SPIROTECH

Maximising Performance for You

INSTRUCTION MANUAL

TOPCONTROL MODULAR (ETCM-_1)

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!

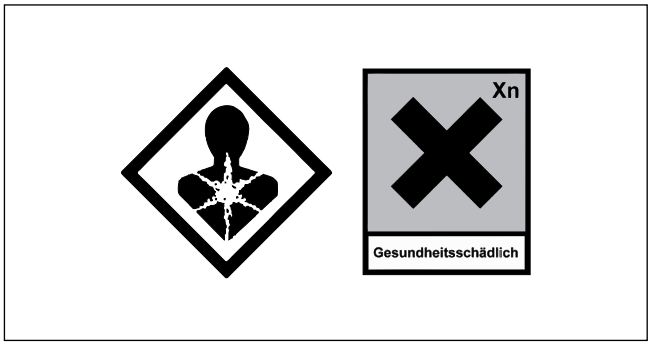


Figure 1: Hazard warning 1

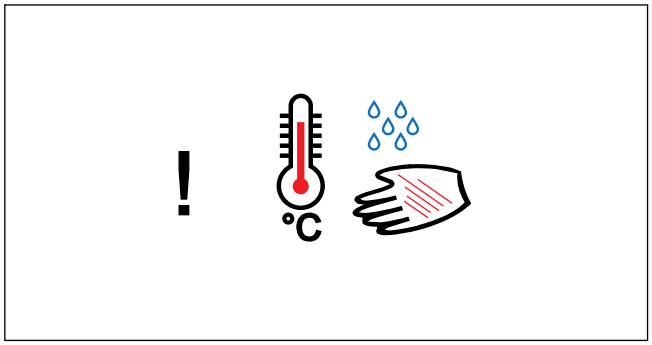


Figure 2: Hazard warning 2

Since different devices each may have a special medium contained within, 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 installer of the system and, after proper handover, the responsibility of the operator of the system to take appropriate safety-related measures if necessary.
Take precautions and, if necessary, attach warning signs 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!

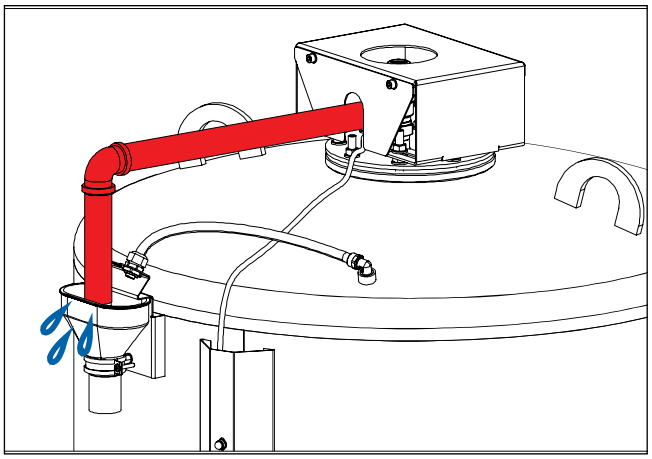


Figure 3: Vessel overflow

- For maintenance purposes, a filling and emptying tap is installed in the pressuriser, which allows the hot and harmful system medium to escape by opening the tap. In this case there is a risk of scalding!

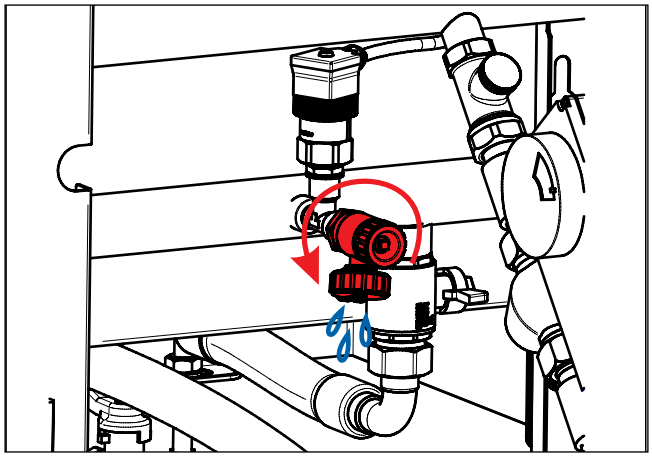


Figure 4: Filling and emptying tap of the pressuriser

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

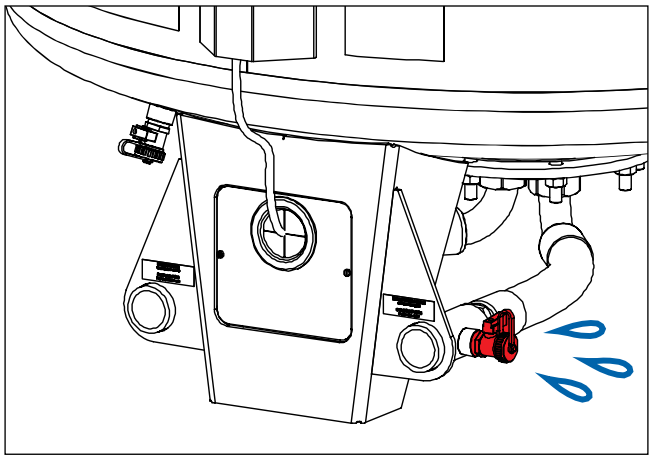


Figure 5: Filling and emptying tap of the vessel

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" function or uncontrolled if the EMCF 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!***

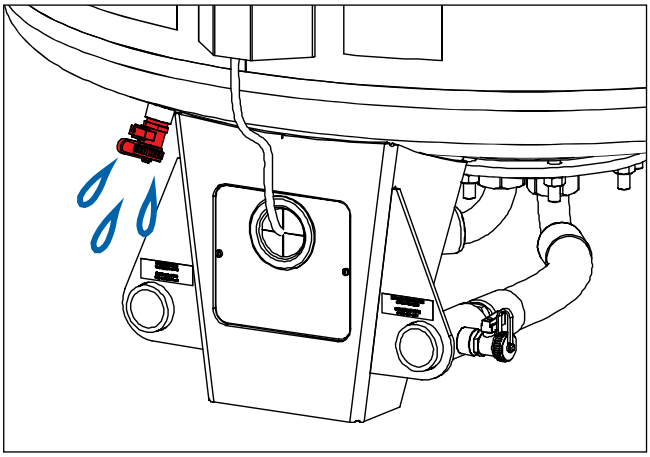


Figure 6: Emptying vessel (EG)

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
Spirotech 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

Topcontrol modular ETCM-_1 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 a self-supporting, sound-insulating construction for modular combination with unpressurized expansion tanks (max. 0.5 bar), connections for suction and overflow lines on the back.

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 maintaining pump(s) and overflow valve(s) continuous and pressure-proportional regulation.

Precision system pressure measurement. Hydraulic connection (expansion line) for on-site integration ex works on the left and with necessary barrier (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.

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.

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). Automatic, economical low-pressure degassing function based on the principle of depressurisation integrated as standard. 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
- max. operating pressure (PN): 10 bar

3.2. CE mark

The device is CE labelled. This means that the device has been developed, built and tested in accordance with the applicable health and safety regulations. Provided that the operating instructions are followed, the device can be used and maintained safely.

3.3. Type plate

The rating plate of the device is located on the side of the device and is shown in the illustration below.

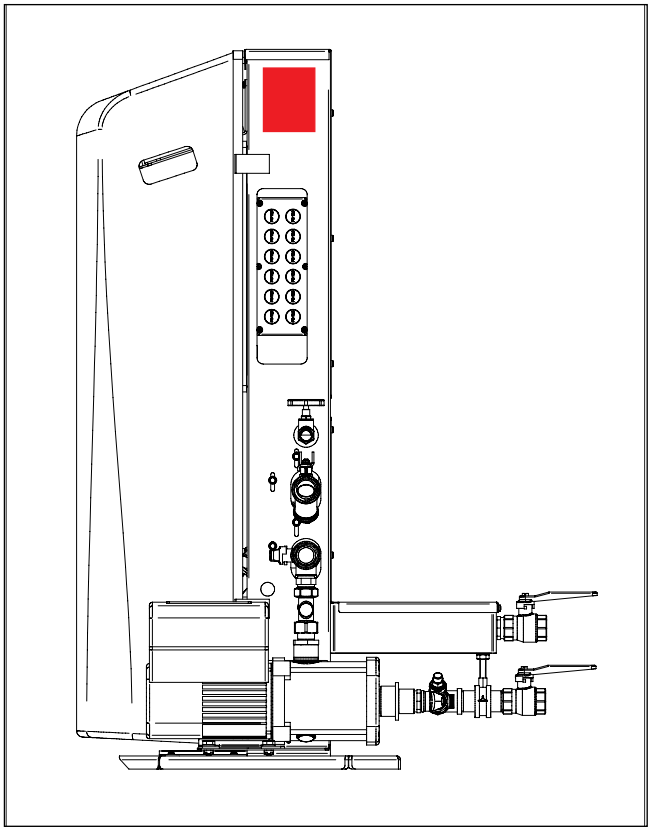


Figure 7: Type plate ETCM-_1

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.

The connection of all hydraulic lines from the Spirotech device to the system must be as de-energised as possible.

The nozzle loads introduced into the device through connected piping must not impair the device in any operating phase. Pipes must be designed and installed in such a way that impermissible forces are avoided (ex: by installing expansion joints or setting fixed points immediately before the transition to the connection points on the device).

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

Operation:
The device should only be installed in enclosed indoor areas of buildings. The ambient temperature in the installation room must be in the range between +5°C and +40°C from the time the device is first filled with the system medium until the device is decommissioned.

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).

Integration into the system return is carried out according to the diagrams (in Chapter 5 - "Hydraulic connection diagrams").

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!

4.2. Backfeed module multicontrol EMCF-1

Devices from the topcontrol modular ETCM-_1 series are delivered ex works without an EMCF-1 backfeed module. Retrofitting is possible at any time. The assembly of this module is carried out in accordance with the instructions included with the module when it is delivered.

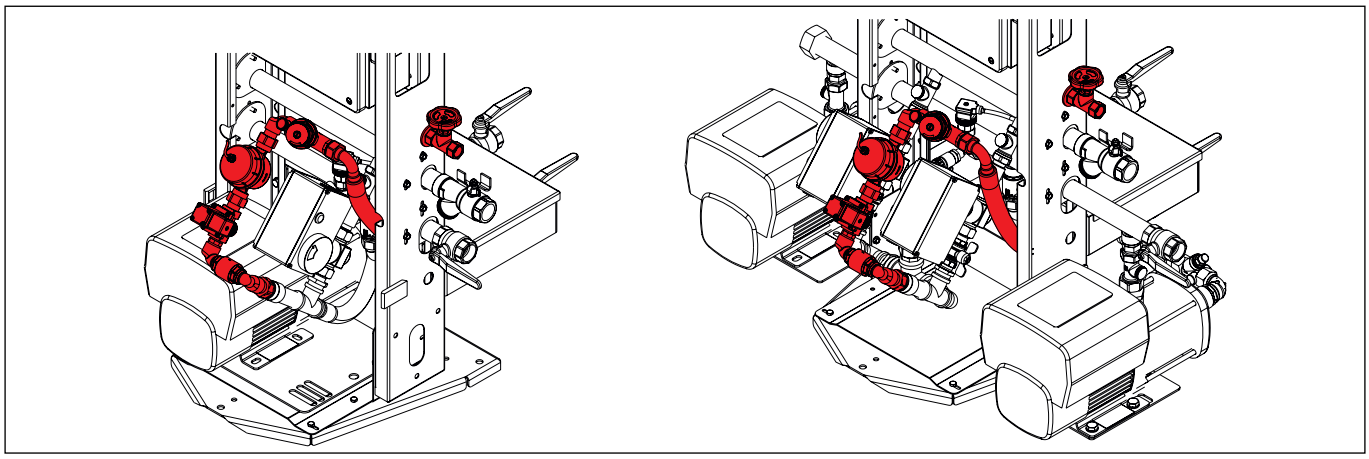


Figure 8: Installation of the EMCF-1 backfeed module on ETCM-S1 (left) and ETCM-M1/D1/twin (right)

4.3. Connection to the water supply system

Devices with a built-in backfeed module (EMCF, EMCC-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

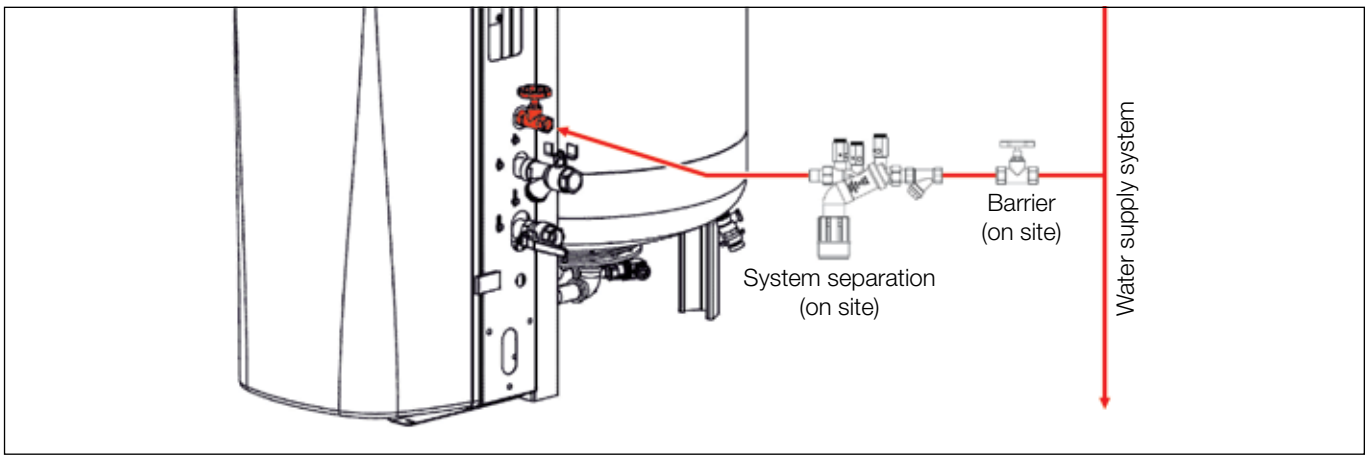


Figure 9: Connection for fresh water supply

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. Connection side right / left

On ETCM-_1 devices, the connections from/to the system return are located on the right side ex works. These can be converted to the left-hand side if required. The other side must be closed with the caps supplied (Fig. 10).

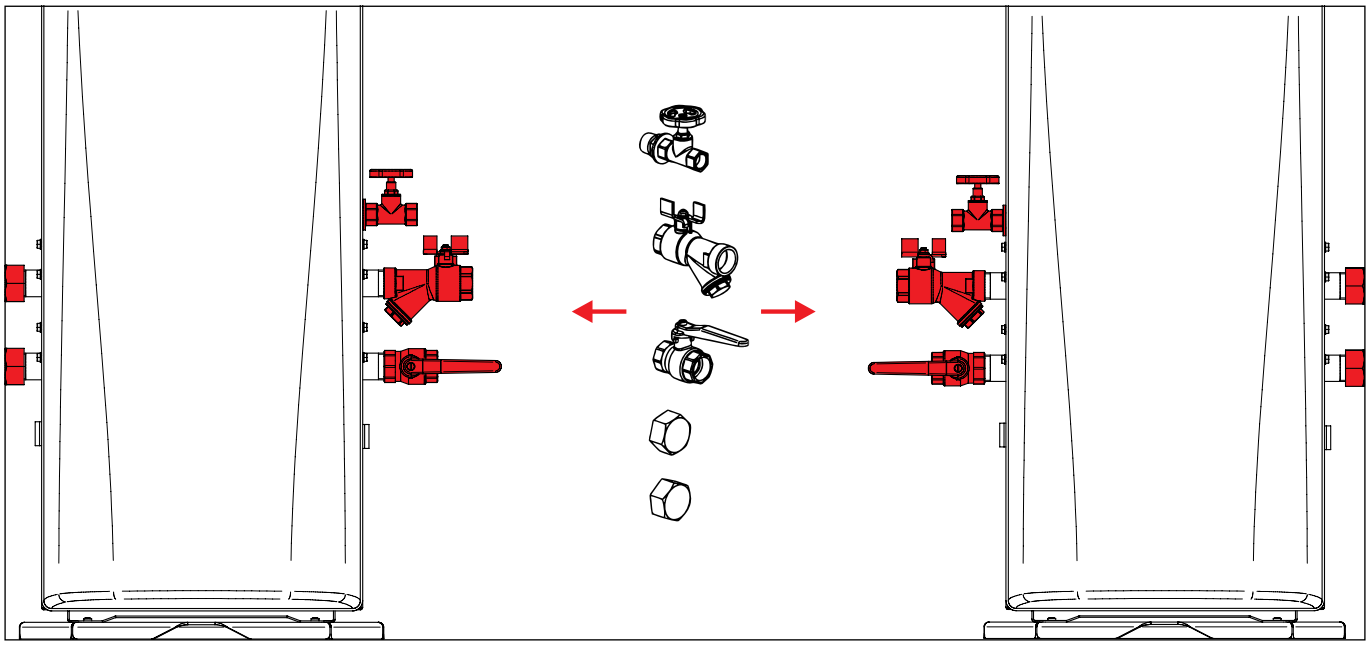


Figure 10: Conversion of connection side hydraulics MultiControl Compact

The connections from/to the expansion vessel are located on the rear of the device (Fig. 11).
A conversion to the right/left of the rear connections is not possible!

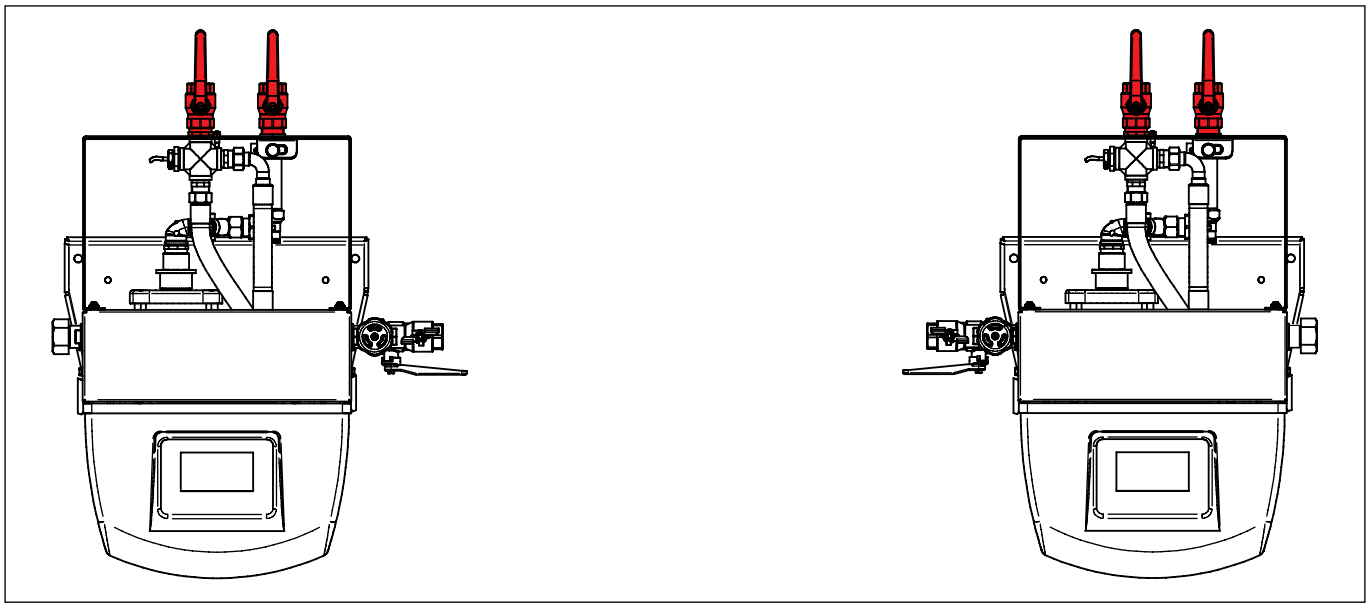


Figure 11: Connections from/to the expansion vessel

The electrical connections (cable flange plate with pre-punched cable glands) are also located on the right-hand side of the unit and can also be converted to the left-hand side if required (Fig. 12).

The opening on the other side must be closed with the blind flange (ex works on the left-hand side) (Fig. 13).

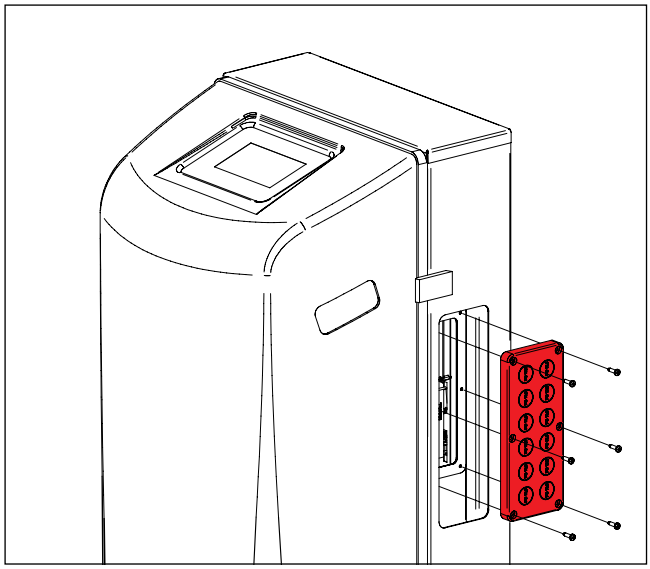


Figure 12: Cable flange plate

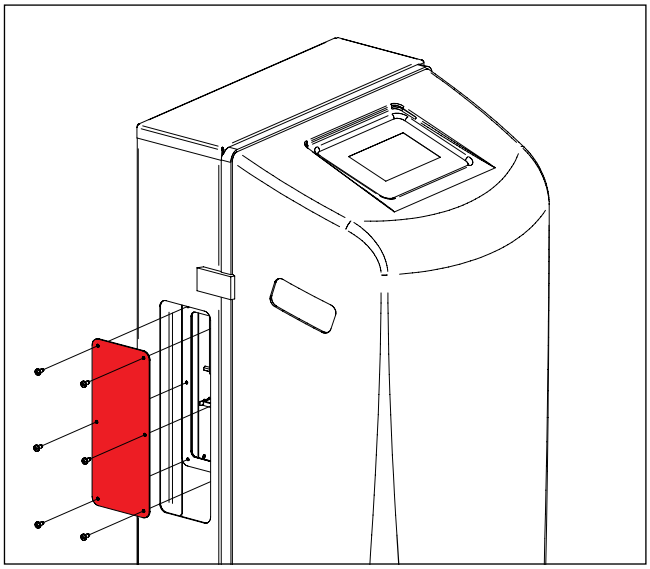


Figure 13: Blind flange

4.5. Use of ETCM-_1 devices without degassing function

ETCM-_1 devices can also be operated without a degassing function. The unused connections must be connected to one another according to the sketch below (Fig. n+4). This connection can be made with the MULTICONTROL COMPACT bypass set, which is available as an accessory. Alternatively, this can also be carried out on site (DN 25).

Integration into the system then takes place with just one pipe (connection "EXPANSION/OVERFLOW LINE from system return") in the system return, see also Chapter 5 - "Hydraulic connection diagrams".

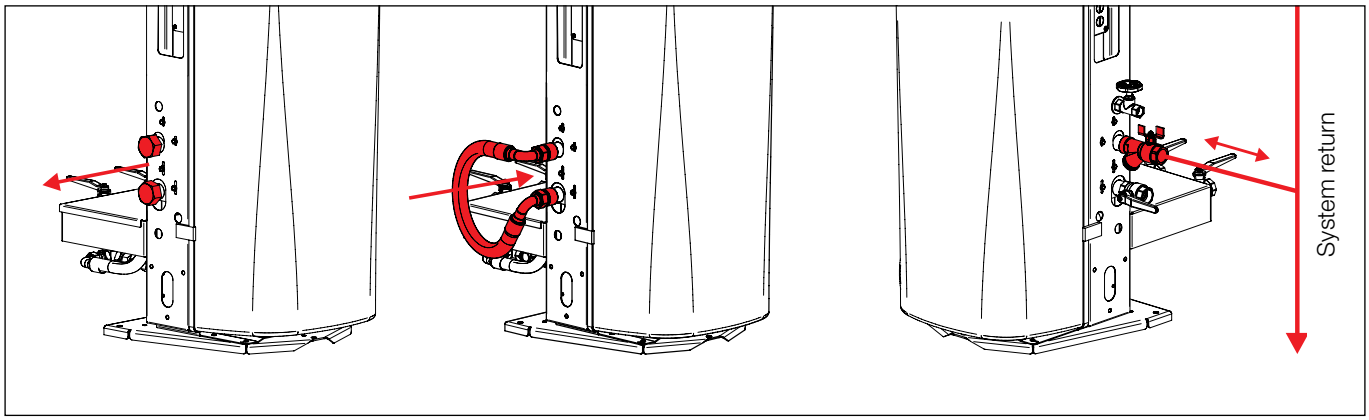


Figure 14: : Connection of the connections to the bypass set and connection to the system return

4.6. Use of cooling vessels

ETCM-_1 devices are suitable for systems where the maximum temperature at the connection point does not exceed 70 °C. If temperatures of more than +70 °C (up to +110 °C) can occur at the point of integration into the system, a cooling vessel must be used.

Depending on the pipe routing from the system return to the EV cooling vessel, a vent valve must be installed on the upper connection. This must be vented once during commissioning.

INFORMATION

When using an EV cooling vessel, ensure that it is not thermally insulated under any circumstances. This also applies to the entire expansion line from the system return to the automatic expansion valve.

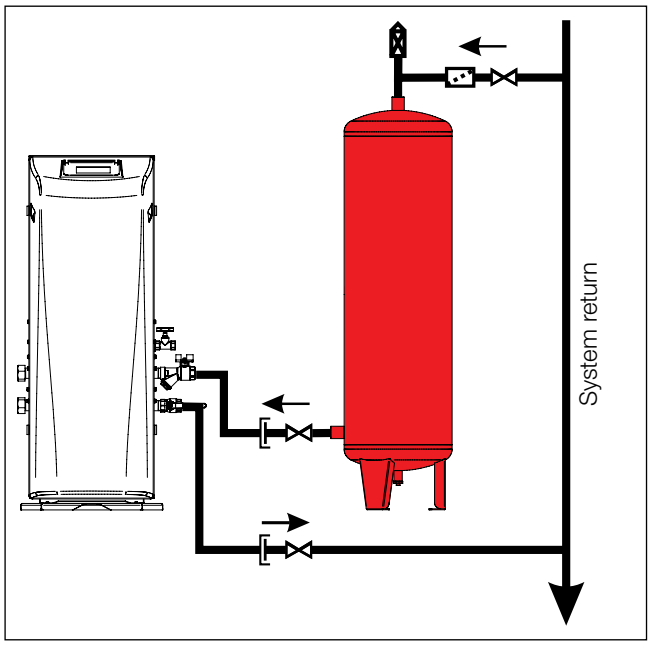


Figure 15: Use of an EV cooling vessel

4.7. Temperature sensor T2

ETCM-_1 devices, in conjunction with the T2 temperature sensor available as an accessory, offer the option of monitoring the temperature in the system return or in the expansion overflow pipe.
With the help of this monitoring, the degassing function is blocked to protect the device if the temperature becomes too high, so that the fittings and the membrane are not damaged during the degassing process by system medium that is too hot or has not yet cooled down. The installation of a T2 temperature sensor is highly recommended for systems with a protection temperature of more than 95 °C.
This temperature sensor is integrated on site in the system return immediately upstream of the connection point (Fig. 16). When using an cooling vessel, a sleeve is provided on the cooling vessel for this purpose (Fig. 17).

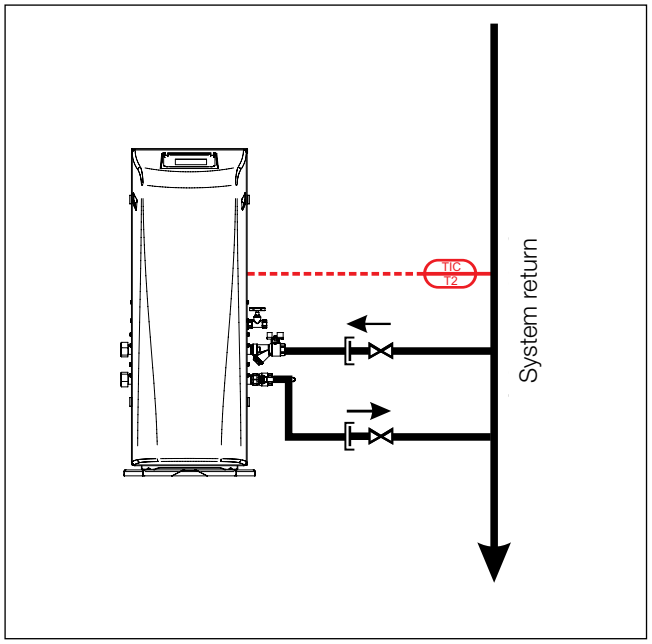


Figure 16: Integration of temperature sensor T2 without cooling vessel

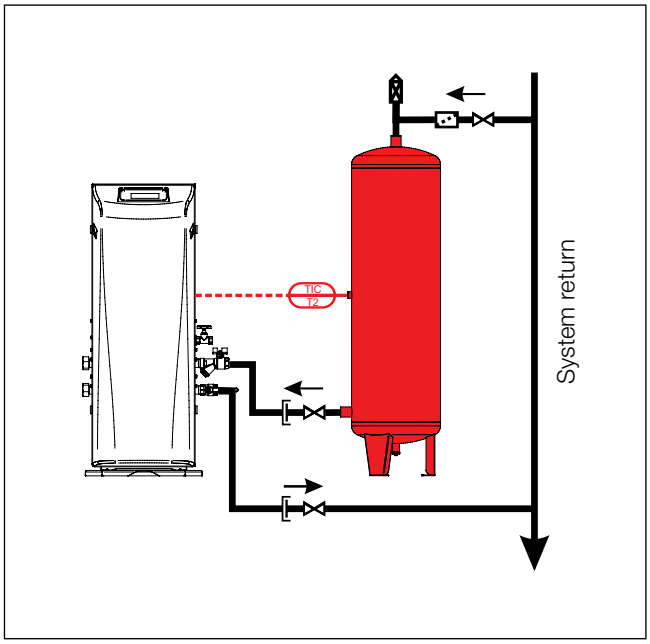


Figure 17: Integration of temperature sensor T2 with cooling vessel

4.8. Electrical connection

For single-phase devices, the mains supply cable is designed as a protective contact supply cable and should be connected by plugging it into a protective contact socket. This plug is intended for complete disconnection of the device from the mains; no other disconnecting devices are included.

If a direct connection to the mains is required, an appropriate device must be installed on site to enable complete disconnection from the mains (e.g. two-pole main switch).

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:

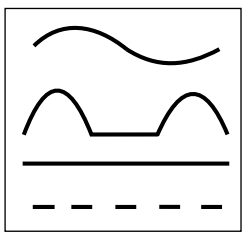


Figure 18: Symbol

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.

4.8.1. Phase, neutral conductor

Both when connecting to the earthed socket and when connecting directly to the mains, ensure that the phase and neutral conductors are not interchanged. A corresponding check must be carried out by a suitably trained electrician as part of the electrical installation.

The phase and neutral conductor are connected correctly if no voltage is measured between the earthing busbar and neutral conductor busbar when the power supply is connected (the earthing and neutral conductor busbars are located in the MultiControl device's switch cabinet).

If a voltage equal to the supply voltage (approx. 230V~) is measured during this check, the phase and neutral conductors must be connected reversed and the polarity reversed accordingly.

Important!
The polarity of the phase and neutral conductors must always be reversed externally to the MultiControl device (when connecting to an earthed socket, the phase and neutral conductors must be swapped in the socket).

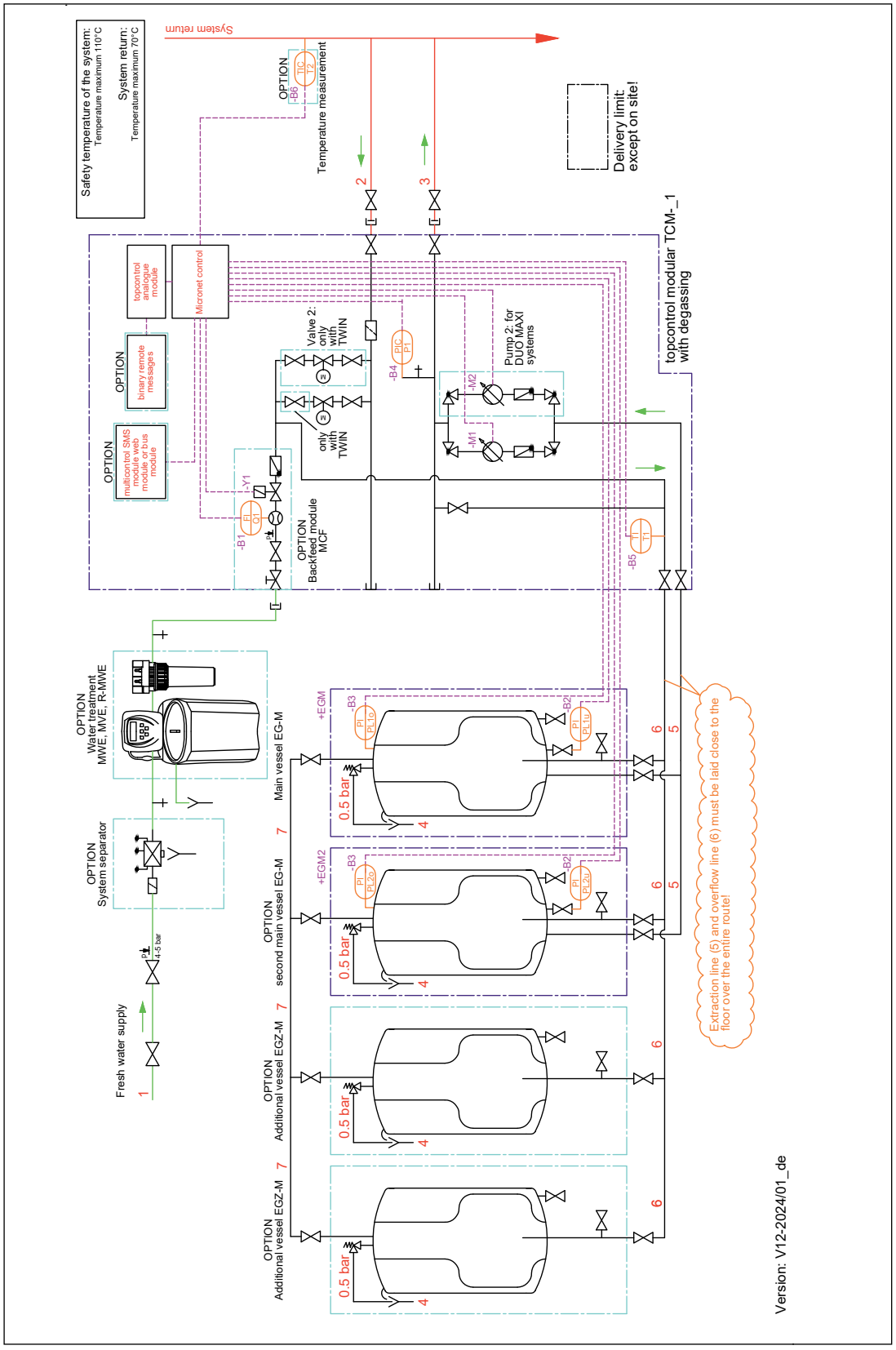
CAUTION
If the mains connection cable of this device is damaged, it must be replaced by the manufacturer or its customer service or a similarly qualified person in order to avoid hazards.

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 DIAGRAMS

5.1. TopControl Modular ETCM-_1 with degassing function standard diagram):

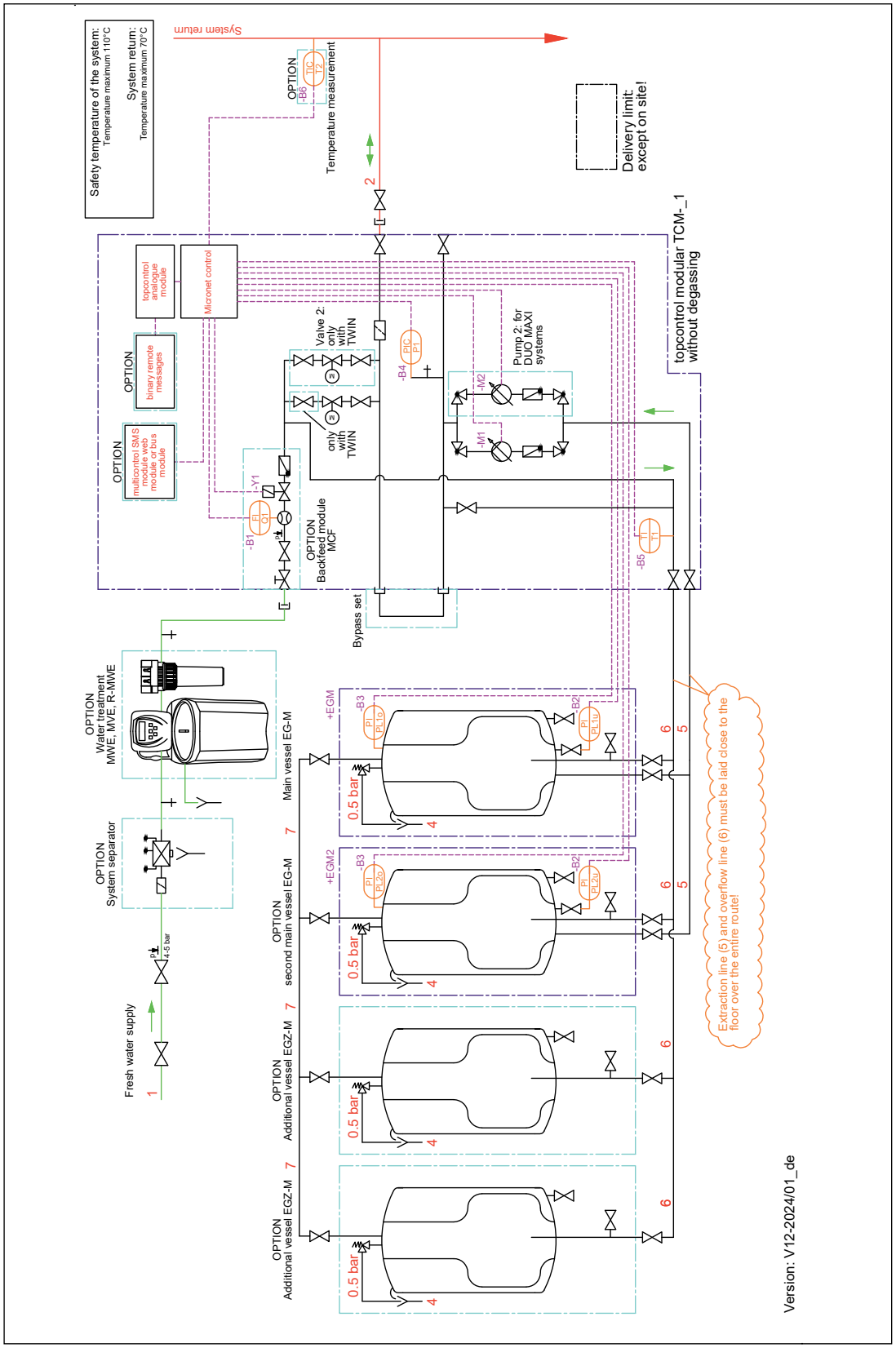


1. Fresh water supply	5. Suction line from the expansion tank
2. Expansion overflow line from the system return at least DN25	6. Overflow line to the expansion tank
3. Expansion pressure line to the system return at least DN25	7. DN20 gas-side vessel connection
4. Vessel safety valve drain pipe	

Options:

2 EG-M main vessels with level measurement, 2 EGZ-M additional vessels, expansion modules, EMCF-1 backfeed module, sensor T2

5.2. TopControl Modular ETCM-_1 without degassing function:

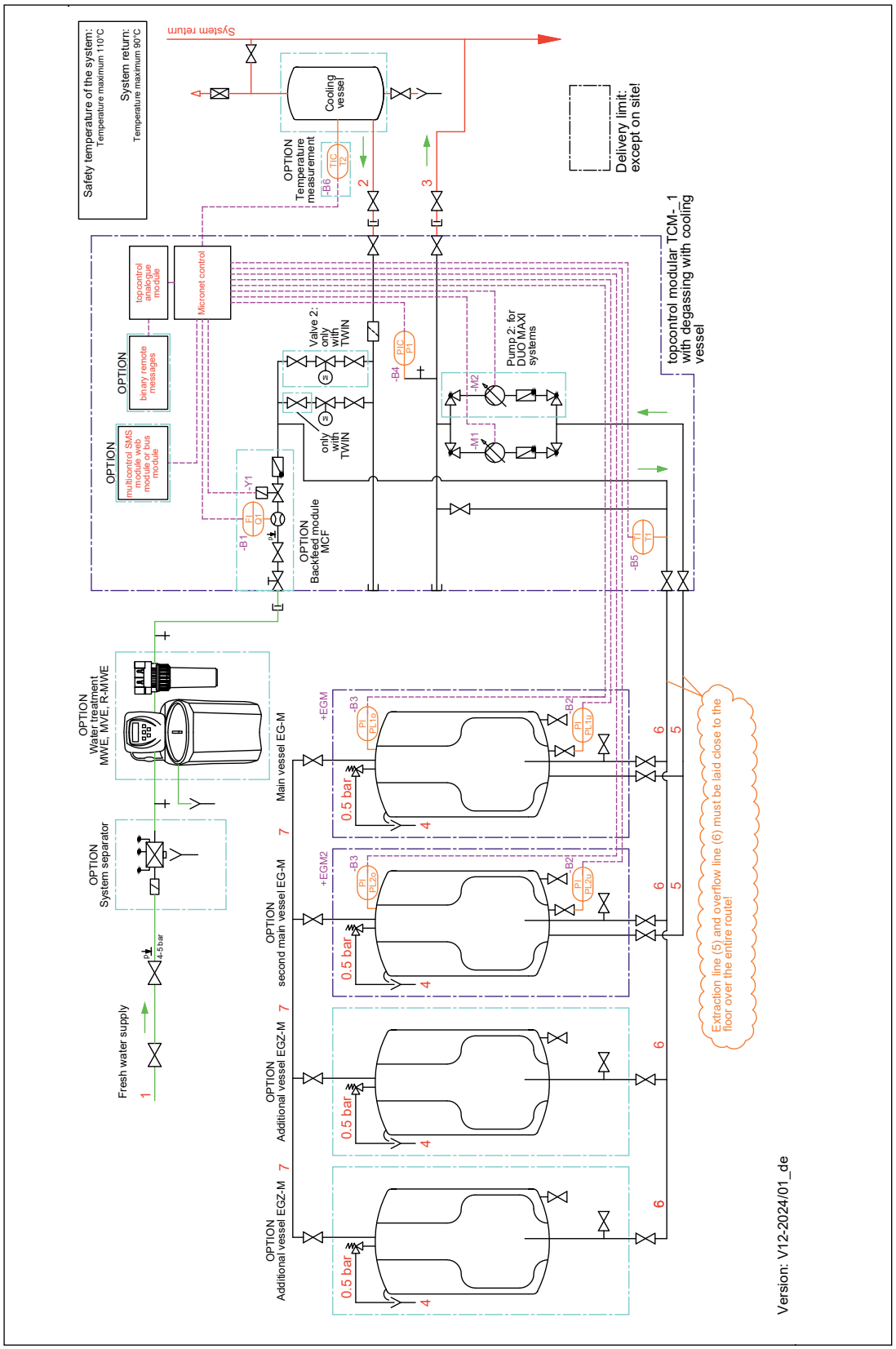


1. Fresh water supply	5. Suction line from the expansion tank
2. Expansion overflow line from the system return at least DN25	6. Overflow line to the expansion tank
3. Expansion pressure line to the system return at least DN25	7. DN20 gas-side vessel connection
4. Vessel safety valve drain pipe	

Options:

2 EG-M main vessels with level measurement, 2 EGZ-M additional vessels, expansion modules, EMCF-1 backfeed module, sensor T2, bypass

5.3. TopControl Modular ETCM-_1 with degassing function with cooling vessel:

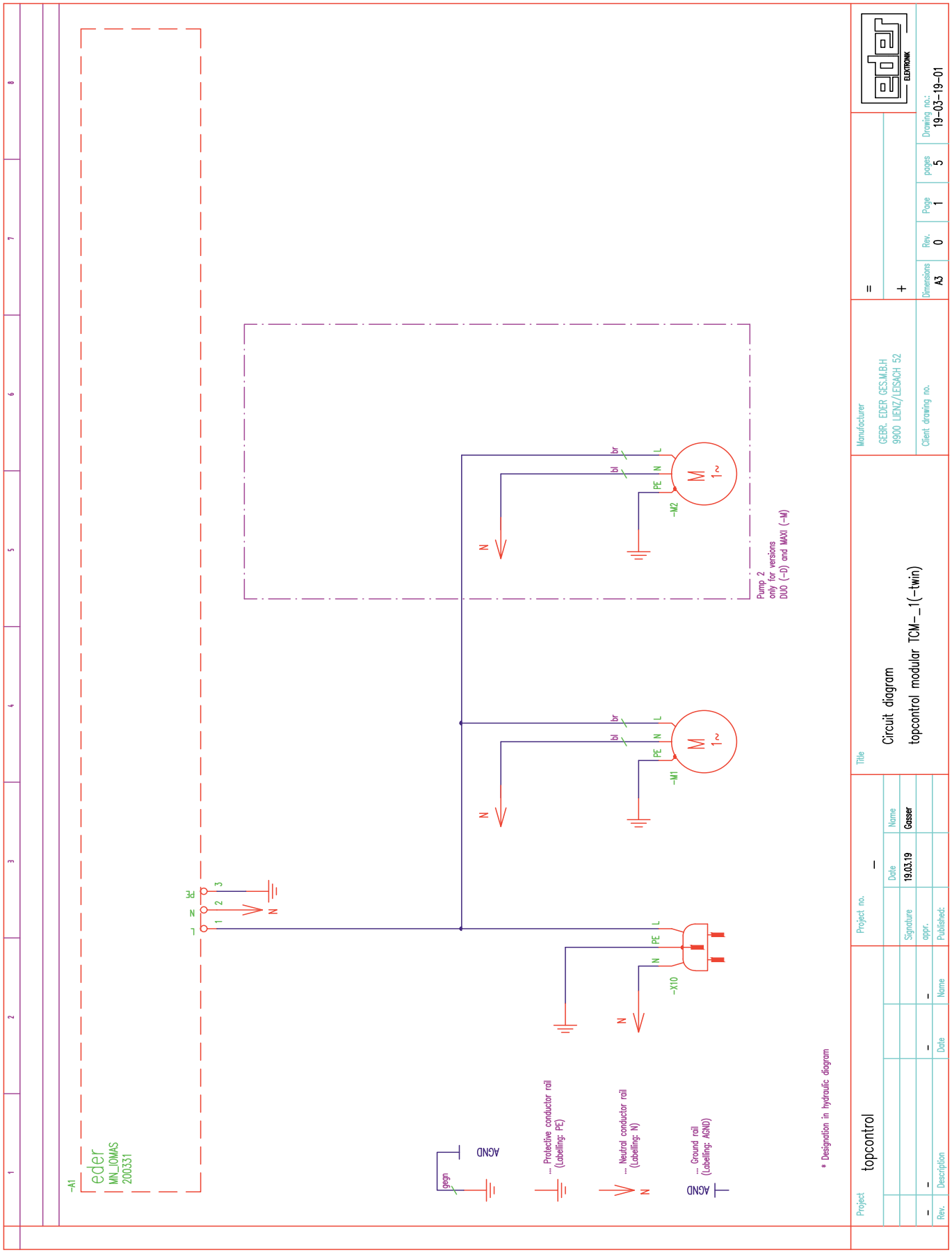


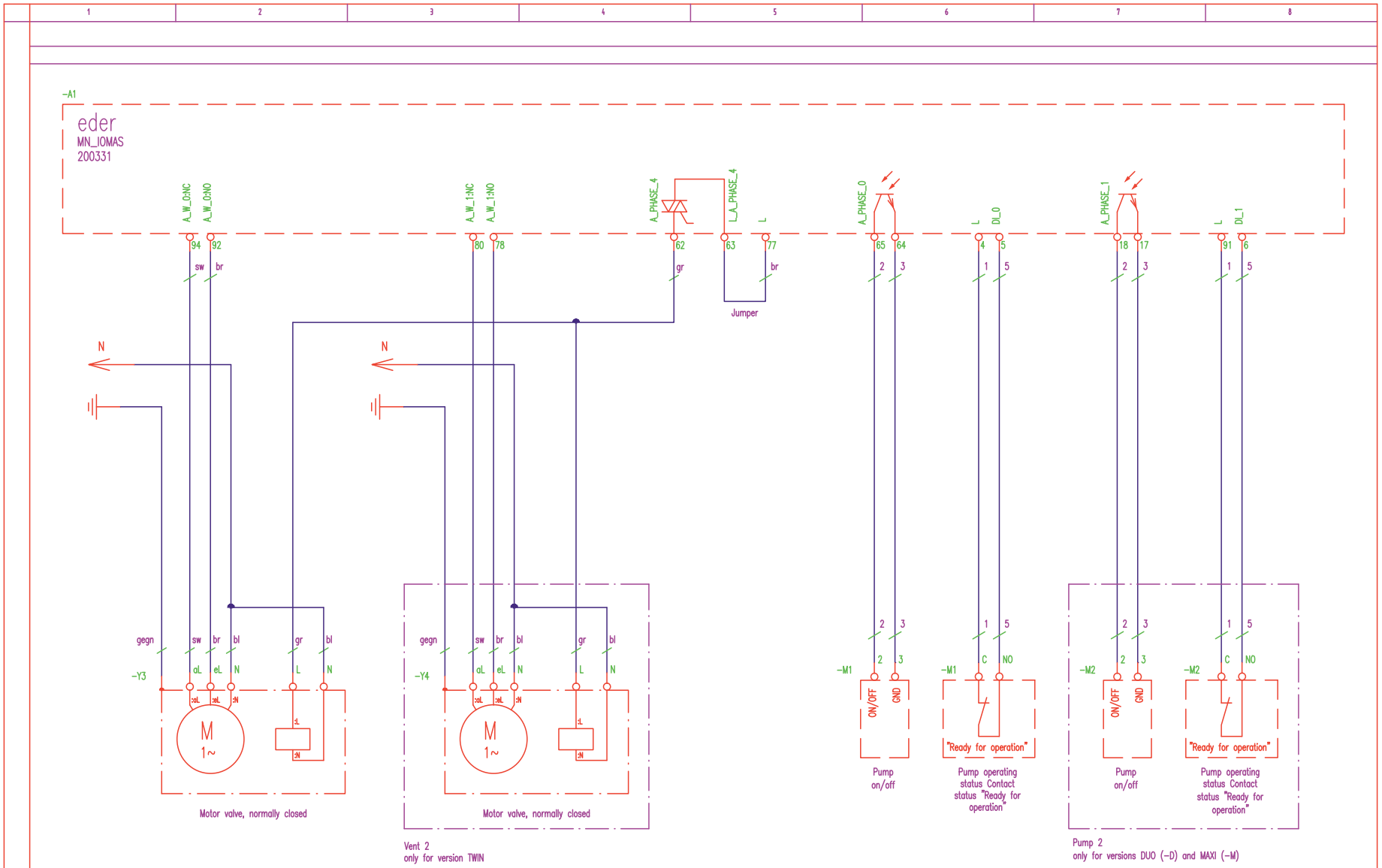
1. Fresh water supply	5. Suction line from the expansion tank
2. Expansion overflow line from the system return at least DN25	6. Overflow line to the expansion tank
3. Expansion pressure line to the system return at least DN25	7. DN20 gas-side vessel connection
4. Vessel safety valve drain pipe	

Options:

2 EG-M main vessels with level measurement, 2 EGZ-M additional vessels, expansion modules, EMCF-1 backfeed module, sensor T2, EV cooling vessel

6. CIRCUIT DIAGRAMS





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

Client drawing no.

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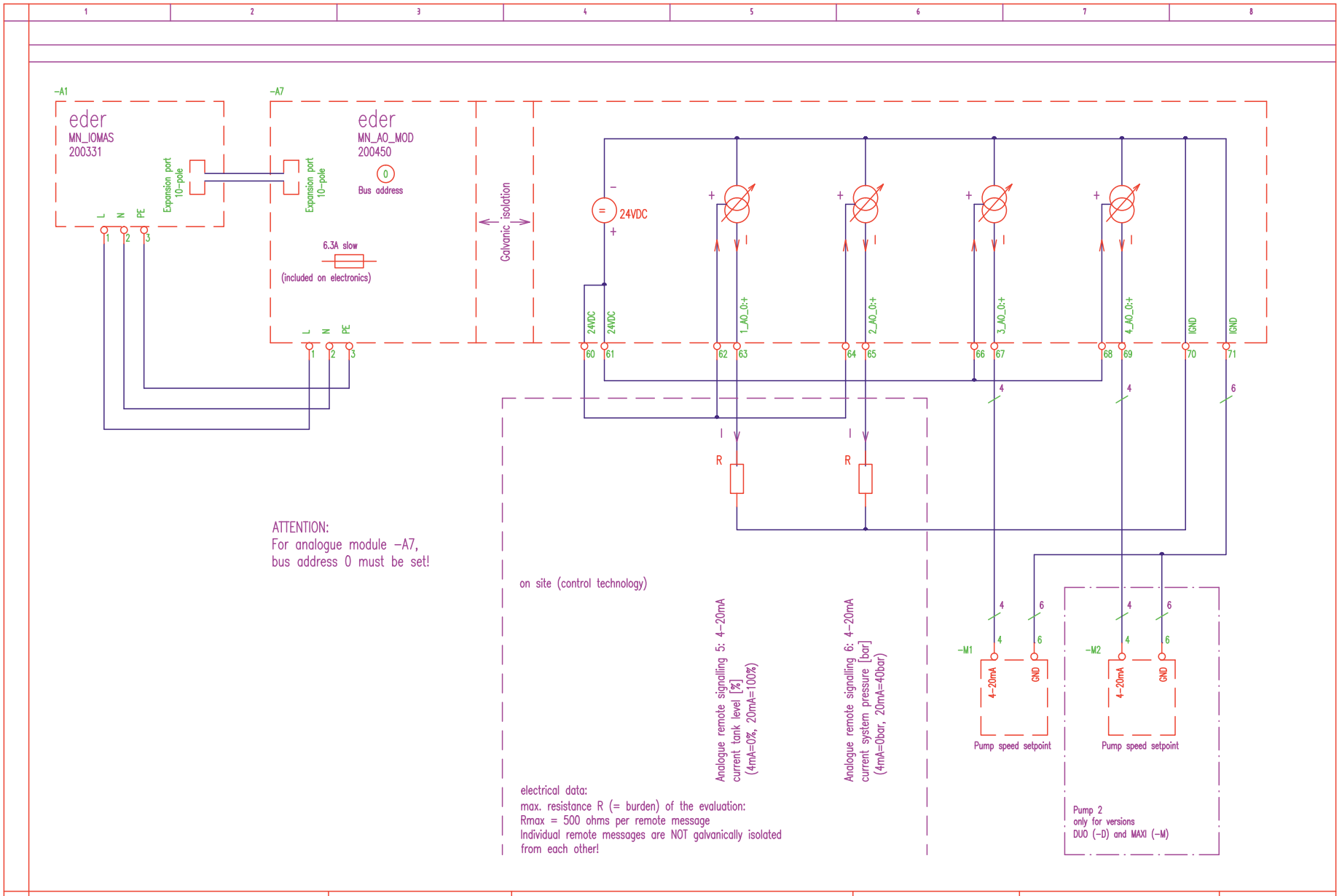

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Rev.	Description	Date	Name	Published:		

Title: Circuit diagram topcontrol modular

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

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Dimensions	Rev.	Page	pages	Drawing no.:
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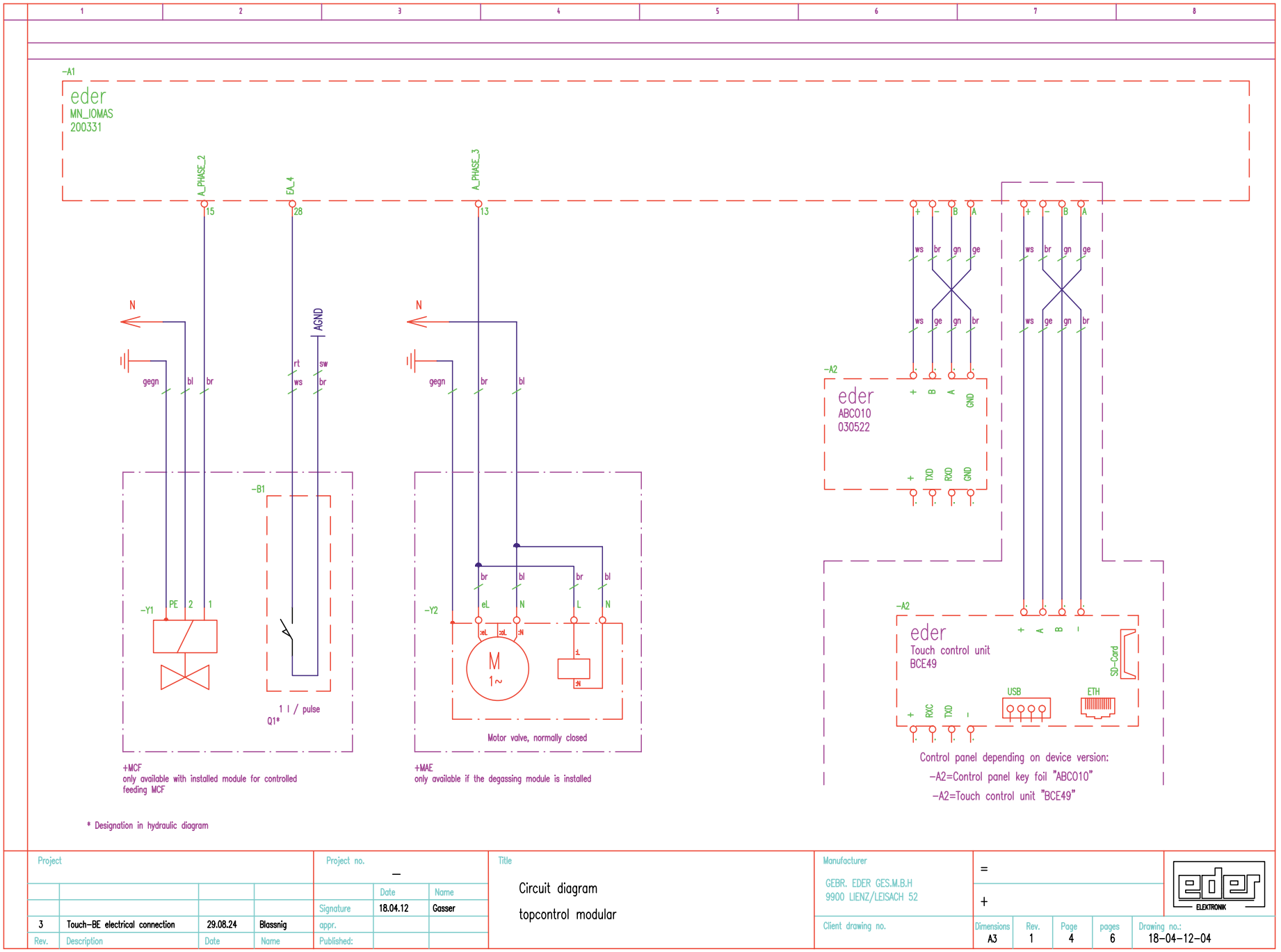
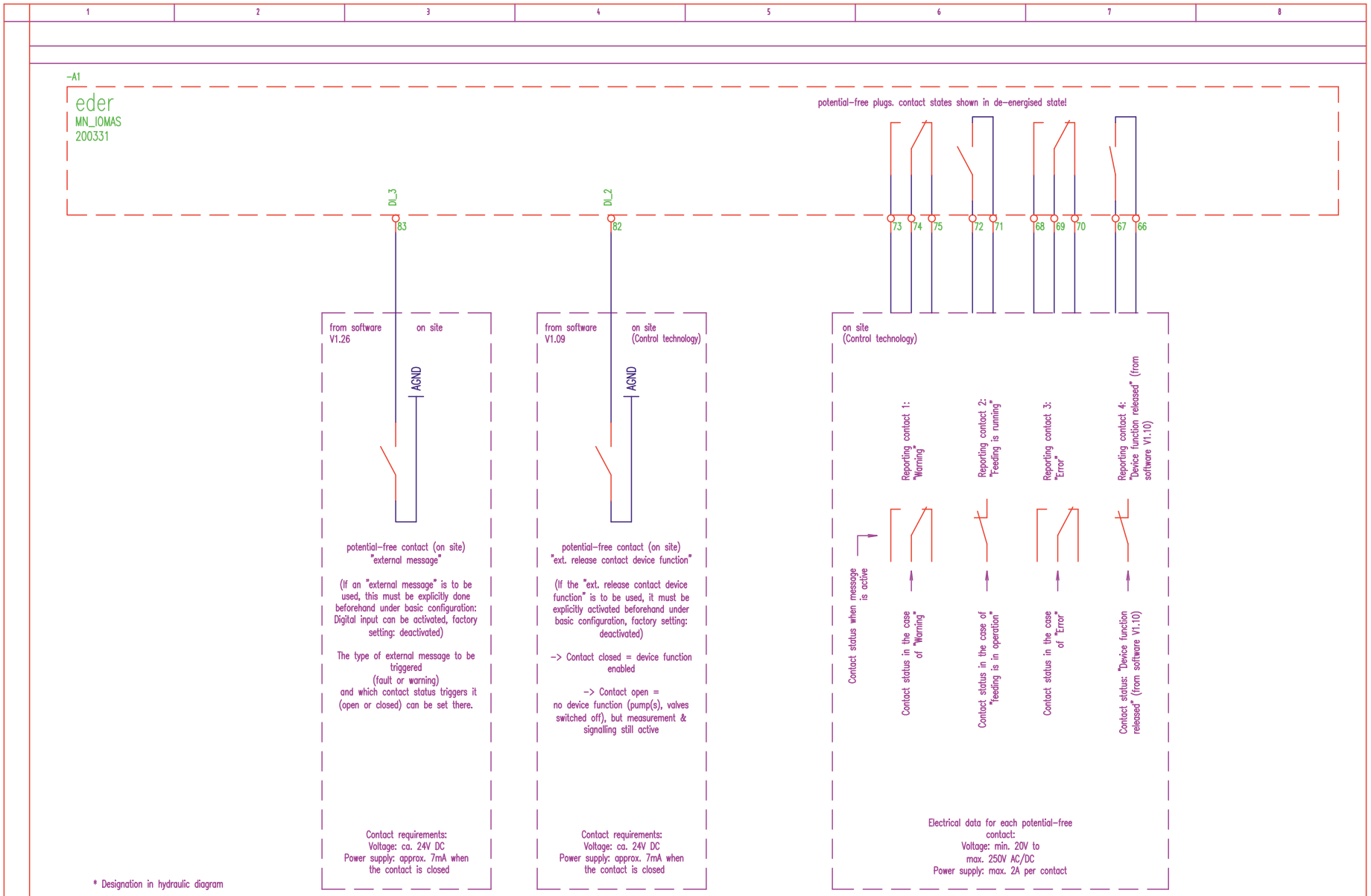


* Designation in hydraulic diagram



Project				Project no.		
				–		
					Date	Name
				Signature	18.04.12	Gasser
1	External message added	07.11.18	Gasser	appr.		
Rev.	Description	Date	Name	Published:		

Title: Circuit diagram topcontrol modular

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

Client drawing no.

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Dimensions	Rev.	Page	pages	Drawing no.:
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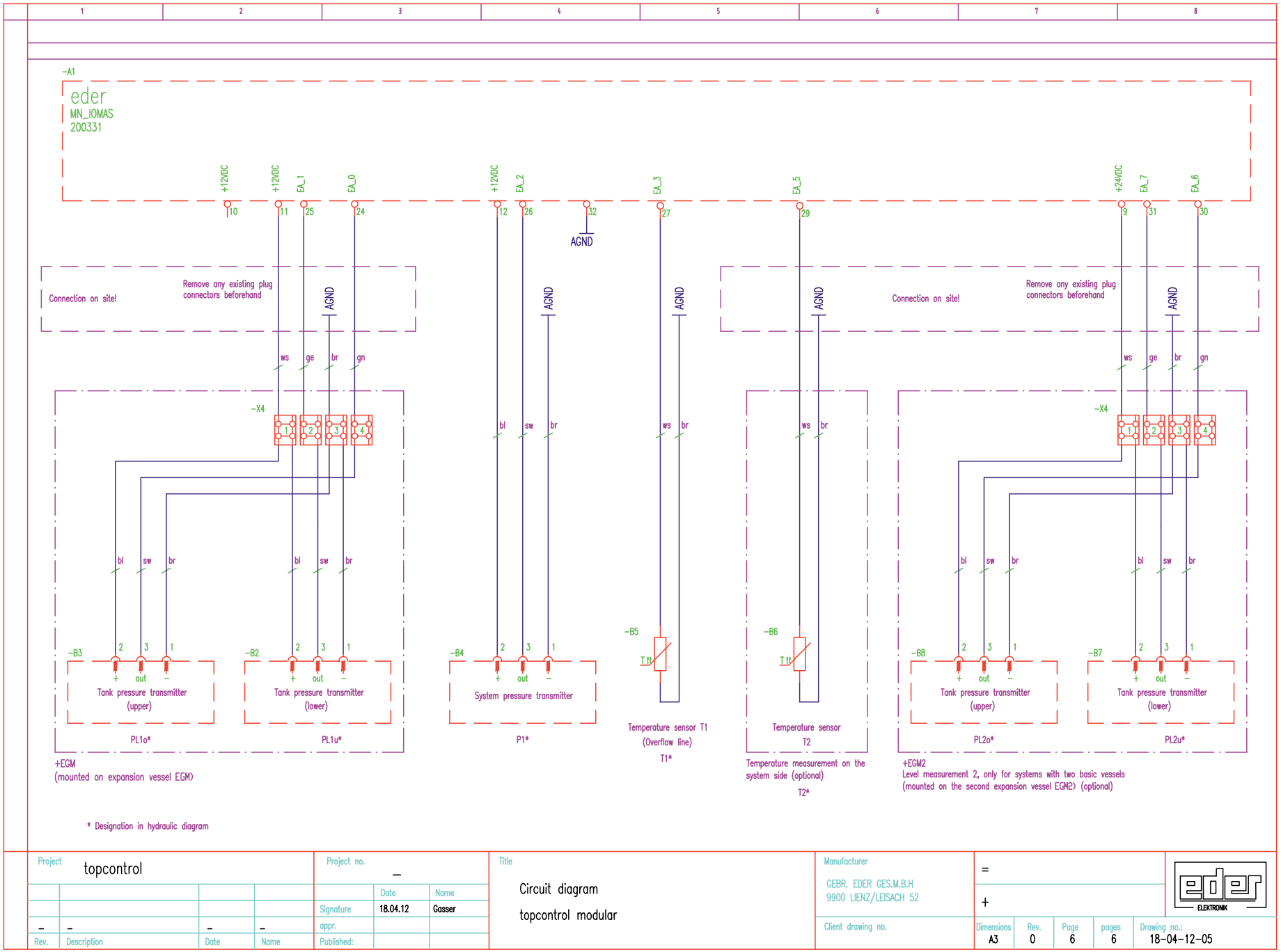

Project	topcontrol	Project no.	–
Title	Circuit diagram topcontrol modular	Manufacturer	GEBR. EDER GES.M.B.H 9900 LIENZ/LEISACH 52
Client drawing no.		Dimensions	A3
Rev.	0	Page	6
pages	6	Drawing no.:	18-04-12-05

Rev.	Description	Date	Name
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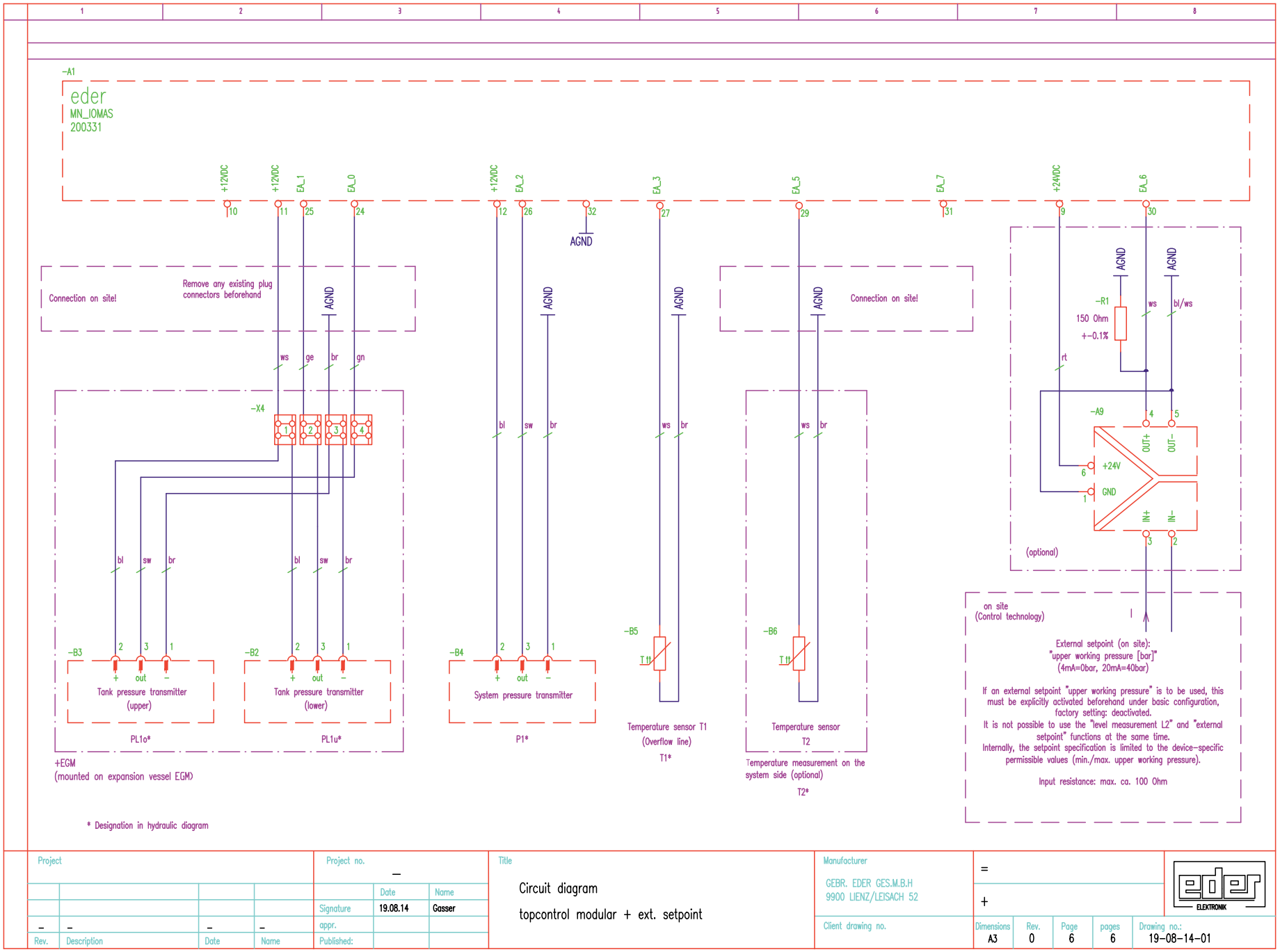
	Date	Name
Signature	18.04.12	Gasser
appr.		
Published:		


1
2
3
4
5
6
7
8
-A1
eder
MN_IOMAS
200331
+12VDC
+12VDC
EA_1
EA_0
+12VDC
EA_2
AGND
EA_3
EA_5
EA_7
+24VDC
EA_6
10
11
25
24
12
26
32
27
29
31
9
30
Connection on site!
Remove any existing plug connectors beforehand
AGND
ws
ge
br
gn
-X4
1
2
3
4
bl
sw
br
-B3
-B2
2
3
1
+
out
-
Tank pressure transmitter (upper)
Tank pressure transmitter (lower)
PL1o*
PL1u*
+EGM
(mounted on expansion vessel EGM)
bl
sw
br
-B4
System pressure transmitter
P1*
ws
br
-B5
T1
Temperature sensor T1
(Overflow line)
T1*
Connection on site!
ws
br
-B6
T2
Temperature sensor
T2
Temperature measurement on the system side (optional)
T2*
AGND
AGND
-R1
150 Ohm
+-0.1%
ws
bl/ws
rt
-A9
4
5
OUT+
OUT-
6
+24V
1
GND
IN+
IN-
3
2
(optional)
on site
(Control technology)
External setpoint (on site):
"upper working pressure [bar]"
(4mA=0bar, 20mA=40bar)
If an external setpoint "upper working pressure" is to be used, this must be explicitly activated beforehand under basic configuration, factory setting: deactivated.
It is not possible to use the "level measurement L2" and "external setpoint" functions at the same time.
Internally, the setpoint specification is limited to the device-specific permissible values (min./max. upper working pressure).
Input resistance: max. ca. 100 Ohm
* Designation in hydraulic diagram
Project
Project no.
-
Date
Name
Signature
19.08.14
Gasser
appr.
Published:
Rev.
Description
Date
Name
Title
Circuit diagram
topcontrol modular + ext. setpoint
Manufacturer
GEBR. EDER GES.M.B.H
9900 LIENZ/LEISACH 52
Client drawing no.
=
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Dimensions
A3
Rev.
0
Page
6
pages
6
Drawing no.:
19-08-14-01

REG.	DESCRIPTION
-A1	eder control electronics: Topcontrol motherboard, type 200331
-A2	depending on device version: eder control electronics: Processor board multicontrol, type ABCO10 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: 4-20mA, 24VDC, 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	Vessel pressure transmitter bottom (PL2u*) (OPTION)
-B8	Vessel pressure transmitter top (PL2o*) (OPTION)
-X4	Connection clamp
-M1	Motor of pump 1 with integrated frequency converter
-M2	Motor of pump 2 with integrated frequency converter (OPTION)
-Y2	Degassing module MAE: Degassing valve (OPTION)
-Y3	Actuator of overflow valve 1 (motorised valve, currentless closed)
-Y4	Actuator of overflow valve 2 (motorised valve, currentless closed) (OPTION)
-X10	Shockproof plug mains supply line 1
-X11	Shockproof plug mains supply line 2 (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 setpoint (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.

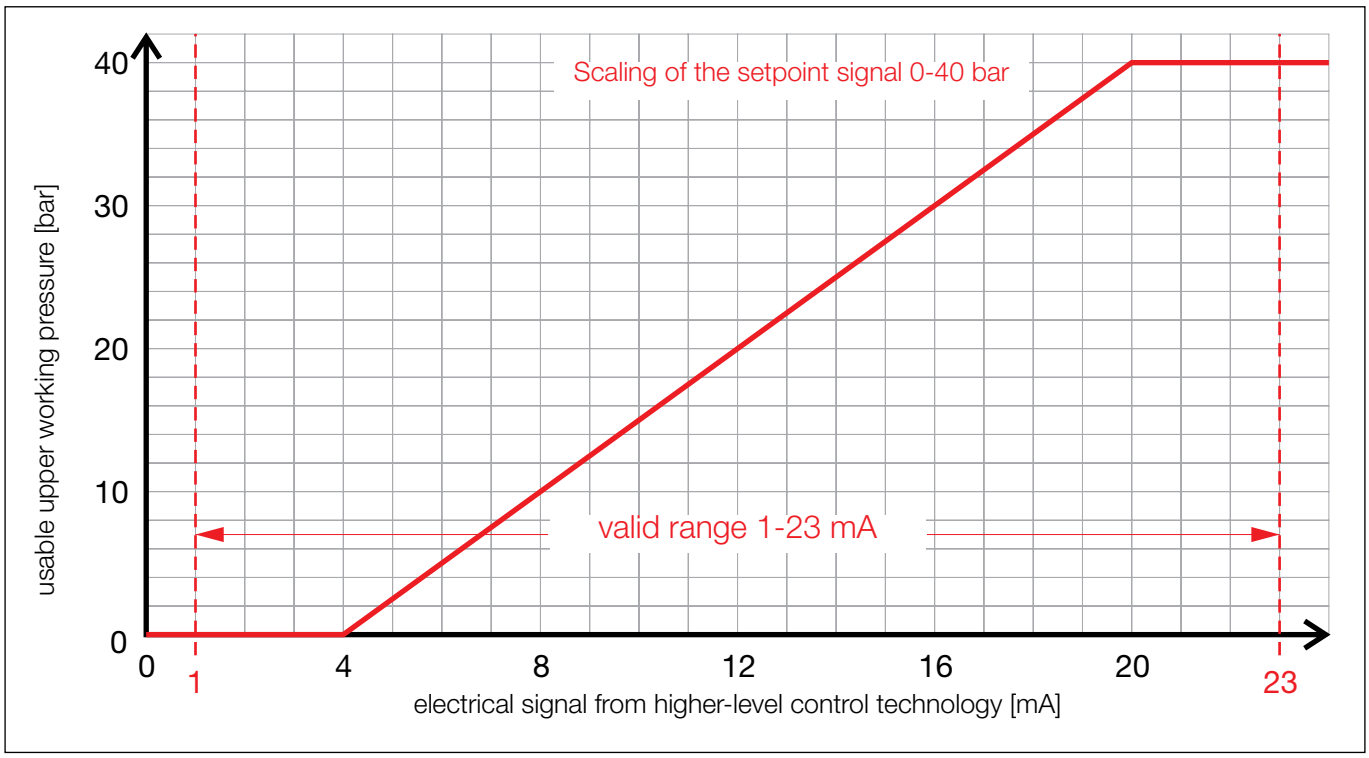


Figure 19: Working pressure specification diagram

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 7.0 bar is to be set on a ETCM-S1-8.4 control unit. The control technology must therefore send a signal with 6.8 mA. Regardless of the size of the sent setpoint signal, the upper working pressure for this type can never be set lower than w1.0 bar and higher than 8.4 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. 4.0 bar and max. 8.0 bar. Regardless of the size of the setpoint signal, the upper working pressure can therefore never be set lower than 4.0 bar or higher than 8.0 bar (characteristic curve -·-·-).

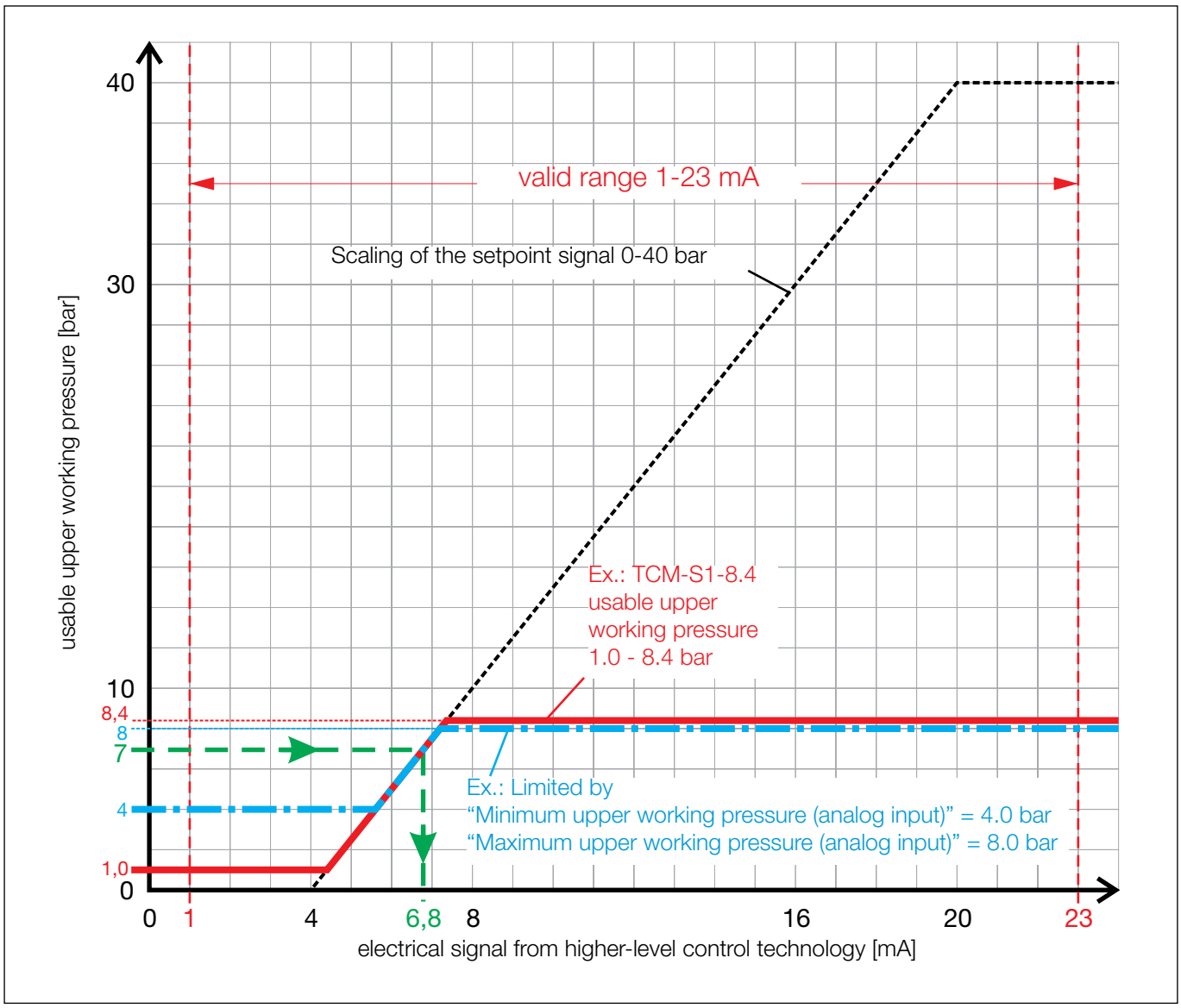


Figure 20: Diagram

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" → "Pressure maintenance" (see diagram and example on the next page).

Example:
For an ETCM-S1-8.4, an upper working pressure of 7.0 bar should be specified by an external body (e.g. control technology). In this case, bytes 4/5 must have the binary value 0000 0010 1011 1100 (= 700 = 7.0 bar*100).

Regardless of the size of the sent setpoint, the upper working pressure for this type can never be set lower than 1.0 bar and higher than 8.4 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. 4.0 bar and max. 8.0 bar. Regardless of the size of the setpoint value, the setpoint value for the upper working pressure can therefore never be less than 4.0 bar or greater than 8.0 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).

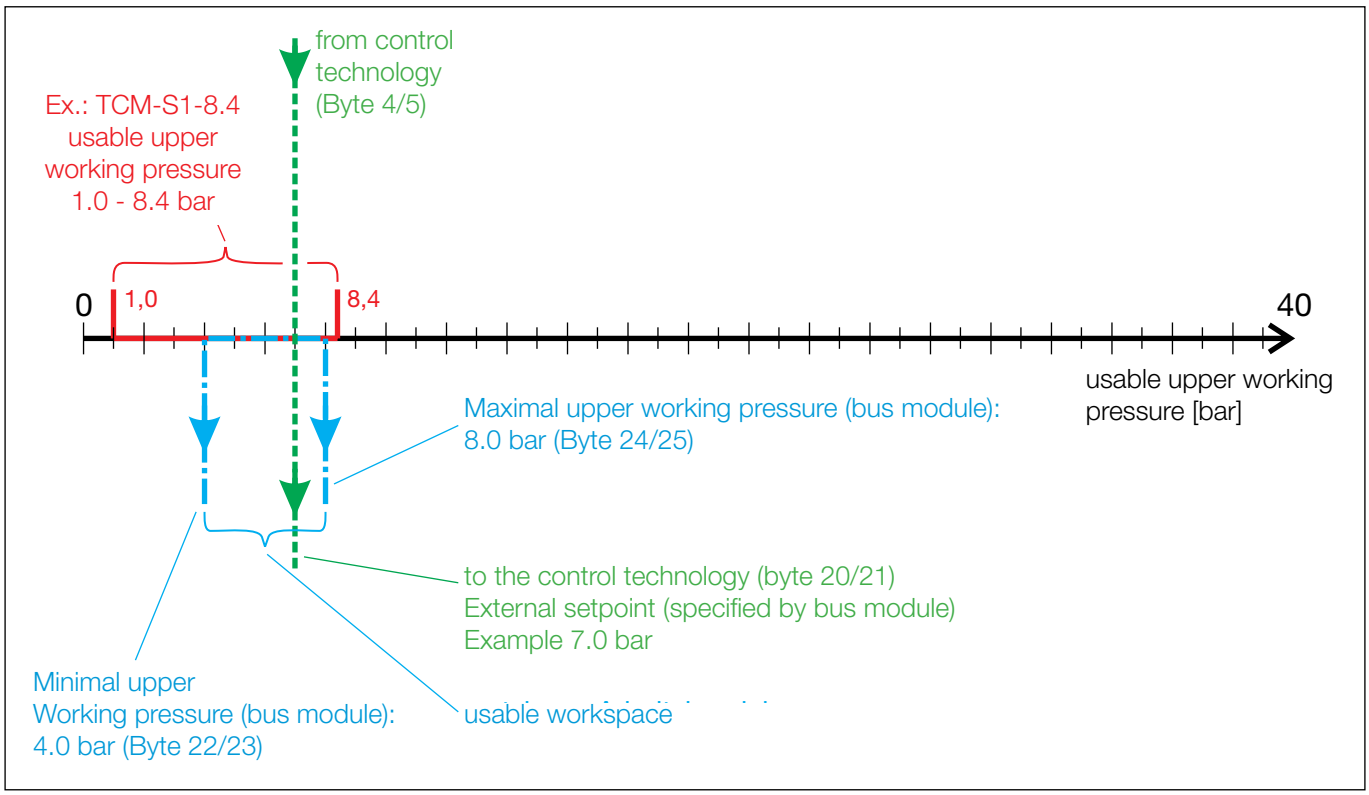


Figure 21: Diagram

8. COMMISSIONING

8.1. Putting the device into operation

NOTE
Commissioning of the device by the Spirotech 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:

NOTE
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.

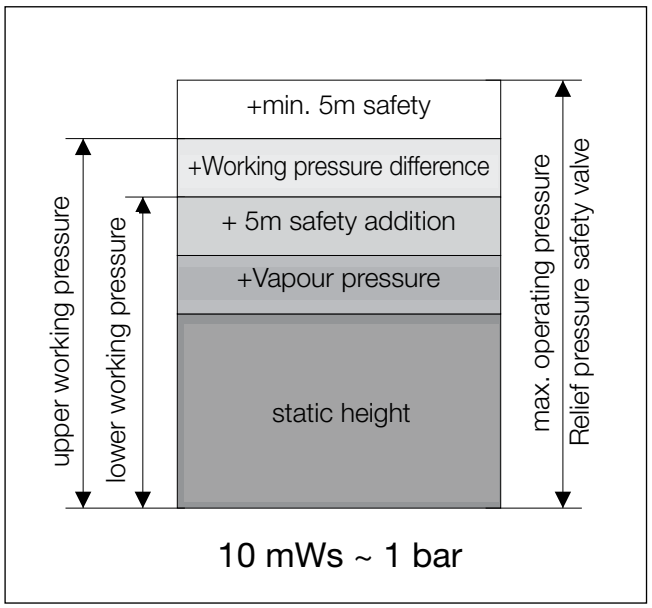


Figure 22: Determination of upper and lower working pressure

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-_1!

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 flow direction of the expansion overflow line and expansion pressure line, as well as their integration.

Step 5:
Open the fresh water supply to the ETCM-_1 on the (EMCF) backfeed module and set the pressure reducer 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.

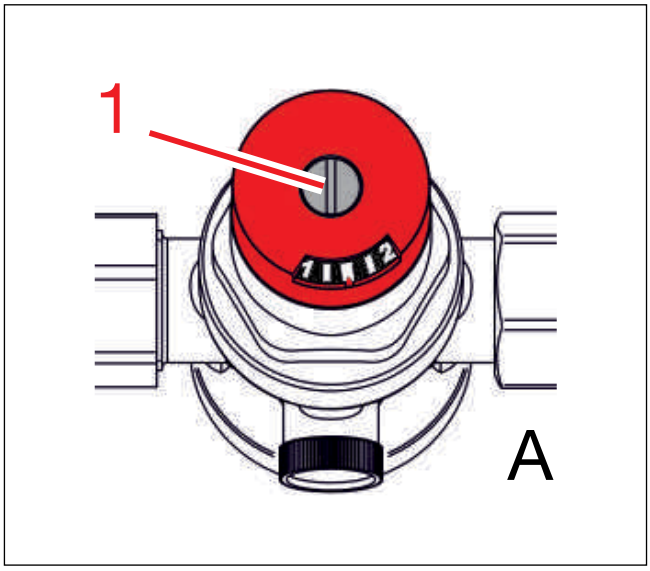


Figure 23: Pressure reducer on EMCF version A

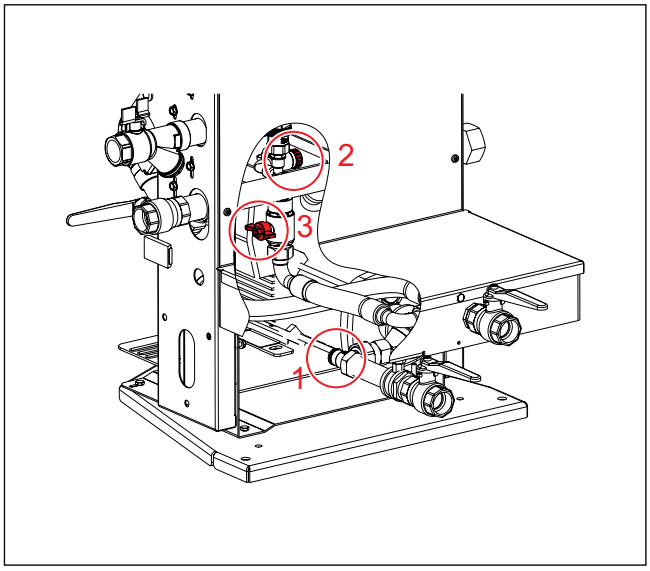


Figure 24: Venting the pressure maintenance pump

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 barrier on the pump suction side (1) (open ex works)
- Open drain (2)
- With the EMCF-1 backfeed module installed, switch to manual mode 1 (operating level 3: Manual mode → Outputs).
  Switch on the "backfeed valve" output (manual "1") and fill the pump(s) and container until a continuous jet of system medium emerges from the drain (2). Close the drain (2) and then set the "backfeed valve" output back to automatic operation (Auto "1"). As a guideline, a container level of approx. 30-40% can be assumed, at which the pump(s) and piping should be filled. During this filling process, the vessel level can be monitored in the basic display.

INFORMATION
Shut off all expansion tanks except the first main vessel beforehand to speed up the filling process.

- For devices without a built-in EMCF-1 backfeed module, fill (e.g. via the KFE tap in the overflow line at the connection to the EG-M) until a continuous jet of the system medium emerges from the drain (2). Close the drain (2). If the container level is still less than 30% at this point, continue filling until the 30% level is reached. During this filling process, the vessel level can be monitored in the basic display.
- Open the bypass barrier (3) completely (closed at the factory).
- In the manual mode menu, set the "Pump 1" output to Manual "1" 100%)" (also the "Pump 2" output for devices with 2 pumps).
- The system medium now circulates within the device and causes the pump(s) to vent. During this process, the bypass barrier (3) must be closed and opened again several times in order to achieve complete ventilation of the pump chambers due to the resulting changed flow conditions. The venting process must be carried out for at least 5 minutes to ensure that all air pockets in the pump(s) are removed.

When venting and with the bypass barrier (3) closed, the system pressure in the device must reach the pressure value corresponding to "Hmax" of the pump.

- Finally, end manual operation ("Set all manual operations to Auto") and close the bypass barrier (3) completely.

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). Device setup: see touchscreen operating unit operating instructions, menu "Settings" → "Device set-up".

NOTE

For device set-up, see "Touchscreen operating unit operating instructions"

Step 9:

Set working pressure

(Menu "Settings" → "Pressure maintenance" → "Working pressure")

- Open the shut-off valves from/to the system (expansion line, fresh water).
- 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.

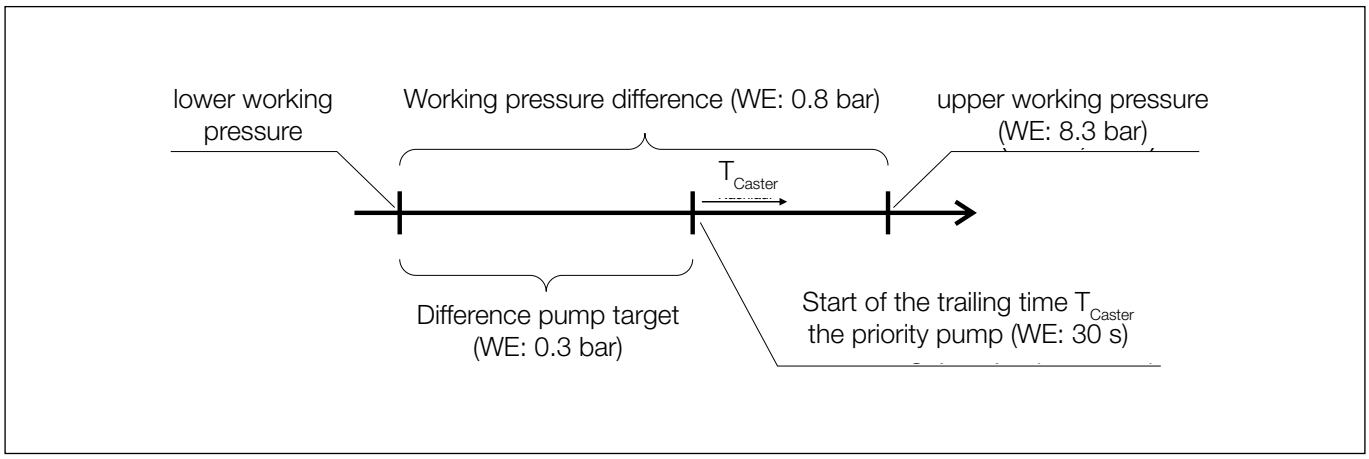


Figure 25: Setting the working pressure

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

Step 10:
If an EMCF backfeed module is installed, the operating mode of the backfeed module must be selected. This 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. A description of the possible operating modes can be found in the operating instructions for the touchscreen operating unit.

A description of the possible operating modes can be found in the operating instructions for the touchscreen operating unit.

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:
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).
In topcontrol ETCM-_1 devices, this is done on the regulating valves on the inlet side of 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, 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.

To adjust the pressure-side regulating valve, close it turn by turn using an Allen key (fully open at the factory) until the necessary throttling is achieved. The number of revolutions the valve(s) were opened must be noted in the system or commissioning log.

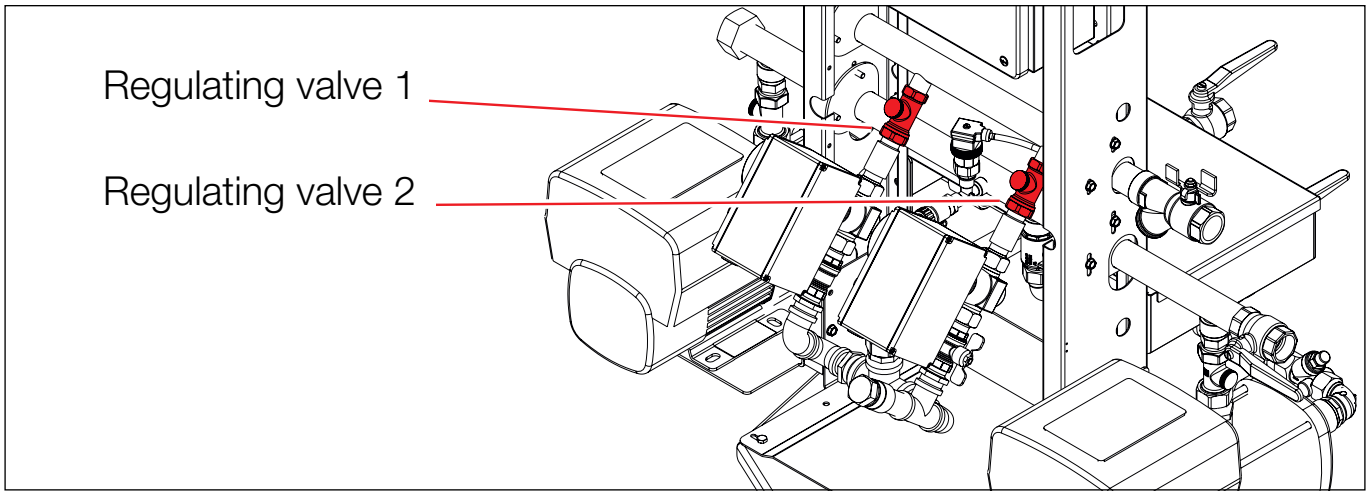


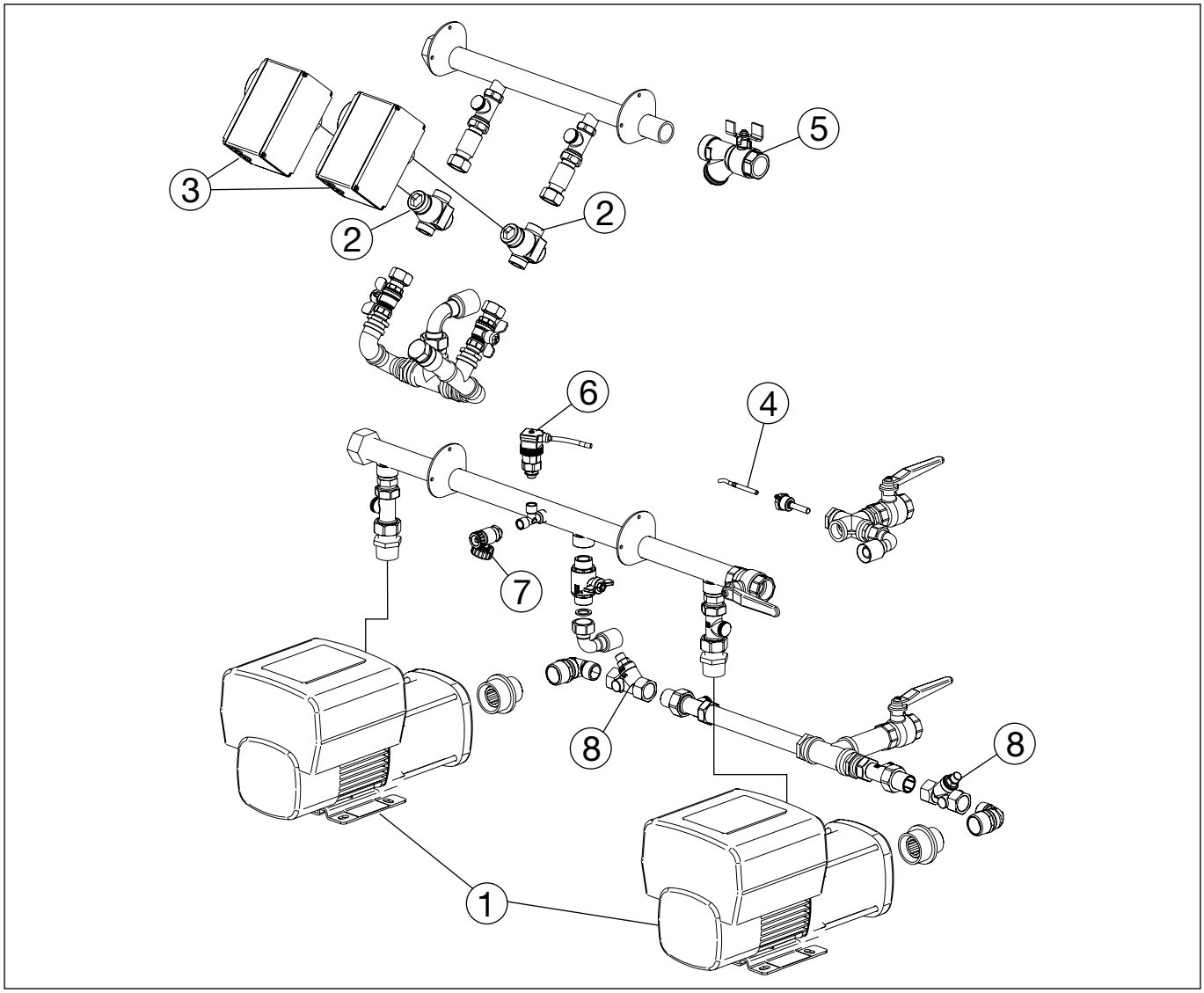
Figure 26: Pressure-side regulating valves

Step 13:
The device is now ready for operation.
The shut-off valves in the pipes from/to the system must be secured against unintentional closing (e.g. remove handles...)

Further settings (e.g. MWE softening, operating modes, etc.) must be made in the "Settings" menu (see operating instructions for the touch control unit).

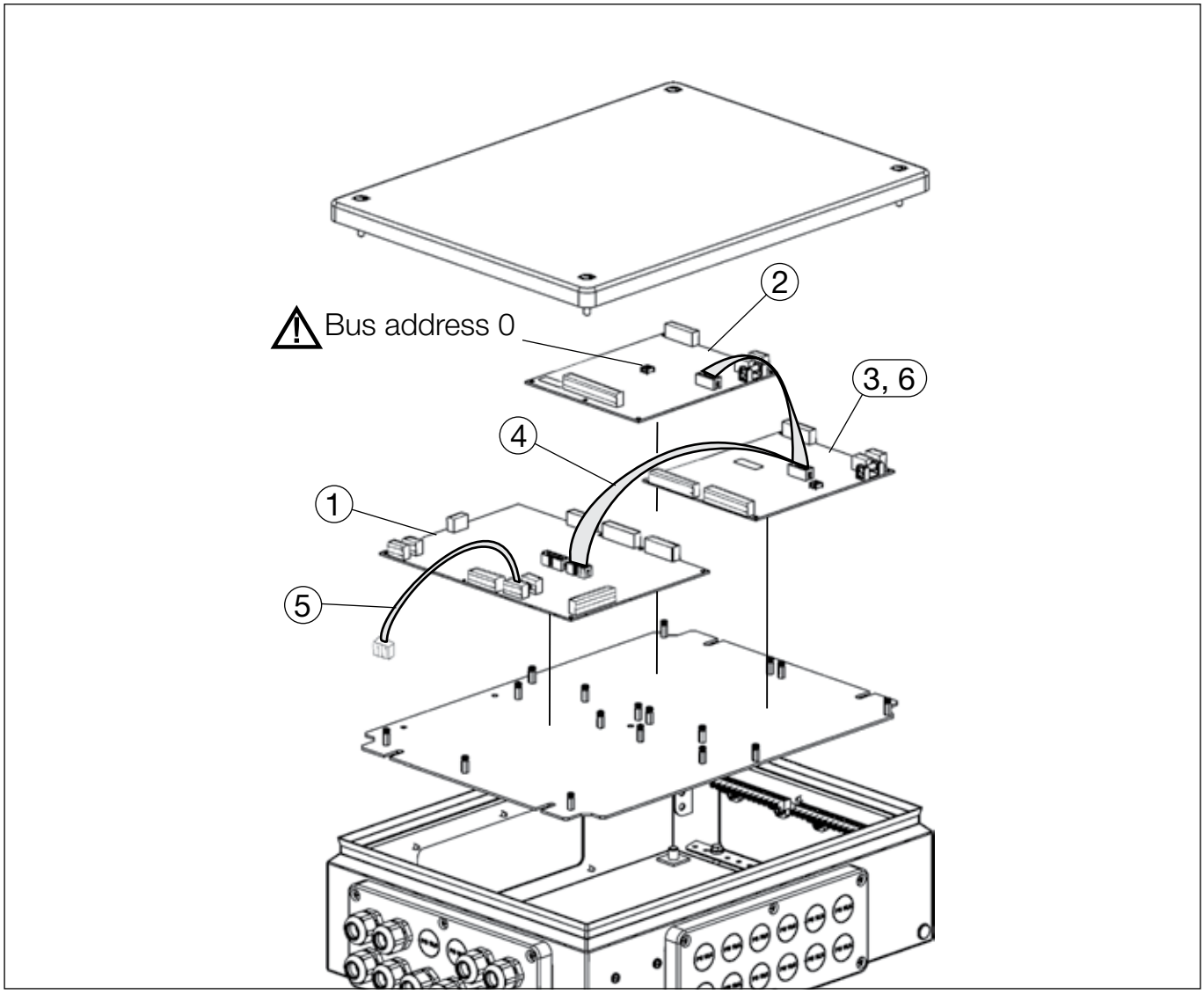
9. SPARE PARTS LIST

9.1. Piping



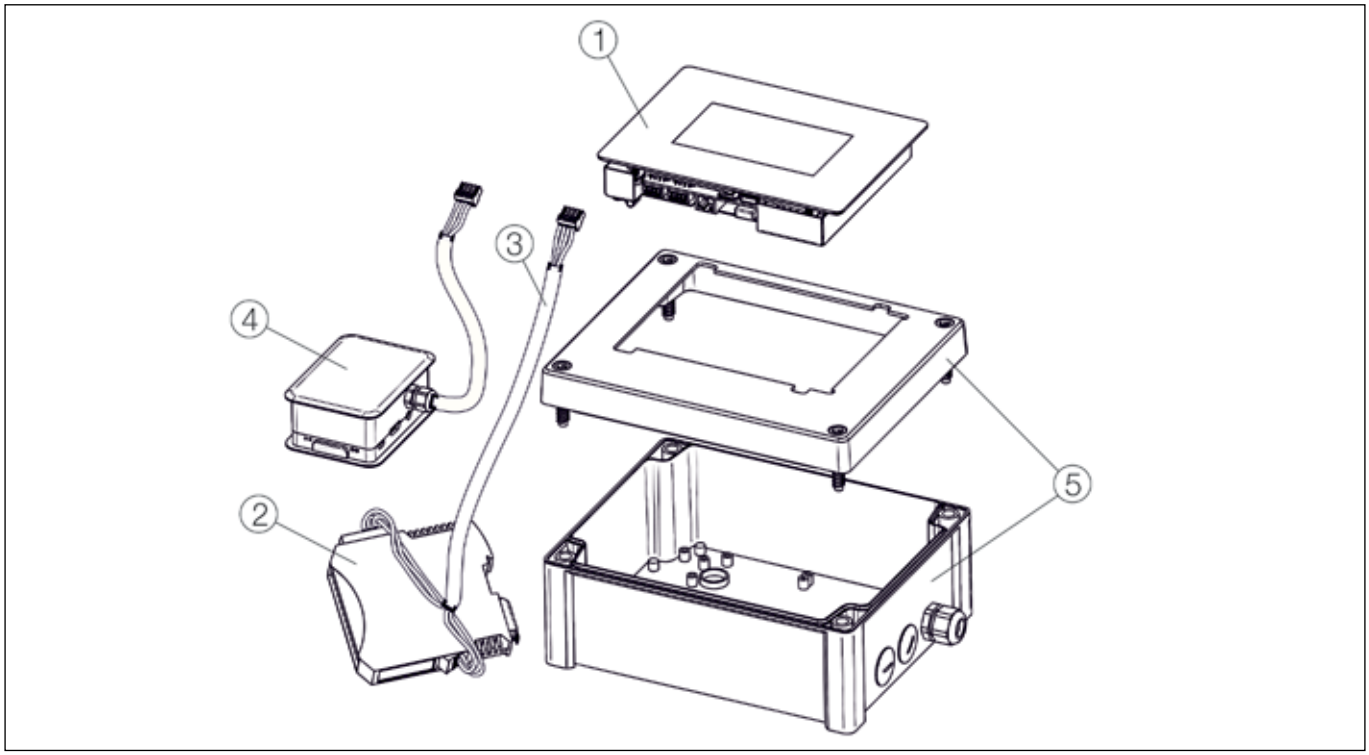
POS.	DESIGNATION	SPARE PART ART. NO.		
		ETCM-S1	ETCM-M1-8.4 ETCM-M1-8.4-TWIN	ETCM-D1-8.4 ETCM-D1-8.4-TWIN
1	Pressure maintenance pump	E90978		
2	Electric overflow valve	E90926		E90979
3	Linear actuator for overflow valve	E90927		
4	Temperature sensor	E90911		
5	Strainer, 1", lockable	E90912		
6	System pressure transmitter	E90140		
7	Emptying ¼" - ¾"	E90914		
8	Angle seat check valve	E90547		

9.2. Electronic unit



POS.	DESIGNATION	SPARE PART ART. NO.
		ETCM-S1-8.4 ETCM-M1-8.4 ETCM-M1-8.4-TWIN ETCM-D1-8.4 ETCM-D1-8.4-TWIN
1	Print - Motherboard ETCM-_1	E91002
2	Print - ETCM-_1 Analogue module (Adr. 0), 4 equipped outputs (200450)	E91003
3	Print - "Binary remote signalling" expansion module	E90625
4	Cable - Connecting cable Motherboard expansion board, 10 poles	E90982
5	Cable - Connecting cable Motherboard processor board, 4 poles	E70083
6	Print - Expansion module "Binary remote signalling & remote acknowledgement"	E90626

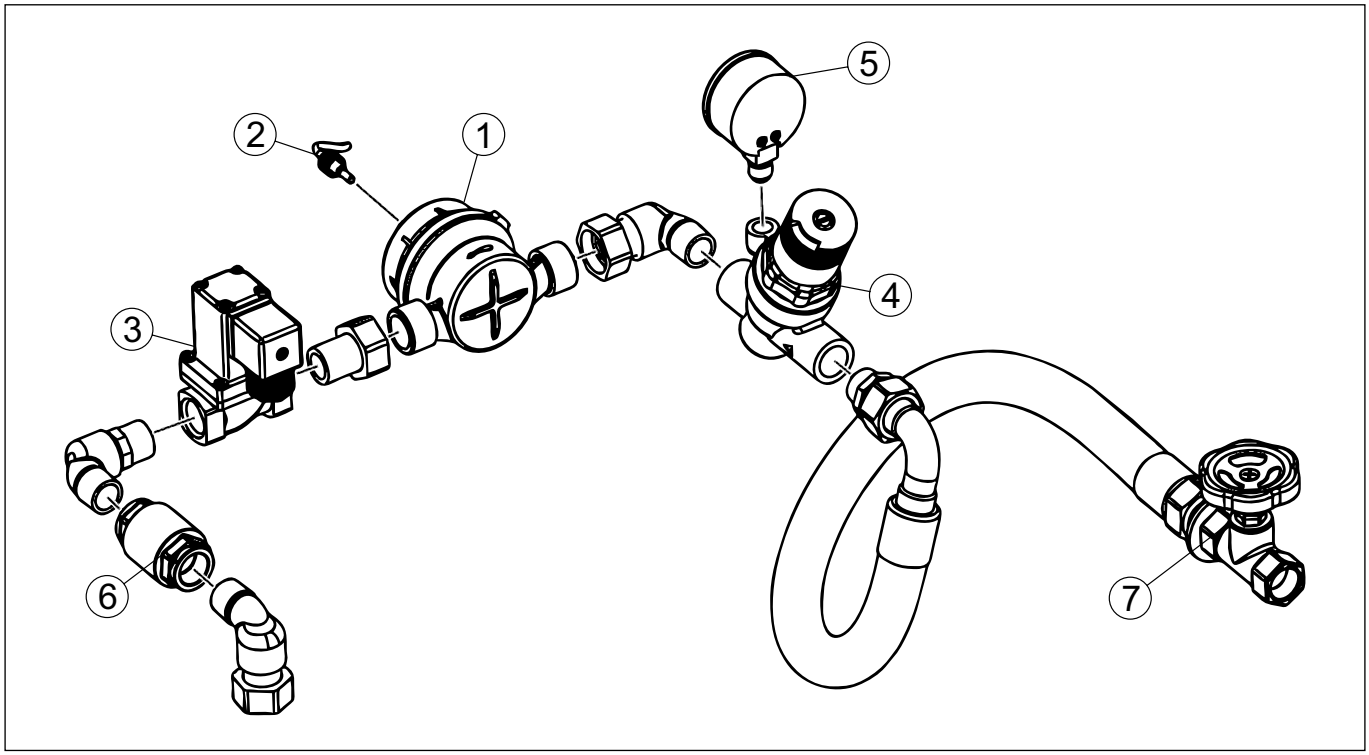
9.3. Elektronik



POS.	DESIGNATION	SPARE PART ART. NO.
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), machined, empty	E90997

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

9.4. EMCF backfeed module



POS.	DESIGNATION	SPARE PART ART. NO.	
		EMCF-1	EMCF-3
1	Water meter 1.5 m^3/h, version B Water meter 2.5 m^3/h, version B	E90950 -	- 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 Pressure reduction valve, ¾", type D05; Version B	E90952 -	- E90953
5	Pressure gauge - for EMCF (optional depending on version)	E90908	
6	Check valve	E90620	E90621
7	Flow valve with handwheel, ½" (MFC-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 disruptions in operation caused by non-compliance with this prescribed cleaning of the dirt trap are excluded from any warranty claims.

10.2. 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 Spirotech factory customer service must be commissioned to do so.

INFORMATION
It is recommended that maintenance is carried out by the Spirotech customer service centre. The conclusion of a maintenance contract is highly recommended.

11. DECLARATION OF CONFORMITY

EG-Konformitätserklärung
EC Declaration of Conformity

im Sinne der Richtlinie(n):	**in accordance with the directive(s):**
- 2006/42/EG über Maschinen	- 2006/42/EC on machinery
- 2014/30/EU über die elektromagnetische Verträglichkeit	- 2014/30/EU relating to electromagnetic compatibility
- 2014/35/EU über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt	- 2014/35/EU relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- 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	- 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

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).**

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

Leisach, 03.02.2022
Ort, Datum

Ing. Hans Jacobs, Geschäftsführer
Unterschrift

12. APPENDIX

12.1. Appendix A Sizing of the expansion line

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

INFORMATION
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.

INFORMATION
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 θ_{TZ} and the total content of the system V_A.

The heating time t_A, which is required to reach the safety temperature θ_{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. heat capacity of heating water Θ_{TZ}	[kJ/(kg . K)]
Φ_N	Nominal heat output	[kW]
ρ_W	Density of the heating water Θ_{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.

12.2. Details on connecting ETCM-_1 with EP-R(S)

Devices in the TopControl Modular series do not have an attached expansion vessel; the expansion volume is stored in expansion vessels from the EP-R(S) series, with the EP-R(S) expansion vessel 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-_1 with EP-R(S)!

Connection between ETCM-_1 and EP-R(S)
EP-R(S) expansion vessels have internals on the lower vessel flange that are required for proper degassing function.

Therefore, the overflow line of the ETCM-_1 control unit must always be connected to the overflow line on the expansion tank, and this must also be observed for the suction line!

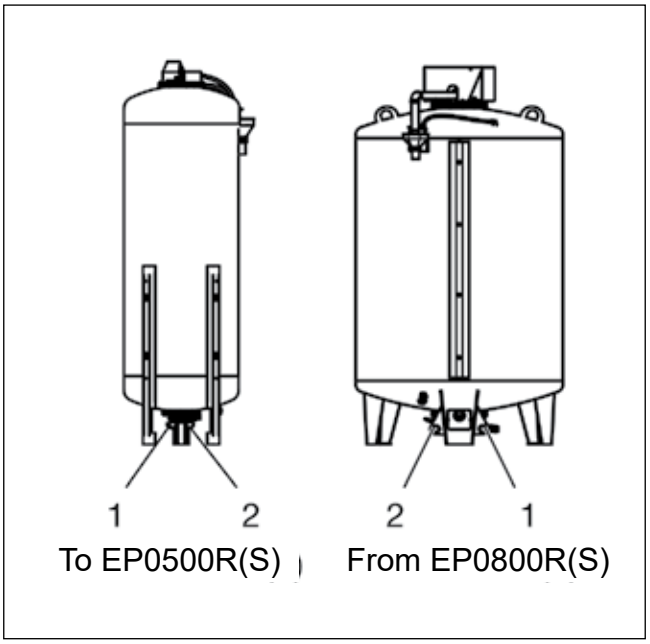


Figure 27: Overflow line (1) and suction line (2) of EP-R(S)

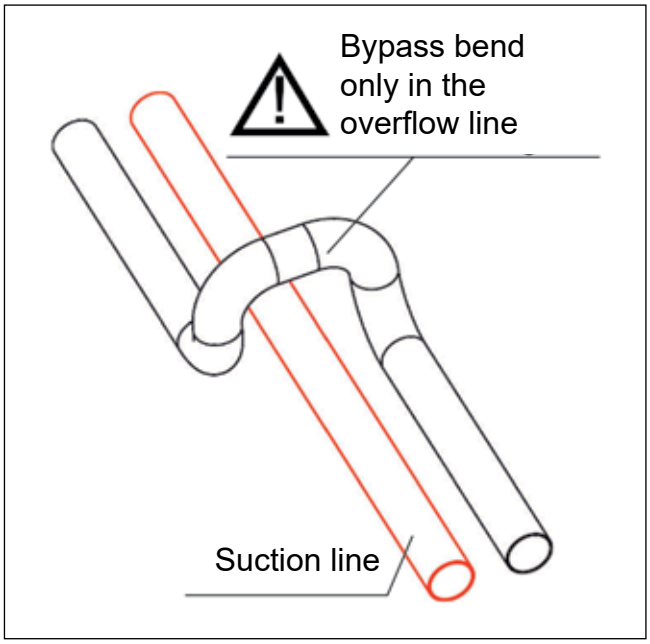


Figure 28: Laying the suction line

Laying the suction line

In some cases it may happen that in order to properly connect the ETCM-_1 and EP-R(S), the overflow line and the suction line must be placed crossed.

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

If level differences between the ETCM-_1 and EP-R(S) cannot be avoided, it must at least be ensured that the suction line from the ETCM-_1 to the EP-R(S) is routed upwards.

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

NOTES

NOTES

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