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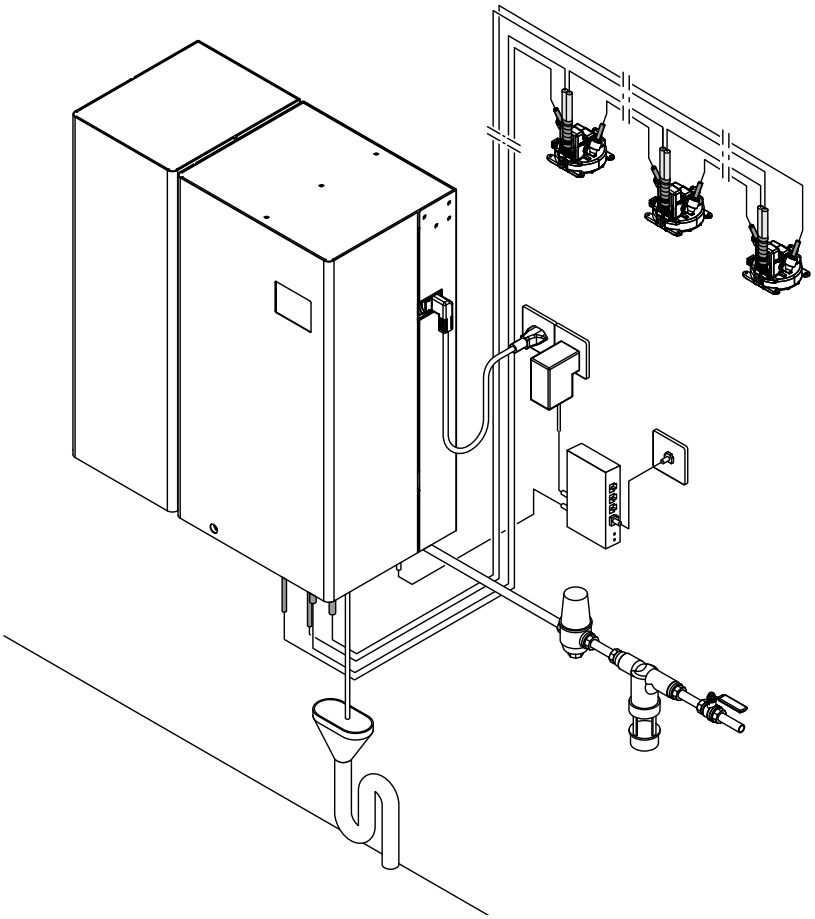
MN SERIES



FOR INTERNAL USE ONLY!

SERVICE MANUAL

Condair HumiLife - The flexible room solution
Condair MN

Humidification and Evaporative Cooling

condair

Contact

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Table of Contents

1 Introduction

This service manual is intended for trained Condair service technician who has a good knowledge of the Condair MN, who knows the installation manual and the operation manual, and who is familiar the hazards associated with handling the device.

If the Condair MN system is operated with the optional reverse osmosis system Condair RO-HB, the english version of the installation and operation manual for the reverse osmosis system Condair RO-HB can be downloaded using the following QR code:

Symbols

CAUTION!

The signal word "CAUTION", appearing in combination with the general hazard symbol, indicates information given in this service manual which, if ignored, could lead to **damage and/or the malfunctioning of the device or other material assets**.

WARNING!

The signal word "WARNING", appearing in combination with the general hazard symbol, indicates safety and hazard information given in this service manual which, if ignored, could **lead to personal injury**.

DANGER!

The signal word "DANGER", appearing in combination with the general hazard symbol, indicates safety and hazard information in this service manual, which, if ignored, could result in **serious personal injury, including death.**

2 For your safety

General

The service technicians assigned to working on the Condair MN must have read and understood this service manual as well as the installation instructions and the operating instructions of the Condair MN before starting work on the unit.
An understanding of the contents of the service manual as well as the installation and operating instructions is a basic prerequisite for protecting personnel from danger, avoiding improper operation and thus for the safe and proper operation of the Condair MN.

Personnel qualifications

All work described in this Service Manual must be performed only by trained Condair service technicians.

For VDI-certified systems, the personnel must meet the following qualifications:

It is assumed that the service technicians are familiar with and will abide by the regulations on occupational health and safety and accident prevention.

Hazards that may arise from the Condair MN:

DANGER!
Risk of electrocution

The Condair MN's central unit is supplied with line voltage. If the central unit is open, live parts may be touched. Touching live parts may cause severe injury or death.

For this reason: Before starting work on the central unit, disconnect it from the main power supply (remove plug from socket).

Warning!
System contamination hazard

If the Condair MN is switched off, there is a risk of the water supply line and the internal water system becoming contaminated, as the water system is then not being flushed regularly.

For this reason: The Condair MN must not be switched off after being commissioned. This will ensure that the water system is purged at regular intervals, and any contamination is counteracted.

Warning!
UV-C radiation

A UV lamp is built into the Condair MN's central unit. In principle this should pose no risks, as it is installed in a radiation-proof housing. If the UV lamp is operated outside of this housing, harmful UV-C radiation may be released. This may cause damage to the eyes and skin.

For this reason: the UV lamp must never be operated outside of the protective housing. The central unit must be switched off and disconnected from the main power supply (remove the plug from the socket) before the central unit is opened.

Warning!

Waste from damaged UV lamps may lead to injury and cause damage to human health and harm to the environment.

For this reason: the waste from damaged UV lamps must be disposed of in accordance with local provisions on hazardous substances and the site of the damage must be cleaned properly.

CAUTION!

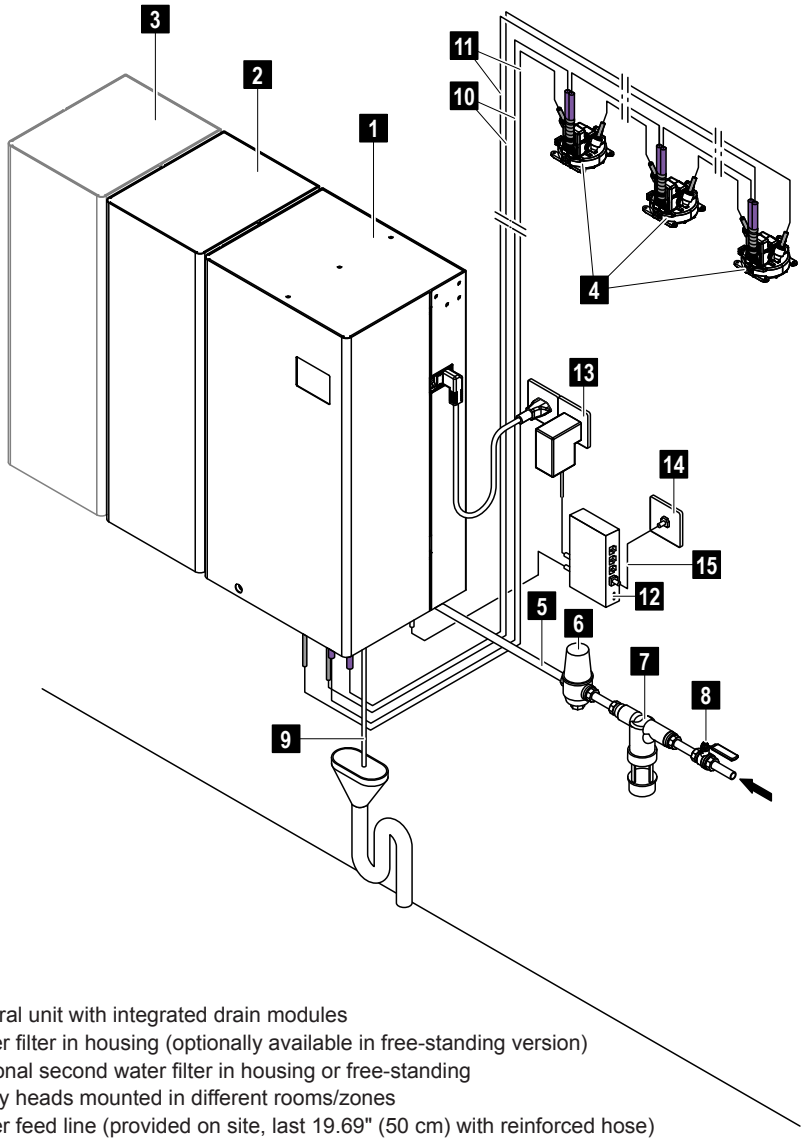
Leaky or defective water pipes/connections may lead to water damage.

For this reason: After replacing components, make sure the system is leak free.

3 Product overview

3.1 System overviews

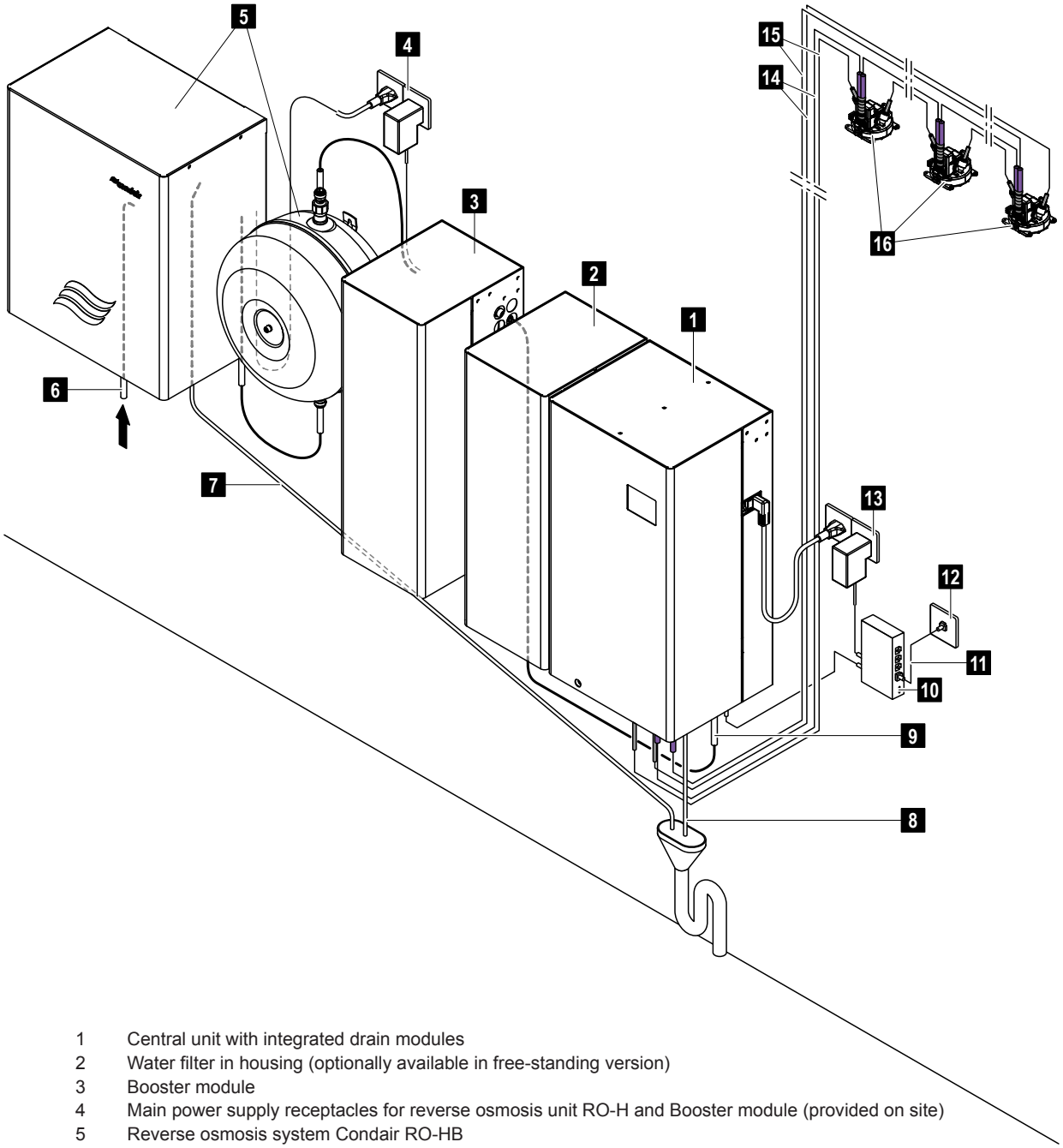
3.1.1 Overview Condair MN system with one spray loop and internal drainage of the spray loop



1 Central unit with integrated drain modules
2 Water filter in housing (optionally available in free-standing version)
3 Optional second water filter in housing or free-standing
4 Spray heads mounted in different rooms/zones
5 Water feed line (provided on site, last 19.69" (50 cm) with reinforced hose)
6 Pressure reducing valve (provided on site) for water pressures > 72.5 psig (>500 kPa)
7 Backflow preventer for fluid category 2 with integrated particle filter (provided on site)
8 Water inlet shut-off valve (provided on site)
9 Central unit drain line
10 CAN bus cable
11 Water hoses
12 LAN gateway
13 Main power supply receptacles for central unit and LAN gateway (provided on site)
14 LAN connection (provided on site)
15 LAN cable (provided on site)

Fig. 1: Overview Condair MN system with one spray loop and internal drainage of the spray loop

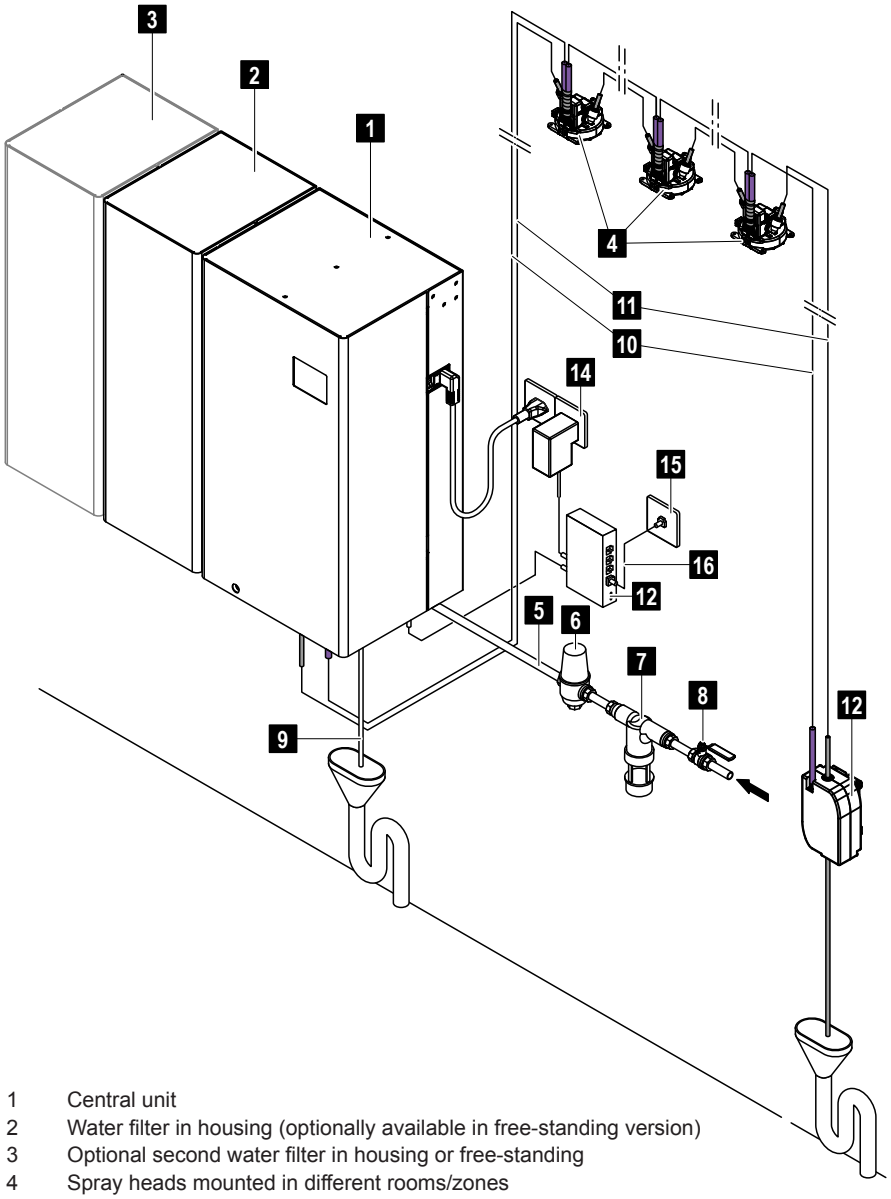
3.1.2 Overview Condair MN system with one spray loop and internal drainage of the spray loop and reverse osmosis system Condair RO-HB



1 Central unit with integrated drain modules
2 Water filter in housing (optionally available in free-standing version)
3 Booster module
4 Main power supply receptacles for reverse osmosis unit RO-H and Booster module (provided on site)
5 Reverse osmosis system Condair RO-HB
(consisting of reverse osmosis unit RO-H and 3.17 US gal (18 l) expansion tank)
6 Water inlet reverse osmosis unit RO-H
7 Drain line reverse osmosis unit RO-H
8 Central unit drain line
9 RO water feed line
10 LAN gateway
11 LAN cable (provided on site)
12 LAN connection (provided on site)
13 Main power supply receptacles for central unit and LAN gateway (provided on site)
14 CAN bus cable
15 Water hoses
16 Spray heads mounted in different rooms/zones

Fig. 2: Overview Condair MN system with one spray loop and internal drainage of the spray loop and reverse osmosis system Condair RO-HB

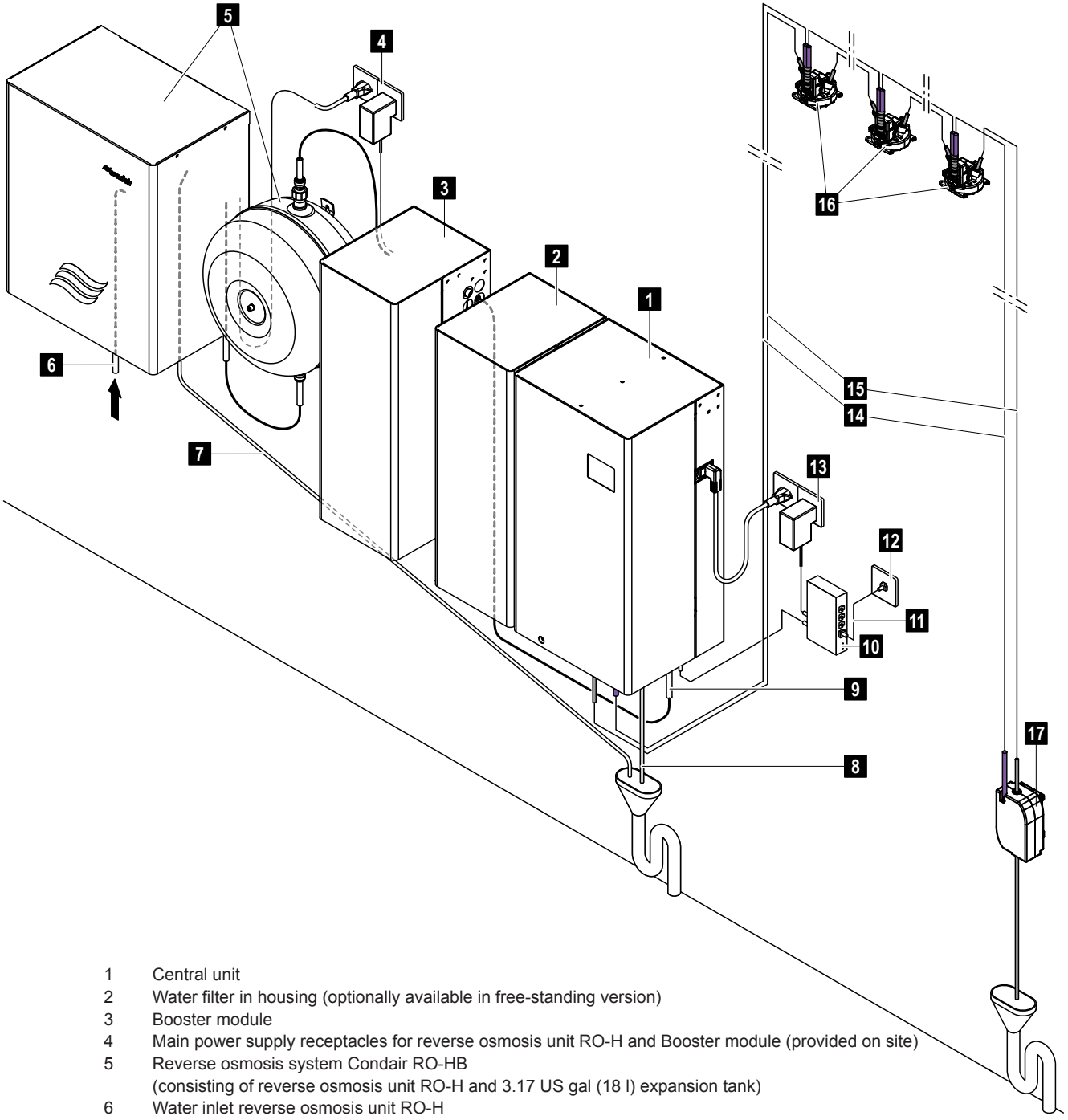
3.1.3 Overview Condair MN system with one spray loop and external drainage of the spray loop



1 Central unit
2 Water filter in housing (optionally available in free-standing version)
3 Optional second water filter in housing or free-standing
4 Spray heads mounted in different rooms/zones
5 Water feed line (provided on site, last 19.69" (50 cm) with reinforced hose)
6 Pressure reducing valve (provided on site) for water pressures > 72.5 psig (>500 kPa)
7 Backflow preventer for fluid category 2 with integrated particle filter (provided on site)
8 Water inlet shut-off valve (provided on site)
9 Central unit drain line
10 CAN bus cable
11 Water hoses
12 Drain module (installed externally)
13 LAN gateway
14 Main power supply receptacles for central unit and LAN gateway (provided on site)
15 LAN connection (provided on site)
16 LAN cable (provided on site)

Fig. 3: Overview Condair MN system with one spray loop and external drainage of the spray loop

3.1.4 Overview Condair MN system with one spray loop and external drainage of the spray loop and reverse osmosis system Condair RO-HB



1 Central unit
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8 Central unit drain line
9 RO water feed line
10 LAN gateway
11 LAN cable (provided on site)
12 LAN connection (provided on site)
13 Main power supply receptacles for central unit and LAN gateway (provided on site)
14 CAN bus cable
15 Water hoses
16 Spray heads mounted in different rooms/zones
17 Drain module (mounted externally)

Fig. 4: Overview Condair MN system with one spray loop and *external* drainage of the spray loop and reverse osmosis system Condair RO-HB

3.2 System description

System design

The Condair MN consists of:
– a central unit;
– a water filter and an optional second water filter (both water filters with or without housing);
– one to max. two spray loops with maximum 15 spray heads per spray loop;
  Note: The spray heads are designed as standard for flush mounting on the ceiling or walls. Surface panels for surface mounting of the spray heads are available as an option.
– a internal drainage (drain module integrated into the central unit, see *Fig. 1* and *Fig. 2*) or a external drainage (drain module installed in a separate room, see *Fig. 3* and *Fig. 4*) per spray loop.

The Condair MN system can optionally be equipped with a reverse osmosis system RO-HB (reverse osmosis unit with expansion tank) and a booster module to feed the Condair MN system with RO water (see *Fig. 3* and *Fig. 2*).

Humidification output

The maximum humidification output of one spray head is 1.272 US gal/day or 10.58 lbs/day.

This yields the following maximum humidification outputs:
– With one spray circuit with max. 15 spray heads:
  max. 19.08 US gal/day or 158.7 lbs/day
– With two spray circuits with max. 15 spray heads per spray circuit:
  max. 38.16 US gal/day or 317.4 lbs/day

Power supply

– Central unit:	115 VAC / 50-60 Hz
– Spray heads:	36 VDC, supplied by the central unit through a bus cable

Supply water

– Quality:	Drinking water in accordance with applicable local drinking water regulations or reverse osmosis water
– Permissible water supply pressure:	43.5 ... 72.5 psig (300 ... 500 kPa)
– Permissible water temperature:	41 ... 77 °F (5 ... 25 °C)
– Water hardness:	50...530 ppm (5...53 °F)
– Conductivity:	5 ... 1000 µS/cm
– Silicate content in any form, e.g. SiO_2:	max. 12 mg/l

Note: The permissible values for the supply water for the optional RO-HB reverse osmosis system can be found in the separate installation and operation manual for the reverse osmosis unit.

Water drainage

– Open drain funnel with trap connected to the building's wastewater pipe.

Hygiene functions

In order to comply with the guidelines set out in VDI 6022, sheet 6, the Condair MN has the following hygiene functions as standard:

– Periodic system flushing
– UV treatment of water
– Permanent temperature control
– Safeguard against system being switched off for too long

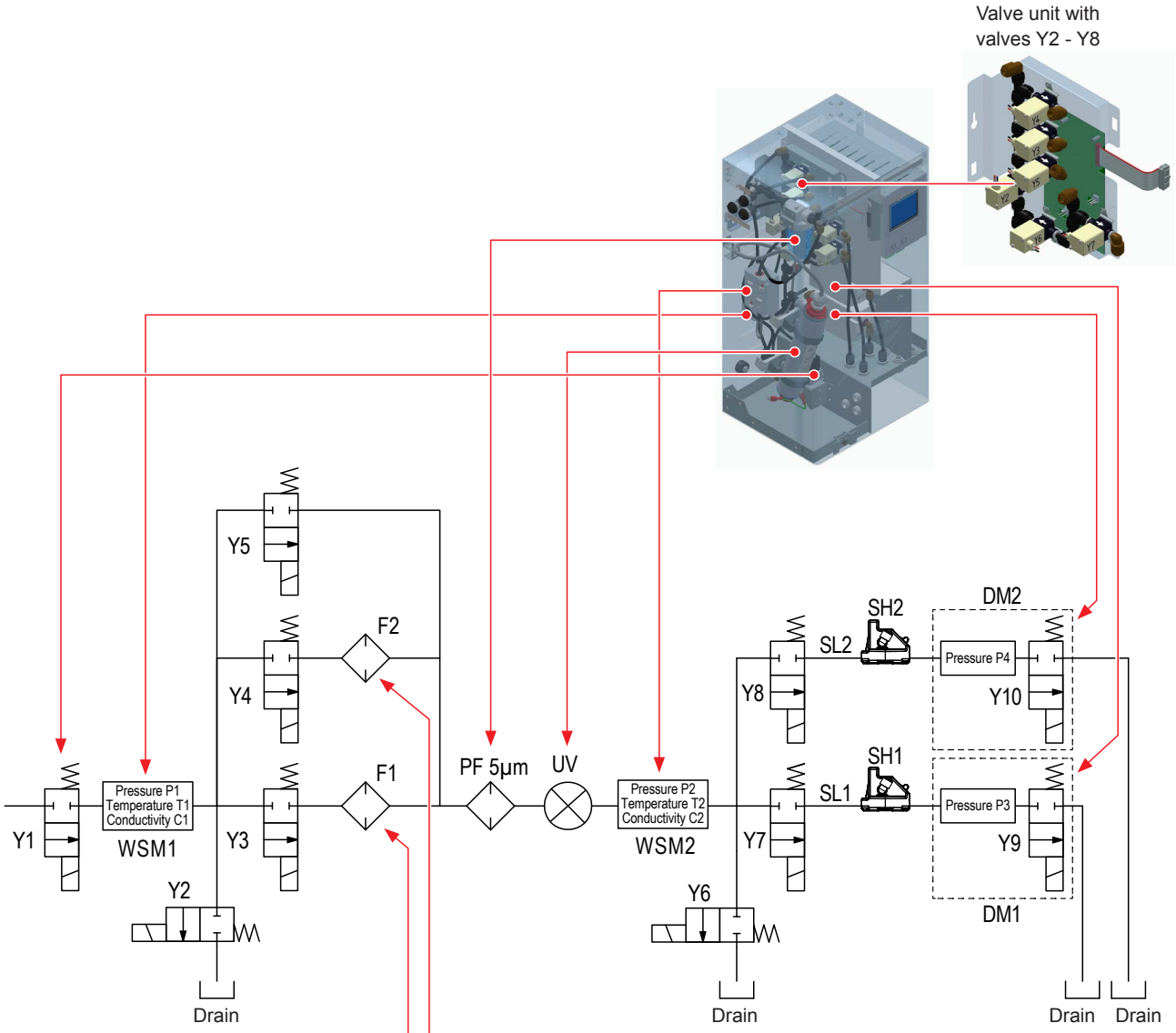
Safety functions

- Hydraulics
  - Permanent conductivity monitoring
  - Permanent pipe burst monitoring
  - Periodic leakage monitoring
  - Permanent temperature control
- Electronics
  - Short circuit fuse on spray loop

Remote operation/monitoring

Connecting the Condair MN via a LAN gateway enables online access and monitoring of the system.

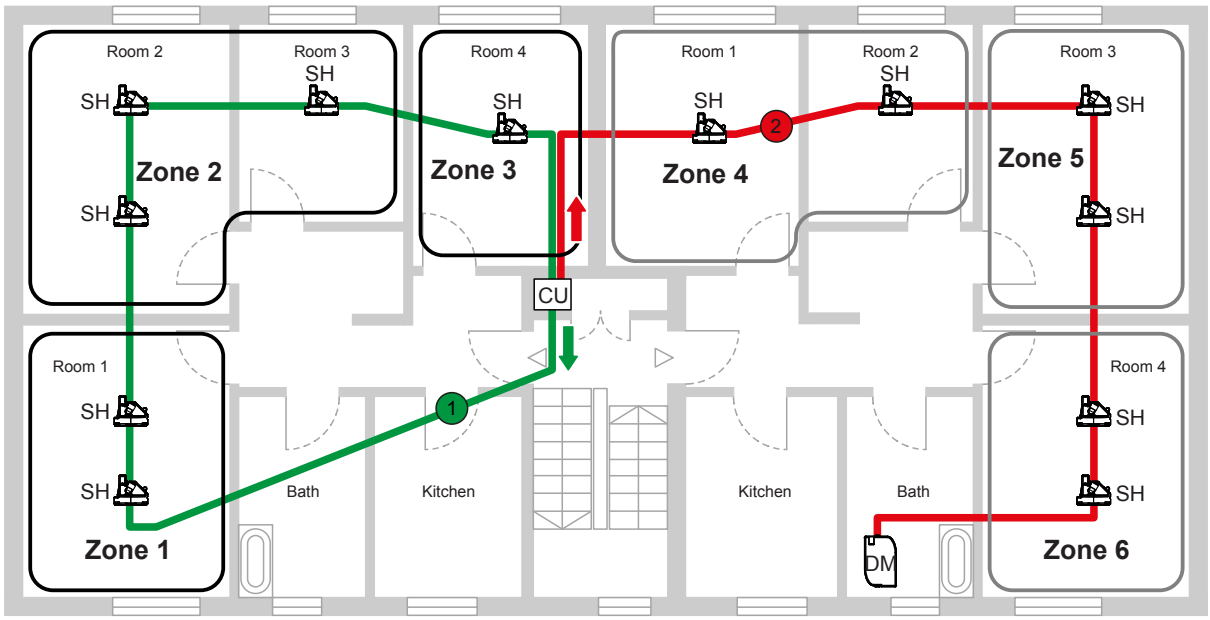
3.3 Layout Condair MN hydraulic system



DM1	Drain module spray circle 2
DM2	Drain module spray circle 1
F1	Water filter 1
F2	Water filter 2
SL1	Spray circle 1
SL2	Spray circle 2
SH1	Spray heads spray circle 1
SH2	Spray heads spray circle 2
PF 5 µm	Particle filter
Y1	Inlet valve
Y2	Drain valve (flushing section 1)
Y3	Valve water filter 1
Y4	Valve water filter 2
Y5	Bypass valve water filter(s)
Y6	Drain valve (flushing section 2)
Y7	Valve spray circle 1
Y8	Valve spray circle 1
Y9	Drain valve Drain module 1 (DM1)
Y10	Drain valve Drain module 2 (DM2)
UV	UV lamp
WSM1	Water sensor module 1
WSM2	Water sensor module 2

Fig. 5: Layout Condair MN hydraulic system

3.4 Condair MN spray loop design



1 Spray circle 1 with internal drainage
2 Spray circle 1 with external drainage

CU: Central unit
SH: Spray head
DM: Drain module (external drainage)

Fig. 6: Spray loop design

Maximum spray circle length

The maximum length per spray loop depends on the water supply pressure at the central unit.

Water supply pressure	Maximum spray circuit length per spray circuit
43.5 psig (300 kPa)	up to 197 ft (60 m)
50.8 psig (350 kPa)	up to 262 ft (80 m)
58.0 psig (400 kPa)	up to 328 ft (100 m)
65.3 psig (450 kP)	up to 361 ft (110 m)
72.5 psig (500 kPa)	up to 394 ft (120 m)

Note: When operating the Condair MN with the **Condair RO-HB reverse osmosis system with booster module**, the **maximum spray loop length is always 394 ft (120 m).**

3.5 Condair MN electric diagram

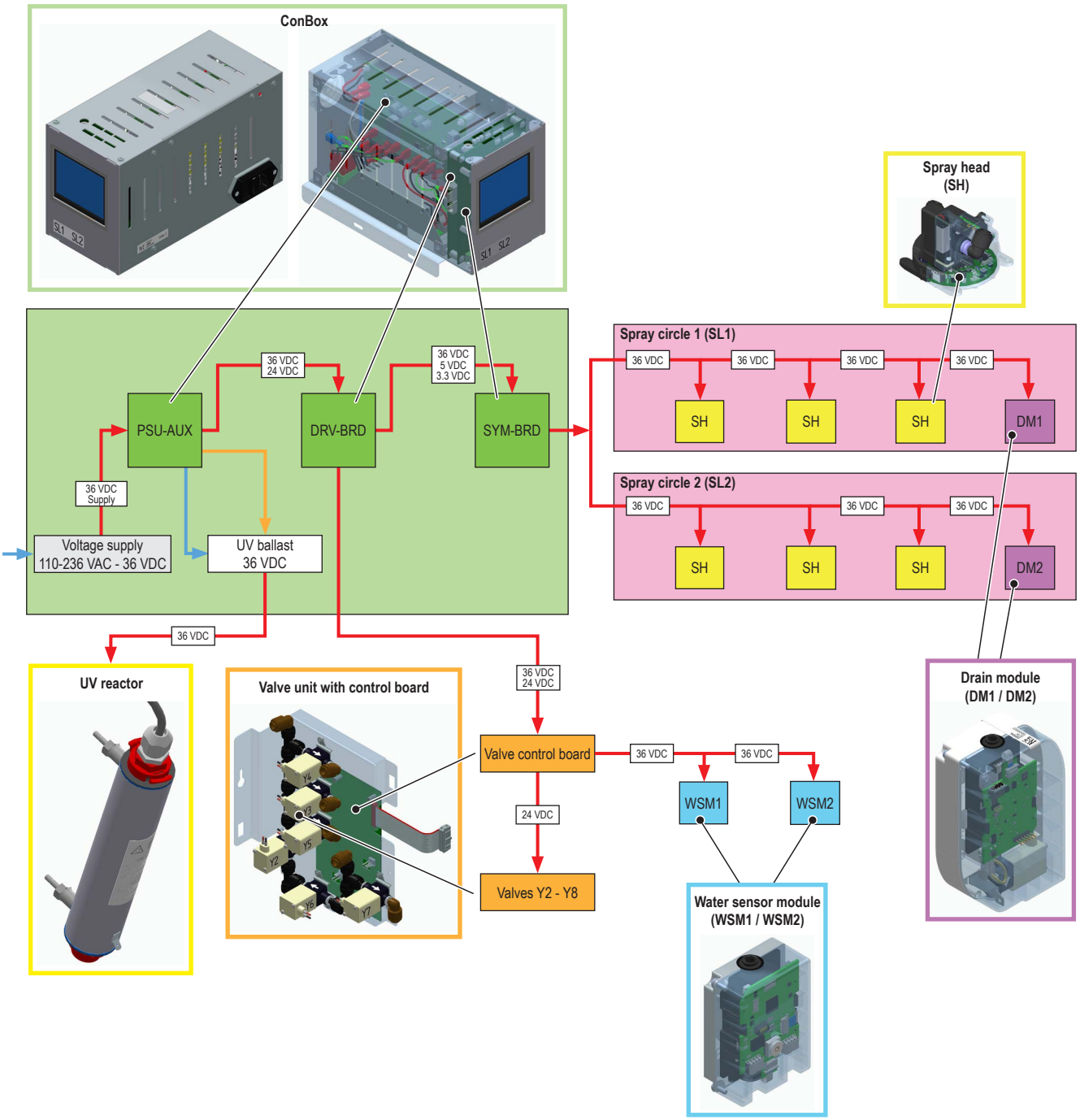


Fig. 7: Electrical diagram Condair MN

3.6 Units overview

3.6.1 Overview central unit

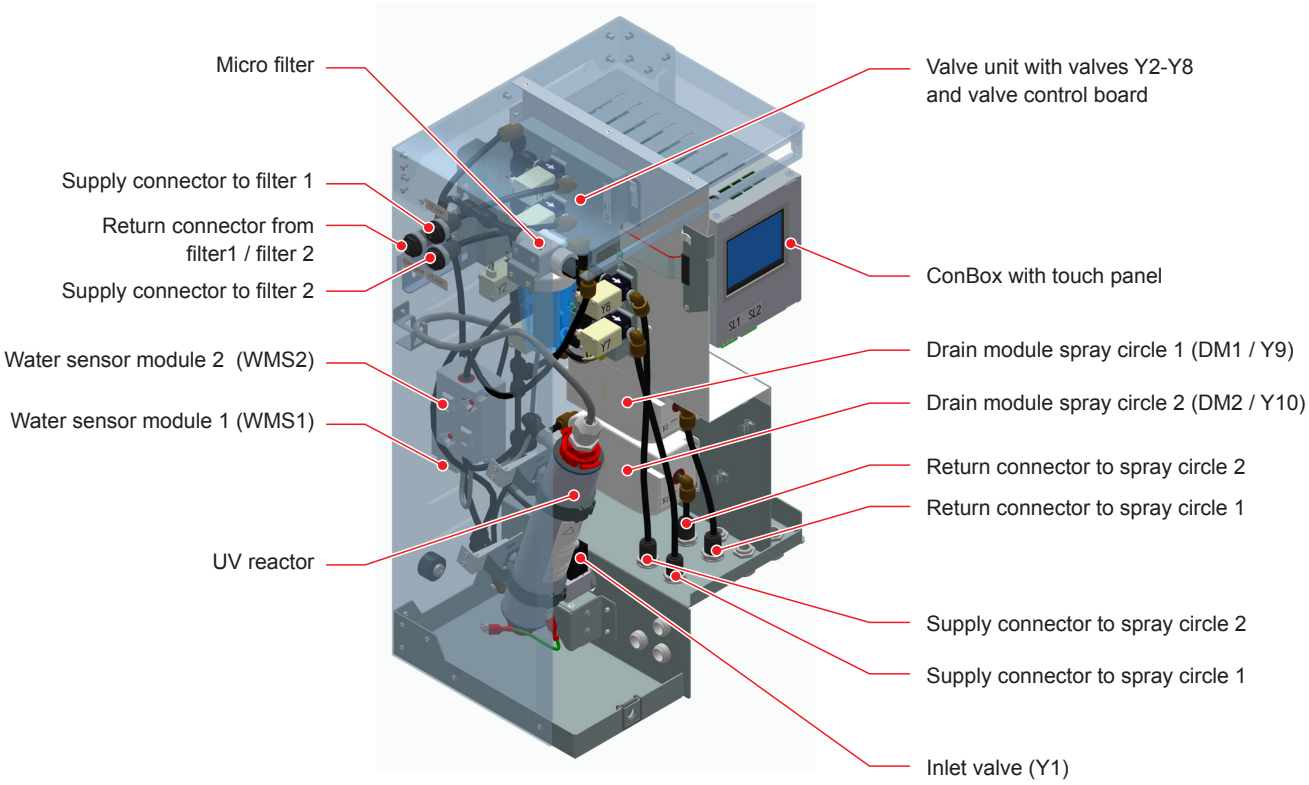


Fig. 8: Central unit

3.6.2 Overview Water filter

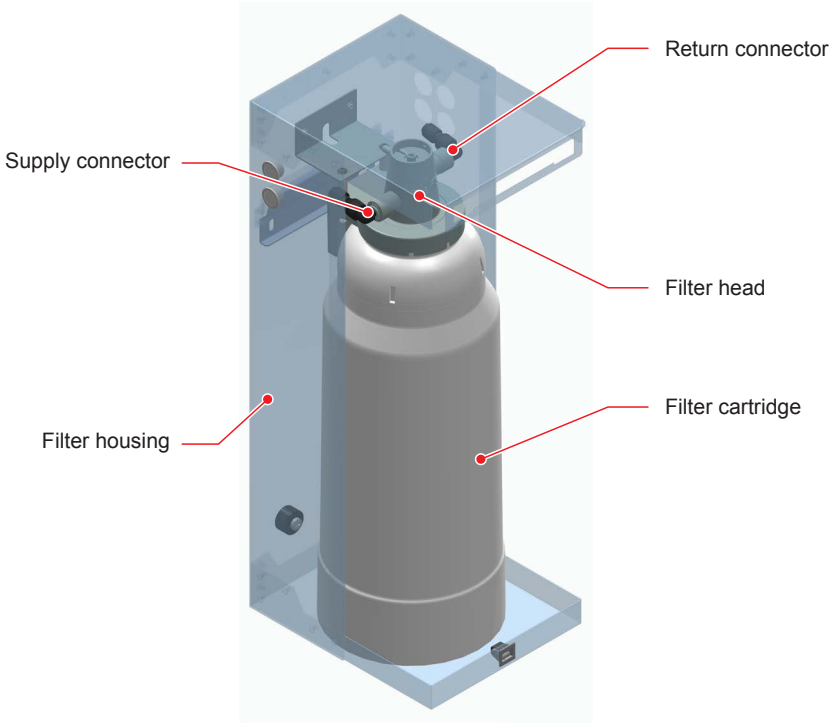


Fig. 9: Water filter

3.6.3 Overview booster module

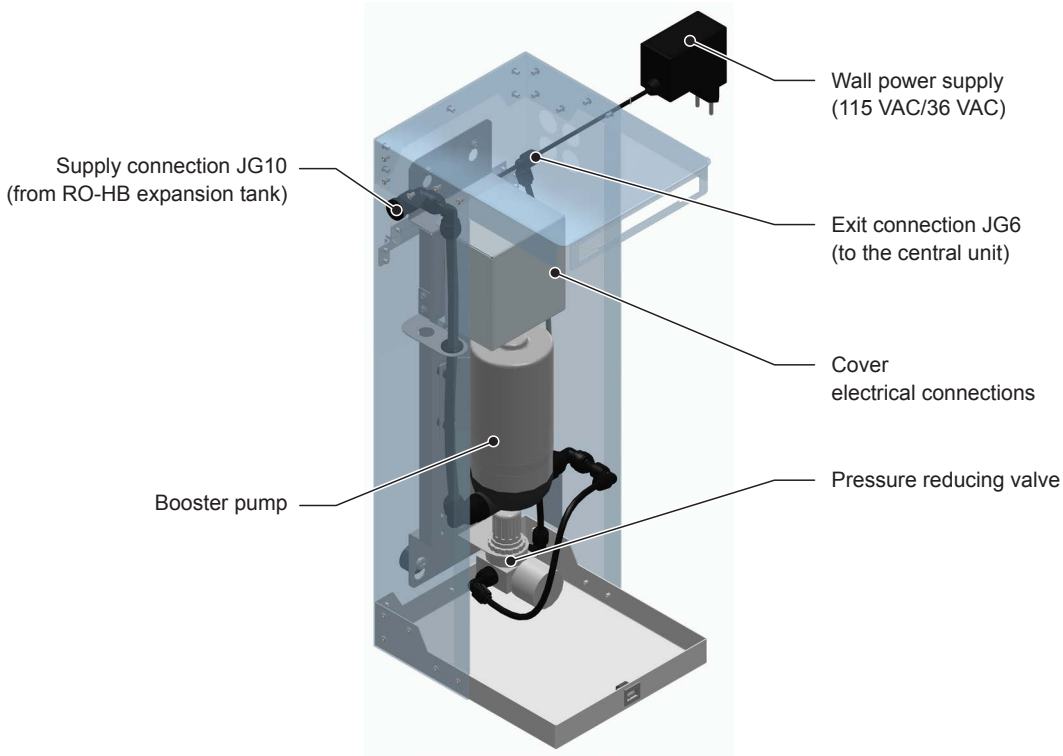


Fig. 10: Booster module

3.6.4 Overview spray head

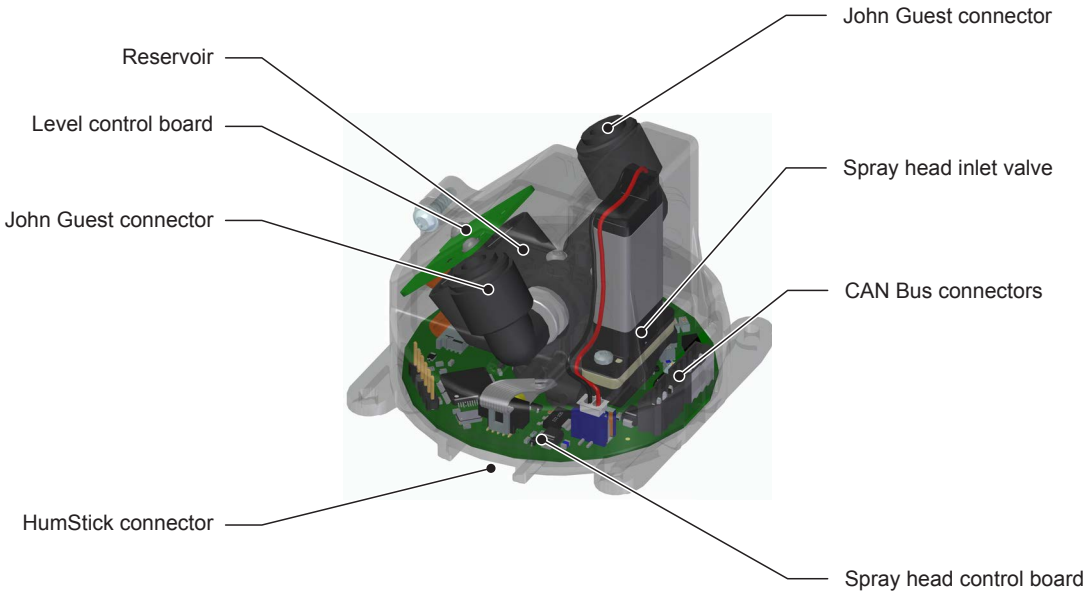


Fig. 11: Spray head

4 MN Service Back-Office application

Note: The following description of the MN Service Back-Office application assumes that the current version of the MN Service Back-Office application is installed on your laptop.

4.1 The start screen

Start the MN Service Back-Office application on your laptop. The start screen appears.

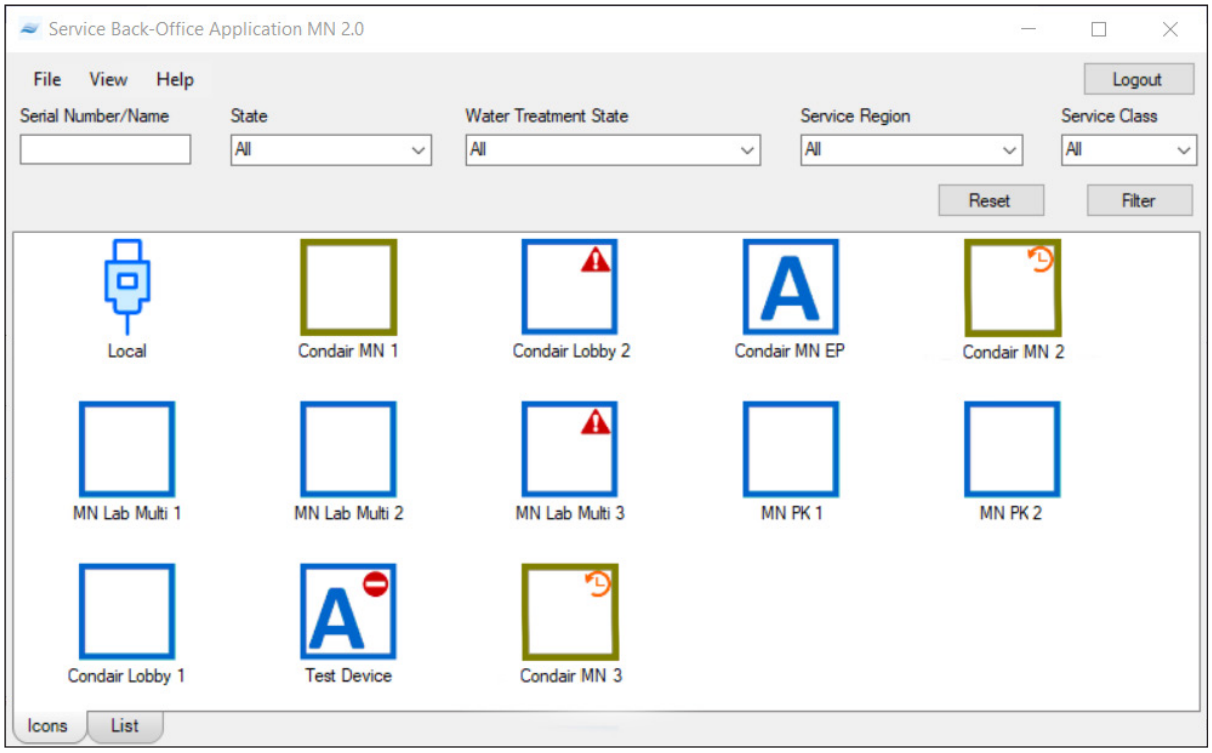


Fig. 12: Start screen (Icon view)

The start screen shows the available systems to connect to. The display of the systems can be filtered using the settings in the filters "Serial Number/Name", "State", "Water Treatment State", "Service Region" and "Service Class" and then clicking on the “Filter” button. By clicking on the "Reset" button, the filters are reset and all systems are displayed again.

Using the "Local" icon (only available in icon view) a local connection can be established, e.g. for commissioning a new system (see *Section 5*).

The "Icons" and "List" tabs can be used to switch between icon view and list view of the systems.

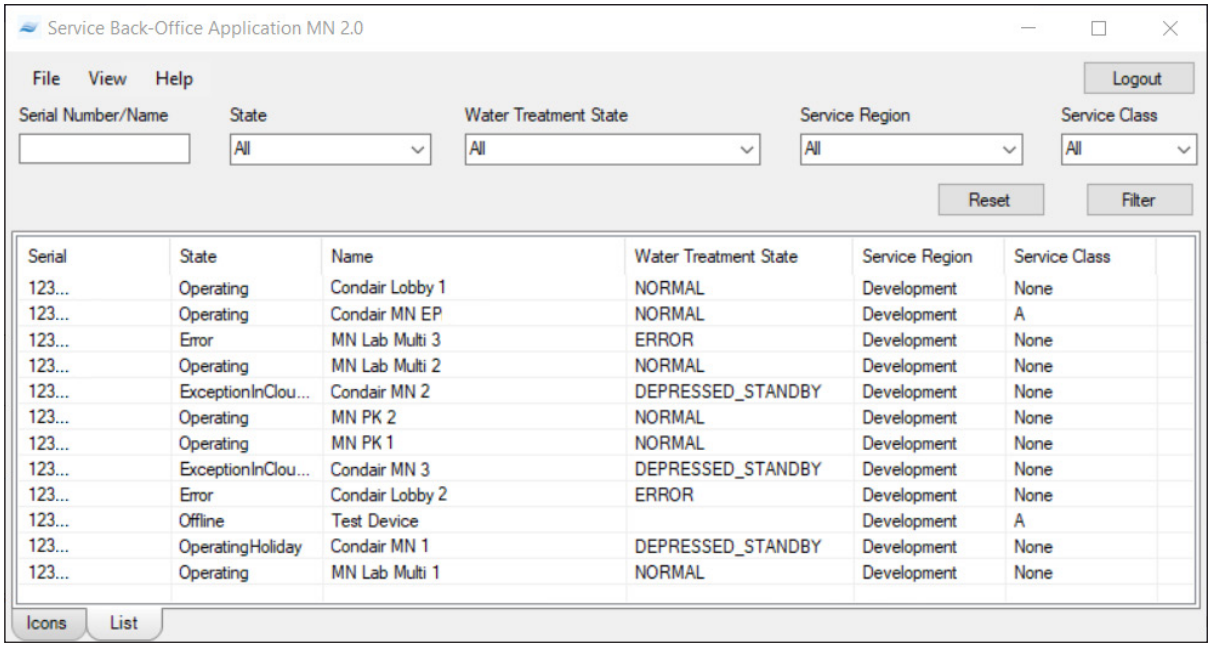


Fig. 13: Start screen (list view)

The various system icons in the icon view have the following meanings:

Characteristic	Meaning	Example
Frame color system icon		
Blue	System in normal operation	
Green	System in summer operation	
Letters		
Letters A-D	Type of service contract	
No letter	System without a service contract	
Red icons at top right		
	Water filter replacement due	
	System in SHUTDOWN, INIT or ERROR status	
	System offline	
	System switched off, but connected via gateway	
	New events in the history list	

Double-clicking on a system icon in icon view or on a system in the list view establishes a connection to the corresponding system and opens the system window (see *Section 4.2*).

4.2 System window

- Via the menu
  - *File* > *Exit*: Close the system window
  - *Control* > *Commands*: Access the Command Wizard
  - *Control* > *Commissioning*: Access the commissioning routine
  - *Help* > *About*: Display of the software version of the MN Service Back-Office application
- At the top right of the system window, marked with the open-end wrench symbol the date for the next service is displayed.
- Various current system data can be displayed via the tabs at the bottom of the window (see *Section 4.2.1* to *Section 4.2.6*).
- The current pressure and the water conductivity measured by water sensor modules 1 and 2 (WSM1/WSM2) and the pressure of the spray loop 1 and 2 (SL1/SL2) are displayed on the bottom right of the system window.

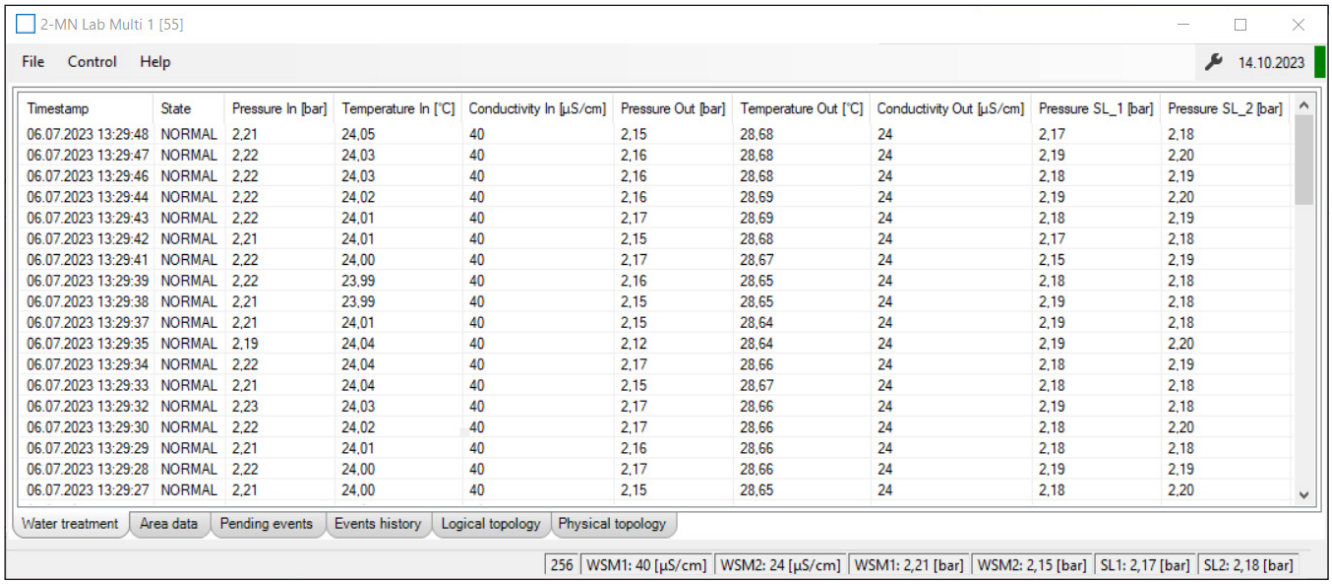


Fig. 14: System window

4.2.1 "Water treatment" tab

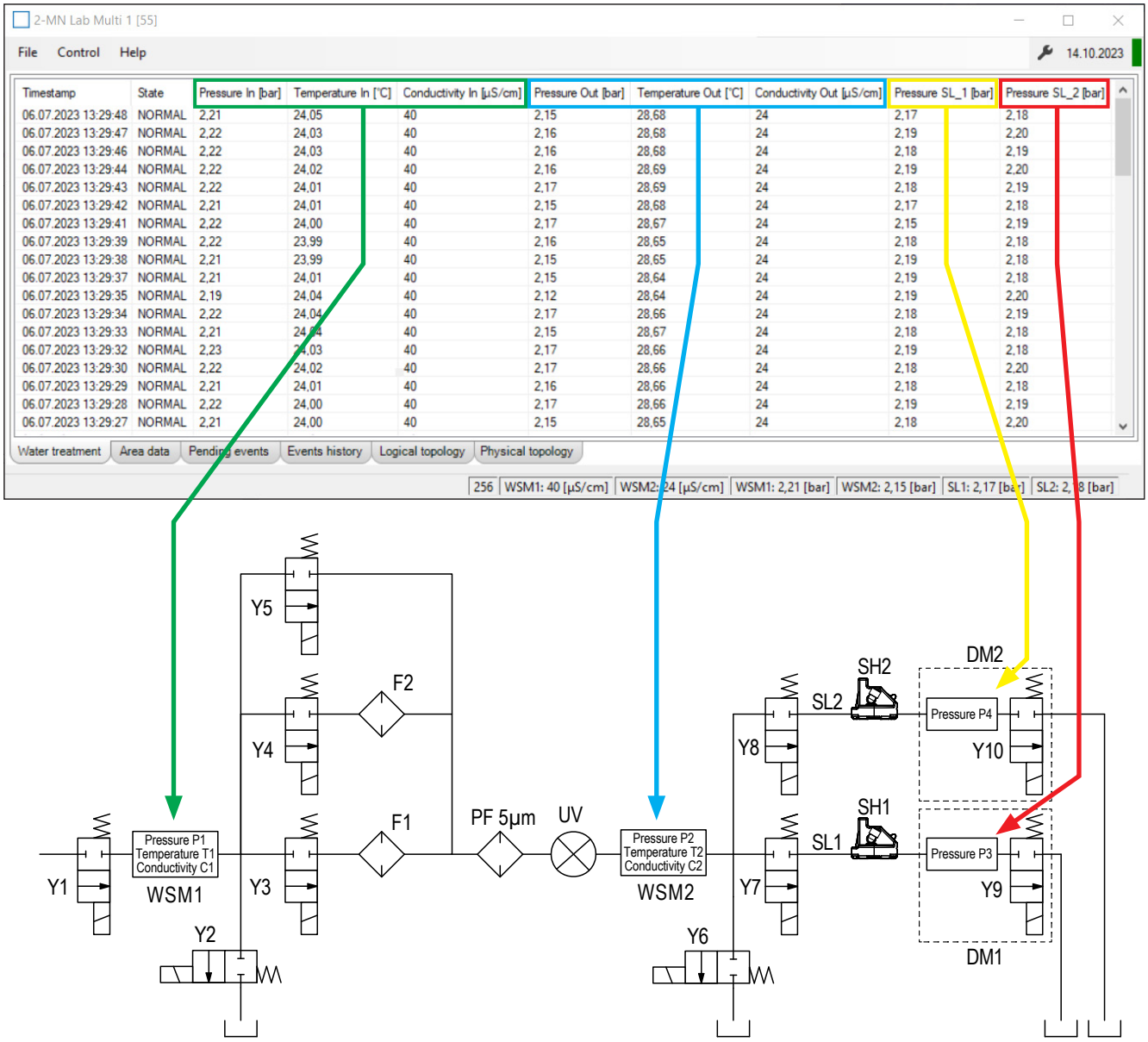


Fig. 15: "Water treatment" tab

In the "Water treatment" window, the operating status, the temperature, pressure and conductivity of the supply water after the inlet valve (sensed by the water sensor module 1), the temperature, pressure and conductivity of the water after the water filter(s) (sensed by the Water sensor module 2) and the pressure in spray loop 1 and spray loop 2 are displayed.

The following operating states may be displayed:

	Operating State	Without RO-HB	With RO-HB 72.5 psig (500 kPa)	Description
Different individual states	**INIT**			Initialization status remains, for example, if no spray loop is found
	NORMAL			System in humidification state, no errors present.
	ERROR			Error state, there is one or more errors. It may be that one spray loop has an error and the system continues to humidify on the other spray loop, if that is possible.
	UV_PREHEAT			UV exposure of the water in the reactor after a longer period of time without humidification.
	REG_UV_PREHEAT			UV exposure of the water in the reactor before regular flsuhing after a longer period of time without humidification.
Start flush (Start Force or starting the system) Note: Start flush takes longer than regular flush	**START_PRES_IN**	5 s	5 s	Pressure test inlet section
	START_PRES_OUT	5 s	5 s	Pressure test outlet section
	START_PRES_SL	5 s	5 s	Pressure test spray loop
	START_LEAKAGE	30 s	30 s	Leak test
	START_FLUSH_IN	max. 300 s or Water temperature <71.6°F (<22°C)	max. 60 s or Water temperature <71.6°F (<22°C)	Flushing inlet section
	START_FLUSH_BYP	60 s	60 s	Flushing bypass
	START_FLUSH_F1	900 s flushing at intervals of 100 s flushing and 100 s pause	900 s flushing at intervals of 100 s flushing and 100 s pause	Flushing filter 1
	START_FLUSH_F2	900 s flushing at intervals of 100 s flushing and 100 s pause	900 s flushing at intervals of 100 s flushing and 100 s pause	Flushing filter 2
	START_FIRST_FLUSH_F1 (Only when changing filter)	900 s flushing at intervals of 100 s flushing and 100 s pause	900 s flushing at intervals of 100 s flushing and 100 s pause	Flushing new filter 1
	START_FIRST_FLUSH_F2 (Only when changing filter)	900 s flushing at intervals of 100 s flushing and 100 s pause	900 s flushing at intervals of 100 s flushing and 100 s pause	Flushing new filter 2
	START_FLUSH_SL1	300 s	80 s	Flushing Sprayloop 1
	START_FLUSH_SL2	300 s	80 s	Flushing Sprayloop 2
Preparation for humidification	**PRES_IN**	5 s	5 s	Pressure test inlet section
	PRES_OUT	5 s	5 s	Pressure test outlet section
	PRES_SL	5 s	5 s	Pressure test spray loop
Regular flushing, every 12 hours	**REG_PRES_IN**	5 s	5 s	Pressure test inlet section
	REG_PRES_OUT	5 s	5 s	Pressure test outlet section
	REG_PRES_SL	5 s	5 s	Pressure test spray loop
	REG_LEAKAGE	30 s	30 s	Leak test
	REG_FLUSH_IN	max. 300 s or water temperature <71.6°F (<22°C)	max. 60 s or water temperature <71.6°F (<22°C)	Flushing inlet section
	REG_FLUSH_BYP	30 s	30 s	Flushing bypass
	REG_FLUSH_F1	60 s	60 s	Flushing filter 1
	REG_FLUSH_F2	60 s	60 s	Flushing filter 2
	REG_FLUSH_SL1	140 s	80 s	Flushing spray loop 1
	REG_FLUSH_SL2	140 s	80 s	Flushing spray loop 2

	Operating State	Without RO-HB	With RO-HB 72.5 psig (500 kPa)	Description
Conductivity flushing when conductivity is outside the permissible range	**COND_OUT_PRES_IN**	5 s	5 s	Pressure test inlet section
	COND_OUT_PRES_OUT	5 s	5 s	Pressure test outlet section
	COND_OUT_PRES_SL	5 s	5 s	Pressure test spray loop
	COND_OUT_FM	60 s	60 s	Flushing active filter
	COND_OUT_FS	60 s	60 s	Flushing inactive filter
Inlet temperature flushing	**TEMP_IN_PRES_IN**	5 s	5 s	Pressure test inlet section
	TEMP_IN_PRES_OUT	5 s	5 s	Pressure test outlet section
	TEMP_IN_PRES_SL	5 s	5 s	Pressure test spray loop
	TEMP_IN	300 s	300 s	Flushing inlet section
Outlet temperature flushing	**TEMP_OUT_PRES_IN**	5 s	5 s	Pressure test inlet section
	TEMP_OUT_PRES_OUT	5 s	5 s	Pressure test outlet section
	TEMP_OUT_PRES_SL	5 s	5 s	Pressure test spray loop
	TEMP_OUT_IN	20 s	20 s	Flushing inlet section
	TEMP_OUT_OUT	5 s	5 s	Flushing oulet section
Depressurize the system	**DEPRESS_ALL**			All drain valves open, depressurizing the system
	DEPRESS_OUT			Depressurizing the outlet section
	DEPRESS_SL			Depressurizing spray loop
	DEPRESS_SL1			Depressurizing spray loop 1
	DEPRESS_SL2			Depressurizing spray loop 2
Different depressurized states	**DEPRESS_SHUTDOWN**			Depressurizing system
	DEPRESS_CHG_FIL			Depressurized for filter change
	DEPRESS_PRE_DISINF			Depressurized before disinfection
	DEPRESS_POST_DISINF			Depressurized after disinfection
	DEPRESS_STANDBY			Depressurizing system in summer mode
	DEPRESSED_SHUTDOWN			System depressurized
	DEPRESSED_CHG_FIL			System depressurized for filter change
	DEPRESSED_PRE_DISINF			System depressurized for disinfection
	DEPRESSED_POST_DISINF			System depressurized after disinfection
	DEPRESSED_STANDBY			System depressurized in summer mode
Disinfection routine	**DISINF_IN**			
	DISINF_F1			
	DISINF_SL1_BYP			
	DISINF_SL2			
	DISINF_F2			
	DISINF_WAIT			
	DISINF_DONE			
	DISINF_WATER_F1			
	DISINF_WATER_F2			
Short flushing if spray loop did not humidify for more than 6 hours	**QUICK_SL_PRES_IN**	5 s	5 s	Pressure test inlet section
	QUICK_SL_PRES_OUT	5 s	5 s	Pressure test outlet section
	QUICK_SL_PRES_SL	5 s	5 s	Pressure test spray loop
	QUICK_SL_SL1	140 s	60 s	Pressure test spray loop 1
	QUICK_SL_SL2	140 s	60 s	Pressure test spray loop 2

4.2.2 "Area data" tab

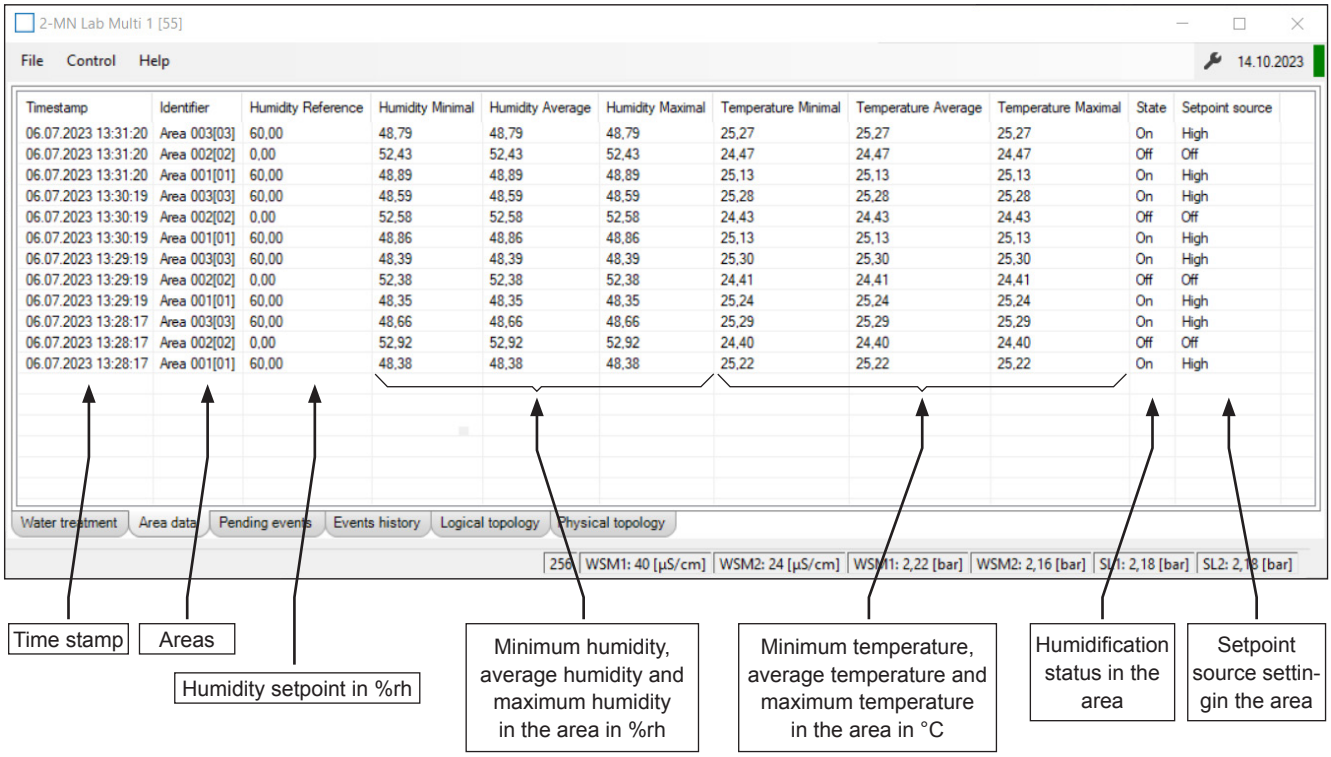


Fig. 16: "Area data" tab

The "Area data" window shows the humidity setpoint, the minimum humidity, the average humidity and the maximum humidity, the minimum temperature, the average temperature and the maximum temperature, the humidification status and the setting of the setpoint source for the various zones.
Note: The humidification in a zone is switched off as soon as any one humidity sensor in the zone has reached the humidity setpoint.

4.2.3 "Pending events" tab

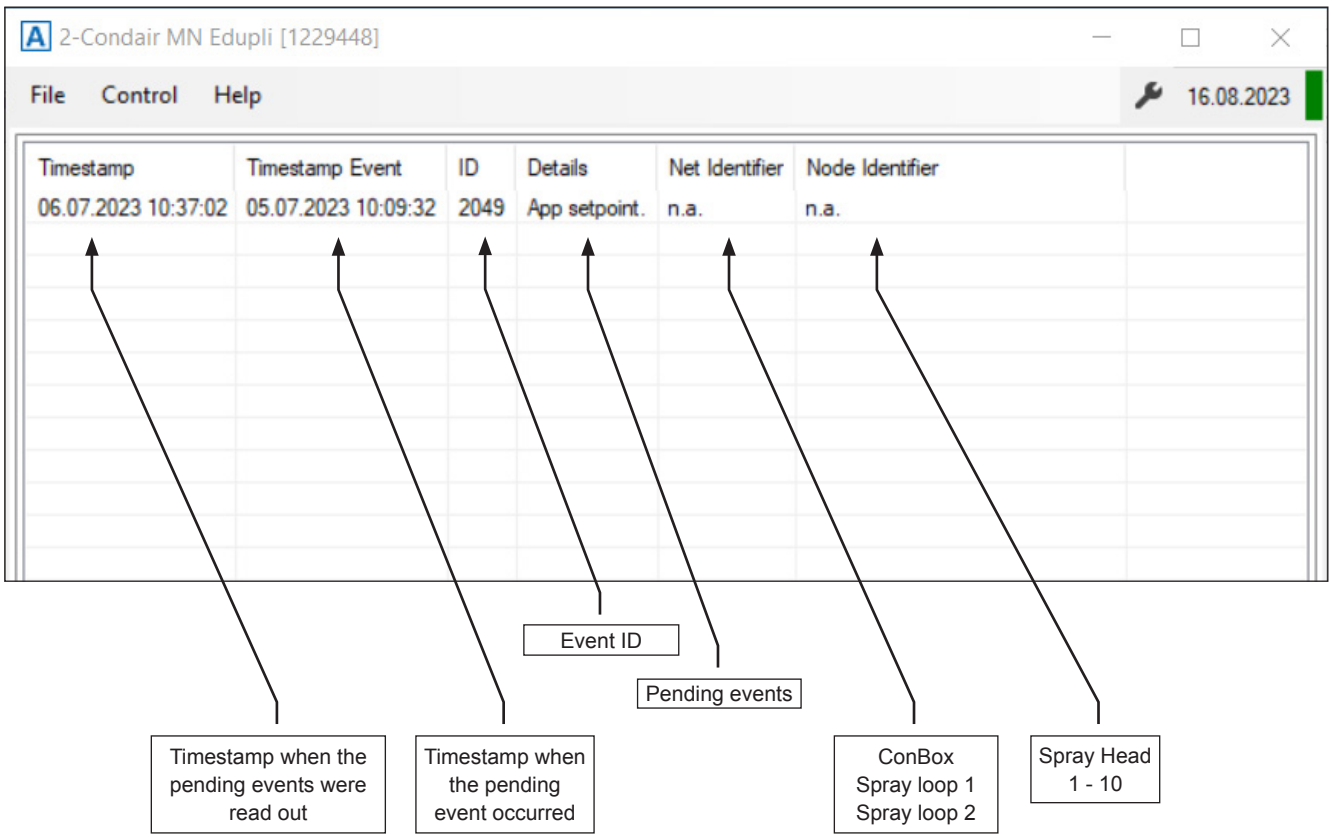


Fig. 17: "Pending events" tab

The "Pending events" window shows the currently pending event messages.

4.2.4 "Events history" tab

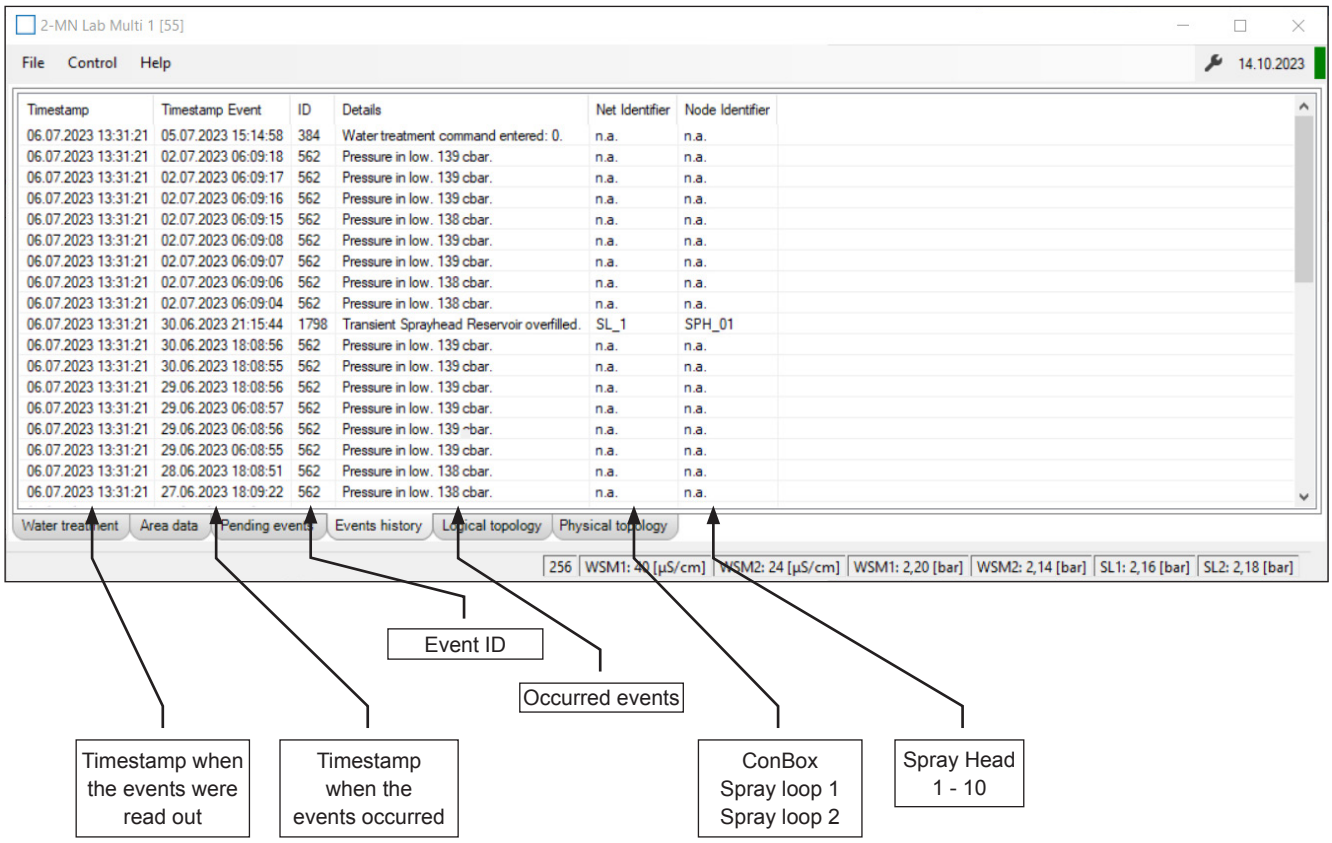


Fig. 18: "Events history" tab

The "Events history" window shows the list of past event messages that have occurred since the last system start is displayed.

4.2.5 "Logical topology" tab

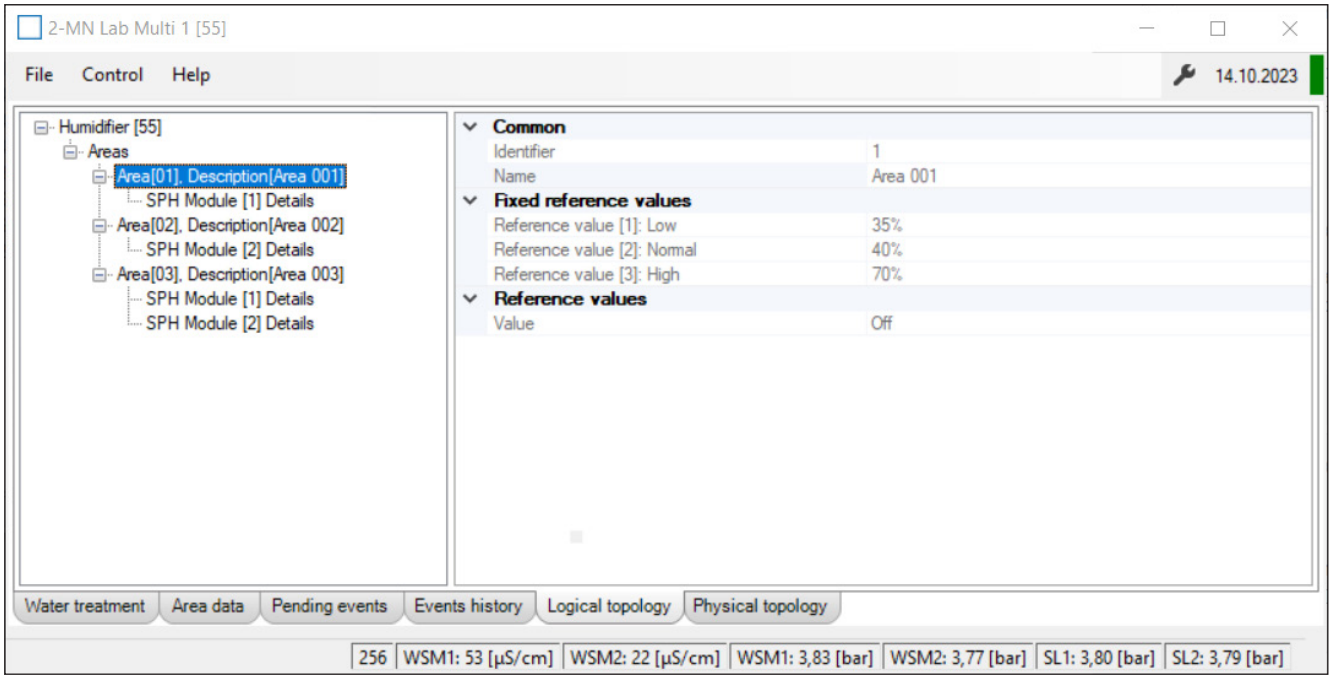


Fig. 19: "Logical topology" tab (Area data)

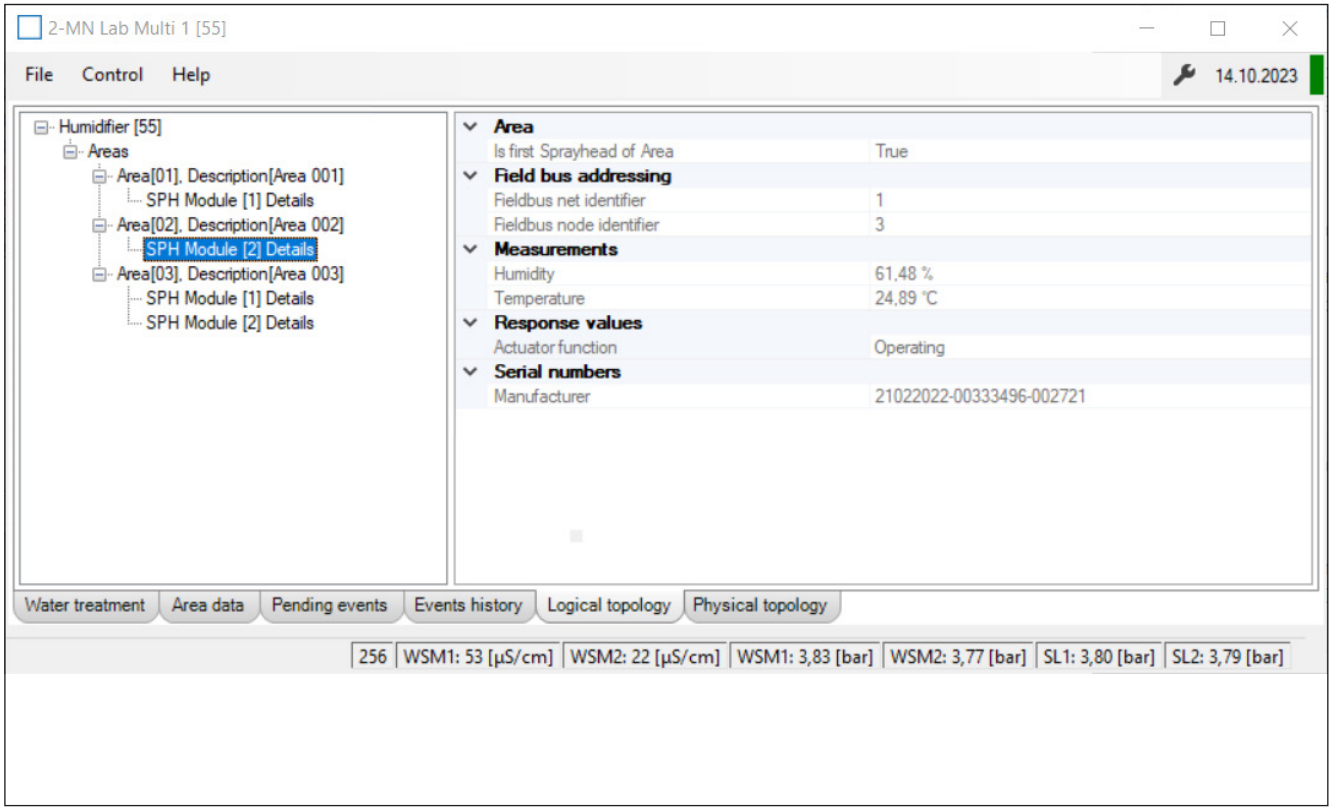


Fig. 20: "Logical topology" tab (Spray head data)

The "Logical topology" window shows the logical topology of the MN system with the current settings for the various zones and spray heads.

4.2.6 "Physical topology" tab

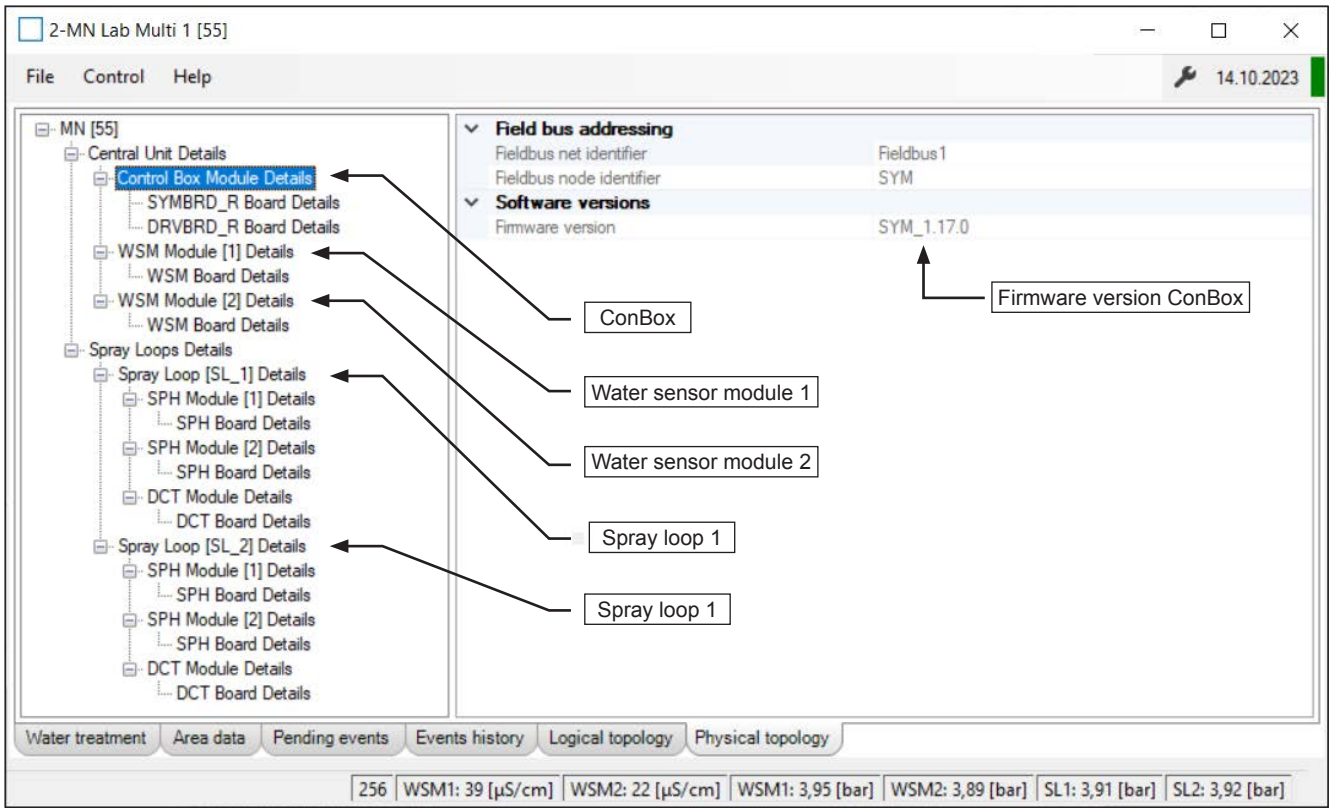


Fig. 21: "Physical topology" tab

The "Physical topology" window shows the individual components of the MN system and how they are connected in the system. For each component additional information (hardware version, software version, etc.) is displayed.

4.3 Command Wizard

After selecting "Control > Commands" in the system window, the "Command Wizard" window appears.

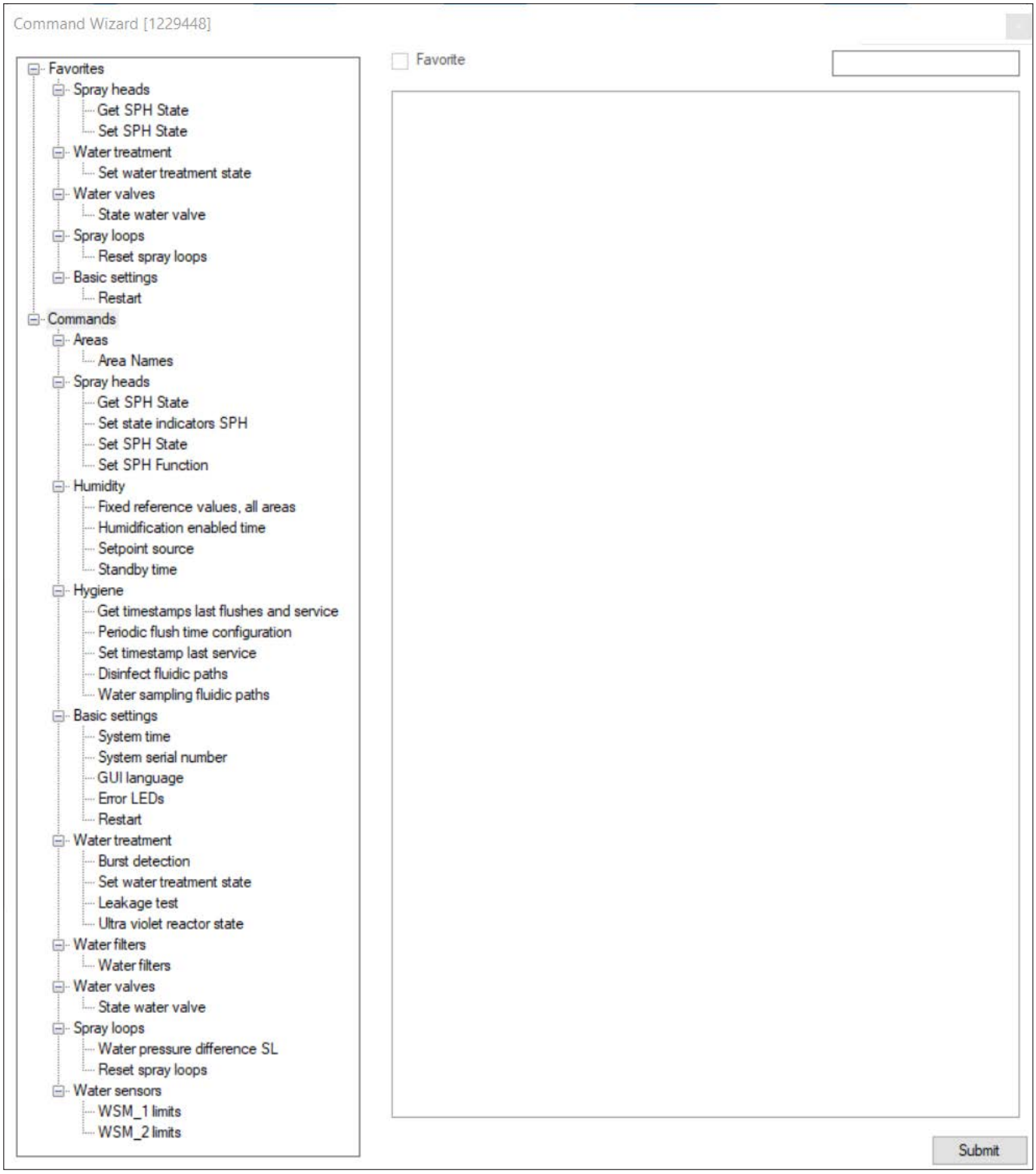


Fig. 22: "Command Wizard" window

Via the individual commands of the "Command Wizard" system values can be set or queried.

Command	Action
Commands	
Areas	
Area Names	Determination of the area names.
Spray heads	
Get SPH state	Query actuator status, sensor function, actuator function and reservoir status of a spray head in the system.
Set state indicators SPH	Switch the LEDs of a spray head or the spray heads of an area or a spray loop on (flashing) or off.
Set SPH State	Determination of the status of a spray head's actuator in the system (empty reservoir, fill reservoir, spray continuously, reset permanent error, or return to automatic mode when reservoir is empty).
SPH Function	Activation (Operation) or deactivation (Inactive) of the actuator function and sensor function of a spray head in the system.
Humidity	
Fixed reference values, all areas	Determination of the high, low, and normal setpoints for the different zones.
Humidification enabled time	Determination of the humidification operating times for each day of the week for the different areas.
Setpoint source	Determination of the humidity setpoint sources for the individual zones (humidity setpoint via app, humidity setpoint via external controller, high humidity setpoint, low humidity setpoint, normal humidity setpoint or off).
Standby time	Determination of the standby time of the MN system.
Hygiene	
Get timestamps last flushes and service	Query of the time stamp of the last periodic flushings and the last quick flushings of spray loops 1 and 2, the last service and the set advance warning times.
Periodic flush time configuration	Query or determination of the start times for the first and second periodic flushing of the water system.
Set time stamp last service	Determination of the number of days for the triggering of the pre-warning, the warning and the risk warning for the customer when the system service is due.
Disinfect fluidic paths	Query or determination of the settings for the disinfection of the flushing sections (flushing time section 1, flushing time section 2 (filter 1), flushing time section 3 (filter 2), flushing time section 4 (bypass), flushing time section spray loop 1 and filter 1, flushing time section spray loop 2 and filters 2).
Water sampling fluidic path	Query or determination of the settings for water sampling for spray loops 1 and 2 (select filter, select spray loop, sampling delay time, sampling duration).
Basic Settings	
System time	Query system date and system time.
System serial number	Query system serial number.
GUI language	Query of the set language on the device display.
Error LED	Determination of whether an error is displayed via the device LED (On) or not (Off).
Restart	Triggering a system restart.

Command	Action
Water treatment	
Burst detection	Query or determination of the pressure difference and triggering delay for a burst detection.
Set water treatment state	Determination of the water system status (Start, Shutdown, Quick Start, Start Enforced, Continue).
Leakage test	Query or determination of the pressure loss and the duration of the leakage test.
Ultra violet reactor state	Query or determination of the UV reactor status (On or Off).
Water filters	
Water filters	Query or determination of the number of water filters and the master water filter.
Water valves	
State water valve	Determination of the operational status (On or Off) of each valve (Y1 to Y10) for test purposes or to flush specific sections of the water system.
Spray Loops	
Water pressure difference SL	Query or determination of the pressure difference of spray loop 1 and spray loop 2.
Reset spray loops	Determination of whether spray loop 1, spray loop 2 or both should be reset and after what delay time they should be reset.
Water sensors	
WSM_1 limits	Determination of the low and high pressure and temperature limits, the low and high pressure and temperature warning limits, and the low and high conductivity warning limits for the water sensor module 1.
WSM_2 limits	Determination of the low and high pressure and temperature limits, the low and high pressure and temperature warning limits, and the low and high conductivity warning limits for the water sensor module 2.

Note: Frequently used commands can also be saved as favorites. The figure below shows such a collection of commands.

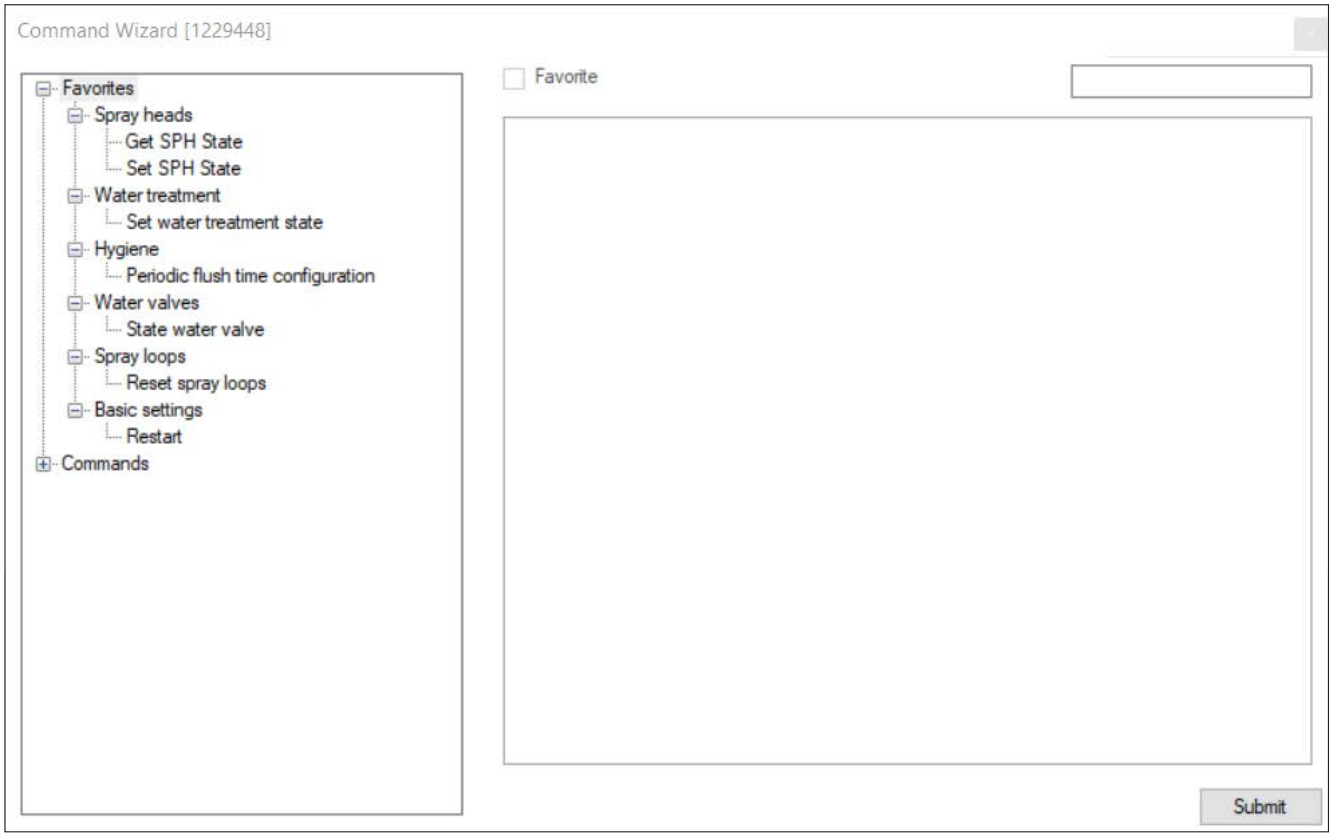


Fig. 23: Favorites

5 Installation

5.1 Important notes on the installation work

For the correct installation of the system, it is essential that suitable tools are used. A list of recommended tools can be found in *Section 9.2*.

5.2 Installation of spray heads (flush-mounting)

The installation of spray heads described below assumes that the preliminary installation work has been completed, that the appropriate holes have been drilled at the ceiling or wall junction points of the spray heads, and that the hoses and CAN bus cables have been retracted.

The spray heads are to be mounted as follows.

1a. **Mount the installation ring (for flush mounting without catch springs only):**

- Using two screws, mount the installation ring at the intended position in such a way that it is concentric with the hole on the ceiling or wall. Make sure to use screws that are suitable for mounting on the respective surface.
  Important: If mounting on the ceiling, the installation ring must be mounted in such a way that the recess for the Humstick in the installation ring points towards the middle of the room. If mounting on a wall, the installation ring must be mounted in such a way that the designation "UP" in the mounting ring points upwards!

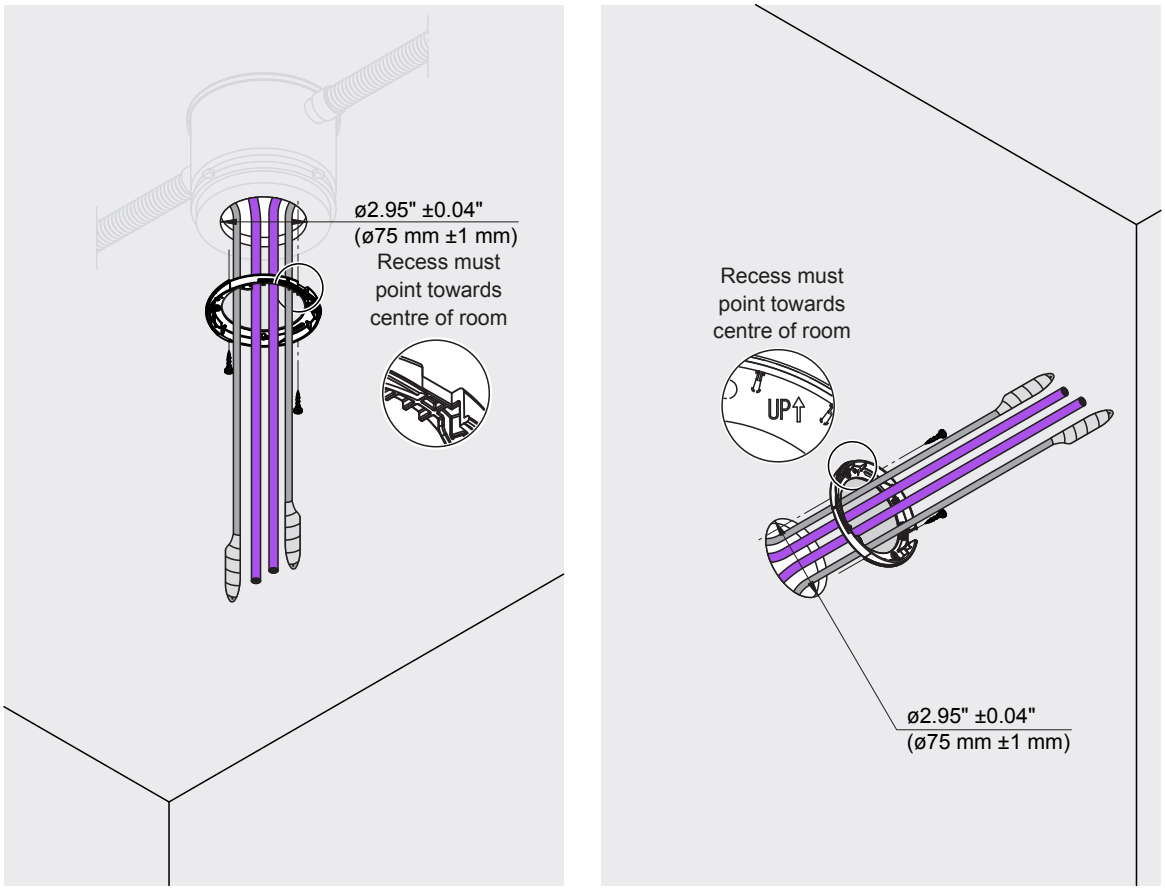


Fig. 24: Mount the installation ring

1b. **Fix the installation ring and catch springs to the spray head (for flush mounting with catch springs only)**:

- Fix the installation ring to the spray head with two screws.
  Important: Mount the installation ring so that the recess for the Humstick in the installation ring is on the connection side of the Humstick of the spray head!
- Insert the catch springs on both sides of the spray head as far as they will go into the holes provided.

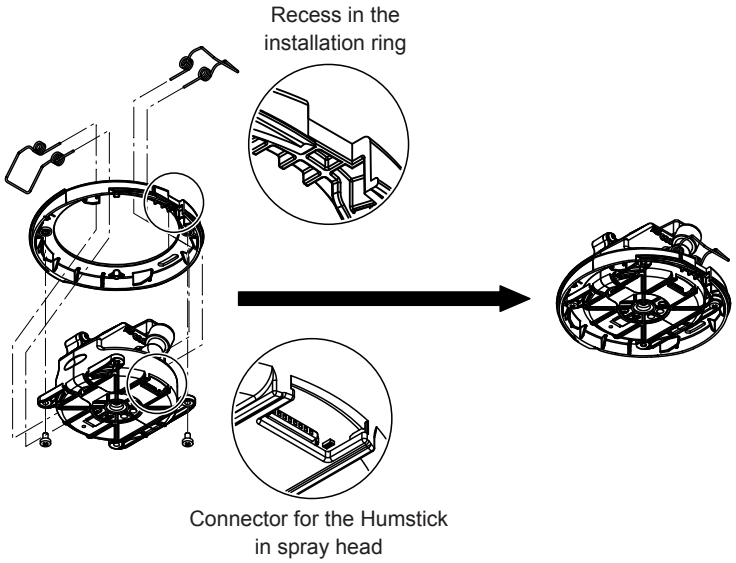


Fig. 25: Fixing the installation ring and catch springs to the spray head

1c. **Mount the mounting plate (only for surface mounting):**

- Using four screws, mount the mounting plate to the ceiling or wall in the intended position. Make sure to use screws that are suitable for mounting on the respective surface.
  Important: If mounting on the ceiling, mount the mounting plate with the "Humstick" side facing the centre of the room. If mounting on a wall, the mounting plate must be mounted so that the flattened side of the mounting plate points upwards!

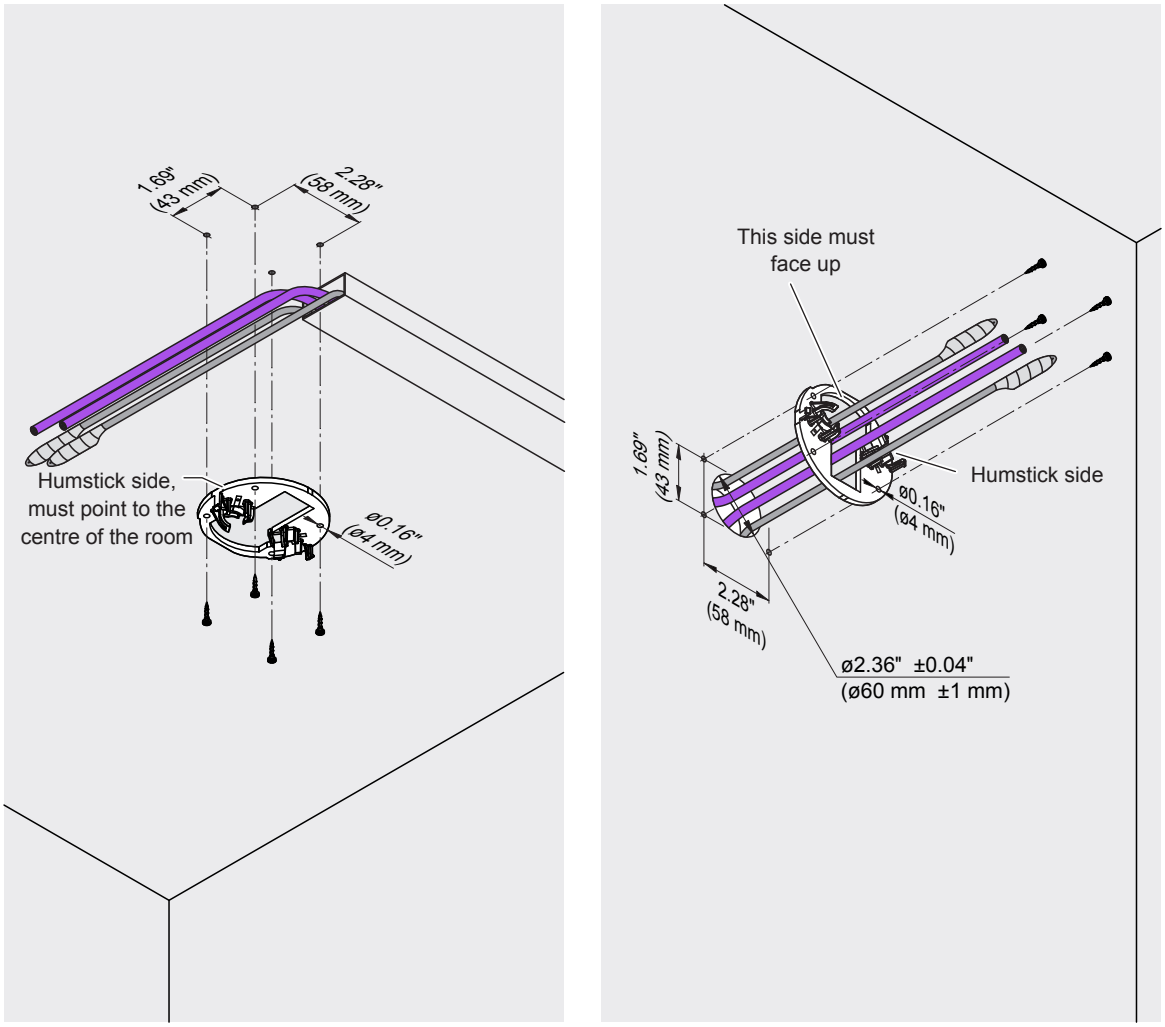


Fig. 26: Mount the installation ring.

2. Cut the CAN bus cables and hoses to the required length of 11.81" (300 mm).

3. Prepare the CAN bus cables for connection to the socket according to *Fig. 27*.

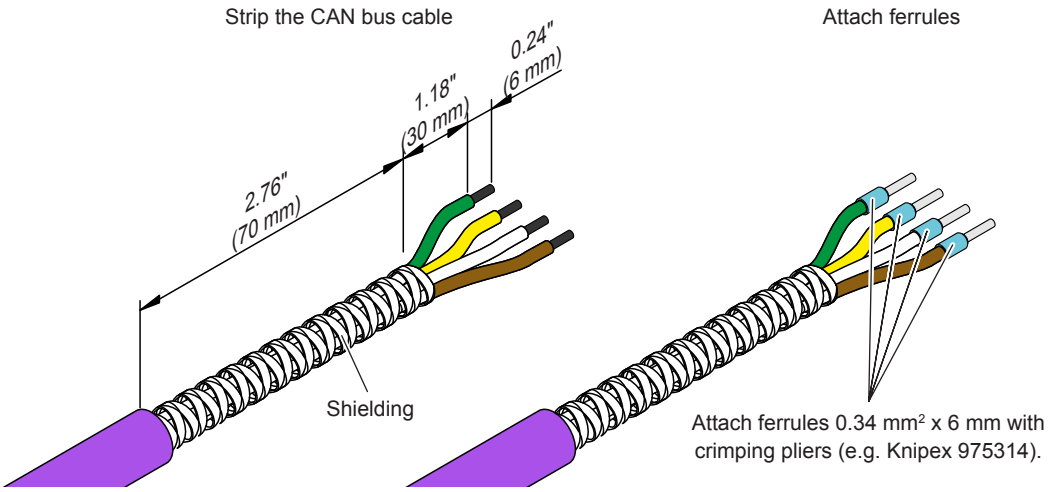


Fig. 27: Prepare cable

4. Connect the **black** connector plugs supplied to the CAN bus cables according to the connector assignment below.

Contact	Function	Cable color
1	CAN low (CAN L)	Green
2	CAN high (CAN H)	Yellow
3	V in (40 V)	White
4	Earth (GND)	Brown

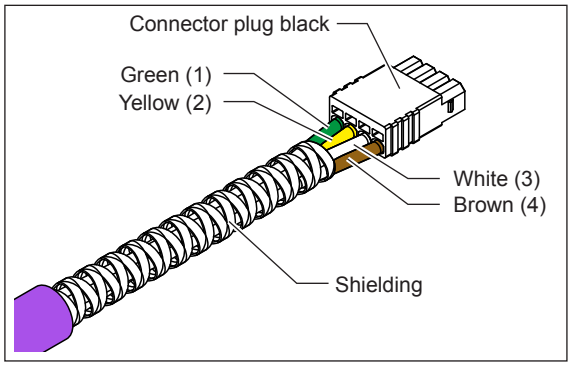


Fig. 28: Connect CAN bus cable

5. Connect ø0.24" (ø6 mm) hoses and CAN bus cable to the spray head.

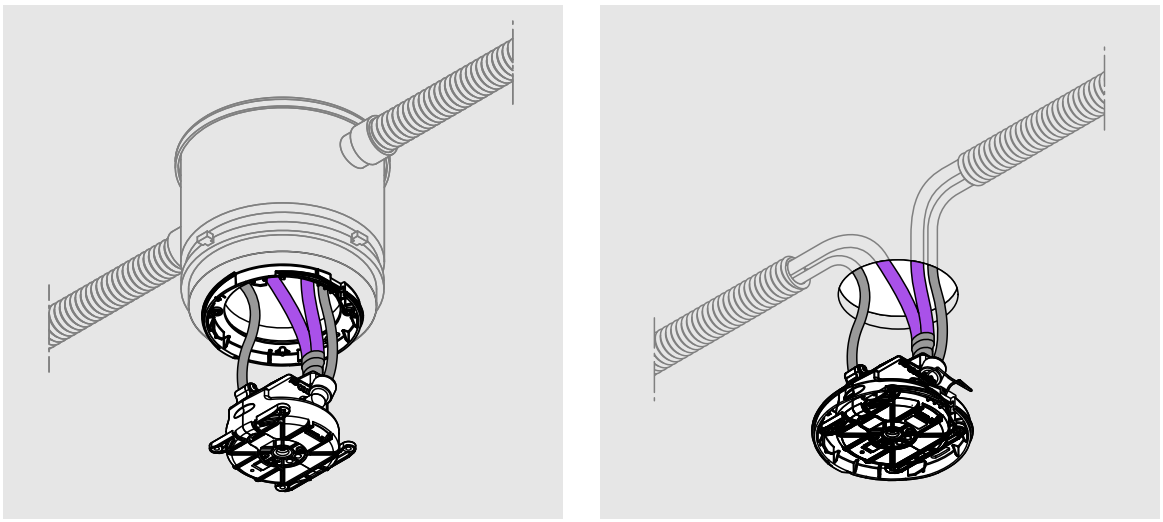


Fig. 29: Connect CAN bus cables and hoses to the spray head

- Push the hoses into the hose couplings as far as they will go.
  Note: Correctly installed hoses can no longer be pulled out without pressing in the clamping ring.
- Fix the self-adhesive cable tie socket (service accessory) to the side of the spray head with the cable connections as shown in *Fig. 30*. Plug in the two cables and secure them to the cable tie socket with a cable tie.
  Important: Tighten the cable tie so that the shieldings of the two cables are electrically connected (check with a continuity tester).

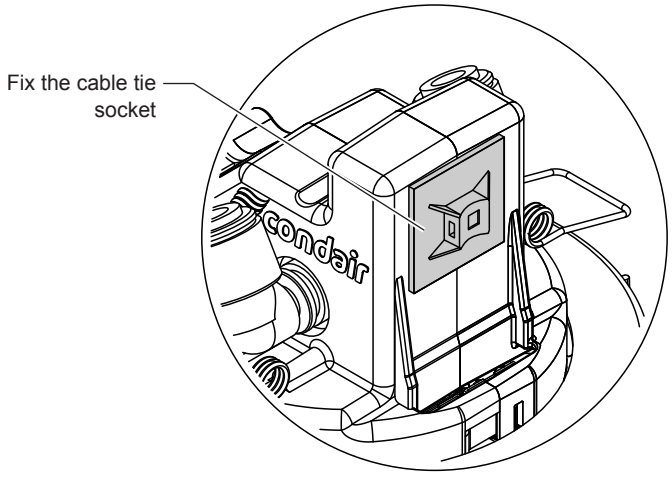


Fig. 30: Fixing the self-adhesive cable tie socket

- Align the plugs of the two cables at the bottom and then connect the cables together with adhesive tape, as shown in *Fig. 31*, so that the shieldings of the two cables are electrically connected (check with a continuity tester).
- Plug in the two cables and secure them to the cable tie socket with a cable tie.
  Important: Ensure that the plugs are correctly inserted in the sockets of the spray head.

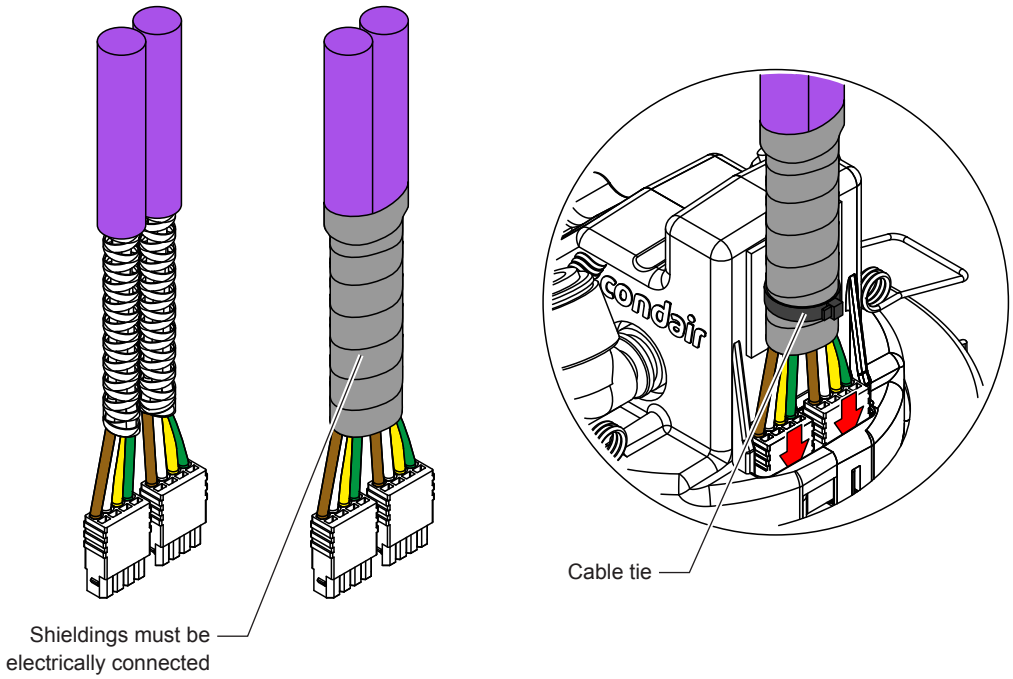


Fig. 31: Connect the CAN bus cable to the spray head

6. Insert the Humstick (supplied separately) into the spray heads.

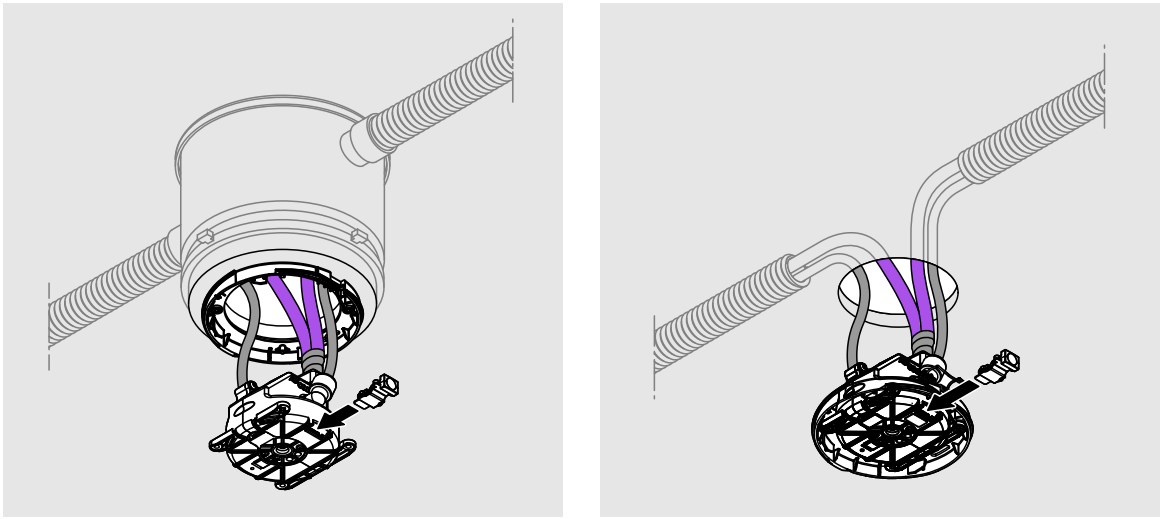


Fig. 32: Insert Humstick

7. **Configure spray zones**

Each spray loop of the Condair MN can be divided into different spray zones at the bottom of the spray head via the ASI (Area Start Indicator) switch. The spray zones are always configured in a clockwise direction. This ensures that, in the event of any subsequent troubleshooting, the sequence of the spray heads is clear.

Set the ASI switch to the "ON" position for the first spray head in a zone and "OFF" for each additional spray head in the same zone (see also *Fig. 33*).

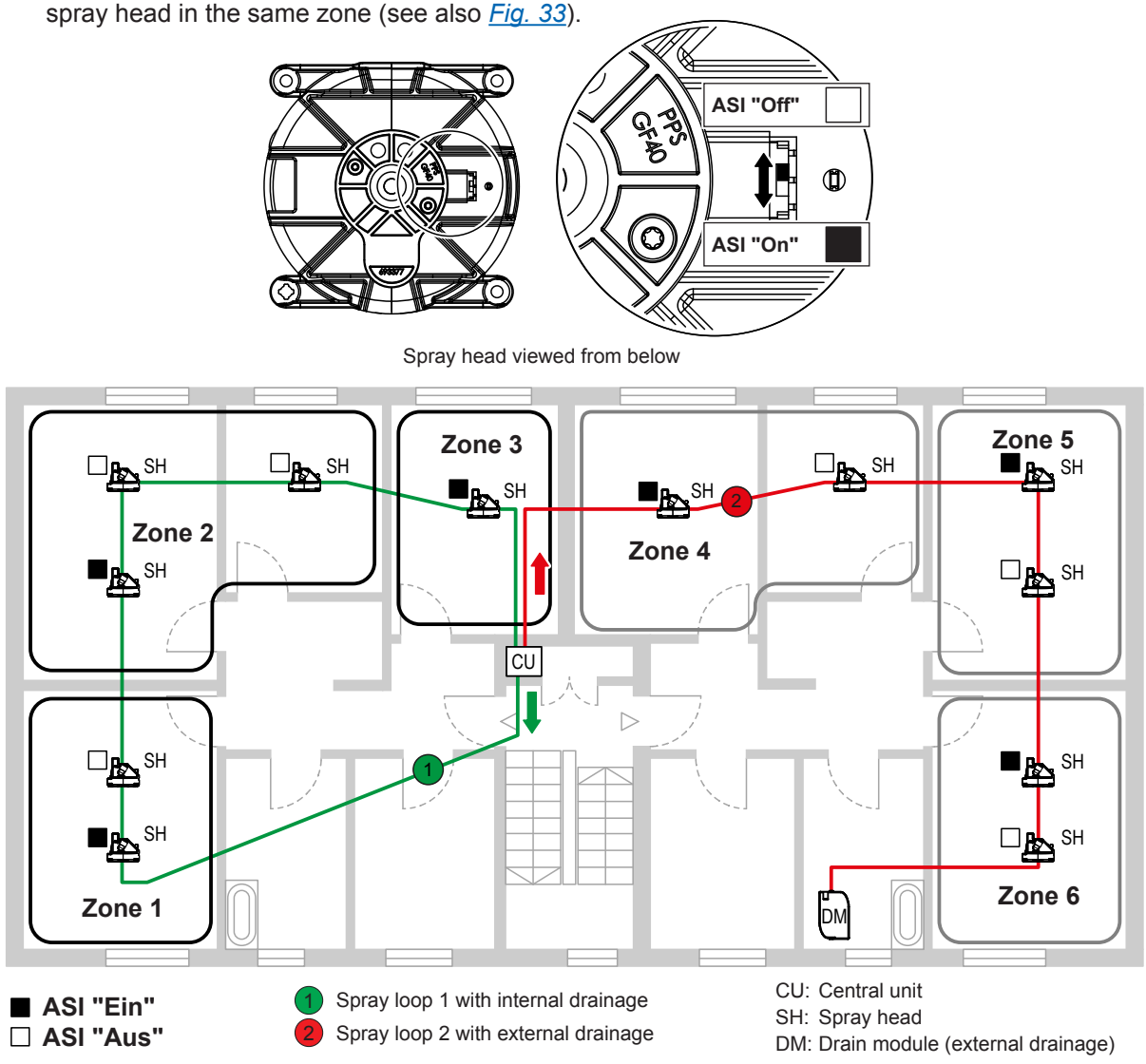


Fig. 33: Zone configuration

5.3 Assembly and connection of the drain module (only with external drainage)

Ex factory the mounting plate(s) and the drain module(s) are installed and connected in the central unit. For the external mounting of the drain module(s), the mounting plate(s) and the drain module(s) must be removed from the central unit.

1. Make sure that the power cable of the central unit is unplugged.
2. Remove the front panel of the central unit.
3. Disconnect the hoses to the drain module (s) from the connection (s) in the housing base and the T-connector(s). Then remove the emptying module (s) "A" together with the hoses and elbow connectors "B".
4. Disconnect hoses and elbow connectors "B" from the drain module(s) "A".
5. Loosen screw(s) and remove the mounting plate(s) "C".
6. Close the open connection(s) on the T-connector(s) with blind plug(s) "D".
7. Only for central unit with two spray loops: create hose connections "E".
8. If no further work needs to be carried out on the central unit, attach and lock the front cover of the central unit.

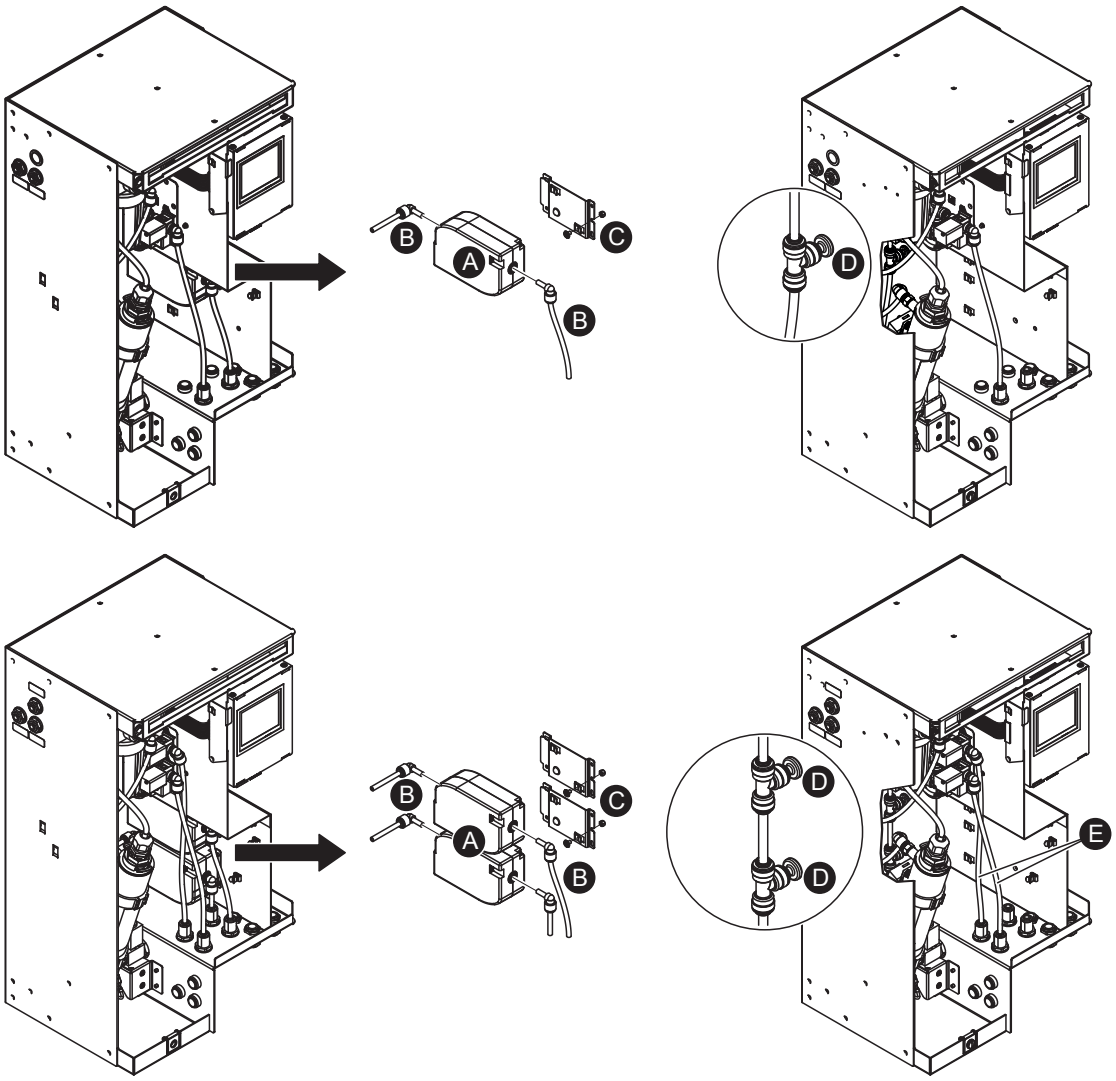


Fig. 34: Removal of the drain modules

Installation of the external drain module

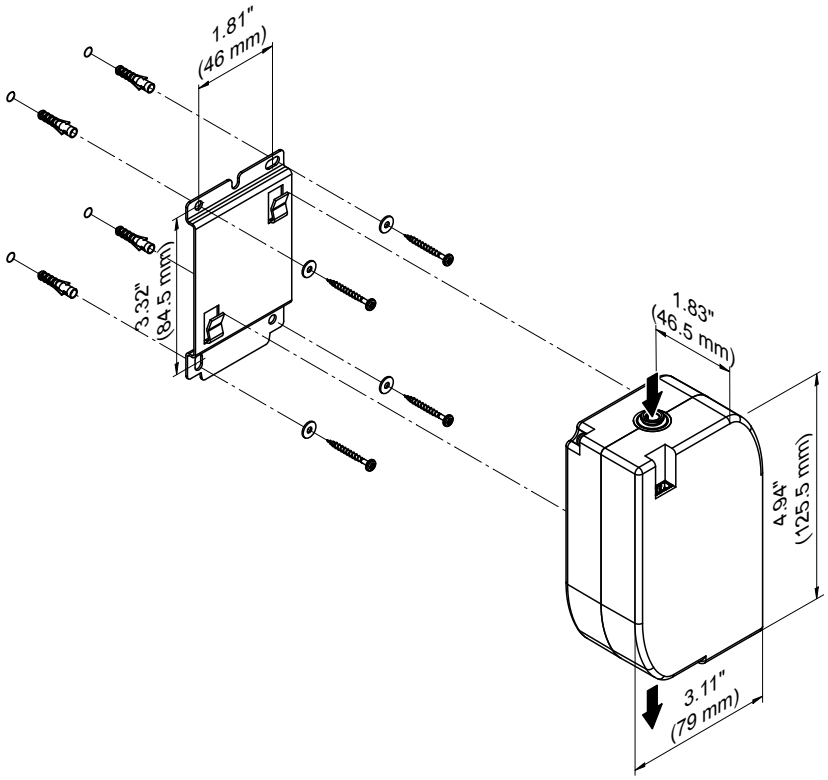


Fig. 35: Installation of the external drain module

1. Mark the four attachment points of the mounting plate at the desired location using a level.
2. Secure the mounting plate to the appropriate place with suitable mounting hardware (not supplied). Before tightening the screws, align the mounting plate horizontally using a level.
3. Hook the drain module into the tabs of the mounting plate and press down until it stops.

Important: Record the height difference in metres between the external drain module(s) and the central unit and convert to "bar". This value must be entered when commissioning the system in the MN Service Back-Office application (see *Section 6.2*)**.**

Example:
– The drain module for spray loop 1 is **16.40 ft (5 m) above** the central unit
– The drain module for spray loop 2 is **9.84 ft (3 m) below** the central unit

This results in the following input values in bar:
– Input value for water pressure difference for spray loop 1: **0.5**
– Input value for water pressure difference for spray loop 2: **-0.3**

Connect external drain module

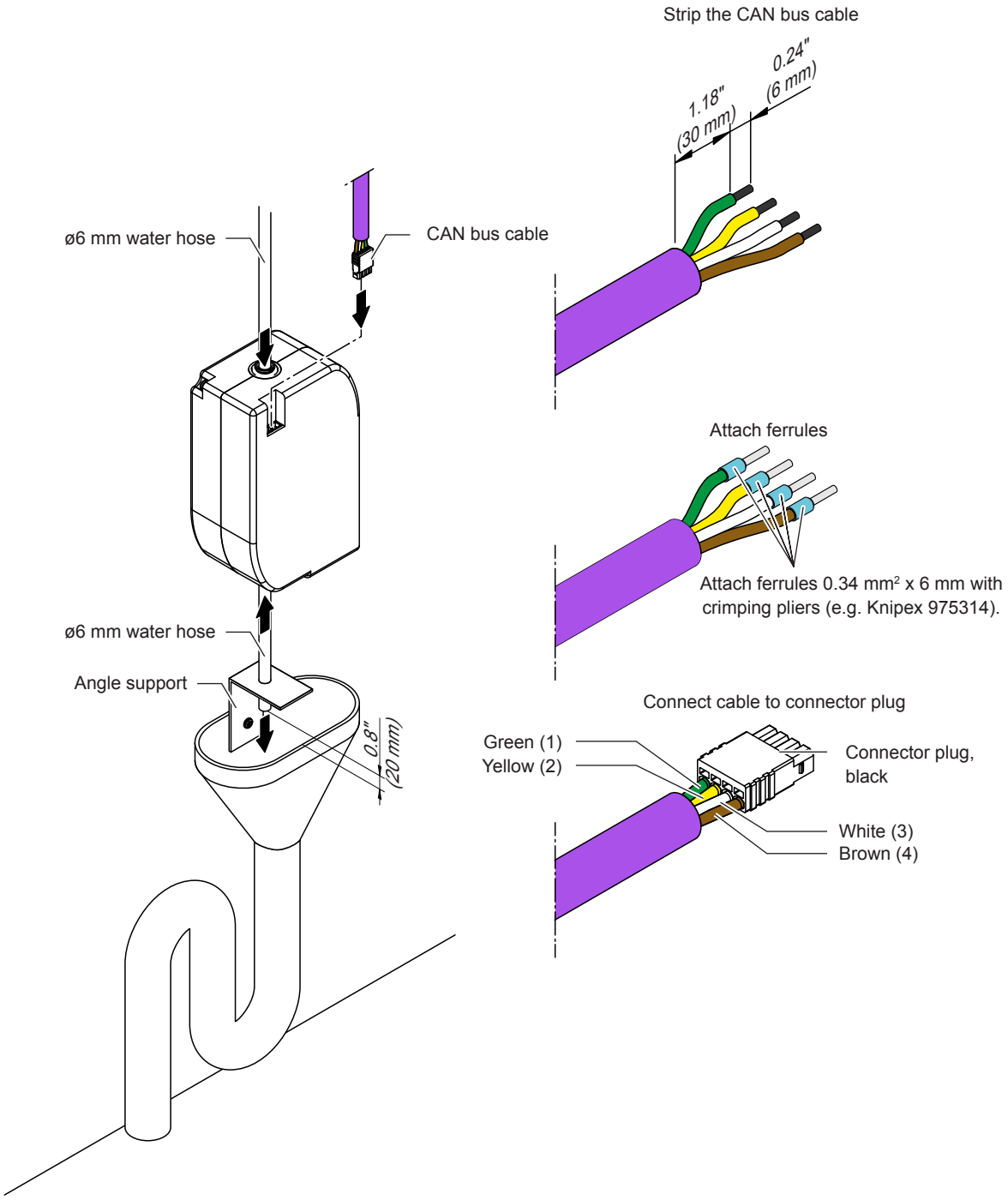


Fig. 36: Connect external drain module

1. Connect hoses according to *Fig. 36* appropriately.
   - Important: **Push water hoses all the way into the hose couplings. Correctly mounted hoses cannot be pulled out without depressing the clamping ring.**
   - Important: **The flushing process takes place under pressure. You must therefore attach the outlet pipe so that it cannot shift during operation (e.g. with angle support and drill).**
   - The end of the outlet pipe must stop 0.8 "(2 cm) above the discharge funnel and may not touch it under any circumstances.
2. Prepare the CAN bus cable, attach the plug to the CAN bus cable (see *Fig. 36*) and connect the CAN bus cable to the drain module.

5.4 Install water filter(s) and connect water hoses

Install water filter cartridge

The water filter(s) are supplied in a separate package and must be installed and connected in the filter housing on site. Proceed as follows:

1. Remove the front cover of the housing.
2. Slide the filter head upwards until it stops.
3. Remove the cap at the top of the water filter.
4. Place the water filter under the filter head so that the label faces forward and the notch in the water filter is under the left groove on the filter head.

   The following filter cartridge types must be used:

   – Operation with **drinking (tap) water**: Filter cartridge MN (SAP-No.: 2590361)

   – Operation with **reverse osmosis water**: Filter cartridge MN type RO (SAP-No.: 2605501)

   Important: Do not use Filter cartridge MN type RO for systems operated with tap water!
5. Slide the filter head downwards while rotating the water filter counterclockwise.
6. Turn the water filter counterclockwise until it stops.
7. Repeat steps 1 through 6 for the second water filter (if present).

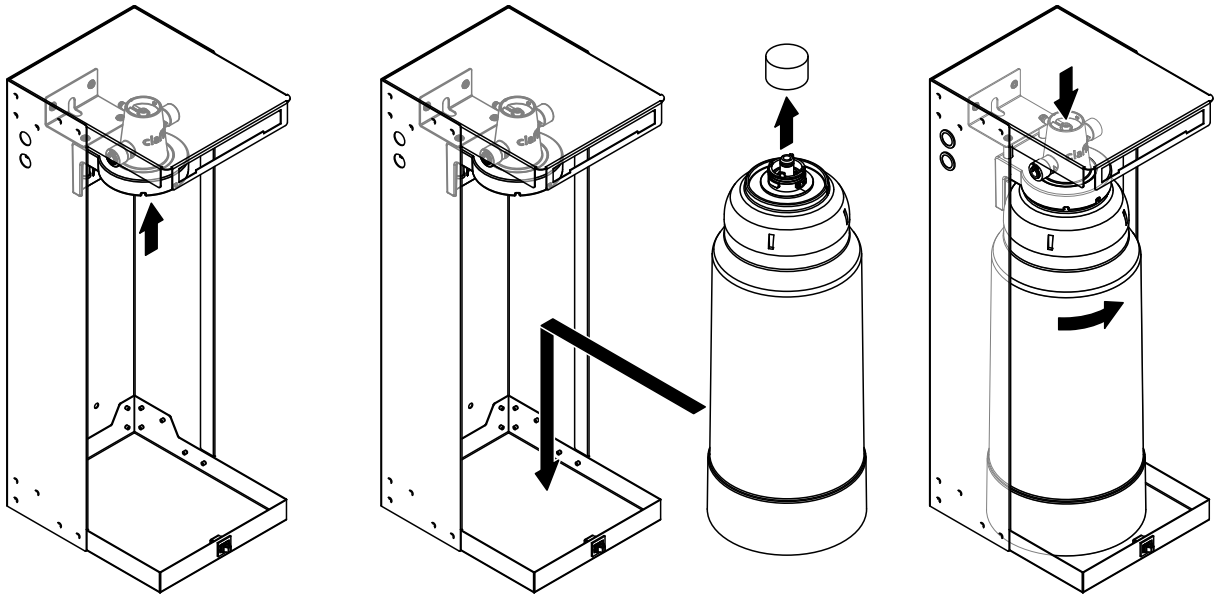


Fig. 37: Installation of the water filter

8. Connect the water hoses between the filter head and the central unit according to *Fig. 38* or *Fig. 39*.

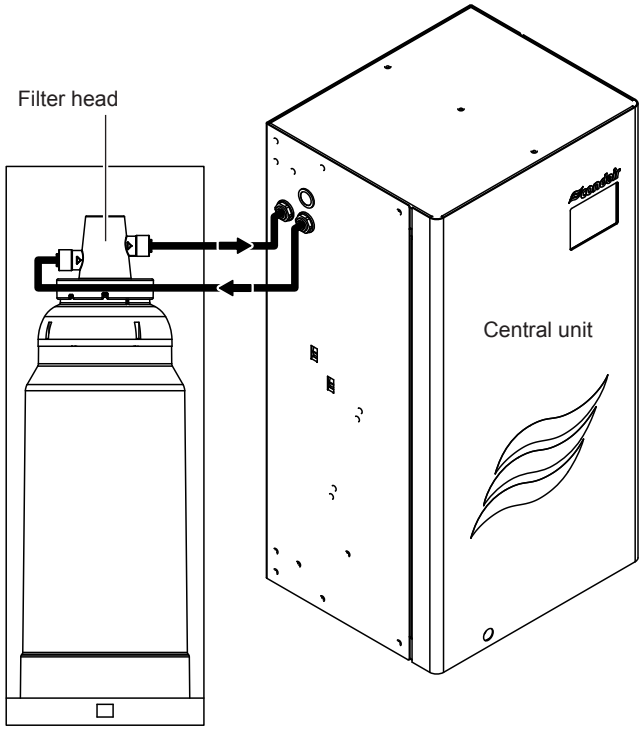


Fig. 38: Connection diagram with one water filter

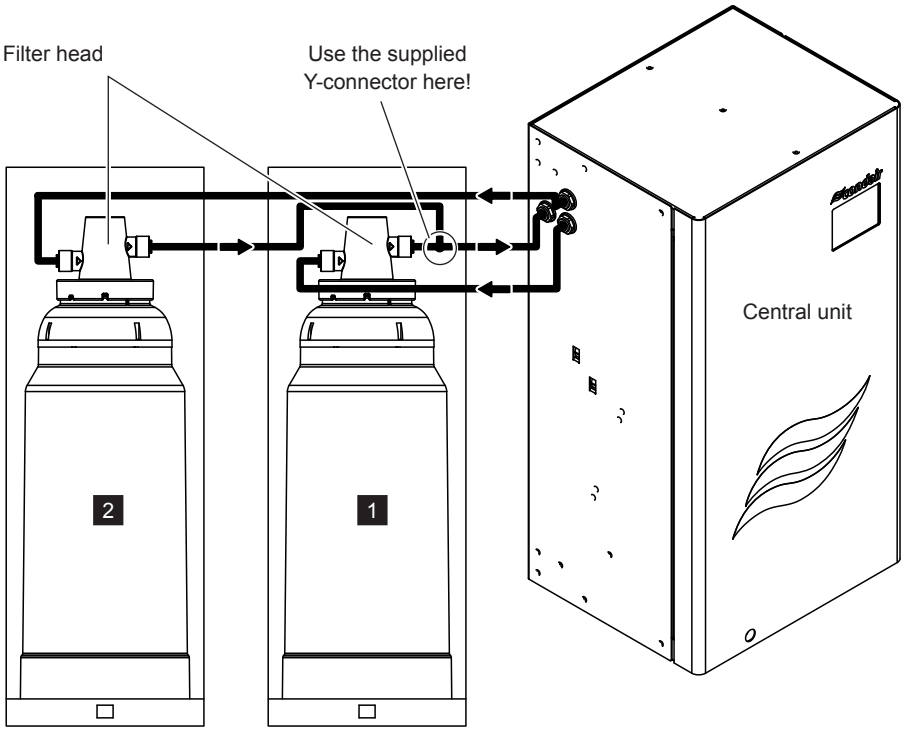


Fig. 39: Connection diagram with two water filters

10. Only when there are two water filters: Label filter housing inside with "1" and "2".
11. Replace the front cover(s) of the housing(s).

5.5 Connection of the spray loop hoses to the central unit

1. Connect the spray loop hoses from spray loop 1 and, if present, spray loop 2 to the central unit according to *Fig. 40*.
   Important: If the spray loop hoses are not marked or are marked insufficiently, label them according to *Fig. 40*.

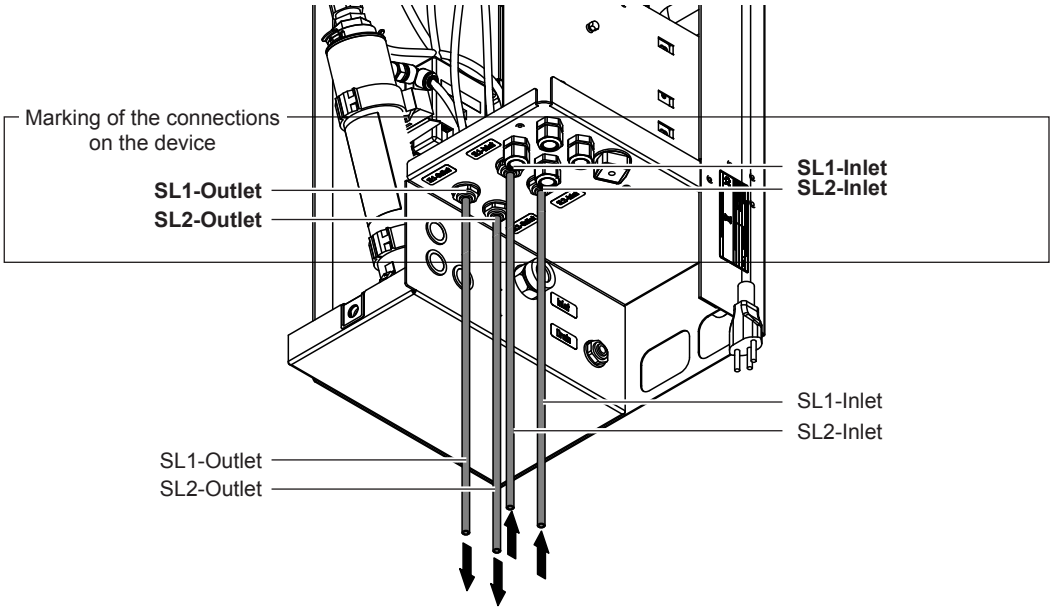


Fig. 40: Connection of the spray loop hoses

5.6 Perform pressure test on the water system

1. Remove inlet pipe (spray loop 1 or 2) from the central unit.
2. Connect the inlet pipe to the hand air pump of the service kit.
3. Set spray loop with the hand air pump under a pressure of 29.01 - 72.52 psi (300 - 500 kPa).

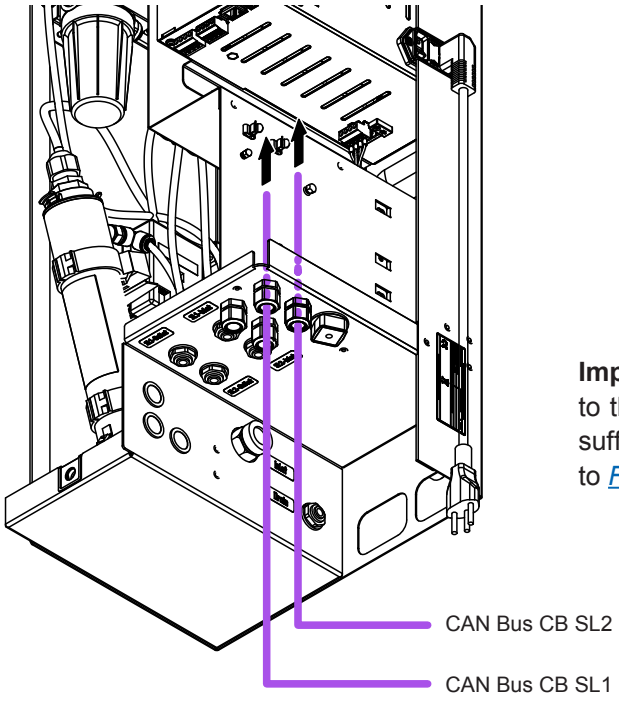
> **CAUTION!**
>
> The maximum pressure for the pressure test must under no circumstances exceed 87.02 psi (600 kPa). Otherwise, system components may be damaged.

4. If the pressure remains constant for 30 s, the system is **tight**

   If the pressure drops within 30 s, or if no pressure can be built up at all, the water system is not **tight** If this should occur, find and correct the leakage and repeat the pressure test.
5. Repeat the pressure test for the second spray loop, if present.
6. Reconnect the inlet hoses to the central unit (see *Fig. 40*).

5.7 Connecting the CAN bus cables to the central unit

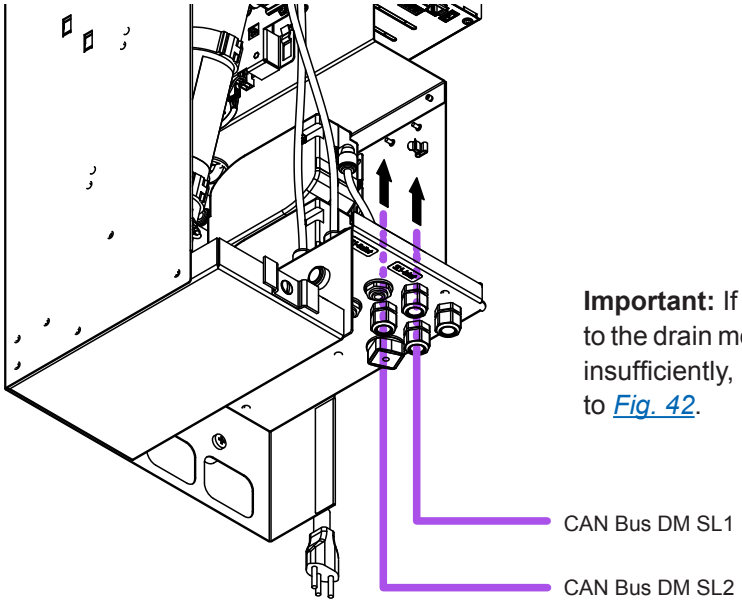
1. Route the CAN bus cable to the central unit.
   - Guide the CAN bus cable to be connected to the ConBox (CB) through the respective cable glands into the central unit according to *Fig. 41*.



Important: If the CAN bus cable to be connected to the ConBox are not marked or are marked insufficiently, label the CAN bus cables according to *Fig. 41*.

Fig. 41: Insert CAN bus cables to be connected to the ConBox into the central unit

   - Guide the CAN bus cable to be connected to the drain modules (DM) through the respective cable glands into the central unit according to *Fig. 42*.



Important: If the CAN bus cable to be connected to the drain modules are not marked or are marked insufficiently, label the CAN bus cables according to *Fig. 42*.

Fig. 42: Insert CAN bus cables to be connected to the drain modules into the central unit

2. **Connect the plug to the CAN bus cable(s).**
   - Prepare the CAN bus cable(s) to be connected to the ConBox according to *Fig. 43*.

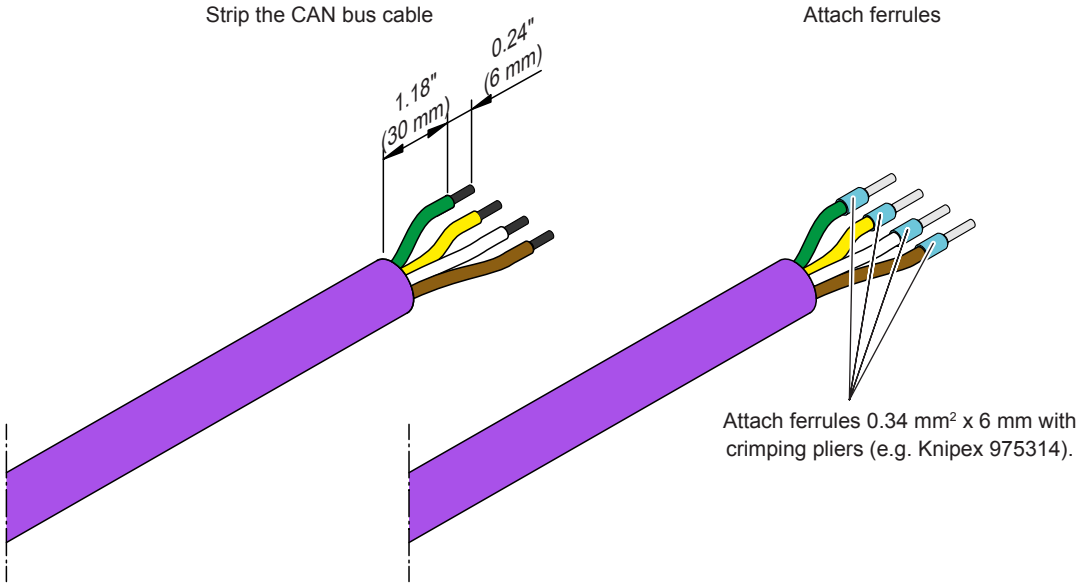


Fig. 43: Preparing cable(s)

   - Connect the supplied **green** connector plugs to the CAN bus cables according to the connector assignment below.

Contact	Function	Cable color
1	CAN low (CAN L)	Green
2	CAN high (CAN H)	Yellow
3	V in (40 V)	White
4	Earth (GND)	Brown

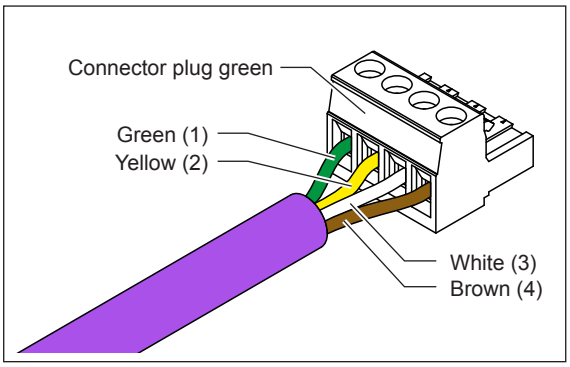


Fig. 44: Connecting the plug(s) to the CAN bus cable(s)

- Prepare the CAN bus cable(s) to be connected to the drain module(s) according to *Fig. 45*.

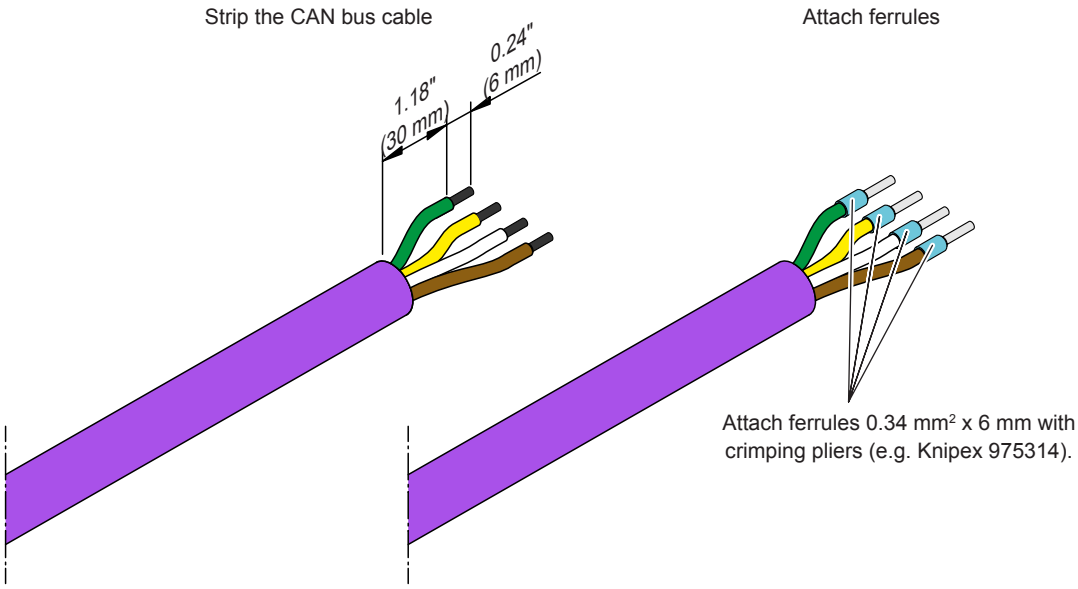


Fig. 45: Preparing cable(s)

- Connect the supplied **green** connector plugs to the CAN bus cables according to the connector assignment below.

Contact	Function		Cable color
1	CAN low	(CAN L)	Green
2	CAN high	(CAN H)	Yellow
3	V in	(40 V)	White
4	Earth	(GND)	Brown

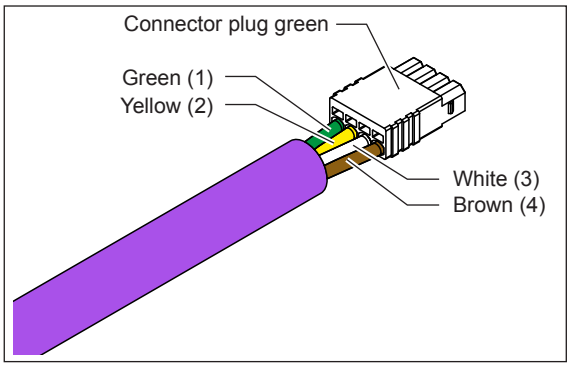


Fig. 46: Connecting the plug(s) to the CAN bus cable(s)

3. **Before connecting the CAN bus cables, check the cables for continuity.**
   - To do this, use a multimeter to check the connections with wires of the same color, one after the other (green, yellow and brown; white does not have to be checked) on the green plug and on the black plug of the CAN bus cables of the same spray loop (1 or 2) for continuity. If the plugs are connected correctly, the green, yellow and brown strands must show continuity (Note: The white strands are controlled by the signal of the spray heads and only have continuity in operation). Otherwise, all cable connections must be checked again and connected correctly.

4. **Connect the CAN bus cables in the central unit:**
   - Connect the CAN Bus cable from spray loop 1 and, if present, spray loop 2 to the corresponding ports on the ConBox (CB) of the central unit according to *Fig. 47*.
     Important: At the position indicated, the shielding must be exposed and the cable with the exposed shielding must be routed through the clamp holder.

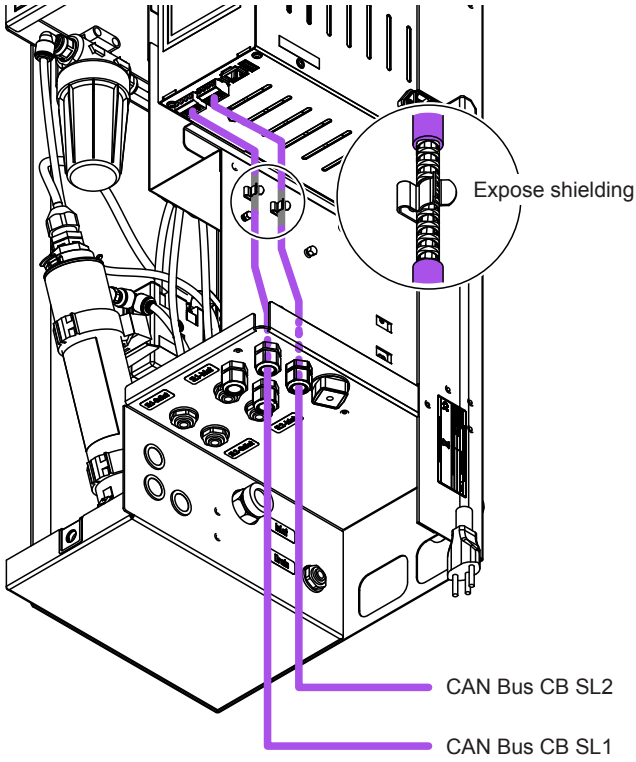


Fig. 47: Connecting CAN bus cables for spray loop 1 and spray loop 2 to the ConBox

5. Connect the CAN bus cables from spray loop 1 and, if present from spray loop 2 to the corresponding drain module (DM) in the central unit according to *Fig. 48*.
   Important: At the site indicated, the shielding must be exposed and the cable with the exposed shielding must be routed through the clamp holder.

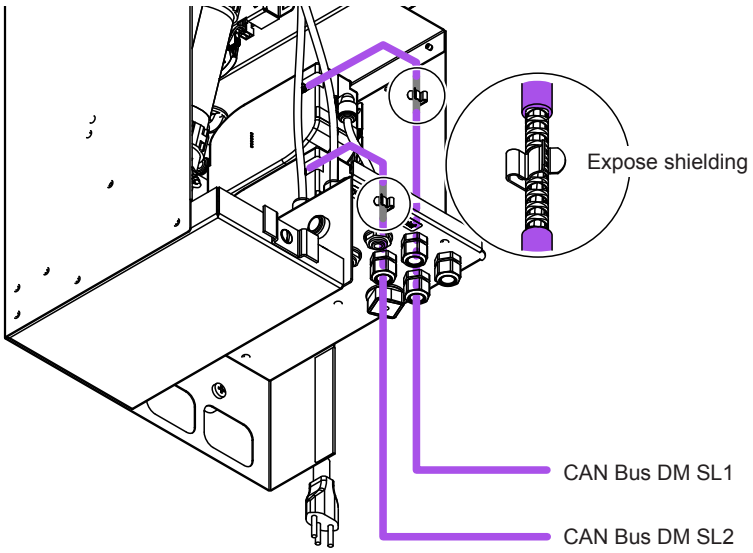


Fig. 48: Connecting CAN bus cables for spray loop 1 and spray loop 2 to the drain modules

5.8 Connection of the optional RO-HB reverse osmosis unit

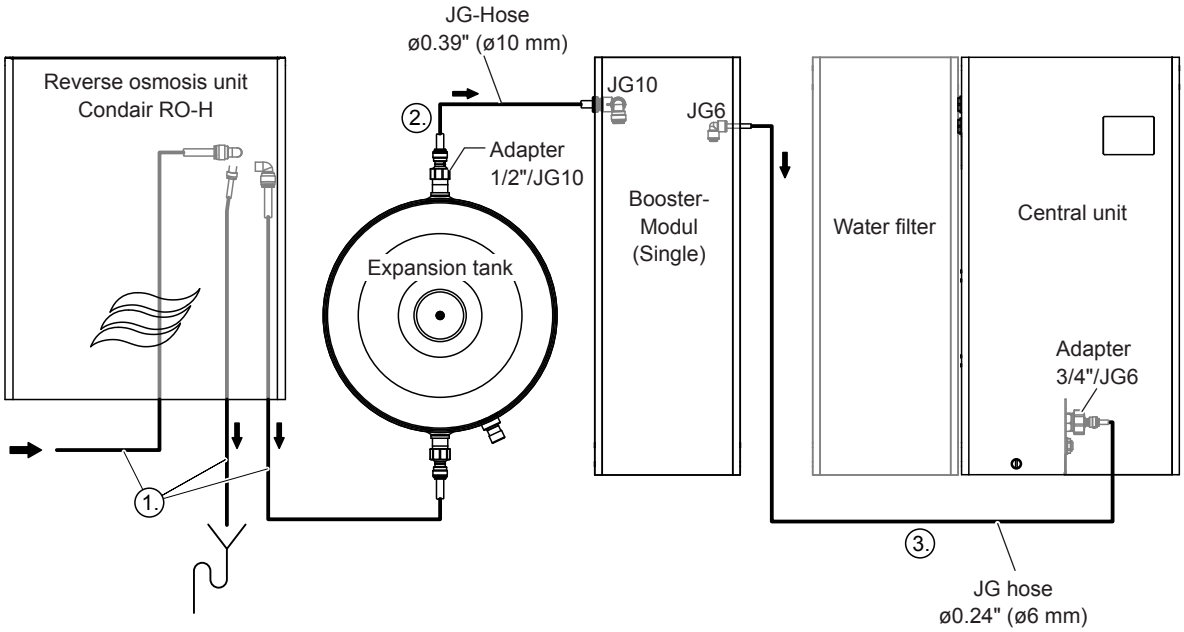


Fig. 49: Connection diagram

Establish the hydraulic connections (see *Fig. 49*)

Note: The adapters are included in the scope of delivery of the reverse osmosis system Condair RO-HB.

1. Establish the hydraulic connections of the reverse osmosis system Condair RO-HB according to the information in the installation and operation manual for the reverse osmosis system.
2. Connect the outlet connection on the expansion tank to the inlet connection on the booster module.
3. Connect the outlet connection on the booster module to the inlet connection on the central unit.

5.9 Flush the water feed line and connect to the central unit

When operating the Condair MN with raw water (potable water):

1. Route the water feed line into a water outlet.
2. Carefully open the shut-off valve in the water feed line and flush the water line for approx. 5 minutes.
3. Close the shut-off valve and connect the water line to the corresponding connection on the central unit.

5.10 Connect the control cable of the booster module in the central unit

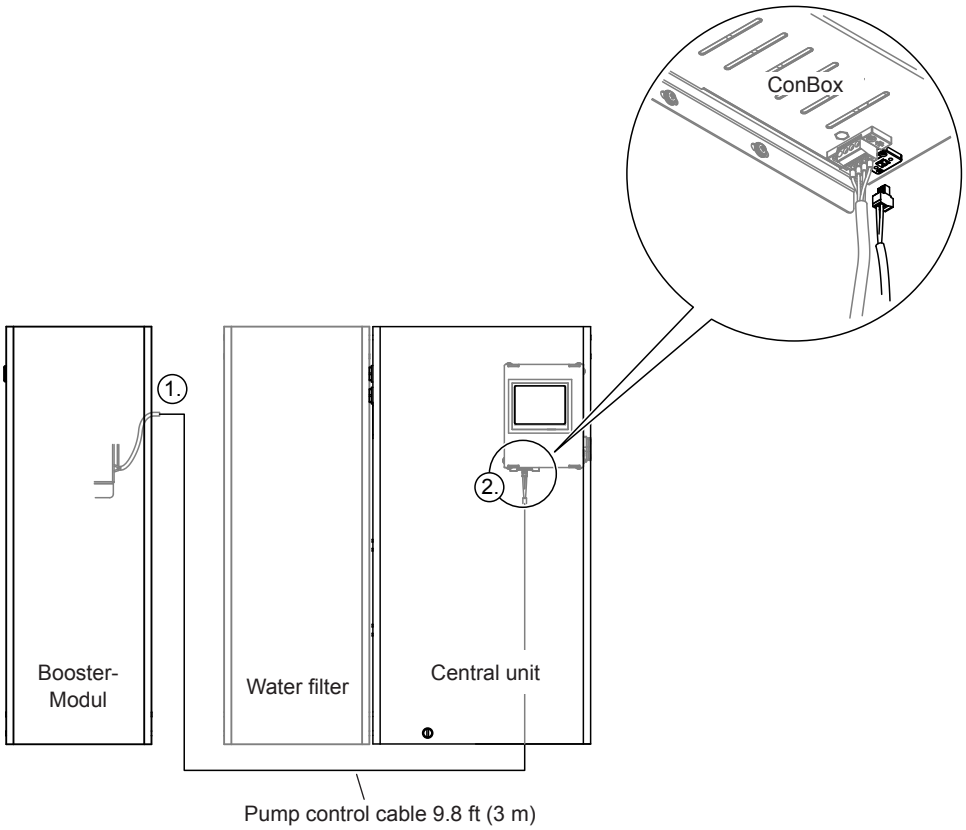


Fig. 50: Connection of the booster module control cable

1. Guide the pump control cable connected to the booster module through the opening in the housing.
2. Guide the control cable through a cable gland into the housing of the central unit and plug it into the two-pole connection socket at the rear of the ConBox.

5.11 Connect the reverse osmosis system Condair RO-HB to the power supply

1. Plug in the reverse osmosis unit Condair RO-H to the electrical supply.
2. Plug in the booster module to the electrical supply.

5.12 Connect the LAN cable to the central unit

The LAN cable (Cat. 5 cable or better) is connected in the central unit as follows:

1. Route the LAN cable to the ConBox in the central unit via the two-part cable feedthrough at the bottom of the central unit.
2. Plug the LAN cable into the RJ45 connection socket.

5.13 Plug in the central unit to the electrical supply

1. Make sure that the device switch is switched off.
2. Connect the mains plug of the central unit to the electrical supply.

6 Commissioning and transfer

6.1 Update of the control software before commissioning

Before you start up the system with the MN Service Back-Office application, the control software of the Condair MN must be updated to the current software version. Please note the information in *Section 7.4*.

6.2 Commission the system with the MN Service Back-Office application

1. Connect the Ethernet cable of the central unit to the Ethernet port of the laptop on which the MN Service Back-Office application is installed.
2. Start the MN Service Back-Office application.
3. Switch the central unit on using the On/Off switch on the right side.
4. Create a local connection to the central unit in the MN Service Back-Office application window (double-click the "Local" icon).
5. Start the "Workflow Commissioning" in the MN Service Back-Office application via "Control > Commissioning" and then input the following settings:
   - Compare the serial number of the central unit (see type plate) with the serial number in the "Basic configuration properties" and adjust the serial number in the "Basic settings" if necessary.

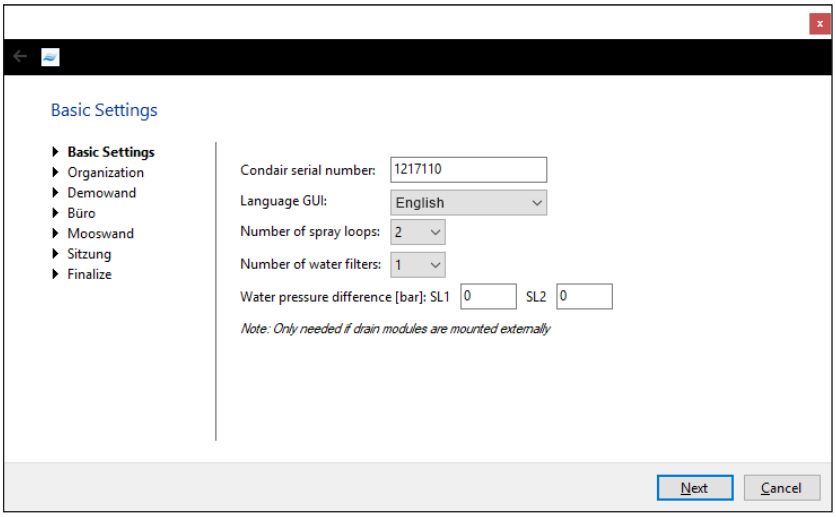


Fig. 51: Basic settings

- Select organization unit.
  Note: The Condair MN is only visible to the selected organization unit.

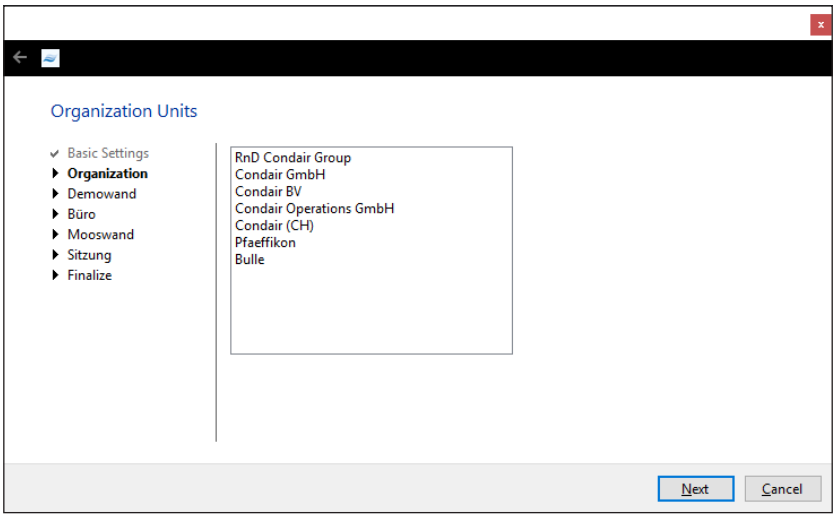


Fig. 52: Selecting the organization unit (Organization)

- Enter the designation (e.g. "Bedroom 1") and the humidity setpoints for the individual zones.

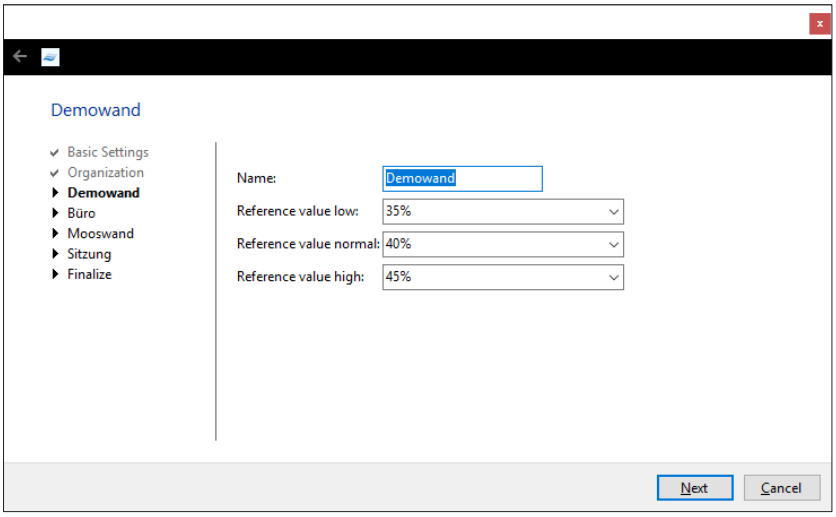


Fig. 53: Area properties

7. In the final window, select whether:
   - the date of the last service should be set to the current date and time or not.
   - the MN system is operated with the reverse osmosis system Condair RO-HB or not.
   - the MN system should or should not be flushed during commissioning.

   Then confirm the completion of commissioning with **<Finish>** (the system time is set automatically).

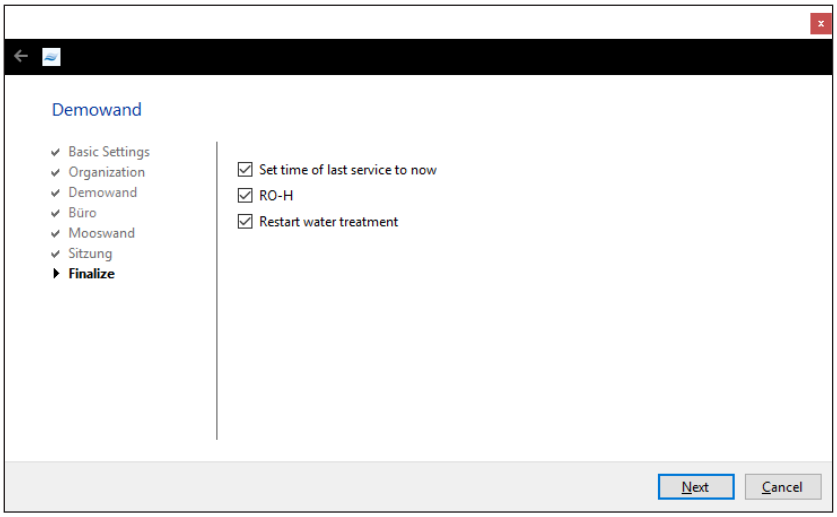


Fig. 54: Final window (Finalize)

8. If your MN system is operated with a reverse osmosis system Condair RO-HB and this feeds several central units, the periodic flushing times for each MN system must be offset by at least one hour. To do this, select the "Set periodic flush time configuration" function in the MN Service Back-Office application via "Control > Commands > Hygiene" and set the flushing time for each MN system with an offset accordingly.

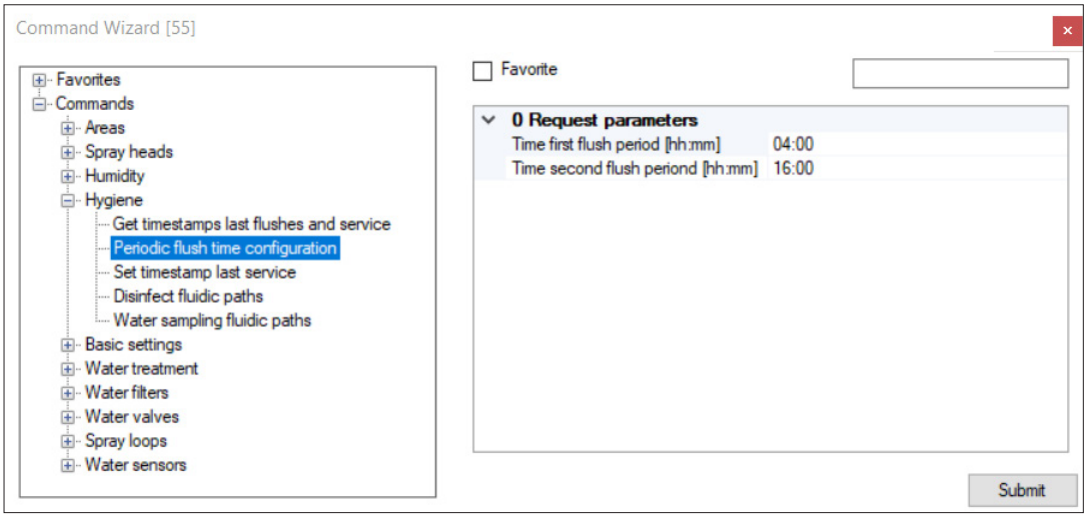


Fig. 55: Setting the periodic flushing time

9. Open the shut-off valve in the water supply line.
10. The system will begin the flushing and start-up procedure (duration approx. 15 - 20 minutes).
11. During the flushing procedure:
    - If your MN system is operated with a reverse osmosis system Condair RO-HB: Set the pressure reducer in the/in all booster module(s) to 72.5 psi (500 kPa).

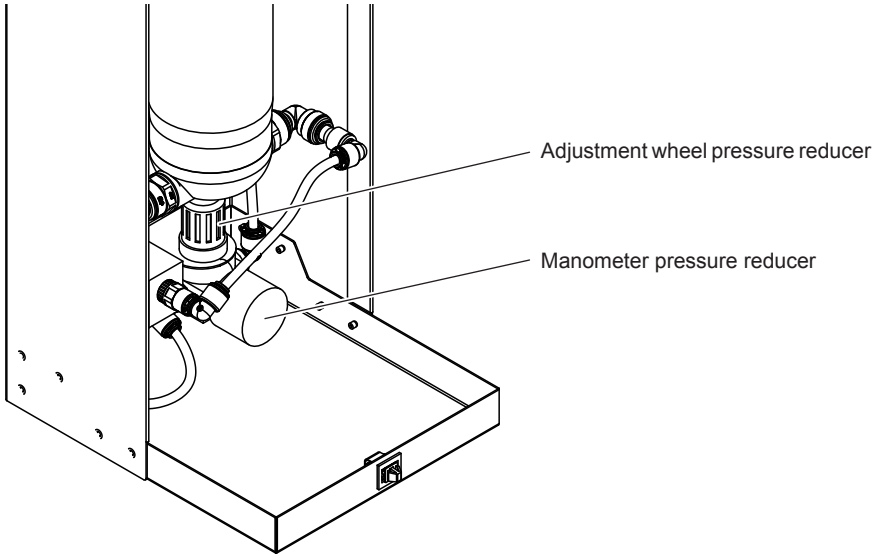


Fig. 56: Pressure reducer booster module

    - Measure the discharge rate per unit of time at the outlet of the central unit or at the outlet(s) of the external drain module and compare it with **the setpoint discharge quantity of ≥0.5 l/min per spray loop**.

      Note: If the measured values are below the setpoint, this can be caused by:
      – kinks in the water hoses to the spray heads
      – a spray loop that is too long
      – a too low pressure

      In this case, all spray heads and spray loops 1 and 2 must be checked again.
12. If the conductivity is too high (Error "595 - Conductivity_F1_toohigh" or Error "598 - Conductivity_F2_toohigh") after the flushing process, select the "StartEnforced" function in the MN Service Back-Office application via "Control > Commands...> Set water treatment state" and start a forced flush with **<Submit>**.
13. If everything is in order, use the MN Service Back-Office application to turn each zone on and check the spray heads for leaks. If necessary, repair leaks.
14. Screw on the spray heads and mount the panels (flush mounting) or covering hoods (surface mounting).
15. After installing the spray heads and the panels or cover hoods, select the function " Water sampling fluidic paths" under "Control > Commands...>" in the MN Service Back-Office application. Select the spray loop (1 or 2) to be tested, set the "Sampling delay time" to the desired value (see note below) and the "Sampling time" to 100 s, then start the process with **<Submit>**.
    Note: If the external drain modules are installed at some distance from the central unit, then the "Sampling delay time" must be set accordingly to allow sufficient time to reach the appropriate drain module to perform the measurement.

After the "Sampling delay time" has elapsed, measure the discharge rate during 60 s at the end of the central unit or at the outlet of the corresponding external drain module. Repeat measurement for the second spray loop (if present).

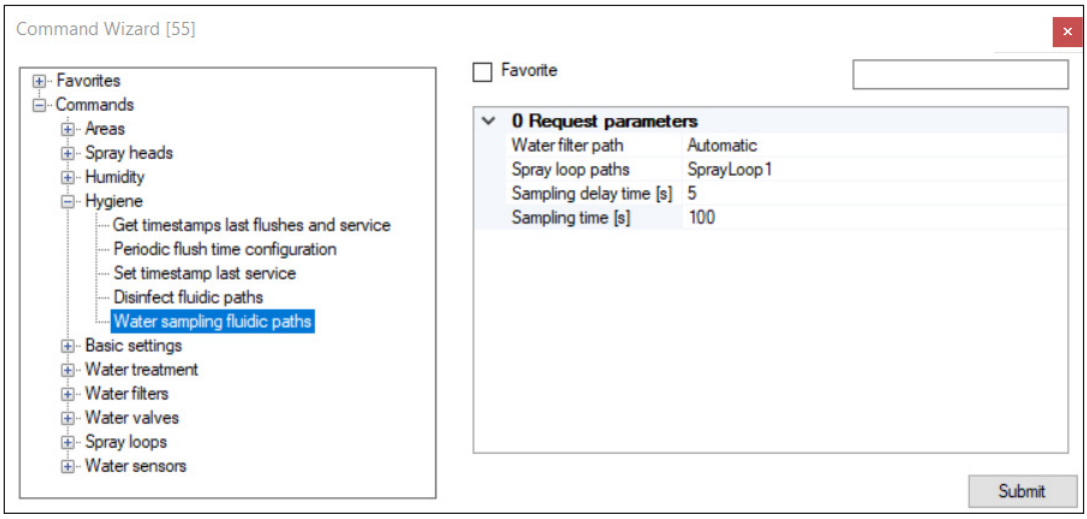


Fig. 57: Flushing spray loops with "Water sampling fluidic paths"

The measured values may deviate only minimally from those measured in point 10. A larger deviation suggests a kink in the water hoses to the spray heads. In this case, all spray heads must be checked again.

16. In case the external drain module(s) is/are mounted below or above the level of the central unit: Under "Control> Commands..." in the MN Service Back-Office application, select the function "Set water pressure difference spray loop 1" or "Set water pressure difference spray loop 2" and the value of the difference in height between drain module 1 and drain module 2 and the central unit in bar.

    Example:
    – The drain module for spray loop 1 is **16.40 ft (5 m) above** the central unit
    – The drain module for spray loop 2 is **9.84 ft (3 m) below** the central unit

    This results in the following input values in bar:
    – Input value for water pressure difference for spray loop 1: **0.5**
    – Input value for water pressure difference for spray loop 2: **-0.3**
17. Stop the MN Service Back-Office application and disconnect the Ethernet cable from the laptop.

6.3 Connect the gateway

– **Commissioning and configuration without WiFi**

1. Connect the gateway to the power supply.

Fig. 58: Connecting the gateway to the power supply

2. Connect the gateway to the in-house network via the Ethernet connection on the power connection side using an Ethernet cable.

Fig. 59: Connecting the gateway to the in-house network

3. Connect the gateway to the ConBox via the Ethernet connection on the antenna side using an Ethernet cable.

Fig. 60: Connecting the gateway to the ConBox

The gateway automatically establishes the connection to the ConBox.

– **Commissioning and configuration <u>with</u> WiFi**

1. Download the Putty to your laptop via "https://www.putty.org/".
2. Start the Putty via the Windows start menu.

3. Connect the gateway to the power supply.

Fig. 61: Connecting the gateway to the power supply

4. Connect the gateway to the laptop using an "RS232 to ultra mini serial connector" cable.

Fig. 62: Connecting the gateway to the laptop using the RS232 cable

5. Connect the gateway to the ConBox via the Ethernet connection on the antenna side using an Ethernet cable.

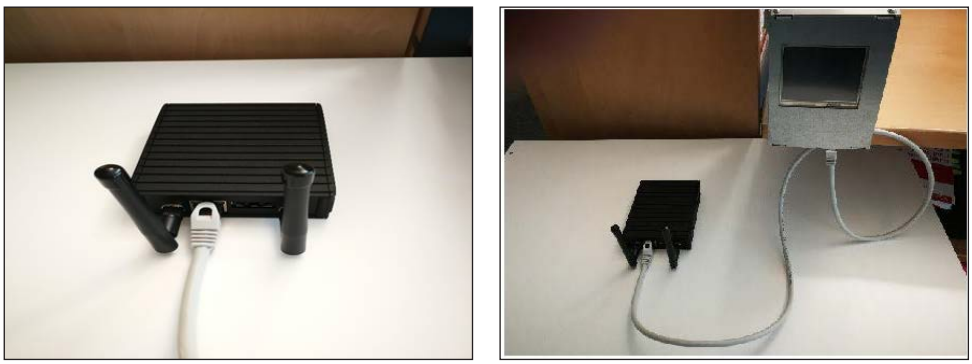


Fig. 63: Connecting the gateway to the ConBox

6. Make the following settings in the Putty:

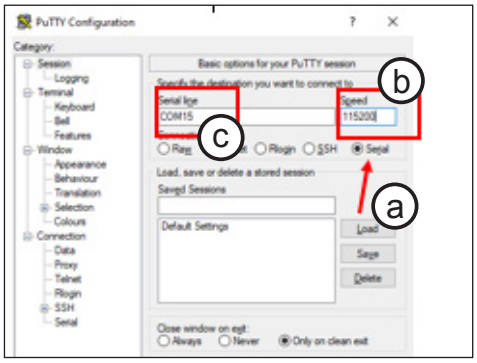


Fig. 64: Putty settings

a. Set the connection type to Serial.

b. Set the transmission speed (Speed) to 115200.

c. Set the serial connection to the corresponding COM port (e.g. COM15)
Note: The COM port used for the serial connection can be checked in the Windows Device Manager under "Connections (COM&LPT) > USB Serial Port (e.g. COM15)".

7. Call up the Putty's command line editor and establish the WiFi connection in the command line window as follows:

a. Press Enter if nothing is displayed.

b. Log in with the following access data:

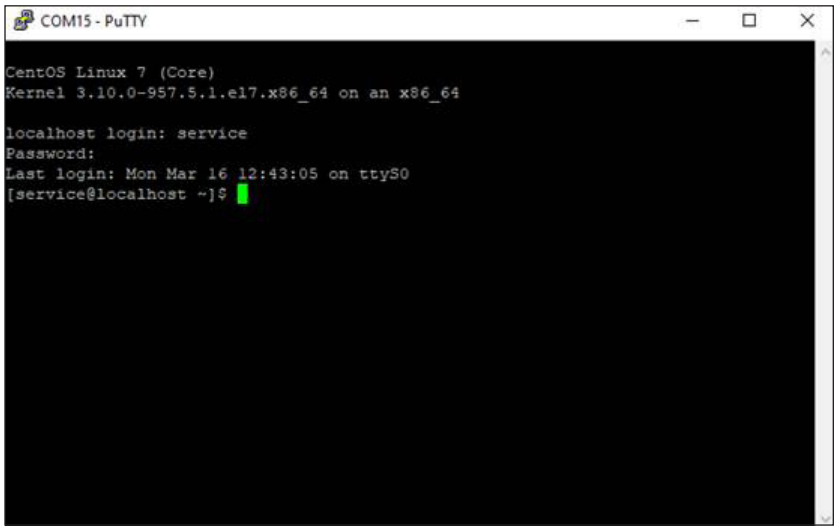
User: **service** (confirm with enter)
Password: **Condair8808Service** (confirm with enter)

c. Set the network configuration with the following command:

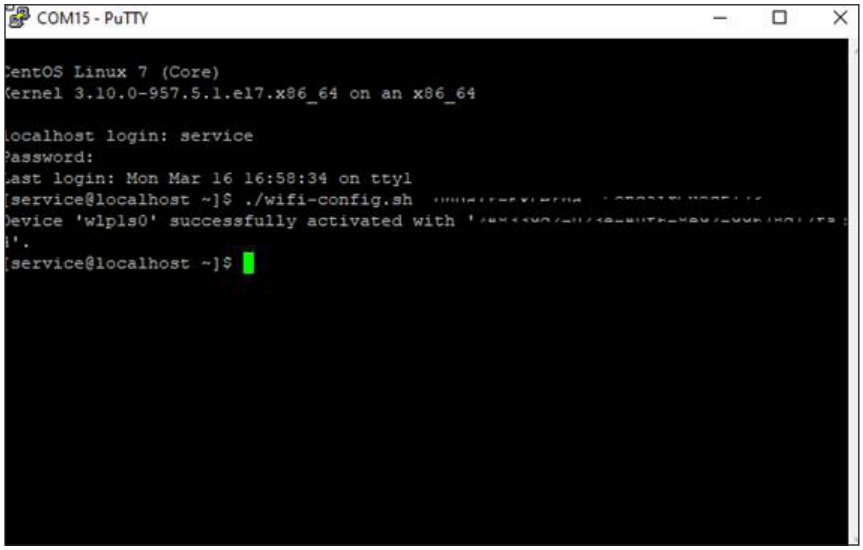
./wifi-config.sh [Name] [Password] (confirm with enter)

[Name] = SSID or network name
[Password] = WiFi network password

Example: **./wifi-config.sh WLAN1 Test123!**



d. Wait 10 seconds. If successful, the following message appears: **"successfully activated with ...."**.
Notes: If necessary, repeat the command according to step 7c.



6.4 Set up the HumiLife-App for the customer

6.4.1 Install the HumiLife-App on the customer's mobile device and create a user account

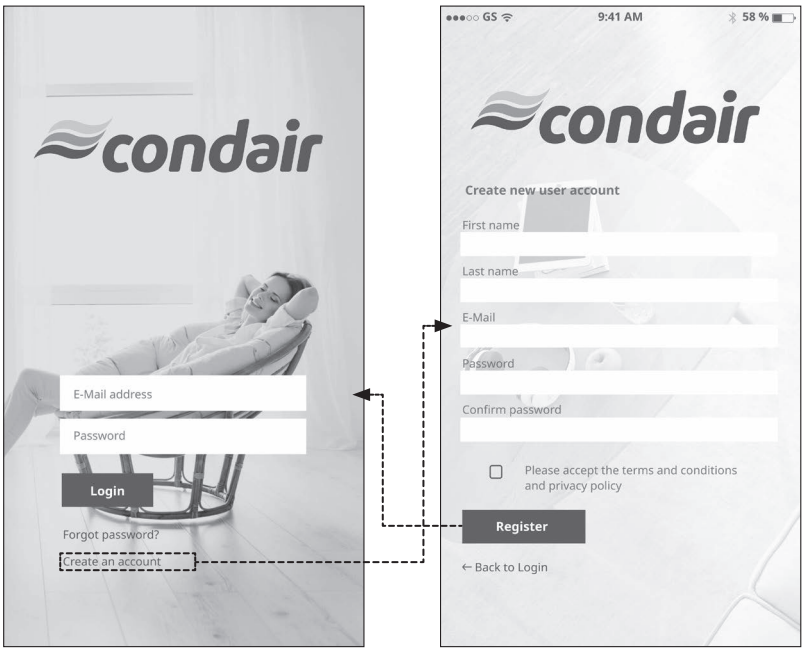
If the customer has not yet installed the HumiLife-App on his mobile device and has not yet created a user account, proceed as follows:

1. Download the Condair HumiLife-App from the App Store (iPhone) or the Google Play Store (Android). Use the camera or QR scanner on the customer's mobile device and take a photo or scan the QR code to go to Google Play (Android) or the App Store (iOS).

Google Play (Android)	App Store (iOS)

2. Then install the HumiLife app on the customer's mobile device.
3. On the customer's mobile device open the HumiLife-App. The login screen appears.

   On the login screen, press the <Create an account> button. The registration screen appears. Enter first name, last name, email address and desired password. Accept the terms and conditions and data protection regulations and confirm the entries by pressing the **<Register>** button.



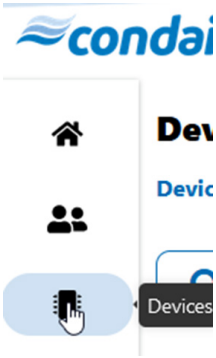
   The login screen appears again. By entering the email address and password in the login screen and confirming the entries by pressing the **<Login>** button, the customer can now log in to the HumiLife-App.

6.4.2 Register Condair MN in the cloud for remote operation via the HumiLife-App

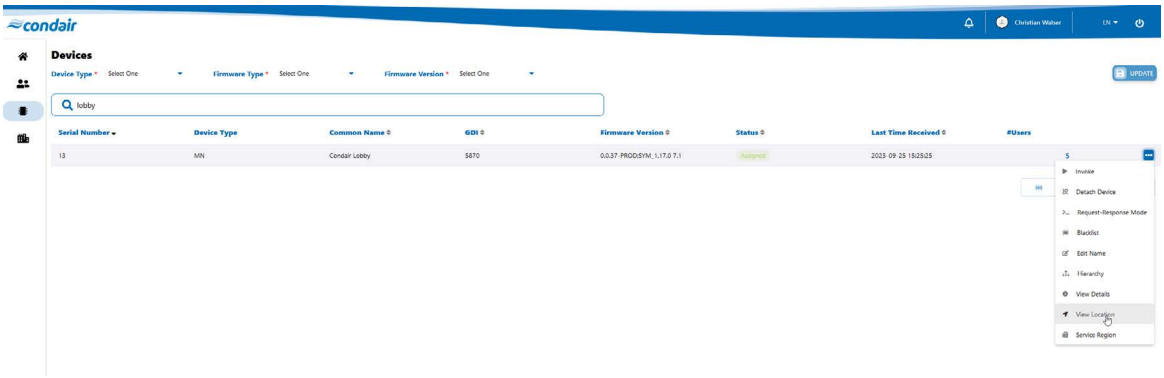
The Condair MN is registered in the cloud for remote operation via the HumiLife-App via the service back office of the corresponding Condair representative. To register the Condair MN you need the device name or the serial number.

Registration is as follows:

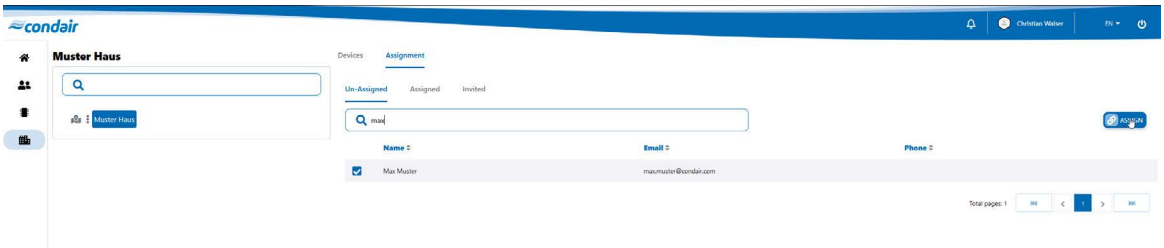
1. Log in to "portal.iot.condair.cloud" and go to the "Devices" tab.



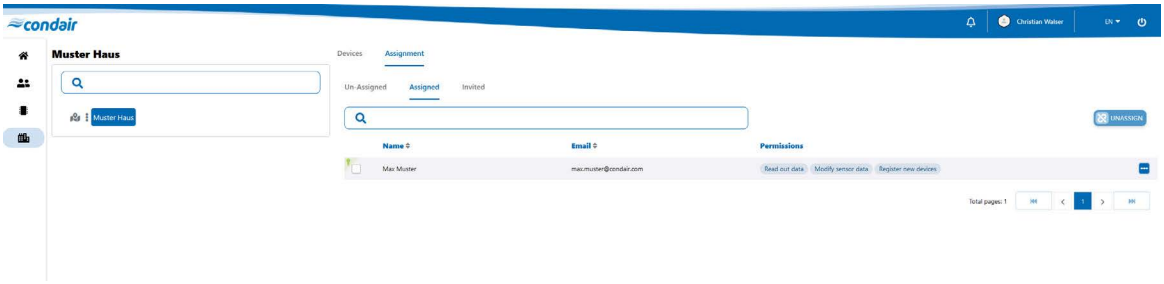
2. Search for the corresponding Condair MN in the search bar (either with the serial number or the name of the device).
3. On the right side of the window, select the button with the three dots.



4. Select "View location" from the pull-down menu. You will now be redirected to the "Building" tab of that device. On the "Building" tab, navigate to Assignment, Un-Assigned Users, and search the list for the appropriate user you want to assign to the device.
5. Set the check box on the appropriate user, then click the "Assign" button on the right.



6. Navigate to "Assigned" and verify that the appropriate user is now assigned to the Device. Once the user has been assigned, he can then remote operate the Condair MN via the HumiLife-App.



6.5 Transfer of the system

The following work must be carried out during the transfer:

1. Complete the commissioning report on the PC.
2. Complete the transfer document.
3. Explain the functions of the system to the customer:
   - Explain functions of the user app
   - Explain the procedure for replacing the water filter(s)
   - Explain what to do in the event of a fault
4. Transfer documents (manual, login data, etc.)

7 Service and replacement of components

7.1 Notes on servicing the Condair MN / service intervals

To ensure hygienic operation the Condair MD system must be serviced by authorized service specialists once a year.

The service is regulated in a corresponding service contract. Condair arranges and carries out the annual service. After completion, the service must be documented in the customer's service log.

The annual service includes the following work:

Work to be done	See	Yearly service
A water sample may be taken if required.	*Section 7.1.1*	x
Replace UV lamp and check/clean quartz glass	*Section 7.1.2*	x
Replace the filter cartridge of the microfilter	*Section 7.1.3*	
If required, replace the water filter(s)	*Section 7.1.4*	x
If required, disinfect the water system	*Section 7.1.5*	x
Check the air pressure of the flow-through tank of the optional Condair RO-HB reverse osmosis system (if equipped)	*Section 7.1.6*	x

7.1.1 Taking water samples

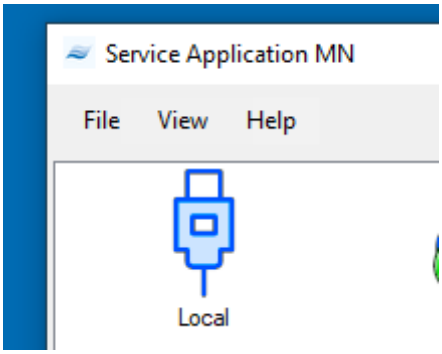
In the event of the annual or semi-annual service, a water sample of 0.066 US gal (0.25 l) may be taken on the return of spray loop 1 and spray loop 2 (if present) for quality monitoring and statistics.

For taking the water samples, you will need an empty container of 1 liter capacity and the sampling kit consisting of:

– paper towels
– 2 sterile sample containers with 0.066 US gal (0.25 l) capacity
– Styrofoam cooling box
– 2 Cooling pads
– Tape
– Document folder with order document and address of the laboratory

To take the water samples, proceed as follows:

1. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
2. Start the MN Service Back-Office application on the laptop. In the MN Service Back-Office application window, establish a local connection to the central unit (double-click the "Local" icon).



3. Select the function " Water sampling fluidic paths" under "Control > Commands...>" in the MN Service Back-Office application.

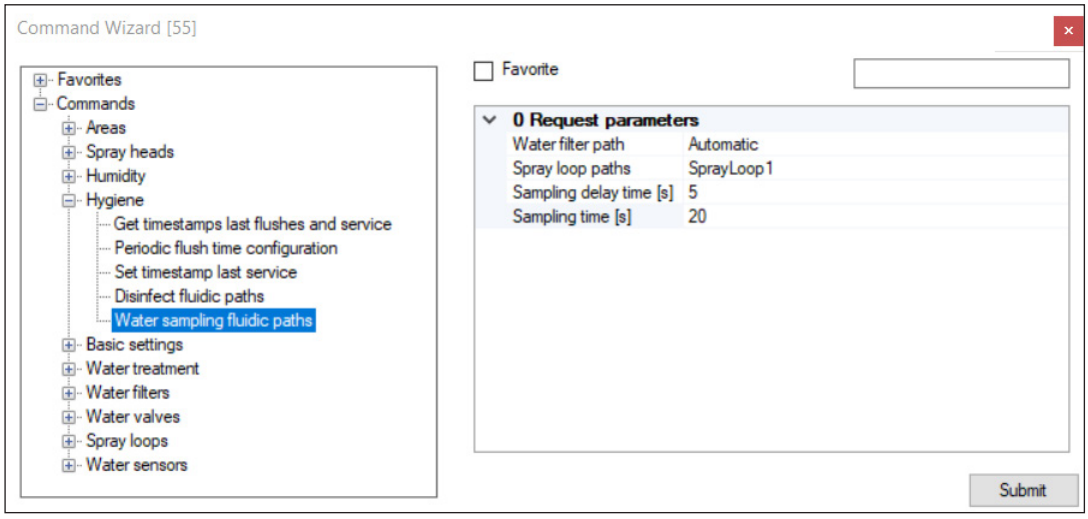


Fig. 65: Flushing spray loops with "Water sampling fluidic paths"

4. Set the "Sampling delay time" to the desired value (see note below) and the "Sampling time" to 20 s (Factory settings: "Sampling delay time": 5 s, "Sampling Time": 20 s).
   Note: If the external drain modules are installed at some distance from the central unit, then the "Sampling delay time" must be set accordingly to allow sufficient time to reach the appropriate drain module to perform the measurement.
5. Pull out the hose at the inlet to the drain module 1 or drain module 2 and clean hose.
6. Hold the hose in an empty 0.264 US gal (1 l) container and start process with **<Submit>** in the "Water sampling fluidic paths" window. Now, approx. 0.053 US gal (0.2 l) of water are poured into the tank to rinse the hose.
7. Open the sample container and lay the lid with the inside facing down on a clean paper towel.
8. Insert the hose into the sample container and fix it firmly. Make sure not to touch the end of the hose and the inside of the sample container with your hands. Then, press **<Continue>** in the "Water sampling fluidic paths" window, the sample container will be filled.
9. Close the sample container with the lid well.
   Important: Work properly. Avoid any contact with the water, as otherwise the water samples will be contaminated and lead to wrong results.
10. Label sample container: Date, spray loop number (1 or 2) and serial number of the system.
11. Push the hose back into the connection of the water drain module (as described on the screen) and remove any water residues.
12. If necessary, repeat steps 5 to 12 for the second spray loop.
13. In the "Water sampling fluidic paths" window, press **<Finalize>** to return the system to normal operating mode.
14. Complete the analysis order (sample name, date and signature) and place it in the document folder together with the folded address form.
15. Place the sample container(s) together with the cooling pads in the styrofoam box. Close the styrofoam box with adhesive tape and attach the document folder with the address to the styrofoam box.
16. Send styrofoam box with samples immediately by A-post to the analysis office.
17. Continue with the next point of the annual service.

7.1.2 Replacing UV lamp and check/clean quartz glass

WARNING!
UV-C radiation

A UV lamp is built into the Condair MN's central unit. In principle, there is no danger from the UV lamp embedded in the central unit, as it is installed in a radiation-proof housing. If the UV lamp is operated outside of this housing, harmful UV-C radiation may be released. This may cause damage to the eyes and skin.

For this reason: the UV lamp must never be operated outside of the protective housing. The central unit must be switched off and disconnected from the mains power supply (remove the plug from the socket) before the central unit is opened.

WARNING!

Waste from damaged UV lamps may lead to injury and cause damage to human health and harm to the environment.

For this reason: the waste from damaged UV lamps must be disposed of in accordance with local provisions on hazardous substances and the site of the damage must be cleaned properly.

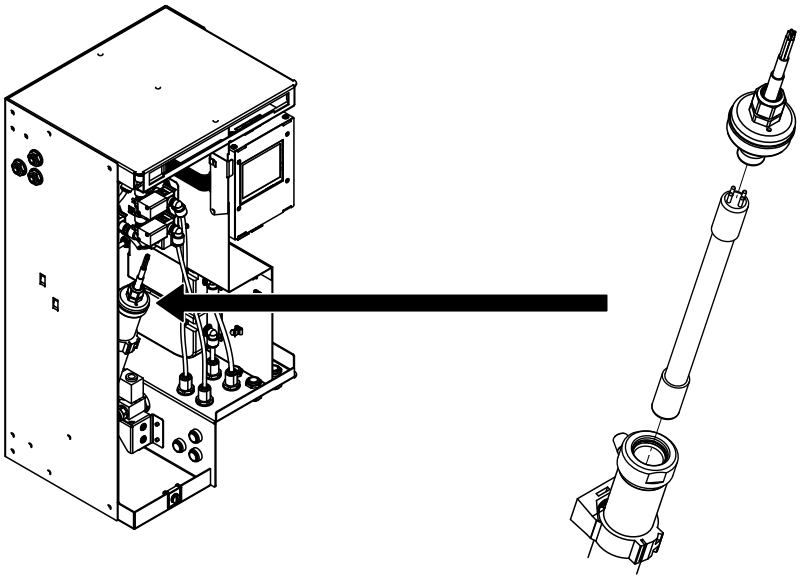


Fig. 66: Replacing the UV lamp in systems produced until March 31, 2020

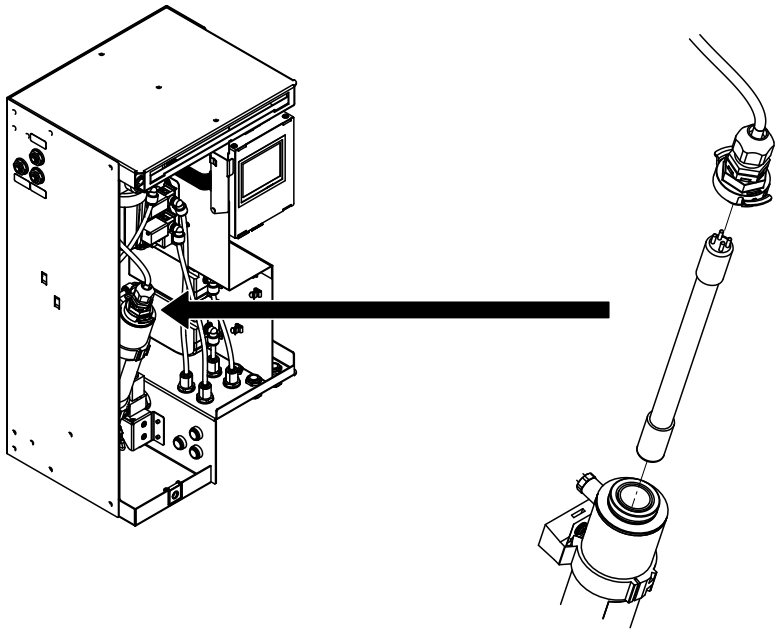


Fig. 67: Replacing the UV lamp in systems produced from April 1, 2020

To replace the UV lamp, proceed as follows:

1. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
2. Start the MN Service Back-Office application on the laptop. In the MN Service Back-Of**fice application** window, establish a local connection to the central unit (double-click the "Local" icon) and use the "Shutdown" function (path: "Control > Commands... > Set water treatment state") to shut the system down. The system will be automatically depressurized and the UV lamp deactivated.
3. **Important:** Wait until the status "Depressed_Shutdown" is displayed. Then stop the MN Service Back-Office application on the laptop.
4. Switch the central unit off and unplug the power cable.
5. Remove the front panel of the central unit.
6. Carefully remove the connector plug from the UV housing.
7. Disconnect the UV lamp from the connector plug.
8. Check the quartz glass with a flashlight for turbidity. If the quartz glass is cloudy, proceed as follows:
   - For systems that were produced **until March 31, 2020**:
     - Remove all water and electrical connections from the UV reactor (note assignment)
     - Remove the UV reactor.
     - Install replacement UV reactor.
     - Reconnect all water and electrical connections to the UV reactor.
   - For systems that were produced **from April 1, 2020**:
     - Pull off the lower cap on the UV reactor.
     - Push the quartz glass out of the UV reactor from below and remove.
     - Clean the quartz glass with a lint-free cloth.
     - Check the O-rings at the top and bottom of the UV reactor housing and replace if damaged.
     - Put the lower cap back on the UV reactor.
     - Carefully push the quartz glass into the UV reactor as far as it will go.
9. Connect new UV lamp to the connector plug.
10. Carefully insert the UV lamp into the housing and attach the connector plug to the housing.

11. Attach and lock the front cover of the central unit.
12. Plug the mains cable of the central unit in and switch the central unit on.
13. Start the MN Service Back-Office application on the laptop. In the MN Service Back-Office application window, establish a local connection to the central unit (double-click the "Local" icon) and start the system using the "QuickStart" function (path: "Control > Commands... > Set water treatment state"). The system will then go into normal operating mode.
14. Stop the MN Service Back-Office application. Then disconnect the network cable from the central unit on the laptop and reconnect it to the gateway.

7.1.3 Replacing the filter cartridge of the particle filter

To replace the filter cartridge of the particle filter, proceed as follows:

1. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
2. Start the MN Service Back-Office application on the laptop. In the MN Service Back-Of**fice application** window, establish a local connection to the central unit (double-click the "Local" icon) and use the "Shutdown" function (path: "Control > Commands... > Set water treatment state") to shut the system down. The system will be automatically depressurized and the UV lamp deactivated.
3. **Important:** Wait until the status "Depressed_Shutdown" is displayed. Then stop the MN Service Back-Office application on the laptop.
4. Switch the central unit off and unplug the power cable.
5. Remove the front panel of the central unit.
6. Place an absorbent rag under the filter.
7. Carefully unscrew and remove the filter housing from the filter head.
8. Remove filter cartridge and clean filter housing.
9. Insert a new filter cartridge in the filter housing.
10. Screw the filter housing with the new filter cartridge into the filter head.
11. Wipe up any water residue.
12. Attach and lock the front cover of the central unit.
13. Plug the mains cable of the central unit in and switch the central unit on.
14. Start the MN Service Back-Office application on the laptop. In the MN Service Back-Office application window, establish a local connection to the central unit (double-click the "Local" icon) and start the system using the "QuickStart" function (path: "Control > Commands... > Set water treatment state"). The system will then go into normal operating mode.
15. Stop the MN Service Back-Office application. Then disconnect the network cable from the central unit on the laptop and reconnect it to the gateway.

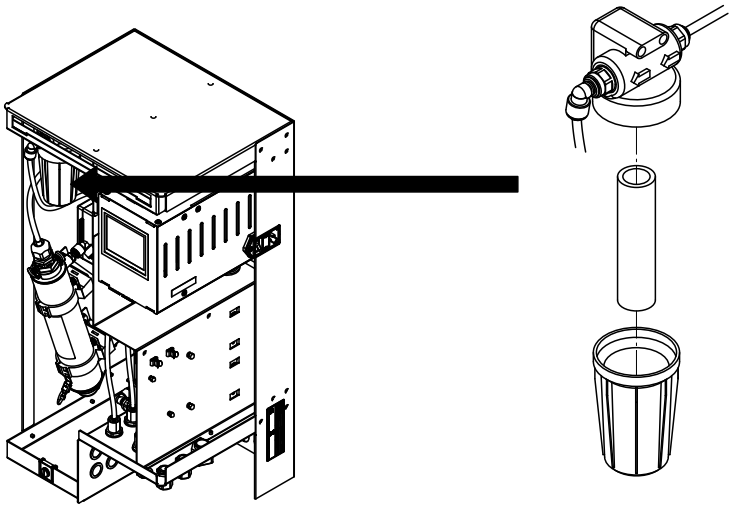


Fig. 68: Replacing the filter cartridge of the particle filter

7.1.4 Replace water filter(s)

Note: The replacement of the water filter(s) should, if possible, be carried out via the operating panel of the central unit using the "Change filter" service function. The replacement of the water filter is menu-driven with a corresponding entry in the log file. Please observe the information in the Condair MN operating instructions.

If it is not possible or desired to replace the water filter(s) using the "Change filter" service function, proceed as follows to replace the water filter(s):

1. Remove the front cover off of the housing.
2. Turn the water filter clockwise until it stops.
3. Slide the filter head upwards until it stops.
4. Remove the old water filter.
5. Remove the cap at the top of the water filter.
6. Place the water filter under the filter head so that the label faces forward and the notch in the water filter is under the left groove on the filter head.

   The following filter cartridge types must be used:

   – Operation with **drinking (tap) water**: Filter cartridge MN (SAP-No.: 2590361)
   – Operation with **reverse osmosis water**: Filter cartridge MN type RO (SAP-No.: 2605501)

   Important: Do not use Filter cartridge MN type RO for systems operated with tap water!
7. Slide the filter head downwards while rotating the water filter counterclockwise.
8. Turn the water filter counterclockwise until it stops.
9. Relocate the front cover off of the housing.
10. Repeat steps 1 through 9 for the second water filter (if present).

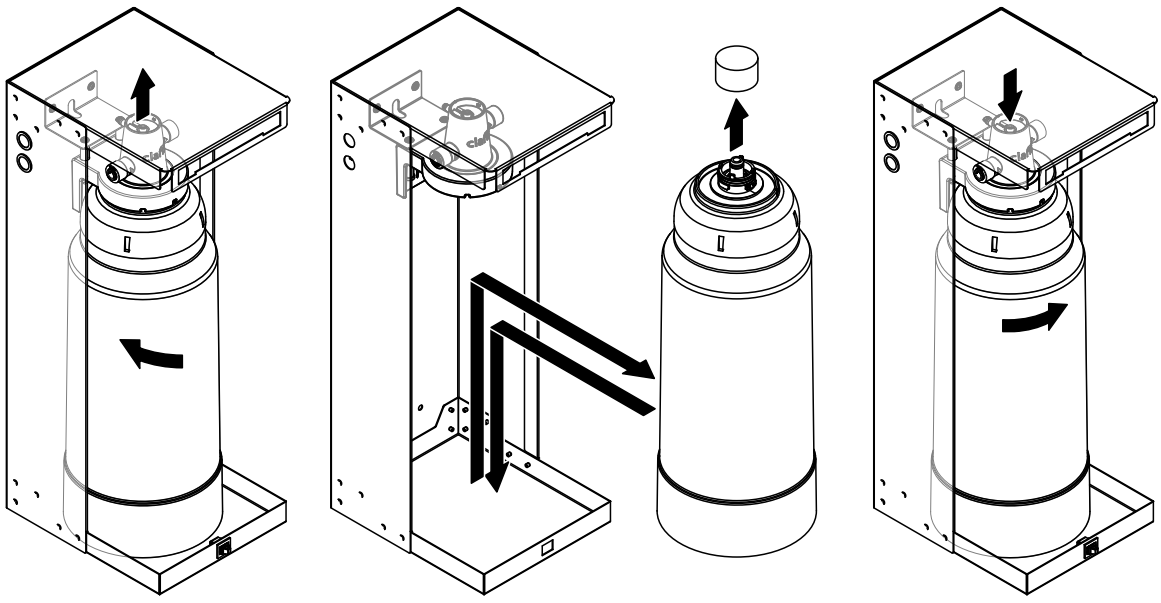


Fig. 69: Replacing the water filter

7.1.5 Disinfect water system

If the Condair MN has been idle or without a power supply for several days (>48 hours), or if the water samples have revealed increased microbial contamination, water system of the Condair MN and, if present, the RO-HB reverse osmosis system must be disinfected.

The following chapters describe how to disinfect the water system.

WARNING!

Contact with the disinfectant can cause chemical burns to the eyes, mucous membranes and skin.

For this reason: It is mandatory that you observe and follow the safety instructions of the manufacturer of the disinfectant and always wear appropriate protective equipment (gloves, protective goggles, etc.).

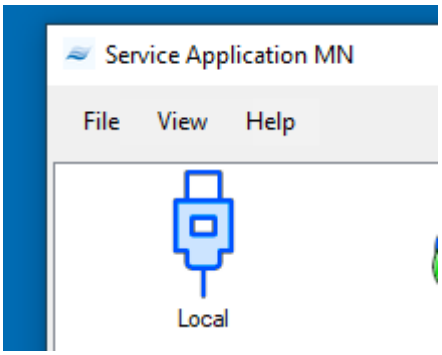
WARNING!

The components of the Condair RO-HB and the Condair MN can be contaminated if they are touched with bare hands.

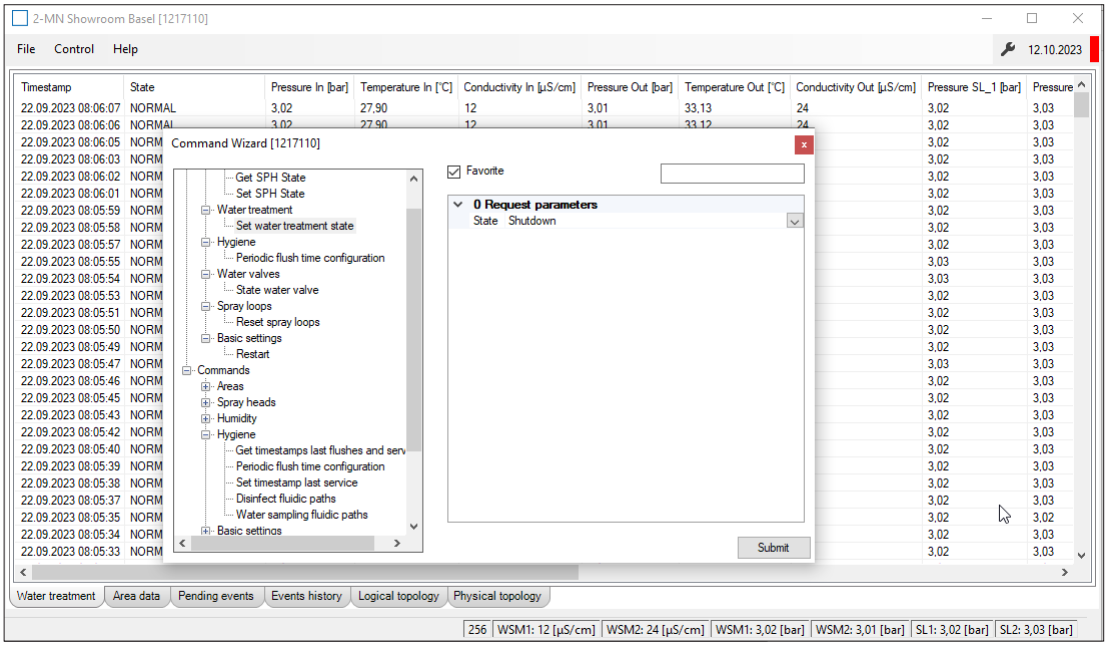
For this reason: Wash your hands and always wear clean disposable gloves when removing and installing components (filter, RO membrane).

7.1.5.1 Depressurize the water system

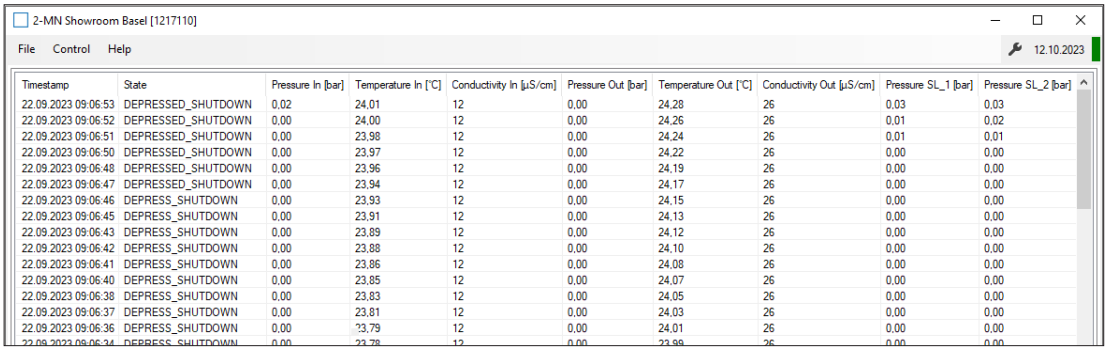
1. If the central unit is switched off: Plug the power cord in (if necessary) and switch the central unit on. If an error message is displayed, proceed to the next step.
   The system is automatically purged upon power up; this flushes any contaminated water from the system. Wait until the rinsing process is finished (approx. 25 minutes).
2. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
3. Start the MN Service Back-Office application on the laptop. Create a local connection to the central unit in the MN Service Back-Office application window (double-click the "Local" icon).



4. Once the connection is established, select "Set water treatment state" function under "Control> Commands...". Select "Shutdown" in the pull-down menu and confirm with **<Submit>**. The water system will be depressurized.



After the command has been transmitted, it takes approx. 30 s for the water system of the Condair MN to be depressurized. The status "DEPRESS-SHUTDOWN" will be displayed for as long as the pressure release is still in progress.



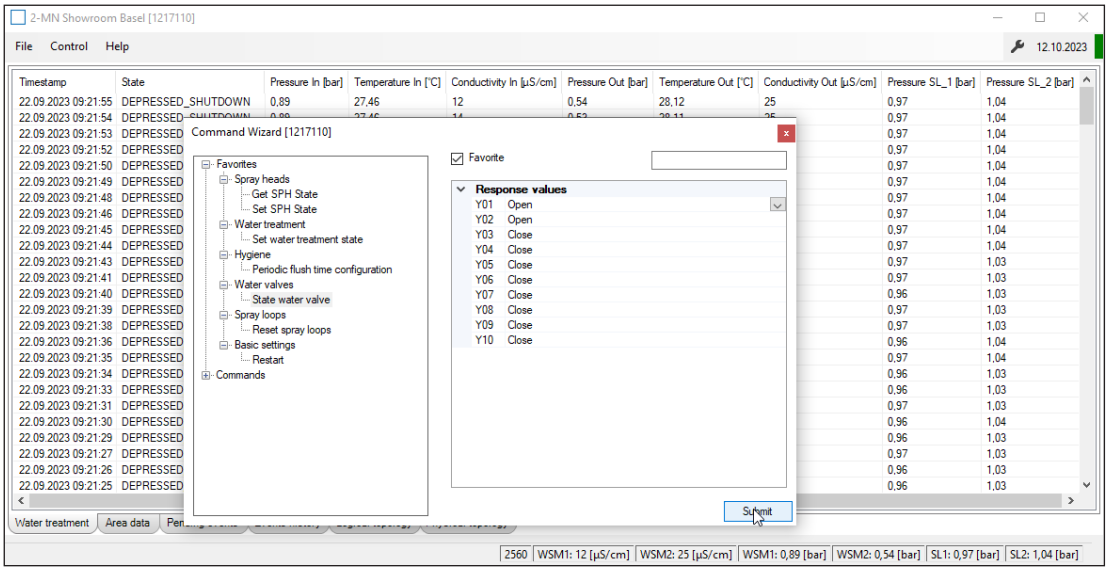
Wait for the "Depressed_Shutdown" status to appear.

5. Close the shut-off valve in the water supply line to the central unit or to the Condair RO-HB.

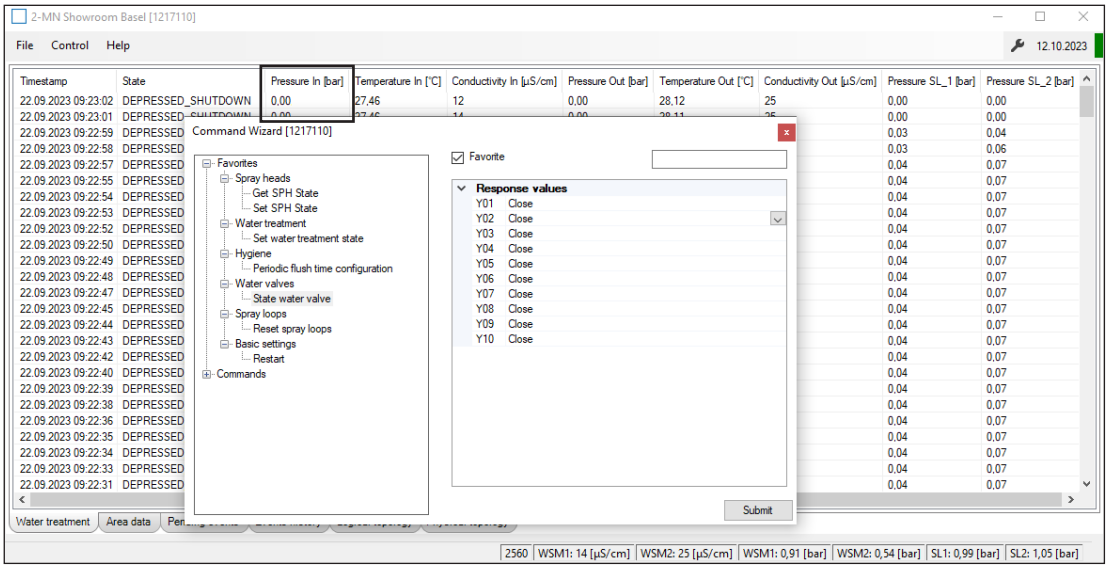
If your system is equipped with a Condair RO-HB reverse osmosis system, proceed with step 6, otherwise with step 8.

6. Unplug the mains cable of the Condair RO-H reverse osmosis unit and wait a few seconds. Plug the mains cable in again for approx. 10 to max. 15 seconds (the pressure in the water supply line is released), then unplug it again.

7. Depressurize the expansion tank: Select "Set state water valves" function under "Control > Commands...", Set the valves "Y1" and "Y2" to "Open" and confirm with **<Submit>**. After the command has been transmitted, it takes approx. 7 minutes for the pressure in the expansion tank to be released.



As soon as the pressure display of the "Pressure In" parameter no longer shows any pressure, select the "Set state water valves" function under "Control > Commands...", set the valves "Y1" and "Y2" to "Close" and press **<Submit>** confirm.



8. Carry out the disinfection of the Condair MN water system according to *Section 7.1.5.2* and then, if applicable, the disinfection of the Condair RO-HB reverse osmosis system according to *Section 7.1.5.3*.

7.1.5.2 Disinfect the water system of the Condair MN

To disinfect the water system of the Condair MN, you will need the following service accessories:
– Circulation pump with On/Off switch (Recommendation: Renkforce garden pump, 1100 W, 1215 US gal/h (4600 l/h), 65.2 psi (450 kPa))
Attention: The maximum pump pressure must not exceed 72.5 psi (500 kPa)!
– Sanosil S015 (0.264 US gal (1 liter) for the disinfection of a spray loop or 0.528 US gal (2 liters) for the disinfection of two spray loops)
– A 3 US gal (approx. 12 liter) bucket
– Two JG ø0.24" (ø6 mm) straight connectors (1 per water filter)
– Cleaning cloths
– Min. 10 ft. (3 m) JG hose ø0.24" (ø6 mm) (new or always the same one)

1. Make sure that the water system is depressurized (see *Section 7.1.5.1*). Then disconnect the water supply hose from the connection to the central unit.
Caution: There may be some residual pressure.
2. Remove the filter cartridge of the particle filter in the central unit (see *Section 7.1.3*).
3. Remove the water filter(s) and pull off the inlet and outlet hoses on the filter head(s) and join the hoses with a JG ø6 mm straight connector (service accessory).

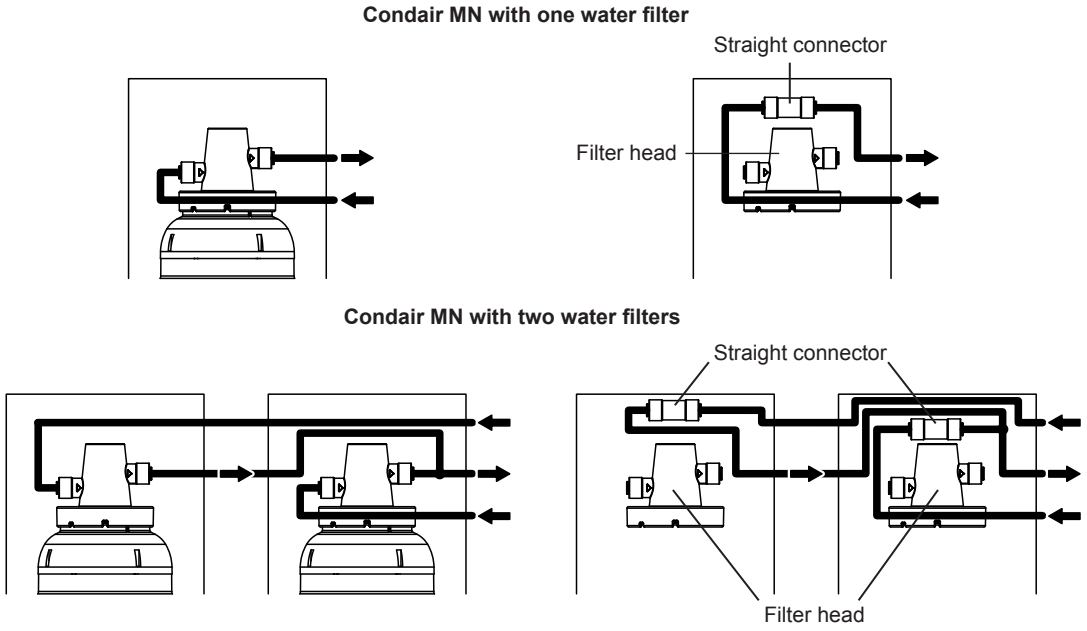


Fig. 70: Remove water filter(s) and join inlet and outlet hoses

4. If the system has **1 spray loop**, prepare the quantity of disinfectant solution described below:
Fill a 3 US gal (12 l) bucket (service accessory) with **1.32 US gal (5 liters) of potable water** and mix with **0.264 US gal (1 liter) of Sanosil S015** (service accessory) (16% solution).

   If the system has **2 spray loops,** prepare the quantity of disinfectant solution described below:
Fill a 3 US gal (12 l) bucket (service accessory) with **2.11 US gal (8 liters) of potable water** and mix with **0.528 US gal (2 liters) of Sanosil S015** (service accessory) (20% solution).

5. **For MN systems that are operated with raw water (potable water)**:
   - Immerse the suction hose of the circulation pump (service accessory) in the bucket with the disinfectant solution and connect the pressure hose to the supply connection of the central unit (see *Fig. 71*). Then start the circulation pump according to the instructions of the pump.

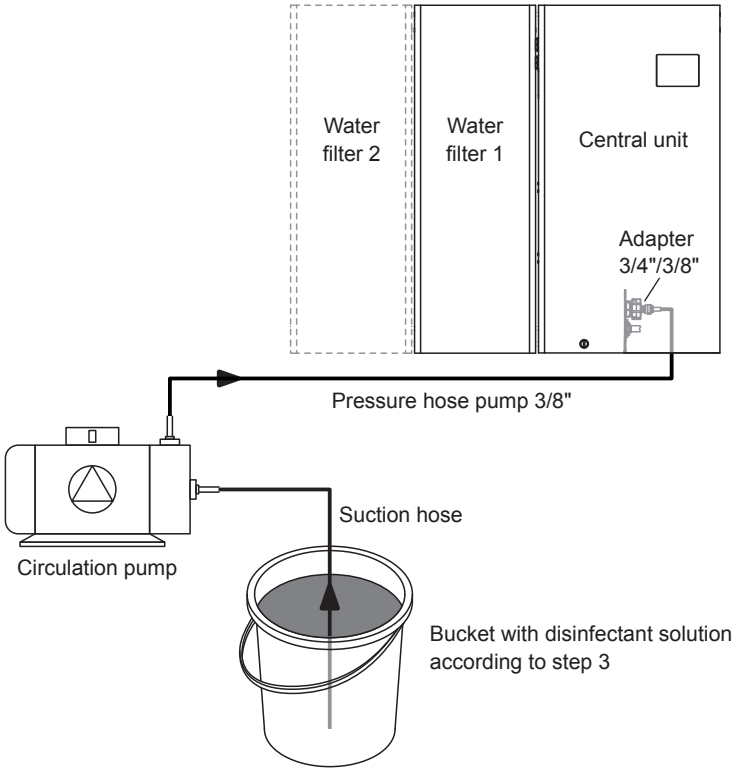


Fig. 71: Schematic diagram for the connection of the circulation pump for disinfection

For MN systems that are operated with RO water from the RO-HB reverse osmosis system:

- Disconnect the hose from the expansion tank from the connection on the booster module. Immerse a suction hose ø0.39" (ø10 mm) into the bucket with the disinfectant solution and connect it to the connection of the booster module (see *Fig. 72*).

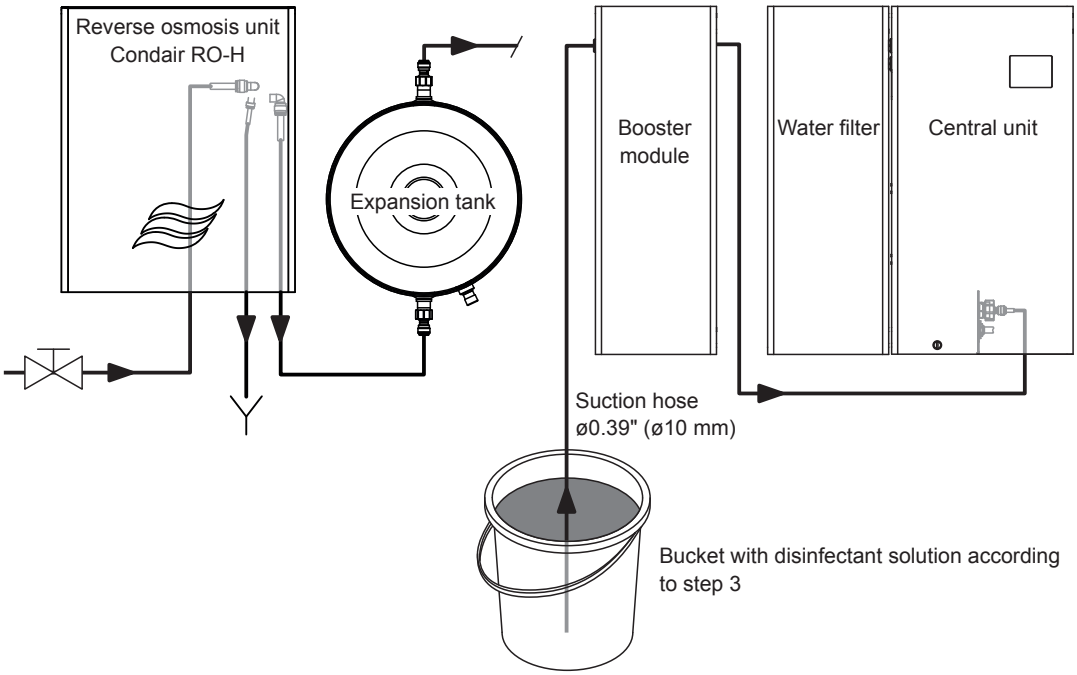
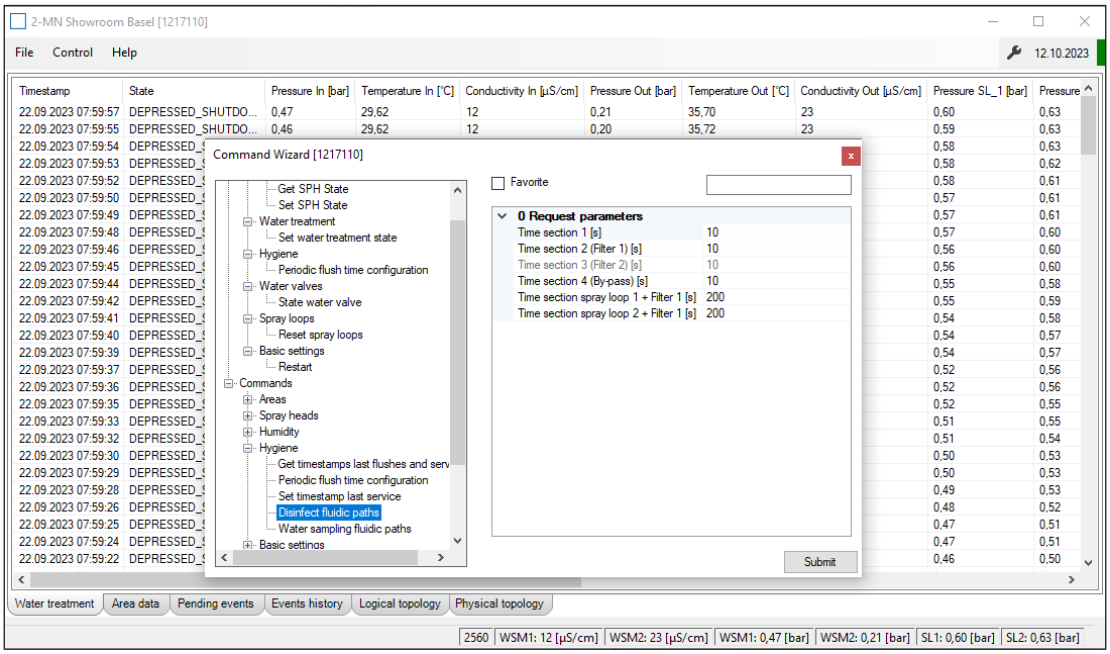


Fig. 72: Schematic diagram of the hose layout for disinfection of MN systems with RO-HB

6. Make sure that the booster module is connected to the mains socket.
7. Select the "Disinfect fluidic paths" function under "Control> Commands..." in the MN Service Back-Office application for the disinfectant filling process. Set the values for "Time section 1-4" to 10 s and for "Time section spray loop 1-2" to 200 s (Factory setting: "Time section 1-4": 10 s, "Time section spray loop 1-2": 200 s). Start the process with **<Submit>**.



The system is now automatically filled with the disinfectant solution (filling time approx. 7 minutes). As soon as the system is filled, the process is automatically terminated.

8. **For MN systems that are operated with raw water (potable water):** Switch off the circulation pump.
9. **Allow the disinfectant to act for one hour**.
   Note: The RO-HB reverse osmosis system can be disinfected during the reaction time, if installed (see *Section 7.1.5.3*).

10. After the reaction time has lapsed, the water system must be flushed. Proceed as follows:
    - Rinse out the 3 US gal (approx. 12 l) bucket (the rest of the disinfectant solution can be safely disposed of in the drain).
    - Then fill the bucket completely with fresh potable water.

    For MN systems that are operated with raw water (drinking water):

    - Immerse the suction hose of the circulation pump (service accessory) into the bucket with the fresh potable water and connect the pressure hose to the supply connection of the central unit (see *Fig. 73*). Then start the circulation pump according to the instructions of the pump.

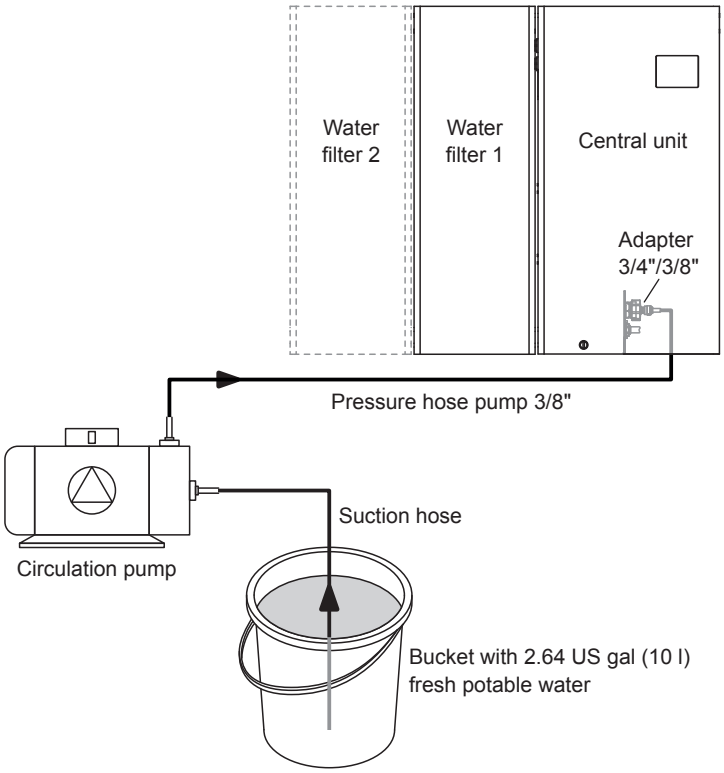


Fig. 73: Schematic diagram for the connection of the circulation pump for flushing

For MN systems that are operated with RO water from the RO-HB reverse osmosis system:

- Immerse the suction hose ø0.39" (ø10 mm) in the bucket with the fresh potable water (see *Fig. 74*).

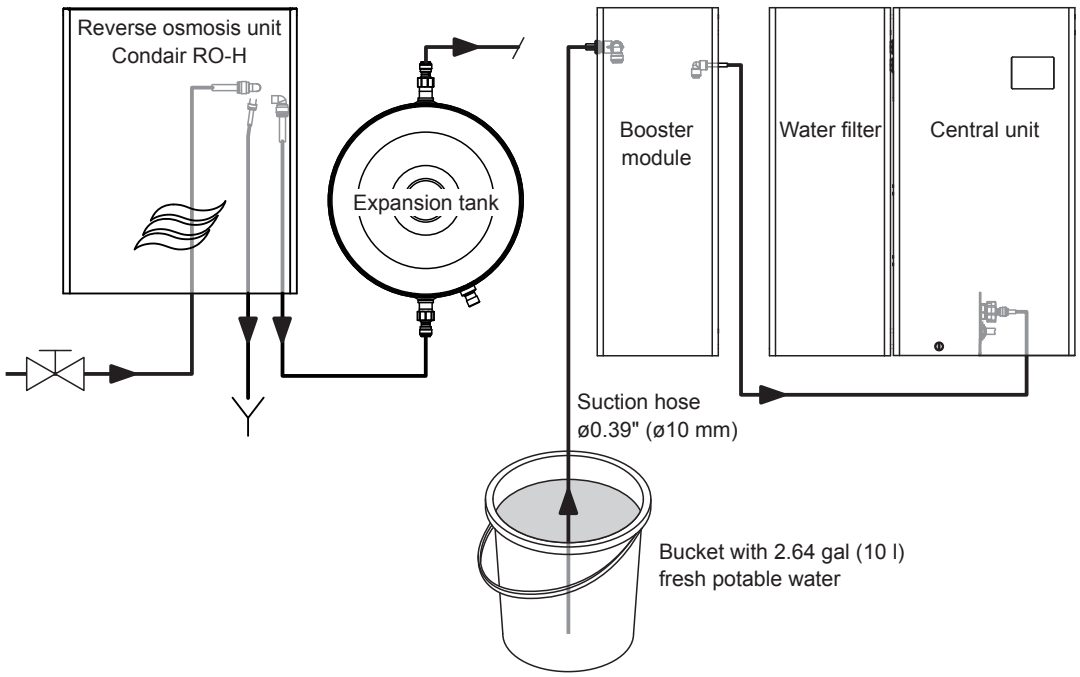
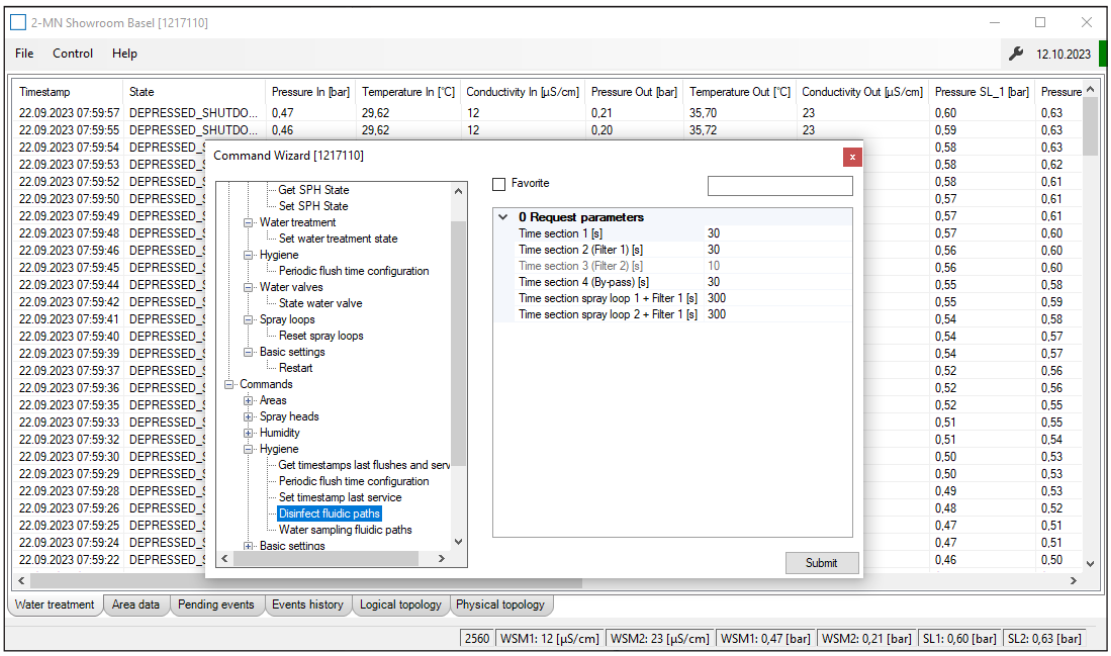


Fig. 74: Schematic diagram of the hose layout for flushing of MN single systems with RO-HB

- Select the "Disinfect fluidic paths" function under "Control> Commands..." in the MN Service Back-Office application. Set the values for "Time section 1-4" to 30 s and for "Time section spray loop 1-2" to 300 s. Start the flushing process with <Submit>.
- Start the flushing process with **<Submit>**. This flushing takes max. 12 minutes.



The determination of the individual flushing sections can be found in *Section 9.1*.

11. When the flushing process is complete:
    - **For MN systems that are operated with raw water (drinking water):** Switch off the circulation pump. Then remove the pressure hose of the circulation pump from the connection on the central unit and connect the water supply to the central unit.
    - **For MN systems that are operated with RO water from the RO-HB reverse osmosis system:** Remove the suction hose from the connection on the booster module and connect the hose from the expansion tank to the connection of the booster module. See connection diagrams in *Section 5.8*.
    - Remove the straight connector(s) to which the inlet and outlet hose(s) are connected in the housing(s) of the water filter(s) and reconnect the hose(s) to the filter head(s) (see *Fig. 75*).

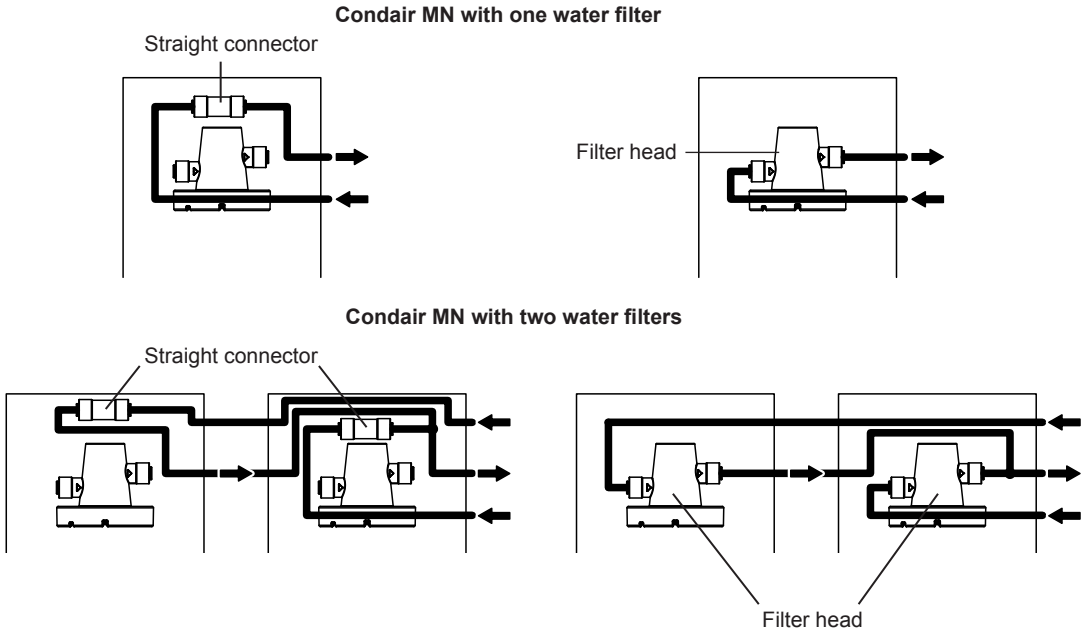


Fig. 75: Connect the inlet and outlet hoses to the filter head(s)

12. Install a **new** filter cartridge in the particle filter of the central unit (see *Section 7.1.3*).
13. The disinfection of the internal water system of the Condair MN is complete. If your system is equipped with a Condair RO-HB reverse osmosis system, continue with the disinfection of the Condair RO-HB reverse osmosis system according to *Section 7.1.5.3*. Otherwise, put the system back into operation as described in *Section 7.1.5.4*.

7.1.5.3 Disinfect the Condair RO-HB reverse osmosis system

To disinfect the Condair RO-HB, you will need the following service accessories:
– Sanosil S015, 1.06 US gal (4 liters)
– A 3 US gal (approx. 12 liter) bucket
– One new activated carbon filter cartridge and one new sediment filter cartridge
– A new RO membrane
– Cleaning cloths
– Manual shut-off valve with hose
– Min. 10 ft. (3 m) JG hose ø0.24" (ø6 mm) (new or always the same one)

1. Place an empty bucket under the RO-H to catch any residual water.
2. Make sure that the water system is depressurized (see *Section 7.1.5.1*). Then disconnect the hoses marked in *Fig. 76*.

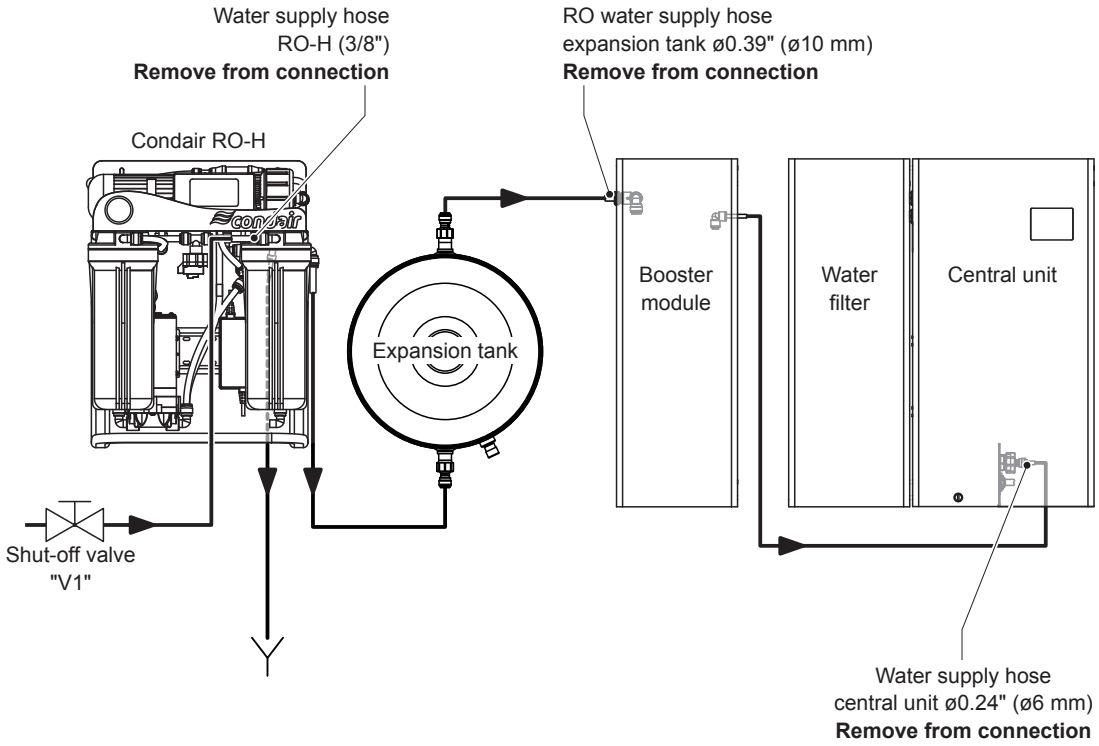


Fig. 76: Removing the hoses

3. Unscrew the filter housing of the activated carbon filter and sediment filter from the filter heads and remove the filter cartridges (see chapter 5.6 in the installation and operation manual of the Condair RO-HB).

CAUTION!

Residual water may spill out; place a bucket under the filters.

Note: Dispose of the activated charcoal filter cartridge and sediment filter cartridge in accordance with local regulations.

4. Clean the two filter housings and screw the **empty** filter housings back into the filter heads (see chapter 5.6 in the installation and operation manual of the Condair RO-HB).

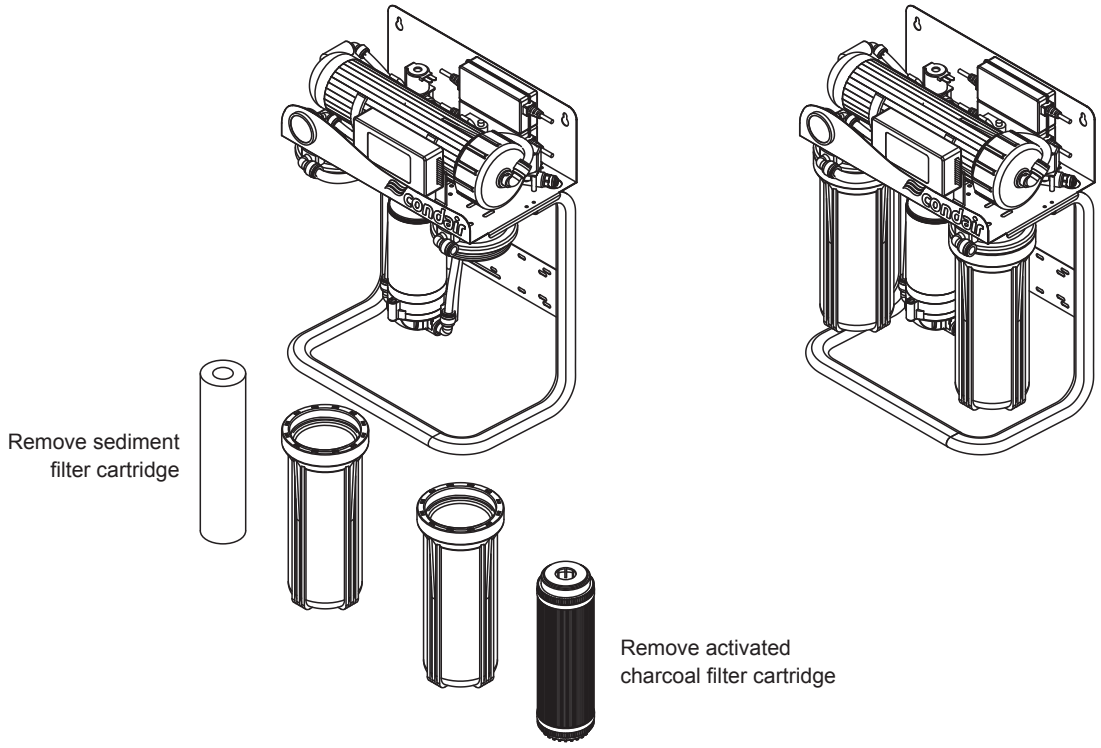


Fig. 77: Removing the activated carbon filter and sediment filter cartridge

5. Remove hose to the cover of the membrane housing, unscrew the cover and remove the RO membrane from the membrane housing (see chapter 5.6 in the installation and operation manual of the Condair RO-HB).

   Note: Dispose of the RO membrane in accordance with local regulations.

6. Screw on the cover of the membrane housing again and reconnect the hose.

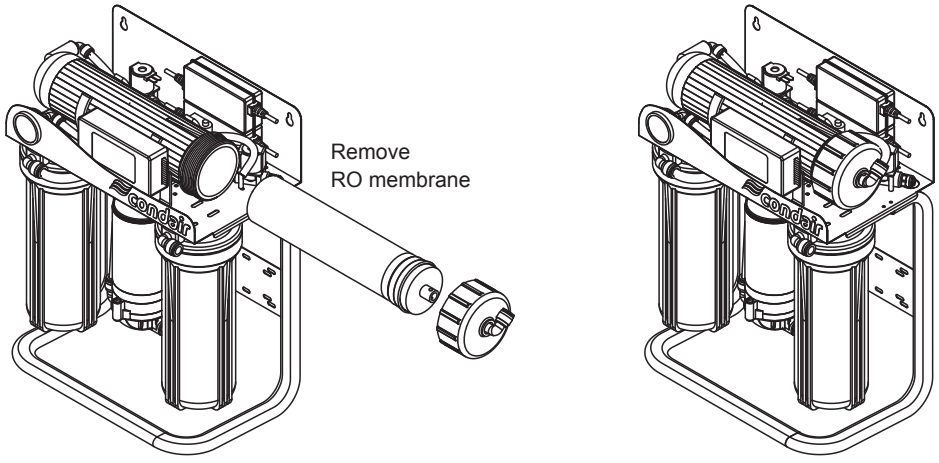


Fig. 78: Removing the RO membrane

7. Prepare disinfectant solution: Fill a 3 US gal (approx. 12 l) bucket (service accessory) with **1.59 US gal (6 liters) of potable water and mix it with 1.06 US gal (4 liters) of Sanosil S015** (service accessory) (results in a 3% solution).
8. Create hose connections as shown in *Fig. 79*:
   - Lead the outlet hose of the expansion tank ø0.39" (ø10 mm) into the bucket with the disinfectant solution.
   - Immerse a suction hose ø0.39" (ø10 mm) into the bucket with the disinfectant solution and connect it to the RO water connection of the booster module.
   - Connect the outlet hose of the booster module (ø6 mm) with an adapter ø6-3/8 " to the inlet connection of the reverse osmosis unit Condair RO-H.
     Note: If the outlet hose of the booster module is too short because the reverse osmosis unit is too far away from the booster module, another, correspondingly long 0.24" (ø6 mm) hose must be used.

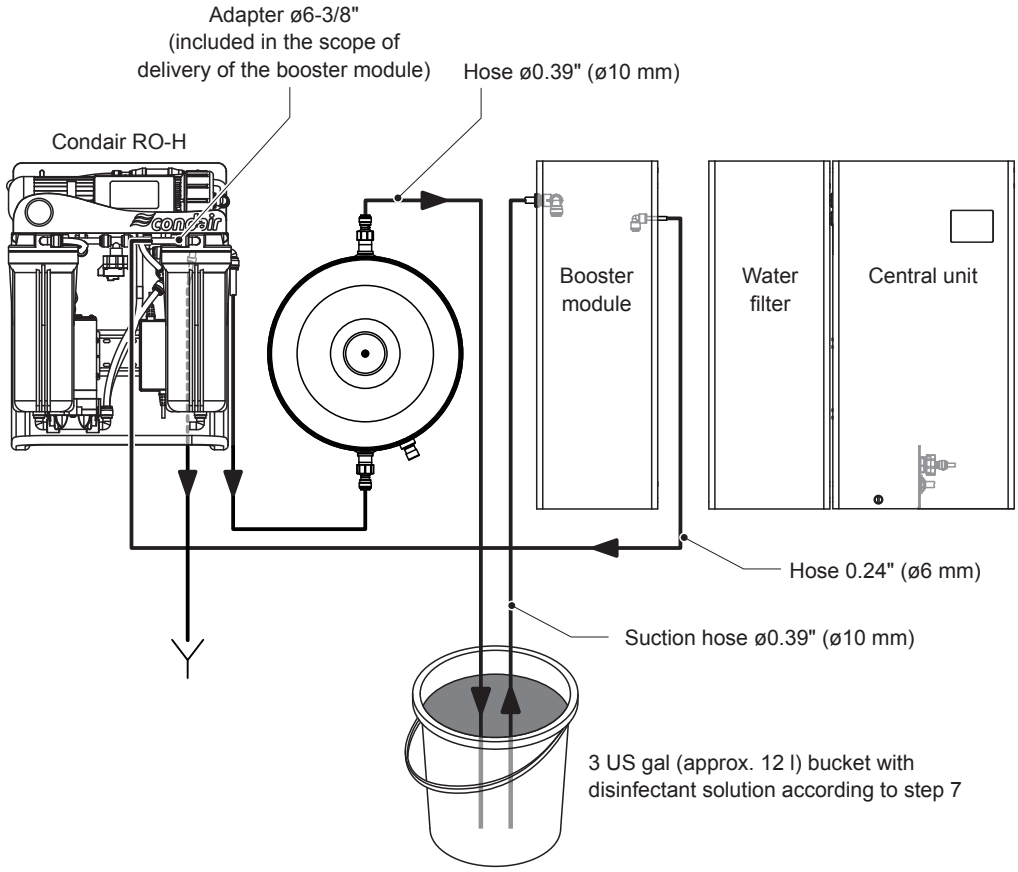
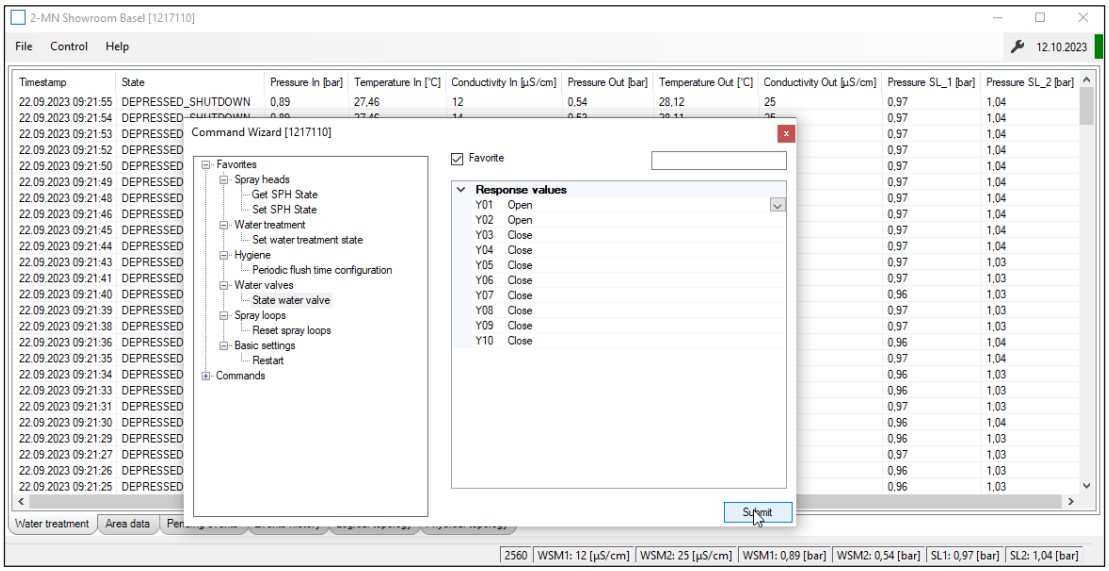
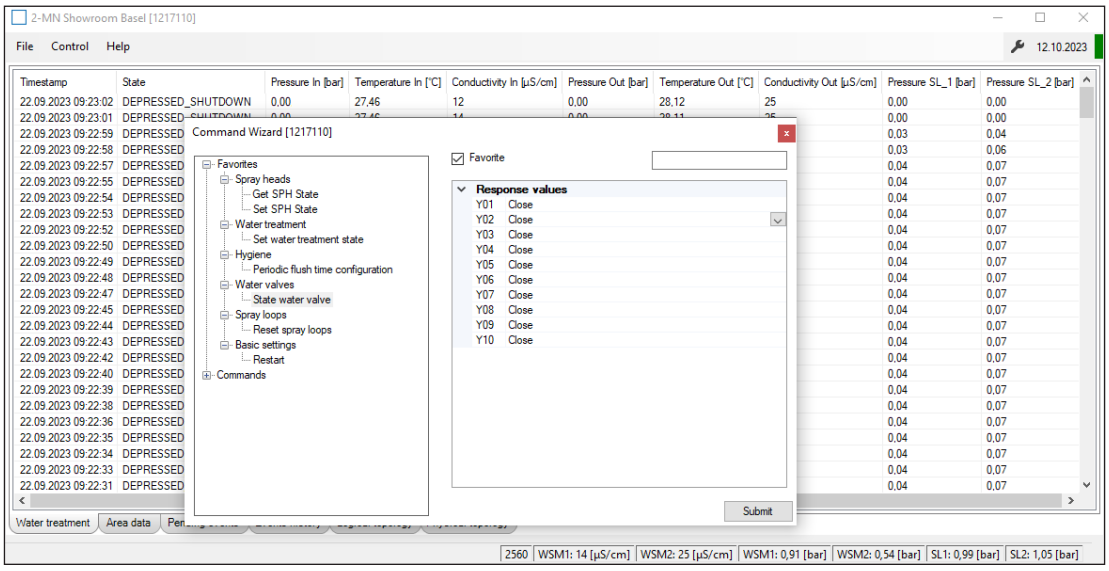


Fig. 79: Schematic diagram of the hose layout for disinfection of the Condair RO-HB for MN systems

9. When everything is connected according to *Fig. 79*, select the "Set state water valves" function under "Control > Commands ...", set the valves "Y1" and "Y2" to "Open" and confirm with **<Submit>**. The pump in the booster module starts up.



10. Connect the reverse osmosis unit Condair RO-H to the power supply. The disinfectant solution is then pumped into the reverse osmosis unit and the expansion tank with the pump of the booster module (approx. 8 l).
11. Wait until the disinfectant solution runs out of the hose from the expansion tank into the bucket with the disinfectant solution. Then select the "Set state water valves" function under "Control > Commands ...", set the valves "Y1" and "Y2" to "Close" and confirm with **<Submit>** and disconnect the reverse osmosis unit from the power supply.



12. Allow the disinfectant solution to act in the reverse osmosis unit Condair RO-H and the expansion tank for at least 30 minutes.
13. Rinse out the 12 liter bucket (the rest of the disinfectant solution can be safely disposed of in the drain) and fill it with fresh potable water.

14. After the reaction time has lapsed, immerse the outlet hose of the expansion tank (ø10 mm) in the drain funnel on the building side and the suction hose in the bucket with the fresh potable water (see *Fig. 80*).

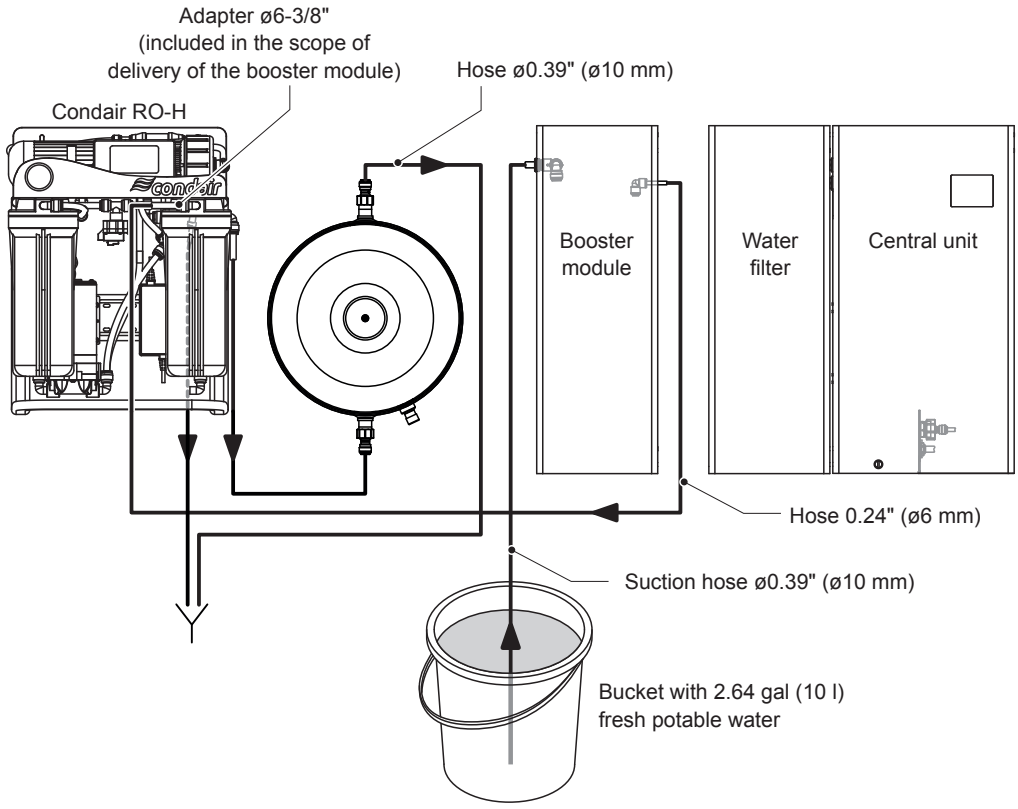
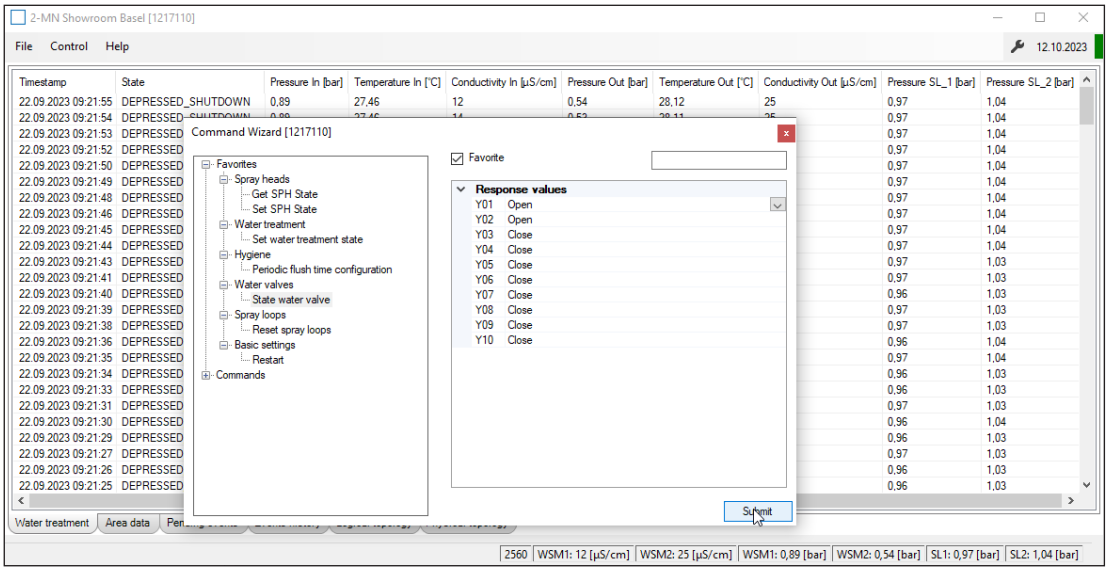
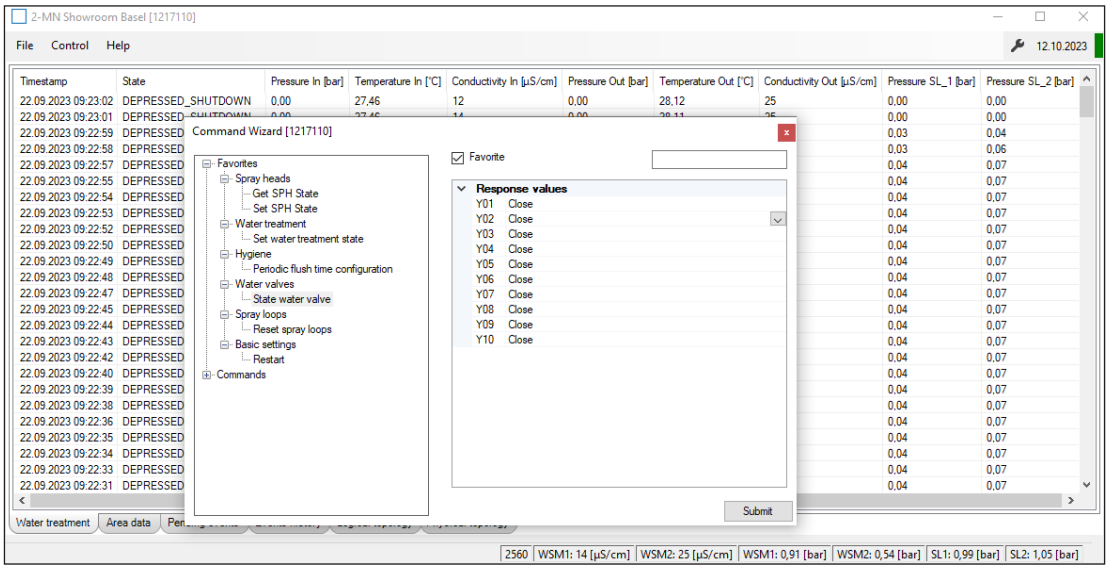


Fig. 80: Schematic diagram of the hose layout for flushing of the Condair RO-HB for MN systems

15. Under "Control > Commands ..." select the "Set state water valves" function, set the valves "Y1" and "Y2" to "Open" and confirm with **<Submit>**. The pump in the booster module starts up.



16. Connect the reverse osmosis unit Condair RO-H to the power supply. The fresh potable water is then pumped with the pump of the booster module through the reverse osmosis unit and the expansion tank into the drain funnel. Check whether the solution flows out into the funnel has visible dirt or particles. If soiling is found, repeat the flushing process (steps 13 to 16).
17. As soon as the bucket with the fresh potable water is empty, select the "Set state water valves" function under "Control > Commands ...", set the valves "Y1" and "Y2" to "Close" and confirm with **<Submit>** and disconnect the reverse osmosis unit from the power supply.



18. Unscrew the filter housings from the filter heads and empty the filter housings into the bucket.
19. Put an empty bucket under the membrane housing. Lift the membrane housing on the side with the cover, pull off the hose and unscrew the cover of the membrane housing. Then empty the membrane housing into the bucket.

20. Install a new activated carbon filter cartridge (right) and a new sediment filter cartridge (left) in the filter housings and screw the filter housings back into the filter heads (see chapter 5.6 in the installation and operation manual of the Condair RO-HB).

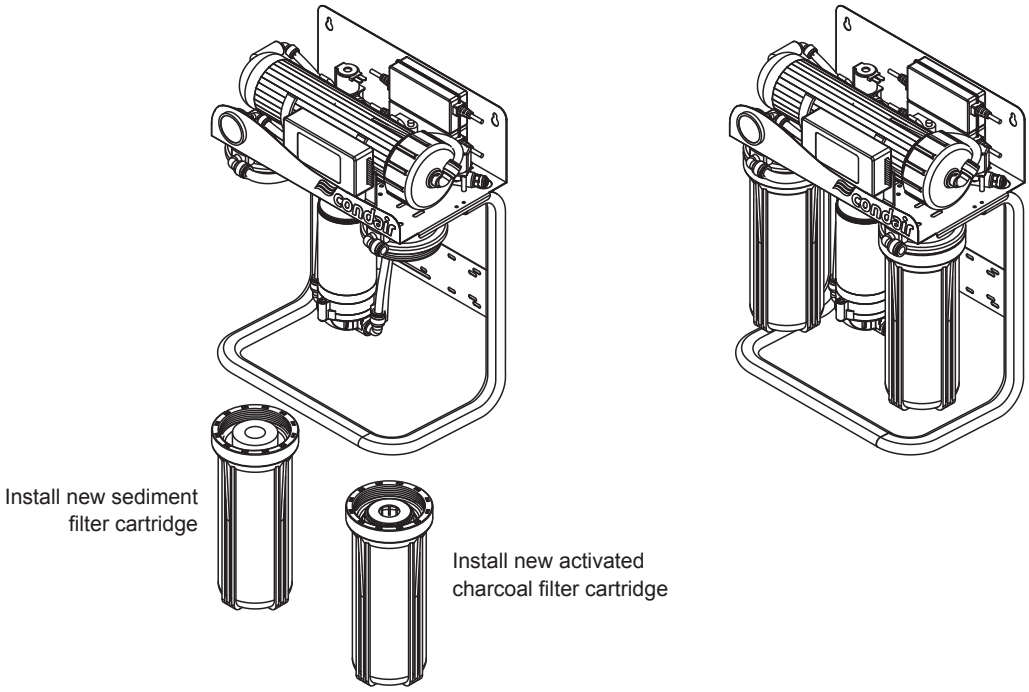


Fig. 81: Installing new activated carbon filter and sediment filter cartridge

21. Insert the new RO membrane into the membrane housing, screw on the cover and reconnect the hose (see chapter 5.6 in the installation and operation manual of the Condair RO-HB).

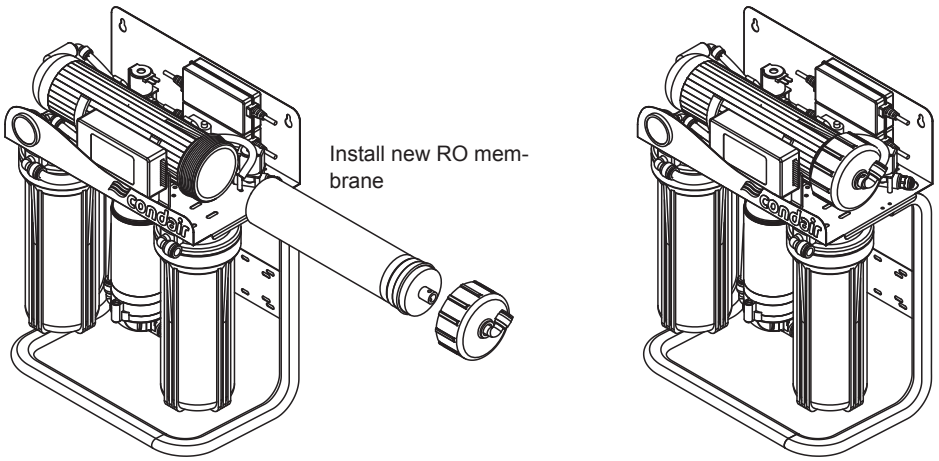


Fig. 82: Installing new RO membrane

22. Reconnect the reverse osmosis unit Condair RO-HB to the booster module and to the central unit as shown in the figure in *Section 5.8*.
Important: Flush the water supply hose before connecting it to the reverse osmosis unit RO-H: To do this, lead the water supply hose into a drain or empty bucket. Carefully open the shut-off valve "V1" and allow approx. 0.79 to 1.06 US gal (3 to 4 liters) of water to run out. Close the shut-off valve "V1" again.
23. Open the shut-off valve "V1" in the water supply line to the reverse osmosis unit Condair RO-H (see *Fig. 76*). The filter housings are filled and the system is pressurized.

24. Check system for leaks. Seal if necessary.
25. Connect the Condair RO-HB to the power supply.
26. The Condair RO-HB first flushes for approx. 30 seconds, then the permeate production is started and the expansion tank is filled (duration: approx. 10-15 minutes). A counter is shown in the display of the controller of the reverse osmosis unit Condair RO-H.

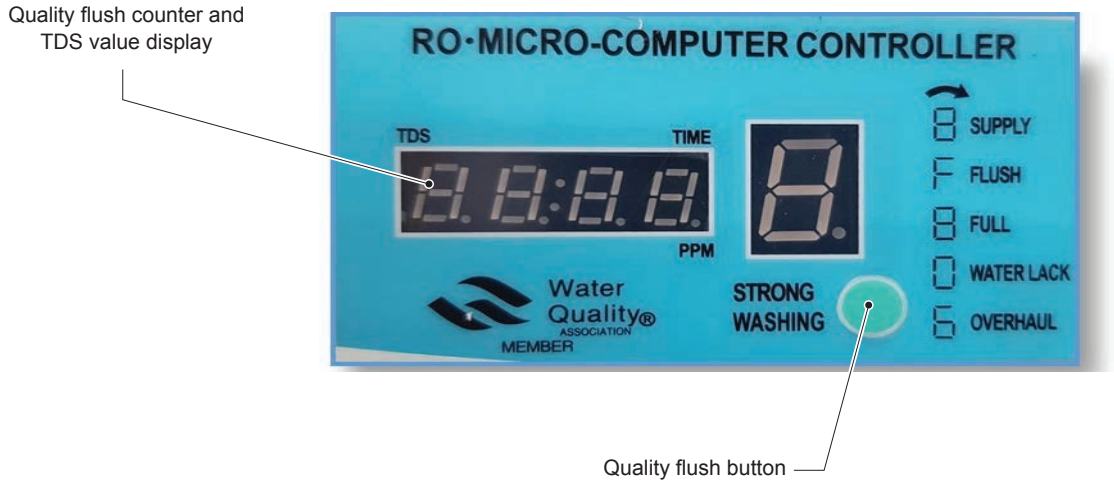
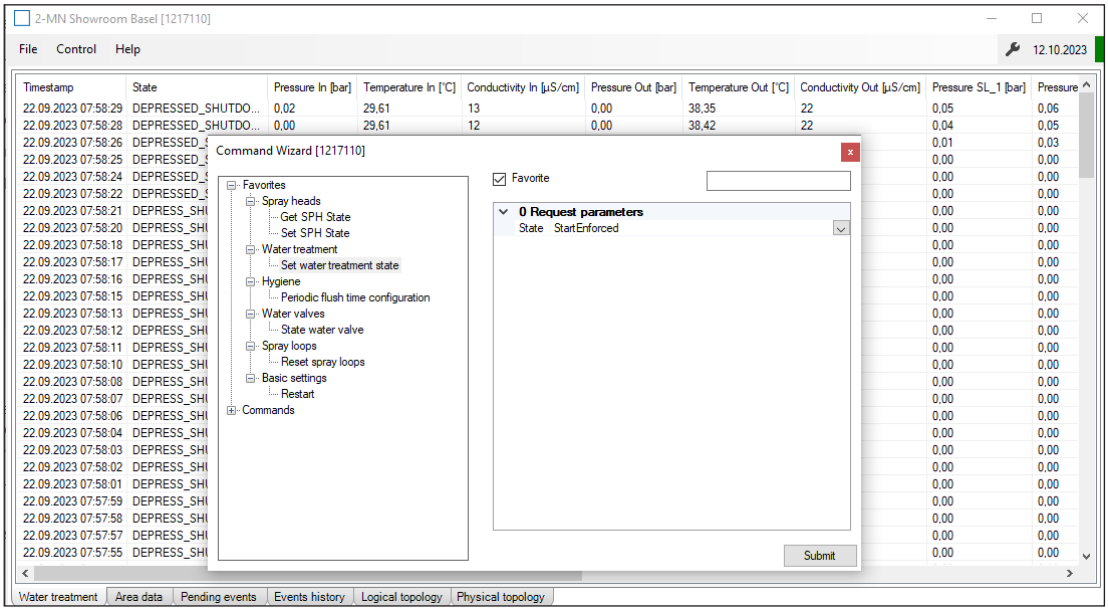


Fig. 83: Display Condair RO-HB controller

27. If the displayed TDS value is >15 ppm, press the **<Quality Flush>** key repeatedly until the TDS value in the display is between 10-15 ppm.
28. The disinfection process of the Condair RO-HB is complete. Continue with the steps for putting the system into operation according to *Section 7.1.5.4*.

7.1.5.4 Put the system into operation

1. Start the system with the "StartEnforced" function (path: "Control > Commands... > Set water treatment state").



2. While booting up (about 30 s after confirming with **<Submit>**), replace the water filter(s) with the "Change filter" service function on the control panels.

   As soon as the menu-guided procedure for the replacement of the water filter(s) is completed, the system is restarted, the water system is flushed via the water filter(s) and all error messages are deleted. Duration of startup, approx. 20 minutes. The system then automatically goes into normal operating mode and is ready for operation.

7.1.6 Check the air pressure of the expansion tank of the Condair RO-HB reverse osmosis system

Check the air pressure of the expansion tank at the compressed air connection (tire valve) with an appropriate gauge. The **pre-pressure must be 11.6 psi ±1.5 psi (80 kPa ±10 kPa)**. If necessary, top up compressed air via the compressed air connection.

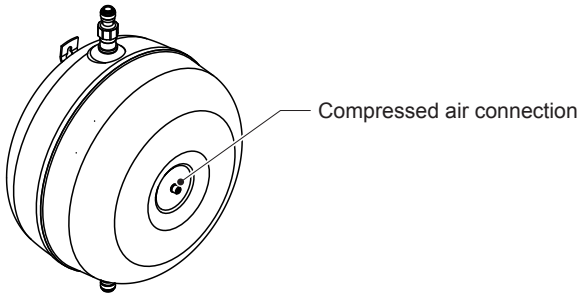
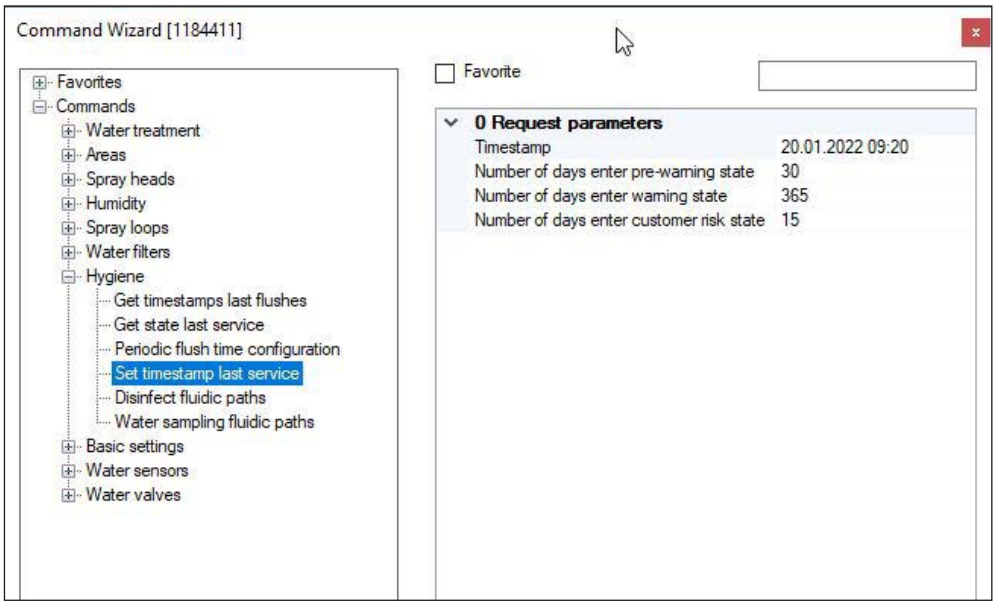


Fig. 84: Compressed air connection expansion tank

7.2 Reset the maintenance counter

1. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
2. Start the MN Service Back-Office application on the laptop. Establish the local connection to the central unit (double-click the "Local" icon).
3. Select the "Set timestamp last service" function in the MN Service Back-Office application under "Control > Commands...>".
4. In the "Timestamp" field, enter the current date and time in the format "DD.MM.YYYY hr:min".
5. If necessary, specify the number of days for the pre-warning message for the next maintenance in the "Number of days enter pre-warning state" field and the number of days until the warning message for the next maintenance is triggered in the "Number of days enter warning state" field.



7.3 Replacement of components

7.3.1 Preparing the system for component replacement

1. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
2. Start the MN Service Back-Office application on the laptop. Establish the local connection to the central unit (double-click the "Local" icon) and use the "Shutdown" function (path: "Control > Commands... > Set water treatment state") to shut the system down. The system will be automatically depressurized and the UV lamp deactivated.
3. **Important:** Wait until the status "Depressed_Shutdown" is displayed. Then stop the MN Service Back-Office application on the laptop.
4. Switch the central unit off and unplug the power cable.

7.3.2 Resetting the system to normal operating mode after replacing components

1. Plug in the main power supply cable of the central unit in and switch the central unit on.
2. Start the MN Service Back-Office application on the laptop. Establish the local connection to the central unit (double-click the "Local" icon) and start the system using the "QuickStart" function (path: "Control > Commands... > Set water treatment state"). The system will go into normal operating mode.
3. Stop the MN Service Back-Office application, disconnect the network cable from the central unit on the laptop and reconnect it to the gateway.

7.3.3 Replacing the water sensor modules

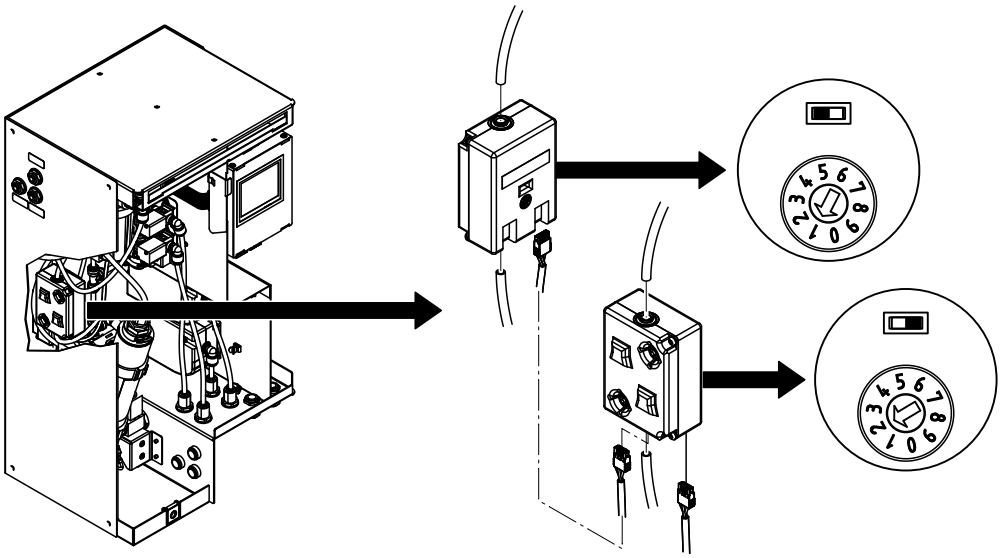


Fig. 85: Replacement of the water sensor module

1. Prepare the system for the replacement according to *Section 7.3.1*.
2. Remove the front panel of the central unit.
3. Disconnect the two hoses at the bottom and top of the corresponding water sensor module.
   CAUTION: Some residual water may escape when the hoses are loosened! Have rags to hand and immediately wipe off any leaked water.
4. Disconnect the one or two CAN bus cables from the water sensor module.
5. Push the corresponding water sensor module upwards out of the retaining tabs and remove.
   Note: If you want to check and clean the inside of the water sensor module for dirt, follow the instructions in *Section 7.3.3.1*.
6. For a new water sensor module, set the rotary switch and the DIP switch as follows:
   – Water sensor module on the back wall:
     Rotary switch to pos. 1 and DIP switch to the left
   – Water sensor module on the side wall:
     Rotary switch to pos. 2 and DIP switch to the right
7. Hook the new or cleaned water sensor module into the corresponding retaining tabs and push down until it stops.
8. Insert the one or two CAN bus cables into the corresponding connection(s) on the water sensor module.
9. Connect the two hoses to the connections at the top and bottom of the water sensor module.
10. Attach and lock the front cover of the central unit.
11. Reset system to normal operation mode according *Section 7.3.2*.

7.3.3.1 Check the water sensor module for dirt and clean

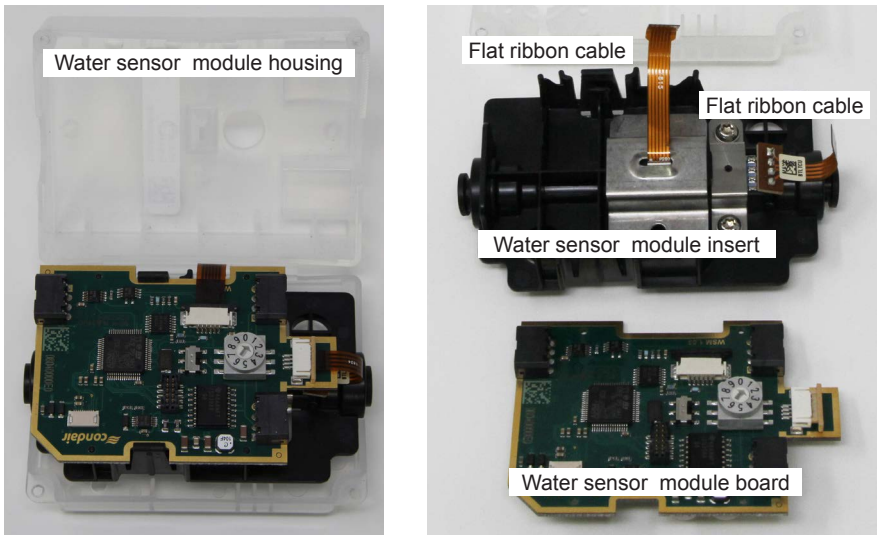


Fig. 86: Dismantling the water sensor module

1. Unscrew the two screws and open the water sensor module housing.
2. Disconnect the two flat ribbon cables on the water sensor module board and remove water sensor module board from the module insert.

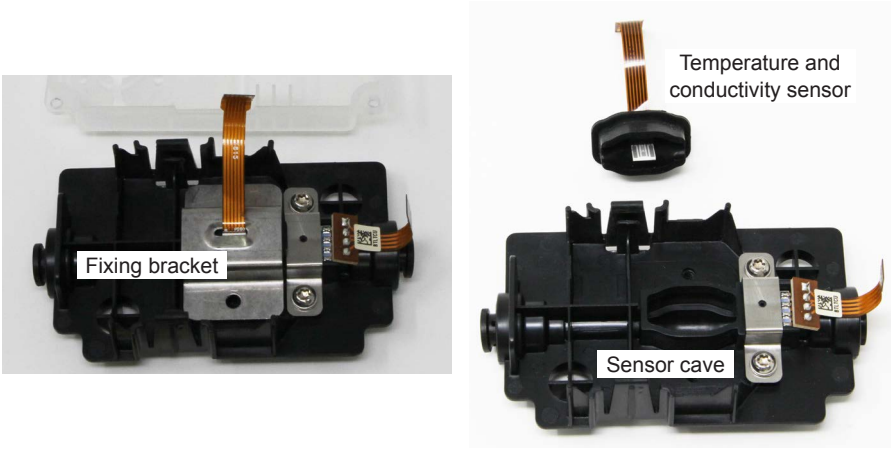


Fig. 87: Dismantling the temperature and conductivity sensor from the module insert

3. Unscrew the two screws then remove the fixing bracket.
4. Carefully lift the temperature and conductivity sensor out of the module insert.
5. Carefully remove any dirt from the temperature and conductivity sensor and the sensor cave.
6. Assemble water sensor module in reverse order.

7.3.4 Replacing the drain modules

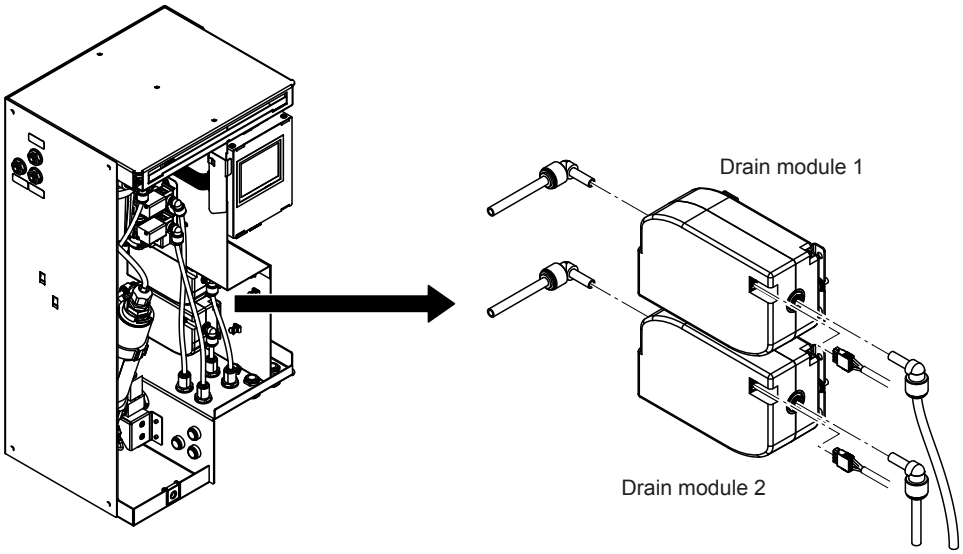


Fig. 88: Replacing the drain module

1. Prepare the system for the replacement according to *Section 7.3.1*.
2. Remove the front panel of the central unit, if the internal drain module(s) must be replaced.
3. Pull off the right angle connectors (internal drain module) or the two hoses at the bottom and top (external drain module) from the corresponding drain module.
4. Disconnect the CAN bus cable from the corresponding drain module.
5. Push the defective drain module out of the holder and remove.
   Note: If you want to check and clean the valve inside of the drain module, follow the instructions in *Section 7.3.4.1*.
6. Hook the new or checked drain module into the holder and push it into the holder until it stops.
7. Insert the CAN bus cable into the drain module connection.
8. Insert the angle connectors (internal drain module) or the two hoses at the bottom and top (external drain module) as far as possible into the respective connectors.
9. If the internal drain modules have been replaced, attach and lock the front cover of the central unit.
10. Reset system to normal operation mode according *Section 7.3.2*.

7.3.4.1 Removing and installing the drain module valve

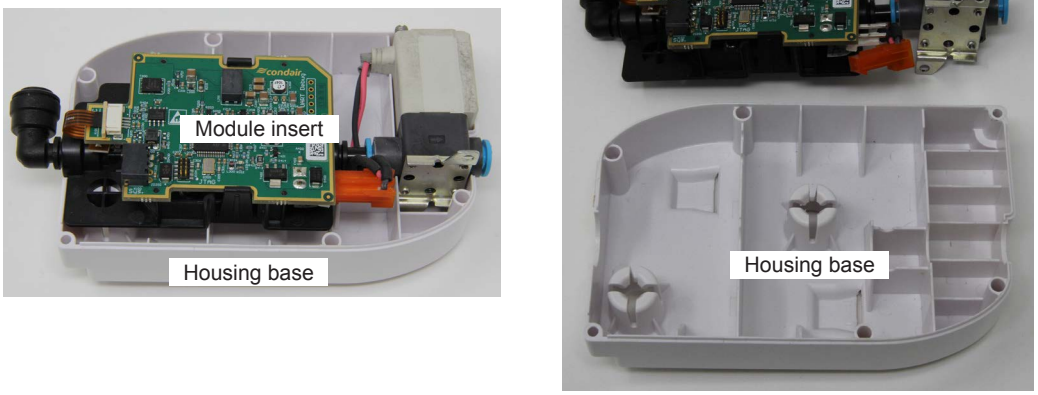


Fig. 89: Dismantling the drain module

1. Unscrew the six screws in the drain module cover and remove the housing cover.
2. Lift the entire module insert out of the housing base
3. Remove the valve cable connector from the circuit board and disconnect the hose connection.

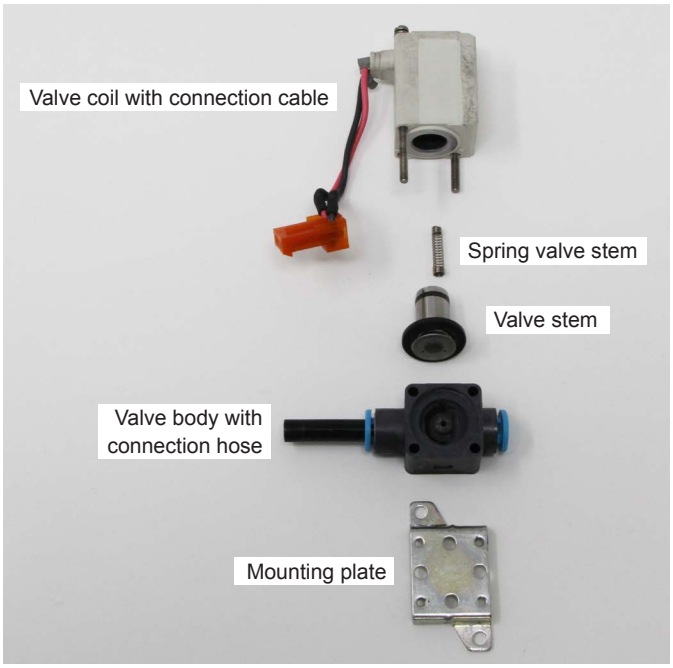


Fig. 90: Dismantling the valve

4. Unscrew the two screws and lift the coil from the valve body.
5. Remove the valve stem and the spring from the coil hole.
6. Carefully remove any dirt on the valve stem and inside the valve body.
7. Reassemble the valve and the drain module in the reverse order.

7.3.5 Replacing the valve block

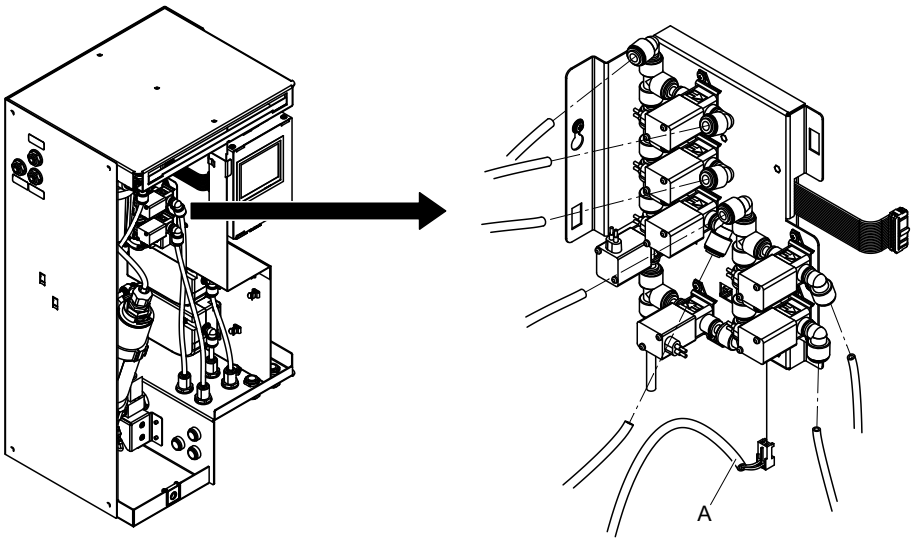


Fig. 91: Replacing the valve block

1. Prepare the system for the replacement according to *Section 7.3.1*.
2. Remove the front panel of the central unit.
3. Mark all hoses according to the valves on the valve block and disconnect them.
4. Mark all connecting cables according to the valves on the valve block and disconnect them.
5. Fold the connector cover down and unplug the flat ribbon cable leading to the ConBox from the ConBox.
6. Disconnect the connection cable from the inlet valve and unhook cables from the tabs on the valve block plate.
7. Slightly loosen the screw on the back wall of the housing and remove the valve block.
   Note: If you want to replace or check and clean a valve of the valve block, follow the instructions in *Section 7.3.5.1*.
8. Hook the new valve block or the valve block with cleaned/replaced valve(s) into the screw on the back wall of the housing and tighten the screw.
9. Hook the connection cable "A" from the inlet valve into the valve block plate and insert it into the connection on the board of the valve block.
10. Connect the flat ribbon cable to the corresponding connector on the ConBox and fold the connector cover upwards.
11. Connect all connection cables to the valves on the valve block according to the notation in step 5.
12. Connect all hoses to the valves on the valve block according to the notation in step 4.
13. Attach and lock the front cover of the central unit.
14. Reset system to normal operation mode according *Section 7.3.2*.

7.3.5.1 Removing and installing a valve of the valve block

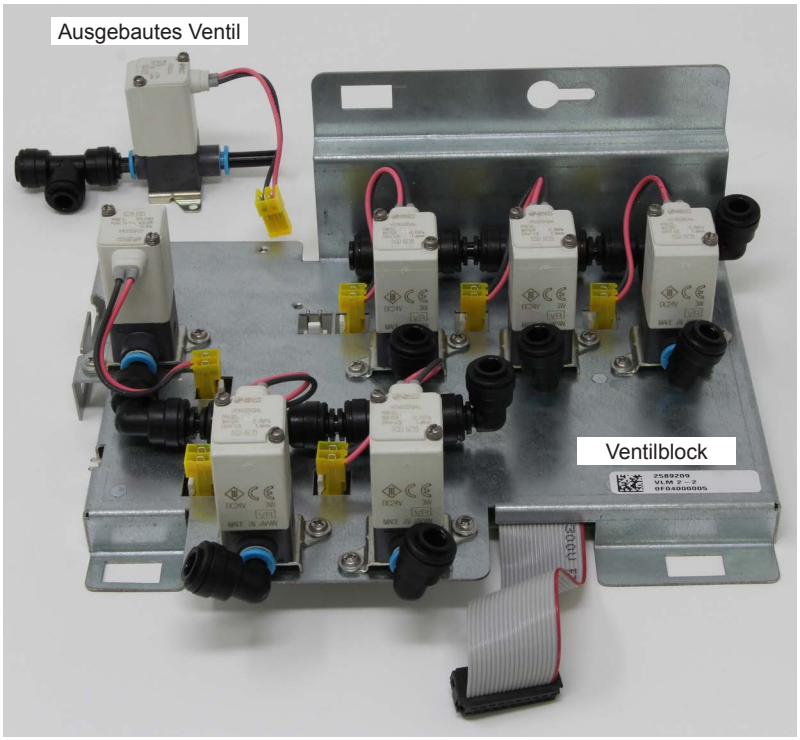


Fig. 92: Removing a valve

1. Loosen the necessary hoses to the corresponding valve.
2. Unplug the valve connection cable.
3. Unscrew the two screws on the mounting plate and remove the valve assembly.

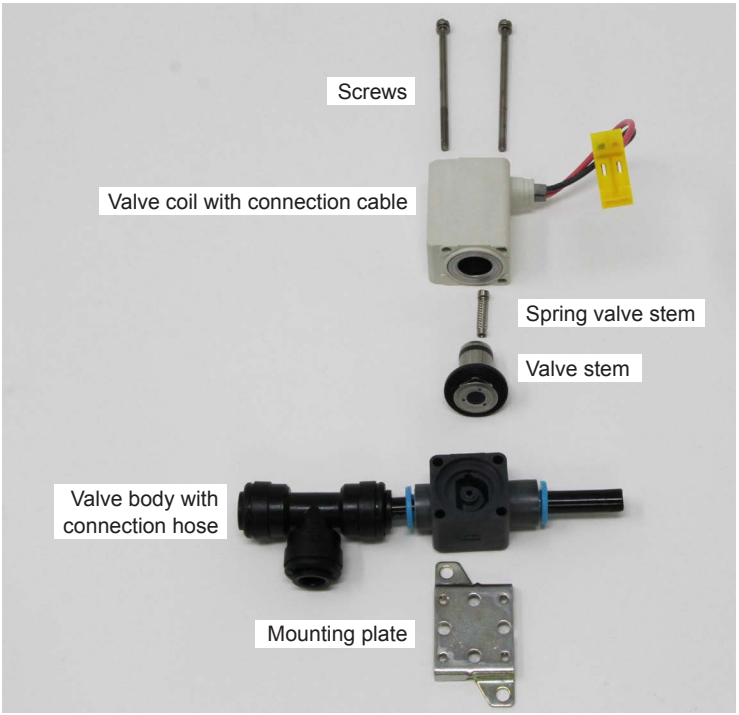


Fig. 93: Dismantling the valve

4. Unscrew the two screws and lift the coil from the valve body.
5. Remove the valve stem and the spring from the coil hole.
6. Carefully remove any dirt on the valve stem and inside the valve body.
7. Reassemble the valve in the reverse order and mount it on the valve block and connect it.

7.3.6 Replacing the inlet valve

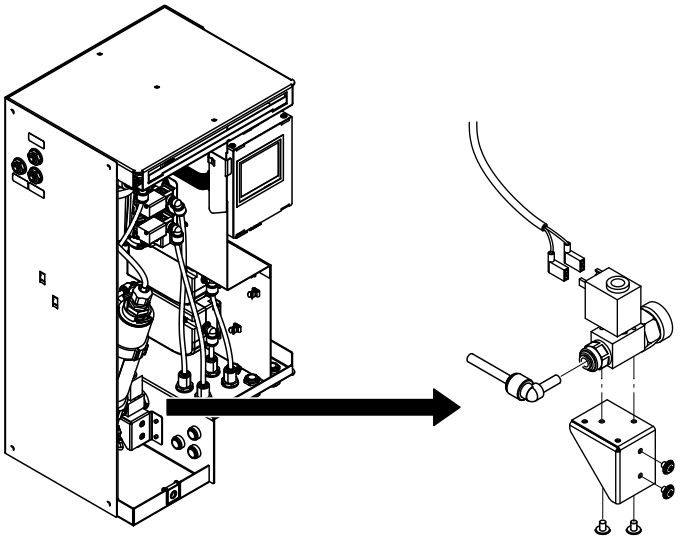


Fig. 94: Replacing the inlet valve

1. Prepare the system for the replacement according to *Section 7.3.1*.
2. Remove the front panel of the central unit.
3. Close the shut-off valve in the water feed line.
4. Disconnect the inlet hose and outlet hose.
5. Disconnect the connection cable from the inlet valve.
6. Loosen the two screws on the retaining plate and remove the inlet valve and retaining plate together.
7. Loosen the two screws securing the inlet valve to the retaining plate and remove the inlet valve.
8. Mount the new inlet valve in the reverse order of steps 4 to 7.
9. Open the shut-off valve in the water supply line and check the inlet valve as well as inlet and outlet hose for leaks.
10. Attach and lock the front cover of the central unit.
11. Reset system to normal operation mode according *Section 7.3.2*.

7.3.7 Replacing the ConBox

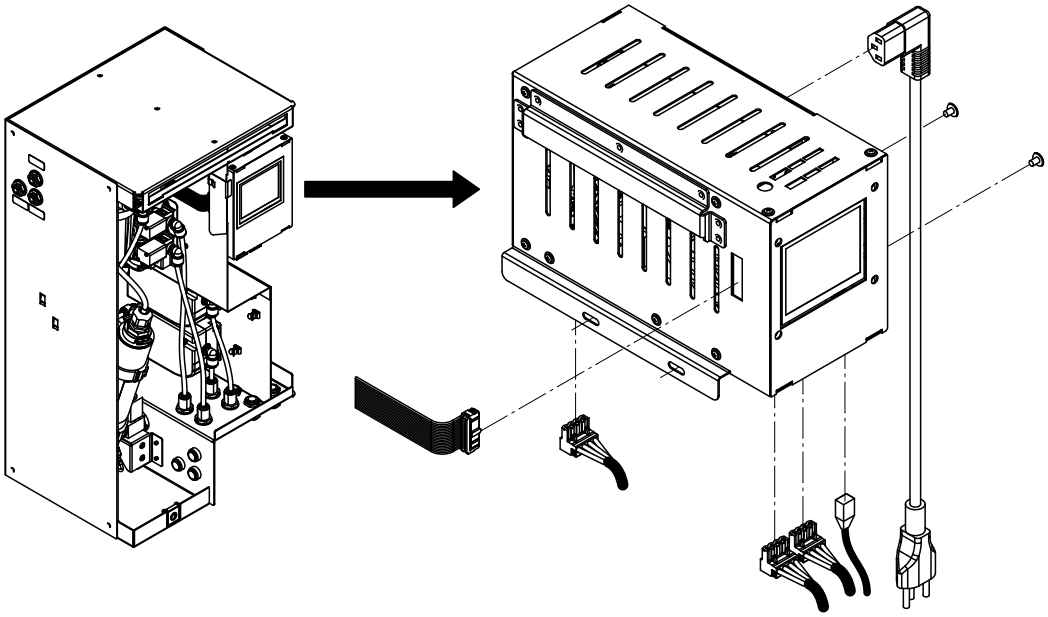


Fig. 95: Replacing the ConBox

1. Disconnect the network cable from the central unit at the gateway and connect it to the laptop.
2. Start the MN Service Back-Office application on the laptop. Establish the local connection to the central unit (double-click the "Local" icon) and use the "Shutdown" function (path: "Control > Commands... > Set water treatment state") to shut the system down.
3. In the MN Service Back-Office application, select "Workflow Commissioning" (path: "Control > Commissioning..."), and note the configuration data (serial number of the system, language, number of spray loops, number of water filters, selected organization unit, zone designations and nominal humidity setpoints of the zones). After recording the data, exit "Workflow Commissioning" with **<Abort>** .

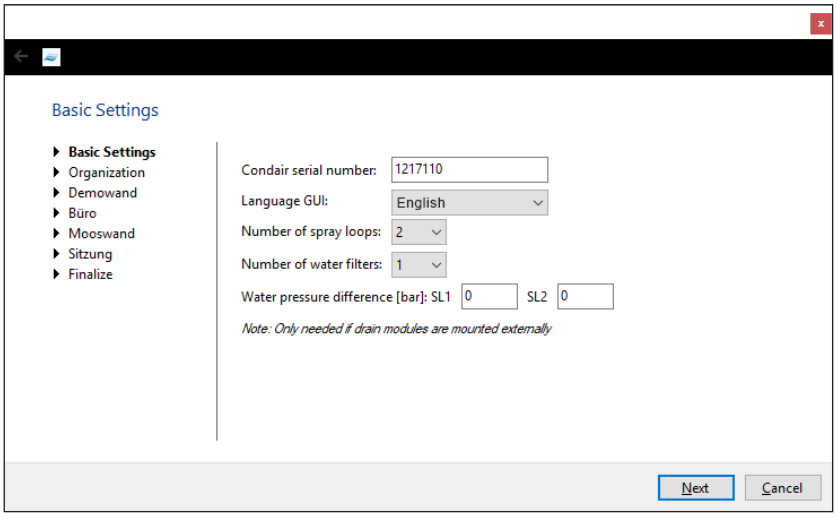


Fig. 96: Basic settings

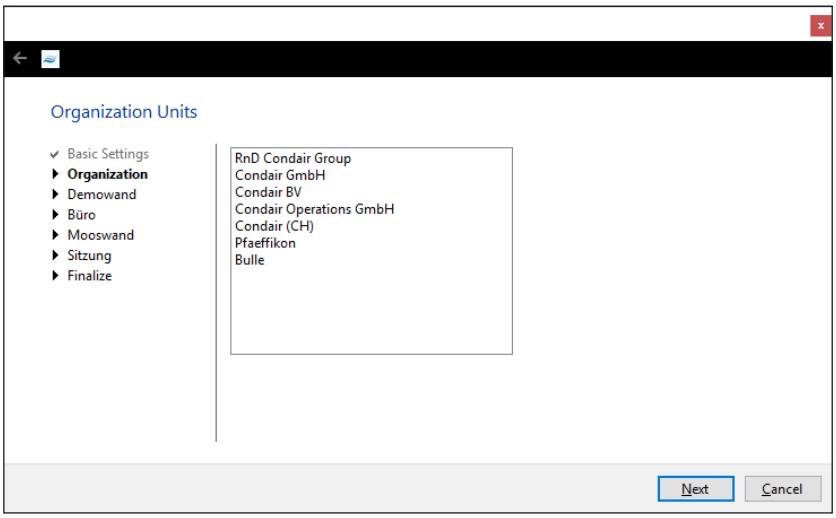


Fig. 97: Organization

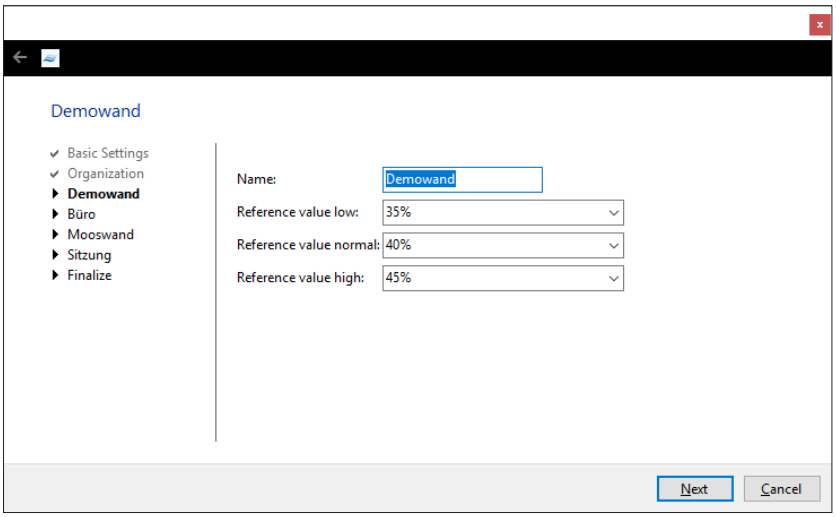


Fig. 98: Area properties

4. Turn the central unit off and unplug the power cord from the central unit.
5. Remove the front panel of the central unit.
6. Disconnect the CAN bus cable (one spray loop) or the two CAN bus cables (two spray loops) at the bottom of the ConBox from the ConBox connections.
7. Fold the connector cover down and unplug the flat ribbon cable leading to the ConBox from the ConBox.
8. Disconnect the UV lamp cable from the connector on the bottom of the ConBox.
9. Disconnect the network cable from the ConBox.
10. Loosen the two screws, slide the ConBox upwards out of the holder and remove the ConBox.
11. Install and connect new ConBox in reverse order of steps 4 to 10.
12. Update the control software (note instructions in *Section 7.4* and follow steps 6 to 13).
13. Attach and lock the front cover of the central unit.

14. Plug the mains cable of the central unit in and switch the central unit on.
15. Restart the MN Service Back-Office application on the laptop. In the MN Service Back-Of**fice application** window, establish a local connection to the central unit (double-click the "Local" icon) and select "Workflow Commissioning" (path: "Control> Commissioning...") and enter the configuration data (language, number of spray loops, number of water filters, the serial number of the system, zone designations and humidity setpoints for the zones) according to the notation in step 3. After entering all configuration data, confirm with **<Execute>**.
16. Stop the MN Service Back-Office application. Then disconnect the network cable from the central unit on the laptop and reconnect it to the gateway.

7.3.8 Replacing the spray head

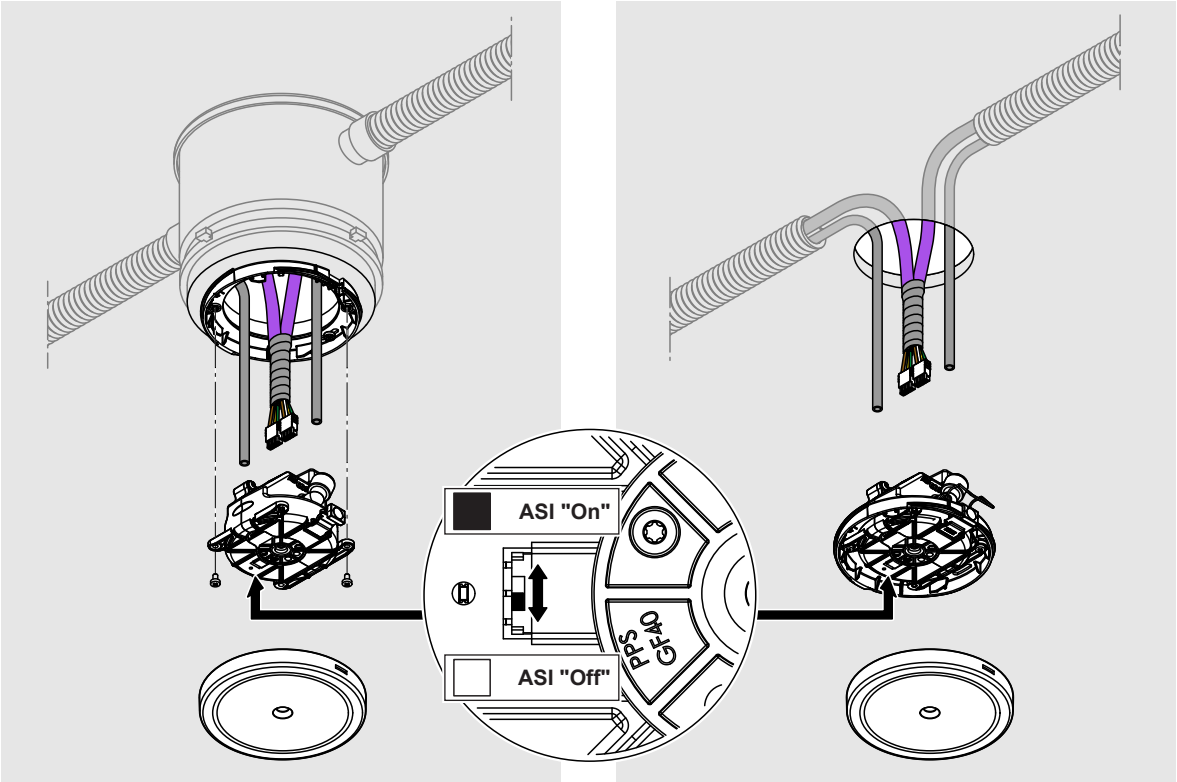


Fig. 99: Replacing the spray head (screwed spray head version on the left, pluggable spray head version on the right)

1. Prepare the system for the replacement according to *Section 7.3.3*.
2. Remove the panel (flush-mounted version) or hood (surface-mounted version) from the corresponding humidifier module.
3. Loosen the two screws (screwed version only, see *Fig. 99* left).
4. Carefully pull the spray head downwards and remove humidity sensor.
5. Disconnect the two hoses and the two CAN bus cables from the connections.
6. Remove the spray head.
   Important: Only remove one spray head at a time; otherwise water could leak out of the open hoses.
7. Plug the humidity sensor into the new spray head (see *Section 7.3.9*).
8. Set the ASI switch on the new spray head to the same position as it was on the old one.
9. Connect the two hoses and the two CAN bus cables to the new spray head.
10. Attach the new spray head with the two screws.
11. Install the panel (flush-mounted version) or hood (surface-mounted version).
12. Reset system to normal operation mode according *Section 7.3.2*.

7.3.9 Replacing the spray head's humidity sensor (HumStick)

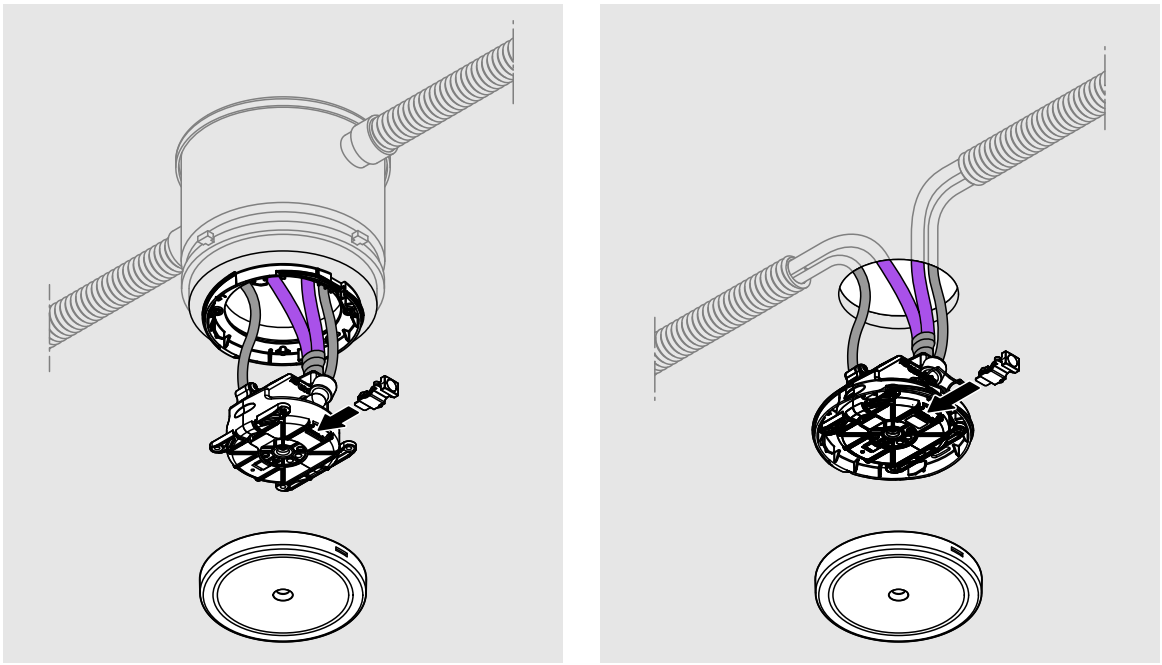


Fig. 100: Replacing the humidity sensor (screwed spray head version on the left, pluggable spray head version on the right)

1. Prepare the system for the replacement according to *Section 7.3.3*.
2. Remove the panel (flush-mounted version) or hood (surface-mounted version) from the corresponding humidifier module.
3. Loosen the two screws (screwed version only, see *Fig. 100* left).
4. Carefully pull the spray head downwards.
5. Disconnect the humidity sensor.
6. Insert the new humidity sensor.
7. Attach the spray head with the two screws.
8. Install the panel (flush-mounted version) or hood (surface-mounted version).
9. Reset system to normal operation mode according *Section 7.3.2*.

7.4 Updating the Condair MN control software

To update the control software, you will need a FAT32-formatted USB memory stick with the actual version of the control software. The new version of the control software must be at the upper level of the USB memory stick.
Note: The latest version of the control software is always sent to the local agents via WeCare. Please get in touch with your area representative in this regard.

DANGER!
Risk of electrocution

The update of the control software must be carried out with the central unit open and turned on. If the central unit is open, live parts may be touched. Touching live parts may cause severe injury or death.

For this reason: The software update may only be performed by qualified personnel who are familiar with the associated risks.

1. Remove the front panel of the central unit.
2. With the central unit switched on, plug the USB memory stick with the new version of the control software into the USB interface at the bottom of the ConBox.
3. The controller automatically detects that a USB flash drive is inserted and the following message will appear in the central unit display. Respond to the question in the negative by pressing the **<X>** button.

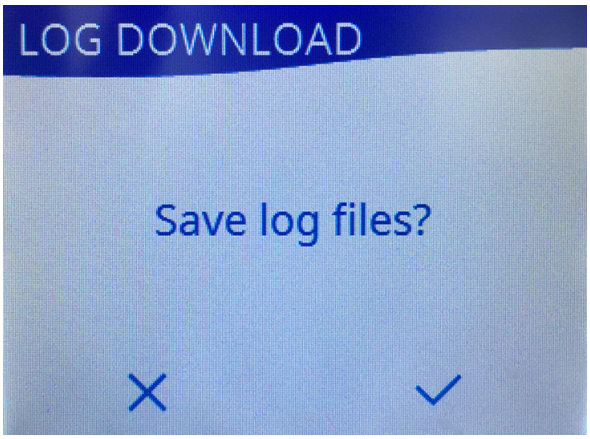


Fig. 101: Save notification system data

4. Then, a message will appear asking if you want to update the control software (if the update program is at the upper level of the USB memory stick). Respond to the question positively by pressing **<✓>**.

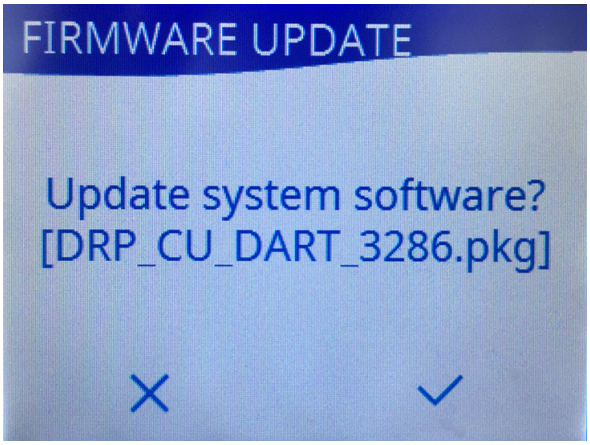


Fig. 102: Copy notification system software

The update will begin. A progress bar will appear in the display during the update process. When the process is completed, the home screen will reappear.

CAUTION!

Do not interrupt a software update once it has started. Wait for the update to finish. Damaged control software or driver disk firmware may render the system unusable.
Note: If a software update is unintentionally interrupted, the system will not run. However, the software update can be restarted, if the USB memory stick is left in the USB interface of the ConBox, and the central unit is switched off and on again. The controller will then detect that the software has not been installed correctly and will automatically restart the update process (at point 8).

5. Remove the USB memory stick.
6. Attach and lock the front cover of the central unit.

8 Malfunctions

8.1 Fault messages

Code	Message	Possible cause	Fault message / Remedy
	Water quality	The water quality no longer meets the system requirements.	(depending on the error, see below)
595	Conductivity of filter 1 too high	Water filter F1 is exhausted.	Water filter 1 is exhausted. Replace water filter 1.
596	Conductivity of filter 1 high	Water filter F1 is nearly exhausted.	Water filter 1 is soon exhausted. Plan water filter replacement.
598	Conductivity of filter 2 too high	Water filter F2 is exhausted.	Water filter 2 is exhausted. Replace water filter 2.
599	Conductivity of filter 2 high	Water filter F2 is nearly exhausted.	Water filter 2 is soon exhausted. Plan water filter replacement.
600	Conductivities of filters out of range	Conductivity value of both water filters too high.	Both water filters are exhausted. Replace water filters.
	Hydraulics	There is an error in the hydraulics.	Please contact your Condair representative.
	Electrical	There is an error in the electronics.	Please contact your Condair representative.
	Communication	There is an error in the communications.	Please contact your Condair representative.

8.2 Water system

Code	Message	Possible cause	Remedy
512	Last inlet flush is too long ago. xx days.	see *Section 8.6*	
513	Last bypass flush is too long ago. xx days.		
514	Last filter 1 flush is too long ago. xx days.		
515	Last filter 2 flush is too long ago. xx days.		
516	Last sprayloop 1 flush is too long ago. xx days.		
517	Last sprayloop 2 flush is too long ago. xx days.		
567	Leakage in. xx bar.	Damaged hose(s) between valve Y1 and Y2 or faulty hose connection(s). Valve Y2 on the valve unit is leaking.	Check hose connections between valve Y1 and Y2 and replace defective hose(s) if necessary. See *Section 8.8*
568	Leakage out. xx bar.	Damaged hose(s) between valve Y1 and Y6 or faulty hose connection(s). Valve Y6 on the valve unit is leaking.	Check hose connections between valve Y1 and Y6 and replace defective hose(s) if necessary. See *Section 8.8*
569	Leakage sprayloop 1. xx cbar.	Drain module 1 (Y9) leaking. Leakage at the spray heads of the spray loop 1. Damaged hose(s) between valve Y7 and Y9 or faulty hose connection(s).	See *Section 8.8* Check spray heads of spray loop 1, replace if necessary. Check hose connections between valve Y7 and Y9 and replace defective hose(s) if necessary.
570	Leakage sprayloop 2. xx cbar.	Drain module 2 (Y10) leaking. Leakage at the spray heads of the spray loop 2. Damaged hose(s) between valve Y8 and Y10 or faulty hose connection(s).	See *Section 8.8*. Check spray heads of spray loop 2, replace if necessary. Check hose connections between valve Y8 and Y10 and replace defective hose(s) if necessary.
571	Pipe burst in.	Hose(s) damaged or faulty hose connection(s).	Check hose connections and replace defective hose(s) if necessary.
572	Pipe burst out.	Hose(s) damaged or faulty hose connection(s).	Check hose connections and replace defective hose(s) if necessary.
573	Depressurizing in failed. xx bar.	Valve Y2 does not open or inlet valve Y1 is leaking.	See *Section 8.9*.
574	Depressurizing out failed. xx bar.	Valve Y6 does not open or inlet valve Y1 is leaking.	See *Section 8.9*.
1812	Sprayloop pipe burst detected.	Hose(s) damaged or faulty hose connection(s).	Check hose connections and replace defective hose(s) if necessary.

8.3 Hydraulic

Code	Message	Possible cause	Remedy
528	Main inlet valve.	Inlet valve is unplugged or the electrical connection to the valve has been interrupted.	Test and check connection cable; replace inlet valve if necessary.
529	Drain1 valve.	Drain valve 1 is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.
530	Flt1 valve.	Valve water filter 1 is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.
531	Flt2 valve.	Valve water filter 2 is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.
532	Bypass valve.	Bypass valve is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.
533	Drain2 valve.	Drain valve 2 is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.
536	Sprayloop 1 inlet valve.	Spray loop Inlet Valve 1 is unplugged or the electrical connection has been interrupted.	Test and check the connection cable, replace valve block if necessary.
537	Sprayloop 2 inlet valve.	Spray loop Inlet Valve 2 is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.
538	Sprayloop drain valve.	Spray loop Drain Valve 1 is unplugged or the electrical connection to the valve has been interrupted.	Test and check the connection cable, replace valve block if necessary.

8.4 Water quality

Code	Message	Possible cause	Remedy
534	UV-Lamp failed.	UV lamp does not start correctly.	Note: if the UV lamp has not ignited properly after 10 s, the error "(0x0217) 535" will occur.
535	UV-Lamp or UV-Signal failure too long.	UV lamp does not turn on after 10 s.	Check electrical connections, and replace UV lamp or replace ConBox.
560	Pressure in too low for flushing. xx cbar.	Problem in the supply network, no humidification possible.	Check inlet pipe. Replace Water Sensor Module 1 (WSM1).
561	Pressure in too high for flushing. xx cbar.	Inlet waterpressure is too high (>10 bar)	Check inlet pipe. Replace Water Sensor Module 1 (WSM1).
562	Pressure in low. xx cbar.	Problem in the supply network; no flushing possible.	Check inlet pipe. Replace Water Sensor Module 1 (WSM1).
563	Pressure in high. xx cbar.	Problem in the supply network, no humidification possible.	Check inlet pipe. Replace Water Sensor Module 1 (WSM1).
564	Pressure out out of tolerance. xx cbar.	Pressure system fault. The pressure value at Water Sensor Module 2 (WSM2) is below or above the set value.	Check inlet pressure. If necessary, adjust pressure values.
565	Pressure SL1 out of tolerance. xx cbar.	Pressure system fault. The pressure value at the drain module 1 is above or below the set value.	Check the inlet pressure at the external drain module 1 and, if necessary, adjust the pressure value under *"Control > Commands > Spray Loops > Water pressure difference SL (SL_1)"*.

Code	Message	Possible cause	Remedy
566	Pressure SL2 out of tolerance. xx cbar.	Pressure system fault. The pressure value at drain module 2 is above or below the set value.	Check the inlet pressure at the external drain module 2 and, if necessary, adjust the pressure value under *"Control > Commands > Spray Loops > Water pressure difference SL (SL_2)"*.
594	Conductivity of filter 1 too low. xx uS/cm.	Conductance of the inlet water too low or water filter 1 is exhausted.	Check conductivity of inlet water, flush water filter (start flushing cycle section 2, see *Section 9.1*), replace water filter.
595	Conductivity of filter 1 too high. xx uS/cm.	Water filter 1 is exhausted.	Replace water filter 1.
596	Conductivity of filter 1 high. xx uS/cm.	Water filter 1 is nearly exhausted.	Plan replacement of water filter 1.
597	Conductivity of filter 2 too low. xx uS/cm.	Conductance of the inlet water too low or water filter 2 is exhausted.	Check conductivity of inlet water, flush water filter (start flushing cycle section 3, see *Section 9.1*), replace water filter.
598	Conductivity of filter 2 too high. xx uS/cm.	Water filter 2 is exhausted.	Replace water filter 2
599	Conductivity of filter 2 high. xx uS/cm.	Water filter 2 is nearly exhausted.	Plan replacement of water filter 2.
600	Conductivity out of filter(s) out of range.	Conductivity value of both water filters too high.	Replace water filters 1 and 2.
608	Temperature in too low. xx cdegC.	The temperature of the inlet water is below the minimum limit of 2°C.	Check inlet pipe. Replace Water Sensor Module 1 (WSM1).
609	Temperature in too high. xx cdegC.	Temperature of the inlet water is above the maximum limit of 30°C.	Check inlet pipe. Replace Water Sensor Module 1 (WSM1).
611	Temperature out too low. xx cdegC.	Temperature of the water downstream of the water filter is below the minimum limit of 2°C.	Possible sensor defect. Temperature already detected at "Temperature in 0x0260"
612	Temperature out too high. xx cdegC.	Temperature of the water after the water filter is above the maximum limit of 30°C even after several automatic flushes.	Generate water consumption (start flushing cycle section 2, see *Section 9.1*) and wait briefly until the temperature drops. If necessary, replace the sensor on the water sensor modules.
625	Conductivity out sensor error.	Sensor error Section 2, no values possible	Replace Water Sensor Module 2 (WSM2)
626	Temperature in sensor error.	Sensor error Section 1, no values possible	Replace Water Sensor Module 1 (WSM1)
627	Temperature out sensor error.	Sensor error Section 2, no values possible	Replace Water Sensor Module 2 (WSM2)
628	Presssure in sensor error.	Sensor error Section 1, no values possible	Replace Water Sensor Module 1 (WSM1)
629	Presssure out sensor error.	Sensor error Section 2, no values possible	Replace Water Sensor Module 2 (WSM2)

8.5 Electronics

Code	Message	Possible cause	Remedy
259	Init CAN Slave failed.	Fault on system master (hardware). This software error only appears during the initial commissioning or during a software update.	Replace ConBox.
260	Init ethernet failed.		
261	Init HUB failed.		
262	Init WAT failed.		
263	Init UPD failed.		
264	Init USB failed.		
267	Init GUI failed.		
268	Init HTTPD failed.		
272	Sprayloop is adapted but not configured.	There are two spray loops connected to the system, but the system is configured for only one spray loop.	Change configuration to two spray loops or remove CAN bus cable from connection "SL2" and then plug in "SL1".
273	Sprayloop is empty but configured.	Spray loop is not configured or the spray loop CAN bus cable is not connected to the ConBox.	Configure the spray loop or check the connection of the spray loop CAN bus cable to the ConBox.
274	Sprayloop valve is adapted but not configured.	The valve for the second spray loop is not configured but is connected.	Adapt configuration or install correct valve block.
275	Filter valve is adapted but not configured.	The valve for the second water filter is not configured but is connected.	Adapt configuration or install correct valve block.
768	CAN emerg. xx.	Failed CAN bus communication.	Analyse log file to locate the exact error.
769	SAB fault. xx.	Failed SAB communication.	Replace corresponding component(s) (water sensor module 1/2, ConBox).
800	Supply voltage.	Voltage on the SM 40 V is not correct.	Replace ConBox.
1024	Flash.	FLASH does not respond.	Analyse the log file to locate the causative error. Check log file to find components.
1025	OTP.	OTP (One Time Programming) values incorrectly written or not written to the hardware of the components.	Replace corresponding component(s) (water sensor module 1/2, ConBox etc.). Search in the log file.
1027	Fault. ID: xx.	Component with corresponding ID has a hardware or software error.	Replace the corresponding component.
1028	Fault. Addr: xx.	Component with corresponding address has a hardware or software error.	Replace the corresponding component.
1029	Sprayloop enumeration.	Numbering of the spray heads failed: CAN bus connection interrupted, spray head wet or defective.	Check CAN bus connections and spray heads. Replace spray heads if necessary.
1030	Sprayloop configuration.	Problem with the configuration of the spray loop(s).	Replace appropriate components (spray heads, drain module, ConBox, cable).
1031	Sprayloop no termination node found.	Drain module is not recognized. Node-1 is spray head number. Drain module is not connected or defective or the CAN bus chain is not complete.	Check/ correctly connect CAN bus connections. Check drain module, replace if necessary.
1032	Sprayloop enumeration power. xx mW.	45 W power is not in the permissible range.	Check components (flashing on the spray head, on the drain module), replace ConBox if necessary.
1033	Sprayloop power consumption. xx mW.	50 W power is not in the permissible range.	Check components (flashing on the spray head, on the drain module), replace ConBox if necessary.

Code	Message	Possible cause	Remedy
1034	Sprayloop short-circuited.	Short circuit detected on CAN bus. Short circuit on at least one component.	Check wires (cables) and components.
1035	Sprayloop voltage too low.	Excessive voltage drop in the CAN bus chain (cable too long, faulty component or defective power supply), short circuit, possibly water in the CAN bus connector.	Check cable length (max. ? m) Check CAN bus connector. Replace faulty component(s).
1152	Air Hum Temp Sensor.	All humidity sensors of the spray heads in a zone are deactivated.	Activate, insert or replace sensors.
1157	Internal Voltage.	Short circuit in spray head or spray loop	Check the spray head and examine the spray loop for a short circuit. Replace spray head.
1284	SAB: Slave missing.	Connection between the driver board in the ConBox and the water sensor modules interrupted.	Check the connection between the driver board and the water sensor modules.
1285	SAB: Slave wrong id.	ID problem with the SAB chain.	Check the rotary switch on the water sensor module(s). Position 1 or 2 set.
1286	SAB: Slave version incompatible.	Rotary switch and DIP switch on the water sensor module(s) incorrectly configured, water sensor module(s) not connected or defective.	Check the rotary switch and DIP switch on the water sensor module(s) (see *Section 7.3.3*). Check/correctly connect the cabling of the water sensor module(s). If necessary, replace water sensor module(s) (see *Section 7.3.3*).
1287	SAB: Slave retry error.		
1288	SAB: Slave: Keepalive missing.		
1289	SAB: Slave address changed.		
1290	SAB: Driverboard 24V supply fault.		
1291	SAB: 5V supply fault.		
1292	SAB: Ref/2 supply fault.		
1293	SAB: EEPROM read/write fault.		
1295	SAB: Could not load DB config.		
1296	SAB: 48V supply fault.		
1298	SAB: 40V supply fault.		
1299	SAB: 40V supply current fault.		
1300	SAB: 3V3 supply fault.		
1301	SAB: Flash read / write fault		
1302	SAB: OTP invalid		
1303	SAB: Firmware update failed		
1537	Watchdog occured. Client ID: xx.	Restart due to internal error	None.
1792	Sprayloop pressure Sensor Error.	Drucksensor im Entleerungsmodul defekt. Hinweis: Der Sprükreis wird drucklos gemacht.	Replace drain module.
1793	Sprayhead Level Detection Absent.	Flat ribbon cable of the level board in the spray head not connected. Note: The spray loop is depressurized.	Check/plug in the flat ribbon cable of the level board or replace the spray head if necessary.
1794	Persistent Sprayhead Level Detection.	Error appears after a certain time after error 1797 occurs.	See *Section 8.7*.
1795	Persistent Sprayhead Reservoir overfilled.	Error appears if the automatic test failed after error 1797 occurred. Note: The spray loop is depressurized.	See *Section 8.7*.
1796	Sprayhead Mesh.	Fault at the atomiser membrane	Replace spray head.

Code	Message	Possible cause	Remedy
1797	Transient Sprayhead Level Detection.	Only the upper but not the lower level in the reservoir is recorded. Drops of water on the level board of the spray head or level board defective. Note: The spray loop is depressurized and the reservoir is emptied.	Check the level board in the spray head. Replace spray head if necessary.
1798	Transient Sprayhead Reservoir overfilled.	Valve in spray head leaking. Note: The upper level is detected for 1 second. The spray loop is automatically depressurized and the reservoir is emptied. The spray loop is then pressurized again. No level may be detected within 5 minutes. If the test is passed, the system continues to run normally.	If test fails, see error 1795.
1808	Sprayhead Reservoir Valve.	Valve in spray head not connected. The corresponding spray head is in error status, the other spray heads in the spray loop continue to run normally.	Connect or replace spray head.
1809	Sprayhead Reservoir Filling.	The valve in the spray head does not open or does not open correctly, the sinter filter is clogged or there is a problem with the water pressure in the spray loop. Note: Demand present, but lower reservoir level is not reached after 120 seconds. The corresponding spray head is in error status, the other spray heads in the spray loop continue to run normally.	See *Section 8.7*.
1810	Sprayhead Reservoir Emptying.	The reservoir will not empty after 90 seconds without demand. The corresponding spray head is in error status, the other spray heads in the spray loop continue to run normally. Malfunction of the valve in the spray head or the atomizer membrane is defective or there is an air bubble over the atomizer membrane.	See *Section 8.7*.
1813	Persistent Sprayhead Reservoir is not empty.	2x water detected, although the reservoir was previously emptied. The valve in the spray head is leaking	See *Section 8.7*.
1814	Transient Sprayhead Reservoir is not empty.	1x water detected although the reservoir was previously emptied. The valve in the spray head is leaking	See *Section 8.7*.
2048	KNX setpoint missing.	No connection to the KNX or setpoint sent less than every 10 minutes.	Check/establish connection to the KNX.

8.6 Re-commissioning process of the Condair MN after error message "Last xxx flush too long ago" (last flush more than 48 hours ago)

8.6.1 Fault messages "Last xxx flush too long ago"

Code	Message	Possible cause	Remedy
(0x0200) 512	Last inlet flush is too long ago. xx days.	Section 1 (see *Section 9.1*) has not been flushed for more than 48 hours. The cause lies in the hydraulics system or in the electronics.	Identify cause of system failure. Proceed according to *Section 8.6.2* and *Section 8.6.3*.
(0x0201) 513	Last bypass flush is too long ago. xx days.	Section 3 (see *Section 9.1*) has not been flushed for more than 48 hours. The cause lies in the hydraulics system or in the electronics.	Identify cause of system failure. Proceed according to *Section 8.6.2* and *Section 8.6.3*.
(0x0202) 514	Last filter 1 flush is too long ago. xx days.	Section 2 (see *Section 9.1*) has not been flushed for more than 48 hours. The cause lies in the hydraulics system or in the electronics.	Identify cause of system failure. Proceed according to *Section 8.6.2* and *Section 8.6.3*.
(0x0203) 515	Last filter 2 flush is too long ago. xx days.	Section 3 (see *Section 9.1*) has not been flushed for more than 48 hours. The cause lies in the hydraulics system or in the electronics.	Identify cause of system failure. Proceed according to *Section 8.6.2* and *Section 8.6.3*.
(0x0204) 516	Last sprayloop 1 flush is too long ago. xx days.	Section 5 (see *Section 9.1*) has not been flushed for more than 48 hours. The cause lies in the hydraulics system or in the electronics.	Identify cause of system failure. Proceed according to *Section 8.6.2* and *Section 8.6.3*.
(0x0205) 517	Last sprayloop 2 flush is too long ago. xx days.	Section 6 (see *Section 9.1*) has not been flushed for more than 48 hours. The cause lies in the hydraulics system or in the electronics.	Identify cause of system failure. Proceed according to *Section 8.6.2* and *Section 8.6.3*.

Legend:
- IN = Inlet (Section 1)
- BYP = Bypass (Section 4)
- F1 = Water filter 1 (Section 2)
- F2 = Water filter 2 (Section 3)
- SL1 = Spray loop 1 (Section 5)
- SL2 = Spray loop 1 (Section 6)

8.6.2 Possible causes of the fault messages "Last xxx flush too long ago"

1. Power interruption for more than 48 h:
   a) A power failure has occurred.
   b) The user has switched off the main fuse (example: holiday house).
   c) The user accidentally switched off the system.
2. If a power interruption was not the cause, this will be displayed in the "Pending events" in the system window of the MN Service Back-Office application. Generally, these are the following causes:
   a) "Pressure in too low for flushing" (Error 560) or "Pressure in too low" (Error 562)
   b) A leak was detected (Errors 567 – 572)
   c) Electrical problem in the spray loop (Errors 1029 – 1035)

8.6.3 Measures

If a system has not been flushed for more than 48 hours, proceed as follows:

1. Find and eliminate the cause of the failure to flush.
2. Take a water sample on site according to the information in *Section 7.1.1*. The water sample must be sent immediately to an accredited laboratory. The laboratory sends the results for evaluation and collection of experience values to the Condair Group AG in Pfäffikon.
3. Disinfect the system immediately according to the information in *Section 7.1.5*.

DANGER!

A system that has not been flushed for more than 48 hours may no longer be put into operation without prior disinfection.

4. Put the system back into operation.

8.7 Procedure for troubleshooting spray head errors 1794, 1795, 1809, 1810 and 1813

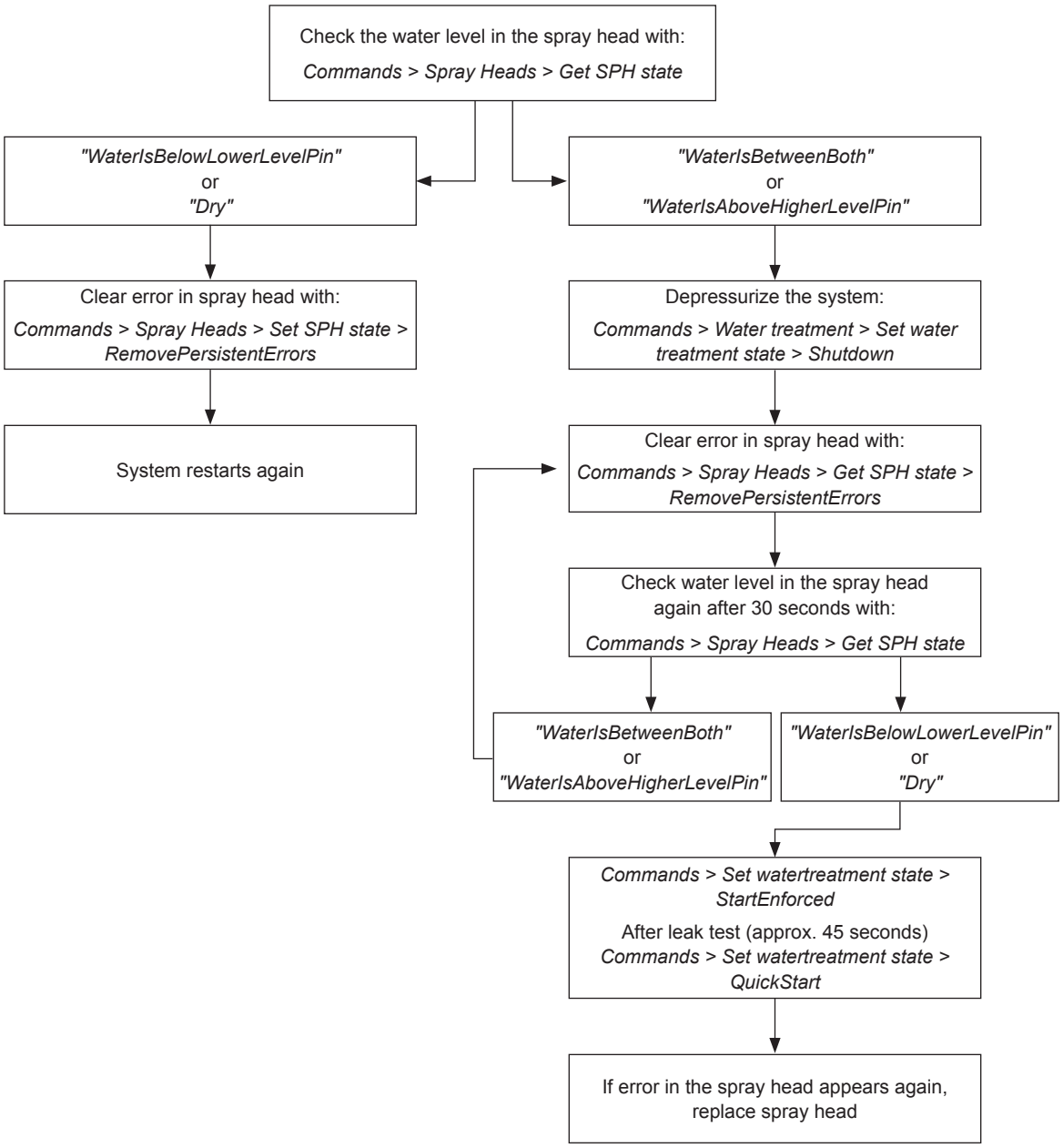
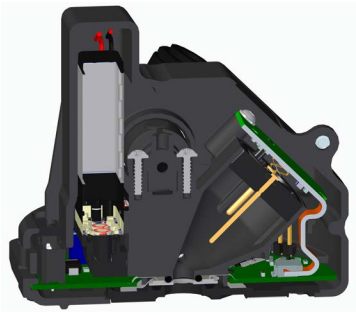


Fig. 103: Flow chart troubleshooting spray head error

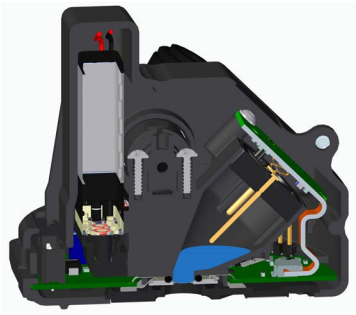
Detected water levels in the spray head reservoir



No water in the reservoir

Reservoir status: *"Dry"*

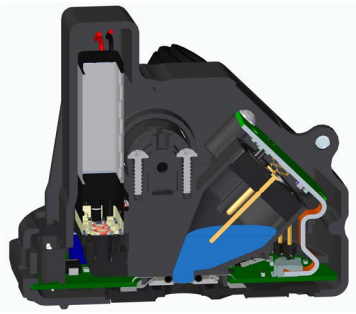
No demand present.



Water level below the lower pin.

Reservoir status: *"WaterIsBelowLowerLevelPin"*

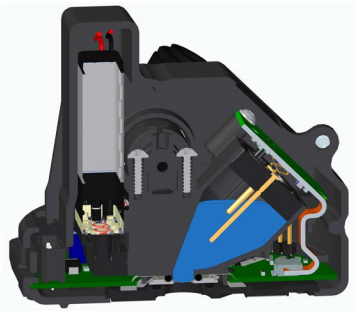
Demand present, Reservoir is being filled.



Water level between lower and upper pin.

Reservoir status: *"WaterIsBetweenBoth"*

Request present, spray head in normal status: Only the longer pin is touched.



Water level above upper pin

Reservoir status*: "WaterIsAboveHigherLevelPin"*

Spray head in the "Overfilled" status: Both pins are touched.

Spray head in "Error Reading Level" status: Both pins are touched, but only the upper one is read.

Note: The "Error Reading Level" status can also occur if there are drops on the spray head level board. In this case, wait 3 hours and reset the error.

Fig. 104:Detected water levels in the spray head reservoir

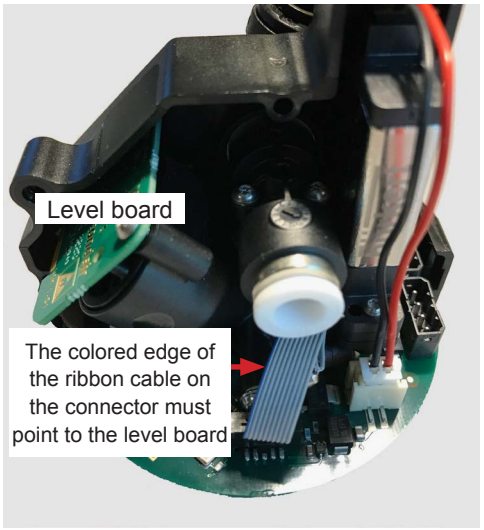
A possible reason for triggering an "overfilled", "reservoir emptying" or "error reading level" can be an incorrectly installed ribbon cable in the spray head. To check the cable in the spray head, proceed as follows:

Depressurize and de-energize the MN system.

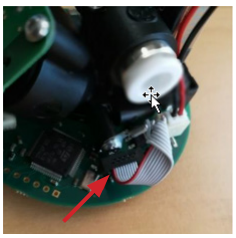
Loosen and remove the Torx screw (TX10) on the spray head housing divider.

Remove the JG elbow on the screw head side.

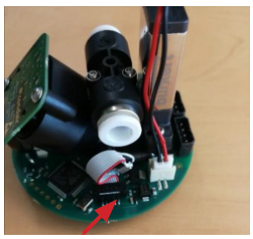
Important: Use only the appropriate JG tool to avoid burring the sealing surface.



The housing can now be carefully opened and the cable checked.



correct



wrong

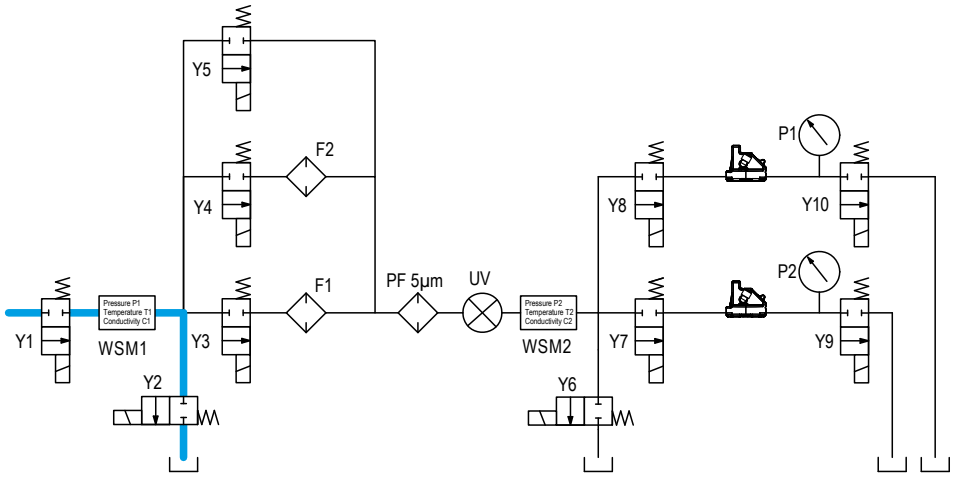
If the colored edge of the ribbon cable on the plug points to the valve, the cable must be unplugged, the plug rotated 180° and plugged in again.

If the error occurs even though the ribbon cable is correctly connected, the spray head must be replaced.

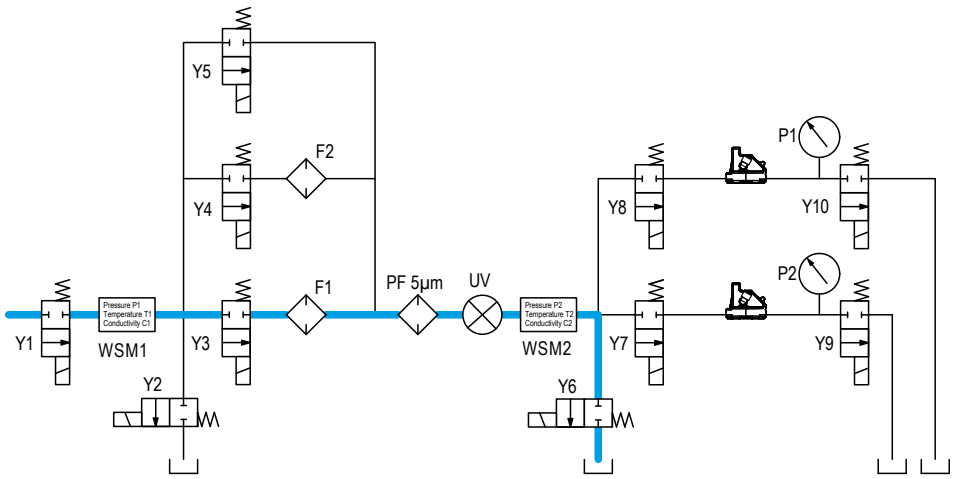
8.8 Procedure for troubleshooting leakage errors 567, 568, 569 and 570

For leakage errors "567 - Leakage In", "568 - Leakage Out", "569 - Leakage SL1" and "570 - Leakage SL2", proceed as follows:

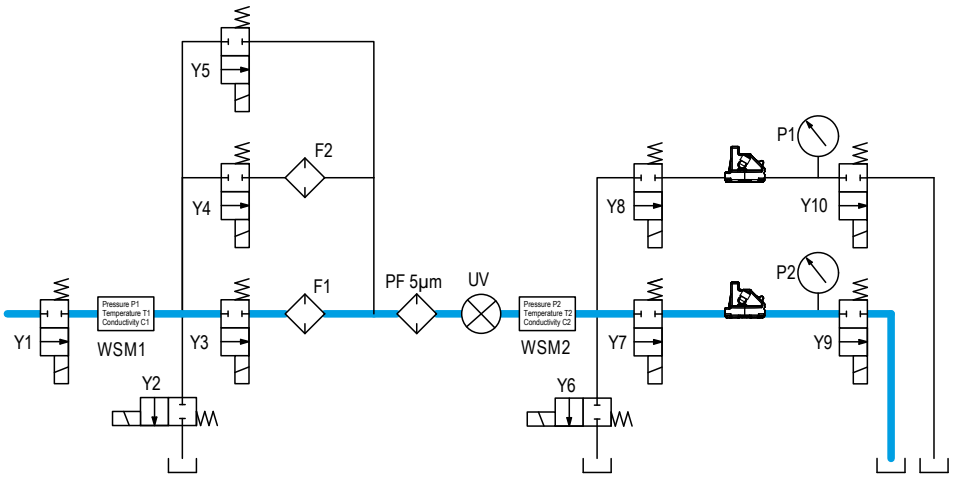
- Switch off the system with the command *"Commands > Water treatment > Water treatment state > Shutdown"*.
- Pressurize the affected section by opening the appropriate valves under *"Commands > Water valves > State water valve > Yn"*. Then try to flush any particles out of the valve by multiple opening and closing (up to 20 times) the corresponding valve several times.
  - "567 - Leakage In": Open Y1. Then open and close Y2



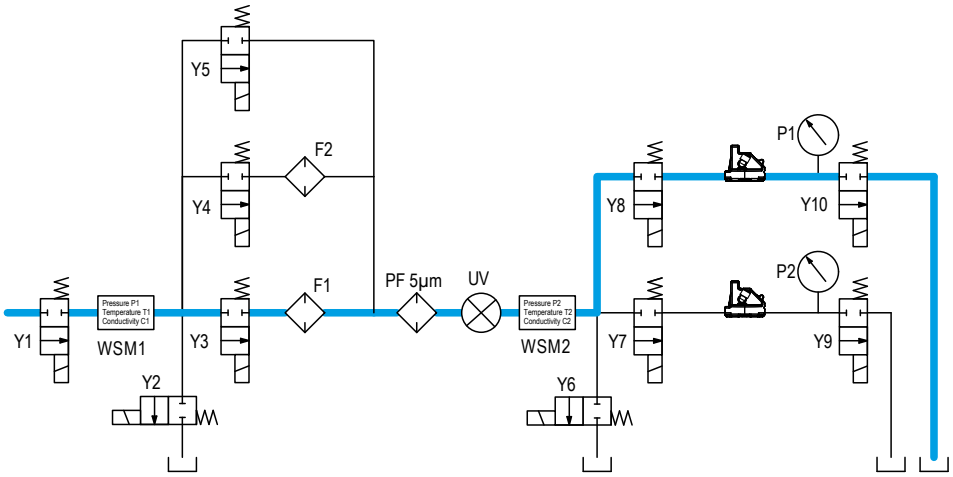
  - "568 - Leakage Out": Open Y1 and Y3. Then open and close Y6



– "569 - Leakage SL1": Open Y1, Y3 and Y7. Then open and close Y9



– "570 - Leakage SL2": Open Y1, Y3 and Y8. Then open and close Y10



- If this procedure does not help and the corresponding error occurs again, the relevant valve Y2 or Y6 on the valve unit or the relevant drainage module DM1 (Y9) or DM2 (Y10) must be replaced.

8.9 Procedure for troubleshooting errors 573 and 574

The errors "573 - Depressurized In" and "574 - Depressurized Out" usually indicate a leaking inlet valve (Y1). To verify this, proceed as follows:

- Switch off the system with the command *"Commands > Water treatment > Water treatment state > Shutdown"* .

  If the system is in the "Depressed shutdown" status, the system is depressurized and all valves are closed. If the pressure in the "Water treatment" display register of the system window rises again, the inlet valve is leaking and must be replaced.

8.10 Procedure for troubleshooting errors 534 and 535

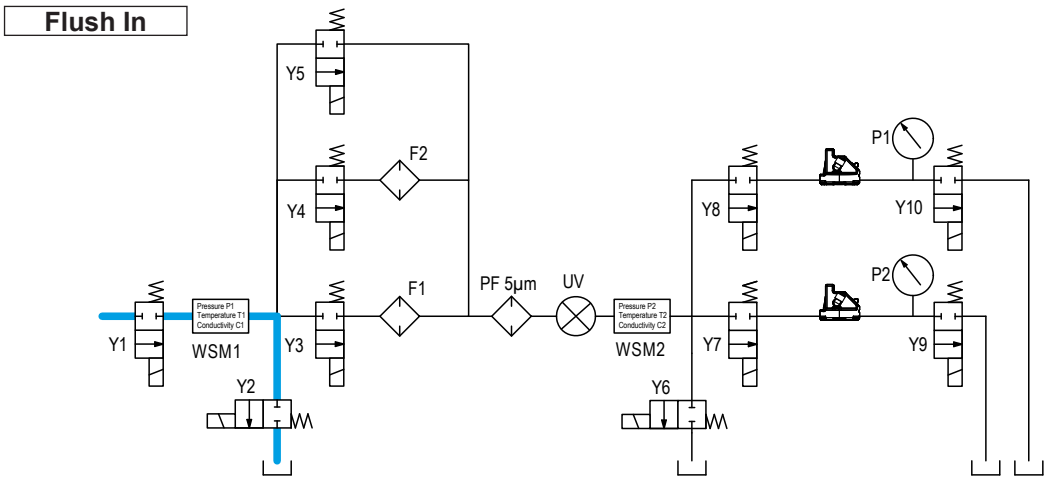
The errors "534 - UV_lamp" and "535 - UV_lamp unhandled" occur because the UV lamp sometimes only starts up after the system has been switched off and on several times. The system sometimes has to be switched off and on again up to 10 times. To power cycle the system, proceed as follows:

- Switch off the system in the command wizard of the MN Service Back-Office application with the command *"Commands > Water treatment > Water treatment state > Shutdown"*.
- *If the system is switched off, switch the system back on with the command "Commands > Water treatment > Water treatment state > Start enforced"*.
- Repeat this process until the UV lamp lights up.

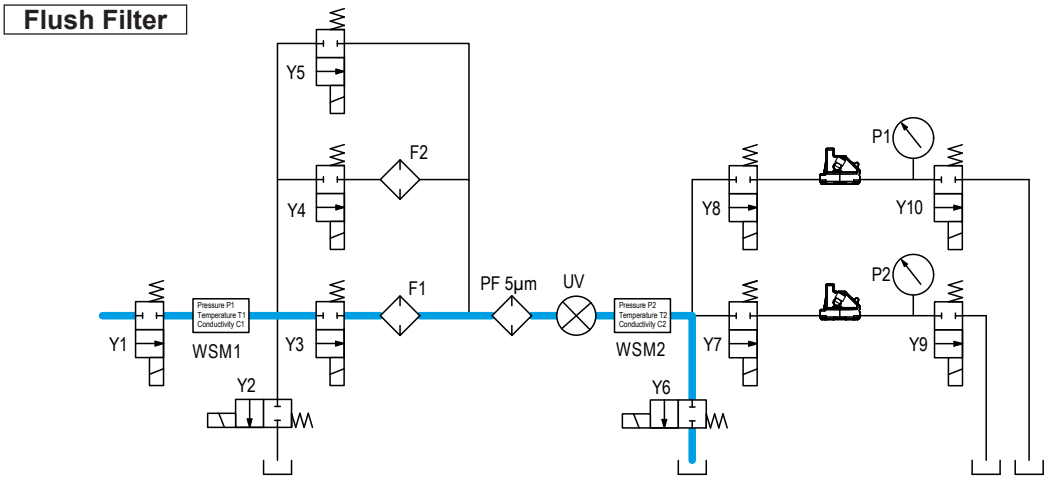
9 Appendix

9.1 Flushing section determination

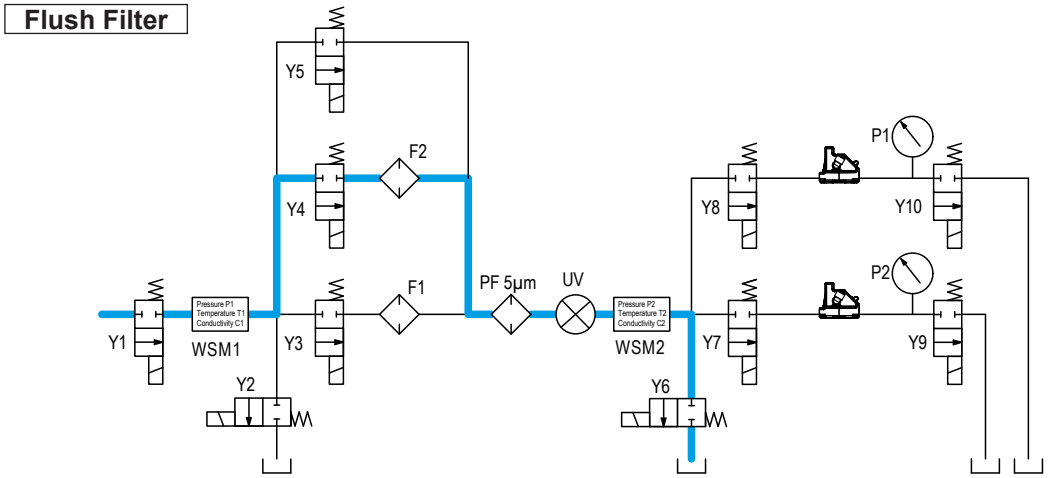
Flushing sections	Open valves
Section 1	Y1+Y2



Section 2 (via water filter 1)	Y1+Y3+Y6

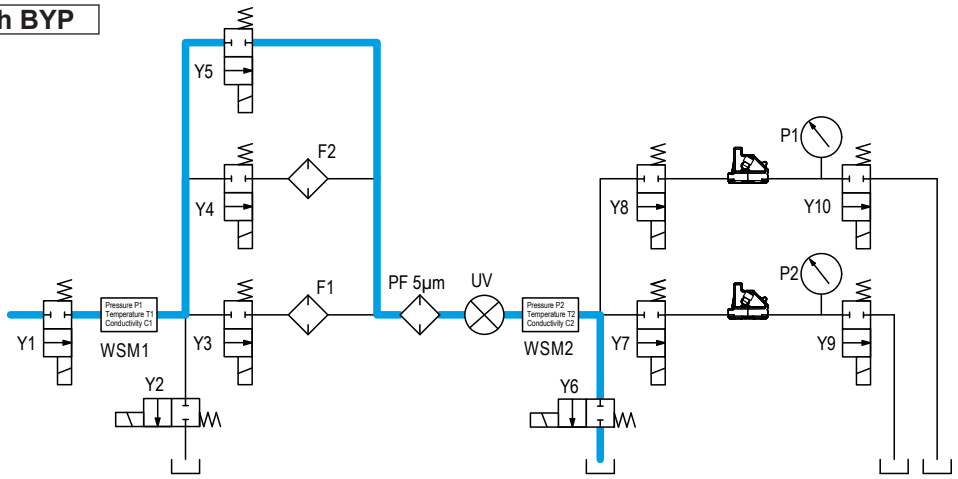


Section 3 (via water filter 2)	Y1+Y4+Y6



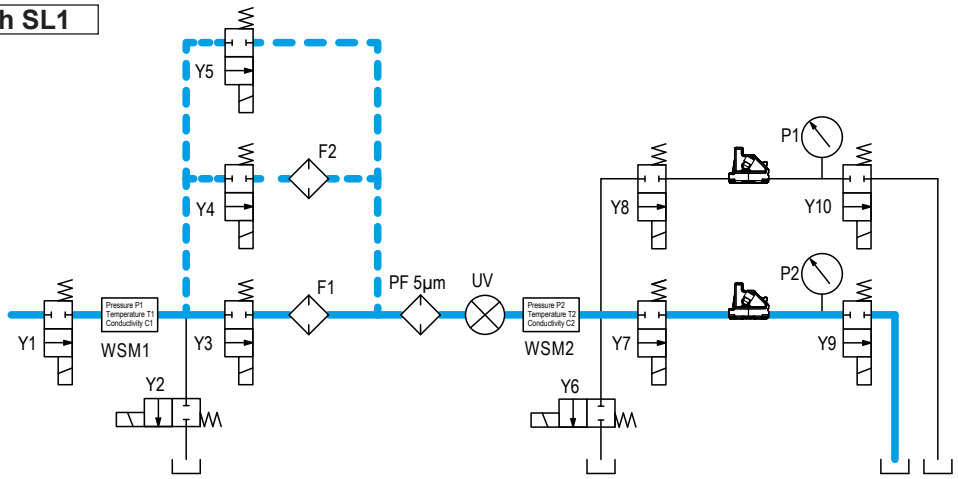
Section 4 (via bypass)	Y1+Y5+Y6

Flush BYP



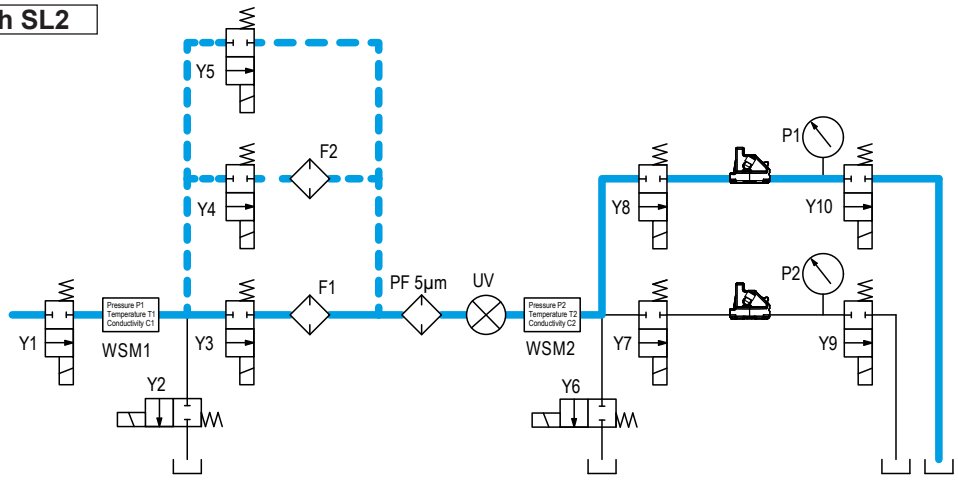
Section spray loop 1	Y1+Yx+Y7+Y9 "x" stands for Y3 or Y4 (system will select the master water filter here)

Flush SL1



Section spray loop 2	Y1+Yx+Y8++Y10 "x" stands for Y3 or Y4 (system will select the master water filter here)

Flush SL2



Starting position: To flush a flushing section, only the specified valves should be opened. All other valves remain closed.

9.2 Tools, kits, software and materials needed for commissioning and service

The following tools, kits, software and materials must be carried by the service technician for commissioning and servicing the Condair MN.

- Standard Tool Case
- Hardware: Laptop or tablet with Ethernet connection and Windows 7 or higher
- Software:
  - MN Service Back-Office application Humilife MN on laptop or tablet
  - Latest firmware for control software update on USB stick
- Special tools:

	Multimeter for verification of the electrical installation
	Hand air pump for leak test
	Dismantling tool (e.g. Jokari)
	Crimping pliers (e.g. Knipex 975314)
	Electronics side cutter
	Channellock/waterpump pliers

	Flat blade screwdriver 0.23 x 1.5
	Wire strippers (e.g. Weidmüller Stripex)
	John Guest hose cutter
	John Guest hose connector release tool
	0.26 US gal (1 liter) measuring jug for evaluation of the system

- Two JG ø0.24" (ø6 mm) straight connectors (1 per filter)
- 10 ft. (3 m) JG hose ø0.24" (ø6 mm)
- Circulation pump with On/Off switch (Recommendation: Renkforce garden pump, 1100 W, 1215 US gal/h (4600 l/h), 65.2 psi (450 kPa))
  Attention: The maximum pump pressure must not exceed 72.5 psi (500 kPa)!
- Sanosil S015 container
- Water sampling kit consisting of:
  - Paper towels
  - 2 sterile sample containers with 0.066 US gal (0.25 l) capacity
  - Styrofoam cooling box
  - 2 cooling pads
  - Adhesive tape
  - Document folder with order document and address of the laboratory
- Standard spare parts set according to definition

Notes

Notes

Warranty

Condair Inc. or Condair Ltd. (depending on the entity that supplied the product, and hereinafter collectively referred to as CONDAIR) warrant for a period of two years after installation or 30 months from the manufacturer's ship date, whichever date is earlier, that CONDAIR's manufactured and assembled products, not otherwise expressly warranted, are free from defects in materials and workmanship. Notwithstanding the foregoing, the products listed below have an alternate warranty period:

- GSTC Series heat exchanger(s) are warranted to be free from defects in materials and workmanship for a period of 3 years from installation or 40 months from the manufacturer's ship date, whichever is earlier.
- SAM-e Short Absorption Manifolds, except for the coupling seals, are warranted to be free from defects in materials and workmanship for a total period of 10 years from the manufacturer's ship date.
- Humilife RH humidifiers are warranted to be free from defects in materials and workmanship for a period of 5 years from the manufacturer's ship date. CONDAIR may, at its discretion, replace individual components or Humilife RH units as a whole.
- Spare Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.
- No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

CONDAIR's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. CONDAIR's factory. The replacement parts are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer. Procedure:

1. Customer Requests Warranty as per instructions on the CONDAIR Warranty Form.
2. CONDAIR reviews the warranty claim and will respond in one of two ways:
    a. Warranty Accepted – Replacement Part or credit granted.
    b. Warranty Declined – Response with justification will be provided to the customer.
3. In some cases, CONDAIR may request the part to be returned, freight prepaid by the customer, as part of the warranty acceptance or warranty determination process. Some reasons include:
    a. Part must be analyzed to determine the root cause of failure.
    b. Part must be returned to the supplier for claim/investigation.

    When parts are requested to be returned, replacement parts will be sent by CONDAIR to the customer against an invoice from CONDAIR paid by the customer. The cost of the replacement parts will be reimbursed to the customer with a credit note after the parts are received and analyzed by CONDAIR, if the warranty is accepted.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to CONDAIR until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty, with the exception of a purchased extended warranty described below, must be in writing, and signed by an officer of CONDAIR.

CONDAIR makes no warranty and assumes no liability unless the equipment is installed in strict accordance with the installation manual in effect at the date of purchase, and by properly qualified and licensed professionals capable of installing such equipment.

CONDAIR makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing, or lack of proper maintenance of the equipment.

CONDAIR makes no warranty and assumes no liability whatsoever for damage to the products, humidifier, supply lines, drain lines, steam distribution systems, or the building as a whole caused by freezing.

CONDAIR reserves the right to change the design, specifications, and performance criteria of its products without notice or obligation.

Extended Warranty

Extended warranties are available to purchase under the conditions listed above. Extended warranties must be purchased at the time of the original equipment order.

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