BÜHLER TECHNOLOGIES

Gas Analysis

19" Sample Gas Conditioning System

SCS 104 (7-Gas Paths)

Installation and Operation Instructions

Original instructions

BECS0031
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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

The SCS 104 is a gas sample conditioning system. The specifications and their limits given in the appendices are to be maintained during installation. The device is not to be used in hazardous areas.

1.2 System Description

Please consult the illustrations and the legend at the end of the operating manual. The components are numbered. The numbers are referenced in the text.

1.2.1 Sample conditioning section

The sample gas is pulled in at the sample inlet (1) and through the cooler (2) by the sample pump (6). The cooler (2) operates at approximately 5 °C (41 °F). The moisture in the sample gas drops out inside the heat exchanger (integral to the cooler) and is delivered to the condensate outlet (10) by the condensate pump (3). The condensate pump is often referred to as a peristaltic pump.

The heat exchanger temperature is shown in the display (30). In the event of a cooler (2) overload and temperature increase of 3 K the sample pump (6) will turn off to avoid downstream moisture damage, and the temperature alarm LED (25) will turn red. Additionally, a highly sensitive moisture sensor (4) is located downstream from the cooler (2) and before the filter (5). If the moisture sensor (4) detects even the slightest amount of moisture in the sample gas stream, the pump will turn off, and the moisture alarm (26) will illuminate and the display shows “h20.1”.

Downstream from the moisture sensor (4) the sample gas passes through the filter (5) to remove particulates. The filter element is visible and accessible at the front panel.

From the outlet of the filter the sample gas is directed to a manual three way valve (7) located on the front panel that allows either sample gas or calibration gas to enter the inlet of the sample pump (6). The manual valve provides calibration gas directly to the analyzers, bypassing the probe when in the calibration position.

The sample pump output passes through an adjustable flowmeter with needle valve (8a) to the analyzer(s). The portion of the sample gas or calibration gas not required by the analyzer(s) flows through a second flowmeter without needle valve (8b). The amount of sample gas being used by the analyzer(s) is the difference between the two flowmeters. Both flowmeters are visible and accessible from the front panel. If flow decreases the set limit at flowmeter (8a), the flow alarm LED (27) on the front panel will turn red.

Condensate pump (3) and gas pump (6) are redundant. Switches (3c and 6c) on relay board RB0291 (23) can be used to change the active pumps.

Whenever the SCS is powered up the sample conditioning system is operating.

1.2.2 Calibration gas section

Up to 6 calibration gases and 1 zero gas (span 1 – span 6 + zero gas) can be connected to the bulkhead fittings (11a..g + zero gas) on the rear panel of the SCS. The flow of each calibration gas is controlled by an independent solenoid valve (12a..g) into a common, adjustable flowmeter with needle valve (13) located on the front panel. From the flowmeter (13) the selected calibration gas flows to the span outlet bulkhead fitting (14) located on the rear panel and to the manual three way valve (7). A specific calibration gas is selected using the mode switch (28) and indicated by the system mode LEDs (29), all located on the front panel. Calibration gases can also be controlled by an external controller when the mode switch (28) is in the sample (external control) position.

1.2.3 Blowback air section

Instrument air for blowback is connected to the inlet bulkhead fitting (15) on the rear panel. The blowback air pressure is adjusted with a regulator (16), displayed on a pressure gauge (19) and controlled by a solenoid valve (17). The blowback air passes through the outlet bulkhead fitting (18) located on the rear panel. Operation of the blowback solenoid is selected with the mode switch (28) and indicated by a system mode LED on the front panel. Blowback air can also be controlled by an external controller (40) when the mode switch (28) is in the sample (external control) position.

1.2.4 Manual control

Manual control is exercised using the rotary (mode) switch (28). The selectable system modes are: "Blow-back", “Zero Air”, “Sample (external control)”, "Span 1", "Span 2", "Span 3", "Span 4", "Span 5", and "Span 6". The selected mode is indicated by the system mode LEDs (29). Rotating the mode switch to any position other than sample (external control), will direct the selected calibration gas or air to the corresponding outlet.

The valves are switched with a short time delay, so the correct mode can be selected before any change in gas flow takes effect.

1.2.5 External control and monitoring

The SCS can be externally controlled only if the rotary switch (28) is in the exernal control (sample) position. Each mode is selected using the corresponding dry contacts at the external control terminal block (40) located on the rear panel. When no external contact is closed the SCS is in the sample mode.

The externally selected mode is shown by the system mode display LEDs on the front panel (29) and can be monitored at the mode output terminal board (41) on the rear panel. LED and status output for external control (sample) position are also active.

Alarms for moisture, flow and temperature can be monitored at the status output terminal block (42) on the rear panel. An open contact indicates status OK. A closed contact indicates an alarm. The normal status of the contacts may be changed on the controller module from normally open to normally closed.

1.2.6 Digital communication

The SCS is optionally available with Modbus RTU, or Modbus TCP interface. The bus connects at the back of the device. Port (43) for Modbus RTU, or port (44) for Modbus TCP.

The digital interface can be used to read device status information, as well as read and configure device settings. If both the manual control unit as well as the external control unit are set to "measure", the gas path can be switched via the Modbus.

1.3 Scope of delivery

- SCS analysis gas conditioning system
- 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 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

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		General notice
	Warning against electrical voltage		Disconnect from mains
	Warning against respiration of toxic gases		Wear respirator
	Warning against acid and corrosive substances		Wear eye/face protection
	Warning against potentially explosive atmospheres		Wear protection gloves
	Warning against hot surface		

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.
- 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.
- Do not install damaged or defective spare part. If necessary, visually inspect prior to installation to determine any obvious damage to the spare parts.

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

DANGER **Electrical voltage**

Electrocution hazard.

a) Disconnect the device from power supply.

b) Make sure that the equipment cannot be reconnected to mains unintentionally.

c) The device must be opened by trained staff only.

d) Regard correct mains voltage.

DANGER **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

The device should be only transported in the original case or in appropriate packing.

If the device is not used for some time, protect it against heat and humidity. Store the device in a roofed, dry, and dust free room. Temperature should be between –5 °C and 40 °C (23 °F and 104 °F).

4 Installation and connection

4.1 Installation site requirements

The unit mounts in a 19 inch rack. Due to the weight the housing requires rails. These are available from the cabinet/rack manufacturer.

Please note, cooling generates waste heat inside the SCS. Adequate ventilation is therefore required (e.g. fan slot inside the cabinet).

The following requirements must be met during installation:

- Never install the system near sources of heat or vibration, in direct sunlight, or around high frequencies or magnetic fields. The operator must install a lightning arrester.
- The system must be permanently installed in a location which can support the weight of the system.
- It must be protected from shock and impact.
- Never expose the display components to external forces.
- Never install the system outdoors.

4.2 Gas Line Connections

DANGER **Toxic, acidic gasses**

Sample gas can be harmful.

a) The gas lines and electric cables must be connected by a professional. Observe local laws and regulations.

b) If necessary, ensure a safe gas discharge.

c) Switch off the gas supply before performing maintenance and secure against accidental opening.

d) Protect yourself from toxic/corrosive gases. Wear suitable protective equipment.

The gas connections are 1/4” bulkhead fittings. Ensure the connections are tight.

4.3 Electrical connections

WARNING **Hazardous electrical voltage**

The device must be installed by trained staff only.

CAUTION **Wrong mains voltage**

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

Use the included M3 plug to connect to power. The plug insert can be installed turned to your liking. Please refer to the wiring diagram in the appendix for the assignment.

The supply line cross-sections must be suitable for the rated current. Use a maximum line cross-section of 1.5 mm^2 and a cable diameter of 8 - 10 mm (0.31 – 0.39 inch).

CAUTION **Same Voltage**

The voltage at the clamps for the status must always be the same. Do not mix different voltages at the clamps.

All other signals connect with the included connector.

CAUTION

Supply cable

The power adapter must be suitable for the maximum power input of the device. It must be heat-resistant and must not come into contact with hot surfaces. The power adapter must meet IEC60227 or IEC60245. Or be approved by another recognised testing body.

Run the lines so the insulation will not be damaged. If necessary, secure the lines with suitable means and avoid excess line lengths. The mains supply must be fused according to the specifications under technical data.

We recommend equipping the power and voltage supply with ELCB.

The ELCB (tripping current 30 mA) must shut off the load within the prescribed period (200 ms at 115 VAC, 40 ms at 230 VAC). It must be suitable for the maximum load.

5 Operation and control

NOTICE

The device must not be operated beyond its specifications.

After switching on the system the block temperature will be displayed. The display will flash until the block temperature has reached the set target value (± adjustable alarm range). The status contact is in the temperature alarm position.

Once the target temperature range has been reached, the temperature will continuously be displayed and the status contact switches over.

If the display flashes during operation or an error message appears, please refer to item "Troubleshooting [> page 28]".

Please refer to the technical data for performance data and maximum ratings.

5.1 Start up

Confirm the SCS is correctly mounted and wired and perform the following procedure in order:

Verify the filter (5) cover is correctly closed (tighten clockwise by hand).

Switch on the SCS. The on/off switch (20a) is located on the PS0191 (20c) front panel.

- The cooler fan will turn on.
- The green power LED will illuminate.
- System mode LED (green) “Sample” will light.
- The cooler display (30) shows the system software version for some seconds (e.g. “d2,03”, “n1.13”)
- On initial power up the cooler display (30) will register approximately ambient temperature (blinking), and the temperature alarm LED will be red.

The alarm LED will continue to stay red until the cooler temperature drops to 8 °C (46 °F). When the cooler temperature drops to 8 °C (46°F), the sample pump will come on.

The condensate pump comes on any way.

The SCS is now ready for operation.

5.2 Using the device menu

The rotary switch (28) can also be used for further settings, e.g. cooler temperature.

5.2.1 Use of menu functions

Rotary switch (28) for menu interaction:

Key	Section	Function
Short push	Display	– No function
	Menu	– Select the menu item displayed
	Enter	– Applies an edited value or a selection
Long push	Display	– Keep switch pushed until display changes for seconds to enter device menu
	Menu	– Flip back to initial display
	Enter	– No function
Rotate clockwise	Display	– Set system mode
	Menu	– Move menu, see „Overview of the menu items“
	Enter	– Decrease parameter value
Rotate counter clockwise	Display	– Set system mode
	Menu	– Move menu, see „Overview of the menu items“
	Enter	– Increase parameter value

5.2.2 Lock Menu

Some menus can be locked to prevent inadvertently changing the settings of the unit. This requires setting a code. For information on setting up or disabling the menu lock please refer to "Global Settings" (toP) under menu item toP > Loc.

The menu lock is **not** enabled at the time of delivery, all menu items can be accessed.

5.2.3 Overview of the menu items

When pressing the rotary switch (28) in normal mode, the display will show the prompt codE if the menu is locked. Enter the right code by rotating the rotary switch (28) and accept with a push.

If an incorrect code or no code is entered, the menu will not be unlocked and you will not be able to access all menu items.

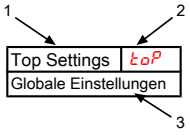
If you forgot the password you can always enter master code 287 to access the menu; the menu will be unlocked.

The following image shows an overview of the menu structure.

Items with a dashed frame will only appear with the respective settings or with the respective status messages.

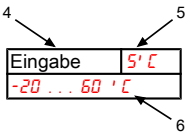
The factory defaults and settings ranges are specified in the overview as well as under the respective menu item. The factory defaults apply unless otherwise agreed.

Menu:

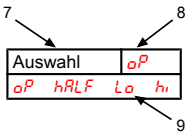


1. Menu designation
2. Display
3. Brief description

Parameter:

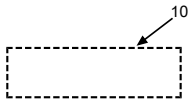


4. Value input
5. Factory preset
6. Parameter range



7. Selecting from the list of values
8. Factory preset
9. Parameter range/selection

Optional menu navigation:



10. dashed box = Optional

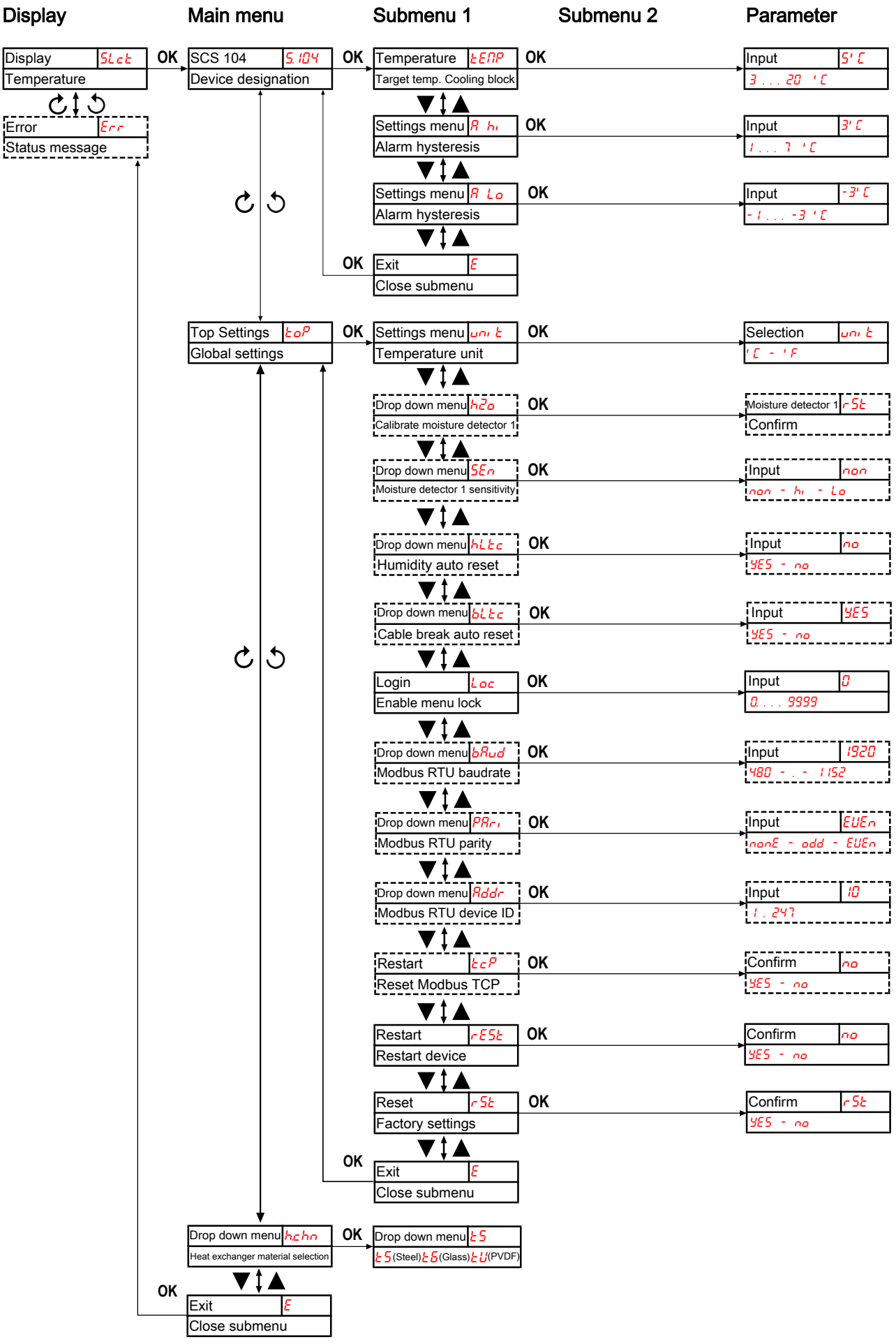


Fig. 1: Menu overview

5.2.4 Description of menu functions

5.2.4.1 Main menu

Cooler of the SCS-system

Display → S. 104

This will take you to the cooler target temperature and the tolerance range setting (alarm threshold).

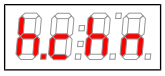
Global setting (ToP Settings)

Display → toP

This menu is used to configure the global cooler settings.

Heat exchanger material selection

Display → hchn

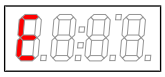


Heat exchanger material selection

Parameter range:	t5 (Steel), t6 (Glass), tU (PVDF)
Factory setting:	t5 (cooler without heat exchanger), or respective material per configuration

Exit main menu

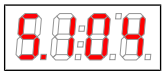
Display → E



Selecting this will return you to display mode.

Cooler of the SCS-system

Display → S. 104



This will take you to the cooler target temperature and the tolerance range setting (alarm threshold).

5.2.4.2 Submenu 1

Target temperature (Temperature)

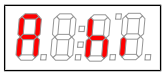
Display → Cooler → tEMP

This setting determines the nominal temperature for the cooler temperature.

Parameter range:	3 °C bis 20 °C (37.4 °F bis 68 °F)
Factory setting:	5 °C (41 °F)
Note:	If the temperature is changed the indicator may blink, until the new operating range has been reached. This menu item is hidden if the keylock is enabled.

upper alarm limit (alarm high)

Display → Cooler → A hi

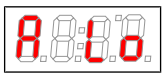


Here you can set the upper threshold for the visual signal and the alarm relay. The alarm limit is set based on the cooler temperature setting.

Parameter range:	1 °C to 7 °C (1.8 °F to 12.6 °F)
Factory setting:	3 °C (5.4 °F)
Note:	This menu item is hidden if the keylock is enabled.

lower alarm limit (alarm low)

Display → Cooler → A Lo

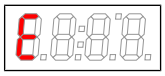


Here you can set the lower threshold for the visual signal and the alarm relay. The alarm limit is set based on the cooler temperature setting.

Parameter range:	-1 °C to -3 °C (-1.8 °F to -5.4 °F)
Factory setting:	-3 °C (-5.4 °F)
Note:	This menu item is hidden if the keylock is enabled.

Exit submenu 1

Display → Submenu → E

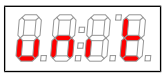


Selecting this will return you to the main menu.

5.2.4.3 Submenu global settings

Temperature unit

Display → toP → unit

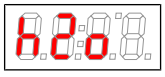


Used to select the temperature display unit.

Parameter range:	C, F
Factory setting:	C

Calibrate moisture detector

Display → toP → h2o (h2o)



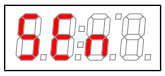
If a moisture detector is installed, calibration can now be performed. To do so, the unit must be flushed with dry gas.

Note:	Calibration was performed at the factory using ambient air. After replacing the moisture detector a calibration is again required. Calibrating the moisture detector will set the menu SEn to hi . This menu will be hidden if the menu is locked.

If the unit has multiple moisture detectors built in, they will be numbered in the menu. In this case, h2o indicates the first, h2o2 the second moisture detector. The same applies to setting the sensor sensitivity in menu SEn.

Moisture detector sensitivity

Display → toP → SEn



If moisture detectors are installed, the sensitivity can be reduced here.

Parameter range:	hi : high sensitivity Lo: low sensitivity non: no moisture detector
Factory setting:	hi
Note:	This menu will be hidden if the menu is locked.

Moisture detector: automatic reset following moisture ingress

Display → toP → hLtc

(hLtc = humidity latch). The setting applies to all connected moisture detectors.

Specifies whether the moisture ingress message must be reset manually or will automatically be reset after the sensor dries.

Parameter range:	YES: The status will be indicated until the user restarts the device and the pumps will be deactivated. no: The status message will automatically be cleared. The pumps will be reactivated again once moisture is no longer detected.
Factory setting:	no
Note:	This menu will be hidden if the menu is locked.

Moisture detector: error cleared automatically after cable break

Display → toP → bLtc

(bLtc = broken wire latch). The setting applies to all connected moisture detectors.

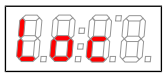
Determines whether the cable break alarm must be reset manually or will automatically clear on valid measuring signal.

Parameter range:	YES: The status will be indicated until the user restarts the device. Clears the error, and the pumps will be deactivated. no: The error message will disappear. The pumps will be switched on again once the moisture detector is reactivated again.
Factory setting:	YES
Note:	This menu will be hidden if the menu is locked.

Lock Menu

To protect the menu from unauthorised use, enter a value for the lock code. Menu items can then only be accessed after entering the correct code.

Display → toP → Loc



This setting will cancel/enable the menu lock.

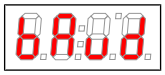
Parameter range:	0 to 9999
Factory setting:	0 (keylock cancelled)
Note:	This menu will be hidden if the menu is locked.

Modbus RTU baudrate

The default transfer rate is 19200 bps. This can be configured for the specific application within a defined range. The options are in the display are listed in kbps (19.2 corresponds to 19200 bps). The properties of the digital interface are not affected when resetting the device to its factory settings!

This menu item is only available on devices with "Digital output Modbus RTU" option.

Display → toP → bAud



Determines the transfer rate for the digital interface.

Parameter range:	4.80 9.60 19.20 38.40 57.60 115.2
Factory setting:	19.20
Note:	This menu will be hidden if the menu is locked.

Modbus RTU parity

The default parity is even/odd, options are odd parity, no parity. The number of stop bits is automatically set based on the respective setting. No parity uses two stop bits, otherwise it is one. The properties of the digital interface are not affected when resetting the device to its factory settings!

This menu item is only available on devices with "Digital output Modbus RTU" option.

Display → toP → PAr.

This setting restores the factory settings.

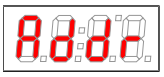
Parameter range:	nonE odd EVEn
Factory setting:	EvEn
Note:	This menu will be hidden if the menu is locked.

Modbus RTU device ID

Selecting the device ID for communication via digital interface. The ID can be any within a defined range, the default is 10. The properties of the digital interface are not affected when resetting the device to its factory settings!

This menu item is only available on devices with "Digital output Modbus RTU" option.

Display → toP → Addr



Defines the ID.

Parameter range:	1 247
Factory setting:	10
Note:	This menu will be hidden if the menu is locked.

Restart Modbus

Resets the Modbus TCP interface to its factory settings.

The properties of the digital interface are not affected when restoring the device to its factory settings!

Factory settings

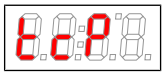
IP: 192.168.15.168

Subnet: 255.255.254.0

Gateway: 192.168.15.1

DHCP: Enabled

Display → toP ↴ tcP



Only relevant for devices with Modbus TCP interface

Parameter range:	YES: Reset interface. no: Exit menu without reset.
Note:	The user settings will be saved.

Restart

Display → toP → rESt

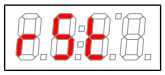
(rESt = restart)

The device will restart, all settings are saved. All error messages will be reset.
The moisture detector will be reset, irrespective of the settings in menus hi tc and hno .

Parameter range:	YES: Restart. The display will show the software version for the device and returns to measurement display. no: Exit menu without restarting.
Note:	The user settings will be saved.

Factory settings

Display → toP → rSt

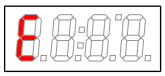


This setting restores the factory settings.

Parameter range:	YES: factory settings restored. no: Exit menu without making changes.
Factory setting:	no
Note:	This menu will be hidden if the menu is locked.

Exit submenu 1

Display → Submenu → E



Selecting this will return you to the main menu.

5.3 Using the Digital Interface

The Modbus interface enables direct access to process and diagnostic data and parameters during operation.

The cooler therefore takes on the role of the slave in communication.

The device optionally comes with a Modbus RTU, or a Modbus TCP port.

Modbus RTU:

The digital interface on this device is a Modbus RTU protocol, which physically communicates via RS485 (2-wire). It connects via the D-Sub9 port (43) at the back of the device. For the pin assignment, see chapter Figure 2: Pin assignments [> page 38] .

Modbus TCP:

Connects at the back of the device via RJ45 port (44).

5.3.1 Modbus RTU configuration

The settings below are the defaults; the parameters can be adjusted if the interface is enabled.

1 start bit

8 data bits

1 parity bits (configurable)

1 stop bit (*)

Baudrate: 19200 bps (configurable)

Device ID: 10 (configurable)

(*) The length of a Modbus frame is always 11 bit, configuring the interface at 0 data bits automatically changes the number of stop bits to 2.

5.3.2 Modbus TCP configuration

The settings below are the defaults; the parameters can be adjusted if the interface is enabled.

The interface can be reset to the factory settings at any time using the "tcp" menu. When using Modbus TCP, the Modbus RTU settings (baudrate 19200 bps, parity even, ID 10) are used to communicate with the installed TCP module and must not be changed.

IP: 192.168.15.168

Subnet: 255.255.254.0

Gateway: 192.168.15.1

DHCP: Enabled

5.3.3 Modbus Communication

Communication via Modbus RTU is always imitated by the master (request). The slave (typically) responds to the request with a response. A Modbus RTU frame for a request/response always has the following structure:

Address field (A)	Function code (FC)	Data	CRC
1 byte	1 byte	1 ... 252 bytes	2 bytes

Register addresses and data are transferred in Big Endian format.

Every register stands for a 16 bit value, with the information represented in various data types. The data type and required function code are assigned to the respective registers in the following tables.

To read/write data types with sizes larger than an individual register, multiple registers must be addressed.

Supported function codes:

Function code (FC)	FC values
Read Holding Registers	3
Write Multiple Registers	16

Data types:

Description	Number of bytes	Number of registers
Float	4	2
Int16	2	1
Uint16	2	1
Int32	4	2
Uint32	4	2

5.3.4 Modbus Register

Description	FC	Address	Access	Data type	Default	Min	Max	Selection	Resolution	Unit
Block temperature measurement	3	2000	R	Float	-	-	-	-	0.5	°C
Block temperature status	3	2002	2	R	Uint32	-	-	Bit 0 := Error Bit 1..15 := Reserved Bit 16 := Sensor not calibrated Bit 17 := Initialization / measurement invalid Bit 18 := Stabilization phase Bit 19 := not used Bit 20 := Measurement outside target range Bit 21..31 := not used	0.5	°C
Block temperature setpoint	3, 16	5000	R/W	Float	5.0	3.0	20.0	-	0.5	°C
Positive alarm tolerance setpoint	3, 16	5002	R/W	Float	3.0	1.0	7.0	-	1.0	K
Negative alarm tolerance setpoint	3, 16	5004	R/W	Float	-3.0	-3.0	-1.0	-	1.0	K
Signal store Moisture detector error	3, 16	9002	R/W	Uint16	2	-	-	1 := No 2 := Yes	-	-
Signal store Moisture alarm	3, 16	9003	R/W	Uint16	1	-	-	1 := No 2 := Yes	-	-
Sensitivity moisture detector 1	3, 16	9004	R/W	Uint16	(with FF) (without FF)	-	-	0 := Sensitivity low 1 := Sensitivity high 2 := Moisture detector inactive	-	-
Display unit selection	3, 16	9006	R/W	Uint16	1	-	-	1 := °C 2 := °F	-	-
Heat exchanger type selection	3, 16	9007	R/W	Uint16	2	-	-	2 := Steel 3 := Glass 4 := PVDF	-	-
Modbus Baudrate selection	3, 16	9009	R/W	Uint16	3			1 := 4800 2 := 9600 3 := 19200 4 := 38400 5 := 57600 6 := 115200		
Modbus Parity selection	3, 16	9010	R/W	Uint16	2			0 := None 1 := Odd 2 := Even		
Modbus Device address selection	3, 16	9011	R/W	Uint16	10	1	247	-	1	-
Lock menu	3, 16	9012	R/W	Uint16	0	0	9999	-	1	-

Description	FC	Address	Access	Data type	Default	Min	Max	Selection	Resolution	Unit
Front panel gas path selection	3	9901	R	Uint16	0x4000	-	-	0x8000 := Blowback 0x4000 := Sample 0x2000 := Zero Air 0x1000 := Span 1 0x0800 := Span 2 0x0400 := Span 3 0x0200 := Span 4 0x0100 := Span 5 0x0080 := Span 6	-	-
External inlet gas path selection	3	9902	R	Uint16	0x0000	-	-	0x8000 := Blowback 0x4000 := Sample 0x2000 := Zero Air 0x1000 := Span 1 0x0800 := Span 2 0x0400 := Span 3 0x0200 := Span 4 0x0100 := Span 5 0x0080 := Span 6	-	-
Modbus gas path selection	3	9903	R/W	Uint16	0x4000	-	-	0x8000 := Blowback 0x4000 := Sample 0x2000 := Zero Air 0x1000 := Span 1 0x0800 := Span 2 0x0400 := Span 3 0x0200 := Span 4 0x0100 := Span 5 0x0080 := Span 6	-	-
IP address	3, 16	9950	R/W		Uint32	0xC0A80FA8	0x00			
Subnet	3, 16	9952	R/W		Uint32	0xfffffe00	0x00			
IP gateway	3, 16	9954	R/W		Uint32	0xC0A80F01	0x00			
DHCP	3, 16	9956	R/W		Int16	1		0 := Disable 1 := Enable		
TEST	3	9990	R	Uint32	12648430	-	-	-	1	-
TEST_UINT16	3, 16	9992	R/W	Uint16	206	0	65535	-	1	-
TEST_INT16	3, 16	9993	R/W	Int16	-206	-32768	32767	-	1	-
TEST_UINT32	3, 16	9994	R/W	Uint32	2766	0	4294967295	-	1	-
TEST_INT32	3, 16	9996	R/W	Int32	-2766	0x80000000	0x7fffffff	-	1	-
TEST_Float	3, 16	9998	R/W	Float	-10.5			-	-	-

Description	FC	Address	Access	Data type	Default	Min	Max	Selection	Resolution	Unit
Status register overview	3	10000	R	Uint16	0	-	-	Bit 0 := Status information register 10001 Bit n := Status information register 10000 + n + 1	-	-
Condition code register 1	3	10001	R	Uint16	0	-	-	Bit 0 := Device status Bit 1 := Device in error status Bit 2 := Set temperature range overrun Bit 3 := Set temperature range underrun Bit 4 := Bit 5 := Bit 6 := Moisture detector 1 connected Bit 7 :=	-	-
Condition code register 2	3	10002	R	Uint16	0	-	-	Bit 0 := Bit 1 := Bit 2 := Initialization phase Bit 3 := Bit 4 := Bit 5 := Bit 6 := Moisture detector 1 moisture alarm Bit 7 :=	-	-
Condition code register 3	3	10003	R	Uint16	0	-	-	-	-	-
Condition code register 4	3	10004	R	Uint16	0	-	-	-	-	-
Error register 1	3	10005	R	Uint16	0	-	-	Bit 0 := Display communication error Bit 1 := Controllerboard communication error Bit 2 := Bit 3 := Controllerboard configuration error Bit 4 := Bit 5 := Bit 6 := Bit 7 := Generell software error	-	-
Error register 2	3	10006	R	Uint16	0	-	-	Bit 0 := Bit 1 := Ring initiator range overrun Bit 2 := Ring initiator range underrun Bit 3 := Bit 4 := Bit 5 := Bit 6 := Bit 7 :=	-	-
Error register 3 - moisture detector 1	3	10007	R	Uint16	0	-	-	Bit 0 := Bit 1 := Bit 2 := Cable break Bit 3 :=	-	-

Description	FC	Address	Access	Data type	Default	Min	Max	Selection	Resolution	Unit
								Bit 4 := Bit 5 := Bit 6 := Bit 7 :=		
Error register 4	3	10008		Uint16	0	-	-	-	-	-
Error register 5 - PT100.1	3	10009	R	Uint16	0	-	-	Bit 0 := General error Bit 1 := Short-circuit / temperature low Bit 2 := Cable break / temperature high Bit 3 := Measurement fluctuation Bit 4 := Bit 5 := Bit 6 := Bit 7 :=	-	-
Error register 6	3	10010	R	Uint16	0	-	-	-	-	-
Error register 7	3	10011	R	Uint16	0	-	-	-	-	-
Error register 8	3	10012	R	Uint16	0	-	-	Bit 0 := Controllerboard hardware error Bit 1 := Relaisboard 1 communication error Bit 2 := Relaisboard 2 communication error Bit 3 := Relaisboard 3 communication error Bit 4 := Cooler communication error Bit 5 := Pump switching error Bit 6 := Bit 7 := Component error	-	-
Error register 9	3	10013	R	Uint16	0	-	-	-	-	-
Error register 10	3	10014	R	Uint16	0	-	-	-	-	-
System run time	3	10100	R	Float	-	0	-	-	6 min	h
Restart device / reset device	16	11000	W	Uint16	0x00	-	-	96 := Reset Modbus TCP factory settings (applied immediately) 86 := Restart device 17:= Factory reset		
Reset moisture detector 1	16	11002	W	Uint16	170	-	-	-		
Refresh TCP	16	11007	W	Uint16	-	-	-	1:= Refresh	-	-

Example:

Register 5000 = 0x1388

Read block temperature set values

	A	FC	Start register HI	Start register LO	No. register HI	No. register LO		CRC	CRC
Request	0x0A (10)	0x03 (3)	0x13	0x88	0x00 (0)	0x02 (2)		0x41	0xDE
	A	**FC**	**No. of byte**	**DATA 3**	**DATA 2**	**DATA 1**	**Data 0**	**CRC**	**CRC**
Response	0x0A (10)	0x03 (3)	0x04	0x40	0xA0	0x00	0x00	0x55	0x11

5.4 Manual operation of the SCS (front panel module CM0193)

The active gas path is selected with the rotary switch (28). Calibration gas flow is selected by rotating the mode switch to the desired span position as indicated by the system mode LED (29). The condition "Sample" starts active after start of the system.

To enter device menu push rotary switch (28) for some seconds until display (30) shows “S.104”.

5.5 Monitoring system operation on the controller module (front panel module CM0193)

The controller module (24) contains the display (30) for the current cooler temperature. The temperature shown in the display is that of the cooling block which is nearly identical to the cooler gas outlet temperature and therefore, the outlet dew point. If the cooler temperature rises above 8 °C (46 °F), the sample gas pump will stop.

On the left side of the CM0193 panel are the alarm LEDs for temperature moisture and flow.

If moisture is detected by the moisture sensor (4), the moisture alarm LED is illuminated, and the sample gas pump is turned off.

The Flow LED turns red, if the flow at flowmeter 8a is below the alarm level. For correct monitoring the flow has to cross the level once.

5.6 External control

To control the SCS externally, the switch (28) must the in the "Measure" position. The external controller is disabled in all other switch positions.

You will then have 8 inputs (40) available at the back which are identical to the switch positions "Blowback", "Calibrating gas", "Span gas 1", "Span gas 2", "Span gas 3", "Span gas 4", "Span gas 5" and "Span gas 6". To control the respective gas path, the contacts must be shorted with a NO contact. Meaning if no contact is closed, the system will be in "Measure" mode.

If multiple contacts are accidentally closed at the same time, only one status will be applied.

With the priority being:

1. BLOWBACK
2. Zero Gas
3. Span 6
4. Span 5
5. Span 4
6. Span 3
7. Span 2
8. Span 1

For example: if the inputs Span 2 and Span 5 are accidentally controlled at the same time, the system will apply Span 5 mode.

5.7 External monitoring

The mode and status of the SCS can be monitored by external devices. All outputs are dry contact and are available during both manual and sample (external control).

The system mode contacts are available at the mode output terminal block (41). A closed contact indicates the corresponding mode is activated. If no contacts are closed and the mode switch is in the sample (external control) position, the SCS is in the sample mode.

The status output contacts are available at the status output terminal block (42). The sample gas path activity is defined by the status of the cooler, flow and moisture detector. In normal operation the alarm status contacts for the cooler and moisture detector are open. Contact closure indicates moisture has been detected, or the cooler has failed.

5.8 Access via Modbus

On devices with Modbus RTU/Modbus TCP option, process data can be read out and device settings configured. Except for the gas path selection, all types of entry have the same priority, i.e. the respective last entry is applied. You will find a list of available registers in chapter Modbus Register [> page 20].

5.8.1 Accessing gas paths

The system status can be both read and set via the digital interface. The gas path can only be changed over via Modbus if both the manual settings as well as the external switchover are set to "Measure" or the channel will not be changed. The actual active gas path can always be read. The internal priority circuit of the gas paths corresponds to that for external switchover.

5.8.2 Accessing device parameters

All configuration options in the menu can also be accessed via Modbus. The Modbus settings (baudrate, parity, device ID) are not affected when resetting the device (via menu or Modbus).

5.8.3 Process data

Process data includes measurements, statuses, regulator load and operating time, which can all only be read, not changed. The statuses correspond to the existing status relays, signal LEDs and display messages but also provide some more detailed information. The load of the cooler regulator as well as the run time of the cooler and the entire system can only be retrieved via Modbus. The device run time of the cooler is always updated when the device is switched on.

5.9 Flow Meter Operation

The flow meters have a range of 50..500 L/h. The flow can be controlled with the built-in valves.

The flow meters are calibrated for air at 20 °C (68 °F) and 1.2 bar (17.4 psi) abs. Actual values may therefore vary when using other calibrating and sample gases.

5.10 Pressure regulators and gauges

Blowback air pressure is controlled by a regulator (18) on the front panel. To adjust the pressure pull the regulator knob out to unlock it and turn counter clockwise to decrease the pressure or clockwise to increase the pressure. When the desired pressure has been obtained, push the knob in to lock it.

The set value is shown on a gauge (19).

6 Maintenance

The following routine maintenance is required:

- **Peristaltic pump:** Check hoses
- **Filter:** Check filter element
- **Moisture detector:** Calibrate moisture detector

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

Problem/malfunction	Possible cause	Action
No display	– Mains voltage interrupted	– Connect to mains; check the plug is correctly inserted
	– Fuse defective	– Check fuse and replace, if necessary
Cooler display doesn't light up	– Cooler or electronics defective	– Service call
Cooler doesn't start up	– Cooler defective	– Service call
No or low flow rate in the gas path	– Filter clogged	– Change filter
	– Gas inlet or outlet clogged or disconnected; pressure or pressure difference on the suction end too high	– Check lines
Moisture detector indicates moisture with cooler at operating range	– Water inside unit	– Sample gas contains condensation water. Install a pre-separator
	– Condensate pump hose defective	– Replace hose
No or low calibrating gas flow.	– No gas being supplied	– Supply calibrating gas
	– Primary pressure low	– Increase pressure
	– Valve on flow meter closed	– Open valve
Calibrating gas flow high	– Excessive primary pressure	– Reduce pressure
No or low blowback	– No air supply	– Connect air
	– Primary pressure low	– Increase primary pressure
	– Blowback regulator closed	– Open regulator
Modbus communication error	– Bus connection fault	– Check electrical connections
	– Line termination fault	– Check bus line
	– Check bus configuration	– Check/reset configurator

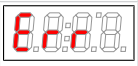
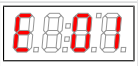
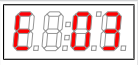
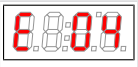
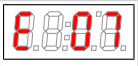
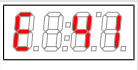
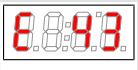
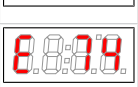
If several errors occur, please contact Bühler Technologies GmbH Service.

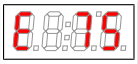
7.1.1 Error messages on the display

If an error occurs, the display will read "Err". Press the rotary switch to show the error number(s).

Error messages will appear until the unit has been restarted or the error is cleared using the "Func" button. It can only be cleared if the cause for the error has been corrected.

Causes/Action: The following is a list of the most common causes and actions for the respective error. If the actions listed do not resolve the problem, please contact Service.

Problem/Malfunction		Possible cause	Action
No display		– No voltage – Loose connecting cable – Display defective	– Check the supply cable – Check fuse – Check connections
 (permanent)	D1.02	(The software version for the display will appear). – Not communicating with the controller	– Check connections
	Error	– An error has occurred	– Read the error number as described above
	Error 01	– Controller malfunction	– Clear error (temporary fault) – Disconnect from power for approx. 5 s – Contact service
	Error 03	– Microcontroller Fault/MCP2	– Contact service
	Error 04	– EEPROM error	– Contact service
	Error 07	– Internal software conflict	– Check version status
	Error 11	– Ring initiator error	– Check cabling/contact service
	Error 12	– Ring initiator error	– Check cabling/contact service
	Error 22	– Moisture detector 1 cable break	– Check moisture detector line – Check moisture detector
	Error 32	– Moisture detector 2 cable break	– Check moisture detector line – Check moisture detector
	Error 40	– General error temperature sensor 1	– Sensor possibly defective
	Error 41	– Low temperature/short-circuit temperature sensor 1	– Check temperature sensor connection
	Error 42	– Excess temperature/short-circuit temperature sensor 1	– Check temperature sensor connection
	Error 43	– Measurement fluctuation temperature sensor 1	– Check temperature sensor connection
	Error 70	– Hardware error front panel module CM0193	– Switch off device and check CM0193 connection – When permanent error replace module
	Error 71	– Relay board failure 1	– Switch off device and check connection – When permanent error replace module
	Error 72	– Relay board failure 2	– Switch off device and check connection – When permanent error replace module
	Error 73	– Relay board failure 3	– Switch off device and check connection – When permanent error replace module
	Error 74	– Communication error cooler – Connection cable loose	– Restart of the device – Check the cooler connections

	Error 75	– Rotary switch for pump broken/contact problems – Relay board in wrong position	– Check connections of the relay board and the rotary switch
	Error 77	– Component failure	– Contact service

Status text		Possible cause	Action
	H2o.1	– Moisture alarm moisture detector 1	– Dry – Check condensate trap
	init	– Initialisation phase	– Wait
 (Flashing)		– Excess/low temperature	– see chapter “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.

CAUTION

Health hazard if the heat exchanger leaks

The heat exchanger is charged with glycol-based coolant.
In the event of a heat exchanger leak:

a) Avoid contact with the skin and eyes.

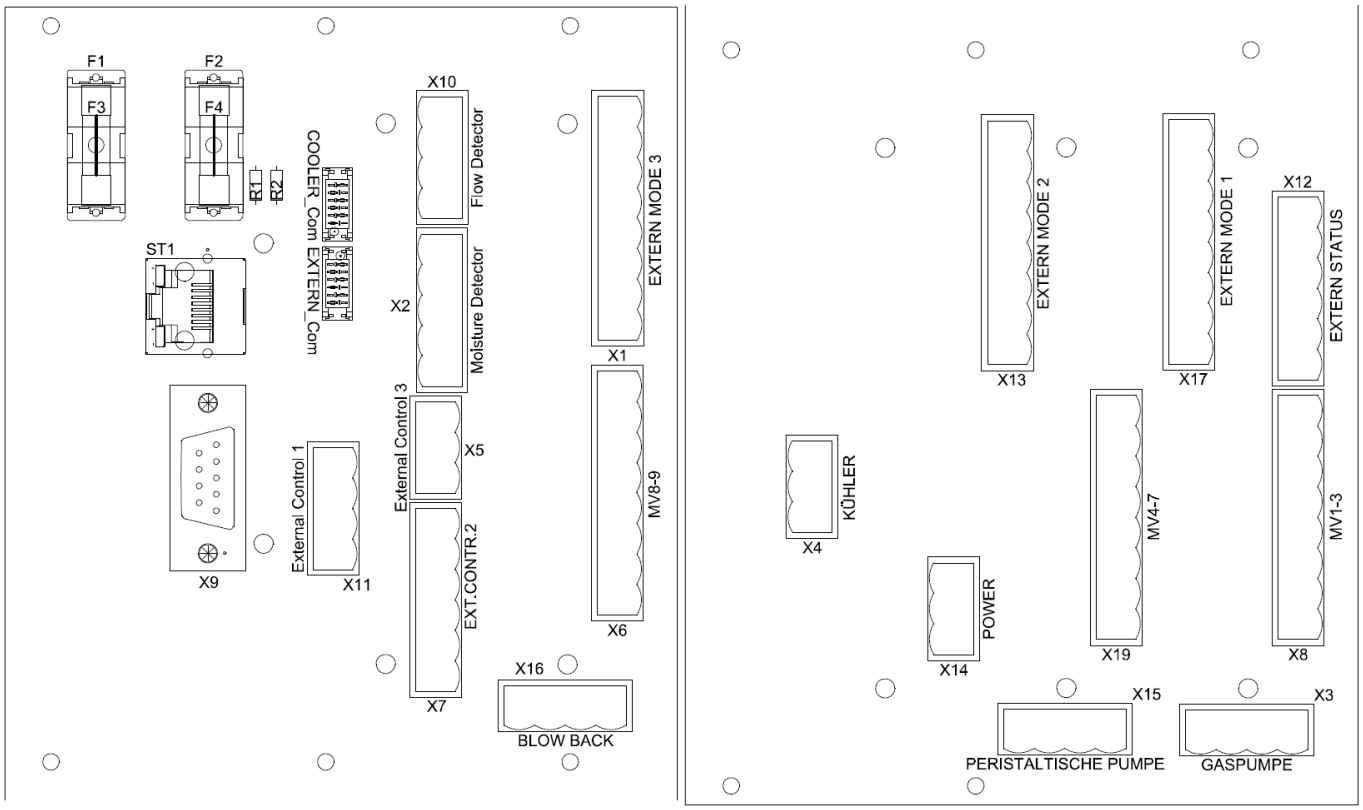
b) In the event of a leak, do not restart the cooler under any circumstances The cooler must be repaired by the manufacturer.

7.3 Replacing the Fuse in the Front Panel

- Switch off mains plug.
- Unscrew the fuse cover counter-clockwise and remove the defective fuse.
- Install a new fuse (see Figure 3: Front view [> page 39], 20b) in the cover and reinstall the cover.

7.4 Replacing the fuse (F1) from the gaspumps

- Switch off mains plug.
- Unscrew the top cover from the housing.
- Take off the cover from the fuse (F1) from the gaspump.
- Install the new fuse (see Spare parts and accessories [> page 33], F1) in the fuseholder.
- Recover the fuse and the cover from the housing.



7.5 Replacing the fuse (F2) from the peristaltic pumps

- Switch off mains plug.
- Unscrew the top cover from the housing.
- Take off the cover from the fuse (F2) from the peristaltic pump.
- Install the new fuse (see Spare parts and accessories [> page 33], F2) in the fuseholder.
- Recover the fuse and the cover from the housing.

7.6 Replacing the Peristaltic Pump Hose

- Close gas supply.
- Switch off device and disconnect all plugs (e.g. connector plug alarm output, supply input, etc.).
- Disconnect supply and discharge tube on peristaltic pump (**observe safety notes!**).
- Loosen but do not remove centre knurled nut on the hammer-head screw. Flip down screw.
- Pull cover up and off.
- Unplug external connections and remove hose.
- Replace hose (Bühler spare part) and install peristaltic pump in reverse order.
- Restore the power and gas supply.

7.7 Replacing the filter element

CAUTION	Gas leakage
	The filter should not be dismantled under pressure. Don't use damaged parts again.

- Twist off the filter cover counter-clockwise.
- Remove the filter element and insert a new one.
- Check for leaks and replace, if necessary.
- Twist on filter cover clockwise and tighten hand-tight.
- Perform a leak test with suitable means.

NOTICE! Please observe legal regulations when disposing of filter elements.

7.8 Replace Flowmeter module

- Close gas supply.
- Switch off device and disconnect all plugs (e.g. connector plug alarm output, supply input, etc.).
- Unscrew the top cover from the housing.
- Loosen all screws from the flowmeter module GM0392 and pull out the module.
- Mark the hoses at the flowmeters and remove them.
- Place the cable of the ring sensor through the housing to the upper end of the backplane and put the hoses on the extension module DK46 SCS 104 the same way they were removed.
- Mount the extension module in the front.
- Remove the resistor from plug X10 (see picture in chapter Replacing the fuse (F1) from the gaspumps) and mount the cables instead (polarity unimportant).
- Recover the top cover from the housing.
- Restore the power and gas supply.
- Attach the type plate to a suitable location on the back of the device.

7.9 Install Extension module gaspump

- Close gas supply.
- Switch off device and disconnect all plugs (e.g. connector plug alarm output, supply input, etc.).
- Loosen the screws on the top cover and put cover aside.
- Mark tubes on gas pump, disconnect and put aside.
- Align the baseplate and pump the same as the installed parts and assemble in the same direction.
- Mount the baseplate with pump to spacer bolts.
- Attach T-pieces to tubes and connect the gas inlet and outlet of both pumps to the T-pieces with the PTFE tube supplied.
- Run the line to the X3 plug (see image chapter Replacing the fuse (F1) from the gaspumps) and connect: attach a ferrule to line 1 and connect to pin 1, attach a twin wire ferrule to line 2 and connect to the installed 2 to pin 2 and attach another to PE and connect with the installed PE.
- Loosen all screws on relay module RB0292 and slide the module out of the device. Remove the dummy plug from the front panel and insert the supplied switch in the opening. Connect the line to the board with a terminal the same as the installed one.
- Reinsert the relay module in the device and fasten with all screws.
- Secure the housing cover with all screws.
- Restore the power and gas supply.
- Apply the type plate in a suitable location on the back of the device.

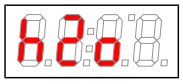
7.10 Drying the Moisture Detector

The moisture detector must be dried if moisture enters.

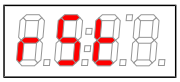
- Close the gas supply.
- Switch off and unplug the device.
- Loosen the swivel nut for the moisture detector connection line and disconnect the line.
- Unscrew the moisture detector counter-clockwise and remove.
- Dry moisture detector.
- Reinsert the moisture detector and carefully tighten the screw connection.
- Connect the connection line and tighten the swivel nut.
- Restore the power and gas supply.

7.11 Calibration of the moisture detector

- When replacing the moisture detectors, they must be recalibrated.
- Be sure dry gas flows through the cooler.
- Select cooler menu and confirm.



- Select menu item moisture detector.



- The display shows (Reset).
- Confirm the display to calibrate the moisture detectors.

For a detailed overview of menu navigation, refer to chapter "Operation and Control".

7.12 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:

Item no.	Description
91 100 00 051	Front plate microfuse, 5 x 20 mm, 4 A delayed action
91 100 00 010	Sample gas pump microfuse F1, 5 x 20 mm, 1,6 A delayed action
91 100 00 040	Peristaltic pump microfuse F2, 5 x 20 mm, 0,125 A delayed action
41 11 100	Moisture detector FF-3-N, without cable

7.12.1 Spare parts and accessories

Item no.	Description
41 15 0010	Filter element FE-E1, package of 5 pcs.
90 09 162	O-ring for filter AGF-FE-1
4492 0035 012	Norprene replacement hose with angled connections for peristaltic pump 0.3 L/h
CS9X PM E0111	Extension module gas pumps for SCS 104
CS9X GM E0391	Extension module flow meter DK46 for SCS 104

8 Disposal

The refrigerant circuit of the cooler contains R134a refrigerant. The heat exchanger is charged with glycol-based coolant.

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

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

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

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

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

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

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

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

9 Appendices

9.1 Technical Data

Gas paths	
Number of outputs	1 sample gas, 1 bypass
Calibrating Gases	6 calibrating gases + zero gas with common output
Materials in contact with media	PTFE, stainless steel, Norprene, PVDF, PP, PC. Viton, glass fiber, epoxy resin, borosilicate glass
Maximum sample gas and SpanGas 1..6 pressure and zero gas	1.5 bar abs. (21.7 psi abs.)
Maximum blow back pressure	10 bar abs. (145 psi abs.)
Gas connections	Bulkhead fittings (stainless steel) for 1/4“ tube
Free flow rate	550 l/h 350 l/h (at –150 mbar rel. at inlet and +120 mbar rel. at outlet)
Dead volume	approx. 100 cm^3

Electrical specifications	
Electrical control connections	Switched by contact, common supply
Electrical outputs max.	230 VAC/150 VDC; 0,5 A; 50 VA, potential-free
Power supply (see type plate)	230 V/50 Hz or 115 V/60 Hz
Power input	max. 500 VA
Control input connection	Terminal plug 16-pin, included
Output mode connection	Terminal plug 16-pin, included
Status outputs connection	Terminal plug 8-pin, included
Modbus RTU connection	D-Sub9 socket, not included
Modbus TCP connection	RJ45
Power connection	M3-Stecker, included

Cooler Data	
Cooling capacity at 25 °C/77 °F (40 °C/104 °F) [1)]	360 (100) kJ/h
Maximum flow rate [1)]	400 l/h
Max. gas inlet temperature [1)]	180 °C (356 °F)
Max. inlet dew point (@1bar abs)	80 °C (176 °F)
Ambient temperature [1)]	5...50 °C (41...122 °F)
Outlet dew point	5 °C (41 °F)
Dew point stability static	0.1 ºC (0.2 º F)

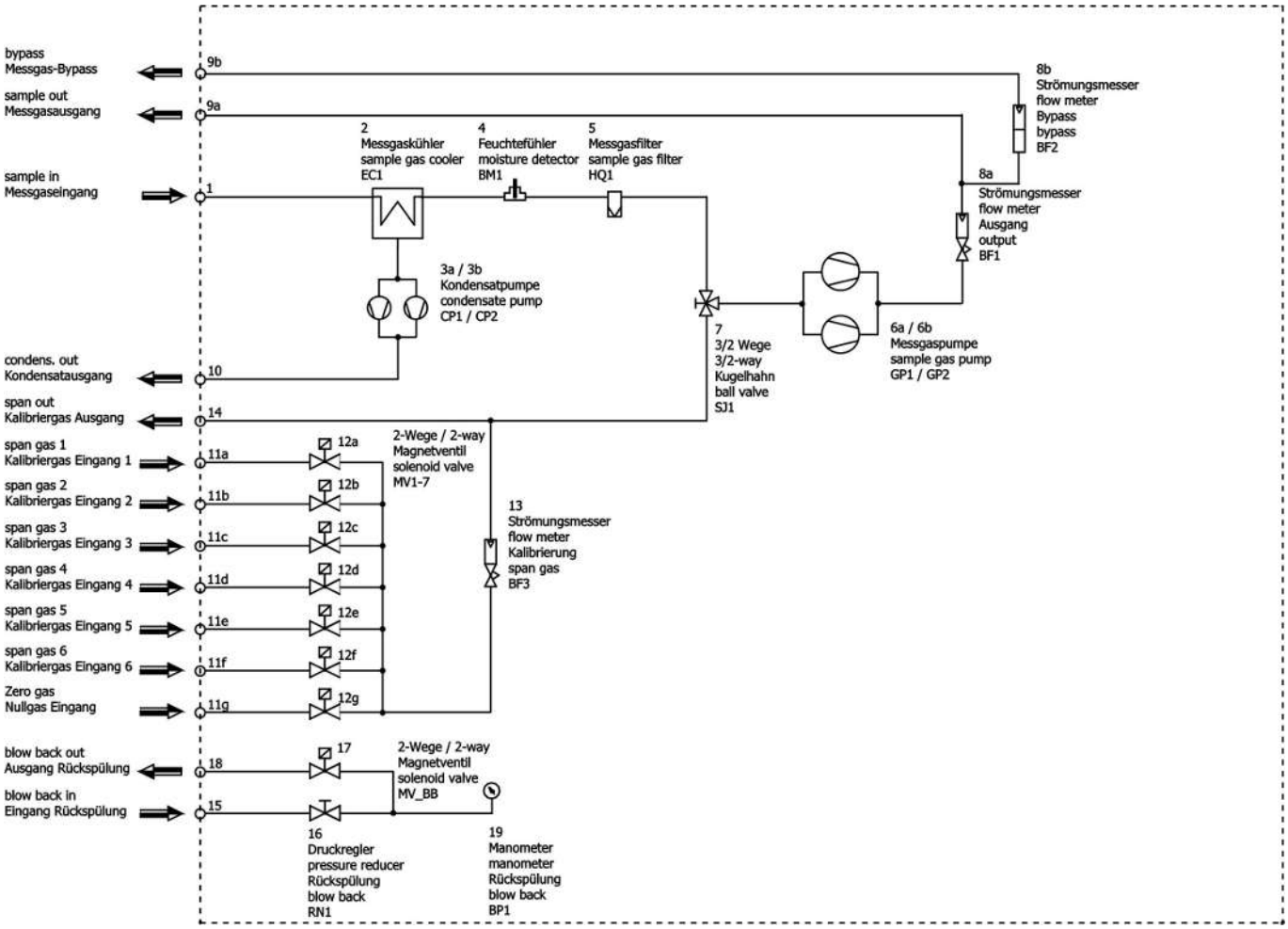
[1)] The real limits depend in a rather complicated manner on a) the ambient temperature and therefore the cooling capacity and b) on the heat exchanger material and the gas parameters themselves. If you need further information on the subject, look into the help chapter of our cooler application program.

General Data	
Dimensions (height x depth)	6 HE x 540 mm
Weight (varies by version)	28 kg (62 lbs)
Ready for use after max.	15 min
IP rating	IP 20

9.2 Legend

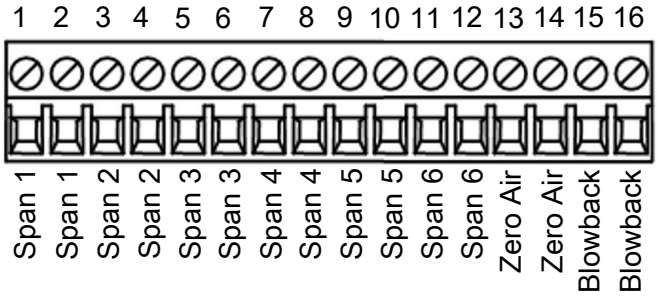
Pos.	Description
1	Sample gas inlet
2	Cooler
3a	Condensate pump (peristaltic pump)
3b	Redundant condensate pump
3c	Switch for condensate pump selection
4	Moisture sensor
5	Filter
6a	Sample pump
6b	Redundant sample pump
6c	Switch for sample pump selection
7	Manual sample – calibration valve
8a	Sample flow meter
8b	Bypass flow meter
9a	Sample outlet
9b	Bypass outlet
10	Condensate outlet
11a..g	Calibration gas inlets + zero gas
12a..g	Calibration gas solenoid valves + zero gas
13	Calibration gas flow meter
14	Calibration gas outlet
15	Blowback air inlet
16	Blowback air pressure regulator
17	Blowback air solenoid valve
18	Blowback air outlet
19	Blowback air pressure gauge
20	Power supply PS0191
20a	On/Off-Switch
20b	Main fuse on PS0191
20c	Signal LED PS0191
21, 22	Relay board RB0191
23	Relay board RB0291 with switches 3c and 6c
24	Controller module CM0193
25	LED temperature alarm
26	LED moisture alarm
27	LED flow alarm
28	Rotary switch (mode switch)
29	System mode LEDs
30	Display for temperature monitoring and device menu
40	El. inputs external control
41	El. outputs system mode
42	El. outputs system status
43	Digital Communication D-Sub 9pol.
44	Digital Communication RJ45
45	Power supply plug

9.3 Drawing 1: Flow chart



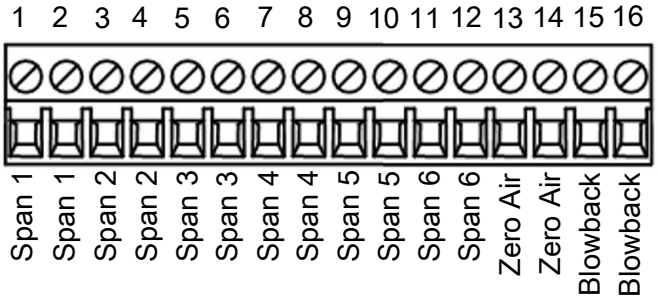
9.4 Figure 2: Pin assignments

Ext. control



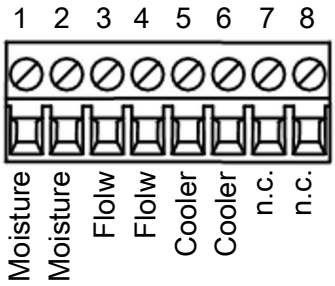
40

Mode output



41

Status output



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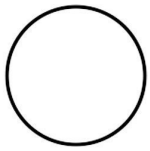
Comm. output

44



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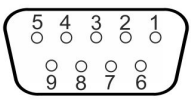
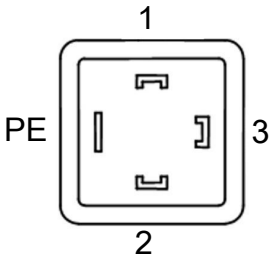
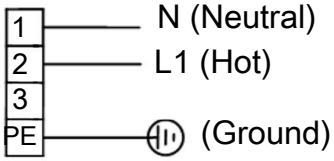


Pin	Beschreibung
1	Common
5	Signal B
9	Signal A

POWER



115/230 VAC Power



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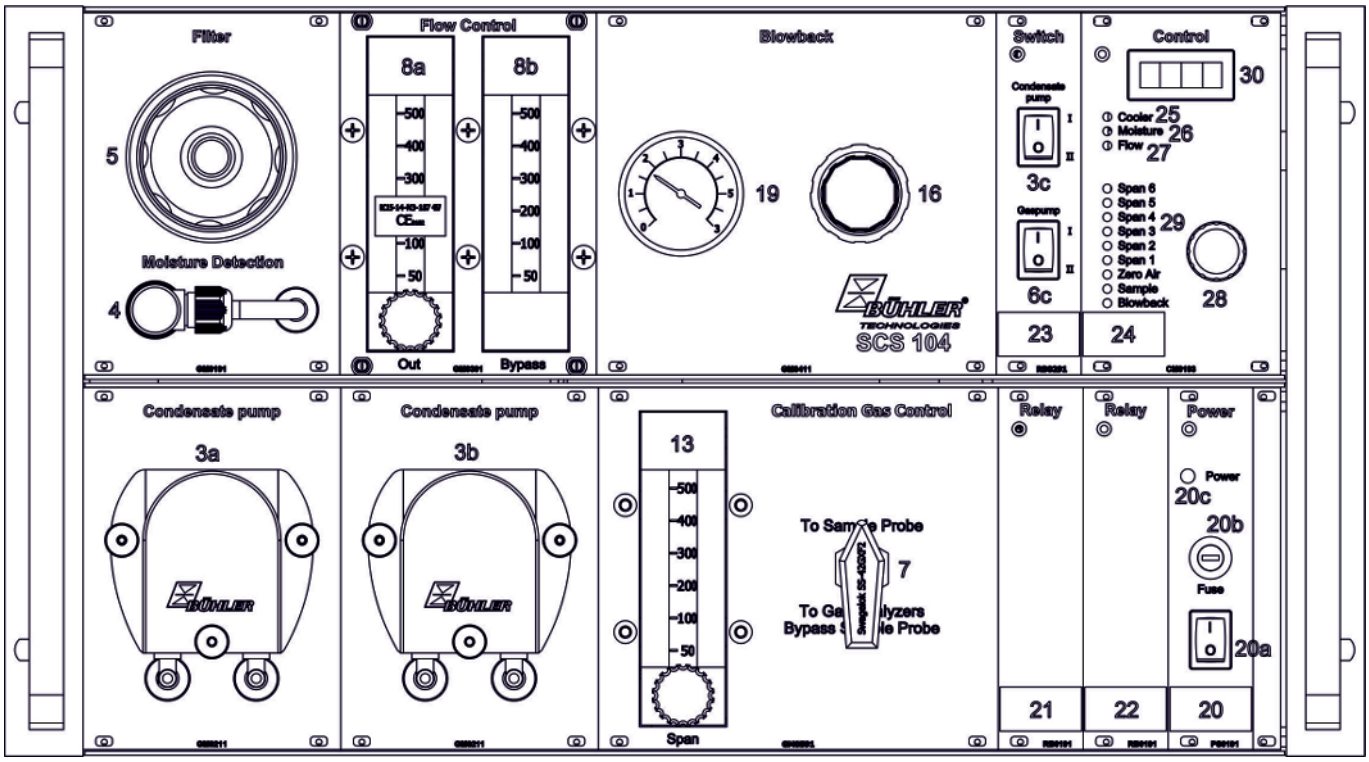
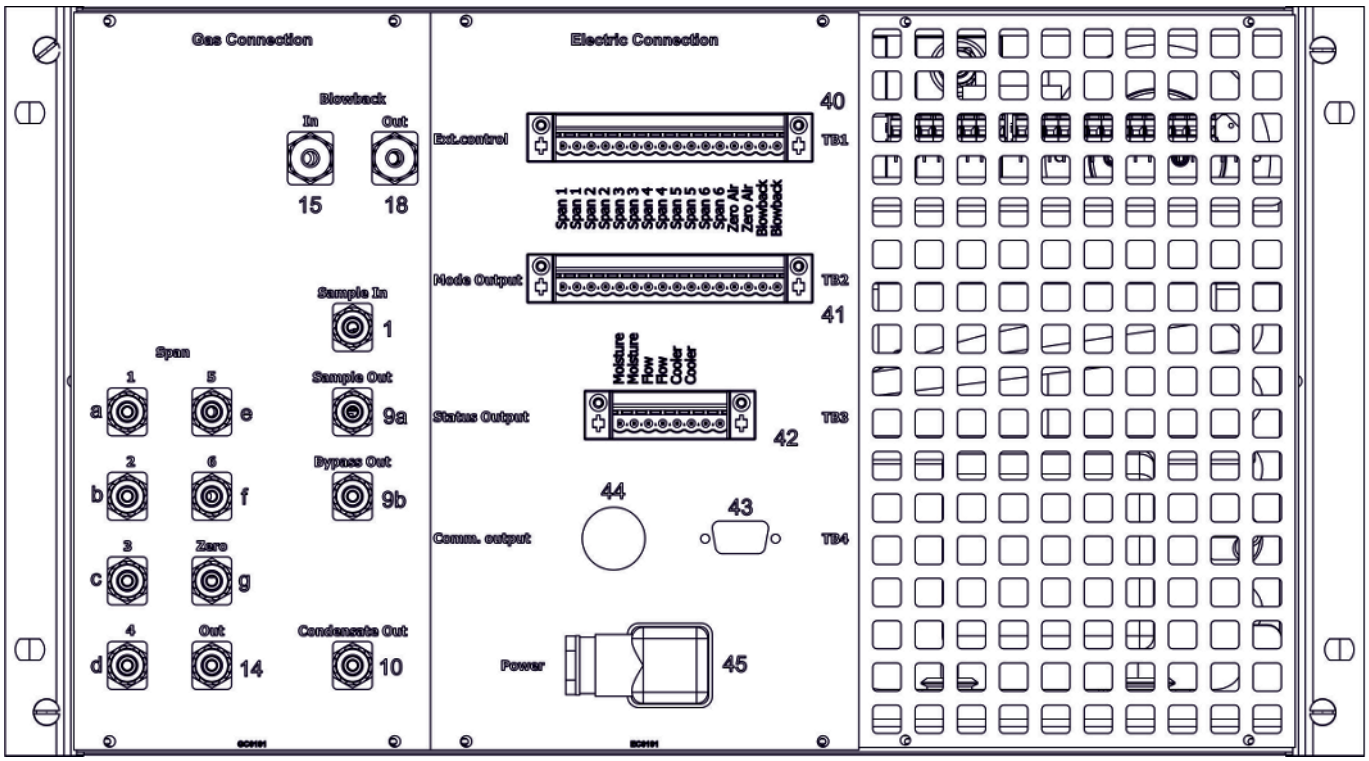
9.5 Figure 3: Front view



9.6 Figure 4: Rear view



10 Attached documents

- Declaration of Conformity KXCS00009
- Operating Instructions Filter
- Operating Instructions Peristaltic Condensate Pumps
- RMA - Decontamination Statement

EU-Konformitätserklärung
EU Declaration of Conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte den wesentlichen Anforderungen der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products correspond to the essential requirements of Directive

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

in ihrer aktuellen Fassung entsprechen.

in its actual version.

Folgende Richtlinie wurde berücksichtigt:

The following directive was regarded:

2014/30/EU (EMV/EMC)

Produkt / products: Analysengas-Aufbereitungssystem / *Sample gas conditioning system*
Typ / type: SCS 104

Das Betriebsmittel ist ein Aufbereitungssystem für Gase in der Gasanalytik.
The equipment is a conditioning system for application in the field of gas analysis.

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 61326-1:2013 **EN 61010-1:2010/A1:2019/AC:2019-04**

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.

Ratingen, den 17.02.2023

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

UK Declaration of Conformity

The manufacturer Bühler Technologies GmbH declares, under the sole responsibility, that the product complies with the requirements of the following UK legislation:

Electrical Equipment Safety Regulations 2016

The following legislation were regarded:

Electromagnetic Compatibility Regulations 2016

Product: Sample gas conditioning system
Type: SCS 104

The equipment is a conditioning system for application in the field of gas analysis.

The object of the declaration described above is in conformity with the relevant designated standards:

EN 61010-1:2010/A1:2019/AC:2019-04

EN 61326-1:2013

Ratingen in Germany, 17.02.2023

Stefan Eschweiler
Managing Director

Frank Pospiech
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

BÜHLER TECHNOLOGIES

Gas Analysis

Sample gas filter

AGF-FE-1, AGF-FE-2

Installation and Operation Instructions

Original instructions

BE410009
06/2019

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: analyse@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: analyse@buehler-technologies.com

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

Document information
Document No.....BE410009
Version.....06/2019

Contents

1 Introduction

1.1 Intended Use

AGF-FE filters were designed specifically for front panel installation in analyzers or systems. All types can be used for filtering sample gas.

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

1.2 Design types

If a filter type has special features, these are described separately in the operating manual. When connecting, please note the specific values of the filter, and the correct version when ordering spare parts.

Please refer to the nameplate to identify your model. In addition to the job number it also contains the item number and model designation.

Filter type	Description
AGF-FE-1	PA / PC / Viton filter; Fibreglass filter element
AGF-FE-1-T	PA / PC / Viton filter; PTFE filter element
AGF-FE-2	PVDF / stainless steel filter; Fibreglass filter element

Tab. 1: Filter type overview

1.3 Scope of delivery

- 1 x Filter
- Product documentation

2 Safety instructions

2.1 Important notices

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

DANGER	Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.
WARNING	Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.
NOTICE	Signal word for important information to the product.

Warning signs

These instructions use the following warning signs:

	Warns of a general hazard		General information
	Warns not to inhale toxic gasses		Wear respiratory equipment
	Warns of corrosive liquids		Wear a safety mask
	Warns of explosive areas		Wear gloves

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	**Toxic, corrosive gases**
	The measuring gas led through the equipment can be hazardous when breathing or touching it. a) Check tightness of the measuring system before putting it into operation. b) Take care that harmful gases are exhausted to a save place. c) Before maintenance turn off the gas supply and make sure that it cannot be turned on unintentionally. d) Protect yourself during maintenance against toxic / corrosive gases. Use suitable protective equipment.
	

3 Transport and storage

The device should be only transported in the original case or in appropriate packing.

If the device is not used for some time, protect it against heat and humidity. Store the device in a roofed, dry, and dust free room. Temperature should be between –20 °C and 40 °C (-4 °F and 104 °F).

4 Installation and connection

4.1 Requirements to the installation site

The front plate has to be prepared according to the drawings in the data sheets.

The filter should be installed in a way so the filter element can be replaced. If the filter protrudes from a contour, please note this poses a risk of damage.

The Maximum pressure is 2 bar (29 psi).

4.2 Connecting the gas lines

The connections must be made carefully and properly using suitable fittings.

Please check if your version has G-threads or NPT threads. On the latter, the item number on the nameplate is followed by "I".

An arrow on the filter indicates the flow direction.

The hoses are only slipped on and must be secured in the event of overpressure.

Perform a leak test with suitable means.

5 Operation and control

NOTICE

The device must not be operated beyond its specifications.

6 Maintenance

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.
– Only perform maintenance when cool.

DANGER

The gas inside the filter, condensate and used filter elements may be caustic or corrosive.

Sample gas can be harmful.

a) Before maintenance turn off the gas supply and surge with air if necessary.
b) Exhaust sample gas to a safe place.
c) Protect yourself against toxic / corrosive gas during maintenance. Wear appropriate personal protection equipment.

6.1 Replacing the filter element

CAUTION

Gas leakage

The filter should not be dismantled under pressure.
Don’t use damaged parts again.

– Twist off the filter cover counter-clockwise.
– Remove the filter element and insert a new one.
– Check for leaks and replace, if necessary.
– Twist on filter cover clockwise and tighten hand-tight.
– Perform a leak test with suitable means.

NOTICE! Please observe legal regulations when disposing of filter elements.

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 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:

Filter*

Item no.	Model
41 15 9991	AGF-FE-1
41 15 8991	AGF-FE-1-T
41 15 099	AGF-FE-2
90 09 162	O-ring for model FE-E1 / FE-1-T
41 28 011	O-ring for model FE-E2

* one filter element is included with delivery.

Filter elements

Item no.	Model	for filter model	Packing unit
41 15 00 10	FE-E1	AGF-FE-1	5 pieces
41 15 00 90	FE-1-T	AGF-FE-1-T	5 pieces
41 15 09 910	FE-E2	AGF-FE-2	5 pieces

8 Disposal

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

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

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

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

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

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

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

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

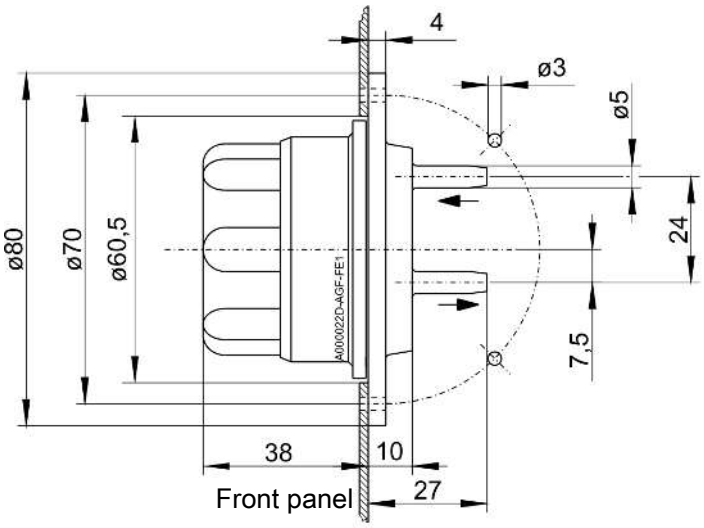
9 Appendices

9.1 Technical Data

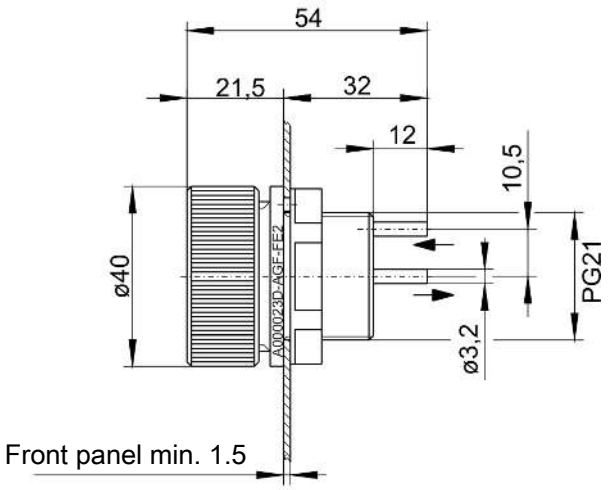
Built-in filter	AGF-FE-1	AGF-FE-1-T	AGF-FE-2
Filter surface	40 cm²	40 cm²	13 cm²
Filter fineness	2 µm	2 µm	8 µm
Dead volume	25 ml	25 ml	6 ml
Material - filter housing	PC	PC	PVDF / 1.4571
Material - gasket	Viton	Viton	Viton
Material - filter element	Fibreglass / epoxy resin	PTFE	Fibreglass / epoxy resin
Connections	DN 4/6	DN 4/6	DN 2/4
Operating pressure max.	2 bar	2 bar	2 bar
Medium temperature	max. +80 °C	max. +80 °C	max. +80 °C

9.2 Dimensions

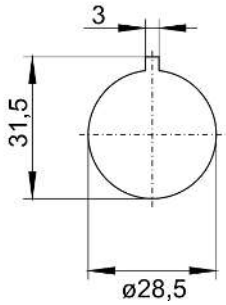
AGF-FE-1 / AGF-FE-1-T



AGF-FE-2



Installation diagram



10 Attached documents

– 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.

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

Gas Analysis

Peristaltic condensate and metering pumps

CPsingle, CPdouble

Installation and Operation Instructions

Original instructions

BE450021
01/2022

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
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Internet: www.buehler-technologies.com
E-Mail: analyse@buehler-technologies.com

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

Document information
Document No..... BE450021
Version..... 01/2022

Contents

1 Introduction

1.1 Intended use

This unit is intended to discharge condensate from cooled process fluids. The temperature of these mediums is approx. 5 °C.

The unit is suitable for use in normal, non-hazardous areas and according to FM for general areas.

Pump models for the USA and Canada 4492***1*** in non-explosive areas

The peristaltic pumps must be installed inside a housing which requires a tool to open and meets the requirements of the overall installation with respect to the housing, layout, space requirement and condensate separation.

Select a housing which meets the requirements of the pump's intended use with respect to mounting, spacing and creepage paths. The housing must be suitable for operating temperatures of 0 °C to min. 52 °C.

It must be fully wired inside the housing. The cables and terminals used must be US-listed or (if applicable) CSA certified. They must be designed for the nominal voltage, the nominal current and an operating temperature range of 0 °C to 52 °C.

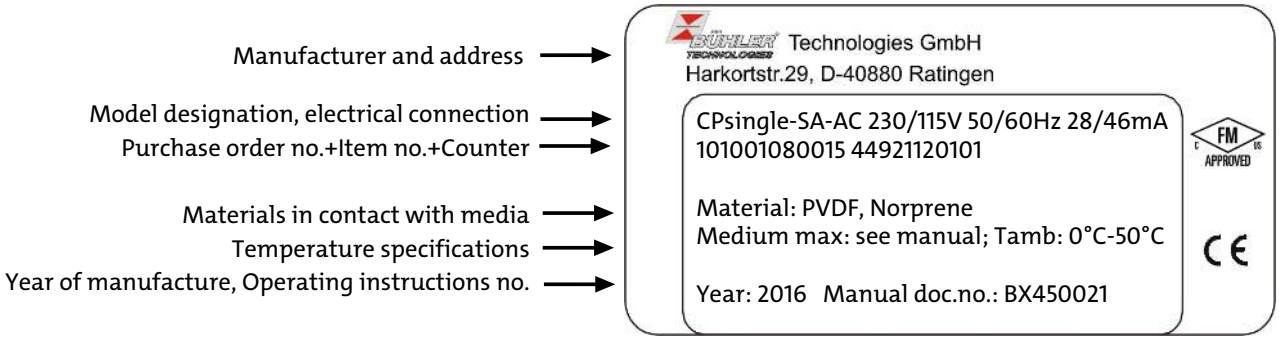
Water and contaminants must be prevented from entering the unit.

1.2 Scope of delivery

- 1 x Peristaltic pump
- Product documentation
- Connection- and mounting accessories (only optional)

1.3 Type plate

Example:



1.4 Peristaltic pump ordering information

The item number is a code for the configuration of your unit. Please use the following model code:

4492	X	X	X	X	X	X	X	Product Characteristic
								Gas path
	1							Single gas path
	2							Double gas path
								Version
		1						Housing version
		2						Built-in version
								Supply voltage
			2					115/230 V AC
			4					24 V DC
								Area of application
				0				Standard applications – CE
				1				for common locations with FM approval
								Hose material [1) 2)]
					1			Tygon (Norprene)
					2			Fluran
					3			Marprene
								Flow rate/hour
						0		0.3 L/h
						2		13 ml/h (only 115/230 V AC, single gas path)
						3		61 ml/h (only 115/230 V AC, single gas path)
						4		25 ml/min or 1.5 L/h (only 24 V DC, single gas path, for standard applications – CE)
								Hose connection [3)]
							1	straight hose nipple
							2	angled hose nipple
							3	straight and angled hose nipple
							4	Screw connection (metric) DN 4/6
							5	Screw connection (US) 1/6"-1/4"
							6	angled hose nipple and screw connection (metric)
							7	angled hose nipple and screw connection (US)
							8	straight hose nipple and screw connection (metric)
							9	straight hose nipple and screw connection (US)

[1)] Please note hose material information during selection.

[2)] For 1.5 L/h pumps as well as 13 ml/h and 61 ml/h metering pumps the only hose material option is Tygon (Norprene).

[3)] For 1.5 L/h pumps as well as 13 ml/h and 61 ml/h metering pumps the only hose connections choices are "Option 4 and 5".

2 Safety instructions

2.1 Important advice

Operation of the device is only permitted 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

DANGER	Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.
WARNING	Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.
NOTICE	Signal word for important information to the product.

Warning signs

These instructions use the following warning signs:

	Warns of a general hazard		General information
	Warns of voltage		Unplug from mains
	Warns not to inhale toxic gasses		Wear respiratory equipment
	Warns of corrosive liquids		Wear a safety mask
	Warns of explosive areas		Wear gloves

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.
- Do not install damaged or defective spare part. If necessary, visually inspect prior to installation to determine any obvious damage to the spare parts.

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

DANGER **Electrical voltage**

Electrocution hazard.

a) Disconnect the device from power supply.

b) Make sure that the equipment cannot be reconnected to mains unintentionally.

c) The device must be opened by trained staff only.

d) Regard correct mains voltage.

DANGER **Toxic, corrosive condensate**

a) Protect yourself from toxic, corrosive condensate when performing any type of work.

b) Wear appropriate protective equipment.

c) Please note the national safety rules!

DANGER **Use in explosive areas**

The equipment is **not** suitable for use in explosive areas.

3 Transport and storage

The products should be transported only in its original packaging or a suitable replacement.

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

4 Installation and connection

4.1 Installation site requirements

Be sure to maintain the approved ambient temperature. Please also note the technical data of the attached gas cooler.

When mounting to a subframe, it is screwed directly to the cooler housing.

The unit is intended for use in enclosed areas. Adequate protection from the weather must be provided when used outdoors.

Pump models for the USA and Canada 4492***1*** in non-explosive areas

The peristaltic pumps must be installed inside a housing which requires a tool to open and meets the requirements of the overall installation with respect to the housing, layout, space requirement and condensate separation.

Select a housing which meets the requirements of the pump's intended use with respect to mounting, spacing and creepage paths. The housing must be suitable for operating temperatures of 0 °C to min. 52 °C.

It must be fully wired inside the housing. The cables and terminals used must be US-listed or (if applicable) CSA certified. They must be designed for the nominal voltage, the nominal current and an operating temperature range of 0 °C to 52 °C.

Water and contaminants must be prevented from entering the unit.

4.2 Mounting

WARNING

Hazardous electrical voltage

The device must be installed by trained staff only.

CAUTION

Wrong mains voltage

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

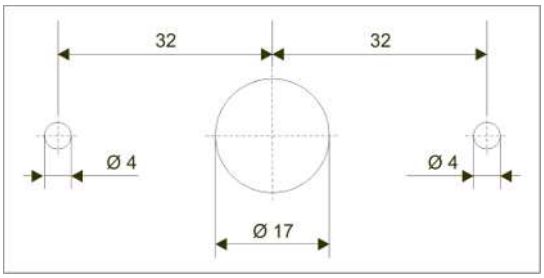
There are two holes at the bottom of the mounting bracket. These can be used for screws.

Connect the tubes to the connectors and assure they are tight. The pump direction is given on the cover.

4.2.1 Installing the built-in version

The built-in version (without housing) of the CPsingle is delivered pre-assembled. Proceed as follows to install:

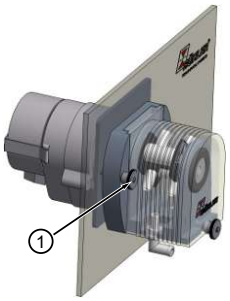
Prepare the mounting plate for the pump. The locations of the bores are indicated in the adjacent drawing. The mounting plate must not be thicker than 3 mm.



Remove the knurled nuts M3 (1) at both ends.

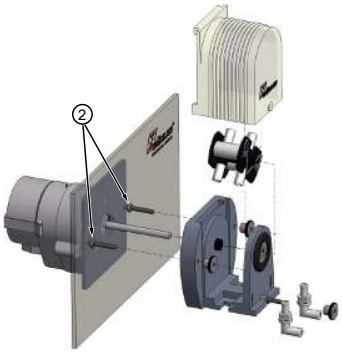
Pull the entire pump head off the gear axle with a slight back and forth motion.

You will see two hex nuts M3 (2).



Remove the two hex nuts and insert the drive motor including retaining plate and pressfit stubs into the prepared coupler from the back.

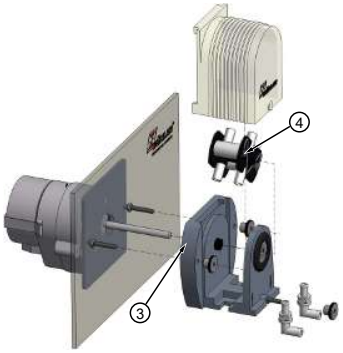
Tighten the hex nuts M3.



Attach the pump head bracket (3) to the gear axle.

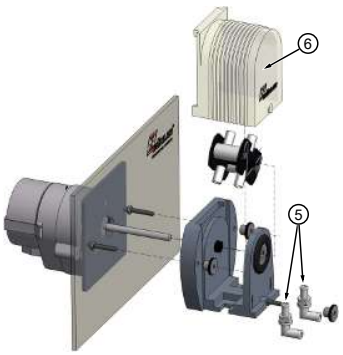
Insert the rotor (4) – cylindrical neck forward - into the pump head bracket, now slide the entire assembly onto the gear axle and the retaining bolts.

Tighten (1) knurled nuts.



Insert the hose fitting (5) with hose into the square breakouts.

Finally, attach the hood (6) and secure with the knurled nut.



4.3 Electrical connections

4.3.1 Electrical Connections (housing version / 115 V or 230 V)

Make sure that mains voltage and frequency meet the specifications of the motor (voltage tolerance ± 5 % and frequency tolerance ± 2%.)

Peristaltic pumps of housing version type SA-AC (230/115 V) are delivered as standard with a 2 m connecting cable.

The fixed connection cable for the housing version has three numbered braids and one PE connection.

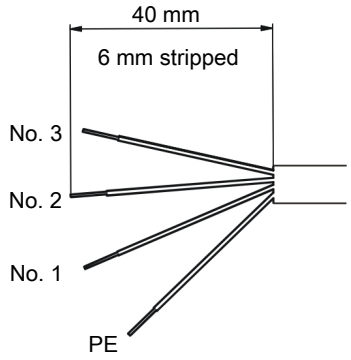
⏚ The protective earth conductor must be connected to the yellow/green wire of the connection cable.

Select mains and protective earthing cross-sections according to the rated current.

For the electrical connections especially for the protective conductor use a cable cross-section from minimum 0,5 mm^2.

Obey differing specifications on the type plate. The conditions at the installation site must meet all specifications on the type plate.

When connecting to a 115 V or 230 V supply, connect the following braids:



Power supply	Connection		Remark
115 V	Braid 2; 3 and PE	DANGER	Braid 1 is live and must be professionally insulated!
230 V	Braids 1; 3 and PE	DANGER	Braid 2 is live and must be professionally insulated!

4.3.2 Electrical Connections (built-in version / 115 V or 230 V)

The three strands (500 mm long) moulded to the motor are white, yellow and blue.

When connecting to a 115 V or 230 V supply, connect the following braids:

Power supply	Connection		Remark
115 V	white and blue	DANGER	The yellow strand is live and must be professionally insulated!
230 V	yellow and blue	DANGER	The white strand is live and must be professionally insulated!

4.3.3 24 V DC

The drive motor features two braids (AWG 24, 250 mm long), which must be connected to the 24 V DC supply as follows:

Power supply	Connection	Remark
24 V	red: *+ U*	Positive terminal supply
	black: *- U*	Negative terminal supply

5 Operation and control

NOTICE

The device must not be operated beyond its specifications.

The pump does not have a power switch. It starts running as soon as the power supply is turned on.

NOTICE

Installing peristaltic **pumps** CPsingle / CPdouble limits the maximum permissible **operating pressure** in the system!
Operating pressure ≤ 1 bar

6 Maintenance

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 condensate

Protect yourself from toxic, corrosive condensate when performing any type of work. Wear appropriate protective equipment.

The hose inside the pumps is a wear item and must regularly be checked for leaks. Replace as described in chapter "Replacing the hose".

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 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 condensate

Protect yourself from toxic, corrosive condensate when performing any type of work. Wear appropriate protective equipment.

7.2 Replacing the hose

NOTICE

Never grease the pump hose!

Check all parts for contamination prior to assembly and clean with a damp cloth as necessary.

- Close gas supply.
- Switch off device and disconnect all plugs (e.g. connector plug alarm output, supply input, etc.).
- Disconnect supply and discharge tube on peristaltic pump (**observe safety notes!**).
- Loosen but do not remove centre knurled nut. Flip down the screw.
- Pull cover up and off.
- Unplug external connections and remove hose.
- Replace hose (Bühler spare part) and install peristaltic pump in reverse order.
- Restore the power and gas supply.

7.3 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:

7.3.1 Replacement Tubes Ordering Instructions

4492	0	0	3	5	X	X	X	Product Characteristic
								Output per litre*
					0			0.3 L/h or 1.5 L/h
					2			13 ml/h or 61 ml/h
								Hose material
						1		Tygon (Norprene)
						2		Fluran
						3		Marprene
								Hose connection
							1	straight hose nipple
							2	angled hose nipple
							3	straight and angled hose nipple
							4	Screw connection (metric)
							5	Screw-in connection (US)
							6	angled hose nipple and screw connection (metric)
							7	angled hose nipple and screw connection (US)
							8	straight hose nipple and screw connection (metric)
							9	straight hose nipple and screw connection (US)

*see technical data for required power output.

Information about hose materials

The standard hose in Norprene has excellent mechanical properties with high chemical resistance to many substances.

Marprene offers a long life for many applications with high chemical resistance, particularly when oxidation agents are present. This is therefore the first alternative to the standard Norprene hose.

Fluran is particularly beneficial if the condensate contains oils, petrols and other solvents. The mechanical properties should rather be assessed weaker, so we only recommend this hose material for the specified chemicals.

The flow capacity of Fluran and Marprene hoses is slightly lower.

Other materials are available on request.

8 Disposal

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

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

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

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

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

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

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

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

9 Appendices

9.1 Technical data

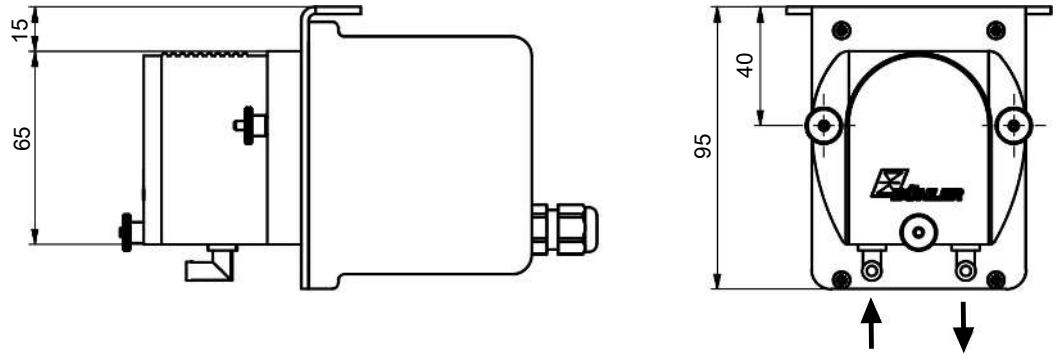
Technical Data CPsingle/CPdouble Peristaltic Pumps

Supply voltage/power input: at T_{amb} = 20 °C and under load	230 V 50/60 Hz, 0.028 A 115 V 50/60 Hz, 0.046 A 24 V DC, 0.1 A *	
Flow rate:	0.3 L/h (50 Hz)/0.36 L/h (60 Hz) with standard hose 13 ml/h (50 Hz)/15 ml/h (60 Hz) 61 ml/h (50 Hz)/73 ml/h (60 Hz) 25 ml/min or 1.5 L/h (at 24 V DC)	
Mechanical load	Tested based on DNV-GL CG0339 vibration class A (0.7g) 2 Hz-13.2 Hz Amplitude ± 1.0 mm 13.2 Hz -100 Hz 0.7g acceleration	
Inlet vacuum:	max. 0.8 bar	
Inlet pressure:	max. 1 bar	
Outlet pressure:	1 bar	
Weight:	CPsingle-SA: 0.7 kg CPsingle-OEM: 0.47 kg CPsingle-24V: 0.44 kg	CPdouble-SA: 0.74 kg CPdouble-OEM: 0.51 kg CPdouble-24V: 0.49 kg
Protection class:	IP 44 (housing version) IP 40 (built-in version)	
Ambient temperatures:	T_{max} = 55 °C (housing version) T_{max} = 60 °C (built-in version) T_{amb} = 0 ... 50 °C (FM versions)	
Cable lengths:	2 m (housing version 115/230 V) 500 mm (Built-in version 115/230 V) 250 mm (24 V DC)	
Parts in Contact with Mediums Hose: Connections:	 Tygon (Norprene) (standard), Marprene, Fluran PVDF Straight 5 mm (recommended hose 4/6) Elbow 6 mm (recommended hose 5/8) Screw-in connection DN 4/6 or 1/6" – 1/4"	
FM no.:	3058168	

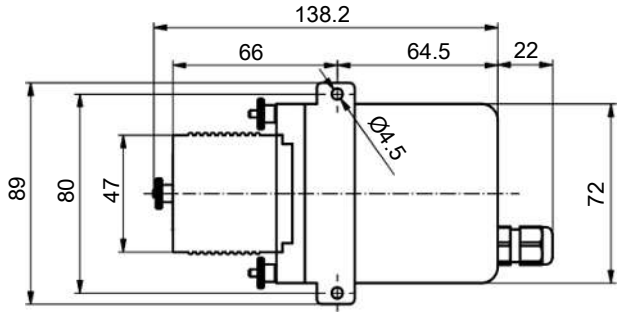
* Lifetime 24 V DC 3000 h

9.2 Dimensions 115 / 230 V

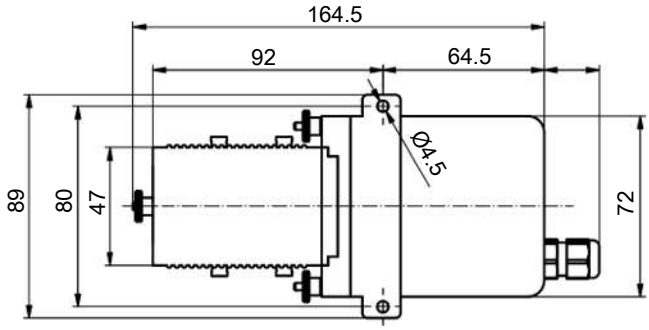
Housing version



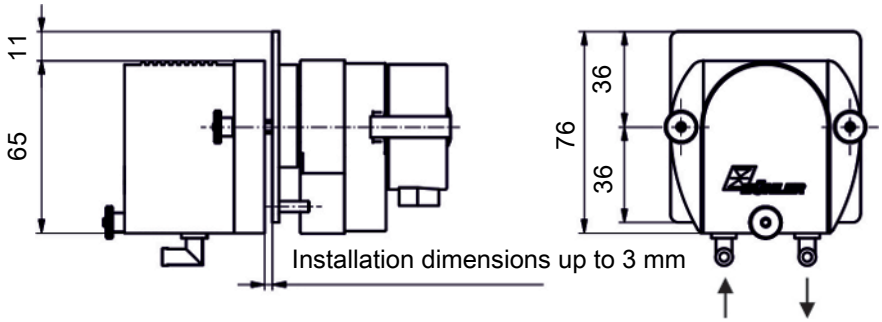
Housing version with 1 gas path



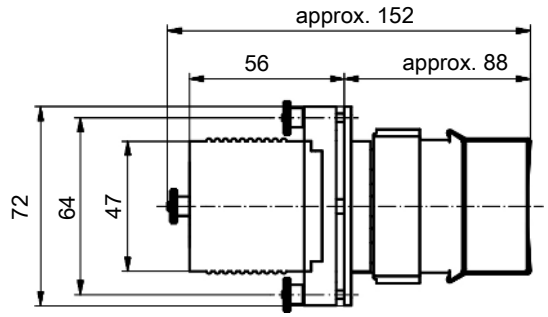
Housing version with 2 gas paths



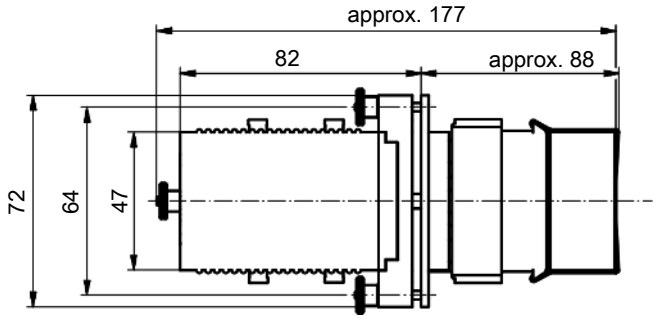
Built-in versions



Built-in version with 1 gas path



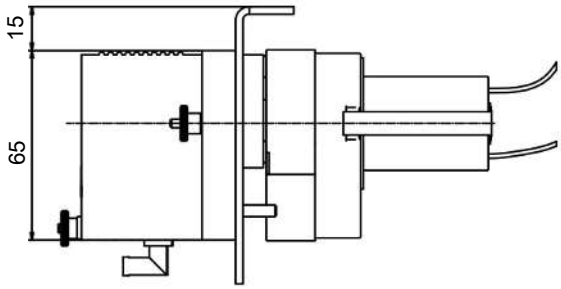
Built-in version with 2 gas paths

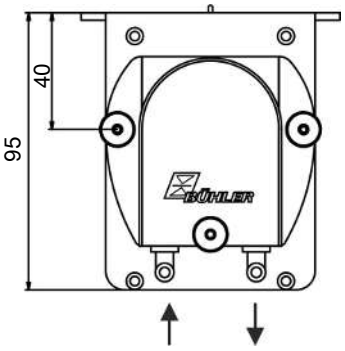


(All dimensions in mm)

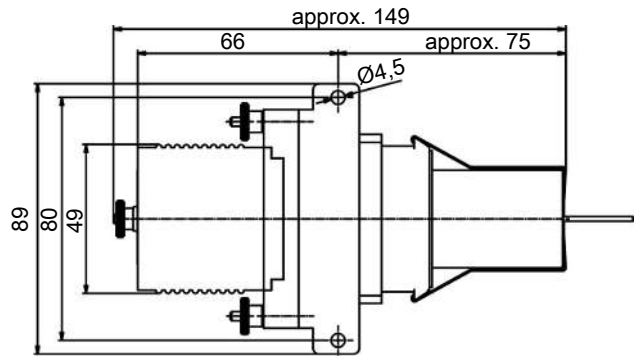
9.3 Dimensions 24 V

Housing version

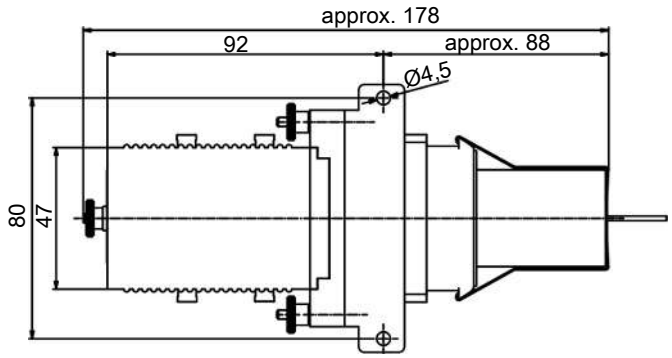




Housing version with 1 gas path

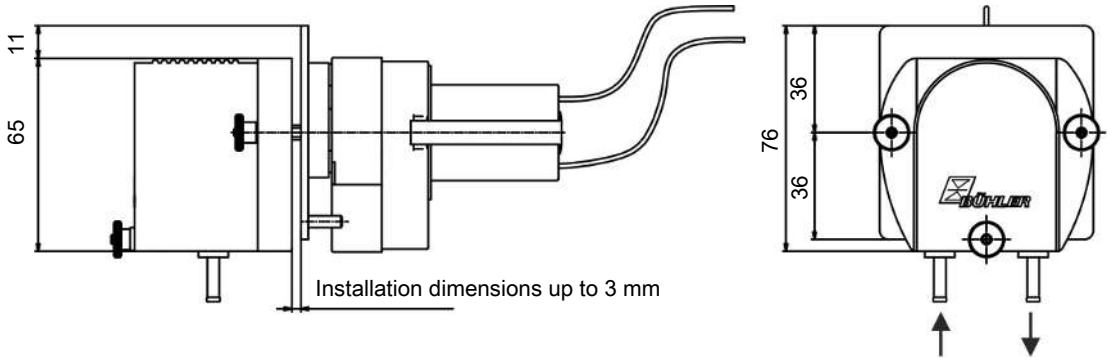


Housing version with 2 gas paths

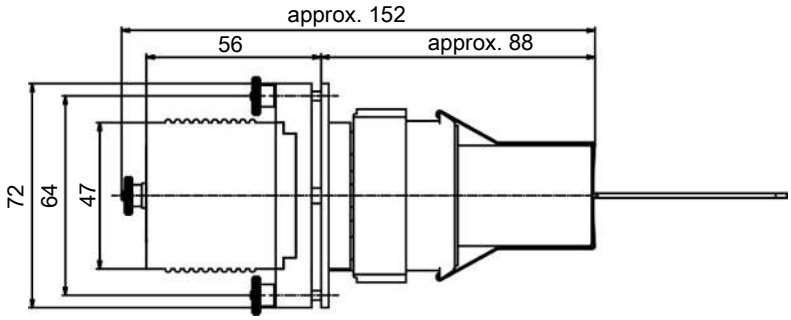


(All dimensions in mm)

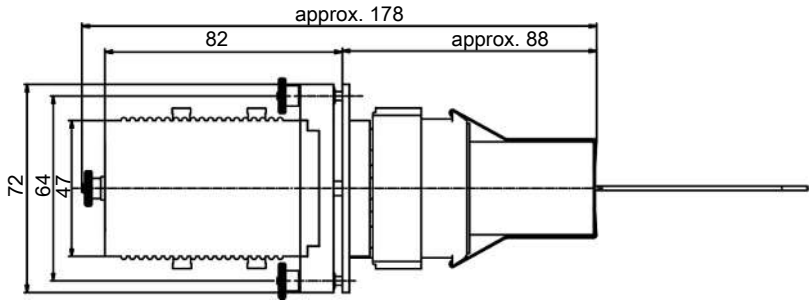
Built-in versions



Built-in version with 1 gas path



Built-in version with 2 gas paths



(All dimensions in mm)

10 Attached documents

- Declaration of Conformity KX 450012
- RMA - Decontamination Statement

EG-/EU Konformitätserklärung
EC/EU Declaration of Conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte den wesentlichen Anforderungen der Richtlinie

2006/42/EG
(MRL)

in ihrer aktuellen Fassung entsprechen.

Herewith declares Bühler Technologies GmbH that the following products correspond to the essential requirements of Directive

2006/42/EC
(MD)

in its actual version.

Die Produkte sind Maschinen nach Artikel 2 a).

The products are machines according to article 2 (a).

Folgende Richtlinie wurde berücksichtigt:

The following directive was regarded:

2014/30/EU (EMV/EMC)

Produkt / products: Peristaltische Kondensatpumpe / *Peristaltic condensate pump*
Typ / type: CPsingle, CPdouble

Das Betriebsmittel ist zur Ableitung von Kondensat aus Gasanalysesystemen bestimmt.
The equipment is designed to discharge condensate from gas analysis systems.

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 809:1998 + A1:2009

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

Ratingen, den 01.11.2022

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

UK Declaration of Conformity

The manufacturer Bühler Technologies GmbH declares, under the sole responsibility, that the product complies with the requirements of the following UK legislation:

Machinery Safety Regulations 2008

The following legislation were regarded:

Electromagnetic Compatibility Regulations 2016

Product: Peristaltic condensate pump
Types: CPsingle
CPdouble

The equipment is designed to discharge condensate from gas analysis systems.

The object of the declaration described above is in conformity with the relevant designated standards:

EN 809:1998 + A1:2009

EN 61326-1:2013

Ratingen in Germany, 01.11.2022

Stefan Eschweiler
Managing Director

Frank Pospiech
Managing Director

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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

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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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- ☐ andere/ other

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