Gas Analysis

Portable sample gas conditioning

PCS.smart (+)

Installation and Operation Instructions

Original instructions

BE464004
10/2021

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.....BE464004
Version.....10/2021

Contents

1 Introduction

1.1 Intended Use

The respective operating conditions greatly impact an analysis instrument working correctly. Since in addition to the gas component to be analysed, sample gas often contains large amounts of moisture and dirt particles, the sample gas must be conditioned accordingly. Especially with frequently changing sampling points this often causes problems. Accurate gas analyses in changing locations require compact gas conditioning systems. PCS.smart was developed for these applications.

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.

1.2 Ordering instructions

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

1.2.1 PCS.smart

CSP	S	1	X	3	1	X	X	X	1	X	X	X	0	X	X	Product characteristic
																Supply voltage
			1													115 V AC
			2													230 V AC
																Heat exchanger
				3												PVDF
																Filter
					1											Panel filter, AGF-FE-4
																Moisture detector
						0										without moisture detector
						1										with moisture detector
																Sample gas pump and flow meter
							0	0								none
							0	3								without P1, 1x flow meter with needle valve
							2	0								P1 with bypass, without flow meter
							2	1								P1 with bypass and 1x flow meter
							2	4								P1 with bypass and 2x flow meters with needle valve [1]
							2	5								P1 with bypass, 1x flow meter and 1x flow meter with needle valve
																Condensate pump
									1							CPsingle with angled adapter
																Gas inlet
										0						Screw connection, metric, PVDF, DN 4/6 [2]
										1						Screw connection, US, PVDF, 1/4" / 1/6" [2]
										2						Screw connection, metric, stainless steel, 6 mm [3]
										3						Screw connection, US, stainless steel, 1/4" [3]
										4						Quick-coupler with counter piece, metric, PVDF, DN 4/6 [2]
										5						Quick-coupler with counter piece, US, PVDF, 1/4" / 1/6" [2]
										6						Quick-Lock [2]
																Gas outlet
											0					Screw connection, metric, PVDF, DN 4/6
											1					Screw connection, US, PVDF, 1/4" / 1/6"
											2					Screw connection, metric, stainless steel OD, 6 mm
											3					Screw connection, US, stainless steel, 1/4"
											4					Quick-coupler with counter piece, metric, PVDF, DN 4/6
											5					Quick-coupler with counter piece, US, PVDF, 1/4" / 1/6"
											6					Quick-Lock
																heated line
												0	0			none
												2	0			heated line
																Signal outputs
														0		status output only
														1		Analog output, 4..20 mA, incl. status output
																Trolley
															0	No
															1	Yes

[1] Version 2 x SM with needle valve includes an additional bypass gas outlet. The connection corresponds with the selected gas outlet configuration.

[2] Maximum medium temperature 140 °C.

[3] Recommended for connecting a heated line.

1.2.2 PCS.smart+

CSP	S	2	X	8	1	X	X	X	2	X	X	X	0	X	X	Product characteristic
																Supply voltage
			1													115 V AC
			2													230 V AC
																Heat exchanger
				8												PVDF
																Filter
					1											Panel filter, AGF-FE-4
																Moisture detector
						0										without moisture detector
						1										with moisture detector
																Sample gas pump and flow meter
							0	0								none
							0	3								without P1, 1x flow meter with needle valve
							2	0								P1 with bypass, without flow meter
							2	1								P1 with bypass and 1x flow meter
							2	4								P1 with bypass and 2x flow meters with needle valve [1]
							2	5								P1 with bypass, 1x flow meter and 1x flow meter with needle valve
																Condensate pump
									2							2x CPsingle with angled adapter
																Gas inlet
										0						Screw connection, metric, PVDF, DN 4/6 [2]
										1						Screw connection, US, PVDF, 1/4" / 1/6" [2]
										2						Screw connection, metric, stainless steel, 6 mm [3]
										3						Screw connection, US, stainless steel, 1/4" [3]
										4						Quick-coupler with counter piece, metric, PVDF, DN 4/6 [2]
										5						Quick-coupler with counter piece, US, PVDF, 1/4" / 1/6" [2]
										6						Quick-Lock [2]
																Gas outlet
											0					Screw connection, metric, PVDF, DN 4/6
											1					Screw connection, US, PVDF, 1/4" / 1/6"
											2					Screw connection, metric, stainless steel OD, 6 mm
											3					Screw connection, US, stainless steel, 1/4"
											4					Quick-coupler with counter piece, metric, PVDF, DN 4/6
											5					Quick-coupler with counter piece, US, PVDF, 1/4" / 1/6"
											6					Quick-Lock
																heated line
												0	0			none
												2	0			heated line
																Signal outputs
														0		status output only
														1		Analog output, 4..20 mA, incl. status output
																Trolley
															0	No
															1	Yes

[1] Version 2 x SM with needle valve includes an additional bypass gas outlet. The connection corresponds with the selected gas outlet configuration.

[2] Maximum medium temperature 140 °C.

[3] Recommended for connecting a heated line.

1.3 Contents

- PCS.smart in the selected version
- Optional accessories such as Smartline, sample gas probe, process connectors
- Product documentation

1.4 Product description

The low weight and small dimensions of the system are ideal for e.g. service engineers using sample- or comparison measurements.

A sturdy case provides reliable protection for delicate components in the gas conditioning system from the weather and mechanical damage and allows for convenient system transport.

The base version of the gas conditioning system consists of a gas cooler with condensate pump and a filter. For complete sample gas conditioning we recommend the options and accessories moisture detector, sample gas pump with flow meter and a heated line. Please refer to the chapter "Spare Parts and Accessories" or the order key directly for the accessories and options.

The sample gas is cooled to the preset dew point (factory preset 5 °C) regardless of the ambient temperature. This safely falls below the dew point and moisture in the sample gas is separated as condensate. A safety circuit only starts the gas pump once the operating point of the cooler has been reached. The optional moisture detector communicates with the sample gas pump, switching it off in the event of condensate entering the cooler or cooler overload.

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.

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.

CAUTION **Tilting risk**

Damage of the device
Secure the device against any sudden translocation during maintenance.

CAUTION **Hot surface**

Burning hazard
Let the device cool down before maintaining.

3 Transport and storage

The portable gas conditioning system must be stored and transported in the original case. Operation without case is prohibited. Only transport the device in the designated position (upright, level). If this cannot be ensured due to logistics (e.g. transport via shippers or air transport) it's important to completely drain condensate from the gas conditioning system, as condensate could otherwise flow back into the gas lines. Purge the gas path with ambient air to allow acidic condensate to escape.

DANGER **Toxic, corrosive condensate**

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

The system must be flushed with dry air to ensure the driest possible condensate path.

The equipment must be protected from moisture and heat when not in use. They must be stored in a covered, dry and dust-free room at a temperature between -20 °C and 60 °C.

Outdoor storage is **prohibited**. On principle, the operator must meet all applicable standards with respect to preventing damage to the equipment due to lightning, which could result in equipment damage.

Storage spaces must be free from ozone generating equipment, e.g. fluorescent lighting, mercury vapour lamps, high voltage electrical equipment.

4 Setup and connection

Check the device for damage prior to installation. This/these could be a damaged housing or add-on components visible from the outside, such as filter and flow meter. Never use equipment with obvious damage.

CAUTION

Damage/health hazard due to heater leakage

Check the device for obvious leaks before every use and at regular intervals. Any leaks must be repaired prior to using the device. In addition to gas leaks, leaking fluids in particular can post an electrical and health hazard.

4.1 Installation site requirements

Be sure the equipment is positioned upright and horizontal on a level, solid surface. Also be sure to observe the approved ambient temperature.

Do not obstruct the convection of the cooler. There must be adequate room between the vent and the next obstacle (at least 10 cm).

CAUTION

Damage to the device

Protect the equipment against dust, falling objects and external impacts.

Stroke of lightning

Outdoor installation is **forbidden**. As a matter of principle, the operator must regard all applicable standards according prevention of damage due to lightning, which may otherwise damage the device.

4.2 Connecting a gas probe

The sample gas probe connects to the DN 6 hose connection on the device marked **IN**.

The following devices (e.g. analyser) must be connected to the DN 6 hose connection marked **OUT** with a suitable hose.

4.3 Electrical connections

WARNING

Hazardous electrical voltage

The device must be installed by trained staff only.

CAUTION

Wrong mains voltage

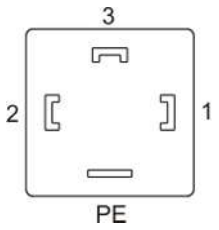
Wrong mains voltage may damage the device.
Regard the correct mains voltage as given on the type plate.

The low heat device socket features an on/off switch which cuts off all poles. This must be set to the zero position prior to connecting the electrical.

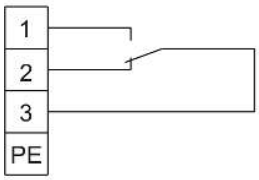
Connect the included low heat device cable to the device and a suitable voltage source. Ensure the correct voltage and frequency. The type plate contains any deviating specifications.

Plug connection

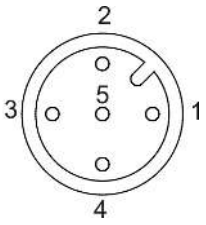
Plug numbering



Alarm contact



Analogue output



1 - not assigned
2 - not assigned
3 - GND
4 - 4-20 mA out
5 - shield

Connection regulated, heated line

Connection	Pin	Assignment	Line type
	1	L 230/115 V	regulated heated line
	2	N 230/115 V	
	3	N 230/115 V	self-regulating heated line
	4	L 230/115 V	
	5	Pt100	regulated heated line
	6	Pt100	
	7	PE	

The heated line may only be connected to electricity directly through the built-in socket in accordance with the specifications for the PCS.smart portable gas conditioning system.

DANGER **Electric voltage**

Risk of electric shock

a) Always disconnect the unit from the mains before performing work.

b) Secure the equipment from accidental restarting.

c) The unit may only be opened by trained, competent personnel.

d) Ensure the correct voltages supply.

e) An add-on sensor (Pt100) must be shielded.

The maximum power input of the consumer is 1600 W at a voltage of 230 V and 800 W at a voltage of 115 V. The maximum current is 7 A.

4.4 Signal outputs

The device has various status signals (also see table "Description of signal outputs"). The maximum switching power of the alarm outputs is 230 VAC/150 V DC, 2 A, 50 VA, each.

An alarm is triggered by the alarm contact / status output (S2) if the temperature of the cooler is outside the specified limits. It does not indicate if the alarm was triggered due to excess temperature or insufficient temperature.

The front film has three LEDs:

Colour	Marking	Function
Red	S2	High/low temperature, device error
Yellow	S1	---
Green	OP	Normal operation

The LEDs OP and S2 indicate the device status similar to alarm contact S2.

If the option "temperature signal" is built in, the unit has a signal output via the analogue output to indicate the actual cooler temperature.

When the moisture detector (optional) is installed, an alarm will also be triggered via the alarm contact / status output (S2) if moisture is still present in the conditioned sample gas or a cable break is detected.

The temperature signal can be read via the panel plug (S3) using the M12x1 connector. This plug is located on the terminal side.

Description of signal outputs

	Function / contact type	Description	
Regarding S2)	internal changeover contact: max. 250 V AC / 150 V DC, 2 A, 50 VA	the following device statuses can be indicated via two switching outputs:	Contact between 3 and 2 closed (alarm) – No mains voltage and/or actual temperature outside the alarm thresholds Contact between 3 and 1 closed (ok) – Mains voltage attached + actual temperature within the alarm thresholds
			With moisture detector option
			Contact between 3 and 2 closed (alarm) – The moisture detector registers residual humidity in the sample gas or cable break: Error message Contact between 1 and 3 closed (ok) – no residual moisture in measuring gas / no cable break
			With temperature signal option
Regarding S3)	4-20 mA analogue output (R_{Load} <500 Ω)	Signalling of actual temperature (please use shielded cables)	T_{Cooler} = -20 °C ≙ (-4 °F) -> 4 mA/ 2 V T_{Cooler} = 5 °C ≙ (41 °F) -> 9 mA/ 4,5 V T_{Cooler} = 60 °C ≙ (140 °F) -> 20 mA/ 10 V

5 Operation and control

NOTICE

PCS.smart is a portal device which must always be operated inside the original transport case. The side cover flaps must be open during operation.
Only operate and transport the unit upright. Operating the device with the cover flaps closed or outside the specifications is prohibited!

After switching on, the cooler the block temperature will be displayed. The display will flash until the block temperature has reached the preset target value (± adjustable alarm range). The status contact is in the 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 bullet "Troubleshooting".

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

5.1 Description of functions

The cooler is controlled by a microprocessor. With the factory preset the control already incorporates the various characteristics of the built-in heat exchangers.

The programmable display shows the block temperature in the selected display unit (°C / °F) (factory preset °C). Application-specific settings can easily be configured guided by the menu, using the 5 buttons. For one, this applies to the target outlet dew point, which can be set from 2 to 20 °C (factory preset 5 °C).

And then the warning thresholds can be adjusted for low and excess temperature. These are set relative to the outlet dew point τ_a setting.

For the low temperature the range is τ_a -1 to - 3 K (at a minimum 1 °C cooling block temperature), for the excess temperature the range is τ_a +1 to +7 K. The factory presets for both values are 3 K.

The flashing display and the status relays indicate the conditions are below or above the configured warning range (e.g. after switching on).

The status output can e.g. be used to control the sample gas pump to allow for the gas flow to only be switched on once the permissible cooling range has been reached or shut off the pump in the event of a moisture detector alarm.

The separated condensate is drained via connected peristaltic pump.

It further has a fine mesh filter. The glass dome allows the dirt level of the filter element to easily be determined.

The moisture detector is easy to remove. This may be necessary if condensate enters the cooler due to a malfunction and the peristaltic pump can no longer remove it.

5.2 Sample gas pump cold start

During normal operation the sample gas pump will only be activated once the block temperature reaches the target temperature range.

In the case of the PCS.Smart, if the ambient temperature is around freezing, the system may need to be heated with warmer gas. The pump can be started manually for this purpose.

The sample gas pump can be activated for 30 seconds from the GASP menu, the sample gas pump and status will switch over. This process may be repeated any number of times until the minimum block temperature of 2 °C has been reached. During this period the status text "MANU" will flash in the display.

WARNING

Operate the sample gas pump manually at your own risk.

Only use dry air.

5.3 Optional heated line

Both a self-regulating as well as a non-self regulating line can be connected to units with the "heated line" option. With non-self regulating lines the temperature is regulated by the built-in regulator.

The built-in regulator can be (de)activated via the menu. The regulator is factory deactivated.

With the built-in regulator activated the Pt100 for the heated line will be monitored. If a sensor error occurs or no line is connected, the display will show an error message.

Without a heated line requiring regulation connected, deactivate the built-in regulator via the menu and the error message will automatically be cleared.

The message nAdd in the display indicates if a heated line with Pt100 is connected and the regulator is deactivated. The regulator must be reactivated in the menu.

So long as the heated line is heating up, the display will show the status ,nit. This condition will persist for a few minutes after the target temperature has been reached until the heat has spread evenly throughout the heated line.

On the Smartline the heat-up period varies by ambient temperature and initial temperature. At an ambient temperature of 25 °C the heat-up phase should not be much more than 30 minutes.

During the heat-up period the status contact will be in alarm position.

5.4 Use of menu functions

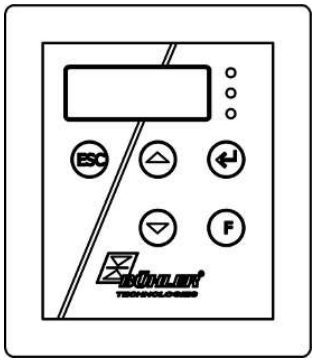


Fig. 1: Display unit

Brief description of the operating principle:

The unit is operated using 5 keys. Their functions are:

Button	Section	Functions
↵ or OK	Display	– Switches from the measurement display to the main menu
	Menu	– Selects the menu item displayed
	Enter	– Applies an edited value or a selection
▲	Display	– temporarily switches to the alternative measurement display (if option installed)
	Menu	– Back
	Enter	– Increase value or browse selection – Note: – Press button 1 x = changes parameter / value by one; – Hold button = fast mode (numerical values only) – Display flashes: modified parameter/value – Steady display: original display/value
▼	Display	– temporarily switches to the alternative measurement display (if option installed)
	Menu	– Next
	Enter	– Reduce value or browse selection
ESC	Menu	– Move one level up
	Enter	– Return to menu Changes will not be saved!
F or Func		– Sets a menu to favourite. (Note: The favourite menu will also be activated with the menu locked!)

5.4.1 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.

With the menu locked, only the following menu items will be visible without entering the correct code:

Menu item	Explanation
toP > unit	Temperature unit selection (°C or °F).
F or Func.	Accessing the Favourites menu
	NOTICE! This menu may be one that is normally locked.

5.4.2 Overview of the menu items

When pressing the **OK** button in normal mode, the display will show the prompt codE if the menu is locked. Use the ▲ and ▼ buttons to enter the correct code and press **OK**.

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.

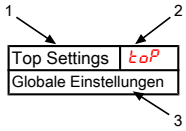
The following image shows an overview of the menu structure.

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.

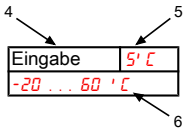
You can cancel entries and menu selections without saving by pressing the **ESC** key.

Menu:

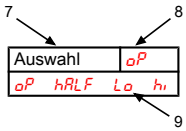


1. Menu designation
2. Display
3. Brief description

Parameter:



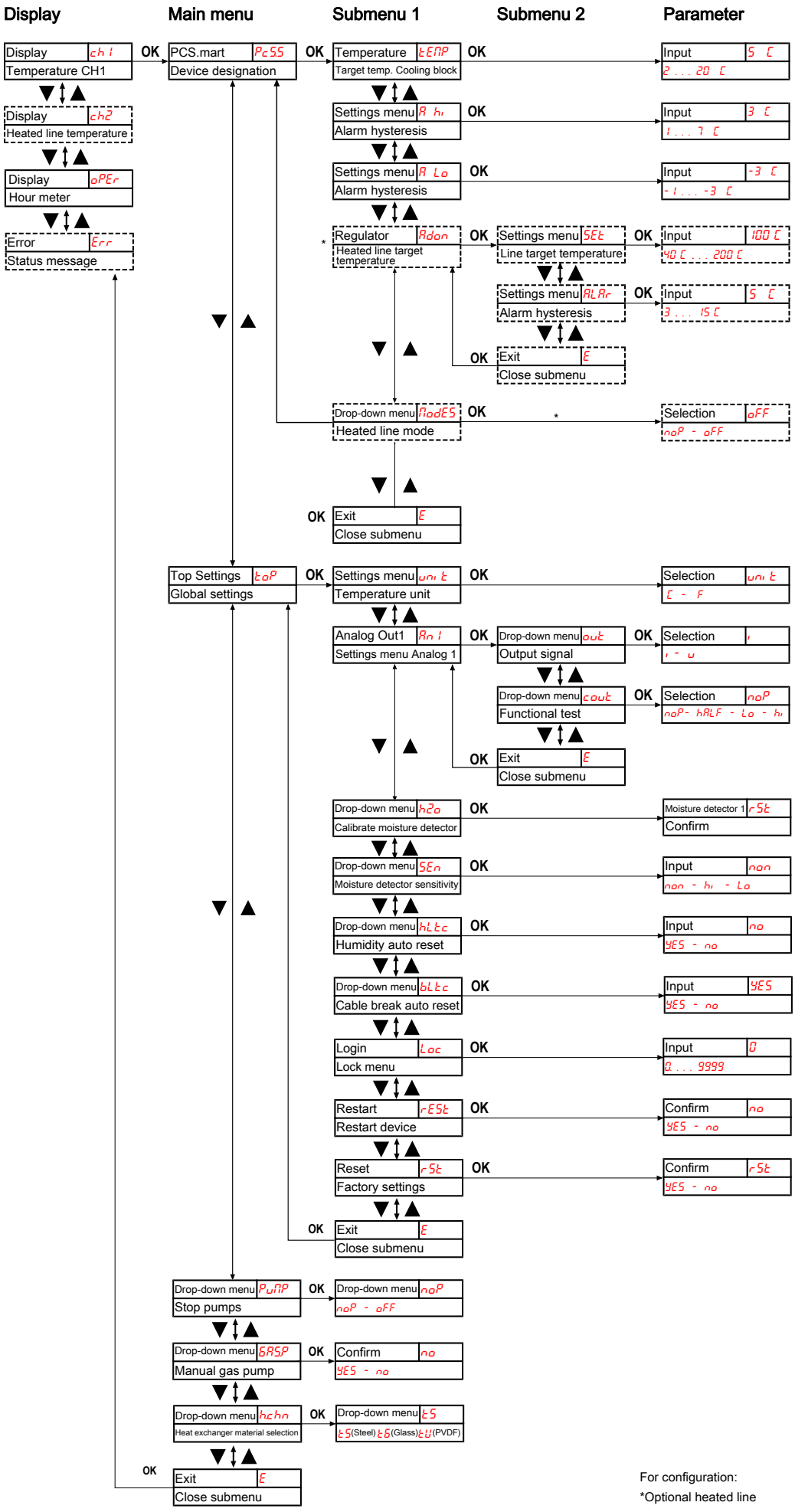
4. Value input
5. Factory preset
6. Parameter range



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

Optional menu navigation:

10. dashed box = Optional



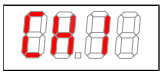
For configuration:
*Optional heated line

5.5 Description of menu functions

5.5.1 Display Menu

Block temperature display

Display → ch 1



Depending on the device state, the temperature will be displayed as a constant, flashing, or alternating with a status message.

Heated line display

Display → ch2

The display is only available on devices with the "heated line" option. Depending on the device state, the temperature will be displayed as a constant, flashing, or alternating with a status message.

Operating hours /runtime display

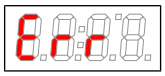
Display → oPEr

Displays the operating hours of the unit. The runtime cannot be reset and can be output in various display formats. To view/exit the runtime, press the „Enter" key.

- YYMM – display in years and months (default)
- MtH – display in months
- WEEH – display in weeks
- dAYS – display in days
- One month corresponds to 30 days. Press the „F" key to switch between the display formats. The display will then first show the selected format as short text, then the duration.

Error code display

Display → Err



In the event of errors/malfunctions not related to operation, the error code indicates possible causes and solutions.

5.5.2 Main menu

PCS.smart (PcS.S) Portable Gas Conditioning System

Display → PcS.S

This will take you to the portable gas conditioning system target temperature and the tolerance range setting (alarm threshold).

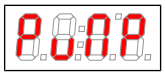
Global setting (ToP Settings)

Display → toP

This menu is used to configure the global cooler settings.

Peristaltic pump and sample gas pump

Display → PUMP



Switching the peristaltic pump and sample gas pump on and off.

Parameter range:	noP , oFF
Factory setting:	noP
Note:	Status switches, "PUMP" flashes.

Peristaltic pump and sample gas pump

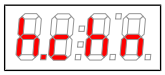
Display → GASP

The sample gas pump can be manually activated for 30 seconds. This process can be repeated several times.

Parameter range:	YES , no
Factory setting:	no

Heat exchanger material selection

Display → hchn

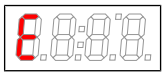


Heat exchanger material selection

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.

5.5.3 Submenu cooler

Target temperature (Temperature)

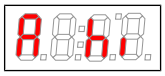
Display → Cooler → tEMP

This setting determines the nominal temperature for the cooler temperature.

Parameter range:	2 °C to 20 °C (35.6 °F to 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

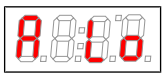


Here you can set the upper threshold for the visual signal and the alarm relay. The alarm limit is set based on the cooler temperature setting.

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

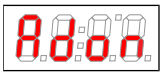


Here you can set the lower threshold for the visual signal and the alarm relay. The alarm limit is set based on the cooler temperature setting.

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.

Regulator/heated line

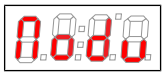
Display → PcSS → Rdon



This will take you to the target temperature setting for the heated line regulator and the tolerance range (alarm thresholds).

Enabling/disabling the heated line (Modu)

Display → Cooler → Modu

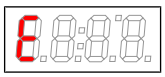


Used to de(activate) the heated line.

Parameter range:	noP, oFF
Factory setting:	oFF
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.

5.5.3.1 Submenu heated line

Target temperature regulator 2

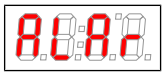
Display → PcSS → tEM2 → SEt

This setting defines the heated line target temperature.

Parameter range:	40 °C to 200 °C (104 °F to 392 °F)
Factory setting:	100 °C (212 °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.

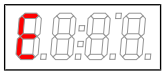
Alarm thresholds (Alarm)

Display → PCSS → tEM2 → ALAr

	Used to specify the threshold for the alarm with respect to the heated line target temperature. If the temperature measured is outside this interval, the temperature display will flash and the alarm relay will trip.
Parameter range	±5 °C (±41 °F)
Factory setting:	±3 °C .... ±15 °C (±37 °F ... ±59 °F)
Note:	This menu item is hidden if the keylock is enabled.

Exit submenu 1

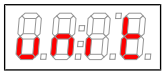
Display → Submenu → E

	Selecting this will return you to the main menu.

5.5.4 Submenu 1 (global settings)

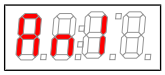
Temperature unit

Display → toP → unit

	Used to select the temperature display unit.
Parameter range:	C, F
Factory setting:	C

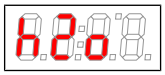
Analog output

Display → toP → An1

	This submenu is used to specify the settings for analog output 1, see chapter Submenu 2 (Analog Output 1)
Note:	This menu will be hidden if the menu is locked.

Calibrate moisture detector

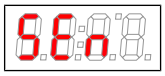
Display → toP → h2o (h2o)

	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.

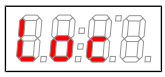
Determines whether the cable break alarm must be reset manually or will automatically clear on valid measuring signal.

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.

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 hMoi .

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

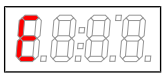
Display → toP → rSt

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.

5.5.4.1 Submenu 2 (Analog Output 1)

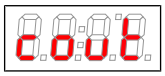
Signal behaviour

In normal mode (noP) the measuring point will output the actual temperature. For testing purposes you can generate constant values hi , Lo or HALF. The analogue output will output a constant signal with a value as specified in the table.

Constant	Current output 4 – 20 mA	Voltage output 2 – 10 V
hi	20 mA	10 V
Mi	12 mA	6 V
Lo	4 mA	2 V
noP	4 – 20 mA	2 – 10 V

After testing, the signal behaviour must be changed back to normal mode (noP).

Display → toP → An 1 → cout

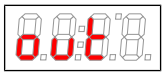


This setting determines how the analogue output will behave.

Parameter range:	noP = Operation (normal mode), hi , Lo, HALF
Factory setting:	noP
Note:	This menu will be hidden if the menu is locked.

Selection -> Output Signal

Display → toP → An 1 → out

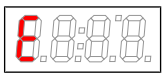


Select the type of output signal.

Parameter range:	' Status output 4... 20 mA
	u Status output 2...10 V
Factory setting:	'
Note:	Disconnect meter before switching!
	This menu item is hidden if the keylock is enabled.

Exit Submenu 2

Display → toP → An 1 → E



Selecting this will return you to submenu 1.

5.5.5 Set favourite menu

Use the **F** or **Func** (function) key to set a favourite menu to later open it with just the push of a button.

– Open the menu you wish to set as the favourite. This menu can also be a lockable menu.
– Press the function key for more than 3 sec.
  The current menu has been set as the favourite. The display will briefly show the message Func.
– Press **ESC** or E (Exit) to return to the display.

To now access the favourite menu, press the **F** or **Func** key.

NOTICE! The favourite menu can also be accessed if the menu is locked.

5.6 Operating the sample gas pump

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.

The pump will only run after reaching the block temperature. It is only intended to convey gaseous mediums. It is not suitable for liquids.

Operation under primary pressure is prohibited. The flow inside the device (optional regulation via bypass or flow meter with built-in needle valve) should always be at least 50 L/h. Throttling greatly will shorten the life of the sample gas pump.

CAUTION **Hot surface**

Risk of burns
Housing temperatures may be high during operation.
Allow the unit to cool down before performing maintenance or repairs.

5.7 Operating the flow metre (optional)

The flow volume of the system can be adjusted using the built-in needle valve on the flow metre.

Avoid a flow of less than 50 L/min. Throttling greatly will shorten the life of the sample gas pump.

5.8 Condensate

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.

Condensate accumulates during operation. The built-in condensate pump transports this to outside through the factory installed hose. Please note, the hose clamp on the hose must be open during operation. This requires suitable condensate collection and disposal. The hose clamp should be closed when not in use and during transport to prevent the condensate from accidentally leaking.

CAUTION

Operation in designated position

The unit should only be operated in the designated position. If this cannot be ensured due to logistics (e.g. transport via shippers), it's important to completely empty the vessel, as condensate could otherwise flow back into the gas lines.

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 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.

CAUTION

Tilting risk

Damage of the device
Secure the device against any sudden translocation during maintenance.

CAUTION

Gas leakage

The sample gas pump should not be dismantled under pressure.

CAUTION

Hot surface

Risk of burns
Housing temperatures may be high during operation.
Allow the unit to cool down before performing maintenance or repairs.

6.1 Replacing the filter element

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.

The front panel filter should be routinely checked and with frequent operation replaced at least every 6 months. To do so, unscrew the cap, remove the element, and replace with a new element if necessary.

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

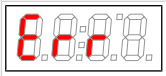
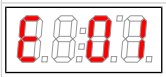
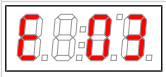
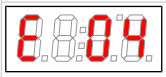
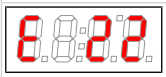
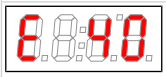
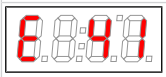
Problem / Malfunction	Possible cause	Action
Condensate inside the gas output	– Cooler overloaded	– Maintain limits
Reduced gas flow rate	– Gas circuit clogged	– Uninstall and clean heat exchanger – if necessary, replace filter element
	– Condensate output iced over	– Send in unit
Excess temperature	– Operating point not yet reached	– Wait (max. 20 min)
	– Cooling output too low despite the cooler running	– Ensure the vents are not covered (heat buildup)
	– Flow rate / dew point / gas temperature too high	– Maintain limits / install pre-separator
	– Installed fan stopped	– Check and replace if necessary
Temperature low	– Control unit failure	– Send in cooler

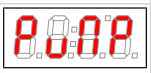
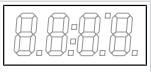
7.1.1 Error messages on the display

If an error occurs, the display will read "Err". Press the "▲" button 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 failure	– 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 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 (block temperature)	– Possible sensor failure
	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 50	– General error temperature sensor 2 (heated line)	– Possible sensor failure
	Error 51	– Low temperature / short-circuit temperature sensor 2	– Check temperature sensor connection
	Error 52	– Excess temperature / short-circuit temperature sensor 2	– Check temperature sensor connection
	Error 53	– Measurement fluctuation temperature sensor 2	– Check temperature sensor connection

Status text		Possible cause	Action
	H2o.1	– Moisture alarm moisture detector 1	– Dry – Check condensate trap
	init	– Heated line initialisation/heat-up phase	– Wait
	PuMP	– Pumps deactivated	– Reactive pumps via menu
	dt	Active Delta T control only: The block temperature is outside the defined temperature range. – Cooler is still in the "break-in phase" – Fluctuating ambient temperature – Insufficient cooling capacity	– Wait to see if the target temperature will be reached – Check the ambient temperature / power supplied – Process-related: Adjust alarm limits
	Manu	– Gas pump was manually activated for 30 seconds	– Not required
	Mode Addon	– Heated line with Pt100 detected, regulator inactive	– Activate regulator in the menu
 (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.

CAUTION

Risk due to defective device

Personal injury or damage to property

a) Switch off the device and disconnect it from the mains.

b) Repair the fault immediately. The device should not be turned on again before elimination of the failure.

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

Hot surface

Risk of burns
Housing temperatures may be high during operation.
Allow the unit to cool down before performing maintenance or repairs.

7.3 Replacing the main fuse

– Close gas supply.
– Switch off and unplug the device.
– The main fuse is located on the connection side inside the low heat socket. The square fuse holder next to the contacts can be pried off with a suitable tool.
– Replace the fuse and push to reinstall the fuse holder.
– Restore the power and gas supply.

7.4 Replacing the microfuse on the sample gas cooler

– Close gas supply.
– Switch off and unplug the device.
– Open case cover.
– Unscrew font panel.
– Replace microfuse (No. F1, F2 or F3).

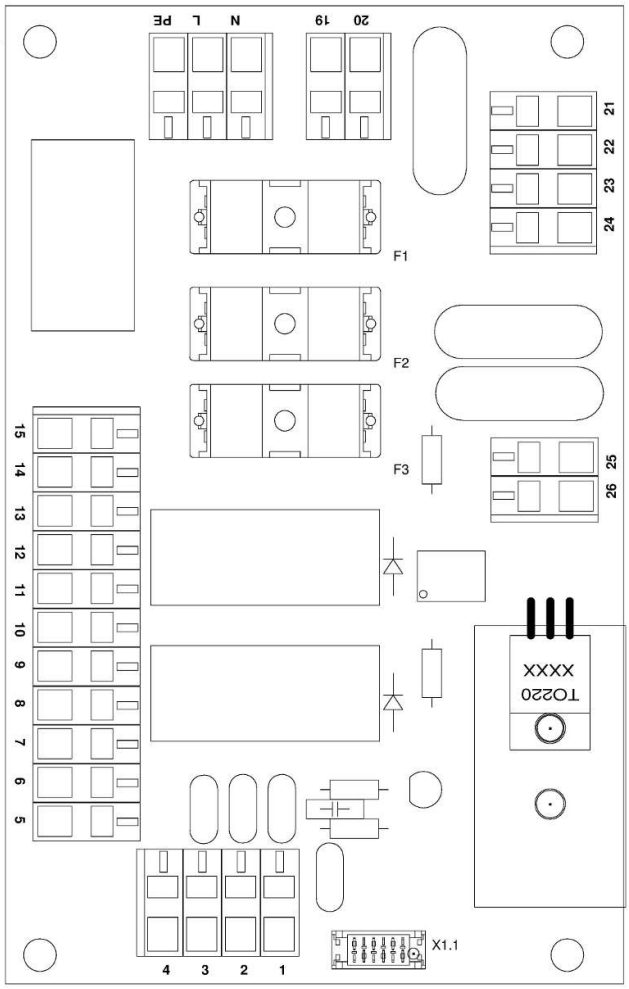


Fig. 2: Add-on electronics wiring diagram

No.	Function	Fusing	
		230 V	**115 V**
F1	Main unit + pumps	1.25 A	2.5 A
F2	self-regulating, heated line	8 A	8 A
F3	built-in regulator	8 A	8 A

– The fuse is located under a plastic cap on the top board (see image). Replace microfuse and put the cap back on. Please note the mains voltage in order to select the correct microfuse.
– Reinstall front panel.
– Restore the power and gas supply.

7.5 Drying of the moisture detector (option)

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.

7.6 Replacing the 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.

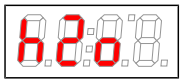
NOTICE

Never grease the pump hose!

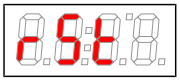
Check all parts for contamination prior to assembly and clean as necessary.

7.7 Calibration of the moisture detector (option)

- 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".

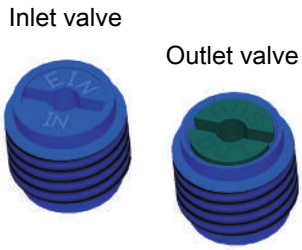
7.8 Replacing the inlet and outlet valves

First detach the screw connections.

Unscrew the inlet or outlet valve with a wide slot screwdriver.

Attention: The PVDF and PVDF with bypass valve pump bodies already have PTFE gaskets installed in the gas inlets and outlets. These are also included in the valve spare parts kit. Remove the old gaskets before installing the new ones.

The inlet and outlet valves are identical. Their installation position determines the function. As shown in the image, the valves are blue on one side and black on the other. The valves are further marked “IN” or for inlet and “OUT” for outlet.

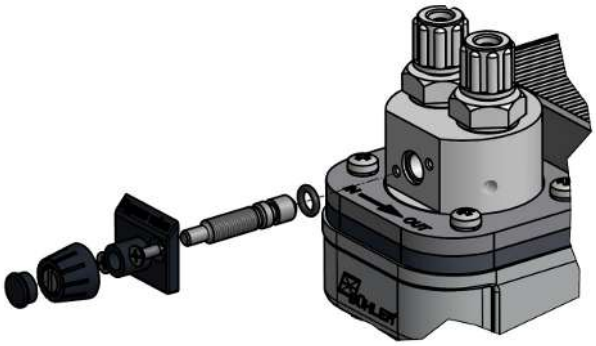


To assemble the sample gas pump, perform the steps in reverse order. When tightening the inlet and outlet valves be sure to observe the required tightening torque of max. 1 Nm. **CAUTION! Tightening the valves more will permanently deform the pump body, requiring replacement.**

When installing the screw connection, ensure the connection is tight.

7.9 Replacing the O-ring on the bypass valve (optional)

- Loosen the two screws on the valve plate and carefully remove the entire unit.
- Coat the new O-ring with suitable O-ring grease (e.g. Fluoronox S90/2) and install in the spindle.
- Carefully insert the entire unit into the pump body while turning and tighten screws.



7.10 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 00 10 00 07	Display module MCD400
91 44 05 00 79	Connecting cable controller board display module
91 00 13 01 80	Microcontroller board LPP MCP2
CS PB 00 06	Flow block mini complete
91 10 00 00 58	Sample gas cooler microfuse 230 V, 5 x 20 mm, 1.25 A, delayed action
91 10 00 00 13	Sample gas cooler microfuse 115 V, 5 x 20 mm, 2.5 A, delayed action
91 10 00 00 16	Microfuse PCS.smart, 10 A delayed action
91 10 00 00 67	Microfuse heated line/regulator, 8 A delayed action
41 11 10 0	Moisture detector FF-3-N, without cable
see data sheet 450020	Peristaltic Pumps CPsingle, CPdouble

7.10.1 Spare parts and accessories

Item no.	Description
CS PX 00012	Removable trolley case with 50 mm casters; aluminium
44 92 00 35 012	Condensate pump replacement hose, Tygon (Norprene), angled hose nipple
41 15 10 50	FE-4 spare filter, 8 count
42 28 00 3	Bellow for P1 pump
90 09 39 8	O-ring for bypass P1 pump
42 28 06 6	Set inlet/outlet valves 70 °C for P1 pump
see data sheet 4640002	Smartline

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 PCS.smart	
Ambient temperature:	+5 to 50 °C [1]
Gas output dew point: Warning thresholds:	adjustable, 2 ... 20 °C adjustable, -3 ... -1 K and +1 ... +7 K around dew point
Flow rate:	approx. 50 ... 280 L/h [2]
Operating pressure:	0.2 ... 2 bar abs. [2]
Dew point static throughout the range:	0.1 K ±1.5 K
Max. inlet dew point:	70 °C [1]
Gas inlet temperature:	max. 180 °C [1] [4]
Rated cooling capacity (at 25 °C):	80 kJ/h [2] [3]
Electric supply:	230/115 V, 50/60 Hz
IEC connector, termination length:	2.5 m
Power input:	max. 250 VA (without heated line)
Status output switching capacity:	max. 250 V AC, 150 V DC 2 A, 50 VA, potential-free
Operational readiness:	after approx. 10 min.
Dimensions without line (h x w x d):	approx. 460 x 360 x 260 mm
Weight standard version:	approx. 13.5 kg
Parts in contact with media:	PVDF, glass, stainless steel, PTFE, Norprene, Viton, epoxy resin, sintered PTFE [2]
IP rating:	IP 20 D

[1] Considering the available total cooling capacity (see Technical Data TC-Standard OEM). Please also refer to our calculation program or contact our sales department for guidance.

[2] May vary due to optional add-on parts.

[3] Subject to installation conditions

[4] Varies by device configuration.

9.2 Technical Data - Options

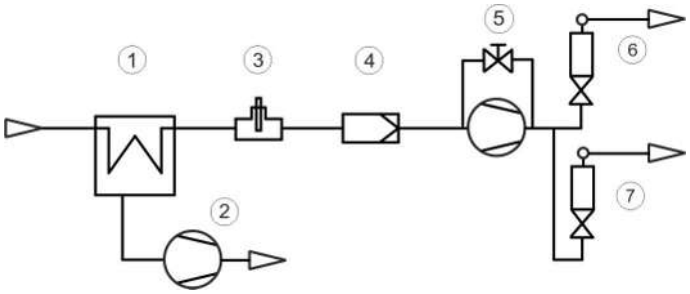
Technical Data Sample Gas Pump P1	
Inlet:	0.5 ... 1.3 bar abs.
Outlet:	Back-pressure max. 1 bar rel.
Nominal output:	280 L/h (at p = 1 bar abs.)

Technical Data DK 702 Flow Meter	
Standard measuring tubes:	Air 20 °C, 1.2 bar abs.
Meas. range:	25 ... 250 NL/h
Options:	Built-in needle valve

Technical Data Controller for heated line	
Temperature, preset: adjustable:	 100 °C 40 °C ... 200 °C
Motor power:	max. 1600 W (230 V) / 800 W (115 V)
Sensor type:	Pt100, 2-wire
Connection:	693 series socket, 7-pin

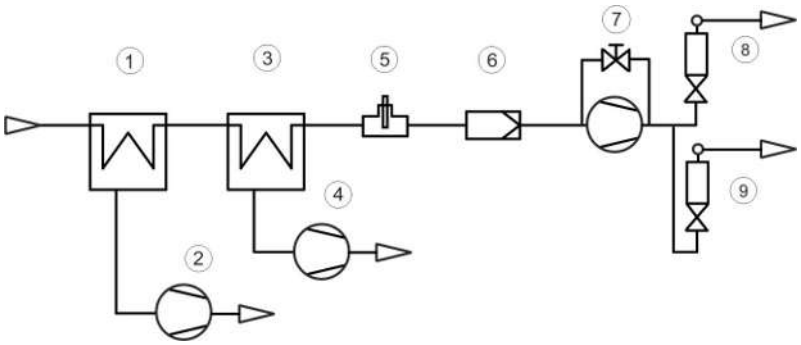
9.3 Flow diagrams

PCS.Smart, Item No. CSPS 1xxx



1	Cooler	5	Sample gas pump with bypass (optional)
2	Condensate pump	6	Flow meter (optional)
3	Moisture detector (optional)	7	Flow meter (optional)
4	Filter		

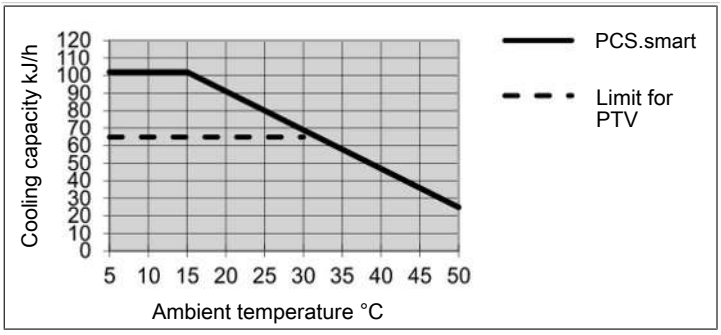
PCS.Smart+, Item No. CSPS 2xxx



1	Cooler	6	Filter
2	Condensate pump	7	Sample gas pump with bypass (optional)
3	Cooler	8	Flow meter (optional)
4	Condensate pump	9	Flow meter (optional)
5	Moisture detector (optional)		

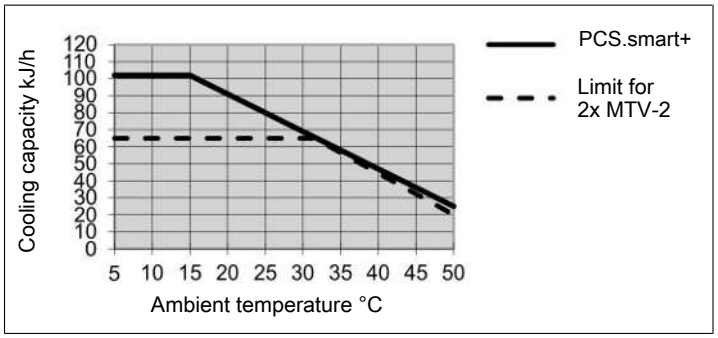
9.4 Output

PCS.smart	
Rated cooling capacity (at 25 °C)	80 kJ/h
Max. Ambient temperature	50 °C
Dew point fluctuations	
static	± 0.1 K
in the entire specification range	± 1.5 K



Remark: The limit curve for the heat exchanger applies to a dew point of 40 °C.

PCS.smart+	
Rated cooling capacity (at 25 °C)	80 kJ/h
Max. Ambient temperature	50 °C
Dew point fluctuations	
static	± 0.1 K
in the entire specification range	± 1.5 K
Temperature difference between heat exchangers	< 0.5 K



Remark: The limit curve for the heat exchanger applies to a dew point of 50 °C.

9.5 Heat exchanger description

The energy content of the sample gas and the required cooling capacity of the gas cooler is determined by three parameters: gas temperature ϑ_G, dew point τ_e (moisture content) and volume flow v. The outlet dew point rises with increasing energy content of the gas. The following limits for the maximum flow are specified for a standard operating point of τ_e = 40 °C and ϑ_G = 70 °C. The maximum flow v_{max} in Nl/h of cooled air indicated, so after moisture has condensed. Values may differ for other dew points and gas inlet temperatures. However, the physical facts are so vast we decided to omit the illustration. Please contact our experts for clarification or refer to our calculation programme.

9.6 Heat exchanger overview

PCS.smart

Heat exchanger	PTV
Version / Material	PVDF
Flow rate v_{max} [1)]	250 Nl/h
Inlet dew point $\tau_{e,max}$ [1)]	65 °C
Gas inlet temperature $\vartheta_{G,max}$ [1)]	140 °C
Max. Cooling capacity Q_{max}	90 kJ/h

[1)] Max. cooling capacity of the cooler must be considered.

PCS.smart+

Heat exchanger	2x MTV-2 in-line
Version / Material	PVDF
Flow rate v_{max} [1)]	250 NL/h
Inlet dew point $\tau_{e,max}$ [1)]	70 °C
Gas inlet temperature $\vartheta_{G,max}$ [1)]	140 °C
Max. Cooling capacity Q_{max}	90 kJ/h

[1)] Considering the maximum cooling capacity of the cooler

9.7 PCS.smart+ volume flow temperature chart

T_e	V_{max} [NL/h]*
40	205
50	180
65	100

*at 25 °C ambient temperatures.

10 Attached documents

- Declaration of Conformity KX460026
- 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: Tragbare Gasaufbereitung / *Portable sample gas conditioning*
Typ / type: PCS.smart, PCS.smart+

Das Betriebsmittel dient zur Aufbereitung des Messgases an ständig wechselnden Entnahmestellen, um das Analysengerät vor Restfeuchtigkeit und Fremdpartikel im Messgas zu schützen.
This equipment is used for conditioning the sample gas with frequently changing sampling points to protect the analysis instrument from residual moisture and particles in the sample gas.

Das oben beschriebene Produkt der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:
The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

EN 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*

KX 46 0026

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: Portable sample gas conditioning
Types: PCS.smart
PSC.smart+

This equipment is used for conditioning the sample gas with frequently changing sampling points to protect the analysis instrument from residual moisture and particles in the sample gas.

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

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