Addendum to the Operating Instructions

Gear Unit
R..7, F..7, K..7 S..7, SPIROPLAN® W Series
Oil-Air Cooler for Splash Lubrication /OAC

Edition 11/2015

22499865/EN
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1 Important information

INFORMATION

This addendum provides important additional information to the operating instructions for the "R..7, F..7, K..7, K..9, S..7, Spiroplan® W Gear Unit Series". Observe the additional information specified in this document.

This document does not replace the detailed operating instructions.
2 Oil-Air cooler for splash lubrication /OAC

2.1 Structure

If the thermal rating of the naturally cooled gear unit is not sufficient, an oil-air cooling system can be used.

**INFORMATION**

The following information applies for gear units with splash lubrication. Also refer to the original operating instructions of the cooling system manufacturer.

SEW-EURODRIVE uses oil-air cooling systems for standard gear units in sizes OAC 005, OAC 010 and OAC 020.

The following figure shows an example of a standard parallel-shaft helical gear unit next to an oil-air cooler.

![Diagram of oil-air cooler and gear unit with labels]

- [1] Motor for pump and fan
- [2] Oil-air heat exchanger
- [3] Temperature switch with 2 switching points
- [4] Suction pipe connections
- [5] Pressure pipe connections
- [6] Option: Oil expansion tank connection

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The following figure shows the unit structure:

- [1] Motor for pump and fan
- [2] Oil-air heat exchanger
- [3] Temperature switch with 2 switching points
- [4] Suction pipe connections
- [5] Pressure pipe connections

### 2.2 General information

The cooling system is delivered without electrical wiring and piping as a complete unit on a base frame for separate installation.

The standard scope of delivery of the cooling system includes:

- Pump with directly mounted asynchronous motor
- Oil-air heat exchanger
- Temperature switch with 2 switching points

The customer has to carry out the following electrical wiring:

- Wiring between the temperature switch and the motor for the pump and fan
- Wiring the motor for the pump and fan

### 2.3 Information

#### 2.3.1 Temperature switch

Temperature switches with different switching points are used, depending on the gear unit size.

<table>
<thead>
<tr>
<th>Gear unit size R., F., K.</th>
<th>Temperature switch</th>
<th>First switching point (oil temperature)</th>
<th>Second switching point (oil temperature)</th>
</tr>
</thead>
<tbody>
<tr>
<td>97 – 107</td>
<td>TSM-2-55NO</td>
<td>55 °C</td>
<td></td>
</tr>
<tr>
<td>127 – 187</td>
<td>TSK-2-40NO</td>
<td>40 °C</td>
<td>90 °C</td>
</tr>
</tbody>
</table>
2.3.2 Pump

When the pump is operated, a pressure control valve in the cooler limits the plant pressure to 5 bar.

**NOTICE**

An incorrectly set valve can damage the gear unit.

Gear unit failure

- Do not change the factory setting of the pressure control valve.

2.4 Sizes, cooling capacity, selection

The performance data of the standardized cooling systems is summarized in the following tables depending on the line frequency.

The specified cooling power ratings are valid under the following conditions:

- Air temperature 40 °C
- Oil temperature 70 °C

2.4.1 Performance data at 50 Hz line frequency

<table>
<thead>
<tr>
<th>Size of the cooling system</th>
<th>OAC 005</th>
<th>OAC 010</th>
<th>OAC 020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling capacity of the cooling system in kW</td>
<td>4.4</td>
<td>7.0</td>
<td>9.3</td>
</tr>
<tr>
<td>Oil flow rate of the cooling system in l min⁻¹</td>
<td>15</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Connected load of the motor for the pump and fan in kW</td>
<td>0.75</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>Motor voltage 50 Hz in V</td>
<td>230/400</td>
<td>230/400</td>
<td>230/400</td>
</tr>
<tr>
<td>Sound pressure level in dB</td>
<td>71</td>
<td>71</td>
<td>73</td>
</tr>
<tr>
<td>Oil fill quantity of oil-air cooler in l</td>
<td>1.8</td>
<td>1.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Weight in kg</td>
<td>38</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

2.4.2 Performance data at 60 Hz line frequency

<table>
<thead>
<tr>
<th>Size of the cooling system</th>
<th>OAC 005</th>
<th>OAC 010</th>
<th>OAC 020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling capacity of the cooling system in kW</td>
<td>5.1</td>
<td>7.3</td>
<td>9.7</td>
</tr>
<tr>
<td>Oil flow rate of the cooling system in l/min</td>
<td>20</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Connected load of the motor for the pump and fan in kW</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Motor voltage 60 Hz in V</td>
<td>276/480</td>
<td>276/480</td>
<td>276/480</td>
</tr>
<tr>
<td>Sound pressure level in dB</td>
<td>71</td>
<td>71</td>
<td>73</td>
</tr>
<tr>
<td>Oil fill quantity of oil-air cooler in l</td>
<td>1.8</td>
<td>1.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Weight in kg</td>
<td>38</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>
2.4.3 Wiring diagram of sizes OAC 005 / 010 / 020

Control circuit main motor

- L1
- F1
- S0
- K3
- K1
- N

Control circuit temperature switch

- F2
- S0
- T2
- K2

Main circuit

- L1
- L2
- L3
- F3
- K3
- M
- M1
- M
- M2
- PE

Temperature switch

- T1
- TSM-2-55NO
- TSK-2-40NO

Main motor control

- M

Pump and fan motor

- M

Note:

- Signal from contactor K2 via temperature sensor type TSM-2-55NO or TSK-2-40NO:
  - Warning or gear unit stop
- Switch on when TSM-2-55NO: q_{oil} > 55°C
- TSK-2-40NO: q_{oil} > 40°C

Emergency switching off

- S0

Temp. signal on main motor control:

- Warning or gear unit stop

Warning or gear unit stop

- PE

Signal from contactor K2

- K3
- F3

Switch on when:

- TSM-2-55NO: q_{oil} > 55°C
- TSK-2-40NO: q_{oil} > 40°C
2.5 Mechanical connection

Connect the heat exchanger to the cooling circuit according to the identifying markings observing local regulations.

In this respect, observe the following basic conditions:

- Do not reduce the specified cable cross sections.
- It is important that you choose the correct wall thickness and material when selecting pipes, hoses and screw fittings.

2.6 Electrical connection

Make the electrical connections for the temperature switch TSK-2-55NO or TSM-2-40NO and the motor of pump and fan according to local regulations.

Make sure that the pump rotates in the correct direction.

The following responses have to be tripped at the switching points of the temperature switch:

Setpoint 1

<table>
<thead>
<tr>
<th>Switching point 1 exceeded</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSK-2-55NO: Oil temperature &gt; 40 °C → switch closes</td>
<td>COOLER ON</td>
</tr>
<tr>
<td>TSM-2-40NO: Oil temperature &gt; 55 °C → switch closes</td>
<td>Switch on the motor for pump and fan of the oil-air cooler</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switching point 1 undercut</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSK-2-55NO: Oil temperature &lt; 40 °C → switch opens</td>
<td>COOLER OFF</td>
</tr>
<tr>
<td>TSM-2-40NO: Oil temperature &lt; 55 °C → switch opens</td>
<td>Switch off the motor for pump and fan of the oil-air cooler</td>
</tr>
</tbody>
</table>

Setpoint 2

<table>
<thead>
<tr>
<th>Switching point 2 exceeded</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSK-2-55NO and TSM-2-40NO: Oil temperature &gt; 90 °C → switch opens</td>
<td>Gear unit stop or Warning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switching point 2 undercut</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSK-2-55NO and TSM-2-40NO: Oil temperature &lt; 90 °C → switch closes</td>
<td>Gear unit enable</td>
</tr>
</tbody>
</table>
2.7 Installation and connection information

**NOTICE**

Damage to the gear unit due to improper installation of the oil-air cooler.

Gear unit failure.

- Install the oil-air cooler in such a way that input and output air can flow unobstructedly.
- Ensure sufficient protection from dirt for the oil-air cooler.

Adhere to the following basic conditions when connecting the cooling system to the gear unit:

- Provide for a low-vibration installation site.
- The cooling system and the gear unit are set up separately as standard. The distance between the gear unit and the cooling system must not exceed 1 m.
- The cooling system must be installed at the same level as the gear unit or lower. If this is not possible, contact SEW-EURODRIVE.
- Do not reduce the specified cable cross sections.
- It is important that you choose the correct wall thickness and material when selecting pipes, hoses and screw fittings. Preferably use screw fittings with non-metallic gaskets.

SEW-EURODRIVE recommends the following cross sections for connecting the cooling system to the gear unit and the cooling circuit:

<table>
<thead>
<tr>
<th>Size cooling system</th>
<th>Pump suction connection</th>
<th>Suction pipe</th>
<th>Cooler pressure connection</th>
<th>Pressure pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAC 005</td>
<td></td>
<td>G 1 1/4&quot;</td>
<td>G 1&quot;</td>
<td>DN25</td>
</tr>
<tr>
<td>OAC 010</td>
<td></td>
<td>DN32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OAC 020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Maximum length 1.5 m
2) Maximum length 2.5 m

**INFORMATION**

The dimensions of the oil-air cooler are specified in the original operating instructions of the respective cooling system manufacturer.

More detailed technical data of the several cooling systems are available from SEW-EURODRIVE on request.
2.8 Notes on checking the oil level

**NOTICE**

Incorrect oil fill damages the gear unit.

Gear unit failure.

- Note that the use of an oil-air cooler affects the oil level in the gear unit. The fill quantity on the nameplate of the gear unit must be increased by the oil fill quantities of the cooling system and the connection pipes.

- Fill the gear unit with the oil grade specified on the nameplate.

When the gear unit is connected to an oil cooling system, the oil fill quantity changes. For the oil fill quantity of gear units with oil-air cooler applies:

Oil fill quantity of the system = oil fill quantity of the gear unit (see nameplate) + oil fill quantity of the cooling system (1.8 l) + volume of the pressure and suction pipes (depends on their length).

Check the oil level before startup. Observe the chapters "Checking the oil level" and "Checking the oil level and changing the oil in the " R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W Gear Unit Series" operating instructions of the main drive.
3 Supplier documentation

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Off-line coolers

BNK

Installation and Operation Instructions

Original instructions

BE360001 - 12/2014
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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.

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Document information
Document No. ....................................BE360001
Version ........................................... 12/2014
1 Introduction

1.1 Intended use
BNK off-line coolers are suited for the cooling of oils in hydraulic and lubrication systems. Their scope is given by their specifications. The use in other applications is not permitted without confirmation by Bühler Technologies GmbH.

1.2 Model key

<table>
<thead>
<tr>
<th>Motor power</th>
<th>Pump output per litre</th>
<th>Number of motor contacts</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNK 4.4-30-0.75kW- IBx - T50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To also have a bypass and/or thermal contact, the specification will be added to the type designation:

<table>
<thead>
<tr>
<th>Bypass version</th>
<th>Temperature switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB external bypass</td>
<td>T50, T60 Temperature in °C, specification see</td>
</tr>
<tr>
<td>B internal bypass</td>
<td>T70, T80 separate data sheet</td>
</tr>
<tr>
<td>IB internal temperature-dependent bypass 2 bar / 45 °C</td>
<td></td>
</tr>
<tr>
<td>ITB internal temperature-dependent bypass 2 bar / 45 °C</td>
<td></td>
</tr>
<tr>
<td>ATB external temperature-dependent bypass 2 bar / 45 °C</td>
<td></td>
</tr>
<tr>
<td>x bypass value 2 bar, 5 bar, 8 bar</td>
<td></td>
</tr>
</tbody>
</table>

1.3 Scope of delivery
- 1 x Off-line cooler
- Product documentation
2 Safety instructions

2.1 Important advice

Operation of the device is only valid if:
- the product is used under the conditions described in the installation- and operation instruction, the intended application according to the type plate and the intended use. In case of unauthorized modifications done by the user Bühler Technologies GmbH cannot be held responsible for any damage,
- when complying with the specifications and markings on the nameplates,
- the performance limits given in the datasheets and in the installation- and operation instruction are obeyed,
- monitoring devices and safety devices are installed properly,
- service and repair is carried out by Bühler Technologies GmbH,
- only original spare parts are used.

This manual is part of the equipment. The manufacturer keeps the right to modify specifications without advanced notice. Keep this manual for later use.

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:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Warning against hazardous situations</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning against electrical voltage</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning against hot surface</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning against environmental hazard</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning against potentially explosive atmospheres</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning against high pressure</td>
</tr>
<tr>
<td>⚠️</td>
<td>General notice</td>
</tr>
<tr>
<td>⚠️</td>
<td>Disconnect from mains</td>
</tr>
<tr>
<td>⚠️</td>
<td>Wear protection gloves</td>
</tr>
</tbody>
</table>
Installation and Operation Instructions
Off-line coolers BNK
Safety instructions

2.2 General hazard warnings

Installation of the device shall be performed by trained staff only, familiar with the safety requirements and risks.

Check all relevant safety regulations and technical indications for the specific installation place. Prevent failures and protect persons against injuries and the device against damage.

The operator of the system must secure that:
– safety and operation instructions are accessible and followed,
– local safety regulations and standards are obeyed,
– performance data and installation specifications are regarded,
– safety devices are installed and recommended maintenance is performed,
– national regulations for disposal of electrical equipment are obeyed.

Maintenance, repair:
– Repairs on the device must be carried out by Bühler authorized persons only.
– Only perform modifications, maintenance or mounting described in this manual.
– Only use original spare parts.

When carrying out maintenance works of any kind, the relevant health and safety regulations of the country of use must be observed.

| DANGER | Electrical voltage  
|---|---|
| Electrocutation 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. |

| CAUTION | Hot surface  
|---|---|
| Burning hazard  
Let the device cool down before maintaining. |

| 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. |

| DANGER | Potentially explosive atmosphere  
|---|---|
| Explosion hazard if used in hazardous areas.  
The device is not suitable for operation in hazardous areas with potentially explosive atmospheres. |
3 Transport and storage

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

For transportation, units with air coolers have lifting screws M10 on top of the cooler housing. These points are not always above the center of gravity so that the cooler might swing when lifted. The threads M8 in the cooling elements are not allowed to be used for lifting the entire unit.

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

WARNING

Bruising hazard
Risk of bruising during transport and installation of the device.
To prevent injuries when lifting the device, use appropriate lifting aids.
Make sure that the used lifting equipment is not damaged and that it is approved for the weight of the oil/air cooler.
Make sure that the device is fixed tightly.
4 Installation and connection

4.1 Requirements to the installation site

Unit
The unit must be located in such a way that there is free airflow around and enough room for servicing and repair. If the device is installed outdoors, regard the protection class of the motor (IP55 is standard).

Air cooler
The cooler must be located in such a way that the air flowing through the matrix has free flow on entry and exit. The distance between air intake or air outlet to the nearest surrounding obstacle should be at minimum half the height of the matrix. Free air flow must be provided. If the cooler is to be sited near to working personnel, the effect of hot draught and noise emissions must be taken into account.

If the cooler is installed in closed space, ensure sufficient air circulation. Avoid back flow of warmed air. If necessary, the room must be vented.

Due to lower temperatures with respect to closed rooms, the cooling capacity outside raises, but on the other hand higher start up pressure may result due to higher oil viscosity. In this case, consider a bypass valve and / or a heating.

The rotating fan might lead to static charging. Therefore sensitive equipment like electronics should be kept away from the device.

4.2 Installing the unit

The unit is mounted with bolts to the mounting points on an adequate support structure. The connections to the system should be stress and vibration free. The use of flexible hoses is highly recommended. Please regard that the hose on the suction side is suitable for suction pressure for example a mesh wire reinforced type. Avoid leakage in the oil circuit. If necessary, place drip pans. Comply with local safety requirements and avoid any risk to the environment from oil spills etc.

4.2.1 Additional advices for units with pump

The distance from the unit to the reservoir should be as short as possible. Especially the suction pipe should be short and of sufficient inner diameter.

We suggest mounting the unit in the same height as the liquid level. Mounting below the liquid level is possible as well.

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 generator 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.
4.3 Hydraulic connection

Hydraulic connection is to be carried out as described in the appended data. All pipes are free of vibration and current. Generally speaking, connections should be made using tubes.

Contaminated fluids affect the service life of the fluid system. For this reason we advise using fluids of purity class 23/19/13 (as per ISO 4406).

Should your hydraulic system be equipped with switching valves or check valves, we recommend using a pressure relief valve to protect your system. A pressure relief valve has not been factory installed in the cooler.

4.4 Electrical connections

CAUTION Electrical voltage

Wrong mains voltage may damage the device.
Installation of the device shall be performed by trained staff only. Regard the voltage given on the type plate. Make sure that the cables have sufficient strain relief.

Fusing

Fusing has to be done due to local standards!

Polarity

Take care of the directional rotation of the motor. The fan rotates counter clockwise when regarded form the motor’s side!
Watch the direction arrow on the type plate sticker.

The rotational direction is changed by exchanging the connection two phases.

For calculating the correct values of fuses and cross-section of connection wires, refer to local rules and standards. The motor and, if equipped, starting devices must be connected to protective earth.

Lead fuses protect the cables in case of a short cut, but are not sufficient to protect the motor coils from 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 value given on the type plate of the motor. Operation out of the limits for mains voltage and frequency range is prohibited.

Lightning protection must be installed by the operator.
5 Operation and control

WARNING  Hazard due to rotating fan
Injury of hands and fingers
To avoid injuries, do not reach into the running fan!

NOTICE  The device must not be operated beyond its specifications.

NOTICE  Abrupt flow variation can lead to pressure peaks that may damage the cooler matrix. Make sure that the specifications are not exceeded in this case!

5.1 Before starting
– Check that all parts are free of damage, especially the cooling element and fan guard. Do not put a damaged device into operation.
– Check if the two warning labels (rotating parts) on the cooler’s housing are fitted.
– Check the correct connections of oil and power circuits according to chapter „Installation and connection“.
– Make sure that all valves or other parts in the cooling circuit, which have to be opened, are opened.

5.2 During starting
First, check that the fan rotates counter clockwise when looking from the motor’s side.

CAUTION  Hot surface
Burning hazard
Let the device cool down before maintaining.

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.

Noise level
Our cooler is supplied with a low noise pump. 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

- Maintenance of the device shall be performed by trained staff only, familiar with the safety requirements and risks.
- Only perform maintenance work described in this manual.
- Regard all relevant safety regulations and internal operating instructions during 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.

**CAUTION**

**Hot surface**

Burning hazard

Let the device cool down before maintaining.

**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.

The outer parts of the motor, especially the cooling fins and the cooling ducts must be kept as clean as possible to ensure sufficient heat dissipation.

Keep in mind the protection class for dust and humidity. Cleaning the device with high pressure cleaners is only allowed if the motor has the respective protection class.

The motor is equipped with on both sides with sealed ball bearings. The greasing is designed for the total lifetime. Maintenance (subsequent greasing) is not necessary.

The bearings must be replaced by trained staff only.
6.1 Cleaning and disassembly of the cooler matrix

Due to the design of the cooling fins, the cooler has low susceptibility to dust and dirt. Normally, it is sufficient to clean the front surface with a brush. If the ambient air is loaded with higher amounts of oil or dust, it may be necessary to clean the cooling matrix in regular intervals.

- First, let the cooling matrix cool down. Then disconnect the motor from the mains and secure it against reconnecting.
- Depressurize the system and disconnect the piping. Place an oil drip pan below the cooling matrix to collect leaking oil.
- Close all connections with plugs to avoid further oil leakage.
- Protect the cooling matrix from falling down.
- Dismantle the cooling matrix from the fan case by loosening the 4 fastening bolts. The cooler sizes 6 up to 8 provide threads for eyebolts in the cooler matrix for lifting with hoisting devices.
- Take it to the cleaning area. Be careful not to damage the fins during transport and cleaning.
- Clean the matrix by blowing pressurized air from the rear side through the fin rows in parallel.
- If dirt is wet and sticky use steam cleaner and/or some washing agent. In this case, rinse the cooler matrix with pure water.
- Remount the cooling matrix in reverse order.
- Regard correct mounting of the connecting sleeves.

6.2 Cleaning the cooler matrix inside

If the matrix gets clogged from the inside due to impurities it should be rinsed with a cleaning liquid.

- Dismantle the cooling matrix as described in chapter „Cleaning and disassembly of the cooler matrix“.
- Fill in a degreasing agent and plug the cooling matrix.
- After some reaction time, empty the cooling matrix and rinse it with clean duty oil. Dispose the degreasing agent and the cooling oil according to National regulations.
- Remount the cooling matrix in reverse order as described.

6.3 Cleaning the fan case

Due to the design, dust and dirt will not deposit in a large amount inside the fan case. Nevertheless, any deposits of dirt should be blown out each time the cooler is cleaned.
6.4 Replacing fan parts

- Disconnect the motor from the mains and protect it from being re-connected unintentionally.
- Now remove the mains cable.
- There are two different fan models.
- Models with fixed fan hub, the fan can be replaced only together with the hub.
- Models with separated hub and fan, the fan can be replaced without replacing the hub.

Models with motor support and mounting brackets:
- Secure the fan unit against falling.
- Loosen the four fixing bolts at the case on top of the mounting brackets.
- Unscrew the four screws connecting the fan unit to the housing at the tips of the fan guard.
- The fan unit can now be pulled out carefully to the back.
- Remount the new fan in reverse order. If the fan is replaced, insert the screw adding with glue.

Models with motor support and elongated holes in the mounting rails:
- Secure the fan unit against falling.
- Loosen the screws fixing the support to the coolers feet about two revolutions.
- Unscrew the four screws connecting the fan unit to the housing at the tips of the fan guard.
- The fan unit can now be pulled out carefully to the back.
- Remount the new fan in reverse order. If the fan is replaced, insert the screw adding with glue.
7 Service und repair

If the device shows irregularities see this chapter for troubleshooting.

Repairs on the device must be carried out by Bühler authorized persons only.

If you need help or more information call: +49-(0)2102-498955 or your local agent

If the device doesn’t work correctly after elimination of failures and turning power on, the device must be checked by the manufacturer. Please ship the device with suitable packing to

Bühler Technologies GmbH
- Reparatur/Service -
Harkortstraße 29
40880 Ratingen
Deutschland

In Addition, attach the filled in and signed Declaration of Decontamination status to the packing.
Otherwise, your repair order cannot be processed!
The form can be requested by e-mail to service@buehler-technologies.com.

7.1 Troubleshooting

<table>
<thead>
<tr>
<th>Problem / Failure</th>
<th>Possible cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling capacity not sufficient</td>
<td>Ambient air temperature is higher than specified</td>
<td>Select larger model</td>
</tr>
<tr>
<td></td>
<td>Motor's rotation direction wrong</td>
<td>Correct connection, see Electrical connections</td>
</tr>
<tr>
<td></td>
<td>Motor doesn’t start</td>
<td>Correct connection, see Electrical connections</td>
</tr>
<tr>
<td></td>
<td>Air flow too low</td>
<td>Correct connection, see Electrical connections</td>
</tr>
<tr>
<td></td>
<td>Air fins clogged</td>
<td>Clean cooler matrix, see Maintenance</td>
</tr>
<tr>
<td></td>
<td>Near obstacles</td>
<td>Regard minimum distance</td>
</tr>
<tr>
<td></td>
<td>Oil flow too low</td>
<td>Increase oil flow</td>
</tr>
<tr>
<td></td>
<td>Oil channel clogged</td>
<td>Cleaning, see chapter Cleaning the cooler matrix inside</td>
</tr>
<tr>
<td></td>
<td>Oil circuit blocked</td>
<td>Open valves and cocks</td>
</tr>
<tr>
<td></td>
<td>Suction pressure to high, therefore reduced oil flow.</td>
<td>Select suction hose with sufficient diameter</td>
</tr>
<tr>
<td></td>
<td>Back pressure in the pressure line too big. Motor will be overloaded and motor speed braked down.</td>
<td>Reduce suction height</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Choose bigger nominal width</td>
</tr>
<tr>
<td>No oil flow</td>
<td>Not enough oil inside pump housing due to long standstill or storage, therefore no suction.</td>
<td>Refill some oil into the pump housing before connecting the suction hose</td>
</tr>
<tr>
<td>Pump too noisy</td>
<td>Suction pressure too high</td>
<td>Select suction hose with sufficient diameter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduce suction height</td>
</tr>
</tbody>
</table>

Tab. 2: Troubleshooting
8 Disposal

Dispose of the parts in such a way that does not present a danger to other people’s health or to the environment. Observe the legal requirements in the country of use for the disposal of electrical components and oils and coolants.
9 Calculations

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

Definitions

\[ b = 159 \cdot \ln \frac{V_{40}}{0,23} \]
\[ b = 159 \cdot \ln \frac{V_{40}}{0,23} = 842,4325 \]
\[ a = 0,23 \cdot e^{-0,677} \]
\[ a = 0,23 \cdot e^{-0,677} = 0,08801 \]

Example: oil VG 46

\[ b = 159 \cdot \ln \frac{46}{0,23} = 842,4325 \]
\[ a = 0,23 \cdot e^{-0,677} = 0,08801 \]
\[ v = a \cdot e^{-(b-95,2)} \]
\[ v = 0,08801 \cdot e^{(842,4325-95,2)} = 97,35 \text{ cst} \]

Viscosity given in cst (mm²/s)

9.2 Table of operational viscosity for VG oil

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>VG 46</th>
<th>VG 68</th>
<th>VG 220</th>
<th>VG 320</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 °C</td>
<td>264,45</td>
<td>444,77</td>
<td>2,120,17</td>
<td>3,489,92</td>
</tr>
<tr>
<td>20 °C</td>
<td>131,96</td>
<td>210,85</td>
<td>861,60</td>
<td>1,350,22</td>
</tr>
<tr>
<td>30 °C</td>
<td>73,58</td>
<td>112,61</td>
<td>404,31</td>
<td>607,96</td>
</tr>
<tr>
<td>40 °C</td>
<td>46,00</td>
<td>68,00</td>
<td>220,00</td>
<td>320,00</td>
</tr>
<tr>
<td>50 °C</td>
<td>29,13</td>
<td>41,63</td>
<td>121,71</td>
<td>171,40</td>
</tr>
<tr>
<td>60 °C</td>
<td>20,04</td>
<td>27,86</td>
<td>74,99</td>
<td>102,85</td>
</tr>
<tr>
<td>70 °C</td>
<td>14,43</td>
<td>19,58</td>
<td>49,00</td>
<td>65,66</td>
</tr>
<tr>
<td>80 °C</td>
<td>10,78</td>
<td>14,32</td>
<td>33,61</td>
<td>44,12</td>
</tr>
<tr>
<td>90 °C</td>
<td>8,32</td>
<td>10,84</td>
<td>24,01</td>
<td>30,94</td>
</tr>
</tbody>
</table>

9.3 Calculating the pressure loss
Valid for smooth straight piping per meter at laminar current.

Definitions

\[ PV = \frac{0,32 \cdot v \cdot \rho \cdot V}{DN^2} \]

Example: oil VG 46

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

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 your specific application.

NOTICE
To avoid damage of the cooling system, make sure that the maximum pump pressure is not exceeded. High pressure may occur if the system is shut off or throttled at the pressure side.
## 10 Pressure loss in straight pipes

Pressure loss (bar) in straight pipes per meter at laminar flow with mineral flow:

### BFP 8 8 l/min – DN 25

<table>
<thead>
<tr>
<th>Temperature</th>
<th>VG 46</th>
<th>VG 68</th>
<th>VG 120</th>
<th>VG 160</th>
<th>VG 220</th>
<th>VG 320</th>
<th>VG 460</th>
<th>VG 680</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 °C</td>
<td>0.03</td>
<td>0.05</td>
<td>0.11</td>
<td>0.17</td>
<td>0.25</td>
<td>0.42</td>
<td>0.68</td>
<td>1.14</td>
</tr>
<tr>
<td>20 °C</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.07</td>
<td>0.10</td>
<td>0.16</td>
<td>0.25</td>
<td>0.40</td>
</tr>
<tr>
<td>30 °C</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.07</td>
<td>0.11</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>40 °C</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.09</td>
<td>0.13</td>
<td>0.22</td>
</tr>
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<td>50 °C</td>
<td>0.01</td>
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<td>0.04</td>
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### BFP 15 16 l/min – DN 32

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<th>VG 46</th>
<th>VG 68</th>
<th>VG 120</th>
<th>VG 160</th>
<th>VG 220</th>
<th>VG 320</th>
<th>VG 460</th>
<th>VG 680</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 °C</td>
<td>0.02</td>
<td>0.04</td>
<td>0.08</td>
<td>0.12</td>
<td>0.19</td>
<td>0.31</td>
<td>0.50</td>
<td>0.85</td>
</tr>
<tr>
<td>20 °C</td>
<td>0.01</td>
<td>0.02</td>
<td>0.04</td>
<td>0.10</td>
<td>0.12</td>
<td>0.19</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>30 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.05</td>
<td>0.04</td>
<td>0.08</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>40 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>50 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
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### BFP 30 28 l/min – DN 32

<table>
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<th>VG 68</th>
<th>VG 120</th>
<th>VG 160</th>
<th>VG 220</th>
<th>VG 320</th>
<th>VG 460</th>
<th>VG 680</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 °C</td>
<td>0.04</td>
<td>0.07</td>
<td>0.15</td>
<td>0.22</td>
<td>0.33</td>
<td>0.54</td>
<td>0.86</td>
<td>1.46</td>
</tr>
<tr>
<td>20 °C</td>
<td>0.02</td>
<td>0.03</td>
<td>0.06</td>
<td>0.10</td>
<td>0.13</td>
<td>0.21</td>
<td>0.33</td>
<td>0.52</td>
</tr>
<tr>
<td>30 °C</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.07</td>
<td>0.09</td>
<td>0.14</td>
<td>0.22</td>
</tr>
<tr>
<td>40 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.07</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>50 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
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### BFP 60 57 l/min – DN 40

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<th>VG 46</th>
<th>VG 68</th>
<th>VG 120</th>
<th>VG 160</th>
<th>VG 220</th>
<th>VG 320</th>
<th>VG 460</th>
<th>VG 680</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 °C</td>
<td>0.03</td>
<td>0.06</td>
<td>0.12</td>
<td>0.18</td>
<td>0.28</td>
<td>0.45</td>
<td>0.74</td>
<td>1.24</td>
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<tr>
<td>20 °C</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.08</td>
<td>0.11</td>
<td>0.18</td>
<td>0.27</td>
<td>0.43</td>
</tr>
<tr>
<td>30 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.08</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>40 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.04</td>
<td>0.06</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>50 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td></td>
</tr>
</tbody>
</table>

### BFP 90 86 l/min – DN 40

<table>
<thead>
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<th>Temperature</th>
<th>VG 46</th>
<th>VG 68</th>
<th>VG 120</th>
<th>VG 160</th>
<th>VG 220</th>
<th>VG 320</th>
<th>VG 460</th>
<th>VG 680</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 °C</td>
<td>0.05</td>
<td>0.09</td>
<td>0.19</td>
<td>0.27</td>
<td>0.42</td>
<td>0.68</td>
<td>1.11</td>
<td>1.87</td>
</tr>
<tr>
<td>20 °C</td>
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<td>0.08</td>
<td>0.12</td>
<td>0.17</td>
<td>0.26</td>
<td>0.41</td>
<td>0.65</td>
</tr>
<tr>
<td>30 °C</td>
<td>0.02</td>
<td>0.02</td>
<td>0.04</td>
<td>0.06</td>
<td>0.08</td>
<td>0.12</td>
<td>0.18</td>
<td>0.27</td>
</tr>
<tr>
<td>40 °C</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.06</td>
<td>0.09</td>
<td>0.13</td>
</tr>
<tr>
<td>50 °C</td>
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<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.07</td>
</tr>
</tbody>
</table>

---

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11 Appendices

11.1 Technical data

<table>
<thead>
<tr>
<th>Materials / surface protection</th>
<th>Aluminium, painted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling battery:</td>
<td>plastic-coated steel</td>
</tr>
<tr>
<td>ventilation box, safety guard and motor</td>
<td>hard-anodised aluminium, sintered steel</td>
</tr>
<tr>
<td>brackets:</td>
<td></td>
</tr>
<tr>
<td>pump:</td>
<td></td>
</tr>
<tr>
<td>Colour:</td>
<td>RAL 7001</td>
</tr>
<tr>
<td>Operating fluids:</td>
<td>Mineral oils per DIN 51524</td>
</tr>
<tr>
<td></td>
<td>Gear oil per DIN 51517-3</td>
</tr>
<tr>
<td>Operating pressure static:</td>
<td>max. 10 bar</td>
</tr>
<tr>
<td>Suction pressure:</td>
<td>max. - 0.4 bar</td>
</tr>
<tr>
<td>Operating oil temperature:</td>
<td>max. 80 °C (higher upon request)</td>
</tr>
<tr>
<td>max. Viscosity:</td>
<td>100 cSt medium viscosity (higher upon request)</td>
</tr>
<tr>
<td>Electric motors (others available upon request)</td>
<td></td>
</tr>
<tr>
<td>Voltage / frequency:</td>
<td>230 / 400 V - 50 Hz ± 5 %</td>
</tr>
<tr>
<td></td>
<td>276 / 480 V - 60 Hz ± 5 %</td>
</tr>
<tr>
<td>Thermal stability:</td>
<td>Class of insulation F, utilisation per Class B</td>
</tr>
<tr>
<td>Protection class:</td>
<td>IP55</td>
</tr>
<tr>
<td>The motors comply with standards</td>
<td>IEC 60034, IEC 60072, IEC 60085</td>
</tr>
</tbody>
</table>
### 11.1.1 Basic data (at 50 Hz frequency)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Cooler model</th>
<th>spec. cooling power kW/K</th>
<th>Cooling power at ETD = 40 K (kW)</th>
<th>max. circulation rate (l/min)</th>
<th>Motor power</th>
<th>Number of poles</th>
<th>Rated current at 400 V</th>
<th>Weight (kg)</th>
<th>Capacity (l)</th>
<th>Noise db(A)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>3601406IE2</td>
<td>BNK 1.4-7.5-0.75kW</td>
<td>0.04</td>
<td>1.6</td>
<td>7.5</td>
<td>0.75 kW / 4 / 1.94 A</td>
<td>25</td>
<td>0.7</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3601401IE2</td>
<td>BNK 1.4-15-0.75kW</td>
<td>0.07</td>
<td>2.8</td>
<td>15</td>
<td>0.75 kW / 4 / 1.94 A</td>
<td>25</td>
<td>0.7</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3602401IE2</td>
<td>BNK 2.4-15-0.75kW</td>
<td>0.09</td>
<td>3.6</td>
<td>15</td>
<td>0.75 kW / 4 / 1.94 A</td>
<td>30</td>
<td>1.3</td>
<td>66</td>
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<tr>
<td>3602402IE2</td>
<td>BNK 2.4-30-0.75kW</td>
<td>0.13</td>
<td>5.0</td>
<td>28</td>
<td>0.75 kW / 4 / 1.94A</td>
<td>33</td>
<td>1.3</td>
<td>66</td>
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<tr>
<td>3602407IE2</td>
<td>BNK 2.4-40-1.1kW</td>
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<td>11</td>
<td>3x G1</td>
<td>¼</td>
<td>9</td>
<td>33</td>
<td>275</td>
<td>101.5</td>
<td>134</td>
<td>G1</td>
<td>G ¼</td>
<td>30</td>
<td>135</td>
</tr>
</tbody>
</table>
11.3 Functional diagram

Standard version BNK 2

The oil inlet is on the left of the cooling battery. The oil outlet is always on the opposite side.

* recommended position of additional oil filter

Standard version BNK 1, 3 to BNK 8

The oil inlet is on the bottom left of the cooling battery. The second connection at the top must be closed. The oil outlet is always on the opposite side.

Internal bypass IB/ITB (BNK 3-8)

The oil inlet and outlet is always on the same side of the cooling battery. The connection on the opposite side must be closed.

External bypass AB/ATB (BNK 2-8)

The oil inlet is always at the bottom left of the cooling battery. The second connection must be closed. The oil outlet is always on the opposite side.

With bypass valve

With temperature-dependent bypass valve

With temperature switch attached
12 Attached documents

- Declaration of Conformity KX 350001
- Declaration of Contamination status
EG-Konformitätserklärung
EC-declaration of conformity

Hiermit erklären wir, dass die nachfolgenden Produkte den wesentlichen Anforderungen der folgenden EG-
Richtlinie in ihrer aktuellen Fassung entsprechen:
Herewith we declare that the following products correspond to the essential requirements of the following EC
directive in its actual version:
2006/42/EG (Maschinenrichtlinie / machinery)
Folgende weitere Richtlinien wurden berücksichtigt / the following directives were regarded
2006/95/EG (Niederspannungsrichtlinie / low voltage directive)
2004/108/EG (EMV / EMC)

Produkte / products:
Öl-Luft Kühler, Öl-Nebenstromkühler
Oil/Air cooler, Offline Oil/Air cooler

Typ(en) / type(s):
BLK, BNK

Zur Beurteilung der Konformität wurden folgende harmonisierte Normen in aktueller Fassung herangezogen:
The following harmonized standards in actual revision have been used:

- EN 12100-1 Sicherheit von Maschinen - Grundbegriffe, allgemeine Gestaltungsleitsätze -
  Teil 1: Grundsätzliche Terminologie, Methodologie
- EN 12100-2 Sicherheit von Maschinen - Grundbegriffe, allgemeine Gestaltungsleitsätze -
  Teil 2: Technische Leitsätze
- EN 60204-1 Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1:
  Allgemeine Anforderungen
- EN 55011 Industrielle, wissenschaftliche und medizinische Geräte - Funkstörungen -
  Grenzwerte und Messverfahren
- EN 61000-6-2 Elektromagnetische Verträglichkeit (EMV) - Teil 6-2: Fachgrundnormen -
  Störfestigkeit für Industriebereiche

Dokumentationsverantwortlicher für diese Konformitätserklärung ist der Unterzeichnende mit Anschrift am
Firmensitz.

The person authorised to compile the technical file is the one that has signed and is located at the company’s
address.

Ratingen, den 14.07.2010

Stefan Eschweiler
Geschäftsführer – general manager

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
Email: fluidcontrol@buehler-technologies.com

KX 35 0001

Addendum to the Operating Instructions – R..7, F..7, K..7 S..7, SPIROPLAN® W Series
Um eine schnelle und reibungslose Bearbeitung Ihres Anliegens zu erreichen, füllen Sie bitte diesen Rücksendeschein aus. Eine genaue Fehlerbeschreibung ist für die Ursachenanalyse nötig und hilft bei der schnellen Bearbeitung des Vorgangs. Die Aussage „Defekt“ hilft bei der Fehlersuche leider nicht.

Die RMA-Nummer bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service.


Bitte complete this return form to ensure your claim is processed quickly and efficiently. An accurate description of the problem is necessary for cause analysis and will help processing the claim quickly. Unfortunately, stating “defective” will not help us troubleshoot the issue.

You may obtain the RMA number from your sales or service representative.

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 employees’ health.

Attach the return form including decontamination statement along with the shipping documentation to the outside of the package, inside a clear pouch. Otherwise we are unable to process your repair order!

Sender information:

Firma / Company
Ansprechpartner / Contact person
Anschrift / Address
Abteilung / Department
E-Mail / E-Mail:
Tel. / Phone
Fax / Fax:

Artikelnummer / Item number
Auftragsnummer / Order number
Anzahl / Quantity

Rücksendegrund / Return reason
Reparatur / Repair
Garantie / Warranty
Zur Prüfung / For inspection
Rückgabe / Return

Vorgangnummer des Kunden / Customer transaction number:

Ort, Datum / Place, Date
Unterschrift / Stempel / Signature / Stamp:
### RMA - Decontamination Statement

**Gerät / Device**

**Serien-Nr. / Serial no.**

<p>| | |</p>
<table>
<thead>
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**RMA-Nr. / RMA no.:**

<p>| | |</p>
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</table>

I hereby declare that the device as specified above has been properly cleaned and decontaminated and that there are no risks present when dealing with the device.

In other cases, please describe the hazards in detail:

**Aggregate state (please check):**

- Fluid / Liquid
- Solid
- Pulvry / Powdery
- Gaseous

Please note the following warnings (please check):

- Explosive
- Toxic / Lethal
- Flammable substances
- Oxidizing

- Compressed gases
- Hazardous to health
- Harmful to health
- Harmful to the environment

Please include an updated data sheet of the hazardous substance!

**Ort, Datum / Place, Date:**

**Unterschrift / Stamp:**