

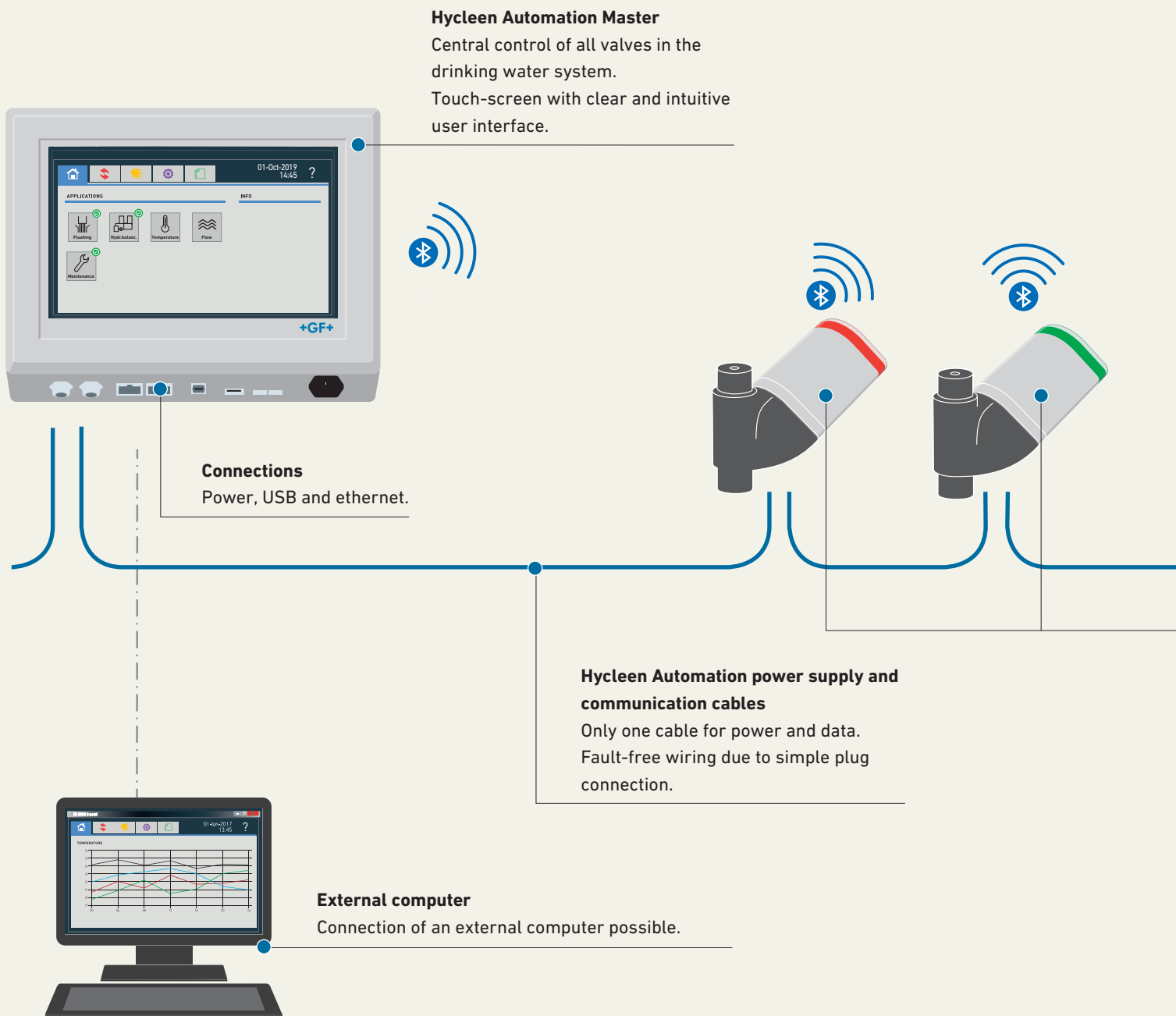
GF Piping Systems

+GF+

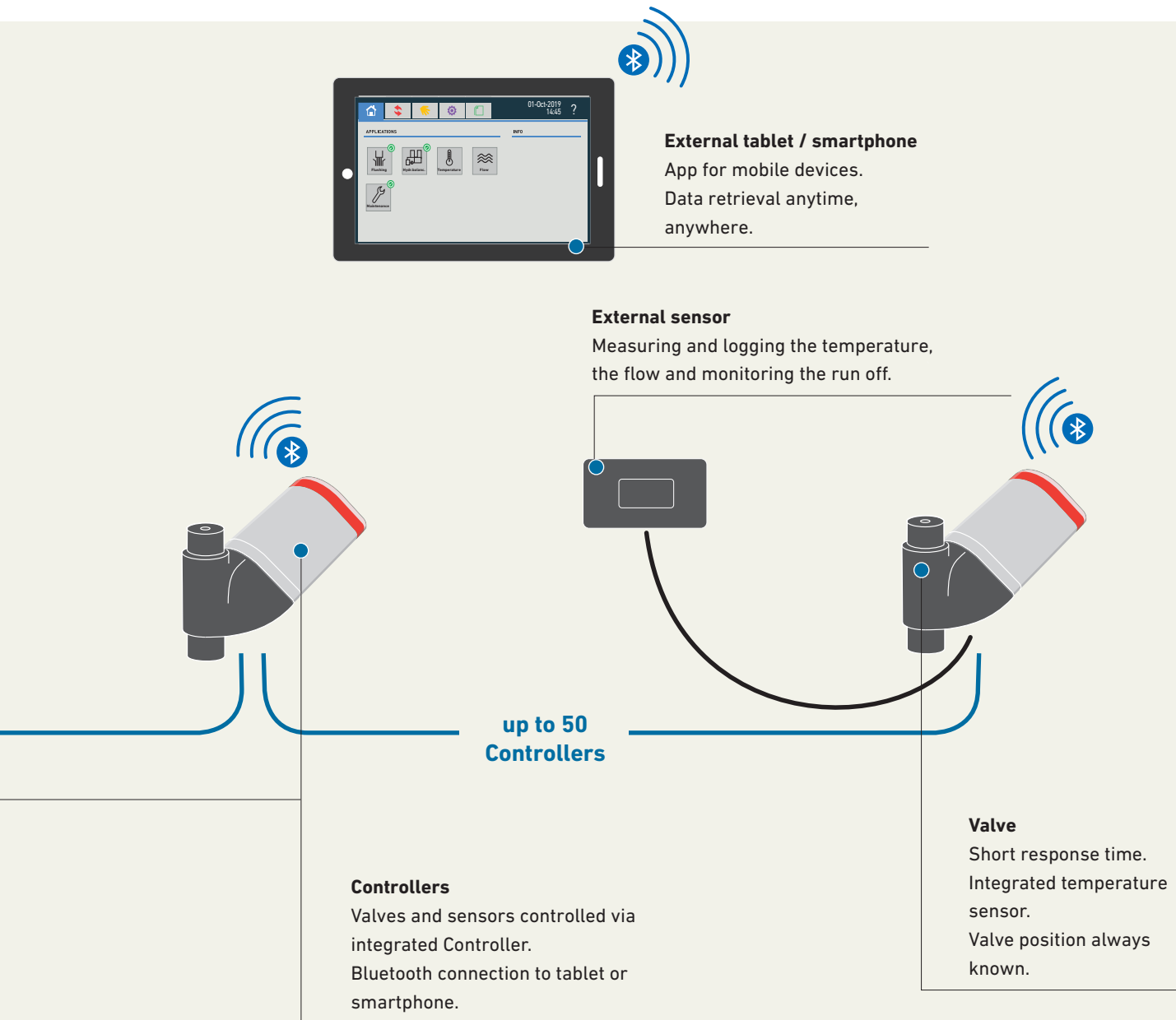
# Hyclean Automation System

Revolutionizing Potable Water Safety  
& Efficiency in Premise Plumbing

# Simply Controlling all Valves with One Master



The Hycleen 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 all processes and supports a safe, efficient potable water installation through logging and reporting. The synchronised components are wired to each other using a simple plug and play, single power/data cable set up.





## Hyclean Automation System

# Your Benefits

### + Hygiene



- System for hydraulic balancing and water flushing with preventive maintenance
- Quick reaction time and problem resolution based on constant monitoring
- Flexible adjustment of the valve opening
- Reduction of biofilm formation through the automatic flushing of all lines

### + Convenience



- User-friendly programming
- The desired water temperature is reached immediately
- Monitoring and logging the limit temperatures

### + Energy optimization



- Optimized balance of energy and hygiene, no need for security back ups (temperature)
- No unnecessary waste of resources and expenses
- Constant temperature monitoring and adjustment
- Short reaction times in case of temperature losses

### + Simplicity



- Simple planning, installation and initial start-up
- Simple system design, 1 Master for all applications
- Quick installation time
- Intuitive user interface

### + Engineers/Designers

#### Safe and fast to plan

System configuration according to simple rules, supported by our BIM and CAD database.

Applications and all parameters easy to program with the Master.

Hydraulic balancing for cold and hot water without elaborate 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 possible.

### + Building Owners & Operators

#### Low-maintenance potable water system

Thorough flushing of all potable water lines in an automated cleaning process.

#### Low risk application

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

#### Services

Support throughout planning, installation, commissioning, and operation. Data analysis and advice during operation.

Data read-outs and software updates.

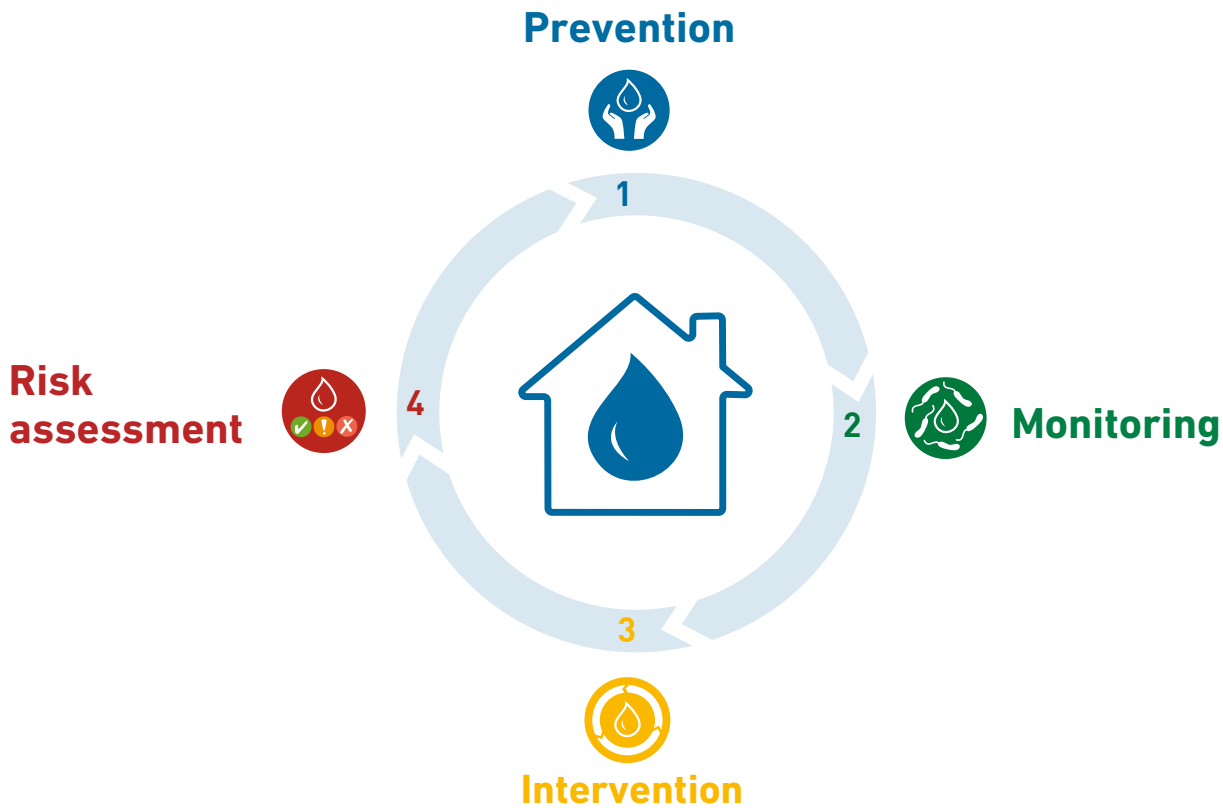
Hycleen Automation System

# 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 drinking water hygiene in 4 steps"



With its Hycleen Automation System, GF Piping Systems supports designers, installers and building owners/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 Hycleen valves and sensors as well as the easy-to-operate software and the smart Hycleen applications make it possible to automate important premise plumbing functions, such as maintaining consistent temperatures and reducing water age.

	<b>Prevention</b>	Sufficient circulation in all piping sections Ensuring the minimum temperature in hot water circulation Constant hydraulic balancing in all operating phases
	<b>Monitoring</b>	Continuous temperature monitoring Storing measuring data and logging
	<b>Intervention</b>	Implementation of controlled thermal disinfection possible
	<b>Risk assessment</b>	Comprehensive database for status and risk assessment



# + Hycleen Automation System Applications

The Hycleen Automation System offers versatile, ready-to-use applications for a safe and efficient potable water installation.

All programs and functions can be intuitively operated via the touch-screen on the Hycleen 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.

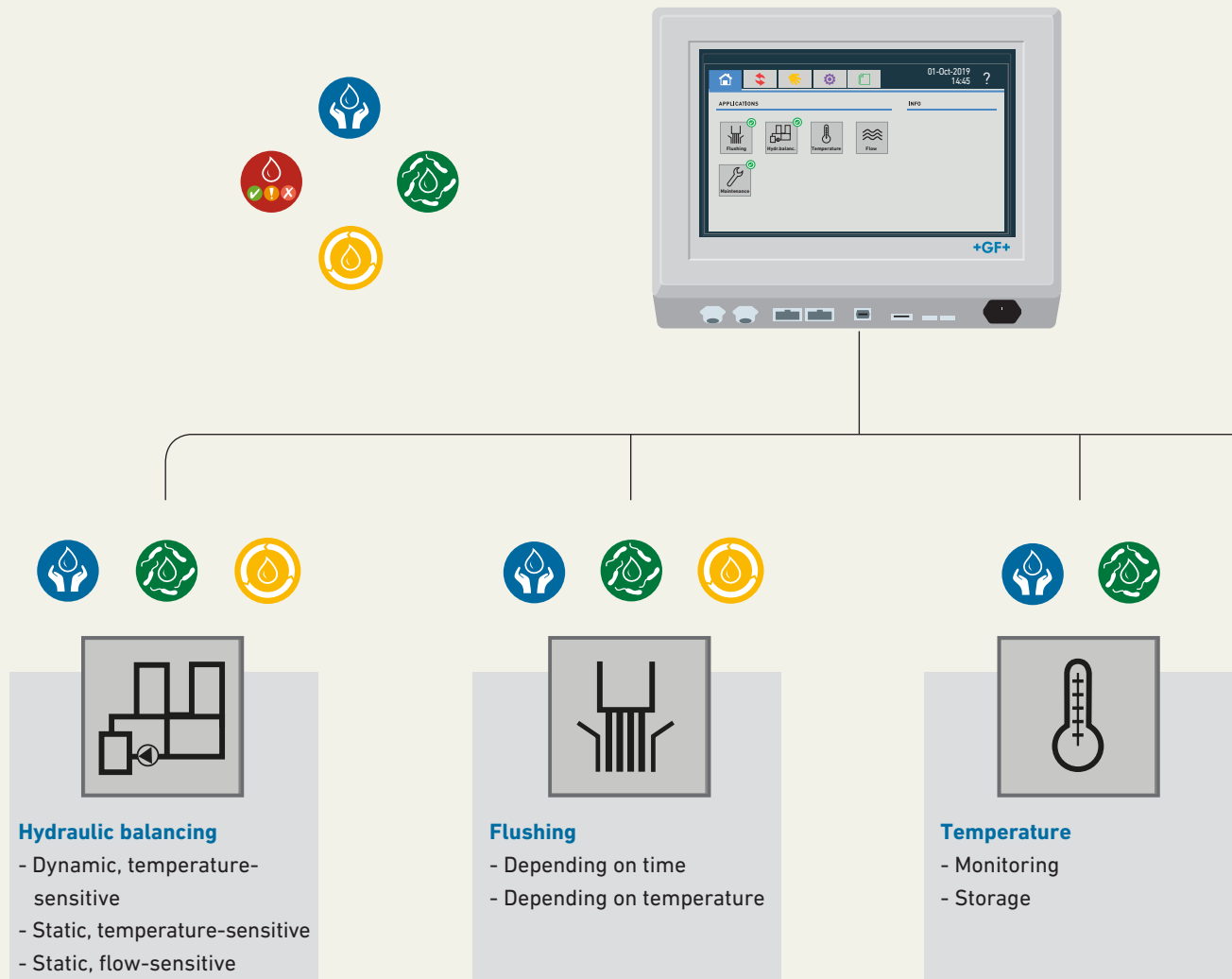
## Hycleen Automation Master

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

## Hycleen balancing valve

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

## Hycleen Automation Master





### Hycleen Flushing valve

- Flushing the cold and hot water system
- Temperature monitoring

### Temperature

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

### Flow

- Display of the flow in real time
- Storage of flow and volume

### Maintenance – Balancing valve

- Automatic maintenance once a week
- Prevents the valves from getting stuck or clogged



### Flow

- Monitoring
- Storage



### Maintenance

- Prevention (weekly)

## Hycleen Automation System – Application Hydraulic Balancing

# Hydraulic Balancing

Especially in larger hot water distribution systems – e.g. in hospitals, hotels, nursing homes – stagnation, non-compliant materials 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.

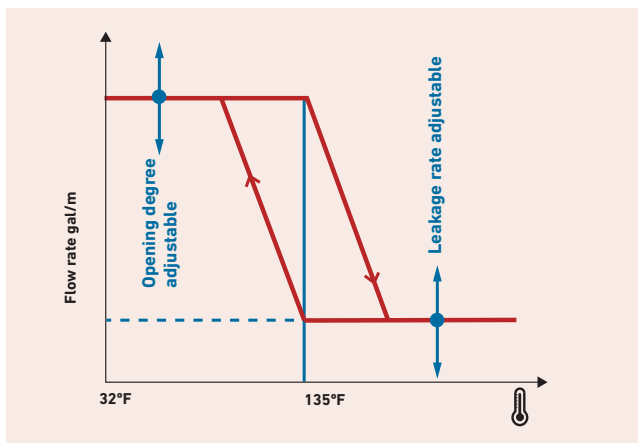
A lot of time and effort is invested into the design of a hot water distribution system which can easily be affected by conditions and changes in the field.

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

### Dynamic, temperature-sensitive hydraulic balancing

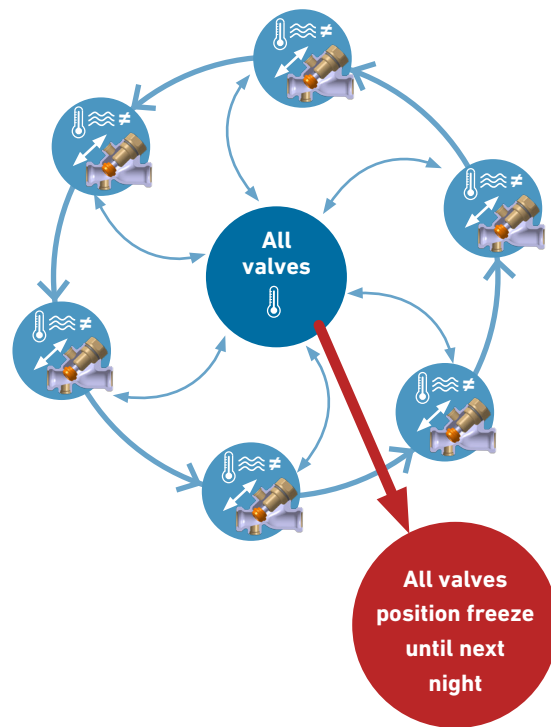
The circulation controllers with temperature sensor open and close automatically and regulate the flow as a function of the water temperature. If the temperature rises above the pre-programmed calibration temperature (default 135 °F), the circulation controller closes to leakage level (minimum flow). 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 hydraulic balancing according to temperature or flow

Once a day at a predetermined time, the Hycleen Automation Master, searches, based on historic data, for the ideal leakage rate of each individual circulation valve, until the set balancing temperature or nominal flow rate is reached on all circulation valves. The circulation controllers remain in this position until the next hydraulic calibration. It is recommended to schedule this process to take place overnight when water consumption is at the lowest. This eliminates the need for manual presetting of the circulation controllers during initial start up and saves the installer time during installation.



### Thermal disinfection

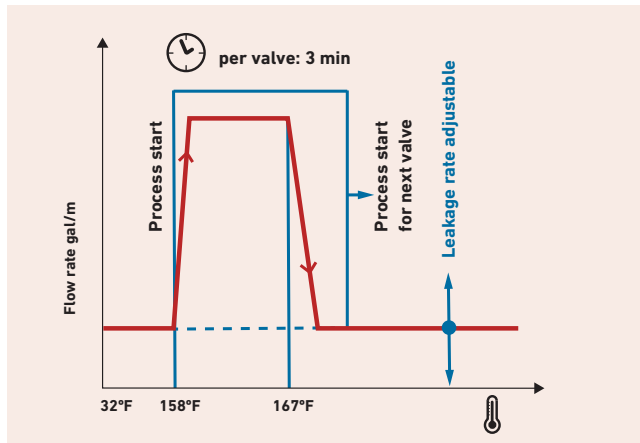
Thermal disinfection starts automatically or at a pre-set time when the hot water temperature is raised above start temperature (default 158 °F) at which Legionella are killed.

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 valves 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 calibration.

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 already 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.

### Thermal disinfection



### Safety thanks to monitored threshold temperature

Permanent monitoring of the limit temperature and automatic maintenance additionally increase safety. 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 balancing, the valve opens automatically to compensate for the temperature drop.

### Automatic maintenance

In order to prevent particles such as lime or sand from depositing in the valve and clogging it, 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.

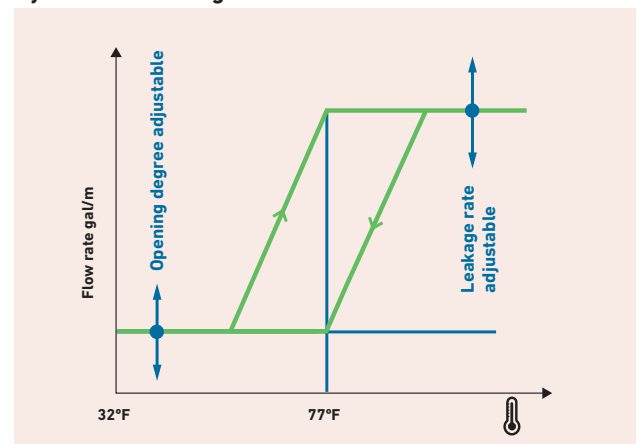
Both after a temperature alarm and after automatic maintenance, the valves return to the stored position for hydraulic balancing. If the temperature values no longer match those stored, the hydraulic calibration will be restarted.

### Hydraulic balancing cold water circulation

To prevent stagnation in the cold water lines and to keep the temperature below 77 °F, which is critical for hygiene, a cold water circulation can be installed.

This is based on the fact that inside the building, cold water in the pipes can heat up relatively quickly. The heating up depends on the pipe diameter, temperature and time. This leads to stagnating cold water in small pipe dimensions heating up considerably within a few hours (over 77 °C). For this reason, the hydraulic balancing valves, as shown in the graph depicted below, can maintain the potable water temperature at the set temperature level.

### Hydraulic balancing cold water circulation



# Automatic Flushing

## Depending on Temperature or Time

If water stagnates over a long 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 drinking water installation and a high bacteria concentration can be reduced sustainably. The Hyclean Automation System allows automatic flushing of cold and hot water pipes depending on the temperature or a specific time.

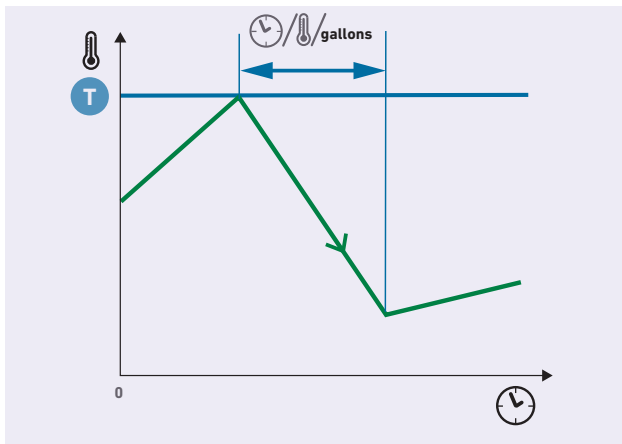
### Temperature controlled flushing

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

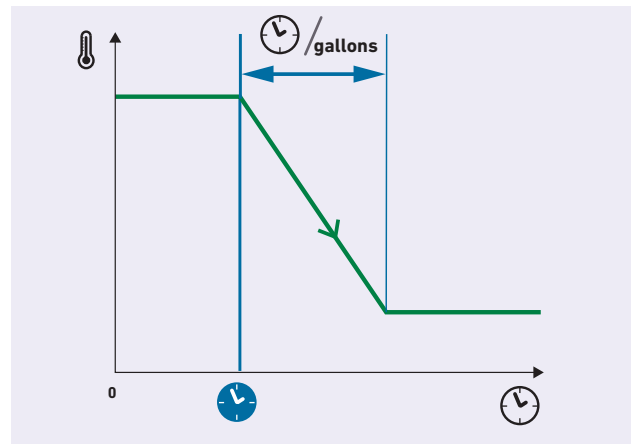
### Timed flushing

All 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 at will, so that several flushing cycles per day are possible. Each flushing process is logged.

Temperature controlled flushing



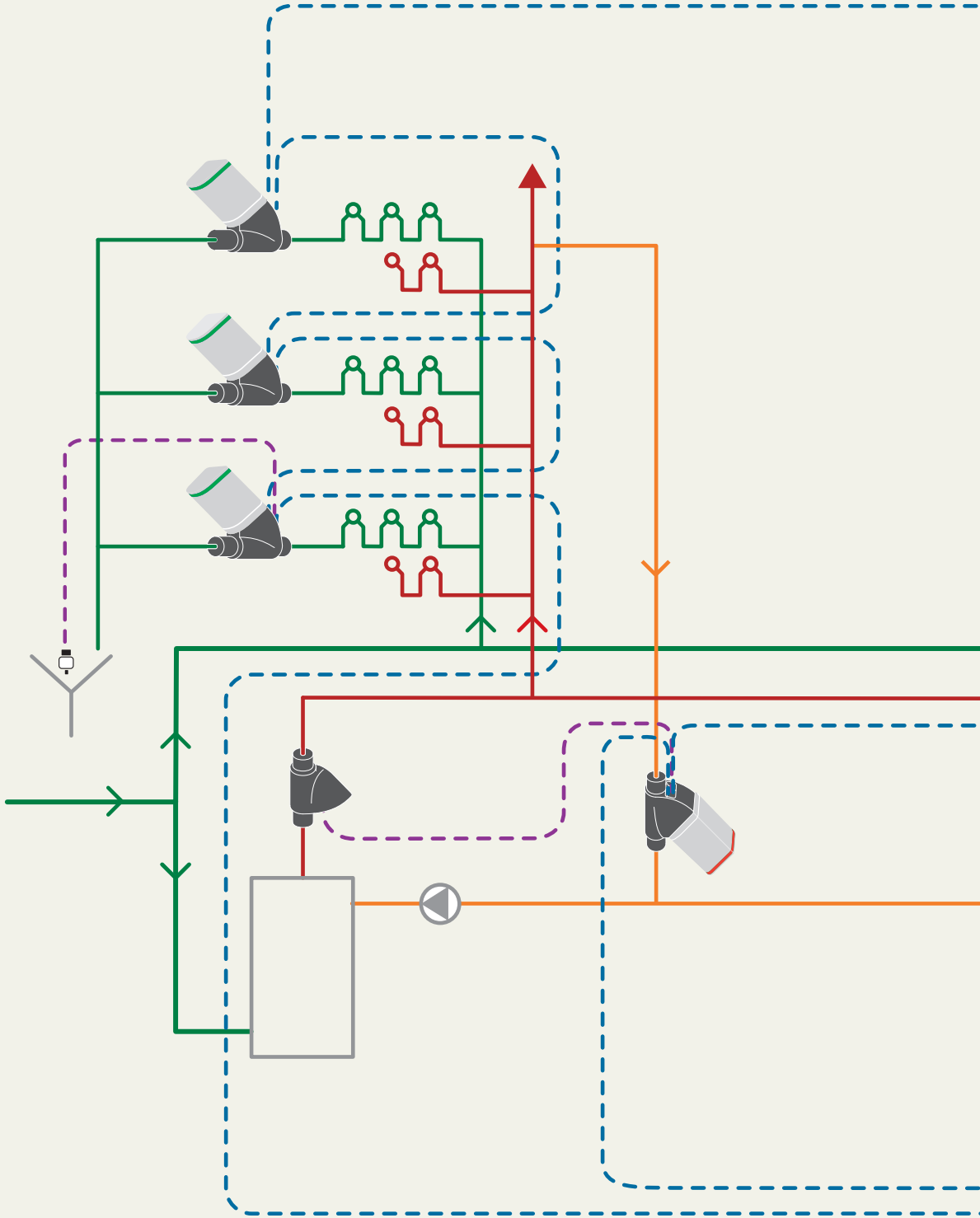
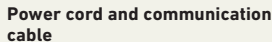
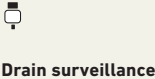
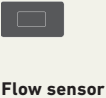
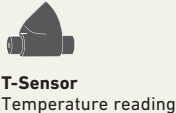
Timed flushing

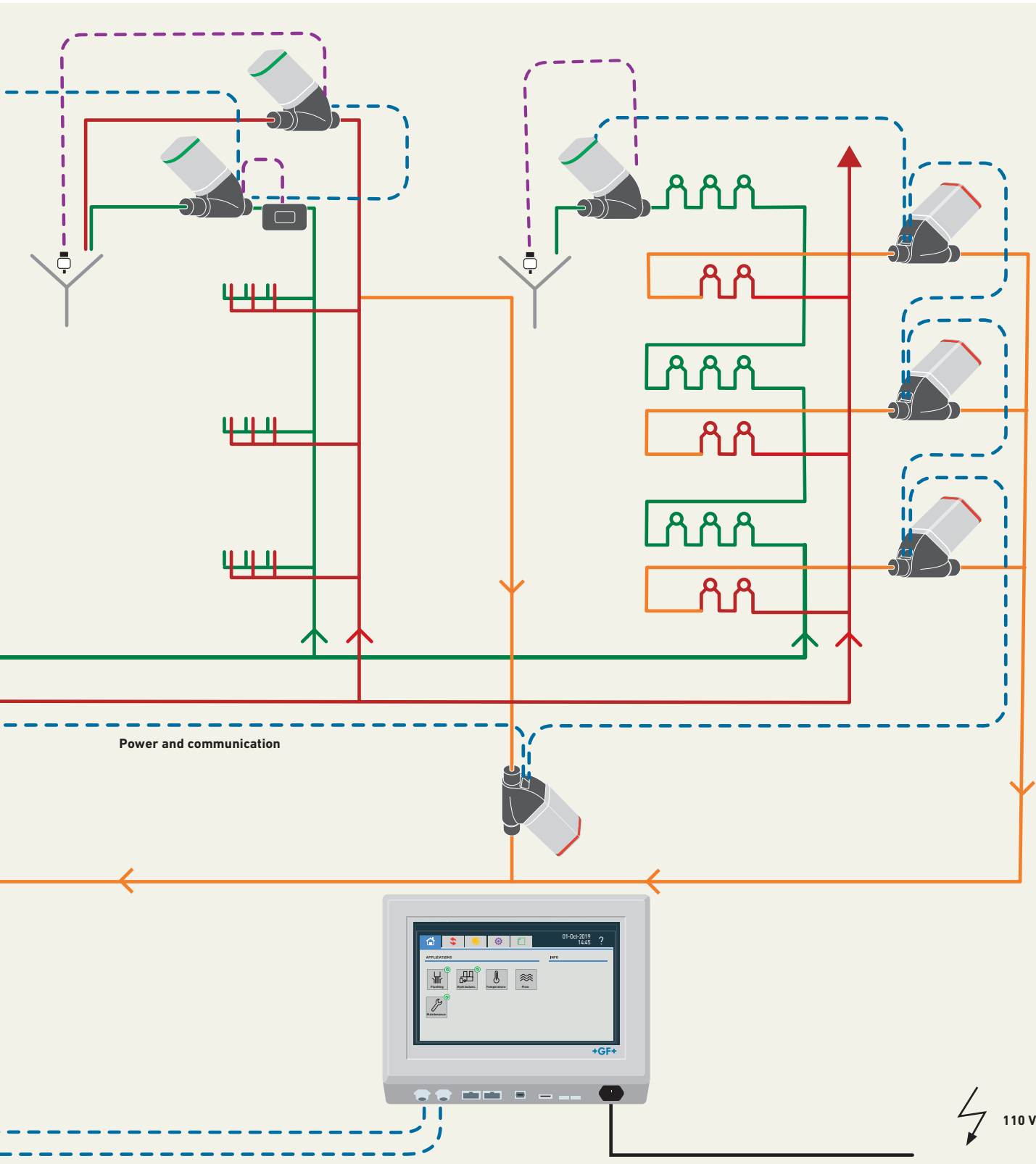




# Installation Diagram

**System components**





## Hycleen Automation System – Product range

# Master

The Hycleen Automation Master controls up to 50 controllers on two cable harnesses (Total max. 3280 ft).

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.

### Applications

Flushing, Hydraulic balancing, Temperature, Flow, Maintenance

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.

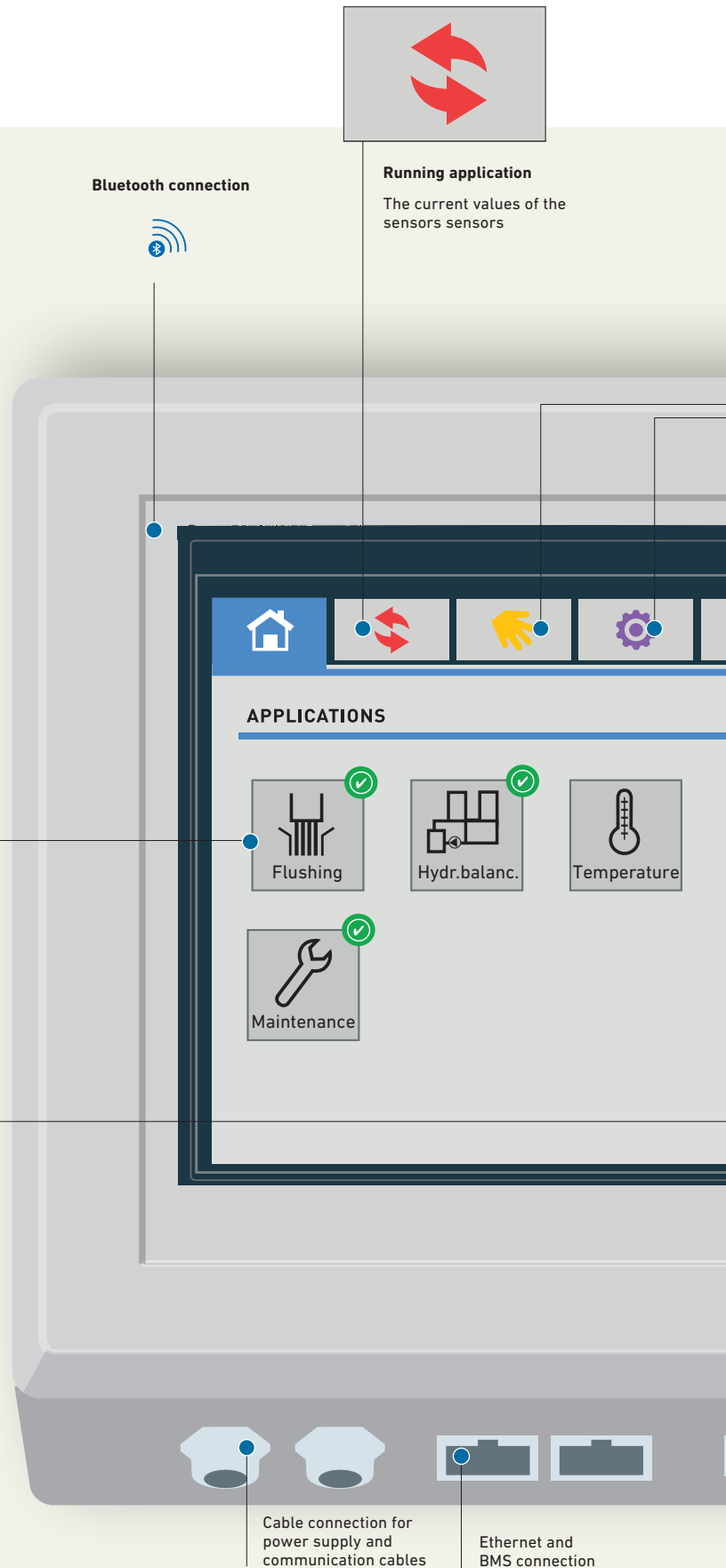
When connecting the cable to the valve, the valve automatically detects input and output. All plug connections (M12) are designed to rule out installation errors.

Bluetooth connection



Running application

The current values of the sensors



Cable connection for power supply and communication cables

Ethernet and BMS connection





**Manual mode**

All valves and sensors can also be controlled directly.



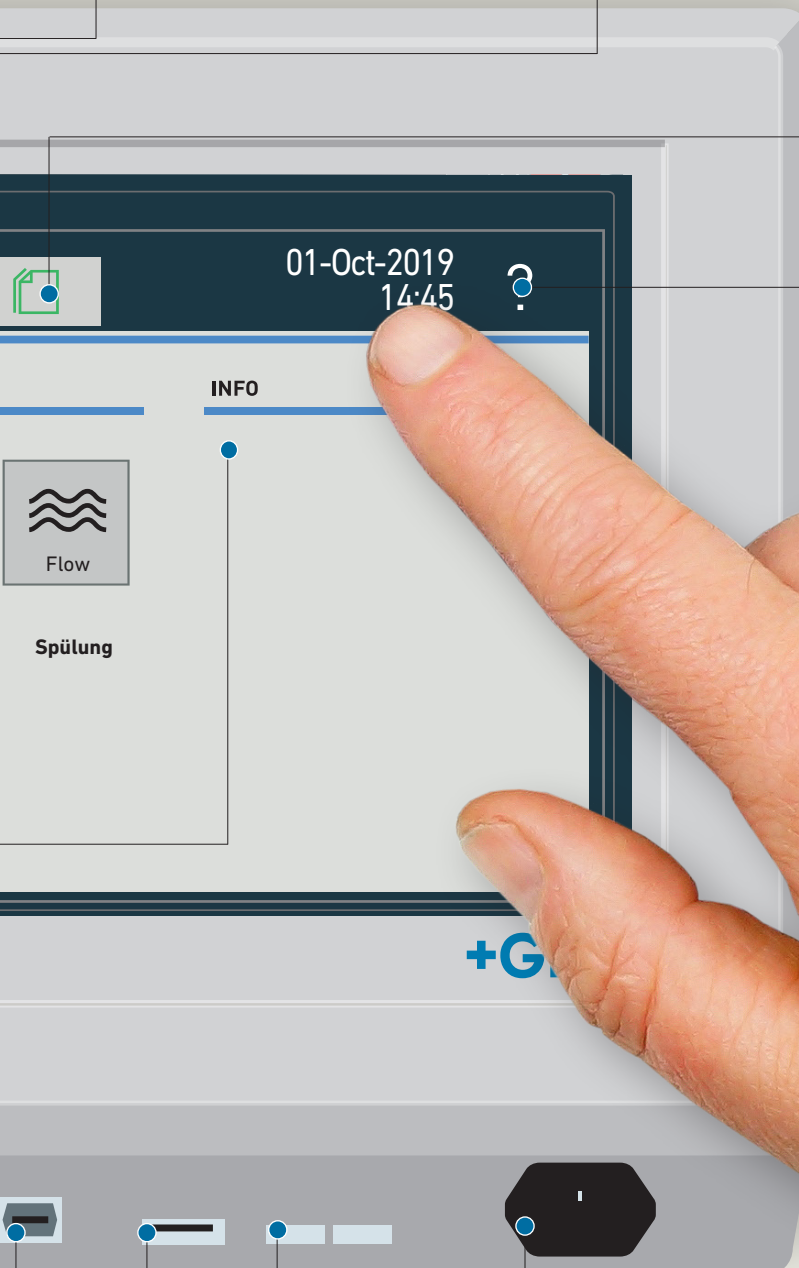
**Settings**

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

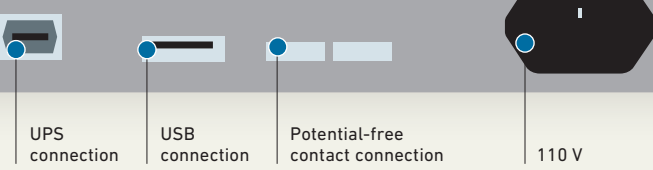


**Logs**

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



Context-sensitive help



## Hyclean Automation System – Product range

# Valve

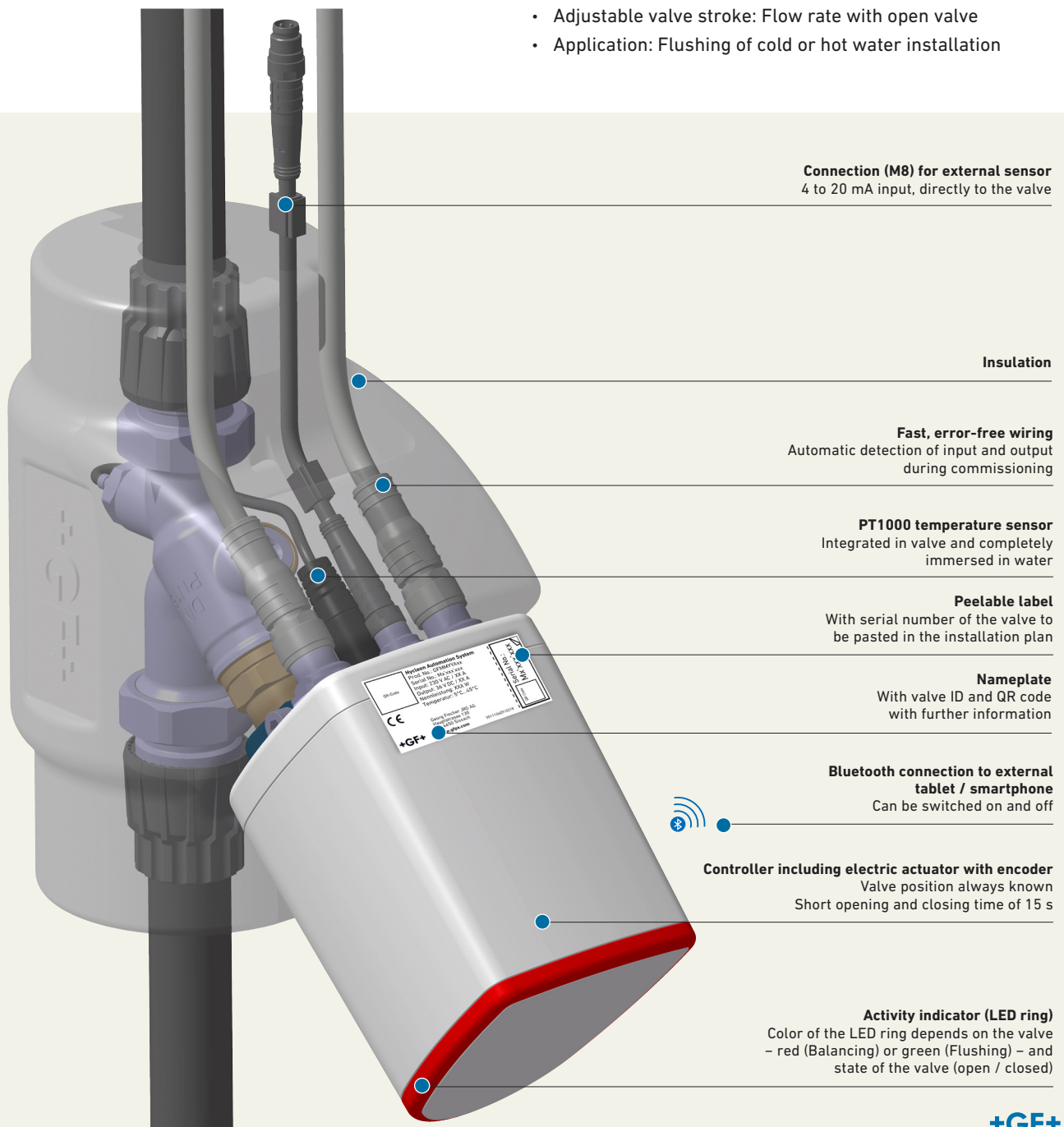
The Hyclean balancing and flushing valves, together with the Master, are at the heart of the Hyclean Automation System. Water temperature readings are permanently taken by the valves; the values are passed on to the Master. The valves are activated dependent on preprogrammed parameters. During commissioning, all valves are automatically detected by the Master by their ID.

### Hyclean balancing valve

- Adjustable position of leak rate and maximum opening degree
- Higher linearity and more precise regulation thanks to special cone profile
- Application: hydraulic balancing, thermal disinfection, automatic maintenance (once a week)

### Hyclean flushing valve

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



## Hycleen Automation System – Product range

# Sensors

All sensors are automatically detected and monitored by the Master

### T-Sensor

The external temperature sensor monitors the temperatures at additional locations, for example at the input/output of the hot water supply and return.

### Flow sensor

The flow sensor is connected to any Hycleen Automation valve, and measures the volume and flow rate. The flow

sensor connected to a balancing valve allows a static hydraulic balancing based on a set flow rate.

### Drain surveillance

The drain surveillance adds safety to the flushing process. It is inserted in the drain pipe and connected to a flushing valve. The additional safety element initiates a signal when the water level rises, which suspends the flushing process.

### Flow sensor

**M8 plug**  
Connection to a valve  
Sensor type is automatically recognized by the Master



**Flow sensor**  
Measurement of flow and flow rate

**Flow direction arrow**

### T-Sensor

Dimension-independent

**T-Sensor**  
Temperature monitoring

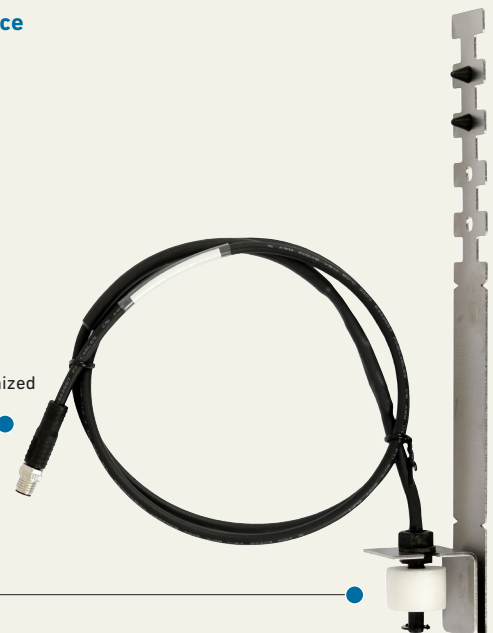
**M8 plug**  
Connection to a valve  
Sensor type is automatically recognized by the Master



### Drain surveillance

**M8 plug**  
Connection to a valve  
Sensor type is automatically recognized by the Master

**Float switch**





## Hyclean Automation System – Product range

# Building Automation

There is the option of using BACnet IP (Building Automation and Control network), or a connection can be established via Rest API (Representational State Transfer Application Programming Interface).

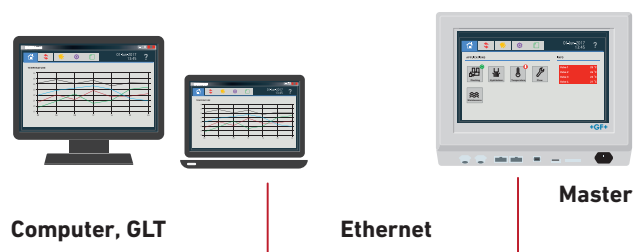
Data communication is through the applied interface.

Both interfaces allow connection of the Building Management System (BMS) with reading rights. BACnet is compatible with standard BMS systems, while Rest API is the interface of the future.

After acquiring the license, the following Automation System data can be read out via the superior BMS.

### Available options:

- Real-time data monitoring
- Data logging
- Alarm management



## Hyclean Automation System – Logging Data

# Logging Data Temperature and Flow

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

The Hyclean Automation Master does not only log the temperature at all valves, but also provides pre-programmed reports containing a clear overview of all readings. Thus, even the non-specialist can easily interpret trends and react immediately in case of deviations.

### Logging the temperature and the flow

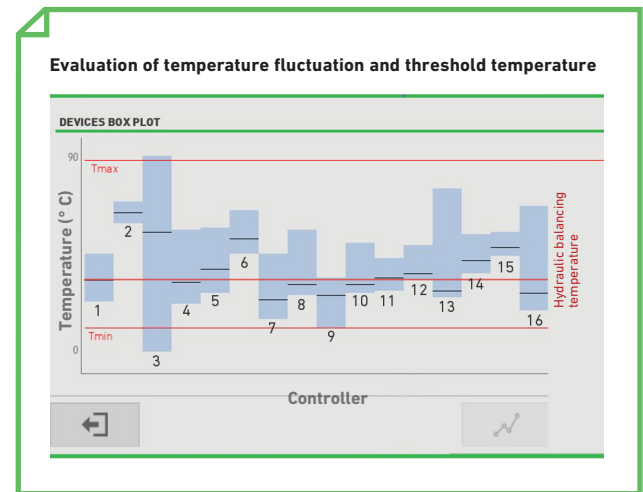
Depending on the desired accuracy, temperature readings can be logged every 5, 15, 30 or 60 minutes.

### Pre-programmed reports

The following reports are available:

- Hydraulic balancing
- Flushing
- Manual operation
- Maintenance

The time period for a report is adjustable: a day, a week, or a month. The data is evaluated for each individual valve and the most important information presented as a clearly structured table or diagram. All reports can be exported in the PDF and XML formats. The information is presented on three levels with different detail levels.



All data can be exported.

## Hyclean Automation System – Applications



# App

The Hyclean Automation System app allows monitoring on the go. You no longer have to go to the office or equipment room. It is enough to be in the vicinity of a valve. Simply connect the Smartphone to a valve for immediate access to the data on the master (reading rights only). With a simple Bluetooth connection, which can be turned on and off on the master.



# Possible uses

In today's premise plumbing systems, special care must be given to monitoring potable water systems and keeping them safe. Potable water hygiene 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 and non-potable water by Legionella and other pathogens. Consequences: It often proves difficult to ensure safe potable water in large complex facilities.

However, in view of tightened legal regulations facility operators are pushed to take measures to ensure safe potable water to avoid complaints, negative publicity, loss of revenue or even criminal penalties.

The Hycleen 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.



### Assisted Living Facilities

Hygiene is very important in assisted living facilities because their inhabitants are of advanced age and are often immunocompromised. That is why, safety of the potable water is of central importance. Assisted living operators are well advised to pay special attention to hygiene in the potable water installation in order to exclude health risks for their inhabitants.

### Hotels

In many hotels, rooms and plumbing fixtures 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. Potable water safety is important, since hotels provide accommodation to people with diverse health conditions – an important point for building owners and 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 here. 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, a sustainable protection from infection and helps to prevent nosocomial infections.

### Apartment buildings

For the increasingly aging population the lack of hygiene of potable water constitutes a higher risk. In addition, optimal hydraulic balancing ensures constant hot water temperatures, which in turn leads to increased user comfort and an energy-optimized design.

# Made for you

APPLICATION 'Hydraulic alignment'

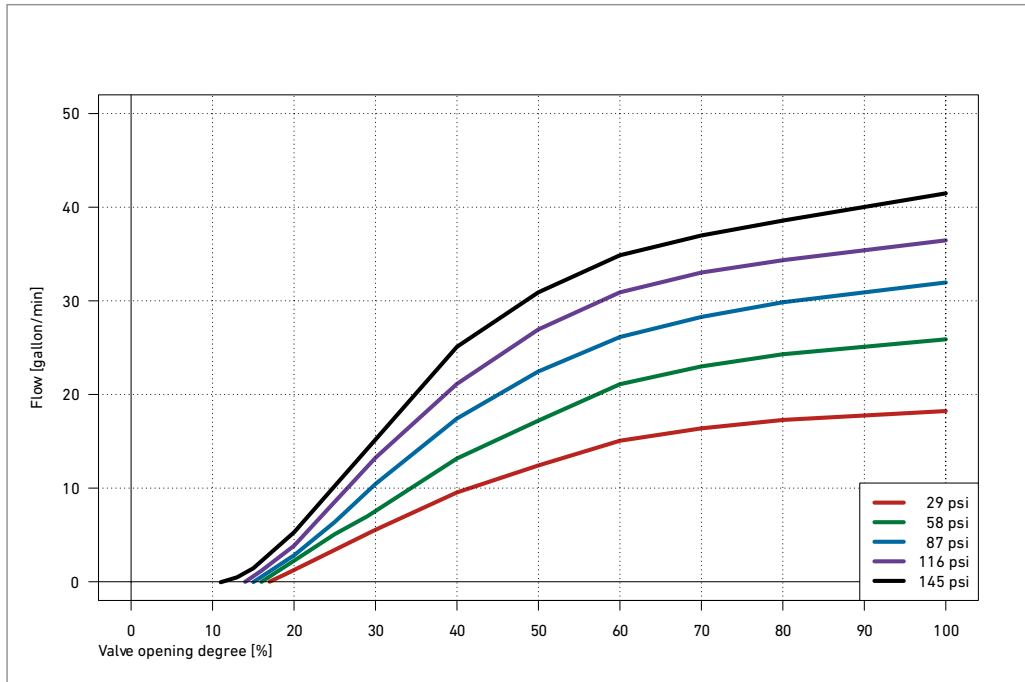
No.	Name	Value
1	Legiotherm	
2	Legiotherm	
3	Legiotherm	
4	Legiotherm	53°C
5	Legiotherm	56°C
6	Legiotherm	57°C
7	Legiotherm	57°C
	Legiotherm	58°C

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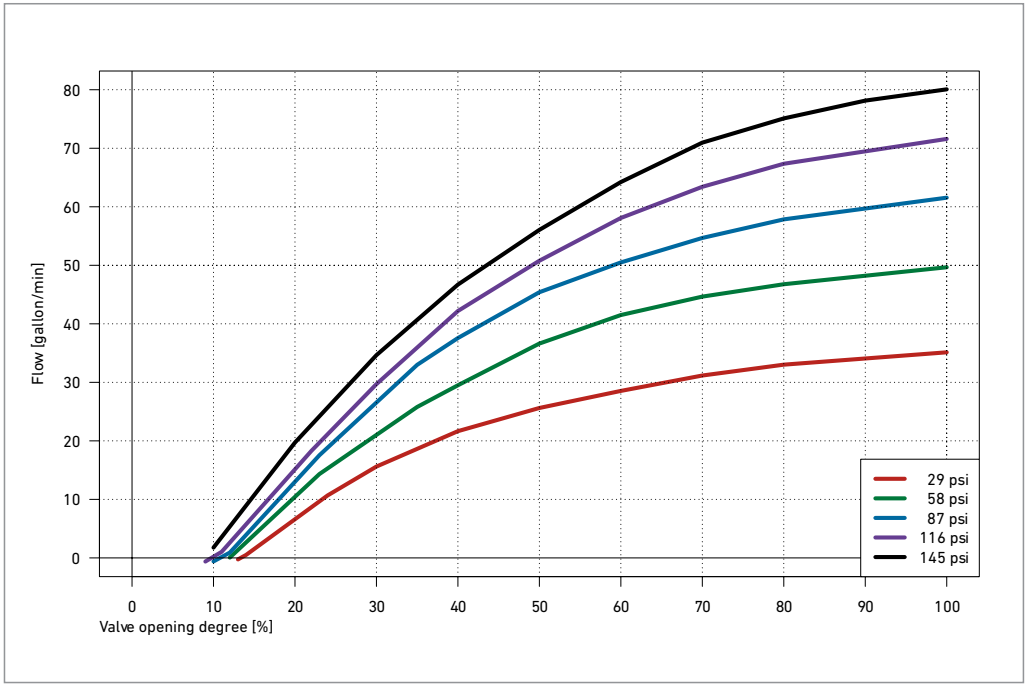


# Specifications

## + Nomogram Flushing Valve



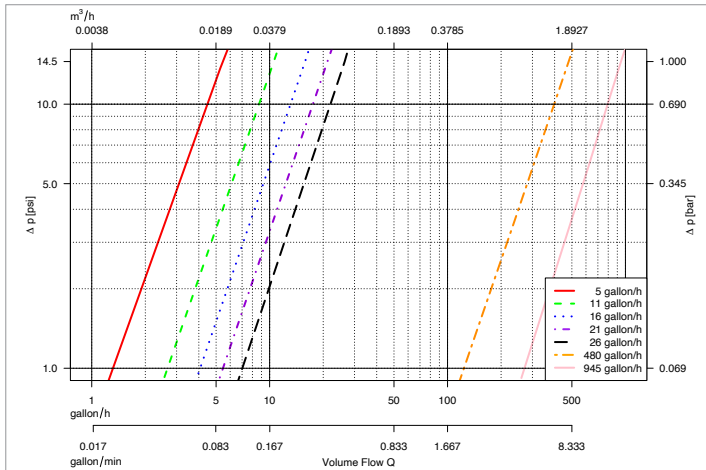
Flushing discharge rate  
1/2" (DN 15)



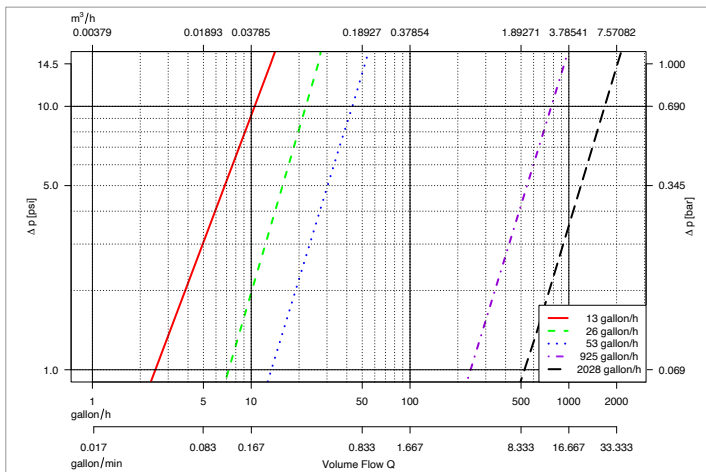
Flushing discharge rate  
3/4" (DN 20)

# Hyclean Automation System Specifications

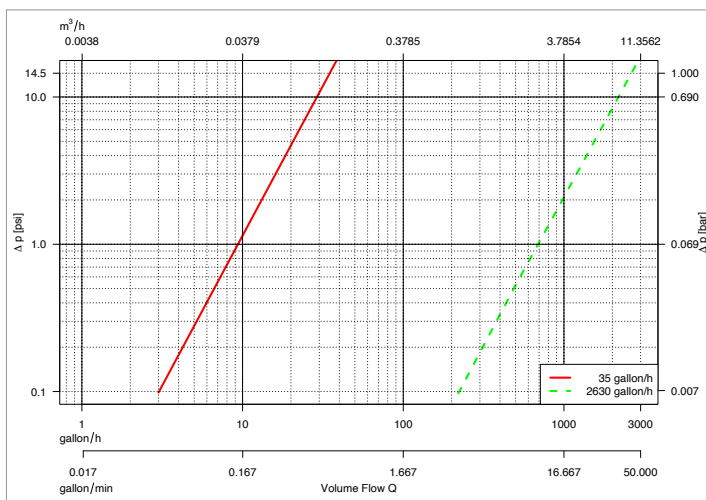
## + Nomogram Balancing Valve



Pressure loss ½" (DN 15)



Pressure loss ¾" (DN 20)

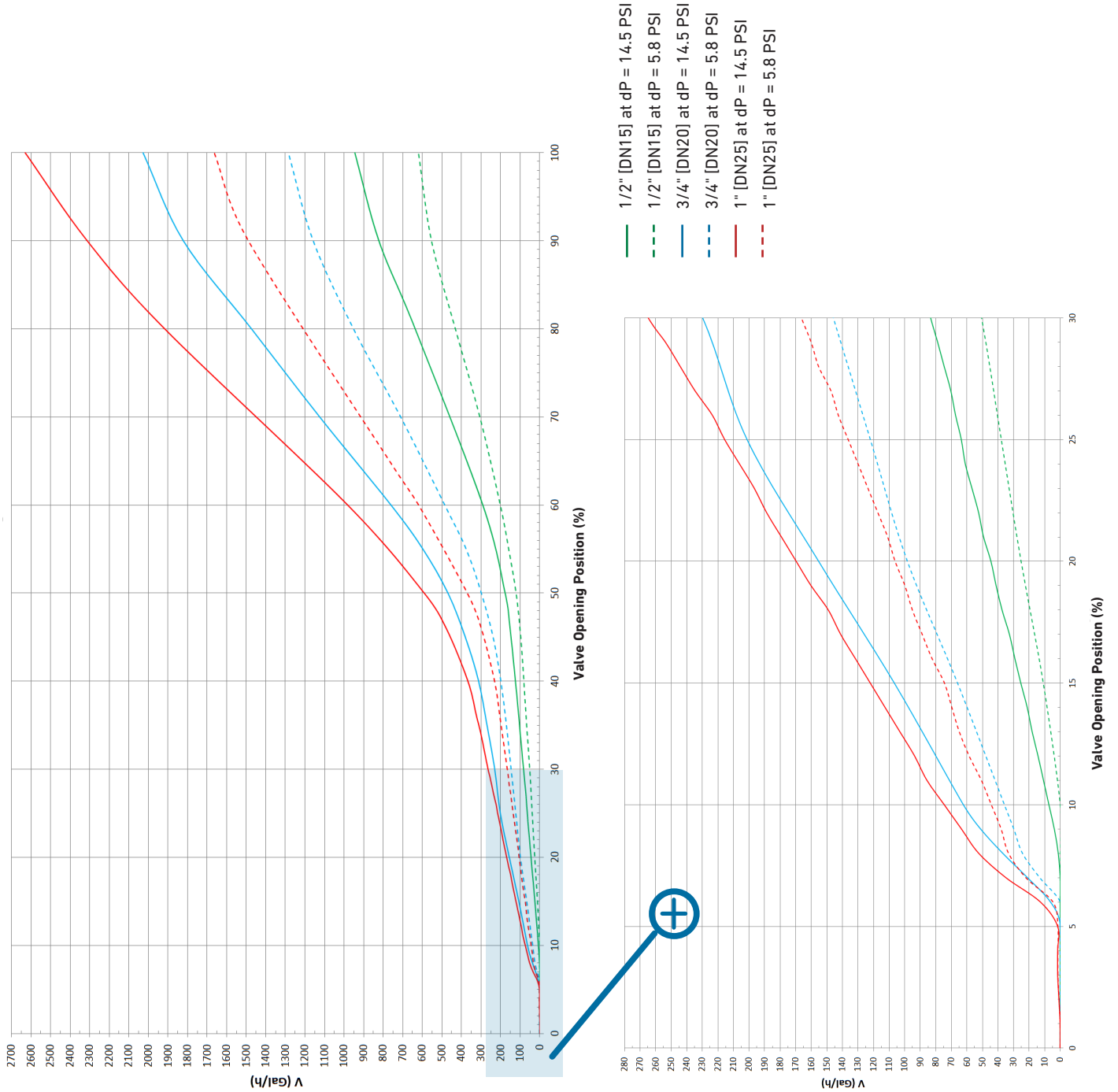


Pressure loss 1" (DN 25)

# Hyclean Automation System Specifications

## + Nomogram Balancing Valve

Characteristic curve opening degree valve



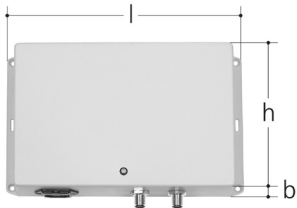
# Product range



### Hycleen Automation Master

- Description: master for max. 50 controller
- Consisting of: touchscreen 10.1", power supply, bluetooth connection, 2 plugs M12 for 2x 984ft (300m) cable (1640 ft/500m with powerbox), 2 Rj45 jacks (Ethernet), 2 USB connections (read/write), USB jack (read only), relay output, screw set

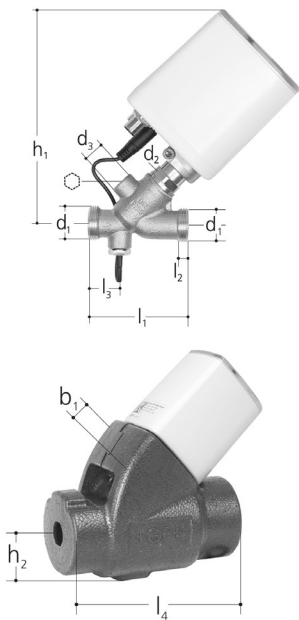
Voltage	Product Code	Weight (lb)	l (in)	b (in)	h (in)
110V/36V	<b>351 110 657</b>	5.07	12.83	3.31	8.43



### Hycleen Automation Powerbox

- Description: Power supply of Hycleen Automation System for expansion of 984ft (300m) cable length to max. 1640ft (500m) per cable line
- Consisting of: 6.5ft (2m) power cable, screw set

Voltage	Product Code	Weight (lb)	l (in)	b (in)	h (in)
110V/36V	<b>351 110 658</b>	2.20	9.61	2.52	6.46

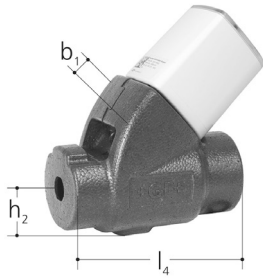
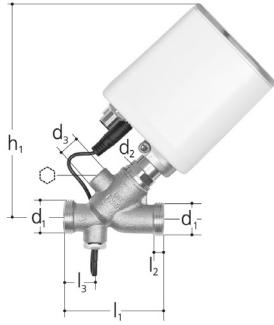


### Hycleen Balancing Valve

- Temperature: max. 194°F
- Material: brass, stainless steel, EPDM
- Factory setting: 135°F (adjustable 32 - 194°F) thermal disinfection 158°F (adjustable 140 - 194°F)
- Connection: male thread ( for union connection with flat gasket)
- NSF 61 Compliant

Size (in)	Product Code	Weight (lb)	d1 G (in)	d2 G (in)	d3 Rp (in)
1/2	<b>351 110 780</b>	1.81	3/4	1/2	1/4
3/4	<b>351 110 781</b>	2.31	1	3/4	1/4
1	<b>351 110 782</b>	3.09	1 1/4	1	1/4

Size (in)	l1 (in)	l2 (in)	l3 (in)	l4 (in)	b (in)	h1 (in)	h2 (in)	⊙
1/2	2.95	0.23	0.94	6.81	3.55	6.38	1.97	6
3/4	3.42	0.28	0.94	8.11	3.63	6.66	2.13	6
1	3.90	0.31	0.94	9.17	3.94	7.05	2.20	6



### Hyclean Flushing Valves

- Temperature: max. 194°F
- Material: brass, stainless steel, EPDM
- Factory setting: 77°F (adjustable 32-194°F)
- Connection: male thread (for union connection with flat gasket)

Size (in)	Product Code	Weight (lb)	d1 G (in)	d2 G (in)	d3 Rp (in)
1/2	<b>351 110 600</b>	1.79	3/4	1/2	1/4
3/4	<b>351 110 610</b>	2.25	1	3/4	1/4

Size (in)	l1 (in)	l2 (in)	l3 (in)	l4 (in)	b (in)	h1 (in)	h2 (in)	
1/2	2.95	0.24	0.94	6.81	3.55	6.38	1.97	6
3/4	3.42	0.28	0.94	8.11	3.63	6.65	2.13	6



### Hyclean Automation power supply and communication cable

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

Length (ft)	Voltage (V)	Product Code	Weight (lb)	d (in)	d (in)
4.9	36	<b>351 110 581</b>	0.24	0.57	0.27
16.4	36	<b>351 110 582</b>	0.66	0.57	0.27
32.8	36	<b>351 110 583</b>	1.39	0.57	0.27
65.6	36	<b>351 110 584</b>	2.73	0.57	0.27
164.0	36	<b>351 110 585</b>	7.05	0.57	0.27



### Hyclean Automation Coupling

- Description: Coupling between 2 Hyclean Automation power supply and communication cable
- Connection: plug M8

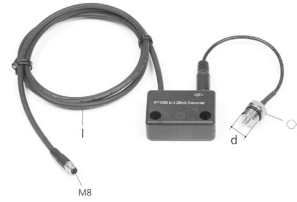
Product Code	Weight (lb)	L (in)	H (in)
<b>351 110 586</b>	0.22	2.28	0.55



### Sensor Extension Cable

- Description: connection between sensor and controller
- Connection: plug M8

Product Code	Weight (lb)	l (ft)	l1 (in)	l2 (in)
<b>351 110 662</b>	0.24	16.4	1.3	1.7



### T-Sensor, dimension independent

- Description: Temperature sensor PT 1000
- Temperature: max. 194°F
- Connection: plug M8

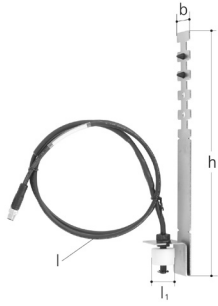
d (in)	Product Code	Weight (lb)	l (ft)	⬡
0.55	<b>351 110 611</b>	0.33	3.28	17



### Flow Sensor

- Temperature: max. 194°F
- Material: brass
- Connection: male thread, plug M8

d (in)	DN (mm)	Product Code	Weight (lb)	l (in)	l1 (in)	h (in)	h1 (in)	h2 (in)
3/4	20	<b>351 110 772</b>	0.55	2.36	0.59	39.33	1.93	1.26



### Drain Surveillance

- Connection: plug M8
- Consisting of: float switch, bracket, cable, cable ties

Product Code	Weight (lb)	l (ft)	l1 (in)	h (in)	b (in)
<b>351 110 763</b>	0.36	3.28	0.94	9.84	1.18



### Hyclean Automation Commissioning

Product Code
<b>351 110 783</b>



### BMS Gateway REST API/JSON

- Description: interface for data communication

Product Code
<b>351 110 790</b>



### BMS Gateway BACnet IP

- Description: interface for data communication

Product Code
<b>351 110 791</b>

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**Item #1401 (2/20)**  
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