Precooler
TS 10

Installation and Operation Instructions

Original instructions
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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# 1 Introduction

## 1.1 Intended use

This unit is intended for industrial use in gas analysis systems. It’s an essential component for conditioning the sample gas to protect the analysis instrument from residual moisture in the sample gas.

Please note the specifications in the data sheet on the specific intended use, existing material combinations, as well as pressure and temperature limits.

## 1.2 Types

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

## 1.3 Scope of delivery

- Cooler with pump
- Product Documentation
- Connection/mounting accessories (optional)
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 can not 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

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DANGER</strong></td>
<td>Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.</td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>NOTICE</strong></td>
<td>Signal word for important information to the product.</td>
</tr>
</tbody>
</table>

Warning signs

These instructions use the following warning signs:

<table>
<thead>
<tr>
<th>Sign</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Exclamation Mark]</td>
<td>Warns of a general hazard</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Warns of voltage</td>
</tr>
<tr>
<td>![Cross]</td>
<td>Warns not to inhale toxic gasses</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Warns of corrosive liquids</td>
</tr>
<tr>
<td>![Exclamation Mark]</td>
<td>Warns of explosive areas</td>
</tr>
<tr>
<td>![Plug]</td>
<td>General information</td>
</tr>
<tr>
<td>![Wrench]</td>
<td>Unplug from mains</td>
</tr>
<tr>
<td>![Mask]</td>
<td>Wear respiratory equipment</td>
</tr>
<tr>
<td>![Mask]</td>
<td>Wear a safety mask</td>
</tr>
<tr>
<td>![Gloves]</td>
<td>Wear gloves</td>
</tr>
</tbody>
</table>
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.
- the device is protected from mechanical loads.

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 Toxic, corrosive gas/condensate

Sample gas/condensate may be hazardous to health.

a) If necessary, ensure a safe gas/condensate discharge.

b) Always disconnect the gas supply when performing maintenance or repairs.

c) Protect yourself from toxic/corrosive gasses/condensate when performing maintenance. Wear appropriate protective equipment.

### 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.

Do not expose the device to combustible or explosive gas mixtures.
3 Transport and storage

Only transport the product inside the original packaging or a suitable alternative. The equipment must be protected from moisture and heat when not in use. It must be stored in a covered, dry and dust-free room at a temperature of -20 °C to 60 °C (-4 °F to 140 °F).
4 Installation and connection

4.1 Installation site requirements
The unit is only intended for wall-mounted use in enclosed areas. Adequate protection from the weather must be provided when used outdoors.
Install the unit leaving enough room below the cooler to discharge the condensate. Leave room above for the gas supply.
Be sure to maintain the approved ambient temperature. Do not obstruct the convection of the cooler. The vents must have enough room to the next obstacle. The distance must especially be a minimum of 10 cm on the air outlet side.
Ensure adequate ventilation when installing in enclosed housings, e.g. analyser cabinets. If the convection is inadequate, we recommend aerating the cabinet or installing a fan to lower the inside temperature.

4.2 Installation
Mount the angles with the included screws.
Depending on the service conditions, the hoses must be made from suitable material and secured tightly.
Run the gas supply to the cooler with a downward slope.

4.2.1 Peristaltic pump
Coolers ordered with built-in peristaltic pumps already have these installed and wired. Heat exchangers ordered at the same time are already installed and connected to the peristaltic pumps.

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing peristaltic pumps CPsingle / CPdouble limits the maximum permissible operating pressure in the system!</td>
</tr>
<tr>
<td>Operating pressure ≤ 1 bar</td>
</tr>
</tbody>
</table>

4.2.2 Connecting the heat exchanger
The gas inputs are marked in red.
Suitable screw connections can be found in our catalogue.

4.3 Electrical connections
The operator must install an external separator for the device which is clearly assigned to this device.
This separator
– must be located near the device,
– must be easy for the operator to reach,
– must comply with IEC 60947-1 and IEC 60947-3,
– must separate all live conductors and the status output, and
– must not be attached to the power feed.
An additional, or integrated in the separator, overcurrent device is required. All feeders except the ELCB must have overcurrent devices, e.g. circuit breakers or fuses. This should be next to each other, have the same rating, and not be integrated in the neutral wire of multi-phase equipment.
We recommend using a 800 mA delayed action fuse or MCB.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous electrical voltage</td>
</tr>
<tr>
<td>The device must be installed by trained staff only.</td>
</tr>
</tbody>
</table>
Wrong mains voltage
Wrong mains voltage may damage the device. Regard the correct mains voltage as given on the type plate.

Plug connection
This device has one DIN 43650 plug each for the power supply. If the lead is connected correctly, these cannot be confused. Therefore please be sure to correctly reassemble the plugs after connecting the wires. Ensure suitable strain relief.

The supply line cross-sections must be suitable for the rated current. Use a maximum line cross-section of 1.5 mm² (AWG 16) and a cable diameter of 8 - 10 mm (0.31 - 0.39 inch).

Below you will find the pin assignments, with the numbers corresponding to those on the plugs:

pin assignment | power supply
---|---
1 | L1
2 | N
3 | PE

Fig. 1: A100048 Cooler electric supply

The supply voltage is 230 VAC 50 Hz or 115 VAC 60 Hz (please note type plate!). The clamping area has a diameter of 8-10 mm.
5 Operation and control

NOTICE

The device must not be operated beyond its specifications.

After switching on the cooler, both the pump and fan will start.
Please refer to the data sheet or technical data for performance data and maximum ratings.
6 Maintenance

The basic version of the cooler requires no special maintenance. However, it may have different options depending on the cooler model. In this case the following maintenance must be performed regularly:

– **Optional peristaltic pump**: Check hoses

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.

---

**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**

**Toxic, corrosive gas/condensate**

- Sample gas/condensate may be hazardous to health.
  - a) If necessary, ensure a safe gas/condensate discharge.
  - b) Always disconnect the gas supply when performing maintenance or repairs.
  - c) Protect yourself from toxic/corrosive gasses/condensate when performing maintenance. Wear appropriate protective equipment.
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
- Reparatur/Service -
Harkortstraße 29
40880 Ratingen
Germany

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

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

service@buehler-technologies.com.

7.1 Troubleshooting

<table>
<thead>
<tr>
<th>Problem / Failure</th>
<th>Possible cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump or fan does not start</td>
<td>– no power</td>
<td>– check power supply</td>
</tr>
<tr>
<td>Reduced gas flow</td>
<td>– clogged gas path</td>
<td>– check / flush heat exchanger</td>
</tr>
</tbody>
</table>

Tab. 1: Troubleshooting

7.2 Safety instructions

– The device must be operated within its specifications.
– All repairs must be carried out by Bühler authorised personnel only.
– Only perform modifications, servicing or mounting described in this manual.
– Only use original spare parts.

**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** Toxic, corrosive gas/condensate

Sample gas/condensate may be hazardous to health.

a) If necessary, ensure a safe gas/condensate discharge.
b) Always disconnect the gas supply when performing maintenance or repairs.
c) Protect yourself from toxic/corrosive gasses/condensate when performing maintenance. Wear appropriate protective equipment.
7.3 Replacing the hoses of the peristaltic pump (option)

- Turn off gas supply.
- Switch the device off and disconnect power supply.
- Remove the supplying and draining hoses from the pump (Take care of the safety instructions!).
- Loosen the centre knurled screw but do not remove it. Push the screw downwards.
- Pull off the cover.
- Pull the connections sideward and remove the hose.
- Replace the hose and remount the pump in reverse order.
- Reconnect power supply.

7.4 Spare parts and accessories

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

Upgrade and expansion parts can be found in our catalog.

Available spare parts:

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 00 999</td>
<td>TS 10 precooler, 230 V, 50 Hz</td>
</tr>
<tr>
<td>45 00 899</td>
<td>TS 10 precooler, 115 V, 60 Hz</td>
</tr>
<tr>
<td>45 00 799</td>
<td>TS 10 GB precooler (glass coated), 230 V, 50 Hz</td>
</tr>
</tbody>
</table>

7.4.1 Spare Parts and Accessories

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 92 00 35 114</td>
<td>Norprene replacement hose with one angled connection and one screw connection (metric) for peristaltic pump 1 L/h</td>
</tr>
<tr>
<td>44 92 00 35 115</td>
<td>Norprene replacement hose with one angled connection and one screw connection (US) for peristaltic pump 1 L/h</td>
</tr>
</tbody>
</table>
8 Disposal

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

9.1 Technical Data

**TS 10 precooler Technical Data**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>0 .. 60 °C</td>
</tr>
<tr>
<td>Electric supply</td>
<td>115 V, 60 Hz or 230 V, 50 Hz</td>
</tr>
<tr>
<td>Power input</td>
<td>25 W</td>
</tr>
<tr>
<td>Type of protection electric</td>
<td>IP 20</td>
</tr>
<tr>
<td>Housing</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Installation</td>
<td>wall-mounted</td>
</tr>
</tbody>
</table>

**Heat exchanger**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas pressure $P_{\text{max}}$</td>
<td>1 bar</td>
</tr>
<tr>
<td>Max. gas inlet temperature</td>
<td>180 °C</td>
</tr>
<tr>
<td>Gas connections</td>
<td>G3/8</td>
</tr>
<tr>
<td>Pump condensate connection</td>
<td>DN 4 (screw connection, metric) on 230 V</td>
</tr>
<tr>
<td></td>
<td>1/6” (screw connection, US) on 115 V</td>
</tr>
</tbody>
</table>

9.2 Dimensions (mm)

![Diagram showing dimensions](image-url)
10 Attached documents

- KX450008 Declaration of Conformity
- RMA - Decontamination Statement
Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte den wesentlichen Anforderungen der Richtlinie in ihrer aktuellen Fassung entsprechen.

Folgende Richtlinie wurde berücksichtigt:

2014/35/EU (Niederspannungsrichtlinie / low voltage directive)

in its actual version.

The following directive was regarded:

2014/30/EU (EMV/EMC)

Produkt / products: Vorkühler / Precooler
Typ / type: TS 10

Das Betriebsmittel dient der Aufbereitung des Messgases, um das Analysengerät vor Restfeuchtigkeit im Messgas zu schützen.

This equipment is used for conditioning the sample gas to protect the analysis instrument from residual moisture in the sample gas.

Das oben beschriebene Produkt der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

EN 61010-1:2010 EN 61326-1:2013

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 authorized to compile the technical file is Mr. Stefan Eschweiler located at the company’s address.


Stefan Eschweiler
Geschäftsführer – Managing Director

Frank Pospiech
Geschäftsführer – Managing Director
RMA-Formular und Erklärung über Dekontaminierung
RMA-Form and explanation for decontamination

**Firma/ Company**
- Name:
- Straße/ Street:
- PLZ, Ort/ Zip, City:
- Land/ Country:

**Gerät/ Device**
- Anzahl/ Quantity:
- Auftragsnr./ Order No.:

**Grund der Rücksendung/ Reason for return**
- ☐ Kalibrierung/ Calibration
- ☐ Reklamation/ Claim
- ☐ andere/ Other

**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:

![Safety Symbols]

**Bitte Sicherheitsdatenblatt beiliegen/ 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.**

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

**Datum/ Date**

rechtsverbindliche Unterschrift/ Legally binding signature
Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies.

Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.


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

To ensure conclusive analysis the goods must be inspected unaltered, if possible. Modifications or other damages which may hide the cause or render it impossible to analyse are prohibited.

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

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