



# Hyclean™ Automation System

A revolutionary automated balancing, flushing and disinfection system designed to combat legionella and other waterborne pathogens

## Hyclean Automation System

# Simply Controlling all Valves with One Master

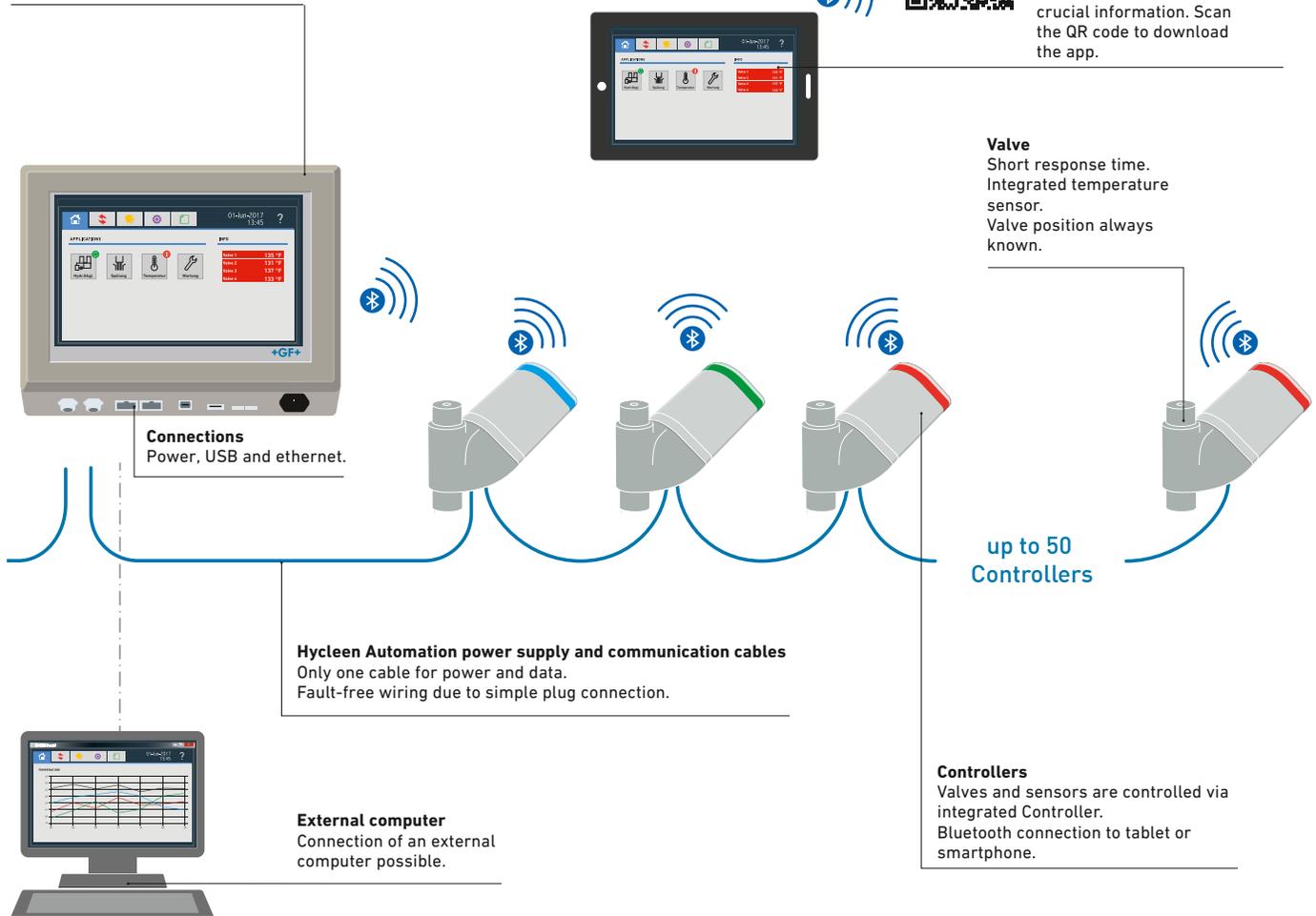
The Hyclean Automation System by GF Piping Systems offers a sophisticated package for the automation of potable water installations. Sensors and Controllers integrated in the valves log the required data. The Master controls system balancing, flushing and disinfection to provide safe, consistent, potable water while also maintaining desired system temperature. This is done using a simple plug and play, single power/data cable set up.

### Hyclean Automation Master

Central control of all valves in the Hyclean potable water system. Touch-screen with clear and intuitive user interface. Apps for the automation of potable water hygiene

### External tablet / smartphone

App available for automation. Real-time data available anytime, anywhere with push notifications available for crucial information. Scan the QR code to download the app.



**Connections**  
Power, USB and ethernet.

**Hyclean Automation power supply and communication cables**  
Only one cable for power and data.  
Fault-free wiring due to simple plug connection.

**External computer**  
Connection of an external computer possible.

**Valve**  
Short response time.  
Integrated temperature sensor.  
Valve position always known.

up to 50  
Controllers

**Controllers**  
Valves and sensors are controlled via integrated Controller.  
Bluetooth connection to tablet or smartphone.

# Your Benefits

## + Hygiene

### Uniform hot water temperatures and regular automatic flushing

Prevention of biofilm formation and Legionella infestation thanks to hydraulic balancing and automatic flushing.

## + Automation

### Central control and status display

Easily control the Hycleen Automation System via a central user interface without the need to manually adjust valves or calibrate sensors.

## + Monitoring

### Logging and reporting

Monitoring and storage of temperature data in automatically generated reports.  
Compatible with popular building management systems for easy data retrieval.

### Remote monitoring

Monitoring via external devices such as smartphone, tablet or computer.

## + Engineers/Designers

### Simple and Easy Design

Applications and all parameters easily programmable through Master.

Hydraulic balancing without complicated calculations.

## + Installers

### Plug & Play

Simple installation with only one cable for power and data.

Fast, software-assisted commissioning.

Master automatically detects type and ID of all connected Controllers.

### Smart operation

Clear and easy-to-use interface.

Bluetooth connection via smartphone or tablet.

## + Building Owners and Operators

### Low-maintenance potable water system

Thorough flushing of all runs in an automated cleaning process.

### Low risk application

Continuous monitoring and logging of system conditions for easy reporting. Data accessible only by approved external devices.

### Services

Support throughout planning, installation, commissioning, and operation. Data analysis and advice during operation. Data read-outs and software updates.

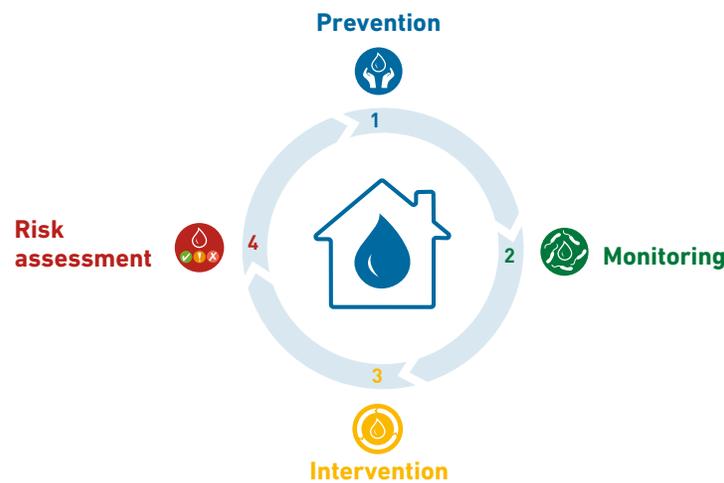
# Hycleen Automation System

# Safe and Hygienically Optimized Potable Water Installation

Utility companies regularly check the potable water quality, but are only responsible up to the domestic water inlet. In the building, the potable water quality is the operator's responsibility. There is a risk of bacterial growth due to inadequate temperatures, stagnation and biofilm formation. In view of this, potable water installations in buildings must be carefully planned, designed and operated.

## + Hygiene Concept

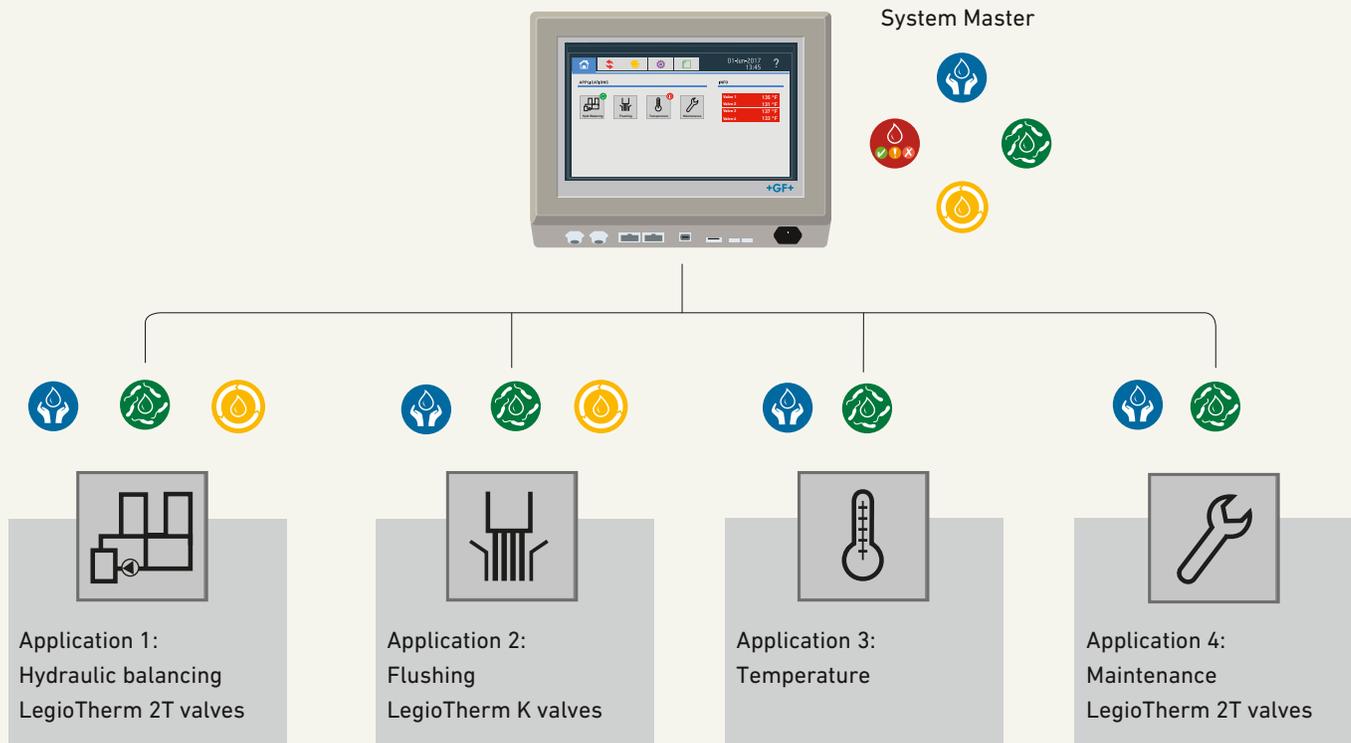
"Hycleen – Securing optimum potable water hygiene in 4 steps"



With its Hycleen Automation System, GF Piping Systems supports designers, installers, and owner/operators in a variety of ways to implement the concept of Hycleen – Securing optimum potable water hygiene in 4 steps".

With central data storage and control through the master, the powerful LegioTherm valves and sensors as well as the easy-to-operate software and the smart LegioTherm applications make it possible to automate important hygienic precautions.

|  |                        |   |
|--|------------------------|---|
|  | <b>Prevention</b>      | Sufficient circulation in all piping sections<br>Ensuring the minimum temperature in hot water circulation<br>Constant hydraulic balancing in all operating phases<br>Regular water exchange through automatic flushing |
|  | <b>Monitoring</b>      | Continuous temperature monitoring<br>Storing measuring data and logging of hygienic precautions   |
|  | <b>Intervention</b>    | Regular thermal disinfection / chemical disinfection  |
|  | <b>Risk assessment</b> | Comprehensive database for status and risk assessment   |



## + Hyclean Automation System Applications

The Hyclean Automation System offers versatile, ready-to-use applications for a safe and hygienically optimized potable water installation.

In addition to the supplied standard applications, additional applications can be freely defined in the future without any programming effort, in regards to time, sensor values or external data.

All programs and functions can be intuitively operated via the touch-screen on the Hyclean Automation Master. The Master is connected to the Controllers that control the individual valves and sensors. All sensors are permanently monitored and deviations immediately reported.

### Hyclean Automation System

- One simple Master for all applications with intuitive operating concept
- Individually customizable monitoring and reporting functions with data storage

#### Application 1: Hydraulic Balancing – LegioTherm 2T

- Temperature-sensitive hydraulic balancing for cold and hot water
- Thermal disinfection
- Temperature monitoring
- Adjustable leakage rate

#### Application 2: Flushing – LegioTherm K

- Flushing the cold and hot water system
- Temperature monitoring

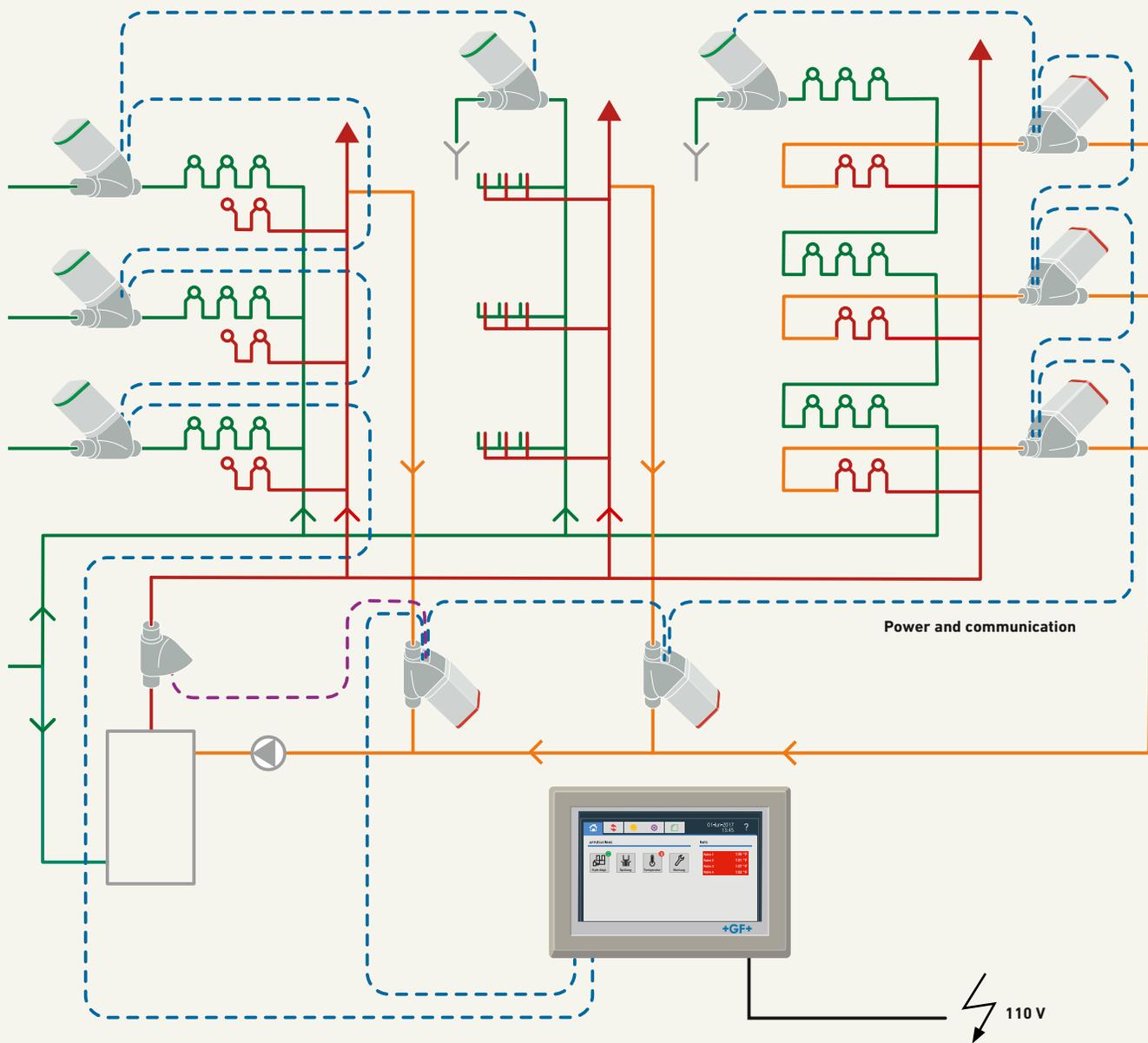
#### Application 3: Temperature

- Display of all temperatures in real time
- Clear graphical representation
- Storage of all valve temperatures in the log

#### Application 4: Maintenance – LegioTherm 2T

- Automatic weekly maintenance
- Prevents the valves from getting stuck or clogged

# Installation Diagram



## System components



**LegioTherm 2T valve**  
Hydraulic balancing



**LegioTherm K valve**  
Flushing

**T-sensor**  
Temperature reading



**Master**



**Sensor cable**



**Power cord and communication cable**

## Hycleen Automation System – Application Hydraulic Balancing

# Temperature-Sensitive Hydraulic Balancing

Especially in larger hot water distribution systems – e.g. in hospitals, hotels, nursing homes – stagnation, rough surfaces and temperatures below 122 °F can promote the formation of biofilms and thus the proliferation of Legionella. That is why the prevention of Legionella, sufficiently high temperatures and regular water exchange are of paramount importance.

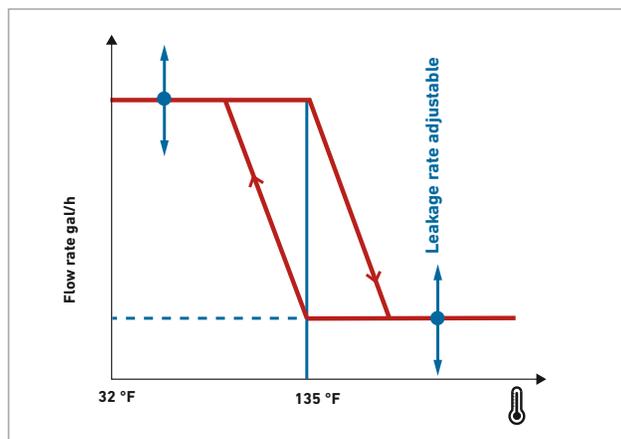
A lot of time and effort is invested into the design of a hot water distribution system which can easily be affected by conditions and changes in the field.

The Hycleen Automation System offers several options for hydraulic balancing. Temperature sensors in the balancing valves automatically adjust flow to meet required temperature - eliminating the need for costly commissioning.

### Dynamic, temperature-sensitive hydraulic balancing

The circulation controllers with temperature sensor open and close automatically and regulate the flow as a function of the water temperature. If the temperature rises above the pre-programmed calibration temperature (default 135 °F), the circulation controller closes to leakage level (minimum flow). As soon as the temperature drops below the calibration temperature, the circulation controller opens again. The permanent calibration of all circulation regulators results in a constantly high water temperature in the entire hot water circulation, which considerably limits germ formation.

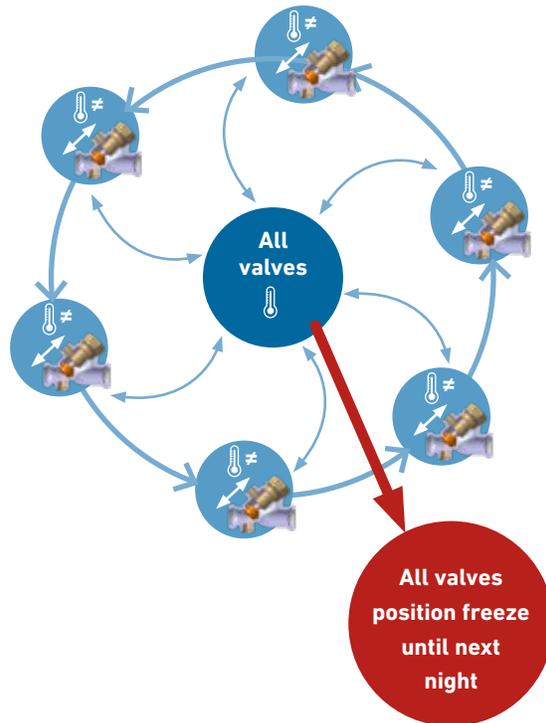
### Dynamic hydraulic balancing



### Static, temperature-sensitive hydraulic balancing

Once a day at the programmed time, the Hycleen Automation Master searches for the ideal flow rate for each individual circulation controller until the calibration temperature is reached at all circulation controllers. The circulation controllers will remain in this position until next hydraulic calibration. It is advisable to set this time at night, when water consumption is lowest.

This eliminates the need for manual presetting the circulation controllers during commissioning and saves the installer time during installation.



### Thermal disinfection

Thermal disinfection starts at a pre-determined time or automatically when the hot water temperature is raised above the start temperature (default at 158°F)- which is lethal to Legionella bacteria. All circulation controllers reduce the flow to minimum. The circulation controller, which first detected the start temperature for thermal disinfection, remains open for a period of three minutes and then closes again to leakage rate. If the calibration temperature for thermal disinfection (default 167 °F) is reached within this period, the circulation controller closes before the three minutes have elapsed. This process is repeated at all further circulation controllers one after the other.

Even during thermal disinfection, the system remains hydraulically balanced. When thermal disinfection is completed, the system returns to normal operation with hydraulic balance.

If a temperature sensor is installed at the outlet of the water heater and this is selected for the detection of the start temperature, the Hycleen Automation Master will fully open the first valve in the system. Combined with the cascaded opening of the valves, this procedure reduces the overall time for thermal disinfection and saves energy and costs compared to circulation systems in which all valves are always open during thermal disinfection.

### Safety thanks to monitored threshold temperature

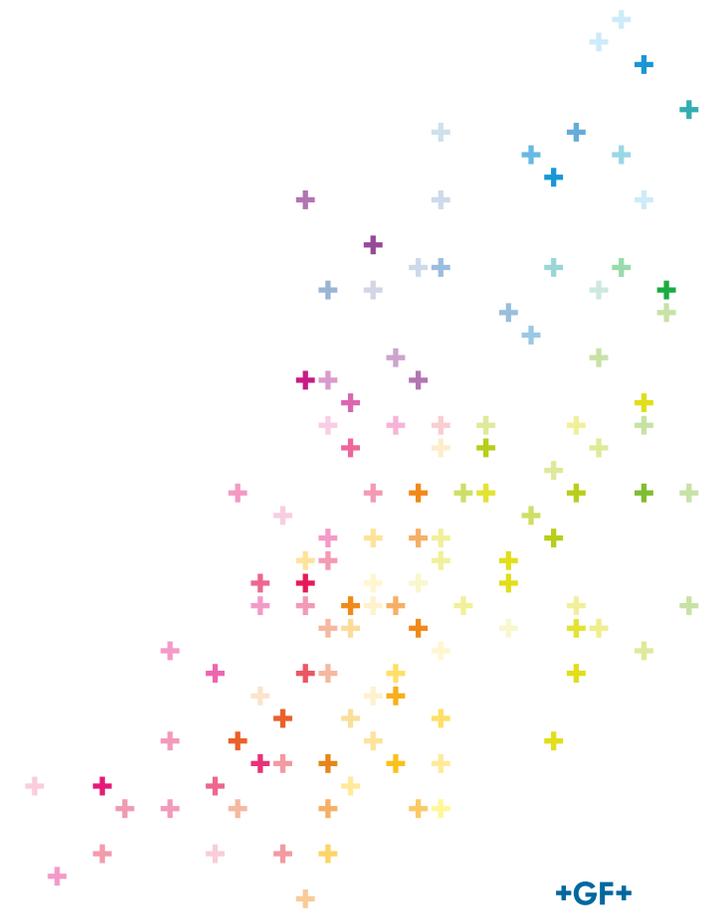
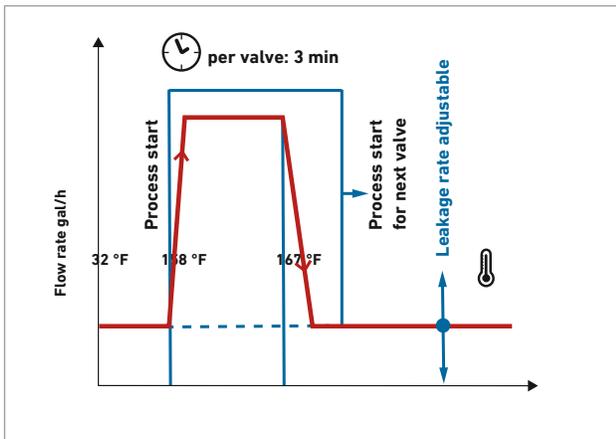
Building safety is additionally increased thanks to permanent monitoring of the threshold temperature and automatic maintenance. If the temperature in the potable water system falls below a pre-set threshold temperature (default 122 °F), an alarm is issued. For static hydraulic calibration, the valve opens automatically to compensate for the temperature drop.

### Automatic maintenance for both types of hydraulic calibration

In order to prevent particles such as lime or sand from depositing in the valve and causing a clog, a maintenance process is started automatically once a week, thoroughly flushing all runs. All circulation controllers reduce the flow to minimum. Each circulation controller opens one after the other for one minute and then closes again.

Both after a temperature alarm and after automatic maintenance, the valves return to the stored position for hydraulic balancing. If the temperature values no longer match those stored, the hydraulic calibration will be restarted.

### Thermal disinfection



# Automatic Flushing

## Depending on Temperature, or Programmed

If water stagnates over a longer period, bacteria can multiply in it until a dangerous concentration is reached. If the entire volume in the potable water distribution (cold and hot water) is exchanged within three days, the bacteria are flushed out of the potable water installation and the bacteria concentration drops to a harmless level. The Hycleen Automation System allows automatic flushing of cold and hot water supply lines depending on the temperature or a specific time of day (timer).

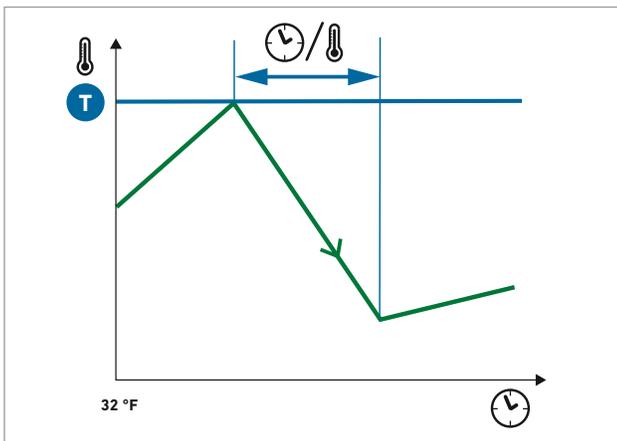
### Temperature controlled flushing

As soon as the threshold temperature at the temperature sensor of a LegioTherm K flush valve is exceeded (cold water) or below (hot water), the flush valve opens and closes again after the pre-programmed time or when a certain temperature is reached.

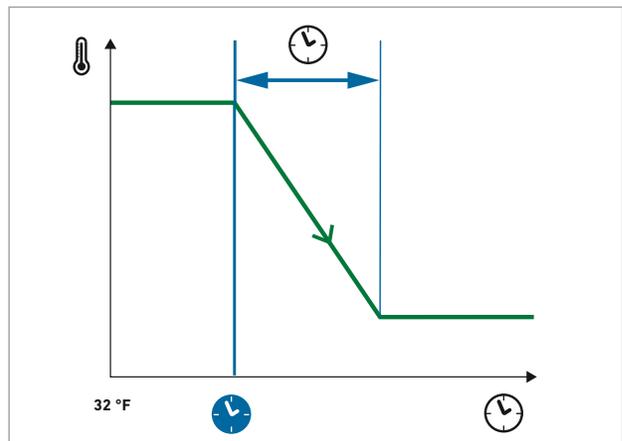
### Timed flushing

All LegioTherm K flush valves open as soon as the pre-set time is reached and close after the defined flushing period. The time interval between two flushing cycles can be set so that several flushing cycles per day are possible. Each flushing process is logged.

### Temperature controlled flushing



### Timed flushing



## Hycleen Automation System - Components

# The Master

The Hycleen Automation Master controls up to 50 controllers on two cable harnesses (each 1'640 feet).

During commissioning, the Master detects all valves and sensors in the system with ID and type and assigns them to the appropriate applications.

With predefined values, the system is immediately ready to start. However, all parameters can also be conveniently adapted to individual needs, not only via the Master, but also via a connection to a computer, a tablet or a smartphone.

If an uninterruptible power supply module (UPS) is connected to the Master, all valves move to a predefined, safe position in the event of a power failure.

### Applications

Hydraulic balancing, flushing, temperature, maintenance ...  
Spülung, Temperatur...

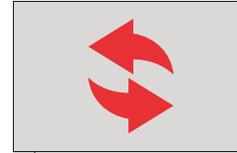
Additional information on the current screen

### Only one cable for power supply and data transmission

The pre-assembled Hycleen Automation power supply and communication cables are available in several lengths. The cables can be easily extended by means of suitable cable couplings.

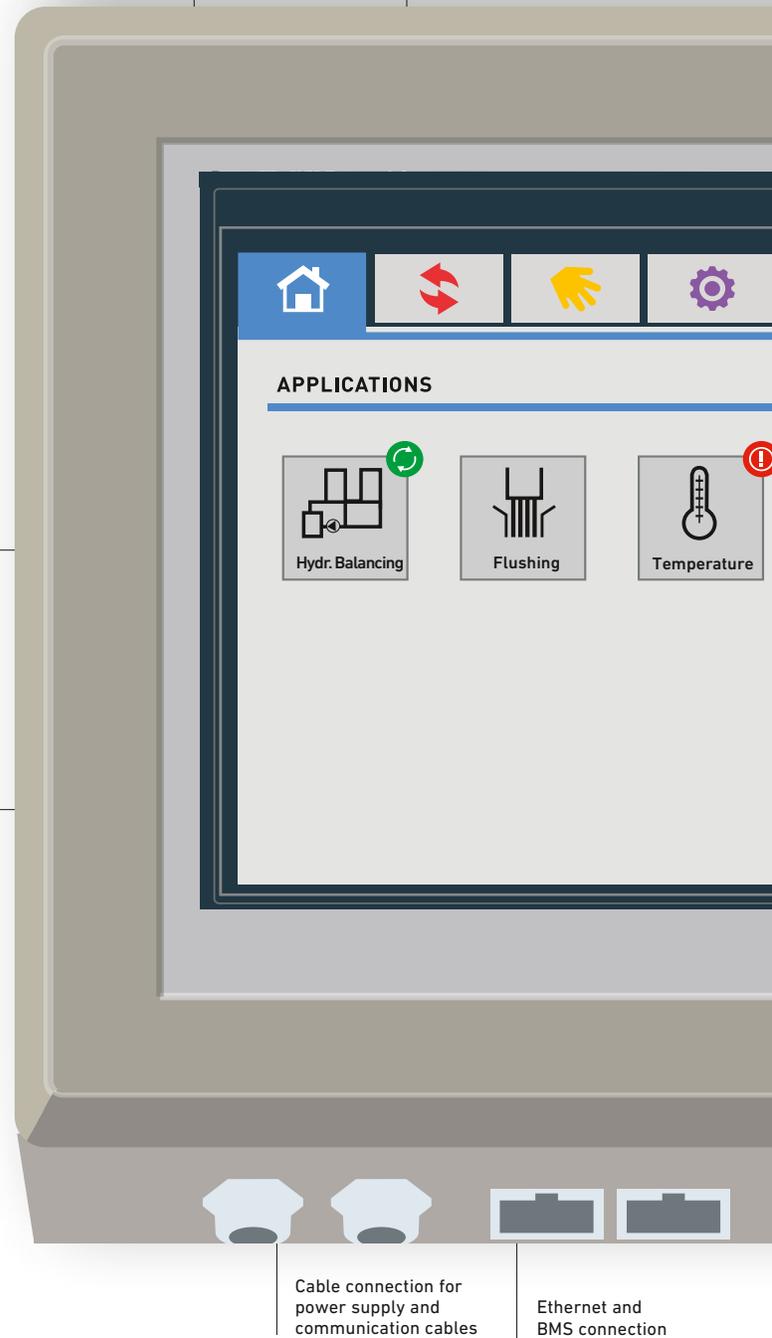
When connecting the cable to the valve, the valve automatically detects input and output. All plug connections (M12) are designed to rule out installation errors.

Bluetooth connection



Running application

The current values of the connected valves and sensors are displayed in real time.



Cable connection for power supply and communication cables

Ethernet and BMS connection



**Manual mode**

All valves and sensors can also be controlled directly.



**Settings**

System parameters (date, time, units and language) can be adjusted at any time.



**Logs**

Automatically created logs, e.g. for example, for temperature curve or thermal disinfection, can be displayed and retrieved.



Context-sensitive help



UPS connection



USB connection



Potential-free contact connection



110 V

## Hycleen Automation System – Logging

# Logging Data and Creating Reports

Temperature monitoring is the most important instrument for building owners and operators to assess the state of their potable water installation and quickly and reliably detect risks. In addition, system performance is logged to show that the building has been operating safely.

The Hycleen Automation Master does not only log the temperature at all valves, but also provides pre-programmed reports containing a clear overview of all readings. Trends can easily be interpreted and reacted upon immediately in case of deviations

### Logging the temperature

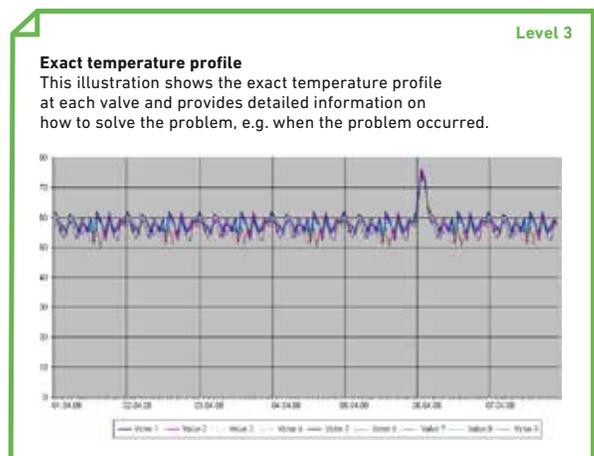
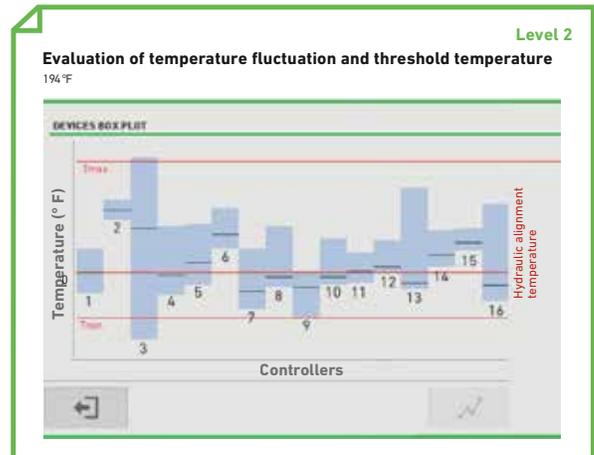
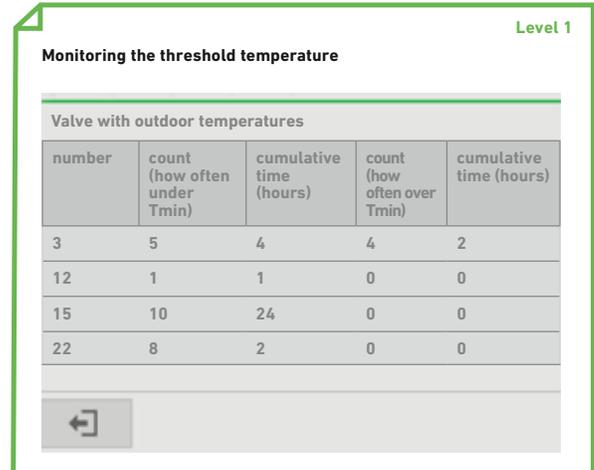
Depending on the desired accuracy, temperature readings can be logged every 5, 15, 30 or 60 minutes.

### Pre-programmed reports

The following reports are available:

- Temperature for hydraulic balancing
- Temperature for flushing
- Thermal disinfection
- Automatic flushing
- Error message

The report period is adjustable: one day, one week or one month. The data is evaluated for each individual valve and the most important information is displayed in either a clear chart or diagram. All reports can be exported in PDF and XML formats. The information is given in three levels of detail.



All data can be exported.

## Hycleen Automation System – Components

# Valve

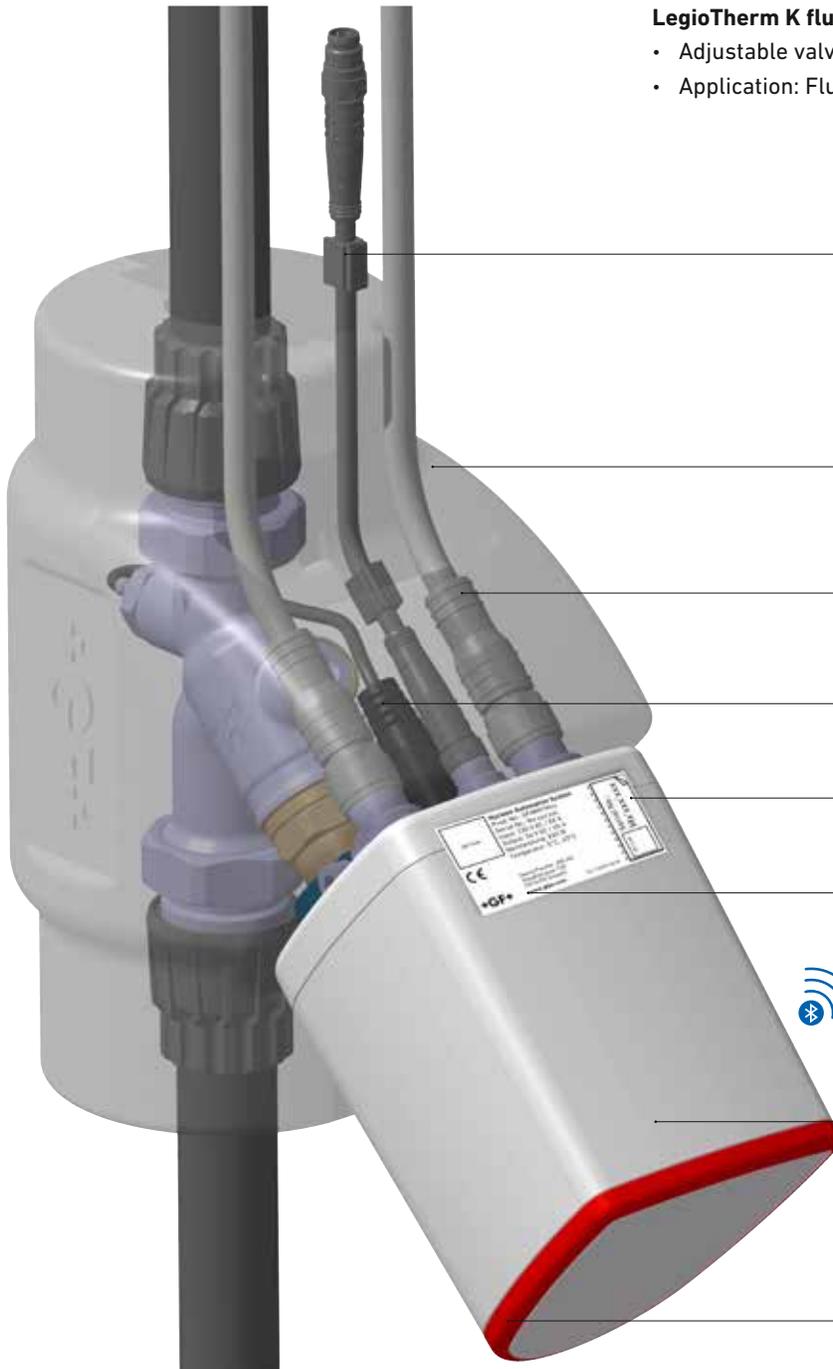
The LegioTherm 2T and LegioTherm K valves, together with the Master, are at the heart of the Hycleen Automation System, water temperature readings are permanently taken by the valves; the values are passed on to the Master. The valves are activated dependent on preprogrammed parameters. During commissioning, all valves are automatically detected by the Master by their ID.

### JRG LegioTherm 2T circulation controller

- Adjustable leakage rate flow rate when the valve is closed
- Higher linearity and more precise regulation thanks to special cone profile
- Application: hydraulic balancing, thermal disinfection, maintenance flushing (once a week)

### LegioTherm K flush valve

- Adjustable valve stroke: Flow rate with open valve
- Application: Flushing of cold or hot water installation



**Connection (M8) for external sensor**  
4 to 20 mA input, directly to the valve

**Insulation**

**Fast, error-free wiring**  
Automatic detection of input and output during commissioning

**PT1000 temperature sensor**  
Integrated in valve and completely immersed in water

**Peelable label**  
With serial number of the valve to be pasted in the installation plan

**Nameplate**  
With valve ID and QR code with further information

**Bluetooth connection to external tablet / smartphone**  
Can be switched on and off



**Controller including electric actuator with encoder**  
Valve position always known  
Short opening and closing time of 15 s

**Activity indicator (LED ring)**  
Colour of the LED ring depends on the valve – red (LegioTherm 2T) or green (LegioTherm K) – and state of the valve (open / closed)

# Possible uses

In today's buildings, special care must be given to monitoring potable water systems and keeping them safe. Potable water hygiene also poses a challenge in large properties with fluctuating water consumption e.g. hotels as well as in public buildings with a lot of coming and going such as schools or offices.

Planning errors and improper operation can lead to stagnation and unfavourable temperatures in the piping system. This can lead to microbiological contamination of potable water by Legionella and other pathogens. Consequently, it often proves difficult to ensure high potable water quality in spacious properties.

With ever increasing regulations, building owners and operators are pushed to take measures to ensure quality potable water supply and avoid complaints, negative publicity, building down time, and even criminal penalties.

The Hyclean Automation System reliably and simply supports the planning, installation, operation and maintenance of potable water installations, especially in large building complexes:

- The hydraulic balancing ensures sufficiently high temperatures and sustainably prevents biofilm formation.
- Automatic flushing cycles prevent stagnation and ensure regular water exchange in cold and hot water distribution.
- Permanent temperature monitoring is the most crucial factor when ensuring potable water hygiene.
- Regular thermal disinfection kills existing germs.
- Continuous data logging of all readings for seamless documentation of the operating values and presentation to a supervisory body.



### Retirement homes

Hygiene is very important in retirement homes because their inhabitants are of older age and often immunocompromised. That is why, safety of the potable water is of central importance. Retirement home operators are well advised to pay special attention to hygiene in the potable water system in order to exclude health risks for their inhabitants as far as possible.

### Hotels

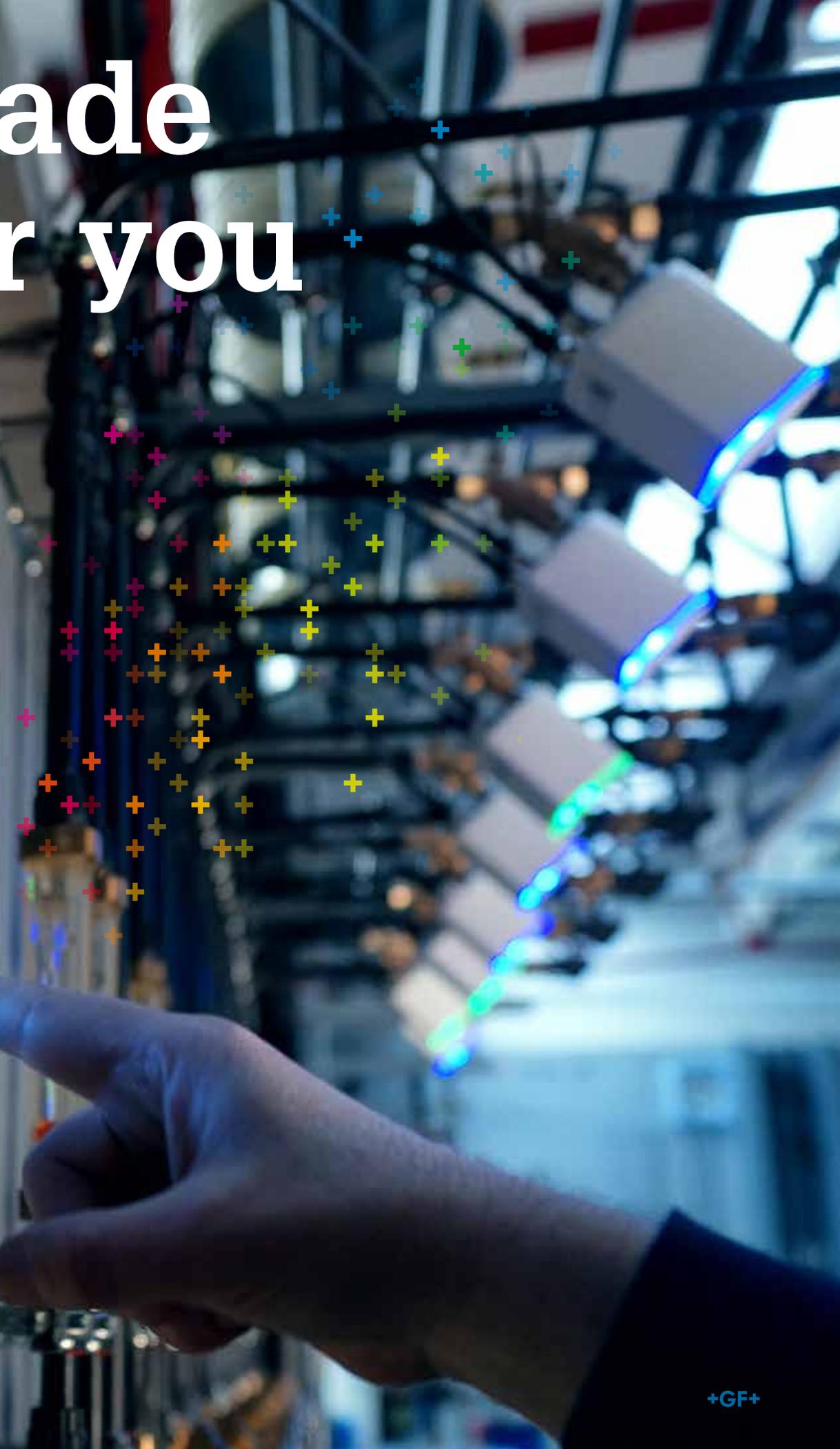
In many hotels, rooms and tapping points are not permanently in use. Especially in view of occasional vacancies, it is advisable to pay particular attention to the hygiene in the potable water installations and to flush them regularly. Highest potable water quality is important, since hotels provide accommodation to people with diverse health condition – an important point for operators in their effort to make all guests feel comfortable.

### Hospitals

Hospital hygiene must meet the highest standards. Safe and hygienically impeccable water supply is crucial. Potable water is in use everywhere – when washing your hands before surgery, cleaning surgical instruments and hospital equipment, providing catering services, up to cleaning the hospital or doing the laundry.

You simply cannot do without hygienically impeccable water. Rules of conduct in hospitals help combat the spread of infections. The Hycleen Automation System ensures efficient protection from contamination in the piping system, sustainable protection from infection and helps to prevent nosocomial infections.

# Made for you

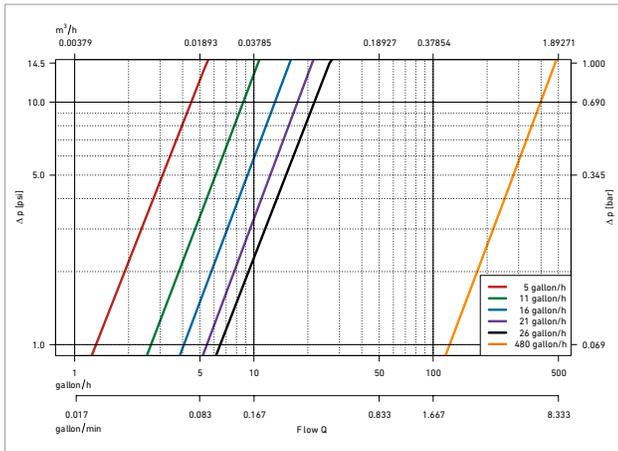


# Hyclean Automation System

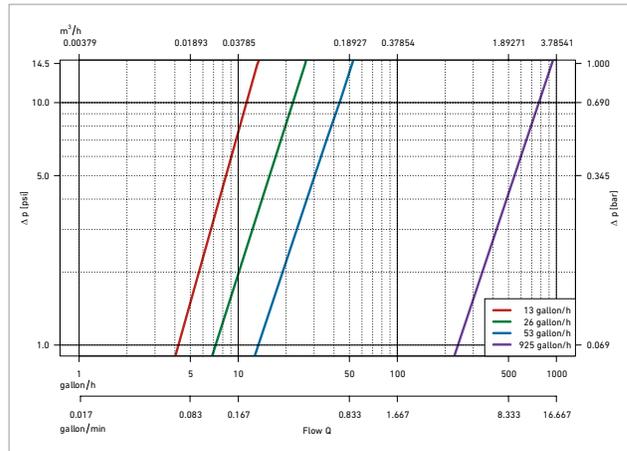
# Specifications

## + Nomograms

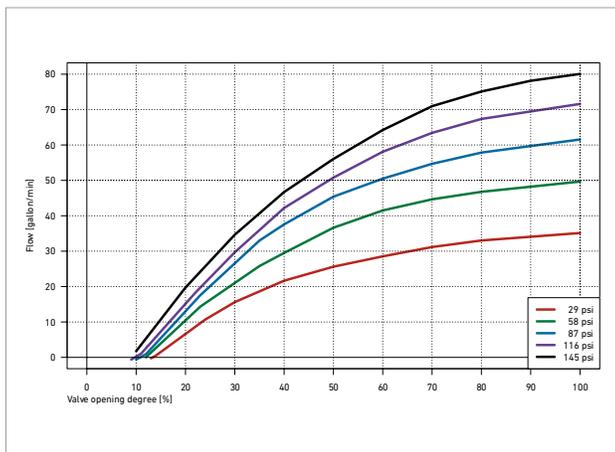
Pressure loss LegioTherm 2T DN15



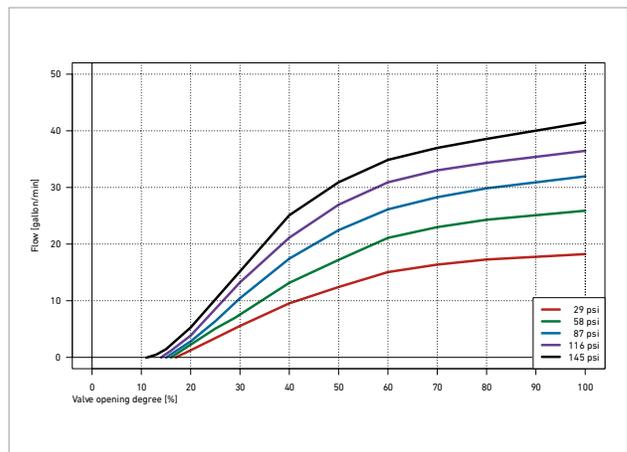
Pressure loss LegioTherm 2T DN20



Flushing capacity LegioTherm K DN15



Flushing capacity LegioTherm K DN20



# Products



### Hycleen Automation Master (US)

- Description: master for max. 50 controller
- Material: plastic
- Consisting of: touchscreen 10.1", power supply, bluetooth connection, 2 plugs M12 for 2x 984ft cable, 2 Rj45 jacks (Ethernet), 2 USB connections (read/write), USB jack (read only), relay output, screw set

| Voltage    | JRG Code        | Weight (lb) | l (inch) | b (inch) | h (inch) | Version |
|------------|-----------------|-------------|----------|----------|----------|---------|
| 110V / 36V | <b>9900.002</b> | 5.07        | 12 53/64 | 3 5/16   | 8 27/64  | USA     |



### JRG LegioTherm 2T Circulation valve with controller, PN 10 (US)

- Temperature: max. 194°F
- Material: low lead brass
- Factory setting: 134°F (adjustable 32-194°F) thermal disinfection 158°F (adjustable 140-194°F)
- Connection: male thread (for union connection with flat gasket)

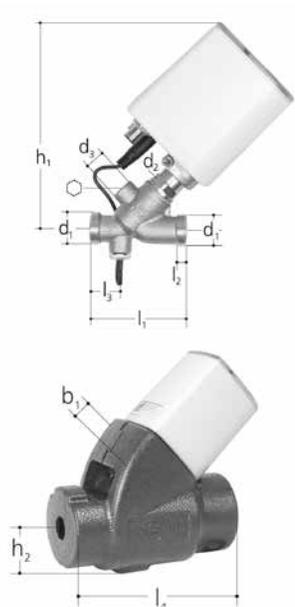
| DN (mm) | JRG Code        | GF Code            |
|---------|-----------------|--------------------|
| 15      | <b>9919.010</b> | <b>351 110 780</b> |
| 20      | <b>9919.020</b> | <b>351 110 781</b> |



| DN (mm) | Weight (lb) | d1 G (inch) | d2 G (inch) | d3 Rp (inch) | l1 (inch) | l2 (inch) | l3 (inch) | l4 (inch) | b (inch) | h1 (inch) | h2 (inch) |
|---------|-------------|-------------|-------------|--------------|-----------|-----------|-----------|-----------|----------|-----------|-----------|
| 15      | 1.807       | 3/4         | 1/2         | 1/4          | 2 61/64   | 15/64     | 15/16     | 6 13/16   | 3 35/64  | 6 3/8     | 1 31/32   |
| 20      | 2.314       | 1           | 3/4         | 1/4          | 3 27/64   | 9/32      | 15/16     | 8 7/64    | 3 5/8    | 6 21/32   | 2 1/8     |

| DN (mm) | ○ |
|---------|---|
| 15      | 6 |
| 20      | 6 |

# Products



### JRG LegioTherm K Flushing valve with controller, PN 10 (US)

- Temperature: max. 194°F
- Material: low lead brass
- Factory setting: 77°F (adjustable 34-194°F)
- Connection: male thread (for union connection with flat gasket)

| DN<br>(mm) | JRG<br>Code |
|------------|-------------|
| 15         | 9929.015    |
| 20         | 9929.020    |

| DN<br>(mm) | Weight<br>(lb) | d1 G<br>(inch) | d2 G<br>(inch) | d3 Rp<br>(inch) | l1<br>(inch) | l2<br>(inch) | l3<br>(inch) | l4<br>(inch) | b<br>(inch) | h1<br>(inch) | h2<br>(inch) |
|------------|----------------|----------------|----------------|-----------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|
| 15         | 1.807          | 3/4            | 1/2            | 1/4             | 2 61/64      | 15/64        | 15/16        | 6 13/16      | 3 35/64     | 6 3/8        | 1 31/32      |
| 20         | 2.314          | 1              | 3/4            | 1/4             | 3 27/64      | 9/32         | 15/16        | 8 7/64       | 3 5/8       | 6 21/32      | 2 1/8        |

| DN<br>(mm) | Ø |
|------------|---|
| 15         | 6 |
| 20         | 6 |



### Hycleen Automation power supply and communication cable (US)

- Description: For serial connection of Hycleen Automation System components (master, controller), incl. 2x M12 plugs, ROHS

| L<br>(ft) | Voltage | JRG<br>Code | GF<br>Code  | Weight<br>(lb) | d<br>(inch) | d1<br>(inch) |
|-----------|---------|-------------|-------------|----------------|-------------|--------------|
| 4.921     | 36V     | 9940.001    | 351 110 581 | 0.242          | 37/64       | 17/64        |
| 16.404    | 36V     | 9940.005    | 351 110 582 | 0.661          | 37/64       | 17/64        |
| 32.808    | 36V     | 9940.010    | 351 110 583 | 1.388          | 37/64       | 17/64        |
| 65.616    | 36V     | 9940.020    | 351 110 584 | 2.733          | 37/64       | 17/64        |
| 164.041   | 36V     | 9940.050    | 351 110 585 | 7.054          | 37/64       | 17/64        |



### Hycleen Automation Coupling (US)

- Description: Coupling between 2 Hycleen Automation power supply and communication cable

| JRG<br>Code | GF<br>Code  | Weight<br>(lb) | l<br>(inch) | h<br>(inch) |
|-------------|-------------|----------------|-------------|-------------|
| 9941.000    | 351 110 586 | 0.220          | 2 9/32      | 35/64       |