SPIROTECH

Maximising Performance for You

# INSTRUCTION MANUAL

## TOPCONTROL MODULAR (ETCM)


SPIROEXPAND®

# TABLE OF CONTENTS

# 1. SAFETY

## 1.1. Warnings and notices of warnings

This safety information warns the user of risks and shows how the risks can be avoided.

In this documentation, warnings are used with the following hazard levels to draw attention to immediate hazards and important safety instructions:

| SYMBOLS | | |
|---|---|---|
|  | **DANGER** | This symbol warns of an imminent and extremely dangerous situation in which failure to observe the hazard warning will result in death or serious irreversible injury. |
|  | **WARNING** | This symbol warns of an extremely dangerous situation in which failure to observe the hazard warning may result in death or serious irreversible injury. |
|  | **CAUTION** | This symbol warns of a dangerous situation in which failure to observe the hazard warning may result in minor, reversible injuries. |
|  | **NOTE** | This symbol warns of situations in which failure to observe the instructions can lead to material damage. |
|  | **INFORMATION** | This symbol provides the user with useful information on the system design. |

# 2. HAZARD WARNINGS

Due to the design of the pressurisation unit, hardly any hazards are to be expected.

However, it should always be noted that hot system media (e.g. heating water) or even harmful media can leak out when handling these devices!

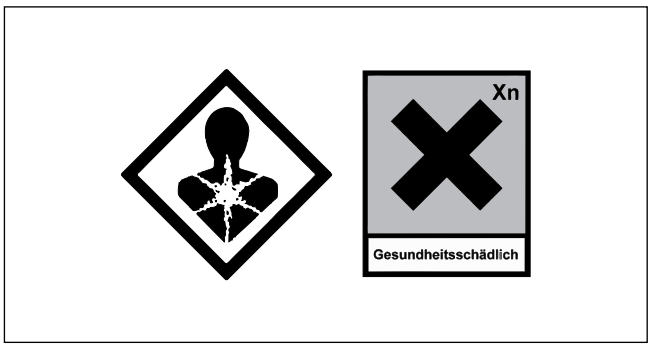



*Figure 1: Hazard warning 1*

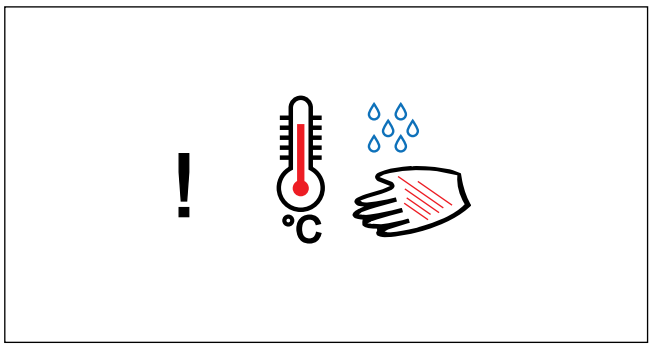



*Figure 2: Hazard warning 2*

Since different devices each may have a special medium contained within, Eder Spirotech cannot predict which medium the respective system will use. This also applies to harmful mixtures of media that may be used in the system.

It is the responsibility of the person setting up the system and, after proper handover, the responsibility of the operator of the system to take appropriate safety precautions if necessary and to affix warning notices to the device!

If it is the case that the system medium is a hazardous, harmful substance, the following hazardous situations may arise:

- There is a tank overflow on the expansion tanks where system media can leak out if the tank is overfilled. **In this case there is a risk of scalding!**

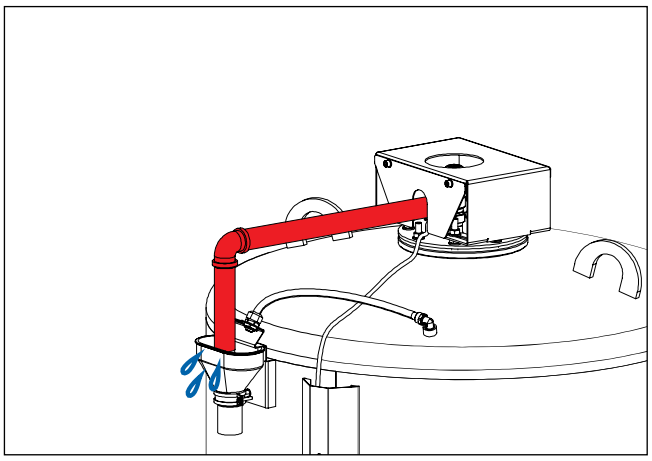


*Figure 3: Vessel overflow*

A filling and emptying tap is located on the lower flange of the container. This is also used for maintenance purposes, whereby harmful and hot system media can escape when the tap is opened. **In this case there is a risk of scalding!**

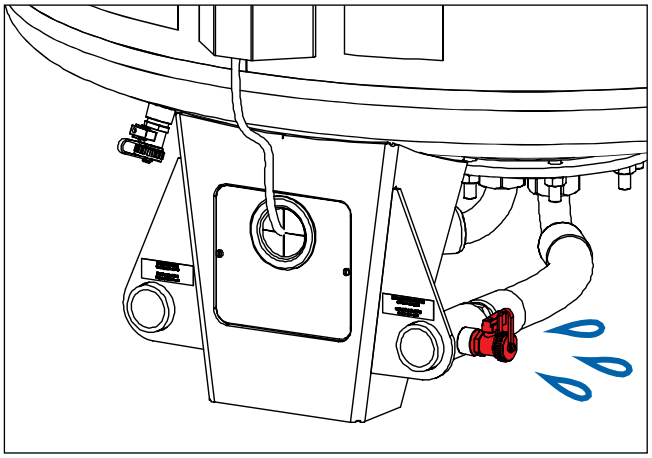


*Figure 4: Filling and emptying tap of the vessel*

There is a 0.5 bar safety valve on the top flange of the tank, which can be triggered by the following causes and thus allow hot and harmful system media to escape:

- The expansion valve and the expansion tank have been sized incorrectly (too small) and the entire expansion volume cannot be accommodated in the tank.
- The content measurement may not work correctly due to defective pressure transmitters or a defective membrane, which can cause the container to overflow.
- The tank was filled to too high a level when cold (possibly by the "Fill once" action or uncontrolled if the MCF backfeed module is not installed), whereby the expansion volume that occurs was not taken into account and can therefore no longer be fully absorbed in the tank. **In this case there is a risk of scalding!**
- There is an emptying tap at the bottom of the container, which is not expected to pose any danger during normal operation. If the membrane installed in the tank is defective for any reason, hot and harmful system media can leak out through this tap. **In this case there is a risk of scalding!**

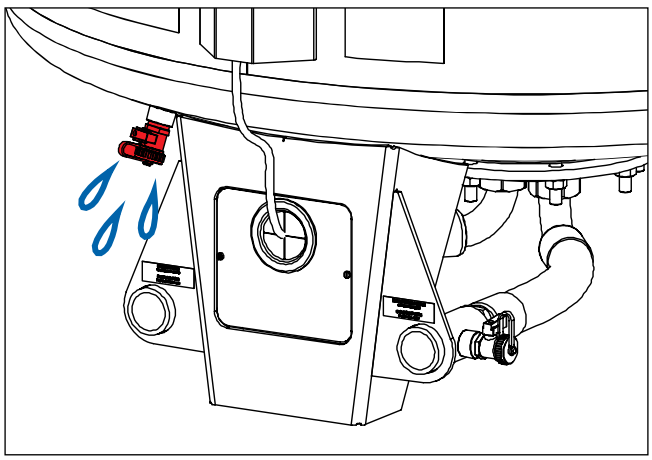


*Figure 5: Emptying tap of the vessel*

**WARNING**
Work on the device may only be carried out by trained specialist personnel.
The device must be de-energised before carrying out any electrical work!

**NOTE**
Illustrations in this document may differ from the model supplied depending on the type and equipment.

**NOTE**
EDER devices are subjected to a functional test at the factory before delivery and the device is filled with a frost-protected ready-mixed test water.

Although the device is emptied as far as possible after the function test, small quantities of testing water (max. approx. 1.5 litres) may remain in the device, depending on the device type and design.

This test water is frost-protected down to -20°C and is produced on the basis of propylene glycol together with protective substances. Experience has shown that such small quantities of test water in the system do not cause any problems at the final destination when mixed with the system water there.

However, if there are concerns about the introduction of such a small amount of test water into the system at the destination, the pressurisation unit must also be flushed before connecting it to the system in the same way as is specified for the system itself (e.g. in ÖNORM H5195-1)

# 3. GENERAL

## 3.1. Tender text

SpiroExpand TopControl Modular ETCM for loss-free absorption of the expansion volume and for pressure stabilisation in closed heating, air-conditioning and cooling systems. Manufactured in accordance with the EN 12828 construction guidelines.

Attractive, self-contained unit in self-supporting, sound-insulating design for modular combination with unpressurised expansion tanks (max. 0.5 bar), connections for extraction and overflow line at the rear.

Control unit as compact hydraulics with one or two low-noise, electronically speed-controlled pressure maintenance pump(s) (Solo model 1x100%, Duo model 2x50%, Maxi model 2x100%) with high-efficiency motor with integrated frequency converter in the form of a vertical, normal-priming high-pressure centrifugal pump in inline design with highly wear-resistant cartridge mechanical seal made of the highest quality material pairing (can nevertheless be replaced from the outside for easy servicing if required), one (Solo, Duo, Maxi model) or two (Duo twin, Maxi twin model) electronically controlled electric overflow valve(s) (1x100% or 2x100% of the expansion volume flow) in the form of a continuous from closed to maximum two (model Duo twin, model Maxi twin) electronically controlled electric overflow valve(s) (1x100% or 2x100% of the expansion volume flow) in the form of a control valve that opens continuously from closed to maximum stroke (0 ... 100% opening) including attached electric actuator with safety reset (currentless mechanical self-closing via spring tension). Control of pressure maintenance pump(s) and overflow valve(s) with continuous and pressure-proportional control.

Precision system pressure measurement. Hydraulic connection (expansion line) for on-site integration ex works on the left and with necessary shutoff (can be easily converted to the right). Temperature monitoring of the incoming system medium.

Prepared connection point for easy assembly of the backfeed module for quantity-controlled, litre-precise backfeed, also available for retrofitting at any time. Water treatment can be combined with the backfeed module (softening, demineralisation) for standard-compliant backfeed water.

Furthermore, prepared connection point for easy installation of a degassing module for automatic, economical low-pressure degassing function based on the principle of depressurisation, also available for retrofitting at any time. Connection for degassing line then at the rear including necessary shutoff.

Electronic control unit in microprocessor design for controlling all processes, ergonomically arranged control panel with sophisticated operating concept in many national languages. Self-contained compact measuring and switching unit in closed switch cabinet design including connection cables and load circuit for pump switching with motor protection switch and main switch in separate switch box.

The basic version already includes four potential-free signalling contacts (error, warning, backfeed running, device function enabled), as well as inputs for "ext. Enable contact device function", "external message" and external setpoint 4-20mA: "upper working pressure". In addition, two analogue standard signals (4-20mA) for remote monitoring or connection to a higher-level control system with the following assignment programmed as standard:

- analogue remote signalling 1: "current vessel level (0-100%)"
- analogue remote signalling 2: "current system pressure (0-40 bar)".

Prepared installation space for additional expansion module (also for retrofitting). Remote monitoring of the device is also possible using various multicontrol bus modules or multicontrol web module (also prepared for retrofitting). Additional external temperature monitoring provided by optional temperature sensor at the point of integration into the system.

- max. safety temperature of the system: 110 degrees C (with cooling vessel)
- max. temperature at the connection point: 70 degrees C

# 4. ASSEMBLY

## 4.1. Setting up the device

The device must be set up on a level, solid floor. Any unevenness must be levelled out. Setting the device up outdoors is not permitted. For devices with adjustable feet, it is also important to ensure that they are set up vertically.

**Storage:**
Ambient temperature min./max: -18 °C/40 °C
Storage must be protected from precipitation and direct sunlight.

**Operation:**
The device may only be installed in enclosed indoor areas.

The ambient temperature in the installation room must be between +5°C and +40°C from the time the device is first filled with the system medium until it is taken out of service.

Sufficiently bright electrical lighting must be provided for the display and safety equipment, the operating devices and the access routes. Objects that are not intended for the operation or maintenance of the pressurisation system must not be stored in the immediate vicinity of the system (observe construction and safety regulations).

Our pressurisation units are suitable for systems in which the maximum temperature at the connection point does not exceed 70 °C (with multicontrol cool min./max. temperature at the connection point: -10°C/70°C. If temperatures of more than 70 °C or less than -10 °C may occur at the point of integration into the system, a cooling vessel must be used. The connection to the system return must be made at a point where there are no external hydraulic pressures that could influence the proper functioning of the pressure maintenance.

The expansion line is sized in accordance with ÖNORM H5151-1. See Appendix A.

**INFORMATION**
We recommend connecting the pressurisation unit with a minimum dimension of DN25.

**CAUTION**
Danger of damage due to stray welding currents during installation with electric welding processes! If the welding current return cable is connected incorrectly to the part of the system to be welded, welding current may flow via the protective earth conductor. This can destroy protective conductors, damage devices and electrical equipment, overheat components and cause fires!

**NOTE**
Details on the hydraulic connection of multicontrol modular with EG(Z)-M expansion tanks can be found in the appendix.

## 4.2. Degassing module multicontrol EMAE, backfeed module multicontrol EMCF

Devices in the topcontrol modular series are supplied ex works without EMAE degassing module or EMCF backfeed module. Retrofitting is possible at any time. These modules are installed in accordance with the instructions supplied with the respective module.

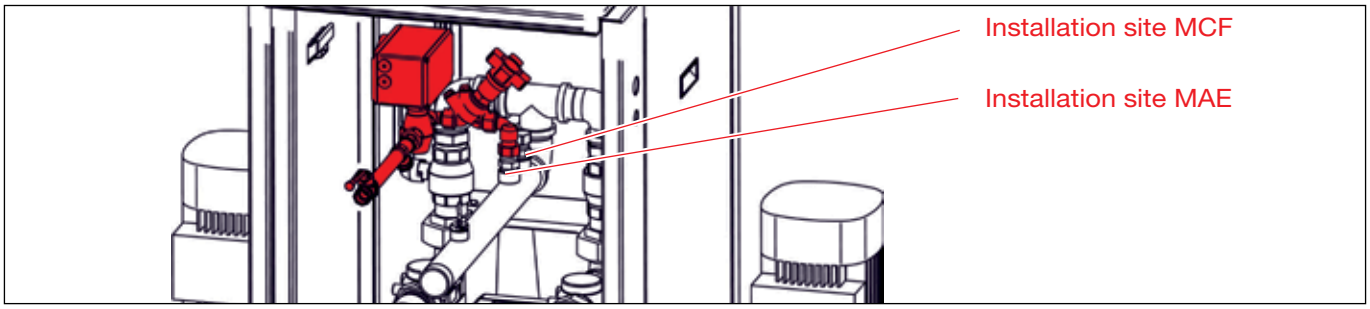



*Figure 6: MAE Degassing module*

## 4.3. Connection to the water supply system

Devices with a built-in backfeed module (MCF, MCC-N1, PCF) are equipped with a connection for fresh water supply.

If the fresh water connection is connected to the public water supply system, non-drinking water (heating water) must be prevented from being siphoned back into the water supply system.

Appropriate devices that reliably prevent back siphoning are not built into the multicontrol device and must be provided externally (on site) (e.g. system separator).

Connection conditions fresh water connection:

- highest inlet water pressure: 1.0 MPa = 10 bar
- lowest inlet water pressure: 0.2 Mpa = 2 bar

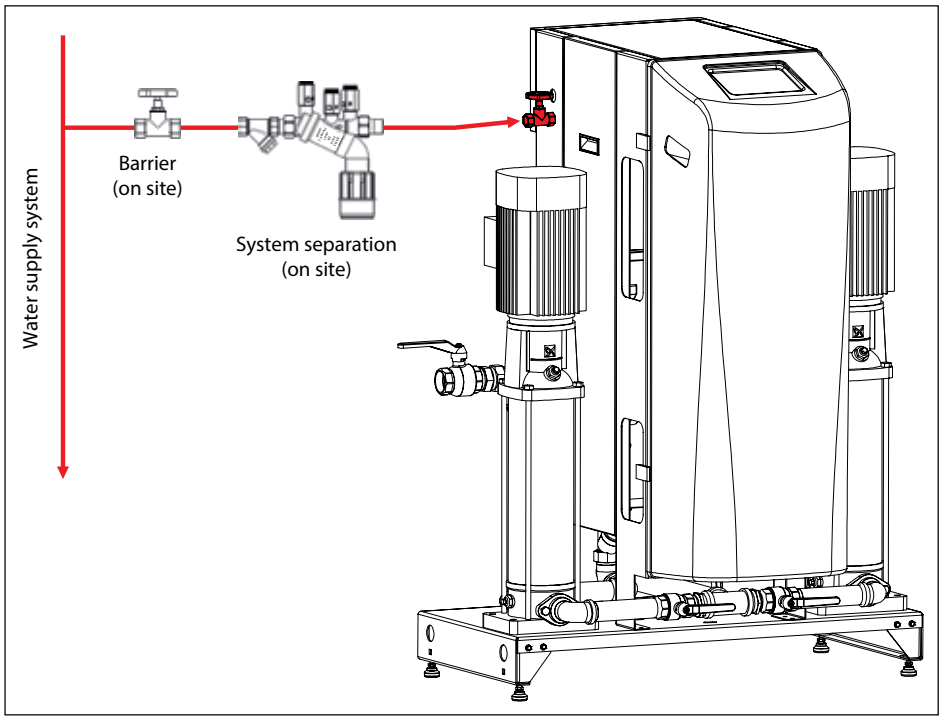



*Figure 7: Connection for fresh water supply*

**WARNING**
Devices intended for connection to the water supply system must be fitted on site with devices that reliably prevent non-drinking water from being siphoned back into the water supply system.

## 4.4. Electrical connection

ETCMs are multiphase devices that are equipped with a flexible mains connection cable and are intended for permanent connection to a permanently installed mains connection. The mains connection cable must be attached to the device according to connection type Y.

The device must be secured on site and connected to an external all-pole mains switch.

Ensure that the electrical data specified on the rating plate matches the existing power supply.

The device must be connected to the equipotential bonding before commissioning. A corresponding connection point is provided on the device and labelled accordingly.

The pump manufacturer specifies the installation of a type B "universal current sensitive" residual current circuit breaker (RCD or RCCB) as an additional protective device in the power supply (the integrated frequency converters in the pump can generate a direct current in the protective conductor).

The residual current circuit breaker used must be marked with the following symbol:

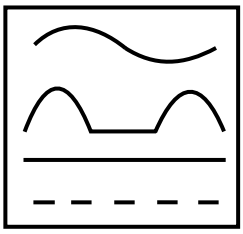


*Figure 8: Symbol*

When selecting the residual current circuit breaker, the total residual current of all pumps with frequency converters installed in the device must be taken into account.

ETCM: Three-phase power supply incl. N and PE per pump with three-phase motor applies:
Residual current (AC) < 5 mA

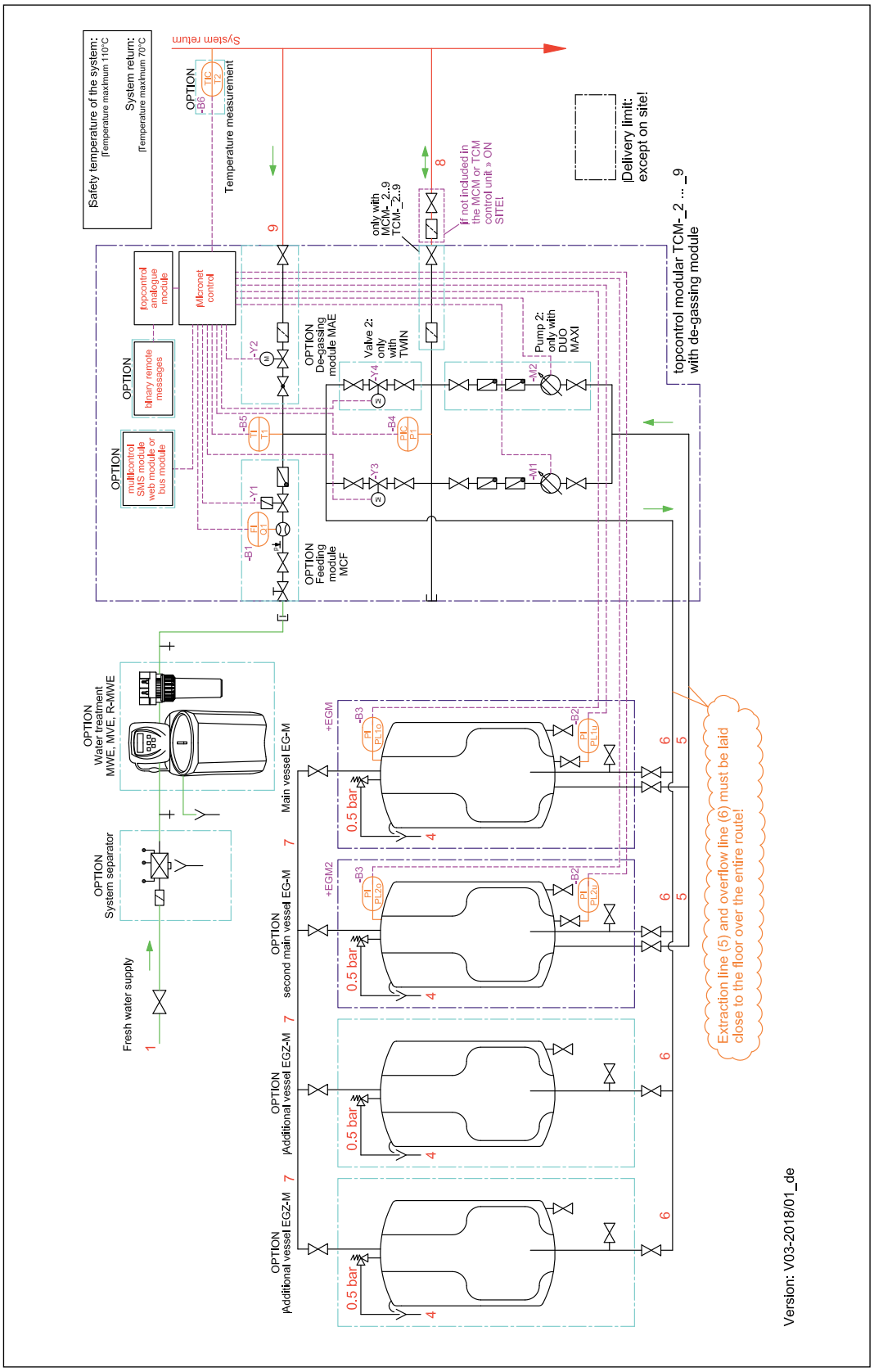
The residual currents were measured without a load on the shaft and in accordance with EN 61800-5-1:2007.

**CAUTION**
If the mains connection cable of this device is damaged, it must be replaced by the manufacturer or its customer service or a similarly qualified person in order to avoid hazards.

**WARNING**
The applicable electrical regulations must be observed and complied with!

**INFORMATION**
The electrical connection values can be found on the type plate of the device.

# 5. HYDRAULIC CONNECTION DIAGRAM




1. Fresh water supply
4. Vessel safety valve drain pipe
5. Suction line from the expansion tank
6. Overflow line to the expansion tank
7. DN20 gas-side vessel connection
8. Expansion line from/to the system return
9. Degassing line from the system return

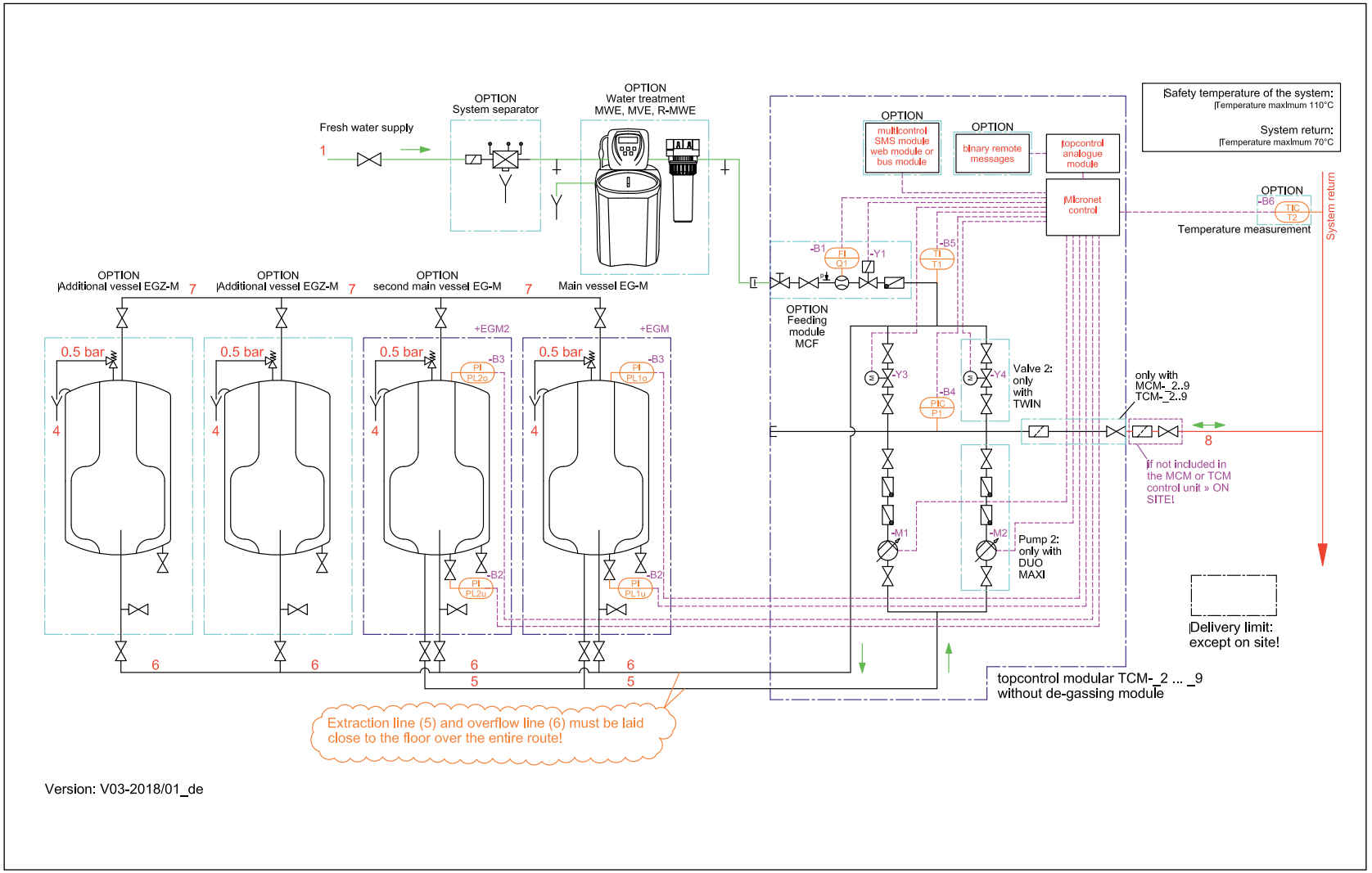
**Options:**

EGZ-M additional vessels, expansion modules, MAE degassing module, MCF backfeed module, R-MWE water softener, system separator, sensor T2

**Options:**

EGZ-M additional vessels, expansion modules, MCF backfeed module, R-MWE

Water softening, system separator, sensor T2




1. Fresh water supply
4. Vessel safety valve drain pipe
5. Suction line from the expansion tank
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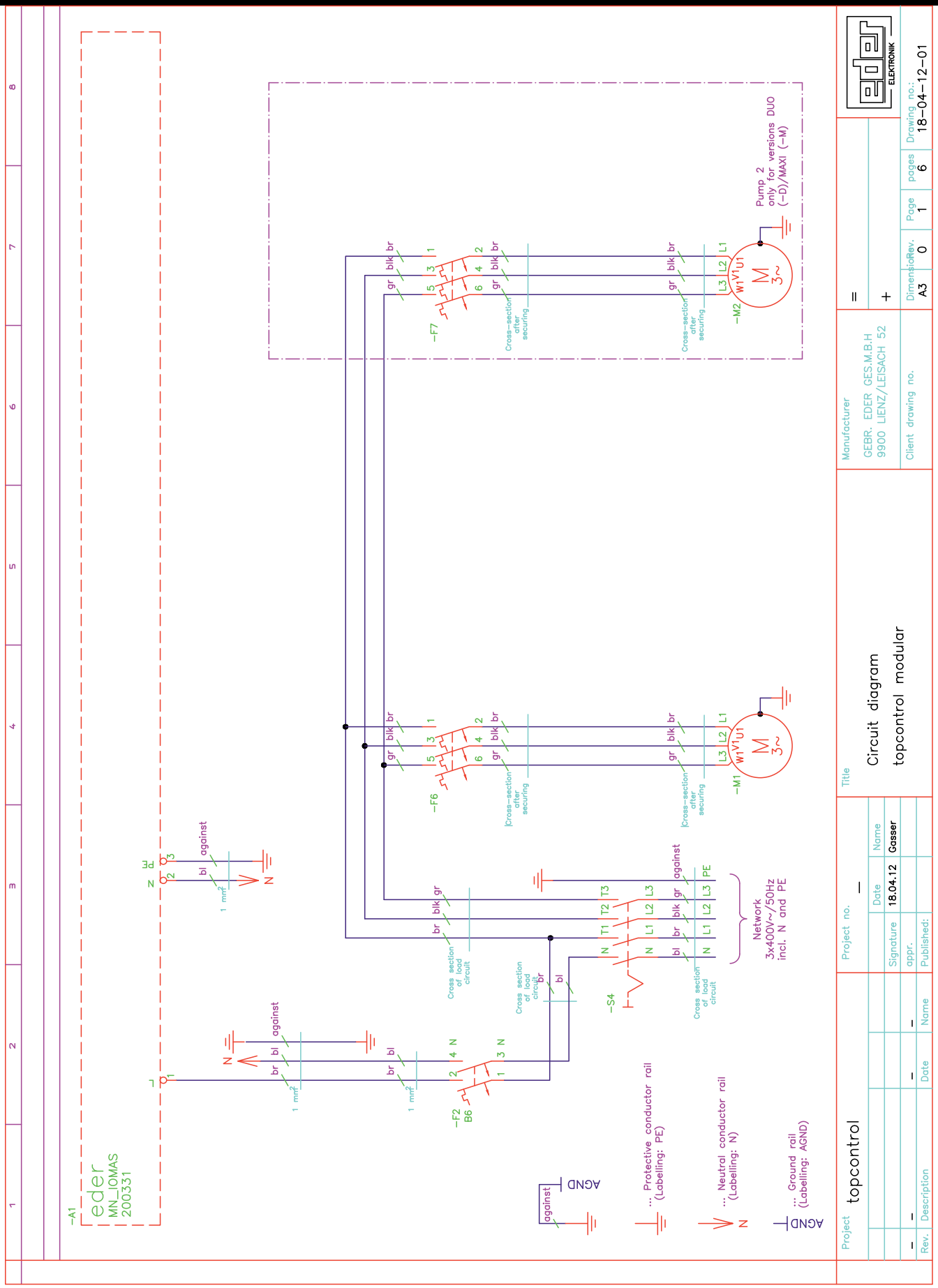
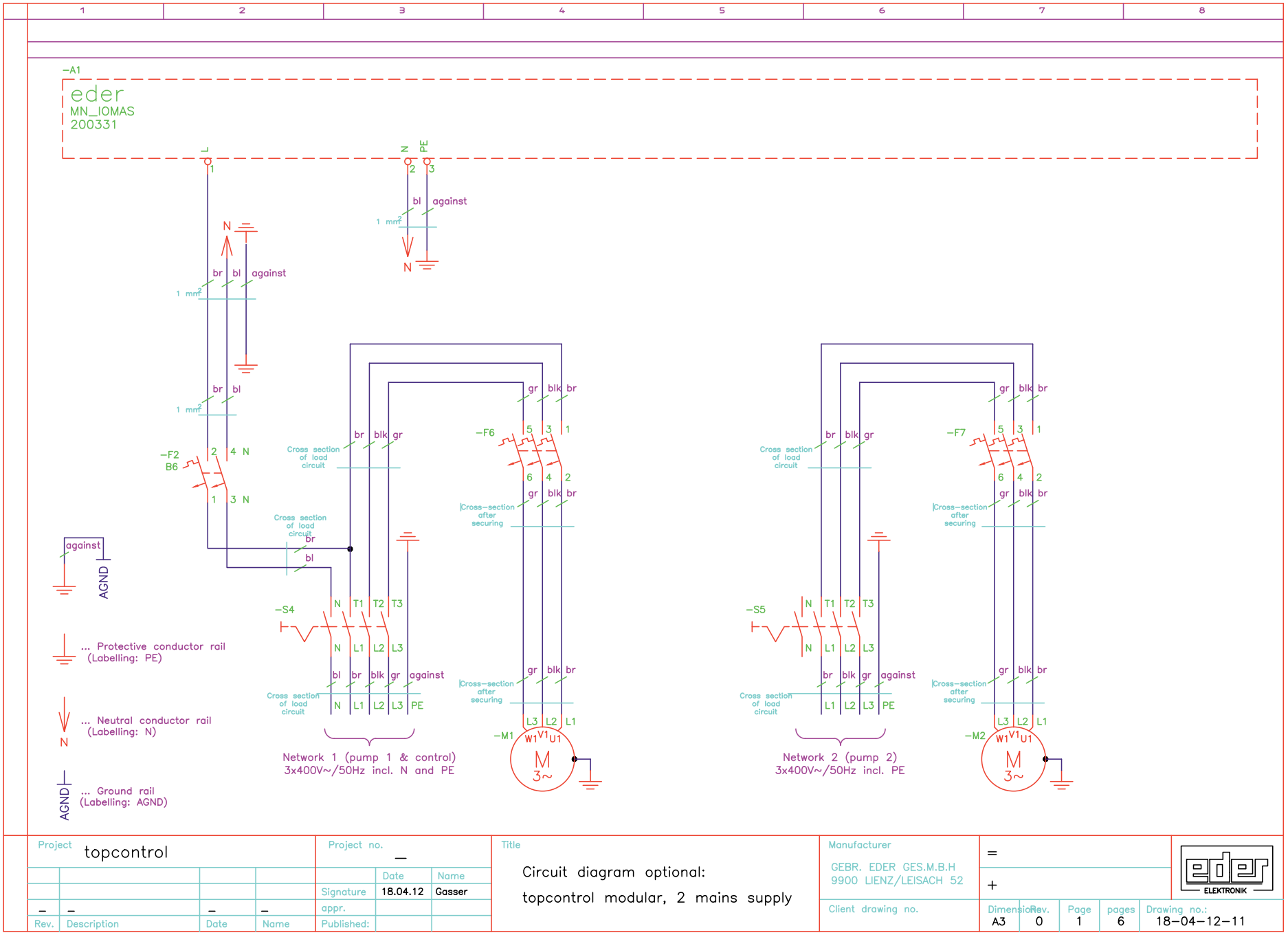
7. DN20 gas-side vessel connection
8. Expansion line from/to the system return

# 6. CIRCUIT DIAGRAMS



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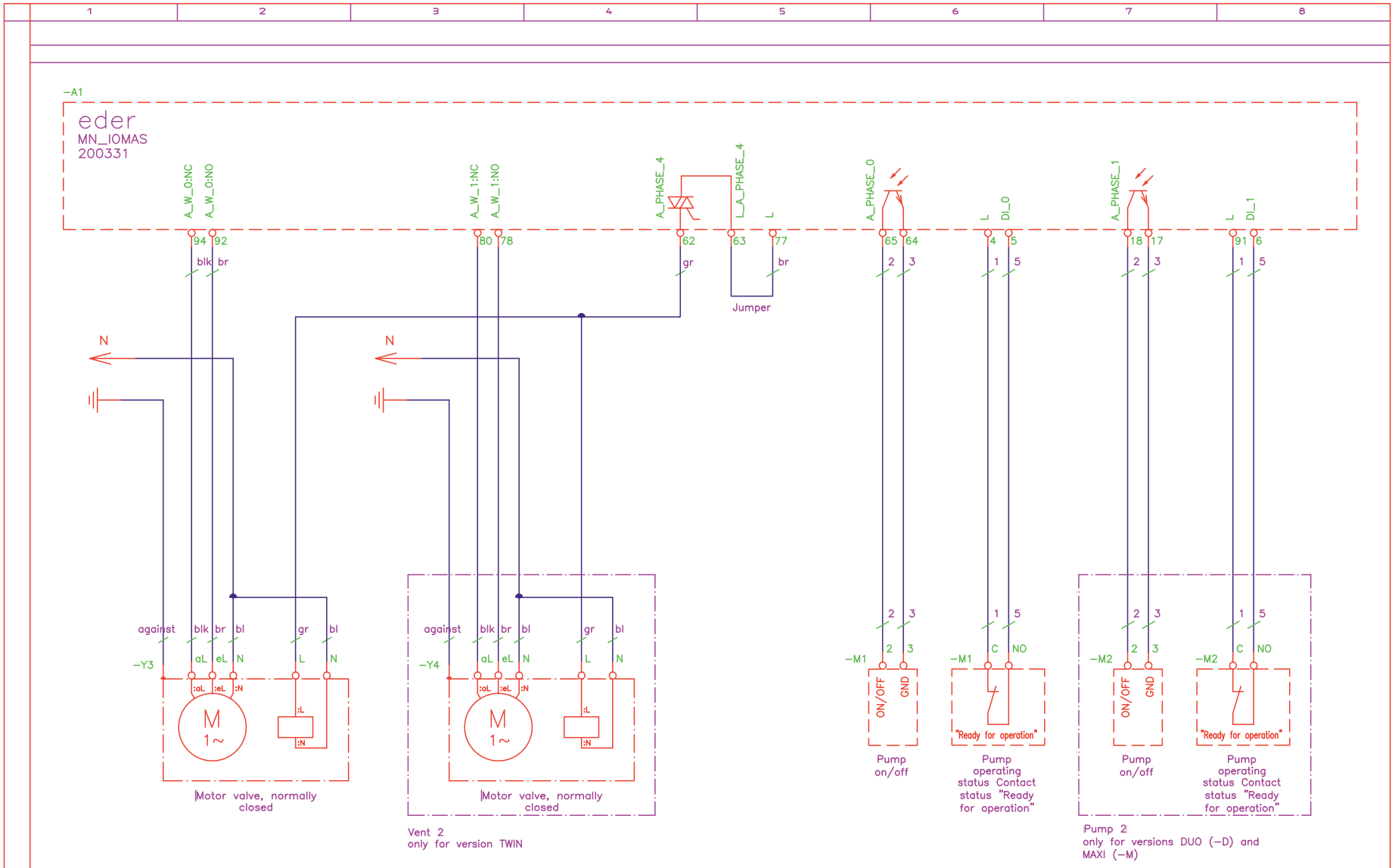


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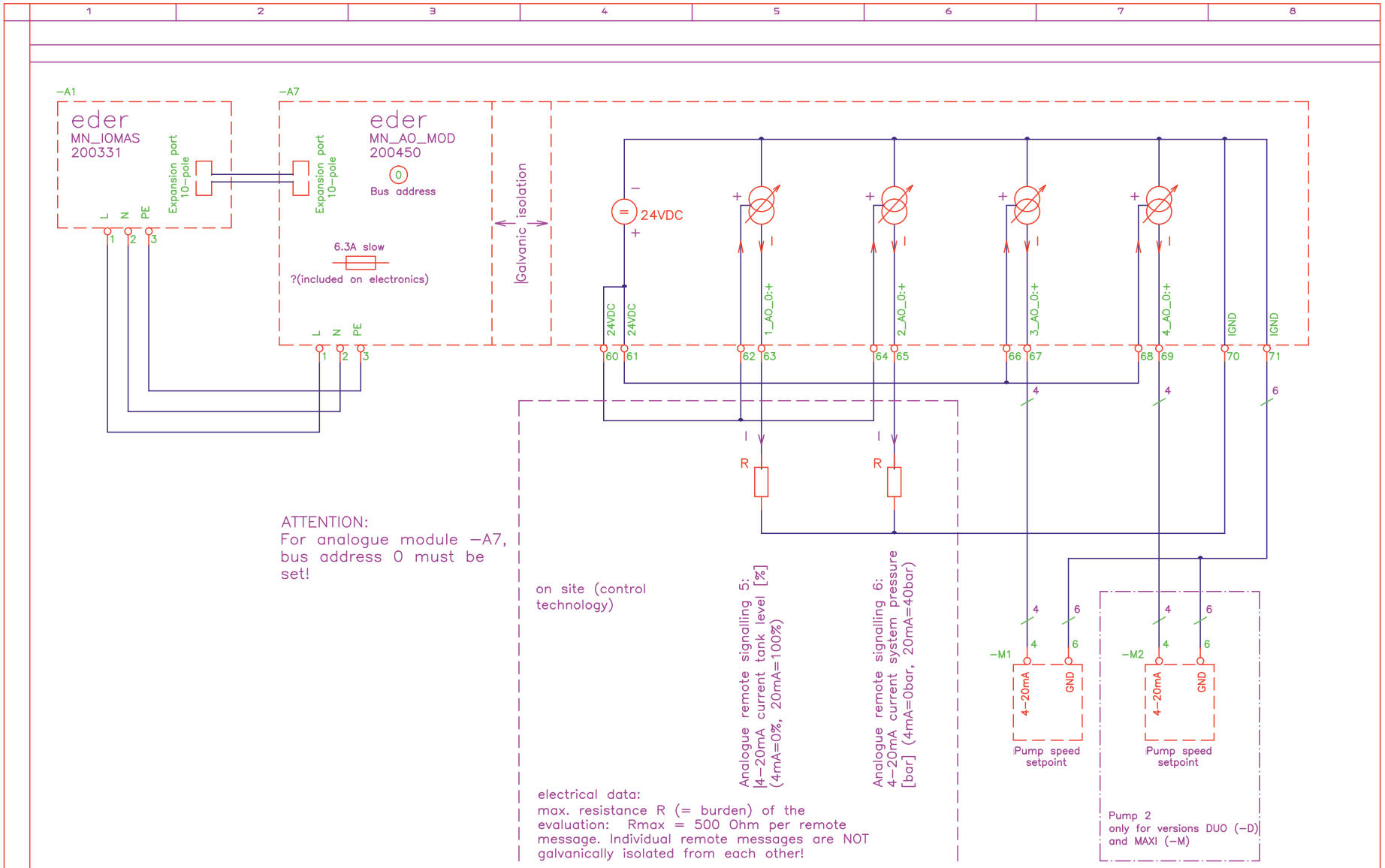


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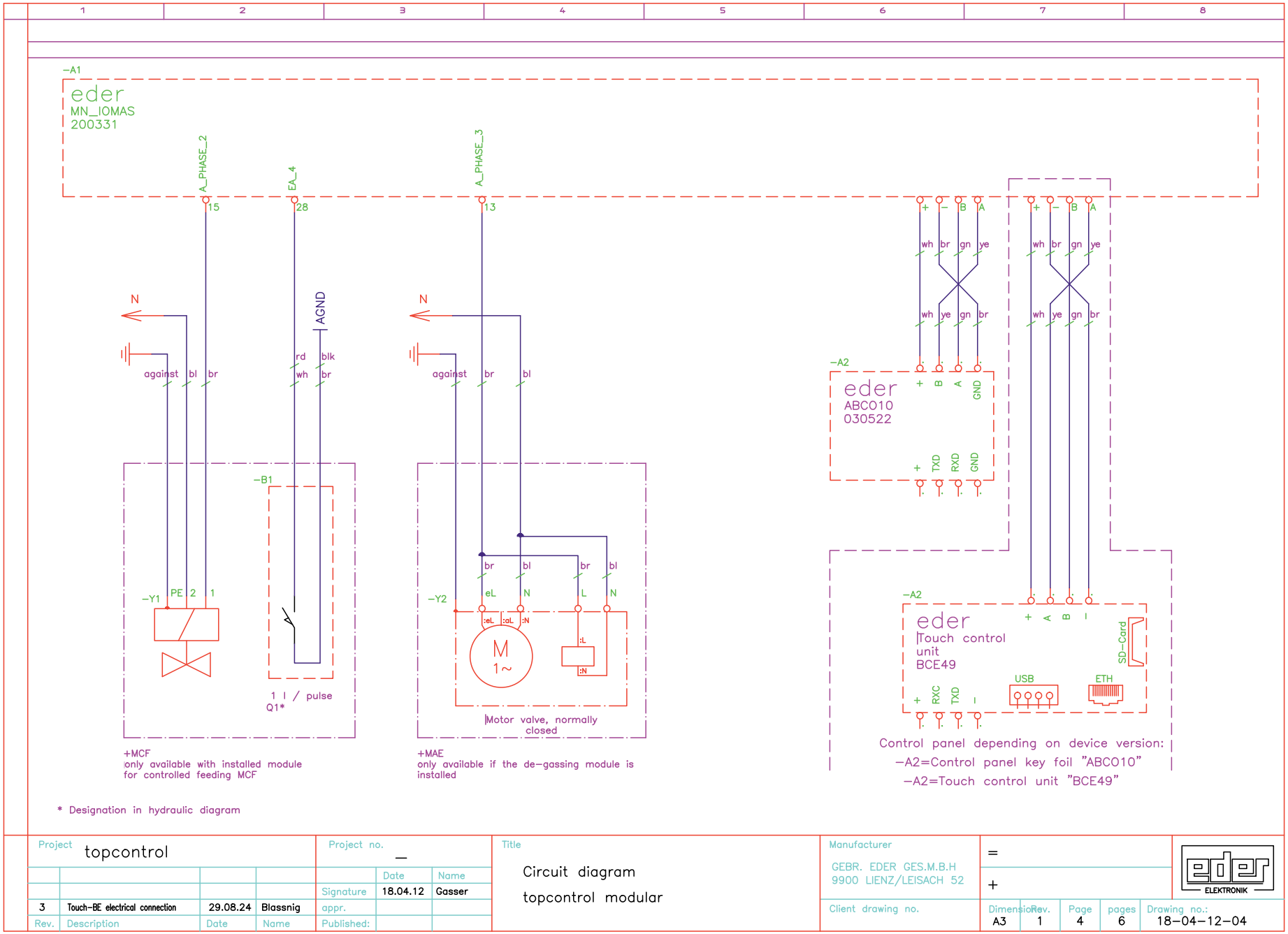
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Touch control
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BCE49
+
A
B
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SD–Card
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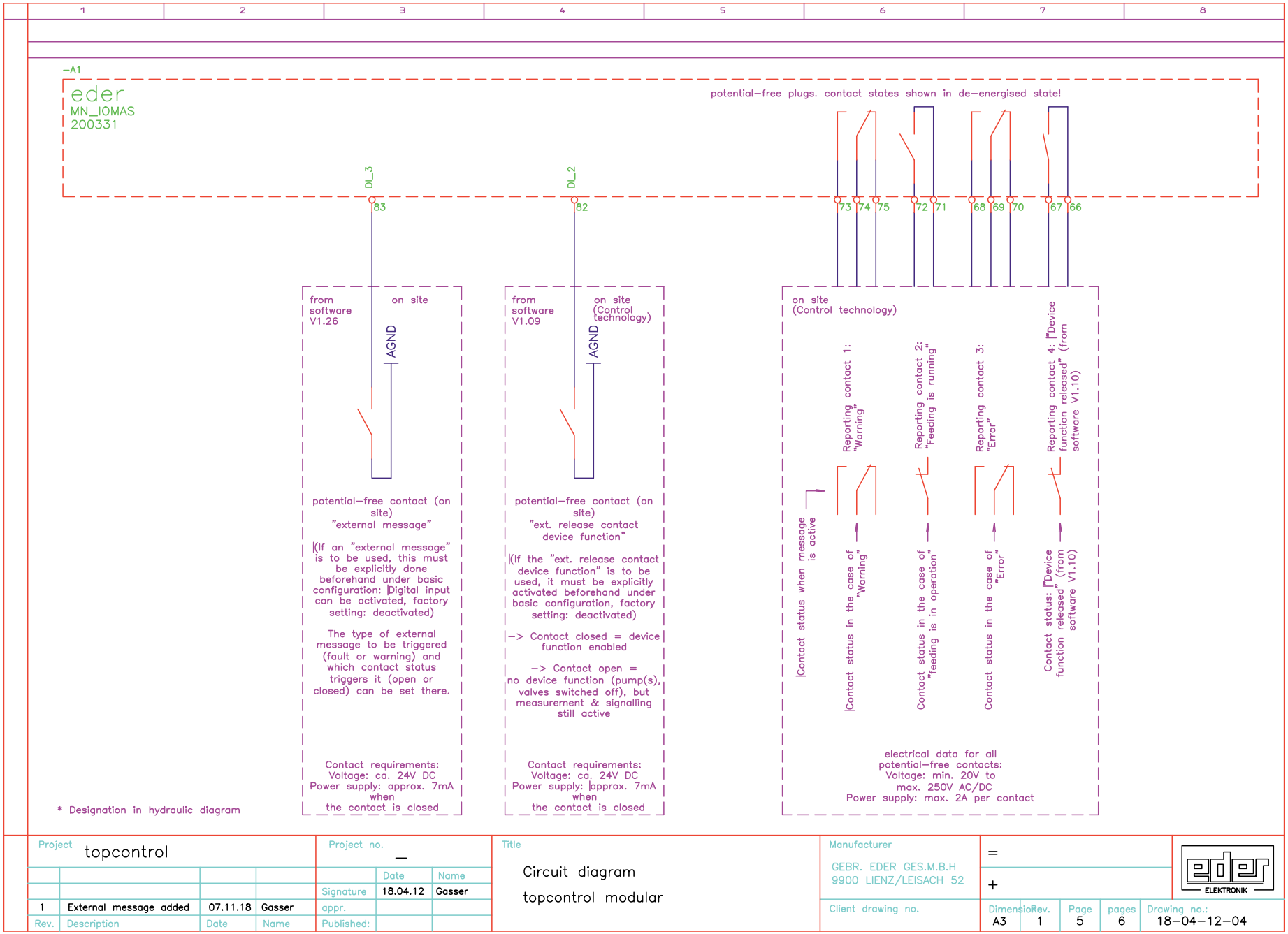


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Manufacturer: GEBR. EDER GES.M.B.H 9900 LIENZ/LEISACH 52

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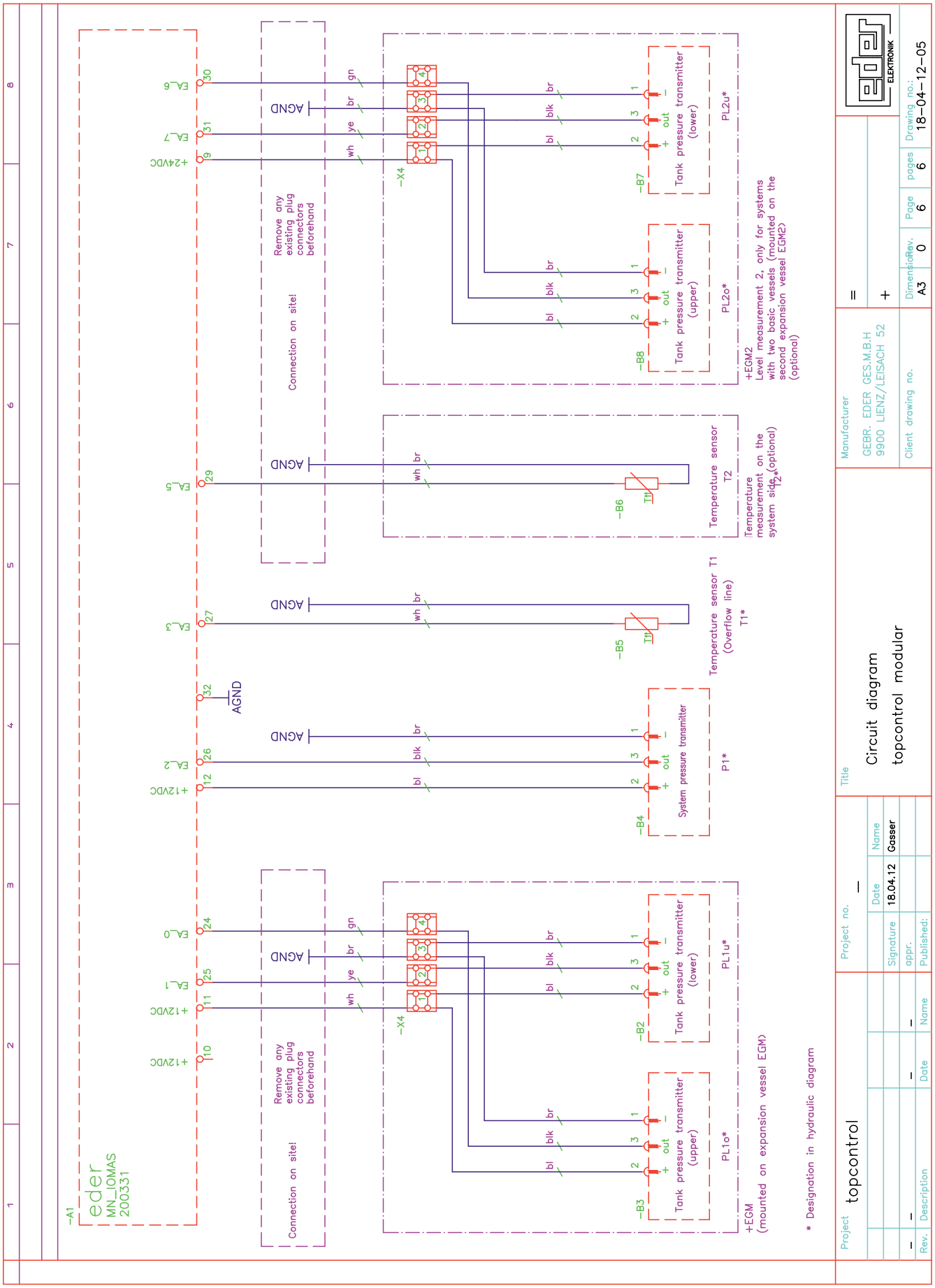
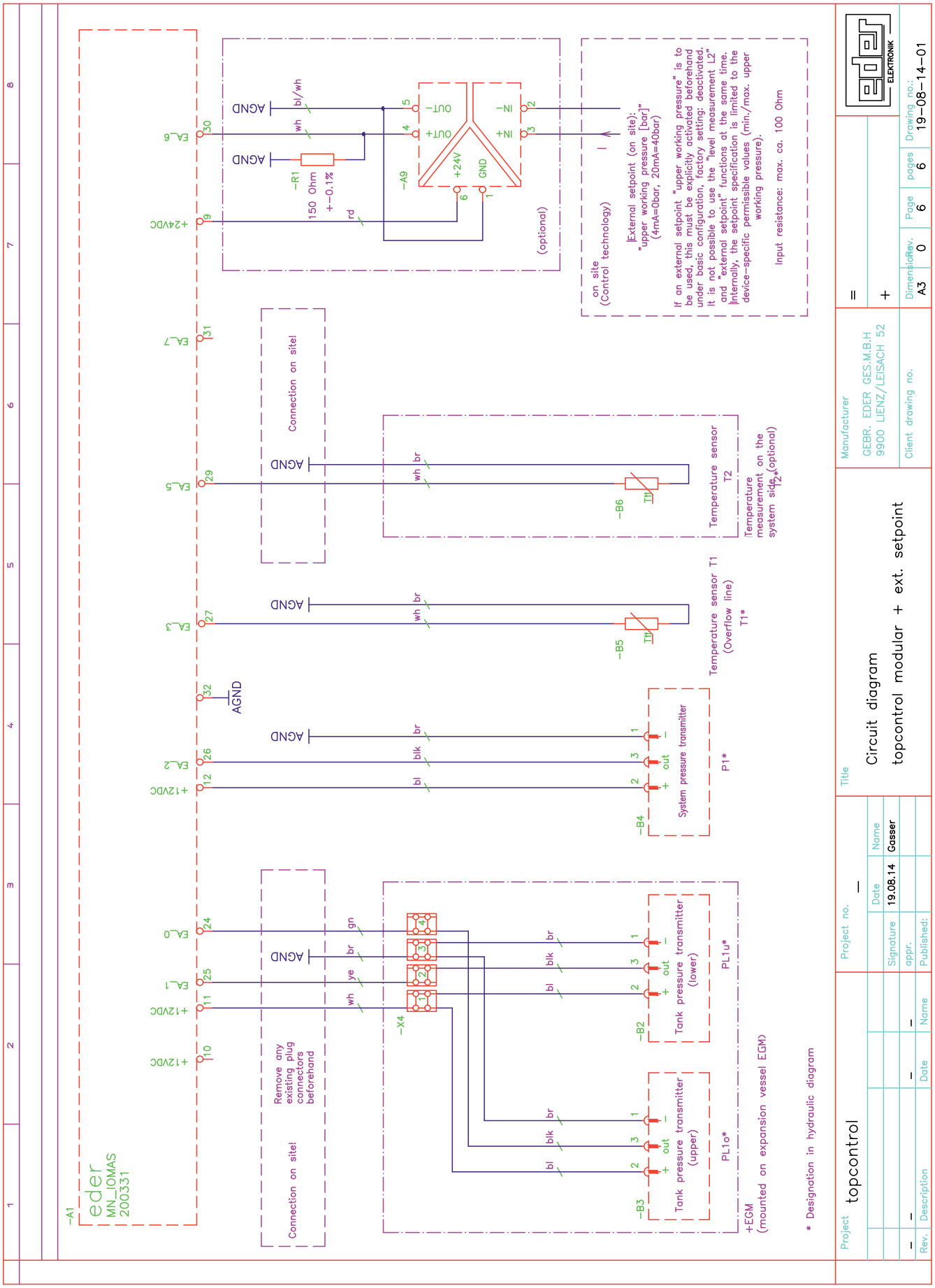



Optional use of "Level measurement L2" for systems with two basic vessels. Simultaneous use of "external setpoint" not possible!




Optional use of "external setpoint".
Simultaneous use of "Level measurement L2" not possible!

| KEY | |
|---|---|
| **Designation** | **Description** |
| -A1 | EDER control electronics: TOPCONTROL motherboard, type 200331 |
| -A2 | depending on device version:<br>EDER control electronics: Processor board MULTICONTROL, type ABCO10<br>EDER control electronics: Touchscreen operating unit, type BCE49 |
| -A7 | EDER control electronics: Analogue module, type 200450, 4 outputs, bus address 0 |
| -A9 | Signal isolation amplifier, In: 4-20mA, Out: 4-2 mA, 24 VDC, 3-way isolation (OPTION) |
| -R1 | Resistor, 150 Ohm, > = 0.25W, + -0.1%, < = + -15ppm/°C (OPTION) |
| -Y1 | MCF backfeed module: Solenoid valve (OPTION) |
| -B1 | MCF backfeed module: Water meter pulse output (OPTION) |
| -B2 | Vessel pressure transmitter bottom (PL1u*) |
| -B3 | Vessel pressure transmitter top (PL1o*) |
| -B4 | System pressure transmitter (P1*) |
| -B5 | Temperature sensor (T1*), sensor element KTY10-6 or compatible |
| -B6 | Temperature sensor (T2*), sensor element KTY10-6 or compatible |
| -B7 | Bottom vessel pressure transmitter (PL2u*) |
| -B8 | Vessel pressure transmitter top (PL2o*) |
| -X4 | Connection clamp |
| -S4 | Main switch |
| -S5 | Main switch for mains 2 (only for versions with 2 mains supply cables) |
| -F2 | Automatic circuit breaker, characteristic curve B, 6A, 1-pole + N |
| -M1 | Motor of pump 1 with integrated frequency converter (OPTION) |
| -F6 | Automatic circuit breaker - Pump 1 |
| -M2 | Motor of pump 2 with integrated frequency converter (OPTION) |
| -F7 | Automatic circuit breaker - Pump 2 (OPTION) |
| -Y2 | Degassing module MAE: Degassing valve, currentless closed) |
| -Y3 | Actuator of overflow valve 1 (motorised valve, currentless closed) |
| -Y4 | Actuator of overflow valve 2 (motorised valve, currentless closed) (OPTION) |

# 7. EXTERNAL SETPOINT

With devices from the TopControl series, it is possible to specify an external setpoint for the upper working pressure using an analogue signal (4-20 mA) and a bus module. This is required, for example, if the working pressure has to change depending on the operation of the overall system (e.g. winter/summer operation).

The external setpoint specification from the bus module has priority over the analogue external setpoint specification. Regardless of the setting of the analogue external setpoint specification (device setup -> "External setpoint (analogue input)"), the value from the bus is used as the setpoint for the upper working pressure if the setpoint is activated by the bus module (bus module/web module -> "External setpoint (specified by bus module)").

## 7.1. Working pressure specification (0-40 bar) by means of external set-point (analogue signal 4-20 mA):

The external setpoint signal 4-20 mA always corresponds to a pressure of 0-40 bar. Depending on the device type, however, the usable upper working pressure is always limited. An approximate conversion between the desired upper working pressure and the external setpoint signal required for this is possible using the diagram below.

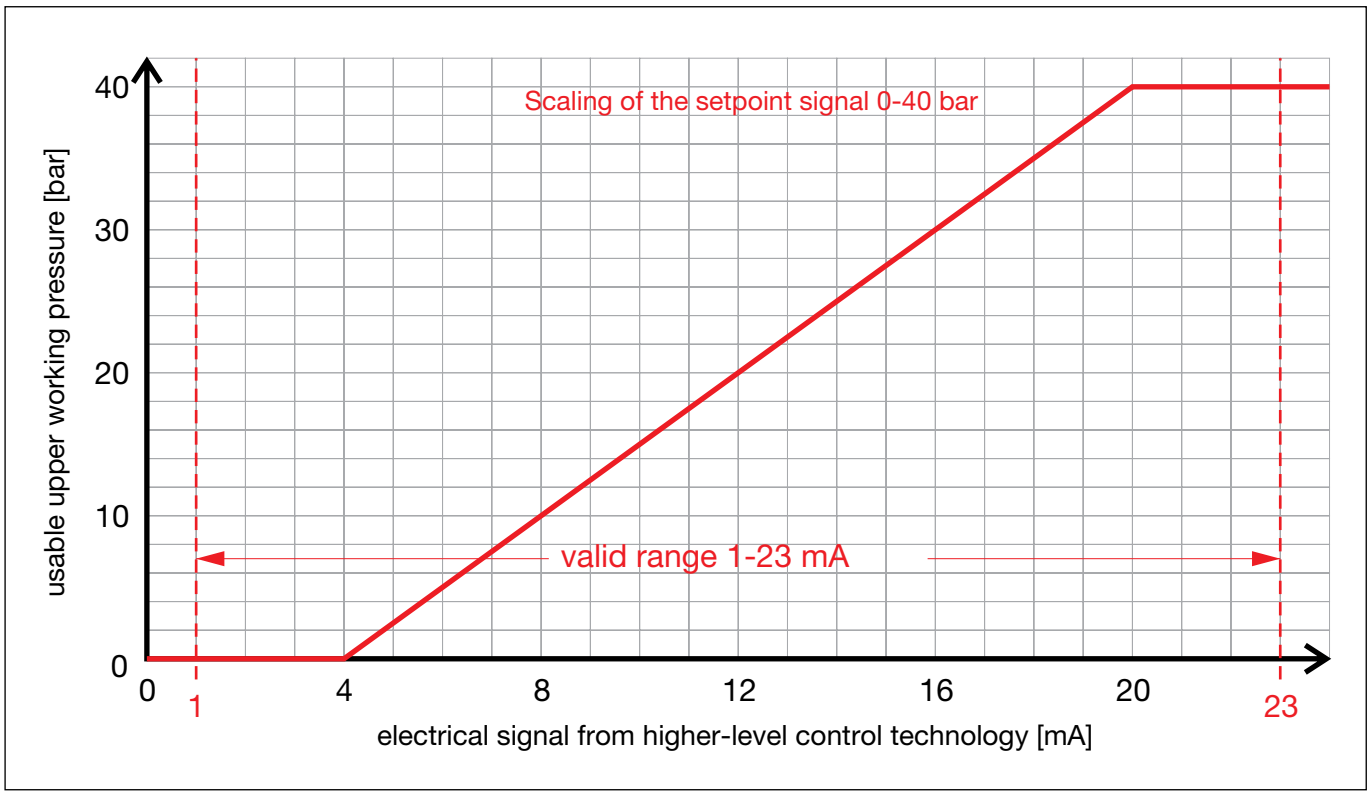



*Figure 9: Calculation of external setpoint signal*

The usable upper working pressure depends on

1. the existing device type
2. the OPTIONAL pressure setpoints
   "Minimum upper working pressure (analogue input)" and
   "Maximum upper working pressure (analogue input)"
   (operating level 3 → settings → pressure maintenance)

Example:
An upper working pressure of 20.0 bar is to be set on a ETCM-S4.7-23.5 control unit. The control technology must therefore send a signal with 12 mA. Regardless of the size of the sent setpoint signal, the upper working pressure for this type can never be set lower than 2.6 bar and higher than 23.5 bar (characteristic curve ——).

In addition, the upper working pressure can be limited by the settings "Min. and max. upper working pressure (analogue input)", in this example with min. 16.0 bar and max. 21.0 bar. Regardless of the size of the setpoint signal, the upper working pressure can therefore never be set lower than 16.0 bar or higher than 21.0 bar (characteristic curve -·-·-·- ).

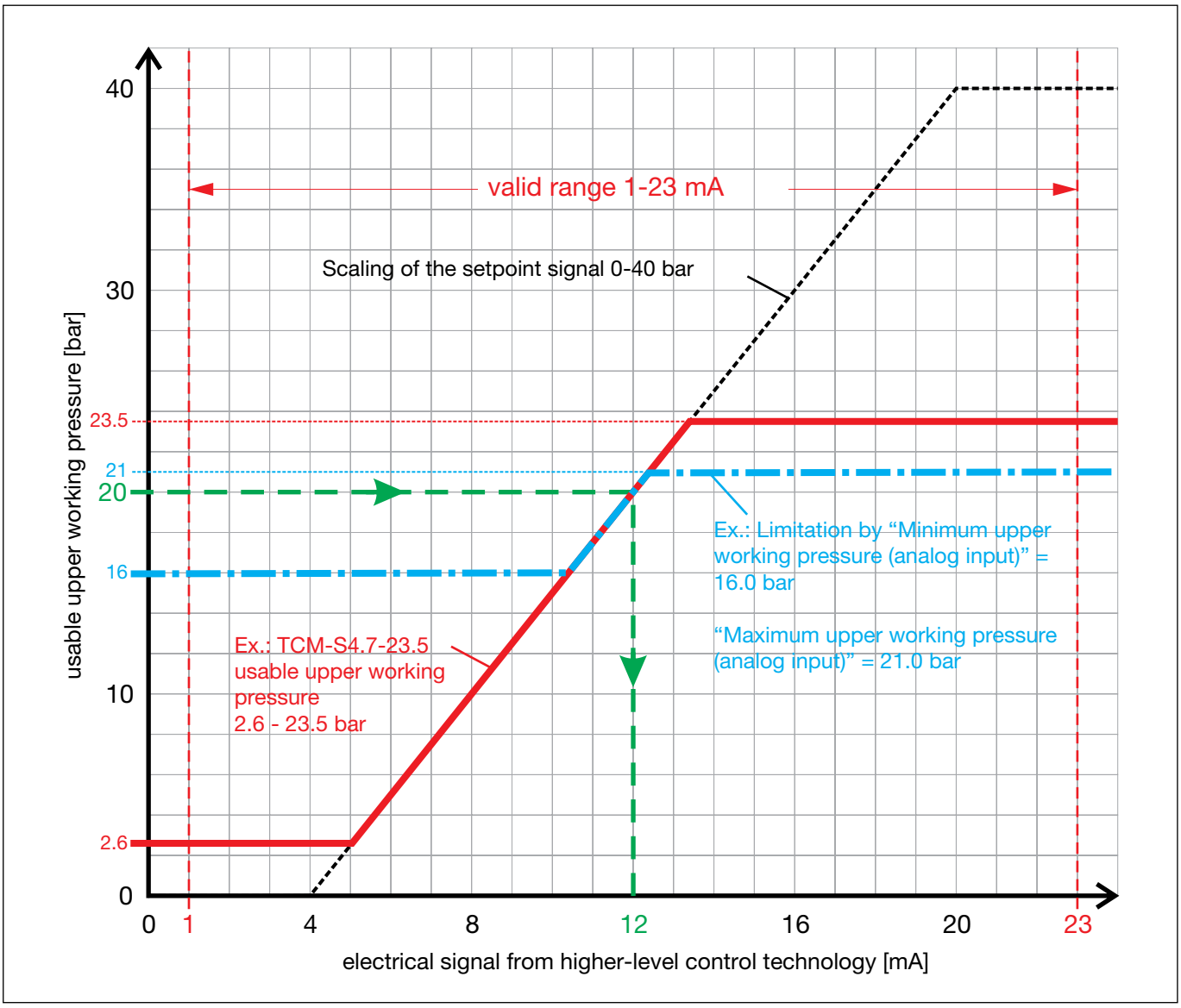



*Figure 10: Signal areas*

**NOTE**
If the signal is outside the valid range (1-23 mA), the working pressure set during commissioning is used and error messages S40 or S41 are triggered.

**INFORMATION**
As soon as the signal is back in the valid range, the working pressure is set again according to the external setpoint. However, the error messages will continue to be displayed until they are acknowledged!

## 7.2. Working pressure specification (0-40 bar) via bus module:

The specified value of the external setpoint can cover a pressure range of 0-40 bar. Depending on the device type, however, the usable upper working pressure is always limited. To limit this range even further, the values "Minimum upper working pressure (bus module)" and "Maximum upper working pressure (bus module)" can also be set under the menu item "Settings" g "Pressure maintenance" (see diagram and example on the next page).

Example:
An upper working pressure of 20.0 bar is to be set on a ETCM-S4.7-23.5 control unit. The control system must therefore send the value 0000 0111 1101 0000 (binary for 2000 as conversion = bar*100) in bytes 4/5.

Regardless of the size of the sent setpoint, the upper working pressure for this type can never be set lower than 2.6 bar and higher than 23.5 bar (characteristic curve ——— ).

In addition, the upper working pressure can be limited by the settings "Minimum upper working pressure (bus module)" and "Maximum upper working pressure (bus module)", in this example with min. 16.0 bar and max. 21.0 bar. Regardless of the size of the setpoint value, the setpoint value for the upper working pressure can therefore never be less than 16.0 bar or greater than 21.0 bar (characteristic curve -·-·- ).

The values currently set on the device are also sent back to the control system via the bus module in order to be analysed or checked there. "Minimum upper working pressure (bus module)": Byte 22/23, "Maximum upper working pressure (bus module)": Byte 24/25, "External setpoint (specified by bus module)": Byte 20/21).

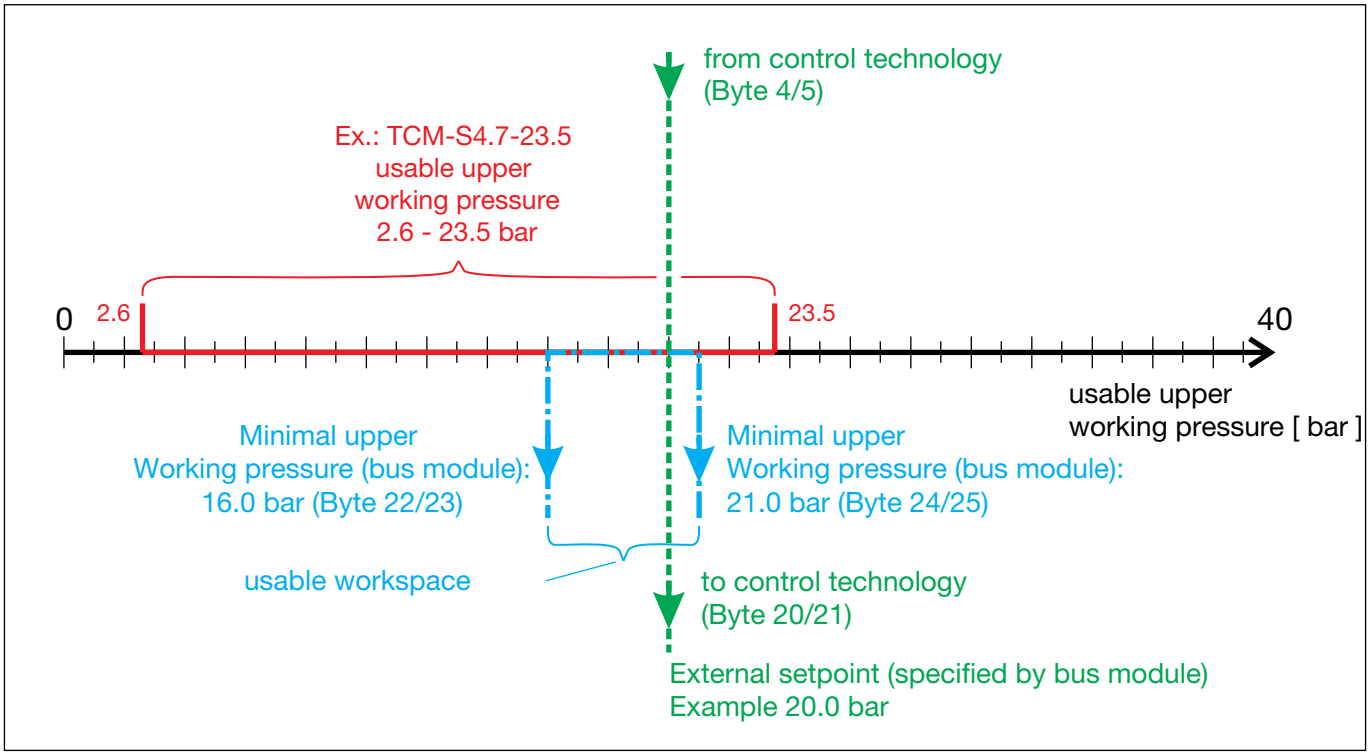



*Figure 11: Working pressure specification*

# 8. COMMISSIONING

## 8.1. Putting the device into operation

**NOTE**
Commissioning of the device by the eder factory customer service or an authorised partner, including training of the operating personnel of the system, is mandatory!

Proceed as follows when commissioning the topcontrol modular:

**INFORMATION**
Steps 1-3 represent work to be carried out on site in preparation for commissioning

**Step 1:**
Determination of the upper working pressure. The upper working pressure corresponds to the "Manual upper working pressure" setting.

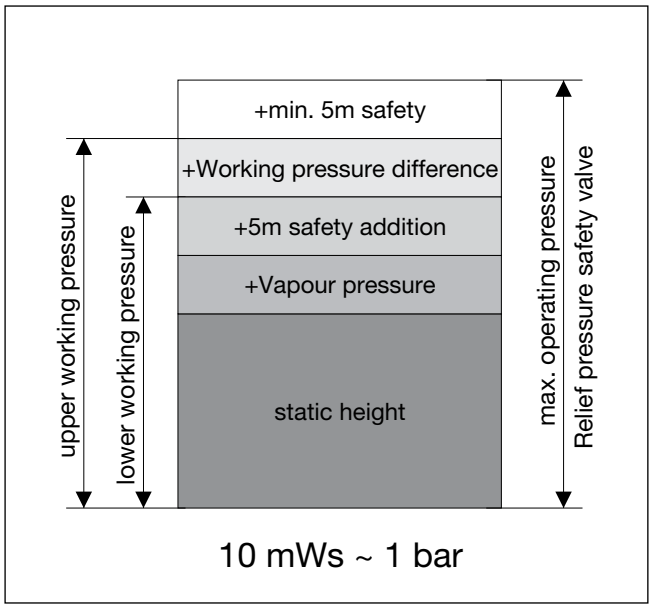



*Figure 12: Determination of upper and lower working pressure*

**Step 2:**
Shut off the lines from/to the system (expansion overflow line, expansion pressure line, fresh water supply).

**CAUTION**
But do not shut off the suction line and overflow line at ETCM!

**Step 3:**
Fill and ventilate the system to the upper working pressure determined in step 1.

**Step 4:**
Check the hydraulic and electrical connections for correctness, especially the expansion line.

**Step 5:**
Open the fresh water supply to the topcontrol on the MCF backfeed module and set the pressure reducing valve to 1.5 bar - max. 2.0 bar. Loosen the fixing screw (1) and set the pressure reducer to 1.5 bar - max. 2.0 bar. Then tighten the screw again to fix the setting of the pressure reducer.

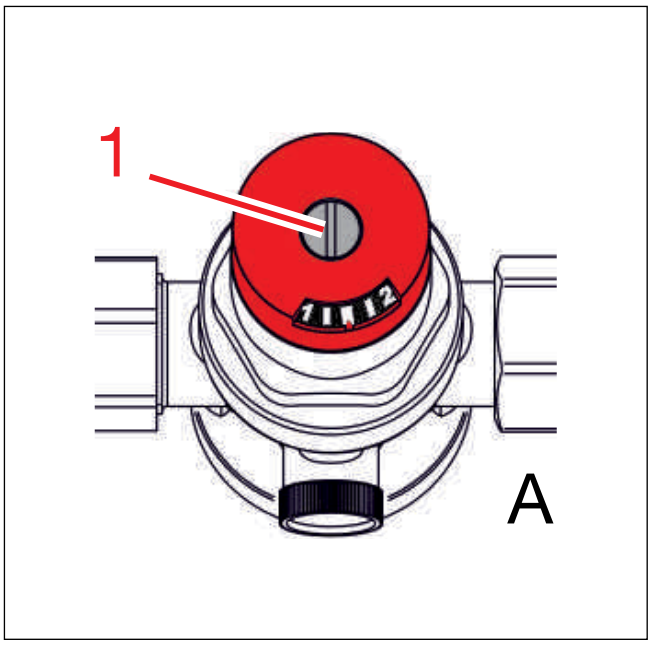



*Figure 13: Pressure reducer on MCF version A*

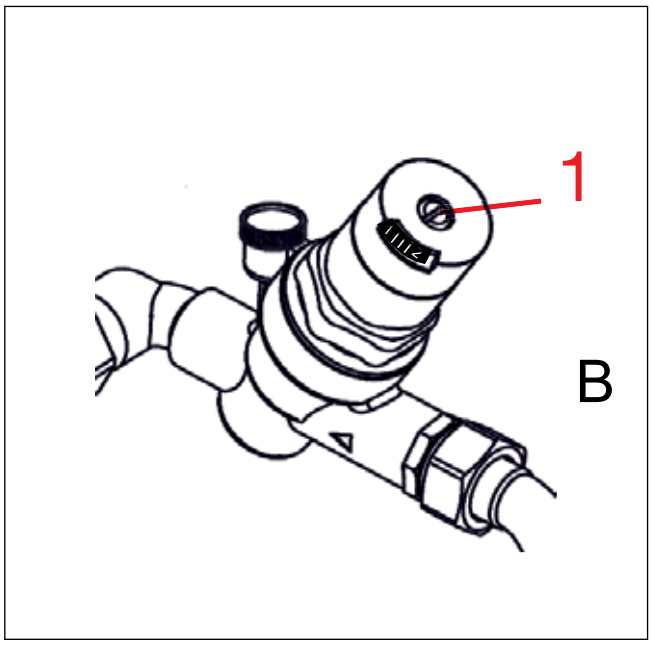



*Figure 14: Pressure reducer on MCF version B*

**Step 6:**

Switch on the power supply and check whether the device function is deactivated.

If necessary, switch off the device function using the Activate device function button (system ON/OFF) (refuse manual device release).

**Step 7:**

Filling and venting the pressurising pump(s) and the piping

- Fully open the shutoff valves on the pump extraction side and fully close them on the pump pressure side
- Open the bleed valve on the pressurising pump(s)

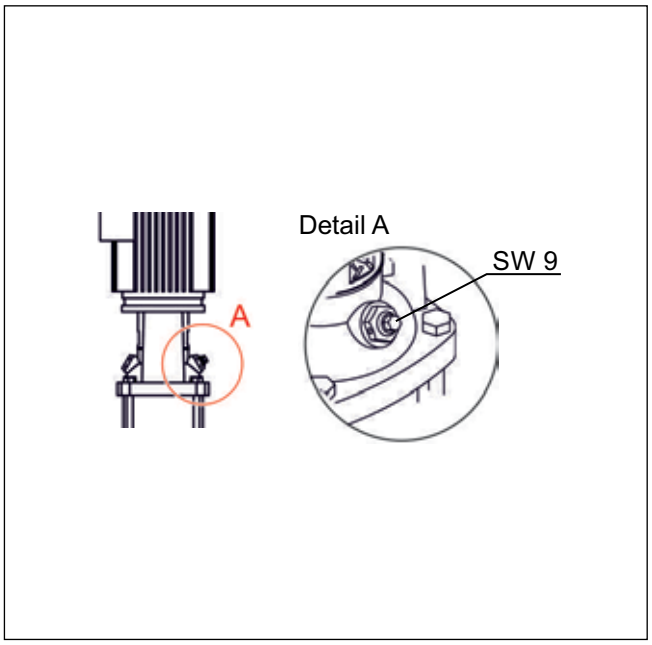



*Figure 15: Venting valve on the pressure maintenance pump*

- With the MCF backfeed module installed, switch to manual mode (operating level 3: Manual mode -> Outputs). Switch on the "Backfeed valve" output (Manual "1") and fill the tank with it until a continuous jet of the system medium emerges from the pump vent valve (Detail A), then switch the "Backfeed valve" output back to automatic mode (Auto "1"). Tip: Shut off all expansion tanks except the first main vessel beforehand to speed up the filling process.

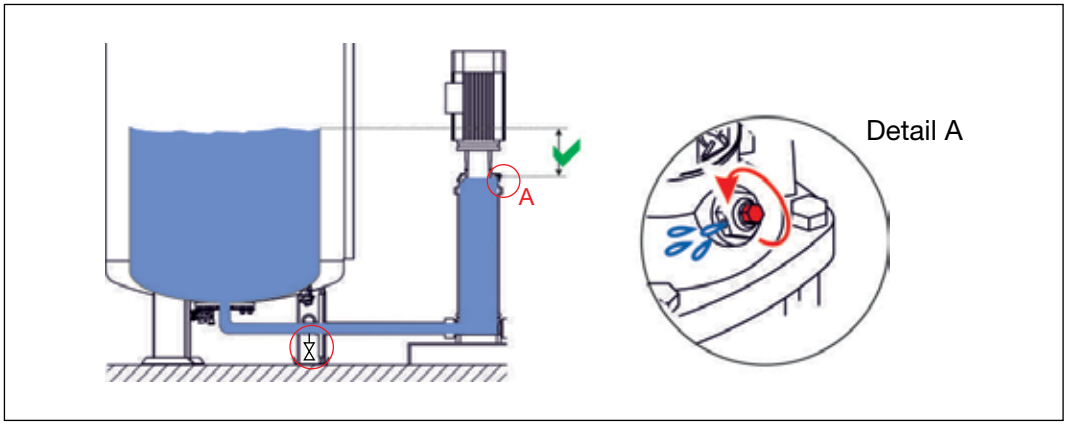



*Figure 16: Venting the pressure maintenance pumps*

- For devices without a built-in MCF backfeed module, the vessel must be filled (e.g. via the KFE tap on the connection of the EG-M - see Figure 4) until a continuous jet of the system medium emerges from the pump vent valve (detail A).
- In the Manual mode menu, set the "Pump 1" output to Manual "1" 25%)", as well as the "Pump 2" output.

**NOTE**
This prevents the pressure maintenance pumps from pumping into the system at too high a speed during subsequent venting.

Then switch the pressure maintenance pump (output "Pump 1" with manual "0" or manual "1") on and off several times in manual mode in order to achieve complete venting of the pump chambers.
- Close and tighten the pump venting valve again.
- For devices with 2 pressure maintenance pumps (Duo and Maxi models), follow the steps above for the 2nd pump. Repeat pump (front view: Pump 1=left, Pump 2=right)

**NOTE**
The direction of rotation is independent of the supply line due to the design of the pressure maintenance pumps with integrated frequency converter and is therefore always correct.

**Step 8:**
Device setup of the multicontrol electronics (touchscreen operating unit).

**NOTE**
Settings in the device setup allow the touchscreen operating unit to be customised to the components in the device and its range of functions. Some of the settings possible in the device setup have already been preconfigured in the factory.
Further settings are made during commissioning or, if necessary, in the course of a component extension or component replacement (service/maintenance).

**NOTE**
Device setup: see touchscreen operating unit operating instructions, menu "Settings" "Device setup".

**Step 9:**
Set the working pressure
(Menu "Settings" → "Pressure maintenance" → "Working pressure")

- Open the shut-off valves from/to the system (expansion line, fresh water). If the MAE degassing module is installed, its ball valve on the inlet side must be closed.
- The current settings are displayed; these correspond to the last set values (e.g. the factory-set default values).

**CAUTION**
Depending on the values displayed, the working pressure must always be set again during commissioning!

- Select "Manual upper working pressure". The window for entering the desired upper working pressure opens. Enter the desired upper working pressure and confirm with OK (value can be adjusted using the slider, plus/minus buttons or directly by entering a number).
- Select "Working pressure difference". The window for entering the desired working pressure difference opens (default setting: 0.8 bar). Enter the working pressure difference and confirm with OK (difference between the set upper working pressure and the switch-on pressure of the pump (= lower working pressure).
- Select “pump difference target”. The window for entering the pump target difference opens (default setting: 0.3 bar). Enter the value and confirm with OK.

**NOTE**
Once the working pressure has been set, always check whether the Topcontrol is working according to the set pressure values.

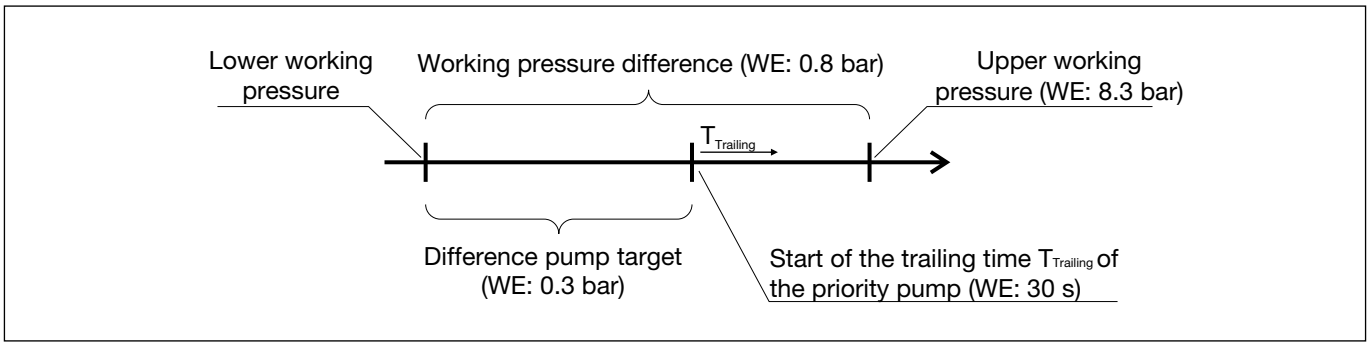



*Figure 17: Setting the working pressure*

**Step 10:**
If an MCF backfeed module is installed, the operating mode of the backfeed module must be selected.

This operating mode depends on various factors, such as the size of the system, the age of the system, any known leaks, etc. In the case of known regular leaks (e.g. if it is known that a certain quantity needs to be refilled within a certain time), we recommend the "Time-controlled" operating mode.

You will find a description of the possible operating modes in the operating instructions for the touchscreen operating unit. An indication that adjustment is necessary may be, for example, if the overflow valve only closes completely at more than approx. 0.5 bar below the upper working pressure after the pump(s) have been switched off.

**Step 11:**
Use the Activate device function button (system ON/OFF) to switch on the device function (issue manual device function). The Activate device function button changes from white to red!

**NOTE**

The initial pressure build-up can take some time, depending on the size of the system, as the pressure must first be propagated through the entire connected system.

**Step 12:**

If the MAE degassing module is installed, the "Degassing module" operating mode must be selected. Incorrect selection will not guarantee correct degassing function!

One-off adjustment of the degassing module:

- Close the regulating valve and the ball valve on the degassing module.
- Open the degassing valve in manual mode. Menu "Manual mode" -> "Outputs" -> "Degassing valve" -> Manual "1".
- Wait until the motor valve is fully open (approx. 35 seconds; the scale or the red shaft on the linear actuator must no longer rotate)
- Opening the ball valve on the inlet side
- Slowly open the regulating valve until a flow can be heard (1/4 turn). The system pressure drops and the pressure maintenance pump switches on.
- Monitor the system pressure on the display
- The regulating valve is set correctly if a pump can build up and maintain the pressure again in a short amount of time. If this is not possible, e.g. in case the second pump switches on for duo and maxi models, the regulating valve is set incorrectly (open too wide).
- Then set the "Degassing valve" output back to automatic (Auto "1").
- The setting (1) of the regulating valve must be noted in the system or commissioning log.

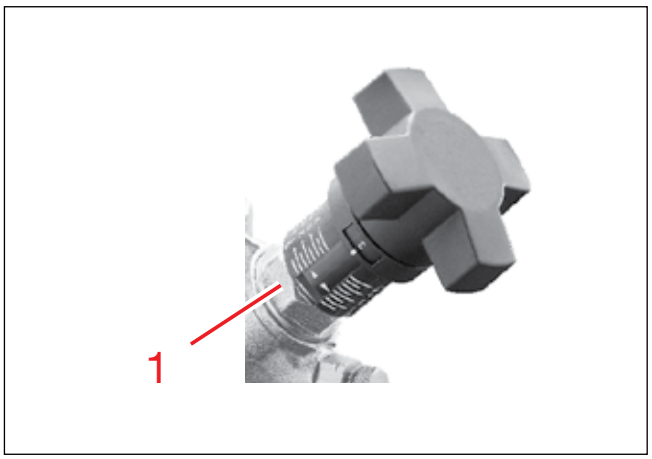



*Figure 18: Setting of MAE regulating valve:*

**Step 13:**

The device is now ready for operation. The shut-off valves in the lines from/to the system must be secured against unintentional closure (e.g. remove handles...) Further settings (e.g. softening MWE, operating modes etc.) must be made in the "Settings" menu (see operating instructions for the touchscreen operating unit).

Any necessary adjustment of the electrical overflow valves:

The respective regulating valve on the inlet side of the electric overflow valve(s) is fully open ex works.

Due to the set working pressure, the size of the system, etc., it may be necessary to throttle the overflow valve(s).

An indication that adjustment is necessary may be, for example, that the pressure maintenance pump switches on immediately after the overflow valve is opened. In this case, for example, the system pressure drops to the lower working pressure immediately after the overflow valve is opened and the pressure maintenance pump starts to build up pressure.

The setting of the pressure-side regulating valve(s) must be noted in the system or commissioning log.

Setting of regulating valve overflow valve 1: _____
Setting of regulating valve overflow valve 2: _____

# 9. SPARE PARTS LIST

## 9.1. Piping

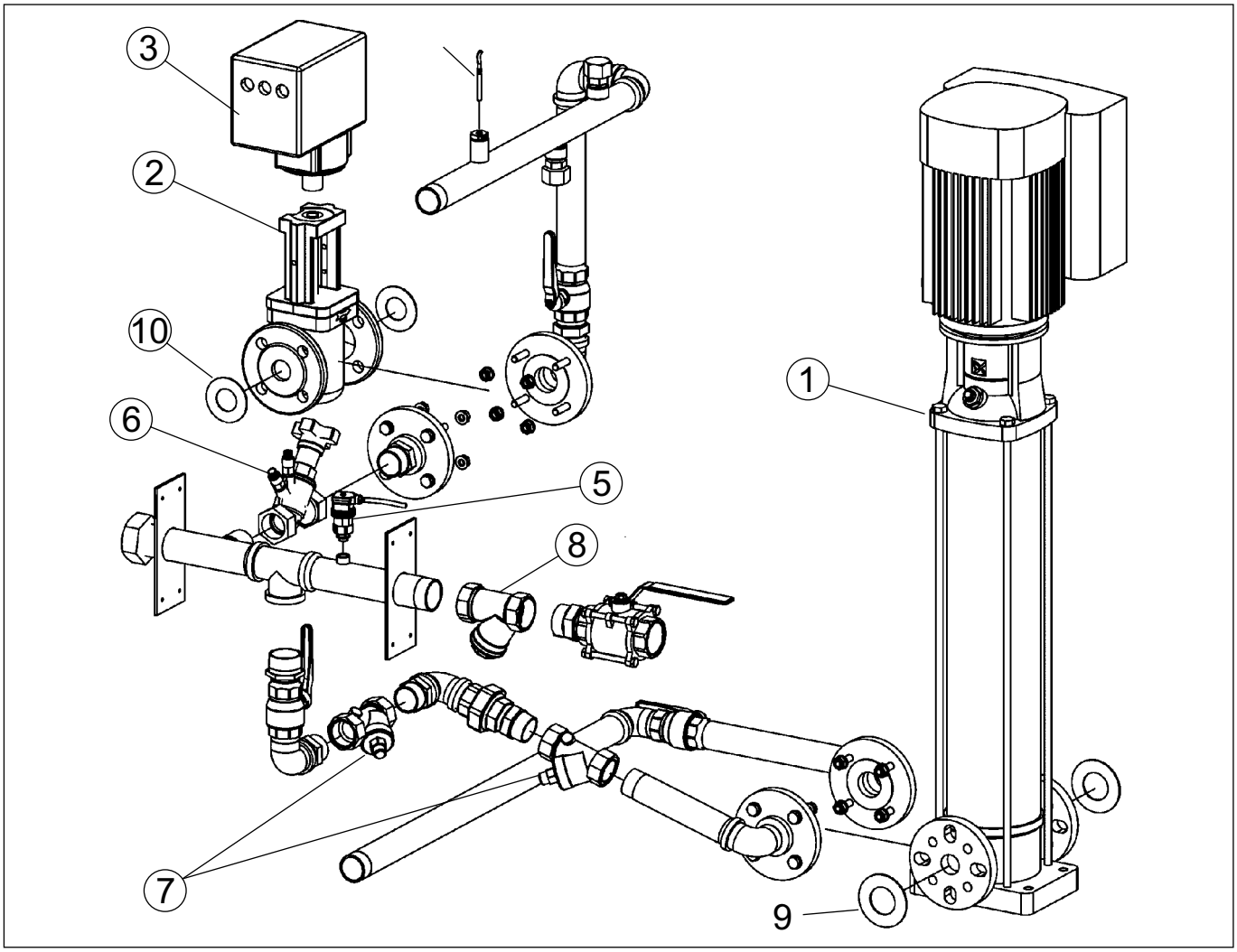
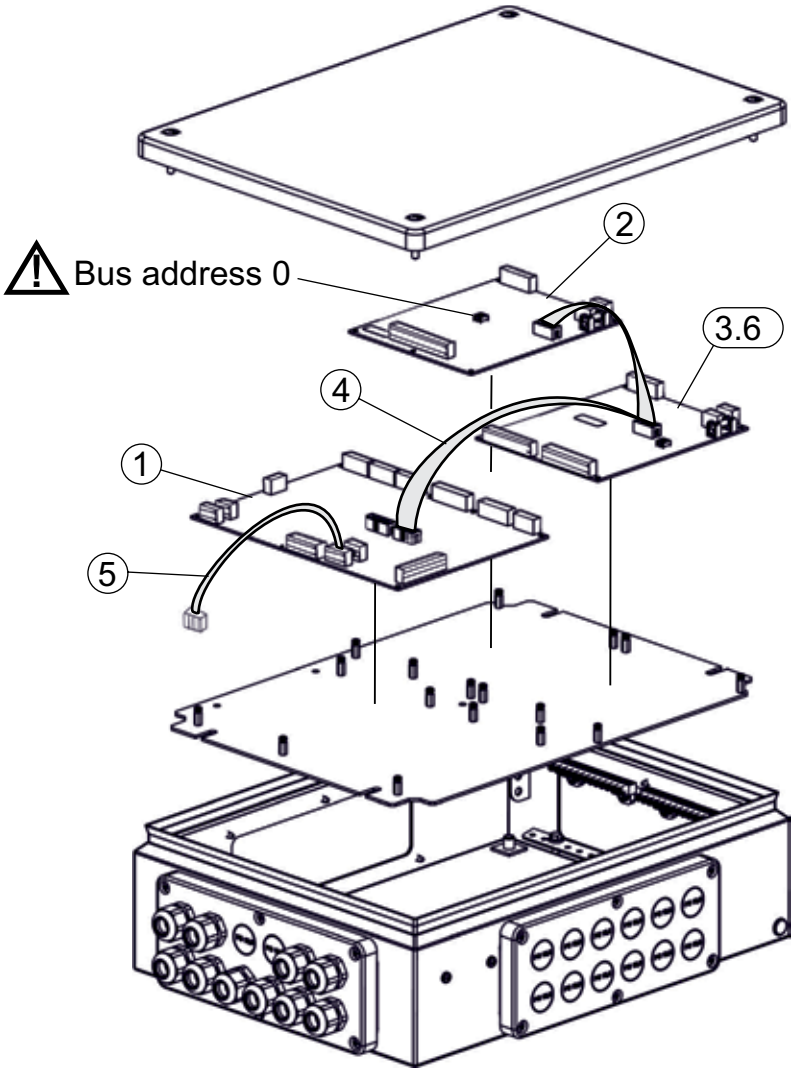


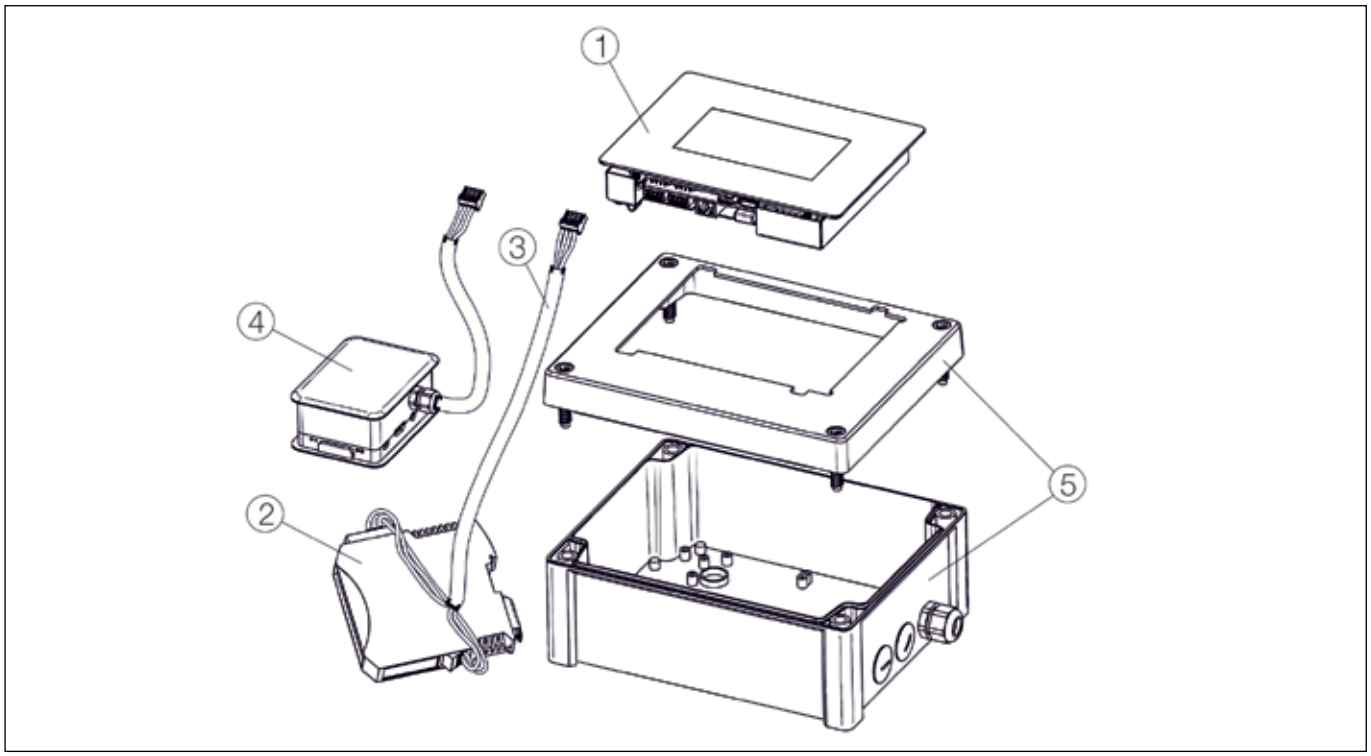

*Figure 19: Spare parts for piping*

| POS. | DESIGNATION | SPARE PART ART. NO. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ETCM-S5.4-15.7<br>ETCM-M5.4-15.7<br>ETCM-M5.4-15.7-twin | ETCM-S4.7-23.5<br>ETCM-M4.7-23.5<br>ETCM-M4.7-23.5-twin | ETCM-S9.1-14.9<br>ETCM-M9.1-14.9<br>ETCM-M9.1-14.9-twin | ETCM-S10.0-23.5<br>ETCM-M10.0-23.5<br>ETCM-M10.0-23.5-twin | ETCM-D10.8-15.7<br>ETCM-D10.8-15.7-twin | ETCM-D9.4-23.5<br>ETCM-D9.4-23.5-twin | ETCM-D18.2-14.9<br>ETCM-D18.2-14.9-twin | ETCM-D20.0-23.5<br>ETCM-D20.0-23.5-twin |
| 1 | Pressure maintenance pump | E90324 | E90325 | E90326 | E90327 | E90324 | E90325 | E90326 | E90327 |
| 2 | Electric overflow valve | E91001 | | | | E91005 | | | |
| 3 | Linear actuator for overflow valve | E91000 | | | | | | | |
| 4 | Temperature sensor | E90911 | | | | | | | |
| 5 | System pressure transmitter | E90140 | | | | | | | |
| 6 | Regulating valve | E90931 | | | | E91006 | | | |
| 7 | Angle seat check valve | E90131 | E90936 | E90131 | E90936 | E90131 | E90936 | E90131 | E90936 |
| 8 | Dirt trap | E90933 | E90934 | E90933 | E90934 | E90933 | E90934 | E90933 | E90934 |
| 9 | Seal for pressure maintenance pump | E90941 | | | | | | | |
| 10 | Seal for overflow valve | E90941 | | | | E91007 | | | |

## 9.2. Electronic unit



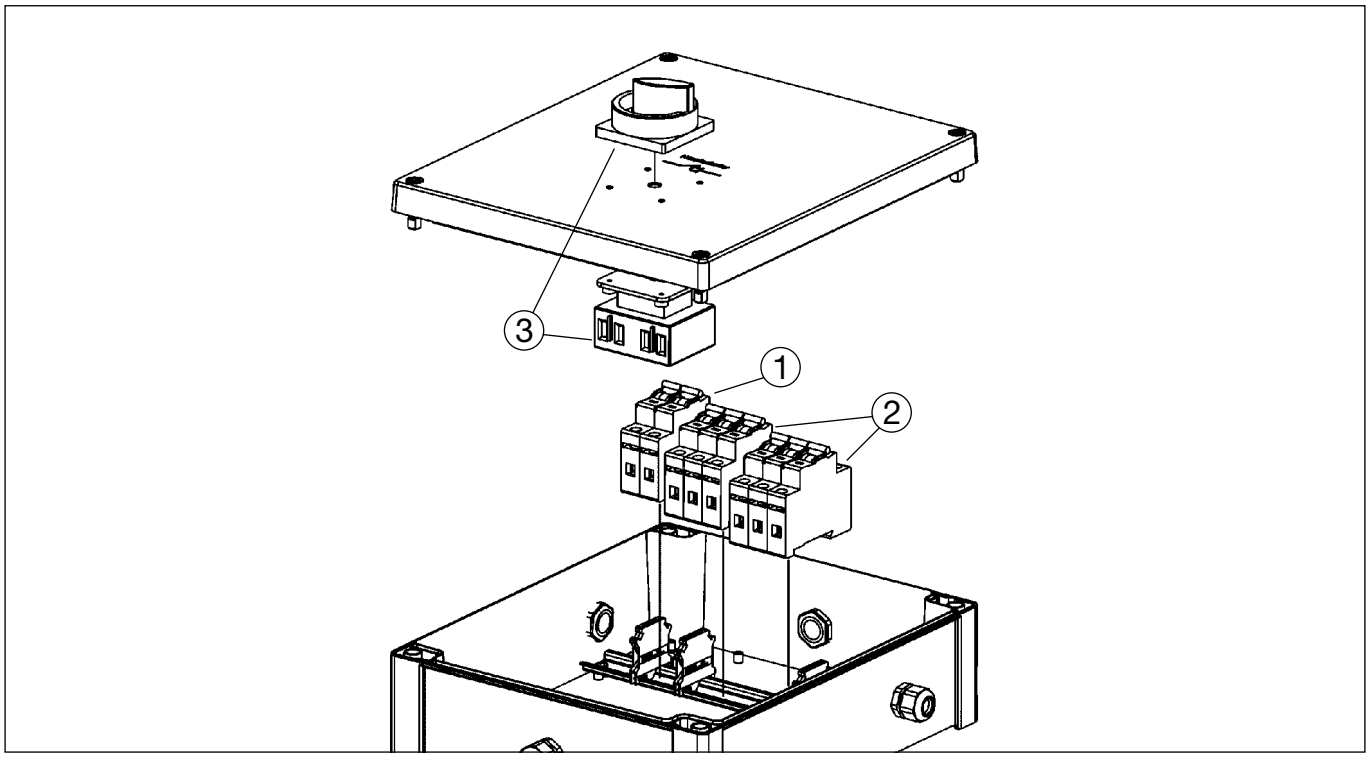

| POS. | DESIGNATION | SPARE PART ART. NO. |
|---|---|---|
| | | ETCM-S5.4-15.7<br>ETCM-M5.4-15.7(-twin)<br>ETCM-S4.7-23.5<br>ETCM-M4.7-23.5(-twin)<br>ETCM-S9.1-14.9<br>ETCM-S9.1-14.9(-twin)<br>ETCM-S10.0-23.5<br>ETCM-M10.0-23.5(-twin)<br>ETCM-D10.8-15.7(-twin)<br>ETCM-D9.4-23.5(-twin)<br>ETCM-D18.2-14.9(-twin)<br>ETCM-D20.0-23.5(-twin) |
| 1 | Print - topcontrol motherboard | E91002 |
| 2 | Print - topcontrol analogue module (addr. 0), 4 equipped outputs (200450) | E91003 |
| 3 | Print - "Binary remote signalling" expansion module | E90625 |
| 4 | Cable - Connecting cable<br>Motherboard expansion board, 10 poles | E90965 |
| 5 | Cable - Connecting cable<br>Motherboard processor board, 4 poles | E70083 |
| 6 | Print - "Binary remote signalling & remote acknowledgement" expansion module | E90626 |




| POS. | DESIGNATION | SPARE PART ART. NO. |
|---|---|---|
| | | EMCK-_ __-__<br>EMCM-_ 1-__ |
| 1 | Touchscreen operating unit, type BCE49, incl. shielding plate | E90996 |
| 2 | MULTICONTROL Bus Module Profibus | (optionally available as an accessory) |
| 2 | MULTICONTROL Bus Module Modbus RTU RS485 | (optionally available as an accessory) |
| 2 | MULTICONTROL Profinet Bus Module | (optionally available as an accessory) |
| 2 | MULTICONTROL Bus Module Modbus TCP | (optionally available as an accessory) |
| 3 | Connection cabling for bus module | (included in the scope of delivery of the bus module) |
| 4 | MULTICONTROL web module | (optionally available as an accessory) |
| 5 | Touchscreen operating unit - MULTICONTROL operating housing (base + cover), processed, empty | E90997 |

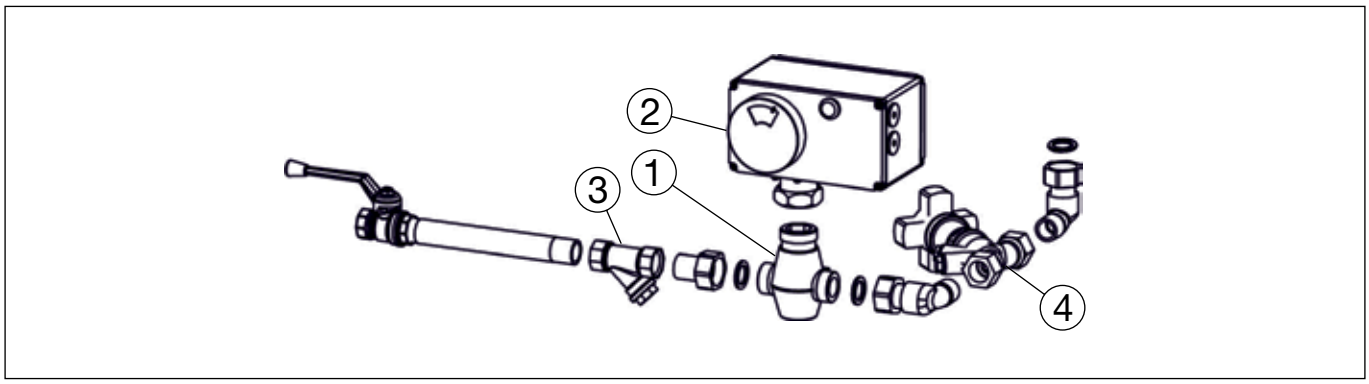
**WARNING**
Simultaneous use of bus module and web module is not possible!

## 9.3. Power section



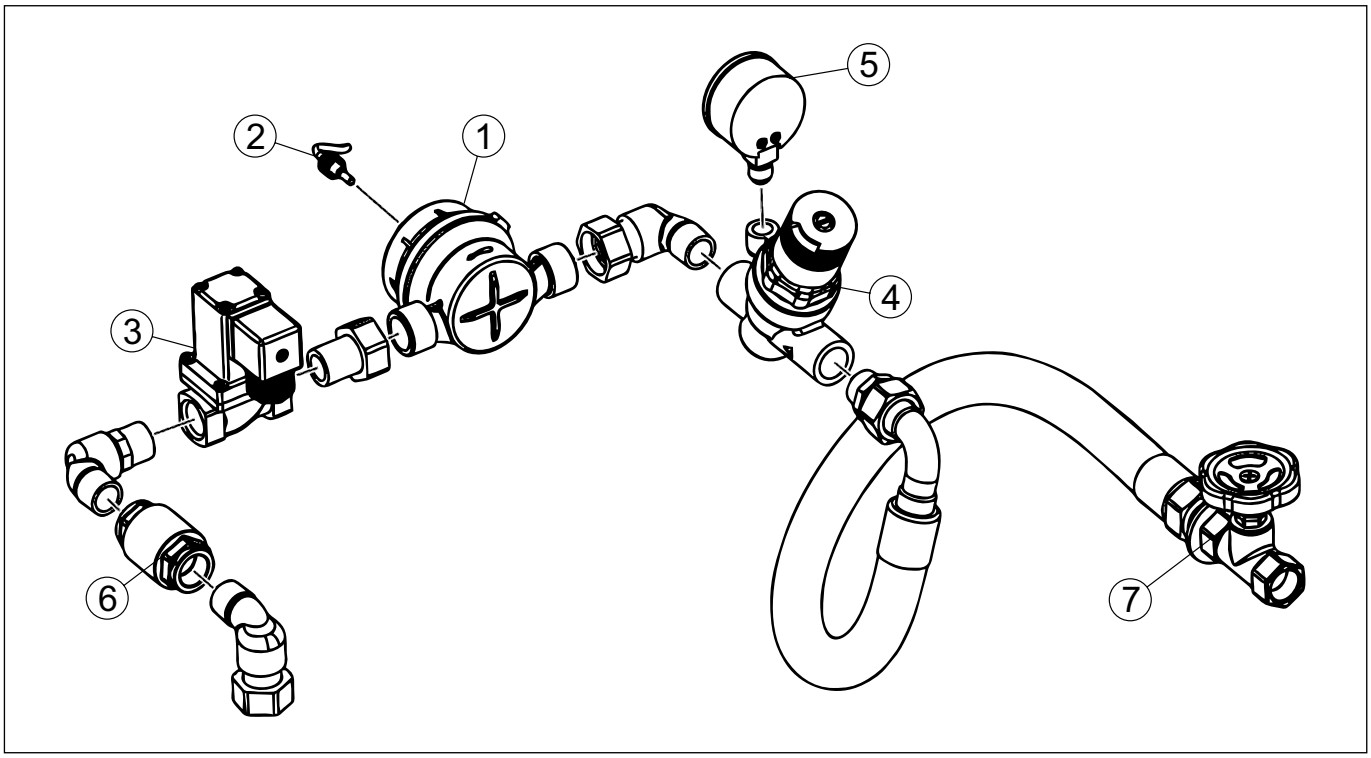

| POS. | DESIGNATION | SPARE PART ART. NO. |
|---|---|---|
| | | ETCM-S5.4-15.7<br>ETCM-M5.4-15.7(-twin)<br>ETCM-S4.7-23.5<br>ETCM-M4.7-23.5(-twin)<br>ETCM-S9.1-14.9<br>ETCM-S9.1-14.9(-twin)<br>ETCM-S10.0-23.5<br>ETCM-M10.0-23.5(-twin)<br>ETCM-D10.8-15.7(-twin)<br>ETCM-D9.4-23.5(-twin)<br>ETCM-D18.2-14.9(-twin)<br>ETCM-D20.0-23.5(-twin) |
| 1 | Automatic circuit breaker, 2-pole, N switched, 6 A | E90920 |
| 2 | Automatic circuit breaker, 3-pole, 16 A | E91004 |
| 3 | Main switch, 4-pole, 32 A | E90924 |

## 9.4. Degassing module EMAE




| POS. | DESIGNATION | SPARE PART ART. NO. |
|---|---|---|
| | | EMAE |
| 1 | Control valve 1/2" PN25 | E90926 |
| 2 | Linear actuator for control valve 1/2" with safety function | E90927 |
| 3 | Strainer 1/2" PN25 | E90928 |
| 4 | Regulating valve 1/2" PN25 | E90929 |

## 9.5. EMCF backfeed module




| POS. | DESIGNATION | SPARE PART ART. NO. | |
|---|---|---|---|
| | | EMCF-1 | EMCF-3 |
| 1 | Water meter 1.5 m³/h, version B<br>Water meter 2.5 m³/h, version B | E90950<br>- | -<br>E90951 |
| 2 | Water meter contact module 1 litre/pulse plug-in, for meter version B | E90949 | |
| 3 | Solenoid valve | E90575 | E90038 |
| 4 | Pressure reduction valve, ½", type D05; Version B<br>Pressure reduction valve, ¾", type D05; Version B | E90952<br>- | -<br>E90953 |
| 5 | Pressure gauge - for EMCF (optional depending on version) | E90908 | |
| 6 | Check valve | E90620 | E90621 |
| 7 | Flow valve with handwheel, ½" (EMFC-1) or ¾" (EMCF-3) | E90694 | E90695 |

# 10. CLEANING AND MAINTENANCE

## 10.1. Cleaning

During operation, dirt particles are separated from the system at the built-in strainer. These impurities are gathered in the strainer and are consequently lead to the reduced passage of the strainer. This may cause problems with the function of the device.

**NOTE**
Recommendation: If problems with contamination occur frequently or constantly, further measures should be considered for the system (e.g. replacement and flushing of the system contents, installation of additional filters or sludge separators, etc.). These measures have a positive effect on all installed devices with direct contact with the medium, not just the pressurisation system.

The dirt particles separated by the strainer must therefore be removed at regular intervals by removing and cleaning the strainer screen. This inspection and cleaning of the strainer must be carried out at least twice a year! However, if there are any problems with the function of the device, the strainer must be cleaned first of all! Problems and malfunctions caused by failure to clean the strainer as prescribed are excluded from any warranty claims.

## 10.2. Cleaning the motor

Cooling fins and fan blades must be kept clean to ensure adequate cooling of the motor and electronics.

## 10.3. Maintenance

The device must undergo maintenance at least once a year or when a warning (W03) is displayed! Carrying out this maintenance is the responsibility of the operator.

**NOTE**
If the operator of the system is unable or unwilling to carry out this annual maintenance, appropriate specialist personnel or the factory customer service must be commissioned to do so.

**NOTE**
It is recommended that maintenance is carried out by the eder factory customer service. The conclusion of a maintenance contract is highly recommended.

## 10.4. Relubricating the engine mounts

**Pumps with 0.37 - 7.5 kW:**

The motor bearings are closed and permanently lubricated. The motor bearings can therefore not be relubricated.

**Pumps with 11 - 22 kW:**

The motor bearings are open and must therefore be relubricated regularly. The motor bearings are already pre-lubricated upon delivery.

Before relubricating, remove the lower plug in the motor flange and the plug in the bearing cover so that the old grease can escape unhindered.

The use of polycarbamide-based lubricating grease is recommended.

**Reference values for the amount of grease:**

- Motor type MGE 160 13 ml
- Motor type MGE 180 15 ml

When relubricating for the first time, use double the amount of grease because the lubrication channel is not yet filled with grease.

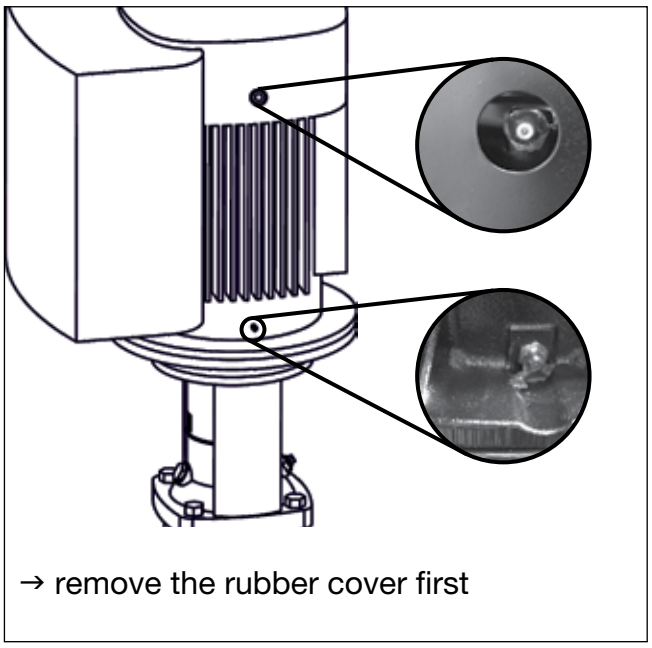



*Figure 20: Position of the grease nipples*

# 11. APPENDIX

## 11.1. Appendix A Sizing of the expansion line

Expansion lines are pipes that connect the system to the expansion and pressure maintenance system.

**NOTE**
The design criterion is the nominal heat output to be dissipated, the maximum operating temperature and the flow velocity according to ÖNORM H 5151-1:2010 12 15.

Extract from ÖNORM H 5151-1:2010 12 15:

11.2.3.2 Sizing the expansion line (expansion line).

The following points must be observed when sizing the expansion line:

- The nominal heat output of the heat supply system applies to the sizing of the expansion line.
- For systems with a nominal heat output of less than 500 kW, the minimum nominal diameters can be retrieved from the adjacent table.

| DN | Nominal heat output in kW |
|---|---|
| 20 | up to 120. |
| 25 | over 120 to 500 |

*Minimum nominal diameter of expansion lines*

The maximum flow velocity in the expansion line must not exceed 0.15 m/s.

**NOTE**
If the heat supply and heat distribution systems are separated, there may be a small volume of water in the heat supply system. It may therefore be necessary to size the expansion line using the maximum flow velocity.

The calculation of the flow velocity in the expansion line must be based on the percentage temperature-dependent increase in volume $V_e$ from the filling water temperature (10°C) to the protection temperature $\theta_{TZ}$ and the total content of the system $V_A$.

The heating time $t_A$, which is required to reach the safety temperature $\theta_{TZ}$ and the total volume of the system $V_A$, is calculated according to equation A:

$$t_A = \frac{(V_A \cdot \Delta\theta_{TZ} \cdot c_W \cdot \rho_W)}{\Phi_N}$$

| | | |
|---|---|---|
| $c_W$ | Spec. heating capacity heating water at $\theta_{TZ}$ | [ kJ/(kg . K) ] |
| $\Phi_N$ | Ratedheat output | [ kW ] |
| $\rho_W$ | Heating water density at $\theta_{TZ}$ | [ kg/m³ ] |

Equation A

The expansion volume flow $V_e$ is calculated according to equation B:

$$\dot{V}_e = \frac{V_e}{t_A \cdot 1000}$$

Equation B

The calculation inner diameter of the expansion line is calculated according to equation C:

$$d_{AI} = \sqrt{\frac{4 \cdot \dot{V}_e}{\pi \cdot v}} \cdot 1000$$

Equation C

The next larger nominal pipe diameter must be selected. The maximum pressure loss in the expansion line must not exceed 1 kPa.

**NOTE**
Within the pressure maintenance system (overflow line, suction line), the manufacturer decides which flow velocities ensure problem-free functioning of the pressure maintenance system.
The maximum flow velocities are therefore 0.75 m/s in the overflow line and 0.50 m/s in the suction line.

## 11.2. Appendix B Details on the connection of ETCM with EG(Z)-M

Devices of the topcontrol modular series do not have an attached expansion tank; the expansion volume is stored in expansion tanks of the EG series, with the EGZ expansion tank serving as a possible extension.

The individual devices must always be connected in accordance with the required hydraulic connection diagram in section 3.

**NOTE**
For proper functioning of the pressure maintenance system, the following instructions must be observed when connecting ETCM with EG(Z)-M!

**Ensure that the respective connections are connected correctly!**
EG(Z)-M expansion tanks have internals on the lower vessel flange that are required for proper degassing function.

Therefore, the overflow line of the ETCM control unit must always be connected to the overflow line on the expansion tank, and this must also be observed for the suction line!

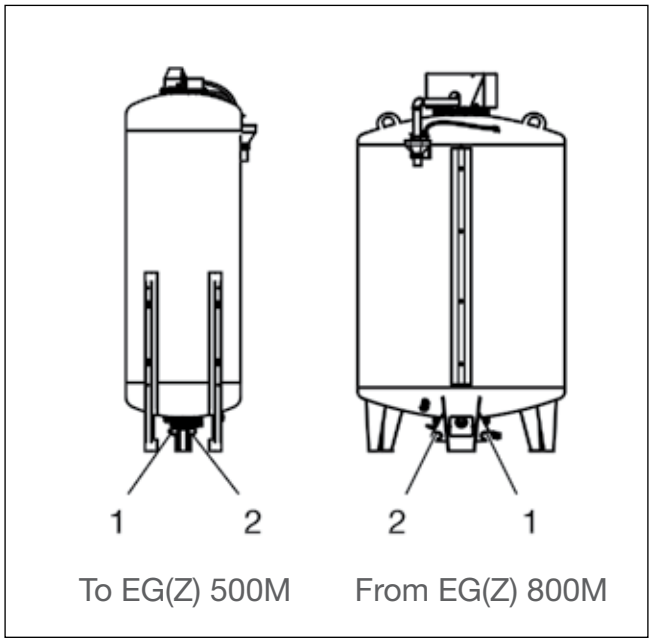



*Figure 21: Overflow line (1) and suction line (2) from EG(Z)-M*

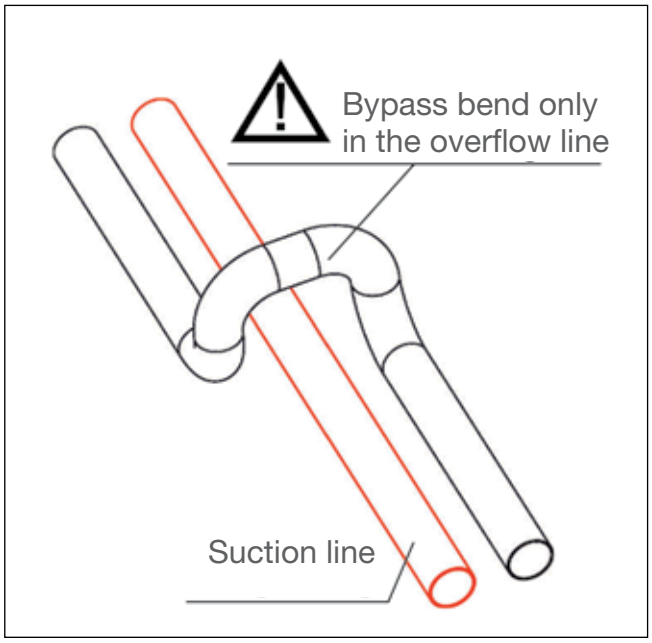



*Figure 22: Laying the suction line*

**Laying the suction line**

In some cases, it may be necessary to cross the overflow line and the suction line in order to connect the ETCM and EG(Z)-M correctly.

It is important to ensure that the suction line is laid without constant differences in level.

If differences in level between the ETCM and EG(Z)-M cannot be avoided, care must at least be taken to ensure that the suction line from the ETCM to the EG(Z)-M is routed upwards.

**NOTE**

Avoidance bends, jump bends etc. required for the crossing may only be implemented in the overflow line.

To ensure problem-free level compensation between the individual vessels, the suction line and overflow line must be laid close to the floor along their entire length!

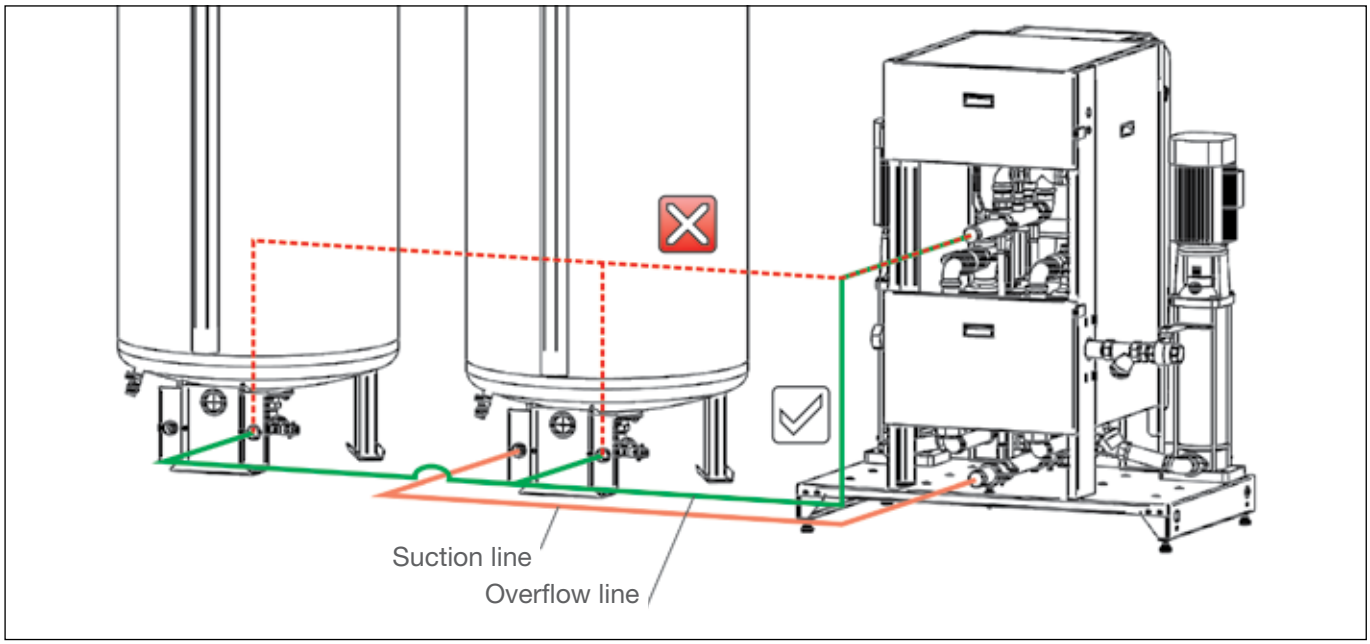



*Figure 23: Laying the suction line and overflow line*

# 12. CE DECLARATIONS OF CONFORMITY

## EG-Konformitätserklärung
## *EC Declaration of Conformity*

**im Sinne der Richtlinie(n):**

- 2006/42/EG über Maschinen

- 2014/30/EU über die elektromagnetische Verträglichkeit

- 2014/35/EU über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt

- 2011/65/EU Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS 2) gemäß Anhang II (gültig ab 22.07.2019) nach Änderungen der Richtlinie (EU) 2015/863

**in accordance with the directive(s):**

- 2006/42/EC on machinery

- 2014/30/EU relating to electromagnetic compatibility

- 2014/35/EU relating to the making available on the market of electrical equipment designed for use within certain voltage limits

- 2011/65/EU use of certain hazardous substances in electrical and electronic equipment (RoHS 2) as per Annex II (valid from 22 July 2019) acc. to the amendments of the directive (EU) 2015/863

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**Der Hersteller** / **The manufacturer**

Eder Spirotech GmbH
Leisach 52
A - 9909 Leisach

**erklärt hiermit, dass das Produkt** / **declares hereby, that the product**

topcontrol modular TCM

**mit dem (optionalen) Zubehör** / **with the (optional) accessories**

| | | |
|---|---|---|
| Expansionsgefäß | elko-mat eder EG-M | expansion vessel |
| Nachspeisemodul | multicontrol MCF | makeup module |
| Entgasungsmodul | multicontrol MAE | degassing module |

**entwickelt, konstruiert und gefertigt wurde in Uber-einstimmung mit der/den oben genannten Richtlinie(n).**

**has been developed, designed and manufactured in compliance with the above listed directive(s).**

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**Folgende harmonisierten und nationalen Normen und Spezifikationen sind angewandt:**

**The following harmonised and national standards and specifications have been applied:**

- ÖNORM EN ISO 12100:2013
- ÖVE EN 60204-1:2019
- EN 61000-6-2:2005
- EN 61000-6-3:2007 +A1:2011 +AC:2012
EN 61326-1:2013
EN 61000-3-2:2014
EN 61000-3-3:2013
ÖNORM EN 60335-1:2012 + AC:2014
ÖVE ÖNORM EN 60730-1:2012

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Leisach, 03.02.2022
Ort, Datum

Ing. Hans Jacobs, Geschäftsführer
Unterschrift

**NOTES**

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# MAXIMISING PERFORMANCE FOR YOU





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