GF Piping Systems

Hycleen Automation System User Guide

Version 2.0

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1 About this document

1.1 Follow the instruction manual

The instruction manual is part of the product and an important element within the safety concept.

- ⇨ Read and observe instruction manual.
- ⇨ Always have instruction manual available by the product.
- ⇨ Give instruction manual to all subsequent users of the product.

1.2 Symbols used in this manual

Safety-relevant information is labeled in this document by the following symbols and signal words:

⚠ CAUTION

Risk of injury!

Non-observance may lead to physical injury!

- ⇨ Remedy

NOTICE

Risk of material damage!

Non-observance may lead to material damage (loss of time, loss of data, machine defects, etc.)!

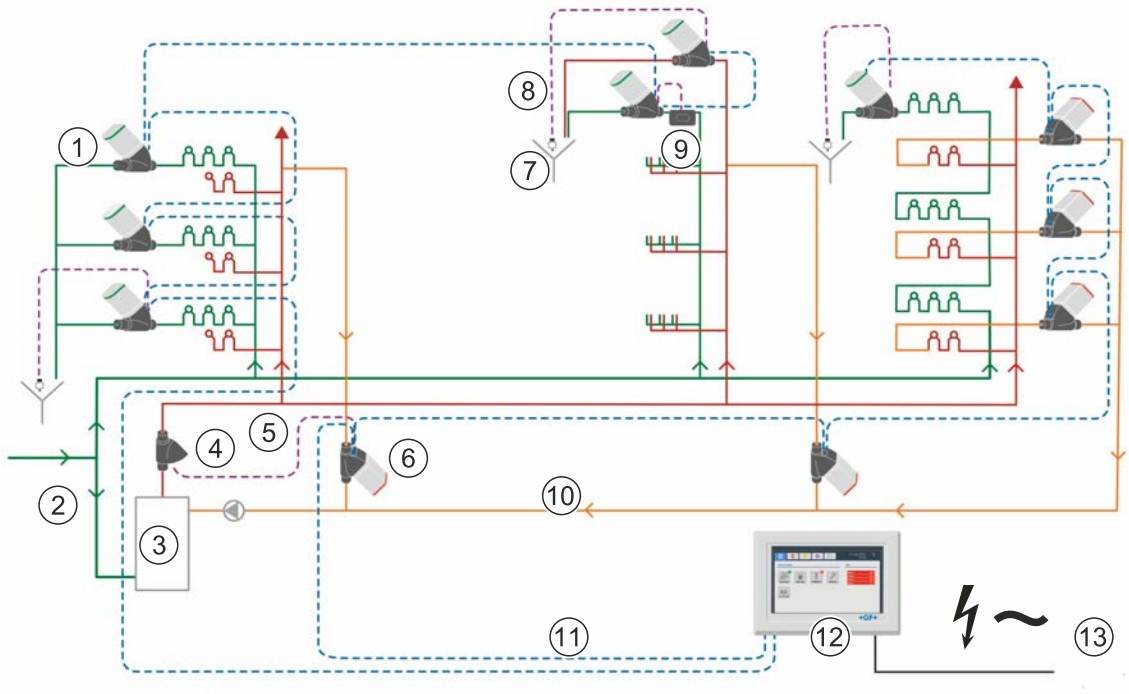
- ⇨ Remedy

Descriptive text

- ⇨ Instructions for conduct
  - ⇨ Reaction of the system

2 System Overview

2.1 Sample system



The sample system shows water supply with 3 cold water pipes and 5 hot water circulations.

1	Valve LegioTherm K	8	Sensor cable
2	Cold water pipe	9	Flow sensor
3	Water heater	10	Return line (hot water)
4	Temperature Sensor	11	Power supply and communication cable
5	Feed line (hot water)	12	Master
6	Valve LegioTherm 2T	13	External power supply
7	Run off monitoring system		

2.2 Operating principle

The hot water and cold water circulations contain valves of the types **LegioTherm K** and **LegioTherm 2T**. The latter serves hydraulic alignment (circulation system).

Both circulations can be rinsed. The rinse water runs into a drain.

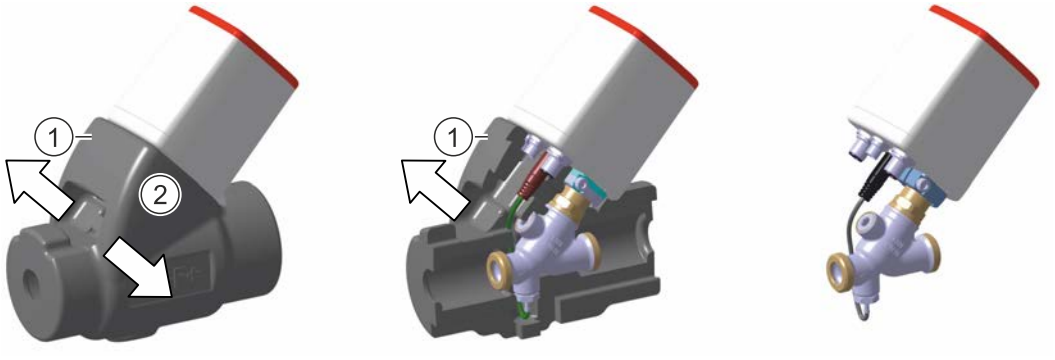
The LegioTherm valves are equipped with a temperature sensor.

All valves are connected with the **master** via power supply and communication cables serially (i.e. not radial!), which also supplies them with power. The master controls the opening angle of the valves according to its programming, taking into account the connected sensors and creates log data in the form of protocols.

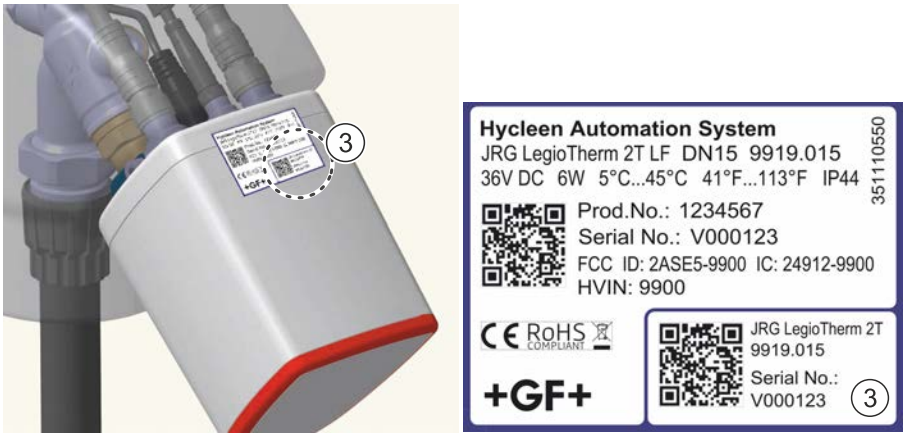
After the valves are installed according to their operating instructions, they only must be **connected** to Hycleen Automation power supply and communication cables. The power supplied by the master via these connection cables. For cable lengths of more than 300 m and additional**Hycleen Automation Powerbox** is required. Via its 2 cable connections, a master with 2 power boxes can supply and control up to 1,000 m cable length.

3 Installation

The insulation of the valves must be removed for cabling the valves.



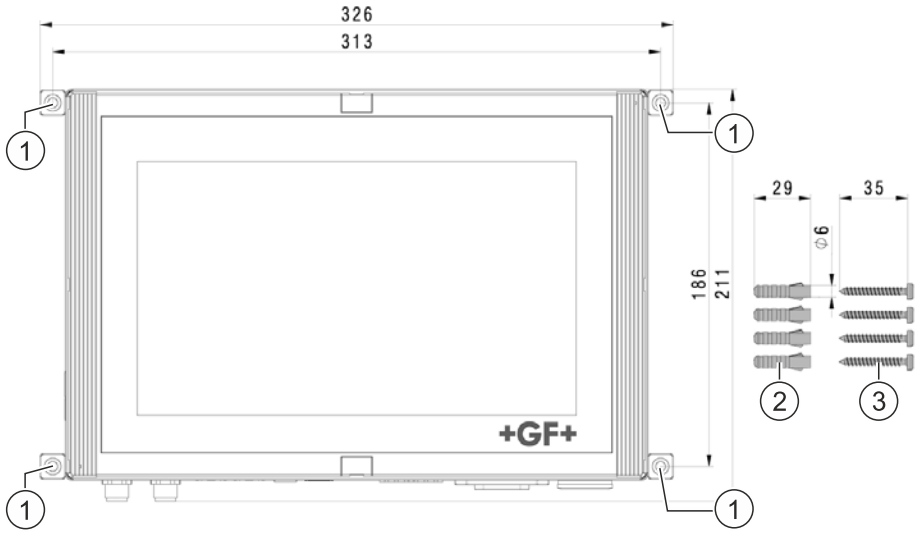
- ⇨ To remove the insulation, carefully pull apart both parts (1, 2). Make sure that the temperature sensor cable is not detached or damaged.
- ⇨ Put the insulation aside for later assembly.



After assembling each valve, remove the detachable part (3) of the label from the valve and stick it in the installation plan. This part contains information about the valve type, serial number and size etc., and serves the subsequent identification of the valve in the installation plan.

3.1 Mounting master on the wall

The housing of the master is attached to the wall using 4 eyelets (1).



- ⇨ Drill 4 dowel holes with a diameter of 6 mm into the wall according to dimensional drawing and insert the supplied dowels (2).
- ⇨ Use a Phillips screwdriver to screw on the master with the 4 screws provided (3).

3.2 Cabling master with valves

The **connecting cables** include 2 lines for the voltage supply and 2 signal lines. The two cable ends are equipped with the same female plug-in connectors. They are secured to prevent rotation and their M12 knurled screws ensure a reliable hold, even in harsh environments.

NOTICE

Non-approved components can cause malfunctions!

Components must not be modified and connecting cables or distributors for star topology cabling must not be installed at any time!

- ⇨ Always interconnect master, valves and, where required, powerboxes in series, i.e. one behind the other, to the components specified by the manufacturer!

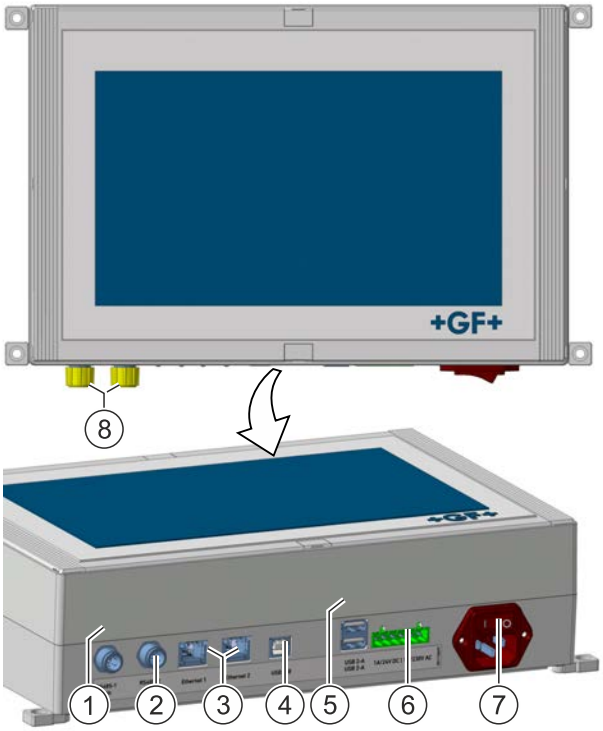
NOTICE

Sub-standard assembly can cause malfunctions!

If the cabling is carried out with the power supply switched on, this could cause damage to the electronic components!

⇨ Make sure that neither the master nor powerbox(es) are supplied with voltage while cabling!

Connecting master



⇨ Connect one of the plugs of the connecting cable to the **left** M12 connection (1) of the master and fasten the knurled screw. After that the M12 (2) connection can also be used, for example, (1) for one side of the building, and (2) for the other side.

⇨ Close the open M12 connection on the last valve with a protection cap (8).

When switching on the master, the valves coming from the master are numbered automatically, starting with the left line (1). The components of the right line (2) are then further numbered directly afterwards.

NOTICE

Sub-standard assembly can cause malfunctions!

If no component is connected to the left connection (1), the master will ignore the right connection (2) during the booting procedure after switching on.

⇨ When switching on the components, start with the left line (1)!

⇨ Connect power supply cable to the connection (7) of the master. The other elements are reserved for service purposes: Ethernet connections (3), UPS connection (4), USB connections (5), potential-free switching contacts (6).

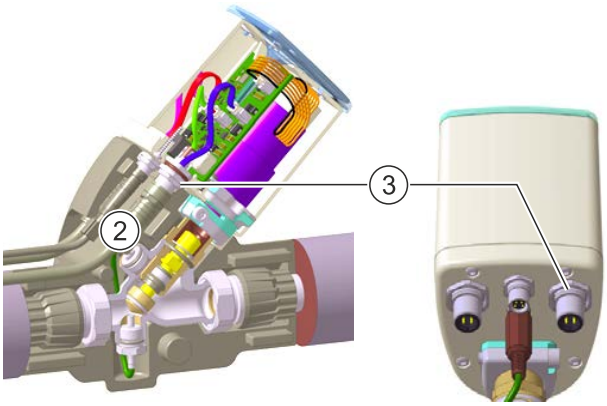
Connecting the valve

NOTICE

Sub-standard assembly can cause malfunctions!

If the cabling is carried out with the power supply switched on, this could cause damage to the electronic components!

⇨ Make sure that the master is not supplied with power while cabling!



⇨ Connect the other plug (2) of the connecting cable to one of the two M12 plugs (3) of the valve and fasten with a knurled screw. Both M12 plugs (3) of the valves are equivalent.

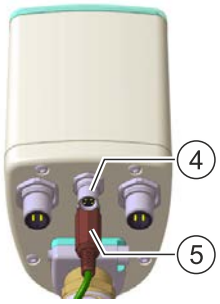
Where required: Connect sensor(s) to the valve

NOTICE

Sub-standard assembly can cause malfunctions!

If the cabling is carried out with the power supply switched on, this could cause damage to the electronic components!

⇨ Make sure that the master is not supplied with power while cabling!



Sub-standard assembly can cause malfunctions! If the connection is carried out with the power switched on it can result in damage to the electric components! Make sure that the master is not supplied with power during the connection! Connect plug (5) of the sensor to the sensor connection (4). During the switching on process of the master, the sensor is automatically detected.

Connecting other valves

⇨ Connect one of the plugs of the next connecting cable to the second M12 plug (3) of the valve and fasten with a knurled screw, etc.

NOTICE

Sub-standard assembly can cause malfunctions!

If the knurled screw is not tightened correctly, the connection can work loose over time. This causes the system to malfunction!

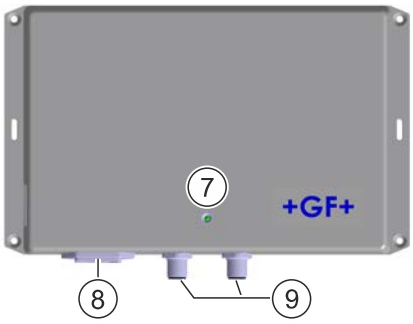
⇨ Make sure that all knurled screws of the connecting cables are tightened!

3.3 Installing other components

Extending the connecting cable

⇨ Use the **connector** (6) for connecting two connecting cables in series.

Installing the Powerbox



In the case of cable lengths longer than 300 m, switch a **powerbox** between two connecting cables. This way, the cable length can be extended by another 200 m to 500 m maximum.

⇨ Connect the plug of the first connecting cable to one of the M12 plugs (9) of the powerbox and fasten with a knurled screw.

⇨ Connect the plug of the second connecting cable to the second M12 plug (9) of the powerbox and fasten with a knurled screw.

⇨ Only insert the cold-device plug of the power cable into the connection (8) to begin the startup of the system once all components have been correctly cabled.

⇨ The LED (7) of the powerbox lights up green.

NOTICE

Sub-standard assembly can cause malfunctions!

If the knurled screw is not tightened correctly, the connection can work loose over time. This causes the system to malfunction!

- ⇨ Make sure that all knurled screws of the connecting cables are tightened!

NOTICE

Sub-standard assembly can cause malfunctions!

If powerboxes are installed, these components provide voltage even when the master is switched off.

- ⇨ Make sure that all powerboxes are first switched off before switching off the master!
- ⇨ Make sure that all powerboxes are first switched on again before switching on the master!

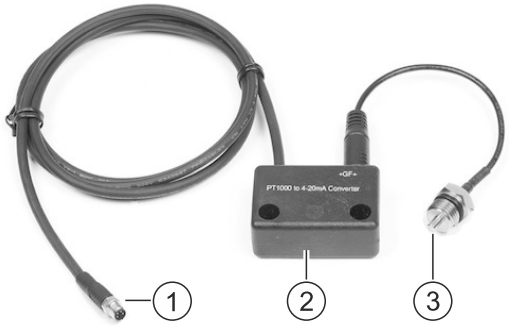
NOTICE

Sub-standard assembly can cause malfunctions!

The master must be switched off during the connection of new external sensors.

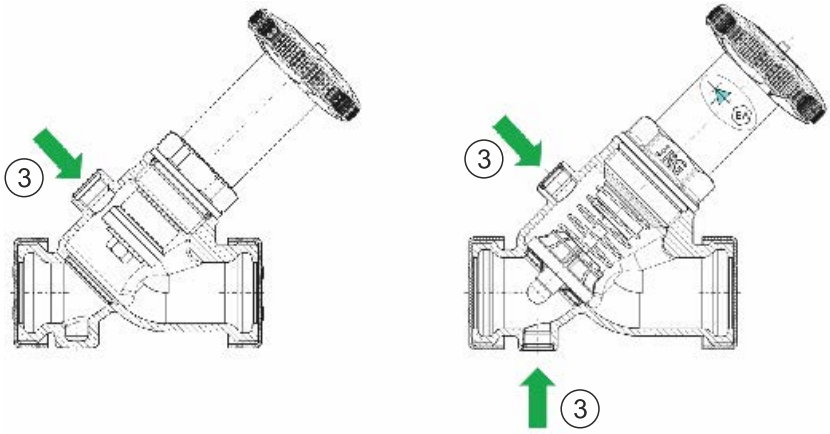
- ⇨ Switch off all powerboxes before switching off the master.
- ⇨ Switching off the master.
- ⇨ Connect the sensors with the master as described below.
- ⇨ Switch on all powerboxes again before switching on the master.
- ⇨ Switch on the master again. This first initializes all connected powerboxes and then launches the master software. The newly connected external sensors are now automatically detected by the master.

Installing the temperature sensor

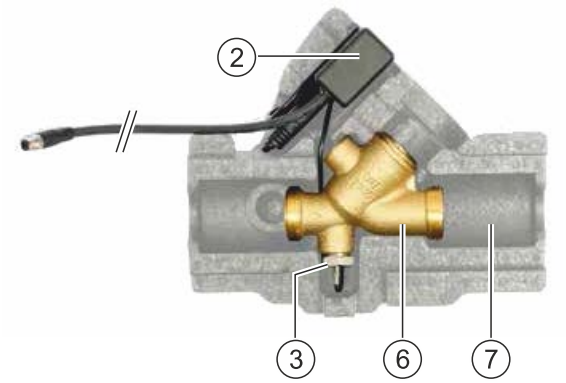


The external temperature sensor (3, 9952.000, PT1000) is delivered with a converter (2, output 4 - 20 mA) and connecting cable (1).

⇨ Screw the temperature sensor (3) with its screw-in thread AG ¼" to the desired point of the installation. **Example:** Installation to a JRG LegioStop inclined seat valve:



Under JRG number 9951.xxx the temperature sensor (3) is delivered fully pre-installed on a red brass pipe section (6, DN 15 or DN 20), complete with matching insulation (7), which also offers room for the converter (2).



With this variation, only the pipe section (6) is installed to an appropriate point of the installation.

⇨ Position the converter (2) in the included insulation (7).

⇨ The external temperature sensor is connected to the controller of a valve (flushing or calibration valve), for this, connect the connection valve (1) to the M8 connection (8).

Using the above-shown extension cables (9, 9943.005) the connection of several extension cables of 5m each in series can bridge a distance of max. 50 m between the temperature sensor and the valve. We recommend to always minimize the distance to the valve.

Installing the run off monitoring system

The run off monitoring system (1) detects whether the water in the run off exceeds the maximum level determined by the installation height of the sensor.

⇨ It is connected to the controller of a valve (flushing or calibration valve), for this, connect the connection valve (1) to the M8 connection (8).

The Flushing function determines to which flushing valves the run off monitoring should apply.

Using the above-shown extension cables (9, 9943.005) the connection of several extension cables of 5m each in series can bridge a distance of max. 50 m between the sensor and the valve. We recommend to always minimize the distance to the valve.

Installing the flow sensor

The external flow sensor (1) measures the flow through the pipe section.

It is connected to the controller of a valve (flushing or calibration valve), for this, connect the connection valve (1) to the M8 connection (8).

Using the above-shown extension cables (9, 9943.005) the connection of several extension cables of 5m each in series can bridge a distance of max. 50 m between the sensor and the valve. We recommend to always minimize the distance to the valve.

4 Working with the master

The master allows the control and steering of all connected components.

It is protected from unauthorized access by a password: 137.

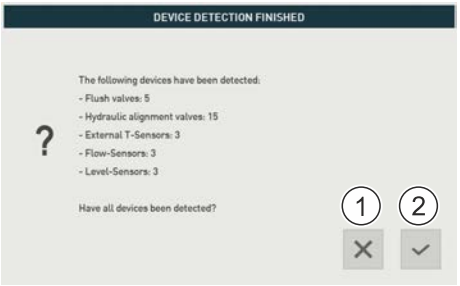
The available functions depend on the current configuration. A sample configuration is described here.

4.1 Commissioning

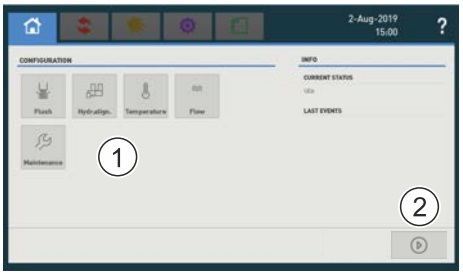
The Hycleen Master starts automatically as soon as the voltage supply is switched on. A notice then appears informing you that some settings first have to be performed. In this phase, all valves supplied correctly with power flash blue and green alternately and can communicate with the master.

The master first records and numbers the connected components. It groups each valve, sensor etc. into the relevant function groups. The numbering starts at the left line and is then continued at the right line, see also Installation.
The adjustment path of the valve plug for all valves of type LegioTherm 2T is also checked in order to adjust the exact position of the valve plug.
It is not possible to enter any data during all these initialization processes. The indicator lights of the valves light up yellow and the master checks the firmware version of each component. If an update is necessary, this is performed automatically by the master and a message is displayed, too.

⇨ Afterwards, the recorded components are displayed.



- ⇨ If some of the components were not recorded correctly, press button (1) to close the dialog, switch the master off, check that all components are connected correctly and then switch the master on again.
- ⇨ If all valves were recorded correctly, confirm dialog positively with button (2).
  - ⇨ The master overview appears. The detected components are initialized.



- ⇨ The pre-configured applications can already be opened and parameterized using the functional elements in (1) without starting them. The **Run** button (2) is still inactive.

  - ⇨ After successful initialization, a message (3) additionally appears. The **Run** button (2) becomes active.
- ⇨ Press the **Run** (2) button to start normal operation. This button only becomes active if it was positively confirmed that all components were detected, and the initialization of the components was completed afterwards.
  - ⇨ Thus, the main menu is also displayed completely.

The master is ready.

- The active applications are marked with a green circle.
- The applications currently running are marked with an animated blue circle.
- In area (1), all configured applications can be opened and parameterized.

4.2 Home/main menu

Section (1) includes icons for all active applications.

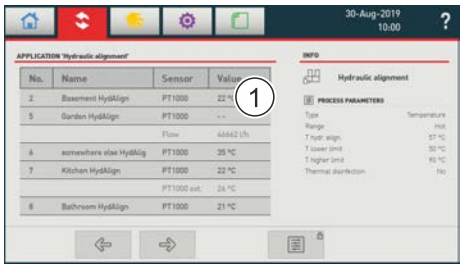
Furthermore, the main includes the additional functions:

- **Applications (2)**
  Switch back and forth between the running applications, e.g. for adjustment of the parameterization.
- **Manual functions (3)**
  Manual operation of the recorded valves.
- **Settings (4)**
  Adjustment of general system settings.
- **Protocols (5)**
  Viewing of protocols of previously implemented processes.
- **Help (6)**
  Viewing the help for the current action (operating manual).

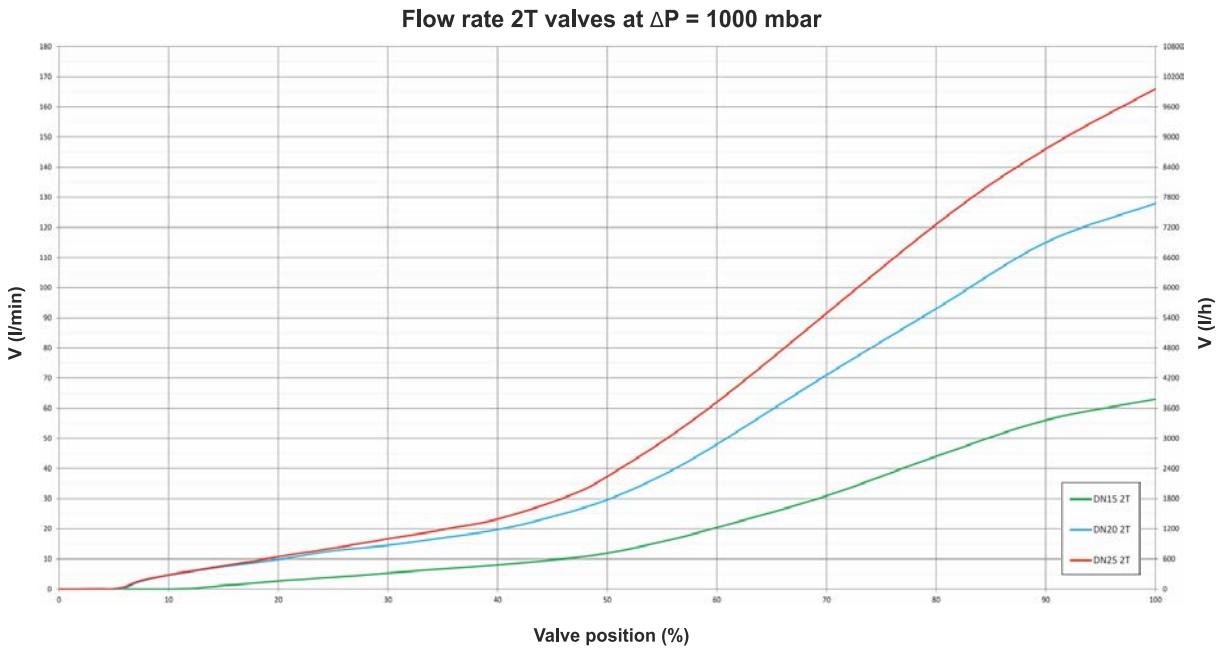
4.3 Hydraulic alignment

The hydraulic alignment requires a circulation line. The corresponding valves do not close completely but only up to a adjustable leakage rate (minimum flow, Kvmin). The maximum opening angle (maximum flow Kvmax) of each valve can also be adjusted.

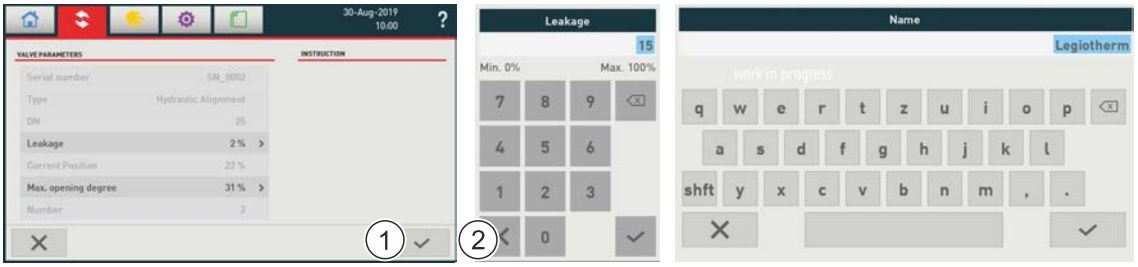
Selecting the application icon for hydraulic alignment opens this dialog, which first displays the recorded components:



⇨ Select valve entry in the area (1) in order to adapt the name, leakage rate, and maximum opening angle of this valve - a virtual keyboard appears for this purpose.



Allocation of flow (liters/h) to the opening angle (leakage rate).



The light fields display parameters, which cannot be adjusted. The number of a component is continuously assigned automatically, beginning with the line at the left socket of the master.

Button x (2) closes the respective dialog without making any changes.

Leakage rate (Kvmin, default setting 15%) and maximum opening angle (Kvmax, default setting 70%) can be adjusted.

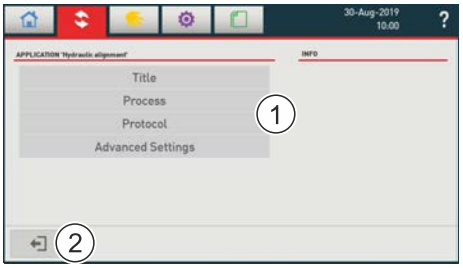
The checkmark button (1) activates the changes and closes the respective dialog.

The current process parameters are displayed in the information area (2).

Button (3) switches back and forth between the applications.

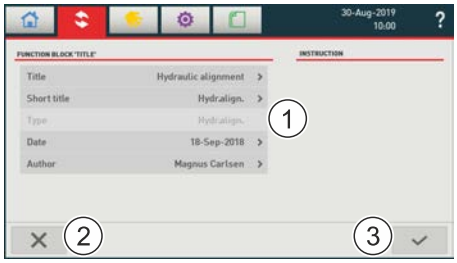
Button (4) opens the dialog for parameterizing the hydraulic alignment process after entry of the authorization code: 42.

4.3.1 General procedure



- ⇨ Define title, process and protocol successively: Pressing the fields in area (1) opens the corresponding dialogue.
- ⇨ Activate data using button (2).

4.3.2 Title



- ⇨ Enter meta data for the protocol in the area (1) (virtual keyboards): title, short title (labeling of App icon), date, author.
- ⇨ Activate data using button (3) or abort dialog using button (2).

4.3.3 Process

- ⇨ Process type in the area (1) is temperature
  - ⇨ The other fields change depending on this selection.

The selection options in the area (1) adjust to the selected type. Displayed for temperature here:

- ⇨ Define the other parameters in the area (1) (virtual keyboards). For this purpose, move the list in the area up or down as required.
- ⇨ Activate data using button (3) or abort dialog using button (2).
- ⇨ Button (4) resets the data to the factory settings.

4.3.4 Type = Temperature

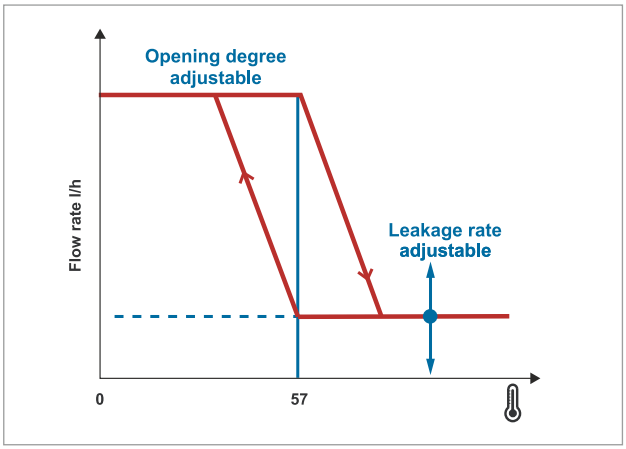
The process is started upon reaching a specific temperature.

Process sequence for hot water (area = hot)

Type	Temperature	>
Range	Hot	>
T hydr. align.	57 °C	>
T lower limit	50 °C	>
T higher limit	90 °C	>
Thermal disinfection	☑	
T start TD	70 °C	>
Duration per valve	3 min	>
Overall duration	3 h	>
T hydr. align. TD	75 °C	>

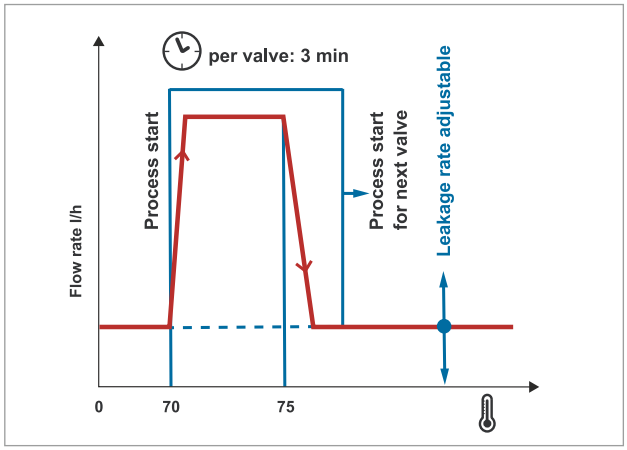
- If the hot water becomes colder than the **temperature** (here: 57 °C, still thermally safe against legionella), then the process starts and opens the valve. If the **temperature** is exceeded again, the valve closes again (leakage rate). The leakage rate can be defined separately for each valve.

Dynamic hydraulic alignment



- If the **temperature lower limit** (here: 50 °C) is fallen below, an error message appears and an entry is made in the error log.
- If the **temperature upper limit** (here: 90 °C) is exceeded, an error message appears and an entry is made in the error protocol. These two limits must be defined meaningfully, since they form the basis for an evaluation of the protocols.
- If the checkmark at **Thermal disinfection (TD)** is set, the parameters shown below it are displayed and active.

Thermal disinfection



CAUTION

Risk of injury from hot water and components!

Danger of burning and scalding during thermal disinfection!

⇨ Make sure not to touch the components of the hot water circulation and the drain water during thermal disinfection. Please note that the components and the drained water require some time to cool down after the rinsing process.

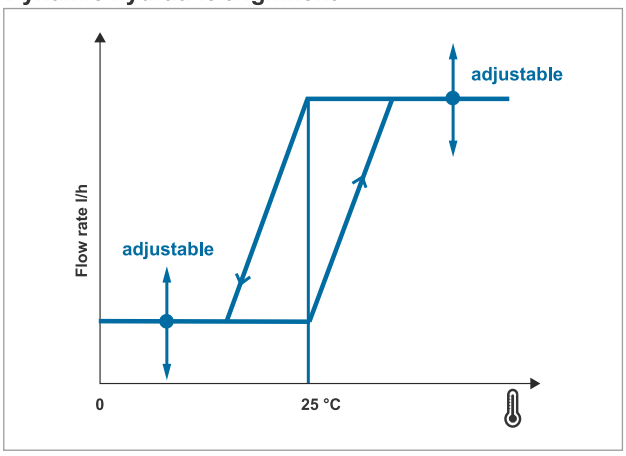
- If the temperature at the first valve reaches the set **temperature** for the TD (here: 70 °C, 70 °C for at least 3 min. is recommended), this valve is opened and all other valves are closed (leakage rate). If the **duration** or the **max. temperature** (here: 75 °C) required for the thermal disinfection is reached at the first valve, this is closed again (leakage rate).
  This is now also performed successively for the other valves: Heat up to the **temperature** (here: 70 °C) required for the TD and then close again to leakage rate. If this TD is not completed for all valves before the total time has elapsed (here: 3 h), then an error message appears.
- Results and error messages are recorded in the protocol.
- After thermal disinfection the system remains inactive for 4 hours to allow the components to cool down again. During this time, all valves are set to the "leakage rate" position.

Process sequence for cold water (area = cold)

Type	Temperature	>
Range	Cold	>
T hydr. align.	15 °C	>
T lower limit	2 °C	>
T higher limit	27 °C	>
Thermal disinfection		☐

- If the cold water becomes warmer than the **temperature** (here: 25 °C), then the process starts and opens the valve. The resulting cold water circulation lowers the temperature.

Dynamic hydraulic alignment



- T behavior cold water If the **temperature** is fallen below again, the valve closes again (leakage rate).
- If the **temperature lower limit** (here: 2 °C) is fallen below, an error message appears and an entry is made in the error log.
- If the **temperature upper limit** (here: 27 °C) is exceeded, an error message appears and an entry is made in the error protocol.
- Results and error messages are recorded in the protocol.

Thermal disinfection (TD) is not necessary for cold water.

4.3.5 Type = Temperature static

The process is started daily at a specific **start-up time**. The starting time must be selected so that the process of static hydraulic alignment takes place at a time when no water is withdrawn, i.e. typically at night.

Process sequence

- At the start of the process, the opening angle (leakage rate) of each single valve is set. During this, the valves sequentially adjust to the flexible average temperature of the past 24 hours and the set **nominal temperature**. The valves maintain this set opening angle for 24 hours until the next regulation phase.
- The first period after activation of the hydraulic alignment of type **temperature, static**is used to determine the basic data (determination of average values for 3 hours and 24 hours). The first hydraulic alignment is only executed in the 2nd regulation phase (2nd night). With each additional regulation phase, the opening angle of the valves is further optimized. Depending on the complexity of the drinking water installation, optimal hydraulic alignment may require several nights.
- Providing the specific water content of the pipe on which the alignment valve is installed can expedite the process (optional). For this purpose, enter the pipe volume (volume of the entire circulation line), see Pipe volume (> valve > settings). The pipe volume is a proportional factor that affects the adjustment steps and thus helps the system to adjust faster.
- If the average temperature of the past 3 hours falls below the **temperature lower limit** , a new ideal valve position is immediately calculated and the opening degree (leakage rate) is adjusted. This safety correction is carried out no more than 1 time per valve and regulation phase.

Process sequence for hot water (area = hot)

Type	Temperature static	>
Range	Hot	>
T hydr. align.	57 °C	>
T lower limit	50 °C	>
T higher limit	90 °C	>
Start time	2:00	>
Thermal disinfection	☑	
T start TD	70 °C	>
Duration per valve	3 min	>
Overall duration	3 h	>
T hydr. align. TD	75 °C	>

- At the set **start-up time** the first valve regulates its flow to the set **temperature**, in the shown example to 57 °C.
- Then the second valve regulates its flow, followed by the other valves, and finally the process is repeated until all valves reach the set **temperature** or the 4 hours have passed.
- If the **temperature lower limit** (here: 50 °C) is fallen below, an error message appears and an entry is made in the error log.
- If the **temperature upper limit** (here: 90 °C) is exceeded, an error message appears and an entry is made in the error protocol. These two limits must be defined meaningfully, since they form the basis for an evaluation of the protocols.
- If the checkmark at **Thermal disinfection (TD)** is set, the parameters shown below it are displayed and active. Thermal disinfection process see Thermal disinfection.

Process sequence for cold water (area = cold)

Type	Temperature static	>
Range	Cold	>
T hydr. align.	15 °C	>
T lower limit	2 °C	>
T higher limit	25 °C	>
Start time	2:00	>
Thermal disinfection	☐	

- At the set **start-up time** the first valve regulates its flow to the set **temperature**, in the shown example to 15 °C.
- Then the second valve regulates its flow, followed by the other valves, and finally the process is repeated until the 4 hours have passed.
- If the **temperature lower limit** (here: 2 °C) is fallen below, an error message appears and an entry is made in the error log.
- If the **temperature upper limit** (here: 25 °C) is exceeded, an error message appears and an entry is made in the error protocol. These two limits must be defined meaningfully, since they form the basis for an evaluation of the protocols.

Thermal disinfection (TD) is not necessary for cold water.

4.3.6 Type = Flow

The process is based on the hydraulic alignment related to the flow. For this purpose, a flow sensor is installed in each circulation line with a hydraulic alignment valve and connected to the controller, see Installing a flow sensor.

The process is started daily at a specific **start-up time**.

The starting time must be selected so that the process takes place at a time when no hot water is withdrawn, i.e. typically at night. The valves sequentially adjust to the set **flow**, for a maximum of 4 hours, and then maintain the set opening angle until the next regulation phase.

The first period after activation of the hydraulic alignment of type **flow**is used to determine the basic data. The first hydraulic alignment is only executed in the 2nd regulation phase (2nd night). With each additional regulation phase, the opening angle of the valves is further optimized. Depending on the complexity of the drinking water installation, optimal hydraulic alignment may require several nights.

Providing the specific water content of the pipe on which the alignment valve is installed can expedite the process. For this purpose, enter the pipe volume (volume of the entire circulation line), see Pipe volume (-> settings -> valves).

Process sequence

Type	Flow rate >
Flow rate	200 l/h >
T lower limit	50 °C >
T higher limit	90 °C >
Start time	2:00 >
Thermal disinfection	☑
T start TD	70 °C >
Duration per valve	3 min >
Overall duration	3 h >
T hydr. align. TD	75 °C >

- At the set **start-up time** the first valve regulates its flow to the set **flow rate**, in the shown example to 200l/h.
- Then the second valve regulates its flow, followed by the other valves, and finally the process is repeated until all valves reach the set flow rate or the 4 hours have passed.
- If the **temperature lower limit** (here: 50 °C) is fallen below, an error message appears and an entry is made in the error log.
- If the **temperature upper limit** (here: 90 °C) is exceeded, an error message appears and an entry is made in the error protocol. These two limits must be defined meaningfully, since they form the basis for an evaluation of the protocols.
- If the checkmark at **Thermal disinfection (TD)** is set, the parameters shown below it are displayed and active. Thermal disinfection process see Thermal disinfection.

4.3.7 Type = Constant

In this type, the opening angle set for the valve (leakage rate) is not changed.

Type	Fixed >

There are also no parameters to be adjusted. The system permanently maintains the opening angel set for each valve, for details of the setting see leakage rate (-> settings -> valves). Only the weekly maintenance disrupts this state for a short period of time.

4.4 Flushing

The flushing of a line requires a valve that flows outwardly into a drain. The corresponding valves close completely.

The recorded components are first displayed.

⇨ Select valve entry in area (1) in order to adapt the name of the valve - a virtual keyboard appears for this purpose.

⇨ Enter the required text for the name of the valve via the virtual keyboard (1).

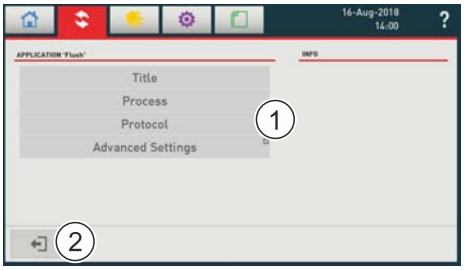
⇨ Abort keyboard dialogue with x (2) in order not to make any adaptation or activate the keyboard entry with the checkmark (3).

The current process parameters are displayed in area (2).

The buttons (3) switch back and forth between the applications.

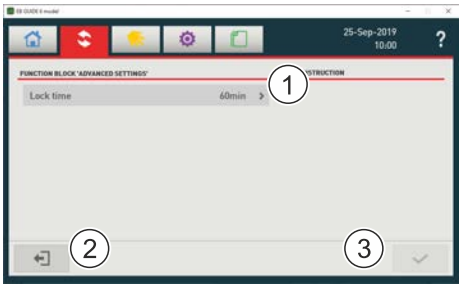
Button (4) opens the dialogue for defining the parameters after entry of the authorization code.

4.4.1 General procedure

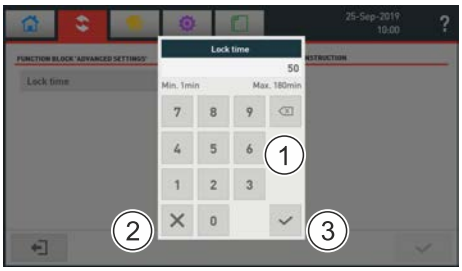


- ⇨ Define title, process and protocol successively: Pressing the fields in area (1) opens the corresponding dialogue.
- ⇨ Activate data using button (2).

4.4.2 Enhanced settings



Allows alteration of the blocking time after a valve adjustment. The valve carries out the next adjustment at the earliest after the expiration of the blocking time.



- ⇨ Enter the required value via the virtual keyboard (1). Abort keyboard dialogue with x (2) in order not to make any adjustment or activate the adjustment with the checkmark (3).

The factory setting is **60 min** (recommended blocking time).

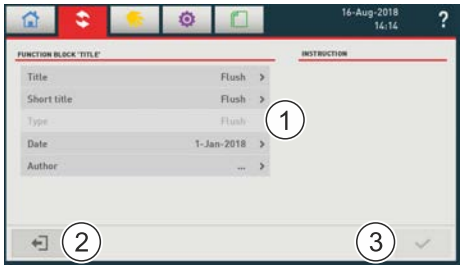
NOTICE

Permanent reduction of the blocking time decreases the system run time!

A reduced blocking time leads to higher wear and thus a possible reduction of the system run time.

- ⇨ Reduce the blocking time only temporarily and as needed (e.g during commissioning).

4.4.3 Title

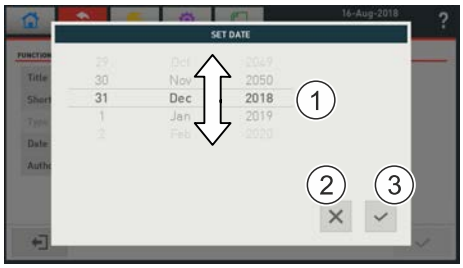


The light-colored fields indicate parameters that cannot be adjusted, such as the type. The number of a component is assigned automatically, for example, beginning with the line at the left socket of the master, see Installation.

⇨ Enter meta data for the protocol in the area (1): title etc.:

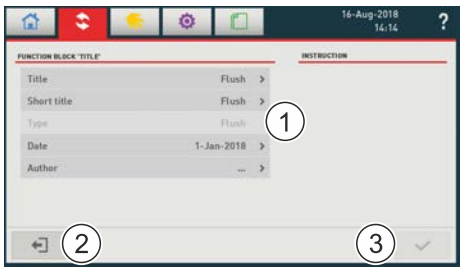
⇨ Enter the required text via the virtual keyboard (1).

⇨ Abort keyboard dialogue with x (2) in order not to make any adjustment or activate the entry with the checkmark (3).



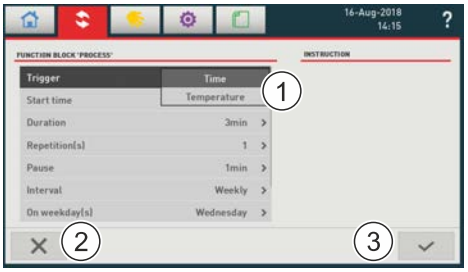
⇨ Adjust desired date.

⇨ Abort keyboard dialogue with x (2) in order not to make any adjustment or activate the adjustment with the checkmark (3).



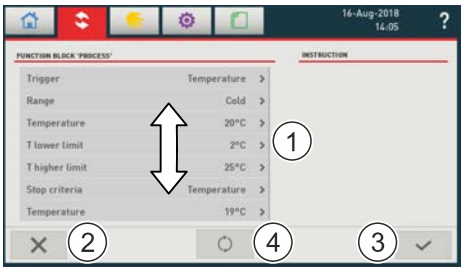
⇨ If the necessary adjustments have been made in the area (1), activate data using button (3) or abort dialog using button (2).

4.4.4 Process



- ⇨ Select trigger in the area (1): time or temperature.
- ⇨ Once everything has been defined, activate data using button (3)
- ⇨ Abort dialog using button (2) if necessary.

The selection options in the area (1) adapt to the selection of the trigger. Here for temperature:

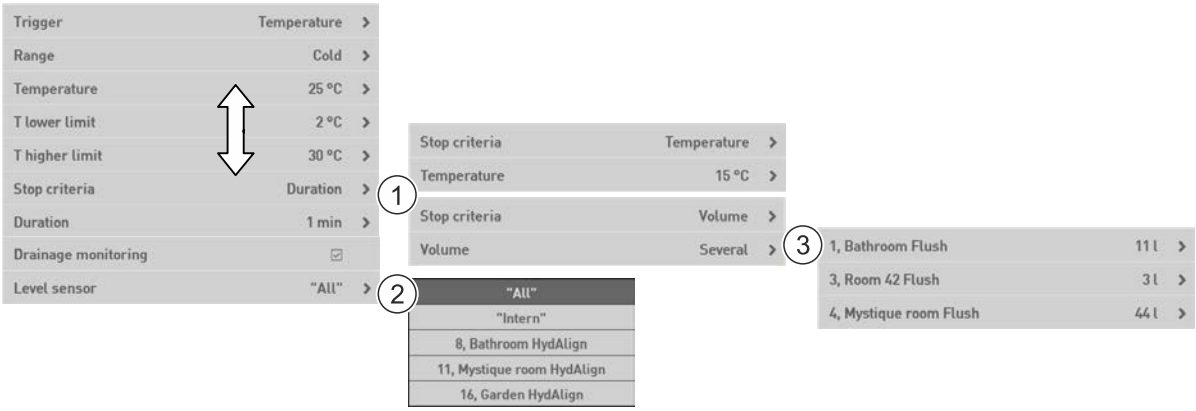


- ⇨ Define the other parameters in the area (1). For this purpose, move the list in the area up or down as required.
- ⇨ Activate data using button (3) or abort dialog using button (2).
- ⇨ Button (4) resets the data to the factory settings.

4.4.5 Trigger = Temperature

The process is started for each individual valve depending on the temperature.

Process sequence for cold water (area = cold) Parameter hydraulic alignment, cold water



The process is started if the water temperature exceeds the **temperature** (default setting: 20 °C).

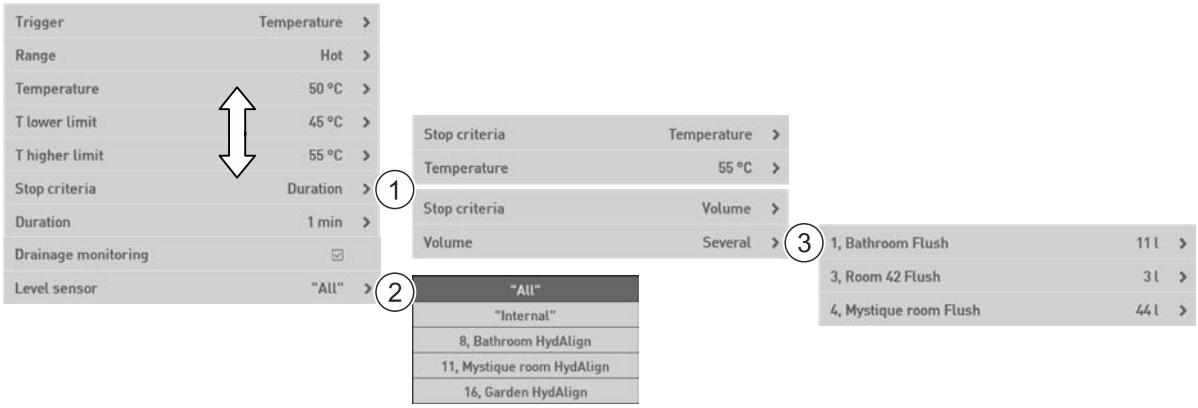
The lines are now flushed with cold water. The stop criterion (1) for the flushing process is either a defined **duration** (default setting: 1 min), a **temperature** to be fallen below (default setting: 15 °C), or a specific **volume**. If for the stop criterion **temperature** the target temperature is not reached within 5 min, the valve closes again and an entry is made in the protocol.

Stop criterion **volume**: This stop criterion can only be selected if a flow sensor is connected to all flush valves of the sensor. It must be installed in the same pipe as the respective flush valve, see Installing the flow sensor. The **volume** (3) to be flushed can be individually adjusted for each flush valve with a flow sensor.

If **run off monitoring** is installed, see Installing run off monitoring, it can be activated via the checkmark. Under **level sensor** you can determine whether actuation of the signal of the float switch closes **all** flush valves in the system (default setting and **recommendation**), only the valve (**internally**), to which the sensor is connected, or a manually selected flush valve.

In normal operation, an error message is displayed if the water temperature falls below the **temperature lower limit** (risk of frost), and if it exceeds the**temperature upper limit** (possible growth of legionella).

Process sequence for hot water (area = hot) Parameter HA, T static, warm water



The process is started if the water temperature falls below the **temperature** (default setting: 50 °C).

The lines are now flushed with hot water. The **stop criterion** (1) for the flushing process is selectable: Either a defined **duration** (default setting: 1 min), a **temperature** to be exceeded (default setting: 55 °C), or a specific **volume** for each flush valve. If for the stop criterion **temperature** the target temperature is not reached within 5 min, the valve closes again and an entry is made in the protocol.

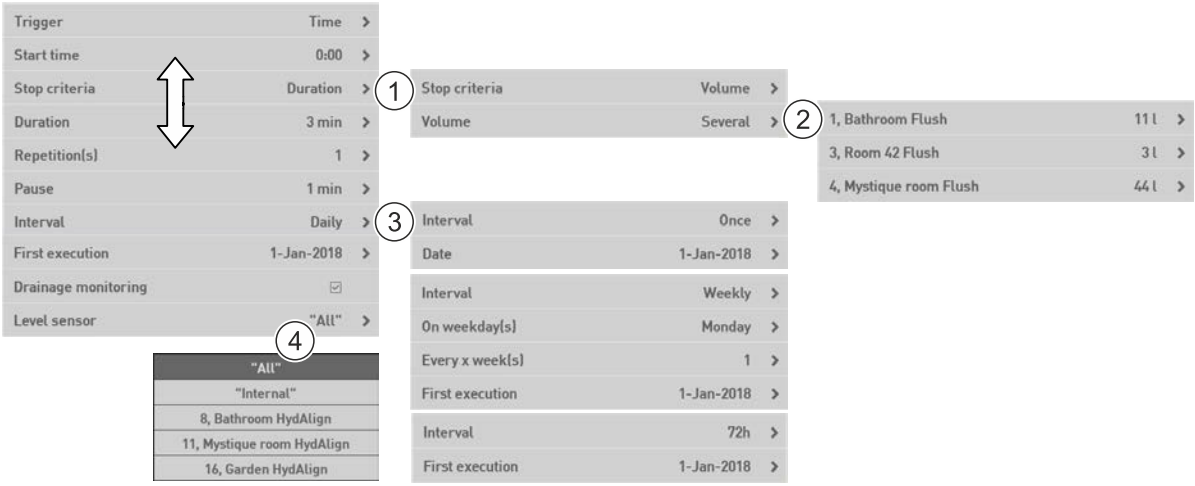
Stop criterion **volume**: This stop criterion can only be selected if a flow sensor is connected to all flush valves of the sensor. It must be installed in the same pipe as the respective flush valve, see Installing the flow sensor. The **volume** to be flushed can be individually determined for each flush valve with a flow sensor

If **run off monitoring** is installed, see Installing run off monitoring, it can be activated via the checkmark. Under **level sensor** you can determine whether actuation of the signal of the float switch closes **all** flush valves in the system (default setting and **recommendation**), only the valve (**internally**), to which the sensor is connected, or a manually selected flush valve.

In normal operation, an error message is displayed if the water temperature falls below the **temperature lower limit** (risk of frost), and if it exceeds the**temperature upper limit** (possible growth of legionella).

4.4.6 Trigger = Time

The flush process is started time-dependent and then implemented for all flush valves in sequence, starting with the first flush valve.



The process is started when the set **start time** (default setting: 00:00 o'clock) is reached. The stop criterion (1) for the flushing process is selectable: Either a defined duration (default setting: 1 min), or a specific volume for each flush valve (2).

The lines are now flushed with water for the **duration** (default setting: 1 min). The set **number of executions** follows (default setting: 1). In the meantime, a pause is made for the set **pause after execution**(default setting: 1 min). The **interval** (3) is once, daily, weekly, or every 72 hours (every 3 days).

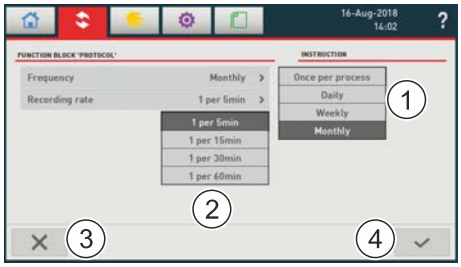
The flushing process ends when the stop criterion **duration** is reached (default setting: 1 min)

- ⇨ In the case of single execution, set the desired day (date selection).
- ⇨ In the case of daily execution or execution every 72 hours, set the desired day for the **first execution** (date selection).

⇨ In the case of weekly execution, e.g. Mondays and Wednesdays every week, set the desired weekday, in the example here **on weekday** Monday and Wednesday:

Under **every x weeks**, set whether execution should take place weekly (x = 1, default settings) or less frequently (x > 1).
If **run off monitoring** is installed, see Installing run off monitoring, it can be activated via the checkmark. Under **level sensor** you can determine whether actuation of the signal of the float switch closes **all** flush valves in the system (default setting and **recommendation**), only the valve (**internally**), to which the sensor is connected, or a manually selected flush valve – only such a valve is selectable.

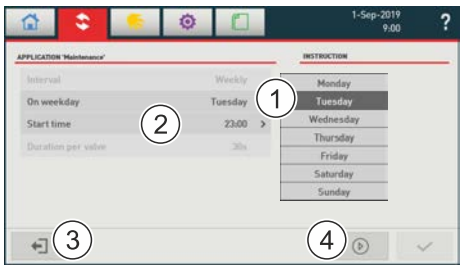
4.4.7 Protocols



⇨ Select frequency (1) of the protocols and recording rate (2) of the measured values.

⇨ Activate selection with checkmark (4) or discard with x (3).

4.5 Automatic Maintenance Process



Once a week, the **Maintenance** application is actuated.

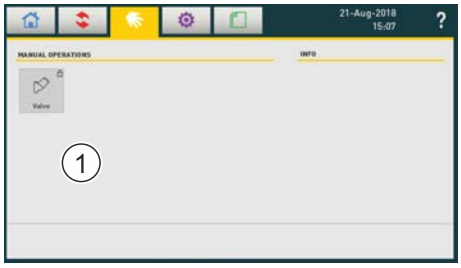
It ensures long-term reliable operation of the valves during hydraulic alignment. A basic problem of hydraulic regulator valves is the fact that during operation they are never shut fully or only during maintenance measures. There are also lines that only have to be regulated very rarely. This leads to the danger of sediments accumulating and obstructing the function of the valves. The automatic maintenance process prevents this problem by moving the valve to the positions 0 and 100% opening degree. Potential sedimentation is also avoided in this way. In addition, the sequential opening of the individual circulation lines at 100% ensures repeated high flow velocity (cleaning effect).

Process sequence

- ⇨ All circulation regulators decrease the flow to the leakage rate.
- ⇨ Each valve opens in sequence for 30 seconds and is rinsed, then the valve assumes the preset position again.
- ⇨ Define the desired day of the week (1) and starting time (2) for the automatic maintenance process. The starting time must be selected so that the process takes place at a time when no warm water is withdrawn, i.e. typically at night.
- ⇨ Save the changes using the confirm key (3).

The play key (4) initiates an immediate maintenance process.

4.6 Manual operation



Area (1) contains applications for all components that can be set manually.

The manual movements are password-protected. After selecting the application, a virtual keyboard appears for entering the password. The password is 42.

4.6.1 Valves

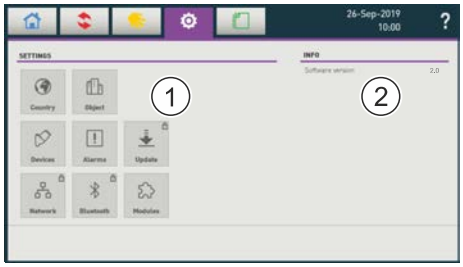
The dialog allows the service technician to adjust the valve position using the slider (3).

Valve number (1), valve position (4) and temperature (2) at the sensor of the valve are displayed.

Button (5) closes the dialog. It is inactive during the manual valve movements.

Button (6) starts the manually set valve movement. Its icon changes to a pause icon until the valve status set on the slider (3) has been reached. Afterwards, the play icon appears again as shown here, and button (5) is active again. After exiting the dialog, the application takes over control again via the component.

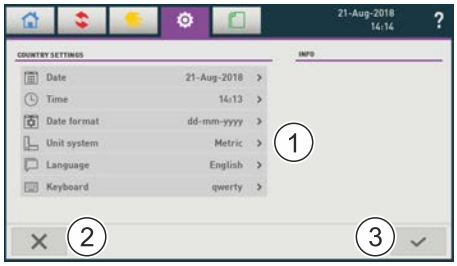
4.7 Settings



Area (1) contains functional elements for all configured adjustment options.

Next to that, the current software version (2) is displayed.

4.7.1 Country settings



The following settings can be adjusted in the area (1):

- **Date**: Current date, selection dialog
- **Time**: Current time, selection dialog plus 24h or am/pm
- **Date format**: dd-MM-yyyy or yyyy-MM-dd
- **System of units**: Metric or Imperial
- **Language** depending on configuration
- **Keyboard**: QWERTY, QWERTZ or others, depending on configuration

Button (2) closes the dialog without making any changes.

Button (3) saves the changes and closes the dialog.

4.7.2 Property

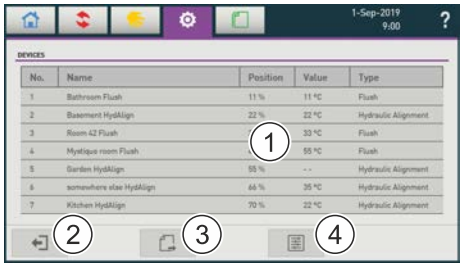
Data to the current property or building can be customized in area (1).

- View the entries of the building concerned in the area (1) and adjust them if necessary (virtual keyboard). For this purpose, move the list in the area up or down as required.

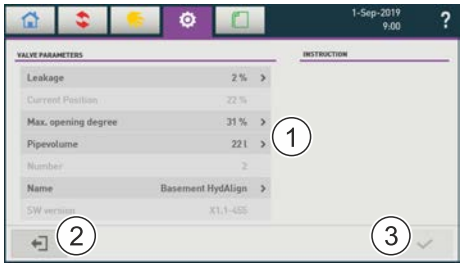
Button (2) closes the dialog without making any changes.

Button (3) saves the changes and closes the dialog.

4.7.3 Valves



- The list in the area (1) displays one line for each valve, which is connected to the master.
- Move the list up or down as required.
- Select a valve entry to change valve data.
- If required, issue a system overview (commissioning) protocol (PDF or XML) using button (3).
- The LED illumination of all valves can be switched on or off via button (4).
- After successful adjustment, close dialog using button (2).



Dialog for changing valve data

Area (1) normally displays the parameters that can be adjusted.

- ⇨ Adjust the name of the valve and the pipe volume as required.
- ⇨ In the case of valves for hydraulic balancing, the maximum opening angle and the leakage rate can additionally be adjusted.
- ⇨ Precise setting of the pipe volume controlled by the valve allows the quick adjustment of the leakage rate during hydraulic balancing. The pipe volume consists of the content of the entire circulation line to which the valve is connected.

  The following table shows the pipe volume per pipe length meter for standard pipe diameters.

Sanipex MT	Inner diameter / mm	Liter / m
16	12	0.104
20	15	0.177
26	20	0.314
32	25	0.531
40	32	0.855
50	40	1.350
63	63	2.230

Button (2) closes the dialog without making any changes.

Button (3) saves the changes and closes the dialog.

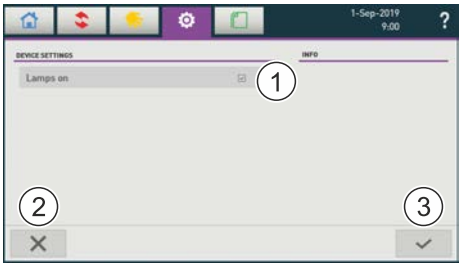
NOTICE

Adjusting the leakage rate to values outside 10 to 15% means that the DVGW standard W554 is not complied with!

Dialog for exporting the system overview (commissioning) protocol

- ⇨ Select the desired export format (PDF or XML).
- ⇨ If a USB stick is detected, button (3) is active and starts the export. Otherwise, no USB stick is detected. In this case make sure that the USB stick is correctly inserted and, if required, use a USB stick of another make.

Button (2) closes the dialog without making any changes.



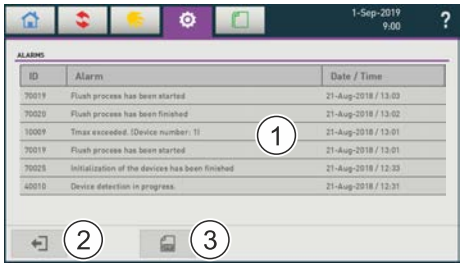
Dialog for the LED illumination of the valves

In the default setting, the "lamps on" checkmark is set, i.e. the LED illumination of all attached valves is switched on.

- ⇨ To turn the LED illumination on/off, set/deactivate the checkmark.
- ⇨ Activate changes with button (3).

Button (2) closes the dialog without making any changes.

4.7.4 Alarms Messages



The list in the area (1) displays the last messages.

For a system analysis, button (3) can be used to create a DMP file and import it onto a USB stick. The file contains the commands carried out in the master and can provide information in case of an unexpected event. For this purpose, the DMP file can be sent to the technical customer service via e-mail, see Troubleshooting.

If button (3) is not active, no USB stick is detected. In this case make sure that the USB stick is correctly inserted and, if required, use a USB stick of another make.

Button (2) closes the dialog.

4.7.5 Update

The update of the master with a new firmware is protected by a password: 42.

We provide software updates as a zip archive. These must be copied to a USB stick in their original condition.

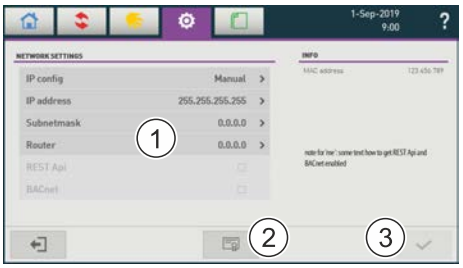
During the update you must agree to the general terms and conditions and our non-liability disclaimer, otherwise the process is abandoned. The software shows step by step instructions.

- ⇨ After the update of the firmware remove the USB stick and restart the master. For this purpose, switch the power to the master and any connected power-boxes off and on again.
- ⇨ The new software is also installed on the controllers of the connected valves. This process takes a few minutes (about 30 seconds per controller).

The update is completed as soon as the following message is shown: "Firmware update of the valves is completed."

If the software update is not successfully completed, the current master software remains active and unimpeded functional.

4.7.6 Network



In area (1) you can adjust the network parameters of the master: **IP config** on **Automatic** makes sure that the IP address of the master is automatically retrieved.

Otherwise (**Manual**) the entered IP address applies.

As information (4), the **MAC address of the master** is displayed.

With button (2) you can import a new HTTPS certificate.

Button (3) activates the implemented adjustments.

The certificate is expected on a USB stick.

Importing a new certificate

If button (2) is not active, no USB stick is detected. In this case make sure that the USB stick is correctly inserted and, if required, use a USB stick of another make.

Button (2) starts the import.

Button (1) closes the dialog without making any changes.

Notes for HTTPS certificates

- The RSA cryptographic system is supported by the .pem (privacy-enhanced mail) format.
- The certificate must be created according to the X.509 standard for the definition of formats for public key certificates.
- The certificate and the private key must be in the same file.
- Supported byte size: 512 to 3072.
- Password protection of the certificate is supported.
- Example of creating a certificate under Linux:

  openssl req -x509 -days 365 -newkey rsa:2048 -keyout any.pem -out any.pem

If a module for **REST Api** or **BACnet** was acquired, for activation see Settings -> modules, the corresponding interface can be activated by setting the checkmark.

Activating the **BACnet**interface expands the list of parameters by the network parameters of **BACnet**:

These are adjusted in line with the network parameters.

4.7.7 Bluetooth

The **Hycleen Automation System** app is available as an Android and Apple version in the respective app stores. It allows status monitoring via a smartphone. The connection is via the Bluetooth access of a valve controller (max. distance 10 m). The valve through which the connection is set up maintains its function and continues to operate normally.

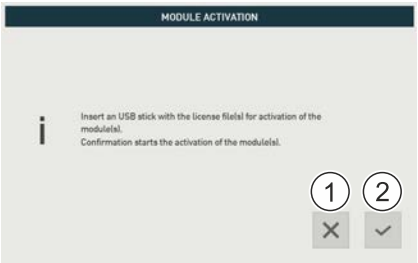
This Bluetooth access to the master can be activated and deactivated by setting the checkmark (1) in the Bluetooth settings.

Button (3) activates the implemented adjustments.

Button (2) closes the dialog without making any changes.

4.7.8 Modules

By importing the associated license file(s) here, chargeable modules can be activated, such as the **REST API** interface (1) or the **BACnet** interface (2).



Importing a license file

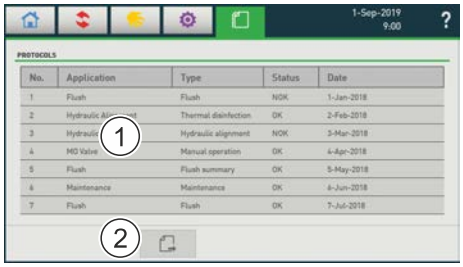
The required license file is expected on a USB stick.

The parameterization of the BACnet interface takes place via Settings -> network

With button (2) you can import a license file. If button (2) is not active, no USB stick is detected. In this case make sure that the USB stick is correctly inserted and, if required, use a USB stick of another make.

Button (1) closes the dialog without making any changes.

4.8 Protocols



The list of available protocols is displayed in area (1).

Button (2) exports all protocols at once via USB (choice of: PDF or XML).

Selecting an entry in the area (1) displays details of the selected protocol in a new dialog:

Area (1) displays the meta data of the selected protocol.

Button (2) takes you back to the list of available protocols.

Button (3) exports the current protocol via USB.

Button (4) opens the display of the valves that have exceeded the limit temperatures in the time periods recorded by the protocol.

Button (5) opens the display of the temperature ranges in the time periods recorded by the protocol.

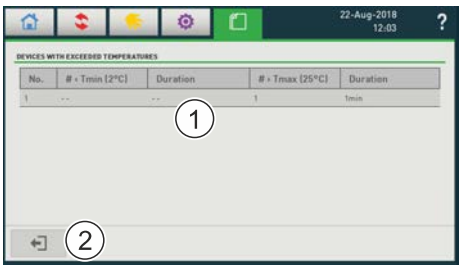
Export Dialog

Area (1)allows you to select the output format: PDF or XML.

Button (2) closes the dialog.

Button (3) exports the current protocol via USB. If button (3) is not active, no suitable USB stick is recognized. In this case make sure that the USB stick is correctly inserted and, if required, use a USB stick of another make.

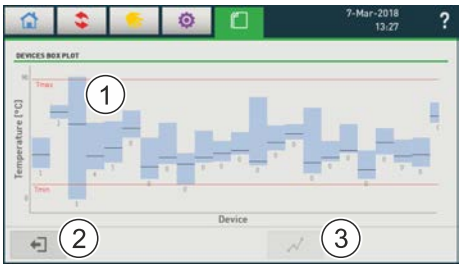
Exceedance of limit temperatures (4)



The table in the area (1) provides a clear summary of the temperature messages. Each time a limit temperature is exceeded, it is displayed in a separate line with details of the valve concerned. Here, you can quickly find out whether there were any critical conditions during the protocol period.

Button (2) takes you back to the list of available protocols.

Temperature ranges (5)

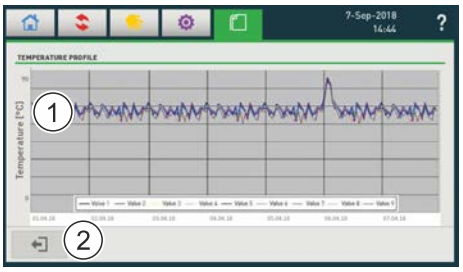


Area (1) displays a bar with the recorded temperature range for each time interval of the selected protocol. You can see immediately if T_{max} was exceeded or T_{min} was not met.

Selecting an interval in the area (1) activates button (3), which opens the graph with the corresponding chronological sequence of all recorded temperatures. Up to 5 intervals can be selected simultaneously.

Button (2) takes you back to the protocol.

Chronological sequence



Area (1) displays the chronological sequence of all recorded temperatures. You can see immediately when exactly and how often T_{max} was exceeded or T_{min} was not met.

Button (2) takes you back to the display of the temperature ranges.

5 Troubleshooting

Below you can find the most important error notifications and information for resolving the error. Address any questions to your contact person at GF Piping Systems or our technical customer service, tel.+ 41 61 975 23 77, e-mail: tkd.jrg.ps@georgfischer.com.

5.1 Notifications

10003: Required temperature not reached or maximum time limit exceeded

Measures:

- ⇨ Check the storage temperature.
- ⇨ Check the storage volume.
- ⇨ Test the performance of the circulation pump.

10006: Wrong password

Measures:

- ⇨ Enter the correct password:
  - Monitor: 137
  - Application changes: 42

10008: Tmin not reached

Measures:

- ⇨ Check the temperature at the water heater.

10009: Tmax exceeded

Measures:

- ⇨ Check the piping system for excess temperature.

10045: No applicable data found on the USB stick

Measures:

- ⇨ Use a USB stick with the applicable data.

10047: The license of one of the modules expired

Measures:

- ⇨ Renew the license.

5.2 Error messages

10004: Power supply < 28V

Measures:

- ⇨ Check: cable length in line with the specification.

10005: TCP/IP error

Measures:

- ⇨ Check the cable connections.
- ⇨ Check the IP addresses.

10013: PT 1000 Temperature sensor defective

Measures:

- ⇨ Replace PT 1000 temperature sensor.

10014: PT 1000 temperature sensor not connected

Measures:

- ⇨ Check the cable connection of the temperature sensor.
- ⇨ Connect the temperature sensor according to the installation instructions.

10016: Controller communication error

Measures:

- ⇨ Check the cable connection.
- ⇨ Connect the temperature sensor according to the installation instructions.

10029: Actuator defective

Measures:

- ⇨ Check the cable connection of the temperature sensor.
- ⇨ Check the actuator and controller.
- ⇨ Connect the actuator according to the installation instructions.
- ⇨ Replace the controller

10030: Valve blocked

Measures:

- ⇨ Check the actuator and controller.
- ⇨ Uninstall and check the valve top section and controller.

10050: Level sensor was actuated (NOK)

Measures:

- ⇨ Identify the concerned flushing valve and check the associated process.

6 Compliance

6.1 FCC

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received,

including interference that may cause undesired operation.

L’émetteur / récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes :

1. 1. L’appareil ne doit pas produire de brouillage;
2. 2. L’appareil doit accepter tout brouillage radioélectrique subi,

même si le brouillage est susceptible d’en compromettre le fonctionnement.

NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

6.2 ISED

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment.

7 CE Declaration

+GF+

EG / EC / UE
KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ

Wir **Georg Fischer JRG AG**
We ***Hauptstrasse 130***
Nous *CH-4450 Sissach*

(Name und Anschrift des Herstellers) (supplier's name and adress) (nom du fournisseur et adresse)

erklären in alleiniger Verantwortung, dass das Produkt,
declare under our sole responsibility that the product,
déclarons sous notre seule responsabilité que le produit,

Hycleen Automation System
Hycleen Automation Master **9900.XXX**
Year of Construction **2018**

(Art der Produkts, Modell, Baujahr, evtl. Seriennummer;)
(Type of product, model, year of production, ev. serial number)
(Type du produit, modèle, année de production, ev. no de série)

konform ist mit den Anforderungen der Richtlinien,
is conform to the provisions of directives,
est conforme aux exigences des directives,

2014/53/EU

gestützt auf die folgenden Normen,
based on the following standards,
basé aux normes suivants,

EN 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4
EN 61000-4-5, EN 61000-4-6, EN 61000-11
EN 55032:2015 class B, EN 61000-6-3:2007+A1:2011
ETSI EN 301 489-17, V3.2.0:2017
ETSI EN 300 328 V2.1.1:2017-01
EN 60730, EN 62479

(Titel und/oder Nummer sowie Ausgabedatum der Norm(en) oder der anderen normativen Dokument(e)
(Title and/or number and date of issue of the standard(s) or other normative document(s)
(Titre et/ou no. et date de publication de la (des) norme(s) ou autre(s) document(s) normatif(s)

Sissach, 14.06.2018	Philippe Cachot
(Ort und Datum der Ausstellung)	(Name und Unterschrift oder gleichwertige Kennzeichnung des Befugten)
(Place and Date of issue)	(name and signature or equivalent marking of authorized person)
(Lieu et date)	(nom et signature du signataire autorisé)

Verantwortlich für die technische Dokumentation ist:
Responsible for the technical documentation is:
Responsable pour le documentation technique est:

Arnaud Andreolli

(Name und Anschrift der verantwortlichen Person; Unterschrift)
(Name and address of the responsible person; signature)
(Nom et adresse de la personne responsable; signature)