ex LAS REPARACIONES se harán de acuerdo con las normas definidas en el estándar EN 60079-19..

Estas reparaciones sólo pueden realizarse bajo el control y autorización de Orange1 EM o bien en un taller de reparaciones certificado. Cuando la reparación se realice en un taller de reparaciones certificado, deben respetarse todas las características originales del motor y utilizar sólo recambios originales. Además se debe colocar una placa de identificación adicional en el motor con el símbolo escrito para identificar la reparación. Debe mostrarse en dicha placa el nombre de la empresa, certificación, número de operación de reparación y fecha. No puede modificarse nada en relación con el tipo de protección. En caso de que no se respeten estas normas, el motor pierde toda su característica de certificación.

LAS JUNTAS NO SE PUEDEN REPARAR

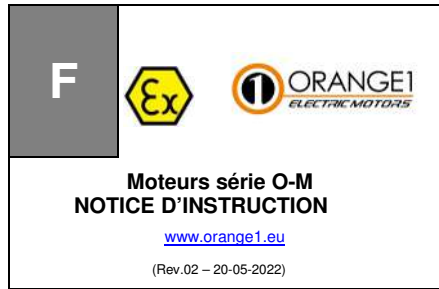
7. COMPONENTES MODULARES

Los motores son completamente modulares. Las patas y las bridas pueden montarse sin afectar el certificado ATEX, ya que son externos y no son parte del tipo de protección. En la tabla de a continuación te mostramos los tornillos que deben utilizarse para montar los diferentes componentes modulares.

Tamaño del Motor	Bridas	Pies/Patas	Cubierta caja de terminales
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 TUERCA M8	M5x14
112	M8x20	M8x35 TUERCA M8	M5x14
132	M10x20	M10X50 TUERCA M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Calidad de tornillo 8.8			

8. FECHA DE PRODUCCIÓN

La fecha de producción se muestra en la placa del motor indicando Mes y Año de fabricación: MM-AA



1. GENERALITES

⚠ Ces instructions de sécurité se réfèrent à l'installation, l'utilisation, le transport et à la maintenance des moteurs série O-M pour une utilisation dans les atmosphères potentiellement explosives en présence de gaz et / ou de poussières. Les informations de ces instructions sont uniquement destinées à du personnel qualifié. Les instructions sont généralement délivrées à un personnel qualifié, en responsabilité d'utiliser des machines dans les atmosphères potentiellement explosives. A l'exception de l'ouverture du couvercle de la boîte à bornes, toute ouverture d'un autre élément, annule les conditions de garantie concernant ces moteurs. Ci-dessous sont listés les différents marquages des moteurs ainsi que les zones dans lesquelles ils peuvent être utilisés.

GAZ	II 2G Ex db IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db IIC T5 Gb T.amb -40°C , +40°C II 2G Ex db eb IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T5 Gb T.amb -40°C , +40°C	Zones 1, 2
POUSSIÈRES	II 2D Ex tb IIIC T125°C T.amb -40°C , +60°C (épaisseur maximale de la couche de poussière 5mm)	Zones 21, 22

Ces moteurs sont conformes aux Exigences Essentielles de sécurité et de santé pour les atmosphères potentiellement explosives selon les normes européennes :

IEC/EN 60079-0, EC/EN 60079-1, IEC/EN 60079-7, IEC/EN60079-31

⚠ Les machines tournantes représentent un danger lorsqu'elles sont en rotation et peuvent provoquer également des brûlures en raison de la température très élevée de la surface extérieure. Toute intervention sur ces moteurs tels que branchement, connexion, maintenance, mise en service, ne peuvent être effectués que par des personnes qualifiées (IEC 364 doit être appliquée). Un travail mal réalisé peut provoquer des dommages aux personnes et aux biens environnants.

⚠ Il est impératif avant de branchement de lire avec précaution la plaque signalétique fixée sur le moteur. Les moteurs basse tension sont des composants devant être incorporés à des machines selon la directive 2006/42/EC. La mise en service n'est pas autorisée jusqu'à ce que la conformité de la machine avec cette directive ne soit établie.

Ces moteurs asynchrones sont en conformité avec la directive EMC 2014/30/UE et aucune protection particulière n'est requise lorsqu'ils sont connectés à un signal sinusoïdale pur.

⚠ Avant toute intervention sur le moteur, soyez certain qu'il soit arrêté et débranché du secteur d'alimentation (ainsi que les équipements auxiliaires éventuels). En cas de démarreurs, de re-démarreurs automatiques, relais ou télécommande, faire attention aux recommandations spécifiques de ces équipements.

2. TRANSPORT ET STOCKAGE

⚠ Lors de la réception de ces moteurs, vérifier si aucune avarie n'est survenue lors du transport . Si tel est le fait, ne pas mettre en service et contacter immédiatement votre transporteur. Les anneaux de levage, lorsqu'ils sont fournis avec le moteur, doivent être correctement fixés, ou en vérifier la fixation, car ils ne sont prévus et calculés que pour lever le moteur seul, et aucune charge additionnelle n'est autorisée. Si nécessaire utiliser des éléments plus appropriés au transport ou déplacements. Ne jamais utiliser d'autres éléments du moteur pour le lever ou le transporter. Si deux anneaux de levage sont montés ou fournis avec le moteur, utiliser les deux anneaux en même temps pour le lever. Stocker les moteurs dans un local sec, propre, sans poussières, abrité des intempéries dans une température ambiante comprise entre 5°C et 40°C, avec un taux d'humidité relative < à 50%. Afin de ne pas endommager les roulements, durant leur stockage, les moteurs ne devront pas être exposés à des vibrations (v eff < 0,2mm/s). Avant la mise en service, la résistance d'isolement devra être mesurée. Dans le cas où la valeur de la résistance serait < 1,5 M.Ω , les bobinages devront être séchés. Contactez immédiatement notre service technique afin de connaître la procédure à suivre.

3. INSTALLATION

⚠ ⚠ L'installation doit être effectuée conformément aux normes EN 60079-14 ou aux normes nationales en vigueur (dernière édition). Avant l'installation dans une atmosphère explosive, l'installateur devra vérifier que le moteur est adapté à la classification de la zone et aux caractéristiques des différentes substances inflammables, gaz ou poussières, présentent dans la zone où le moteur sera installé. Il est impératif de vérifier le marquage sur la plaque signalétique avant l'installation.

Le moteur doit être installé uniquement par du personnel qualifié qui a la connaissance des risques dus aux courants électriques et aux caractéristiques chimiques et physiques des gaz et poussières combustibles dans les environnements dangereux. Il devra également savoir quoi faire en cas d'arrêt du moteur, de la machine, afin d'éviter un redémarrage intempestif. Les indications portées sur la plaque signalétique correspondent aux voltages et fréquences de l'alimentation et autres données électriques et mécaniques, ainsi que les indications de sécurité concernant le moteur (type de protection, classe de température, température ambiante etc...).

ATTENTION : NE PAS OUVRIR EN PRESENCE D'ATMOSPHERE EXPLOSIVE

Les accouplements ou autres éléments montés sur les arbres moteurs devront être équilibrés. Tous montages sur l'arbre moteur, accouplements, poulies, moyeux etc... devront être effectués avec des outillages appropriés pour ne pas endommager les roulements du moteur.

Après montage de ces éléments, vérifier qu'ils soient bien fixés sur le bout d'arbre et notamment qu'ils soient en appui contre l'épaulement. Dans le cas contraire compenser l'espace par des rondelles ou par une entretoise.

Les poulies trop grandes ou trop petites peuvent nuire à la durée de vie des roulements à billes. De même une tension trop importante des courroies provoquent les mêmes problèmes et également provoquer une déformation ou une rupture de l'arbre. Les moteurs doivent être installés dans de bonnes conditions mécaniques et aérodynamiques nécessaire à un bon échange thermique. La ventilation doit être libre de toute gêne pour faciliter l'entrée et la sortie d'air de toute part , et ne doit pas être perturbée par des éléments voisins contradictoires. Afin de ne pas perturber la ventilation, une distance de 40mm minimum doit être respectée entre l'arrière du capot de ventilation et un élément susceptible de nuire à l'aspiration de l'air, nécessaire au refroidissement du moteur. Eviter également des éléments chauds à proximité du moteur qui pourraient affecter les températures du refroidissement ainsi que celle du moteur lui même.

En cas d'installation à l'extérieur, il est impératif de protéger le moteur des rayons solaires ainsi que des intempéries pluie et neige (la neige neutralisant la ventilation). Il est obligatoire d'utiliser en cas de montage vertical arbre en bas, un toit ou un parapluie pour protéger l'entrée d'air du ventilateur contre des éléments étrangers extérieurs .

Il est préférable de protéger le moteur par un disjoncteur ou un limiteur de couple lorsqu'il n'est pas protégé par une sonde thermométrique dans les bobinage connectée à un relais approprié.

Dans le cas d'un environnement très humide et / ou de moisissure, Orange1 EM peut équiper les moteurs de réchauffeurs.

Ces réchauffeurs ne doivent pas être connectés lorsque le moteur fonctionne.

Au lieu d'utiliser des réchauffeurs anti-condensation, il est possible d'alimenter le moteur sur les broches U1-V1 avec une tension de 4 à 10% de la tension de phase nominale du moteur; 20-30% du courant nominal est suffisant pour chauffer le moteur.

⚠ Vérifier le sens de rotation avant de coupler le moteur. Pour cela, avant de brancher le moteur, retirer ou maintenir par un adhésif la clavette afin d'éviter son éjection lors de la rotation.

Si le sens de rotation n'est pas celui requis, débrancher le moteur du secteur et modifier le sens selon:

- Moteur triphasé, intervertir 2 phases sur la plaquette à bornes
- Moteur monophasé, suivre le schéma de branchement fourni avec le moteur.

Les schémas de branchement sont fournis avec le moteur ou imprimés dans la boîte à borne. En cas d'oubli ou de perte, se référer à ce manuel ou nous contacter

Entrées de câbles

⚠ En fonction du type de protection du moteur, les entrées de câbles, presse étoupe ou autres raccordements, devront être impérativement conformes aux normes en vigueur selon le tableau ci-dessous et devront aussi correspondre à la gamme de température du moteur.

Type de protection de la boîte à bornes	Type de protection du. presse-étoupe	Tempeatura operativa
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

Filetage de presse-étoupe	Taille du moteur	Diamètre du câble (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12,5-20,5
M32X1.5	160-180	17-26

Les presse-étoupes et les fiches, s'ils ne sont pas fournis avec le moteur, doivent être comme ci-dessus.

Le presse-étoupe monté sur la boîte à bornes doit être couvert par un certificat ATEX et IECEx valide selon le type de protection du compartiment de raccordement (Ex db et ou Ex eb et ou Ex tb), Il doit avoir un degré de protection minimum IP66 selon EN/CEI 60529 et EN/CEI 60079-0 ; la température de fonctionnement du presse-étoupe doit être comprise dans la plage de température définie par la température ambiante minimale indiquée sur l'étiquette Ex du moteur et la température ambiante maximale + 25 °C.

Les presse étoupe ou tout autre raccordements, devront être vissés à fond sur les entrées de câbles de la boîte à bornes du moteur : 5Nm couple de serrage

- Le câblage de terrain doit être effectué en utilisant des câbles ayant une température globale de fonctionnement de la gaine au moins égale à la température ambiante maximale du moteur +25°C et une température d'isolation du conducteur au moins égale à la température ambiante maximale du moteur +35°C .

Les presse-étoupes du boîtier du condensateur et les presse-étoupes des câbles du moteur à l'intérieur des boîtiers Ex sont installés en usine. Il est interdit de dévisser ou de modifier l'installation d'usine.

Les moteurs sont conçus avec des pattes rapportées pouvant être montées dans différentes positions sur la carcasse du moteur afin de positionner la boîte à bornes sur le dessus ou à droite ou à gauche.

De même les entrées de câbles de la boîte à bornes peuvent être orientées dans 4 positions différentes. Pour cela , avant câblage, et après avoir enlevé le couvercle de la boîte à bornes, desserrer les 4 vis à l'intérieur de la boîte à bornes et tourner la boîte dans la position requise. Resserrer les 4 vis à fond en appliquant le couple de serrage selon le tableau « couple de serrage » ci-après, et refermer le couvercle de la boîte à bornes après connexion : 5Nm couple de serrage.

4. RACCORDEMENT AUX CIRCUITS ELECTRIQUES

⚠ ⚠ Seulement les personnes qualifiées peuvent effectuer cette opération. Vérifier la mesure de résistance d'isolement.

Ce raccordement, doit être réalisé soit par l'intermédiaire du ou des presse étoupe fournis avec le moteur , soit par un presse étoupe ou autre dispositif possédant obligatoirement une certification en accord avec la directive ATEX 2014/34/EU.

Dans le cas où le moteur serait fourni avec une sortie de fils ou câbles, les fils volants devront être connectés directement dans une zone non dangereuse, si la longueur du câble d'origine le permet, ou à l'intérieur d'une boîte EX correspondant à la protection requise de la zone ou elle sera installée.

⚠ Toujours se rapporter à la plaque signalétique du moteur pour vérifier les tensions et fréquences, afin qu'elles correspondent avec l'alimentation à réaliser. Si rien n'est spécifié, la tolérance de voltage admise est +/- 5% et de 1% pour la fréquence par rapport aux indications écrites sur la plaque (le X sur le numéro du certificat). Pour les moteurs des classes de température T3 et T4 il est possible d'avoir ±10% sur la tension. Il est important afin d'éviter les risques de surcharge ampère-métriques non autorisée dans le cas d'un démarrage Y / D, de vérifier et d'être certain que la connexion se réalise après que la période de démarrage soit terminée.

Le calibrage des câbles d'alimentation doit correspondre dimensionnellement aux intensités indiquées sur la plaque signalétique.

Les moteurs doivent être protégés par un disjoncteur pouvant en cas de surcharge couper l'alimentation afin que la température de surface du moteur ne dépasse pas la température maximale d'inflammabilité des gaz ou poussières dans l'atmosphère environnante.

⚠ Les moteurs construits avec des boîte à bornes « eb » (Exdb eb) sont équipés de plaquettes à bornes à isolation renforcée et possèdent des distances augmentées entre les contacts.

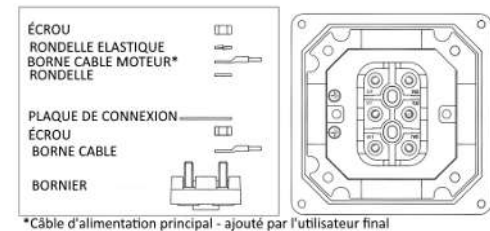
⚠ Les moteurs Exd sont équipés d' une plaquette à bornes standard.

TABLEAU DES COUPLES DE SERRAGE

Visserie	M4	M5	M6	M8
Couple de serrage (Nm)	1,5	2	3	6

La visserie de connexion de la plaquette à bornes doit être montée selon le schéma ci-dessous:

Les écrous doivent être serrés conformément au TABLEAU DES COUPLES DE SERRAGE pour éviter tout desserrage.



IMPORTANT : Pour les moteurs équipés de boîte à bornes Ex eb, et pour le respect d'une bonne étanchéité, bien replacer le joint avant de refermer le couvercle de boîte à bornes et bien resserrer toutes les vis.

Mise à la terre:

⚠ En plus du dispositif de mise à la terre à l'intérieur de la boîte à bornes, le moteur est équipé d'une borne de terre extérieure. Ces bornes doivent être connectées selon:

Câble de terre	Câble d'alimentation
= S	S ≤ 16 mm ²
16	16 mm ² < S ≤ 35 mm ²
≥ 0,5 S	S > 35 mm ²

Connexions des auxiliaires dans une boîte à bornes « eb », pour moteurs Exdb eb.

⚠ Si le moteur est équipé d'une plaquette à bornes incluant des bornes pour brancher des sondes thermiques ou réchauffeurs, les utiliser à ces fins. Dans le cas contraire, ces auxiliaires devront être soudés aux câbles, et isolés en utilisant un fourreau ou gaine rétractable en le chauffant.

Protection

⚠ Le moteur doit être protégé par un disjoncteur thermique ou ampère-métrique permettant en cas de surcharge ou blocage de couper l'alimentation afin d'éviter une surchauffe pouvant dépasser la température d'inflammabilité permise dans la zone où il est installé.

Moteurs alimentés par l'intermédiaire d'un variateur de fréquence.

⚠ Il est obligatoire dans ce cas que les bobinages des moteurs soient équipés de sondes thermiques (les sondes PTC étant les plus utilisées).Celles-ci ont pour fonction de contrôler la classe de température à respecter de la zone. Ces sondes doivent être connectées à un relais qui coupera l'alimentation du moteur dans le cas de températures excessives.

Les caractéristiques de fonctionnement autorisées dans ce mode sont indiquées sur la plaque signalétique ou sur une étiquette supplémentaire. Les filtres de sortie doivent être installés en fonction de la longueur du câble côté moteur du variateur de fréquence (VFD). La sélection du filtre et la longueur maximale du câble dépendent des instructions et des données fournies par le fabricant du VFD. Pour éviter les courants de circulation vagabonds, il est recommandé d'utiliser des mesures appropriées sur l'alimentation électrique qui permettent de réduire considérablement la cause de déclenchement. Pour cela, contactez votre fournisseur VFD local.

Résistance de chauffage

⚠ Les résistances ne doivent en aucun cas être alimentées lorsque le moteur est sous tension. Les câbles de raccordement doivent être adaptés à une puissance de 25W avec une tension d'alimentation d'une intervalle de 110V-240V (± 10%).

Charges axiales et radiales maximum admises

Dans l'esprit d'assurer une durée de vie de 20 000 heures pour les moteurs 2 pôles et de 40 000 heures pour les moteurs 4,6,8 pôles, il est recommandé de ne pas dépasser les valeurs suivantes:

	Ht D'axe	Roulements	*Charges radiales maxi à L/2	*Charges axiales maxi (poussée)	*Charges radiales maxi (tirée)
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

Services autorisés

S1 : Service continu le moteur fonctionne à charge constante jusqu'à ce que l'équilibre thermique soit atteint.
S2 : Service intermittent : Une fois démarré, le moteur fonctionne à charge constante pendant une durée limitée et l'équilibre thermique n'est pas atteint. Le moteur sera redémarré une deuxième fois lorsque sa température sera descendue à la température ambiante.

S3 : Service intermittent : Suite de cycles de service identiques, constitués d'un temps de fonctionnement à charge constante et d'un temps de repos. Au repos, le moteur n'est pas alimenté. Le courant de démarrage n'influence pas significativement l'échauffement.

S9 : La charge et la vitesse varient périodiquement dans la plage de fonctionnement autorisée. Une surcharge fréquente peut se produire. Typique des moteurs alimentés par variateur de fréquence.

Moteurs servo-ventilés (IC416)

Dans le cas de moteurs à ventilation forcée (IC416), le moteur principal ne doit être alimenté que lorsque la ventilation auxiliaire fonctionne.

5. MARQUAGE

 (*)		Marquage de conformité des Normes Européennes
 (*)		Marquage spécifique des matériels de protection contre l'explosion
II (*)		Zone de surface (différents des mines zone I)
GAZ	2 (*)	Category 2: high level of protection
	G (*)	Atmosphère explosive due à la présence de gaz et /ou vapeur
	Ex db	Moteur antidéflagrant ainsi que la boîte à bornes
	Ex dbeb	Moteur antidéflagrant avec la boîte à bornes à sécurité augmentée «e»
	IIC	Groupe de gaz , valable également pour IIB et IIA
	T3, T4, T5	Classes de températures
POUSSI ERIS	D (*)	Atmosphère explosive due à la présence de poussières explosives
	Ex tb IIC	tD Enceinte, méthode A pour zone 21(catégorie2D)
	T125°C	température de surface maximale
T.amb		la température ambiante
AB xx ATEX yyy		AB: Nom du laboratoire ayant délivré le certificat CE de type xx: Année du certificat yyy: Numéro du certificat
ZZZZ (*)		Numéro de référence déterminant la notification de l'Assurance Qualité du produit.
(*) Uniquement pour le marquage ATEX		

6. MAINTENANCE ET REPARATION

⚠ ⚠ ⚠ La maintenance doit être effectuée uniquement par du personnel qualifié en accord avec les normes EN60079-17 ou avec les normes nationales, dernière édition en vigueur. Le personnel qualifié doit avoir la parfaite connaissance de l' installation des appareils électriques dans les atmosphères explosives. Périodiquement, en relation avec l'environnement et le service , vérifiez:

-Toutes les 3000 heures, compléter si nécessaire la graisse sur les joints d'arbres.

-La présence de poussières ou huiles sur la surface du moteur et la nettoyer régulièrement pour éviter les dépôts.

-S'assurer que le passage d'air du ventilateur et capot ne soit pas gênés ou obstrués.

-Que les vis principales, les connections et presse étoupe ne soient pas desserrés.

-Que le moteur tourne librement, sans vibrations anormales (v eff < 3,5mm/s pour Pn < 15kw) et sans bruits excessifs. Dans le cas de vibrations et / ou bruits, vérifier les fixations du moteur, équilibrage (des équipements montés) et que les roulements soient en bon état.

⚠ Les réparations doivent être effectuées en relation avec les règles et Normes définies selon EN60079-19. Les réparations ne peuvent être réalisées que sous le contrôle et l'autorisation de Orange1 EM, ou par un établissement agréé et certifié. Lorsqu'un établissement certifié effectue la réparation, celle-ci doit être réalisée en respectant strictement les caractéristiques du moteur et en utilisant uniquement des pièces d'origine . Après cette intervention, une plaque signalétique supplémentaire doit être fixée sur le moteur avec le symbole d'identification de l'établissement étant intervenu , son numéro de certification, le numéro et la date d'intervention.

Aucun élément d'origine concernant la protection du moteur ne peut être modifié.

Dans le cas d'une modification par rapport à l'origine ou du non respect évoqué ci-dessus, le moteur perdra sa certification d'origine.

LES JOINTS NE PEUVENT PAS ÊTRE RÉPARÉS 7. COMPOSANTS MODULAIRES

Ces moteurs sont construits dans un esprit de modularité. Pattes et brides peuvent être montées ou démontées sans pour autant affecter la certification ATEX du moteur lui-même. Ces opérations étant hors de l'enceinte antidéflagrante.

Dans le tableau ci-dessous, sont répertoriées les vis nécessaires aux montages de ces différents éléments.

Ht D'axe	Brides	Pattes	Couvercle BâB
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 / ECROU M8	M5x14
112	M8x20	M8x35 / ECROU M8	M5x14
132	M10x20	M10x50 MUT M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6x20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6x20
Vis qualité 8.8			

8. DATE DE FABRICATION

La date de fabrication est indiquée sur la plaque signalétique du moteur indiquant le mois et l'année de fabrication : MM-AA

Dichiarazione UE di Conformità / UE Declaration of Conformity / Déclaration UE de Conformité UE Konformitätserklärung / Declaration UE de Conformidad

*I motori elettrici asincroni / Electric asynchronous motors / Les moteurs électriques asynchrone
Elektrische asynchron motoren typ / Los motores electricos asincronos del tipo*

Serie O-M

Che riportano una delle marcature

Bearing one of the marks / Marques / Kennzeichnung / Que llevan una de los marcados

EU Type Examination certificate (according to Annex III of the ATEX Directive 2014/34/EU)				EPT 17 ATEX 2588 X
CE	0477	Ex	II 2G Ex db IIC T5... T3 Gb	
CE	0477	Ex	II 2GD Ex db IIC T5... T3 Gb Ex tb IIIC T125°C Db	
CE	0477	Ex	II 2G Ex db eb IIC T5... T3 Gb	
CE	0477	Ex	II 2GD Ex db eb IIC T5... T3 Gb Ex tb IIIC T125°C Db	

Sono dichiarati conformi sotto l'esclusiva responsabilità del costruttore/ They are declared compliant under the sole responsibility of the manufacturer / Ils sont déclarés conformes sous la seule responsabilité du fabricant / Sie werden unter der alleinigen Verantwortung des Herstellers als konform erklärt./Se declaran conformes bajo la exclusiva responsabilidad del fabricante.

ORANGE 1 ELECTRIC MOTORS S.P.A.

*in accordo alle seguenti Direttive CE/in compliance with the EC Directives/selon les Directives CE suivantes
in übereinstimmung mit den folgenden EG-Richtlinien/de acuerdo con las siguientes Directivas EC*

2014/34/UE
2014/30/UE
2006/42/EC
2015/863 / EU
(EU) 2019/1781

(ATEX)
(EMC)
(Machinery)
(RoHS III)
(Ecodesign Requirements)

*e in conformità alle seguenti Norme/ and comply with the following Standards / et enconfrmité avec les Normes
und entsprechen den folgenden Standard / y conform a las sigulentes Normas*

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-31:2014, EN 60079-7:2015+A1:2018
EN 60034-1,2,5,6,7,9,12,14, IEC60072-1,

NOTA/ NOTE/ BEMERKUNG/ NOTAS

(Directive 2006/42/EC Direttiva Macchine, Machinery Directive, Directive Machine, Maschinen-Richtlinie, Directiva Maquinaria)

*I motori in oggetto sono considerati componenti, in accordo con la direttiva macchine. Il motore non deve essere messo in servizio
finché la macchina stessa su cui è montato non venga dichiarata conforme alla direttiva macchine.*

*Above motors considered as components, comply with the directive machine. The motor must not be incorporated in service until the machine
itself has not been declared in conformity with the machinery directive.*

*Les moteurs ci-dessus considérés comme composants sont conformes à la directive machine. Le moteur ne peut être incorporé
et mis en service avant que la machine dans laquelle il est incorporé ne soit déclarée conforme à la directive machine.*

*Für die korrekte installation der oben genannten Motore sowie der entsprechenden komponenten, die in ihrer Bauart mit den zu dieser
Bescheinigung aufgeführten Vorschriften übereinstimmen, ist der Mashinenherstelle/Maschinenbetreiber verantwortlich. Die Motoren
entsprechen den Vorschriften nur, solange die Anlage, in der sie eingebaut wurden, in übereinstimmung mit den geltenden Maschinen-
richtlinien und Vorschriften errichtet wurde.*

*Los motores en objecto, por tratarse de componentes, cumplen las normas de la directiva si la instalacion està correctamente controlada por el
constructor de la máquina. El motor no debe entrar en servicio hasta que la máquina en que ha sido incorporado disponga de la declaration de
la directive maquinaria*

Product Quality Assurance Notification Number (according to Annex IV of the ATEX Directive 2014/34/EU): EPT 21 ATEX 4234 Q
Notified by Eurofins Product Testing Italy S.r.l. – Notified Body n.0477 - Via Courgné 21 - 10156 Torino Italy

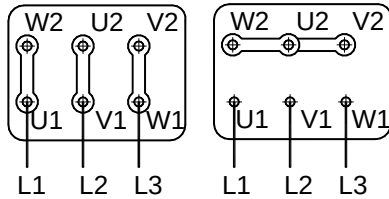


28/06/2021

Armando Donazzan
Legale Rappresentante

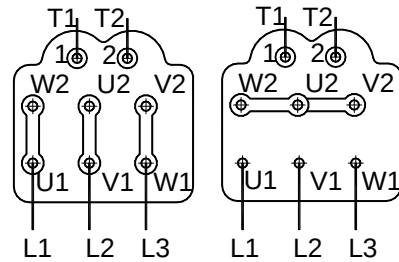
Schemi di collegamento / Wiring diagrams

Trifase 1 Velocità 2-4-6-8 poli (6 fili) – Three-phase 1 speed 2-4-6-8 poles (6 wires)



(D) Collegamento delta
Tensione inferiore
Delta connection
lower voltage

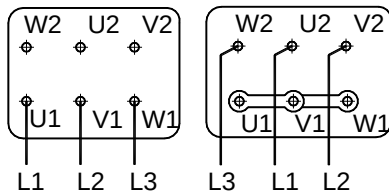
(Y) Collegamento stella
Tensione superiore
Star connection
higher voltage



(D) Collegamento delta
Tensione inferiore
Delta connection
lower voltage

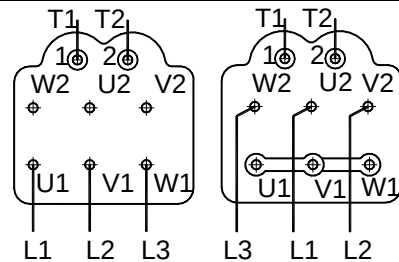
(Y) Collegamento stella
Tensione superiore
Star connection
higher voltage

Trifase doppia velocità 1 avvolgimento – Three-phase double speed 1 winding



Bassa velocità – Low speed

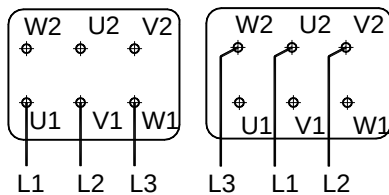
Alta velocità – high speed



Bassa velocità – Low speed

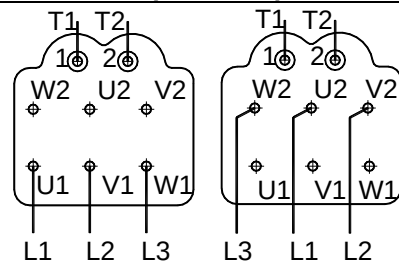
Alta velocità – high speed

Trifase doppia velocità 2 avvolgimenti separati – Three-phase double speed 2 separate windings



Bassa velocità – Low speed

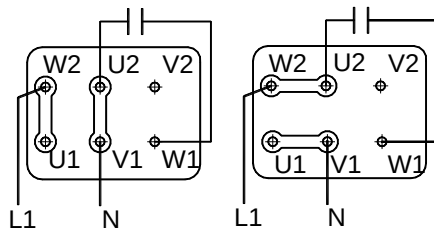
Alta velocità – high speed



Bassa velocità – Low speed

Alta velocità – high speed

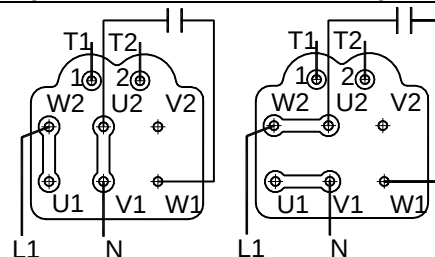
Monofase 4 fili – Single-phase 4 wires



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

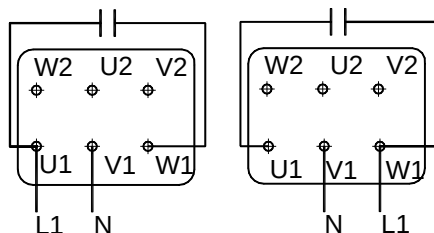
Monofase 4 fili con protezione termica Single-phase 4 wires with thermal protection



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

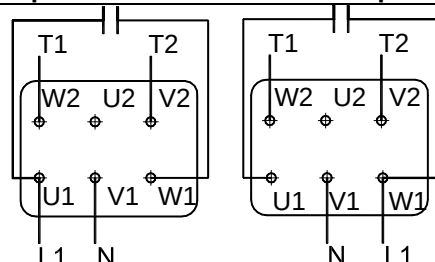
Monofase 3 fili – Single-phase 3 wires



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

Monofase 3 fili con protezione termica Single-phase 3 wires with thermal protection



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation



[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 4**

[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.22.REL.02/2213099

[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

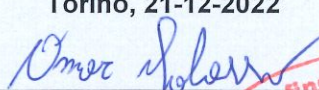
[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[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  and the following strings:

II 2G
Ex db IIC T5 ... T3 Gb or
II 2G
Ex db eb IIC T5 ... T3 Gb or
-40°C ≤ Tamb ≤ +60°C
II 2GD
Ex db IIC T5 ... T3 Gb
Ex tb IIIC T125°C Db
II 2GD
Ex db eb IIC T5 ... T3 Gb
Ex tb IIIC T125°C Db
*Relationships between ambient
temperature range and temperature
limits are reported in the equipment
description*
*Applicable when flameproof terminal
compartment is used*
*Applicable when increased safety
terminal compartment is used*

Place and date of issue:
(DD-MM-YYYY)

Torino, 21-12-2022

Omar Galasso
Deputy Directive Responsible


Paolo Trisoglio
Managing Director

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.



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ANNEX
EU-TYPE EXAMINATION CERTIFICATE
N. EPT 17 ATEX 2588 X issue 4

[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.

The motors can be produced in low efficiency version (IE1, not for European market) or high efficiency version (IE2 or IE3)

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: IP66 (For version with Ex db / Ex tb termination compartment)

IP65 (For version with Ex eb / Ex tb termination compartment)

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:

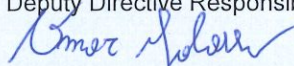
T5, T4, T3, T125°C as a function of the ambient temperature and of the electrical characteristics (as indicated in the technical note).



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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).

Impellers for Ex db motors, which have a peripheral speed below 50 m/s, are made of plastic material.

Impellers 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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ANNEX **EU-TYPE EXAMINATION CERTIFICATE** **N. EPT 17 ATEX 2588 X issue 4**

Identification

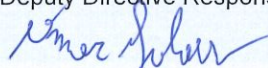
The three-phase and single-phase asynchronous motors, Series O-M (IE1 Range), are identified by a code as follows

Motor Type Identification				OD	063	A	4
Motor Type							
Three phase and single phase motors Efficiency IE1							
MD	1ph Ex db or Ex db Ex tb (ATEX Marking)	ME	1ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX Marking)				
MX	1ph Ex db or Ex db Ex tb (ATEX + IECEX Marking)	MY	1ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX + IECEX Marking)				
OD	3ph Ex db or Ex db Ex tb (ATEX Marking)	OE	3ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX Marking)				
OX	3ph Ex db or Ex db Ex tb (ATEX + IECEX Marking)	OY	3ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX + IECEX Marking)				
Shaft Height							
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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ANNEX **EU-TYPE EXAMINATION CERTIFICATE** **N. EPT 17 ATEX 2588 X issue 4**

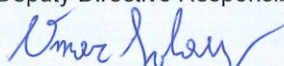
The three-phase and single phase asynchronous motors, Series O (IE2-IE3 Range), are identified by a code as follows:

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 Height										
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									



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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"

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.22.REL.02/2213099

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

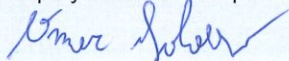
Supply voltage must be within:

- $\pm 5\%$ of the nominal value for temperature class T5;
- $\pm 10\%$ 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.



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ANNEX
EU-TYPE EXAMINATION CERTIFICATE
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[18] Essential Health and Safety Requirements

Assured by compliance with harmonized standards.

[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 attachments included)	Technical note asynchronous motors series O - M sizes 56-180	3	06-10-2022
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.

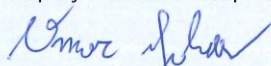
The following conditions may render this certificate invalid:

- 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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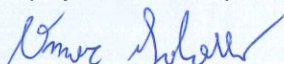
[21] History

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



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End of Certificate



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx EUT 14.0001X	Page 1 of 4	<u>Certificate history:</u>
Status:	Current	Issue No: 6	Issue 5 (2022-12-21)
Date of Issue:	2023-12-04		Issue 4 (2022-07-15)
Applicant:	ORANGE1 ELECTRIC MOTORS S.p.A. Via Mantova, 93 43122 Parma Italy		Issue 3 (2021-06-29)
Equipment:	Series O-M three-phase and single-phase asynchronous squirrel cage rotor motors, supplied by mains or inverter		
Optional accessory:	Terminal box and Capacitor box		
Type of Protection:	Flameproof enclosures "d"; Equipment dust ignition protection by enclosure "t", Increased safety "e"		
Marking:	Ex db IIC T5 ... T3 Gb or Ex db IIC T5 ... T3 Gb Ex tb IIIC T125°C Db or Ex db eb IIC T5 ... T3 Gb or Ex db eb IIC T5 ... T3 Gb Ex tb IIIC T125°C Db -40°C ≤ Tamb ≤ +60°C Relationships between ambient temperature range and temperature limits are reported in the attachment		

Approved for issue on behalf of the IECEx
Certification Body:

Dionisio Bucchieri

Position:

Head of IECEx CB

Signature:
(for printed version)

Date:
(for printed version)

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.



Certificate issued by:

Eurofins Product Testing Italy S.r.l.
Via Cuorgnè
n.21 - 10156 Torino
Italy



Product Testing



IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 14.0001X**

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Date of issue: 2023-12-04

Issue No: 6

Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A.**
Via Mantova, 93
43122 Parma
Italy

Manufacturing
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-1:2014 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

IEC 60079-31:2013 Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
Edition:2

IEC 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

[IT/EUT/ExTR14.0001/06](#)

Quality Assessment Report:

[IT/EUT/QAR14.0001/10](#)



IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 14.0001X**

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Date of issue: 2023-12-04

Issue No: 6

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

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"; A version without terminal box and with a smaller box (flat box) for supply cable connection with splicing or head to head connectors is also available

The capacitor enclosure has types of protection "Ex d" and "Ex t";

See the detailed description in the annexed document to this certificate.

SPECIFIC CONDITIONS OF USE: YES as shown below:

- Supply voltage must be within:

- $\pm 5\%$ of the nominal value for temperature class T5;

- $\pm 10\%$ 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.



IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 14.0001X**

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Date of issue: 2023-12-04

Issue No: 6

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

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.

Annex:

[Annex to CoC.pdf](#)



Annex to certificate: IECEx EUT 14.0001X Issue N. 6

General product information:

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; in the case of head to head connectors the supply cable is permanently connected and the connections are drowned in resin

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.

The motors can be produced in low efficiency version (IE1, not for European market) or high efficiency version (IE2 or IE3)

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: IP66 (For version with Ex db / Ex eb / Ex tb termination compartment)
IP65 (For Ex db eb flat box execution)

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. $-40 \div +40^{\circ}\text{C}$ (or $+60^{\circ}\text{C}$ for T3,T4 class of temperature)

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).

Impellers for Ex db motors, which have a peripheral speed below 50 m/s, are made of plastic material.

Impellers 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 $-40^{\circ}\text{C} + 60^{\circ}\text{C}$
Ex db eb IIC T4 Gb	Ex tb IIIC T125°C	Tamb $-40^{\circ}\text{C} + 60^{\circ}\text{C}$
Ex db IIC T5 Gb	Ex tb IIIC T125°C	Tamb $-40^{\circ}\text{C} + 40^{\circ}\text{C}$
Ex db eb IIC T5 Gb	Ex tb IIIC T125°C	Tamb $-40^{\circ}\text{C} + 40^{\circ}\text{C}$

Cable connection by means of flat box

Three phases motors

Ex db eb IIC T3 Gb	Ex tb IIIC T125°C	Tamb $-40^{\circ}\text{C} + 60^{\circ}\text{C}$
Ex db eb IIC T4 Gb	Ex tb IIIC T125°C	Tamb $-40^{\circ}\text{C} + 50^{\circ}\text{C}$

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

Ex db eb IIC T3 Gb	Ex tb IIIC T125°C	Tamb $-40^{\circ}\text{C} + 50^{\circ}\text{C}$
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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 IECEx certified.

The accessories used for cable entries and for unused holes must be covered by a separate IECEx certification according to the applicable standards IEC 60079-0, IEC 60079-1, IEC 60079-7 and IEC 60079-31.

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							
Three phase and single phase motors Efficiency IE1							
MD	1ph Ex db or Ex db Ex tb (ATEX Marking)	ME	1ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX Marking)				
MX	1ph Ex db or Ex db Ex tb (ATEX + IECEx Marking)	MY	1ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX + IECEx Marking)				
OD	3ph Ex db or Ex db Ex tb (ATEX Marking)	OE	3ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX Marking)				
OX	3ph Ex db or Ex db Ex tb (ATEX + IECEx Marking)	OY	3ph Ex db Ex eb or Ex db Ex eb Ex tb (ATEX + IECEx Marking)				
Shaft Height							
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						

EPT.23.REL.02/2313144

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The three-phase and single phase asynchronous motors, Series O-M (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 Height							
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 list:

“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”



Routine tests:

According to clause 7.1 of IEC 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.

RMA-Formular und Erklärung über Dekontaminierung

RMA-Form and explanation for decontamination



RMA-Nr./ RMA-No.

Die RMA-Nr. bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service. Bei Rücksendung eines Altgeräts zur Entsorgung tragen Sie bitte in das Feld der RMA-Nr. "WEEE" ein./ You may obtain the RMA number from your sales or service representative. When returning an old appliance for disposal, please enter "WEEE" in the RMA number box.

Zu diesem Rücksendeschein gehört eine Dekontaminierungserklärung. Die gesetzlichen Vorschriften schreiben vor, dass Sie uns diese Dekontaminierungserklärung ausgefüllt und unterschrieben zurücksenden müssen. Bitte füllen Sie auch diese im Sinne der Gesundheit unserer Mitarbeiter vollständig aus./ This return form includes a decontamination statement. The law requires you to submit this completed and signed decontamination statement to us. Please complete the entire form, also in the interest of our employee health.

Firma/ Company

Firma/ Company

Straße/ Street

PLZ, Ort/ Zip, City

Land/ Country

Gerät/ Device

Anzahl/ Quantity

Auftragsnr./ Order No.

Ansprechpartner/ Person in charge

Name/ Name

Abt./ Dept.

Tel./ Phone

E-Mail

Serien-Nr./ Serial No.

Artikel-Nr./ Item No.

Grund der Rücksendung/ Reason for return

- ☐ Kalibrierung/ Calibration ☐ Modifikation/ Modification
☐ Reklamation/ Claim ☐ Reparatur/ Repair
☐ Elektroaltgerät/ Waste Electrical & Electronic Equipment (WEEE)
☐ andere/ other

bitte spezifizieren/ please specify

Ist das Gerät möglicherweise kontaminiert?/ Could the equipment be contaminated?

- ☐ Nein, da das Gerät nicht mit gesundheitsgefährdenden Stoffen betrieben wurde./ No, because the device was not operated with hazardous substances.
☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ No, because the device has been properly cleaned and decontaminated.
☐ Ja, kontaminiert mit:/ Yes, contaminated with:



☐
explosiv/
explosive



☐
entzündlich/
flammable



☐
brandfördernd/
oxidizing



☐
komprimierte
Gase/
compressed
gases



☐
ätzend/
caustic



☐
giftig,
Lebensgefahr/
poisonous, risk
of death



☐
gesundheitsge-
fährdend/
harmful to
health



☐
gesund-
heitsschädlich/
health hazard



☐
umweltge-
fährdend/
environmental
hazard

Bitte Sicherheitsdatenblatt beilegen!/ Please enclose safety data sheet!

Das Gerät wurde gespült mit:/ The equipment was purged with:

Diese Erklärung wurde korrekt und vollständig ausgefüllt und von einer dazu befugten Person unterschrieben. Der Versand der (dekontaminierten) Geräte und Komponenten erfolgt gemäß den gesetzlichen Bestimmungen.

This declaration has been filled out correctly and completely, and signed by an authorized person. The dispatch of the (decontaminated) devices and components takes place according to the legal regulations.

Falls die Ware nicht gereinigt, also kontaminiert bei uns eintrifft, muss die Firma Bühler sich vorbehalten, diese durch einen externen Dienstleister reinigen zu lassen und Ihnen dies in Rechnung zu stellen.

Should the goods not arrive clean, but contaminated, Bühler reserves the right, to commission an external service provider to clean the goods and invoice it to your account.

Firmenstempel/ Company Sign

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature



Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies GmbH. Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

Umgang mit elektrostatisch sensiblen Baugruppen

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

Einbau von Ersatzteilen

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

Einsenden von Elektroaltgeräten zur Entsorgung

Wollen Sie ein von Bühler Technologies GmbH stammendes Elektroprodukt zur fachgerechten Entsorgung einsenden, dann tragen Sie bitte in das Feld der RMA-Nr. „WEEE“ ein. Legen Sie dem Altgerät die vollständig ausgefüllte Dekontaminierungserklärung für den Transport von außen sichtbar bei. Weitere Informationen zur Entsorgung von Elektroaltgeräten finden Sie auf der Webseite unseres Unternehmens.

Avoiding alterations and damage to the components to be returned

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies GmbH. To ensure conclusive analysis the goods must be inspected unaltered, if possible. Modifications or other damages which may hide the cause or render it impossible to analyse are prohibited.

Handling electrostatically conductive components

Electronic assemblies may be sensitive to static electricity. Be sure to handle these assemblies in an ESD-safe manner. Where possible, the assemblies should be replaced in an ESD-safe location. If unable to do so, take ESD-safe precautions when replacing these. Must be transported in ESD-safe containers. The packaging of the assemblies must be ESD-safe. If possible, use the packaging of the spare part or use ESD-safe packaging.

Fitting of spare parts

Observe the above specifications when installing the spare part. Ensure the part and all components are properly installed. Return the cables to the original state before putting into service. When in doubt, contact the manufacturer for additional information.

Returning old electrical appliances for disposal

If you wish to return an electrical product from Bühler Technologies GmbH for proper disposal, please enter "WEEE" in the RMA number box. Please attach the fully completed decontamination declaration form for transport to the old appliance so that it is visible from the outside. You can find more information on the disposal of old electrical appliances on our company's website.

