BÜHLER TECHNOLOGIES

Fluidcontrol

Circulation pumps

BFP ATEX-2GD

Installation and Operation Instructions

Original instructions

BE370006
03/2019

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

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Contents

1 Introduction

1.1 Intended Use

BFP circulation pumps are used to convey oils in hydraulic and lubrication circuits. Their scope is indicated by their specifications. Various combinations of the equipment can be marketed.

The pumps are solely intended for proper and designated use in systems for industrial purposes and typical industrial atmospheres (without aggressive substances). They may only be used in accordance with the technical documentation and the specifications on the type plate. Any other applications require the prior approval of Bühler Technologies GmbH.

Non-compliance will void any and all warranty and manufacturer liability.

1.2 Model key

BFP 8-4-0.75kW-Atex-T4-BPx

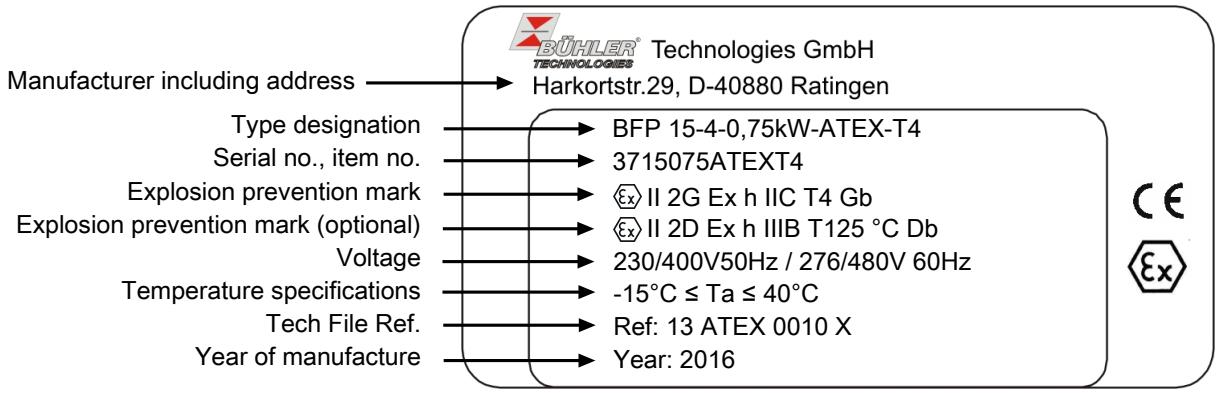
- Temperature class T4
- ATEX mark
- Motor power
- Number of motor contacts
- Pump output per litre

If a bypass is desired, the information is added to the to the type designation:

BFP 8-4-0.75kW-Atex-T4-BPx	Bypass version	**BP** **x**	**Bypass valve** **Bypass rate in bar**	**} not for BFP 60 and BFP 90**

1.3 Type plate

Example:



1.4 Scope of delivery

- BFP ATEX Circulation Pump
- Product documentation

2 Safety instructions

2.1 Important notices

Before installing the equipment, verify the application parameters for your pump meet the specifications and the approved ambient parameters. Further check if all contents are complete. **Please also note the motor operating instructions in the appendix.**

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,
- The specifications and markings in the type plate are observed,
- The threshold values in the data sheet and the instructions are observed,
- 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,
- All special requirements in the enclosed type examination certificate are observed.

Erecting electrical systems in explosive areas requires compliance with regulations EN 60079-14 and EN 60079-17.

Additional national regulations pertaining to initial operation, operation, maintenance, repairs and disposal must be observed.

These operating instructions including the instructions for add-on parts (e.g. motor) are a part of the entire 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

In this manual, the following warning signs are used:

 Warning against hazardous situations	 Warning against high pressure
 Warning against electrical voltage	 General notice
 Warning against hot surface	 Disconnect from mains
 Warning against environmental hazard	 Wear protection gloves
 Warning against potentially explosive atmospheres	

General explosion prevention information:

The equipment complies with the applicable standards and regulations and meet the requirements of directive 2014/34/EU.

Depending on the designation, the equipment may be used as follows:

a) In zone 1 (Gas-Ex, Category 2G) in explosion groups IIA, IIB and IIC (hydrogen only)
b) In zone 21 (Dust-Ex, Category 2D) in explosion groups IIIA (lint) and IIIB (non-conducting dusts)
c) In zone 2 (Gas-Ex, Category 3G) in explosion groups IIA, IIB and IIC (hydrogen only)
d) In zone 22 (Dust-Ex, Category 3D) in explosion groups IIIA (lint) and IIIB (non-conductive dusts)

The surface temperature qualification is T4. The equipment has no ignition sources for any gasses, vapours and mists with an ignition temperature > 135 °C. When using this equipment in T3 the limit temperature is > 200 °C. The equipment may therefore only be operated in atmospheres where the ignition temperatures are not lower than these values.

Installing add-on parts beyond the as-delivered condition may cause a rise in temperature. Be sure these do not exceed the temperature class marking.

Dust environment requirements

The pump may only be used in areas with an explosive dust atmosphere if the glow temperatures of the dust layers and the ignition temperatures of the dust atmosphere are higher than the following temperatures:

	Version T 125 °C	Version T 150 °C
Glow temperature (5 mm dust layer)	≥ 200 °C	≥ 225 °C
Dust atmosphere ignition temperature	≥ 188 °C	≥ 225 °C

Always note the explosion prevention mark in the name plate of your equipment (and all add-on parts).

Operating media requirements

In temperature class **T4** or **T125 °C**, respectively, only operation media with a flash point ≥ 175 °C may be conveyed through the pump.

In temperature class **T3** or **T150 °C**, respectively, only operation media with a flash point ≥ 200 °C may be conveyed through the pump.

ATEX marking on standard equipment

The ATEX mark depends on the version of the equipment and provides information on equipment category, equipment group, ex-atmosphere, ignition protection type. Please refer to the chart below for possible and complete markings.

Version for	Marking	Explanation
Gas	II 2G Ex h IIC T4 Gb	Zone 1, 2 (IIC hydrogen only) Temperature class T4
Gas	II 2G Ex h IIC T3 Gb	Zone 1, 2 (IIC hydrogen only) Temperature class T3
Dust	II 2D Ex h IIIB T125 °C Db	Zone 21, 22 max. surface temperature 125 °C
Dust	II 2D Ex h IIIB T150 °C Db	Zone 21, 22 max. surface temperature 150 °C

Gas and dust atmosphere must not be present at the same time.

Vibrations: Bühler pumps are subject to vibration testing per EN 14986. During use, however, external vibration or (in the event of a malfunction) vibration produced by the unit itself could result in premature damage to the motor mount. This can result in high, incendive temperatures or sparks on the motor mounts.

The equipment must be installed on a solid and vibration-free surface. Select an installation site so vibrations and resonances will not have a negative impact.

Please pay attention to any turbulent operation and unusual noise in all equipment. These can indicate damage to the motor bracket. The equipment must then immediately be put out of operation and replaced by Bühler. Please refer to the **Service schedule** for inspection intervals.

2.2 General hazard warnings

The equipment must be installed by a professional familiar with the safety requirements and risks.

Be sure to observe the safety regulations and generally applicable rules of technology relevant for the installation site. Prevent malfunctions and avoid personal injuries and property damage.

The operator of the system must ensure:

- Safety notices and operating instructions are available and observed,
- The respective national accident prevention regulations are observed,
- The permissible data and operational conditions are maintained,
- Safety guards are used and mandatory maintenance is performed,
- Legal regulations are observed during disposal,
- compliance with national installation regulations.

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.

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

Electrostatic propagating brush discharge

Propagating brush discharges are strong sources of ignition with a high energy content. The unit must not be used in processes generating high loads.

DANGER

Explosion hazard when exceeding the flash point of the fluid

The fluid may ignite when exceeding the flash point.
In temperature class T4 or T125 °C only convey fluids with a flash point ≥ 175 °C through the pump.
In temperature class T3 or T150 °C only convey fluids with a flash point ≥ 200 °C through the pump.

DANGER

Explosion hazard due to igniting dust layers

Dust accumulations can raise the equipment temperatures to prohibited levels.
Dust layers > 2 mm are prohibited and must therefore be cleaned regularly. When doing so, be sure not to cause dust clouds, which could ignite. Only clean insulating surfaces with a damp cloth.

WARNING

Hot surface

Risk of burns

Depending on the operating parameters and type, the housing temperature may reach up to 100 °C during operation.
Allow the unit to cool down before performing maintenance. Wear suitable protective gloves.

CAUTION

High pressure

Hazard of injury due to flung off parts or oil, environmental hazard due to oil.

a) Before starting any maintenance or repair to the oil circuit, make sure that the device is depressurized. This applies to the locking screws as well.

b) Avoid environmental pollution (oil spills) during cleaning or maintenance of the oil circuit.

c) Use drip pans.

3 Transport and storage

The products should be transported only in its original packaging or a suitable replacement. Secure device for transportation.

When not in use, protect the equipment against moisture and heat. Keep it in a covered, dry and dust-free room at ambient temperature.

4 Installation and connection

4.1 Installation site requirements

Be absolutely sure to only install equipment and accessories with EX classifications **meeting the prevailing EX zones / categories**.

Be absolutely sure to comply with the applicable national **erection regulations** (e.g. EN 1127-1, EN 60079-14, EN 61241-14) during installation/assembly.

On principle a **potential equalization** must be established in the system. Also observe the erection regulations in the country of use (e.g. VDE 0100 Part 540, IEC 364-5 54). Be sure no vagrant currents are conveyed through the pumps (e.g. produced through welding systems or motors in inverter operation). **The pumps must not be used in systems with cathodic corrosion protection.**

Ensure adequate ventilation. Be sure the hose is stable against negative pressure, e.g. steel wire reinforced.

4.2 Installing the pump

DANGER	**Explosion hazard due to:**
	**Failure to observe equipment specifications** Explosion hazard if operated outside the equipment specification. All pumps may only be operated within the specifications indicated. Please note the type plate and the specifications in these instructions. **Impact** Strong blows to the housing can produce sparks, which can ignite an EX atmosphere. Protect the equipment from external impact. Damaged / deformed housing parts must be replaced immediately.

The pumps are mounted in the installation site using four screws.

To protect the pumps and system from damage, the connections to the pump must be stress free. We recommend using flexible hoses.

When installing outdoors, be sure to consider the IP protection class of the motor and provide sufficient weather protection. Low outdoor temperatures can result in high starting pressures due to the higher viscosity of the oil. In this case you should consider using a bypass valve or / and heater.

Avoid possible leaks in the circuit to prevent environmental damages. If necessary, use an oil pan. Never install the pumps **above hot parts**, which could ignite leaking fluid / operating liquid. Select an installation site for your pump so that even in the event of a malfunction (e.g. pump or line leak) fluid / operating liquid will not be ignited by nearby hot parts.

4.3 Hydraulic connection

Arrows on the motor housing indicate the flow direction (FLOW) and the direction of motor rotation (M). Connect the lines stress and vibration free, so typically using hoses. Be sure to use suitable lines (with regard to fluid resistance, environmental influences, fire) when connecting to the hydraulic-, lubricant circuit.

Contaminated fluids impact the life of the pump, we therefore recommend a purity class of 23/19/13 per ISO 4406.

If your hydraulic system is equipped with control or shut-off valves, we urgently recommend protecting the pump with a pressure relief valve.

The distance between the pump (pump suction side) and tank should be as short as possible.

There should be no difference between the vertical height of the tank and pump / cooling system. The pump / the cooling system can also be installed below this level.

If the aggregate can only be installed above this level, the pump will have a constant suction pressure of 0.4 bar (atmosphere). Depending on the oil viscosity and temperature, this will result in a different suction lift. A difference in value of 2 m can be used as a guide.

Until the oil is heated to operating temperature, a suction pressure of 0.6 bar is permissible temporarily.

The diameter of the intake pipe should not be smaller than specified in the data sheet. We recommend a max. flow rate of 1.5 m/s.

When first starting up a hydraulic system with a long intake pipe can cause problems due to excess air in the intake pipe. In this case we suggest filling the suction pipe with oil and using a suction valve without spring.

Oil is sprayed into the pump housing during the assembly process at our factory. This is necessary to seal the gerator from the housing with an oil film. During extended periods of storage the pump housing may not have enough oil anymore to create this oil film when switching on the pump. The pump may then completely lose suction. Before connecting the suction pipe we recommend spraying some oil into the pump housing to prevent this.

The pump may be exposed to max. 0.5 bar of pressure on the suction side.

The pump head of all pumps can be mounted turned in 90° increments to align with the line routing. Please note the offset from the centre of the motor.

The connection threads are manufactured to ISO 228. The screw-in surfaces are finished and suitable for the use of soft seals. We recommend using screwed plugs per ISO 1179-2.

4.4 Electrical connections

CAUTION **Electric voltage**

An incorrect mains voltage can destroy the unit
The connection must be made by a trained professional. Observe the mains voltage indicated on the type plate. Make sure the cables have sufficient strain relief.
Fusing
Fusing must comply with applicable standards!
Polarity
Please note the direction of rotation of the motor when connecting: The direction of rotation is indicated on the pump head with “M” and an arrow.

The electrical circuits must be installed in accordance with the applicable erection specifications (by professionals). Electricity is connected via the terminals in the motor housing. Ensure proper installation and maintaining IP protection!

On principle the motor must always be connected under zero potential.

In EX areas, the electric circuits of the motor connection may only be put into operation by professionals with qualifications similar to a qualified person according to TRBS 1203. The specifications on the type plate must absolutely be observed.

Please also note the motor manufacturer’s operating instructions.

DANGER **Potential equalization/static charge**

Static charges can result in incendive sparking.
Avoid static charges. Any conductive pump parts must be grounded!
The housing or terminal box has a connection for an earth/equipotential bonding conductor. Ensure the housing is adequately earthed (minimum conductor cross-section 4 mm^2).
Particularly observe the requirements of EN 60079-14!

Use the applicable local regulations to determine the safety values and the cross-sections of connection leads. The motor and, if equipped, starting devices must be connected to protective earth.

Connect the protective earth of the motor to the protective earth on site. Protective earth per DIN VDE 0100 must be connected to the marked earth lead terminal.

DANGER **Motor connection, operation and maintenance**

Improper handling of the motor poses an explosion hazard.
Be sure to observe the separate instructions of the motor manufacturer.

Motor monitoring

Lead fuses protect the cables in case of a short circuit, but are not sufficient to protect the motor coils from overheating/burning due to overload. Therefore, install an adequate motor circuit breaker with high precision range of adjustment for thermal protection to protect the motor against overload and operation with two phases

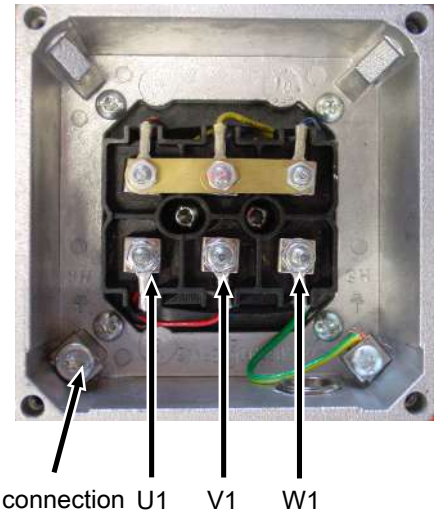
Adjust the **motor circuit breaker** according to the nominal current specified on the type plate of the motor. Operation outside the specified mains voltage and frequency range limits is prohibited.

The operator of the equipment is responsible for ensuring lightning protection.

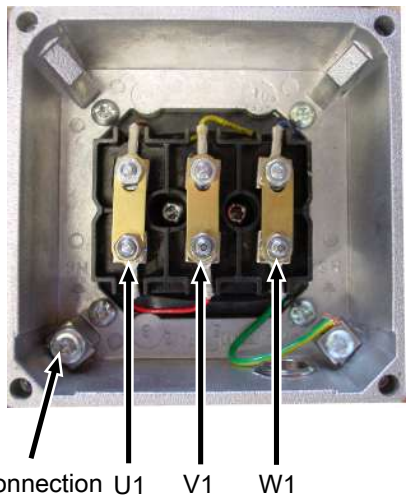
Connection

– Open the motor connection box and install the bridge circuits according to the voltage for the connection in star or delta connection.
– Connect the power supply to U1/V1/W1.
– Close the terminal box.

Y Star connection - high voltage



△ Delta connection - low voltage



Change the direction of rotation by switching any two leads.

5 Operation and control

5.1 Before startup

Before startup, check:

- the operating instructions for the motor (see appendix) were observed.
- No parts **are damaged** .
- The pump is not being operated outside the specifications (observe specification on type plate, in the data sheet, in the operating instructions).
- The **Ex classification** of the equipment (per type plates) is suitable for use in the prevailing explosive area.
- **Voltage and frequency** match the mains values specified on the type plate.
- All connection cables are installed without strain.
- All required **protective measures** have been taken (e.g. earthing + potential equalisation, motor circuit breaker, fluid filter.
- All cable glands are sealed properly.
- All valves or other parts which must be open during startup were opened.
- The hose- and electrical connections are installed correctly and undamaged.
- Applicable **Ex regulations** are met (e.g. EN 60079-14).

5.2 During startup

DANGER	**Explosion hazard due to oil pump dry running**
	Dry running the pump causes excessive temperatures or sparks. These can ignite an explosive atmosphere. Dry running is prohibited during normal operation. Dry running is only permitted briefly (< 30s) when starting the pump up and under supervision. Regularly check the pump for oil leaks (see maintenance schedule). Monitor the fluid level in your hydraulic system. Monitoring circuits used to ensure excess fluid of the pump must at a minimum meet PL a per EN 13849-1.

DANGER	**Explosion hazard due to particles / solid objects in the fluid**
	Particles / solid objects inside the fluid to be conveyed can damage and overheat the oil pump. Ensure fluid flowing through the pump is filtered adequately (**grade of filtration ≤ 25µm**).

First, check that the pump rotates counter clockwise. The direction is marked on the pump housing with M and directional arrow.

If equipment malfunctions occur, immediately put it out of operation and correct the malfunction (see chapter "Troubleshooting").

Noise level

Our pump is supplied with a low noise. If the noise level increases significantly check if the suction line has the right dimension and if the pump works in the appropriate temp/viscosity range. Ask Bühler Technologies GmbH for technical advice.

6 Maintenance

DANGER

Electrostatic charge (sparking)

Cleaning housing parts can result in an electrostatic charge of the surfaces.
Always clean housing parts with insulating surfaces with a damp cloth.

DANGER

Explosion hazard due to excessive temperatures

Contamination, ageing or corrosion of fluids can cause excessive oil pump temperatures. The values may then exceed those in the type plate and potentially ignite an explosive atmosphere.

a) Please note the maximum life of the fluids being conveyed.

b) Maintain the prescribed intervals for replacing fluids.

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.
– When performing maintenance of any type, observe the respective safety and operation regulations.

The coolers must regularly be maintained and cleaned (see maintenance schedule). The intervals must be determined and adjusted by the operator according to environmental exposure.

Always observe the applicable safety and operating regulations when performing any type of maintenance. Maintenance work must always be performed by personnel with qualifications comparable to a qualified person per the Technical Rules for Operating Safety (TRBS 1203).

Only perform conversion-, maintenance or installation work described in these operating and installation instructions. Any other work on the unit must be performed by personnel authorised by Bühler.

Only perform maintenance and cleaning when there is no explosive atmosphere or outside the explosive area. If this is not possible, equivalent contingency measures (e.g. non-arcing tools) must be taken.

Furthermore, it's important the pump is also earthed again using the earthing connection on the motor (see chapter "Electrical Connections") after being maintained.

6.1 Maintenance schedule

Component	Interval	Work to be performed	To be performed by
Motor	See motor operating instructions		
Motor	Monthly	– Check for turbulent operation – Acoustic inspection for unusual noise	Customer
4 screws for the motor flange	After 200 h	Retighten the screws to 6 Nm	Customer
Complete pump	Monthly	– Check for prohibited heating using suitable measuring devices, and for unusual noise – Visual inspection for intactness / leaks – Remove dust deposits > 2 mm	Customer
Electrical components	8000 h or annually*	Detailed inspection for intactness and functionality	Customer
Complete pump	After 25000 h or 5 years	– Inspection at Bühler – Replace motor bearings – Replace pump bearings	Bühler Technologies service technician
Operating fluids	Per manufacturer specifications	Replace or treat per manufacturer specifications	Customer

Maintenance schedule for normal ambient conditions / *whichever occurs first.

Special measures:

1. Also observe the maintenance notes in the motor instructions.
2. If unusual events occur, e.g. short-circuit, emergency shutdown, period duty or overload cut-off, a visual inspection is required before restarting the unit!
3. When used in zone 2 or zone 22 the monthly monitoring intervals may be doubled.
4. Replacing the motor bearings: The motor bearings must be replaced by Bühler Technologies authorized persons or a motor manufacturer certified shop.
5. The lifetime calculation is based on a typical mixed application at 25 % of the life at full-load operation and 75 % of the life at left-load operation of the motor.

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

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

Werk 2 – Service-

Halskestr. 23

40880 Ratingen

Germany

Please also attached 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

DANGER **Risk due to defective unit**

Personal injury or property damage may occur.
Correct defects to the unit immediately. Switch the unit off and disconnect from the mains. Discontinue use of the device until the defect has been corrected.

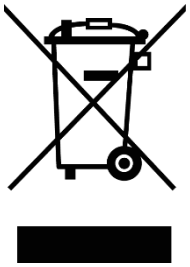
Problem / malfunction	Possible cause	Action
Insufficient pump capacity	– Reversed direction of motor rotation	– Correct connection, see chapter "Electrical Connections"
	– Motor doesn't start	– Correct connection, see chapter "Electrical Connections"
	– Oil flow too low	– Correct connection, see chapter "Electrical Connections"
	– Oil circuit blocked	– Open valves and cocks
	– Excessive suction pressure, reducing the oil flow rate	– Reduce suction lift
	– Excess back-pressure in the pressure pipe. Motor is being overloaded and throttled	– Select a larger cross-section
No oil flow	– insufficient oil in the pump housing after prolonged standstill, thus no suction	– spray some oil into the housing before connecting the oil ling
Loud pump	– Negative intake pressure too high	– Select a large enough suction hose
		– Reduce suction lift
	– Bracket damage	– Shut equipment down immediately and contact Bühler Technologies service

Tab. 1: Troubleshooting

8 Disposal

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

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



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

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

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

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

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

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

9 Calculations

9.1 Calculating viscosity

Valid for VG-oil between 10 - 100 °C at an exactness from ± 5 %.

	Definitions
V_{40}	oil viscosity at 40 °C in cst
T	temperature in °C
υ	viscosity in cst

$$b = 159 \cdot \ln \frac{V_{40}}{0{,}23}$$

$$a = 0{,}23 \cdot e^{\frac{-b}{877}}$$

$$\upsilon = a \cdot e^{\frac{b}{T+95{,}2}}$$

	Example: oil VG 46
V_{40}	46 cst
T	25 °C

$$b = 159 \cdot \ln \frac{46}{0{,}23} = 842{,}4325$$

$$a = 0{,}23 \cdot e^{\frac{-842{,}4325}{877}} = 0{,}08801$$

$$\upsilon = 0{,}08801 \cdot e^{\frac{842{,}4325}{25+95{,}2}} = 97{,}35 \text{ cst}$$

9.2 Table of operational viscosity for VG oil

	10 °C	20 °C	30 °C	40 °C	50 °C	60 °C	70 °C	80 °C	90 °C
VG 46	264,45	131,96	73,58	46,00	29,13	20,04	14,43	10,78	8,32
VG 68	444,77	210,85	112,61	68,00	41,63	27,86	19,58	14,32	10,84
VG 220	2.120,17	861,60	404,31	220,00	121,71	74,99	49,00	33,61	24,01
VG 320	3.489,92	1.350,22	607,96	320,00	171,40	102,85	65,66	44,12	30,94

Viscosity given in cst (mm^2/s)

9.3 Calculating the pressure loss

Valid for smooth straight piping per meter at laminar current.

	Definitions
υ	Viscosity in cst
ρ	spec. gravity in kg/dm³
DN	tube diameter in mm
V	flow in m/s
PV	pressure loss in bar

$$PV = \frac{0{,}32 \cdot \upsilon \cdot \rho \cdot V}{DN^2}$$

	Example: oil VG 46
υ	97,35 cst
ρ	0,8817 kg/dm³
DN	20 mm
V	3,18 m/s (60 l/min for tube DN 20)

$$PV = \frac{0{,}32 \cdot 97{,}35 \cdot 0{,}8817 \cdot 3{,}18}{20^2} = 0{,}22 \; bar$$

NOTICE

Pressure loss increases significantly for bends and fittings.
It might be necessary in some cases to determine the final shape of the suction line on site under specific conditions.

Please do not hesitate to contact us for help to calculate the pressure loss of the suction line for you specific application.

10 Pressure loss in straight pipes

Pressure loss (bar) per metre in straight tubing with laminar flow of mineral oil:

BFP 8 8 l/min – DN 25

	VG 46	VG 68	VG 120	VG 160	VG 220	VG 320	VG 460	VG 680
10 °C	0.03	0.05	0.11	0.17	0.25	0.42	0.68	1.14
20 °C	0.02	0.03	0.05	0.07	0.10	0.16	0.25	0.40
30 °C	0.01	0.01	0.02	0.03	0.05	0.07	0.11	0.17
40 °C	0.01	0.01	0.01	0.03	0.03	0.04	0.05	0.08
50 °C	0.01	0.01	0.01	0.02	0.01	0.02	0.03	0.04
60 °C – 100 °C < 0.03 bar								

BFP 15 16 l/min – DN 32

	VG 46	VG 68	VG 120	VG 160	VG 220	VG 320	VG 460	VG 680
10 °C	0.02	0.04	0.08	0.12	0.19	0.31	0.50	0.85
20 °C	0.01	0.02	0.04	0.10	0.08	0.12	0.19	0.30
30 °C	0.01	0.01	0.02	0.05	0.04	0.05	0.08	0.12
40 °C	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.06
50 °C	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03
60 °C – 100 °C < 0.02 bar								

BFP 30 28 l/min – DN 32

	VG 46	VG 68	VG 120	VG 160	VG 220	VG 320	VG 460	VG 680
10 °C	0.04	0.07	0.15	0.22	0.33	0.54	0.88	1.48
20 °C	0.02	0.03	0.06	0.09	0.13	0.21	0.33	0.52
30 °C	0.01	0.02	0.03	0.04	0.07	0.09	0.14	0.22
40 °C	0.01	0.01	0.02	0.02	0.03	0.05	0.07	0.10
50 °C	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.06
60 °C – 100 °C < 0.03 bar								

BFP 60 57 l/min – DN 40

	VG 46	VG 68	VG 120	VG 160	VG 220	VG 320	VG 460	VG 680
10 °C	0.03	0.06	0.12	0.18	0.28	0.45	0.74	1.24
20 °C	0.02	0.03	0.05	0.08	0.11	0.18	0.27	0.43
30 °C	0.01	0.01	0.03	0.04	0.05	0.08	0.12	0.18
40 °C	0.01	0.01	0.02	0.02	0.02	0.04	0.06	0.08
50 °C	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.05
60 °C – 100 °C < 0.03 bar								

BFP 90 86 l/min – DN 40

	LVG 46	VG 68	VG 120	VG 160	VG 220	VG 320	VG 460	VG 680
10 °C	0.05	0.09	0.19	0.27	0.42	0.68	1.11	1.87
20 °C	0.03	0.04	0.08	0.12	0.17	0.26	0.41	0.65
30 °C	0.02	0.02	0.04	0.06	0.08	0.12	0.18	0.27
40 °C	0.01	0.01	0.02	0.03	0.04	0.06	0.09	0.13
50 °C	0.01	0.01	0.01	0.02	0.02	0.03	0.05	0.07
60 °C – 100 °C < 0.04 bar								

Note: Values in blue exceed the suction operation limit of -0.4 bar.

11 Appendices

11.1 Technical data

Technical Data	
Pump housing:	Anodised and impregnated cast aluminium
Motor housing:	Aluminium die casting
Motor flange:	Grey cast iron
Gerotor:	Sintered steel
Operating fluids:	Mineral oils per DIN 51524 Gear oil per DIN 51517-3
Operating pressure:	8/16/29 L/min – max. 8 bar 42 L/min – max. 6 bar 58/88 L/min – max. 8 bar
Operating oil temperature:	max. 80 °C
Seal:	Viton
Ambient temperature:	-15 to 40 °C

Electric motors	
Voltage / frequency:	230 / 400 V - 50 Hz ± 5 % 277 / 480 V - 60 Hz ± 5 %
Thermal stability:	Class of insulation F
Design:	Three-phase asynchronous squirrel-cage induction motor totally enclosed, fan cooled
Colour:	RAL 2004
Protection class:	IP 65
The motors comply with standards IEC 60079-0, IEC 60079-7, IEC 61241-0, IEC 61241-1	

Please also observe the operating manual for the motor! All pumps are supplied with cable gland inside the motor terminal box.

Pump selection information:

When selecting the pump model, choose the motor output according to the oil viscosity to be used. Motor output information refers to the maximum oil viscosity at maximum operating pressure.

The BFP 8 to BFP 40 are also available as a special version with a 6 bar internal bypass valve for protection. This does not change the dimensions.

Installation information:

The pump head of all pumps can be mounted turned in 90° increments to align with the line routing. Please note the offset from the centre of the motor.

The connection threads are manufactured to ISO 228. The screw-in surfaces are finished and suitable for the use of soft seals. We recommend using screwed plugs per ISO 1179-2.

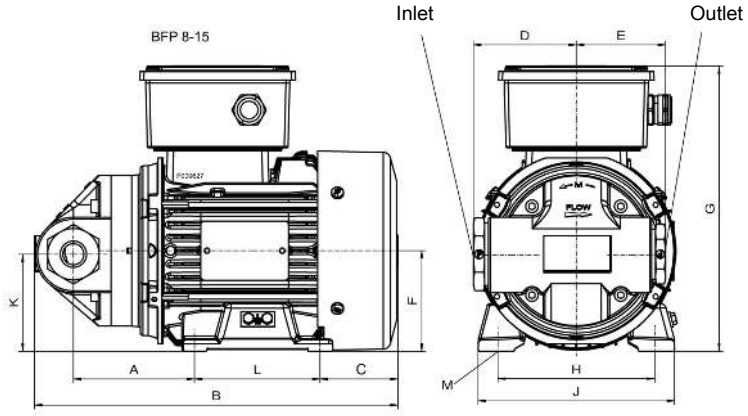
Please note:

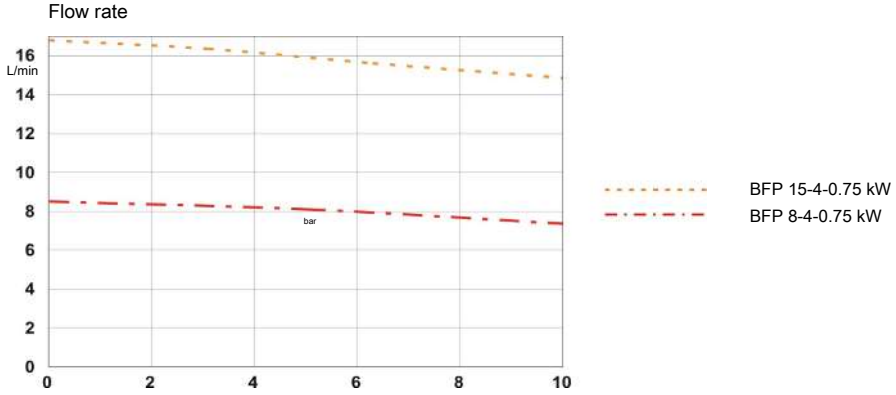
Especially note the dimension of the suction pipe. The cross-sections should not be smaller than specified. In most cases, loud noise indicates the cross-section was reduced too much.

Please refer to the notices in the operating instructions.

11.1.1 BFP 8 / BFP 15

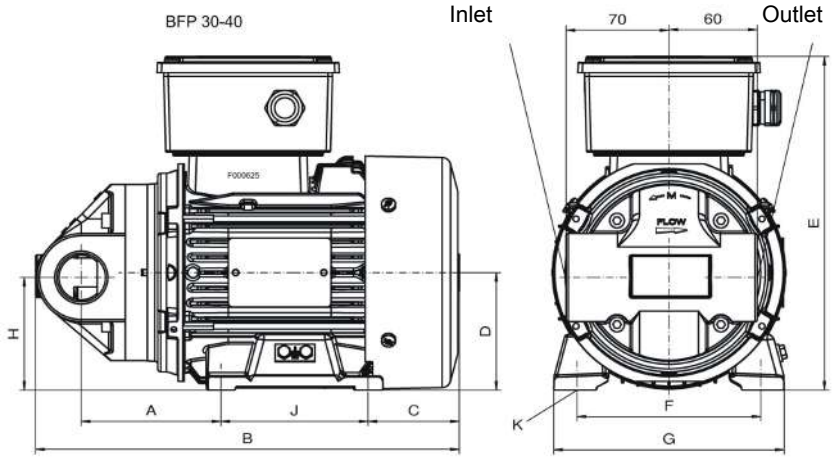
	BFP 8-4-0.75 kW	BFP 15-4-0.75 kW	BFP 15-4-1.5 kW
Item number	3708075ATEXT4	3715075ATEXT4	3715150ATEXT4
Motor power	0.75 kW	0.75 kW	1.5 kW
Max. oil viscosity	1500 cSt	300 cSt	2000 cSt
At max. operating pressure	8 bar		
Number of poles	4		
Max. power input (400 V/50 Hz)	approx. 1.7 A	approx. 1.7 A	approx. 3.3 A
Nominal delivery volume at 50/60 Hz	5.8 cm^3/U	11.7 cm^3/U	11.7 cm^3/U
	8/10 L/min	16/20 L/min	16/20 L/min
Suction side connection	G3/4 – DN20	G1 1/4 – DN32	G1 1/4 – DN32
Pressure side connection	G1/2 – DN16	G1 – DN25	G1 – DN25
Suction pressure for all types briefly up to	-0.4 bar		
	-0.6 bar		
Acoustic power per ISO 3744	56 dB(A)	59 dB(A)	59dB(A)
Weight	15 kg	15 kg	21.7 kg
Dimensions			
A	102.5	102.5	109.5
B	290	290	366
C	56	56	109.5
D	82	70	70
E	71	60	60
F	90	90	100
G	247	247	262
H	140	140	160
J	172	172	196
K	87	87	97
L	100	100	140
M	4xØ10	4xØ10	4xØ12

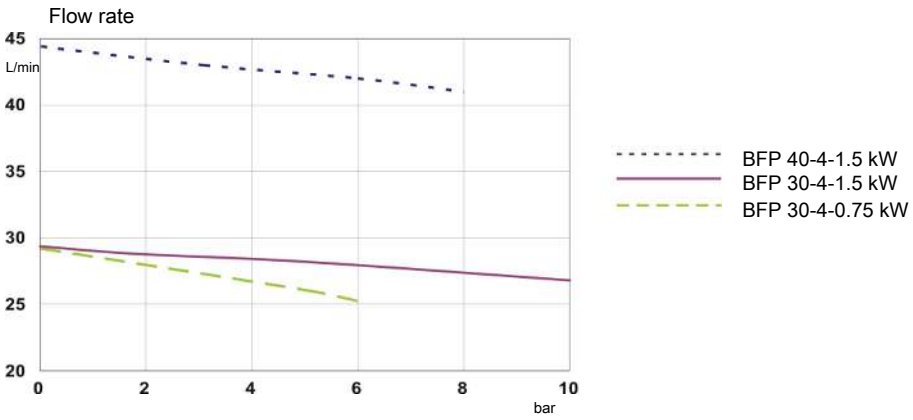




11.1.2 BFP 30 / BFP 40

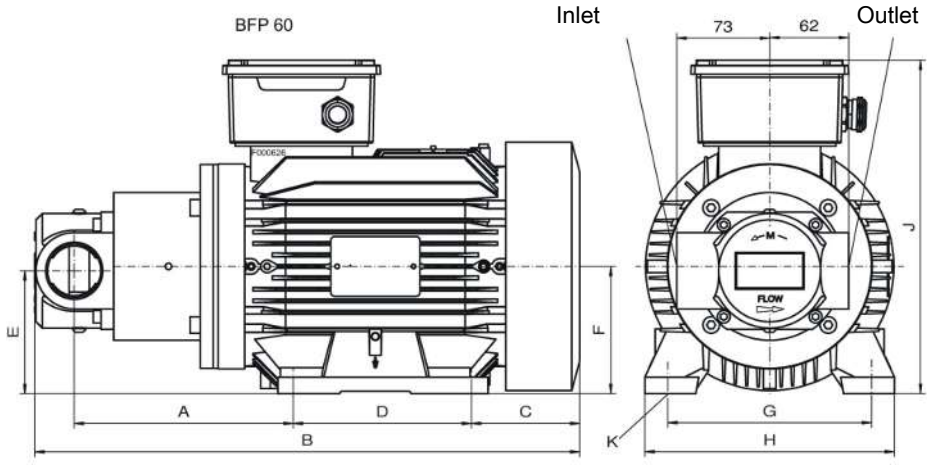
	BFP 30-4-0.75 kW	BFP 30-4-1.5 kW	BFP 40-4-1.5 kW
Item number	3730075ATEXT4	3730150ATEXT4	3740150ATEXT4
Motor power	0.75 kW	1.5 kW	1.5 kW
Max. oil viscosity	100 cSt	1000 cSt	700 cSt
at max. operating pressure	6 bar	8 bar	6 bar
Number of poles	4		
Max. power input (400 V/50 Hz)	approx. 1.7 A	approx. 3.3 A	approx. 3.3 A
Nominal delivery volume	20.4 cm^3/U	20.4 cm^3/U	30.6 cm^3/U
at 50/60 Hz	29/35 L/min	29/35 L/min	42/50 L/min
Suction side connection	G1 1/4– DN32		
Pressure side connection	G1 – DN25		
Suction pressure	-0.4 bar		
for all types briefly up to	-0.6 bar		
Acoustic power per ISO 3744	61 dB(A)	61 dB(A)	62 dB(A)
Weight	14.8 kg	21.8 kg	22.2 kg
Dimensions			
A	95	108	117.5
B	288	364	374
C	77	85	85
D	90	100	100
E	247	262	262
F	140	160	160
G	172	196	196
H	87	97	97
J	100	140	140
K	4xØ10	4xØ12	4xØ12

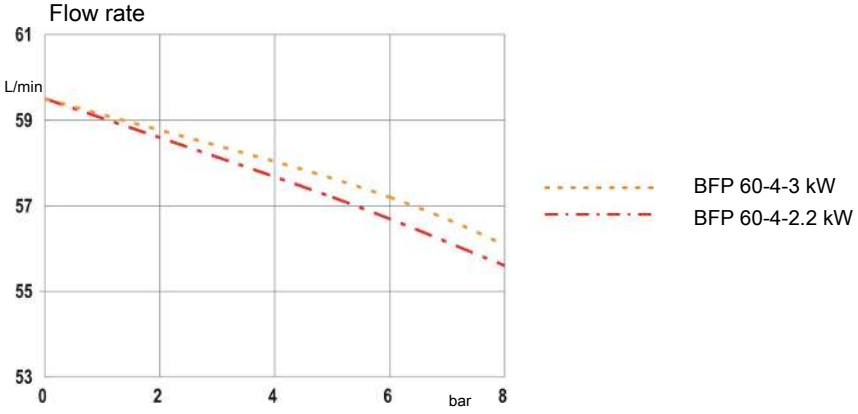




11.1.3 BFP 60

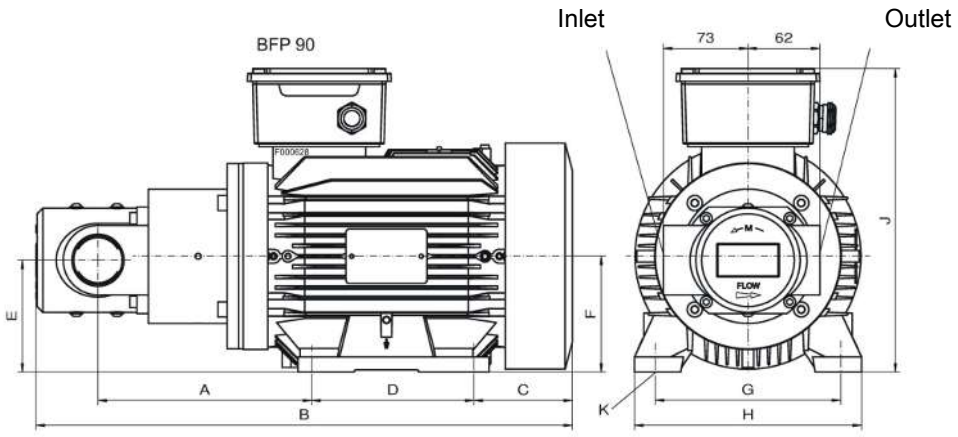
	BFP 60-4-2.2 kW	BFP 60-4-3 kW
Item number	3760220ATEXT4	3760300ATEXT4
Motor power	2.2 kW	3 kW
Max. oil viscosity	300 cSt	900 cSt
At max. operating pressure	8 bar	
Number of poles	4	
Max. power input (400 V/50 Hz)	approx. 4.4 A	approx. 6.5 A
Nominal delivery volume at 50/60 Hz	40.8 cm^3/U	
	58/70 L/min	
Suction side connection	G1 1/2– DN40	
Pressure side connection	G1 1/4– DN32	
Suction pressure for all types briefly up to	-0.4 bar	
	-0.6 bar	
Acoustic power per ISO 3744	64 dB(A)	
Weight	26 kg	40.5 kg
Dimensions		
A	172	179
B	455	495
C	112	145
D	140	140
E	97	97
F	100	100
G	160	160
H	196	200
J	271	305
K	4xØ10	4xØ12

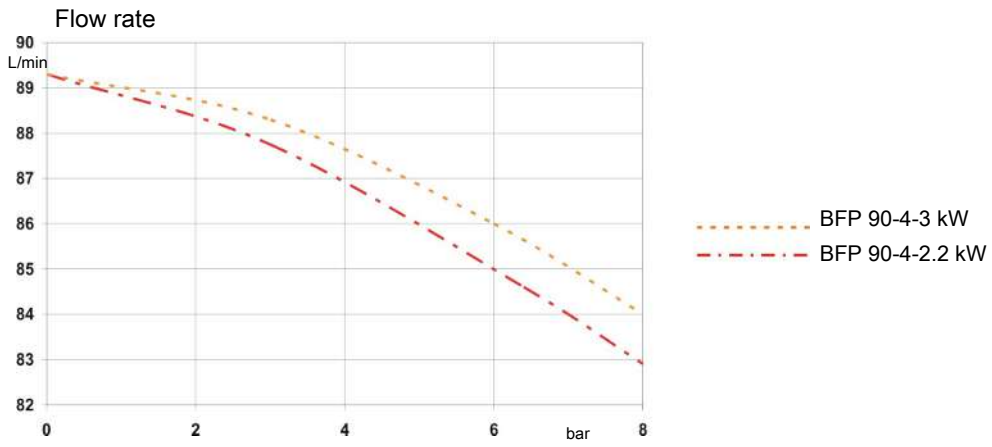




11.1.4 BFP 90

	BFP 90-4-2.2 kW	BFP 90-4-3 kW
Item number	3790220ATEXT4	3790300ATEXT4
Motor power	2.2 kW	3 kW
Max. oil viscosity	100 cSt	300 cSt
At max. operating pressure	8 bar	
Number of poles	4	
Max. power input (400 V/50 Hz)	approx. 4.4 A	approx. 6.5 A
Nominal delivery volume at 50/60 Hz	61.2 cm^3/U	
	88/105 L/min	
Suction side connection	G1 1/2– DN40	
Pressure side connection	G1 1/4– DN32	
Suction pressure for all types briefly up to	-0.4 bar	
	-0.6 bar	
Acoustic power per ISO 3744	65 dB(A)	
Weight	27.7 kg	42.2 kg
Dimensions		
A	184.5	191.5
B	490	530
C	112	145
D	140	140
E	97	97
F	100	100
G	160	160
H	196	200
J	271	305
K	4xØ12	4xØ12





11.2 Installation torques and clamping range for cable fitting

Size	Strain relief clamping range (mm)	Installation torque (Nm)
M12x1,5	3-6	1,5
M16x1,5	5-9,5	2,5
M20x1,5	8-13	3,5
M25x1,5	11-17	5
M32x1,5	15-21	5
M40x1,5	19-28	7,5
M50x1,5	27-35	7,5
M63x1,5	32-42	13

11.3 User book (Please make copies)

Maintained on	Unit no.	Operating hours	Remarks	Signature

12 Attached documents

12.1 Declaration of conformity

EG-/EU Konformitätserklärung
EC/EU Declaration of Conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte „Geräte" im Sinne des Artikels 1, (3) a)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 und die Schutzziele erfüllen.

Article 1, (3) a) in its actual version and that they fulfil the essential safety objectives.

Die Produkte sind Maschinen im Sinne der Richtlinie

2006/42/EG
(MRL)
Artikel 2 a)

und erfüllen alle einschlägigen Anforderungen.

The products are machines according to Directive

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

and fulfill all relevant requirements.

Folgende Richtlinien wurden berücksichtigt:

The following directives were regarded:

2014/30/EU (EMV/EMC)

Produkt / products: Öl-Luftkühler / *Oil/Air Blast Coolers*
Förderpumpen / *Oil pumps*

Typ / type: BLK***, BNK***
BFP***

***siehe Typenschlüssel im entsprechenden Datenblatt/see model key in the corresponding data sheet

Die Produkte werden entsprechend der derzeitig 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:

⟨Ex⟩ II 3G[1] Ex h IIB[2] T4[3] Gb[4]
und/oder / and/or
⟨Ex⟩ II 3D[5] Ex h IIIB T125 °C[6] Db[7]

1 Je nach Ausführung 2G oder 3G / In accordance to the construction 2G oder 3G
2 Je nach Ausführung IIB oder IIC / In accordance to the construction IIB or IIC
3 Je nach Ausführung T4 oder T3 / In accordance to the construction T4 or T3
4 Je nach Ausführung Gb oder Gc / In accordance to the construction Gb or Gc
5 Je nach Ausführung 2D oder 3D / In accordance to the construction 2D oder 3D
6 Je nach Ausführung T125 °C oder T150 °C / In accordance to the construction T125 °C oder T150 °C
7 Je nach Ausführung Db oder Dc / In accordance to the construction Db or Dc

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

EN ISO 80079-36:2016 **EN ISO 80079-37:2016**

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

EN 60204-1:2007 **EN ISO 12100:2010** **EN 61000-6-3:2011**
EN 61000-6-2:2005

Zusätzlich wurden folgende nationale Normen, Richtlinien oder Spezifikationen berücksichtigt:
In addition, the following national standards, guidelines or specifications have been used:

TRGS 727:2016

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 05.02.2019

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*

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

12.2 Statement of Conformity

(1) **Konformitätsaussage** / ***Statement of Conformity***

(2) **- Richtlinie 2014/34/EU -**
Geräte zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

- Directive 2014/34/EU -
Equipment Intended for Use in Potentially Explosive Atmospheres

(3) Nummer: / *Document-ID:* **ExGuide 13 ATEX 0010 X (Edition 2)**

(4) Geräte: / *Equipment:* **Öl-Luftkühler / *Oil/Air Blast Coolers* BLK*** und/*and* BNK*** und/*and* Förderpumpen / *Oil pumps* BFP***

(5) Hersteller: / *Manufacturer:* **Bühler Technologies GmbH**

(6) Anschrift: / *Address:* **Harkortstraße 29, DE 40880 Ratingen**

(7) Die Bauart dieser Geräte, sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Konformitätsaussage festgelegt.

This equipment and any acceptable variation thereto is specified in the enclosure of this Statement of Conformity.

(8) ExGuide Technology - Günter Kämper VDI bescheinigt, dass dieses Gerät die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption von Geräten der Kategorien 2 und 3 zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.
Das ISO 9001 - System des Unternehmens ExGuide Technology - Günter Kämper VDI wird vom BVQi unter der Registrierung DE003950-1 überwacht. Die Ergebnisse der sicherheitlichen Betrachtung sind im vertraulichen Dokument D045090323 hinterlegt.

ExGuide Technology – Gunter Kamper VDI certifies that this equipment has been found to comply with the Essential Safety and Health Requirements relating to the design and construction of equipment of Categories 2 and 3 intended for use in potentially explosive atmospheres given in Annex II of the Directive.
The ISO 9001 system of ExGuide Technology – Gunter Kamper VDI is supervised by BVQi under the registration number DE003950-1.
The examination and test results are recorded in the confidential report number D045090323.

(9) Die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen wird durch Übereinstimmung mit den folgenden Normen bestätigt:

- ISO 80079-36:2016
- ISO 80079-37:2016
- TRGS 727:2016

Compliance with the Essential Safety and Health Requirements has been assured by compliance with the following standards:

(10) Falls das Zeichen "X" hinter der Nummer (3) steht, wird in der Anlage zu dieser Konformitätsaussage auf besondere Bedingungen für die sichere Anwendung des Gerätes hingewiesen.

If the sign "X" is placed after the Document-ID (3), it indicates that the equipment is subject to special conditions for safe use specified in the enclosure of this Statement of Conformity.

(11) Diese Konformitätsaussage bezieht sich nur auf die Konzeption und den Bau des festgelegten Gerätes. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen.

This Statement of Conformity relates only to the design and construction of the specified equipment. Further requirements of this Directive apply to the manufacturing and supply of this equipment.

(12) Die Kennzeichnung der Geräte soll die folgenden Angaben enthalten:

The marking of the equipment shall include the following:

Ⓔx II 3G[1] Ex h IIB[2] T4[3] Gb[4] und/oder / *and/or*
Ⓔx II 3D[5] Ex h IIIB T125 °C[6] Db[7]
-15 °C ≤ Ta ≤ 40 °C[8] [9]

ExGuide Technology - Günter Kämper VDI
Ing.-Büro für Explosionsschutz
Birkenstraße 10
DE 44579 Castrop-Rauxel

Telefon: +49 2305 357130
Telefax: +49 2305 357137

E-Mail: info@exguide.de
URL: www.exguide.de

Castrop-Rauxel, den 18. Juli 2016

KA45130320 BLK 13 ATEX0010X E2.odt

Diese Konformitätsaussage ist ohne Unterschrift ungültig! Im Original sind Teile in roter Schrift dargestellt (Zeile 1, 3, 14 und Logo).
This statement of conformity is not valid without signature! In the original, parts are printed in red (lines 1, 3, 14 and logo).

Günter Kämper, Inhaber
Verbindlich ist die deutsche Fassung / *Only the German version is binding*

Anlagen / *Enclosures*

1 Je nach Ausführung 2G oder 3G / *In accordance to the construction 2G oder 3G*
2 Je nach Ausführung IIB oder IIC / *In accordance to the construction IIB or IIC*
3 Je nach Ausführung T4 oder T3 / *In accordance to the construction T4 or T3*
4 Je nach Ausführung Gb oder Gc / *In accordance to the construction Gb or Gc*
5 Je nach Ausführung 2D oder 3D / *In accordance to the construction 2D oder 3D*
6 Je nach Ausführung T125 °C oder T150 °C / *In accordance to the construction T125 °C oder T150 °C*
7 Je nach Ausführung Db oder Dc / *In accordance to the construction Db or Dc*
8 Für die Versionen BNK und BFP/ *For versions BNK and BFP*
9 Für die Version BLK ist hier 60 °C zulässig / *for version BLK 60 °C is valid at this place*

(13) Anlage zur *Enclosure to*

(14)

Konformitätsaussage *Statement of Conformity*

ExGuide 13 ATEX 0010 X

(15) Beschreibung der Geräte *Description of equipment*

(15a) Die Kühlgebläse und die Hydraulikpumpen sind für den Einsatz in Fluid-Kreisläufen vorgesehen. Sie können in unterschiedlichen Kombinationen (siehe 15d) in Verkehr gebracht werden. Sie bestehen aus den wesentlichen Teilgeräten:

The cooling fans and the hydraulic pumps are intended for use in fluid circulation and can be supplied in several combinations (see 15d). Principally, the equipment consists of the following components:

a) Elektrischer Antriebsmotor (mit eigener Zulassung), *a) an electric drive motor (certified separately),*

b) wahlweise einem Lüfter, der mit dem Motor formschlüssig verbunden ist und dessen Lufteintrittsseite von einem Lüfterschutzgitter (IP20) abgeschlossen wird, *b) optionally, a fan which is form-fit connected with the motor and whose air intake side is closed by a finger guard (IP 20);*

c) wahlweise einem Aluminium-Kühlregister für den Fluid-Kreislauf, das direkt an der Luftaustrittsseite des Lüfters montiert ist, *c) optionally an aluminum cooling matrix for the fluid circulation which is directly mounted onto the exhaust side of the fan;*

d) wahlweise einer Gerotor-Fluidpumpe, die zusätzlich auf dem (zweiten) Wellenausgang des Motors montiert ist. *d) optionally a gerotor fluid pump which is additionally mounted onto the (second) shaft output of the motor.*

e) Öl-Luft-Kühler können darüber hinaus mit beigestellten Förderpumpen kombiniert und in Verkehr gebracht werden. *e) Oil/air blast coolers can also be supplied and used in conjunction with the feed pumps provided.*

(15b) Alle Geräte und Gerätekombinationen können, je nach Kennzeichnung auf dem Typenschild, folgendermaßen eingesetzt werden:

The equipment or combination of it can be used as follows with regard to the marking on each type label:

a. In der Zone 2 (Gas-Ex, Kategorie 3G, EPL Gc) in den Explosionsgruppen IIA, IIB und IIC (nur H_2) *a) In Zone 2 (Gas, Category 3G, EPL Gc) in the explosion groups IIA, IIB and IIC (H_2 only)*

b. In der Zone 22 (Staub-Ex, Kategorie 3D, EPL Dc) in den Explosionsgruppen IIIA und IIIB *b) In Zone 22 (Dust, Category 3D, EPL Dc) in the explosion groups IIIA and IIIB*

c. In der Zone 1 (Gas-Ex, Kategorie 2G, EPL Gb) in den Explosionsgruppen IIA, IIB und IIC (nur H_2) *c) In Zone 2 (Gas, Category 2G, EPL Gb) in the explosion groups IIA, IIB and IIC (H_2 only)*

d. In der Zone 21 (Staub-Ex, Kategorie 2D, EPL Db) in den Explosionsgruppen IIIA und IIIB *d) In Zone 21 (Dust, Category 2D, EPL Db) in the explosion groups IIIA and IIIB*

e. Die Pumpen sind bei bestimmungsgemäßem Betrieb immer vollständig gefüllt; hier tritt keine Zone auf. *e) If run as intended, the pumps are always fully filled and thus no zone occurs.*

Die Qualifizierung hinsichtlich der Oberflächentemperatur ist T4 oder T3; für alle Gase, Dämpfe und Nebel mit einer Zündtemperatur > 135 °C / 200 °C sind die Geräte keine Zündquelle.

The qualification with regard to the surface temperature is T4 or T3; for all gases, vapours and mists with an ignition temperature >135 °C / 200 °C the equipment is not an ignition source.

Im Staub-Ex-Bereich ist 125 °C / 150 °C die Bezugstemperatur für die weiteren Überlegungen in Hinsicht Sicherheitsabstand von der Glimmtemperatur.

In the Dust-Ex area 125 °C / 150 °C is the reference temperature for further considerations with regard to a safe distance from the glowing temp.

(15c) Mechanische Daten und Leistungen gem. Angaben des Herstellers, u.a. / *Mechanical data in accordance with the manufacturer's specifications*

Details siehe / *Details see* 17 ff

(15d) Typenschlüssel / *Type coding* Typ / *Type* BLK

BLK 4 . 4 – ATEX – T4 - IBx
1 2 3 4 5

1 = BLK Öl-Luftkühler / *oil/air blast cooler*
2 = Baugröße / *module* 2, 3, 4, 5, 6, 7, 8
3 = Polzahl des Motors / *motor poles* 4, 6
4 = Temperaturklasse / *temperature class*
5 = Bypassversion (oder leer) / *bypass version (or empty)*
- AB außen liegender Bypass / *external bypass*
- IB innen liegender Bypass / *internal bypass*
- x Bypasswert / *bypass value* 2, 5 oder / *or* 8 bar
- ITB innen liegender temperaturabhängiger Bypass 2 bar / 45 °C / *internal, temperature-related bypass*
- ATB außen liegender temperaturabhängiger Bypass 2 bar / 45 °C / *external, temperature-related bypass*
- x Bypasswert / *bypass values* 2, 5 oder / *or* 8 bar

Typ / *Type* BFP
BFP 8 - 4 – 0.75 kW – ATEX – T4 – BPx
1 2 3 4 5 6

1 = BFP Pumpe / *pump*
2 = Literleistung der Pumpe / *power output per litre* [l min^{-1}] *8, 15, 30, 40, 60, 90*
3 = Polzahl des Motors / *motor poles*: 4
4 = Leistung des Motors / *motor power* in kW; 0.75, 0.9, 1,.5, 1.8, 2.2, 2.6, 3, 3.6
5 = Temperaturklasse / *temperature class*
6 = Bypassversion (oder leer) / *bypass version (or empty)*
- x Bypasswert / *bypass value* in bar, 6, 8

Typ / Type BNK:
BNK 4 . 4 - 40 – 1.5 kW – ATEX – T4 - IBx
1 2 3 4 5 6 7

1 = BNK Öl-Luftkühler mit Pumpe (Nebenstromkühler) / *oil/air blast cooler with pump (bypass cooler)*
2 = Baugröße / *module* 2, 3, 4, 5, 6, 7
3 = Polzahl des Motors / *motor poles*: 4, 6
4 = Durchfluss / *flow rate* l/min: 30, 40, 60, 70, 90, 105,
5 = Leistung des Motors / *motor power* in kW; 0.75, 1.5, 1.8, 2.2, 2.6, 3, 3.6
6 = Temperaturklasse / *temperature class*
7 = Bypassversion (oder leer) / *bypass version (or empty)*
- AB außen liegender Bypass / *external bypass*
- IB innen liegender Bypass / *internal bypass*
- x Bypasswert / *bypass value* 2, 5 oder / *or* 8 bar
- ITB innen liegender temperaturabhängiger Bypass 2 bar / 45 °C / *internal, temperature-related bypass*
- ATB außen liegender temperaturabhängiger Bypass 2 bar / 45 °C / *external, temperature-related bypass*
- x Bypasswert / *bypass values* 2, 5 oder / *or* 8 bar

Typ / t*ype* BLK, kombiniert mit beigestellter Förderpumpe BFP / *combined with feed pump provided*
Kühlaggregat / *cooling unit* 2 -4 -IB2 -15 -0.75 kW -BP6 -ATEX – T3
1 2 3x 4 5 6 7

1 = Kühler Baugröße / *cooler module:* 2, 3, 4, 5, 6, 7, 8
2 = Polzahl des Motors / *motor poles*: 4, 6
3 = Bypassversion (oder leer) / *bypass version (or empty)*
- AB außen liegender Bypass / *external bypass*
- IB innen liegender Bypass / *internal bypass*
- x Bypasswert / *bypass value* 2, 5 oder / *or* 8 bar
- ITB innen liegender temperaturabhängiger Bypass 2 bar / 45 °C / *internal, temperature-related bypass*
- ATB außen liegender temperaturabhängiger Bypass 2 bar / 45 °C / *external, temperature-related bypass*
- x Bypasswert / *bypass values* 2, 5 oder / or 8 bar

- 0 ohne Bypass / *without bypass*

4 = Literleistung der Pumpe / *power output per litre* [l min^{-1}] 8, 15, 30, 40, 60, 90

5 = Leistung des Motors / *motor power* in dW; 075, 150, 220, 300

6 = Pumpen-Bypassventil / *bypass version (or empty)*
- 0 ohne Bypass / *without bypass*, 6 = Bypassdruck / *bypass pressure* 6 bar
- 8 Bypassdruck / *bypass pressure* 8 bar

7 = ATEX *Temperaturklasse / ATEX temperature class*
- T3, T4

(15e) Mindestkennzeichnung
Hersteller mit Anschrift
Type: B *** [Seriennummer] CE [Baujahr]
Ex II 2G Ex h IIC T4 oder siehe Zeile 12!
TFR: 13 ATEX 0010 X
-15 °C ≤ Ta ≤ 40 °C
(Ergänzungen sind zulässig.)

Minimum Identification
Name and address of manufacturer
Type: [serial number] CE *[Year of construction]*
see also line 12!
(Additional hints are allowed)

(16) Die Prüfungsunterlagen sind im internen Dokument D045090323 hinterlegt. Gemeinsam mit dem Hersteller ist ein Gefahrenbewertungsbericht PL45090319 erarbeitet worden.
Die vertrauliche Nachweisdokumentation mit der TFR 13 ATEX 0010 X lag zur Bewertung vor und ist bei der benannten Stelle 0158 BVS (DEKRA EXAM, Bochum) hinterlegt.

Test reports are stored in the internal document D045090323 In cooperation with the manufacturer a risk assessment report PL45090319 was compiled.
The confidential proof documentation with TFR 13 ATEX 0010 X has been submitted to inspection at notified body 0158 BVS (DEKRA EXAM, Bochum)

(16a) Sicherheitstechnische Hinweise

a) Die Hinweise in der vom Hersteller jedem Gerät beizufügenden Betriebsanleitung sind unbedingt einzuhalten.

b) Festsitzende Teile, z.B. durch Korrosion oder Frost, dürfen bei vorhandener explosionsfähiger Atmosphäre nicht mit Gewalt gelöst werden.

c) Zur Sicherstellung des Explosionsschutzes müssen zusätzliche elektrische und mechanische Betriebsmittel den Anforderungen der vor Ort geltenden Zonen entsprechen und sind vom Errichter der Maschine gesondert zu prüfen.

d) Bei den Ausführungen zum Einsatz im Staub-Ex-Bereich dürfen ausschließlich leitfähige Lüfterschutzgitter verbaut sein, die einen ausreichenden Kontakt zum Umgehäuse haben.

e) Beim Einsatz in der Zone 21 muss eine regelmäßige Schwingungsüberwachung durchgeführt werden; es ist angeraten, dieses mit einer automatischen Messeinrichtung zu machen.

f) Mechanische Elemente sind nach den vor Ort herrschenden Bedingungen zu reinigen.

g) Ein Betrieb der Pumpen z. B. gegen geschlossene Schieber oder Drosseln, die zu einer Überschreitung der in 15c) angegebenen Grenzwerte führen, sind nicht zulässig.

Safety relevant notes:

a) The notes in the operator's manual, enclosed to each order of the manufacturer, have to be followed strictly.

b) Parts being stuck (e.g. by corrosion or icing) may not be removed by force in the presence of explosive atmosphere.

c) In order to ensure the explosion protection required, additional electrical and mechanical equipment has to meet the requirements of the locally applicable zones and has to be checked separately by the company installing the unit.

d) Variants of the equipment intended for use in Dust-Ex atmospheres may only be equipped with conductive cooler guards which have sufficient contact surface to the enclosure.

e) When used in Zone 21, regular vibration monitoring shall be carried out, and it is advised to do this with an automatic measuring device.

f) Mechanical elements have to be cleaned according to local conditions.

g) It is not permitted to operate the equipment against closed gate valves and chokes if this can lead to a temperature increase inside the machine exceeding the limit values stated in 15 c).

h) At normal operation no explosive mixture shall

h) Beim bestimmungsgemäßen Betrieb darf sich im Pumpenraum kein explosionsfähiges Gemisch befinden; zum An- und Abfahren der Anlage sind Ausnahmen zulässig.

i) Bei elektrostatisch aufladbaren Medien müssen in Absprache mit den Verantwortlichen besondere Sicherheitsmaßnahmen getroffen werden.

j) Vor der Inbetriebnahme ist die Pumpe / die Ölversorgungsanlage zu befüllen.

k) Streuströme dürfen nicht über die Maschine geführt werden.

l) In der Zone 1 ist darauf zu achten, dass die max. Temperatur der Betriebsflüssigkeit 80 % der Zündtemperatur des umgebenden Gases nicht überschreitet.

m) Es ist darauf zu achten, dass bei der Verwendung diverser Anbauteile die Erwärmung größer als die gestempelte Temperaturklasse sein kann!

n) Die Überwachungsgeräte für die Kaltleiterauslösung der Motoren-Temperaturüberwachung müssen den Anforderungen der vor Ort geltenden Zonen entsprechen (Sicherheits-, Kontroll- und Regelgeräte nach RL 2014/34/EU).

o) Wenn Überwachungsstromkreise zur Sicherstellung der Flüssigkeitsüberdeckung der Pumpe genutzt werden müssen, so sind sie mindestens nach Pl a entsprechend EN 13849-1 auszuführen.

be present in the pumping chamber; during the start-up and shutdown of the machine, exceptions may be permitted.

i) If media are prone to electrostatic charges, special precautions have to be taken and agreed with the responsible parties.

j) Before commissioning the equipment, the pump or oil supply system has to be filled.

k) Equalizing currents must not be conducted via the machine.

l) In Zone 1 it has to be observed that the maximum temperature of the operating fluid does not exceed 80 % of ignition temperature of the ambient gas atmosphere.

m) It has to be observed that the use of certain attached parts may lead to higher temperatures than stated in the temperature class!

n) The control equipment in place to trigger the posistors of the motor temperature control have to comply with the locally applicable requirements for each zone (safety, monitoring and control units according to Directive 2014/34/EU).

o) If monitoring circuits are necessary and used to ensure the liquid coverage of the pump, they must be designed according to PI a) of EN 13849-1.

(17) Besondere Bedingungen

Special conditions for safe use

(17a) a) Die Betriebsmittel dürfen nur dann in der Explosionsgruppe IIC eingesetzt werden, wenn ausschließlich Wasserstoff als explosionsgefährliches IIC-Gas auftreten kann.

b) Bei der Inbetriebnahme (und während des Betriebs) ist sicherzustellen, dass die Hot-Spots der Zeile 17b nicht überschritten werden.

a) The equipment is only permitted for use in explosion group IIC if hydrogen is the only explosive IIC gas to be present.

b) When putting the equipment into service (and when operating it later) it has to be ensured that the hot spots mentioned in line 17b are not exceeded.

(17b)

Gerät / *Equipment*	**Umgebungstemperatur /** *ambient temperature range*	**Öl-Temperatur /** *Oil temperature*	**Hot-Spot**	**Gas**	**Staub / Dust**
BLK	-15 °C … 60 °C	< 100 °C	< 120 °C	T4	T125 °C
BNK, BFP	-15 °C … 40 °C	< 80 °C	< 120 °C	T4[10]	T125 °C
			< 145 °C	T3	T150°C

10 T4 wird nur bei Anlagen mit geringer Leistung und/ oder geringer Umgebungs-/ Öltemperatur erreicht./
T4 will be only reached, if it used in systems with low power and/ or low ambient/ oil temperature.

12.3 Motor operating instructions (Leroy-Somer)

BÜHLER TECHNOLOGIES

FluidControl

Leroy-Somer

Excerpt from the original instructions of the manufacturer

350031EN
03/2017

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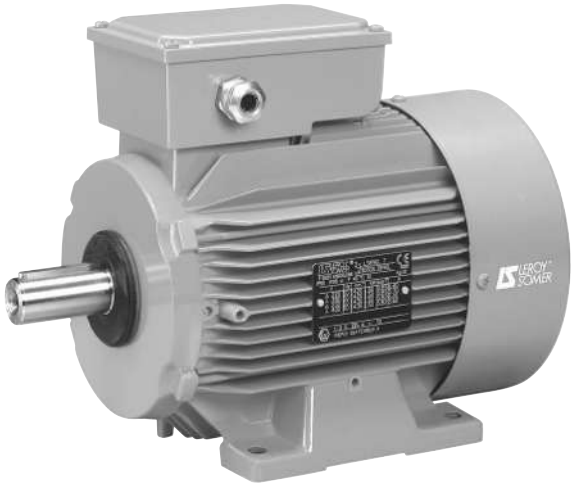
Internet: www.buehler-technologies.com
E-Mail: fluidcontrol@buehler-technologies.com

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.

Document information
Document No..... 350031EN
Version.....03/2017

LEROY SOMER®

Maintenance manual Bühler Technologies 09.2011



Bühler Technologies GmbH
DE-40880 Ratingen

Article number	
35MT055804ATEX(xx)	36MT221126ATEX(xx)
35MT075904ATEX(xx)	36MT301124ATEX(xx)
35MT221004ATEX(xx)	36MT2210041ATEX(xx)
35MT151006ATEX(xx)	36MT2213261ATEX(xx)
35MT0558041ATEX(xx)	36MT3011241ATEX(xx)
35MT0759041ATEX(xx)	37MT075804ATEX(xx)
35MT2210041ATEX(xx)	37MT0759041ATEX(xx)
35MT1511261ATEX(xx)	37MT15904ATEX(xx)
36MT075904ATEX(xx)	37MT1510041ATEX(xx)
36MT0759041ATEX(xx)	37MT221004ATEX(xx)
36MT15904ATEX(xx)	35MT2210041ATEX(xx)
36MT1510041ATEX(xx)	37MT301004ATEX(xx)
36MT221004ATEX(xx)	37MT3011241ATEX(xx)

CE

This manual is to be given to the end user

II 2 G(D)

Ex e II T1 bis T4

LSE-FLSE

Three-phase induction motors for atmospheres containing explosive gases and dust

Installation and maintenance

Rev. 15

LSE-FLSE

THREE-PHASE INDUCTION MOTORS FOR ATMOSPHERES CONTAINING EXPLOSIVE GASES AND DUST

IMPORTANT

These symbols ⚠ ⚠ appear in this document whenever it is important to take special precautions during installation, operation, maintenance or servicing of the motors.

It is essential that electric motors are installed by qualified, experienced and authorised personnel.

In accordance with the main requirements of the EC Directives, the safety of people, animals and property should be ensured when fitting the motors into machines.

Particular attention must be given to equipotential ground or earthing connections.

The noise level of the machines, measured under standard conditions, conforms to the requirements of the standard and does not exceed the maximum value of 85 dB(A) pressure at 1 metre.

⚠ **The following preliminary precautions must be taken before working on any stationary device:**

- **Mains voltage disconnected and no residual voltage present**
- **Careful examination of the causes of the stoppage (blocked transmission - loss of phase - cut-out due to thermal protection - lack of lubrication, etc)**

1 - PREFACE

1.1 - Training

⚠ ⚠ **Electric motors are industrial products. They must therefore be installed by qualified, experienced and authorised personnel. The safety of people, animals and property must be ensured when fitting the motors into machines (please refer to current standards).**

Those persons required to work on electrical installations and equipment in zones where there is a risk of explosion must be specially trained and authorised for this type of equipment.
They must be familiar with not only the electrical risks, but also with those that are due to the chemical properties and physical characteristics of the products used in the installation (gas, vapour, dust), as well as the environment in which the equipment operates. These elements determine the risk of fire and explosion.

In particular, they must be informed and aware of the reasons for the specific safety instructions in order to comply with them. For example:
- Do not open when powered up
- Do not open when powered up in atmospheres containing explosive gas or dust
- Do not repair while powered up
- Do not move when on load
- Wait for a few minutes before opening
- Replace the seals tightly to ensure watertightness

⚠ **Before commissioning, ensure compatibility of the information on the motor nameplate with the actual explosive atmosphere and the operating zone.**

NOTE:
LEROY-SOMER reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document may therefore be changed without notice.

LSE-FLSE

THREE-PHASE INDUCTION MOTORS FOR ATMOSPHERES CONTAINING EXPLOSIVE GASES AND DUST

Dear Customer,

*You have just acquired a LEROY-SOMER **safety motor**.*

This motor benefits from the experience of one of the largest manufacturers in the world, using state-of-the-art technology in automation, specially selected materials and rigorous quality control. As a result, the regulatory authorities have awarded our motor factories the ISO 9000 - Edition 2000 international certificate.

We thank you for making this choice, and would ask you to read the contents of this manual.

By observing a few essential rules, you will ensure problem-free operation for many years.

LEROY-SOMER

ISO 9001 DNV SYSTEME QUALITE CERTIFIE

1.2 - Conformity

Motors for potentially explosive atmospheres comply with:

- ATEX 94/9/EC, 2006/95/EC and 93/68/EC directives (low voltage)
- IEC-EN 60034, IEC-EN 60072, EN 60529 standards
- IEC-EN 60079-0: Electrical apparatus for explosive gas atmospheres (general rules)
- IEC-EN 60079-7: Electrical apparatus for explosive atmospheres (increased safety “e”)
- IEC-EN 61241-0 and 1: Electrical apparatus for use in the presence of combustible dust; Part 0: General requirements and part 1 (protection by enclosures “tD”)

They are designed for use in potentially explosive atmospheres due to the presence of gas (G marking) or gas and dust (GD marking); for each danger zone there is a corresponding class of equipment.

LEROY SOMER

EC DECLARATION OF CONFORMITY AND INCORPORATION
(F)LSE motor

We, **MOTEURS LEROY SOMER,**

declare, under our sole responsibility, that the following products :

LSE and FLSE series type "e" increased safety induction motors

bearing the following markings on their nameplates:

CE 0080 II 2G Ex e II T3 (ou T4) IP55 (for zone 1)
or **CE 0080 II 2GD Ex e II T3 (ou T4) Ex tD A21 IP65 T125°C** (for zone 1 and 21)

Comply with :

▪ European and international standards :	**EN60079-0:2006** **EN 60079-7:2007** **EN 61241-0:2006 & EN 61241-1:2004** (GD motors) **IEC-EN 60034 / IEC-EN 60072 / EN 60529**
▪ The Low Voltage Directive:	**2006/95/CE**
▪ The ATEX European Directive:	**94/9/EC (decree 96 1010 from 19/10/1996)**
▪ The type awarded an EC type-examination certificate By the notified body: INERIS (0080) – BP 2 – Parc technologique ALATA 60550 – VERNEUIL EN HALATTE	**INERIS 01ATEX0010 X**
The design and manufacturing requirements are covered by the PRODUCT QUALITY ASSURANCE notifications	Under the responsibility of the notified body : **INERIS**

This conformity permits the use of these ranges of products in machines subject to the application of the Machinery Directive 2006/42/EC, provided that they are integrated or incorporated and/or assembled in accordance with, amongst others, the regulations of standard EN 60204 "Electrical Equipment for Machinery" and the Electromagnetic Compatibility Directive 2004/108/EC.

The products defined above may not be put into service until the machines in which they are incorporated have been declared as complying with the applicable Directive.

Installation of these motors must comply with the regulations, decrees, laws, orders, directives, application circulars, standards, rules or any other document relating to the installation site. LEROY-SOMER accepts no liability in the event of failure to comply with these rules and regulations.

Note: When the motors are supplied via appropriate separate electronic inverters and/or controlled by electronic control or monitoring devices, they must be installed by a professional who will be responsible for ensuring that the electromagnetic compatibility regulations of the country in which the product is installed are observed.

Signature of quality director : P. THERY

Signature of technical director : F.PELTIER

Q1T135 E from 26/06/2010

These documents are supplied with the relevant products.

LSE-FLSE

THREE-PHASE INDUCTION MOTORS FOR ATMOSPHERES CONTAINING EXPLOSIVE GASES AND DUST

INDEX

LSE-FLSE

THREE-PHASE INDUCTION MOTORS FOR ATMOSPHERES CONTAINING EXPLOSIVE GASES AND DUST

On receipt of your motor, check that it has not suffered any damage in transit.
If there are obvious signs of knocks, contact the carrier (you may able to claim on their insurance) and after a visual check, turn the motor by hand to detect any malfunction.

2 - MARKING

As soon as you receive the motor, check that the nameplate on the machine conforms to your order.

LEROY SOMER F - 16015 ANGOULEME — **Mot. 3 ~ LSE 112 MU** — **N 027010 LF040** — CE 0080

IP55 IK08 cl.F 40C S1 kg 36,5

V	Hz	min^{-1}	kW	cos φ	A
Δ 400	50	1458	4	0,86	7,7

I_D/I_N = 6,7 - t_E = 8 s

Ex II 2 G - Ex e II T3 INERIS 01ATEX0010X

LEROY SOMER F - 16015 ANGOULEME — **MOT. 3 ~ LSE 160L** — CE 0080 — **N 125089 MA 001 kg 100**

I_D/I_N = 7,3 - t_E = 9,1 s

IP65 IK08 I cl F 40 C S1

V	Hz	min^{-1}	kW	cos φ	A
Δ400	50	1455	15	0,86	28

CTP 150°C

Ex II 2 GD Ex e II T3 Ex tD A21 IP 65 T125°C INERIS 01ATEX0010 X

DE	6212 ZZC3		g
NDE	6309 ZZC3		h

Definition of symbols used on nameplates:

CE **Legal mark of conformity of product to the requirements of European Directives.**

	Zone	Motor type	ATEX marking	Protection type marking	Gas temperature class (G)	Dust max. surface T°C (D)	Index of protection
ATEX	1&2	(F)LSE	Ex II 2 G	EX e II	T1 to T4	/	IP55
ATEX	1 & 21 2 & 22	(F)LSE	Ex I 2 GD	EX e II Ex tD A21	T1 to T4	T125	IP65

ATEX specific marking Ex

0080 : INERIS (Notified Body) identification number
Ex : Specific marking for protection against risks of explosion
II 2G or II 2GD: : Group and category of equipment
Ex : Symbol for equipment designed for potentially explosive atmospheres
e : Protection type
II : Explosion group
T3 : Temperature class
Ex tD A21 IP 65 T 125°C : Protection type and maximum surface temperature in "dust" atmospheres (optional)
VIK : Specific recommendations for the German market
INERIS : Notified Body
01ATEX0010 X : EC type-examination certificate number
PTC 150°C : Optional thermal protection

Motor
MOT 3 ~ : Three-phase A.C. motor
LSE : LSE series
112-160 : Frame size
MU-L : Frame size

Motor no.
No. : Serial number
L-M* : Year of production
F-A** : Month of production
040-001 : Batch number

* **L** = *2000*, **M** = *2001 ...* **W** = *2009*, **X** = *2010*
****A** = *January*, **F** = *June*

kg : Weight
IP 55 or 65: Protection index
IK08 : Shock resistance index
I cl.F : Insulation class F
40°C : Maximum ambient operating temperature
S1 : Duty
V : Supply voltage
Hz : Supply frequency
min^{-1} : Revolutions per minute (rpm)
kW : Rated output power
cos φ : Power factor
A : Rated current
Δ : Connection symbol
I_D/I_N : Starting current
t_E : Locked rotor time

Bearings
DE : Drive end
Drive end bearing
NDE : Non drive end bearing

3 - STORAGE

Prior to commissioning, machines should be stored:
- Away from humidity: at relative humidity levels above 90%, the machine insulation can drop very rapidly, to just above zero at around 100%. The state of the anti-rust protection on unpainted parts should be monitored.
For very long storage periods the motor can be placed in a sealed enclosure (for example heat-shrunk plastic) containing sachets of desiccant:
- Away from frequent significant variations in temperature, to avoid the risk of condensation. During storage the drain plugs must be removed to allow condensation water to escape.
- If the area is subject to vibration, try to reduce the effect of this vibration by placing the motor on a damping support (rubber plate or similar) and turn the rotor a fraction of a turn once a fortnight to prevent the bearing rings from becoming marked. Remove and replace the rotor locking device if applicable.
- Do not remove the rotor locking device (where there are roller bearings).
Even if the motor has been stored in the correct conditions, certain checks must be carried out before it is started up:

Greasing

The motors must be stored in their original packaging, in a location away from humidity (RH<90%) and vibrations.
- Motors fitted with permanently greased bearings: maximum storage period = 3 years; after this time, replace the bearings with an identical type.
- Motors fitted with grease nipples:

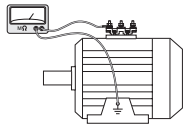
Storage period		
Grade 2 grease	**Grade 3 grease**	
< 6 months	< 1 year	No regreasing before commissioning.
6 months to 1 year	1 to 2 years	Regrease before commissioning in accordance with the instructions appearing on the nameplate (quantity and quality of grease).
1 to 5 years	2 to 5 years	Dismantle and clean the bearings. Completely replace the grease in accordance with the instructions appearing on the nameplate (quantity and quality of grease). Replace the seals on the shaftways and for IP 66 motors on the spigots before commissioning.
> 5 years	> 5 years	Change the bearings. Completely replace the grease in accordance with the instructions appearing on the nameplate (quantity and quality of grease). Replace the seals on the shaftways (lubricate them using the same grease as that on the bearings) and for IP 66 motors on the spigots before commissioning.

⚠ Warning: Do not perform a high voltage test on the auxiliaries.

4 - COMMISSIONING

⚠ Before starting the motor, it is advisable to check the insulation between the phases and earth, and between phases.

This check is essential if the motor has been stored for longer than 6 months or if it has been kept in a damp atmosphere.
This measurement must be carried out using a megohmmeter at 500 V D.C. (do not use a magnetoelectric system).
It is better to carry out an initial test at 30 or 50 volts and if the insulation is greater than 1 megohm, carry out a second test at 500 volts for 60 seconds. The insulation value must be at least 10 megohms in cold state.
If this value cannot be achieved, or if the motor may have been splashed with water or salt spray, or kept for a long period in a very humid place or if it is covered with condensation, it is advisable to dry the stator for 24 hours (only by an authorised Leroy-Somer repair shop) in a drying oven at a temperature of between 110°C and 120°C.
If it is not possible to place the motor in a drying oven:
- Switch on the motor, with the rotor locked, at 3-phase A.C. voltage reduced to approximately 10% of the rated voltage, for 12 hours (use an induction regulator or a reduction transformer with adjustable outlets).
- Or supply the 3 phases in series with a D.C. current, with the voltage at 1 to 2% of the rated voltage (use a D.C. generator with independent excitation or batteries for motors of less than 22 kW).
- NB: The A.C. current must be monitored using a clamp ammeter, and the D.C. current using a shunt ammeter. This current must not exceed 60% of the rated current.
It is advisable to place a thermometer on the motor housing: if the temperature exceeds 70°C, reduce the indicated voltage or current by 5% of the original value for every 10°C difference.
While it is drying, all the motor orifices must be open (terminal box, drain holes). Before commissioning, all these covers must be replaced so that the motor conforms to IP 55 or 65 degree of protection. Clean or replace the orifices and plugs or breathers before reassembly.



⚠ Warning: If the high voltage test, carried out at the factory before despatch, needs to be repeated, it should be performed at half the standard voltage, ie: 1/2 (2 U + 1000 V). Check that the capacitive effect resulting from the high voltage test is eliminated before connecting the terminals to earth.

⚠ Prior to commissioning for all motors:
- Remove all dust from the machine
- Rotate the motor with no load (no mechanical load) for 2 to 5 minutes, checking that there is no abnormal noise. If there is any abnormal noise, see section 11.

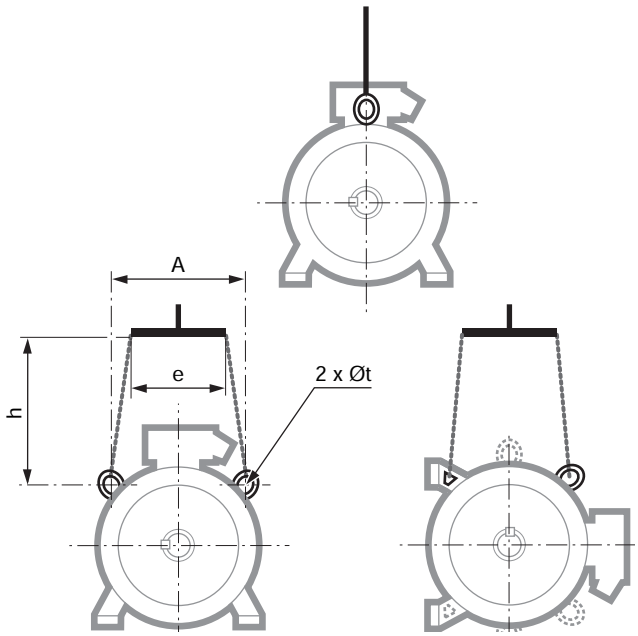
5 - INSTALLATION

5.1 - Position of lifting rings

⚠ The lifting rings are intended for lifting the motor on its own. They must not be used to lift the whole machine once the motor has been fitted to it.

Labour regulations stipulate that all loads over 25 kg must be fitted with lifting devices to facilitate handling.
The positions of the lifting rings and the minimum dimensions of the loading bars are given below in order to help with preparation for handling the motors. If these precautions are not followed, there is a risk of warping or crushing some equipment such as the terminal box, protective cover or drip cover.

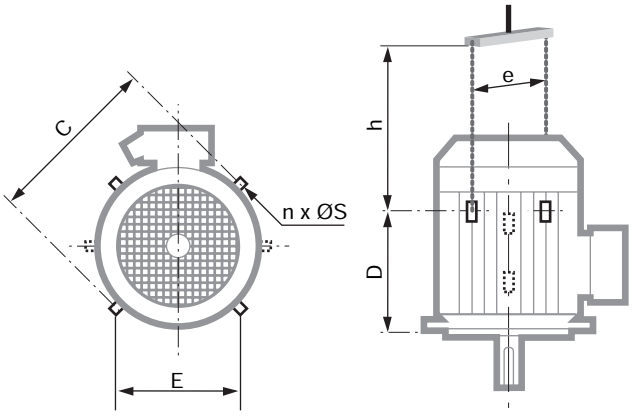
• Horizontal position



Type	Horizontal position			
	A	e min.	h min.	Øt
100	120	200	150	9
112	120	200	150	9
132	160	200	150	9
160	200	160	110	14
180 MR	200	160	110	14
180 L	200	260	150	14
200	270	260	165	14
225 ST/MT/MR	270	260	250	14
250 MZ	270	260	250	14
250 ME	400	400	500	30
280 SC/MC	400	400	500	30

⚠ Motors intended for use in the vertical position may be delivered in the horizontal position on a pallet. When the motor is pivoted, the shaft must under no circumstances be allowed to touch the ground, as the bearings may be irreparably damaged.

• Vertical position



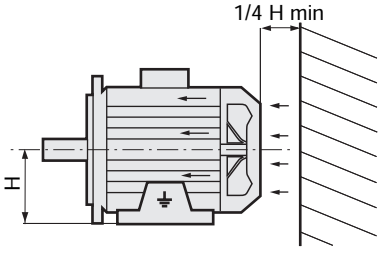
View from above — View from the side

Type	Vertical position						
	C	E	D	n	ØS	e min.*	h min.
160	320	200	230	2	14	320	350
180 MR	320	200	230	2	14	320	270
180 L	390	265	290	2	14	390	320
200	410	300	295	2	14	410	450
225 ST/MT/MR	410	300	295	2	14	410	450
250 MZ	410	300	295	2	14	410	450
250 ME	500	400	502	2	30	500	500
280 SC/MC	500	400	502	2	30	500	500

** if the motor is fitted with a drip cover, allow an additional 50 to 100 mm to avoid damaging it when the load is swung.*

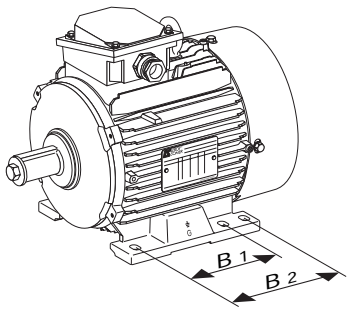
5.2 - Location - ventilation

Our motors are cooled in accordance with method IC 411 (standard IEC 60034-6), ie. “machine cooled by the surface, using the ambient fluid (air) flowing along the machine”.
The fan at the non drive end cools the motor. Air is sucked in through the grille of a fan cover (which provides protection against the risk of direct contact with the fan in accordance with standard IEC 60034-5) and blown along the housing fins to ensure thermal equilibrium of the motor whatever the direction of rotation.



The motor must be installed in an adequately ventilated area, with clearance for the air intake and outlet of at least one-quarter of the frame size.
Blocking the fan cover grille and the housing fins, even accidentally (clogging), is likely to adversely affect the operation and safety of the motor.
In the case of vertical operation with the shaft extension facing down, it is advisable to fit the motor with a drip cover to prevent the entry of any foreign bodies.
It is necessary to check that the hot air is not being recycled. If it is, pipes must be provided for the intake of cold air and discharge of hot air, in order to prevent abnormal temperature rise of the motor.
In this case, if the air is not circulated by an auxiliary fan, the dimensions of the pipes must be such that the load losses are negligible compared to those of the motor.

Positioning
The motor must be mounted in the position specified on the order, on a base which is rigid enough to prevent distortion and vibration.
Where the motor feet have six fixing holes, it is preferable to use those which correspond to the standard dimensions for the motor power rating (refer to the technical catalogue for induction motors) or, failing that, to those shown at B2.

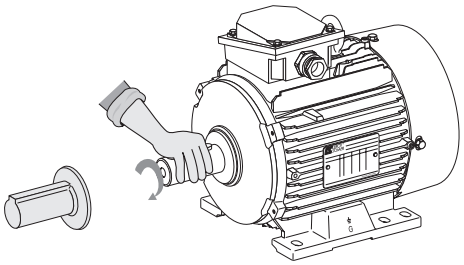


Provide easy access to the terminal box, the condensation drain plugs and, if appropriate, to the grease nipples.
Use lifting equipment which is compatible with the weight of the motor (indicated on the nameplate).

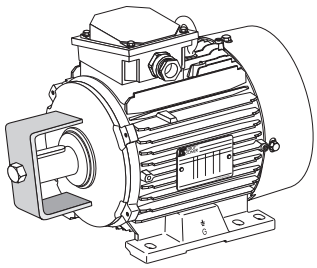
⚠ When the motor is fitted with lifting rings, they are for lifting the motor on its own and must not be used to lift the whole machine after the motor has been fitted to it.
Note 1: When installing a suspended motor, it is essential to provide protection in case the fixing breaks.
Note 2: Never stand on the motor.

5.3 - Coupling

Preparation
Turn the motor by hand before coupling to detect any possible fault due to handling.
Remove any protection from the shaft extension. Drain off any condensation water which may have formed inside the motor (see section 4 page 6).



Rotor locking device
For made-to-order motors with roller bearings, remove the rotor locking device.
In exceptional circumstances when the motor has to be moved after the coupling device has been fitted, the rotor must be re-immobilised.



Balancing
Rotating machines are balanced according to standard IEC 60034-14:
- Half-key when the shaft extension is marked H.

By special request, the balancing can be set:
- No key when the shaft extension is marked N
- Full key when the shaft extension is marked F

Any coupling element (pulley, coupling sleeve, slip-ring, etc) must therefore be balanced accordingly.

Motor with 2 shaft extensions:
If the second shaft extension is not used, in order to comply with the balancing class, the half-key or key must be fixed firmly in the keyway so that it is not thrown out during rotation (H or F balancing) and must be protected against direct contact.

6 - ELECTRICAL PARAMETERS LIMIT VALUES

6.1 - Minimizing motor starting problems

In order to protect the installation, any significant temperature rise in the cabling conduits must be prevented, while ensuring that the protection devices are not triggered during starting.

Problems affecting the operation of other devices connected to the same source are due to the voltage drop caused by the current inrush on starting.

Even though mains supplies increasingly allow D.O.L. starting, the current inrush must be reduced for certain installations.

Jolt-free operation and soft starting ensure greater ease of use and an increased lifespan for the machines being driven.

The two essential parameters for starting cage induction motors are:
- Starting torque
- Starting current

The starting torque and the resistive torque determine the starting time.
Depending on the load being driven, it may be necessary to adapt the torque and the current to the machine starting time and to the possibilities of the mains power supply.

The five essential modes are:
- D.O.L. starting
- Star/delta starting
- Soft starting with autotransformer
- Soft starting with resistors
- Electronic starting

The "electronic" starting modes control the voltage at the motor terminals during the entire starting phase and enable very soft, jolt-free starting.

Starting systems must be placed outside the potentially explosive zone or be of an approved type.

6.2 - Supply voltage

The rated voltage is indicated on the nameplate.

6.3 - Starting time

For application with wery long starting time, please contact Leroy-Somer passing on the motor type as the serial number.

6.4 - Locked rotor time t_E

t_E is the maximum locked rotor time permitted to conform to the rated temperature class. The t_E value is indicated on the motor nameplate.

If the rotor locks, a protective device should switch off the power supply in a time less than t_E.

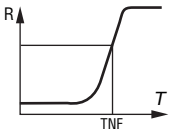
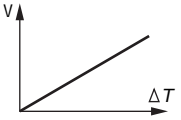
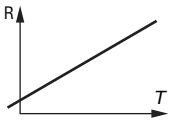
Protection devices must be placed outside the potentially explosive zone or be of an approved type.

6.5 - Supply by frequency inverter

(See section 8.1)

7 - USE

Thermal protection (see section 9) and space heaters.

Type	Operating principle	Operating curve	Breaking capacity (A)	Protection provided	Mounting Number of devices*
Thermistor with positive temperature coefficient **PTC**	Non-linear variable resistor, indirectly heated 		0	General surveillance for transient overloads	Mounted with associated relay in control circuit 3 in series
Thermocouples ***T*** (*T*<150°C) Copper Constantan **K** (*T*<1000°C) Copper-nickel	Peltier effect		0	Continuous surveillance at hot spots at regular intervals	Mounted in control boards with associated reading equipment (or recorder) 1 per hot spot
Platinum resistance thermometer **PT 100**	Variable linear resistance to indirect heating		0	High accuracy continuous surveillance at key hot spots	Mounted in control boards with associated reading equipment (or recorder) 1 per hot spot

- NRT: nominal running temperature.
- The NRTs are chosen according to the position of the sensor in the motor and the temperature rise class.

* The number of devices relates to the winding protection.

Alarm and early warning

All protective equipment can be backed up by another type of protection (with different NRTs): the first device will then act as an early warning (light or sound signals given without shutting down the power circuits), and the second device will be the alarm (shutting down the power circuits).

Thermal magnetic protection

The motors must be protected by a thermal magnetic device located between the isolating switch and the motor. These protection devices provide total protection of the motor against non-transient overloads.

This device can be accompanied by fused circuit-breakers.

Built-in indirect thermal protection

The motors can be equipped with optional heat sensors. These sensors can be used to monitor temperature changes at “hot spots”:

- Overload detection
- Cooling check
- Monitoring strategic points for maintenance of the installation
- **Ensuring the temperature of the hot spots is monitored**

⚠ To ensure that the maximum surface temperature is never reached, the thermal sensors fitted on the motor must be connected to a device (in addition to and functionally independent of any system which could be required for operational reasons in normal conditions) which switches off the motor.

⚠ Under no circumstances can these sensors be used for direct control of the motor operating cycles.

⚠ Control and breaking devices must be installed in cabinets placed outside the danger zone or must be of an approved type.

Temperature sensor operating thresholds:

- Maximum surface temperature: 125°C (GD)
  - winding sensor: 120°C ± 5°C
  - DE shield sensor: 120°C ± 5°C
- Maximum surface temperature: 130°C (class T4)
  - winding sensor: 120°C ± 5°C
  - DE shield sensor: 120°C ± 5°C
- Maximum surface temperature: 195°C (class T3)
  - winding sensor: 150°C ± 6°C
  - DE shield sensor: 120°C ± 5°C

8 - SPECIAL OPERATING CONDITIONS

- Thermal protection (see sections 7 & 9)

- Space heaters (see section 7)

- Temperatures: storage and ambient
Note: T_a = ambient temperature

If the motor has been stored at a temperature lower than -10°C, heat it (see section 4) and turn the shaft manually before starting up the machine.

If it is to be used at a temperature lower than - 20°C, the motor may be equipped with space heaters.

Our standard motors are designed to operate at an ambient temperature Ta of between -20°C and 40°C.

If $-40°C \leq T_a < -25°C$, the shaftway seals must be made of silicon and the fan must be metal. The flat seals of the terminal box must be silicon or polyurethane mastic.

- Surface temperature
As standard, the maximum surface temperature of our motors is 200°C for T_3 or 135°C for T_4 with an ambient temperature of $\leq$ 40°C (G).

If the motors are also to be used in atmospheres which may contain explosive dust, the maximum surface temperature will be 125°C (GD).

- Installation zones
Motors with IP 65 protection are designed for use in atmospheres containing explosive dust - group II - Category 2 (zone 21) or Category 3 (zone 22).

In atmospheres containing explosive gas, the degree of protection is IP 55.

- Connection
Particular attention must be paid to the information on the nameplate in order to choose the correct type of connection for the supply voltage.

- Earthing
It is compulsory to earth the motor, and earthing must be performed in accordance with current regulations (protection of workers).

- Seals
If the drain plugs or breathers are removed, they must be replaced in order to ensure that the motor conforms to IP 55 or IP 65 protection. Replace the seals which have been removed with new seals of the same type. Clean the holes and plugs before reassembly.

***** Each time the motor is dismantled, and during planned maintenance, replace the seals on the shaftways, the shield spigots and the terminal box cover with new seals of the same type after cleaning all parts. The seals on the shaftways must be fitted using the same type of grease as on the bearings.

*This operation must be carried out by an authorised repair shop.

- Workforce safety
Protect all rotating devices before power-up.

If a motor is started up without a coupling device having been fitted, carefully immobilise the key in its location.

All measures must be taken to ensure protection against the risks which arise when there are rotating parts (coupling sleeve, pulley, belt, etc).

Beware of backdriving when the motor is switched off. The appropriate precautions must be taken:
- For example, for pumps a non-return valve must be installed.

- Contactors - Isolators
In all cases, contactors, isolators, etc, must be installed and connected in an enclosure outside the danger zone or be of an approved type.

- Shock resistance
The motor can withstand a weak mechanical shock (IK 08 according to EN 50102). The user must provide additional protection if there is a high risk of mechanical shock.

8.1 - Use with a variable speed drive

When a drive is used, any special instructions detailed in the specific drive manual must be observed. In particular, the following minimum steps must be taken:

- Check that the drive switching frequency is at least 3 kHz.

- Check that the motor has a second nameplate indicating the maximum motor characteristics when used with a variable speed drive.

- The reference voltage, usually 400 V at 50 Hz, is indicated on the motor nameplate. The drive must deliver a constant voltage/frequency signal to the motor.

- Program in the drive the maximum current value and also the min. and max. frequency values indicated on the second motor nameplate.

- Each type of "e" motor should have been tested first on load with a drive of exactly the same type as the one it will be controlled with.

⚠ **Drives and sensor connection devices must be placed outside danger zones (outside zones 0, 1, 2, 20, 21 and 22).**

8.1.1 - Special conditions for safe operation

- As standard, the motor shock resistance corresponds to a “low” risk of mechanical danger, and they should therefore be installed in an environment with a low risk of shocks.
- The motor must be fitted with thermal sensors in the winding (all frame sizes) and on the DE bearing (frame size 160 and above) in the following cases:
  - Motor supplied by a frequency inverter
  - Motor in a good air-flow (IC418) and not self-cooled
  - Motor adapted so as to no longer be self-cooled (IC410)
  - Motor fitted with a backstop

- The thermal sensors fitted on the motor must be connected to a device placed outside the zone, which switches off the motor when the operating thresholds are reached, so that the maximum surface temperature is never reached. This device must operate in normal conditions and must be in addition to and functionally independent of any system which could be required for operational reasons in normal conditions.

- When the motor is fitted with auxiliary or forced ventilation (IC416), a device must be present to prevent the main motor from operating when there is no ventilation.

- The space heaters should only be supplied with power when the motor is switched off and cold; their use is recommended in ambient temperatures less than -20°C.

- The supply voltage and frequency must conform to those indicated on the motor nameplate.

- The frequency range specified on the motor nameplate must be strictly observed.

- When several motors are supplied by the same drive, individual protection must be provided on each motor starter (thermal relay for example), for safety reasons.

- When a frequency inverter is used, any special instructions detailed in its specific manual must be complied with.

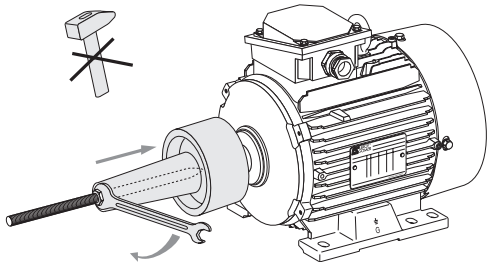
- The cable glands should be compatible with the protection method used for the connection part. On variants with an integral cable(s), the motor must be connected outside the potentially explosive atmosphere, or inside a box protected by a suitable recognised protection method.

- When the motor is fitted with one or more auxiliary junction boxes protected with increased safety, it can only tolerate a low risk of mechanical danger, and the user will need to provide additional protection if there is a high level of risk. (In other words, when an auxiliary terminal box is attached to the main terminal box).

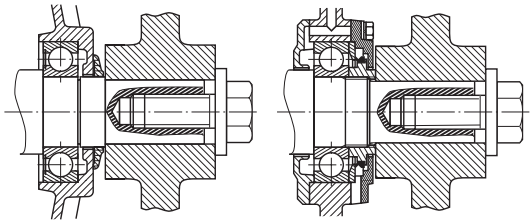
Remark:
PTCs thermistor characteristics as wiring diagram can be transmitted by Leroy-Somer.
Please always pass on motor type and serial number.

9 - MECHANICAL ADJUSTMENTS

Tolerances and adjustments
The standard tolerances are applicable to the mechanical characteristics given in our catalogues. They comply fully with the requirements of IEC standard 60072-1.
- Users must adhere strictly to the instructions provided by the transmission device supplier.
- Avoid impacts which could damage the bearings.
Use a spanner and the tapped hole of the shaft extension with a special lubricant (e.g. molykote grease) to make it easier to fit the coupling.



The hub of the transmission device must be:
- Fully in contact with the shoulder of the shaft or, if this is missing, against the metal stop ring which forms a labyrinth seal and thus locks the bearing in place (do not crush the seal).
- Longer than the shaft extension (2 to 3 mm) so that it can be tightened using a screw and washer. If it is not, a spacer ring must be inserted without cutting the key (if this ring is large, it must be balanced).



Shaft shoulder bracket Thrust ring bracket

If there is a second shaft extension, it must only be used for direct coupling and the same recommendations must be followed.

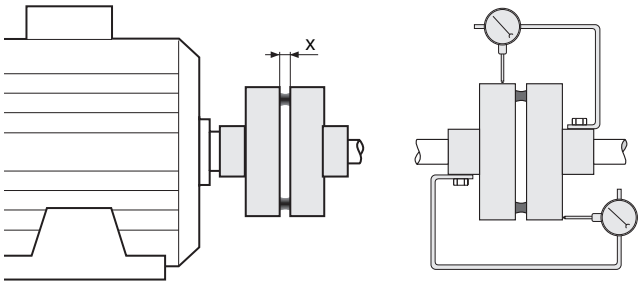
⚠ The 2nd shaft extension may also be smaller than the main shaft extension, and under no circumstances can it deliver torques greater than half the rated torque.

Inertia flywheels must not be mounted directly onto the shaft extension, but installed between end shields and connected by a coupling device.

Direct connection onto the machine
When mounted directly on the motor shaft extension of the moving device (pump or fan turbine), check that this device is perfectly balanced and that the radial force and the axial thrust are within the limits indicated in the catalogue for bearing performance.

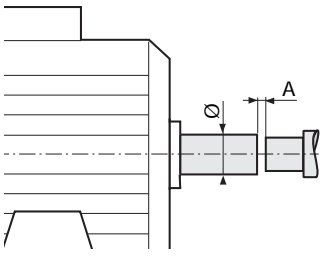
Direct connection using a flexible coupling
Selection of the coupling sleeve should take account of the rated torque to be transmitted and the safety factor dependent on the starting conditions for the electric motor.
The machines must be carefully aligned, so that any lack of concentricity and parallelism in the two parts of the coupling sleeve is compatible with the recommendations of the coupling sleeve manufacturer.
The two parts of the coupling sleeve must be assembled provisionally to assist their movement in relation to one another.

Adjust the parallel plane of both shafts using a gauge. Measure the distance between the two coupling surfaces at one point on the circumference. Rotate them 90°, 180° and 270° in relation to this initial position, and measure each time. The difference between the two extreme values of dimension “x” must not exceed 0.05 mm for standard couplings.



To perfect this adjustment and at the same time check the concentricity of the two shafts, fit 2 gauges as shown in the diagram and slowly turn both shafts.
The differences registered by either shaft will indicate the need for an axial or radial adjustment if the difference exceeds 0.05 mm.

Direct connection using a rigid coupling
The two shafts must be aligned so as to adhere to the tolerances of the coupling sleeve manufacturer.
Maintain the minimum distance between the two shaft extensions to allow for expansion of the motor shaft and the load shaft.



Ø (mm)	A (mm) min.
9 to 55	1
60	1.5

10 - SUPPLY CONNECTION

10.1 - Terminal box

This is placed as standard on the top of the motor near the drive end. It has IP 55 (G) or IP 65 (GD) protection and is fitted with a cable gland according to the table below.

Warning: The position of the terminal box cannot be easily modified, even with flanged motors, as the condensation drain holes (if appropriate) must be at the bottom.

Cable gland

If the thread(s) on the orifice(s) designed to take one or more cable glands or conduits is (are) metric, there will be no particular marking on the motor; if the thread type is different or mixed, the type(s) will be marked on the equipment.
The standard position of the cable gland (1) is on the right, seen from the motor drive end.
Due to the symmetrical construction of the terminal box, it can be placed in any of the four directions, except position 2 on flange-mounted motors (B5), apart from on 355 LK - 400 - 500.
A cable gland must never open upwards.
Check that the incoming bend radius of the cables prevents water entering via the cable gland.

⚠ **The installer is responsible for the IP 5x or IP 6x sealing of the cable path.**

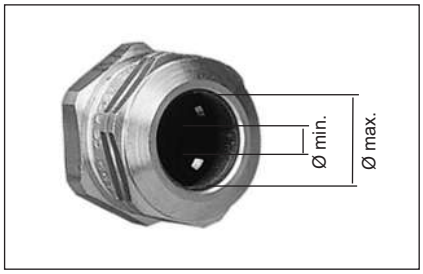
Cable size

⚠ **Adapt the cable gland and its reducer or amplifier, if fitted, to the diameter of the cable being used, in accordance with the manual specific to the cable gland, which is included with the motor.**
To maintain the original stated IP protection of the motor, it is essential to make a watertight seal between the rubber ring and the cable, by tightening the cable gland correctly (it should not be possible to unscrew it without a tool).
Unused cable glands must be replaced with threaded plugs.
Unused orifices must also be closed off using threaded plugs. When fitting cable glands or blocking holes, a seal of perbunan, or silicon or polyurethane mastic, must be inserted between the cable glands, the plugs, the reducers or (and) the amplifiers and the support or the terminal box.
For connections using screwed conduit entries, a minimum of 5 cylindrical threads or 3 tapered threads must be engaged (check the minimum thickness of the cable gland). These threads must be rendered watertight by using polyurethane or silicon mastic, or anti-vibration adhesive.

Cable size of the cable glands and diameter of drill holes on the cable gland baseplates

Cable gland type *	Min. cable Ø (mm)	Max. cable Ø (mm)
ISO M16 x 1.5	6	11
ISO M20 x 1.5	7.5	13
ISO M25 x 1.5	12.5	18
ISO M32 x 1.5	17.5	25
ISO M40 x 1.5	24.5	33.5
ISO M50 x 1.5	33	43
CMA 3" GC	40	62

* Cable anchor gland* certified Exe. Cable gland made of brass.



LSE-FLSE

THREE-PHASE INDUCTION MOTORS FOR ATMOSPHERES CONTAINING EXPLOSIVE GASES AND DUST

⚠ **The motors are factory-fitted with guidance labels which must be kept clean and legible.**

⚠ **Under no circumstances should the power supply cable be used for handling the motor.**

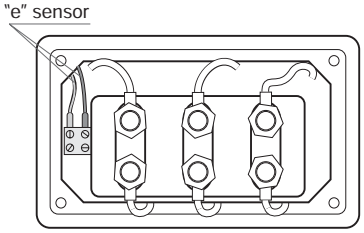
10.2 - Wiring diagram for terminal block or isolators

All motors are supplied with a wiring diagram in the terminal box. If required, this diagram should be obtained from the supplier, specifying the motor type and number (shown on the motor nameplate).
The connector links required for coupling can be found inside the terminal box.
Single speed motors have a block with 6 EExe approved safety terminals, whose marking complies with IEC 60034-8 (or NFC 51-118).

10.3 - Direction of rotation

When the motor is powered by U1, V1, W1 or 1U, 1V, 1W from a direct mains supply L1, L2, L3, it turns clockwise when seen from the drive shaft end.
If 2 phases of the power supply are changed over, the motor will rotate anti-clockwise (the motor should be checked to ensure that it has been designed to rotate in both directions).
If the motor is fitted with accessories (thermal protection or space heater), these must be connected on mini-terminals.

Motor fitted with a terminal block



10.4 - Earth terminal

⚠ **It is compulsory to earth the motor, and earthing must be performed in accordance with current regulations (protection of workers).**

One earth terminal is located inside the terminal box, and another is outside the enclosure. They are marked: ⏚
They must be protected against self-release by a jumper, lock washer, screw or locknut, or anti-vibration adhesive.
The sizing of the cables must comply with the specifications of standard 60079-0.

10.5 - Connecting the power supply cables to the terminal block

The cables must be fitted with connectors suitable for the cable cross-section and the terminal diameter (diagrams 1 and 3).
They must be crimped in accordance with the connector supplier's instructions.

10.5.1 - Terminal block with round connectors

These terminal blocks, mounted on the housing and held in place by 2 locked screws, make it possible to use standard round connectors.

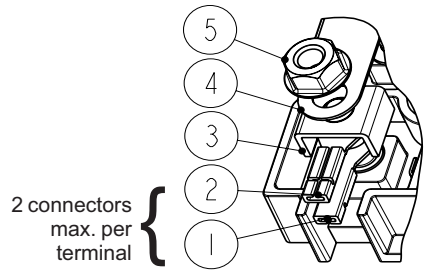


Diagram 1

Each terminal consists of the following items, positioned in order:
- 1: motor cable connector, shank locked
- 2: power supply cable connector, shank locked
- 3: terminal washer
- 4: Y or Δ connector link
- 5: "Serpress" brake nut

Tightening torque (N.m) for the nuts on LSE terminal blocks

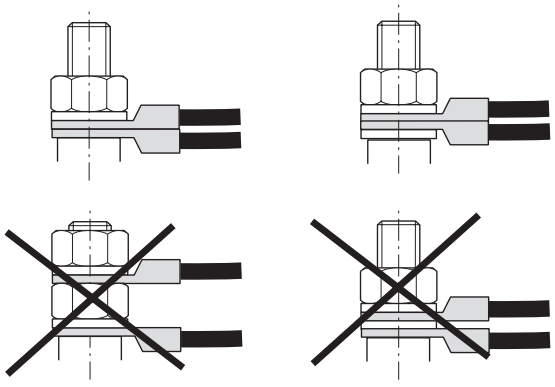
Terminal	M4	M5	M6
Steel	2	3.2	5
Brass	1	2	3

- Earth terminal:
This is situated inside the terminal box; in some cases, the earth terminal may be situated on one of the feet or on one of the cooling fins (round motors). It is indicated by the symbol: ⏚

It is compulsory to earth the motor, and earthing must be performed in accordance with current regulations (protection of workers).

* If required, ask the supplier for this diagram, specifying the motor type and number (shown on the motor nameplate).

- Connecting the power supply cables to the terminal block:
The cables must be fitted with connectors suitable for the cable cross-section and the terminal diameter.
They must be crimped in accordance with the connector supplier's instructions.
Connection must be carried out with connector resting on connector (see the diagrams below):



11 - MAINTENANCE

11.1 - General information

11.1.1 - Frequent monitoring

This monitoring, generally carried out by operators, is intended to:
- Monitor, as a preventive measure, the state of the equipment (cables, cable glands, etc) bearing in mind the environmental conditions (temperature, humidity, etc).
- Detect as early as possible any potentially dangerous problems, such as damage to the cable ducts by abrasion.
- Ensure that staff are fully trained on the risks and means of prevention.

If there is an accumulation of dust between the fins and/or on the fan cover grille, leading to a rise in the surface temperature, the motor should be cleaned frequently.

11.1.2 - Repairs

Repairs to and/or rewinding of the electrical equipment for use in potentially explosive zones must be carried out by qualified staff, using identical equipment, in compliance with the specifications of standard 60079-19. It is essential that the motor is returned to its original state, adhering scrupulously to the original motor construction. Disregarding this may affect the safety of the equipment (for example, protection index not conforming to IP 55 or IP 65) or the surface temperature (for example, rewinding the motor). Prior written authorisation from the manufacturer is necessary.

WARNING:

Unless written authorisation has been obtained, the manufacturer cannot be held responsible for any action which could affect the motor's safe operation.

Service Centres (CDS) are trained and approved by "Saqr - ATEX" to guarantee the maintenance and repair of these motors in complete safety.

11.1.3 - Spare parts

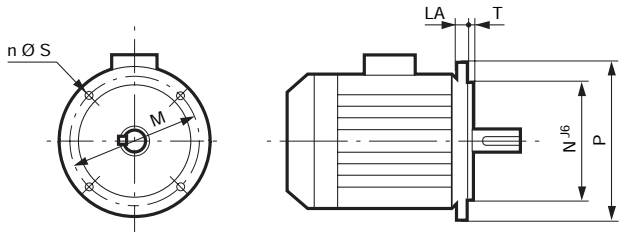
When ordering spare parts, you must indicate the complete motor type, its serial number and the information given on the nameplate (see section 2).

Part numbers can be found on the exploded views and their descriptions in the parts list (section 12).

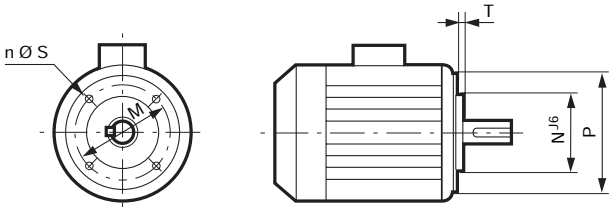
Routine maintenance kits can be obtained from our After Sales Service.

In the case of flange mounted motors, indicate the type of flange and its dimensions (see below).

Moteur avec bride à trous lisses



Moteur avec bride à trous taraudés



To ensure that our motors operate correctly and safely, we recommend the use of original manufacturer spare parts.

In the event of failure to comply with this advice, the manufacturer cannot be held responsible for any damage.

11.2 - Corrective maintenance: general information

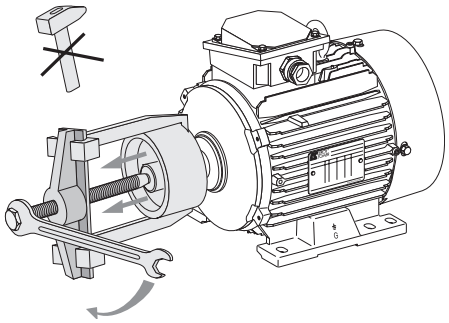
11.2.1 - Dismantling the motor

First switch off and lock the power supply and ensure there is no potentially explosive atmosphere.

Repair and maintenance of inner parts must be carried out by an authorized repair shop. Control and replacement of seals described in §11.2.2 can be done by a trained and competent body according to EN 60079-19

- Open the terminal box, mark the wires and their positions
- Disconnect the power supply wires
- Uncouple the motor from the equipment being driven

Always use an extractor to remove any devices mounted on the motor shaft extension.



11.2.2 - Check-up of the shaftways seals

To maintain the protection principle of an ATEX dust motor, it's mandatory to prevent the ingress of dust into the machine to avoid its combining with air to form an explosive atmosphere.

For the motors use in explosive dust environment (zone 21 & 22), it's imperative to maintain the protection index (IP 65) of the machines. Therefore, all seals have to be replaced every 3 years of operation.

In zone 21, the shaftways seals installed fan drive side must be checked every year (not applicable for the seals installed oil pump drive side).

After decoupling of the driven equipment, the following controls must be carried out:

- Manually rotate the motor and verify that the lip rub remains in all position in contact with the endshield
- Check that the inner lip of the each seals doesn't have any crack

11.2.3 - Shaftways seals replacement

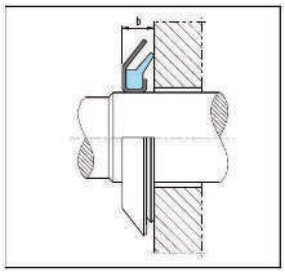
Minimum every 3 years of operation, all the seals of the motors used in explosive dust atmosphere must be replaced.

Replace the seals on the shaftways and on the shield spigots with new seals of the same type, after cleaning the parts.

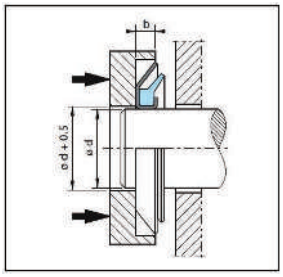
- Remove the shaft key, the fan cover (if installed) and the cooling fan (if installed)
- Clean the shaft extension as the endshields and remove all traces of knocks

- Install new shaftways seals of the same type (same dimensions and same material) as follow:

o Prior to being fitted, the sealing member shall be greased but not between the sealing member and the case. It is important that the seal is fitted with adequate precision.
o The seal shall be pressed onto the shaft with a uniform and even pressure.
o The case must not be tapped directly with a hammer: the seal should be pressed to the right position by means of a suitable assembly tool (see figures).



Installation principle



Assembly tool

Ambiant temperature	Reference Bühler Technologies	Motor Type	Seal material	Endshield seals	
				N.D.E. *	D.E. *
40°C	37MT075804ATEX	LSE 80L	Nitrile rubber	20-35	17-30
	37MT15904ATEX	LSE 90L	Nitrile rubber	25-40	20-35
	36MT0759041ATEX	LSE 90S	Nitrile rubber	25-40	20-35
	36MT1510041ATEX	LSE 100L	Nitrile rubber	25-40	25-40
	36MT2210041ATEX	LSE 100LG	Nitrile rubber	30-47	30-47
	36MT2213261ATEX	LSE 132SM	Nitrile rubber	20-35	25-40
	36MT3011241ATEX	LSE 112MU	Nitrile rubber	30-47	30-47
	37MT0759041ATEX	LSE 90S	Nitrile rubber	25-40	20-35
	37MT1510041ATEX	LSE 100L	Nitrile rubber	25-40	25-40
75°C	35MT055804ATEX	LSE 80L	Fluorinated rubber	20X35X4	NA
	35MT075904ATEX	LSE 90S	Fluorinated rubber	25x40x4	25x40x4
	35MT221004ATEX	LSE 100LG	Fluorinated rubber	30x47x4,5	NA
	35MT151006ATEX	LSE 100LG	Fluorinated rubber	30x47x4,5	30x47x4,5
	36MT075904ATEX	LSE 90S	Fluorinated rubber	25x40x4	20x35x4
	36MT15904ATEX	LSE 90L	Fluorinated rubber	25x40x4	20x35x4
	36MT221004ATEX	LSE 100LG	Fluorinated rubber	30x47x4,5	30x47x4,5
	36MT221126ATEX	LSE 112MG	Fluorinated rubber	30x47x4,5	30x47x4,5
	36MT301124ATEX	LSE 112MU	Fluorinated rubber	30x47x4,5	30x47x4,5

*** : D.E. = terminal box side; N.D.E. = terminal box opposite side**

11.3 - Safety regulations

⚠ Before any work is carried out on the motor or in the cabinet, ensure that there is no potentially explosive atmosphere and that all the components of the equipment are powered down.

⚠ Before any work is carried out on the motor or in the cabinet, check that the cosine φ compensation capacitors are isolated and/or discharged (read the voltage at the terminals).

⚠ Depending on the type of thermal protection, the motor may remain powered up. Ensure that the mains supply is disconnected before any work is carried out in the terminal box or in the cabinet.

11.4 - Routine maintenance

Inspection after commissioning
After approximately 50 hours' operation, check the tightness of the screws fixing the motor and the coupling device. In the case of chain or belt transmission, check that the tension is correctly adjusted.

Cleaning
To ensure the motor operates correctly, remove any dust or foreign bodies which may clog the air intake and the housing fins.
Precaution: Check that the motor is completely sealed (terminal box, drain holes, etc) before carrying out any cleaning operation.
Dry cleaning (vacuuming or compressed air) is always preferable to wet cleaning.

⚠ Cleaning must always be carried out at a pressure of less than 10 bars, from the centre of the motor outwards to avoid dust and particles getting under the seals.

Draining condensation water
Variations in temperature cause condensation to form inside the motor. This must be removed before it affects the operation of the motor.
Condensation drain holes, located at the bottom of the motors (bearing in mind their operating position) are sealed with plugs or breathers.

⚠ Replace the drain hole covers to ensure IP55 or IP65 protection of the motor. Replace the seals which have been removed with new seals of the same type. Clean the orifices and plugs or breathers before reassembling them.

11.4.1 - Lubrication

11.4.1.1 - Grease life

The lifetime of a lubricating grease depends on:
- the characteristics of the grease (type of soap and base oil, etc)
- service stress (type and size of bearing, speed of rotation, operating temperature, etc)
- contamination

11.4.1.2 - Permanently greased bearings

For motors from 80 to 132 frame size, the type and size of the bearings make for long grease life and therefore lubrication for the lifetime of the machine.

Reference Bühler Technologies	Motor Type	Polarity	Permanently greased bearings	
			D.E. *	N.D.E. *
37MT075804ATEX	LSE 80L	4	6204ZZC3	6203ZZC3
37MT15904ATEX	LSE 90L	4	6205ZZC3	6204ZZC3
36MT0759041ATEX	LSE 90S	4	6205ZZC3	6204ZZC3
36MT1510041ATEX	LSE 100L	4	6205ZZC3	6205ZZC3
36MT2210041ATEX	LSE 100LG	4	6206ZZC3	6206ZZC3
36MT2213261ATEX	LSE 132SM	6	6308ZZC3	6207ZZC3
36MT3011241ATEX	LSE 112MU	4	6206ZZC3	6206ZZC3
37MT0759041ATEX	LSE 90S	4	6205ZZC3	6204ZZC3
37MT1510041ATEX	LSE 100L	4	6205ZZC3	6205ZZC3
35MT055804ATEX	LSE 80L	4	6203ZZC3	6204ZZC3
35MT075904ATEX	LSE 90S	4	6204ZZC3	6205ZZC3
35MT221004ATEX	LSE 100LG	4	6206ZZC3	6206ZZC3
35MT151006ATEX	LSE 100LG	6	6206ZZC3	6206ZZC3
36MT075904ATEX	LSE 90S	4	6204ZZC3	6205ZZC3
36MT15904ATEX	LSE 90L	4	6205ZZC3	6204ZZC3
36MT221004ATEX	LSE 100LG	4	6206ZZC3	6206ZZC3
36MT221126ATEX	LSE 112MG	6	6206ZZC3	6206ZZC3
36MT301124ATEX	LSE 112MU	4	6206ZZC3	6206ZZC3

* : D.E. = terminal box side; N.D.E. = terminal box opposite side

11.5 - Reconditioning the bearings

⚠ **Replacement of bearings must be only carried out by Leroy-Somer or by an authorised repair shop.**

11.6 - IP 55 or IP 65 protection for the motor

⚠ **Each time the motor is dismantled and during planned site maintenance, replace the seals on the shaftways, the shield spigots and the terminal box cover (if mastic) with new seals of the same type after cleaning all parts. The seals on the shaftways must be fitted using the same type of grease as on the bearings.**

⚠ **If the drain plugs or breathers are removed, they must be replaced in order to ensure that the motor conforms to IP 55 or IP 65 protection. Replace the seals which have been removed with new seals of the same type. Clean the holes and plugs before reassembly.**

⚠ **If the terminal box cover is removed, clean all the parts and replace the seal with a new seal of the same type, if its condition no longer provides the required degree of protection.**

Remark:
Expertise or repair can only be carried out by an authorised and approuved service Company.

11.7 - Repainting

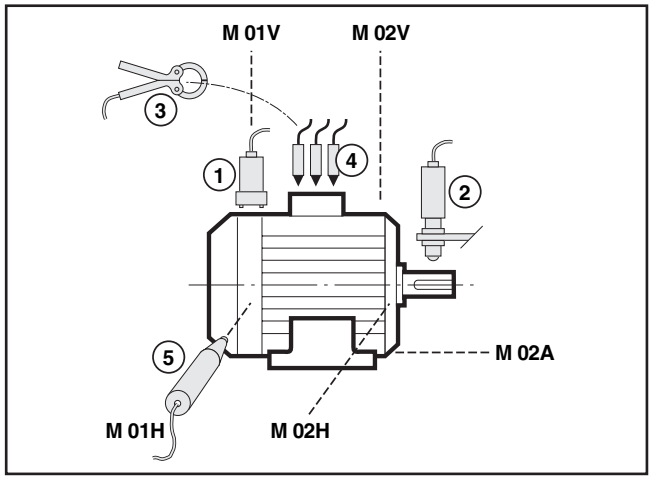
If the motors must be repainted, the coating thickness can not exceed 200 µm (remove the old painting if necessary).

11.8 - Troubleshooting guide (in addition to standard IEC 79-17)

Incident	Possible cause	Remedy
Abnormal noise	Originating in motor or machine being driven?	Uncouple the motor from the equipment being driven and test the motor on its own
Noisy motor	**Mechanical cause:** if the noise persists after switching off the electrical power supply	
	- Vibration	- Check that the key conforms to the type of balancing (see section 11.3)
	- Damaged bearings	- Change the bearings
	- Mechanical friction: ventilation, coupling	- Check
	Electrical cause: if the noise stops after switching off the electrical power supply	- Check the power supply at the motor terminals
	- Normal voltage and 3 phases balanced	- Check the connection of the terminal block and the tightening of the connectors
	- Abnormal voltage	- Check the power supply line
	- Phase imbalance (current)	- Check the winding resistance and the balancing of the mains supply (voltage)
Motor heats up abnormally	- Faulty ventilation	- Check the environment - Clean the fan cover and the cooling fins - Check that the fan is correctly mounted on the shaft
	- Faulty supply voltage	- Check
	- Terminal connection fault	- Check
	- Overload	- Check the current consumption in relation to that indicated on the motor nameplate
	- Partial short-circuit	- Check the electrical continuity of the windings and/or the installation
	- Phase imbalance	- Check the winding resistance
Motor does not start	**No load** - Mechanical seizing - Broken power supply line	When switched off: - Check by hand that the shaft rotates freely - Check the fuses, electrical protection, starting device, electrical continuity
	On load - Phase imbalance	When switched off: - Check the direction of rotation (phase order) - Check the resistance and continuity of the windings - Check the electrical protection

11.9 - Preventive maintenance

The diagram and table below give the recommended equipment to use and the ideal positions to take measurements of all parameters which can affect the operation of the machine, such as eccentricity, vibration, state of the bearings, structural problems, electrical problems, etc.



Detector	Measurement	Measurement points								
		M 01V	M 01H	M 02V	M 02H	M 02A	Shaft	E01	E02	E03
(1) Accelerometer	For measuring vibrations	●	●	●	●	●				
(2) Photo-electric cell	For measuring speed and phase (balancing)						●			
(3) Clamp ammeter	For measuring current (D.C. and 3-phase A.C.)							●	●	●
(4) Voltage probe	For measuring voltages							●	●	●
(5) Infra-red probe	For measuring temperature	●		●						

MOTEURS LEROY-SOMER 16015 ANGOULÊME CEDEX - FRANCE

338 567 258 RCS ANGOULÊME
Limited company with capital of 62,779,000 €

www.leroy-somer.com

INERIS
INSTITUT NATIONAL DE L'ENVIRONNEMENT
INDUSTRIEL ET DES RISQUES

Parc Technologique ALATA
B P N° 2 - 60550 Verneuil-en-Halatte - France
Tél : (33) 03 44 55 66 77 - Fax (33) 03 44 55 67 04
E-mail : ineris@ineris.fr

(2) **Equipment and protection systems intended for use in potentially explosive atmospheres Directive 94/9/EC**

(1) EC-TYPE EXAMINATION CERTIFICATE

(3) Number of the EC type examination certificate: **INERIS 01ATEX0010 X**

(4) Protection system or equipment:

3-PHASE ASYNCHRONOUS MOTOR TYPE FLSE... or LSE...

(the type may be supplemented by an option symbol and the type by the shaft height an indication of the symbol for the distance between the centre lines of the motor mounting holes and/or for the number of poles)

(5) Manufacturer: **LEROY SOMER**

(6) Address: F- 16015 ANGOULEME

(7) This protection system or equipment and any other acceptable alternative of this one are described in the appendix of this certificate and the descriptive documents quoted in this appendix.

(8) The INERIS, notified body and identified under number 0080, in accordance with article 9 of Council Directive 94/9/CE 23 th March 1994, certifies that this protection system or equipment fulfills the Essential of Health and Safety Requirements relating to the design and construction of equipments and protection systems intended for use in potentially explosive atmospheres, described in appendix II of the Directive.

The examinations and the tests are consigned in official report n° 16021/01.

(9) The respect of the Essential Health and Safety Requirements is ensured by:

- conformity with:

EN 50 014	of June	1997	+ A1 and A2
EN 50 019	of November	2000	
EN 50 281-1-1	of September	1998	

- specific solutions adopted by the manufacturer to meet the Essential Health and Safety Requirements described in the descriptive documents.

(10) Sign X, when it is placed following the Number of the EC type examination certificate, indicates that this equipment and protection system is subjected to the special conditions for safe use, mentioned in the annex of this certificate.

(11) This EC type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

(12) The marking of the equipment or the protection system will have to contain:

⟨Ex⟩ II 2 G or ⟨Ex⟩ II 2 GD EEx e II T3 or EEx e II T4 IP65 T200°C to T125°C

Verneuil-en-Halatte, 2001 12 29

X. LEFEBVRE

Engineer at the Laboratory for Certification of ATEX equipment

Director of the Certifying Body,
By delegation
B. PIQUETTE
Deputy Manager of Certification

ATMOSPHERES EXPLOSIVES ORGANISME NOTIFIE INERIS NOTIFIED BODY EXPLOSIVE ATMOSPHERES

(13) # ANNEX

(14) EC TYPE EXAMINATION CERTIFICATE N° INERIS 01ATEX0010 X

(15) **DESCRIPTION OF THE EQUIPMENT OR THE PROTECTION SYSTEM**

Three-phase asynchronous electric motor with frame out of cast aluminium for type LSE... and frame out of cast iron for type FLSE... and cast iron flanges.
The basic shaft heights are in mm: 80, 90, 100, 112, 132 and 160.

A primary junction box in cast iron or steel is mounted on the housing. An auxiliary box can be fitted on the primary box. As a variation, between one and four auxiliary junction boxes,can be welded on the primary junction box in steel, or the connection can be made of a unterminated cable.

The motor may be designed with one or two speeds.

Temperature sensors may be incorporated in the stator windings and in the bearings.

The motor may be supplied through a frequency converter an/or can operate at variable speed. In this case, it is fitted with temperature sensors located in the stator windings and in the front bearing. These sensors should be connected to a device that shuts off power to the motor so that the maximum indicated surface temperature is never reached.

Heating resistances may be located in the winding.

The motor and the junction boxes can be realised by the manufacturer for use in an ambient temperature range from -25°C to 40°C, or from -25°C to 60°C or from -40°C to 60°C.

The degrees of protection of enclosures (motor and junction box(es)) are IP55 in the standard version, IP66 according in the variant to EN 60 034 part 5 EN 60 529.

The degrees of mechanical protection of enclosures are IK08 in the standard version.

Electrical cables are inserted into the apparatus through screw-in cable penetrations of a type certified EEx d and/or EEx e, according to the CENELEC standards or through conduit entrie(s).

The motor can be fitted with the following Ex components:
- Terminal KS 7A certificate PTB 90C3163U,
- Terminal KS 8A certificate PTB 90C3164U,
- Terminal KS 10A certificate PTB 90 C3165U.

SAFETY PARAMETERS

Motor:
- Supply voltage max : 1100 V above the shaft height 132
- Supply voltage max : 726 V until the shaft height 132
- Frequency : 50 or 60 Hz or
  other fixed values between,
  - up to 200 Hz until the shaft height ≤ 132
  - up to 100 Hz up to the shaft height 132

  Frequency variation : same range defined below
- Rating : - standard version, S1 service
  from 0.37 kW to 11 kW under 50 Hz
  - for special versions the different parameters can be adapted.

Heating resistances : Umax = 240V (50/60Hz)
- P max = 100W

Operating maximal thresholds of the temperature sensors:
- Maximum surface temperature = 125°C
  . winding sensor = 120°C ± 5°C
  . bearing sensor = 120°C ± 5°C

- Maximum surface temperature = 130°C (class T4)
  . winding sensor = 120°C ± 5°C
  . bearing sensor = 120°C ± 5°C

- Maximum surface temperature = 195°C (class T3)
  . winding sensor = 150°C ± 6°C
  . bearing sensor = 190°C ± 5°C

MARKING

Marking must be readable and indelible; it must comprise the following indications:

- **LEROY SOMER**
  F- 16015 ANGOULEME
- FLSE... or LSE... (1)
- INERIS 01ATEX0010 X
- (serial number)
- (Year of construction)
-  **II 2 G or**  **II 2 GD**
- **EEx e II T3 or EEx e II T4 IA/IN tE (*)**
- IP65 T200°C or T 135°C or T125°C **(**)**
- T amb: -25°C to 40°C

or

- **LEROY SOMER**
  F- 16015 ANGOULEME

- FLSE... or LSE... (1)
- INERIS 01ATEX0010 X
- (serial number)
- (Year of construction)
- Ⓔx **II 2 G or** Ⓔx **II 2 GD**
- **EEx e II T3 IA/IN tE (*)**
- IP65 T200°C or T 145°C or T135°C **(**)**
- T amb: -25°C to 50°C or T amb: -25°C to 60°C
- T cable : 100°C

(1) FLSE or LSE may be supplemented by an option symbol and the type by the shaft height an indication of the symbol for the distance between the motor mounting holes and/or of the number for poles
(*) see classification temperature table
(**)for explosive dusty atmospheres

Rated current and voltage
on the junction box, the marking :
DO NOT OPEN WHEN ENERGIZED

and, in each of the above cases, on each junction box lid, the following:

DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT

The covered type by this EC type examinatiob certificate are mentioned in the temperture class table.

The whole of marking can be carried out in the language of the country of use.

The protection apparatus or system must also carry the marking normally envisaged by the standards of construction which relate to it.

ROUTINE EXAMINATIONS AND TESTS

Each example of the equipment protected defined above must have successfully passed before delivery a dielectric strength test carried out as specified in 7.1 in accordance with 6 of the EN 50 019 standard on the connection elements.

(16) DESCRIPTIVE DOCUMENTS

The report is composed of the documents quoted hereafter, constituting the descriptive file of the apparatus, object of this certificate.

- Descriptive notice ref..LS :BEGP« LSE»12-01 : (7 pages) signed on 10.12.2001
- Addition to instruction notice and maintenance signed on 10.12.2001
- Temperature class table 23.10.2001
- Association table motors with frequency inverter on 2001.12.10
- Plans E6919 rev A (3 folios) signed on 20.06.2001
- Plans E6921 rev A (3 folios) signed on 20.06.2001

- Plans E6923 rev A (3 folios) signed on 20.06.2001
- Plans E6986 rev A (3 folios) dated on 25.09.2001 signed on 02.10.2001
- Plans E6988 rev A (3 folios) dated on 25.09.2001 signed on 12.10.2001
- Plans E6988 rev A (3 folios) dated on 25.09.2001 signed on 12.10.2001
- Plans E6989 rev A (3 folios) dated on 10.10.2001 signed on 10.10.2001
- Plans E7004 rev A (3 folios) dated on 10.10.2001 signed on 12.10.2001
- Plans E7012 rev A (3 folios) dated on 16.10.2001 signed on 16.10.2001
- Plans E7014 rev A (3 folios) dated on 16.10.2001 signed on 16.10.2001

(17) SPECIAL CONDITIONS FOR SAFE USE

When the motor is supplied through a frequency converter and /or used in an air flow, it must be fitted with thermal sensors in the windings, on the front bearing and eventually on the rear bearing.

When the motor is fitted with a forced ventilation, a device has to oppose to running of the main motor in absence of ventilation.

In order to ensure that the maximum surface temperature is not exceeded, the thermal sensors fitted to the motor should be connected to a device that switches off power to the motor when the operating thresholds defined in **(15)** are reached. Also the heating resistances may be powered only when the motor is disconnected from the power supply and cold.

When the motor is equipped with one or many auxiliary connecting boxes, it can only support a low risk of mechanical danger and the user would have to ensure a complementary protection in case of high risk.

The cable entries must be compatible with the type of protection used for the connecting part. In the variant with unterminated cable(s), the connection to the motor must be made whether in a non-explosive atmosphere or protected by a standard type of protection.

These special conditions are defined in the instructions for the motor.

(18) ESSENTIAL REQUIREMENTS OF SAFETY AND HEALTH

The respect of the Essential Health and Safety Requirements is ensured by:

- conformity to the European standards EN 50 014, EN 50 019 and EN 50 281-1-1
- the whole of the provisions adopted by the manufacturer and described in the descriptive documents.

ADDITION

(3) **INERIS 01ATEX0010 X/01**

(4) **3-PHASE ASYNCHRONOUS MOTOR TYPE LSE...or FLSE...**

(5) **Made by LEROY SOMER**

(15) - **PURPOSE OF THE ADDITION**

Up date of the descriptive documents allowing:

- Extension of motor range according the following shaft height: 63, 71, 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280.
- Modification of the ambient temperature range :-20°C to 40°C as normal use.
- Mechanical modification.
- Table of temperature class according to the shaft heights.
- Add of the components Ex defined in the descriptive documents.
- Association motor frequency converter.
- Add of manufacturing areas.

PARAMETERS RELATING TO THE SAFETY

The parameters relating to safety indicated in the basic certificate are supplemented as follow:
Motor:
Rating:
- standard version, S1 service from 0.25 kW to 75 kW under 50 Hz
- for special versions the different parameters can be adapted.

MARKING

The code marking envisaged in the basic certificate is supplemented by the following code:

- LEROY SOMER
- F- 16015 ANGOULEME or F- 90500 BEAUCOURT or F- 69 SAINT SYMPHORIEN D'OZON or F- 16230 MANSLE
- LSE...or FLSE... (1)
- INERIS 01ATEX0010 X
- (Serial number)
- (Year of construction)

- ⟨Ex⟩ II 2 G or ⟨Ex⟩ II 2 GD
- **EEx e II T3 IA/IN tE (*)**

Or

- **EEx e II T4 IA/IN tE (*)**

IP66 T 125°C or T 135°C or T145°C**(**)**
Tamb : mandatory mention if it differs from -20°C to 40°C
(1) FLSE or LSE may be supplemented by an option symbol and the type by the shaft height an indication of the symbol for the distance between the motor mounting holes and/or of the number for poles
(*) see classification temperature table
(**)for explosive dusty atmospheres
Rated current and voltage
on the junction box, the marking :
DO NOT OPEN WHEN ENERGIZED

and, in each of the above cases, on each junction box lid, the following:

DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT
The covered type by this EC type examination certificate are mentioned in the temperature class table.

ROUTINE EXAMINATIONS AND TESTS

The examinations and individual tests envisaged in the basic certificate are unchanged.

(16) - DESCRIPTIVE DOCUMENTS

The documents referred to below, constitute the file describing the modifications of the apparatus and forming the subject of the present addition.

- Descriptive Notice of extension n°1 dated and signed on 2005.05.17
- Technical annex 25 items dated and signed on 2005.12.01
- Table of temperature class ST1036A dated and signed on 2005.03.15
- Table of temperature class T50Q020B dated and signed on 2005.03.14
- Table of temperature class ST70 0002_1 dated and signed on 2005.12.22
- Table of association motor/frequency converter ST1008_B dated and signed on 26.01.2006
- Plan GT104700 2005.02.08

(17)- SPECIAL CONDITIONS FOR SAFE USE

The special conditions are completed as follow:

The motor supplied through a frequency converter removed and located in non hazardous area or used in a sufficient air flow or eventually adapted in view to not be self ventilated must be fitted with thermal sensors in the windings (all shaft heights), on the front bearing (from the shaft height 160) and eventually on the rear bearing.

(18)- ESSENTIAL REQUIREMENTS OF SAFETY AND HEALTH

The respect of the Essential Health and Safety Requirements indicated in the basic certificate is unchanged.

Verneuil-en-Halatte, 2006 02 21

ATMOSPHERES EXPLOSIVES ORGANISME NOTIFIE INERIS NOTIFIED BODY EXPLOSIVE ATMOSPHERES

X. LEFEBVRE

Engineer at the Laboratory of Certification of ATEX Equipment

Director of the Certifying Body,
By delegation
B. PIQUETTE
Deputy manager of Certification

ADDITION

(3) **INERIS 01ATEX0010X/02**

(4) **3-PHASE ASYNCHRONOUS MOTOR TYPE LSE or FLSE...**

(5) **Made by LEROY SOMER**

(15) PURPOSE OF THE ADDITION

- Conformity of the standards: EN 60079-0: 2006, EN 60079-7: 2007, EN 61241-0: 2006 and EN 61241-1: 2004.
- Modification of plastic materials of the ventilators, for the motors GD.
- Limitation of the maximum supply voltage to 1000V.
- Addition of a new maximum ambient temperature: +75°C.
- Electrical and mechanical execution variations.
- For the plant of BEAUCOURT, LEROY-SOMER becomes LEROY-SOMER MOTORS, Constructions Electriques de Beaucourt (CEB), company of LEROY-SOMER group.
- Addition of synchronous motors.

PARAMETERS RELATING TO THE SAFETY

The parameters relating to the safety are modified as follow:

- Maximal supply voltage: 800V, up to shaft height 132,
- Maximal supply voltage: 1000V, beyond of shaft height 132,
- Maximum output per pole: 200kW.

MARKING

The marking is modified as follow:

LEROY SOMER
F-16015 ANGOULEME or F-69360 SAINT SYMPHORIEN D'OZON or F-16230 MANSLE
or
LEROY SOMER MOTORS - CEB
F-90500 BEAUCOURT
LSE or FLSE...(1)
INERIS 01ATEX0010X
(Serial number)
(Year of construction)

Ⓔx II 2 G	or	Ⓔx II 2 GD
Ex e II T3 ou T4		Ex e II T3 or T4
		Ex tD A21 IP65 or IP66 $T_{(2)}$

I_A/I_N
t_E
Tamb: (3)
Tcable: (4)
Rated voltage and current
WARNINGS (5): DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT
DO NOT OPEN WHEN ENERGIZED

(1) may be supplemented by an option symbol and the type by the shaft height an indication of the symbol for the distance between the motor mounting holes and/or of the number for poles.

(2) T125°C, T135°C or T200°C in conformity with descriptive documents.

(3) ambient temperature range if different to -20°C, +40°C and in the limits of -25°C, +75°C ; as defined in the descriptive documents.

(4) in accordance with descriptive documents.

(5) on each junction box lid.

The whole of marking can be carried out in the language of the country of use.

The protection apparatus or system must also carry the marking normally envisaged by the standards of construction which relate to it.

ROUTINE EXAMINATIONS AND TESTS

The routine examinations and tests are modified as follow:

- In accordance with clause 7.1 of the EN 60079-7 standard, a test of dielectric strength on each of the different circuits of the connection units, performed according to the relevant standards. The test voltage has to be applied during one minute.

(16) DESCRIPTIVE DOCUMENTS

The descriptive documents quoted hereafter constitute the technical documentation describing the modification of the equipment, subject of this present addition.

- Document ST1353 revision A (4 pages)	dated and signed on the 2010.03.03.
- Document Q1T135 revision E (1 page)	dated and signed on the 2010.06.25.
- Document 3614fr revision C	dated on the June 2010
- Document 3606 revision C (4 pages)	dated and signed on the 2010.02.26.
- Document ST1008 revision C (3 pages)	dated and signed on the 2010.03.11
- Document SM A18 revision D	dated and signed on the 2009.04.03
- Document ST1453 revision A	dated and signed on the 2010.03.03
- Document ST1036 revision C	dated and signed on the 2010.06.10
- Document ST70 0002 revision 3	dated and signed on the 2010.06.23
- Document T10S105 revision D	dated and signed on the 2010.08.20
- Document FB « ATEX »13/03 indice B	dated and signed on the 2010/08/30
- Plan E9222_A	signed on the 2010.02.05
- Plan E9224_A	signed on the 2010.02.05
- Plan E9228_A	signed on the 2010.02.05
- Plan E9227_A	signed on the 2010.02.05
- Plan DM3051 revision A	signed on the 2010.02.10
- Plan DM3052 revision A	signed on the 2010.02.10
- Plan DM3053 revision A	signed on the 2010.02.10
- Plan DM3054 revision A	signed on the 2010.02.10
- Plan DM3055 revision A	signed on the 2010.02.10
- Plan DM3056 revision A	signed on the 2010.02.10
- Plan DM3057 revision A	signed on the 2010.02.10
- Plan DM3058 revision A	signed on the 2010.02.10
- Plan DM3059 revision A	signed on the 2010.02.10
- Plan DM3061 revision A	signed on the 2010.02.10
- Plan E7745 revision A	signed on the 2004.09.01
- Plan E8140 revision B	signed on the 2009.11.04
- Plan E8033 revision B	signed on the 2009.11.04
- Plan PB81 revision F	signed on the 2009.12.23
- Plan PB82 revision F	signed on the 2009.12.23
- Plan ST1325 revision 0	dated on the 2009.11.20

(17) SPECIAL CONDITIONS FOR SAFE USE

The special conditions for safe use are unchanged.

(18) ESSENTIAL SAFETY AND HEALTH REQUIREMENTS

The respect of the Essential Health and Safety Requirements is ensured by:

- Conformity to the standards quoted in clause (15).
- All provisions adopted by the manufacturer and defined in the descriptive documents.

Verneuil-en-Halatte, 2010 09 24

Director of the Certifying Body,
By delegation
T. HOUEIX
Certification Officer
Certification Division

ATMOSPHERES EXPLOSIVES ORGANISME NOTIFIE INERIS NOTIFIED BODY EXPLOSIVE ATMOSPHERES

We, **MOTEURS LEROY SOMER,** Bd - Marcellin LEROY 16915 Angoulême cedex 9 France, declare, under our sole responsibility, that the following products :

LSE and **FLSE series type "e" increased safety induction motors**

bearing the following markings on their nameplates:

CE 0080 Ⓔx **II 2G Ex e IIC T3** (or T4) **Gb**	(zone 1)
or **CE 0080** Ⓔx **II 2GD Ex e IIC T3** (or T4) **Gb Ex tb IIIC T125°C Db**	(zone 1 and 21)
IIC motors can be marked IIA or IIB for commercial reasons.	

Comply with :

European Directives:

• Low Voltage Directive	**2014/35/EU**
• Electromagnetic Compatibility Directive	**2014/30/EU**
• ATEX Directives:	**2014/34/EU**
European and international standards:	**IEC-EN 60034-1:2010; 60034-2-1:2014; 60034-5:2001/A1:2007; 60034-6:1993; 60034-7:1993/A1:2001; 60034-8:2007/A1:2014; 60034-9:2005/A1:2007; 60034-14:2004 /A1:2007; 60034-30-1: 2014 ; 60072-1:1991; IEC 60079-0:2007; EN 60079-0:2009; IEC 60079-7:2006; EN60079-7:2007; IEC 60079-31:2008; EN 60079-31:2009** (Ex tb)
The type awarded an EC type-examination certificate by the notified body:	**INERIS 01ATEX0010 X** INERIS (0080) – BP 2 – Parc technologique ALATA 60550 – VERNEUIL EN HALATTE

The design and manufacturing requirements are covered under the responsibility of the notified body by the PRODUCT QUALITY ASSURANCE notification : **INERIS (0080)**

These products are not concerned by major technical modifications brought in standard EN 60079-0:2012, they are considered as performing Essential Safety and Health Requirements from ATEX directive.

This conformity permits the use of these ranges of products in machines subject to the application of the Machinery Directive 2006/42/EC, provided that they are integrated or incorporated and/or assembled in accordance with, amongst others, the regulations of standard EN 60204 "Electrical Equipment for Machinery".

The products defined above may not be put into service until the machines in which they are incorporated have been declared as complying with the applicable Directive.

Installation of these motors must comply with the regulations, decrees, laws, orders, directives, application circulars, standards, rules or any other document relating to the installation site. LEROY-SOMER accepts no liability in the event of failure to comply with these rules and regulations.

Note: When the motors are supplied via appropriate separate electronic inverters and/or controlled by electronic control or monitoring devices, they must be installed by a professional who will be responsible for ensuring that the electromagnetic compatibility regulations of the country in which the product is installed are observed.

Signature of plant quality manager :	Signature of plant technical manager :
G.GARDAIS date: 29/04/2016	B.VINCENT date: 29/4/2016

12.4 Motor operating instructions (ATB)

BÜHLER TECHNOLOGIES

FluidControl

Motor Documentation

ATB

Excerpt from the original instructions of the manufacturer

350028EN
03/2017

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

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: fluidcontrol@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.

Document information
Document No..... 350028EN
Version.....03/2017

Operating Manual

NORDENHAM

Flame-Proof Motors
II 2G Ex d(e) IIC(B) T3-T6 Gb
II 2D Ex tb IIIC T200-85 °C Db

ATB NORDENHAM
Technology in Motion
SCHORCH

1. 2001 Edition, Date of Publication 02/ 01
2. 2002 Edition, Date of Publication 03/ 02
3. 2003 Edition, Date of Publication 06/ 03
4. 2004 Edition, Date of Publication 04/ 04
5. 2005 Edition, Date of Publication 02/ 05
6. 2005 Edition, Date of Publication 05/ 05
7. 2013 Edition, Date of Publication 09/ 13

Author: Wolfgang Sobel

Printed on paper chlorine-free and acid-free bleached cellulose.

Warning!

Hazardous electrical current!
Ensure protection against explosions!

Before installing

- Switch off the power to the device.
- Make sure that device cannot be switched on again by accident.
- Make sure that the device is de-energized.
- Connect to earth and short out.
- Cover or close off any neighbouring live parts with a barrier.
- Follow carefully the assembly instructions provided for the device.
- Only qualified personnel as per EN 50110-1/-2 (VDE 0105, part 100) can perform any work on this device/system.
- The electrical connections are to be made as per the relevant specifications (e.g. cross-section of the supply line, fuses, protective connection).
- Opening the motor - save for the terminal box - during the warranty period without the manufacturer's permission shall lead to the termination of the warranty.
- Original spare parts must be used for all repairs
- Live and rotating parts of electrical motors can cause major or deadly injuries.
- All work involving transport, installation, start-up and maintenance must be carried out by qualified experts. Please pay attention to the applicable explosion protection standards and the national accident prevention regulations.
- As regards any equipment subject to these guidelines, it is important to adopt the necessary safety precautions to protect the personnel against possible injuries.
- The personnel must be duly instructed to proceed with caution and according to regulations during shipping, hoisting, and positioning and while repairing the motor.
- Do not lift the motor together with the drive equipment by the motor lifting eyebolts.
- Do not use the supplied lifting eyebolts at ambient temperatures below –20°C, in accordance with DIN 580. The eyebolts may break at lower temperatures.
- Do not load the eyebolts as per DIN 580 no more than 45° compared to the screwing direction. The use of crossbeams is recommended. See the operating instructions for the layout dimensions of the lifting eyebolts and the minimum dimensions of the loading crossbeams and chain lengths.
- In the case of motors with built-in brake appropriate safety measures are to be adopted against the possible failure of the brake especially in applications involving the pulling of loads.
- Operating the motor with the supplied shaft protection cover alone is forbidden.
- Contact with the capacitor for the start-up and running of single-phase motors is to be avoided until the unloading procedure is carried out securely.
- If a high-voltage test is necessary, the procedures and precautionary measures set forth in accident prevention regulations are to be followed.

Table of Contents

About this Manual

These operating instructions apply to explosion-proof three-phase current motors in model series CD...; dCD...; CEIGL...; BD... and dBD....

Besides the general assembly instructions, these guidelines are to be followed for the installation, start-up and maintenance of explosion-protected AC motors with a degree of protection of "pressure-resistant encapsulation" marked: Ⓔx (II..), Ex de II. T. and Ex d II. T. and Ex tb III.T. as well as the general installation instructions.

Any independent manufacturing equipment mounted on or built into the motors like brakes, rotary encoders or frequency converters, etc. have their own operating instructions which are to be duly followed.

Target audience

This manual is addressed to the specialists in charge of installing, operating and servicing the motors. Besides conventional technical training they must possess knowledge in the field of explosion protection.

Abbreviations and symbols

This manual uses abbreviations and symbols having the following meanings:

▶ indicates action instructions

draws your attention to interesting tips and additional information

Attention!
warns against minor damages to property.

Caution!
warns against major damages to property and minor injuries.

Warning!
warns against major damages to property and major injuries or death.

All of the dimensions are in mm unless otherwise specified.

In order to ensure clarity, at the top of every page you will find the name of the chapter on the left hand and the current section on the right hand; the only exceptions are the first page of each chapter and the blank pages at the end of the chapter.

1 Explosion-protected Motors

Intended use

The motors are to be operated only according to the data specified on the rating plate. According to the relevant marking on the rating plate, the motors are fit for use in areas subject to explosion hazards.
The motors are fit to be built into another machine. Start-up is forbidden until the conformity of the final product with directive 2006/42/EC has been determined.
If the test certificate number on the rating plate is followed by an "X", the "Special Requirements" specified in these operating instructions for safe operation and the supplements to these requirements must be complied with.
(→ Section „Explosion protection“, Page 46)

Liability and Warranty Guarantee

We cannot be held liable for any damage or malfunctions resulting from assembly errors, the failure to follow these operating instructions or improper repairs.
Original spare parts are manufactured and tested specifically for these motors.
We recommend that you obtain any spare parts and accessories only from the manufacturer.
We hereby specify that any spare parts and accessories not supplied by the manufacturer require our approval.
Under any circumstances the mounting and use of third-party products can negatively affect the motor's original structural properties and impair the safety for persons, the motor or other real values (explosion protection).
The manufacturer shall not be liable for any damages resulting from the use of spare parts or accessories not authorized by the manufacturer.
Any unauthorized conversions and alterations to the motor shall not be approved for safety reasons and the manufacturer cannot be held liable for any resulting damage.

Servicing

The customer service department is available to provide any technical information about these motors.

Should any difficulties with our motors be encountered, please contact our factory or local branch office. Log on to our website to find at the address of our local branch office nearest you.

ATB Nordenham GmbH
Helgoländer Damm 75
D-26954 Nordenham
Tel.: +49 (0)4731/365-0
Fax: +49 (0)4731/365-159
E-Mail: info@atb-nordenham.de
Internet:www.atb-nordenham.de

Spare parts

When ordering spare parts, besides the name of the required part, specify also the motor type and serial number.

Delivery, Storage, Transport

Delivery

▶ Check the motor for damages during transportation.

In case of damage during transportation an investigation of fault is to be performed by the forwarding agent.

▶ Report any covert damages to the forwarding agent or manufacturer no later than seven days from the transfer of the motor.

The entire packaging material can be recycled by means of the Dual System.

Storage

Motors can be stored for a maximum of 36 months after delivery under the following conditions.

- The cable lead-ins must be sealed with closed screw fittings (the provided cable glands are not impervious to rain!).
- The environment must be dry and dust-free.
- The room temperatures must not drop below +5 °C or exceed +30 °C with an air humidity of <70 % and register changes in temperature greater than 10 °C/day.
- In order to prevent bearing damage, any oscillation that occurs must amount to V_{eff} <0.2 mm/s.
- For motors with regreasing systems that are being stored for longer than 6 months, repress an amount of grease double that specified on the motor at standstill before storage.

Attention!
In case of storage conditions deviating from those specified above the measures set forth in the separate AR9 storage instructions must be adopted.

Transport

Do not lift the motor together with mounted driven machines such as, pumps, gearing, etc. by the motor lifting eyebolts.

Do not use eyebolts as per DIN 580 at ambient temperatures lower than -20 °C. At these temperatures the eyebolts may break and hence injure the personnel and/or damage the machinery.

Do not load the eyebolts as per DIN 580 no more than 45° compared to the screwing direction. The use of crossbeams is recommended. Layout dimensions of the lifting eyebolts and the minimum dimensions of the loading crossbeams and chain lengths (→ Figure 1).

Do not remove the shaft transport protection until the motor is standing on the provided foundation.
The transport protection must be fitted again in the event of subsequent further transportation in order to protect the bearings.

Attention!
When mounting vertical motors from the horizontal position, the shaft must not touch the floor to avoid damaging the bearings.

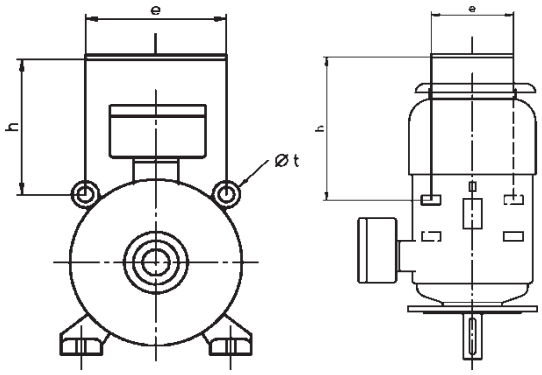


Figure 1: Eyebolt dimensions

Table 1: Minimum dimensions for lifting eyebolts and crossbeams

Frame size	Ø t	horizontal		vertical	
		e	h	e	h
90	20	167	100	220	187
100	20	185	112	242	201
112	20	202	103	262	236
132	25	243	170	307	247
160	30	262	206	314	293
180	30	294	223	402	372
200	35	390	219	451	399
225	40	366	230	510	490
250	40	435	282	546	548
280	40	498	301	600	574
315	50	640	337	700	595
355	60	629	397	816	893
400	60	790	312	890	771
450	60	833	317	980	660

2 Installation

Mechanical checks

After removing the shipping braces and shaft blocks (see also the marking on the motor), the motor shaft must be rotated by hand. In the case of brake motors, the brake must be vented at standstill (maximum of 10 min). This must be performed after applying voltage as per the circuit diagram from page 38.

Attention!
Save the shipping braces and shaft blocks for subsequent transportation, as the bearings risk being damaged during transportation.

Site

The completely closed motors are intended for operating sites in which they are exposed to soiling, humidity and other open air conditions as per the relevant degree of protection.
The motors must be installed in a place with ambient temperatures of -20 °C to a maximum of +40 °C and a max. of 1000 m above sea level. Any permissible ambient temperatures (T_{amb}) and heights (MSL) other than those indicated above must be specified on the rating plate.
The motors must not be allowed to stand in direct sunlight at ambient temperatures of above 30 °C.

Attention!
The ventilator hood air inlet and outlet must not be obstructed, as there is the risk of heating beyond the permissible temperature class and of reducing the life of the winding insulation
(→ Figure 2 and → Table 2).

This applies in particular to the use of soundproof covers. The air ducts must checked and cleaned regularly in factories with heavy soiling.

Table 2: Minimum distance (LE) of an obstacle from the air opening. → Figure 2

Shaft height	LE [mm]
up to 160	35
180 to 225	85
over 250	125

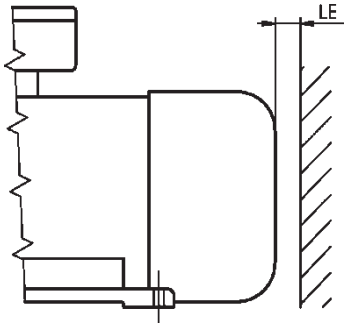


Figure 2: Minimum distance of obstacles from the air opening

The motors are intended for use in areas subject to explosion hazards. The following information on the rating plate identifies the motor as explosion-protected equipment and provides information about using the equipment for its correct purpose.

- Device group
- Device category
- Degree of protection
- Protection class IP
- max. Surface temperature (Temperature class)
- Equipment Protection Level

This information assigns the motor to the relevant zone of the operating site.

Mounting

Attention!
Make sure that the fastening screws are duly dimensioned.

The foundations must be compliant with DIN 4024. The machine vibration must be evaluated in accordance with ISO 10816-3.However, because of the pressure-resistant design of the motors, a maximum vibration speed of 3.5 mm/s is permitted.
Data on the foundation loading generated by the motor can be requested from the manufacturer by specifying the motor number. The fastening screws must be duly tightened according to their layout and secured to prevent loosening during operation and hence the damaging of the drive

(→ Table 4, Page 17).

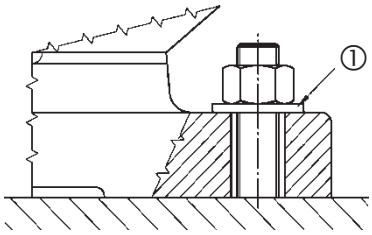


Figure 3: Motor Fastening

① Large-surface washer

In order to achieve an adequately large contact surface, apply a large-surface washer under each nut or screw head (→ Figure 3).

→ Alternatively use flange nuts or bolts.

If the motors shaft end points up or down (vertical mounting arrangement), it is necessary to fit an appropriate cover to prevent any foreign bodies from dropping in the driven machine through the air inlet and outlet openings in the ventilator hood.

▽ **Attention!**
The flow of cooling air through the motor must not be limited by said cover (→ Section "Site", Page 10).

The balance of the motors is specified on the shaft end plate and/or on the rating plate after the motor number (H = half key, F = full key, N = no key).

The design of the coupling or pulley must match the motor's balance.

Attention!
If balancing with half key (H), work on the vertical (visible) key components on the shaft diameter or cover these with washers with keyway along the relevant length.
If the coupling is longer than the key, the keyway in the remaining part of the coupling must be filled.
In case of failure to comply with the foregoing, out-of-balances liable of causing excessive vibrations may occur.

Mains supply and connections

The motors operate in accordance with EN/IEC 60034 with mains voltage oscillations of up to ±10 % or frequency oscillations of up to –5 % to +3 %. The mains ratings must match the voltage and frequency data specified on the ratings plate.
Connect the motors according to the connection diagrams attached to the terminal box
(→ Figure 11 , From page 33). Use only the supplied original connection components, (→ mains and guard circuit connection, Page 21)

Attention!
Carry out the motor, controller, overload protection and earthing connection operations in compliance with local installation requirements.

Attention!
A monitoring device that has been activated must not switch itself on again automatically.

Mains connection of explosion-protected motors
As well as any general installation regulations, EN/IEC 60079-14 must be complied with. Suitable overload protection must be subsequently provided either with a motor circuit breaker or similar protective devices. These may include also PTC thermistors with tripping devices (→ Section "Motors with temperature monitoring", Page 24). These must be specified on the rating plate together with a tripping time t_A.
If the test certificate number on the rating plate is followed by an "X", the "Special Requirements" specified in these operating instructions for safe operation and the supplements to these requirements must be complied with.
(→ Section „Explosion protection“, Page 46)

Motors with direct line lead-in
The free end of the cable inserted in the motor must be connected according to the regulations in force concerning the connection area. If the line lead-in used on the motor is provided with pull relief, the cable can be laid freely; otherwise the cable must be secured with a pull relief device in the near vicinity.
The maximum operating temperature of the line that is used must not be exceeded.

Terminal box
Open the box by loosening the screws on the cover (Figure 5) or in version with grub screw (Figure 6) by turning the grub screw counter-clockwise and then loosening the tapped cover. Close the terminal box again after connecting the mains by following the same instructions in the opposite order.

In order to change the position of the cable and line lead-ins, the terminal box can be rotated by 4 x 90°.

- Loosen either
  the four fastening screws (→ Figure 5) or
  - the anti-rotation pins by means of the grub screw (→ Figure 6).
  The screws are secured using anaerobic adhesive. This can be released with a hammer blow to the head of the screw.

- Turn the terminal box to the desired position.

Attention!
This must not be rotated in motors with single-conductor bushings rather than a terminal board, since the supply cables inside the motor would otherwise become damaged.

Attention!
Terminal boxes fastened as per Fig. 6 are to be turned counter-clockwise by a maximum of one turn away from the thread end stop.

- Then tighten the fastening components to the relevant torque, see the following Table 4.
- Secure the screws with a low-strength anaerobic screw locking adhesive.

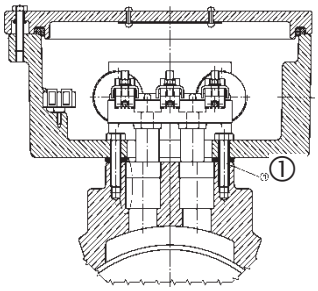


Figure 5: Terminal box with fastening screw ①

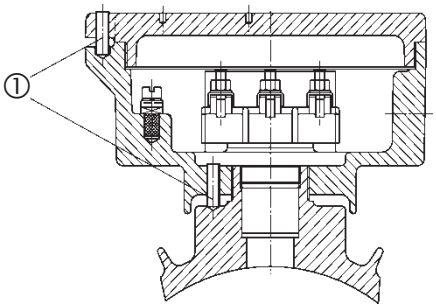


Figure 6: Terminal box with grub screw ①

Table 4: Torque values for 8.8-type screws

Thread size	Torque
M5	6 Nm
M6	10 Nm
M8	25 Nm
M10	49 Nm
M12	85 Nm
M16	210 Nm
M20	425 Nm

Attention!
The grub screws as anti-rotation protection for the terminal box are a constituent of the explosion protection and may only be replaced with genuine spare parts.

Attention!
Screwed-on covers must also be secured to prevent them from unintentionally working themselves open.

The surfaces of flash-proof gaps, particularly at terminal box covers with ignition protection type "pressure-resistant encapsulation, marking Ex d IIC(B)" must be protected from corrosion.
(→ Section „Explosion protection“, Page 46)

Attention!
In the case of "increased safety" and "dust protection" terminal boxes the gaskets used are included in the approval. Only original gaskets are to be used.

When terminal boxes are being closed up, the cover screws must be tightened cross-wise.

Attention!
Do not damage the flat surface of the Ex-gap with sharp tools (screwdrivers) when opening the cover of terminal boxes with "pressure-resistant encapsulation". Use jacking screws.

Terminal boxes with entry plate

The gasket of the entry plate is only intended for one-off use. After opening the plate, the round cord must be replaced with an original gasket.
During installation, please ensure that the sealing edge of the plate and the box are on the same level.
Cut the gasket flush after installing the plate or protruding by max. 0.5 mm.

Cable and line lead-ins

Connect motors with cable and line lead-ins or via duct systems as per EN/IEC 60079-14. These must meet the following requirements:

- EN/IEC 60079-7 for wiring spaces with a degree of protection of "increased safety", (Ex e II marking on the component)
- EN/IEC 60079-1 for a degree of protection of "pressure-resistant encapsulation", (Ex d IIC(B) marking on the component)

Specific test certificates must be provided for cable and line lead-ins.

Attention!
Any openings that are not used must be closed with sealing plugs for which the relevant test certificates and/or the aforementioned markings must be provided.

Attention!
The supplied sealing plugs for the line lead-ins serve only as protection during transportation and are not an approved sealing means. This applies also for the storage of motors outdoors. In this case additional rain protection is required.

The lead-ins supplied as a standard (version 1) are used for the insertion of firmly secured lines.

Version 3 available as a special accessory, with additional pull relief, is used for the insertion of lines in movable motors.

Attention!
Cable lead-ins and sealing plugs that fail to meet these requirements are prohibited. The cable and line diameters used must comply with the clamping range specified on the lead-in.
Follow carefully the operating instructions of the cable and line lead-ins.

Motors with terminal boxes whose mains lead is located in the layer separating the upper and lower parts

Use only the supplied original gaskets to ensure compliance with the "Ex e II" degree of protection. Depending on the type (see marking on the plug), the plugs are suitable for the following cable diameters (→ Table 5).
Follow carefully the operating instructions for the lead-in parts and sealing plugs.

Table 5: Cable diameter

Type	Cable diameter
RS-75	26 to 48 mm
RS-100	48 to 70 mm

- After connecting the mains lead close the terminal box with the upper part.
- Strip the skins of the plugs so that the following condition is fulfilled:
  By stripping the skin, the plugs are adapted to the cable diameter so that a gap of less than 1 mm is obtained between the cable and the plug applied on the cable. Therefore, an extra layer of skin must be removed from one half of the module compared to other.
- Lubricate the cutting edge and the sealing surfaces of the plug with the supplied grease.
- Insert the plug halves over the cable and completely in the bushing opening.
- Brace it with the screws until a perceivable resistance (maximum torque:
  6 Nm) is achieved.

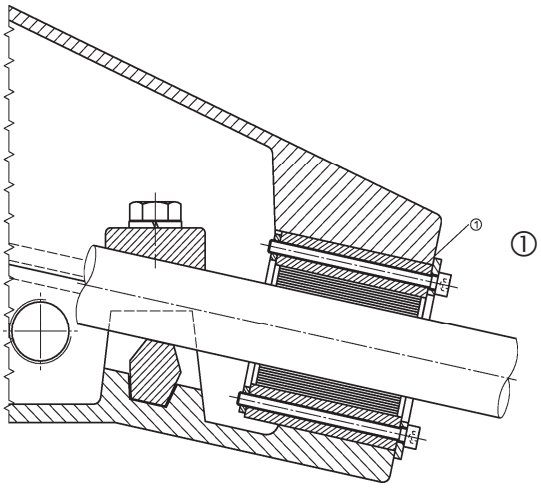


Figure 7: Cable lead-in

① Maximum of two line lead-ins, Company Roxtec, Plug type RS

Mains and guard circuit connection

The mains can be connected either with or without cable lug both in models with terminal board (→ Figure 8) or in those with single-conductor bushings (→ Figure 9).
Cable lugs that are specially designed for the terminal board must be used for motors with an axis height of 63 to 112.
(→ Section "Connection diagrams", Page 38).

▶ Connect the power line to the relevant terminals as per the supplied wiring diagram.

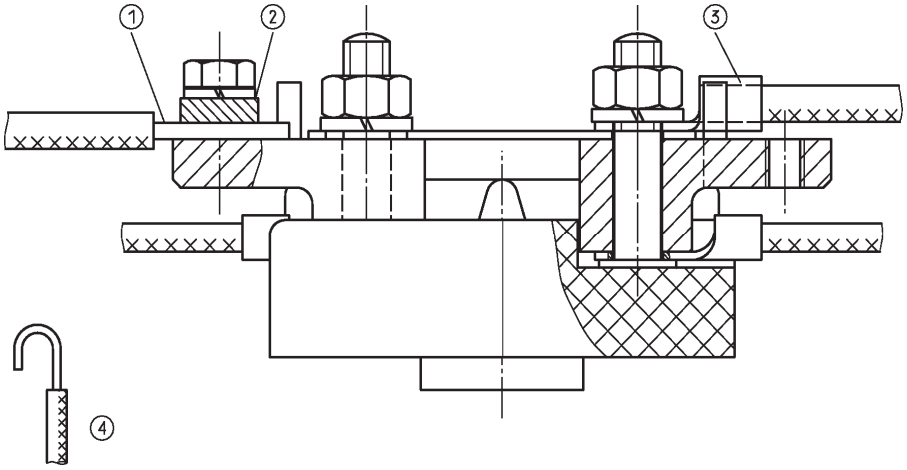


Figure 8: Line connection

① Connection without cable lug
② Clamp
③ Connection with cable lug
④ Single-wire conductor without cable lug with terminals with one screw only

▶ When connecting a single-wire conductors without cable lugs to terminals with just one screw, bend the conductor end as illustrated ④.

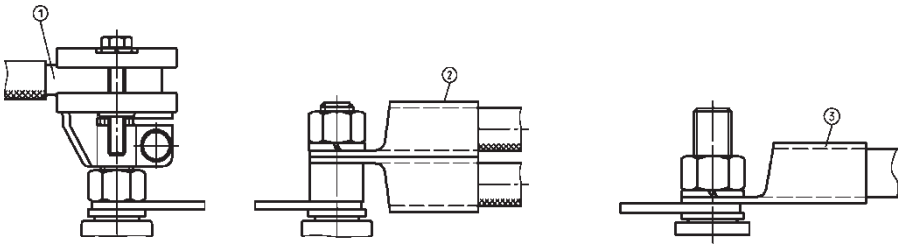


Figure 9: Conductor bushing

① Connection without cable lug
② Connection with two cable lugs
③ Connection with one cable lug

Take note of the maximum connectable conductor cross-section for the terminals. If no other data is available on the terminals, refer to the following table.

Table 6: Rated cross-sections

Shaft height	Rated cross-section [mm2]
63 to 112	4
132 to 160	10 (r)
180 to 225	70
250 to 280	120
315	150/ 300 (depending on the model)
over 355	300

In the case of "increased safety" terminal boxes, make sure to comply with the clearances specified in EN/IEC 60079-7 (→ Table 7) between conductive parts having different potentials. Tighten the screws and nuts on the live parts to the specified torque (→ Table 8).

Table 7: Clearances

Rated voltage U [V]	Minimum clearance [mm]
175 < U ≤ 275	5
275 < U ≤ 440	6
440 < U ≤ 550	8
550 < U ≤ 690	10
690 < U ≤ 880	12
880 < U ≤ 1100	14
2750 < U ≤ 3500	36
5500 < U ≤ 6900	60
8800 < U ≤ 11000	100

Table 8: Torques and current intensities for live pins

Thread size	Torque [Nm]	Permissible continuous current [A]	
		Brass	Copper
M4	1.2	16	-
M5	2	25	-
M6	3	63	-
M8	6	100	-
M10	10	160	200
M12	15.5	250	315
M16	30	315	400
M20	52	400	630

Depending on the model, additional terminals for instance for temperature monitoring or space heater are located either in the main terminal box or in additional terminal boxes; see the supplied wiring diagram.

Attention!
Take note of the rating data imprinted on the terminals.

Attention!
Only use separately approved components inside Ex e housings.

Attention!
Keep the wiring diagram supplied in the terminal box in the enclosure with the documents belonging to the drive.

Motors with unidirectional fan
Make sure that the fan's direction of rotation matches that of the motor.

Motors with separate cooling via separately powered external fans
Make sure by means of the electric control that the main motor can be operated with the motor switched-on for separate cooling.

Motors with temperature monitoring
Terminals 1TP1-1TP2 or 2TP1-2TP2

The motors are equipped with PTC's in accordance with DIN 44081 or other temperature sensors. Please note the specifications on the rating plate.

Connect the PTCs to an approved tripping device with marking PTB 3.53-PTC/A or Ex II(2) GD.

Attention!
Pay attention to the tripping device operating instructions.

Being the only overload protection as set forth in EN/IEC 60079-14, the temperature sensors described herein can be used together with an approved tripping device only if the tripping time t_A is specified on the motor rating plate.
(Refer to Section 3, "Operation & Repairs", Page 41.)

Motors with space heater
The rating data for the space heater is specified on a plate on the motor. Depending on the model, there are two heating variants:
- by means of heater bands powered via terminals HE1-HE2 or
- by means of the stator winding by feeding AC voltage to terminals U1-V1.

Depending on the design, the heater bands are suitable for preventing condensation, terminals 1HE. or providing protection from motor temperatures below -20 °C, terminals 2HE.

Attention!
Make sure by means of the electric control that the motor voltage and the heater voltage are not fed simultaneously.

If the heater is designed to provide protection from motor temperatures below -20 °C, the built-in temperature sensor (PT100), terminals 20R1 - 20R2, must be connected. The motor may only be switched on with a measurement of above -20 °C. The temperature limit up to which the heater is suitable with no wind is specified on the rating plate (only suitable for installation indoors).

The heater bands that are used are made from a self-limiting semiconductor material. It is not possible to perform a function test using a resistance measurement. The testing takes place by measuring the activation current. The motor-specific setpoints must be obtained from the manufacturer.

3 Operation and repairs

Duty types and thermal protection

- In S1 duty class motors a temperature sensor (TS) can be used in addition to the motor circuit breaker as required by EN/IEC 60079-14.
- If in S1 duty cycle motors protection is to be provided against overheating only by means of the TS, a proven combination of TS and tripping device is to be used for said purpose.
- In the case of non-S1 duty cycle motors proven combinations of TS and tripping device must be used as protection against overheating.
- The supplying of power to the motors via the frequency converter is permissible only if a proven combination of TS on the windings and tripping device is used.

The temperature sensors must be connected as described in the section "Motors with temperature monitoring", Page 24 .

Attention!
A monitoring device that has been activated must not switch itself on again automatically.

Special operating conditions

Ambient temperature
Operating the motors at ambient temperatures outside the generally valid range of –20 to +40 °C is allowed also without heater if an appropriate temperature range – e.g. 55 °C ≤ T_{amb} ≤ 60 °C is specified on the rating plate.

Operation at less than -20 °C is also possible if the temperature of the motor is kept to at least -20 °C using a stationary heater. When doing this, pay attention to the rating data for the heater and the minimum permissible ambient temperature on the rating plate of the motor (→ Section "Stationary heater", Page 24)

Start-up

Attention!
Before mounting or start-up the insulation resistance is to be measured by qualified technicians. With U_N > 500 V the resistance should be greater than 1 MΩ and with U_N <= 500 V is should be greater than 0.5 MΩ. If this value is not reached, the motors must be dried.

The best way to do it is in an oven at temperatures up to 100 °C. To eliminate any humidity, open the motor. To be entitled to any warranty claims, contact the manufacturer in advance.

These works must be carried out by qualified technicians; in the course of said works the manufacturer shall instruct said technicians on how to ensure the explosion protection during reassembly. For the assembly and disassembly, see the relevant repair instructions.

- Check the direction of rotation and operation during idle running. In case of unidirectional external fans (axial fans) observe the sign for the direction of rotation on the motor. If the direction of rotation needs to be changed, invert the two power lines and the fan.
- If the motor was stored and an additional quantity of grease was applied in the anti-friction bearings, the motor must be run with no load for at least 0.5 h to ensure an adequate distribution of the grease and to avoid the overheating of the anti-friction bearings.
- Make sure that the operating current matches the specified current values on the rating plate.
  The protective equipment required as per EN/IEC 60079-14 must be set according to the motor rating values specified on the rating plate. The specified current value on the rating plate must not be exceeded in continuous duty conditions.

Attention!
Run the motor with load for at least 1 hour and check that there is no unusual noise or heating exceeding the specified temperature class values.

Relubricate motors with regreasing equipment with the specified amount of grease during start-up.
Vibration severity values of V_{eff} < 2.3 mm/s for rigid foundations and V_{eff} < 3.5 mm/s for flexible foundations in accordance with EN/IEC 60034-14 are harmless in coupled operating mode. In the event of changes to normal operation – e.g. higher temperatures, noise, vibration – determine cause and consult the manufacturer if necessary.

Attention!
The protective equipment must always be kept in service also during trial runs. In case of doubt switch off the machine.

Maintenance

Inspection

- The motors are to be constantly monitored depending on the operating conditions.
- Keep the motors clean and the venting openings free (→ Section "Site", Page 10)

The national regulations that apply to the servicing/maintenance of electrical operating materials in potentially explosive areas must be adhered to, e.g. EN/IEC 60079-17 and -19 etc. in Germany, particularly the "Operating Safety Legislation".

During maintenance especially those parts on which the degree of protection depends must be checked; these include, for instance, the integrity of the lead-in components and gaskets.

Explosion protection

Markings such as Ex (II2G), Ex de IIC T4 Gb indicates where the motor may be used and that it has been designed, built and approved according to the relevant IEC and European standards required for operation in potentially explosive areas.

Attention!
The motor must not be altered in any way whatsoever and the operating instructions set forth herein must always be complied with.

If the motor is altered or repairs need to be made, these are to be performed by the manufacturer or by repair workshops that possess the necessary explosion protection know-how. Before the starting the motors again, conformity with the requirements of EC directives 94/9/EC and 99/92/EC by said sites is to be ascertained and confirmed by means of an appropriate marking on the

motor or by issuing a test report.

If these requirements are not met, the motor is no longer classified as explosion-protected and the marking - see above - is to be removed.

Special conditions for ensuring explosion protection during operation

- All of the contact screws and nuts of the electrical connections are to be tightened securely to prevent excessively high contact resistance values that may lead to an excessive degree of overheating of the contact point; torque values (→ Table 8, Page 23).
- Use the utmost caution when connecting the mains cable. Observe the creep distances and clearances. Use duly the sealing parts of the cable lead-ins and connections spaces as well as the lead-in parts envisaged for the pull relief or as protection against torsion in order to maintain the degree of protection of the connection spaces
  (→ mains and guard circuit connection, Page 21)
- Eliminate any damages immediately and use only original spare parts. A designated body must check that the work has been properly carried out in accordance with the relevant EC directives. In Germany this must be carried out by a qualified expert as per the "Operating Safety Legislation", and in other countries in accordance with the applicable national regulations and confirmed by means of an appropriate marking on the motor or by issuing a test report.
- In order to avoid electrostatic charging of the painted surface of the motor, in accordance with EN/IEC 60079-0 for group IIC the thickness of the coating must either be no more than 200 µm or appropriate proof that it cannot be charged must be provided. Original motors fulfil these requirements.
  Subsequent overpainting with any coating system is possible up to a maximum total coating thickness of 200 µm.
  Thicker coatings are only possible using the original coating systems after consulting the manufacturer.
  Processes that generate extreme amounts of charging must be avoided with offshore special and NORSOK systems when used in zone 1 and zone 2.
- The surfaces of ignition-protected gaps must not be reworked and must be protected from corrosion.

Grease used for protecting the surfaces of the joints against corrosion must not harden with age, must not contain volatile solvents and must not cause the surfaces to corrode. The motor manufacturer uses Fuchs Renolit LX-PEP 1/2 or OKS 245, for example. Other approved sealing materials are: Hylomar, by Marston-Domsel or Admosit and Fluid-D, by Teroson (follow the manufacturer's usage instructions). This must be observed in particular for the openings in the cover for connection spaces having a pressure-resistant encapsulation degree of protection, marking Ex d IIC(B).

- All screws must be tightened with the prescribed torque (→ Table 4, Page 17) and present in a quantity that matches the number of securing holes. Any damaged screws must only be replaced with screws of the same dimensions and quality (at least A2-70) unless otherwise specified on the type plate.

Repairs

Repairs and changes to explosion-protected machines are to be carried out by one of the aforementioned sites as per EC directives 94/9/EC and 99/92/EC, in Germany in compliance with the "Operating Safety Legislation" as well as with the safety regulations and requirements of our repair instructions.
Any works relating to the explosion protection must be carried out by the manufacturer or by a specialized workshop for electrical machinery. If said works are not performed by the manufacturer, these must be surveyed by an authorized qualified person.
Written confirmation as per the "Operational Safety Legislation" is required for restarting in Germany. In foreign countries the applicable national regulations must be complied with.
Repairs to the flash-proof joint may only be carried out in accordance with the manufacturer's design specification. Repairs in accordance with the values in Tables 1 and 2 of EN/IEC 60079-1 are not permitted.

4 Additional dust protection requirements

(application in zones 21 and 22)

Intended use	The labelling Ⓔx II 2D Ex tb IIIC T… °C Db must be found on the motor's rating plate.
Installation and Operation	**Cable and line lead-ins** Separately approved lead-ins belonging to category 2G with at least IP 65 or category 2D are to be used. Any openings that are not used are to be closed with duly approved plugs. **Operation and Repairs** The motors must be operated in accordance with the requirements of EN/IEC 60079-31. They must not be operated with excessive dust deposits, as these may lead to the exceeding of the admissible surface temperature. Regular cleaning must be performed. The radial shaft seal rings are included in the approval. Only original gaskets are to be used. In motors with a roller bearing re-greasing facility, it must be ensured that the greasing channels are always filled with grease, since otherwise the explosion protection will be null and void. Processes that generate extreme amounts of charging must be avoided with offshore special and NORSOK coating systems when used in zone 21.

Deutsch: Sollten Sie die Angaben in dieser Betriebsanleitung in der vorliegenden Sprache nicht lesen können, so wenden Sie sich bitte an das Herstellerwerk.

Dansk: Hvis denne brugsanvisning ikke er skrevet på et sprog, som du forstår, så henvend dig venligst til fabrikanten.

Suomi: Ellette pysty lukemaan tämän käyttöohjeen tietoja olemassa olevalla kielellä, ottakaa yhteyttä valmistajaan.

Français: Si vous ne pouvez pas lire la langue dans laquelle sont écrites les indications contenues dans les présentes instructions de service, veuillez vous adresser au fabricant.

Español: Si no puede leer las indicaciones en estas instrucciones de funcionamiento editadas en el presente idioma, diríjase por favor a la empresa fabricante.

Elinika: Εάν δεν μπορείτε να διαβάσετε στην υπάρχουσα γλώσσα τα στοιχεία σε αυτές τις οδηγίες λειτουργίες, σας παρακαλούμε να απευθυνθείτε στον κατασκευαστή.

English: If you cannot understand the operating instructions in the language provided please contact the manufacturers.

Italiano: Se non potete leggere le informazioni contenute nelle istruzioni per l'uso nella lingua in cui sono formulate, vi preghiamo di rivolgervi allo stabilimento di produzione.

Nederlands: Wanneer u op grond van de gebruikte taal de gegevens in deze bedrijfshandleiding niet kunt lezen, verzoeken wij u om contact op te nemen met de fabrikant.

Portugês: Caso não lhe seja possível compreender as indicações neste manual de instruções no presente idioma, queira contactar o fabricante, por favor.

Svenska: Om du inte förstår innehållet i instruktionsboken på det aktuella språket, kontakta tillverkaren.

Čeština: Pokud byste informace v tomto návodu k obsluze nemohli číst ve stávajícím jazyce, obraťte se prosím na výrobce.

Magyar: Ha a használati útmutató adatai ezen a nyelven nem érthetőek, akkor kérjük, forduljon a gyártóhoz.

Slovenščina: V primeru, da podatkov v priloženih navodilih za uporabo v danem jeziku ne razumete, se obrnite na proizvajalca.

Slovenčina: Pokiaľ by ste údaje v tomto návode na použitie v danom jazyku nevedeli prečítať, obráťte sa prosím na výrobný závod.

Lietuviškai: Jei negalite perskaityti šioje naudojimo instrukcijoje tam tikra kalba pateiktų duomenų, kreipkitės į gamintoją.

Latviski: Ja šajā lietošanas pamācībā informācija sniegta Jums nezināmā valodā, lūdzam Jūs vērsties ražotājfirmā.

Polski: Jeżeli nie możecie Państwo przeczytać instrukcji obsługi w tym języku, prosimy o zwrócenie się z tym do zakładu produkcyjnego.

Eesti: Kui te ei suuda selle tegevusjuhendi andmeid antud keeles lugeda, siis palun pöörduge tootjatehase poole.

Български: Ако не можете да разберете инструкциите за експлоатация на дадения език, моля обърнете се към производителите.

Română: Dacă nu înţelegeţi instrucţiunile de exploatare în limba în care sunt furnizate, vă rugăm să contactaţi producătorul.

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Motorentechnik

04/2003
60230 54 E407

Betriebsanleitung / Operating instructions / Mode d'emploi

Kabel-u.Leitungseinführungen,Reduzierungen,Verschlußstopfen,Trompetenverschraubungen
Cable entries, reducing glands, srew plugs, trumpet-shaped cable glands
Entrées de câble, bagues de réduction, bouchons de fermeture, presses-étoupes à trompette

Technische Angaben für:

Kabel- und Leitungseinführungen	Cable entries	Entrées de câble	M12 - M63
Reduzierungen	Reducing glands	bagues de réduction	M16/M20 - M50/M63
Verschlußstopfen	Screw plugs	bouchons de fermeture	M16 – M50
Trompetenverschraubungen	Trumpet-shaped glands	presses-étoupes à trompette	M20 - M63

Gerätekennzeichnung nach / Apparatus marking acc. to / Marquage de l'appareil selon 94/9/EG: Ex II 2 G

Explosionsschutz / Explosion protection category / Type de protection contre l'explosion EEx e II

EG-Baumusterprüfbescheinigung / EG-type examination certificate / Certificat d'examen type CE:

Kabel- und Leitungseinführungen / Cable entries / Entrées de câble	M20 – M63	PTB 99 ATEX 3128 x
Kabel- und Leitungseinführungen / Cable entries / Entrées de câble	M12 – M16	PTB 99 ATEX 3101 x
Reduzierungen / Reducing glands / bagues de réduction	M16/M20 – M50/M63	PTB 99 ATEX 3128
Verschlußstopfen / Screw plugs / bouchons de fermeture		PTB 99 ATEX 3130 x
Trompetenverschraubungen / trumpet-shaped cable glands / presses-étoupes à trompette		PTB 99 ATEX 3121

Schutzart nach / Degree of protection to / Indice de protection selon EN 60529/IEC529: IP 66

Prüfdrehmomente bei 20°C [Nm] / Test torques at 20°C [Nm] / Couples de serrages testés à 20°C [Nm]:

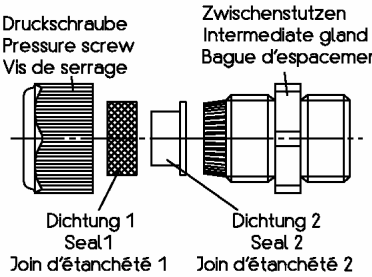
Typ / Type / Type	M12	M16	M20	M25	M32	M40	M50	M63
Einschraubgewinde in Gehäuse / Srew-in thread in enclosure / Partie filetée dans l'enveloppe	2,50	3,75	3,75	5,00	7,50	7,50	7,50	7,50
Druckschraube / Pressure screw/ Vis de serrage	1,65	2,50	2,50	3,50	5,00	5,00	5,00	5,00
Trompetenstutzen / Trumpet-shaped gland / Bague trompette	-	-	2,50	3,50	5,00	5,00	5,00	5,00
Zugentlastung (Trompete) / Pull relief (trumpet) / Décharge de traction (trompette)	-	-	2,50	2,50	2,50	2,50	2,50	2,50

Kabelklemmbereiche / Cable clamping ranges / Rayon de serrage du câble:

		Klemmbereich Cable clamping ranges Rayon de serrage du câble	Dichtung 1 + 2 Seal 1 + 2 joint d'etanchéité1+2	Dichtung 1 Seal 1 joint d'etanchéité 1
Kabel- und Leitungseinführungen / Cable entries / Entrées de câble	M12 x 1,5	Ø 4 – 7 mm	-	-
	M16 x 1,5	Ø 5,5 – 10 mm	-	-
	M20 x 1,5	Ø 5,5 – 13 mm	Ø 5,5 – 8 mm	Ø 8 – 13 mm
	M25 x 1,5	Ø 8 – 17 mm	Ø 8 – 12 mm	Ø 12 – 17 mm
	M32 x 1,5	Ø 12 – 21 mm	Ø 12 – 16 mm	Ø 16 – 21 mm
	M40 x 1,5	Ø 17 – 28 mm	Ø 17 – 21 mm	Ø 21 – 28 mm
	M50 x 1,5	Ø 22 – 35 mm	Ø 22 – 27 mm	Ø 27 – 35 mm
	M63 x 1,5	Ø 27 – 48 mm	Ø 27 – 35 mm	Ø 35 – 48 mm
Trompetenverschraubung / Trumped shaped cable gland / presses-étoupes à trompette	M20 x 1,5	Ø 8 – 13 mm		
	M25 x 1,5	Ø 11 – 16 mm		
	M32 x 1,5	Ø 15 – 20 mm		
	M40 x 1,5	Ø 19 – 27 mm		
	M50 x 1,5	Ø 26 – 34 mm		
	M63 x 1,5	Ø 35 – 46 mm		

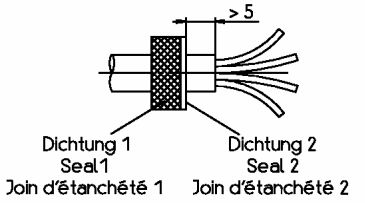
Diese Betriebsanleitung muß beim Betrieb aus dem Klemmkasten entfernt werden.
This operating instruktion has to be removed from the terminal box during operation.
Cette notice d'utilisation doit être retirée de la boîte raccordement pendant la functionement.

Bild/fig. 1 Kabeleinführung (Ausführung 1)
Cable entrie (version 1)
Entrées de câble (exécution 1)



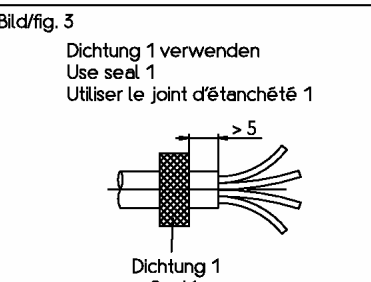
Montage der Kabel-und Leitungs-einführungen (Ausführung1) nach Bild 1 – 3.
Achtung: Das Ineinanderschachteln von Dichtungssätzen unter-schiedlicher Einführungen ist nicht zulässig.
Achtung: Das Ineinanderschrauben mehrerer Reduzierstutzen ist nicht zulässig.
Montage der Trompetenver-schraubung (Ausführung 3) nach Bild 4. Der „Zwiebelringdichtungs-einsatz“ ist durch Ausschneiden der einzelnen Dichtungsringe auf den jeweiligen Kabeldurchmesser anzupassen.

Bild/fig. 2
Dichtung 1 und Dichtung 2 verwenden
Use seal 1 and seal 2
Utiliser les joints d'étanchété 1 et 2

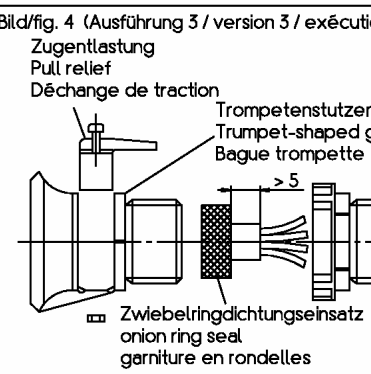


Mounting of cable entries (version 1) corresponding to figure 1 – 3.
Warning: The fitting of seal inserts one inside the other or the interchanging of seal inserts of different entries to reduce the cable opening is not permitted.
Warning: the screwing of several reducing glands one inside the other to reduce the thread is not permitted.
Mounting of trumpet-shaped gland (version 3) corresponding to figure 4. Cut out the individual rings of the „onion ring“ seal insert to match the respective cable diameter.

Bild/fig. 3
Dichtung 1 verwenden
Use seal 1
Utiliser le joint d'étanchété 1



Bild/fig. 4 (Ausführung 3 / version 3 / exécution 3)
Zugentlastung
Pull relief
Déchange de traction



Montage des entrées de câble (exécution 1) voir fig. 1 – 3.
Attention: Superposer et échnger les garnitures de différentes entrées de câble afin de réduir l'ouverture de câble n'est pas permis.
Attention: Il n'est pas permis de juxtaposer plusieur bagues de réduction afin de réduir les parties filtées dans les enveloppes.
Montage des presses-étoupes à trompette (exécution 3) voir fig. 4. La garniture en rondelles être adapté par découpage au diamètre du câble.

EU Konformitäterklärung
EU Declaration of Conformity
Déclaration UE de conformité

Wir erklären in alleiniger Verantwortung, dass

We declare that it is our sole responsibility that

Nous attestons sous notre seule responsabilité

Drehstrommotoren

Three-Phase-Motors

Moteurs á courant triphasé

Typ CD …

Type CD …

Type CD …

auf die sich diese Erklärung bezieht, den Bestimmungen der folgenden Richtlinie entsprechen

to which this declaration relates is in accordance with the provision of the following directives

se référant á cette attestation correspondent aux dispositions des directives suivantes

2014/34/EU
Amtsblatt-Nr. der EU L 96/309-356

2014/34/EU
Official Journal of EU L 96/309-356

2014/34/UE
Journal officiel de I'UE L 96/309-356

und mit folgenden Normen übereinstimmen.

and is in conformity with the following standards.

et sont conformes aux normes.

EN 60079-0:2012
EN 60079-1:2007
EN 60079-7:2007
EN 60079-31:2009 (nur bei II 2D)
EN 60034-1,5,6,7,8,9,12,14

EN 60079-0:2012
EN 60079-1:2007
EN 60079-7:2007
EN 60079-31:2009 (only at II 2D)
EN 60034-1,5,6,7,8,9,12,14

EN 60079-0:2012
EN 60079-1:2007
EN 60079-7:2007
EN 60079-31:2009 (seulement à II 2D)
EN 60034-1,5,6,7,8,9,12,14

Kennzeichnung

Marking

Marquage

0044 **II 2G Ex d IIC T3...T6 Gb** bzw. **Ex de IIC T3...T6 Gb** **PTB 08 ATEX 1087 X**
oder wahlweise / or optional / ou au choix **II 2D Ex tb IIIC T200 °C – T85 °C Db**

Das bezeichnete Produkt ist zum Einbau in eine andere Maschine bestimmt. Die Inbetriebnahme ist solange untersagt, bis die Konformität des Endproduktes mit der Richtlinie 2006/42/EG festgestellt ist.

The indicated product is intended for installation into a different machine. Operation is prohibited until the final product concurs with the 2006/42/EEC regulations.

Le produit indiqué est prévu pour être intégré dans une machine. La mise en service n'est autorisée que lorsque la conformité du produit final selon la directive 2006/42/CEE a été vérifiée.

Diese Erklärung ist keine Zusicherung von Eigenschaften im Sinne der Produkthaftung.

This statement does not warrant any characteristics regarding product liability.

Cette déclaration ne constitue pas une assurance des propriétés au sens de la responsabilité produit.

Die Sicherheitshinweise der Produktdokumentation sind zu beachten.

Safety instructions stated in the production records have to be adhered to.

Les consignes de sécurité rappelées dans la documentation du produit doivent être respectées.

Nordenham, den 20. April 2016, Ausgabe 7

ATB – NORDENHAM GMBH
HELGOLÄNDER DAMM 75
D-26954 NORDENHAM

W. Sobel

Wolfgang Sobel
QUM und Ex-Schutz Beauftragter

SCHORCH

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 08 ATEX 1087 X

(4) Equipment: Three-phase motors of types CD 80, CD 90, CD 100, CD 112, CD 132, CD 160, CD 225, CD 250, CD 280, CD 315, dCD 63

(5) Manufacturer: ATB Motorentechnik GmbH

(6) Address: Helgoländer Damm 75, 26954 Nordenham, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 08-18277.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2006 **EN 60079-1:2007** **EN 60079-7:2003**

EN 61241-0:2006 **EN 61241-1:2004**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2 G Ex d IIC T3 - T6 and Ex de IIC T3 - T6

II 2 D Ex tD A21 IP6X T200 °C - T85 °C

Zertifizierungssektor Explosionsschutz
By order:

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

ZSEx10100e.dot

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

(15) Description of equipment

The equipment is a rotary electric machine, which is designed to Flameproof Enclosure "d" type of protection when used for "G" areas (areas with potentially explosive gas, vapour, mist, air mixtures). For "D" areas (areas with inflammable dust), the machine is designed to IP 6X degree of protection. The enclosure is equipped with cooling ribs and can optionally be a cast construction or be of welded steel construction. The shaft rotates in rolling bearings. Together with the end shields / the inner bearing caps, it forms a flameproof shaft joint for "G" area at the drive and the non-drive ends. For "D" areas, the shaft is provided with sealing rings, which ensure that the IP degree of protection is maintained.

Separately certified terminal compartments provide for power input. Certified bushings are used for electric connection between the terminal compartment and the motor compartment.

The maximum permissible ambient temperature range is -55 °C to 60 °C. This temperature range can be restricted by the terminal boxes or components selected or by the data sheet specifying the electrical design.

The electric motor data, including specifications safeguarding compliance with the temperature class, are defined in a data sheet attached to the EC Type-Examination Certificate.

(16) Test Report PTB Ex 08-18277

(17) Special conditions for safe use

Repairs of the flameproof joints must be made in compliance with the structural specifications provided by the manufacturer. Repair in compliance with the values in tables 1 and 2 of EN 60079-1 is not accepted.

Additional notes for safe operation

Screws complying with strength class A2-70 as a minimum must be used for enclosure of the flameproof chamber.

Components attached or installed (terminal compartments, bushings, cable entry fittings, connectors) have to be of a technical standard that complies with the specifications on the cover sheet. They must be suited for the operating conditions, and be covered by a separate examination certificate. The special conditions specified for the components must be complied with and may have to be included in the type test. This also applies to components already specified in the technical description.

The condensate drain unit must not be removed while the three-phase motor is in operation. After the three-phase asynchronous motor has been stopped, the waiting period indicated on the motor must be observed before the condensate drain can be removed. The motor must not be restarted until after the drain unit has been replaced.

Monitoring devices must satisfy the requirements in Directives 94/9/EC and EN 1127-1.

(18) Essential health and safety requirements

Met by compliance with the above Standards.

Zertifizierungssektor Explosionsschutz
By order:

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 01 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 80

Electrical data

The motors of type series CD 80.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	25	A
Output:	4	kW
Speed:	19000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 316	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, October 16, 2008

Dr.-Ing. M. Thedens
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 02 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 90

Electrical data

The motors of type series CD 90.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	25	A
Output:	7	kW
Speed:	15000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 - 250	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 03 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 100.-...

Electrical data

The motors of type series CD 100.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	25	A
Output:	8	kW
Speed:	12000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 200	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, October 16, 2008

Dr.-Ing. M. Thedens
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 04 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 112.-...

Electrical data

The motors of type series CD 112.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	25	A
Output:	10	kW
Speed:	12000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 200	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 05 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 132.-...

Electrical data

The motors of type series CD 132.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	63	A
Output:	15	kW
Speed:	10000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 167	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, October 16, 2008

Dr.-Ing. M. Thedens
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 06 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 160-...

Electrical data

The motors of type series CD 160-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	63	A
Output:	26	kW
Speed:	9000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 150	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, October 16, 2008

Dr.-Ing. M. Thedens
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 07 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 225.-...

Electrical data

The motors of type series CD 225.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	100	A
Output:	64	kW
Speed:	5300	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 120	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, October 16, 2008

Dr.-Ing. M. Thedens
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 08 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 250.-...

Electrical data

The motors of type series CD 250.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	250	A
Output:	87	kW
Speed:	3600	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 120	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 09 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 280.-...

Electrical data

The motors of type series CD 280.-...manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	250	A
Output:	121	kW
Speed:	3600	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 120	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig October 16, 2008

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 10 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series CD 315.-...

Electrical data

The motors of type series CD 315.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	400	A
Output:	310	kW
Speed:	3600	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 120	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

DATA SHEET 11 TO EC-TYPE-EXAMINATION CERTIFICATE PTB 08 ATEX 1087 X

Manufacturer: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

for three-phase motors of type series dCD 63.-...

Electrical data

The motors of type series dCD 63.-... manufactured by ATB Motorentechnik GmbH, D-26954-Nordenham, are designed for ratings up to the following values:

Winding:	Low voltage	
Voltage:	1100	V
Current:	25	A
Output:	2.2	kW
Speed:	30000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	1 – 500	Hz

For each motor design, compliance with the governing regulations has to be verified in the form of a type test. Due regard must in this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the duty type and under the ambient conditions for which they were type tested. This equally applies to operation with frequency converter.

Zertifizierungsstelle Explosionsschutz
By order

Dr.-Ing. M. Thedens
Oberregierungsrat

Braunschweig, October 16, 2008

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 30

ZSEx10102e.dot

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Zertifizierungsstelle, Zertifizierungssektor Explosionsschutz

Physikalisch-Technische Bundesanstalt, Postfach 33 45, 38023 Braunschweig

ATB Motorentechnik GmbH
Herrn Sobel
Helgoländer Damm 75

26954 Nordenham

Ihr Zeichen:	CD 315
Ihre Nachricht vom:	2011-08-26
Mein Zeichen:	3.51-3747/2011-JF
Meine Nachricht vom:	ATB2011-10-17.docx
Bearbeitet von:	Jörg Flötotto
Telefondurchwahl:	0531/592-3599
Telefaxdurchwahl:	0531/592-693599
E-Mail:	Joerg.floetotto@ptb.de
Datum:	2011-10-19

EC-Type-Examination Certificate PTB 08 ATEX 1087 X / Three phase motor type CD 315

Dear Mr. Sobel,

we are pleased to confirm that the motor of type CD 315 within the above mentioned certificate can be operated up to speeds of 5300 rpm.

An additional reference pressure test has been done according to EN 60079-1:2007, clause 15.1.3 with the motor in running (5300 rpm.) and in standstill. A pre compression factor of 1.34 has been applied for admissible ambient temperatures down to -55 °C. Furthermore a dynamic overpressure test according to clause 15.1.3.2 has been done with Acetylene and Hydrogen. The required pressures of 1.5 times reference pressure could be achieved for each gas. No damage of the enclose and no transfer of internal ignition to the outside atmosphere could be detected.

A static overpressure test according to clause 16.1 and PTB working instruction PL-Ex-1 / 3.5 AA-2.13is required as a routine for the flameproof motor enclosure. For this test a test pressure of 20 bar has to be applied. In case of admissible motor ambient temperatures below -20 °C and down to -55 °C this pressure shall be increased to 27 bar.

All the other details of test report PTB Ex 08-18277 and the certificate PTB 08 ATEX 1087X remain unchanged.

We hope that we could help you with our short statement. In case of any further questions don't hesitate to contact us.

Best regards,
By order

Jörg Flötotto

Test protocol No.: 2011 / 00241.1.0 / 2682

j600 00 p

Hausadresse, Lieferanschrift:
Bundesallee 100
38116 Braunschweig
DEUTSCHLAND

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Telefax: +49 531 592-9292
E-Mail: poststelle@ptb.de
Internet: http://www.ptb.de

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Zertifizierungsstelle, Zertifizierungssektor Explosionsschutz

Physikalisch-Technische Bundesanstalt, Postfach 33 45, 38023 Braunschweig

ATB Motorentechnik GmbH
Herrn Sobel
Helgoländer Damm 75

26954 Nordenham

Ihr Zeichen:	CD 280
Ihre Nachricht vom:	2011-07-28
Mein Zeichen:	3.51-4366/2011 JF ATB2011-11-03
Meine Nachricht vom:	
Bearbeitet von:	Jörg Flötotto
Telefondurchwahl:	0531/592-3599
Telefaxdurchwahl:	0531/592-693599
E-Mail:	Joerg.Floetotto@ptb.de
Datum:	November 4, 2011

EC-Type-Examination Certificate PTB 08 ATEX 1087 X / IECEx PTB 06.0009
Three phase motor type CD 280

Dear Mr. Sobel,

We are pleased to confirm that the motor of type CD 280 within the above mentioned certificates can be operated up to speeds of 5000 rpm.

An additional reference pressure test has been done according to EN 60079-1:2007, clause 15.1.3 with the motor in running (4500 rpm.) and in standstill. A pre compression factor of 1.34 has been applied for admissible ambient temperatures down to -55 °C. Furthermore a dynamic overpressure test according to clause 15.1.3.2 has been done with Acetylene and Hydrogen. The tests are done under the worst case conditions with a pre-compression factor of 2.01. No damage of the enclosure has been be detected.

A static overpressure test according to clause 16.1 and PTB working instruction PL-Ex-1 / 3.5 AA-2.13 is required as a routine for the flameproof motor enclosure. For this test a test pressure of at least 20 bar has to be applied. In case of admissible motor ambient temperatures below -20 °C and down to -55 °C this pressure shall be increased to 31.5 bar.

All the other details of test report PTB Ex 08-18277, the certificate PTB 08 ATEX 1087X, the IECEx certificate IECEx PTB 06.0009 and the EXTR DE/PTB/ExTR08.0027/00 remain unchanged.

We hope that we could help you with our short statement. In case of any further questions don't hesitate to contact us.

Best regards
On behalf of PTB:

Jörg Flötotto

Encl.:
Test protocol No.: 2011 / 00208.1.0 / 2655

Hausadresse, Lieferanschrift:
Bundesallee 100
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Achtung – neue Bankverbindung ab 25. März 2011:
Deutsche Bundesbank, Filiale Leipzig
Kto.-Nr.: 860 010 40 BLZ 860 000 00
IBAN: DE38 8600 0000 0086 0010 40
BIC: MARKDEF1860, VAT-Nr.: DE 811 240 952

PTB Berlin-Charlottenburg
Abbestr. 2-12
10587 Berlin
DEUTSCHLAND

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Zertifizierungsstelle, Zertifizierungssektor Explosionsschutz

Physikalisch-Technische Bundesanstalt, Postfach 33 45, 38023 Braunschweig

ATB Motorentechnik GmbH
Herrn Sobel
Helgoländer Damm 75

26954 Nordenham

Your reference:	ATE1
Your letter of:	2011-12-15
My reference:	3.51-4826/2011 JF
My letter of:	
	ATB2011-12-16a.docx
Handled by:	Jörg Flötotto
Telephone:	0531/592-3599
Fax:	0531/592-693599
E-mail:	Joerg.floetotto@ptb.de
Date:	December 20, 2011

EC-Type-Examination Certificate PTB 08 ATEX 1087 X
Three phase motor type CD 132 und CD 160

Dear Mr. Sobel,

we are pleased to confirm that the motor of type CD 160 within the above mentioned certificate can be modified according to the table below.

Length of enclosure	L fe	Free internal Volume
420 mm	min. 250 mm max. 260 mm	max. 9,4 l min. 9 l

Compared with the test sample used for reference pressure test and flame propagation test the enclosure length will be increased by 45 mm. Furthermore the length of the iron core will be also increased about min. 120mm. This leads to the fact that the internal volume of the modified type is less than the volume of the test sample and the test results can be accepted.

The motor type CD 132 has already been modified by the 5. Supplement of previous PTB 98 ATEX 1106. We confirm that core length of 170 mm to 230 mm are also covered by this certificate.

All the other details of test report PTB EX 08-18277 and the certificate PTB 08 ATEX 1087X remain unchanged.

We hope that we could help you with our short statement. In case of any further questions don't hesitate to contact us.

Best regards
On behalf of PTB:

Jörg Flötotto

Encl.:
Description : "Ergänzung zur Kennzeichnungs- und Konstriktionsbeschreibung CD 132, 160"

j600 00 p

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 PTB 06.0009	Issue No.:1	Certificate history: Issue No. 1 (2008-6-12) Issue No. 0 (2006-2-20)
Status:	**Current**		
Date of Issue:	**2008-06-12**	Page 1 of 4	

Applicant: **ATB Motorentechnik GmbH**
Helgoländer Damm 75
26945 Nordenham
Germany

Electrical Apparatus: **Three-phase motor type CD 80, CD 90, CD 100, CD112**
Optional accessory: **CD 132, CD 160, CD 225, CD 250, CD 280, CD 315**

Type of Protection: **Flameproof Enclosure "d"**

Marking: **Ex d IIC T3 - T6 resp. Ex de IIC T3 - T6**
Tamb -55 °C to +60 °C

Approved for issue on behalf of the IECEx Certification Body: Dr.-Ing. Uwe Klausmeyer

Position: Head of Section "Flameproof Enclosures"

Signature:
(for printed version)

Date: 19. 06. 2008

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 tha Official IECEx Wabsite.

Certificate issued by:

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany

IECEx Certificate of Conformity

Certificate No.: IECEx PTB 06.0009

Date of Issue: **2008-06-12** Issue No.: **1**

Manufacturer: **ATB Motorentechnik GmbH**
Helgoländer Damm 75
26945 Nordenham
Germany

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 electrical 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 : 2000 Edition: 3.1	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-1 : 2001 Edition: 4	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures 'd'
IEC 60079-7 : 2001 Edition: 3	Electrical apparatus for explosive gas atmospheres - Part 7: 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:

DE/PTB/ExTR06.0044/00
DE/PTB/ExTR08.0027/00

Quality Assessment Report:
DE/TUN/QAR06.0001/00

IECEx Certificate of Conformity

Certificate No.: IECEx PTB 06.0009

Date of Issue: **2008-06-12** Issue No.: **1**

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

see annex

CONDITIONS OF CERTIFICATION: NO

IECEx Certificate of Conformity

Certificate No.: IECEx PTB 06.0009

Date of Issue: **2008-06-12** Issue No.: **1**

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

The motor type seriec CCD 160.-... will be added to the certificate. Details are shown in the annex.

Electrical data

The motors of type series CCD 160.-... are designed for ratings within the following limits:

Voltage:	1100	V
Current:	63	A
Power:	26	kW
Speed (main):	3600	min^{-1}
Speed (converter):	9000	min^{-1}
Frequency (main):	max. 60	Hz
Frequency (converter):	1 - 150	Hz

Applicant: ATB Motorentechnik GmbH, 26954 Nordenham, Germany

Electrical Apparatus: Three-phase motors of type series CCD 160.-..

Description of equipment

The equipment is a rotating electric machine. The housing is a casting provided with cooling ribs. The shaft rotates in rolling bearings. Together with the end shield on the drive end and the motor housing on the non-drive end, the shaft forms a flameproof shaft joint.

For "G" atmospheres (atmospheres with potentially explosive gas, steam, mist, air mixtures), the machine is designed to Flameproof Enclosure "d" type of protection. Electric power is supplied either by a separately certified flameproof cable entry, or with terminal compartments designed to Flameproof Enclosure "d" or Increased Safety "e" type of protection.

For "D" atmospheres (atmospheres with flammable dust), the machine with its terminal compartments is designed to degree of protection IP 6X. For "D" atmospheres, the shaft is provided with sealing rings which make sure that IP protection is maintained.

Maximum admissible ambient temperatures: -55 °C to 60 °C. The admissible ambient temperature range may be restricted by the terminal boxes, components or enclosures selected or the data sheet for the electrical design.

When using the machines for "D" atmospheres, this may be done at ambient temperatures ≥ -40 °C only. When using the casting compound to delimit motor compartment and terminal compartment, the ambient temperatures have to be ≥ -20 °C.

The electrical motor data, including specifications for compliance with the temperature class, are defined in a data sheet attached to the EC type-examination certificate.

Electrical data

The motors of type series CCD 160.-.., produced by ATB Motorentechnik GmbH, 26954-Nordenham, are designed for the following maximum ratings:

Voltage:	1100	V
Current:	63	A
Power:	26	kW
Speed (mains):	3600	rpm
Speed (converter):	9000	rpm
Frequency (mains):	max. 60	Hz
Frequency (converter):	150	Hz

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100, 38116 Braunschweig, Germany
Postfach 33 45, 38023 Braunschweig, Germany
Telephone +49 531 592-0, Telefax +49 531 592-3605

For each motor design, compliance with the governing regulations shall be verified in the form of a type test. Due regard shall In this connection be given to the code of practice "Merkblatt für die elektrische Auslegung und Prüfung von Motoren in der Zündschutzart Druckfeste Kapselung im Rahmen der EG-Baumusterprüfbescheinigung".

The motors may be employed only for the type of duty, and under the ambient conditions, for which they were type tested. This includes frequency converter operation.

Special conditions for safe use

None;

Additional notes for safe operation:

Any components attached or installed (e.g. terminal compartments, bushings, cable entries, connectors) shall be of a technical standard that complies with the specifications on the cover sheet as a minimum and for which a separate examination certificate has been issued. Any special conditions specified for the components shall be complied with, and the components may have to be included into the type test.

Monitoring devices have to meet the requirements set forth in Directive 94/9/EC and EN 1127-1.

If the three-phase asynchronous motor is cooled by an external fan, due care shall be taken that motor operation is only possible with the external fan in operation.

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12.5 RMA - Decontamination statement

RMA-Formular und Erklärung über Dekontaminierung
RMA-Form and explanation for decontamination

RMA-Nr./ RMA-No.

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

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

Firma/ Company

Firma/ Company	
Straße/ Street	
PLZ, Ort/ Zip, City	
Land/ Country	

Ansprechpartner/ Person in charge

Name/ Name	
Abt./ Dept.	
Tel./ Phone	
E-Mail	

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

Serien-Nr./ Serial No.	
Artikel-Nr./ Item No.	

Grund der Rücksendung/ Reason for return

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

bitte spezifizieren/ please specify

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

☐ Nein, da das Gerät nicht mit gesundheitsgefährdenden Stoffen betrieben wurde./ No, because the device was not operated with hazardous substances.

☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ No, because the device has been properly cleaned and decontaminated.

☐ Ja, kontaminiert mit:/ Yes, contaminated with:

☐ explosiv/ explosive	☐ entzündlich/ flammable	☐ brandfördernd/ oxidizing	☐ komprimierte Gase/ compressed gases	☐ ätzend/ caustic	☐ giftig, Lebensgefahr/ poisonous, risk of death	☐ gesundheitsgefährdend/ harmful to health	☐ gesundheitsschädlich/ health hazard	☐ umweltgefährdend/ 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 comission an external service provider to clean the goods and invoice it to your account.

Firmenstempel/ Company Sign

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature

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

Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

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

Umgang mit elektrostatisch sensiblen Baugruppen

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

Einbau von Ersatzteilen

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

Einsenden von Elektroaltgeräten zur Entsorgung

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

Avoiding alterations and damage to the components to be returned

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

Handling electrostatically conductive components

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

Fitting of spare parts

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

Returning old electrical appliances for disposal

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

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