



Sample gas pumps

P2.x ATEX



Installation and Operation Instructions

Original instructions





Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
Tel. +49 (0) 21 02 / 49 89-0, Fax: +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com
E-Mail: analyse@buehler-technologies.com

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.

All rights reserved. Bühler Technologies GmbH 2022

Document information

Document No..... BE420002
Version..... 07/2022

Contents

1	Introduction.....	2
1.1	Intended Use.....	2
1.2	Item number structures.....	3
1.3	Type plate.....	4
1.4	Scope of delivery.....	5
1.5	Product description.....	5
2	Safety instructions.....	6
2.1	Important advice.....	6
2.2	General hazard warnings.....	7
3	Transport and storage.....	9
4	Installation and connection.....	10
4.1	Requirements to the installation site.....	10
4.1.1	Outdoor installation.....	11
4.2	Installation.....	11
4.3	Special condition moist sample gas.....	12
4.3.1	Alteration of hanging pump bodies.....	12
4.4	Connecting the gas tubes.....	13
4.4.1	Monitoring the sample gas pump.....	13
4.5	Electrical connections.....	14
5	Operation and control.....	16
5.1	Switching on the sample gas pump.....	17
5.2	Operating the sample gas pump.....	17
6	Maintenance.....	18
6.1	Maintenance schedule.....	20
6.2	Inspecting the bellow.....	21
6.3	Replacing bellow and connecting rod-eccentric-combination.....	22
6.4	Replacement of the O-ring of the bypass valve (optional).....	23
6.5	Replacing the inlet and outlet valves.....	23
6.6	Cleaning.....	23
6.6.1	Cleaning the pump console.....	23
6.6.2	Cleaning the motor.....	24
6.7	Inspecting and replacing the flexible spider.....	24
6.8	Order number for the 43.800h inspection.....	25
7	Service and repair.....	26
7.1	Troubleshooting.....	27
7.2	Spare parts and accessories.....	28
8	Disposal.....	29
9	Appendices.....	30
9.1	Technical data P2.2 ATEX, P2.4 ATEX.....	30
9.2	Technical Data P2.7 ATEX.....	31
9.3	Temperature classes.....	32
9.4	Important motor notices.....	32
9.5	Dimensions.....	33
9.6	List of chemical resistance.....	34
9.7	User book (Please make copies).....	35
10	Attached documents.....	36

1 Introduction

1.1 Intended Use

Sample gas pumps are intended for installation in gas analysis systems for industrial applications.

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.

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

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

Please note the additional information in chapters "Product Description" and "Operation and Control" along with the information on specific intended use, existing material combinations, as well as pressure and temperature limits in the data sheets.

When installed outdoors, ensure adequate protection from the weather, see chapter [Requirements to the installation site](#) [> page 10].

1.2 Item number structures

The device is delivered with different configurations. The part number given on the type plate informs you about the specific configuration of your device.

On the type plate you will find the order number as well as the 13-digit product key. This number is a code where each digit (x) describes a certain feature:

P2.2 Atex, P2.4 Atex

42	xx	x	x	x	x	x	9	0	00	Product characteristic
										Base model
	61									P2.2 Atex 400 L/h (direct operation without intermediate flange)
	62									P2.4 Atex 400 L/h (with intermediate flange)
										Motor voltage
		7								230 V 50/60 Hz; 0,78/0,86 A
		8								115 V 50/60 Hz; 2,78/2,3 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° *
										Pump head material
				1						PTFE
				2						Stainless steel 1.4571
				3						PTFE with bypass valve *
				4						Stainless steel 1.4571 with bypass valve *
										Valve material
					1					up to 100 °C; PTFE / PVDF *
					2					up to 140 °C; PTFE / PEEK
										Screw-in connections (depending on pump body)
										PTFE Pump body
										Stainless steel pump body
					9					DN 4/6 (Standard)
					1					6 mm (Standard)
					2					DN 6/8
					3					8 mm
					4					3/8"-1/4"
										1/4"-1/8"
										1/4"-1/6"
										Mounting accessories
						9				incl. mounting bracket and bumper *

* not on P2.4 Atex

P2.72 Atex, P2.74 Atex

42	xx	x	x	x	x	x	9	0	00	Product characteristic
										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; 2,78/2,3 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° *
										Pump head material
2										Stainless steel 1.4571
4										Stainless steel 1.4571 with bypass valve *
										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 bumper *

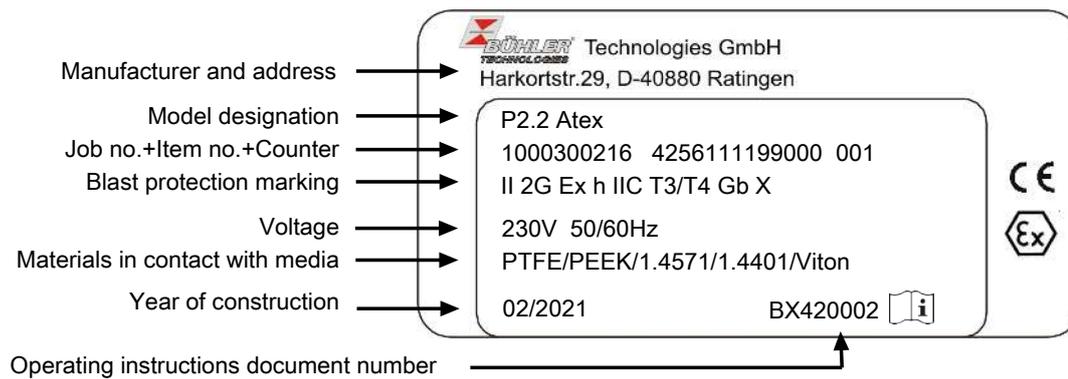
* not on P2.74 Atex

If there are special instructions for a pump type, they are marked in the manual.

Take care of the limits of the pump. When ordering spare parts chose for the type matching part numbers (e.g. valves).

1.3 Type plate

Example:



1.4 Scope of delivery

P2.2 Atex / P2.72 Atex	P2.4 Atex / P2.74 Atex
1 x Sample gas pump with motor	1 x Pump body with intermediate flange
4 x Rubber-metal bumpers	1 x Motor
1 x Mounting bracket	1 x Coupling flange
Product documentation	1 x Coupling
	1 x Mounting ring
	Product Documentation

1.5 Product description

The sample gas pumps are intended exclusively for the pumping of gaseous media. They are not suitable for liquids.

Please observe the information at the end of these instructions in relation to specific intended use, available material combinations, and pressure and temperature limits. In addition, please observe the information and labelling on the identification plates.

The maximum surface temperature depends on the ambient temperature and the temperature of the medium. The connection between the temperature of the medium, the ambient temperature and the temperature class of the pump is specified in the technical data.

NOTICE

Restriction for ATEX pumps



The **P2.x Atex** pumps can pump non-flammable gaseous media and flammable gaseous media that could occasionally be explosive in normal operation (Sampling zone 1). Sampling gas from zone 1 is generally **forbidden** if the gas flow leads to a dangerous electro-static charge in the bellow / pump body (also see the "Operation" section). The **Atex versions** are suitable for use in **Equipment Group II, Equipment Category 2G, Explosion Group IIC, Temperature Classes T3 and T3/T4** and must not be used in dusty areas.

For use in hot applications, in the P2.4 Atex / P2.74 Atex sample gas pumps the pump head and the drive motor are separated. The sample gas pump has a divided reducing flange, one half of which can be mounted in the interior of a heated cabinet and the other half of which, mounted on the outer side, carries the drive motor. As a result, wall thicknesses of up to 30 mm can be bridged with no additional adjustments.

For applications in which the sample gas is still damp, condensate can form in the pipelines and in the pump body. In such cases, the pump body must be mounted in a hanging position (see point "Alteration of hanging pump bodies").

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 use the following warning signs:

	Warns of a general hazard		Warns of limbs being crushed
	Warns of voltage		General notice
	Warns not to inhale toxic gasses		Unplug from mains
	Warns of corrosive liquids		Wear respiratory equipment
	Warns of explosive areas		Wear a safety mask
	Warns 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 mediums 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.

CAUTION**Tilting risk**

Damage of the device

Secure the device against any sudden translocation during maintenance.

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

Temperature of the device depends on the medium temperature. Correlation between medium 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 medium temperatures.

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.

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. They must be stored in a covered, dry and dust-free room at a temperature between -20 °C to +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 **prohibited**. On principle the operator must meet all applicable standards with respect to preventing damage due to lightning, which could result in sample gas pump damage.

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 drying the winding.

The motor shaft should be turned occasionally to ensure the entire bearing remains lubricated. To do so, remove the three cross-tip screws (9) of the console cover (8) and remove. 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.

CAUTION



Use appropriate tools

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

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 be assembled and connected as well as disassembled in a non-Ex zone with the unit cooled down.

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

When installing without Bühler mounting bracket, be sure the motor is far enough from the back panel (at least 40 mm).

The sample gas pumps are rated for ambient temperatures from -20 °C to +50 °C (-4 °F to 122 °F) as well as altitudes ≤ 1000 m. They're available in various styles and the specific technical data may vary. Therefore always note all device-specific data on the pump and motor type plate and 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, verify the sample gas pump is complete. You will also require 6 x suitable length M6 bolts 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 bodies

CAUTION



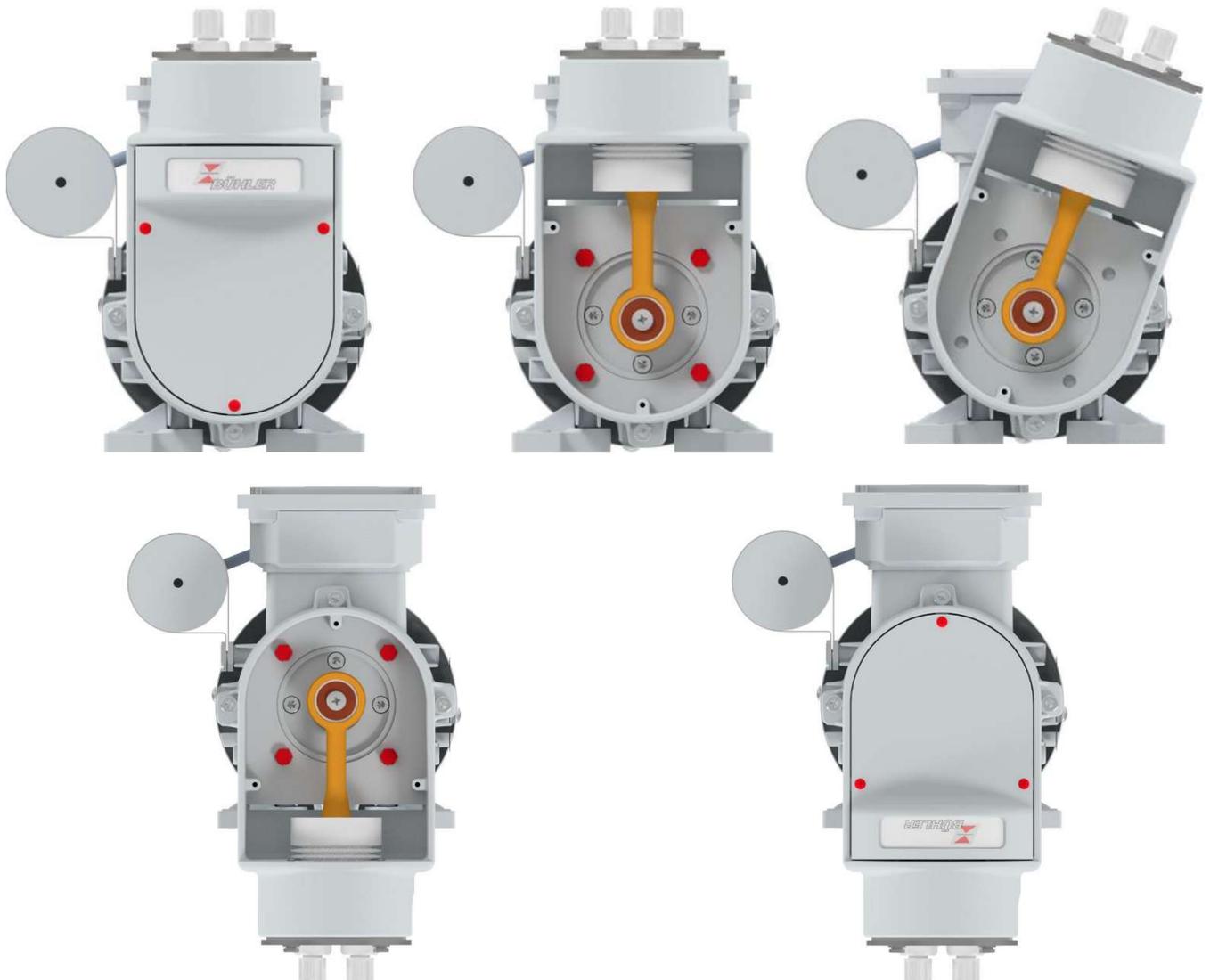
Damage to the device

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 45° or 90° is prohibited!



4.4 Connecting the gas tubes

The pumps are delivered with customized gas connections. Please compare the part-no. on the type plate with the part-no. explained in chapter "Introduction".

Avoid mixed installations, that is connecting metal tubes to plastic bodies. If this is unavoidable for sporadic applications, screw the metal fitting with utmost care and without any use of force to the PTFE pump body.

Install the tubes in a way that the line at the inlet and outlet is flexible over a sufficient distance (pump vibrates).

The pumps are marked with **"In"** for inlet (input) and **"Out"** for outlet (output). Make sure that the connections to the tubes are tight.

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 21] 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.

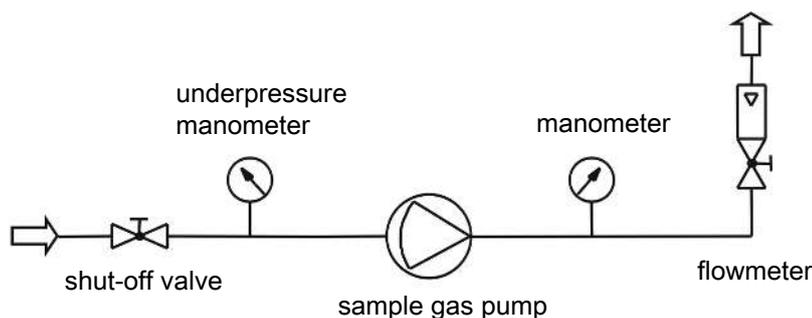


Fig. 1: Sample flow diagram of suitable monitoring

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.



A switch or circuit breaker (per approval) must be installed for the sample gas pump. It must be easy for the operator to reach. The switch must be marked as a cut-off for the device. It mustn't be integrated into a supply cable or interrupt the earth conductor. It must further separate all poles of the sample gas pump from live parts.

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 mm^2 .

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

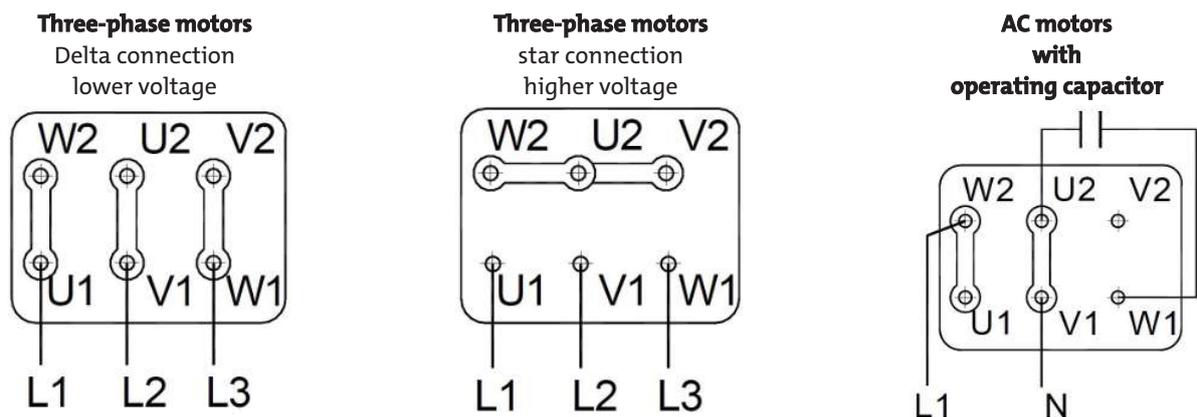
- Protective earth terminal inside the motor terminal box.
- Protective earth terminal on the outside of the motor housing.
- Protective earth terminal on the mounting bracket. (The earth bolt on the mounting bracket may alternatively be connected to the protective earth connection on the outside of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



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 charging (explosion hazard)

Conveying e.g. very dry and particle-laden gasses may result in incendive electrostatic charges inside the bellow / pump body.



Please install a particle-filter with suitable grade of filtration before the gas input of the pump.

Removing explosive gaseous mediums (max. from zone 1) with pump P2.x Atex is prohibited if the gas flow results in an incendive electrostatic charge in the bellow / pump body (projected surface inside the bellow / pump body ~ 15 cm²).

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 device, ensure that:

- the hose and electrical connections are undamaged and correctly installed,
- no parts of the sample gas pump have been dismantled (e.g. cover),
- the gas inlet and outlet of the sample gas pump is not shut,
- the preliminary pressure is under 0.5 bar,
- in the event of throttling under 150 l/h (P2.x Atex) or under 400 l/h (P2.7x Atex) in continuous operation, a bypass is available,
- the ambient parameters are complied with,
- information on rating plates is observed,
- the voltage and frequency of the motor correspond to those of the network,
- the electrical connections are tightly fastened and the monitoring devices have been connected and configured correctly!
- air inlet openings and cooling surfaces are clean,
- protective measures have been carried out; earthing!
- the motor is secured correctly,
- the terminal box cover is closed and the cable entry points have been properly sealed,
- the elastomer sprocket is correctly mounted to the coupling (only P2.4 Atex / P2.74 Atex) and is not damaged,
- depending on the operating mode, the necessary protective and monitoring devices are present and functional (depending on the type of pump, e.g. motor circuit breaker, manometer, flame arrestor, temperature monitoring).

When switching the sample gas pump on make sure that

- no abnormal sounds or vibrations occur.
- the flow rate is neither too low nor too high. This would indicate a cracked bellows.

5.2 Operating the sample gas pump

The sample gas pump is intended exclusively for the pumping of gaseous media. It is not suitable for liquids.

The sample gas pump should be operated without pre-compression. A preliminary pressure of more than 0.5 bar is not permitted. When operating with pre-compression, note the differing permissible pumphead and media temperatures given in the data sheet for the P2.7x types. The gas outlet must not be shut. The flow rate must be at least 50 l/h for the P2.x Atex and at least 200 l/h for the P2.7x Atex pumps. In the event of throttling under 150 l/h for the P2.x Atex and under 400 l/h for the P2.7x Atex pumps in continuous operation, the flow rate must be regulated via a bypass. In this case you should choose a version with bypass valve.

NOTICE



Extreme throttling reduces the life time of the bellows.

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

Maintenance work on the device must be carried out in a non-hazardous area (ex-free zone) and in a cooled down condition. In particular, cleaning work with pressurised air must only be carried out in a non-hazardous area.

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.

NOTICE



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



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.

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.

**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.



Depending on the quality of the sample gas to be pumped, the valves in the inlet and the outlet may have to be changed from time to time. A description of the replacement of parts can be found in the "Replacing inlet and outlet valves" section.

If the valves are heavily contaminated, in particular after just a short period of operation, then you should provide for particle filtration before the pump. This will increase the service life considerably.

Depending on the operating conditions, the following must be performed at suitable intervals (see "Maintenance plan")

- Inspect the terminal compartments and terminals for cleanliness and clean them if necessary.
- Inspect whether the electrical connections are firmly in place.
- The cooling air channels of the motor are cleaned.
- Carry out an inspection of the radial clearance and a visual check of the elastomer sprocket.

The exhaust ports and the cooling surfaces of the motor must be protected from blocking and impurities.

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. Replace if damaged or have 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 23].	Customer
Valves	Every 8,000 h or if pressure drops	Check valves, replace valves if necessary, see Replacing the inlet and outlet valves [> page 23].	Customer
Bellow	Every 4,000 h or 6 months	Check by shutting off the suction pipe. Repair if damaged, see Inspecting the bellow [> page 21] + Replacing bellow and connecting rod-eccentric-combination.	Customer
Complete pump	After 43,800 h or 5 years	Inspection through Bühler Technologies Item no. see Order number for the 43.800h inspection [> page 25].	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

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 20] for maintenance intervals.

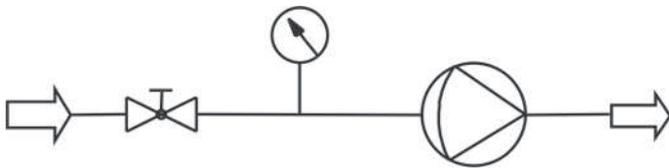


Fig. 2: Inspecting the bellow

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 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 cleaning products containing solvents).
Be sure to observe all notes in chapter [Cleaning](#) [> page 23].
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 proper 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 and tighten to 1.5 Nm. Be sure 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° and 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 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. On principle the alignment of the pump body is irrelevant.
However, it's important to ensure the marking on the mounting ring or pump body matches 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 in the case of PTFE bodies with the mounting ring, and tighten the bolts crosswise, first at 1Nm, then 3 Nm.
19. Lastly, reattach the console cover with the 3 cross-tip screws.
20. Check the sample gas pump for leaks.
21. Perform a test run. At a minimum, the following values must be reached:
Overpressure: 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 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 (e.g. Fluoronox S90/2) and carefully attach it to the spindle.
- Carefully reinsert the entire unit into the pump body, turning, 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 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 so-called 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. Be sure 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. Here the red or orange end corresponds to the gas inlet and the black or grey end the gas outlet. The valves at the gas inlet are marked "EIN" and "IN" and "AUS" and "OUT" at the gas outlet. The marking 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. At a minimum, the following values must be reached:
Overpressure: 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 ambiance, 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.

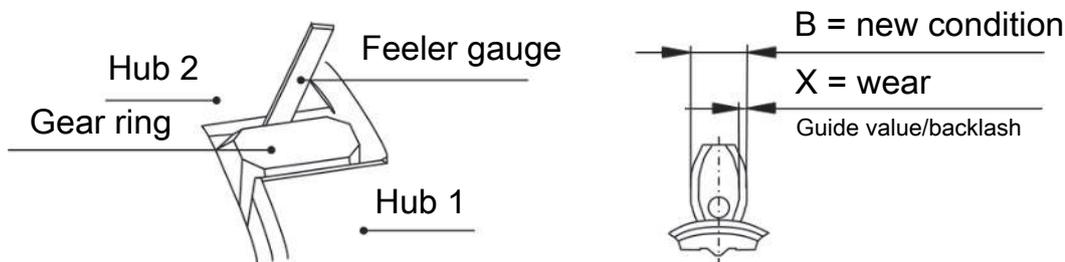


Fig. 3: Sample gas pump coupling

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 respective item number in the inspection order.

The inspection item numbers are structured similar 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.

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	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

P2.74 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: 4261 7112 99 000 (this number is located in the type plate of the pump, also see chapter [Item number structures](#) [> page 3] and [Type plate](#) [> page 4]).

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	<ul style="list-style-type: none"> – Broken or incorrectly connected lead – Defective 	<ul style="list-style-type: none"> – Check connection or fuse and switch – have repaired by Bühler service technician
Pump doesn't convey	<ul style="list-style-type: none"> – Defective or dirty valves – Bypass valve open – Defective bypass valve O-ring – Torn bellow – Coupling hub broken – Broken/worn ring gear 	<ul style="list-style-type: none"> – Carefully blow out or replace valves or see chapter Replacing the inlet and outlet valves [> page 23]. – Close bypass valve – have repaired by Bühler service technician or see Replacement of the O-ring of the bypass valve (optional) [> page 23]. – 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	<ul style="list-style-type: none"> – Crankshaft out of alignment – Work ring gear – Loose coupling hub – Engine bracket damaged 	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – e.g. contact with ozone influences or similar, causing a physical change to the ring gear 	<ul style="list-style-type: none"> – Eliminate any physical changes to the ring gear
Protective device is triggering	<ul style="list-style-type: none"> – Coil- and terminal short circuit – Start-up time exceeded 	<ul style="list-style-type: none"> – Measure insulation resistance – Check start-up requirements (see chapter Switching on the sample gas pump [> page 17]).
Poor performance	<ul style="list-style-type: none"> – Leakage – Torn bellow – Defective or dirty valves 	<ul style="list-style-type: none"> – 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 23].

Tab. 1: Troubleshooting

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

7.2 Spare parts and accessories

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

Upgrade and expansion parts can be found in our catalog.

Available spare parts:

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

Tab. 2: Spare Parts and Accessories

8 Disposal

Dispose of parts so as not to endanger the health or environment. Follow the laws in the country of use for disposing of electronic components and devices during disposal.

9 Appendices

9.1 Technical data P2.2 ATEX, P2.4 ATEX

Technical Data

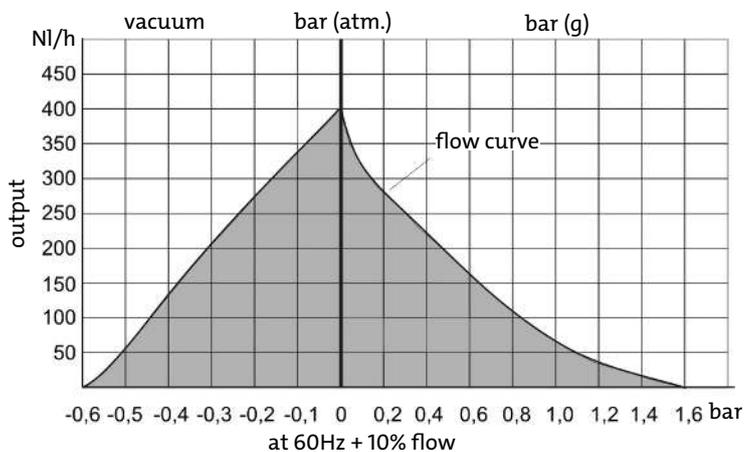
Nominal voltage:	see ordering information
Marking:	II 2G Ex h IIC T3/T4 Gb X
IP rating:	electric IP65 mechanical IP20
Dead volume:	8.5 ml
Weight:	approx. 7.5 kg (P 2.2 ATEX) approx. 8.5 kg (P 2.4 ATEX)
Materials in contact with media vary by configuration:	PTFE, PVDF (standard pump with 100 °C valves)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

Pumps 400 L/h

Ambient temperature	
Motor:	-20 °C to 50 °C
Pump head:	see temperature classes
Valve medium temperature*:	PTFE/PVDF max. 100 °C PTFE/PEEK max. 140 °C

*see temperature classes

Feed curve 400 L/h



9.2 Technical Data P2.7 ATEX

Technical Data

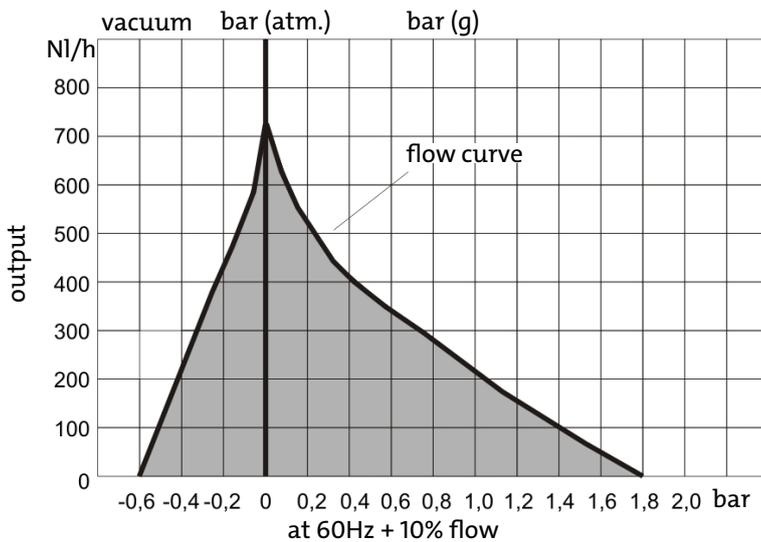
Nominal voltage:	see ordering information
Marking:	II 2G Ex h IIC T3 Gb X
IP rating:	electric IP65 mechanical IP20
Dead volume:	8.5 ml
Weight:	approx. 7.5 kg (P 2.72 Atex) approx. 8.5 kg (P 2.74 Atex)
Materials in contact with media:	PTFE, PEEK, 1.4571 (all models) + Viton (bypass valve) + 1.4401, Viton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

Pumps 700 L/h

Ambient temperature	
Motor:	-20 °C to 50 °C
Pump head:	see temperature classes
Valve medium temperature*:	PTFE/PEEK max. 120 °C

*see temperature classes

Flow curve 700 L/h



9.3 Temperature classes

P 2.2 ATEX		Medium temperature	Pump head temperature *
no flammable gasses in the gas circuit	T3	140 °C	50 °C
	T4	120 °C	50 °C
Flammable gasses in the gas circuit above the LEL	T3	120 °C	50 °C
	T4	50 °C	50 °C

P 2.4 ATEX		Medium temperature	Pump head temperature
no flammable gasses in the gas circuit	T3	120 °C	100 °C
	T4	80 °C	80 °C
Flammable gasses in the gas circuit above the LEL	T3	100 °C	80 °C
	T4	50 °C	50 °C

P 2.72 ATEX		Medium temperature	Pump head temperature *
no flammable gasses in the gas circuit	T3	120 °C	50 °C
Flammable gasses in the gas circuit above the LEL	T3	50 °C **	50 °C **

P 2.74 ATEX		Medium temperature	Pump head temperature
no flammable gasses in the gas circuit	T3	120 °C	100 °C
Flammable gasses in the gas circuit above the LEL	T3	50 °C **	50 °C **

* resulting from the pump's maximum ambient temperature.

** At a primary pressure of 0 to max. 0.5 bar the pump head and medium temperature is max. 45 °C.

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	2,2 - 3,2 A	9132020054
9 = 380-420 V 50 Hz	0,45 - 0,63 A	9132020055
0 = 500 V 50 Hz	0,35 - 0,5 A	9132020071

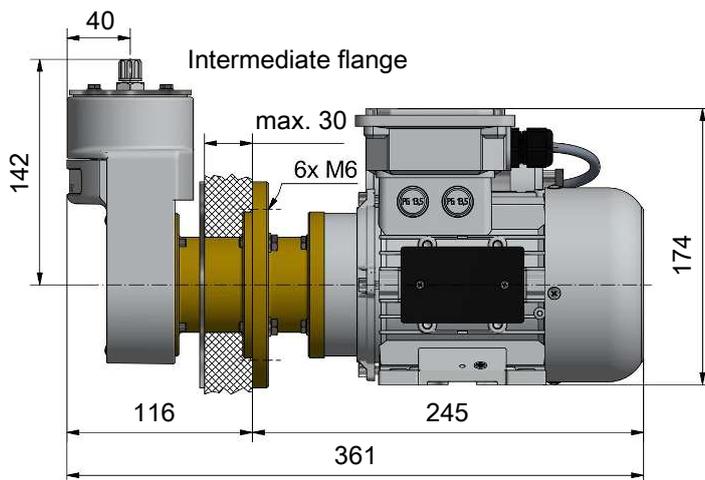
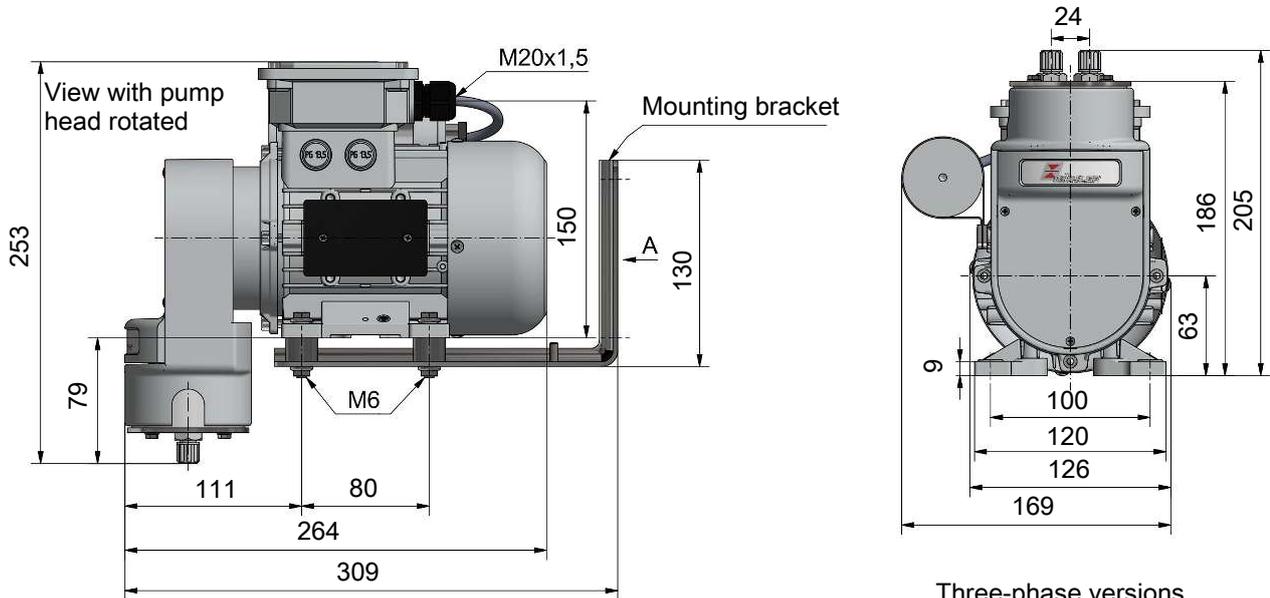
Installing the motor protection switch inside the EX area Zone 1 or 2 (ATEX only)

Motor voltage		Item no.
7 = 230 V 50/60 Hz	0,63 - 1 A	9132020036
8 = 115 V 50/60 Hz (operation at 50 Hz)	2,5 - 4 A	9132020035
8 = 115 V 50/60 Hz (operation at 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

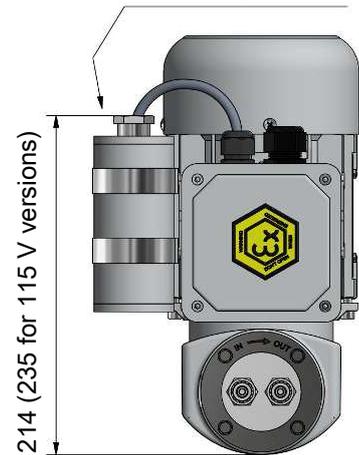
9.5 Dimensions

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

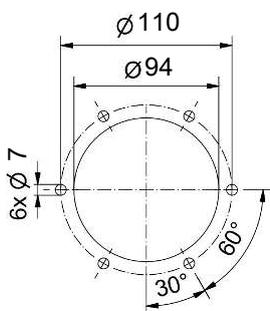
P2.4 Atex, P2.74 Atex – versions with intermediate flange



Three-phase versions without capacitor



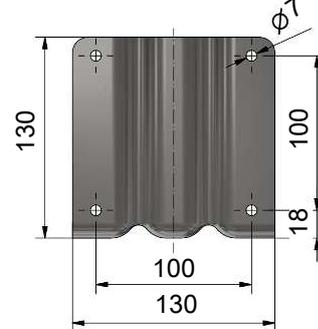
Cabinet cut-out for pumps with intermediate flange



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 wetted materials of your device are printed on the type plate.

Formula	Substance	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	Benzene		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	Ethene		1/0	0/0	0/0	1/0	1/0	1/0	1/0
C ₂ H ₂	Ethine		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 ₂ 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	Propenoxide		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	Sulfur 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	Hydrosulphide		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	Toluene (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

Tab. 3: List of chemical resistance

0 - resistant

1 - practically resistant

2 - partially resistant

3 - not resistant

4 - no data available

Two values are given for each medium, left number = value at 20 °C (68 °F), right number = value at 50 °C (122 °F) Temperature.

Important note

The tables headed "Chemical resistance of plastics" and "Properties of plastics materials" have been compiled from information from various producers of raw materials. The figures relate exclusively to laboratory tests on raw materials. Plastics items made from these materials are often subject to influences which cannot be detected in a laboratory test (temperature, pressure, stresses in the material, chemical substances, design features, etc.). For these reasons the figures quoted can serve only as a guideline. In case of doubt we strongly recommend that a test be carried out. No legal claims can be derived from these figures and we disclaim all liability. The chemical and mechanical resistance of a product does not suffice for the assessment of its suitability for use, for example legislation on flammable liquids (explosion protection) is to be taken into particular consideration.

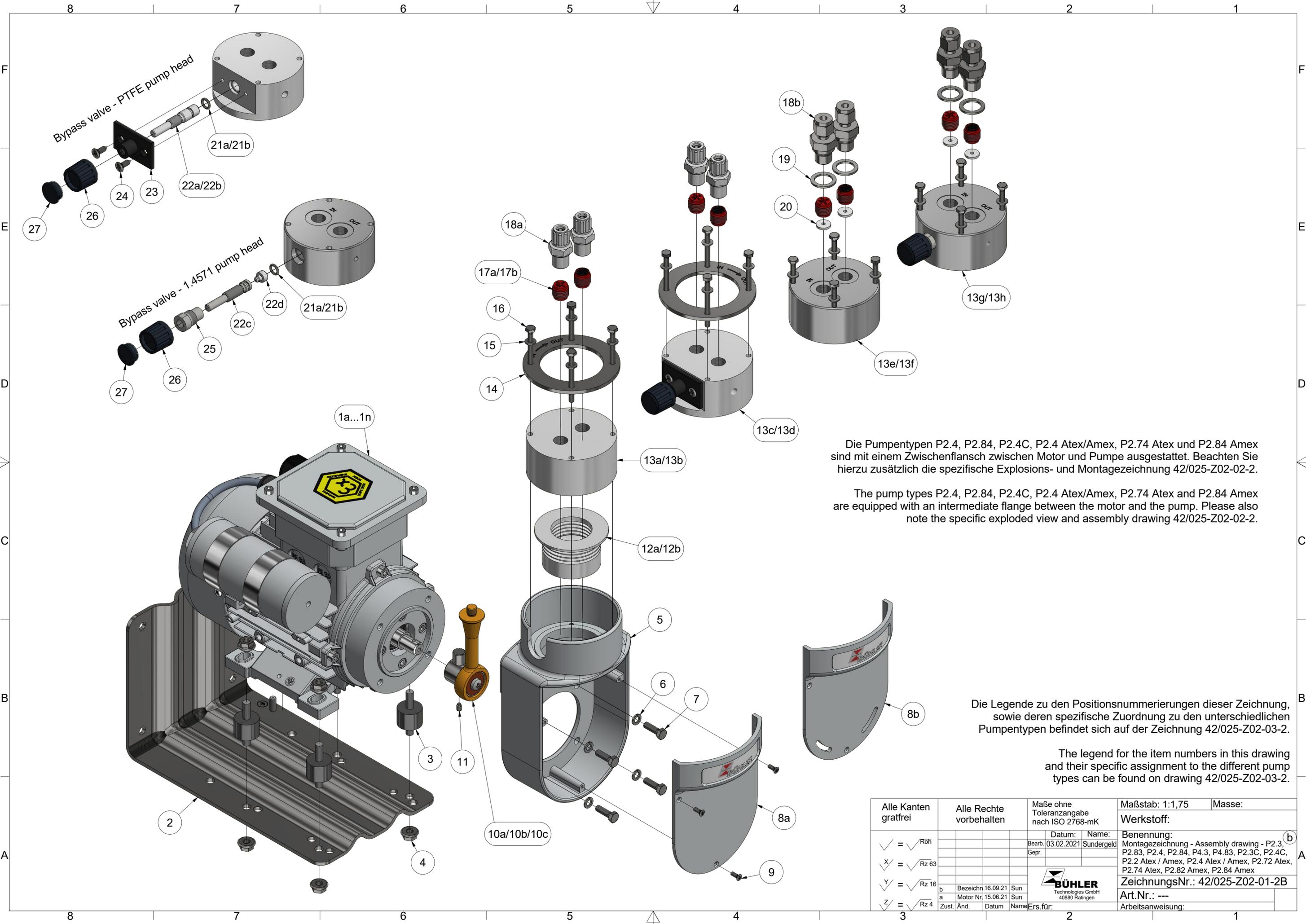
Chemical resistance for other substance on request.

9.7 User book (Please make copies)

Maintained on	Unit no.	Operating hours	Remarks	Signature

10 Attached documents

- Drawings: 42/025-Z02-01-2, 42/025-Z02-02-2; 42/025-Z02-03-2
- Declaration of conformity: KX 42 0010
- Operating 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.

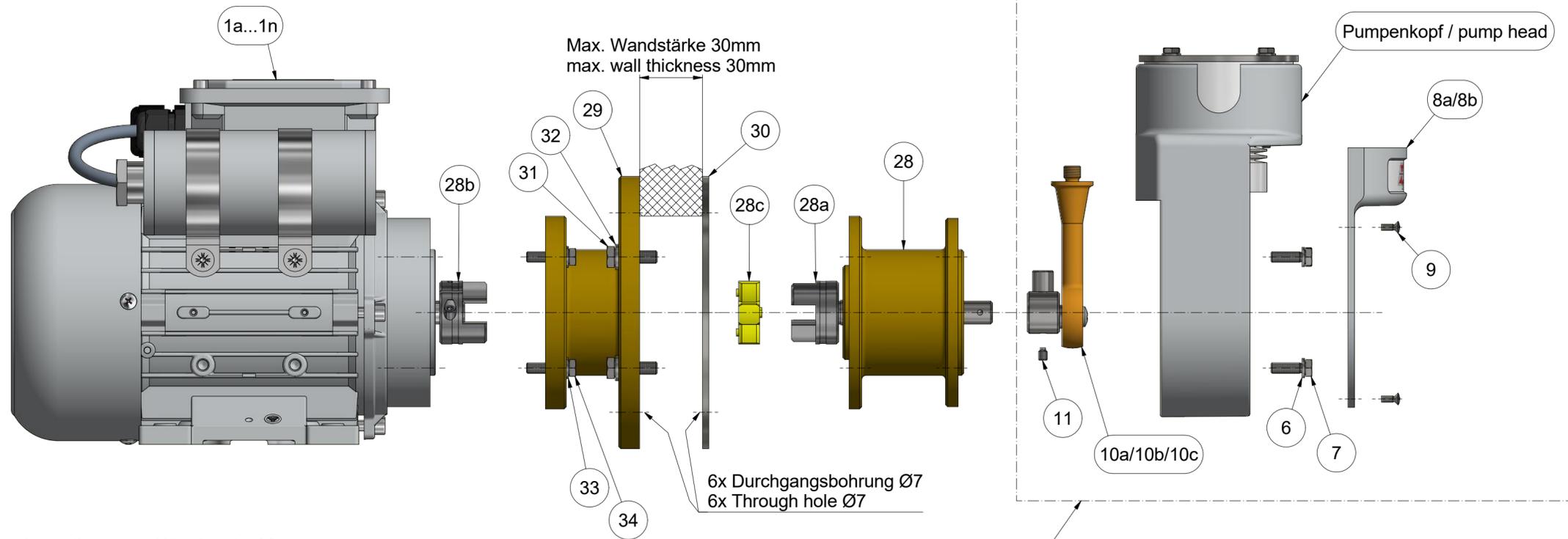
The pump types P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex and P2.84 Amex are equipped with an intermediate flange between the motor and the pump. Please also note the specific exploded view and assembly drawing 42/025-Z02-02-2.

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:
✓ = √R0h		Datum: 03.02.2021	Werkstoff:	
X = √Rz 63		Name: Sundergeld	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	
Y = √Rz 16		Bezeichn. 16.09.21	ZeichnungsNr.: 42/025-Z02-01-2B	
Z = √Rz 4		Motor Nr. 15.06.21	Art.Nr.: ---	
		Zust. And. Datum Name Ers.für:	Arbeitsanweisung:	





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 Kupplungsflansche 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 Kupplungsflansch bereits vormontiert und kann demnach auch betreiber-seitig ausgetauscht werden.

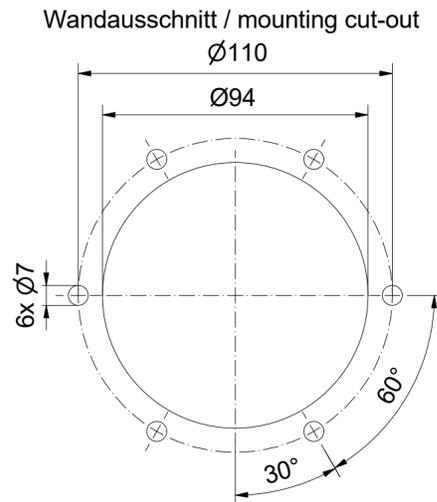
Assembly instructions:

- 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:
✓ = √R0h		Datum: 15.06.21	Werkstoff:	
✗ = √Rz 63		Bearb. 04.02.2021	Benennung: Montagezeichnung - Assembly drawing - P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex, P2.84 Amex	
✓ = √Rz 16		Gepr.	ZeichnungsNr.: 42/025-Z02-02-2A	
✓ = √Rz 4			Art.Nr.: ---	
		a Motor Nr. 15.06.21 Sun	Arbeitsanweisung:	
		Zust. Änd. Datum Name Ers.für:		



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
(MRL)
Artikel 2 a)

2006/42/EC
(MD)
Article 2 (a)

und erfüllen alle einschlägigen Anforderungen.

and fulfill all relevant requirements.

Folgende weitere Richtlinien wurden berücksichtigt:

The following directives were regarded:

2014/30/EU (EMV/EMC)
2014/35/EU (NSR/LVD)

Produkt / products: Messgaspumpe /Sample gas pump
Typ / type: P2.2 Atex, P2.4 Atex, P2.72 Atex, P2.74 Atex

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

 II 2G Ex h IIC T3 Gb X Typ / type: P2.72 Atex, P2.74 Atex

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

Zusätzlich wurden berücksichtigt:
In addition, the following standards have been used:

EN 1127-1:2011

EN ISO 12100:2010

EN 61010-1:2010

CE-Erklärung Zulieferer:
CE-Declaration Supplier

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

Eingeschaltete Benannte Stelle:
Engaged Notified Body:

Eurofins Produkt Testing Italy S.r.l.
Nummer 0477

Nr. der Konformitätsbescheinigung:
No. of Certificate

EPT 17 ATEX 2588 X

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 01.03.2021


Stefan Eschweiler
Geschäftsführer – *Managing Director*


Frank Pospiech
Geschäftsführer – *Managing Director*

GB **Ex** **ORANGE1**
ELECTRIC MOTORS

Motors series O-M

Safety, installing maintenance instructions

www.orange1.eu

(Rev.00 – 28-01-2019)

1. GENERAL SAFETY INFORMATION

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

Ex 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.

Ex 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/UE) Directive and no particular shielding is necessary when connected to a pure sinewave voltage supply.

Ex 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

Ex 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 ($v_{eff} < 0,2 \text{ mm/s}$) area to prevent bearing damage. Before commissioning, the insulation resistance must be measured. In case of values $< 1,5 \text{ M}\Omega$ the winding must be dried. Contact our technical department directly for information on the drying procedure.

3. INSTALLATION

Ex 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.).

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.

In-VI of use anti-condensation heaters, is possible to supply the motor on rated 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.

Ex 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

Ex 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	T.amb	Standard
GAS	Ex eb	-40°C, +60°C	IEC/EN 60079-0, 7
	Ex db	-40°C, +60°C	IEC/EN 60079-0, 1
DUST	Ex tb	-40°C, +60°C	IEC/EN 60079-0, 31

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

Cable gland thread	Motor size	Range of cable diameter (mm)
M16x1,5	(*) on request	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 glands shall be completely screwed to the motor with a tightening torque of 5Nm

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 and screwing them completely in respect of the tightening torque of 5Nm.

4. CONNECTION TO THE POWER SUPPLY

Ex 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.

Ex 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 $\pm 5\%$ on voltage and $\pm 1\%$ on frequency indicated on the nameplate (X on the certificate number).

For motor with temperature class T3 and T4 is possible to have $\pm 10\%$ 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.

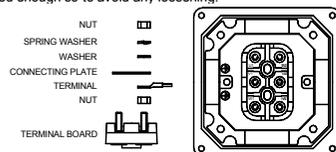
Check and make sure that, in the case of star /delta start, the switching from star to delta can only be executed after the starting current of the star step has fallen; this is important because of the risk of not allowed operational loads.

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.

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

Ex The Ex d motors have a normal terminal board.

The power connection shall be made as in the picture. The nuts shall have to be tightened enough so to avoid any loosening.



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

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

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

Connection of auxiliary cables ("e" terminal box)

Ex 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

Ex 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

Ex 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.

Heaters

Ex 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 ($\pm 10\%$).

Permissible load

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

Motor size	Bearings	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

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 (see above).

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 $Pn < 15 \text{ kW}$ $v_{eff} < 4,5 \text{ mm/s}$ for $Pn > 15 \text{ kW}$) 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.

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 characteristics 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.

Taglia Motore	Flange	Piedi	Coperchio scatola morsetti
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
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

D  

Motorenreihe O-M

Sicherheits-, Installations- und Wartungsanleitung

www.orange1.eu
(Rev.00 – 28-01-2019)

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 STAUBE.

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, +60°C 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, +60°C	Zones 1, 2
STAUB	II 2D Ex tb IIC T125°C T.amb -40°C, +60°C (maximale Dicke der Staubschicht 5mm)	Zones 21, 22

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

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

⚠ 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 ernsthaften 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/EU) 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 Zusatzrichtungen!). 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. Würden zwei Hebeösen mitgeliefert sind diese auch zu benutzen.

Lagern Sie Niederspannungsmotoren in trockener, staub- und vibrationsfreier Umgebung ($v_{eff} < 0,2 \text{ mm/s}$) um Lagerschäden zu vermeiden. Vor Inbetriebnahme messen Sie den Isolationswiderstand. Bei Werten $< 1,5 \text{ M}$ 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.).

Die Anschlussstelle 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 Riemenanspannung 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 Weiterextremen zu schützen.

Ist die Wicklung des Motors nicht mit einem entsprechenden Schallanlage angeschlossenen Temperaturmesswandler ausgestattet, ist es ratsam den Motor gegen Überstrom und mit einem Drehmomentbegrenzer zu schützen.

Bei einer Umgebung mit starken Temperaturschwankungen oder hoher Luftfeuchtigkeit, kann Orange1 EM den Motor mit einer Stillstandheizung ausstatten. Dichtungen und Schrauben sind so ausgelegt, dass die IP Klassifizierung gewährleistet ist.

⚠ Bei einer Flanschmontage B14 ist darauf zu achten, dass die Befestigungsschrauben genau in der Länge zu den Gewindelöchern passen. Zu lange Schrauben können die Motorwicklung beschädigen.

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.

	Schutz	Tamb	Normen
GAS	Ex eb	-40°C, +60°C	IEC/EN 60079-0, 7
	Ex db	-40°C, +60°C	IEC/EN 60079-0, 1
STAUB	Ex tb	-40°C, +60°C	IEC/EN 60079-0, 31

Kabelverschraubung	Motor Größe	Kabeldurchmesser (mm)
M16x1.5	(*) on request	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

Die Kabelverschraubungen sind gut an den Motor festzuschrauben: Anzugsdrehmoment 5 Nm

Da die Füße am Gehäuse (BG 63 – BG 160) in drei verschiedenen Positionen angebaut werden können, kann auch der Klemmkasten links, rechts oder oben auf dem Motor montiert werden.

Die Kabeleinführungen am Klemmkasten sind, je nach Bedarf, von vier Seiten möglich.

Dies erfolgt vor dem Anschluss, indem man den Klemmkastendeckel entfernt, die 4 Befestigungsschrauben des Klemmkastens löst und diese wieder unter Beachtung des korrekten Anzugsmoments 5 Nm festschraubt.

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 sicheren Bereich oder in einem extra dafür ausgelegtem explosionsgeschützten Gehäuse.

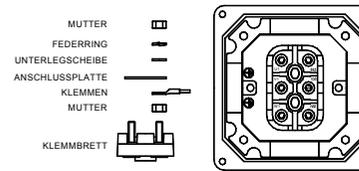
⚠ Prüfen Sie immer die Daten zur Spannung und Frequenz um sicher zu stellen, dass der Motor auch wirklich für diese Stromversorgung ausgelegt ist.

Wenn nicht anders angegeben, ist eine Toleranz von $\pm 5\%$ bei der Spannung und $\pm 1\%$ bei der Frequenz zu den gestempelten Daten zulässig. 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.



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

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 Schutzleitersanschluss 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
= S	$S \leq 16 \text{ mm}^2$
16	$16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$
$\geq 0,5 \text{ S}$	$S > 35 \text{ mm}^2$

Anschluss zusätzlicher Kabel (Exe Klemmkasten):

⚠ Besitzt der Motor zusätzliche Kontakte auf dem Klemmenbrett, kann dort ein Thermoanschütz und/oder eine Stillstandheizung angeschlossen werden. Sollte das Klemmenbrett nur über 6 Kontakte verfügen, erfolgt der Anschluss des Schutzschützes und der Stillstandheizung indem man deren Drähte mit den Kabeldrähten verflocht und einer geschrumpten 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 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.

Stillstandheizung

⚠ Diese Heizung ist nur bei ausgeschaltetem Motor in Betrieb.

Zulässige Belastung: Bei einer angennommener Lebenszeit von 20.000 h bei 2-Pol Motoren und 40.000 für 4,6,8-Pol Motoren.

BG	Lager	Max radial Last in L2	Max axial Last (Schub)	Max axial Last (Druck)
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

Erlaubte Zolldienste

S1, S2, S3 S9

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
	 (*) 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 Explosionsgesch. Motor und Klemmenkasten
	Ex dbeb Explosionsgesch. Motor und Klemmenkasten, 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 regelmäßige 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
- ($v_{eff} < 3,5 \text{ mm/s}$ für $P_n < 15 \text{ kW}$)
- ($v_{eff} < 4,5 \text{ mm/s}$ für $P_n > 15 \text{ kW}$)
- 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  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.

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	Klemmkastendeckel
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 NUT M8	M5x14
112	M8x20	M8x35 NUT M8	M5x14
132	M10x20	M10x50 NUT M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20

Schraubengüte 8.8



Instrucciones de Instalación, seguridad y mantenimiento.

www.orange1.eu

(Rev.00 – 28-01-2019)

1. INFORMACIÓN DE SEGURIDAD GENERAL

EX Estas instrucciones de seguridad se refieren a la instalación, utilización y mantenimiento de los motores de la serie OM para ser utilizados 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 una 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 II 2G Ex db IIC T4 Gb II 2G Ex db IIC T5 Gb II 2G Ex db IIC T3 Gb II 2G Ex db IIC T4 Gb II 2G Ex db IIC T5 Gb	T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C	Zonas 1, 2
POLVO	II 2D Ex tb IIIC T125°C T.amb -40°C, +60°C (espesor máximo de la capa de polvo de 5 mm)		Zonas 21, 22

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

EX 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, conexión, conexión 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.

EX 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.

EX 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, rélo o arranque remoto, evite toda posibilidad de arranque inesperado, prestando atención a las recomendaciones específicas sobre la aplicación del equipo.

2. TRANSPORTE, ALMACENAMIENTO

EX 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 ef <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 de valores de <1,5 M Ω el bobinado debe secarse. Póngase en contacto con nuestro departamento técnico directamente para obtener información sobre el procedimiento de secado.

3. INSTALACIÓN

EX 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).

Los componentes de acoplamiento deben ser también equilibrados con una media claveta 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 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 hay 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.

EX 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

EX 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:

GAS	Tipo de protección	T.amb	Normativa
GAS	Ex db	-40°C, +60°C	IEC/EN 60079-0, 7
	Ex db	-40°C, +60°C	IEC/EN 60079-0, 1
POLVO	Ex tb	-40°C, +60°C	IEC/EN 60079-0, 31

Prensaestopas hilo	Tamaño del Motor	Diámetro del cable (mm)
M16x1.5	(*) on request	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 deberán estar completamente atornillados al motor.

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 enrosca por completo teniendo en cuenta el par de apriete (ver la tabla de los pares de apriete). Prensaestopa motor / terminal de la caja: el par de apriete 5 Nm

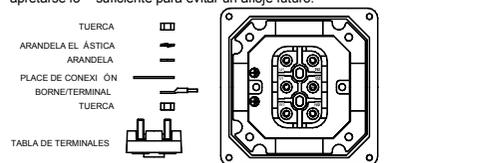
4. CONEXIÓN A LA RED ELÉCTRICA

EX 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/UE. 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. 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.

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

EX 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.



IMPORTANTE: Motores con caja de bornes Ex eb, SITÚE LA JUNTA (SEAL) EN LA POSICIÓN CORRECTA ANTES DE CERRAR LA CAJA DE BORNES Y DESTORNILLAR TOTALMENTE TODOS LOS TORNILLOS.

CONEXIÓN A TIERRA

EX 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 \leq 16 mm ²
16	16 mm ² < S \leq 35 mm ²
\geq 0,5 S	S > 35 mm ²

Conexión de cables auxiliares (Caja de terminales "e")

EX 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 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 tiorretáctil.

Protección

EX 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

EX En caso de que los motores vayan a trabajar con convertidor de frecuencia, 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.

Resistencias de caldeo

EX 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 (Thrust)	Max axial carg (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

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 (+b)	Atmosfera explosiva, por la presencia de vapor de gas combustible o vaho
	Ex db	Motor y caja de bornes antiinflamante
	Ex dbeb	Motor y caja de bornes antiinflamante 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
zzzz (*)	yyy	: número de tipo de certificado CE
		Organismo certificador, que notifica la garantía de calidad producto.
(*) Solo para marcado ATEX		

6. MANTENIMIENTO Y REPARACIÓN

EX 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.

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			

P  

Motores da série O-M

Instruções de instalação, segurança e manutenção.

www.orange1.eu

(Rev.00 – 28-01-2019)

1. INFORMAÇÕES GERAIS DE SEGURANÇA

⚠ Estas instruções de segurança referem-se à instalação, utilização e manutenção dos motores da série OM para uso em áreas de risco por presença de GASES e/ou POEIRAS combustíveis. Estas instruções são somente para pessoal qualificado. Qualquer abertura da carcaça anula as condições de garantia dos motores, com a exceção da abertura da caixa de ligação. Veja abaixo as diferentes marcações dos motores e as diferentes áreas em que podem ser usados:

GÁS	II 2G Ex db IIC T3 Gb II 2G Ex db IIC T4 Gb II 2G Ex db IIC T5 Gb II 2G Ex db IIC T3 Gb II 2G Ex db IIC T4 Gb II 2G Ex db IIC T5 Gb	T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C T.amb -40°C, +60°C	Zones 1, 2
POEIRA	II 2D Ex tb IIIC T125°C T.amb -40°C, +60°C (espessura máxima da camada de poeira 5mm)	T.amb -40°C, +60°C	Zones 21, 22

Os motores estão de acordo com os Requisitos Essenciais de Segurança para áreas classificadas descritas pelas seguintes normas europeias:

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

Máquinas rotativas elétricas podem apresentar perigo devido às altas temperaturas de superfície, bem como perigo físico devido às partes móveis. Todo o trabalho efetuado nos motores, incluindo o transporte, conexão, instalação e manutenção deve ser realizado por pessoal qualificado (de acordo com a norma IEC 364). O manuseio incorreto pode causar sérios danos às pessoas e/ou equipamentos.

⚠ É essencial analisar e verificar os dados impressos na placa de dados antes de operar o motor. Para motores de baixa tensão é necessário estarem em conformidade com a Diretriz 2006/42/EC. A partida está proibida até que a conformidade do produto final com esta diretiva seja atendida. Estes motores assíncronos estão de acordo com a Diretriz EMC (2014/30/UE) e nenhuma proteção especial é necessária se conectado a uma fonte de tensão puramente senoidal.

⚠ Antes de qualquer manuseio, verifique se o motor está parado e desconectado da fonte de alimentação (incluindo equipamentos auxiliares), para evitar qualquer possibilidade de partida inesperada por algum tipo de partida automática, relé ou partida remota. Preste atenção às recomendações específicas sobre aplicação do motor e/ou equipamento que este esteja conectado.

2. TRANSPORTE, ARMAZENAGEM

⚠ Após o recebimento, verifique se o motor não tenha sido danificado durante o transporte. Em caso de danos, estes devem ser comunicados imediatamente ao serviço de transporte e a instalação do motor deve ser evitada.

Olhal de içamento, quando fornecido junto ao motor, deve ser apertado corretamente e ser utilizado para movimentar somente o motor sem outras cargas agregadas. Se necessário, utilizar dispositivos corretamente dimensionados para o transporte. Não içar o motor por nenhuma outra parte para movimentá-lo, a não ser o olhal de içamento.

Se houverem 2 olhais no motor utilize os dois para a movimentação do mesmo. Armazene os motores de baixa tensão em local seco, livre de poeira e vibração (v ef <0,2 mm/s) para evitar danos aos rolamentos. Antes da partida, a resistência de isolamento deve ser medida. Se os valores forem <1,5 M < o enrolamento deve ser seco. Entre em contato diretamente com o nosso departamento técnico para obter informações sobre o processo de secagem.

3. INSTALAÇÃO

⚠ A instalação do motor deve estar em conformidade com a norma IEC/EN 60079-14 ou regulamentos nacionais (edição atualizada). Antes da instalação em um ambiente explosivo, o instalador deve garantir que o motor está adequado para a área classificada, tendo em conta as diferentes substâncias inflamáveis na área de instalação (verifique a marcação na placa de dados antes da instalação).

O motor deve ser instalado apenas por pessoal qualificado com conhecimento de equipamentos elétricos para ambientes explosivos e

instalações elétricas em áreas de risco. A instalação deve ser realizada com o motor e a máquina desligados, sem alimentação e travado mecanicamente. A placa de dados informa a tensão e frequência da fonte de alimentação e todos os outros dados elétricos e mecânicos, assim como os dados de segurança relacionados ao motor (tipo de proteção, classe de temperatura, temperatura ambiente etc.).

Os componentes de acoplamento também devem ser balanceados com meia chaveta em uma superfície completamente lisa. Correas e polias de acoplamento devem ser montadas com as ferramentas corretas para evitar danos aos rolamentos do motor.

Após a instalação verifique se os componentes de acoplamento estão devidamente presos na ponta do eixo e devidamente empurrados até o final do eixo. Nos casos em que a engrenagem da roda dentada de acoplamento for mais curta do que a extremidade do eixo, a diferença deve ser compensada por um casquilho.

Polias muito grandes ou muito pequenas podem danificar a vida útil do eixo e dos rolamentos. Tração excessiva na correa pode reduzir a vida útil dos rolamentos ou até causar quebra do eixo.

Os motores devem ser instalados em uma posição tal que o ar de refrigeração (ventilação) pode entrar e sair facilmente. A ventilação não deverá ser impedida e se houver ar quente proveniente de outras máquinas, este não deve passar pelo motor. Para manter uma boa refrigeração do motor, mantenha uma distância mínima de 40 mm entre a tampa do ventilador e qualquer elemento capaz de reduzir o fluxo de ar da ventilação.

Evitar fontes de calor próximo ao motor que poderiam afetar a temperatura tanto do ar de refrigeração quanto do motor em si. Se instalado ao ar livre, proteger o motor da luz solar e temperaturas extremas. Para montagem vertical com o eixo para baixo, utilize uma tampa para o ventilador estilo chapéu de chuva.

É aconselhável proteger o motor com dispositivos de sobre-tensão e limitadores de torque para os casos onde não há relés térmicos conectados aos sensores de temperatura (PTCs) das bobinas. No caso de ambientes com variações térmicas grandes ou em presença de umidade, a Orange1 EM equipa os motores com resistências de aquecimentos.

Em vez de usar aquecedores anti-condensação, é possível fornecer o motor nos pinos U1-V1 com uma tensão de 4-10% da tensão de fase nominal do motor; 20 a 30% da corrente nominal é suficiente para aquecer o motor.

⚠ Verificar o sentido de rotação do motor enquanto desacoplado. Prenda a chaveta para evitar um arremesso violento da mesma durante o giro do motor. Se o sentido de rotação não estiver correto, desligue o motor e espere até o motor parar completamente:

- no caso de motores de corrente alternada inverter duas fases na caixa de ligação.
- no caso de motores monofásicos observe o diagrama fornecido juntamente com o motor.

Entrada do cabo

⚠ Dependendo do tipo de proteção do motor, as entradas dos cabos devem estar de acordo com as regras prescritas na tabela abaixo e na mesma faixa de temperatura do motor:

	Proteção	T.amb	Norma
GÁS	Ex eb	-40°C, +60°C	IEC/EN 60079-0, 7
	Ex db	-40°C, +60°C	IEC/EN 60079-0, 1
POEIRA	Ex tb	-40°C, +60°C	IEC/EN 60079-0, 31

Rosca da prensa de cabos	Carcaça	Diâmetro do cabo (mm)
M16x1.5	(*) on request	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

Os prensa-cabos devem ser completamente parafusados ao motor.

Como os pés são removíveis, é possível instalá-los em três posições diferentes, podendo ter a caixa de ligação na parte superior, ou lado esquerdo ou direito do motor.

Ao mesmo tempo, a caixa de ligação pode ser girada diretamente no motor para que as entradas de cabos estejam no lado desejado. Assim, as entradas de cabo podem estar em quatro posições diferentes. Esta operação deve ser feita antes da conexão, desparafusando os 4 parafusos que conectam a caixa ao motor e apertando-os completamente com o torque informado na tabela abaixo.

Prensa-cabo do motor/ Caixa de ligação: torque 5 Nm

4. Conexão à rede elétrica

⚠ Somente pessoas qualificadas poderão conectar o motor à fonte de alimentação (rede elétrica).

A conexão do motor à rede elétrica deverá ser feita por cabos passando pelos prensa-cabos da caixa de ligação fornecidos com o motor ou através de prensa-cabos providenciados pelo instalador e que estejam de acordo com as normas europeias indicadas acima e em conformidade com a Diretriz 2014/34/EU.

Para o caso onde o motor é fornecido com cabos soltos para fora da caixa de ligação, as extremidades livres dos cabos devem ser conectadas em uma área segura (não explosiva) ou dentro de um painel certificado para ambientes explosivos.

⚠ Verifique sempre a tensão e dados de frequência na placa de dados para assegurar que o motor está adequado à rede elétrica. Se não for especificado, pode-se assumir uma tolerância de ± 5% de tensão e ± 1% de frequência em relação à informada na placa de dados.

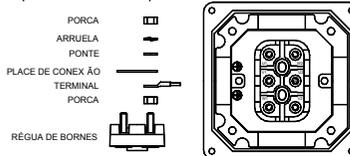
Os diagramas de conexão normalmente são fornecidos com o motor ou impressos na caixa de ligação. Se estiverem faltando, favor consulte este manual ou entre em contato diretamente com nosso departamento técnico.

Certifique-se de que, no caso de partida estrela / triângulo, a transição de strela para triângulo ocorra após a diminuição da corrente de partida do passo estrela. Este ponto é importante devido ao risco de carga inadequada. A bitola dos cabos deve ser adequada às características do motor e do tipo de instalação. Os motores devem ser protegidos por um dispositivo que, em caso de falha, corte a eletricidade antes que a temperatura da superfície exceda a temperatura de ignição do meio explosivo.

⚠ Motores com caixa de ligação de segurança aumentada ("eb") são fabricados com régua de bornes especiais aumentando a distância entre contatos elétricos e aumentando assim a isolamento elétrica.

⚠ Motores do tipo Ex d têm régua de bornes padrão.

A conexão da alimentação deverá ser feita com no diagrama. As porcas devem ser apertadas o suficiente para evitar futuro afrouxamento.



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

IMPORTANTE: Motores com caixa de ligação Ex eb: REINSTALE A VEDAÇÃO NA POSIÇÃO CORRETA ANTES DE FECHAR A CAIXA DE LIGAÇÃO E APERTAR TODOS OS PARAFUSOS.

Aterramento

⚠ Além do terminal do parafuso terra instalado dentro da caixa de ligação, deve haver outro terra externo na carcaça do motor. Se os condutores de linha tiverem uma seção S, os terra precisam ser:

Condutor terra	Condutores de linha
= S	S ≤ 16 mm²
16	16 mm² < S ≤ 35 mm²
≥ 0,5 S	S > 35 mm²

Conexão dos cabos auxiliares (Caixa de ligação "e")

⚠ Se o motor estiver equipado com terminais auxiliares para proteção térmica e resistência de aquecimento, a conexão dos mesmos pode ser feita nestes terminais. Se o motor estiver equipado com apenas uma régua de bornes e somente com 6 pinos, a conexão da proteção térmica e da resistência de aquecimento precisa ser efetuada soldando-se os fios dos dispositivos auxiliares com os cabos que irão ao painel elétrico e o isolamento da conexão deve ser do tipo termo encolhível.

Proteção

⚠ O motor deve ser protegido por um dispositivo de disparo que, em caso de falha, corte a eletricidade do motor de modo que a temperatura de superfície das partes em contato com a ambiente explosivo não atinja a temperatura de ignição do gás ou poeira.

Motores com inversores

⚠ Se os motores estiverem trabalhando com inversores de frequência, eles deverão ter proteção térmica no enrolamento (geralmente termostatos PTC), capazes de assegurar o seu funcionamento dentro dos limites das classes de temperatura. Estes devem ser ligados a um dispositivo de controle capaz de cortar a energia elétrica do motor quando este atingir o limite de temperatura.

Resistências de aquecimento

⚠ Resistências de aquecimento somente devem ser energizadas quando o motor não estiver conectado à rede.

Carga admissível

Supondo uma vida útil de 20.000h para motores de 2P e 40.000h para 4,6,8P:

Carcaça	Rolamento	Carga máx. radial em L/2	Carga máx. axial (empurra)	Carga máx. axial (puxa)
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

Serviços de serviço permitido

S1, S2, S3, S9

Motores servo-ventilados (IC416)

No caso de motores com ventilação forçada (IC416), o motor principal deve ser alimentado somente quando a ventilação auxiliar estiver funcionando.

5. IDENTIFICAÇÃO

CE (*)	Identificação de conformidade com as diretrizes europeias	
Ex (*)	Identificação específica de proteção contra explosão	
II (*)	Motor para superfície em fábricas (diferente de minas)	
2 (+)	Categoria 2: Alto nível de proteção	
GAS	G (+)	Ambiente explosivo devido a presença de gás, vapor ou névoa combustível
	Ex db	Motor e caixa de ligação à prova de chamas
	Ex dbeb	Motor à prova de chamas, de caixa de ligação com segurança aumentada
	IIC	Grupo de gás, adequado a IIA e IIB
DUST	T3, T4, T5	Classe de temperatura
	D (*)	Ambientes explosivos devido à presença de poeira combustível
	Ex tb IIC	Painéis tb indicados para zona 21 (cat. 2D)
	T125°C	Temperatura máxima de superfície
T.amb	Temperatura ambiente	
AB xx ATEX yyy	AB: laboratório emissor do certificado CE xx: ano de emissão do certificado yyy: número do certificado tipo CE	
ZZZZ (*)	Entidade certificadora que fornece a notificação de Garantia de Qualidade de Produto	
(*) Somente para marca ATEX		

6. MANUTENÇÃO E REPARO

⚠ A manutenção deve ser realizada apenas por pessoal qualificado, de acordo com os padrões da norma IEC/EN 60079-17 ou normas nacionais (última edição), onde o motor está instalado. Pessoal qualificado deve ter conhecimento de aparelhos elétricos para ambientes explosivos e instalações elétricas em áreas de risco.

- A cada 3000 horas de funcionamento, verificar e repor, se necessário, a graxa nas vedações radiais (por exemplo anéis em V ou V-ring).
- Verificar periodicamente (dependendo do ambiente e o ciclo de operação):
- a limpeza do motor (óleo, POEIRA, sujeira e detritos) e passagem livre de ar de refrigeração;
- o ajuste correto dos parafusos de fixação das conexões elétricas;
- os níveis de vibração permitidos (v ef <3,5 mm/s para Pn <15KW; v ef <4,5 mm/s para Pn >15KW) e a ausência de ruídos estranhos. Onde houver um alto nível de vibração e/ou ruído, verificar se a fixação e balanceamento do motor, assim como os rolamentos, estão em boas condições.

⚠ REPAROS serão feitos de acordo com as regras definidas pela norma IEC/EN 60079-19.

Estes reparos devem ser feitos apenas sob a supervisão e autorização da Orange1 EM ou uma assistência técnica certificada. Quando o reparo for conduzido por uma assistência técnica certificada, este deverá respeitar todas as características originais do motor e usar somente peças de reposição originais. Também deverá ser adicionado uma placa de identificação no motor com um símbolo para identificar o reparo, assim como o nome da empresa e seu número de certificação, número da operação de reparo e a data. Não é permitido modificar qualquer característica com relação ao tipo de proteção. Se qualquer uma destas condições não for respeitada, o motor perderá todas as suas propriedades e consequentemente a sua certificação.

7. COMPONENTES MODULARES

Os motores são completamente modulares. Os pés e as flanges podem ser montados sem afetarem o certificado ATEX, por serem externos e não estarem no âmbito da proteção. Na tabela abaixo estão os parafusos necessários para a montagem dos vários componentes modulares.

Carcaça	Flanges	Pés	Tampa da caixa de ligação
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 PORCA M8	M5x14
112	M8x20	M8x35 PORCA M8	M5x14
132	M10x20	M10x50 PORCA M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Rigidez dos parafusos 8.8			



Motori serie O-M

Istruzioni sicurezza installazione manutenzione

www.orange1.eu

(Rev.00 – 28-01-2019)

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 morsetteria, 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	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 dbdb IIC T3 Gb II 2G Ex dbdb IIC T4 Gb II 2G Ex dbdb IIC T5 Gb	T.amb -40°C , +60°C T.amb -40°C , +60°C T.amb -40°C , +40°C	
POLVERI	II 2D Ex tb IIC T125°C T.amb -40°C , +60°C (spessore max layer 5mm)	Zones 21, 22	

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/EN 60079-31

EX 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.

EX 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.

EX 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

EX 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 <1,5M, essiccare l'avvolgimento. Per la procedura di essiccazione rivolgersi direttamente al nostro ufficio tecnico.

5.....INSTALLAZIONE

EX 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.).

Gli organi di accoppiamento devono essere equilibrati con mezza chiave 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 parapigiolla.

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.

EX 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

EX 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:

GAS	Protezione	T.amb	Normative
GAS	Ex db	-40°C , +60°C	IEC/EN 60079-0, 7
	Ex eb	-40°C , +60°C	IEC/EN 60079-0, 1
POLVERE	Ex tb	-40°C , +60°C	IEC/EN 60079-0, 31

I passaggi cavo dovranno essere avvitati sul motore fino in fondo.

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

Filetto pressacavo	Grandezza Motore	Diametro cavi (mm)
M16x1.5	(*) on request	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.

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 morsetteria 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 riavvitando nel rispetto della coppia di serraggio (vedi la tabella con le coppie di serraggio).

Pressacavo scatola/motore: coppia di serraggio 5Nm

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.

EX 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 (the X on the certificate number). 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 morsetteria. Qualora mancassero, fare riferimento a quelli forniti nel presente manuale.

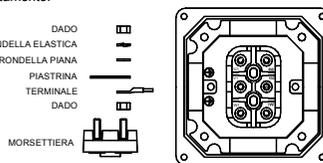
Assicurarsi che, nel caso di avviamento stella/triangolo, il passaggio da stella a triangolo sia eseguito solo quando la corrente di avviamento sia diminuita al valore corrispondente a quello di stella: ciò è importante per evitare il rischio di sovraccarichi non ammessi.

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 morsetteria standard.

Le connessioni di potenza devono essere realizzate come in figura. I collegamenti devono essere sufficientemente stretti in modo da evitare ogni tipo di allentamento.



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

Collegamento di terra

EX In aggiunta al collegamento di terra effettuato all'interno della scatola morsetteria, 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 ≤ 16 mm²
16	16 mm² < S ≤ 35 mm²
≥ 0,5 S	S > 35 mm²

Protezione termica

EX 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

EX Nel caso in cui i motori vengano alimentati tramite inverter, 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.

Scaldiglie

EX 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 (*)	Marcatatura di conformità alle direttive Europee	
EX (*)	Marcatatura 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 dbdb	Motore antideflagrante, scatola a sicurezza aumentata
	IIC	Gruppo del Gas, idoneo anche per IIB e IIA
T3, T4, T5	Classe di temperatura	
POLVERE	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 certificato 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

EX 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.

EX Le RIPARAZIONI devono essere fatte in accordo con la normativa 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.

Nella tabella sottostante mostriamo le viti da utilizzare per il montaggio dei diversi componenti modulari.

I GIUNTI NON POSSONO ESSERE RIPARATI

7. COMPONENTI MODULARI

I motori 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	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	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



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, présentes dans la zone ou 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...).

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 aérauliques 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, intervenir 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	Tamb	Normes
GAZ	Ex eb	-40°C , +60°C	EN 60079-0, 7
	Ex db	-40°C , +60°C	EN 60079-0, 1
POUSSIERES	Ex tb	-40°C , +60°C	EN 60079-0, 31

Filetage de presse-étoupe	Taille du moteur	Diamètre du câble (mm)
M16x1,5	(*) on request	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 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

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 orientés 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/UE.

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.

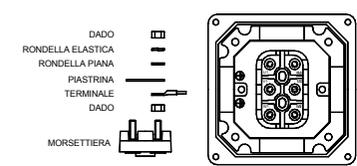
Il est important afin d'éviter les risques de surcharge ampère-métriques non autorisée dans le cas d'un démarrage Y / D, de vérifier et d'être certain que la connexion se réalise après que la période de démarrage soit terminée.

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



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

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

Mise à 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 « e », pour moteurs Exde.

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 la 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 ou 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.

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 (tiré)
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, S2, S3, S9

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

CE (*)	Marquage de conformité des Normes Européennes	
Ex (*)	Marquage spécifique des matériels de protection contre l'explosion	
II (*)	Zone de surface (différents des mines zone I)	
2 (*)	Category 2: high level of protection	
GAZ	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	
POUSSIERES	D (*)	Atmosphère explosive due à la présence de poussières explosives
	Ex tb IIC	ID Encointe, 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 connexions 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..

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 BàB
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 NUT 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

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 la marcatura

Bearing the marks / Marques / Kennzeichnung / Que llevan marcado

CE	0477		II 2G Ex db IIC T3 Gb or II 2G Ex db IIC T3	T _{amb} -40°C +60°C	EPT 17 ATEX 2588 X
CE	0477		II 2G Ex db e IIC T3 Gb or II 2G Ex db eb IIC T3	T _{amb} -40°C +60°C	EPT 17 ATEX 2588 X
CE	0477		II 2G Ex db IIC T4 Gb or II 2G Ex db IIC T4	T _{amb} -40°C +60°C	EPT 17 ATEX 2588 X
CE	0477		II 2G Ex db e IIC T4 Gb or II 2G Ex db eb IIC T4	T _{amb} -40°C +60°C	EPT 17 ATEX 2588 X
CE	0477		II 2G Ex db IIC T5 Gb or II 2G Ex db IIC T5	T _{amb} -40°C +40°C	EPT 17 ATEX 2588 X
CE	0477		II 2G Ex db e IIC T5 Gb or II 2G Ex db eb IIC T5	T _{amb} -40°C+40°C	EPT 17 ATEX 2588 X
CE	0477		II 2D Ex tb IIIC T125°C	T _{amb} -40°C +60°C	EPT 17 ATEX 2588 X

Sono prodotti da/ Are manufactured by/ Sont fabriqués par la société/ Wurden gefertigt von/ Han sido fabricadospor

ORANGE 1 ELECTRIC MOTORS S.P.A.

*in accordo alle seguenti Direttive CE/in compliance with the EC Directives/ selon les Directives CE suivantes
et 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

(ATEX)
(EMC)
(Machinery)
(RoHS III)

*e in conformità alla 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 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-31:2014, EN 60079-7:2015
EN 60034-1,2,5,6,7,9,12,14, IEC60072-1, EN 60259

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 Mashinenhersteller/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 está correctamente controlada por el
constructor de la màquina. El motor no debe entrar en servicio hasta que la màquina en que ha sido incorporado disponga de la declaration de
la directive maquinaria*

Product Quality Assurance Notification Number: EPT 18 ATEX 2964 Q

Notified by Eurofins Product Testing Italy S.r.l. – Notified Body n.0477 - Via Courgné 21 - 10156 Torino Italy

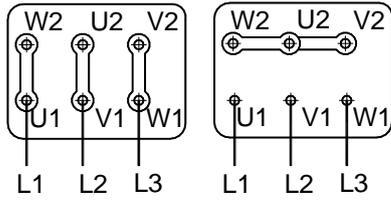
14/05/2020



Armando Donazzan
Legale Rappresentante

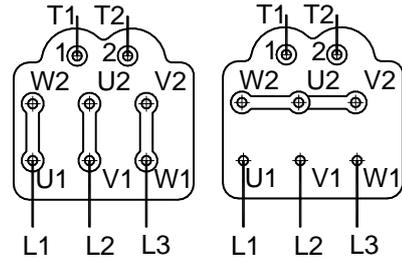
Schemi di collegamento / Wiring diagrams

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

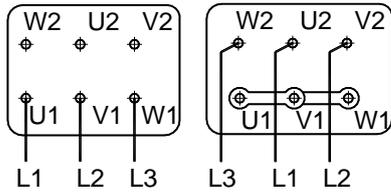
(Y) Collegamento stella
Tensione superiore
Star connection
higher voltage



(D) Collegamento delta
Tensione inferiore
Delta connection
lower voltage

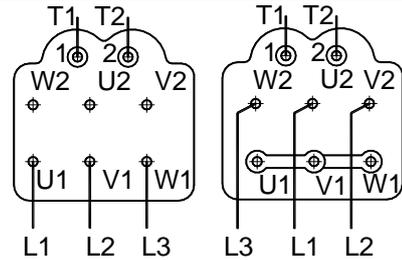
(Y) Collegamento stella
Tensione superiore
Star connection
higher voltage

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



Bassa velocità – Low speed

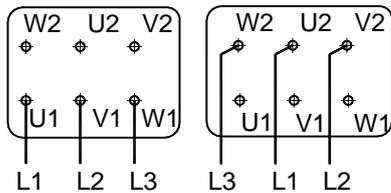
Alta velocità – high speed



Bassa velocità – Low speed

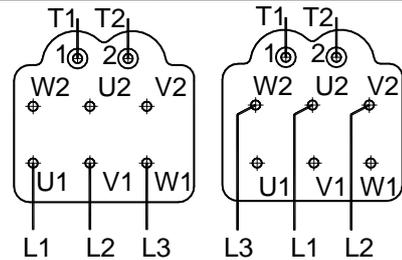
Alta velocità – high speed

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



Bassa velocità – Low speed

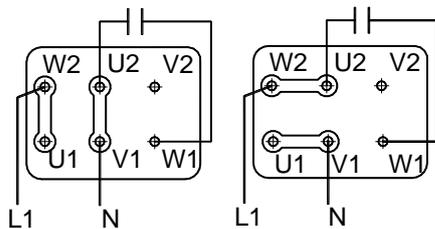
Alta velocità – high speed



Bassa velocità – Low speed

Alta velocità – high speed

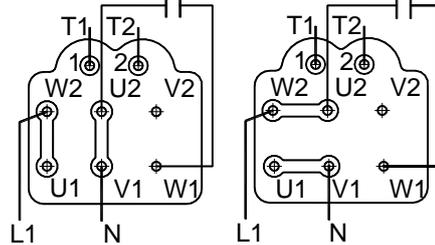
Monofase 4 fili – Single-phase 4 wires



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

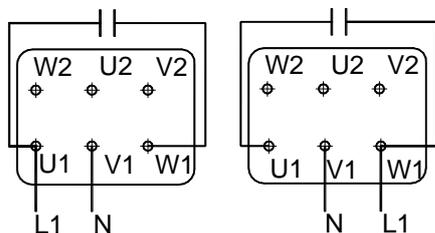
Monofase 4 fili con protezione termica Single-phase 4 wires with thermal protection



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

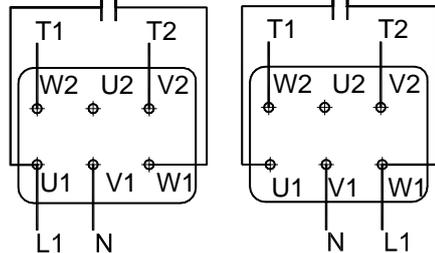
Monofase 3 fili – Single-phase 3 wires



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 and Protective System intended for use in potentially explosive atmospheres
Directive 2014/34/EU – Annex III**

[3]

Certificate Number: **EPT 17 ATEX 2588 X** Issue 1

[4]

Equipment: **Electric motor**

Series: **O-M**

[5]

Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A.**

[6]

Address: **Via Mantova n° 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 26 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.19.REL.02/56858

[9]

Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the standards:

EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-31:2014, EN 60079-7:2015

[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 at least one of the following string:

II 2G Ex db IIC T3 Gb	-40°C ≤ T _{amb} ≤ +60°C
II 2G Ex db eb IIC T3 Gb	-40°C ≤ T _{amb} ≤ +60°C
II 2G Ex db IIC T4 Gb	-40°C ≤ T _{amb} ≤ +60°C
II 2G Ex db eb IIC T4 Gb	-40°C ≤ T _{amb} ≤ +60°C
II 2G Ex db IIC T5 Gb	-40°C ≤ T _{amb} ≤ +40°C
II 2G Ex db eb IIC T5 Gb	-40°C ≤ T _{amb} ≤ +40°C
II 2D Ex tb IIIC T125°C Db	-40°C ≤ T _{amb} ≤ +60°C

Place and date of issue:
Torino, 2019-02-08



Dionisio Bucchi
Dionisio Bucchi
Directive Responsible

Paolo Trisoglio
Paolo Trisoglio
Managing Director

eurofins

Notified Body N. 0477



PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This Certificate has 4 pages and it is reproducible only in its entirety. Conditions of validity are reported below.



[13]

ANNEX

[14]

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

Issue 1

[15] Equipment description

The three-phase and single-phase asynchronous squirrel cage rotors motors, series O-M, supplied by mains or inverter, are identified by a code as follows:

		OD	063	A	4	H	230	5	P	4	U
Motor Type											
MD	Single Phase Ex d	ME	Single Phase Ex de								
OD	Three Phase Ex d	OE	Three Phase Ex de								
Shaft height											
56, 63, 71, 80, 90, 100, 112, 132, 160, 180											
Stator Dimensions											
A, B	56, 63, 71, 80										
S, L	90 - 132 - 160 - 180										
K, M	100 - 132 - 160 - 180										
Poles											
2, 4, 6	Single phase motor										
2, 4, 6, 8	Three phase motor 1 speed										
3, 5, 7, 9	Three phase motor 2 speed 2/4, 4/8, 4/6, 6/8 poles - constant torque										
C, D, E, F	Three phase motor 2 speed 2/4, 4/8, 4/6, 6/8 poles - quadratic torque										
Mounting System (See technical note)											
Supply Voltage											
For double voltage motors is indicated the lowest (ex. 230 for 230/400)											
Frequency											
5	50Hz										
6	60Hz										
7	50/60Hz										
Protection											
P	Motor 2G										
Q	Motor 2GD										
Temperature class											
3	Temperature class T3 (200°C)										
4	Temperature class T4 (135°C)										
5	Temperature class T5 (100°C)										
Thermal protectors											
-	Without protectors										
3	Protector (PTO) - temperature class T3										
4	Protector (PTO) - temperature class T4										
5	Protector (PTO) - temperature class T5										
P	PTC - temperature class T3										
U	PTC - temperature class T4										
V	PTC - temperature class T5										


PRD N° 119B
 Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
 Signatory of EA, IAF and ILAC Mutual Recognition Agreements



 Dionisio Bucchieri
 Directive Responsible

 Page 2 of 4
 2019-02-08

[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2588 X Issue 1


The three phase and single-phase asynchronous motors series O-M are made of aluminum (the paint used has a maximum thickness of 0.2 mm) with separate components: motor enclosure, terminal box for supply and a 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";

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, capacitor).

The anti-condensation heater can be activate 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 zone.

Electrical characteristics:
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: IP 66

Ambient temperature: $-40 \div +40$ °C (or $+60$ °C for T3,T4 class of temperature)

Temperature classes and Maximum surface temperature:

T5, T4, T3, T 125°C as a function of the ambient temperature and of the electrical characteristics as indicated in the technical note.

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 control device conforming to EN 50495.

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.

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.

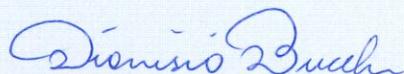
Impellers for Ex tb or Ex db tb or Ex db motors (which have a peripheral speed below 50 m/s) are made of plastic dissipative material or metallic material.

The degree of protection (IP) of ventilation openings are:

- IP 20 on the air inlet side
- IP 10 on the air outlet side



PRD N° 119B
 Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
 Signatory of EA, IAF and ILAC Mutual Recognition Agreements



Dionisio Buccheri
 Directive Responsible

Page 3 of 4
 2019-02-08



[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2588 X Issue 1
Cable entries

The cable entries integrated in motor body, terminal box, capacitor box are part of this certification.
All the other cable entries devices used on the enclosures are already properly certified.

The accessories used for cable entries and for unused holes must be subjected to a separate ATEX certification according to the applicable standards IEC 60079-31 and IEC 60079-1 or IEC 60079-0.

Warning label

"Flameproof joints cannot be repaired"

"Use screws quality 8.8"

[16] Assessment Report n° EPT.19.REL.02/56858

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.

[18] Essential Health and Safety Requirements

Assured by compliance with harmonized standards.

[19] Descriptive documents

The equipment objects of this Certificate is described by the following documents.

Scheduled documents are indicated with the symbol "✓". They cannot be modified without the explicit authorization of the Notified Body.

Document	Name	Rev	Date	Sched.
Technical Note	Technical Note Asynchronous Motors Series O-M sizes 56-180	00	2019-01-28	✓
Safety instructions	Motors Series O-M safety, installing maintenance instructions	00	2019-01-28	✓
Assembly drawing _motor_Exd	Assieme_motore_Exdb_ATEX-IECEX	00	2019-01-28	✓
Assembly drawing _motor_Exde	Assieme_motore_Exdbeb_ATEX-IECEX	00	2019-01-28	✓
Drawing – capacitor enclosures	Custodia_condensatore_Exdb_ATEX-IECEX	00	2019-01-28	✓

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

[21] Certificate History

Issue	Description	Issue date
0	First emission, replacement of the EC-TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350 and its supplements n. 1 and 2.	2017-02-06
1	Constructive change and changing of manufacturer's references	2019-02-08



PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Dionisio Bucchieri
Dionisio Bucchieri
Directive Responsible

Page 4 of 4
2019-02-08

End of Certificate



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

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

Certificate No.: IECEx EUT 14.0001X Issue No: 2 Certificate history:
Status: **Current** Issue No. 2 (2019-02-08)
Date of Issue: **2019-02-08** Page 1 of 4 Issue No. 1 (2017-03-10)
Applicant: **ORANGE1 ELECTRIC MOTORS S.p.A.** Issue No. 0 (2014-03-07)
Via Mantova, 93
43122 Parma
Italy

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 T3, T4 or T5 Gb
Ex tb IIIC T125°C Db
or
Ex db eb IIC T3, T4 or T5 Gb
Ex tb IIIC T125°C Db

Approved for issue on behalf of the IECEx
Certification Body:

Dionisio Bucchieri

Position:

Head of IECEx CB

Signature:
(for printed version)

Date:

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 the [Official IECEx Website](http://www.iecex.com).

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 Issue No: 2
Date of Issue: 2019-02-08 Page 2 of 4
Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A.**
Via Mantova, 93
43122 Parma
Italy

Additional Manufacturing location(s):

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 apparatus 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 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2014-06 Edition:7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-31 : 2013 Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
IEC 60079-7 : 2015 Edition:5.0	Explosive atmospheres – Part 7: Equipment protection by increased safety "e"

*This Certificate **does not** indicate compliance with electrical 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/ExTR14.0001/02](#)

Quality Assessment Report:

[IT/EUT/QAR14.0001/03](#)



IECEx Certificate of Conformity

Certificate No: IECEx EUT 14.0001X

Issue No: 2

Date of Issue: 2019-02-08

Page 3 of 4

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The three-phase and single-phase asynchronous squirrel cage rotor motors series O-M, are made of aluminium (the paint used has a maximum thickness of 0,2 mm) with separate parts: motor enclosure, terminal box for supply and a capacitor enclosure. The motors are suitable for Group IIC and IIIC.

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).

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 control device conforming to EN 50495.

A more detailed description is given in the annex

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



IECEX Certificate of Conformity

Certificate No: IECEx EUT 14.0001X

Issue No: 2

Date of Issue: 2019-02-08

Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

- Changing of manufacturer's references
- Use of metric threaded plugs in holes of flameproof terminal enclosure with a free internal volume up to 450 cm³ (which is possible for motors from size 63 to size 132)

Annex:

[Annex to CoC.pdf](#)

Annex to certificate: IECEx EUT 14.0001 X Issue N. 2 of 2019-02-08

General product information:

The three-phase and single-phase asynchronous squirrel cage rotors motors, series O-M, supplied by mains or inverter, are identified by a code as follows:

		OX	063	A	4	H	230	5	P	4	U
Motor Type											
MX	Single Phase Ex d	MY	Single Phase Ex de								
OX	Three Phase Ex d	OY	Three Phase Ex de								
Shaft height											
56, 63, 71, 80, 90, 100, 112, 132, 160, 180											
Stator Dimensions											
A, B	56, 63, 71, 80										
S, L	90 – 132 – 160 - 180										
K, M	100 – 132 – 160 - 180										
Poles											
2, 4, 6	Single phase motor										
2, 4, 6, 8	Three phase motor 1 speed										
3, 5, 7, 9	Three phase motor 2 speed 2/4, 4/8, 4/6, 6/8 poles – constant torque										
C, D, E, F	Three phase motor 2 speed 2/4, 4/8, 4/6, 6/8 poles – quadratic torque										
Mounting System (See technical note)											
Supply Voltage											
For two voltage motors is indicated the lowest (ex. 230 for 230/400)											
Frequency											
5	50Hz										
6	60Hz										
7	50/60Hz										
Protection (IP and Ex)											
P	Motor 2G										
Q	Motor 2GD										
Temperature class											
3	Temperature class T3 (200°C)										
4	Temperature class T4 (135°C)										
5	Temperature class T5 (100°C)										
Thermal protectors											
-	Without protectors										
3	Protector (PTO) – temperature class T3										
4	Protector (PTO) – temperature class T4										
5	Protector (PTO) – temperature class T5										
P	PTC – temperature class T3										
U	PTC – temperature class T4										
V	PTC – temperature class T5										

The motors are made of aluminium (the paint used has a maximum thickness of 0.2 mm) 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”;

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 activate 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 zone.

Electrical characteristics

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: IP 66

Ambient temperature: $-40 \div +40$ °C (or $+60$ °C for T3,T4 class of temperature)

Temperature classes and Maximum surface temperature:

T5, T4, T3, T 125°C as a function of the ambient temperature and of the electrical characteristics (as indicated in the technical note).

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 control device conforming to EN 50495.

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.

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 below 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



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 IEC Ex certified.

The accessories used for cable entries and for unused holes must be subjected to a separate IEC Ex certification according to the applicable standards IEC 60079-31 and IEC 60079-1 or IEC 60079-0.

Warning label

“Flameproof joints cannot be repaired”

“Use screws quality 8.8”

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.

RMA-Formular und Erklärung über Dekontaminierung

RMA-Form and explanation for decontamination



RMA-Nr./ RMA-No.

Die RMA-Nummer bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service./ You may obtain the RMA number from your sales or service representative.

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

Ansprechpartner/ Person in charge

Name/ Name
Abt./ Dept.
Tel./ Phone
E-Mail
Serien-Nr./ Serial No.
Artikel-Nr./ Item No.

Gerät/ Device
Anzahl/ Quantity
Auftragsnr./ Order No.

Grund der Rücksendung/ Reason for return

- Kalibrierung/ Calibration Modifikation/ Modification
 Reklamation/ Claim Reparatur/ Repair
 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-
heitsgefährlich/
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



Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies.

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.

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.

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.

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies.

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.

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.

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.

