BÜHLER TECHNOLOGIES

Gas Analysis

Cooling unit

CU-EMA+

Installation and Operation Instructions

Original instructions

BE440029
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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

This device is an essential component for conditioning the sample gas to protect the downstream analysis instrument from residual moisture in the sample gas.

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

1.2 Overview

The CU-EMA+ cooler was designed specifically for the requirements of gas conditioning for continuously measuring emissions in maritime applications. Dividing the unit into an internal and external section achieves the IP rating required under the standard without requiring venting the interior. The series connection of the heat exchangers will cool in two cycles to minimise wash out effects.

The exact item number of the model defined by you is determined by the model code in the category ordering information.

The gas cooler comes standard with peristaltic pump and moisture detector. Additional components which every conditioning system should feature can optionally be connected:

- Connection for adding instrument air to purge the system,
- Solenoid valve for adding test gas,
- Heated line connection and regulation,
- metric/US style external connections.

Here the approach is to simplify creating a complete system in a cost-efficient way through pre-installed components with hoses connected. We further paid attention to easy access to wear parts and consumables.

1.3 Scope of delivery

- Cooler unit
- Product documentation
- Heated line (optional)

1.4 Ordering instructions

1.4.1 Cooler with Two In-Line Heat Exchangers

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

4496	2	8	2	2	0	X	1	X	X	2	0	0	X	0	0	X	X	X	Product Characteristics
																			Cooler (with 2 in-line heat exchangers)
				2															CU-EMA+: Ambient temperature 50 °C
																			Certifications
					0														Standard applications – CE
																			Supply voltage
						1													115 VAC, 50/60 Hz
						2													230 VAC, 50/60 Hz
																			Heat exchanger
							1	2	2										Glass, 2 x MTG-2, metric
							1	2	7										Glass, 2 x MTG-2-I, US
							1	3	2										PVDF, 2 x MTV-2, metric
							1	3	7										PVDF, 2 x MTV-2-I, US
																			Peristaltic Pumps
										2	0								CPdouble with hose nipple, angled
																			Moisture detector
												0	0	0	0				without moisture detector
												0	1	0	0				1 moisture detector with adapter
																			Options
																0	0		Without option
																0	1		Instrument air purging connection
																1	0		Solenoid valve for test gas
																1	1		Instrument air purging connection and solenoid valve for test gas
																			Heated line
																		0	no heated line
																		1	ready for self-regulating heated line
																		2	-
																		3	-
																		4	-
																		5	ready for regulated heated line
																		6	**5 m** regulated heated line *
																		7	**8 m** regulated heated line *
																		8	**10 m** regulated heated line
																		9	**15 m** regulated heated line

*for 115 VAC only these lengths available

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.

Any unauthorised changes or modifications will void the EU declaration of conformity and approvals of the system.

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 **Electric voltage**

Risk of electric shock

a) Always disconnect the unit from the mains before working on it. After shutting off the power, allow a discharge time of at least 5 seconds.

b) Secure the device from accidental restarting.

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

d) Ensure the correct voltages supply.

DANGER **Toxic, corrosive gas/condensate**

Sample gas/condensate may be hazardous to health.

a) Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.

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

c) Check the lines in and on the device for leaks.

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

e) Protect yourself from toxic/corrosive gasses/condensate when performing maintenance. Wear suitable 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 **Hot surface**

Burning hazard
Let the device cool down before maintaining.

3 Transport and storage

Only transport the product inside the original packaging or a suitable alternative.

The equipment must be protected from moisture and heat when not in use. They must be stored in a covered, dry and dust-free room at a temperature between -20 °C to 40 °C (-4 °F to 104 °F).

CAUTION

Health hazard/tipping hazard

Transport and carry the products in a way which is not damaging to health.

a) If necessary, use aids to facilitate transport and installation.

b) Avoid damage to the product. Handle the product with care.

c) Avoid sudden acceleration.

d) Do not turn the device upside down or stack other items on top of it.

e) Please note the warnings on the packaging (such as "This Side Up", "Fragile", etc.).

4 Installation and connection

4.1 Installation site requirements

The following requirements must be met during installation:

- Never install the device near sources of heat or vibration, in direct sunlight, or near high frequencies or magnetic fields. The operator must install a lightning arrester and overvoltage protection.
- Consider the electromagnetic compatibility of nearby equipment when selecting the installation site.
- To maintain electrical safety, never operate the device in atmospheres with an oxygen content above 21 %.
- The device must be anchored to the wall, which must be able to support the weight.
- Please refer to chapter Appendix/Technical Data for the max. ambient temperature. Operation outside the limits will void the warranty for this device.
- Do not obstruct the convection of the device. Leave adequate space between the vents and the nearest object. The clearance must especially be a minimum of 10 cm on the air outlet side. The air intake and outlet must be clear. Heat may otherwise build up.
- Protect from shock and impact.
- Never expose the display components to external forces.
- Never install the device outdoors.

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.

4.2 Installation

Install the device in the specified position, see chapter Dimensions [> page 32].

CAUTION **Damage/installation**

Avoid damage to the product. Handle the product with care.
If wall brackets are required for installing the device, ensure these meet DIN EN 61010-1.

NOTICE **Please note:**

At the time of delivery, the device has a leak rate of less than 1.5 mbar/h at a test pressure of 160 mbar and an ambient temperature of 20 °C.
Check the system for leaks following transport and installation before starting it. The operator must include this in his risk/safety assessment and if necessary take additional measures to prevent explosion and/or health hazards.
When changing the factory settings, please document the factory presets as well as the changed values.

4.3 Electrical connections

All connection lines can be fed into the device through the cable glands at the bottom.

Include strain relief for the connection cables. The supply line cross-sections must be suitable for the rated current and meet local regulations.

The signal and supply lines of the device must be properly connected.

Please note the clamping points of the following cable glands:

Thread	Clamping range
M25	11.0 mm – 17.0 mm
M20	6.0 mm – 12.0 mm

Both used and unused cable glands must be properly closed, otherwise the IP protection class cannot be maintained.

Run the lines so the insulation will not be damaged. If necessary, secure the lines with suitable means and avoid excess line lengths.

The power supply must be connected as per chapter Connection [> page 9] or per the wiring diagrams.

The power and voltage supply for the components require the following separators:

RCD (if applicable depending on the electrical system), main switch and circuit breaker or fuses.

The following requirements must be met for operation:

- The RCD 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.
- The main switch must be installed near the device, easy to access and marked as a separator. The separator must not be built into the mains connection line, must not interrupt the protective conductor, must separate all current-carrying conductors and must be suitable for the application.
  If a MCCB is used, it must meet the applicable requirements of IEC 60947-2.
  If a device switch is used, it must meet the applicable requirements of IEC 60947-3.
- The circuit breaker/fuses protect all supply lines but not the earth conductor. The fuses should be arranged side by side, have the same rating/characteristic, and not be connected to the neutral wire of multi-phase equipment.

Please refer to chapter Technical Data [> page 30] for the applicable separator data.

DANGER

Electric voltage

Risk of electric shock

a) Always disconnect the unit from the mains before working on it. After shutting off the power, allow a discharge time of at least 5 seconds.

b) Secure the device from accidental restarting.

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

d) Ensure the correct voltages supply.

DANGER

Potential equalisation

Connect the system's potential equalisation to the potential equalisation on site. Stray electric currents may not flow through this connection.

WARNING

Hazardous electrical voltage

The device must be installed by trained staff only.

WARNING

Electric voltage

Insulation test will damage the device

Do not test the electric strength if the entire unit is under high voltage!

CAUTION

Wrong mains voltage

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

CAUTION

Supply cable

The power adapter must be suitable for the maximum power used by the device.
It must be heat-resistant and must not come into contact with hot surfaces. The power supply must meet IEC 60227 or IEC 60245. Or be approved by another recognised testing body.

NOTICE

Please note:

The structure and quality of the electrical installation can have a considerable impact on the reliability and performance of the devices. We therefore strongly recommend the personnel responsible for the electrical installation familiarise themselves with the included circuit diagrams and instructions before planning the installation. Please observe the local laws. The device must be connected by a trained professional. Please also note the operation instructions for the individual devices.

4.3.1 Connection

Type	Voltage	Terminals	Function
Power supply	115VAC/230VAC, 50 Hz/60Hz	X0: 1 + 2 + PE	Input for entire device
Power supply	115VAC/230VAC, 50Hz/60Hz max. 800 VA	X1: 3+ 8 + PE	Output for external consumers
Input contact	max. 115VAC/230VAC, 24 VDC 2 A, 50 VA (or less depending on consumer)	X3: 1 + 3 + PE	Input external consumers (looped through to X4: 2)
Output contacts	max. 115VAC/230VAC, 24 VDC 2 A, 50 VA	X4: 1 + 2	External consumer
		X4: 1 + 3	Sample gas cooler status, moisture and operational regulated heated line

Options

Type	Voltage	Terminals	Function
Power supply	115VAC/230VAC, 50Hz/60Hz max. 1600 VA	X2: 1 + 2 + PE	Output regulated heated line
Power supply	115VAC/230VAC, 50Hz/60Hz max. 1600 VA	X2.1 1 + 2 + PE	Output self-regulating heated line
Inputs (customer mains)	24 VDC/18 mA	X4: 4 + 5	Control for optional test gas solenoid valve
	115VAC/230VAC/6 mA	X4: 6 + 7	
Input PT100	---	X5: 1 + 2	Input regulated heated line

NOTICE

The connection cable of the PT100 is to be wound around the attached ferrite core by the customer!

4.4 Gas Connections

Please refer to the assembly plan in chapter Dimensions [> page 32] for the number and positions of gas connections

The heated sample gas line must have a downward slant toward the gas inlet.

After connecting the sample gas line it must be braced and secured with the clamp. Longer sample gas lines may require additional clamps along the device path.

DANGER

Toxic, corrosive gases, sample gas can be harmful.

Sample gas/condensate may be hazardous to health.

a) Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.

b) If necessary, ensure safe gas discharge.

c) Switch off the gas supply before performing maintenance and protect from opening inadvertently.

d) Wear suitable protective equipment when performing maintenance to protect yourself from toxic/corrosive gases/mediums.

e) Also protect yourself with a suitable gas sensor when asphyxiant gases such as N2 occur in the gas path.

DANGER

High pressure, danger due to gases being discharged at high pressure!

a) Disconnect the device from the system pneumatics.

b) Release pressure from the lines before beginning work.

c) Secure the equipment from accidentally being reconnected to the pneumatic supply

DANGER

Sample gas can be harmful.

Always install the sample gas outlet in a location where persons will not be harmed. Ensure the lines and connections are leak-proof.

DANGER

Gas emanation

Danger to life due to gas leaks if used incorrectly.

a) Always use the device as specified in this manual. Observe the process conditions.

b) Gas connections must be connected with suitable connectors and be connected correctly.

c) The gas connection must be checked for leaks. Secure the lines adequately.

5 Operation and control

NOTICE

Only operate the device with the door closed and within the specifications!

After starting the device via circuit breaker FC43, the display of the sample gas cooler will show the software version, then the block temperature. The display S2 will stay on until the block temperature has reached the preset value (± adjustable alarm range). The status contact is in the Alarm position.

Once the target temperature range has been reached and the moisture detector does not report an error, the temperature will continuously be displayed and the status contact switches over. With the optional regulated heated line, the temperature signal will also be sent to the status contact.

If the display flashes during operation or an error message appears, please refer to item "Troubleshooting".

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

5.1 Description of functions

The sample gas cooler is controlled by a microprocessor.

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 (36 to 68 °F) (factory setting 5 °C/41 °F).

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 settings for both values are 3 K.

The flashing and an LED on the display unit plus the potential-free contact indicate the warning range has been overrun or underrun (e.g. after switching on) plus the potential-free contact.

5.2 Use of menu functions

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!)

5.2.1 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.**

5.2.2 Menu navigation overview

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.

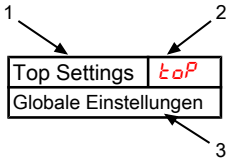
The following image shows an overview of the menu structure.

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

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

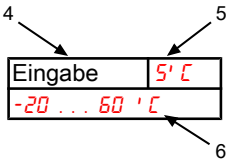
You can cancel entries and menu selections without saving by pressing the **ESC** key.

Menu:

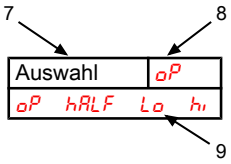


1. Menu designation
2. Display
3. Brief description

Parameter:

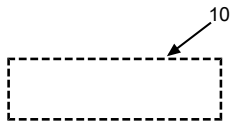


4. Value input
5. Factory preset
6. Parameter range



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

Optional menu navigation:



10. dashed box = Optional

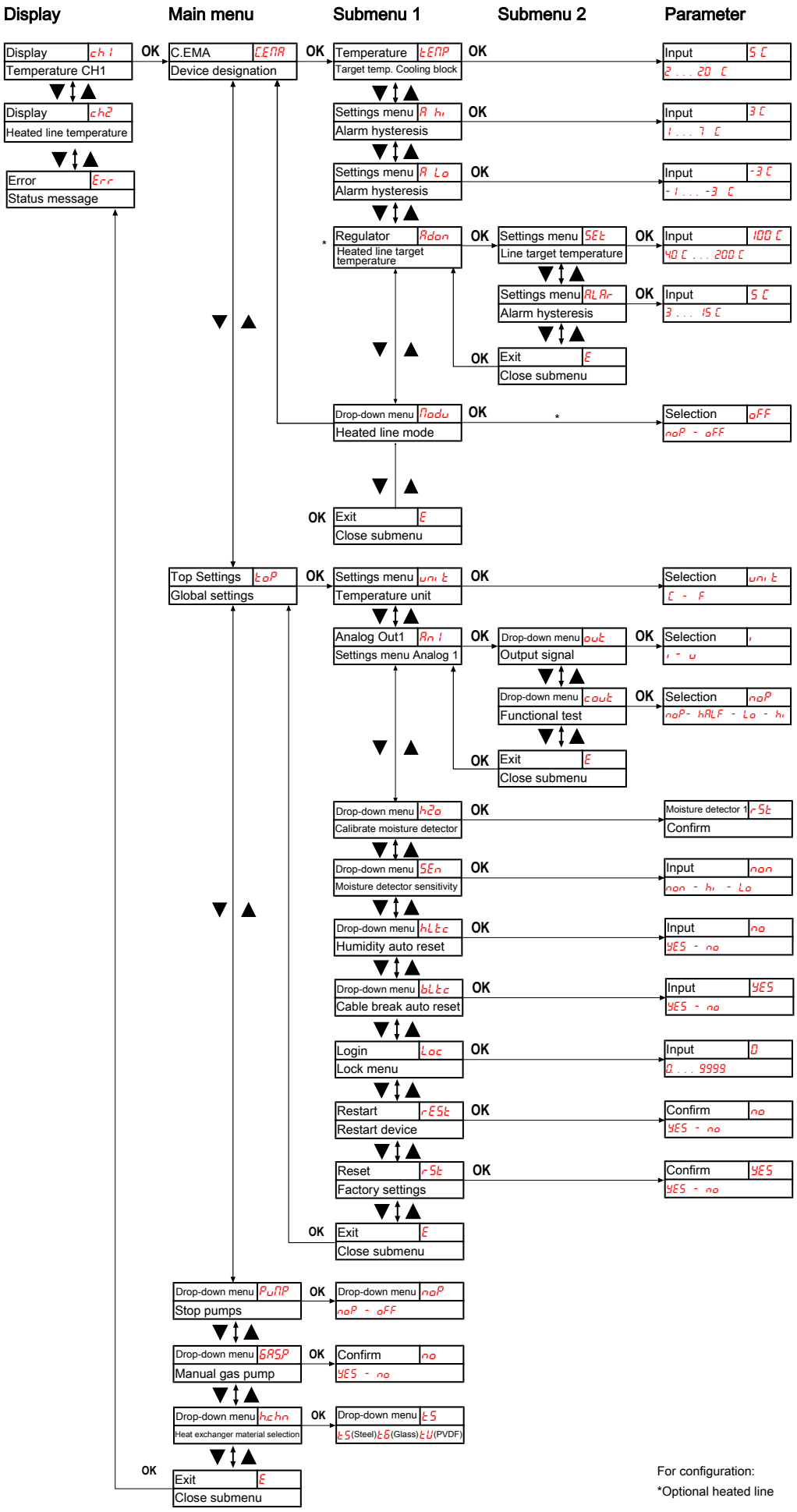


Fig. 1: Menu Overview CU-EMA+

5.3 Description of menu functions

5.3.1 Main menu

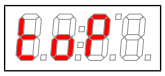
CU-EMA+ cooler

Display → CEMA

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

Global setting

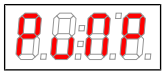
Display → toP (ToP Settings)



This menu is used to configure the global cooler settings.

Peristaltic Pump

Display → PUMP



Switching the peristaltic pump on and off.

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

Sample gas pump (not applicable)

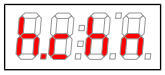
Display → GASP

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

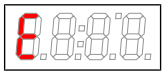


Heat exchanger material selection

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

Exit main menu

Display → E



Selecting this will return you to display mode.

5.3.2 Submenu 1

Target temperature

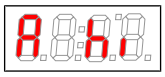
Display → Cooler → tEMP

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

Display → Cooler → A hi (Alarm high)

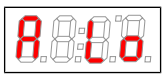


Here you can set the upper threshold for the visual signal and the alarm relay. The alarm limit is set based on the cooler temperature setting.

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

Display → Cooler → A Lo (Alarm low)

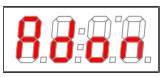


Here you can set the lower threshold for the visual signal and the alarm relay. The alarm limit is set based on the cooler temperature setting.

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

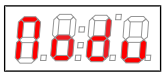
Display → tcAR → Rdon



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

Display → Cooler → Modu

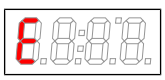


Used to de(activate) the heated line.

Parameter range:	noP, oFF
Factory setting:	oFF
Note:	This menu item is hidden if the keylock is enabled.

Exit submenu 1

Display → Submenu → E

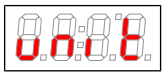


Selecting this will return you to the main menu.

5.3.3 Submenu 1 (global settings)

Temperature unit

Display → toP → unit

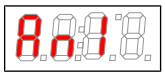


Used to select the temperature display unit.

Parameter range:	C, F
Factory setting:	C

Analog output (not applicable)

Display → toP → An1

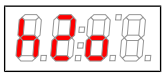


This submenu is used to specify the settings for analog output 1, see chapter Submenu 2 (Analog Output 1)

Note:	This menu will be hidden if the menu is locked.

Calibrate moisture detector

Display → toP → h2o



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: manual or 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 disabled. no: The status message will automatically be cleared/the pumps will be released 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.

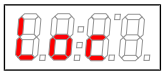
Determines whether the cable break alarm must be reset manually or will automatically clear on valid measuring signal.

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 hno1 .

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

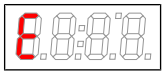
Display → toP → rSt

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.

5.3.3.1 Submenu 2 (Analog Output 1)

The analog output will display the actual cooler temperature.

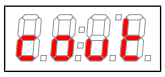
Signal behaviour

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 → An1 → cout

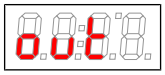


This setting determines how the analogue output will behave.

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 → An1 → out

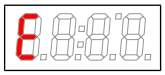


Select the type of output signal.

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

Exit Submenu 2

Display → toP → An1 → E



Selecting this will return you to submenu 1.

5.3.4 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.

5.3.5 Description of Other Options

The instrument air inlet can be used to purse the device/sample gas path with instrument air in both directions.

When connecting power to terminals X4: 4 + 5 or X4: 6 + 7 the solenoid valve can be controlled for adding test gas.

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.
- Observe the respective safety regulations and operating specifications when performing any type of maintenance.
- Always use genuine spare parts.

DANGER

Toxic, corrosive gas/condensate

Sample gas/condensate may be hazardous to health.

a) Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.

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

c) Check the lines in and on the device for leaks.

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

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

DANGER

High pressure, danger due to gases being discharged at high pressure!

a) Disconnect the device from the system pneumatics.

b) Release pressure from the lines before beginning work.

c) Secure the equipment from accidentally being reconnected to the pneumatic supply

DANGER

Electric voltage

Risk of electric shock

a) Always disconnect the unit from the mains before working on it. After shutting off the power, allow a discharge time of at least 5 seconds.

b) Secure the device from accidental restarting.

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

d) Ensure the correct voltages supply.

WARNING

Electric voltage

Insulation test will damage the device

Do not test the electric strength if the entire unit is under high voltage!

CAUTION

Hot surface

Burning hazard

Let the device cool down before maintaining.

6.1 Maintenance Intervals

The frequency of inspections depends on the operating conditions and may need to be adjusted by the operator.

We recommend at a minimum observing the following maintenance and inspection intervals:

Maintenance interval and items	
Entire device: 6 months	Functional test
Entire device: 3 months and before restarting	Test tightness
Entire device: weekly and before restarting	Visual inspection: Check for leaks and corrosion, check seals, replace parts if damaged or worn
Peristaltic pump: 3 months and before restarting	Pump maintenance, e.g. checking hoses or replace wear items
Moisture detector: 3 months and before restarting	Cleaning and calibrating the moisture detector
Periodic inspections	See national regulations

Devices must be inspected regularly to maintain their proper condition. Please observe the national regulations.

All maintenance work is detailed in the respective manual for the component.

Damaged warning signs must be replaced.

Occasionally verify the operation instructions, drawings and operation instructions are complete. These must be in good condition. If necessary, replace with new copies.

6.2 Cleaning

NOTICE

Please note:

Always clean the system dry.
Also observe the instructions for individual components in the event of exceptions.
Particularly observe the warnings in chapter Maintenance.

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

For further information about our services and customised maintenance visit http://www.buehler-technologies.com/service.

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

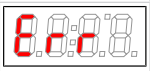
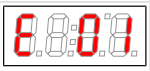
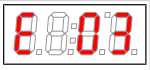
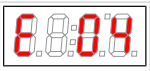
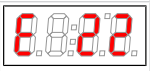
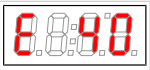
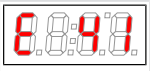
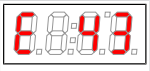
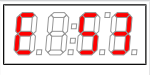
Problem / Malfunction	Possible cause	Action
Condensate inside the gas output	– External condensate trap full	– Empty external condensate trap
	– Cooler overload	– Maintain limits
	– Peristaltic pump failure	– See separate peristaltic pump instructions
Reduced gas flow rate	– Gas circuit clogged	– Remove 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 build-up)
	– Flow rate / dew point / gas temperature too high	– Maintain limits / install pre-separator
	– Built-in fan stopped	– Check and replace if necessary
Temperature low	– Control unit failure	– Send in cooler

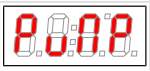
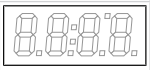
7.1.1 Error messages on the display

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 (reference temperature Delta-T)	– 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
	H2o.2	– Moisture alarm moisture detector 2	– Dry – Check condensate trap
	init	– Initialization phase	– Wait
	PuMP	– Pumps deactivated	– Reactivate pumps from 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.

DANGER

Electric voltage

Risk of electric shock

a) Always disconnect the unit from the mains before working on it. After shutting off the power, allow a discharge time of at least 5 seconds.

b) Secure the device from accidental restarting.

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

d) Ensure the correct voltages supply.

DANGER

Toxic, corrosive gas/condensate

Sample gas/condensate may be hazardous to health.

a) Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.

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

c) Check the lines in and on the device for leaks.

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

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

DANGER

High pressure, danger due to gases being discharged at high pressure!

a) Disconnect the device from the system pneumatics.

b) Release pressure from the lines before beginning work.

c) Secure the equipment from accidentally being reconnected to the pneumatic supply

WARNING

Electric voltage

Insulation test will damage the device

Do not test the electric strength if the entire unit is under high voltage!

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.

CAUTION **Hot surface**

Burning hazard
Let the device cool down before maintaining.

7.3 Replacing the hose of the peristaltic pump

- Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.
- Close gas supply.
- Disconnect device from power.
- After shutting off the power, allow a discharge time of at least 5 seconds.
- Loosen the 4 service cover service cover screws and remove cover.
- Disconnect supply and discharge tube from the pump (**observe safety notes!**).
- Loosen but do not remove centre knurled nut. Flip the screw to the side.
- Pull cover up and off.
- Unplug external connections and remove hose.
- Replace hose (Bühler spare part) and install pump in reverse order.
- Attach the service cover with the 4 screws.
- Restore the power and gas supply.

7.4 Cleaning and Calibrating the Moisture Detector

Moisture detectors only need to be replaced or serviced if unexpectedly trip or are damaged. If they are clogged, we recommend checking if using a filter will avoid future occurrences.

- Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.
- Close gas supply.
- Switch off and unplug the device (also applies to external controller voltage).
- After shutting off the power, allow a discharge time of at least 5 seconds.
- Uninstall, clean and reinstall moisture detector.
- Restore the power and gas supply.
- The device can be calibrated as described in the menu navigation above.

7.5 Cleaning and removal of the heat exchanger

Heat exchangers only need to be replaced or maintained if clogged or damaged. If they are clogged, we recommend checking if using a filter will avoid future occurrences.

- Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.
- Connect hoses or maintain.
- Close gas supply.
- Switch off the device and disconnect all plugs (also applies to external controller voltage).
- After shutting off the power, allow a discharge time of at least 5 seconds.
- Disconnect gas connections and condensate drain.
- Pull the heat exchanger up and out.

- Clean cleaning nest (hole inside the cooler block), as the heat exchangers are installed with silicone grease.
- Purge the heat exchanger until all contaminants have been removed.
- Grease the cooled outside surface external surface with silicone grease.
- Reinsert the heat exchanger into the cooling nest with a rotating movement.
- Reconnect the gas supply and condensate drain. The gas inlet is marked red.
- Restore power/gas supply and wait for unit to be ready for operation.

7.6 Replacing the Microfuse for the Expansion Module/Regulator

- Close gas supply.
- Switch off and unplug the device (also applies to external controller voltage).
- After shutting off the power, allow a discharge time of at least 5 seconds.
- Unscrew the metal cover between the lower conduit to access the board.
- Replace microfuse (pos. F1, F2 or F3).

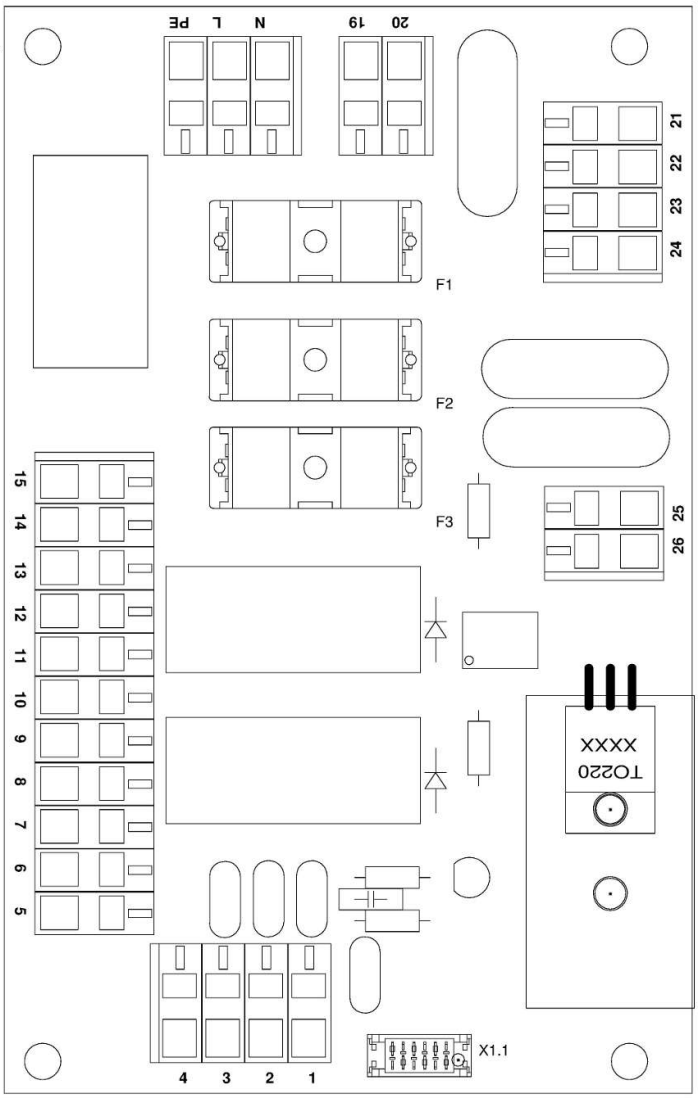


Fig. 2: Add-on electronics wiring diagram

No.	Function	Fusing	
F1	Main unit + pumps	0.5 A delayed action	
F2	self-regulating, heated line	8 A delayed action	(for built-in regulator use 63 mA delayed action)
F3	Built-in regulator	8 A delayed action	(for self-regulating heated line use 63 mA delayed action)

- The fuse is located under a plastic cap on the top board. Replace micro-fuse and put the cap back on. Please note the mains voltage in order to select the correct micro-fuse.
- Restore the power and gas supply.

7.7 Replacing the Solenoid Valve

- Purge the device with inert gas or air (only when non-flammable gases inside the gas path) for some time before connecting the lines or performing maintenance.
- Close gas supply.
- Switch off and unplug the device (also applies to external controller voltage).
- After shutting off the power, allow a discharge time of at least 5 seconds.
- Replace the solenoid valve.
- Restore the power and gas supply.

7.8 Replacing the Relays

- Close gas supply.
- Switch off and unplug the device (also applies to external controller voltage).
- After shutting off the power, allow a discharge time of at least 5 seconds.
- Replace the relay.
- Restore the power and gas supply.

7.9 Spare parts

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

Upgrade and expansion parts can be found in our catalogue.

Please refer to the individual instructions for additional spare parts.

7.9.1 Spare parts and accessories

Item no.	Description
44922420102	Peristaltic pump CPdouble and replacement tube
41111000	Moisture detector and flow cell, various models
9148000182	Solenoid valve, 24 VDC
9120020143	230 VAC relay for controlling the solenoid valves
9120020139	24 VDC relay for controlling the solenoid valve
9110000008	Microfuse 500 mA delayed action, 5x20 mm
9110000032	Microfuse 63 mA delayed action, 5x20 mm
9110000067	Microfuse 8 A delayed action, 5x20 mm

8 Disposal

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.**

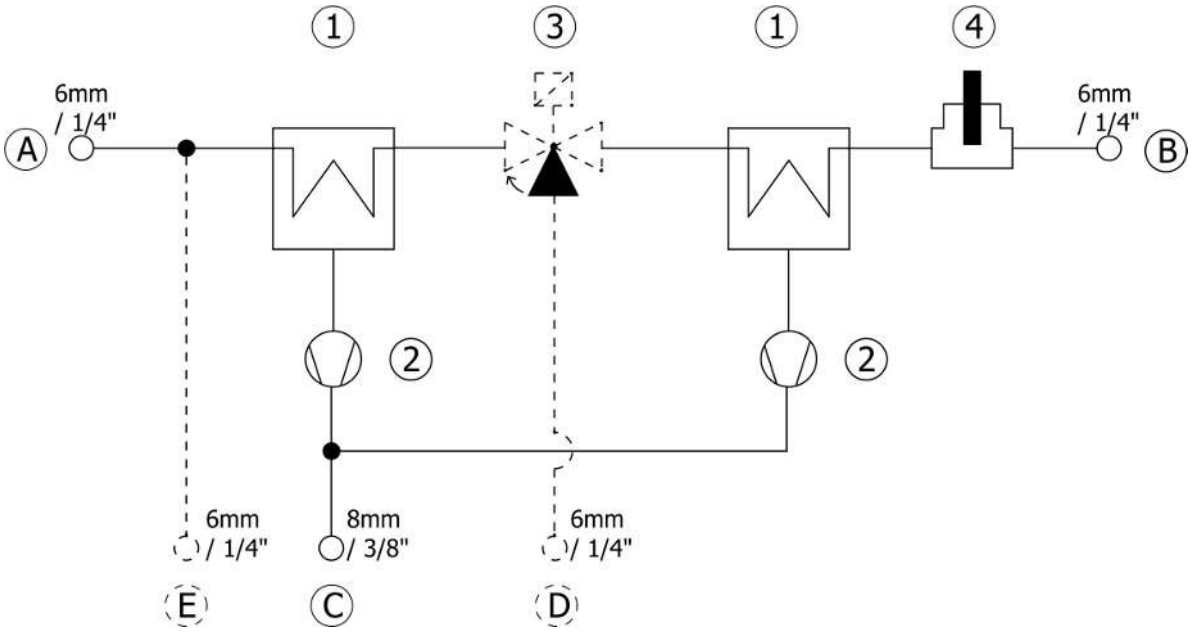
Please return waste electrical and electronic equipment to the following address:

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 Flow Diagram



A	Sample gas input	1	Cooler unit
B	Sample gas output	2	Condensate pumps
C	Condensate output	3	Solenoid valve for adding test gas (optional)
D	Test gas input (optional)	4	Moisture detector
E	Instrument air input (optional)		

9.2 Technical Data

Technical Data	
Type tested:	**DNV GL** rules for classification Ships, offshore units, and high speed and light craft Certificate no.: TAA00002RE **Lloyd's Register** Type Approval System, Test Specification Number 1 - March 2019 Certificate no.: LR2008137TA
Ambient categories as per DNVGL-CG-0339:	Temperature: A Humidity B Vibration A EMC A Housing: B
Environmental categories as per LR:	ENV1, ENV2

Switch cabinet	
Dimensions (h x w x d):	500 x 500 x 300 mm
Material	Sheet steel, RAL 7035, single door
Degree of protection	IP44
Weight	31 kg
Climatic conditions	
Ambient temperatures:	+5 °C ... +50 °C
Storage temperatures:	-20 °C ... +40 °C
Cooler Data	
Ready for operation	after max. 10 minutes
Gas output dew temperature preset: adjustable:	5 °C 2 °C...20 °C
Static dew point stability: throughout the specification range:	+- 0.1 K +- 1.5 K
Inlet dew point max.:	+70 °C Gas input temperature on heat exchanger max. 140 °C
Rated cooling capacity (at 25 °C):	110 kJ/h
Other data	
Gas connections:	see flow diagram
Parts in contact with media:	PVDF, stainless steel, PTFE, Norprene, Viton, epoxy resin
Gas path media pressure:	max. 0.3 bar(g) (also observe the permissible pressures of the upstream and downstream components)
Electrical data	
Supply:	115 VAC/230 VAC, 50/60 Hz, back-up fuse/MCB with 16 A, RCD with tripping current 30 mA (if applicable depending on electrical system), cable clamps, cable cross-section 1.5...2.5 mm^2 shielded
Cooler: (power supply + peristaltic pump)	230 VAC. 300 VA
Status contact cooler, moisture and optional regulated heated line	max. 230 VAC, 24 VDC, 2 A, 50 VA, cable clamps, cable cross-section 0.75...2.5 mm^2 shielded
Max. additional consumers (e.g. heated probe)	115 VAC/230 VAC, 800 VA, cable clamps, cable cross-section 1.5...2.5 mm^2
Transfer clamps (e.g. status contact heated probe)	Cable clamps, cable cross-section 0.75...2.5 mm^2

9.3 Technical Data - Options

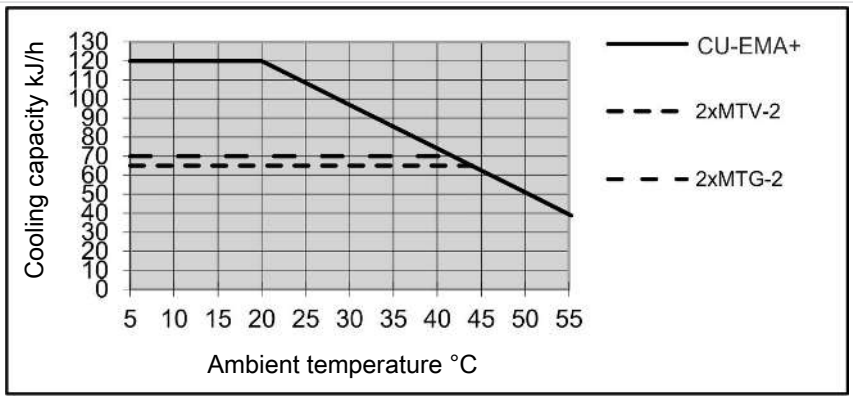
Controller for heated line	
Temperature, preset: adjustable:	 180 °C 40 °C ... 200 °C
Flow:	max. 115 VAC/230 VAC 1600 VA cable clamps, cable cross-section 1.5...2.5 mm²
Sensor type:	Pt100, 2-wire
Connection:	Cable clamps, cable cross-section 0.5...2.5 mm²

Self-regulating heated line	
Flow:	max. 115 VAC/230 VAC 1600 VA cable clamps, cable cross-section 1.5...2.5 mm²

Test gas solenoid valve	
Flow:	Activated with customer power via 230 VAC relay (Attention: cannot be activated with 115 VAC) or 24 VDC, cable clamps, cable cross-section 0.75...2.5 mm²

9.4 Outlet

Two heat exchangers	
Model CU-EMA+	
Rated cooling capacity (at 25 °C)	110 kJ/h
max. ambient temperature	55 °C
Dew point fluctuations static in the entire specification range	 ± 0.1 K ± 1.5 K
Temperature difference between heat exchangers	< 0.5 K



Remark: The limit curves for the heat exchangers MTV-2 and MTG-2 apply at a dew point of 50 °C. Depending on the installation version, the cooling capacity curve may vary.

9.4.1 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.

9.4.2 Heat exchanger overview

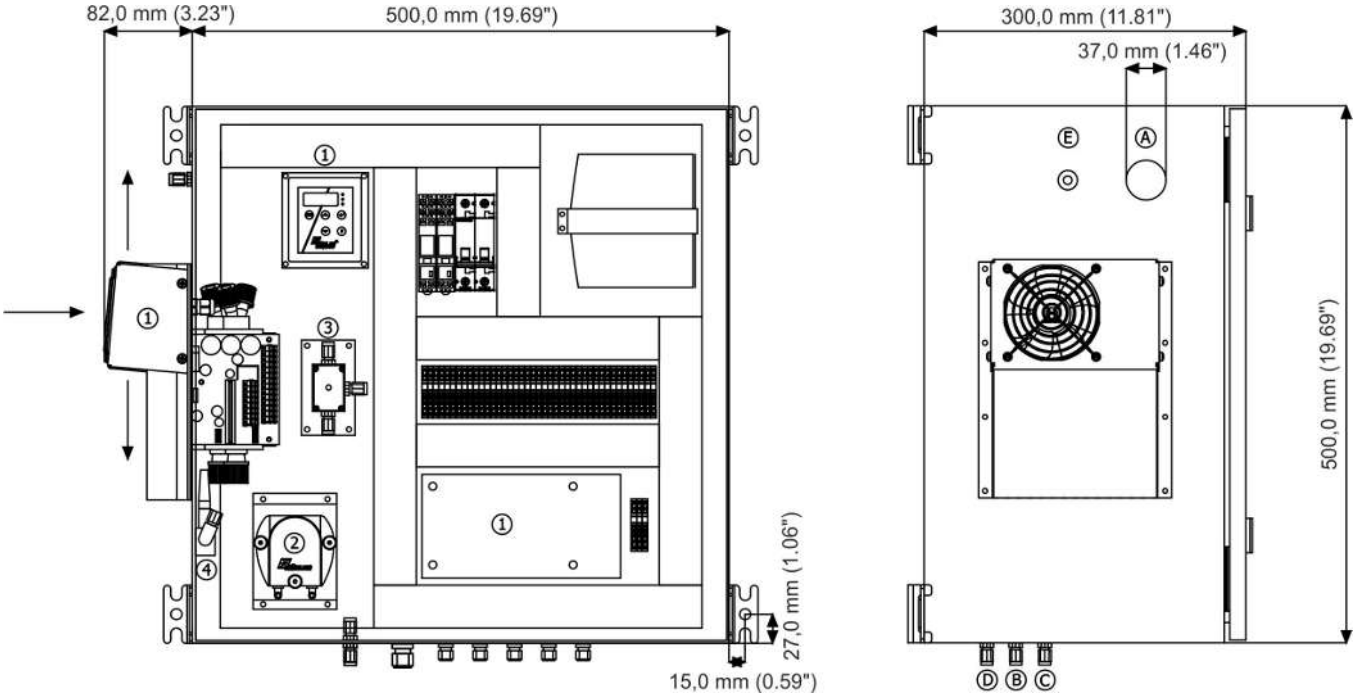
Heat exchanger	2x MTG-2	2x MTV-2 2x MTV-2-I [2]
Materials in contact with media	Glass PTFE	PVDF
Flow rate v_{max} [1]	210 Nl/h	190 Nl/h
Inlet dew point $\tau_{e,max}$ [1]	70 °C	70 °C
Gas inlet temperature $\vartheta_{G,max}$ [1]	140 °C	140 °C
Max. Cooling capacity Q_{max}	80 kJ/h	65 kJ/h
Gas pressure p_{max}	3 bar	2 bar
Pressure drop Δp (v=150 L/h)	19 mbar	18 mbar
Dead volume V_{tot}	38 ml	36 ml
Gas connections (metric)	GL14 (6 mm) [3]	DN 4/6
Gas connections (US)	GL14 (1/4") [3]	1/4"-1/6"
Condensate out connection (metric)	GL18 (8 mm) [3]	G1/4
Condensate out connection (US)	GL18 (8 mm) [3]	NPT 1/4"

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

[2] Models marked I have NPT threads or US tubes, respectively.

[3] Gasket inside diameter

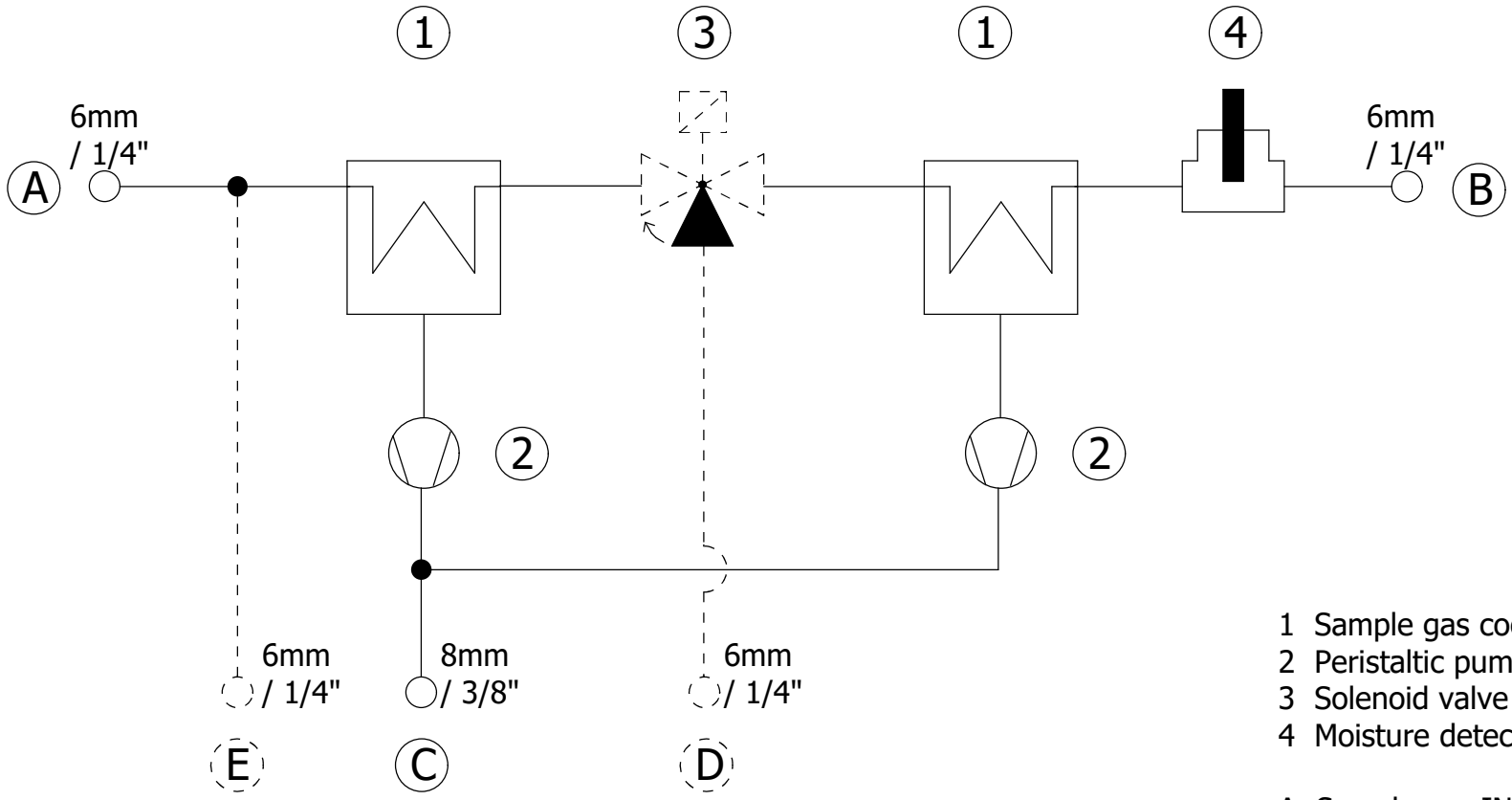
9.5 Dimensions



1	Sample gas cooler and analyser	A	Sample gas input (6 mm / 1/4")
2	Peristaltic Pump	B	Sample gas output (6 mm / 1/4")
3	Solenoid valve for adding test gas (optional)	C	Condensate output (6 mm / 3/8")
4	Moisture detector	D	Test gas input (optional) (6 mm / 1/4")
		E	Instrument air input (optional) (6 mm / 1/4")

10 Attached documents

- Wiring diagram 51/R1256
- CPsingle CPdouble operation instructions
- Moisture detector data sheet
- Solenoid valve operation instructions
- Solenoid valve data sheet
- Circuit breaker data sheet
- Sample gas line data sheet
- Sample gas line drawing
- 24 V relay data sheet
- 230 V relay data sheet
- Mains filter data sheet
- Power supply data sheet
- Declaration of Conformity KX440012
- RMA - Decontamination Statement



1 Sample gas cooler
2 Peristaltic pump
3 Solenoid valve test gas
4 Moisture detector

A Sample gas IN
B Sample gas OUT
C Condensate OUT
D Test gas IN (OPTION)
E Instrument air IN (OPTION)

c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description: Cooling Unit CU-EMA+

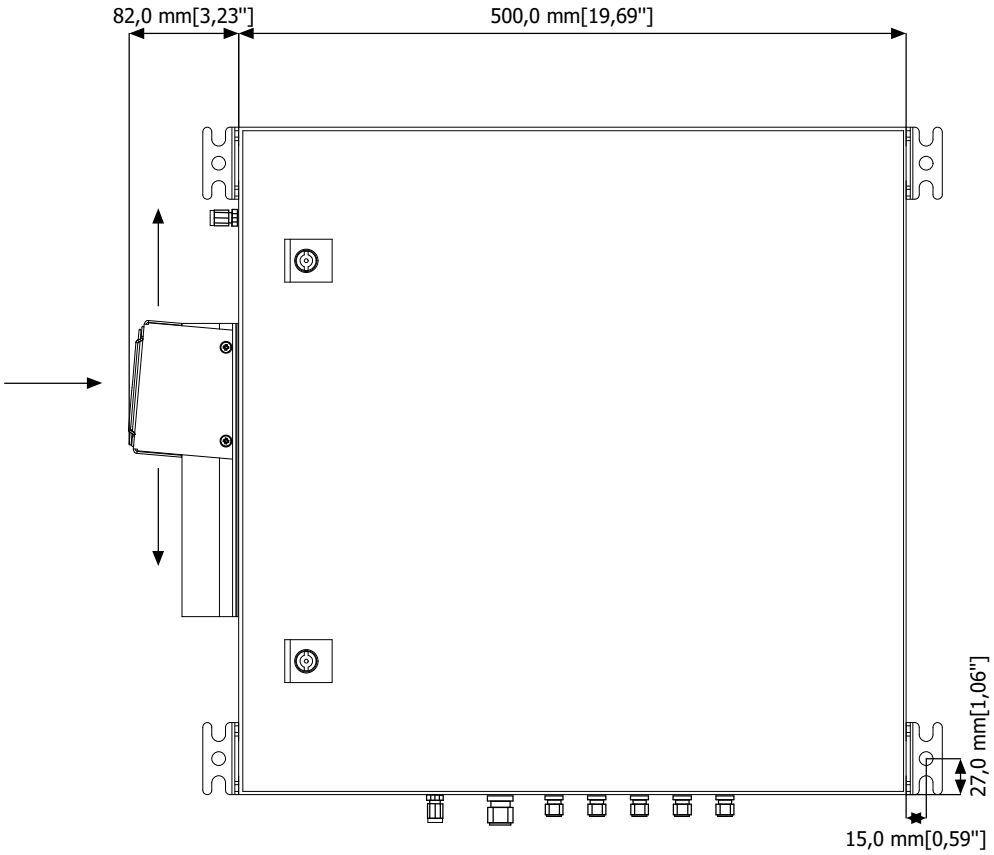
page description: Flow diagram

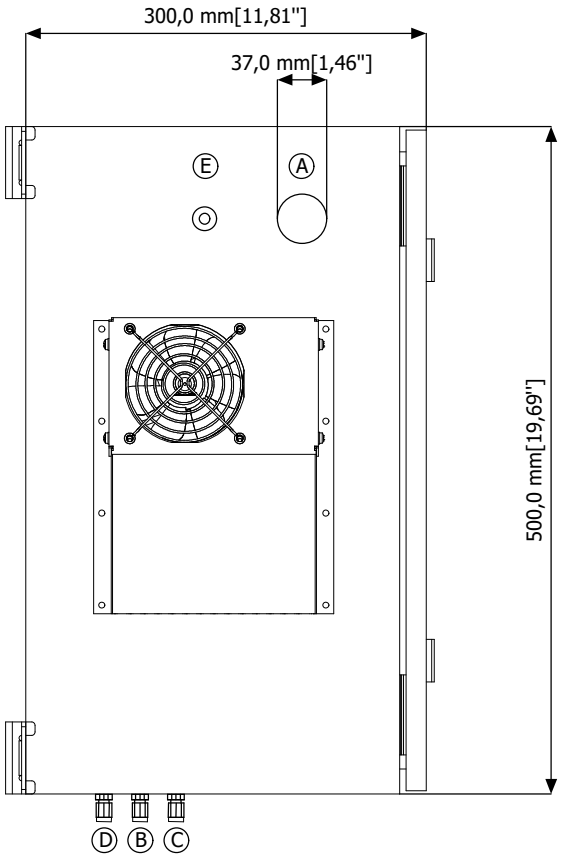
drawing number: 51/R1256

job account number:

customer:

pg. 1
pg. 8





A Sample gas IN
B Sample gas OUT
C Condensate OUT
D Test gas IN (OPTION)
E Instrument air IN (OPTION)

c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description: Cooling Unit CU-EMA+

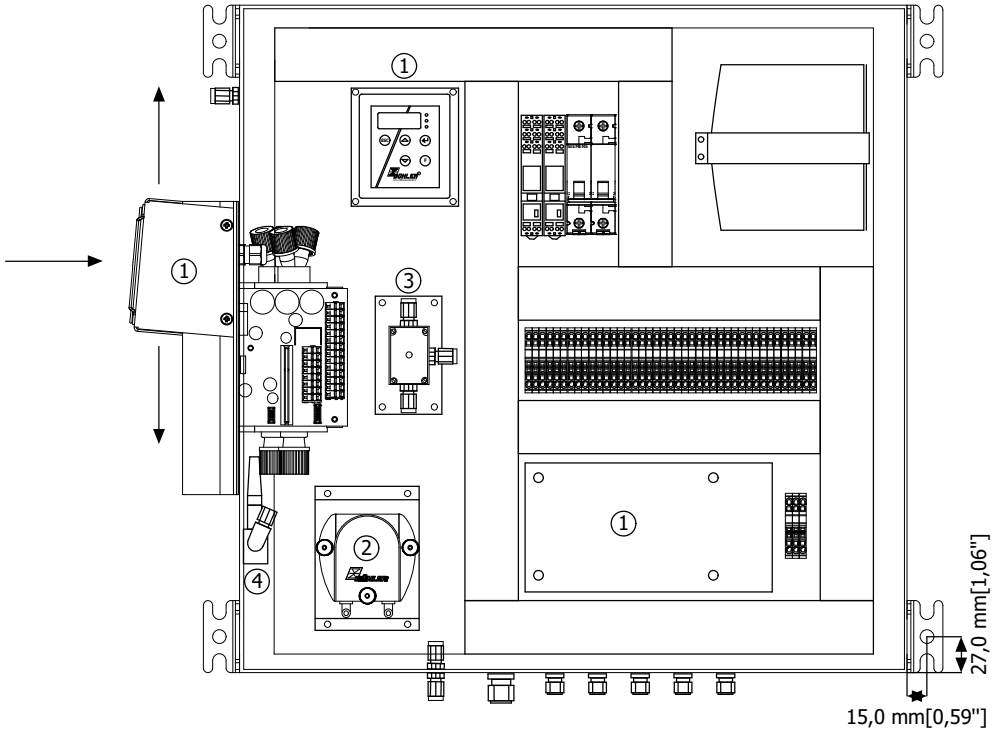
page description: System structure

drawing number: 51/R1256

job account number:

customer:

pg. 2
pg. 8



1 Sample gas cooler
2 Peristaltic pump
3 Solenoid valve test gas
4 Moisture detector

c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description: Cooling Unit CU-EMA+

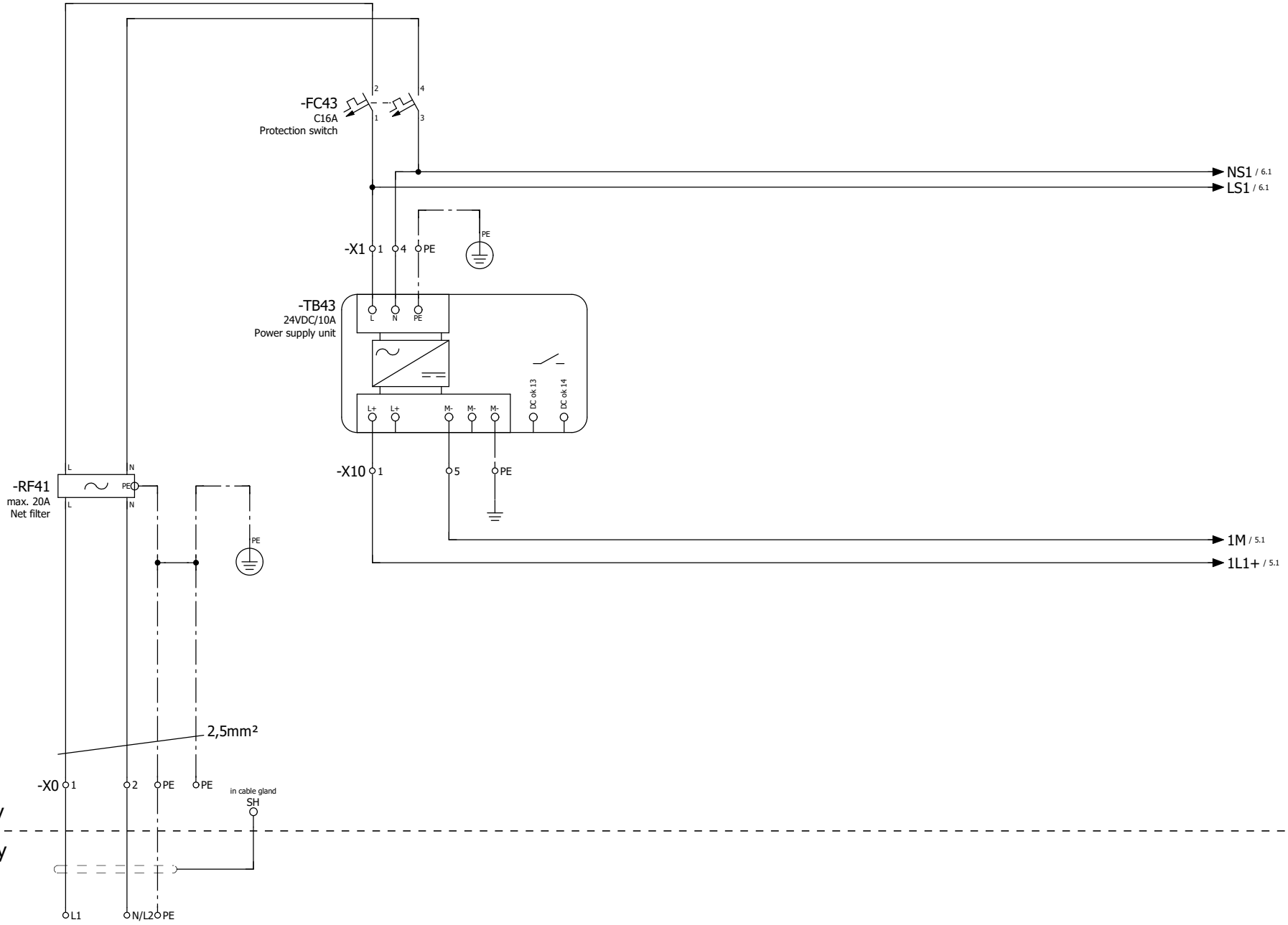
page description: System structure

drawing number: 51/R1256

job account number:

customer:

pg. 3
pg. 8



Power supply
115/230VAC / 50/60Hz / 16A

3

5

c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description:
Cooling Unit CU-EMA+

page description:
Power supply

drawing number:
51/R1256

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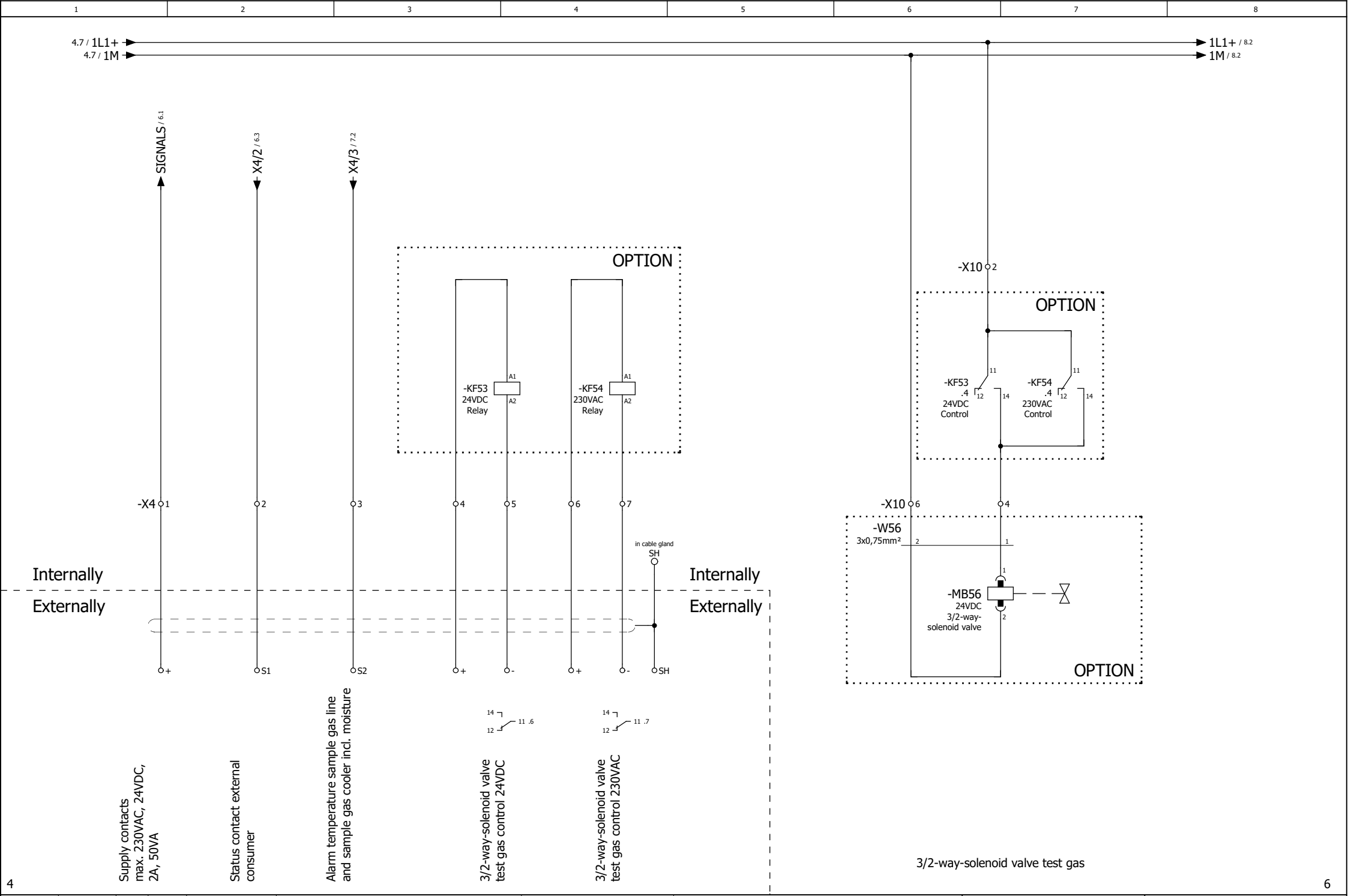
job account number:

customer:

pg. 4
pg. 8



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c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description:
Cooling Unit CU-EMA+

page description:
Signals from/to customer
Solenoid valve

drawing number:
51/R1256

job account number:

customer:

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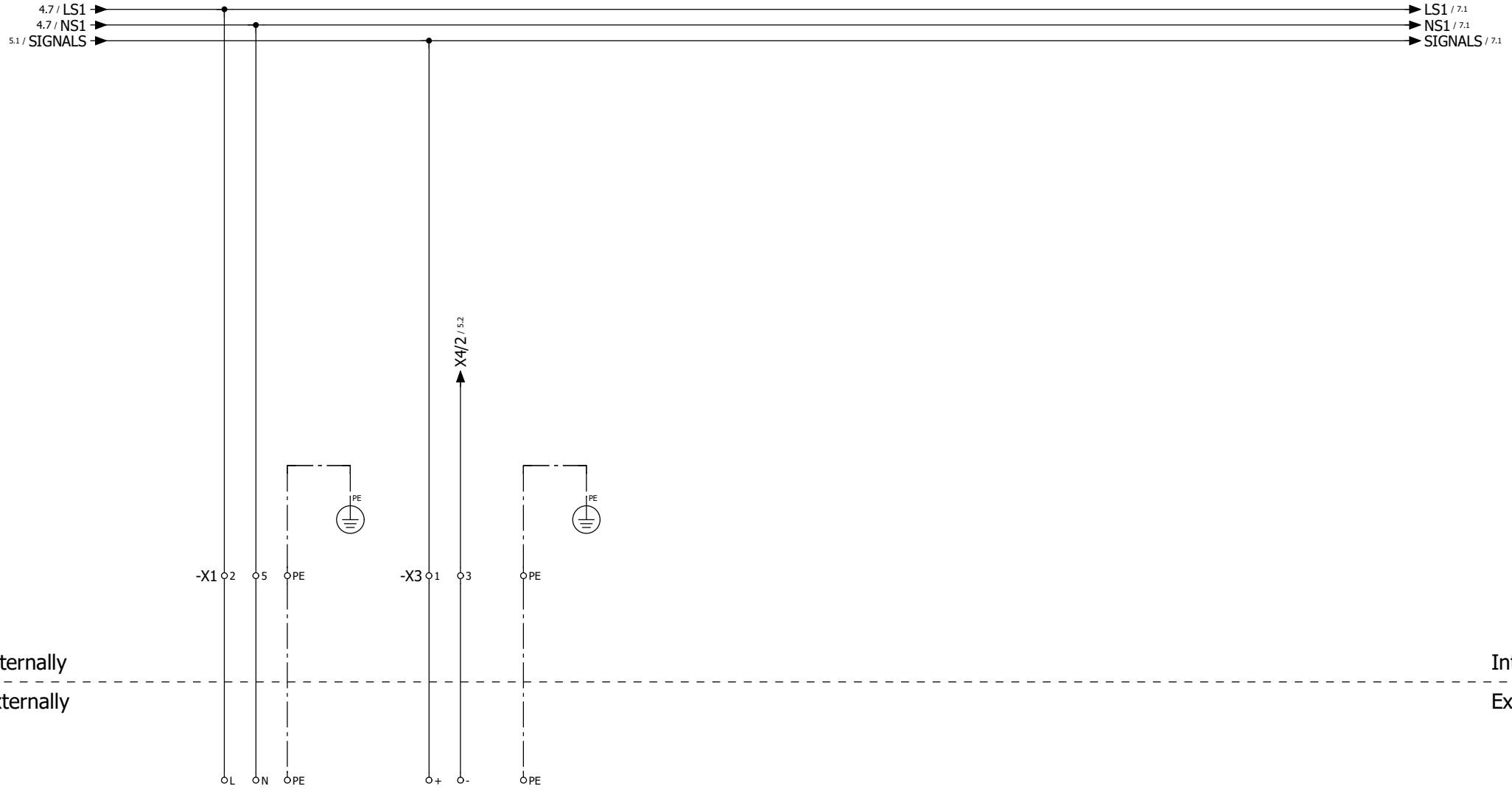
pg. 5
pg. 8



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c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description:
Cooling Unit CU-EMA+

page description:
Sample gas probe

drawing number:
51/R1256

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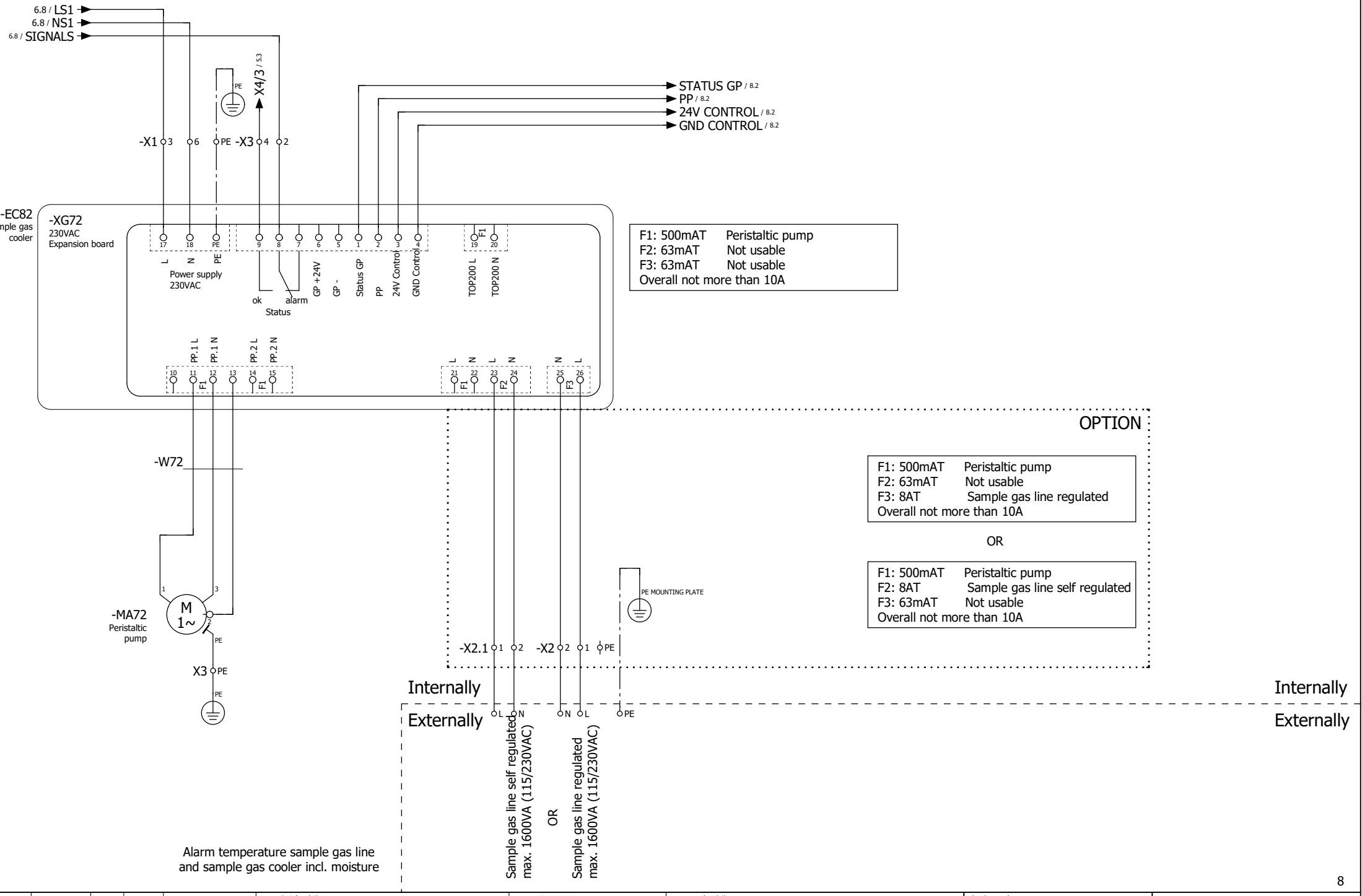
job account number:

customer:

pg. 6
pg. 8



c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description: Cooling Unit CU-EMA+

page description: Sample gas cooler Peristaltic pump

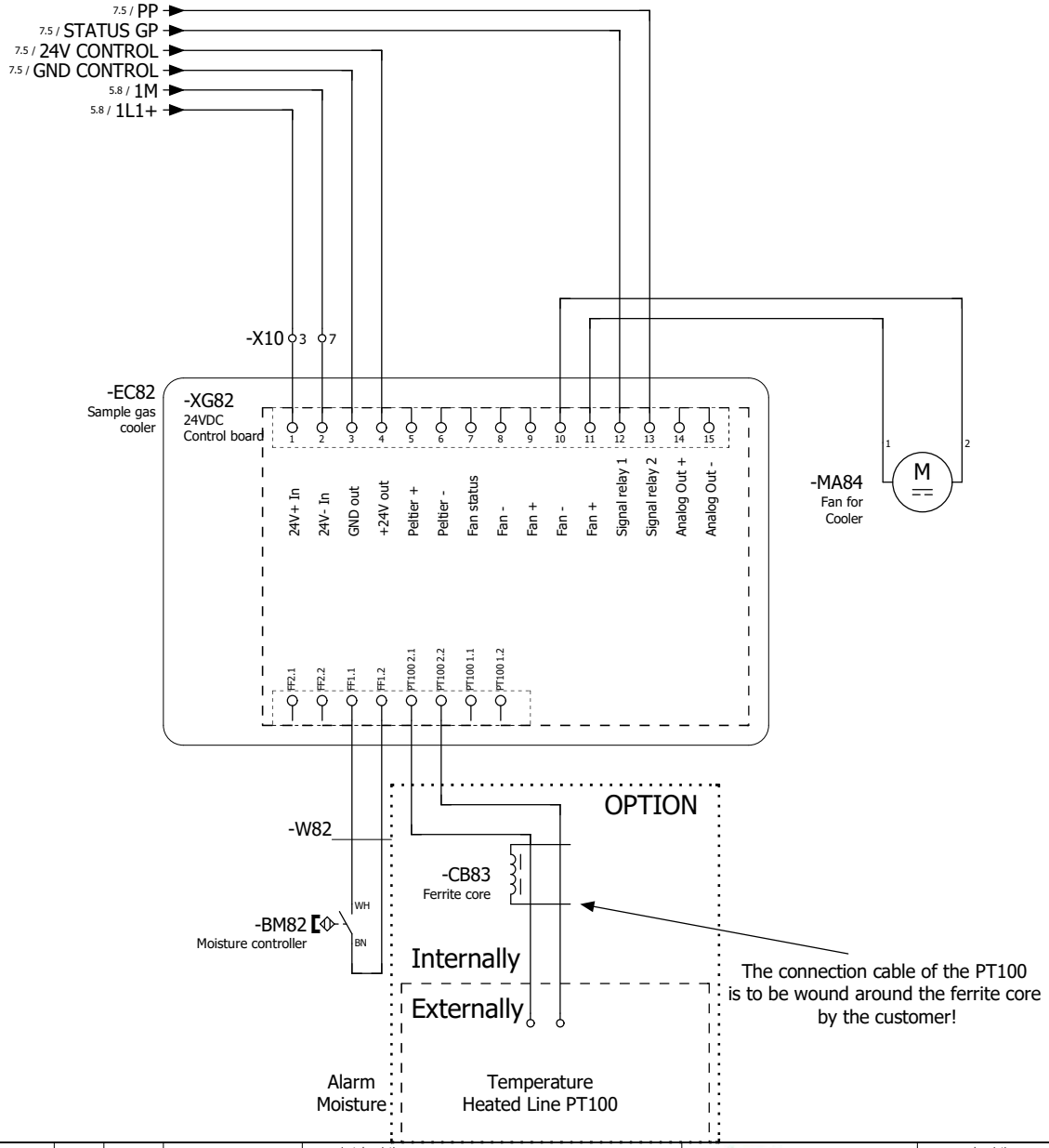
drawing number: 51/R1256

job account number:

customer:

pg. 7

pg. 8



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c			certif.	Kreutner, Kade
b			proces.	Zaunbrecher
a			date	24.05.2023
amendment	date	name	PCS	**CU-EMA+ (EN)**

project description: Cooling Unit CU-EMA+

page description: Sample gas cooler

drawing number: 51/R1256

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job account number:

customer:

pg. 8

pg. 8

Gas Analysis

Peristaltic condensate and metering pumps

CPsingle, CPdouble

Installation and Operation Instructions

Original instructions

BE450021
01/2022

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Internet: www.buehler-technologies.com
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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.

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.

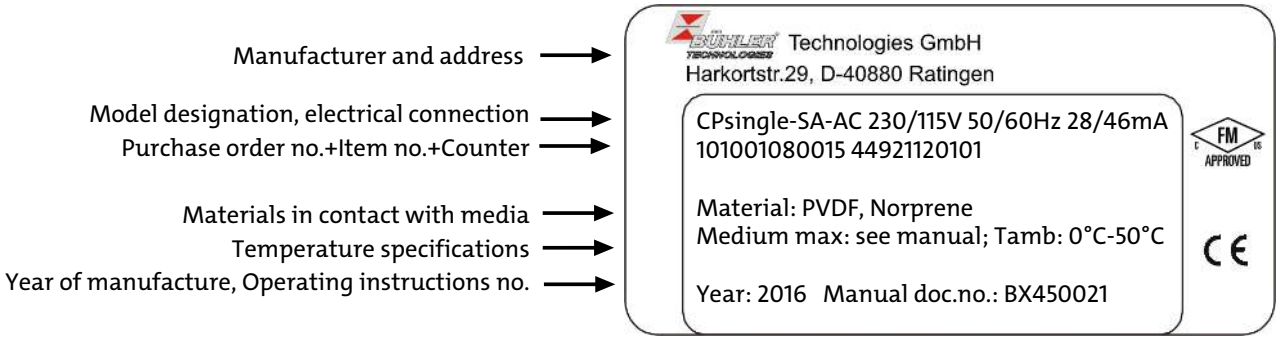
Water and contaminants must be prevented from entering the unit.

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.

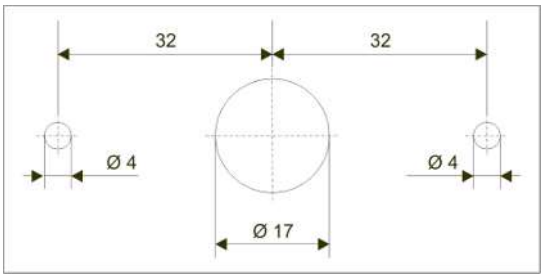
There are two holes at the bottom of the mounting bracket. These can be used for screws.

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:

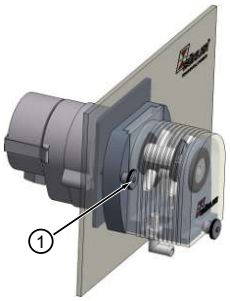
Prepare the mounting plate for the pump. The locations of the bores are indicated in the adjacent drawing. The mounting plate must not be thicker than 3 mm.



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

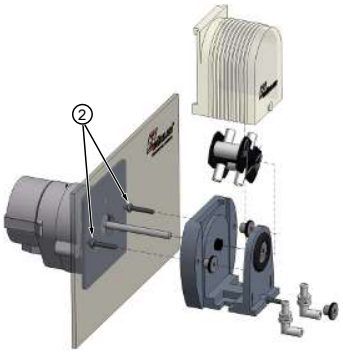
Pull the entire pump head off the gear axle with a slight back and forth motion.

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.

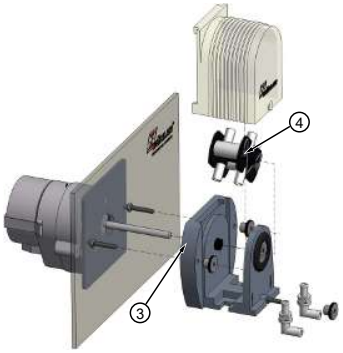
Tighten the hex nuts M3.



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

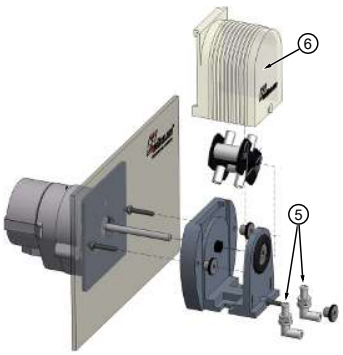
Insert the rotor (4) – cylindrical neck forward - into the pump head bracket, now slide the entire assembly onto the gear axle and the retaining bolts.

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.

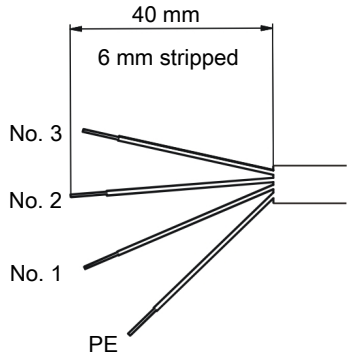
⏚ The protective earth conductor must be connected to the yellow/green wire of the connection cable.

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

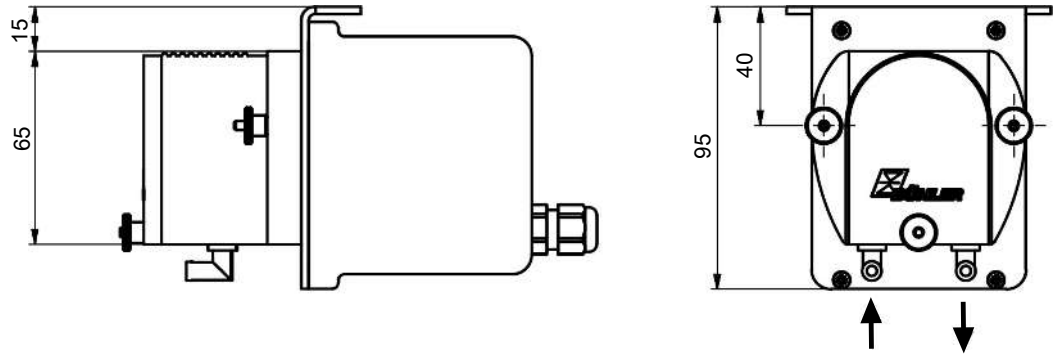
Technical Data CPsingle/CPdouble Peristaltic Pumps

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	

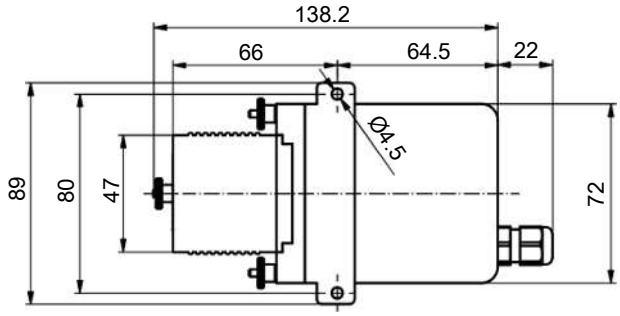
* Lifetime 24 V DC 3000 h

9.2 Dimensions 115 / 230 V

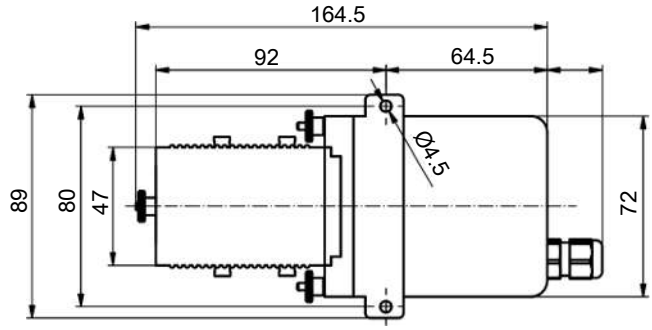
Housing version



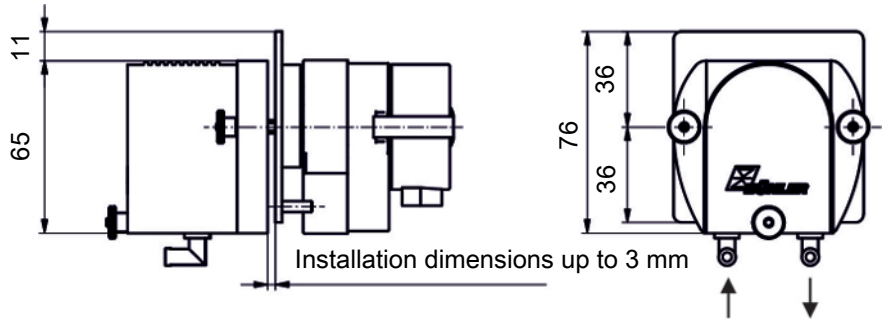
Housing version with 1 gas path



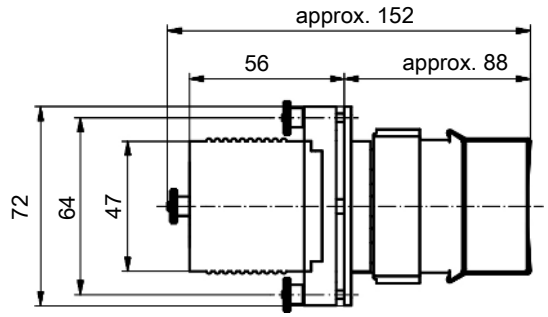
Housing version with 2 gas paths



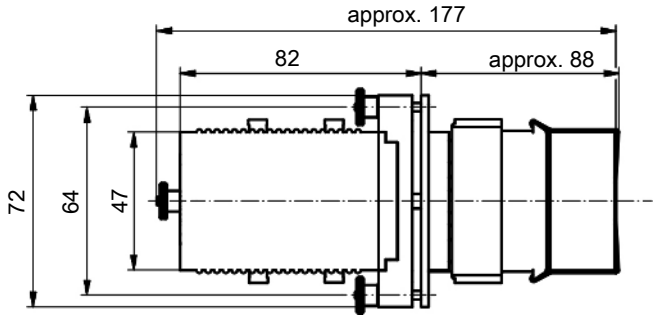
Built-in versions



Built-in version with 1 gas path



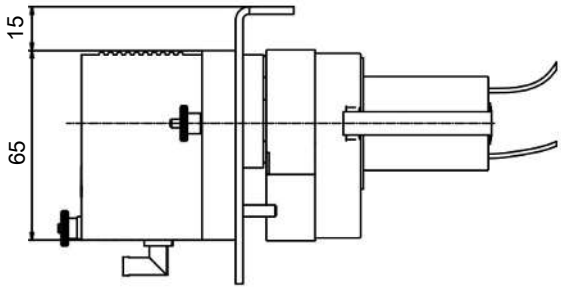
Built-in version with 2 gas paths

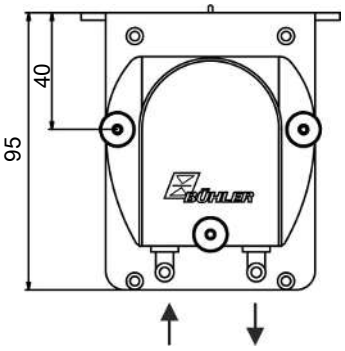


(All dimensions in mm)

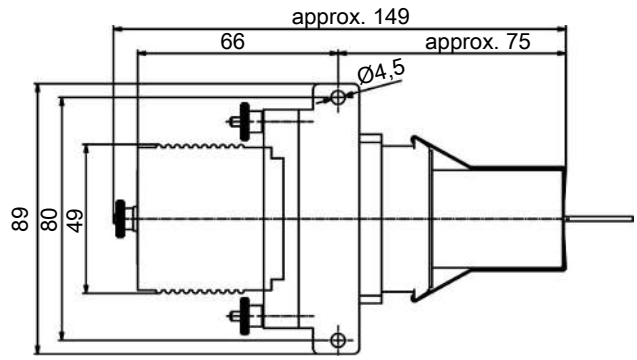
9.3 Dimensions 24 V

Housing version

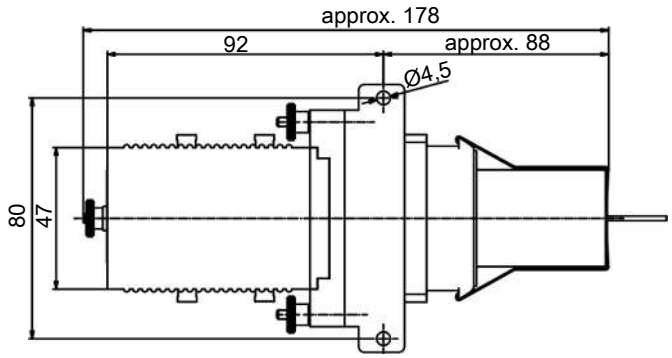




Housing version with 1 gas path

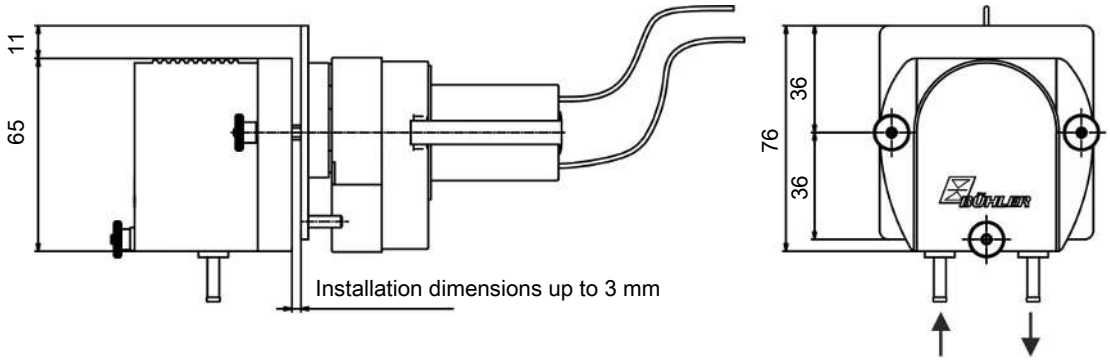


Housing version with 2 gas paths

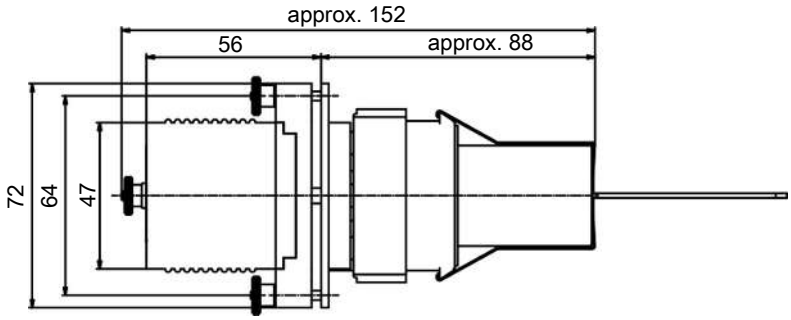


(All dimensions in mm)

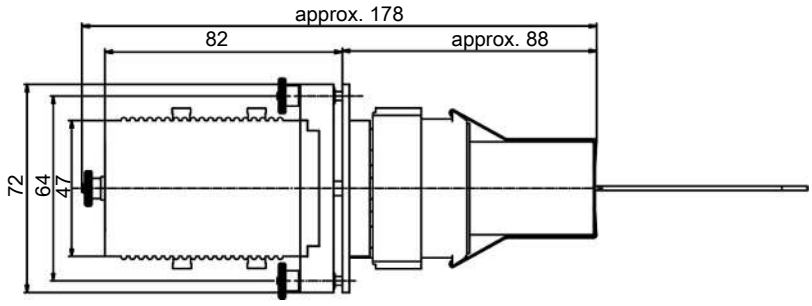
Built-in versions



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

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

Moisture Detectors and Controllers

In extractive gas analysis the sample gas must be conditioned before it enters the measuring cell of the analyser. One of these conditioning stages is moisture precipitating in so-called sample gas coolers. Since the composition of the sample gas can fluctuate, a condensate slip downstream from the cooler cannot be entirely ruled out. Moisture detectors installed in the cooler output indicate such slip. Combined with suitable controllers this will generate the respective signals/alarms in the control system.

The moisture detector series features a wide range of options.

FF-HM series for rail mounting:

Potential-free outputs for moisture alarm and cable break on standby current (fail-safe)
LEDs for voltage, moisture and cable break
Fault analysis settings: auto-reset or lock

FF-x-U series inside a small casing:

Connecting one or up to 2 separate moisture detectors
Auto-resetting alarms, based on open circuit principle
LEDs for voltage, moisture and cable break

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

Technical Data

Moisture detector	FF-3-N	FF-40
Material:	PVDF,1.4571, epoxy resin, 1.4576, PTFE	PE, 1.4571, epoxy resin, 1.4576
Cord length:	Standard 4 m, 4 x 0.34²	Standard 4 m, 2 x 0.25²
Max. operating pressure:	2 bar	40 bar
Operating temperature:	3 °C to 50 °C	3 °C to 50 °C
Cable break detection:	yes	yes

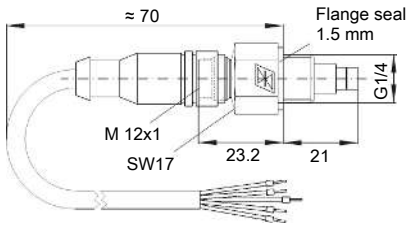
Type FF-3-N is suitable for ATEX areas (II 2G Ex ib IIC T5 T_{amb} 3...50 °C)
(Only when using ER-145/A/Ex, refer to operating instructions)

Adapters	Type G	Type S
Material:	PVDF	1.4571

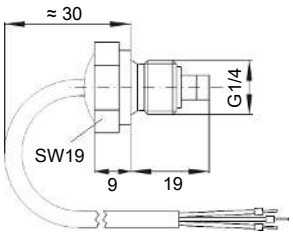
Controllers	FF-HM-230	FF-HM 24	FF-19	FF-x-U	ER-145/A/Ex
Supply voltage:	230/115 V AC 50/60 Hz ±10 %	24 V DC ±10 %	24 V DC ±10 %	230/115 V AC 50/60 Hz ±10 %	230/115 V AC 48/62 Hz ±10 %
Max. switching output current:	230 V/2 A	24 V AC/DC 2 A	24 V AC/DC 2 A	230 V/2 A	AC: 250 V/5 A DC: 150 V/5 A
Protection class:	IP 40 Terminals IP 20	IP 40 Terminals IP 20	IP 20 when built-in	IP 65	IP 40 Terminals IP 20
Ex protection class:	-	-	-	-	II(1)G [EEx ia Ga] IIC
Max. lead length:	4 m	4 m	4 m	4 m	70 m
Dimensions (WxHxD/mm)	70 x 75 x 109	70 x 75 x 109	8TE x 3HE x 170	94 x 180 x 81	22.5 x 99 x 120
Connection:	Terminals	Terminals	Multi-pole connector DIN 41612 style B	Terminals	Terminals

Dimensions

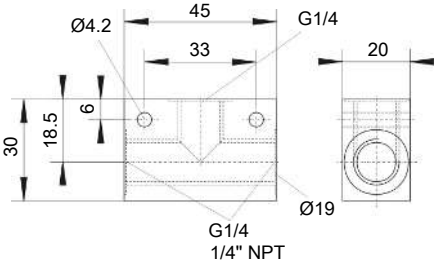
FF-3-N



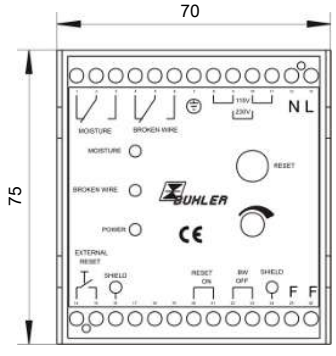
FF-40



Mounting adapter

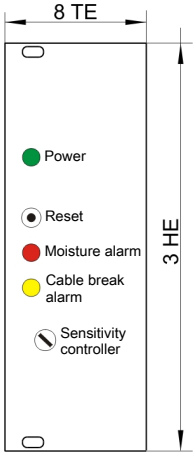


FF-HM230



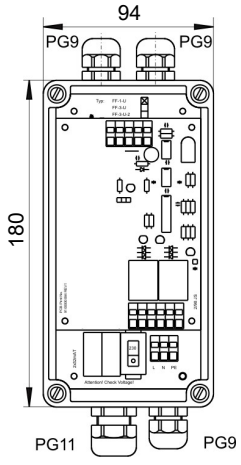
Housing depth 109

FF-19



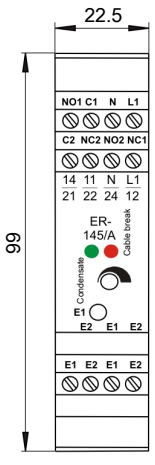
Housing depth 170

FF-x-U



Housing depth 81

ER-145/A/Ex



Housing depth 120

Ordering instructions

Item no.	Description
41 11 100	FF-3-N moisture detector (without cable)
41 11 1000	FF-3-N moisture detector (with cable)
41 89 699	FF-40 moisture detector
40 11 000	Mounting adapter type G (PVDF)
40 11 000I	Mounting adapter type NPT (PVDF)
40 11 005	Mounting adapter type S-G (stainless steel)
40 11 005I	Mounting adapter type S-NPT (stainless steel)
41 11 020	Controller FF-HM-230
41 11 030	Controller FF-HM-24
41 11 017	Controller FF-1-U
41 11 015	Controller FF-3-U
41 11 016	Controller FF-3-U-2
41 11 012	Controller ER-145/A, 230 V
41 11 014	Controller ER-145/A, 115 V
41 11 040	Controller FF-19

bürkert
FLUID CONTROL SYSTEMS

Direct-acting 2/2 or 3/2-way pivoted armature valve

- Direct-acting, media-separated valve up to DN 5
- Maintenance-free pivoted armature technology
- Vibration-proof, block screwed coil system
- Service-friendly, robust manual override
- Explosion-proof variants

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type 1087 ▸
Timer

Type 2518 ▸
Cable Plug
DIN EN 175301-803 - Form A

Type description

The 0330 valve is a direct-acting, media-separated pivoted armature valve. It is available as a 2/2 and 3/2-way variant. As a 3/2-way variant, it can be used as a distributor or mixing valve. Various diaphragm materials and circuit functions are available depending on the actual application. The standard brass body meets all European drinking water requirements. Stainless steel (316L), PVDF, and polypropylene bodies complete the offering. The solenoid coils are moulded with a chemically resistant epoxy. Since the coil system is separated from the medium by a diaphragm, the valve is especially suitable for critical media such as aggressive acids and lyes. The 0330 is equipped with manual override for start-up and testing. To reduce energy demands, all the coils can be delivered with electronic power reduction or as an impulse variant. The switching status can be indicated via position feedback as a binary or NAMUR signal. In combination with a plug to DIN EN 175301-803 Form A, the valves satisfy degree of protection IP65/67 – and NEMA 4X when combined with a stainless steel or plastic valve body.

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Visit product website ▸

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1. General Technical Data

Product properties	
Dimensions	Detailed information can be found in chapter "4. Dimensions" on page 6.
Material	
Seal	EPDM / FKM / FFKM / NBR
Body	Brass Stainless steel (1.4401) PP (Polypropylene) PVDF (Polyvinylidene fluoride)
Material resistance	More detailed information can be found in our resistance table, "3.1. Chemical Resistance Chart – Bürkert resistApp" on page 5.
Weight	Metal body 0.47 kg Plastic body 0.40 kg
Orifice	DN 2…DN 5
Thermal insulation class of solenoid coil	H
Performance data	
Duty cycle	
With brass and stainless steel	100 %
With PP and PVDF	40 % duty cycle (60 % intermittent operation) in 30 min for 8 W version 100 % duty cycle for 5 W version
Max. cycling rate (explosion proof version)	Medium temperature up to +70 °C: 20/min Medium temperature up to +90 °C: 5/min
Switching times[1.] standard version	
Frequency AC	Opening: 8…15 ms Closing: 8…15 ms
Frequency DC	Opening: 10…20 ms Closing: 10…20 ms
Switching times[1.] explosion proof version	
Orifice 2…4	Opening: 30 ms Closing: 40 ms
Electrical data	
Voltage tolerance	±10 %
Power consumption standard	
Frequency AC	Inrush: 30 VA Hold: 15 VA Hold: 8 W
Frequency DC	Cold: 11 W Warm: 8 W
Power consumption Impulse (inrush winding)	
Frequency AC	Hold: 20 VA Hold: 11 W
Frequency DC	Cold: 11 W Warm: 8 W
Power consumption explosion proof version	
Frequency AC/DC	Inrush: 40 W Hold: 3 W
Voltages	
Standard version	24 V 50 Hz, 110 V 50 Hz, 230 V 50 Hz, 120 V 60 Hz, 240 V 60 Hz, 12 V DC, 24 V DC (further voltages on request)
Explosion proof version	24 V, 230 V (further voltages on request)

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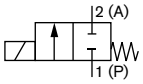
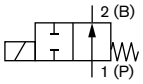
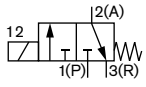
Medium data	
Viscosity	Max. 37 mm^2/s
Operating medium	
With NBR	Neutral medium such as compressed air, town gas, water, hydraulic oil, oils and fats without additives, oxygen
With EPDM	Alkalis, acids to medium concentrations, alkaline washing and bleaching lyes
With FKM	Oxydizing acids and substances, hot oils with additives, salt solutions, waste gases, oxygen
With FFKM	Aggressive mediums, hot air, hot oils
Medium temperature	
With body material brass or stainless steel	NBR: 0 °C…+80 °C EPDM: -30 °C…+90 °C FKM: 0 °C…+90 °C FFKM: +5 °C…+90 °C
With body material PP or PVDF	NBR: 0 °C…+80 °C EPDM: -30 °C…+80 °C FKM: 0 °C…+80 °C FFKM: +5 °C…+80 °C
Process/Port connection & communication	
Port connection	G ¼, NPT ¼, (RC ¼ and G ⅛ on request, G ⅛ not possible for PP and PVDF)
Electrical connection	
Standard version	Pin terminal acc. to DIN EN 175301-803 Form A for cable pug Type 2518/2509 (also on request with moulded cable or terminal box)
Explosion proof version	Moulded cable (for more detailed information, refer to the operating manual ACP016), terminal box without safety fuse
Approvals and certificates	
Standard version	
Degree of protection	IP65 with cable plug
Explosion proof version	
Degree of protection	IP65
Type of protection	II 2 G Ex mb IIC T4 Gb II 2 D EX mb IIIC T130°Db
Certificate	EPS 16 ATEX 1 111 X IECEx EPS 16.0049X
Environment and installation	
Installation position	As required, preferably with actuator upright
Ambient temperature (max.)	
Standard version	+55 °C
Explosion proof version	+40 °C

1.) Measured at valve outlet at 6 bar and +20 °C. Opening: pressure rise 0…90 %, closing: pressure drop 100…10 %

2. Circuit functions

Circuit functions	Description
	**Type: A, solenoid valve** 2/2 way Direct-acting Normally closed
	**Type: B, solenoid valve** 2/2 way Direct-acting Normally opened
	**Type: C, solenoid valve** 3/2 way Direct-acting Normally closed

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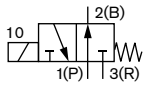
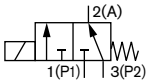
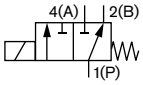
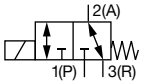
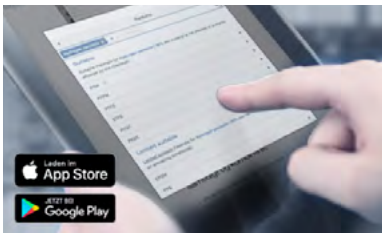
Circuit functions	Description
	**Type: D, solenoid valve** 3/2 way Direct-acting Normally opened
	**Type: E, mixing valve (solenoid valve)** 3/2 way
	**Type: F, distribution valve (solenoid valve)** 3/2 way Direct-acting
	**Type: T, solenoid valve** 3/2 way Direct-acting Flow direction optional

3. Materials

3.1. Chemical Resistance Chart – Bürkert resistApp

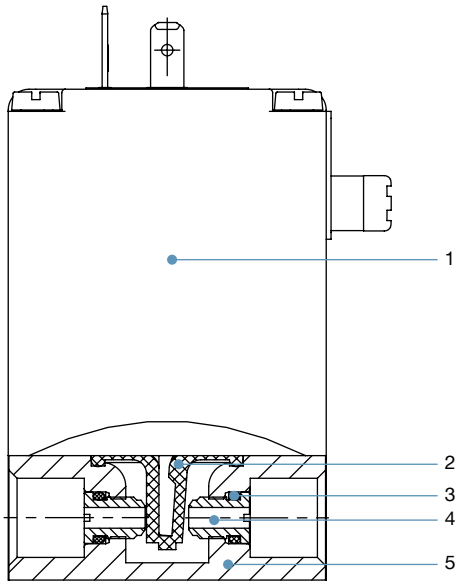


Bürkert resistApp – Chemical Resistance Chart

You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

Start Chemical Resistance Check

3.2. Material specifications



No.	Element	Material
1	Coil	Epoxy
2	Diaphragm	EPDM, FKM, FFKM, NBR
3	O-ring	EPDM, FKM, FFKM, NBR
4	Seat	Brass Stainless steel (1.4401) PP (Polypropylene) PVDF (Polyvinylidene fluoride)
5	Valve body	Brass Stainless steel (1.4401) PP (Polypropylene) PVDF (Polyvinylidene fluoride)

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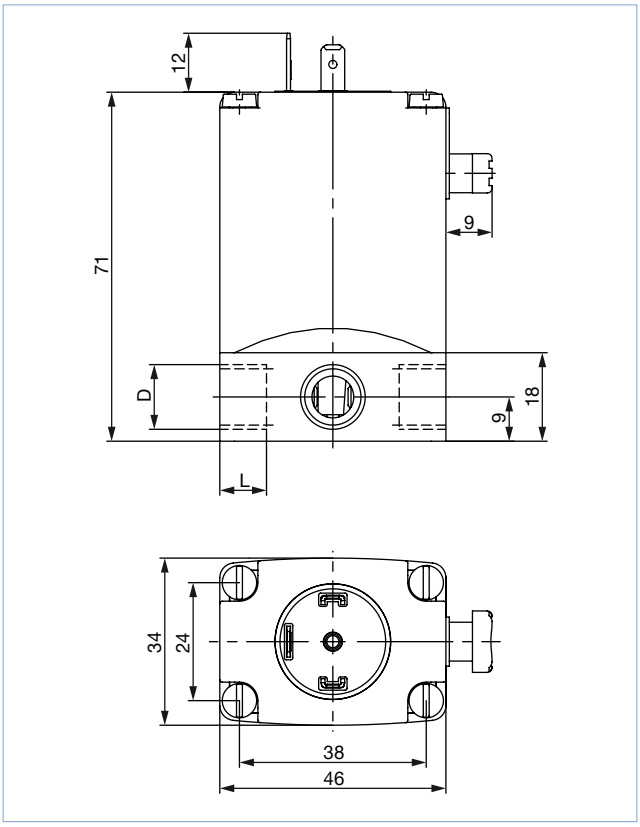
4. Dimensions

4.1. Standard version

Note:

- Dimensions in mm
- The dimensions D1 and L1 apply to G-threads.
- The dimensions D2 and L2 apply to NPT-threads.
- For metal housings, the minimum thread length at the middle connection is 7.5 mm.
- Mounting device: By drilling M4 × 8 (metal housing) or self-tapping screws (plastic housing) on underside of the housing on the hole pattern 38 × 24.
- The dimensions of the cable plug Type 2518 can be found in chapter "8.4. Ordering chart accessories" on page 17.

Metal housing



D1	L1	D2	L2
G ⅛	9	–	–
G ¼	9	NPT ¼	7.5

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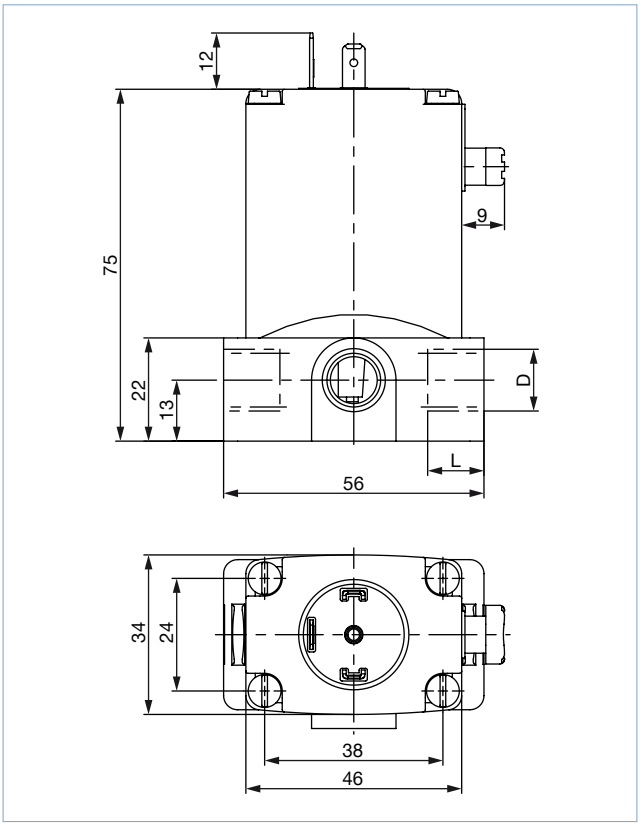
Plastic housing



D	L
G ¼	12
NPT ¼	11

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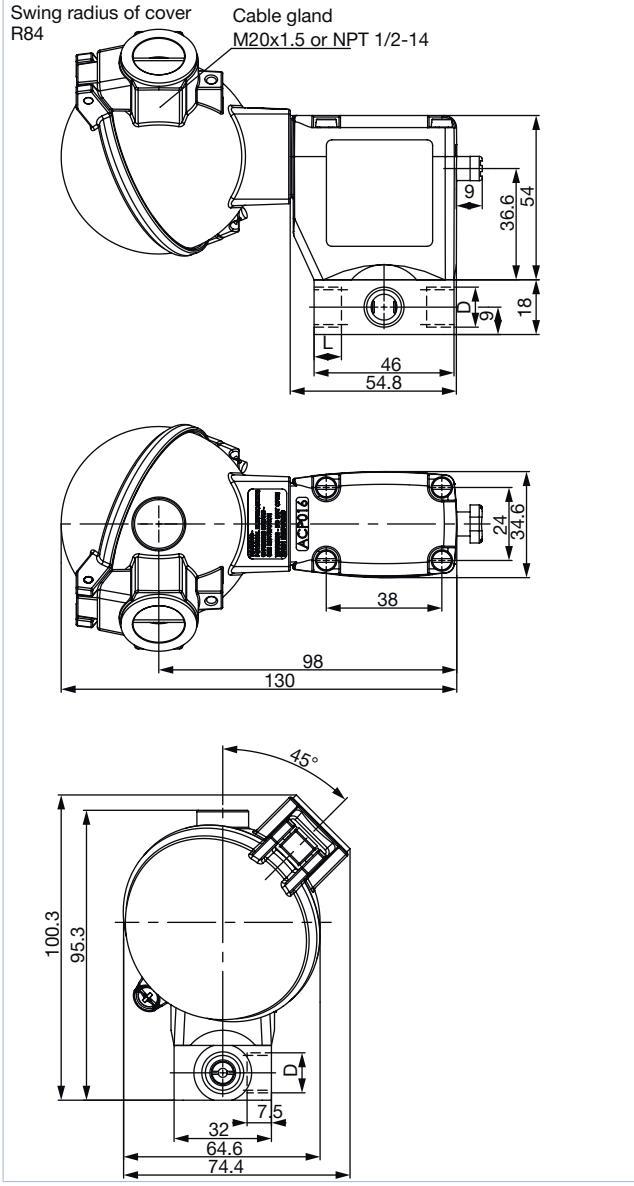
4.2. Explosion proof version

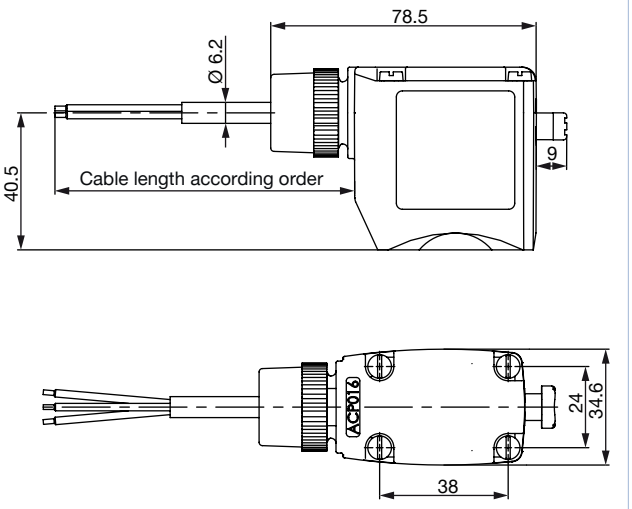
Note:

- Dimensions in mm
- The dimensions D1 and L1 apply to G-threads.
- The dimensions D2 and L2 apply to NPT-threads.

Terminal box version



Cable outlet version

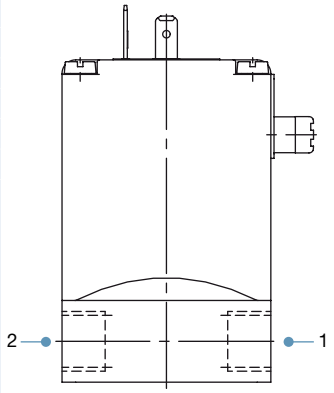
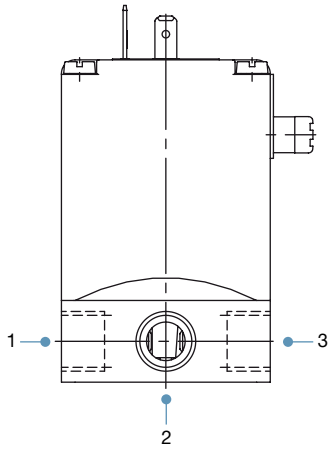


D1	L1	D2	L2
G ⅛	9	–	–
G ¼	9	NPT ¼	7.5

5. Device/Process connections

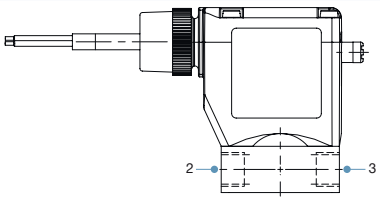
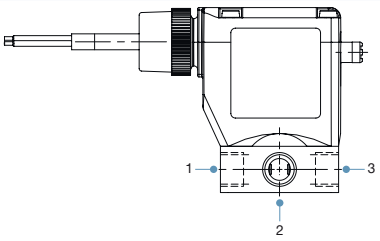
5.1. PIN assignment standard version

Note:
The pin assignment (marked No. 1, 2 and 3 in the drawing) depends on the circuit function. In the table, compare the respective pin assignment with the corresponding circuit function.

Circuit function	Connection 1	Connection 2	Connection 3	2 way	3 way
A	P	A	–		
B	B	P	–		
C	P	A	R		
D	R	B	P		
E	P1	A	P2		
F	A	P	B		
T	NC	I_N/OUT	NO		

5.2. PIN assignment explosion proof version

Note:
The pin assignment (marked No. 1, 2 and 3 in the drawing) depends on the circuit function. In the table, compare the respective pin assignment with the corresponding circuit function.

Circuit function	Connec-tion 1	Connec-tion 2	Connec-tion 3	2 way	3 way
A	P	A	–		
B	B	P	–		
C	P	A	R		
D	R	B	P		
E	P1	A	P2		
F	A	P	B		
T	NC	I_N/OUT	NO		

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6. Performance specifications

6.1. Pressure range and flow rate

Standard version

Circuit function	DN	K_V value water		Pressure range[1.]		
		DC	AC (50 or 60 Hz)	Standard[2.]	Vacuum[3.]	Impulse[4.]
		[m³/h]	[m³/h]	[bar]	[bar]	[bar]
Metal body						
A / B / C / D / F	2.0	0.08	0.11	0…16[5.]	-0.98…10	0…16[5.]
	3.0	0.14	0.18	0…10	-0.98…6	0…10
	4.0	0.17	0.23	0…5	-0.98…3	0…5
	5.0	0.29	0.29	0…2.5	-0.98…1	0…2.5
E	2.0	0.08	0.11	0…10	-0.98…8	0…10
	3.0	0.14	0.18	0…6	-0.98…5	0…6
	4.0	0.17	0.23	0…3	-0.98…2.5	0…3
	5.0	0.29	0.29	0…1.5	-0.98…1	0…1
T	2.0	0.08	0.11	0…12	-0.98…8	0…10
	3.0	0.14	0.18	0…8	-0.98…5	0…6
	4.0	0.17	0.23	0…4	-0.98…2.5	0…5
	5.0	0.29	0.29	0…2.5	-0.98…1	–

Circuit function	DN	K_V value water[6.]	Pressure range[1.]			
			Standard[2.] AC [50 or 60 Hz]	Standard[2.] DC	Vacuum[3.]	Impulse[4.]
		[m³/h]	[bar]	[bar]	[bar]	[bar]
Plastic body						
A / B / C / D / F	2.0	0.13	0…16[5.]	0…12	-0.98…10	0…12
	3.0	0.25	0…10	0…8	-0.98…6	0…8
	4.0	0.30	0…5	0…4	-0.98…3	0…4
	5.0	0.40	0…4.5	0…3	-0.98…1	0…3
E / T	2.0	0.13	0…10	0…7	-0.98…7	0…7
	3.0	0.25	0…6	0…4	-0.98…5	0…4
	4.0	0.30	0…3	0…2	-0.98…2.5	0…2

1.) Pressure values with respect to atmospheric pressure (deviating pressure range for 5 W version)

2.) Rated power consumption 8 W

3.) Vacuum possible for all seal materials

4.) Inrush power 11 W

5.) For seal material FKM and FFKM the max. medium pressure is 12 bar

6.) At frequency DC the K_V value is reduced till 10 % to fulfil the function

Use in other circuit functions

The compression springs installed in the valves differ depending on the circuit function. When used in other circuit functions, the permissible operating pressure changes according to the following table.

Circuit function	Max. operating pressure [bar] when using the valve in a new circuit function																	
	Orifice DN 2						Orifice DN 3						Orifice DN 4					
	A[1.]	B[1.]	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Metal body (8 W respectively 11 W)																		
C	16	1.5	16	1.5	1.5	16	10	1	10	1	1	10	5	0.8	5	0.8	0.8	5
D	4	16	4.5	16	4	4	2.5	10	2.5	10	2	3	2	5	2	5	2	2
T	8	8	10	10	10	8	6	6	6	6	6	6	3	3	3	3	3	3
Plastic body (8 W respectively 11 W)																		
C	16	1.5	16	1.5	1.5	16	10	1	10	1	1	10	5	0.8	5	0.8	0.8	5
D	4	16	4.5	16	4	4	2.5	10	2.5	10	2	3	2	5	2	5	2	2
F	16	1.5	10	1.5	1.5	16	6	1	6	1	1	10	4	1	4	1	1	5

1.) For circuit function A and B the valve must be connected acc. to the pin assignment of 3/2 way valve.

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Explosion proof version

Circuit function	DN	K_v value water	Pressure range[1.) 2.)]	
			Standard	Vacuum
		[m³/h]	[bar]	[bar]
Metal body				
A / B / C / D / F	2.0	0.11	0…16	-0.98…10
	3.0	0.18	0…10	-0.98…6
	4.0	0.23	0…5	-0.98…3
	5.0	0.29	0…4	-0.98…2.5
E	2.0	0.11	0…10	-0.98…8
	3.0	0.18	0…6	-0.98…5
	4.0	0.23	0…3.5	-0.98…2.5
	5.0	0.29	0…3	-0.98…2
T	2.0	0.11	0…10	-0.98…8
	3.0	0.18	0…6	-0.98…5

Circuit function	DN	K_v value water	Pressure range[1.) 2.)]	
			Standard	Vacuum
		[m³/h]	[bar]	[bar]
Plastic body				
A / B / C / D / F	2.0	0.13	0…16	-0.98…10
	3.0	0.25	0…10	-0.98…6
	4.0	0.30	0…5	-0.98…3
	5.0	0.40	0…4.5	-0.98…1
E / T	2.0	0.13	0…10	-0.98…7
	3.0	0.25	0…6	-0.98…5
	4.0	0.30	0…3	-0.98…2.5

1.) Devices with FKM or FFKM diaphragm are reduced to a max. pressure of 12 bar.

2.) Pressure data: Measured as overpressure to the atmospheric pressure

Use in other circuit functions

The compression springs installed in the valves differ depending on the circuit function. When used in other circuit functions, the permissible operating pressure changes according to the following table.

Circuit function	Max. operating pressure [bar] when using the valve in a new circuit function																	
	Orifice DN 2						Orifice DN 3						Orifice DN 4					
	A[1.)]	B[1.)]	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Metal body (8 W respectively 11 W)																		
C	16	1.5	16	1.5	1.5	16	10	1	10	1	1	10	5	0.8	5	0.8	0.8	5
D	4	16	4.5	16	4	4	2.5	10	2.5	10	2	3	2	5	2	5	2	2
T	8	8	10	10	10	8	6	6	6	6	6	6	3	3	3	3	3	3
Plastic body (8 W respectively 11 W)																		
C	16	1.5	16	1.5	1.5	16	10	1	10	1	1	10	5	0.8	5	0.8	0.8	5
D	4	16	4.5	16	4	4	2.5	10	2.5	10	2	3	2	5	2	5	2	2
F	16	1.5	10	1.5	1.5	16	6	1	6	1	1	10	4	1	4	1	1	5

1.) For circuit function A and B the valve must be connected acc. to the pin assignment of 3/2 way valve.

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7. Product accessories

7.1. Accessories standard version

Option	Variable Code	Description
Impulse version	CF02	Bistable magnetic system with inrush and drop-off coil; continuous operation or operation with short current pulses (min. 150 ms) possible
Oxygen versions	NL02	Suitable for applications with oxygen (non-metal materials that are in contact with the medium, are tested and approved according to BAM)
Increased purity requirements e.g. oil, grease and silicone-free	NL50/NL05	Wetted parts are specially cleaned and packaged in accordance with the valves
Increased tightness requirements	PCxx	Standard units are tested at 10^{-2} mbar x l/sec; feasible up to 10^{-6} mbar
Electrical feedback	LF02/LF03	See **Type 1060** ▶. Function as opener, closer or toggle switch depending on the connection (no IP65 achievable)
High-power electronics	CZ05	Inrush power 60 W, nominal holding current 3 W; with plastic versions 100 % duty cycle is now feasible
Vacuum version	NA02	Suitable for vacuums up to -0.98 bar
Increased purity and tightness requirements	NA03	Wetted parts are specially cleaned and leak tested to 10^{-4} mbar x l/sec
Increased purity and tightness requirements and vacuum version	NA01	Wetted parts are specially cleaned and leak tested up to 10^{-4} mbar x l/sec and suited for vacuum up to -0.98 bar
Coil with reduced power (5 W)	–	Devices have lower pressure range; with plastic versions 100 % duty cycle is now feasible
Cable plug	JHxx/JGxx/ JFxx	Cable plug is part of the delivery. Cable plug versions (acc. to DIN EN 175301-803 Form A), see datasheet **Type 2518** ▶ and **Type 2509** ▶
Approvals	PD01	CSA General Purpose valve
	PD02	UR (UL-recognized)/CSA approval
	PD07	DNV-GL (formerly Germanischer Lloyd)
	PR05	cFMus approved coil Class I, Division 1, Groups A, B, C and D - T4 Class II, Division 1, Groups E, F and G - T4 Class III, Division 1 - T4 Class I, Zone 1, AEx mb IIC T4 Gb, Zone 21 AEx mb IIIC T130 C Db Ex mb IIC T4 Gb; Ex mb IIIC T130 C Db
	PE95	UL (UL-listed) approval
	PU15	UL listed for Hazardous Locations for USA and Canada, Class I, Zone 1, AEx eb mb IIC T4; Zone 21, AEx mb tb IIIC T130 °C / Class I, Div 2, Group A,B,C,D; Class II+III, Div 2, Group F,G
	PX41	EPS 16 ATEX 1111 X/IECEx EPS 16.0049X, 2G T4 IIC/2D T130 °C IIIC, Tamb -40 °C bis +60 °C, single and block mounting
Possible conformities (depending on the assembly)	–	EAC, drinking water, FDA

7.2. Accessories explosion proof version

Option	Variable Code	Description
Oxygen versions	NL02	Suitable for applications with oxygen (non-metal materials that are in contact with the medium, are tested and approved according to BAM)
Increased purity requirements e.g. oil, grease and silicone-free	NL50/NL05	Wetted parts are specially cleaned and packaged in accordance with the valves
Increased hermetic requirements	PCxx	Standard units are tested at 10^{-2} mbar x l / sec; feasible up to 10^{-6} mbar
Vacuum version	NA02	Suitable for vacuums up to -0.98 bar
Increased purity and hermetic requirements	NA03	Wetted parts are specially cleaned and leak tested to 10^{-4} mbar x l/sec
Increased purity and hermetic requirements and vacuum version	NA01	Wetted parts are specially cleaned and leak tested up to 10^{-4} mbar x l/sec and suited for vacuum up to -0.98 bar
Electrical feedback	CF15	Coil with intrinsically safe proximity switches (PTB 00 ATEX 2048X) instead of manual override

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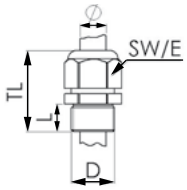
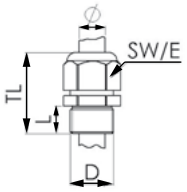
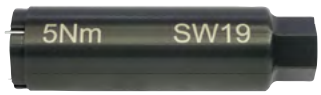
7.3. Cable glands for ATEX/IECEx terminal box

Note:
A cable gland in polyamide version is included in the delivery. A nickel-plated brass version can be ordered at a surcharge, see "8.4. Ordering chart accessories" on page 17.

Description	Ex approvals		Dimensions	
	Certification	Identification		
Ex cable gland, Brass, nickel-plated, 6…13 mm 	PTB 04 ATEX 1112 X, IECEx PTB 13.0027X	II 2 G Ex e IIC Gb, II 2 D Ex tb IIIC Db IP68		TL 29…37 mm L 6 mm D 20 mm SW 24 mm E 27 mm
Ex cable gland, Polyamide, 7…13 mm 	PTB 13 ATEX 1015 X, IECEx PTB 13.0034X	II 2 G Ex e IIC Gb, II 2 D Ex tb IIIC Db IP68		TL 36…45 mm L 10 mm D 20 mm SW 24 mm E 28 mm

7.4. Special tool to turn the junction box

Note:
This special tool is not supplied with the valve (see "8.4. Ordering chart accessories" on page 17.

Description	Components of the set
Set SC02-AC10 	• Special wrench • Service manual

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8. Ordering information

8.1. Bürkert eShop – Easy ordering and quick delivery

Bürkert eShop – Easy ordering and fast delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

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8.2. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements? Use the Bürkert product filter and find suitable articles for your application quickly and easily.

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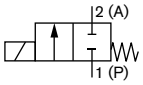
8.3. Ordering chart

Standard version

Note:

- All devices with connection thread G ¼, manual override and cable plug **Type 2518** ▶.
- Further versions on request
- Products with reduced delivery time

Circuit function	Orifice [mm]	Seal material	Housing or seat material	Article no. per voltage/frequency [V/Hz]		
				024/DC	024/50	230/50
A[1)], solenoid valve 2/2 way Direct-acting Normally closed 	3.0	FKM	Brass	020293	022883	124909
	3.0	FKM	Stainless steel	020292	023984	024563
	3.0	FKM	PP	018410	088496	045653
	3.0	FKM	PVDF	018188	020286	069006
	3.0	NBR	Brass	020294	086553	024902
	3.0	EPDM	PP	067214	022105	062398
	4.0	FKM	Brass	024019	025246	124912
	4.0	FKM	Stainless steel	018276	018857	020873
	4.0	FKM	PP	062695	043005	063116
	4.0	FKM	PVDF	023472	069079	087837
	4.0	NBR	Brass	025084	–	046007
	4.0	EPDM	PP	021660	067731	063118
	4.0	EPDM	PVDF	057573	–	125507
	5.0	FKM	PP	062624	067007	022619
	5.0	FKM	PVDF	064512	–	063786
	5.0	EPDM	PP	061321	054261	049969
	5.0	EPDM	PVDF	120184	059802	130117

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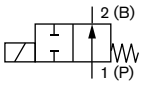
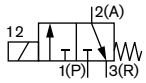
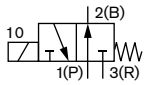
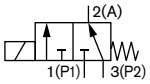
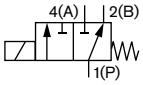
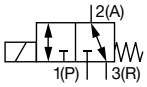
Circuit function	Orifice [mm]	Seal material	Housing or seat material	Article no. per voltage/frequency [V/Hz]		
				024/DC	024/50	230/50
B[1.], solenoid valve 2/2 way Direct-acting Normally opened 	3.0	FKM	Brass	141917	130146	141919
	4.0	FKM	Brass	141920	141921	141923
	3.0	FKM	Stainless steel	141928	141929	141931
	4.0	FKM	Stainless steel	141932	141933	141935
C, solenoid valve 3/2 way Direct-acting Normally closed 	2.0	NBR	Brass	041103	042129	041105
	3.0	NBR	Brass	041107	041108	041116
	3.0	FKM	Stainless steel	052344	045024	052059
	4.0	NBR	Brass	042218	042695	042329
	4.0	FKM	Stainless steel	050483	043324	050979
	4.0	FKM	PP	–	088420	–
	4.0	FKM	PVDF	055788	–	019078
	4.0	EPDM	PP	–	–	063625
D, solenoid valve 3/2 way Direct-acting Normally opened 	2.0	NBR	Brass	056984	041858	041137
	3.0	NBR	Brass	041139	041141	041147
	4.0	NBR	Brass	043129	042696	042903
E, mixing valve (solenoid valve) 3/2 way 	3.0	FKM	PP	069917	066230	022294
	3.0	EPDM	PP	078556	–	078559
	4.0	FKM	PP	061077	086921	053406
	4.0	FKM	PVDF	022340	020550	085599
	4.0	EPDM	PP	067160	044693	066033
F, distribution valve (solenoid valve) 3/2 way Direct-acting 	4.0	FKM	PP	020528	–	–
	4.0	EPDM	PP	–	–	066032
T, solenoid valve 3/2 way Direct-acting Flow direction optional 	2.0	FKM	Brass	124922	138316	124925
	3.0	FKM	Brass	124927	124928	124930
	2.0	FKM	Stainless steel	124932	124933	124935
	3.0	FKM	Stainless steel	124937	124938	124940

1.) The listed article no. and circuit functions have a housing with straight pass.

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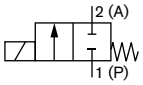
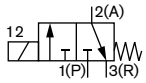
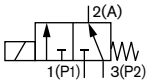
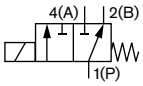
Explosion proof version

Note:

- All devices with connection thread G ¼ and manual override
- Further versions on request

Circuit function	Orifice	Seal material	Housing or seat material	Electrical connection	Article no. per voltage/frequency [V/Hz]	
	[mm]				024/UC	230/UC
A[1.], solenoid valve 2/2 way Direct-acting Normally closed 	3.0	NBR	Brass	Terminal box	353707	353708
	3.0	NBR	Brass	Cable	353616	353617
	3.0	FKM	Stainless steel	Terminal box	353709	353710
	3.0	FKM	Stainless steel	Cable	353618	353619
C, solenoid valve 3/2 way Direct-acting Normally closed 	3.0	NBR	Brass	Terminal box	353594	353695
	3.0	NBR	Brass	Cable	353596	353599
	3.0	FKM	Stainless steel	Terminal box	353700	353706
	3.0	FKM	Stainless steel	Cable	353614	353615
E, mixing valve (solenoid valve) 3/2 way 	3.0	FKM	Stainless steel	Terminal box	353712	353702
	3.0	FKM	Stainless steel	Cable	353620	353621
F, distribution valve (solenoid valve) 3/2 way Direct-acting 	3.0	FKM	Stainless steel	Terminal box	394337	353713
	3.0	FKM	Stainless steel	Cable	353622	353623
	4.0	FKM	Stainless steel	Terminal box	353697	–
	4.0	FKM	Stainless steel	Cable	353646	–

1.) The listed article no. and circuit functions have a housing with straight pass.

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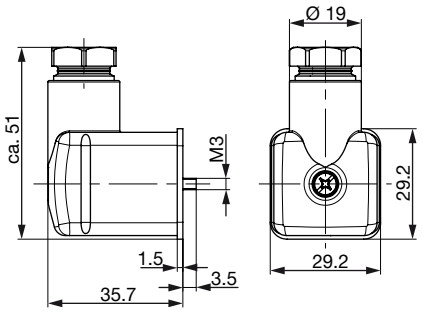
8.4. Ordering chart accessories

Cable plug Type 2518, Form A according to DIN EN 175301-803

Note:
Further versions see data sheet **Type 2518** ▶.

Cable plug	Dimensions	Version	Voltage	Article no.
		Without circuitry (AC/DC)	0…250 V AC/DC	314802
		With LED (AC/DC)	12…24 V AC/DC	314812
		With LED and varistor (AC/DC)	12…24 V AC/DC	314820
		With rectifier, LED and varistor	12…24 V AC/DC	314816

Cable glands for ATEX/IECEx terminal box

Note:

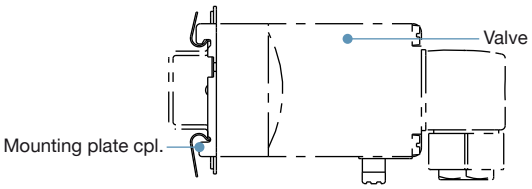
- A cable gland in polyamide version is included in the delivery. A nickel-plated brass version can be ordered at surcharge.
- For more information on Ex cable glands, see "7.3. Cable glands for ATEX/IECEx terminal box" on page 13.

Description	Article no.
Ex cable gland, brass, nickel-plated, 6…13 mm[1.)]	773278
Ex cable gland, polyamide, 7…13 mm[1.)]	773277
Set SC02-AC10: Special wrench[2.)] incl. service manual	293488

1.) Cable diameter

2.) Not included in the scope of delivery of the valve

Mounting plate cpl. for DIN rail mounting

Description	Article no.
	013253

Locking ring

Description	Article no.
Locking ring to prevent inadvertent manual actuation 	013372

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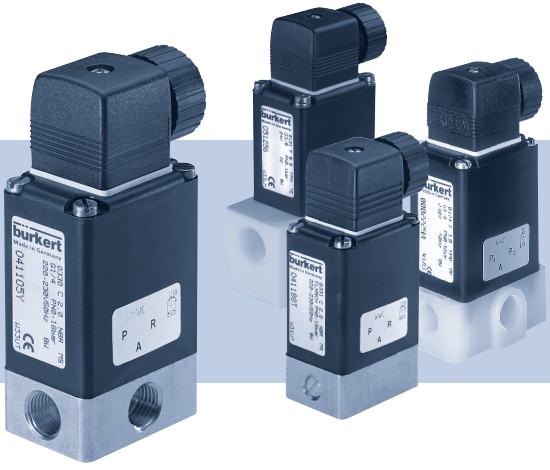
bürkert
FLUID CONTROL SYSTEMS

Type 0121, 0330, 0331 (0124, 0125, 0332, 0333)

2/2- and 3/2-Way Solenoid Valve
2/2- und 3/2-Wege-Magnetventil
Électrovanne à 2/2 et 3/2 voies



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

MAN 1000010161 ML Version: JStatus: RL (released | freigegeben) printed: 28.11.2019

Table of Contents

1 THE OPERATING INSTRUCTIONS

The operating instructions contain important information.

- Read the instructions carefully and follow the safety instructions.
- Keep the instructions in a location where they are available to every user.

The liability and warranty for the device are void if the operating instructions are not followed.

1.1 Symbols

- Designates instructions for risk prevention.

→ Designates a procedure which you must carry out.

DANGER!

Immediate danger! Serious or fatal injuries.

WARNING!

Possible danger! Serious or fatal injuries.

CAUTION!

Danger! Moderate or minor injuries.

NOTE!

Warns of damage to property.

Important tips and recommendations.

Refers to information in these operating instructions or in other documentation.

1.2 Definitions of terms

In these instructions, the term "device" always refers to the Type 0121, 0330, 0331, (0124, 0125, 0332, 0333).

2 AUTHORIZED USE

The device is designed to control, shut off and meter neutral and aggressive media up to a viscosity of 37 mm²/s.

- Use according to the authorized data, operating conditions and conditions of use specified in the contract documents and operating instructions.
- Provided the cable plug is connected and installed correctly, e.g. Bürkert Type 2518, the device satisfies degree of protection IP65 in accordance with DIN EN 60529 / IEC 60529.
- Only operate the device when in perfect condition and always ensure proper storage, transportation, installation and operation.
- Use the device only as intended.

2.1 Restrictions

If exporting the device, observe any existing restrictions.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any contingencies and events which may arise during assembly, operation and maintenance.

Risk of injury from high pressure in the system/device.

- Before working on the system or device, switch off the pressure and vent/drain lines.

Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

Risk of burns/risk of fire if used for a prolonged switch-on time through hot device surface.

- Keep device away from highly flammable substances and media and do not touch with bare hands.

Risk of short-circuit/escape of media through leaking screw joints.

- Ensure seals are seated correctly.
- Carefully screw valve and pipelines together.

Risk of injury due to malfunction of valves with alternating voltage (AC).

Sticking core causes coil to overheat, resulting in a malfunction.

- Monitor process to ensure function is in perfect working order.

General hazardous situations.

To prevent injuries:

- In a potentially explosive area, the device may be used only in accordance with the specification on the type label. For the use, observe the supplementary instructions manual enclosed with the device with safety instructions for the explosion-risk area.
- The enclosed UL instructions must be followed in the UL area.
- Do not carry out any external or internal modifications and do not subject the device to mechanical loads (e.g. by placing objects on it or standing on it).
- Secure the device against unintentional activation.
- Only trained technicians may perform installation and maintenance work.
- The valves must be installed in accordance with the regulations applicable in the country.
- After an interruption in the power supply, ensure that the process is restarted in a controlled manner.
- Observe the general rules of technology.

4 SYSTEM DESCRIPTION

The pivoted armature valves are direct acting 2/2 or 3/2-way solenoid valves in a wide variety of circuit functions and models. Solenoid system and media chamber are separated from one another by a separating diaphragm system. The valves are fast acting and have a long service life.

Type 0121	2/2 or 3/2-way solenoid valve, socket connection
Type 0330	2/2 or 3/2-way solenoid valve, socket connection
Type 0331	2/2 or 3/2-way solenoid valve, flange connection
Type 0332	Bistable 2/2 or 3/2-way solenoid valve with 2 coil windings, socket connection
Type 0333	Bistable 2/2 or 3/2-way solenoid valve with 2 coil windings, flange connection
Type 0124	2/2 or 3/2-way solenoid valve, socket connection
Type 0125	2/2 or 3/2-way solenoid valve, flange connection

5 TECHNICAL DATA

The following values are indicated on the type label:

- **Voltage** (tolerance ±10 %) **/ current type**
- **Coil power consumption** (active power in W - at operating temperature)
- **Pressure range**
- **Body material** (MS=brass, VA=stainless steel, PV=PVC, TE=PTFE, PP=polypropylene, PD=PVDF)
- **Seal material** (F=FKM, A=EPDM, B=NBR, C=FFKM)

5.1 Conformity

The Types 0121, 0330, 0331, (0124, 0125, 0332, 0333) are compliant with the EC Directives according to the EC Declaration of Conformity (if applicable).

5.2 Standards

The applied standards, which are used to demonstrate compliance with the EC Directives, are listed in the EC type test certificate and/or the EC Declaration of Conformity (if applicable).

5.3 Operating conditions

Ambient temperature

Type 0121	max. +50 °C
Other types	max. +55 °C

Duty cycle
for body material

Brass or stainless steel	long-term operation, duty cycle 100 %
Plastic	max. permissible duty cycle see data sheet

Important information for functional reliability.
If switched off for a long period, 1-2 switching actions are recommended prior to restart.

Service life	High switching frequency and high pressures reduce the service life.
Degree of protection	IP65 in accordance with DIN EN 60529 / IEC 60529 with correctly connected and installed cable plug, e.g. Bürkert Type 2518

5.4 Mechanical data

Dimensions	see data sheet
Coil material	epoxide
Connections	G 1/4 (NPT 1/4, G 1/8, G 3/8, Rc 1/4 on request)

5.5 Fluidic data

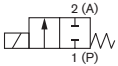
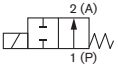
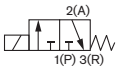
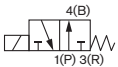
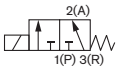
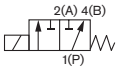
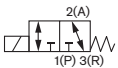
Media	aggressive, neutral, gaseous and liquid media, which do not attack body and seal materials. (see resistance table at www.burkert.com).

Medium temperature for seal material

FKM	0 °C to +90 °C
EPDM	–30 °C to +90 °C
NBR	0 °C to +80 °C
FFKM	+5 °C to +90 °C

For UL Listed valves the following values must be observed:

Fluid	Temperatures	NBR [°F]	NBR [°C]	EPDM [°F]	EPDM [°C]	FKM [°F]	FKM [°C]
Air	Fluid	+32 to +176	0 to +80	−22 to +194	−30 to +90	+32 to +194	0 to +90
	Ambient	+32 to +131	0 to +55	+14 to +131	−10 to +55	+32 to +131	0 to +55
Water	Fluid	+41 to +176	+5 to +80	+41 to +194	+5 to +90	+41 to +194	+5 to +90
	Ambient	+32 to +131	0 to +55	+14 to +131	−10 to +55	+32 to +131	0 to +55
Inert gas	Fluid	+32 to +176	0 to +80	−22 to +194	−30 to +90	+32 to +194	0 to +90
	Ambient	+32 to +131	0 to +55	+14 to +131	−10 to +55	+32 to +131	0 to +55
Oil	Fluid	–		–		+32 to +194	0 to +90
	Ambient					+32 to +131	0 to +55
LP-gas	Fluid	–		–		+32 to +194	0 to +90
	Ambient					+32 to +131	0 to +55
Oxygen	Fluid	–		–		+32 to +194	0 to +90
	Ambient					+32 to +131	0 to +55

Circuit functions		
A (NC)		2/2-way valve, closed in rest position
B (NO)		2/2-way valve, open in rest position
C (NC)		3/2-way valve; closed in rest position, output A unloaded
D (NO)		3/2-way valve, in rest position, output B pressurized
E		3/2-way mixing valve; in rest position, pressure connection P2 connected to output A, P1 closed
F		3/2-way distribution valve, in rest position, pressure connection P connected to output B
T		3/2-way all purpose valve

5.6 Electrical data

Connections DIN EN 175301-803 (DIN 43 650), shape A for cable plug Type 2518 or 2509

5.7 Type label (example)

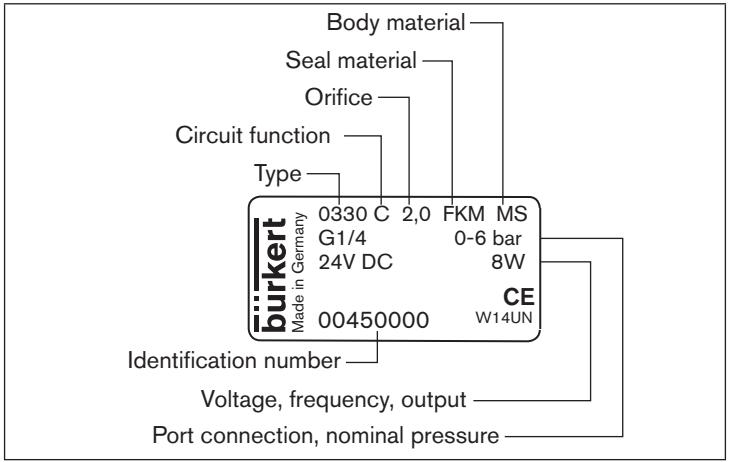


Fig. 1: Description of the type label

6 ASSEMBLY

DANGER!

Risk of injury from high pressure in the system/device.

- Before working on the system or device, switch off the pressure and vent/drain lines.

Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

WARNING!

Risk of injury from improper assembly.

- The assembly may be carried out only by trained technicians and with the appropriate tools.
- Secure system against unintentional activation.
- Following assembly, ensure a controlled restart.

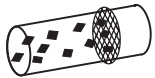
6.1 Before installation

Installation position:

The installation position is optional. Preferably: Actuator at the top.

→ Prior to installation check pipelines for dirt and clean if necessary.

Dirt filter: To ensure that the solenoid valve functions reliably, a dirt filter (≤ 500 µm) must be installed in front of the valve input.



6.2 Installation

→ Observe flow direction:
Functioning of the device is only ensured if the circuit function is maintained.

Devices with socket connection

→ Use PTFE tape as seal material.

→ Determine the maximum screw-in depth of the connecting threads as this does not comply with any standard.

NOTE!

Caution risk of breakage.

- Do not use the coil as a lifting arm.

→ Hold the device with a suitable tool (open-end wrench) on the body; screw into the pipeline.

Attaching the device:

→ Via bore holes M4x8 (made from brass or stainless steel) or self-tapping screws 3.9 DIN 7970 (made from plastic, max. screw-in depth 10 mm) on the bottom side of the body at drill pattern 38x24.

Devices in flange model

Attaching the device:

→ Via supplied screws on basic devices or manifold.

→ Tighten fastening screws on the coil to a maximum torque of 2 Nm.

6.3 Manual control

NOTE!

- When the manual control is locked, the valve cannot be actuated electrically.

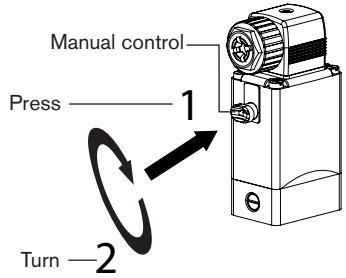


Fig. 2: Manual control

7 ELECTRICAL CONNECTION

DANGER!

Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

If the protective conductor is not connected, there is a risk of electric shock.

- Always connect protective conductor and check electrical continuity between coil and housing.

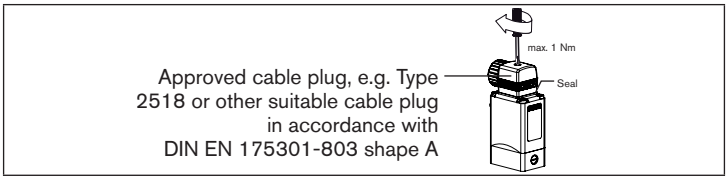


Fig. 3: Connecting the cable plug to the power supply

Note the voltage and current type as specified on the type label.

7.1 Standard device

→ Connect L1/+ and N/– to terminals 1 and 2, independent of the polarity.

→ Connect protective conductor.

→ Attach seal and check for correct fit.

→ Tighten cable plug (Type 2518 or 2509 in accordance with DIN EN 175301-803 (DIN 43 650), shape A, for order numbers see data sheet); while doing so, observe the maximum torque of 1 Nm.

→ Check electrical continuity between coil and body (protective conductor function).

7.2 Pulse variant (CF 02)

In accordance with the terminals on the valves, the connection terminals in the cable plug are marked with the numbers 1 to 3.

→ Connect as shown in “Fig. 4”. Pulse on terminal 1 closes the valve; pulse on terminal 2 opens the valve.

→ Attach seal and check for correct fit.

→ Tighten cable plug (Type 2518 or 2509 in accordance with DIN EN 175301-803 (DIN 43 650), shape A, for order numbers see data sheet); while doing so, observe the maximum torque of 1 Nm.

→ Check electrical continuity between coil and body (protective conductor function).

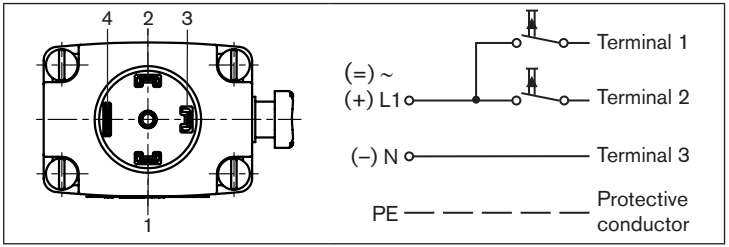


Fig. 4: Electrical connection pulse variant (CF 02)

NOTE!

- Prevent simultaneous pulsing on both coil windings.
- Parallel to the terminals, no other consumers (relay, etc.) may be connected.
- The respective coil connection that does not carry current must be galvanically isolated (open).
- In case two or more valves are connected in parallel, the use of two-pole or multi-pole switches must ensure that this requirement is met.

7.3 Kick-and-drop-electronic variant (solenoid coil ACP016)

Information on the solenoid coil Type ACP016 can be found in the corresponding operating manual at www.burkert.com.

DANGER

If solenoid coils feature a terminal box, also observe the following:

- Insert permanently installed cables and lines only.
- Use a suitable cable and line entry. Observe specifications in the operating instructions ACP016.
- The terminals in the terminal box are intended for wires between 0.5 mm^2 and 2.5 mm^2.
- Tighten terminal screws to 0.25 Nm.
- Lock housing cover properly. Tighten lock screw to 2 Nm.
- Check continuity of the protective conductor connection.
- Before opening the housing cover, disconnect the power supply.
- Connect maximum two conductors to each terminal.

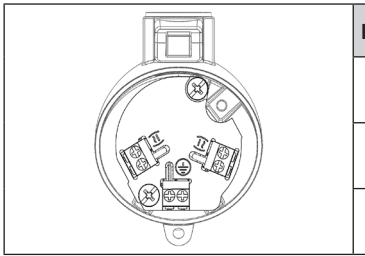
7.3.1 Solenoid coils with cable outlet

The connection cable is encapsulated with the solenoid coil Type ACP016 and cannot be removed.
Observe the indicated voltage according to the type label.

Wire assignment:

Wire color	Terminal assignment
green / yellow	Protective conductor
black	Phase / positive pole (+)
black	Neutral conductor / negative pole (–)

7.3.2 Solenoid coils with terminal box



Position	Terminal assignment
⏚	Protective conductor
(≃)	Neutral conductor / negative pole (–)
(≃)	Phase / positive pole (+)

Fig. 5: Terminal box

8 DISASSEMBLY

DANGER!

Risk of injury from high pressure in the system/device.

- Before working on the system or device, switch off the pressure and vent/drain lines.

Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

WARNING!

Risk of injury from improper disassembly.

- Disassembly may be carried out only by trained technicians and with the appropriate tools.

Risk of injury from hazardous media.

- Before loosening lines or valves, flush out hazardous media, depressurize and drain the lines.

9 MAINTENANCE, TROUBLESHOOTING

DANGER!

Risk of injury from high pressure in the system.

- Turn off the pressure and vent the lines before loosening lines or valves.

Risk of injury due to electrical shock.

- Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

WARNING!

Risk of injury from improper maintenance work.

- Maintenance may be carried out only by trained technicians and with the appropriate tools.
- Secure system against unintentional activation.
- Following maintenance, ensure a controlled restart.

9.1 Malfunctions

If malfunctions occur, check whether:

→ the device has been installed according to the instructions,

→ the electrical and fluid connections are correct,

→ the device is not damaged,

→ all screws have been tightened,

→ the voltage and pressure have been switched on,

→ the pipelines are clean.

Malfunction	Possible cause
Valve does not switch	Short circuit or coil interrupted
	Medium pressure outside the permitted pressure range
	Manual control locked
Valve does not close	Inner compartment of the valve is dirty
	Manual control locked

9.1.1 Repairs

Repairs may only be carried out by the manufacturer. Operating data may change if spare parts are replaced by the user.

10 TRANSPORTATION, STORAGE, DISPOSAL

NOTE!

Transport damage.

Inadequately protected devices may be damaged during transportation.

- Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- Prevent the temperature from exceeding or dropping below the permitted storage temperature.

Incorrect storage may damage the device.

- Store the device in a dry and dust-free location.
- Storage temperature -40 to +80 °C.

Damage to the environment caused by parts contaminated with media.

- Dispose of the device and packaging in an environmentally friendly manner.
- Observe applicable disposal and environmental regulations.

Inhaltsverzeichnis

1 DIE BEDIENUNGSANLEITUNG

Die Bedienungsanleitung enthält wichtige Informationen.

- Anleitung sorgfältig lesen und die Hinweise zur Sicherheit beachten.
- Anleitung so aufbewahren, dass sie jedem Benutzer zur Verfügung steht.

Die Haftung und Gewährleistung für das Gerät entfällt, wenn die Anweisungen der Bedienungsanleitung nicht beachtet werden.

1.1 Darstellungsmittel

- markiert eine Anweisung zur Gefahrenvermeidung.

→ markiert einen Arbeitsschritt, den Sie ausführen müssen.

GEFAHR!

Unmittelbare Gefahr! Schwere oder tödliche Verletzungen.

WARNUNG!

Mögliche Gefahr! Schwere oder tödliche Verletzungen.

VORSICHT!

Gefahr! Mittelschwere oder leichte Verletzungen.

HINWEIS!

Warnt vor Sachschäden.


Wichtige Tipps und Empfehlungen.


verweist auf Informationen in dieser Bedienungsanleitung oder in anderen Dokumentationen.

1.2 Begriffsdefinition

Der in dieser Anleitung verwendete Begriff „Gerät“ steht immer für die Typen 0121, 0330, 0331, (0124, 0125, 0332, 0333).

2 BESTIMMUNGSGEMÄSSE VERWENDUNG

Das Gerät ist zum Steuern, Absperren und Dosieren von neutralen und aggressiven Medien bis zu einer Viskosität von 37 mm²/s konzipiert.

- Für den Einsatz die in den Vertragsdokumenten und der Bedienungsanleitung spezifizierten zulässigen Daten, Betriebs- und Einsatzbedingungen beachten.
- Mit einer sachgemäß angeschlossenen und montierten Gerätesteckdose, z. B. Bürkert Typ 2518 erfüllt das Gerät die Schutzart IP65 nach DIN EN 60529 / IEC 60529.

Das Gerät

- nur in einwandfreiem Zustand betreiben und auf sachgerechte Lagerung, Transport, Installation und Bedienung achten.
- nur bestimmungsgemäß verwenden.

2.1 Beschränkungen

Bei der Ausfuhr des Geräts gegebenenfalls bestehende Beschränkungen beachten.

3 GRUNDLEGENDE SICHERHEITSHINWEISE

Diese Sicherheitshinweise berücksichtigen keine Zufälligkeiten und Ereignisse, die bei Montage, Betrieb und Wartung auftreten können.

Verletzungsgefahr durch hohen Druck in Anlage/Gerät.

- Vor Arbeiten an Anlage oder Gerät den Druck abschalten und Leitungen entlüften/entleeren.

Verletzungsgefahr durch Stromschlag.

- Vor Arbeiten an Anlage oder Gerät die Spannung abschalten und gegen Wiedereinschalten sichern.
- Die geltenden Unfallverhütungs- und Sicherheitsbestimmungen für elektrische Geräte beachten.

Verbrennungsgefahr/Brandgefahr bei längerer Einschaltzeit durch heiße Geräteoberfläche.

- Gerät von leicht brennbaren Stoffen und Medien fernhalten und nicht mit bloßen Händen berühren.

Kurzschlussgefahr/Austritt von Medium durch undichte Verschraubungen.

- Auf einwandfreien Sitz der Dichtungen achten.
- Ventil und Rohrleitungen sorgfältig verschrauben.

Verletzungsgefahr durch Funktionsausfall bei Ventilen mit Wechselspannung (AC).

Festsitzender Kern bewirkt Spulenüberhitzung, die zu Funktionsausfall führt.

- Arbeitsprozess auf einwandfreie Funktion überwachen.

Allgemeine Gefahrensituationen.

Zum Schutz vor Verletzungen ist zu beachten:

- Im explosionsgefährdeten Bereich darf das Gerät nur entsprechend der Spezifikation auf dem Typschild eingesetzt werden. Für den Einsatz muss die dem Gerät beiliegende Zusatzanleitung mit Sicherheitshinweisen für den Ex-Bereich beachtet werden.
- Im UL-Bereich muss die beiliegende UL-Anleitung beachtet werden.
- Am Gerät keine inneren oder äußeren Veränderungen vornehmen und nicht mechanisch belasten (z. B. durch Ablage von Gegenständen oder als Trittstufe).
- Gerät vor unbeabsichtigem Betätigen sichern.
- Nur geschultes Fachpersonal darf Installations- und Instandhaltungsarbeiten ausführen.
- Geräte gemäß der im Land gültigen Vorschriften installieren.
- Nach Unterbrechung der elektrischen Versorgung einen kontrollierten Wiederanlauf des Prozesses sicherstellen.
- Allgemeine Regeln der Technik einhalten.

4 SYSTEMBESCHREIBUNG

Die Klappankerventile sind direktwirkende 2/2- oder 3/2-Wege-Magnetventile in vielfältigen Wirkungsweisen und Ausführungen. Magnetsystem und Mediumsraum sind durch ein Trennmembransystem voneinander getrennt. Die Ventile sind schnellschaltend und haben eine hohe Lebensdauer.

Typ 0121	2/2- oder 3/2-Wege-Magnetventil, Muffenanschluss
Typ 0330	2/2- oder 3/2-Wege-Magnetventil, Muffenanschluss
Typ 0331	2/2- oder 3/2-Wege-Magnetventil, Flanschanschluss
Typ 0332	Bistabiles 2/2- oder 3/2-Wege-Magnetventil mit 2 Spulenwicklungen, Muffenanschluss
Typ 0333	Bistabiles 2/2- oder 3/2-Wege-Magnetventil mit 2 Spulenwicklungen, Flanschanschluss
Typ 0124	2/2- oder 3/2-Wege-Magnetventil, Muffenanschluss
Typ 0125	2/2- oder 3/2-Wege-Magnetventil, Flanschanschluss

5 TECHNISCHE DATEN

Folgende Werte sind auf dem Typschild angegeben:

- **Spannung** (Toleranz ±10 %) **/ Stromart**
- **Spulenleistung** (Wirkleistung in W - betriebswarm)
- **Druckbereich**
- **Gehäusewerkstoff** (MS=Messing, VA=Edelstahl, PV=PVC, TE=PTFE, PP=Polypropylen, PD=PVDF)
- **Dichtwerkstoff** (F=FKM, A=EPDM, B=NBR, C=FFKM)

5.1 Konformität

Die Typen 0121, 0330, 0331, (0124, 0125, 0332, 0333) sind konform zu den EU-Richtlinien entsprechend der EU-Konformitätserklärung (wenn anwendbar).

5.2 Normen

Die angewandten Normen, mit welchen die Konformität zu den Richtlinien nachgewiesen wird, sind in der EU-Baumusterprüfbescheinigung und/ oder der EU-Konformitätserklärung nachzulesen (wenn anwendbar).

5.3 Betriebsbedingungen

Umgebungstemperatur	
Typ 0121	max. +50 °C
andere Typen	max. +55 °C
Einschaltdauer bei Gehäusewerkstoff	
Messing oder Edelstahl	Dauerbetrieb 100 % ED
Kunststoff	max. zulässige Einschaltdauer siehe Datenblatt

Wichtiger Hinweis zur Funktionssicherheit.
Bei langem Stillstand wird eine Mindestbetätigung von 1–2 Schaltungen vor Wiederanlauf empfohlen.

Lebensdauer	hohe Schaltfrequenz und hohe Drücke verringern die Lebensdauer
Schutzart	IP65 nach DIN EN 60529 / IEC 60529 mit sachgemäß angeschlossener und montierter Gerätesteckdose, z. B. Bürkert Typ 2518

5.4 Mechanische Daten

Abmessungen	siehe Datenblatt
Spulenwerkstoff	Epoxid
Anschlüsse	G 1/4 (NPT 1/4, G 1/8, G 3/8, Rc 1/4 auf Anfrage)

5.5 Fluidische Daten

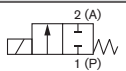
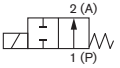
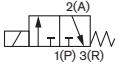
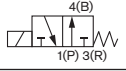
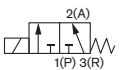
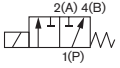
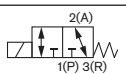
Medien aggressive, neutrale, gasförmige und flüssige Medien, die Gehäuse und Dichtwerkstoffe nicht angreifen (siehe Beständigkeitstabelle unter www.buerkert.de)

Mediumstemperatur bei Dichtwerkstoff

FKM	0 °C ... +90 °C
EPDM	–30 °C ... +90 °C
NBR	0 °C ... +80 °C
FFKM	+5 °C ... +90 °C

Bei UL-gelisteten Ventilen folgende Werte beachten:

Medium	Temperaturen	NBR [°F]	NBR [°C]	EPDM [°F]	EPDM [°C]	FKM [°F]	FKM [°C]
Luft	Medium	+32 ... +176	0 ... +80	−22 ... +194	−30 ... +90	+32 ... +194	0 ... +90
	Umgebung	+32 ... +131	0 ... +55	+14 ... +131	−10 ... +55	+32 ... +131	0 ... +55
Wasser	Medium	+41 ... +176	+5 ... +80	+41 ... +194	+5 ... +90	+41 ... +194	+5 ... +90
	Umgebung	+32 ... +131	0 ... +55	+14 ... +131	−10 ... +55	+32 ... +131	0 ... +55
Inertgas	Medium	+32 ... +176	0 ... +80	−22 ... +194	−30 ... +90	+32 ... +194	0 ... +90
	Umgebung	+32 ... +131	0 ... +55	+14 ... +131	−10 ... +55	+32 ... +131	0 ... +55
Öl	Medium	–		–		+32 ... +194	0 ... +90
	Umgebung					+32 ... +131	0 ... +55
LP-Gas	Medium	–		–		+32 ... +194	0 ... +90
	Umgebung					+32 ... +131	0 ... +55
Sauerstoff	Medium	–		–		+32 ... +194	0 ... +90
	Umgebung					+32 ... +131	0 ... +55

Wirkungsweisen		
A (NC)		2/2-Wege-Ventil; in Ruhestellung geschlossen
B (NO)		2/2-Wege-Ventil; in Ruhestellung offen
C (NC)		3/2-Wege-Ventil; in Ruhestellung geschlossen, Ausgang A entlastet
D (NO)		3/2-Wege-Ventil; in Ruhestellung Ausgang B druckbeaufschlagt
E		3/2-Wege-Mischventil; in Ruhestellung Druckanschluss P2 mit Ausgang A verbunden, P1 geschlossen
F		3/2-Wege-Verteilerventil; in Ruhestellung Druckanschluss P mit Ausgang B verbunden
T		3/2-Wege-Ventil; universell einsetzbar

5.6 Elektrische Daten

Anschlüsse DIN EN 175301-803 (DIN 43 650), Form A für Gerätesteckdose Typ 2518 oder 2509

5.7 Typschild (Beispiel)

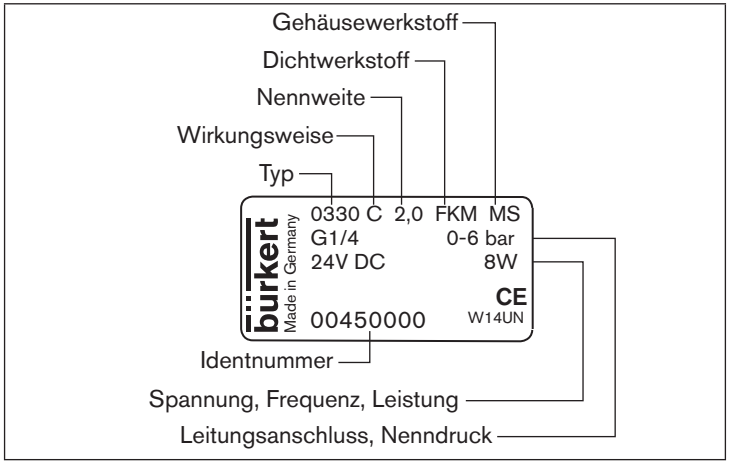


Bild 1: Beschreibung des Typschilds

6 MONTAGE

GEFAHR!

Verletzungsgefahr durch hohen Druck in Anlage/Gerät.

- Vor Arbeiten an Anlage oder Gerät den Druck abschalten und Leitungen entlüften/entleeren.

Verletzungsgefahr durch Stromschlag.

- Vor Arbeiten an Anlage oder Gerät die Spannung abschalten und gegen Wiedereinschalten sichern.
- Die geltenden Unfallverhütungs- und Sicherheitsbestimmungen für elektrische Geräte beachten.

WARNUNG!

Verletzungsgefahr bei unsachgemäßer Montage.

- Die Montage darf nur geschultes Fachpersonal mit geeignetem Werkzeug durchführen.
- Anlage gegen unbeabsichtigtes Betätigen sichern.
- Nach der Montage einen kontrollierten Wiederanlauf gewährleisten.

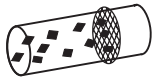
6.1 Vor dem Einbau

Einbaulage:

Die Einbaulage ist beliebig. Vorzugsweise: Antrieb oben.

→ Rohrleitungen vor dem Einbau auf Verschmutzungen überprüfen und gegebenenfalls reinigen.

Schmutzfilter: Für die sichere Funktion des Magnetventils muss vor dem Ventileingang ein Schmutzfilter (≤ 500 µm) eingebaut werden.



6.2 Einbau

→ Durchflussrichtung beachten:
Die Funktion des Geräts ist nur sichergestellt, wenn die Wirkungsweise eingehalten wird.

Gerät mit Muffenanschluss

→ Als Dichtwerkstoff PTFE-Band verwenden.

→ Maximale Einschraubtiefe der Anschlussgewinde ermitteln, da diese keiner Norm entspricht.

HINWEIS!

Vorsicht Bruchgefahr.

- Spule nicht als Hebelarm benutzen.

→ Gerät mit geeignetem Werkzeug (Gabelschlüssel) am Gehäuse festhalten, in die Rohrleitung einschrauben.

Befestigung des Geräts:

→ Über Bohrungen M4 x 8 (Messing- oder Edelstahlausführung) oder selbstschneidende Schrauben 3,9 DIN 7970 (Kunststoffausführung, max. Einschraubtiefe 10 mm) an Gehäuseunterseite am Lochbild 38 x 24.

Geräte in Flanschausführung

Befestigung des Geräts:

→ Über mitgelieferte Schrauben auf Grundgeräte oder Anschlussplatte.

→ Befestigungsschrauben an der Spule mit maximal 2 Nm anziehen.

6.3 Handbetätigung

HINWEIS!

- Bei arretierter Handbetätigung kann das Ventil nicht elektrisch betätigt werden.

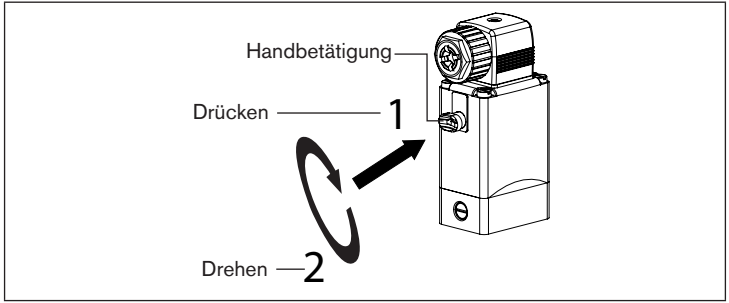


Bild 2: Handbetätigung

7 ELEKTRISCHER ANSCHLUSS

GEFAHR!

Verletzungsgefahr durch Stromschlag.

- Vor Arbeiten an Anlage oder Gerät die Spannung abschalten und gegen Wiedereinschalten sichern.
- Die geltenden Unfallverhütungs- und Sicherheitsbestimmungen für elektrische Geräte beachten.

Bei nicht angeschlossenem Schutzleiter besteht Stromschlaggefahr.

- Schutzleiter immer anschließen und elektrischen Durchgang zwischen Spule und Gehäuse prüfen.

Bild 3: Elektrischer Anschluss der Gerätesteckdose

Spannung und Stromart laut Typschild beachten.

7.1 Standardgerät

→ L1/+ bzw. N/– an Klemmen 1 und 2 unabhängig von der Polung anschließen.

→ Schutzleiter anschließen.

→ Dichtung aufstecken und korrekten Sitz prüfen.

→ Gerätesteckdose (Typ 2518 oder 2509 nach DIN EN 175301-803 (DIN 43 650), Form A, Bestellnummern siehe Datenblatt) festschrauben, dabei maximales Drehmoment 1 Nm beachten.

→ Elektrischen Durchgang zwischen Spule und Gehäuse prüfen (Funktion Schutzleiter).

7.2 Impulsvariante (CF 02)

Die Klemmen in der Gerätesteckdose sind entsprechend den Klemmen am Ventil mit den Ziffern 1 bis 3 gekennzeichnet.

→ Wie in „Bild 4“ anschließen. Impuls auf Klemme 1 schließt das Ventil, Impuls auf Klemme 2 öffnet das Ventil.

→ Dichtung aufstecken und korrekten Sitz prüfen.

→ Gerätesteckdose (Typ 2518 oder 2509 nach DIN EN 175301-803 (DIN 43 650), Form A, Bestellnummern siehe Datenblatt) festschrauben, dabei maximales Drehmoment 1 Nm beachten.

→ Elektrischen Durchgang zwischen Spule und Gehäuse prüfen (Funktion Schutzleiter).

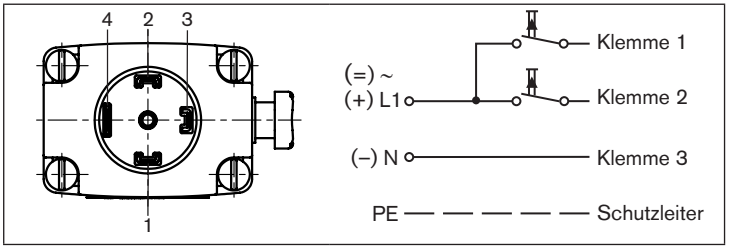


Bild 4: Elektrischer Anschluss Impulsvariante (CF 02)

HINWEIS!

- Gleichzeitige Impulsgabe auf beide Spulenwicklungen vermeiden.
- Parallel zu den Klemmen dürfen keine weiteren Verbraucher (Relais und dergl.) geschaltet werden.
- Der jeweils nicht spannungsbeaufschlagte Spulenanschluss muss galvanisch getrennt (offen) sein.
- Sollten zwei oder mehr Ventile parallel geschaltet werden, ist durch Verwendung von 2- oder mehrpoligen Schaltern sicherzustellen, dass diese Forderung erfüllt ist.

7.3 Kick-and-Drop-Elektronikvariante (Spule ACP016)

Informationen zur Spule ACP016 finden Sie in der entsprechenden Bedienungsanleitung unter www.buerkert.de

GEFAHR

Bei Magnetspulen mit Klemmenanschlusskasten zusätzlich beachten:

- Nur fest verlegte Kabel und Leitungen einführen.
- Geeignete Kabel und Leitungseinführung verwenden. Angaben in der Bedienungsanleitung Typ ACP016 beachten.
- Im Klemmenanschlusskasten nur Adern mit Bemessungsanschluss zwischen 0,5 mm² und 2,5 mm² anschließen.
- Klemmenschrauben mit 0,25 Nm anziehen.
- Gehäusedeckel ordnungsgemäß verschließen. Verschlussschraube mit 2 Nm anziehen.
- Durchgängigkeit der Schutzleiterverbindung prüfen.
- Gehäusedeckel nur im spannungsfreien Zustand öffnen.
- Maximal 2 Leiter pro Klemme anschließen.

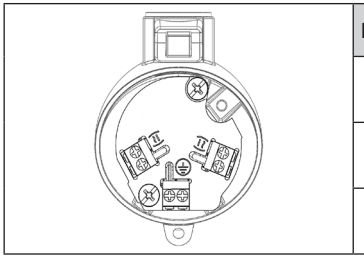
7.3.1 Magnetspulen mit Kabelabgang

Das Anschlusskabel ist mit der Magnetspule Typ ACP016 vergossen und kann nicht demontiert werden.
Die angegebene Spannung laut Typschild beachten.

Aderbelegung:

Aderfarbe	Anschlussbelegung
grün-gelb	Schutzleiter
schwarz	Phase / Pluspol (+)
schwarz	Neutralleiter / Minuspol (–)

7.3.2 Magnetspulen mit Klemmenanschlusskasten



Position	Anschlussbelegung
⏚	Schutzleiter
(≃)	Neutralleiter / Minuspol (–)
(≃)	Phase / Pluspol (+)

Bild 5: Klemmenanschlusskasten

8 DEMONTAGE

GEFAHR!

Verletzungsgefahr durch hohen Druck in Anlage/Gerät.

- Vor Arbeiten an Anlage oder Gerät den Druck abschalten und Leitungen entlüften/entleeren.

Verletzungsgefahr durch Stromschlag.

- Vor Arbeiten an Anlage oder Gerät die Spannung abschalten und gegen Wiedereinschalten sichern.
- Die geltenden Unfallverhütungs- und Sicherheitsbestimmungen für elektrische Geräte beachten.

WARNUNG!

Verletzungsgefahr bei unsachgemäßer Demontage.

- Die Demontage darf nur geschultes Fachpersonal mit geeignetem Werkzeug durchführen.

Verletzungsgefahr durch gefährliche Medien.

- Vor dem Lösen von Leitungen oder Ventilen gefährliche Medien ausspülen, die Leitungen druckfrei schalten und entleeren.

9 WARTUNG, FEHLERBEHEBUNG

GEFAHR!

Verletzungsgefahr durch hohen Druck in der Anlage.

- Vor dem Lösen von Leitungen oder Ventilen den Druck abschalten und Leitungen entlüften.

Verletzungsgefahr durch Stromschlag.

- Vor Arbeiten an Anlage oder Gerät die Spannung abschalten und gegen Wiedereinschalten sichern.
- Die geltenden Unfallverhütungs- und Sicherheitsbestimmungen für elektrische Geräte beachten.

WARNUNG!

Verletzungsgefahr bei unsachgemäßen Wartungsarbeiten.

- Die Wartung darf nur geschultes Fachpersonal mit geeignetem Werkzeug durchführen.
- Anlage gegen unbeabsichtigtes Betätigen sichern.
- Nach der Wartung einen kontrollierten Wiederanlauf gewährleisten.

9.1 Störungen

Überprüfen Sie bei Störungen ob

→ das Gerät vorschriftsmäßig installiert ist,

→ elektrischer / fluidischer Anschluss ordnungsgemäß ausgeführt ist,

→ das Gerät nicht beschädigt ist,

→ alle Schrauben fest angezogen sind,

→ Spannung und Druck anliegen,

→ die Rohrleitungen schmutzfrei sind.

Störung	Mögliche Ursache
Ventil schaltet nicht	Kurzschluss oder Spulenunterbrechung
	Mediumsdruck außerhalb des zulässigen Druckbereichs
	Handbetätigung arretiert
Ventil schließt nicht	Innenraum des Ventils verschmutzt
	Handbetätigung arretiert

9.1.1 Reparatur

Reparaturen grundsätzlich vom Hersteller vornehmen lassen. Die Betriebsdaten können sich ändern, wenn Ersatzteile vom Anwender ausgetauscht werden.

10 TRANSPORT, LAGERUNG, ENTSORGUNG

HINWEIS!

Transportschäden.

Unzureichend geschützte Geräte können durch den Transport beschädigt werden.

- Gerät vor Nässe und Schmutz geschützt in einer stoßfesten Verpackung transportieren.
- Eine Über- bzw. Unterschreitung der zulässigen Lagertemperatur vermeiden.

Falsche Lagerung kann Schäden am Gerät verursachen.

- Gerät trocken und staubfrei lagern.
- Lagertemperatur –40 … +80 °C.

Umweltschäden durch von Medien kontaminierte Teile.

- Gerät und Verpackung umweltgerecht entsorgen.
- Geltende Entsorgungsvorschriften und Umweltbestimmungen einhalten.

Table des matières

1 MANUEL D'UTILISATION

Le manuel d'utilisation contient des informations importantes.

- Lire attentivement le manuel d'utilisation et tenir compte des consignes de sécurité.
- Conserver le manuel d'utilisation afin qu'il soit accessible à tous les utilisateurs.

La responsabilité et la garantie légale concernant l'appareil sont exclues en cas de non-respect du manuel d'utilisation.

1.1 Symboles

- identifie une consigne pour éviter un danger.

→ Identifie une opération que vous devez effectuer.

DANGER !

Danger imminent ! Blessures graves ou mortelles.

AVERTISSEMENT !

Danger potentiel ! Blessures graves ou mortelles.

ATTENTION !

Danger ! Blessures légères ou de moyenne gravité.

REMARQUE !

Met en garde contre des dommages matériels.

Conseils et recommandations importants.

renvoie à des informations dans ce manuel d'utilisation ou dans d'autres documentations.

1.2 Définition des termes

Le terme « appareil » utilisé dans ces instructions désigne toujours le type 0121, 0330, 0331, (0124, 0125, 0332, 0333).

2 UTILISATION CONFORME

L'appareil est conçu pour commander, arrêter et doser des fluides neutres et agressifs jusqu'à une viscosité de 37 mm²/s.

- Lors de l'utilisation, il convient de respecter les données et conditions d'utilisation et d'exploitation admissibles spécifiées dans le manuel d'utilisation et dans les documents contractuels.
- Avec un connecteur, par ex. le type 2518 de Bürkert, connecté et monté de manière conforme, l'appareil est conforme au degré de protection IP65 selon DIN EN 60529 / IEC 60529.

Faire fonctionner l'appareil

- uniquement en parfait état et veiller au stockage, au transport, à l'installation et à l'utilisation conformes.
- uniquement de manière conforme.

2.1 Limitations

Lors de l'exportation de l'appareil, veuillez respecter les limitations éventuelles.

3 CONSIGNES DE SÉCURITÉ FONDAMENTALES

Ces consignes de sécurité ne tiennent pas compte des hasards et des événements pouvant survenir lors du montage, de l'exploitation et de l'entretien.

Risque de blessures dû à la présence de haute pression dans l'installation/l'appareil.

- Avant d'intervenir dans l'installation ou l'appareil, couper la pression et désaérer/vider les conduites.

Risque de choc électrique.

- Avant d'intervenir dans l'installation ou l'appareil, couper la tension et empêcher toute remise sous tension par inadvertance.
- Veuillez respecter les réglementations en vigueur pour les appareils électriques en matière de prévention des accidents ainsi qu'en matière de sécurité.

Risque de brûlures/d'incendie lors d'une durée de fonctionnement prolongée dû à la surface brûlante de l'appareil.

Tenir les substances et les fluides facilement inflammables à l'écart de l'appareil et ne touchez pas ce dernier à mains nues.

Risque de blessure dû à une panne pour les vannes avec tension alternative (AC).

Un noyau bloqué provoque la surchauffe de la bobine et donc une panne.

- Surveiller le bon fonctionnement du processus de travail.

Risque de court-circuit/de sortie du fluide en présence de vissages non étanches.

- Veiller à l'installation correcte des joints.
- Visser soigneusement la vanne et les tuyaux.

Situations dangereuses d'ordre général.

Pour prévenir les blessures, respectez ce qui suit :

- Dans une zone exposée à un risque d'explosion, l'appareil doit impérativement être installé conformément à la spécification indiquée sur la plaque signalétique. Les instructions supplémentaires comportant des consignes de sécurité pour zone présentant des risques d'explosion, fournies avec l'appareil, doivent être respectées lors de l'utilisation de celui-ci.
- En zone UL, les instructions UL fournies avec l'appareil, doivent être respectées.
- Ne pas soumettre l'appareil à des modifications extérieures ou intérieures ni à des contraintes mécaniques (par ex. en déposant des objets sur le corps ou en l'utilisant comme marche).
- Empêcher tout actionnement involontaire.
- Seul du personnel qualifié peut effectuer l'installation et la maintenance.
- Les vannes doivent être installées conformément à la réglementation en vigueur dans le pays respectif.
- Garantir un redémarrage contrôlé du processus après une coupure de l'alimentation électrique.
- Respecter les règles générales de la technique.

4 DESCRIPTION DU SYSTÈME

Les électrovannes à armature battante sont des électrovannes 2/2 ou 3/2 voies à action directe disponibles dans de nombreuses variantes d'exécution et de fonctionnement. Le système magnétique et l'espace réservé au fluide sont séparés l'un de l'autre par un système de séparation à membrane. Les vannes sont à commutation rapide et ont une longue durée de vie.

Type 0121	électrovanne 2/2 ou 3/2 voies, raccord manchon
Type 0330	électrovanne 2/2 ou 3/2 voies, raccord manchon
Type 0331	électrovanne 2/2 ou 3/2 voies,raccord à bride
Type 0332	électrovanne bistable 2/2 ou 3/2 voies avec 2 bobinages, raccord manchon
Type 0333	électrovanne bistable 2/2 ou 3/2 voies avec 2 bobinages, corps de à bride
Type 0124	électrovanne 2/2 ou 3/2 voies, raccord manchon
Type 0125	électrovanne 2/2 ou 3/2 voies,raccord à bride

5 CARACTÉRISTIQUES TECHNIQUES

Les valeurs suivantes sont indiquées sur la plaque signalétique :

- **Tension** (tolérance ±10 %) **/ type de courant**
- **Puissance de bobine** (puissance active en W - à l'état chaud)
- **Plage de pression**
- **Matériau du corps** (MS=laiton, VA=acier inox, PV=PVC, TE=PTFE, PP=Polypropylène, PD=PVDF)
- **Matériau du joint** (F=FKM, A=EPDM, B=NBR, C=FFKM)

5.1 Conformité

Les types 0121, 0330, 0331, (0124, 0125, 0332, 0333) sont conformes aux directives UE conformément à la déclaration de conformité UE (si applicable).

5.2 Normes

Les normes utilisées, avec lesquelles la conformité avec les directives UE sont prouvées, figurent dans l'attestation UE de type et/ou la déclaration de conformité UE (si applicable).

5.3 Conditions d'exploitation

Température ambiante

Type 0121	max. +50 °C
autres types	max. +55 °C

Facteur de marche pour matériau du corps

laiton ou acier inox	marche continu 100 % ED
plastique	facteur de marche max. autorisée voir fiche technique

Remarque importante pour la sécurité de fonctionnement.
Dans le cas d'un arrêt de longue durée, il est recommandé de procéder à 1 - 2 commutations minimum avant le redémarrage.

Durée de vie	Une fréquence élevée de commutation ainsi que des pressions élevées réduisent la durée de vie.
Degré de protection	IP65 selon DIN EN 60529 / IEC 60529 avec un connecteur connecté et monté de manière conforme, par ex. le type 2518 de Bürkert

5.4 Caractéristiques mécaniques

Dimensions	voir fiche technique
Matériau de la bobine	Résine époxy
Raccords	G 1/4 (NPT 1/4, G 1/8, G 3/8, Rc 1/4 sur demande)

5.5 Données fluidiques

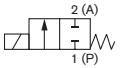
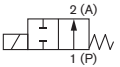
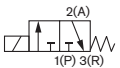
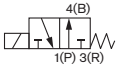
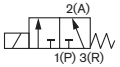
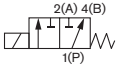
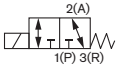
Fluides fluides liquides et gazeux, agressifs, neutres n'attaquant ni le corps ni le matériau du joint (voir le tableau de résistance chimique Bürkert www.burkert.fr).

Température du fluide pour le matériau du joint

FKM	0 °C à +90 °C
EPDM	–30 °C à +90 °C
NBR	0 °C à +80 °C
FFKM	+5 °C à +90 °C

Pour les vannes homologuées UL, les valeurs suivantes doivent être respectées :

Fluide	Température	NBR [°F]	NBR [°C]	EPDM [°F]	EPDM [°C]	FKM [°F]	FKM [°C]
Air	du fluide	+32 à +176	0 à +80	−22 à +194	−30 à +90	+32 à +194	0 à +90
	ambiante	+32 à +131	0 à +55	+14 à +131	−10 à +55	+32 à +131	0 à +55
Eau	du fluide	+41 à +176	+5 à +80	+41 à +194	+5 à +90	+41 à +194	+5 à +90
	ambiante	+32 à +131	0 à +55	+14 à +131	−10 à +55	+32 à +131	0 à +55
Gaz inerte	du fluide	+32 à +176	0 à +80	−22 à +194	−30 à +90	+32 à +194	0 à +90
	ambiante	+32 à +131	0 à +55	+14 à +131	−10 à +55	+32 à +131	0 à +55
Huile	du fluide	–		–		+32 à +194	0 à +90
	ambiante					+32 à +131	0 à +55
Gaz de pétrole liquéfié	du fluide	–		–		+32 à +194	0 à +90
	ambiante					+32 à +131	0 à +55
Oxygène	du fluide	–		–		+32 à +194	0 à +90
	ambiante					+32 à +131	0 à +55

Fonctions		
A (NF)		Vanne 2/2 voies ; fermée en position de repos
B (NO)		Vanne 2/2 voies ; ouverte en position de repos
C (NF)		Vanne 3/2 voies ; fermée en position de repos, sortie A déchargée
D (NO)		Vanne 3/2 voies ; en position de repos pression appliquée sur sortie B
E		Vanne mélangeuse 3/2 voies ; pression appliquée en position de repos, P2 reliée à la sortie A, P1 fermée
F		Distributeur 3/2 voies ; pression appliquée en position de repos, P reliée à la sortie B
T		Vanne à 3/2 voies ; utilisation universelle

5.6 Caractéristiques électriques

Connexions DIN EN 175301-803 (DIN 43 650), forme A pour le connecteur type 2518 ou 2509

5.7 Plaque signalétique (exemple)

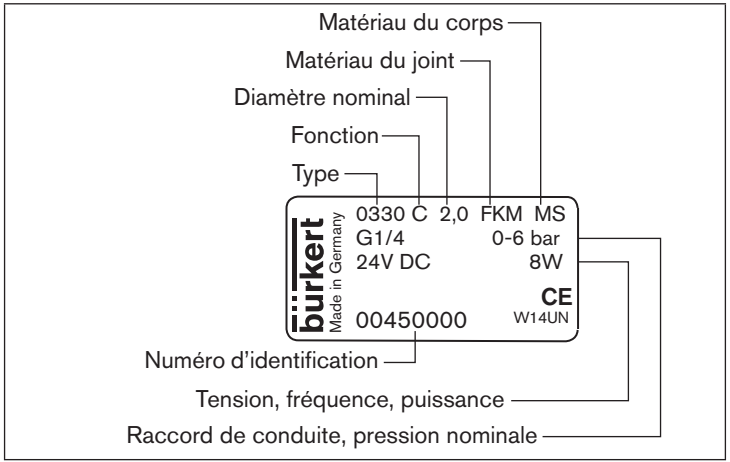


Fig. 1 : Description de la plaque signalétique

6 MONTAGE

DANGER !

Risque de blessures dû à la présence de haute pression dans l'installation/l'appareil.

- Avant d'intervenir dans l'installation ou l'appareil, couper la pression et désaérer/vider les conduites.

Risque de choc électrique.

- Avant d'intervenir dans l'installation ou l'appareil, couper la tension et empêcher toute remise sous tension par inadvertance.
- Veuillez respecter les réglementations en vigueur pour les appareils électriques en matière de prévention des accidents ainsi qu'en matière de sécurité.

AVERTISSEMENT !

Risque de blessures dû à un montage non conforme.

- Le montage doit être effectué uniquement par un personnel qualifié et habilité disposant de l'outillage approprié.
- Empêcher tout actionnement involontaire de l'appareil.
- Garantir un redémarrage contrôlé après le montage.

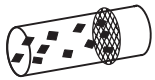
6.1 Avant le montage

Position de montage :

Position de montage indifférente. De préférence : avec actionneur en haut.

→ Préalablement au montage, vérifier si les tuyaux ne présentent pas de salissures et les nettoyer le cas échéant.

Filtre à impuretés : Pour un fonctionnement fiable de l'électrovanne, il convient de monter un filtre à impuretés avant l'entrée de la vanne (≤ 500 µm).



6.2 Montage

→ Respecter le sens du débit :
la fonction de l'appareil n'est assurée que si le fonction est respecté.

Appareils avec raccord manchon

→ Utilisez une bande PTFE comme matériau du joint.

→ Calculer la profondeur de vissage maximale du filetage de raccordement car celui-ci n'est pas normé.

REMARQUE !

Attention risque de rupture.

- La bobine ne doit pas être utilisée comme levier.

→ Maintenez l'appareil sur le corps à l'aide d'un outil approprié (clé à fourche) et vissez-le dans la tuyauterie.

Fixation de l'appareil :

→ A l'aide de perçages M4 x 8 (exécution en laiton ou en acier inox) ou à l'aide de vis autotaraudeuses 3,9 DIN 7970 (version en plastique, profondeur de vissage max. 10 mm) sur la face inférieure du corps au gabarit de trou 38 x 24.

Appareils avec raccord à bride

Fixation de l'appareil :

→ A l'aide des vis fournies sur l'appareil initial ou sur l'embase.

→ Serrer les vis de fixation sur la bobine à 2 Nm maximum.

6.3 Commande manuelle

REMARQUE !

- Lorsque la commande manuelle est enclenchée, la vanne ne peut pas être actionnée électriquement.

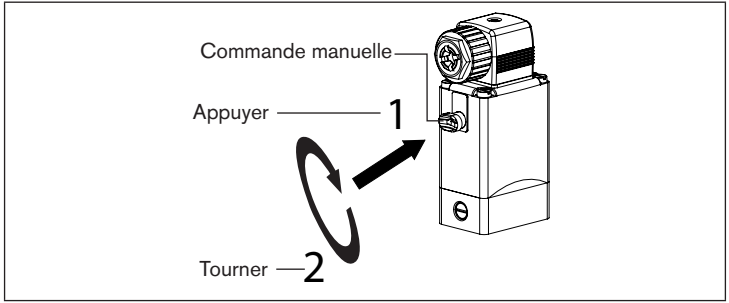


Fig. 2 : Commande manuelle

7 RACCORDEMENT ÉLECTRIQUE

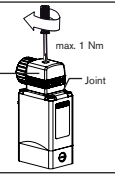
DANGER !

Risque de choc électrique.

- Avant d'intervenir dans l'installation ou l'appareil, couper la tension et empêcher toute remise sous tension par inadvertance.
- Veuillez respecter les réglementations en vigueur pour les appareils électriques en matière de prévention des accidents ainsi qu'en matière de sécurité.

Risque de choc électrique lorsque le conducteur de protection n'est pas raccordé.

- Raccorder toujours le conducteur de protection et vérifier le passage électrique entre la bobine et le corps.



Connecteurs autorisés par ex. type 2518 ou autres connecteurs adéquats selon DIN ISO 175301-803 forme A

Fig. 3 : Raccordement électrique du connecteur

Respecter la tension et le type de courant selon la plaque signalétique.

7.1 Appareil standard

→ Connecter L1/+ et/ou N/– aux bornes 1 et 2 indépendamment de la polarité.

→ Raccorder le conducteur de protection.

→ Placer le joint et contrôler sa position correcte.

→ Visser à fond le connecteur (type 2518 ou 2509 suivant DIN EN 175301-803 (DIN 43 650), forme A, références voir fiche technique), respecter le couple de serrage maximum de 1 Nm.

→ Contrôler le passage du courant entre la bobine et le corps (fonction du conducteur de protection).

7.2 Variante à impulsions (CF 02)

Les bornes de raccordement dans le connecteur sont identifiées à l'aide des chiffres 1 à 3 suivant les bornes de la vanne.

→ Raccorder comme indiqué sur « Fig. 4 ». L'impulsion sur la borne 1 ferme la vanne, l'impulsion sur la borne 2 ouvre la vanne.

→ Placer le joint et contrôler sa position correcte.

→ Visser à fond le connecteur (type 2518 ou 2509 suivant DIN EN 175301-803 (DIN 43 650), forme A, références voir fiche technique), respecter le couple de serrage maximum de 1 Nm.

→ Contrôler le passage du courant entre la bobine et le corps (fonction du conducteur de protection).

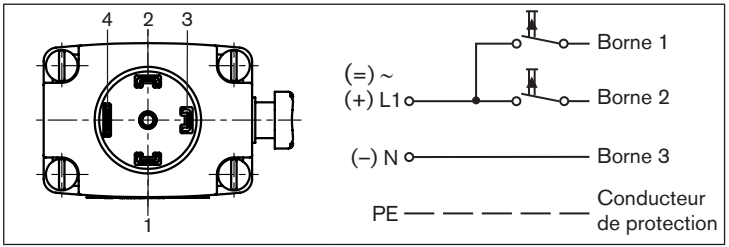


Fig. 4 : Raccordement électrique - variante à impulsions (CF 02)

REMARQUE !

- Éviter l'émission simultanée d'impulsion sur les deux bobines.
- Aucun autre consommateur (relais et autres) ne doit être commuté parallèlement aux bornes.
- La connexion de la bobine, qui n'est pas alimentée en pression, doit être isolée électriquement (ouverte).
- Si deux vannes ou plus doivent être commutées parallèlement, s'assurer par l'utilisation de commutateurs à 2 ou plusieurs pôles que cette obligation est remplie.

7.3 Variante kick-and-drop électronique (bobine magnétique type ACP016)

Vous trouverez des informations sur la bobine ACP016 dans le manuel d'utilisation sur Internet sous : www.burkert.fr

DANGER !

Sur les bobines magnétiques avec coffret à bornes, veiller en outre à :

- Introduire uniquement des câbles et des circuits fixés.
- Utiliser des câbles et des passe-câble appropriés. Respecter les consignes du manuel d'utilisation type ACP016.
- Dans le coffret à bornes, raccorder uniquement des conducteurs avec une connexion de référence située entre 0,5 mm^2 et 2,5 mm^2.
- Serrer les vis des bornes à 0,25 Nm.
- Fermer correctement le couvercle du boîtier. Serrer le bouchon fileté 2 Nm.
- Tester la connexion des conducteurs de protection.
- Ouvrir le couvercle du boîtier uniquement lorsque la bobine est hors tension
- Raccorder 2 conducteurs maximum par borne.

7.3.1 Bobines magnétiques avec départ de câble

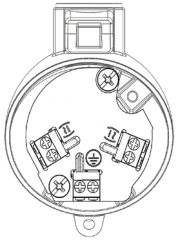
Le câble de raccordement est moulé avec la bobine magnétique type ACP016 et ne peut pas être démonté.

Respecter la tension indiquée sur la plaque signalétique.

Affectation des fils :

Couleur de fil	Affectation du raccordement
vert-jaune	Conducteur de protection
noir	Phase / pôle positif (+)
noir	Conducteur neutre / pôle négatif (–)

7.3.2 Bobine magnétique avec coffret à bornes



Position	Affectation du raccordement
⏚	Conducteur de protection
(≃)	Conducteur neutre / pôle négatif (–)
(≃)	Phase / pôle positif (+)

Fig. 5 : Coffret à bornes

8 DÉMONTAGE

DANGER !

Risque de blessures dû à la présence de haute pression dans l'installation/l'appareil.

- Avant d'intervenir dans l'installation ou l'appareil, couper la pression et désaérer/vider les conduites.

Risque de choc électrique.

- Avant d'intervenir dans l'installation ou l'appareil, couper la tension et empêcher toute remise sous tension par inadvertance.
- Veuillez respecter les réglementations en vigueur pour les appareils électriques en matière de prévention des accidents ainsi qu'en matière de sécurité.

AVERTISSEMENT !

Risque de blessures dû à un démontage non conforme.

- Le démontage doit être effectué uniquement par un personnel qualifié et habilité disposant de l'outillage approprié.

Risque de blessures dû à des fluides dangereux.

- Avant de desserrer les conduites et les vannes, rincer les fluides dangereux, couper la pression et purger les conduites.

9 MAINTENANCE, DÉPANNAGE

9.1 Consignes de sécurité

DANGER !

Risque de blessures dû à la présence de haute pression dans l'installation.

- Avant de desserrer les conduites ou les vannes, couper la pression et purger l'air des conduites.

Risque de choc électrique.

- Avant d'intervenir dans l'installation ou l'appareil, couper la tension et empêcher toute remise sous tension par inadvertance.
- Veuillez respecter les réglementations en vigueur pour les appareils électriques en matière de prévention des accidents ainsi qu'en matière de sécurité.

AVERTISSEMENT !

Risque de blessures dû à des travaux d'entretien non conformes.

- L'entretien doit être effectué uniquement par un personnel qualifié et habilité disposant de l'outillage approprié.
- Empêcher tout actionnement involontaire de l'appareil.
- Garantir un redémarrage contrôlé après l'entretien.

9.2 Pannes

En présence de pannes, vérifiez

→ que l'appareil est installé dans les règles,

→ que le raccord électrique et fluidique est correct,

→ que l'appareil n'est pas endommagé,

→ que toutes les vis sont bien serrées,

→ que la tension et la pression sont disponibles,

→ que les tuyauteries sont propres.

Panne	Cause possible
La vanne ne s'enclenche pas	Court-circuit ou coupure de la bobine
	Pression du fluide hors de la plage de pression autorisée
	Actionnement commande manuelle
La vanne ne se ferme pas	Intérieur de la vanne encrassé
	Actionnement commande manuelle

9.2.1 Réparation

Les réparations sur l'appareil doivent être effectuées uniquement par le fabricant. Les données de service peuvent changer lorsque l'utilisateur remplace des pièces de rechange.

10 TRANSPORT, STOCKAGE, ÉLIMINATION

REMARQUE !

Dommages dus au transport.

Les appareils insuffisamment protégés peuvent être endommagés pendant le transport.

- Transporter l'appareil à l'abri de l'humidité et des impuretés et dans un emballage résistant aux chocs.
- Veiller à ce que la température de stockage ne se situe ni au-dessus ni en dessous de la température de stockage admissible.

Un mauvais stockage peut endommager l'appareil.

- Stocker l'appareil au sec et à l'abri des poussières.
- Température de stockage de -40 à +80 °C.

Dommages sur l'environnement causés par des pièces d'appareil contaminées par des fluides.

- Éliminer l'appareil et l'emballage dans le respect de l'environnement.
- Respecter les prescriptions en matière d'élimination des déchets et de protection de l'environnement en vigueur.

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Manuals and data sheets on the Internet: www.burkert.com
Bedienungsanleitungen und Datenblätter im Internet: www.buerkert.de
Manuels d'utilisation et fiches techniques sur Internet : www.buerkert.fr

Operating Instructions 1911/06_EU-ML_00893047 / Original DE

www.burkert.com

MAN 1000010161 ML Version: JStatus: RL (released | freigegeben) printed: 28.11.2019

SIEMENS

Data sheet 5SY6216-7

Miniature circuit breaker 400 V 6kA, 2-pole, C, 16A, D=70 mm

Model	
Product brand name	SENTRON
Product designation	Miniature circuit breaker
General technical data	
Number of poles	2
Number of poles / Note	2P
Tripping characteristic class	C
circuit-breaker / Design	5SY6
Mechanical service life (switching cycles) / typical	10 000
Overvoltage category	III
Voltage	
Insulation voltage	
• with single-phase operation / at AC / rated value	440 V
• with multi-phase operation / at AC / rated value	440 V
Supply voltage / with single-phase operation / at AC / rated value	230 V
Supply voltage	

Type of voltage	AC
Current / at AC / rated value	16 A
Supply voltage	
• at AC / rated value	400 V
Operating voltage	
• at DC / rated value / maximum	72 V
Supply voltage frequency	
• rated value	50/60 Hz

Protection class

Protection class IP	IP20, with connected conductors

Switching capacity

Switching capacity current	
• at DC / acc. to IEC 60947-2 / rated value	15 kA
• acc. to EN 60898 / rated value	6 kA
• acc. to IEC 60947-2 / rated value	15 kA
Energy limiting class	3

Dissipation

Power loss [W] / for rated value of the current / at AC / in hot operating state / per pole	1.6 W

Current

Tripping residual / rated value / derated current / at 40 Cel	15.02 A
Suitability for operation	Mechanical engineering / industry

Product details

Product function / neutral conductor switching	No
Product feature / Touch protection	Yes
Product component	
• combined terminal top	Yes
• combined terminal bottom	Yes
Product feature	
• Properties for main switches in accordance with EN 60204-1	Yes
• halogen-free	Yes
• sealable	Yes
• silicon-free	Yes

Short circuit

Breaking capacity short-circuit current (Icn)	
• at AC / acc. to UL 1077 and CSA C22.2 No.235	5 kA

Connections

Connectable conductor cross-section / stranded	

• minimum	0.75 mm²
• maximum	35 mm²
Connectable conductor cross-section / finely stranded / with core end processing	
• minimum	0.75 mm²
• maximum	25 mm²
Tightening torque [lbf·in] / with screw-type terminals	
• minimum	22 lbf·in
• maximum	31 lbf·in
Position / of power supply cord	Any

Mechanical Design

Height	90 mm
Width	36 mm
Depth	76 mm
Installation depth	70 mm
Number of width units	2
Mounting type	Quick assembly system
Mounting position	any
Net weight	270 g

Environmental conditions

Influence of the surrounding temperature	max. 95% to 55°C, max. 55% to 70°C, max. 35% to 75°C
Ambient temperature	
• minimum	-25 °C
• maximum	55 °C
Ambient temperature / during storage	
• minimum	-40 °C
• maximum	75 °C
Number of test cycles / for environmental testing / acc. to IEC 60068-2-30	6

Certificates

Reference code	
• acc. to DIN EN 61346-2	F
• acc. to DIN EN 81346-2	F

General Product Approval

CCC IMQ UR VDE Miscellaneous RCM

General Product Approval	Declaration of Conformity	Test Certificates	Shipping Approval
KC	EG-Konf.	Miscellaneous	ABS BUREAU VERITAS LRS

Shipping Approval

RINA

Further information

Information- and Downloadcenter (Catalogs, Brochures,…)
http://www.siemens.com/lowvoltage/catalogs

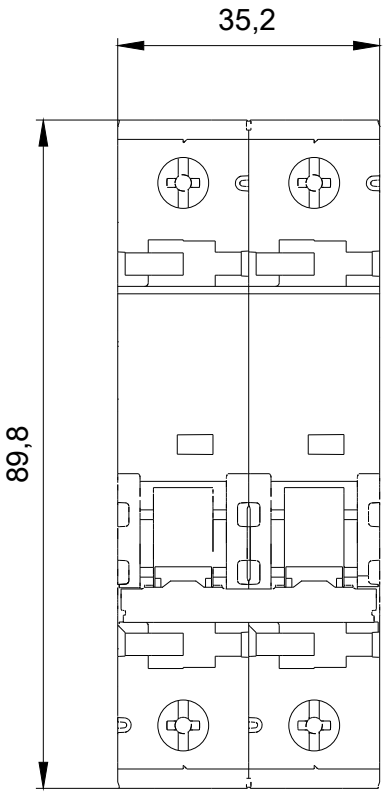
Industry Mall (Online ordering system)
https://mall.industry.siemens.com/mall/en/en/Catalog/product?mlfb=5SY6216-7

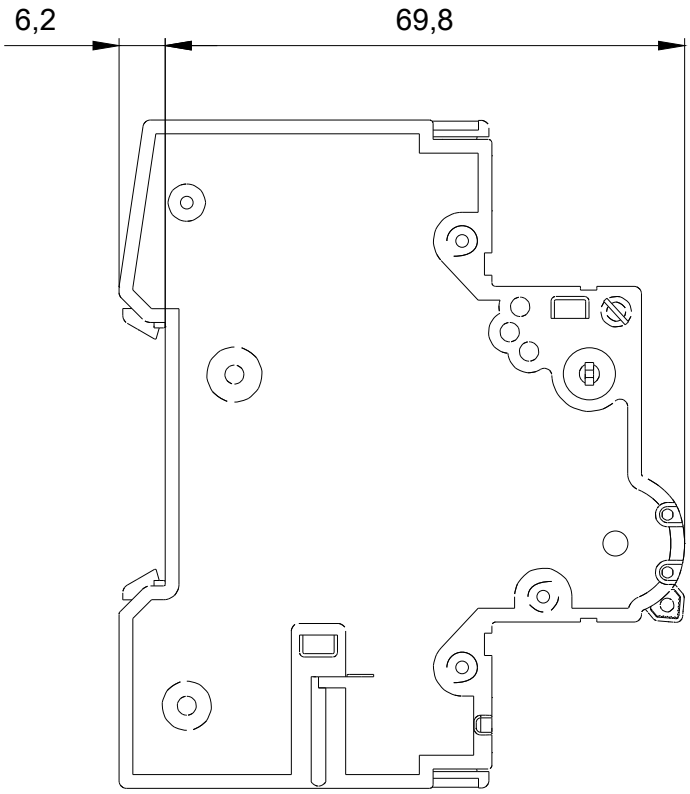
Service&Support (Manuals, Certificates, Characteristics, FAQs,...)
https://support.industry.siemens.com/cs/ww/en/ps/5SY6216-7

Image database (product images, 2D dimension drawings, 3D models, device circuit diagrams, ...)
http://www.automation.siemens.com/bilddb/cax_en.aspx?mlfb=5SY6216-7

CAx-Online-Generator
http://www.siemens.com/cax

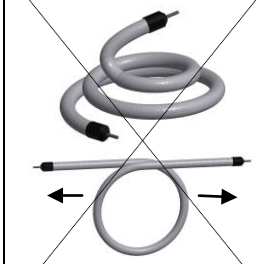
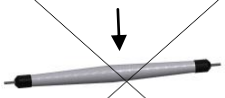
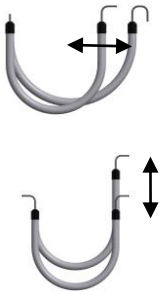
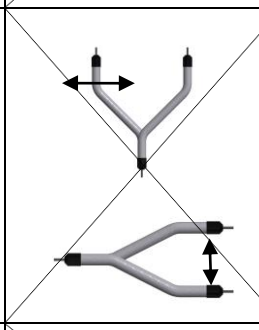
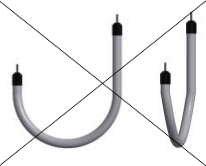
Tender specifications
http://www.siemens.com/specifications





BU-029
Heizschläuche / Heated Hoses / Flexibles chauffants
Montagerichtlinien für den Einbau von Heizschläuchen
Installation instruction for heated hoses
Instructions de montage des flexibles chauffants électriques

Mindestbiegeradius / Minimum bending radius / Rayon de courbure min.:
6x Schlauchaußendurchmesser / 6x hose outer diameter / 6fois le diamètre du flexible

richtig / correct / correct		falsch / wrong / faux
	Die Heizschläuche werden im Normalfall in aufgerolltem Zustand geliefert. Es ist darauf zu achten, dass die Heizschläuche nicht abgezogen werden, da hierdurch eine Unterschreitung des kleinsten Biegeradius erfolgt. Der Heizschlauch ist abzurollen. The heating hose will normally be delivered in a rolled condition. Do not pull the heated hose off the roll otherwise the hose could fall under the minimal bending radius. Les flexibles chauffants sont généralement livrés enroulés. Ne tirez pas le flexible chauffant du rouleau car le flexible pourrait dépasser son rayon de courbure minimum.	
	Stauchen der Heizschläuche verringert die Druckbeständigkeit. Mit Hilfe von Bogen an den Anschlüssen wird dieses verhindert. Use elbows at the connections in order to prevent pressure loss due to compression. Utiliser des coudes rigides aux connexions pour éviter une chute de pression dû à la compression.	
	Es sollte vermieden werden, dass die Heizschläuche bei geradem Einbau grosse Bewegungen aufnehmen. Der Einbau sollte in U-förmigen Zustand erfolgen. The heating hoses should not have large movements when installing and should be U-shaped installed. Les flexibles chauffants ne doivent pas décrire de grands mouvements. L'installation doit être réalisée en forme de U.	
	Die Schlauchachsen sollten parallel verlaufen, sodass die Bewegungsrichtung in einer Ebene liegt. Keep tube axes parallel so that all movements are on one plane. Le sens du mouvement et l'axe du flexible chauffant doivent se situer dans le même plan.	

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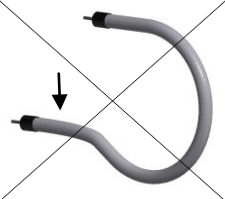
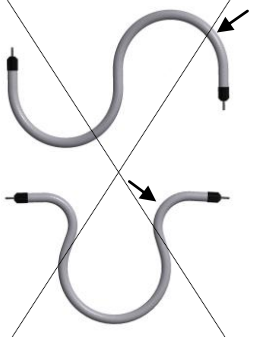
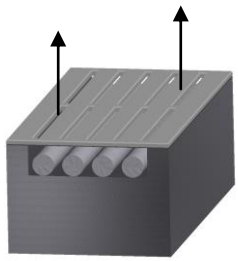
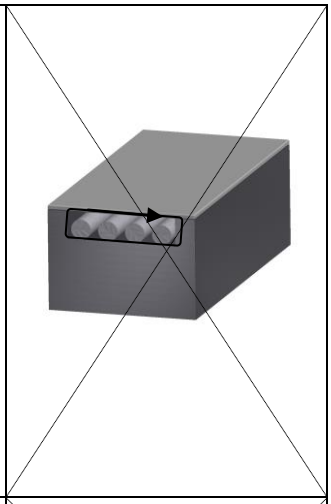
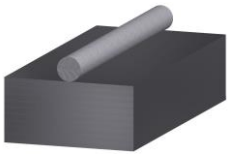
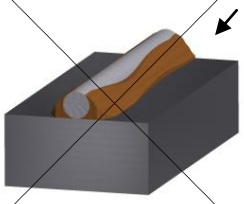
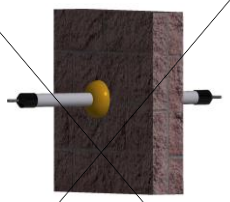
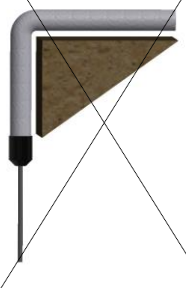
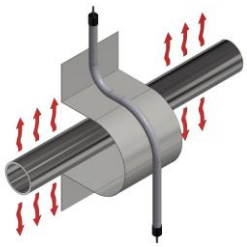
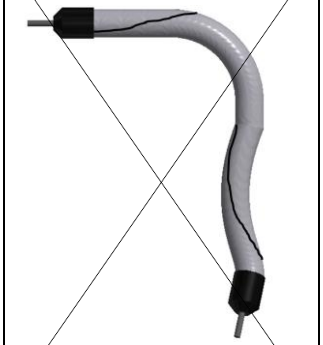
richtig / correct / correct		falsch / wrong / faux
	Um bei Handgeräten eine Knickung zu vermeiden, ist entsprechend der Arbeitsstellung ein Knickschutz vorzusehen. For hand devices, please provide a kink protector in accordance with the working position. Pour des appareils portatifs, veuillez protéger la pliure conformément à la position de travail.	
	Ebenso ist beim Umlenken des Heizschlauches ein dem Durchmesser und dem Mindestbiegeradius angepasster Knickschutz vorzusehen. Please also provide a kink protector suitable for the diameter and the minimum bending radius when the tube is curved. Prévoir également une protection appropriée pour le diamètre et le rayon de courbure minimum quand le flexible est courbé.	
	Bei Angabe der Schlauchlänge ist darauf zu achten, dass an den Anschlussenden ein gerades Stück, ca. 5 x Schlauchdurchmesser, eingeplant wird. Please consider at the connection ends an additional tube length of 5 x heated hose diameter when calculating the tube length. A l'extrémité de la connexion, prendre en compte une longueur de tuyau supplémentaire de 5 x le diamètre de tuyau flexible en calculant la longueur de tuyau.	
	Der Heizschlauch soll beim Einbau nicht durchhängen. Entsprechende Stütze vorsehen. Prevent heated hoses from sagging during installation by providing a suitable support. Protégez les flexibles chauffants de l'affaissement pendant l'installation en leur donnant un appui approprié.	
 	Entsprechende Rohrbogen vorsehen, da starke Biegebeanspruchungen schädlich sind. Please avoid strong bending stresses by providing suitable elbows. Evitez des tensions de courbure fortes en mettant des coudes appropriés.	

richtig / correct / correct		falsch / wrong / faux
	Bei der Verlegung in geschlossenen Kanälen oder Schächten entsteht ein Hitzestau. Es ist für eine ausreichende Belüftung zu sorgen. Heizschläuche mit Aussenmantel Wellschlauch PA12 sind ausserdem vor Austrocknung unter 60° rel. Luftfeuchte zu schützen, da der Aussenmantel sonst brüchig werden kann. Installation in closed channels or slots cause heat accumulation. Provide sufficient ventilation. keep corrugated hoses of PA12 material at a humidity of min. 60% to avoid that they become brittle. L'installation dans des canaux et puits clos peut causer des surchauffes. Ne pas poser les flexibles en contact et prévoir une ventilation suffisante. Maintenez les tuyaux ondulés de matière PA12 à un taux d'humidité de 60 % minimum pour éviter qu'ils ne se fragilisent.	
	Die Heizschläuche sind in regelmäßigen Abständen zu reinigen, da sich durch starke Verschmutzung (pulverartige Substanzen, Kleber, usw.) ebenfalls Hitzestaus bilden. Clean the heated tubes at regular intervals in order to prevent heat accumulation through powdery substances, adhesives, etc. Nettoyer régulièrement les flexibles chauffants afin de prévenir l'accumulation de chaleur par les substances poudreuses, adhésives etc..	
	Ebenfalls findet eine Überhitzung statt, wenn sich die Heizschläuche beim Verlegen berühren. Achten Sie auf den Verlegeabstand. Der Verlegeabstand sollte min. dem Durchmesser des jeweilig verlegten Schlauches entsprechen Please provide sufficient distance between the single heating hoses to prevent heat accumulation. The Verlegeabstand should min. the diameter of the tube correspond respectively relocated. Prévoir une distance suffisante entre chaque flexible chauffant pour prévenir l'auto-échauffement et tout risque de surchauffe. La distance minimum doit correspondre au diamètre du flexible respectivement déplacé.	
 	Bei der Befestigung wie dargestellt beachten, dass die Heizschläuche in diesem Bereich nicht gequetscht werden. Sollten die Schläuche auf Geh- oder Fahrwegen installiert werden so sind diese gegen mechanische Beschädigungen geschützt zu verlegen (z.B. mit Schutzbrücken). Please note for the demonstrated attachment that the heated hoses may not be squeezed within this part. In case that the heated hoses will be installed on sidewalks or driveways, they need to be protected against. mechanical damages (e.g. by means of protection bridges) Assurez-vous de ne pas écraser le flexible chauffant lorsqu'il est attaché ou supporté. Dans le cas où les flexibles chauffants sont installés sur des trottoirs ou des allées, ils doivent être protégés contre les dégâts mécaniques (par exemple au moyen des ponts de protection).	

richtig / correct / correct		falsch / wrong / faux
	Die Schlauchleitung darf nicht eingemauert oder eingeschäumt werden. Hierdurch würde ein Wärmestau auftreten der den Schlauch zerstören würde. The heated line may not be immured or faomed to a wall. Moreover, an additional insulation may not be applied to the heated hoses. Through this, the heated hose would suffer a heat accumulation which would destroy the hose. La ligne chauffée peut devenir pas être emmurée ni recouverte de mousse. De plus, une isolation supplémentaire ne peut pas être appliquée aux flexibles chauffants. Le flexible chauffant subirait alors une accumulation de chaleur qui le détruirait.	
	Bei der Installation ist ein Verlegen über spitze und scharfe Kanten & Ecken zu vermeiden. Bzw. sollten scharfe Kanten und Ecken abgerundet und mit entsprechendem Kantenschutzmaterial versehen werden. Eine mechanische Beschädigung der Heizschläuche durch Aufscheuern an Bauteilen, Kanten oder untereinander ist durch geeignete Verlegung bzw. Fixierung zu verhindern. The laying over peaked and sharp edges is to be prevented during installation or rather should rough edges be provided with edge protection materials. A mechanical damage of the heated hoses by abrading on components, edges or among each other has to be avoided by means of suitable laying, respectively fixations. Lors de l'installation, une pose sur des arêtes et coins vifs et pointus est à éviter sauf si les arêtes vives et coins sont arrondis et munis du matériel de protection correspondant. Un dégât mécanique des flexibles chauffants par frottement des composants, des arêtes ou l'un sur l'autre doit être évité par une mise appropriée ou des fixations.	
	Schlauchhalterungen sind zweckmäßig zu platzieren. Sie sind dort zu vermeiden wo die Längenänderung oder natürliche Bewegung des Schlauches behindert wird. Hose mountings are to placed funtionally. They need to be prevented where elongations or natural movements of the heated hoses would be handicaped. Les fixations de flexible doivent être placées convenablement. Elles sont à éviter aux endroits où les élongations ou le mouvement naturel du flexible chauffant est difficile.	
	Beim Auftreten hoher Temperaturen die von außen auf den Heizschlauch einwirken (heiße Oberflächen, heiße Abgase etc.) sind die Schläuche in einem entsprechendem Abstand zum wärmeabstrahlenden Objekt zu verlegen und / oder durch zweckmäßige Maßnahmen zu schützen. During occurence of high temperatures which may externally impact on the heated hoses (hot surfaces, hot emissions, etc.), the hoses are to be laid in an adequate clearance to the heat radiating object and / or to be protected by means of functional arrangements. Pendant les phases de hautes températures qui peuvent influer extérieurement sur le flexible chauffant (des surfaces chaudes, des gaz d'échappement chauds etc.), les flexibles doivent être soumis à un dégagement adéquat de la chaleur et/ou être protégés par les mesures appropriées.	

	Unsere Heizschläuche dürfen keiner Torsionsbeanspruchung bei der Montage ausgesetzt werden Bei drehbaren Gewindeanschlüssen oder bei der Montage weiterer Armaturen auf Außengewindestutzen, (z.B. Aufdrehen von Gewindeflanschen, Schnellkupplungen usw.) muss immer ein zweiter geeigneter Schlüssel zum Gegenhalten verwendet werden. Never expose the heated hose to torsional stresses during assembly! In case of threaded connectors or applying other fittings on studs with outer thread (e.g. flanges, rapid-acting couplings, etc.) always put another tool on the hose connector to keep it stationary. Ne jamais exposer le flexibles chauffant aux torsions lors de l'assemblage! En cas d'installer des raccords filetés ou des embouts à filetage mâle (par ex. brides filetées, raccords rapides, etc.) toujours utiliser d'autre outil pour le maintenir en position!	

Elektroanschluss:
Standardmäßig sind Netz- und Fühlerleitung für den Anschluss an die vorgegebene Netzspannung (Bemessungsspannung) und die Fühlerart vorbereitet. Die Bemessungsspannung ist auf dem Typenschild vermerkt. Achtung: Wird der Heizschlauch an einer abweichenden Anschlussspannung betrieben kann der Heizschlauch dadurch zerstört werden. Die Toleranzen für die Anschlussspannung entnehmen Sie bitte dem beigefügten Toleranzen- Datenblatt.

eltherm Standard Heizschläuche mit Widerstandsheizkabel müssen zwingend an einer geeigneten Regeleinrichtung betrieben werden. eltherm Heizschläuche mit Widerstandsheizkabel für den Explosionsgefährdeten-Bereich müssen zusätzlich an geeigneten Begrenzereinrichtungen betrieben werden. Bitte beachten Sie hierzu die gesonderte Betriebsanleitung für den Einbau von Heizschläuchen im Ex-Bereich.

Aufheizzeit / Inbetriebnahme:
Vor Inbetriebnahme der Heizschläuche muss sichergestellt werden, dass das zu fördernde Medium im Schlauch und in den Armaturen die Verarbeitungstemperatur erreicht hat. Biegebeanspruchung und Pfropfenbildung im Schlauch oder in den Anschlussarmaturen vor erreichen der Betriebstemperatur kann den Schlauch schädigen. Die jeweilige Aufheizzeit hängt von den gegebenen Betriebsbedingungen ab. Unter normaler Betriebsbedingungen (geschlossener Raum ca. +20°C) beträgt die Aufheizzeit ca. 20-45 Minuten.

Lesen Sie vor Inbetriebnahme unsere Betriebsanleitung und Montagerichtlinien.

Bei besonderen Betriebsbedingungen oder im Zweifelsfall kontaktieren sie uns.
Wir helfen Ihnen gerne weiter.

Electrical connection:
Power and sensor lines for the connection to the specified voltage (rated voltage) and the sensor type are prepared by default. The rated voltage is stated on the type label. Caution: If the heated hose is connected to a deviant voltage, it can be destroyed. The tolerances for connection voltage can be found in the attached datasheet.

eltherm standard heated hoses with resistance heating cable need to be compulsory operated with a suitable controller device. eltherm heated hoses with resistance heating cable for the hazardous area need to be operated additionally with an appropriate limiter device. Please observe the separate operating manual for the installation of heated hoses in the hazardous area.

Warm-up time / Startup:
Before starting up the heated hoses it must be ensured that the medium to be transported has reached the processing temperature within the heated hose and the fittings. Bending stress and bung accumulations in hose or valves before reaching the operating temperature may damage the hose. The respective warm-up time depends on the prevailing operating conditions. Under normal operating conditions (closed room approx. +20 °C) the warm-up time takes approx. 20-45 minutes.

Please read our operating manual and installation guidelines before start-up.

In case of specific operating conditions or in case of any doubts, please contact us. We will gladly assist you.

Connexion électrique:
La puissance et les sondes pour la connexion à la tension indiquée (la tension nominale) et le type de sonde sont préparés par défaut. La tension est indiquée sur l'étiquette. Attention : si le flexible chauffant est connecté à une tension différente, il peut être détruit. Vous trouverez les tolérances pour la tension de connexion dans notre fiche technique des tolérances.

Les flexibles chauffants standards eltherm avec une résistance de câble chauffant doivent obligatoirement fonctionner avec un dispositif de réglage approprié. Les flexibles chauffants eltherm avec une résistance de câble chauffant pour zones explosibles doivent de plus être installés avec un limiteur approprié. Veuillez respecter le mode d'emploi spécial pour installation des flexibles chauffants en zone explosible.

Mise à température / Mise en service :
Avant la mise en exploitation des flexibles chauffants il faut s'assurer que le matériau à transporter a atteint la température de travail dans le flexible chauffant et les raccords. Une courbure excessive et des accumulations de bouchons dans le flexible ou des raccords de connexion avant d'avoir atteint la température de travail peut endommager le flexible. Le temps de chauffe dépend des conditions d'exploitation données. Dans des conditions d'exploitation normales (pièce fermée environ +20°C), le temps de chauffe est d'environ 20 à 45 minutes.

Veuillez lire notre mode d'emploi et nos directives d'installation avant la mise en service.

En cas de conditions de fonctionnement particulières ou en cas de doute, contactez-nous. Nous vous assisterons avec plaisir.

Längenänderung bei / Thermal expansion / Elongation thermique:

50°C	0,9%
100°C	1,6%
200°C	3,8%

BU-035
Fertigungstoleranzen der eltherm-Heizschläuche

Pos. 1 Heizschlauchlänge

Die in unserem Schriftverkehr angegebenen Heizschlauchlängen beinhalten:

1. Bei Heizschläuchen mit Anschlußarmaturen:
   Die beheizte Schlauchlänge inkl. der Armaturen.

2. Bei Heizschläuchen ohne Anschlußarmaturen:
   Die beheizte Schlauchlänge inkl. der Endabschlüsse.
   Die Länge der überstehenden Schlauchseele wird separat ausgewiesen**.**

Die angebenen Toleranzen beziehen sich auf eine Temperatur von +24°C
Druck- und temperaturabhängige Längenänderungen sind durch diese Toleranzangaben nicht abgedeckt.

Zulässige Abweichungen vom Maß L_1 bei fertigmontierten Heizschläuchen.
Die Fertigungstoleranzen entsprechen DIN 20066

Länge L_1 (mm)	Toleranzen bis DN 25 (mm)	Toleranzen ab DN 32 bis DN 50 (mm)	Toleranzen ab DN 60 bis DN 100 (mm)
bis 630	+7 / -3	+12 / -4	+25 / -6
über 630 bis 1250	+12 / -4	+20 / -6	
über 1250 bis 2500	+20 / -6	+25 / -6	
über 2500 bis 8000	+1,5% / -0,5%		
über 8000	+3% / -1%		

Pos. 2 Heizschlauchinnendurchmesser / Wandstärke

2.1 PTFE-Industrieschläuche

Durchmesser Innen (mm)	Toleranz (mm)	Wanddicke (mm)	Toleranz (mm)
1,0 -- 5,0	+/- 0,20	0,10 -- 0,30	+/- 0,05
5,1 -- 7,0	+/- 0,25	0,31 -- 0,60	+/- 0,10
7,1 -- 10,0	+/- 0,30	0,61 -- 1,00	+/- 0,15
10,1 -- 15,0	+/- 0,35	1,01 -- 2,00	+/- 0,20
15,1 -- 20,0	+/- 0,40	2,01 -- 3,00	+/- 0,40
20,1 -- 30,0	+/- 0,50		
30,1 -- 40,0	+/- 0,60		

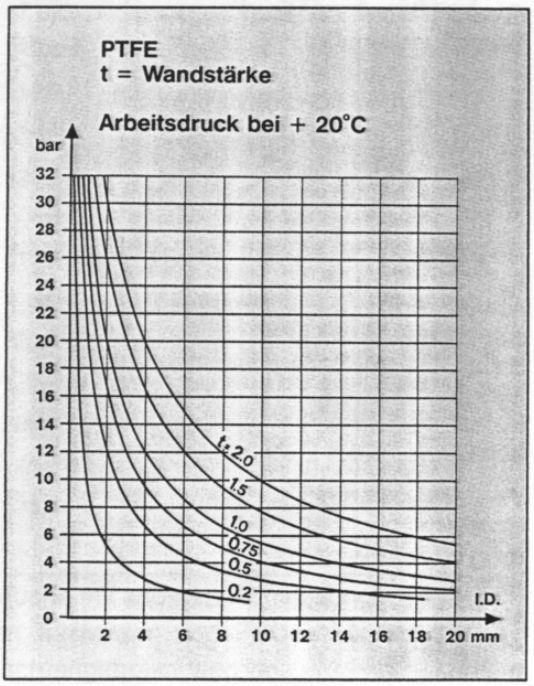
2.2 Edelstahlrohrleitungen

Standardtoleranz des Außendurchmessers im Bereich bis 10mm:	+/- 0,13 mm
Wandstärkentoleranz:	+/- 10%

eltherm GmbH
Ernst-Heinkel-Straße 6-10
(Im Industriepark)
57299 Burbach, Germany
Phone +49 (0) 27 36/44 13-0
Fax +49 (0) 27 36/44 13-50
E-Mail info@eltherm.com
Web www.eltherm.com

Pos. 3 Druckbeanspruchung nackter PTFE-Industrieschläuche

Druckbeanspruchung



Das nebenstehende Diagramm hilft, den empfohlenen Arbeitsdruck (ca. 0,25 x kurzfristiger Berstdruck) für PTFE-Schläuche zu ermitteln.

Bei Einsatztemperaturen über +20°C sind die in dem Diagramm erfassten Drücke mit den entsprechenden Abminderungsfaktoren zu multiplizieren.

Temperatur °C	*Abminderungsfaktor F*
50	0,87
75	0,77
100	0,68
150	0,53
200	0,39
250	0,28

Für Temperaturen unter + 20°C sind keine Abminderungsfaktoren anzubringen.

Druckangaben bei Edelstahl umklöppelten PTFE- Standardschläuchen

Schlauchtyp	**DN**	**4**	**6**	**8**	**101**	**3**	**16**	**20**	**25**
max. Arbeitsdruck md	bar	275	240	200	175	150	135	100	80
max. Arbeitsdruck hd	bar	/	275	250	225	200	175	150	130
max. Arbeitsdruck shd	bar	/	500	475	475	450	363	275	225

Die Betriebsdrücke gelten für Arbeitstemperaturen im Bereich von +20°C bis +50°C

Temperatur- Korrekturfaktoren ELH/md/hd,shd

100°C	150°C	200°C	250°C
0,98	0,9	0,83	0,6

Pos. 4 Leistungstoleranzen

Leistungsaufnahme (W)	Toleranz	*Werte nach VDE*
≤ 200	+/- 10 %	
> 200	+ 5 / - 10 %	

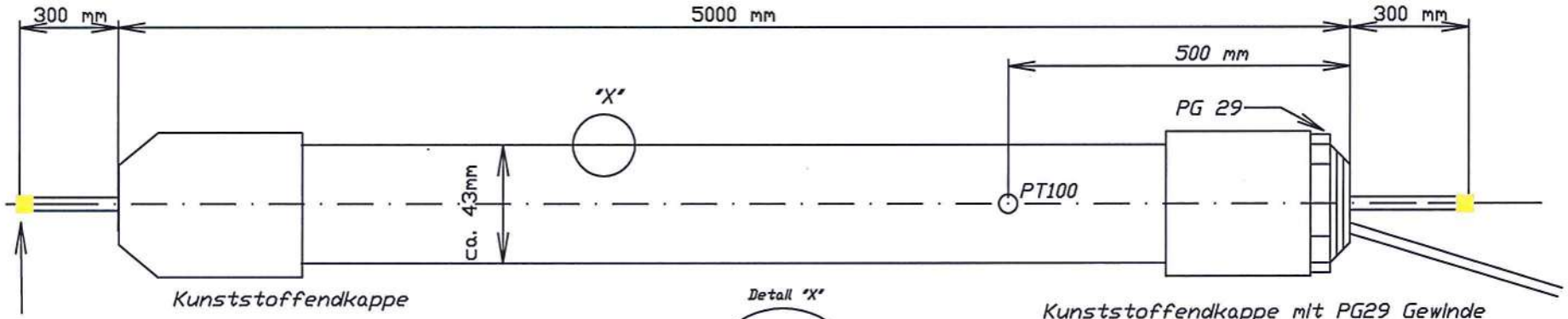
Pos. 5 Spannungstoleranzen

Nennspannung	+/- 10 %	*Werte nach VDE*

Pos. 6 Temperaturtoleranzen

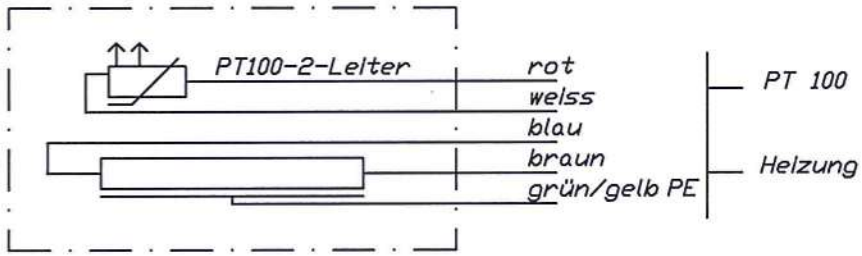
Diese sind von folgenden Kriterien abhängig:

1. Den Toleranzen und der Schaltgenauigkeit der verwendeten Regelgeräte
2. Der Länge und dem Querschnitt der verwendeten Ausgleichsleitung bei Thermoelementen
3. Der Länge und dem Querschnitt des verwendeten Anschlußkabels bei Temperaturfühlern PT 100 (nach DIN)
4. Dem Material und dem Widerstand der verwendeten Klemmen
5. Ein Temperaturgefälle des Heizschlauches hin zu den unisolierten Armaturen ist physikalisch bedingt und hängt ab von den Umgebungsbedingungen. Dies ist nur durch die Beheizung der Armaturen zu verhindern.



Aufbau beheizte Leitung

- feststehender Schlauch:	PTFE NW 4/6 mit welchem VA-Geflecht umflochten
- Heizkabel:	ELKM-AG-N, zugelssen nach: ABS Certificate Number: 16-HG1573777-PDA)
- Isollerung:	Vliesstoffe
- Außenmantel:	PA-Wellschlauch, PA-RAB 36G, schwarz (DNV GL zugelassen)
- min. Biegeradius:	160mm (Im Bereich des Fühlers ohne Biegung)
- Temperaturfühler:	PT 100 / 2-Leiter
- Endabschluß:	werkseitig fertig konfektioniert
- max. Betriebstemperatur:	200°C
- Haltetemperatur:	180°C
- Betriebsspannung:	230 V
- Leistung der Heizung:	100 W/m
- max. Betriebsdruck:	Drucklose Anwendung



Datum	20.12.2018	Fa. Bühler Technologies GmbH	Heizschlauch ELH/adw-200°C	eltherm GmbH Ernst-Heinkel-Straße 6 - 10 57299 Burbach / Germany eltherm® innovations in heat tracing	Blatt:
Bearb.	Gomer	Auftr.-Nr. 18-351197	Zchng.-Nr. 01.9210.4		von:
Gepr.					
Name					

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

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Pre-assembled relay module with push-in connection, consisting of: relay base, power contact relay, plug-in display/suppressor module, and retaining bracket. Contact type: 2 PDTs. Input voltage: 24 V DC

Product Description

The pluggable electromechanical and solid-state relays in the RIFLINE complete product range and the base are recognized and approved in accordance with UL 508.
The relevant approvals can be called up at the individual components in question.

Key Commercial Data

Packing unit	10 pc
Minimum order quantity	10 pc
GTIN	4 046356 732277
GTIN	4046356732277
Weight per Piece (excluding packing)	64.000 g
Custom tariff number	85369000
Country of origin	China
Sales Key	CK6529

Technical data

Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
Type of note	Notes on operation
Note	FBS 2-6... plug-in bridge for the input side (A2) and FBS-2-8... plug-in bridge for the output side (11/21)

Dimensions

Width	16 mm
Height	93 mm
Depth	75 mm

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

Technical data

Ambient conditions

Ambient temperature (operation)	-40 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Degree of protection	IP20 (Relay base)
	RT III (Relay)

Coil side

Nominal input voltage U_N	24 V DC
Input voltage range in reference to U_N	see diagram
Typical input current at U_N	18 mA
Typical response time	8 ms
Typical release time	10 ms
Coil voltage	24 V DC
Protective circuit	Damping diode
Operating voltage display	Yellow LED
Power dissipation for nominal condition	0.43 W

Contact side

Contact type	2 PDT
Type of switch contact	Single contact
Contact material	AgNi
Maximum switching voltage	250 V AC/DC
Minimum switching voltage	5 V (at 10 mA)
Min. switching current	10 mA (At 5 V)
Maximum inrush current	25 A (20 ms, N/O contact)
Limiting continuous current	8 A (see diagram)
Interrupting rating (ohmic load) max.	192 W (at 24 V DC)
	96 W (at 48 V DC)
	60 W (at 60 V DC)
	44 W (at 110 V DC)
	57 W (at 220 V DC)
	2000 VA (for 250 V AC)
Switching capacity	2 A (at 24 V, DC13)
	0.2 A (at 250 V, DC13)
	3 A (at 24 V, AC15)
	3 A (at 120 V, AC15)
	3 A (at 250 V, AC15)

General

Test voltage relay winding/relay contact	4 kV_{rms} (50 Hz, 1 min.)
Test voltage PDT/PDT	2.5 kV_{rms} (50 Hz, 1 min.)
Operating mode	100% operating factor
Mechanical service life	approx. 3x 10^7 cycles

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

Technical data

General

Service life, electrical	see diagram
Mounting position	any
Assembly instructions	In rows with zero spacing

Connection data

Connection name	Coil side
Connection method	Push-in connection
Stripping length	8 mm
Conductor cross section solid	0.14 mm² ... 1.5 mm²
Conductor cross section flexible	0.14 mm² ... 1.5 mm²
	0.14 mm² ... 1.5 mm² (Ferrule with plastic sleeve)
	0.14 mm² ... 1 mm² (Ferrule with plastic sleeve, two conductors on double terminal block)
Conductor cross section AWG	26 ... 16 (solid)
	26 ... 16 (flexible)

Connection data 2

Connection name	Contact side
Connection method	Push-in connection
Stripping length	8 mm
Conductor cross section solid	0.14 mm² ... 1.5 mm²
Conductor cross section flexible	0.14 mm² ... 1.5 mm²
	0.14 mm² ... 1.5 mm² (Ferrule with plastic sleeve)
	0.14 mm² ... 1 mm² (Ferrule with plastic sleeve, two conductors on double terminal block)
Conductor cross section AWG	26 ... 16 (solid)
	26 ... 16 (flexible)

Standards and Regulations

Standards/regulations	DIN EN 50178
Rated surge voltage	6 kV
Insulation	Safe isolation, basic insulation, and 4 kV rated surge voltage between all changeover contacts.
Pollution degree	2
Overvoltage category	III

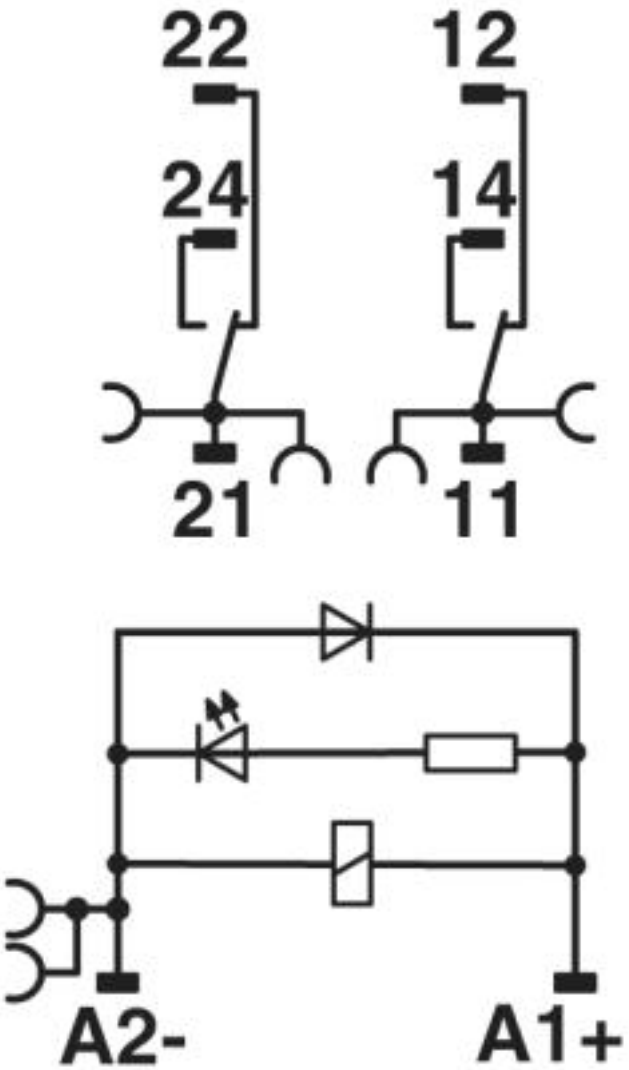
Environmental Product Compliance

China RoHS	Environmentally Friendly Use Period = 50
	For details about hazardous substances go to tab “Downloads”, Category “Manufacturer's declaration”

Drawings

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

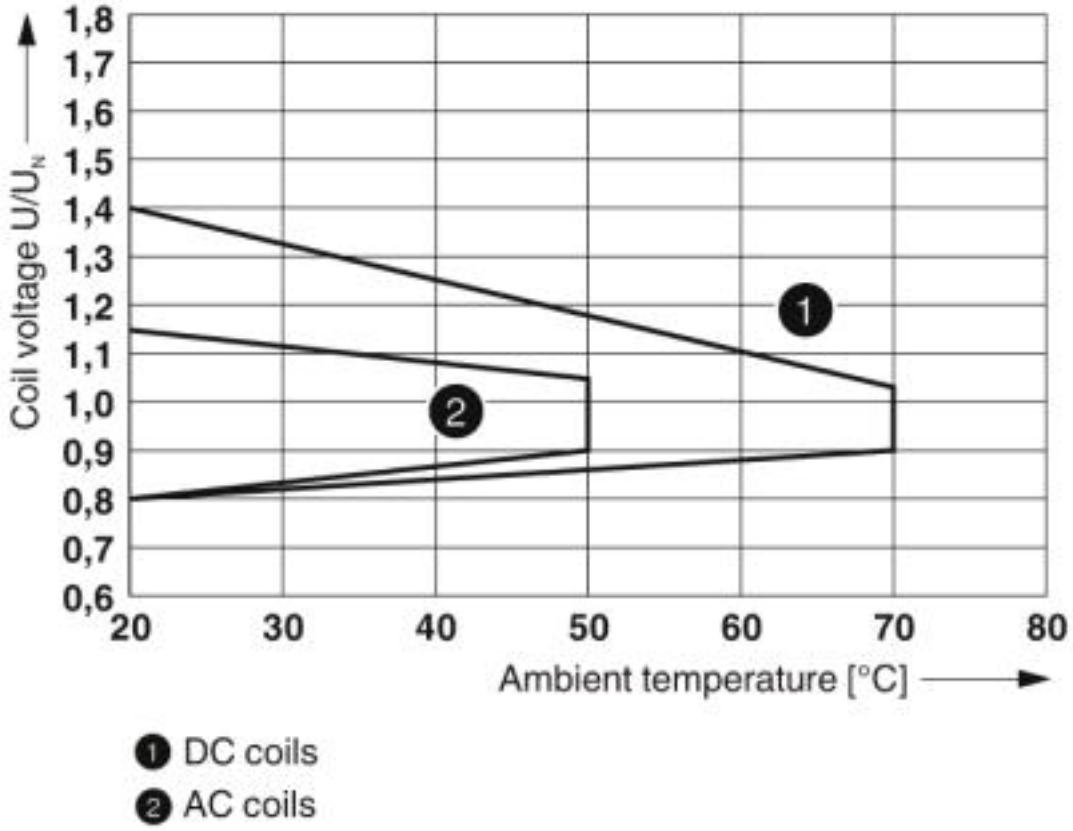
Circuit diagram



DC coils

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

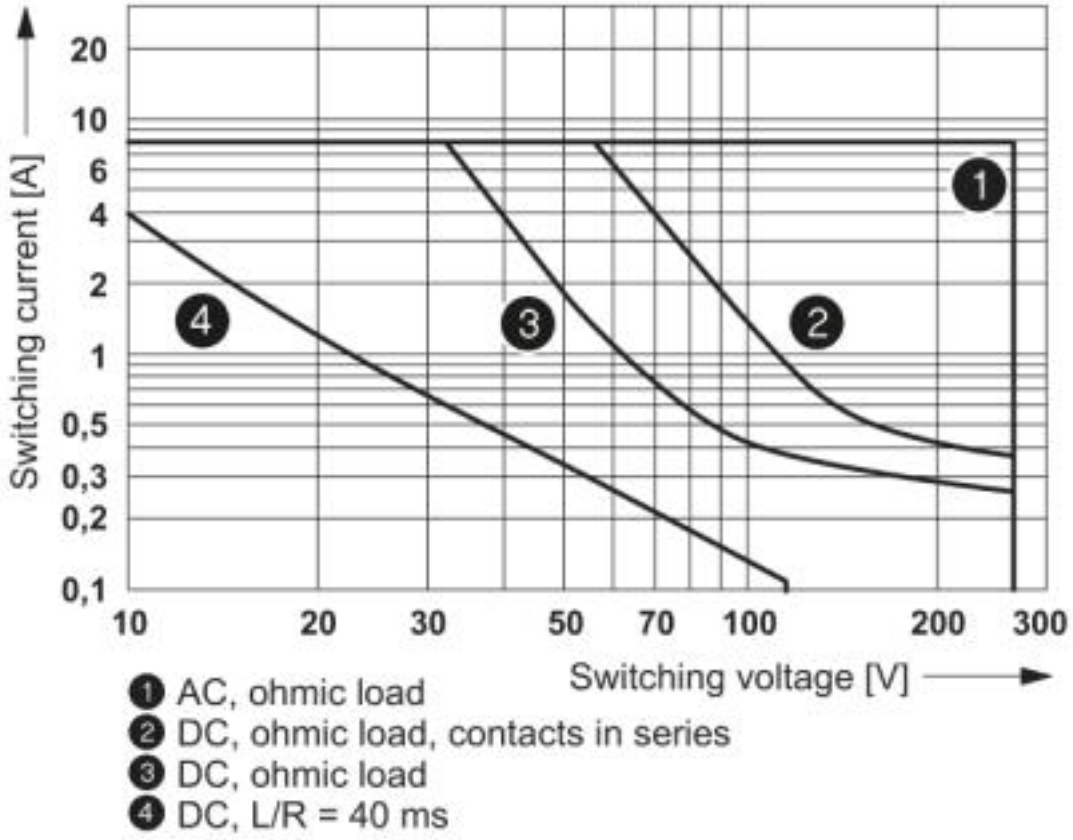
Diagram



Operating voltage range

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

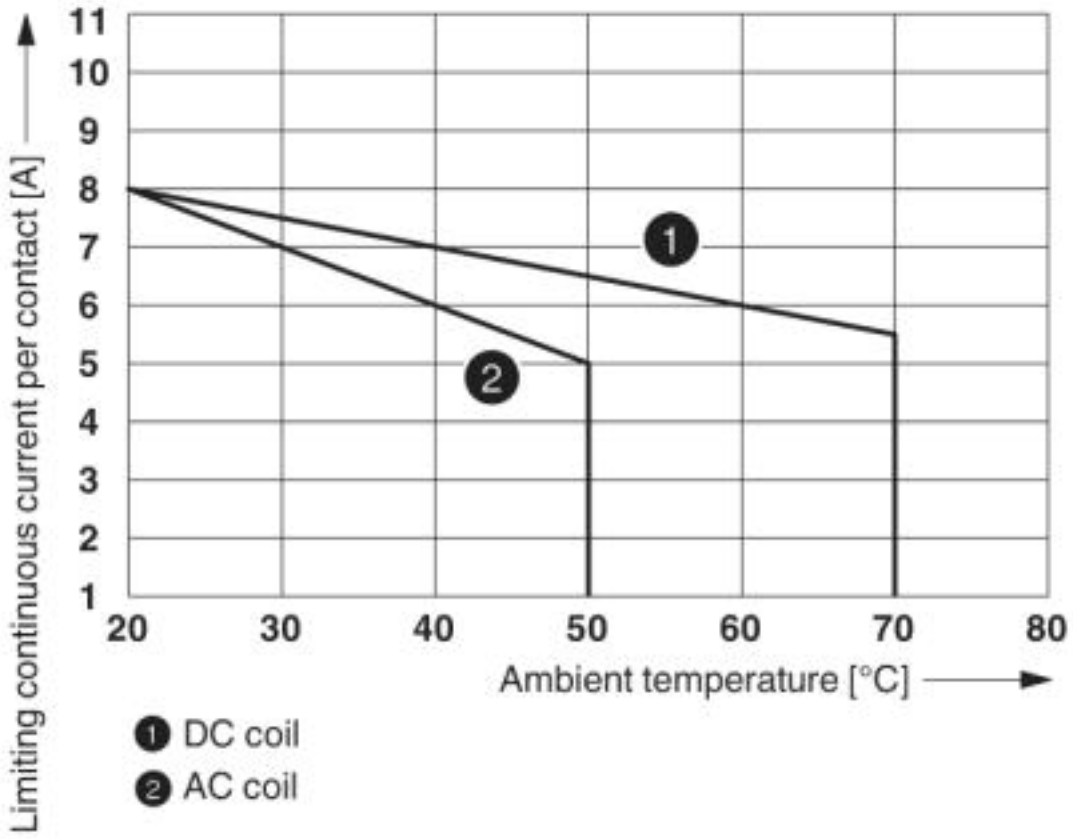
Diagram



Interrupting rating

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

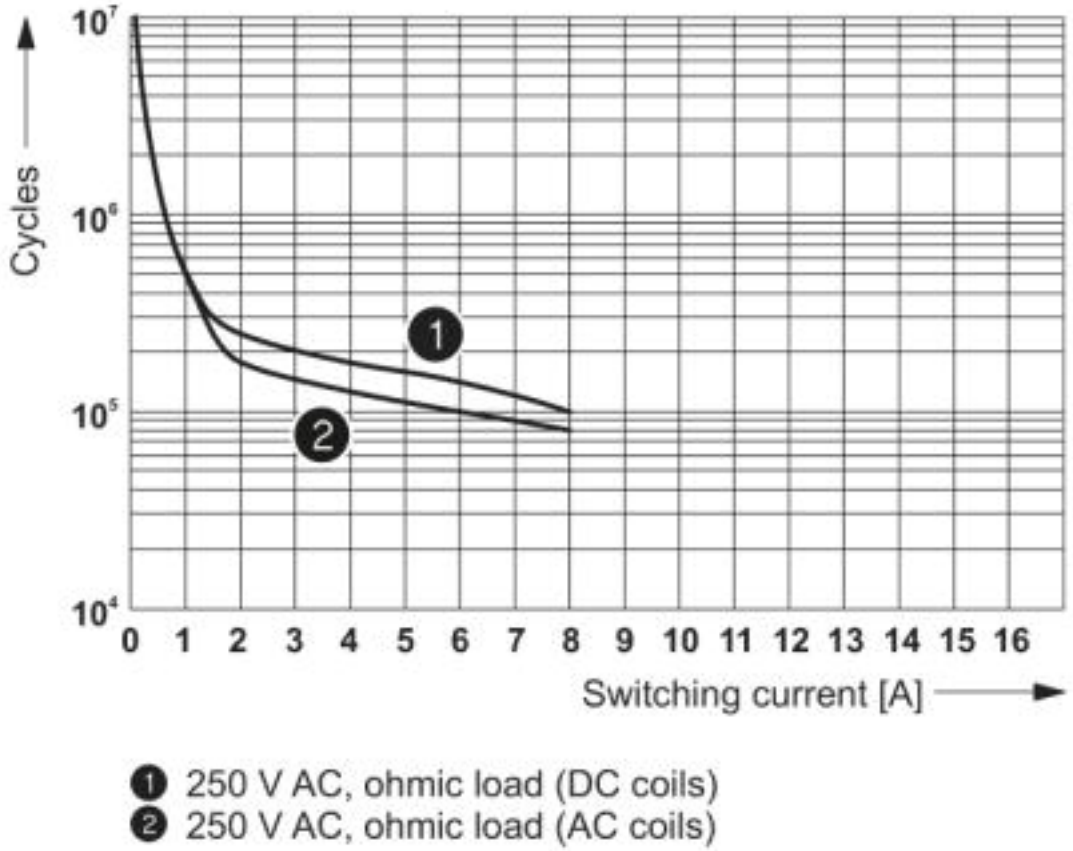
Diagram



Contact derating

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

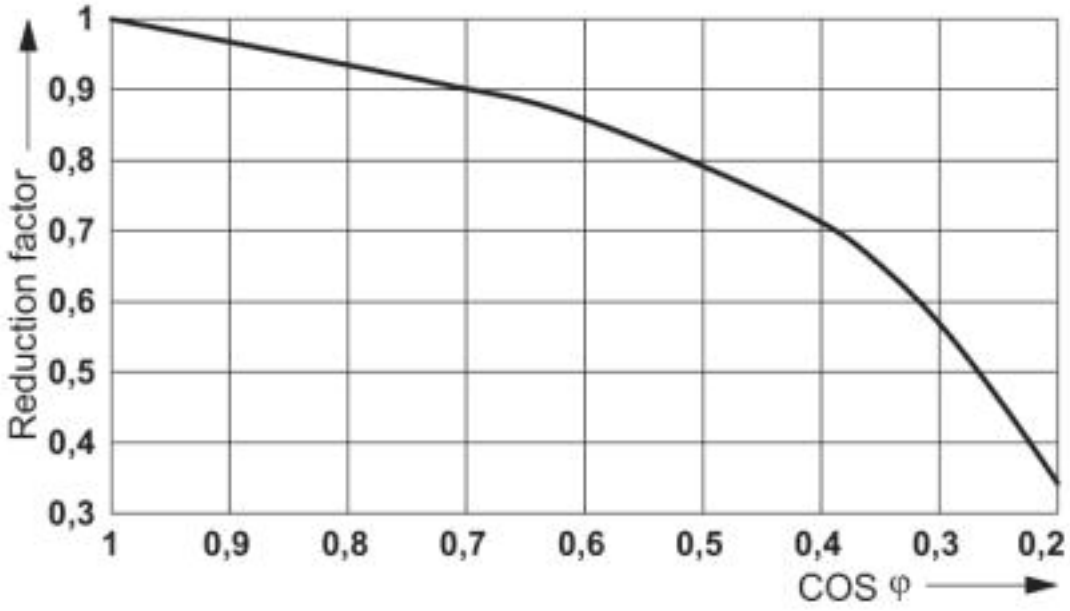
Diagram



Electrical service life

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

Diagram



Service life reduction factor

Articles in set

Relay base - RIF-1-BPT/2X21 - 2900931

RIF-1... relay base, for miniature power relay with 1 or 2 PDTs or solid-state relays of the same design, push-in connection, plug-in option for input/suppressor modules, for mounting on NS 35/7,5

Single relay - REL-MR- 24DC/21-21 - 2961192

Plug-in miniature power relay, with power contact, 2 PDTs, input voltage 24 V DC

Plug-in module - RIF-LDP-12-24 DC - 2900939

Plug-in module, for mounting on RIF-1, RIF-2, RIF-3, and RIF-4, with freewheeling diode and yellow LED, polarity: A1+, A2-, input voltage: 12 ... 24 V DC ±20 %

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

Articles in set

Retaining bracket - RIF-RH-1 - 2900953

Relay retaining bracket, with ejector function and holder for marking material, suitable for RIF-1 relay base, for 16 mm tall miniature power relay and solid-state relay

Classifications

eCl@ss

eCl@ss 4.0	27371100
eCl@ss 4.1	27371100
eCl@ss 5.0	27371600
eCl@ss 5.1	27371600
eCl@ss 6.0	27371600
eCl@ss 7.0	27371601
eCl@ss 8.0	27371601
eCl@ss 9.0	27371601

ETIM

ETIM 2.0	EC001437
ETIM 3.0	EC001437
ETIM 4.0	EC001437
ETIM 5.0	EC001437
ETIM 6.0	EC001437
ETIM 7.0	EC001437

UNSPSC

UNSPSC 6.01	30211917
UNSPSC 7.0901	39121516
UNSPSC 11	39121516
UNSPSC 12.01	39121516
UNSPSC 13.2	39122334
UNSPSC 18.0	39122334
UNSPSC 19.0	39122334
UNSPSC 20.0	39122334
UNSPSC 21.0	39122334

Approvals

Approvals

Relay Module - RIF-1-RPT-LDP-24DC/2X21 - 2903334

Approvals

Approvals

DNV GL / PRS / LR / EAC

Ex Approvals

Approval details

DNV GL	https://approvalfinder.dnvgl.com/	TAA000018V
PRS	http://www.prs.pl/	TE/2108/880590/16
LR	http://www.lr.org/en	15/20011
EAC		TR_TS_D_00573_c

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

Please be informed that the data shown in this PDF Document is generated from our Online Catalog. Please find the complete data in the user's documentation. Our General Terms of Use for Downloads are valid (http://phoenixcontact.com/download)

Pre-assembled relay module with push-in connection, consisting of: relay base, power contact relay, plug-in display/suppressor module, and retaining bracket. Contact type: 2 PDTs. Input voltage: 230 V AC

Product Description

The pluggable electromechanical and solid-state relays in the RIFLINE complete product range and the base are recognized and approved in accordance with UL 508.
The relevant approvals can be called up at the individual components in question.

Key Commercial Data

Packing unit	10 pc
Minimum order quantity	10 pc
GTIN	4 046356 732307
GTIN	4046356732307
Weight per Piece (excluding packing)	68.200 g
Custom tariff number	85369000
Country of origin	Germany
Sales Key	CK6529

Technical data

Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
Type of note	Notes on operation
Note	FBS 2-6... plug-in bridge for the input side (A2) and FBS-2-8... plug-in bridge for the output side (11/21)

Dimensions

Width	16 mm
Height	93 mm
Depth	75 mm

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

Technical data

Ambient conditions

Ambient temperature (operation)	-40 °C ... 50 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Degree of protection	IP20 (Relay base)
	RT III (Relay)

Coil side

Nominal input voltage U_N	230 V AC
Input voltage range in reference to U_N	see diagram
Mains frequency	50/60 Hz
Typical input current at U_N	6 mA
Typical response time	3 ms ... 12 ms
Typical release time range	3 ms ... 20 ms
Coil voltage	230 V AC
Protective circuit	Varistor
Operating voltage display	Yellow LED
Power dissipation for nominal condition	1.38 W

Contact side

Contact type	2 PDT
Type of switch contact	Single contact
Contact material	AgNi
Maximum switching voltage	250 V AC/DC
Minimum switching voltage	5 V (at 10 mA)
Min. switching current	10 mA (At 5 V)
Maximum inrush current	12 A (20 ms, N/O contact)
Limiting continuous current	8 A (see diagram)
Interrupting rating (ohmic load) max.	192 W (at 24 V DC)
	124 W (at 48 V DC)
	108 W (at 60 V DC)
	52 W (at 110 V DC)
	48 W (at 220 V DC)
	2500 VA (for 250 V AC)
Switching capacity	2 A (at 24 V, DC13)
	0.2 A (at 250 V, DC13)
	3 A (at 24 V, AC15)
	3 A (at 120 V, AC15)
	3 A (at 250 V, AC15)

General

Test voltage relay winding/relay contact	4 kV_{rms} (50 Hz, 1 min.)
Test voltage PDT/PDT	2.5 kV_{rms} (50 Hz, 1 min.)
Operating mode	100% operating factor

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

Technical data

General

Mechanical service life	approx. 10^7 cycles
Service life, electrical	see diagram
Mounting position	any
Assembly instructions	In rows with zero spacing

Connection data

Connection name	Coil side
Connection method	Push-in connection
Stripping length	8 mm
Conductor cross section solid	0.14 mm² ... 1.5 mm²
Conductor cross section flexible	0.14 mm² ... 1.5 mm²
	0.14 mm² ... 1.5 mm² (Ferrule with plastic sleeve)
	0.14 mm² ... 1 mm² (Ferrule with plastic sleeve, two conductors on double terminal block)
Conductor cross section AWG	26 ... 16 (solid)
	26 ... 16 (flexible)

Connection data 2

Connection name	Contact side
Connection method	Push-in connection
Stripping length	8 mm
Conductor cross section solid	0.14 mm² ... 1.5 mm²
Conductor cross section flexible	0.14 mm² ... 1.5 mm²
	0.14 mm² ... 1.5 mm² (Ferrule with plastic sleeve)
	0.14 mm² ... 1 mm² (Ferrule with plastic sleeve, two conductors on double terminal block)
Conductor cross section AWG	26 ... 16 (solid)
	26 ... 16 (flexible)

Standards and Regulations

Standards/regulations	DIN EN 50178
Rated surge voltage	6 kV
Insulation	Safe isolation, basic insulation, and 4 kV rated surge voltage between all changeover contacts.
Pollution degree	2
Overvoltage category	III

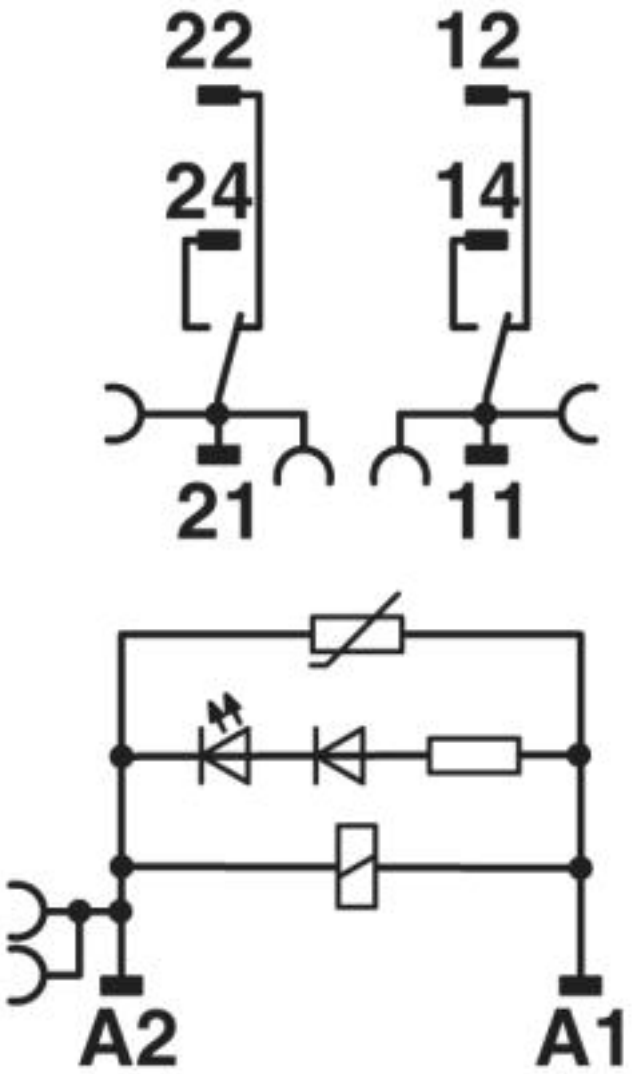
Environmental Product Compliance

China RoHS	Environmentally Friendly Use Period = 50
	For details about hazardous substances go to tab “Downloads”, Category “Manufacturer's declaration”

Drawings

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

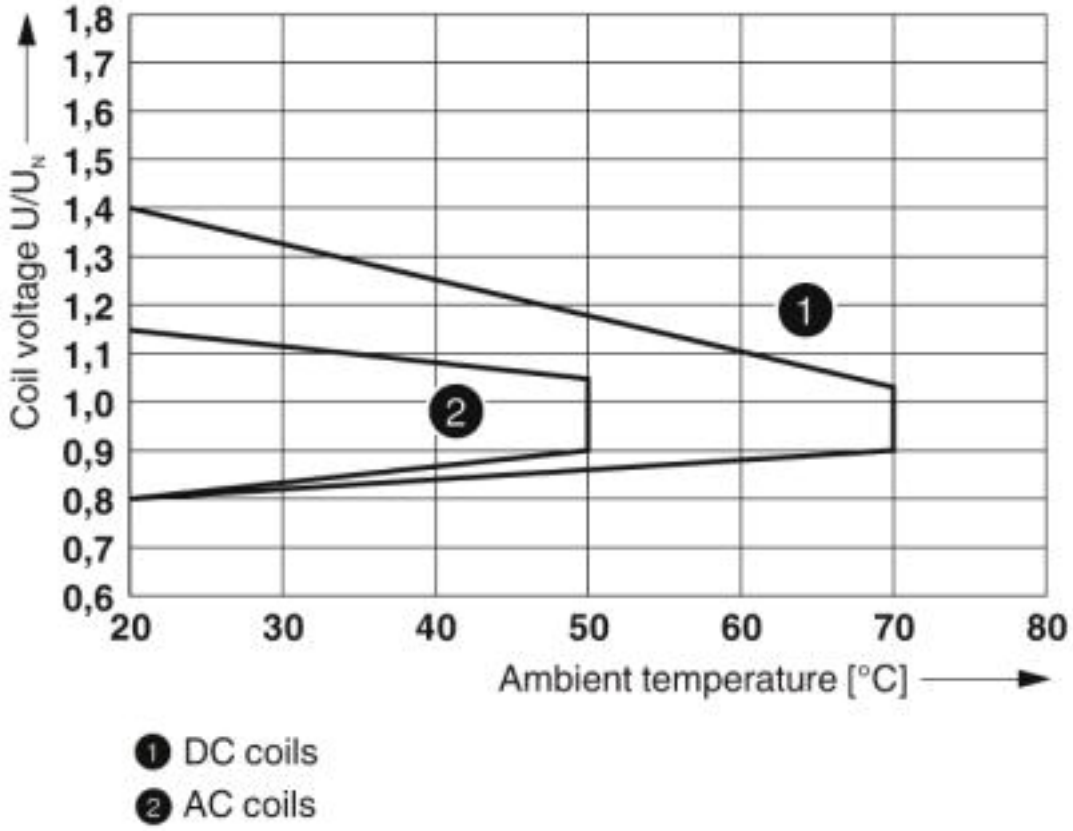
Circuit diagram



AC coils

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

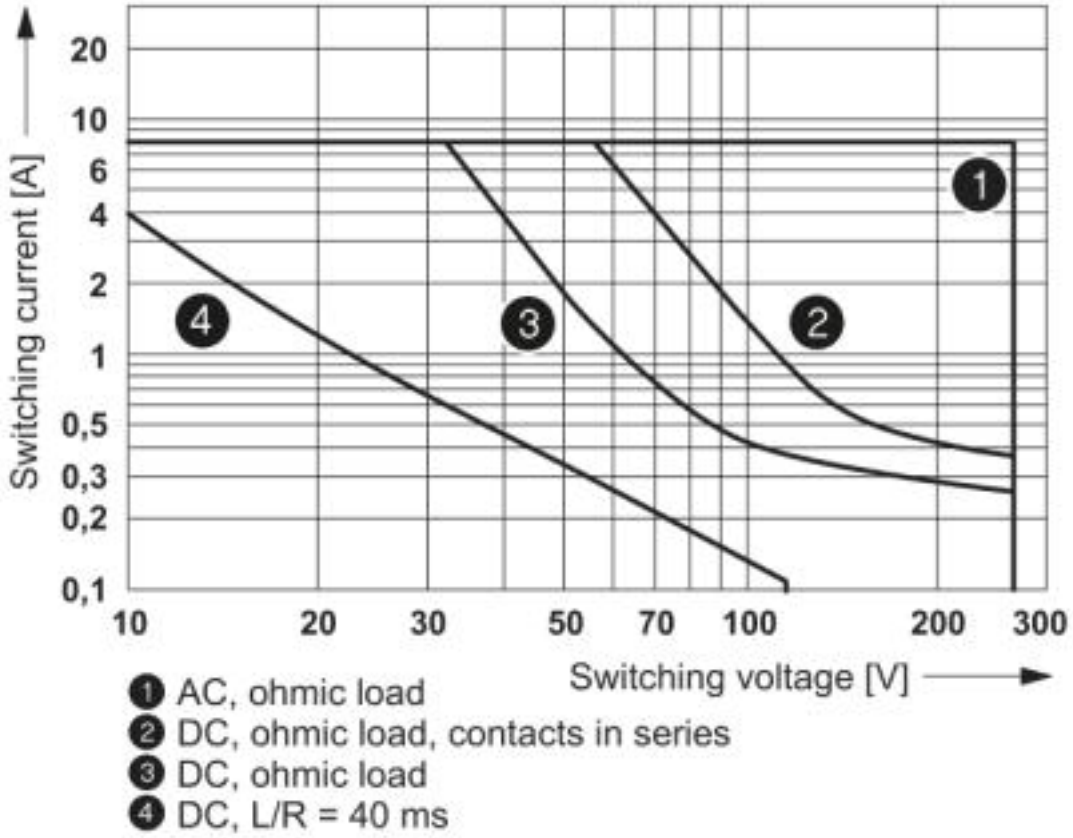
Diagram



Operating voltage range

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

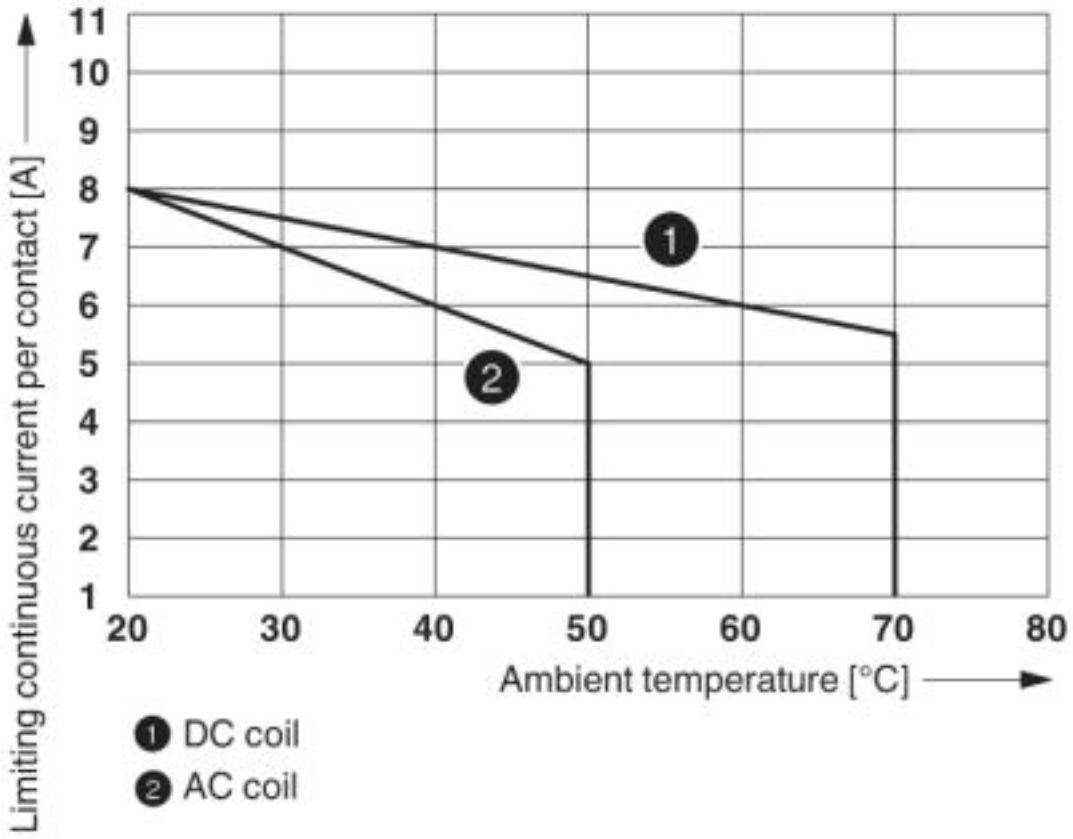
Diagram



Interrupting rating

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

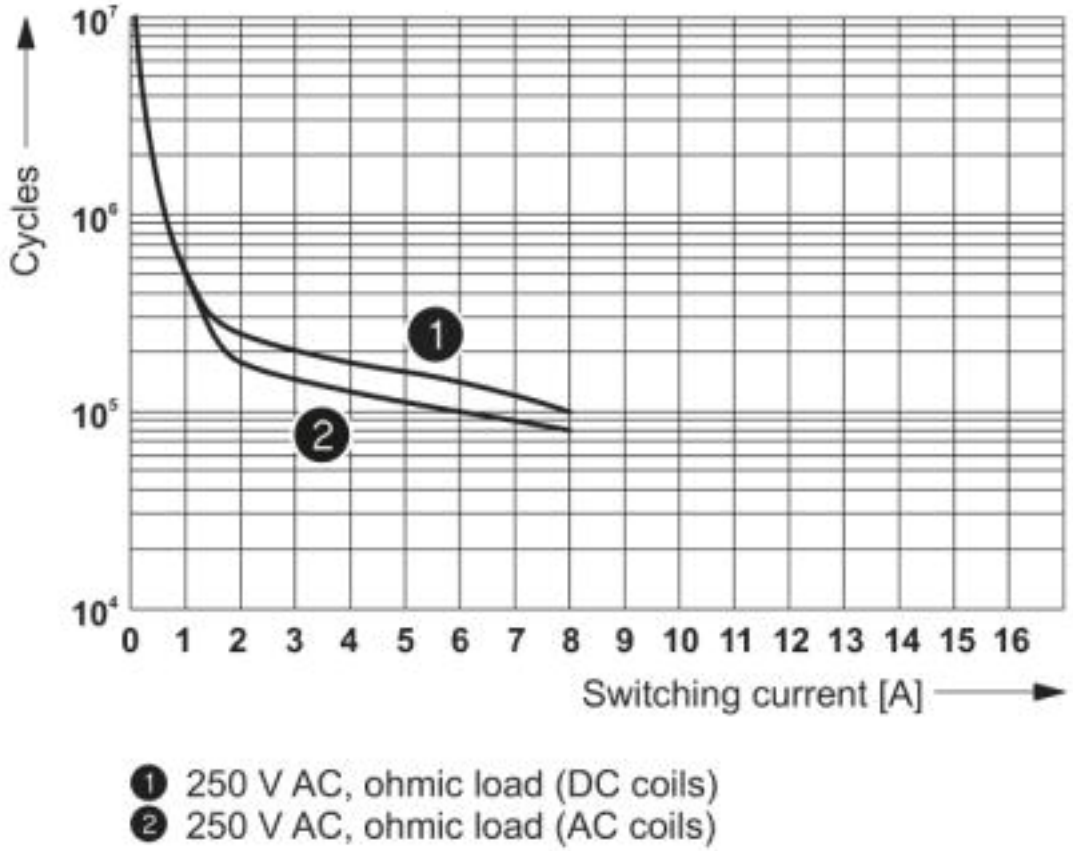
Diagram



Contact derating

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

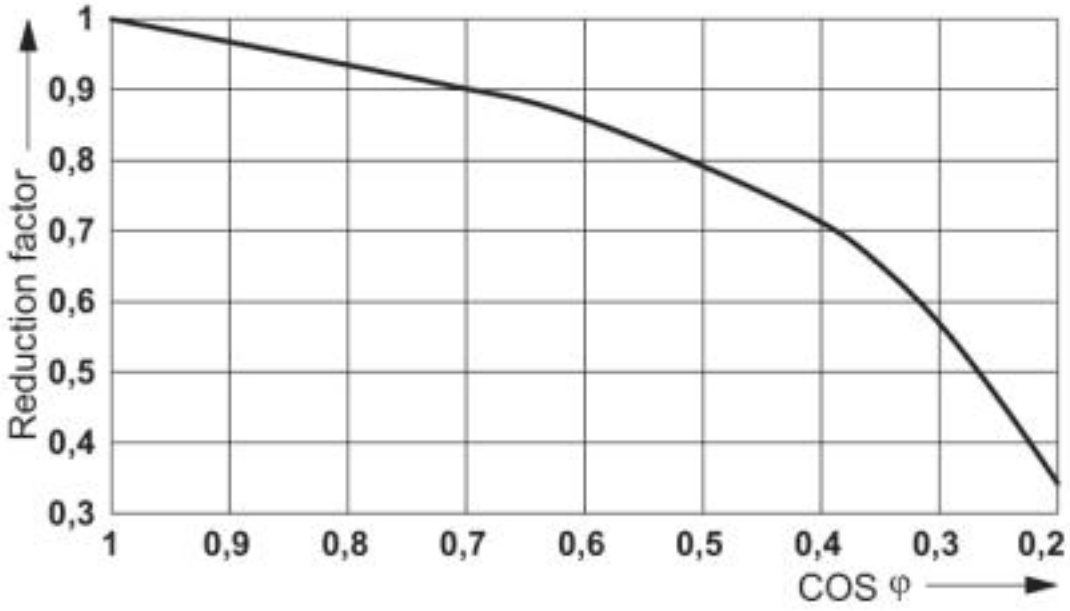
Diagram



Electrical service life

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

Diagram



Service life reduction factor

Articles in set

Relay base - RIF-1-BPT/2X21 - 2900931

RIF-1... relay base, for miniature power relay with 1 or 2 PDTs or solid-state relays of the same design, push-in connection, plug-in option for input/suppressor modules, for mounting on NS 35/7,5

Single relay - REL-MR-230AC/21-21 - 2961451

Plug-in miniature power relay, with power contact, 2 PDTs, input voltage 230 V AC

Plug-in module - RIF-LV-120-230 AC/110 DC - 2900944

Plug-in module, for mounting on RIF-1, RIF-2, RIF-3, and RIF-4, with varistor and yellow LED, input voltage: 120 ... 230 V AC/110 V DC ±20 %

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

Articles in set

Retaining bracket - RIF-RH-1 - 2900953

Relay retaining bracket, with ejector function and holder for marking material, suitable for RIF-1 relay base, for 16 mm tall miniature power relay and solid-state relay

Classifications

eCl@ss

eCl@ss 4.0	27371100
eCl@ss 4.1	27371100
eCl@ss 5.0	27371600
eCl@ss 5.1	27371600
eCl@ss 6.0	27371600
eCl@ss 7.0	27371601
eCl@ss 8.0	27371601
eCl@ss 9.0	27371601

ETIM

ETIM 2.0	EC001437
ETIM 3.0	EC001437
ETIM 4.0	EC001437
ETIM 5.0	EC001437
ETIM 6.0	EC001437
ETIM 7.0	EC001437

UNSPSC

UNSPSC 6.01	30211916
UNSPSC 7.0901	39121515
UNSPSC 11	39121515
UNSPSC 12.01	39121515
UNSPSC 13.2	39122334
UNSPSC 18.0	39122334
UNSPSC 19.0	39122334
UNSPSC 20.0	39122334
UNSPSC 21.0	39122334

Approvals

Approvals

Relay Module - RIF-1-RPT-LV-230AC/2X21 - 2903331

Approvals

Approvals

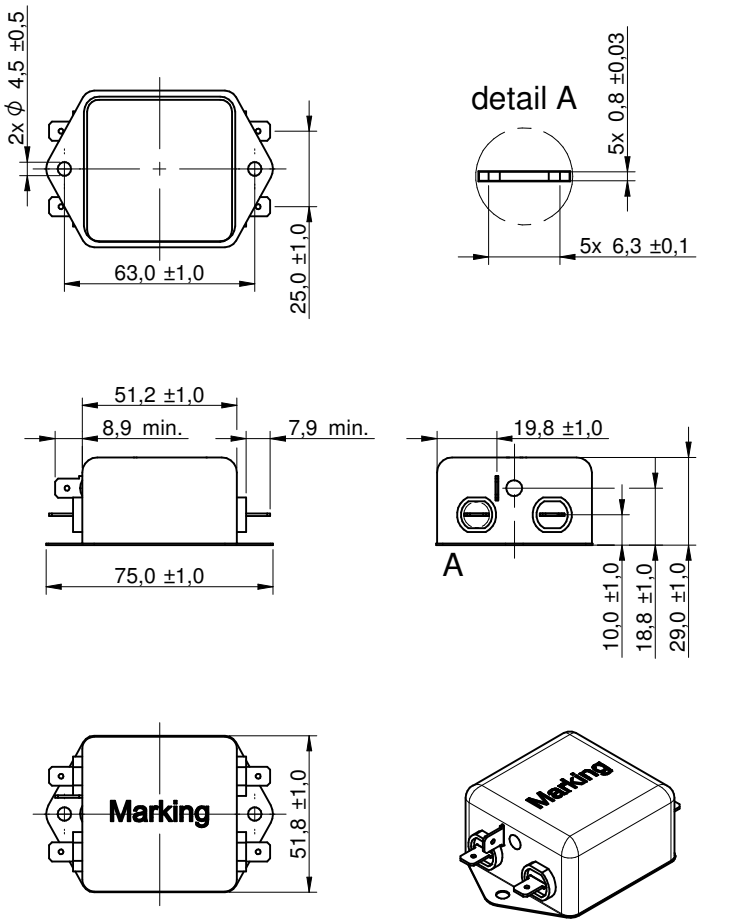
DNV GL / PRS / LR / EAC / EAC

Ex Approvals

Approval details

DNV GL	https://approvalfinder.dnvgl.com/	TAA000018V
PRS	http://www.prs.pl/	TE/2108/880590/16
LR	http://www.lr.org/en	15/20011
EAC		TR_TS_D_00573_c
EAC		TR_TS_S_00010_c

Dimensions: [mm]

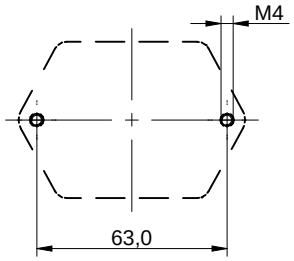


Scale -1:2,5

Mechanical Properties:

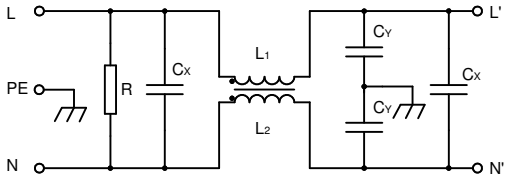
Properties		Value	Unit	Tol.
Weight	m	147	g	typ.

Recommended Screw Thread: [mm]



Scale -1:2,5

Schematic:



L1 = L2 = L

Electrical Properties:

Properties		Test conditions	Value	Unit	Tol.
Rated Voltage	U_R	250 V (AC), 50/60 Hz 250 V (DC)	250	V	max.
Rated Current	I_R	@ 40 °C/ ΔT< 60 K	20	A	max.
Leakage Current	I_{Leak}	250 V (AC)/ 50 Hz	0.785	mA	typ.
DC Resistance	R_{DC}	@ 20 °C	10	mΩ	max.
Inductance	L	10 kHz/ 0.1 mA	1	mH	+50%/-30%
X2-Capacitance	C_X	1 kHz/ 1 V	1	µF	±10%
Y2-Capacitance	C_Y	1 kHz/ 1 V	10	nF	±20%
Discharge Resistance	R	@ 20 °C	330	kΩ	±10%
Insulation Test Voltage L->PE	U_{T1}	50 Hz/ 2 s/ 15 mA	2000	V (AC)	max.
Insulation Test Voltage L->N	U_{T2}	2 s/ 10 mA	1075	V (DC)	max.

General Information:

Operating Temperature	-25 up to +100 °C		
Climatic Category	25/100/21		
Rated Temperature	T_R	40	°C
Storage Conditions (in original packaging)	< 40 °C ; < 75 % RH		
Flammability Rating according to	UL94 V-0		
Moisture Sensitivity Level (MSL)	1		

Leakage current is calculated according to IEC 60939-3. If the neutral line is interrupted, worst case leakage current could reach twice this level. There is no leakage current for DC applications.

Test conditions of Electrical Properties: +20 °C, 33 % RH if not specified differently

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eiSos@we-online.com

WÜRTH ELEKTRONIK

CREATED	CHECKED	GENERAL TOLERANCE	PROJECTION METHOD
FBo	WPi	DIN ISO 2768-1m	

DESCRIPTION
WE-CLFS Line Filter Single-Stage Advanced

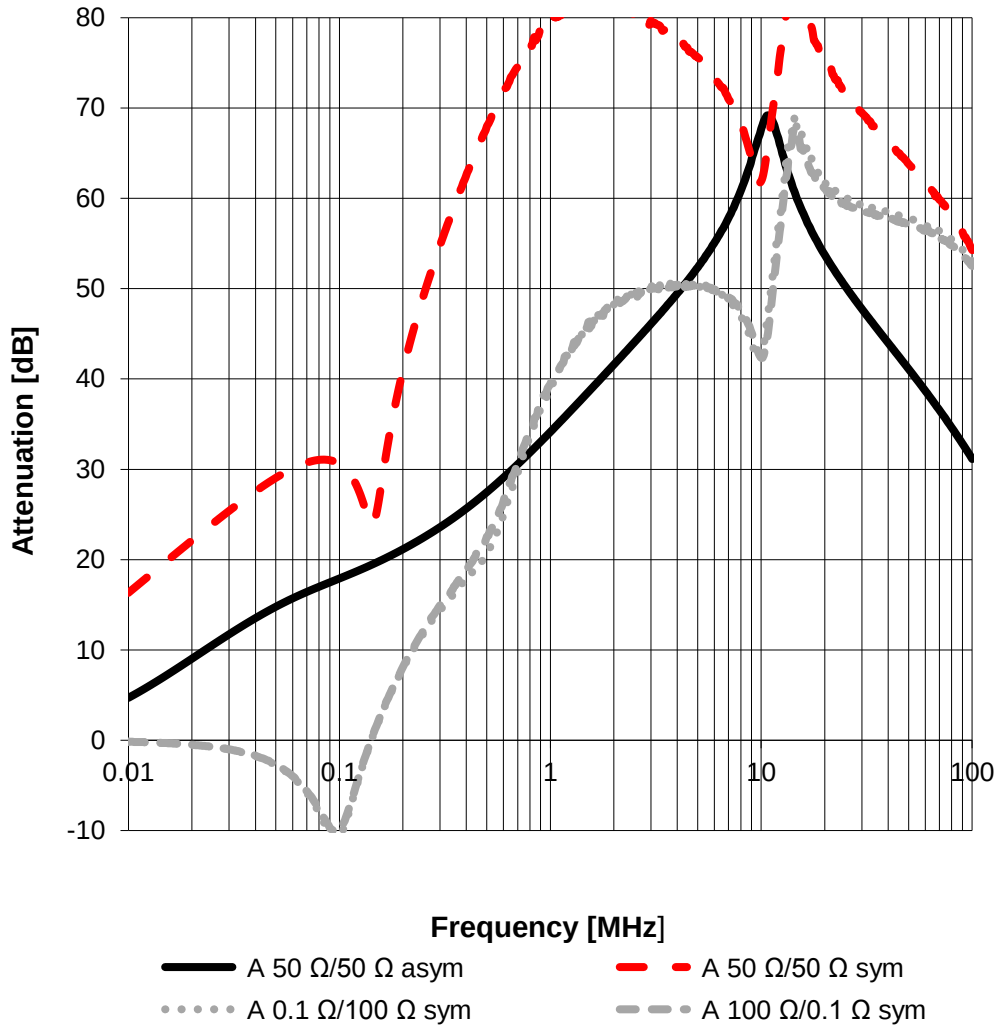
ORDER CODE
810912020

REVISION	STATUS	DATE (YYYY-MM-DD)	BUSINESS UNIT	PAGE
001.000	Draft	2018-11-13	eiSos	1/6

Certification:

VDE Approval	40048805 [IEC/EN 60939-2]
cURus Approval	E502193 [UL 60939-3/ CSA C22.2 NO. 8-13]

Typical Insertion Loss:



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CREATED	CHECKED	GENERAL TOLERANCE	PROJECTION METHOD
FBo	WPi	DIN ISO 2768-1m	

DESCRIPTION
WE-CLFS Line Filter Single-Stage Advanced

ORDER CODE
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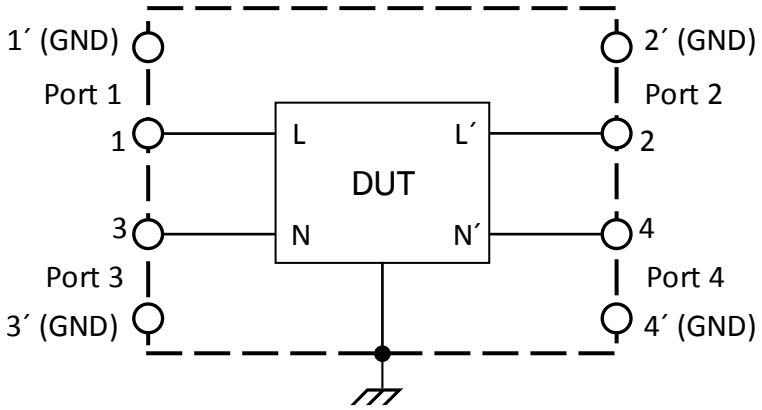
REVISION	STATUS	DATE (YYYY-MM-DD)	BUSINESS UNIT	PAGE
001.000	Draft	2018-11-13	eiSos	2/6

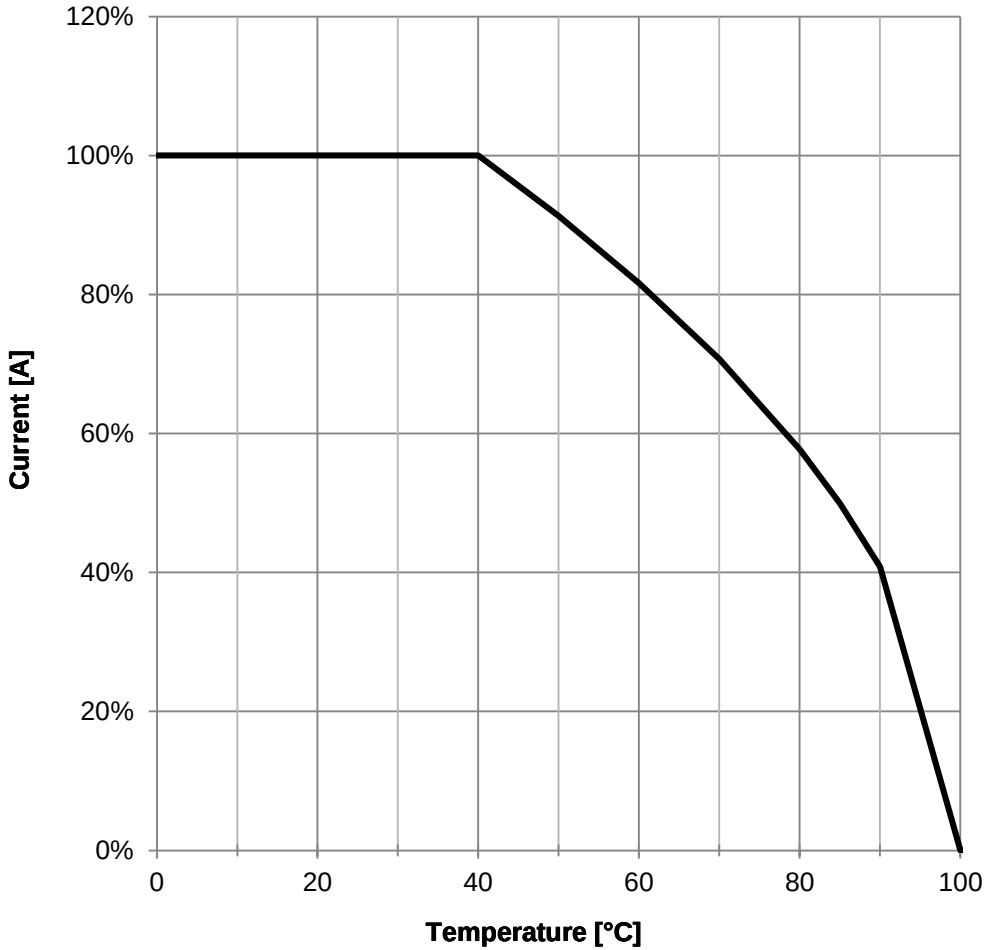
Test Setup:

According to CISPR 17



Network Analyzer: Keysight E5080A or equivalent

Derating Curve:



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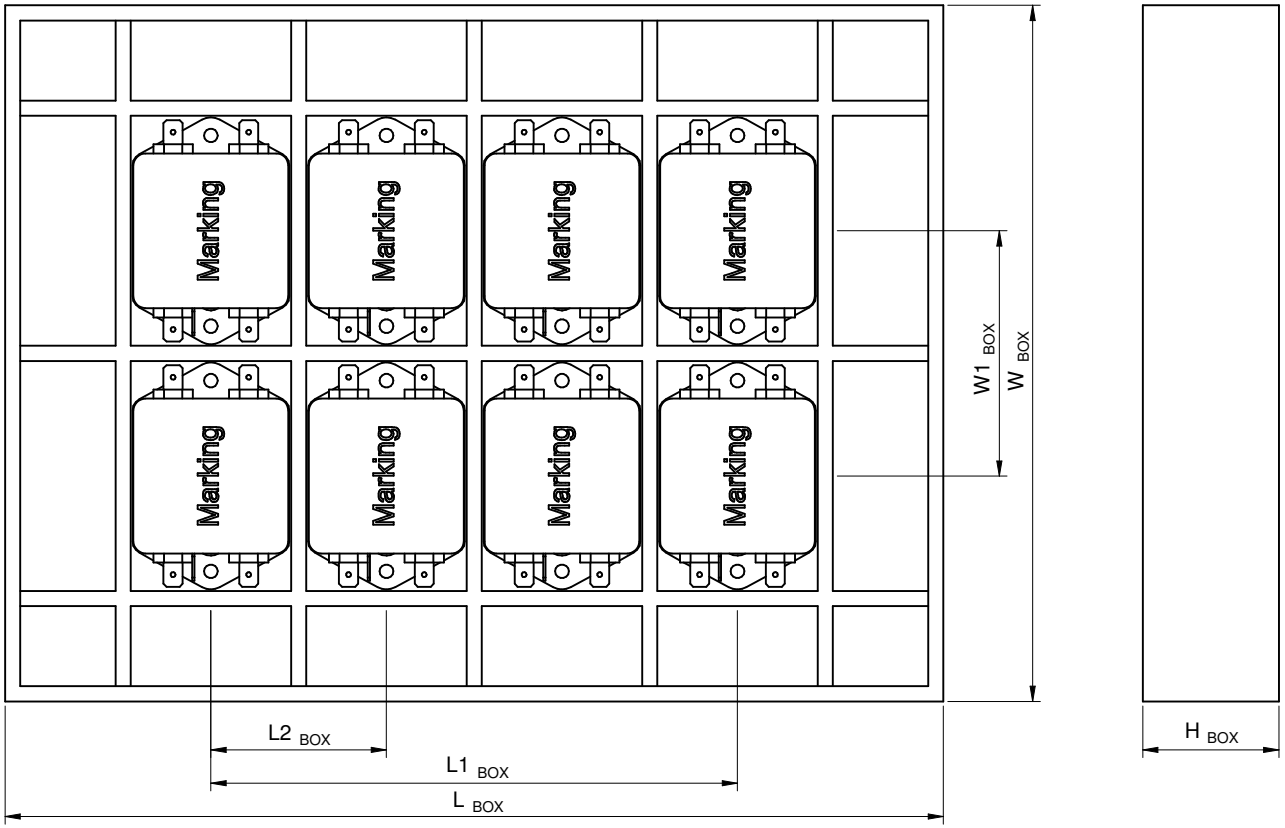
CREATED	CHECKED	GENERAL TOLERANCE	PROJECTION METHOD
FBo	WPi	DIN ISO 2768-1m	

DESCRIPTION: **WE-CLFS Line Filter Single-Stage Advanced**

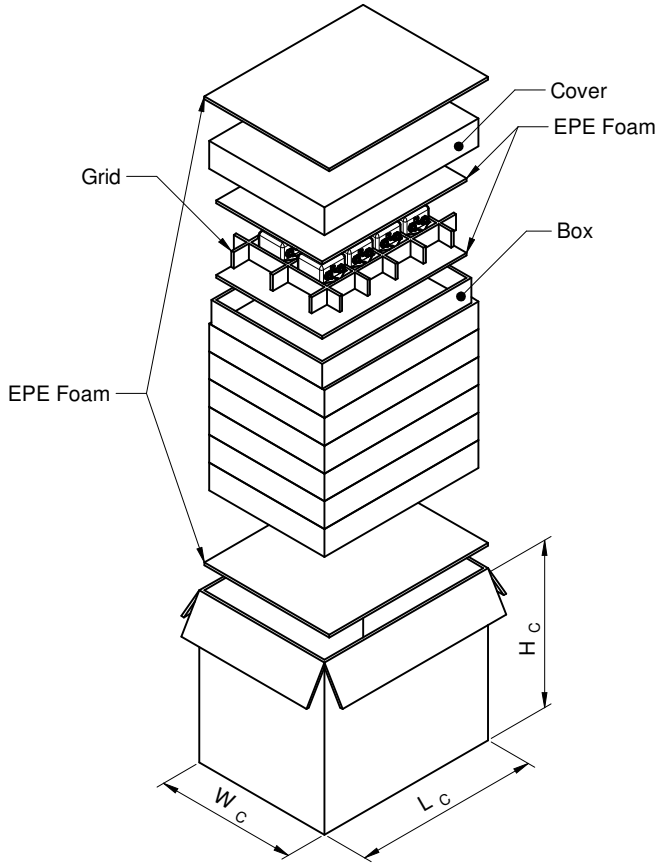
ORDER CODE: **810912020**

REVISION	STATUS	DATE (YYYY-MM-DD)	BUSINESS UNIT	PAGE
001.000	Draft	2018-11-13	eiSos	3/6

Packaging Specification - Tray and Carton: [mm]



L_{BOX} (mm)	$L1_{BOX}$ (mm)	$L2_{BOX}$ (mm)	W_{BOX} (mm)	$W1_{BOX}$ (mm)	H_{BOX} (mm)	No. of EPE Foam	Packaging Unit	Material
typ.	typ.	typ.	typ.	typ.	typ.	pcs.	pcs.	
310,00	174	58	230	81	29	2	8	Paper



L_C (mm)	W_C (mm)	H_C (mm)	No. of box	No. of EPE foam	Packaging Unit	Material
typ.	typ.	typ.	pcs.	pcs.	pcs.	
320,00	240,00	310,00	7	2	56	Paper

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WÜRTH ELEKTRONIK

CREATED	CHECKED	GENERAL TOLERANCE	PROJECTION METHOD
FBo	WPi	DIN ISO 2768-1m	

DESCRIPTION
WE-CLFS Line Filter Single-Stage Advanced

ORDER CODE
810912020

REVISION	STATUS	DATE (YYYY-MM-DD)	BUSINESS UNIT	PAGE
001.000	Draft	2018-11-13	eiSos	4/6

Cautions and Warnings:

The following conditions apply to all goods within the product series of WE-CLFS of Würth Elektronik eiSos GmbH & Co. KG:

General:

- This electronic component was designed and manufactured for use in general electronic equipment.
- Würth Elektronik must be asked for written approval (following the PPAP procedure) before incorporating the components into any equipment in fields such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network, etc. where higher safety and reliability are especially required and/or if there is the possibility of direct damage or human injury.
- Electronic components that will be used in safety-critical or high-reliability applications, should be pre-evaluated by the customer.
- The component was designed and manufactured to be used within the datasheet specified values. If the usage and operation conditions specified in the datasheet are not met, the wire insulation may be damaged or dissolved.
- Do not drop or impact the components, as the core may flake apart.
- Würth Elektronik products are qualified according to international standards, which are listed in each product reliability report. Würth Elektronik does not guarantee any customer qualified product characteristics beyond Würth Elektroniks' specifications, for its validity and sustainability over time.
- The customer is responsible for the functionality of their own products. All technical specifications for standard products also apply to customer specific products.

Product specific:

Assembly instructions:

- While mounting and removing, the electronic component shall be operated in voltage-free condition pursuant to the five safety rules described in the standard EN 50110-1.
- The protective earth connection shall be the first to be connected while installing the filter and shall be the last to be disconnected. The protective earth connection must be prepared considering the leakage current.
- The filter position is suggested to be close as possible to the application. If there are long distances between the filter and application, it is recommended to shield the cables, otherwise, the functionality might be affected.
- To establish a low impedance path for parasitic currents the filter housing shall have a wide connection area to the ground plane. The ground plane shall be free of paint or other isolating materials.
- Keep the connection to the PE as short as possible.
- To minimize crosstalk do not place incoming and outgoing cables next to each other.
- Use short cables to minimize the parasitic effects of the setup.
- The connection to the ground plane should be established with M4 screws. The tightening torque varies with the selected screw and should not exceed the limit of 5Nm.

Cleaning and Washing:

- Washing agents used during the production to clean the customer application might damage or change the characteristics of the component. Washing agent may have a negative effect on the long-term functionality of the product.

Storage Conditions:

- A storage of Würth Electronik products for longer than 12 months is not recommended. Within other effects, the terminals may suffer degradation, resulting in bad solderability. Therefore, all products shall be used within the period of 12 months based on the day of shipment.
- Do not expose the components to direct sunlight.
- The storage conditions in the original packaging are defined according to DIN EN 61760-2.

Handling:

- Violation of the technical product specifications such as exceeding the nominal rated current will void the warranty.
- Only qualified personnel should work with the electronic component including, but not limited to, work such as planning, assembly, installation, operation, repair and maintenance considering the corresponding documentation.
- The filter includes components storing an electric charge and dangerous voltage may remain at the filter terminals even after the power source has been disconnected even after five minutes.
- In case temporary voltage is applied to the unassembled filter, the filter shall be discharged after the power source has been disconnected.
- Avoid any overload or conditions that are not specified in the datasheet.
- Do not exceed the specified temperature limits.
- To maintain regular operation, the filters shall be protected within the application against inadmissible exceedance of the rated current.
- The filter leakage current specified in the data sheet merely serves as a user information. For security reasons, the maximum leakage current of the entire electrical application has to be limited. The permissible limits for your application must be acquired from the relative and applicable regulations, provisions and standards.
- The current derating must be observed. Disregarding the current derating might result in overheating and in a fire hazard as a consequence thereof.
- Due to the heavy weight of the electronic component, strong forces and high accelerations might have the effect to damage the electrical connection and will void the warranty.

Vibration resistance:

- Do not exceed the vibration limits given by IEC60068-2-6.

These cautions and warnings comply with the state of the scientific and technical knowledge and are believed to be accurate and reliable. However, no responsibility is assumed for inaccuracies or incompleteness.

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WÜRTH ELEKTRONIK

CREATED	CHECKED	GENERAL TOLERANCE	PROJECTION METHOD
FBo	WPi	DIN ISO 2768-1m	

DESCRIPTION
WE-CLFS Line Filter Single-Stage Advanced

ORDER CODE
810912020

REVISION	STATUS	DATE (YYYY-MM-DD)	BUSINESS UNIT	PAGE
001.000	Draft	2018-11-13	eiSos	5/6

Important Notes

The following conditions apply to all goods within the product range of Würth Elektronik eiSos GmbH & Co. KG:

1. General Customer Responsibility

Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact it is up to the customer to evaluate, where appropriate to investigate and decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not.

2. Customer Responsibility related to Specific, in particular Safety-Relevant Applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications.
In certain customer applications requiring a very high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component. Therefore, customer is cautioned to verify that data sheets are current before placing orders. The current data sheets can be downloaded at www.we-online.com.

3. Best Care and Attention

Any product-specific notes, cautions and warnings must be strictly observed. Any disregard will result in the loss of warranty.

4. Customer Support for Product Specifications

Some products within the product range may contain substances which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case the field sales engineer or the internal sales person in charge should be contacted who will be happy to support in this matter.

5. Product R&D

Due to constant product improvement product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard inform about minor and major changes. In case of further queries regarding the PCN, the field sales engineer or the internal sales person in charge should be contacted. The basic responsibility of the customer as per Section 1 and 2 remains unaffected.

6. Product Life Cycle

Due to technical progress and economical evaluation we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this we cannot guarantee that all products within our product range will always be available. Therefore it needs to be verified with the field sales engineer or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

7. Property Rights

All the rights for contractual products produced by Würth Elektronik eiSos GmbH & Co. KG on the basis of ideas, development contracts as well as models or templates that are subject to copyright, patent or commercial protection supplied to the customer will remain with Würth Elektronik eiSos GmbH & Co. KG. Würth Elektronik eiSos GmbH & Co. KG does not warrant or represent that any license, either expressed or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, application, or process in which Würth Elektronik eiSos GmbH & Co. KG components or services are used.

8. General Terms and Conditions

Unless otherwise agreed in individual contracts, all orders are subject to the current version of the “General Terms and Conditions of Würth Elektronik eiSos Group”, last version available at www.we-online.com.

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WÜRTH ELEKTRONIK

CREATED	CHECKED	GENERAL TOLERANCE	PROJECTION METHOD
FBo	WPi	DIN ISO 2768-1m	

DESCRIPTION
WE-CLFS Line Filter Single-Stage Advanced

ORDER CODE
810912020

REVISION	STATUS	DATE (YYYY-MM-DD)	BUSINESS UNIT	PAGE
001.000	Draft	2018-11-13	eiSos	6/6

CP10.241, CP10.241-C1, CP10.241-S1, CP10.241-S2, CP10.242

DIMENSION **CP-Series**

24V, 10A, 240W, SINGLE PHASE INPUT

POWER SUPPLY

- AC 100-240V Wide-range Input
- Width only 39mm
- Efficiency up to 95.2%
- Excellent Partial Load Efficiency
- 20% Output Power Reserves
- Safe Hiccup^{PLUS} Overload Mode
- Easy Fuse Breaking due to High Overload Peak Current
- Active Power Factor Correction (PFC)
- Minimal Inrush Current Surge
- Full Power Between -25°C and +60°C
- DC-OK Relay Contact
- 3 Year Warranty

GENERAL DESCRIPTION

The DIMENSION CP-Series units are high-end power supplies in a medium price range without compromising quality, reliability and performance. The CP-Series is part of the DIMENSION power supply family. The most outstanding features of CP10 series are the high efficiency, advanced inrush current limitation, active PFC and the wide operational temperature range.

The CP-Series includes all the essential basic functions. The devices have a power reserve of 20% included, which may even be used continuously at temperatures up to +45°C. Additionally, the CP10 can deliver three times the nominal output current for at least 12ms which helps to trip fuses on faulty output branches.

High immunity to transients and power surges as well as low electromagnetic emission, a DC-OK relay contact and a large international approval package for a variety of applications makes this unit suitable for nearly every situation.

SHORT-FORM DATA

Output voltage	DC 24V	Nominal
Adjustment range	24 – 28V	Factory setting 24.1V
Output current	12.0-10.3A	Below +45°C ambient
	10.0-8.6A	At +60°C ambient
	7.5-6.5A	At +70°C ambient
	Derate linearely between +45°C and +70°C	
Input voltage AC	AC 100-240V	-15%/ +10%
Mains frequency	50-60Hz	±6%
Input current AC	2.15 / 1.13A	At 120 / 230Vac
Power factor	0.99 / 0.97	At 120 / 230Vac
Input voltage DC	DC 110-150V ±20%	For CP10.241 (-xx)
	DC 110-300V ±20%	CP10.242
Input current DC	2.35A	At 110Vdc
	2.35 / 0.84A	At 110 / 300Vdc
Input inrush current	6 / 9A pk	At 40°C 120 / 230Vac
Efficiency	93.6 / 95.2%	At 120 / 230Vac
Losses	16.4 / 12.1W	At 120 / 230Vac
Hold-up time	37 / 37ms	At 120 / 230Vac
Temperature range	-25°C to +70°C	
Size (w x h x d)	39x124x117mm	Without DIN-Rail
Weight	600g / 1.3lb	

ORDER NUMBERS

Power Supply	**CP10.241**	
	CP10.241-C1	Conformal coated pc-boards
	CP10.241-S1	Spring-clamp terminals
	CP10.241-S2	Push-in terminals
	CP10.242	Extended DC-Input range
Mechanical Accessory		
	ZM4.WALL	Wall/panel mount bracket
	ZM12.SIDE	Side mount bracket

MARKINGS

For details and a complete approval list see section 20.

c UL US LISTED IND. CONT. EO. UL 508

c UL US UL 60950-1

CE

c SP US Class I Div 2

IECEx ATEX

GL Marine

INDEX

TERMINOLOGY AND ABREVIATIONS

PE and ⏚ symbol	PE is the abbreviation for **P**rotective **E**arth and has the same meaning as the symbol ⏚.
Earth, Ground	This document uses the term "earth" which is the same as the U.S. term "ground".
T.b.d.	To be defined, value or description will follow later.
AC 230V	A figure displayed with the AC or DC before the value represents a nominal voltage with standard tolerances (usually ±15%) included. E.g.: DC 12V describes a 12V battery disregarding whether it is full (13.7V) or flat (10V)
230Vac	A figure with the unit (Vac) at the end is a momentary figure without any additional tolerances included.
50Hz vs. 60Hz	As long as not otherwise stated, AC 100V and AC 230V parameters are valid at 50Hz mains frequency. AC 120V parameters are valid for 60Hz mains frequency.
may	A key word indicating flexibility of choice with no implied preference.
shall	A key word indicating a mandatory requirement.
should	A key word indicating flexibility of choice with a strongly preferred implementation.

1. INTENDED USE

This device is designed for installation in an enclosure and is intended for the general professional use such as in industrial control, office, communication, and instrumentation equipment.

Do not use this power supply in equipment, where malfunction may cause severe personal injury or threaten human life.

2. INSTALLATION REQUIREMENTS

This device may only be installed and put into operation by qualified personnel.

This device does not contain serviceable parts. The tripping of an internal fuse is caused by an internal defect.

If damage or malfunction should occur during installation or operation, immediately turn power off and send unit to the factory for inspection.

Mount the unit on a DIN-rail so that the input terminals are located on the bottom of the unit. For other mounting orientations see de-rating requirements in this document. See chapter 24.12.

This device is designed for convection cooling and does not require an external fan. Do not obstruct airflow and do not cover ventilation grid (e.g. cable conduits) by more than 15%!

Keep the following installation clearances: 40mm on top, 20mm on the bottom, 5mm on the left and right sides are recommended when the device is loaded permanently with more than 50% of the rated power. Increase this clearance to 15mm in case the adjacent device is a heat source (e.g. another power supply).

A disconnecting means shall be provided for the output of the power supplies when used in applications according to CSA C22.2 No 107.1-01.

⚠ WARNING Risk of electrical shock, fire, personal injury or death.

- Do not use the power supply without proper grounding (Protective Earth). Use the terminal on the input block for earth connection and not one of the screws on the housing.
- Turn power off before working on the device. Protect against inadvertent re-powering.
- Make sure that the wiring is correct by following all local and national codes.
- Do not modify or repair the unit.
- Do not open the unit as high voltages are present inside.
- Use caution to prevent any foreign objects from entering the housing.
- Do not use in wet locations or in areas where moisture or condensation can be expected.
- Do not touch during power-on, and immediately after power-off. Hot surfaces may cause burns.

Notes for use in hazardous location areas:

The power supply is suitable for use in Class I Division 2 Groups A, B, C, D locations and for use in Group II Category 3 (Zone 2) environments. See section 20 for details.

WARNING EXPLOSION HAZARDS!

Substitution of components may impair suitability for this environment. Do not disconnect the unit or operate the voltage adjustment unless power has been switched off or the area is known to be non-hazardous.

A suitable enclosure must be provided for the end product which has a minimum protection of IP54 and fulfils the requirements of the EN 60079-15.

3. AC-INPUT

AC input	Nom.	AC 100-240V	Suitable for TN-, TT- and IT mains networks
AC input range	Min.	85-264Vac	Continuous operation
	Min.	264-300Vac	For maximal 500ms
Allowed voltage L or N to earth	Max.	300Vac	Continuous according to IEC 62477-1
Input frequency	Nom.	50–60Hz	±6%
Turn-on voltage	Typ.	80Vac	Steady-state value, see Fig. 3-1
Shut-down voltage	Typ.	70Vac	Steady-state value, see Fig. 3-1
	Typ.	55Vac	Dynamic value for maximal 250ms
External input protection	See recommendations in chapter 24.3.		

		AC 100V	AC 120V	AC 230V	
Input current	Typ.	2.60A	2.15A	1.13A	At 24V, 10A, see Fig. 3-3
Power factor*)	Typ.	0.99	0.99	0.97	At 24V, 10A, see Fig. 3-4
Crest factor**)	Typ.	1.5	1.5	1.65	At 24V, 10A
Start-up delay	Typ.	300ms	290ms	240ms	See Fig. 3-2
Rise time	Typ.	30ms	30ms	30ms	At 24V, 10A const. current load, 0mF load capacitance, see Fig. 3-2
	Typ.	75ms	75ms	75ms	at 24V, 10A const. current load, 10mF load capacitance,, see Fig. 3-2
Turn-on overshoot	Max.	200mV	200mV	200mV	See Fig. 3-2
External input protection	See recommendations in chapter 24.3.				

*) The power factor is the ratio of the true (or real) power to the apparent power in an AC circuit.
**) The crest factor is the mathematical ratio of the peak value to RMS value of the input current waveform.

Fig. 3-1 **Input voltage range**

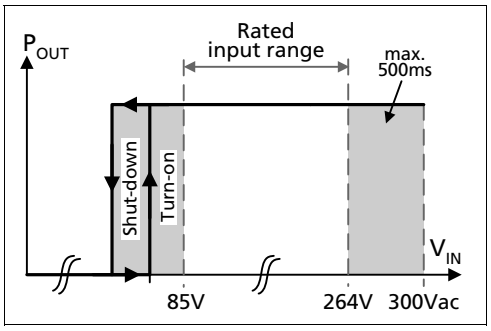


Fig. 3-2 **Turn-on behavior, definitions**

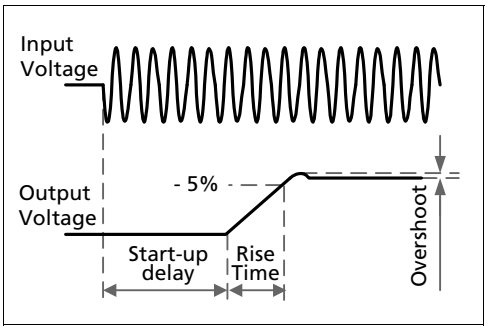


Fig. 3-3 **Input current vs. output current at 24V output voltage**

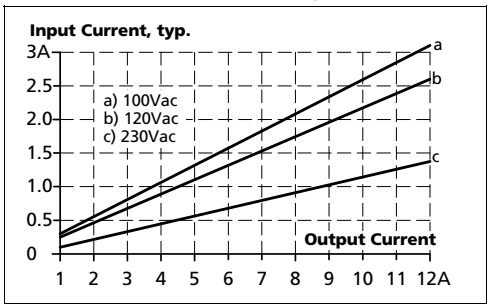
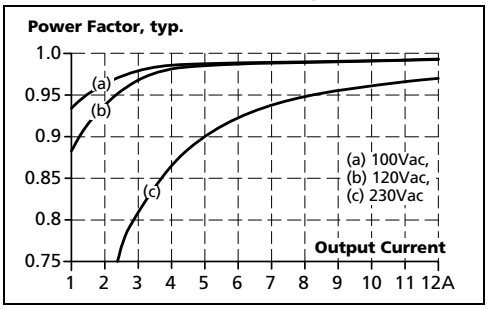


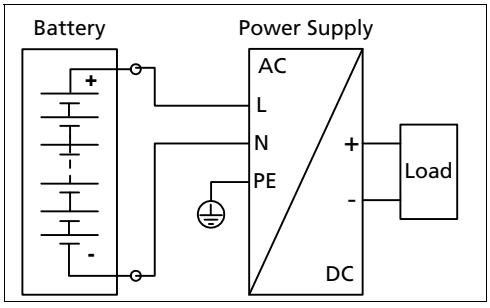
Fig. 3-4 **Power factor vs. output current at 24V output voltage**



4. DC-INPUT

DC input	Nom.	DC 110-150V	±20% For CP10.241, CP10.241-C1, CP10.241-S1, CP10.241-S2
	Nom.	DC 110-300V	±20% For CP10.242
DC input range	Min.	88-180Vdc	For CP10.241, CP10.241-C1, CP10.241-S1, CP10.241-S2, continuous operation
	Min.	88-360Vdc	For CP10.242
DC input current	Typ.	2.35A	At 110Vdc, at 24V, 10A
	Typ.	0.84A	At 300Vdc, at 24V, 10A
Allowed Voltage L/N to Earth	Max.	375Vdc	Continuous, according to IEC 62477-1
Turn-on voltage	Typ.	80Vdc	Steady state value
Shut-down voltage	Typ.	70Vdc	Steady state value
	Typ.	55Vdc	Dynamic value for maximal 250ms

Fig. 4-1 **Wiring for DC Input**



Instructions for DC use:

a) Use a battery or a similar DC source. A supply from the intermediate DC-bus of a frequency converter is not recommended and can cause a malfunction or damage the unit.
b) Connect +pole to L and –pole to N.
c) Connect the PE terminal to an earth wire or to the machine ground.

5. INPUT INRUSH CURRENT

An active inrush limitation circuit (NTCs, which are bypassed by a relay contact) limits the input inrush current after turn-on of the input voltage.

The charging current into EMI suppression capacitors is disregarded in the first microseconds after switch-on.

		AC 100V	AC 120V	AC 230V	
Inrush current	Max.	$11A_{peak}$	$7A_{peak}$	$11A_{peak}$	At 40°C, cold start
	Typ.	$9A_{peak}$	$6A_{peak}$	$6A_{peak}$	At 25°C, cold start
	Typ.	$9A_{peak}$	$6A_{peak}$	$9A_{peak}$	At 40°C, cold start
Inrush energy	Max.	$0.1A^2s$	$0.1A^2s$	$0.4A^2s$	At 40°C, cold start

Fig. 5-1 **Typical turn-on behaviour at nominal load, 120Vac input and 25°C ambient**

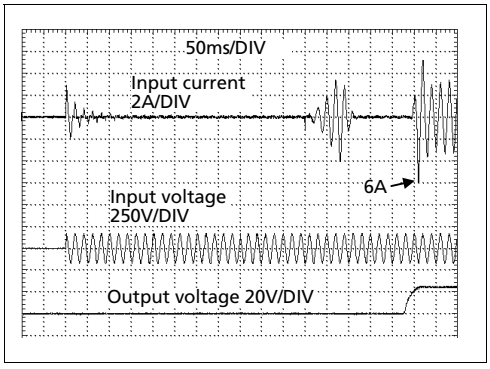
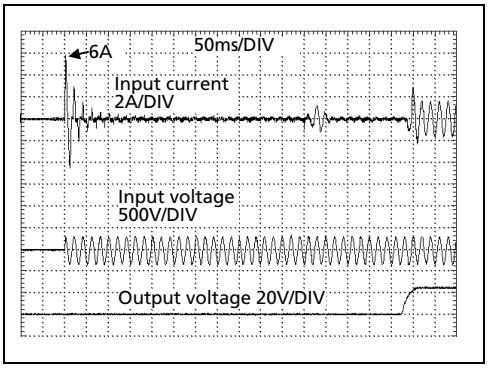


Fig. 5-2 **Typical turn-on behaviour at nominal load, 230Vac input and 25°C ambient**



6. OUTPUT

Output voltage	Nom.	24V	
Adjustment range	Min.	24-28V	Guaranteed value
	Max.	30.0V	This is the maximum output voltage which can occur at the clockwise end position of the potentiometer due to tolerances. It is not a guaranteed value which can be achieved.
Factory settings	Typ.	24.1V	±0.2%, at full load and cold unit
Line regulation	Max.	10mV	Between 85 and 300Vac
Load regulation	Max.	50mV	Between 0 and 12A, static value, see Fig. 6-1
Ripple and noise voltage	Max.	50mVpp	Bandwidth 20Hz to 20MHz, 50Ohm
Output current	Nom.	12A[1)]	At 24V and an ambient temperature below 45°C, see Fig. 16-1
	Nom.	10A	At 24V and 60°C ambient temperature, see Fig. 6-1
	Nom.	7.5A	At 24V and 70°C ambient temperature, see Fig. 16-1
	Nom.	10.3A[1)]	At 28V and an ambient temperature below 45°C, see Fig. 16-1
	Nom.	8.6A	At 28V and 60°C ambient temperature, see Fig. 6-1
	Nom.	6.45A	At 28V and 70°C ambient temperature, see Fig. 16-1
	Typ.	30A	For minimal 12ms once every five seconds, see Fig. 6-2. The output voltage stays above 20V. See chapter 24.1 for more peak current measurements. For AC 100V mains, the pulse length is shorter than 12ms.
Overload behaviour		Continuous current	Output voltage above 13Vdc, see Fig. 6-1
		Hiccup^{PLUS} mode[2)]	Output voltage below 13Vdc, see Fig. 6-1
Short-circuit current	Min.	12.5A[3)]	Load impedance <45mOhm, see Fig. 6-3
	Max.	15.5A[3)]	Load impedance <45mOhm, see Fig. 6-3
	Max.	5A	Average (R.M.S.) current, load impedance 50mOhm, see Fig. 6-3
	Min.	28A	Up to 12ms, load impedance <45mOhm, see Fig. 6-2
	Typ.	30.5A	Up to 12ms, load impedance <45mOhm, see Fig. 6-2
Output capacitance	Typ.	4 400µF	Included inside the power supply

1) **Power Boost**
This power/ current is continuously allowed up to an ambient temperature of 45°C.
Above 45°C, do not use this power or current longer than a duty cycle of 10% and/ or not longer than 1 minute every 10 minutes.

2) **Hiccup^{PLUS} Mode**
At heavy overloads (when output voltage falls below 13V), the power supply delivers continuous output current for 2s. After this, the output is switched off for approx. 18s before a new start attempt is automatically performed. This cycle is repeated as long as the overload exists. If the overload has been cleared, the device will operate normally. See Fig. 6-3

3) Discharge current of output capacitors is not included.

Fig. 6-1 **Output voltage vs. output current, typ.**

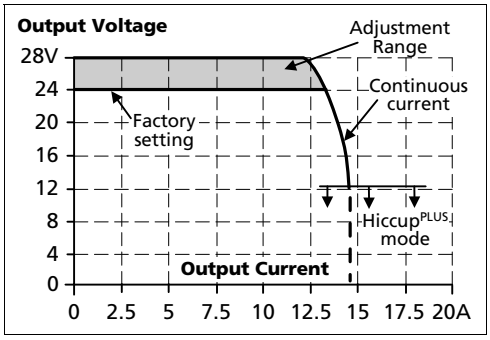


Fig. 6-2 **Dynamic output current capability, typ.**

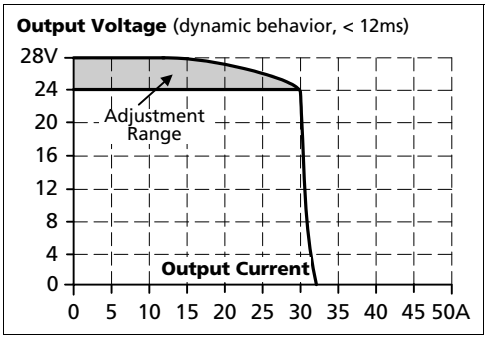
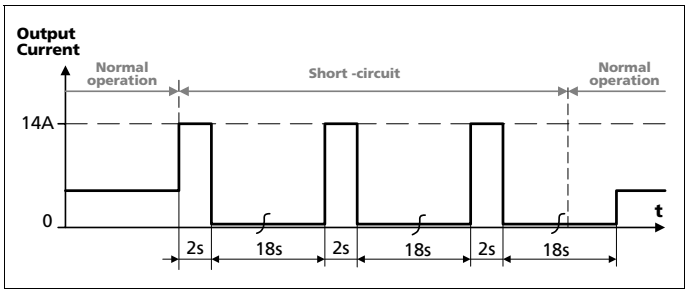


Fig. 6-3 **Short-circuit on output, Hiccup^PLUS mode, typ.**



7. HOLD-UP TIME

		AC 100V	AC 120V	AC 230V	
Hold-up Time	Typ.	73ms	73ms	73ms	At 24V, 5A, see Fig. 7-1
	Min.	55ms	55ms	55ms	At 24V, 5A, see Fig. 7-1
	Typ.	37ms	37ms	37ms	At 24V, 10A, see Fig. 7-1
	Min.	28ms	28ms	28ms	At 24V, 10A, see Fig. 7-1

Fig. 7-1 **Hold-up time vs. input voltage**

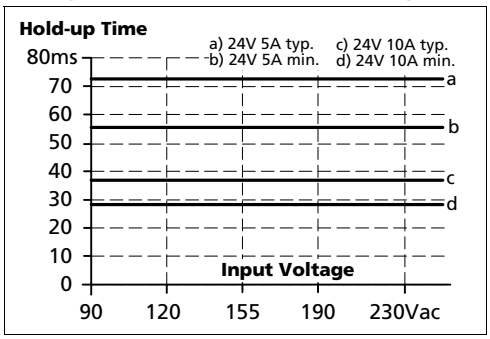
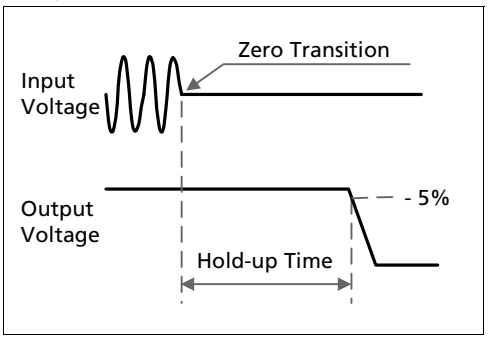


Fig. 7-2 **Shut-down ehaviour, definitions**

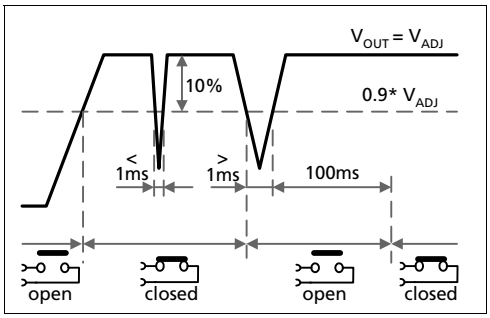


8. DC-OK RELAY CONTACT

This feature monitors the output voltage on the output terminals of a running power supply.

Contact closes	As soon as the output voltage reaches typ. 90% of the adjusted output voltage level.
Contact opens	As soon as the output voltage dips more than 10% below the adjusted output voltage. Short dips will be extended to a signal length of 100ms. Dips shorter than 1ms will be ignored.
Switching hysteresis	1V
Contact ratings	Maximal 60Vdc 0.3A, 30Vdc 1A, 30Vac 0.5A, resistive load Minimal permissible load: 1mA at 5Vdc
Isolation voltage	See dielectric strength table in section 18.

Fig. 8-1 **DC-ok relay contact behavior**



9. EFFICIENCY AND POWER LOSSES

		AC 100V	AC 120V	AC 230V	
Efficiency	Typ.	92.9%	93.6%	95.2%	At 24V, 10A
	Typ.	92.5%	93.4%	95.1%	At 24V, 12A (Power Boost)
Average efficiency*)	Typ.	92.5%	93.0%	94.3%	25% at 2.5A, 25% at 5A, 25% at 7.5A. 25% at 10A
Power losses	Typ.	2.5W	2.1W	1.8W	At 24V, 0A
	Typ.	9.8W	8.9W	7.1W	At 24V, 5A
	Typ.	18.3W	16.4W	12.1W	At 24V, 10A
	Typ.	23.4W	21.7W	14.8W	At 24V, 12A (Power Boost)

*) The average efficiency is an assumption for a typical application where the power supply is loaded with 25% of the nominal load for 25% of the time, 50% of the nominal load for another 25% of the time, 75% of the nominal load for another 25% of the time and with 100% of the nominal load for the rest of the time.

Fig. 9-1 **Efficiency vs. output current at 24V, typ.**

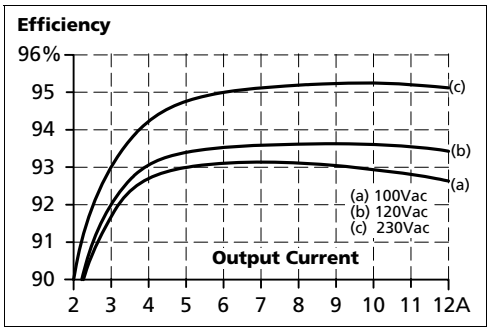


Fig. 9-2 **Losses vs. output current at 24V, typ.**

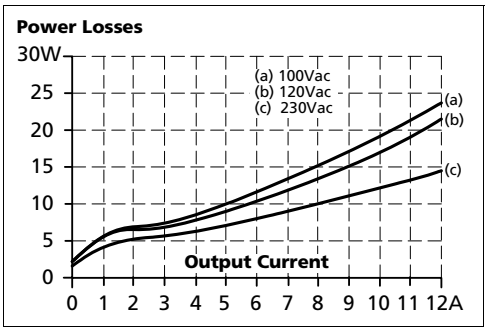


Fig. 9-3 **Efficiency vs. input voltage at 24V, 10A, typ.**

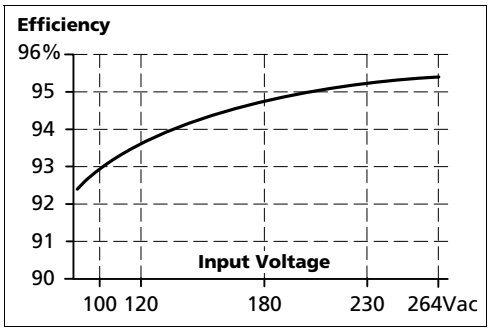
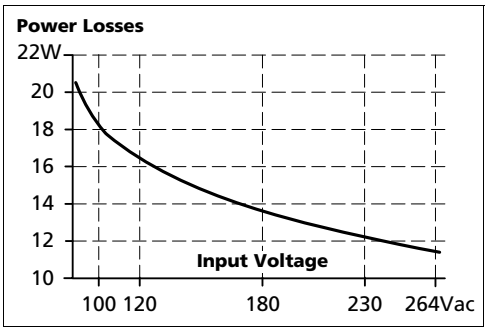


Fig. 9-4 **Losses vs. input voltage at 24V, 10A, typ.**



10. LIFETIME EXPECTANCY

The Lifetime expectancy shown in the table indicates the minimum operating hours (service life) and is determined by the lifetime expectancy of the built-in electrolytic capacitors. Lifetime expectancy is specified in operational hours and is calculated according to the capacitor's manufacturer specification. The manufacturer of the electrolytic capacitors only guarantees a maximum life of up to 15 years (131 400h). Any number exceeding this value is a calculated theoretical lifetime which can be used to compare devices.

	AC 100V	AC 120V	AC 230V	
Lifetime expectancy	128 000h	141 000h	176 000h	At 24V, 5A and 40°C
	61 000h	75 000h	120 000h	At 24V, 10A and 40°C
	47 000h	59 000h	101 000h	At 24V, 12A and 40°C
	363 000h	399 000h	499 000h	At 24V, 5A and 25°C
	173 000h	211 000h	338 000h	At 24V, 10A and 25°C
	132 000h	166 000h	286 000h	At 24V, 12A and 25°C

11. MTBF

MTBF stands for **M**ean **T**ime **B**etween **F**ailure, which is calculated according to statistical device failures, and indicates reliability of a device. It is the statistical representation of the likelihood of a unit to fail and does not necessarily represent the life of a product.

The MTBF figure is a statistical representation of the likelihood of a device to fail. A MTBF figure of e.g. 1 000 000h means that statistically one unit will fail every 100 hours if 10 000 units are installed in the field. However, it can not be determined if the failed unit has been running for 50 000h or only for 100h.

For these types of units the MTTF (**M**ean **T**ime **T**o **F**ailure) value is the same value as the MTBF value.

	AC 100V	AC 120V	AC 230V	
MTBF SN 29500, IEC 61709	550 000h	560 000h	661 000h	At 24V, 10A and 40°C
	1 003 000h	1 017 000h	1 176 000h	At 24V, 10A and 25°C
MTBF MIL HDBK 217F	188 000h	188 000h	213 000h	At 24V, 10A and 40°C; Ground Benign GB40
	252 000h	252 000h	290 000h	At 24V, 10A and 25°C; Ground Benign GB25
	40 000h	40 000h	47 000h	At 24V, 10A and 40°C; Ground Fixed GF40
	51 000h	51 000h	61 000h	At 24V, 10A and 25°C; Ground Fixed GF25

12. TERMINALS AND WIRING

The terminals are IP20 Finger safe constructed and suitable for field- and factory wiring.

CP10.241, CP10.241-C1, CP10.242	Input	Output	DC-OK-Signal
Type	Screw termination	Screw termination	Push-in termination
Solid wire	Max. 6mm²	Max. 6mm²	Max. 1.5mm²
Stranded wire	Max. 4mm²	Max. 4mm²	Max. 1.5mm²
American Wire Gauge	AWG 20-10	AWG 20-10	AWG 24-16
Max. wire diameter (including ferrules)	2.8mm	2.8mm	1.6mm
Recommended tightening torque	Max. 1Nm, 9lb-in	Max. 1Nm, 9lb-in	-
Wire stripping length	7mm / 0.28inch	7mm / 0.28inch	7mm / 0.28inch
Screwdriver	3.5mm slotted or cross-head No 2	3.5mm slotted or cross-head No 2	3mm slotted to open the spring

CP10.241-S1	Input	Output	DC-OK-Signal
Type	Quick-connect spring-clamp termination	Quick-connect spring-clamp termination	Push-in termination
Solid wire	Max. 6mm²	Max. 6mm²	Max. 1.5mm²
Stranded wire	Max. 4mm²	Max. 4mm²	Max. 1.5mm²
American Wire Gauge	AWG 20-10	AWG 20-10	AWG 24-16
Max. wire diameter (including ferrules)	2.8mm	2.8mm	1.6mm
Wire stripping length	10mm / 0.4inch	10mm / 0.4inch	7mm / 0.28inch
Screwdriver	-	-	3mm slotted to open the spring

CP10.241-S2	Input	Output	DC-OK-Signal
Type	Push-in termination	Push-in termination	Push-in termination
Solid wire	Max. 2.5mm²	Max. 2.5mm²	Max. 1.5mm²
Stranded wire	Max. 2.5mm²	Max. 2.5mm²	Max. 1.5mm²
Stranded wire with ferrules	Max. 1.5mm²	Max. 1.5mm²	Max. 1.5mm²
American Wire Gauge	AWG 24-12	AWG 24-12	AWG 24-16
Max. wire diameter (including ferrules)	2.3mm	2.3mm	1.6mm
Wire stripping length	10mm / 0.4inch	10mm / 0.4inch	7mm / 0.28inch
Screwdriver	3.0mm slotted to open the spring	3.0mm slotted to open the spring	3mm slotted to open the spring

Instructions for wiring:

a) Use appropriate copper cables that are designed for minimum operating temperatures of:
   60°C for ambient up to 45°C and
   75°C for ambient up to 60°C and
   90°C for ambient up to 70°C minimum.
b) Follow national installation codes and installation regulations!
c) Ensure that all strands of a stranded wire enter the terminal connection!
d) Unused terminal compartments should be securely tightened.
e) Ferrules are allowed.

Daisy chaining:

Daisy chaining is allowed for CP10.241, CP10.241-C1, CP10.241-S1 and CP10.242.

Daisy chaining is not allowed for CP10.241-S2

Daisy chaining (jumping from one power supply output to the next) is allowed as long as the average output current through one terminal pin does not exceed 25A. If the current is higher, use a separate distribution terminal block as shown in Fig. 12-2.

Fig. 12-1 Daisy chaining of outputs

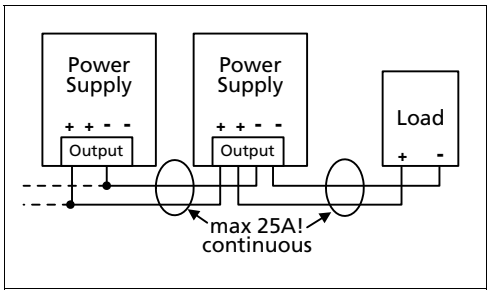
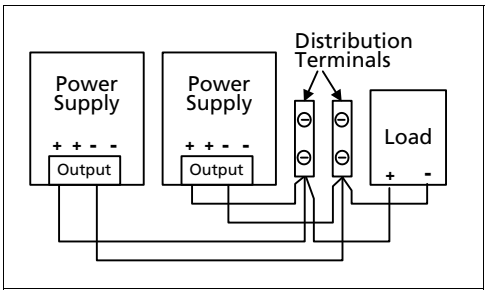
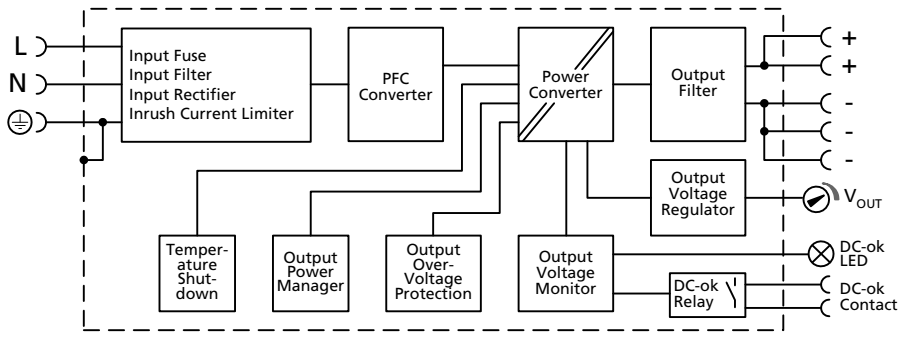


Fig. 12-2 Using distribution terminals



13. FUNCTIONAL DIAGRAM

Fig. 13-1 **Functional diagram**



14. FRONT SIDE AND USER ELEMENTS

Fig. 14-1
Front side CP10.241

Fig. 14-2
Front side CP10.241-C1

Fig. 14-3
Front side CP10.241-S1

Fig. 14-4
Front side CP10.241-S2

Fig. 14-5
Front side CP10.242

A **Input Terminals**
CP10.241, CP10.241-C1, CP10.242: Screw terminals
CP10.241-S1: Spring-clamp terminals
CP10.241-S2: Push-in terminals
N, L Line input
⏚ PE (Protective Earth) input

B **Output Terminals**
(two identical + poles and three identical - poles)
CP10.241, CP10.241-C1, CP10.242: Screw terminals
CP10.241-S1: Spring-clamp terminals
CP10.241-S2: Push-in terminals
+ Positive output
– Negative (return) output

C **Output voltage potentiometer**
Open the flap to adjust the output voltage. Factory set: 24.1V

D **DC-OK LED** (green)
On, when the output voltage is in range and the DC-OK contact is closed.

E **DC-OK Relay Contact** (push-in terminals)
Monitors the output voltage of the running power supply. See chapter 8 for details.

15. EMC

The power supply is suitable for applications in industrial environment as well as in residential, commercial and light industry environments.

EMC Immunity	According togeneric standards: EN 61000-6-1 and EN 61000-6-2			
Electrostatic discharge	EN 61000-4-2	Contact discharge Air discharge	8kV 15kV	Criterion A Criterion A
Electromagnetic RF field	EN 61000-4-3	80MHz-2.7GHz	20V/m	Criterion A
Fast transients (Burst)	EN 61000-4-4	Input lines Output lines DC-OK signal (coupling clamp)	4kV 2kV 2kV	Criterion A Criterion A Criterion A
Surge voltage on input	EN 61000-4-5	L → N L → PE, N → PE	2kV 4kV	Criterion A Criterion A
Surge voltage on output	EN 61000-4-5	+ → - + / - → PE	1kV 2kV	Criterion A Criterion A
Surge voltage on Signals	EN 61000-4-5	DC-OK signal → PE	1kV	Criterion A
Conducted disturbance	EN 61000-4-6	0.15-80MHz	20V	Criterion A
Mains voltage dips	EN 61000-4-11	0% of 100Vac 40% of 100Vac 70% of 100Vac 0% of 200Vac 40% of 200Vac 70% of 200Vac	0Vac, 20ms 40Vac, 200ms 70Vac, 500ms 0Vac, 20ms 80Vac, 200ms 140Vac, 500ms	Criterion A Criterion C Criterion C Criterion A Criterion A Criterion A
Voltage interruptions	EN 61000-4-11	0% of 200Vac (=0V)	5000ms	Criterion C
Voltage sags	SEMI F47 0706	Dips on the input voltage according to SEMI F47 standard		
		80% of 120Vac (96Vac) 70% of 120Vac (84Vac) 50% of 120Vac (60Vac)	1000ms 500ms 200ms	Criterion A Criterion A Criterion A
Powerful transients	VDE 0160	Over entire load range	750V, 0.3ms	Criterion A

Criterions:

A: Power supply shows normal operation behavior within the defined limits.

C: Temporary loss of function is possible. Power supply may shut-down and restarts by itself. No damage or hazards for the power supply will occur.

EMC Emission	According to generic standards: EN 61000-6-3 and EN 61000-6-4	
Conducted emission input lines	EN 55011, EN 55015, EN 55022, FCC Part 15, CISPR 11, CISPR 22	Class B
Conducted emission output lines [2)]	IEC/CISPR 16-1-2, IEC/CISPR 16-2-1	Limits for DC power port according EN 61000-6-3 fulfilled
Radiated emission	EN 55011, EN 55022	Class B
Harmonic input current	EN 61000-3-2	Class A fulfilled between 0A and 12A load Class C fulfilled between 6A and 12A load
Voltage fluctuations, flicker	EN 61000-3-3	Fulfilled [1)]

This device complies with FCC Part 15 rules.

Operation is subjected to following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1) Tested with constant current loads, non pulsing

2) For information only, not mandatory for EN 61000-6-3

Switching Frequencies

PFC converter	110kHz	Fixed frequency
Main converter	84kHz to 140kHz	Output load dependent
Auxiliary converter	60kHz	Fixed frequency

16. ENVIRONMENT

Operational temperature [1]	-25°C to +70°C (-13°F to 158°F)	Reduce output power according to Fig. 16-1
Storage temperature	-40°C to +85°C (-40°F to 185°F)	For storage and transportation
Output de-rating	3.2W/°C 6W/°C	Between +45°C and +60°C (113°F to 140°F) Between +60°C and +70°C (140°F to 158°F)
Humidity	5 to 95% r.h.	According to IEC 60068-2-30 Do not energize while condensation is present.
Vibration sinusoidal [2]	2-17.8Hz: ±1.6mm; 17.8-500Hz: 2g 2 hours / axis	According to IEC 60068-2-6
Shock [2]	30g 6ms, 20g 11ms 3 bumps / direction, 18 bumps in total	According to IEC 60068-2-27
Altitude	0 to 2000m (0 to 6 560ft)	Without any restrictions
	2000 to 6000m (6 560 to 20 000ft)	Reduce output power or ambient temperature, see Fig. 16-2.
Altitude de-rating	15W/1000m or 5°C/1000m	Above 2000m (6500ft), see Fig. 16-2
Over-voltage category	III	According to IEC 62477-1 for altitudes up to 2000m
	II	According to IEC 62477-1 for altitudes from 2000m to 6000m
Degree of pollution	2	According to IEC 62477-1, not conductive
LABS compatibility	The unit does not release any silicone or other LABS-critical substances and is suitable for use in paint shops.	
Corrosive gases	ISA-71.04-1985, Severity Level G3, IEC 60068-2-60 Test Ke Method 4	
Audible noise	Some audible noise may be emitted from the power supply during no load, overload or short circuit.	

1) Operational temperature is the same as the ambient or surrounding temperature and is defined as the air temperature 2cm below the unit.
2) Tested in combination with DIN-Rails according to EN 60715 with a height of 15mm and a thickness of 1.3mm and standard orientation.

Fig. 16-1 **Output current vs. ambient temp.**

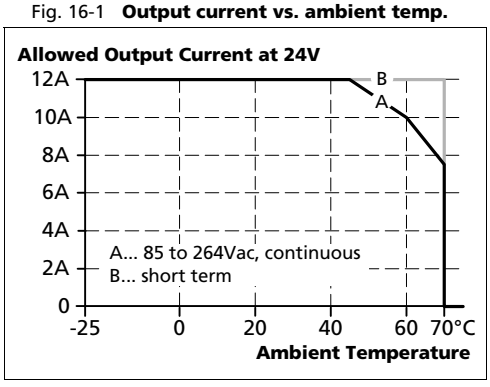
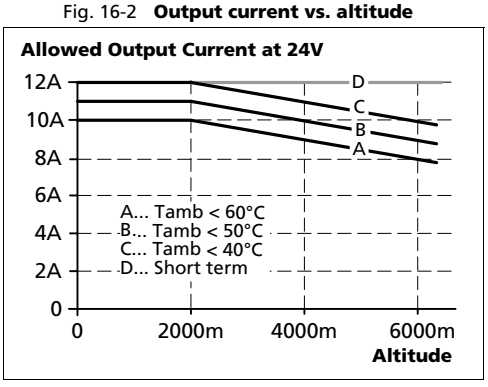


Fig. 16-2 **Output current vs. altitude**



17. PROTECTION FEATURES

Output protection	Electronically protected against overload, no-load and short-circuits. In case of a protection event, audible noise may occur.	
Output over-voltage protection	Typ. 30.5Vdc Max. 32Vdc	In case of an internal power supply defect, a redundant circuit limits the maximum output voltage. The output shuts down and automatically attempts to restart.
Degree of protection	IP 20	EN/IEC 60529
Penetration protection	> 4mm	E.g. screws, small parts
Over-temperature protection	Yes	Output shut-down with automatic restart. The temperature sensor is installed on critical components inside the unit and turns the unit off in safety critical situations, which can happen e.g. when de-rating requirements are not observed, ambient temperature is too high, ventilation is obstructed or the de-rating requirements for different mounting orientation is not followed. There is no correlation between the operating temperature and turn-off temperature since this is dependent on input voltage, load and installation methods.
Input transient protection	MOV (Metal Oxide Varistor)	For protection values see chapter 15 (EMC).
Internal input fuse	Included	Not user replaceable slow-blow high-braking capacity fuse

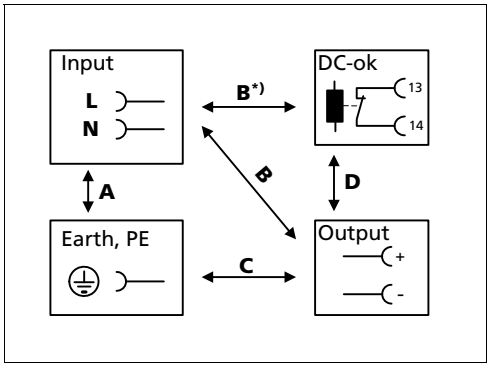
18. SAFETY FEATURES

Input / output separation	Double or reinforced galvanic isolation	
	SELV	IEC/EN 60950-1
	PELV	IEC/EN 60204-1, EN 62477-1, IEC 60364-4-41
Class of protection	I	PE (Protective Earth) connection required
Isolation resistance	> 500MOhm	At delivered condition between input and output, measured with 500Vdc
	> 500MOhm	At delivered condition between input and PE, measured with 500Vdc
	> 500MOhm	At delivered condition between output and PE, measured with 500Vdc
	> 500MOhm	At delivered condition between output and DC-OK contacts, measured with 500Vdc
PE resistance	< 0.1Ohm	Resistance between PE terminal and the housing in the area of the DIN-rail mounting bracket.
Touch current (leakage current)	Typ. 0.14mA / 0.36mA	At 100Vac, 50Hz, TN-,TT-mains / IT-mains
	Typ. 0.20mA / 0.50mA	At 120Vac, 60Hz, TN-,TT-mains / IT-mains
	Typ. 0.33mA / 0.86mA	At 230Vac, 50Hz, TN-,TT-mains / IT-mains
	Max. 0.18mA / 0.43mA	At 110Vac, 50Hz, TN-,TT-mains / IT-mains
	Max. 0.26mA / 0.61mA	At 132Vac, 60Hz, TN-,TT-mains / IT-mains
	Max. 0.44mA / 1.05mA	At 264Vac, 50Hz, TN-,TT-mains / IT-mains

19. DIELECTRIC STRENGTH

The output voltage is floating and has no ohmic connection to the ground. Type and factory tests are conducted by the manufacturer. Field tests may be conducted in the field using the appropriate test equipment which applies the voltage with a slow ramp (2s up and 2s down). Connect all input-terminals together as well as all output poles before conducting the test. When testing, set the cut-off current settings to the value in the table below.

Fig. 19-1 **Dielectric strength**



		A	B	C	D
Type test	60s	2500Vac	4000Vac	1000Vac	500Vac
Factory test	5s	2500Vac	2500Vac	500Vac	500Vac
Field test	5s	2000Vac	2000Vac	500Vac	500Vac
Cut-off current setting		> 10mA	> 10mA	> 20mA	> 1mA

To fulfil the PELV requirements according to EN60204-1 § 6.4.1, we recommend that either the + pole, the – pole or any other part of the output circuit shall be connected to the protective earth system. This helps to avoid situations in which a load starts unexpectedly or can not be switched off when unnoticed earth faults occur.

B*) When testing input to DC-OK ensure that the max. voltage between DC-OK and the output is not exceeded (column D). We recommend connecting DC-OK pins and the output pins together when performing the test.

20. APPROVALS

EC Declaration of Conformity	CE	The CE mark indicates conformance with the - EMC directive, - Low-voltage directive (LVD) and the - ATEX directive
IEC 60950-1 2nd Edition	IECEE CB SCHEME	CB Scheme, Information Technology Equipment
UL 508	c UL US LISTED IND. CONT. EQ.	Listed for use as Industrial Control Equipment; U.S.A. (UL 508) and Canada (C22.2 No. 107-1-01); E-File: E198865
UL 60950-1 2nd Edition	c UL US	Recognized for use as Information Technology Equipment, Level 5; U.S.A. (UL 60950-1) and Canada (C22.2 No. 60950-1); E-File: E137006 Applicable for altitudes up to 2000m.
ANSI / ISA 12.12.01-2015 Class I Div 2 (except CP10.241-S2)	C SP US	Recognized for use in Hazardous Location Class I Div 2 T4 Groups A,B,C,D systems; U.S.A. (ANSI / ISA 12.12.01-2015) and Canada (C22.2 No. 213-M1987)
EN 60079-0, EN 60079-15 ATEX (except CP10.241-S2)	Ex II 3G Ex nA nC IIC T4 Gc	Approval for use in hazardous locations Zone 2 Category 3G. Number of ATEX certificate: EPS 15 ATEX 1 101 X The power supply must be built-in in an IP54 enclosure.
IEC 60079-0, IEC 60079-15 (except CP10.241-S2)	IECEx	Suitable for use in Class 1 Zone 2 Groups IIa, IIb and IIc locations. Number of IECEx certificate: IECEx EPS 15.0079X
Marine (except CP10.241-S2, CP10.242)	GL	GL (Germanischer Lloyd) classified Environmental category: C, EMC2 Marine and offshore applications
EAC TR Registration	EAC	Registration for the Eurasian Customs Union market (Russia, Kazakhstan, Belarus)

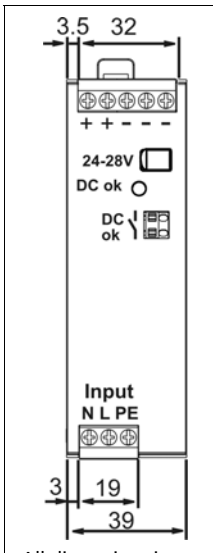
21. OTHER FULFILLED STANDARDS

RoHS Directive	RoHS ✓	Directive 2011/65/EU of the European Parliament and the Council of June 8th, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
REACH Directive	REACH ✓	Directive 1907/2006/EU of the European Parliament and the Council of June 1st, 2007 regarding the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
IEC/EN 61558-2-16 (Annex BB)	Safety Isolating Transformer	Safety Isolating Transformers corresponding to Part 2-6 of the IEC/EN 61558

22. PHYSICAL DIMENSIONS AND WEIGHT

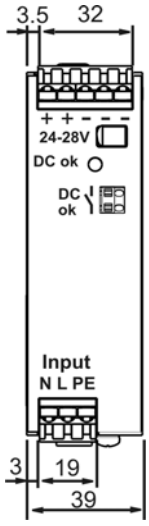
Width	39mm 1.54''
Height	124mm 4.88''
Depth	117mm 4.61'' The DIN-rail height must be added to the unit depth to calculate the total required installation depth.
Weight	600g / 1.3lb
DIN-Rail	Use 35mm DIN-rails according to EN 60715 or EN 50022 with a height of 7.5 or 15mm.
Housing material	Body: Aluminium alloy Cover: zinc-plated steel
Installation clearances	See chapter 2

Fig. 22-1
Front view CP10.241, CP10.241-C1, CP10.242



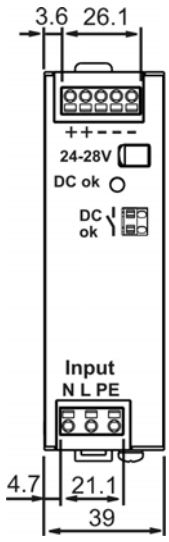
All dimensions in mm

Fig. 22-2
Front view CP10.241-S1



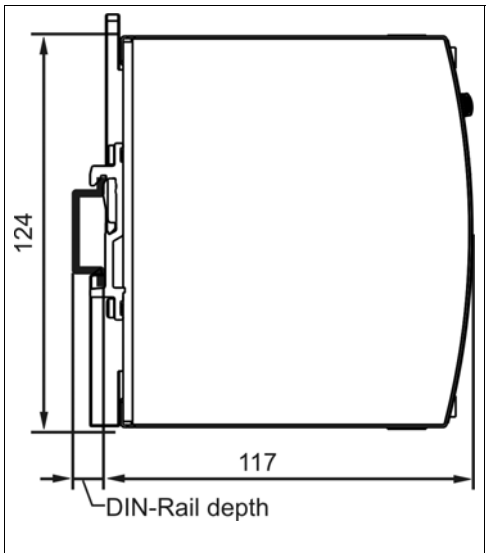
All dimensions in mm

Fig. 22-3
Front view CP10.241-S2



All dimensions in mm

Fig. 22-4
Side view



All dimensions in mm

23. ACCESSORIES

23.1. ZM4.WALL – WALL/PANEL MOUNT BRACKET

This bracket is used to mount the devices on a wall/panel without utilizing a DIN-Rail. It is suitable for the CP10.241, CP10.241-C1, CP10.241-S1 , CP10.241-S2 and CP10.242.

The bracket can be mounted without detaching the DIN-rail brackets.

Fig. 23-1 **Isometric view**
(Picture shows the CP10.241)

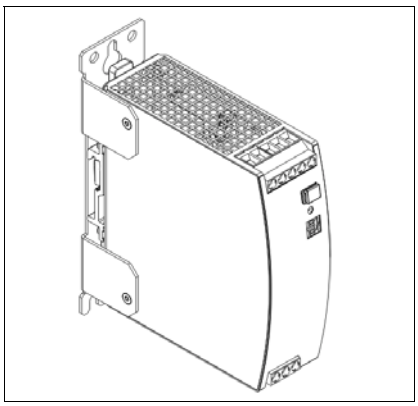


Fig. 23-2 **Isometric view-**
(Picture shows the CP10.241)

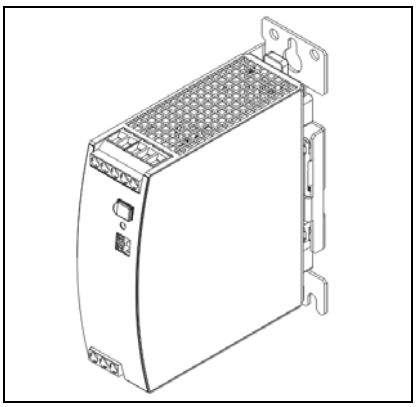


Fig. 23-3 **Isometric view**
(Picture shows the CP10.241)

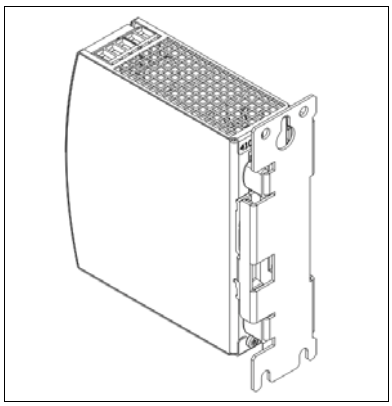


Fig. 23-4 **Wall/panel mounting, front view**
(Picture shows the CP10.241)

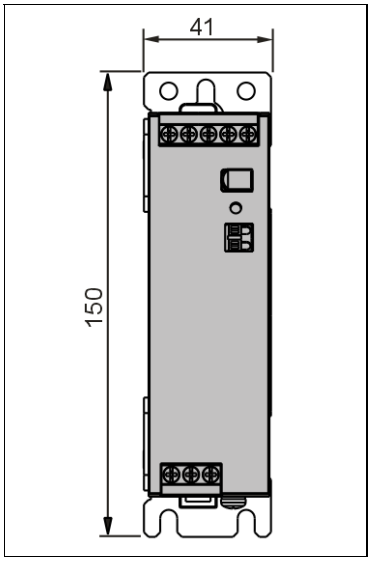


Fig. 23-5 **Hole pattern for wall mounting**

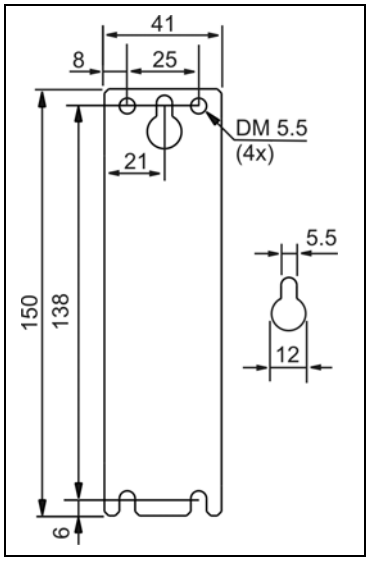
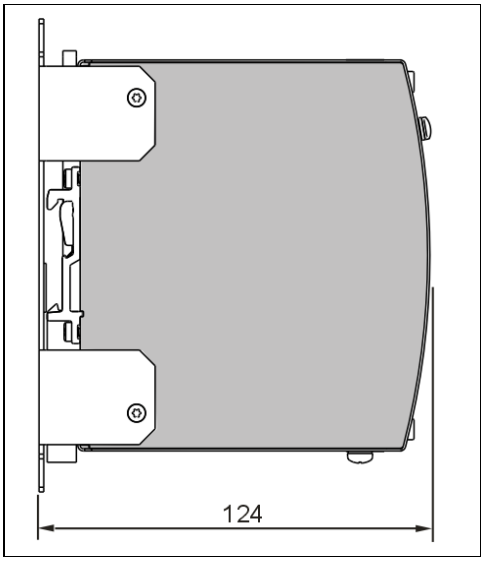


Fig. 23-6 **Wall/panel mounting, side view**
(Picture shows the CP10.241)



23.2. ZM12.SIDE - SIDE MOUNTING BRACKET

This bracket is used to mount the power supply sideways with or without utilizing a DIN-Rail.

The two aluminum brackets and the black plastic slider of the unit have to be detached, so that the steel brackets can be mounted.

For sideway DIN-rail mounting, the removed aluminum brackets and the black plastic slider need to be mounted on the steel bracket.

Fig. 23-7
Side mounting without DIN-rail brackets
(Picture shows the CP10.241)

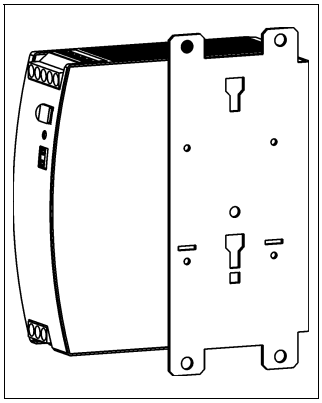


Fig. 23-8
Side mounting with DIN-rail brackets
(Picture shows the CP10.241)

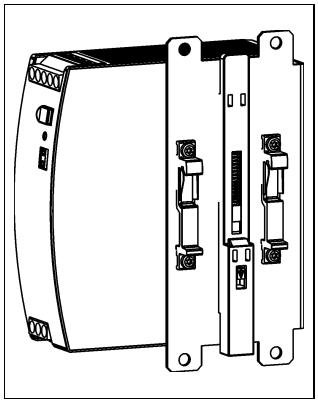
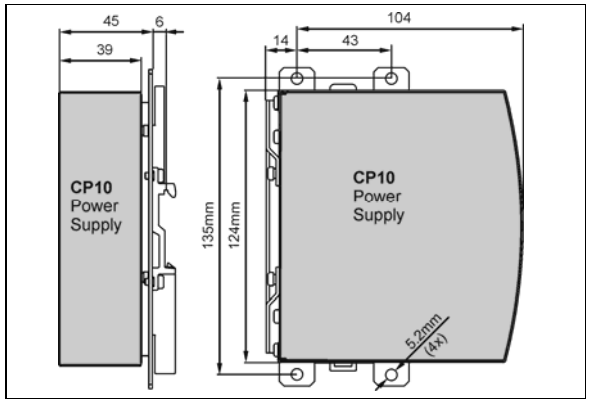


Fig. 23-9
Mounting Dimensions
Side mounting bracket



23.3. YR20.242 - REDUNDANCY MODULE

The redundancy module YR20.242 is equipped with two input channels, which are individually decoupled by utilizing MOSFET technology. Using MOSFETSs instead of diodes reduces the heat generation and the voltage drop between input and output. The YR20.242 does not require an additional auxiliary voltage and is self-powered even in case of a short circuit across the output.

Due to the low power losses, the unit is very slender and only requires 32mm width on the DIN-rail.

The YR20.242 can be used for N+1 and 1+1 redundancy systems.

Further information and wiring configurations can be found in chapter 24.7.

23.4. YR20.246 - REDUNDANCY MODULE WITH AUTOMATED LOAD SHARING

The redundancy module YR20.246 is equipped with two input channels, which are individually decoupled by utilizing MOSFET technology. Using MOSFETSs instead of diodes reduces the heat generation and the voltage drop between input and output. The YR20.246 does not require an additional auxiliary voltage and is self-powered even in case of a short circuit across the output.

Due to the low power losses, the unit is very slender and only requires 32mm width on the DIN-rail.

The YR20.246 is optimized for 1+1 redundancy systems.

Compared to the YR20.242, the YR20.246 is featured with an automated load sharing between the connected power supplies. The YR20.246 monitors the function of the redundancy circuitry and provides a signal in case of too high of output current, which could prevent redundancy, if one power supply fails.

Further information and wiring configurations can be found in chapter 24.7.

24. APPLICATION NOTES

24.1. PEAK CURRENT CAPABILITY

The unit can deliver peak currents (up to several milliseconds) which are higher than the specified short term currents.

This helps to start current demanding loads. Solenoids, contactors and pneumatic modules often have a steady state coil and a pick-up coil. The inrush current demand of the pick-up coil is several times higher than the steady-state current and usually exceeds the nominal output current (including the PowerBoost). The same situation applies when starting a capacitive load.

The peak current capability also ensures the safe operation of subsequent circuit breakers of load circuits. The load branches are often individually protected with circuit breakers or fuses. In case of a short or an overload in one branch circuit, the fuse or circuit breaker need a certain amount of over-current to open in a timely manner. This avoids voltage loss in adjacent circuits.

The extra current (peak current) is supplied by the power converter and the built-in large sized output capacitors of the power supply. The capacitors get discharged during such an event, which causes a voltage dip on the output. The following two examples show typical voltage dips for resistive loads:

Fig. 24-1 **20A peak current for 50ms , typ. (2x the nominal current)**

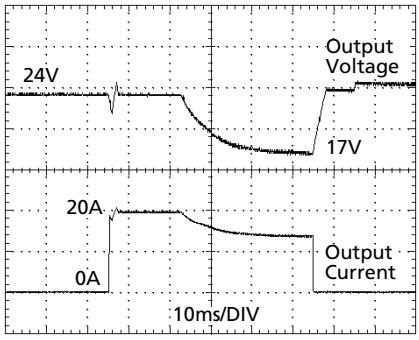


Fig. 24-2 **50A peak current for 5ms , typ. (5x the nominal current)**

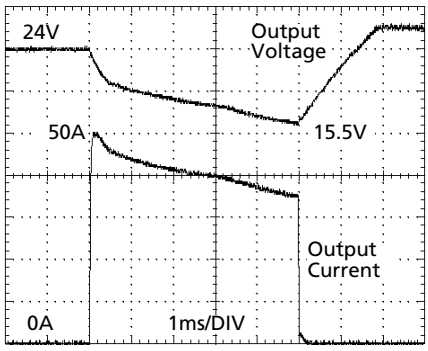
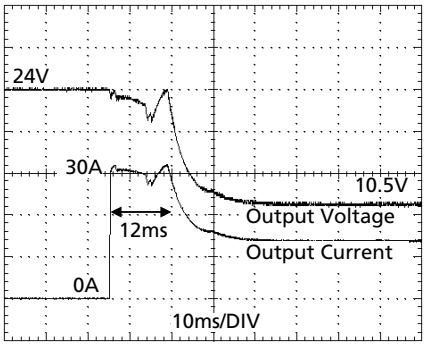


Fig. 24-3 **30A peak current for 12ms , typ. (3x the nominal current)**



Please note: The DC-OK relay triggers when the voltage dips more than 10% for longer than 1ms.

Peak current voltage dips	Typically from 24V to 17V	At 20A for 50ms, resistive load
	Typically from 24V to 19V	At 50A for 2ms, resistive load
	Typically from 24V to 15.5V	At 50A for 5ms, resistive load

24.2. BACK-FEEDING LOADS

Loads such as decelerating motors and inductors can feed voltage back to the power supply. This feature is also called return voltage immunity or resistance against Back- E.M.F. (Electro Magnetic Force).

This power supply is resistant and does not show malfunctioning when a load feeds back voltage to the power supply. It does not matter whether the power supply is on or off.

The maximum allowed feed-back-voltage is 35Vdc. The maximum allowed feed-back peak current is 40A. Higher currents can temporarily shut-down the output voltage. The absorbing energy can be calculated according to the built-in large sized output capacitor which is specified in chapter 6.

24.3. EXTERNAL INPUT PROTECTION

The unit is tested and approved for branch circuits up to 30A (UL) and 32A (IEC). An external protection is only required if the supplying branch has an ampacity greater than this. Check also local codes and local requirements. In some countries local regulations might apply.

If an external fuse is necessary or utilized, minimum requirements need to be considered to avoid nuisance tripping of the circuit breaker. A minimum value of 6A B- or C-Characteristic breaker should be used.

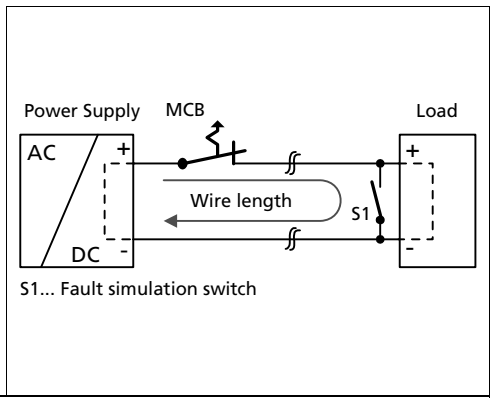
24.4. OUTPUT CIRCUIT BREAKERS

Standard miniature circuit breakers (MCB's or UL 1077 circuit breakers) are commonly used for AC-supply systems and may also be used on 24V branches.

MCB's are designed to protect wires and circuits. If the ampere value and the characteristics of the MCB are adapted to the wire size that is used, the wiring is considered as thermally safe regardless of whether the MCB opens or not.

To avoid voltage dips and under-voltage situations in adjacent 24V branches which are supplied by the same source, a fast (magnetic) tripping of the MCB is desired. A quick shutdown within 10ms is necessary corresponding roughly to the ride-through time of PLC's. This requires power supplies with high current reserves and large output capacitors. Furthermore, the impedance of the faulty branch must be sufficiently small in order for the current to actually flow. The best current reserve in the power supply does not help if Ohm's law does not permit current flow. The following table has typical test results showing which B- and C-Characteristic MCBs magnetically trip depending on the wire cross section and wire length.

Fig. 24-4 **Test circuit**



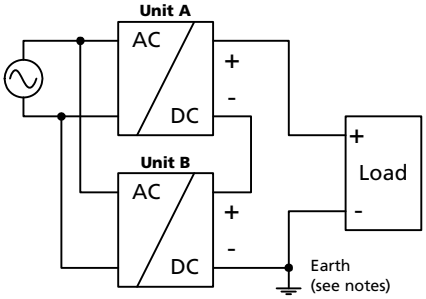
S1... Fault simulation switch

Maximal wire length*) for a fast (magnetic) tripping:

	0.75mm²	1.0mm²	1.5mm²	2.5mm²
C-2A	30 m	37 m	54 m	84 m
C-3A	25 m	30 m	46 m	69 m
C-4A	9 m	15 m	25 m	34 m
C-6A	3 m	3 m	4 m	7 m
C-8A				
B-6A	12 m	15 m	21 m	34 m
B-10A	3 m	3 m	4 m	9 m
B-13A	2 m	2 m	3 m	6 m

*) Don't forget to consider twice the distance to the load (or cable length) when calculating the total wire length (+ and – wire).

24.5. SERIES OPERATION



Power supplies of the same type can be connected in series for higher output voltages. It is possible to connect as many units in series as needed, providing the sum of the output voltage does not exceed 150Vdc. Voltages with a potential above 60Vdc are not SELV any more and can be dangerous. Such voltages must be installed with a protection against touching.

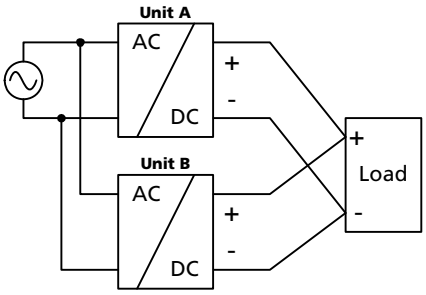
Earthing of the output is required when the sum of the output voltage is above 60Vdc.

Avoid return voltage (e.g. from a decelerating motor or battery) which is applied to the output terminals.

Restrictions:
Keep an installation clearance of 15mm (left / right) between two power supplies and avoid installing the power supplies on top of each other.
Do not use power supplies in series in mounting orientations other than the standard mounting orientation (terminals on bottom of the unit).

Pay attention that leakage current, EMI, inrush current, harmonics will increase when using multiple power supplies.

24.6. PARALLEL USE TO INCREASE OUTPUT POWER



CP10.241 power supplies can be paralleled to increase the output power. The output voltage of all power supplies shall be adjusted to the same value (±100mV) with the same load conditions on all units, or the units can be left with the factory settings. There is no feature included which balances the load current between the power supplies. Usually the power supply with the higher adjusted output voltage draws current until it goes into current limitation. This means no harm to this power supply as long as the ambient temperature stays below 40°C.

If more than three units are connected in parallel, a fuse or circuit breaker with a rating of 15A or 16A is required on each output. Alternatively, a diode or redundancy module can also be utilized.

Energize all units at the same time to avoid the overload Hiccup^{PLUS} mode. It also might be necessary to cycle the input power (turn-off for at least five seconds), if the output was in Hiccup^{PLUS} mode due to overload or short circuits and the required output current is higher than the current of one unit.

Restrictions:
Keep an installation clearance of 15mm (left / right) between two power supplies and avoid installing the power supplies on top of each other.
Do not use power supplies in parallel in mounting orientations other than the standard mounting orientation (terminals on bottom of the unit) or in any other condition where a derating of the output current is required (e.g. altitude, …).

Pay attention that leakage current, EMI, inrush current, harmonics will increase when using multiple power supplies.

24.7. PARALLEL USE FOR REDUNDANCY

1+1 Redundancy:
Power supplies can be paralleled for redundancy to gain higher system availability. Redundant systems require a certain amount of extra power to support the load in case one power supply unit fails. The simplest way is to put two power supplies in parallel. This is called a 1+1 redundancy. In case one power supply unit fails, the other one is automatically able to support the load current without any interruption. It is essential to use a redundancy module to decouple power supplies from each other. This prevents that the defective unit becomes a load for the other power supplies and the output voltage cannot be maintained any more.

Optionally to the use of external redundancy modules, power supplies with built-in redundancy CP10.241-R1 (spring-clamp terminals), the CP10.241-R2 (plug connectors for hot swap) or the CP10.241-R3 (screw terminals) can be used.

Recommendations for building redundant power systems:

- Use separate input fuses for each power supply.
- Monitor the individual power supply units. Therefore, use the DC-OK relay contact of the power supply.
- It is desirable to set the output voltages of all units to the same value (± 100mV) or leave it at the factory setting.

Pay attention that leakage current, EMI, inrush current, harmonics will increase when using multiple power supplies.

Wiring examples for 1+1 redundancy:

Fig. 24-5 **Wiring for 1+1 redundancy with the redundancy module YR20.242**

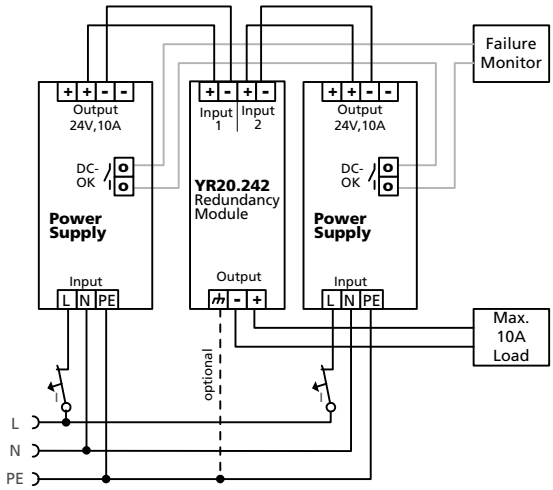
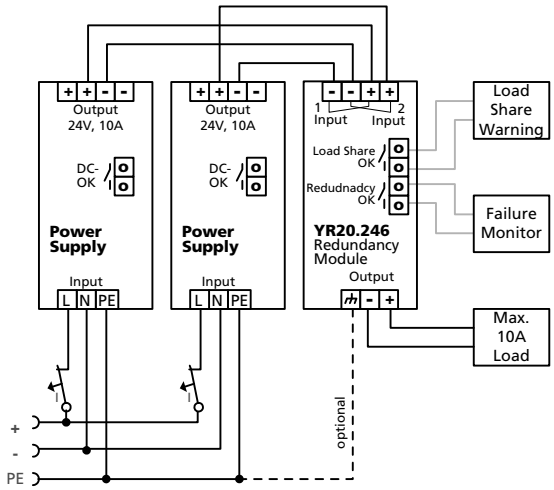


Fig. 24-6 **Wiring for 1+1 redundancy with the redundancy module YR20.246**



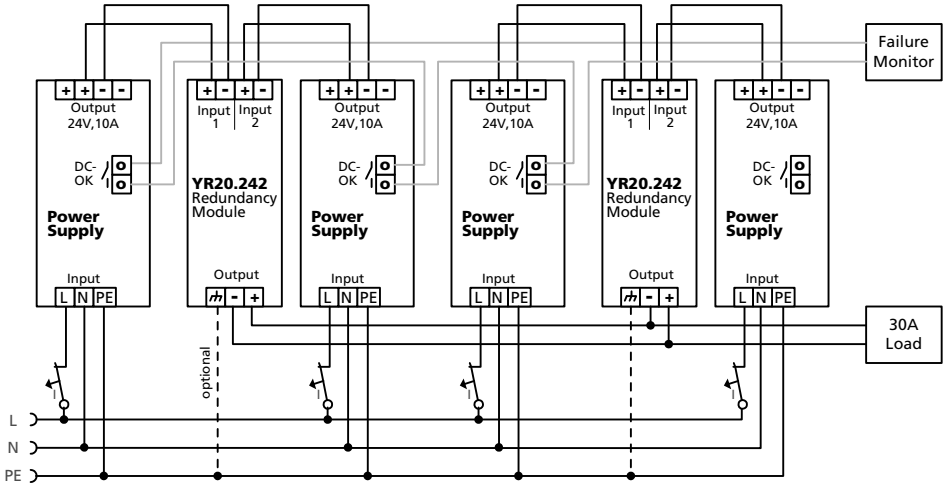
N+1 Redundancy:
Redundant systems for a higher power demand are usually built in a N+1 method. E.g. four power supplies, each rated for 10A are paralleled to build a 30A redundant system.

Pay attention that leakage current, EMI, inrush current, harmonics will increase when using multiple power supplies.

Keep an installation clearance of 15mm (left / right) between two power supplies and avoid installing the power supplies on top of each other.
Do not use power supplies in parallel in mounting orientations other than the standard mounting orientation or in any other condition, where a derating of the output current is required.

Wiring examples for 1+1 redundancy:

Fig. 24-7 **Wiring for N+1 redundancy with four power supplies and two redundancy modules YR20.242**



24.8. INDUCTIVE AND CAPACITIVE LOADS

The unit is designed to supply any kind of loads, including capacitive and inductive loads. If extreme large capacitors, such as EDLCs (electric double layer capacitors or "UltraCaps") with a capacitance larger than 1.5F are connected to the output, the unit might charge the capacitor in the Hiccup^{PLUS} mode (see chapter 6).

24.9. CHARGING OF BATTERIES

The power supply can be used to charge lead-acid or maintenance free batteries (SLA or VRLA batteries). Two 12V batteries are needed in series.

Instructions for charging batteries:

a) Set output voltage (measured at no load and at the battery end of the cable) very precisely to the end-of-charge voltage.

End-of-charge voltage	27.8V	27.5V	27.15V	26.8V
Battery temperature	10°C	20°C	30°C	40°C

b) Use a 15A or 16A circuit breaker (or blocking diode) between the power supply and the battery.

c) Ensure that the output current of the power supply is below the allowed charging current of the battery.

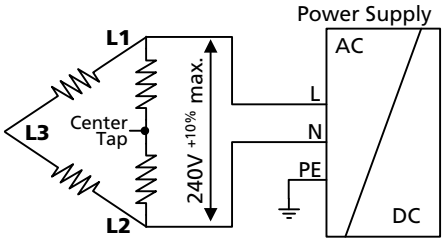
d) Use only matched batteries when putting 12V types in series.

e) Ensure that the ambient temperature of the power supply stays below 40°C.

f) The return current to the power supply (battery discharge current is typ. 3.5mA when the power supply is switched off (except in case a blocking diode is utilized).

24.10. OPERATION ON TWO PHASES

The power supply can also be used on two-phases of a three-phase-system. Such a phase-to-phase connection is allowed as long as the supplying voltage is below 240V$^{+10\%}$.



24.11. USE IN A TIGHTLY SEALED ENCLOSURE

When the power supply is installed in a tightly sealed enclosure, the temperature inside the enclosure will be higher than outside. In such situations, the inside temperature defines the ambient temperature for the power supply.

The following measurement results can be used as a reference to estimate the temperature rise inside the enclosure.

The power supply is placed in the middle of the box, no other heat producing items are inside the box

The temperature sensor inside the box is placed in the middle of the right side of the power supply with a distance of 1cm.

	Case A	**Case B**	**Case C**	**Case D**
Enclosure size	**110**x180x165mm Rittal Typ IP66 Box PK 9516 100, plastic	**110**x180x165mm Rittal Typ IP66 Box PK 9516 100, plastic	**180**x180x165mm Rittal Typ IP66 Box PK 9519 100, plastic	**180**x180x165mm Rittal Typ IP66 Box PK 9519 100, plastic
Input voltage	230Vac	230Vac	230Vac	230Vac
Load	24V, 8A; (=**80%**)	24V, 10A; (=**100%**)	24V, 8A; (=**80%**)	24V, 10A; (=**100%**)
Temperature inside the box	48.6°C	53.8°C	42.0°C	48.1°C
Temperature outside the box	26.3°C	26.6°C	25.8°C	26.2°C
Temperature rise	22.3K	27.3K	16.2K	21.9K

24.12. MOUNTING ORIENTATIONS

Mounting orientations other than all terminals on the bottom require a reduction in continuous output power or a limitation in the maximum allowed ambient temperature. The amount of reduction influences the lifetime expectancy of the power supply. Therefore, two different derating curves for continuous operation can be found below:

Curve A1 Recommended output current.
Curve A2 Max allowed output current (results in approximately half the lifetime expectancy of A1).

Fig. 24-8
Mounting Orientation A
(Standard orientation)

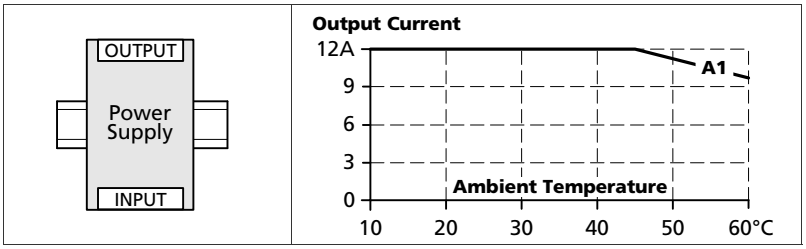


Fig. 24-9
Mounting Orientation B
(Upside down)

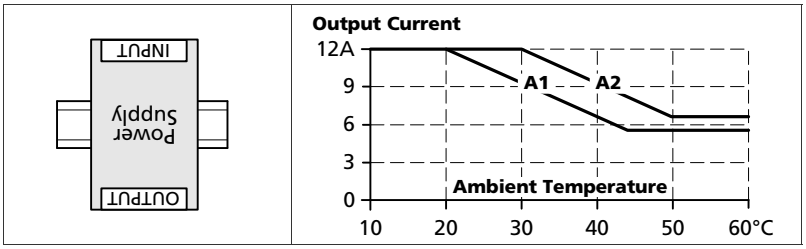


Fig. 24-10
Mounting Orientation C
(Table-top mounting)

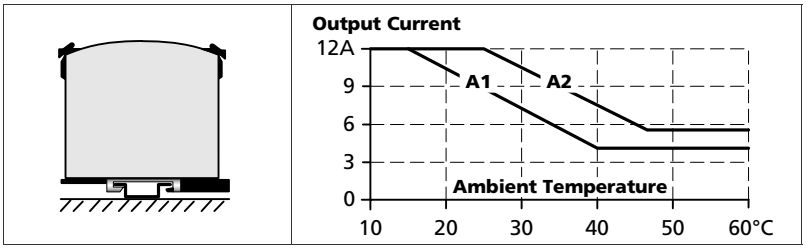


Fig. 24-11
Mounting Orientation D
(Horizontal cw)

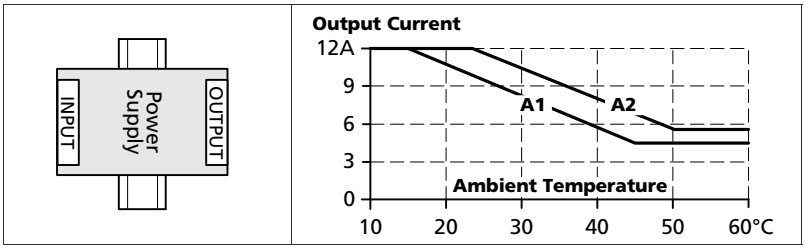
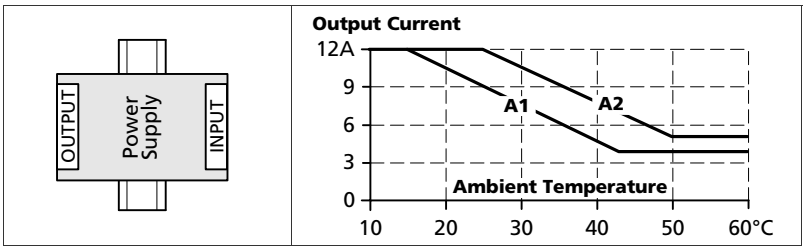


Fig. 24-12
Mounting Orientation E
(Horizontal ccw)



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.

Produkt / *products*: Kühlereinheit / Cooling unit
Typ / *type*: CU-EMA+

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

EN 61010-1:2010/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

Product: Cooling unit
Type: CU-EMA+

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

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

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
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Internet: www.buehler-technologies.com

Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies GmbH. Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

Umgang mit elektrostatisch sensiblen Baugruppen

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

Einbau von Ersatzteilen

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

Einsenden von Elektroaltgeräten zur Entsorgung

Wollen Sie ein von Bühler Technologies GmbH stammendes Elektroprodukt zur fachgerechten Entsorgung einsenden, dann tragen Sie bitte in das Feld der RMA-Nr. „WEEE“ ein. Legen Sie dem Altgerät die vollständig ausgefüllte Dekontaminierungserklärung für den Transport von außen sichtbar bei. Weitere Informationen zur Entsorgung von Elektroaltgeräten finden Sie auf der Webseite unseres Unternehmens.

Avoiding alterations and damage to the components to be returned

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies GmbH. To ensure conclusive analysis the goods must be inspected unaltered, if possible. Modifications or other damages which may hide the cause or render it impossible to analyse are prohibited.

Handling electrostatically conductive components

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

Fitting of spare parts

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

Returning old electrical appliances for disposal

If you wish to return an electrical product from Bühler Technologies GmbH for proper disposal, please enter "WEEE" in the RMA number box. Please attach the fully completed decontamination declaration form for transport to the old appliance so that it is visible from the outside. You can find more information on the disposal of old electrical appliances on our company’s website.

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