SATK wall-mounted heat interface unit
Instantaneous DHW production

SATK22 series

01309/22 EN
replaces 01309/19 GB

Specifications

The SATK22 heat interface units (HIU) offer a heating service and instantaneous domestic hot water production in residential units connected to centralised heating systems.
SATK22 is a “direct” type of HIU, available in LOW, MEDIUM and HIGH temperature variants depending on the type of terminals applied inside the residential unit.

The electronic regulation controls secondary circuit flow temperatures, acting on the primary circuit flow rates by means of modulating valves. A high-performance exchanger for DHW production helps to minimise the central heating system return temperature, allowing a significant reduction in primary circulation flow rates.
This leads to lower energy needs for pumping, in addition to benefits in terms of lower costs of the primary distribution system.

SATK22 series HIU are designed to meet the needs of the various parties involved. SATK22 offers solutions to make installation as easy as possible, various advanced electronic functions aimed at maximising system efficiency and the possibility of remote control of the product, for maintenance and monitoring.

Product range

SATK2210**.** Wall-mounted heat interface unit for LOW temperature heating.

SATK2220**.** Wall-mounted heat interface unit for MEDIUM temperature heating.

SATK2230**.** Wall-mounted heat interface unit for HIGH temperature heating.

SATK2240**.** Wall-mounted heat interface unit for HIGH temperature heating. With pump on the primary side.

. = “3” (e.g. SATK22303): DHW production 50 kW[1]
. = “5” (e.g. SATK22305): DHW production 60 kW[1]
. = “7” (e.g. SATK22307): for low temperature primary circuit

Functional features

Standard functions

- Heating range
  - LOW temperature setting 25–45 °C
  - MEDIUM temperature setting 45–75 °C
  - HIGH temperature setting maximum 90 °C
  Set point regulation
- DHW production range 42–60 °C

Optional functions

Domestic cycle: programmable DHW preheating function return temperature monitoring

Heating cycle: return temperature control
modulating temperature control with compensated set point
weather compensated temperature control
primary flow rate limitation

[1] Primary side head > 50 kPa, flow temperature 70 °C, DHW 10–50 °C

Characteristics of central heating systems with instantaneous DHW production - SATK series heat interface unit

Lighter distribution network
Unlike centralised systems with DHW production in the central heating system, heat interface units make it possible to eliminate 2 of the 5 pipes that must be routed into the apartments. An initial and important benefit is obtained in terms of lower capital investments and installation costs of the distribution networks.

Easy and transparent metering
Metering of consumption is achieved by means of a heat meter (for consumption related to space heating and DHW production) and a single water meter for the total amount of domestic water without dual metering for DHW and DCW.

Standard 9182 states that in the distribution of DHW the water must be delivered at the design temperature within 30 seconds of initial tapping. This may result in the need to lay the recirculation line in the apartment, making it particularly difficult to meter DHW consumption because not all the water that enters the dwelling is actual consumption. Such recirculation networks are also afflicted by serious balancing problems, since each branch must carry a limited flow rate.
Systems with instantaneous DHW do not require recirculation and the speed of response of a heat interface unit depends solely on its position inside the dwelling and the speed of its internal regulation. The SATK series heat interface units are equipped with electronic control that continually acts on stepper type modulating valves in order to guarantee that DHW temperature remains constant even in the presence of sudden changes in the tapped flow rate. To further reduce response times of the unit the exchanger pre-heating option can be activated to keep the unit constantly at operating temperature.

No risk of legionnaires' disease
Local DHW production eliminates the condition for the development of the Legionella bacteria because hot water is produced only when needed. This dispenses with the need for anti Legionella thermal disinfection of the distribution network.

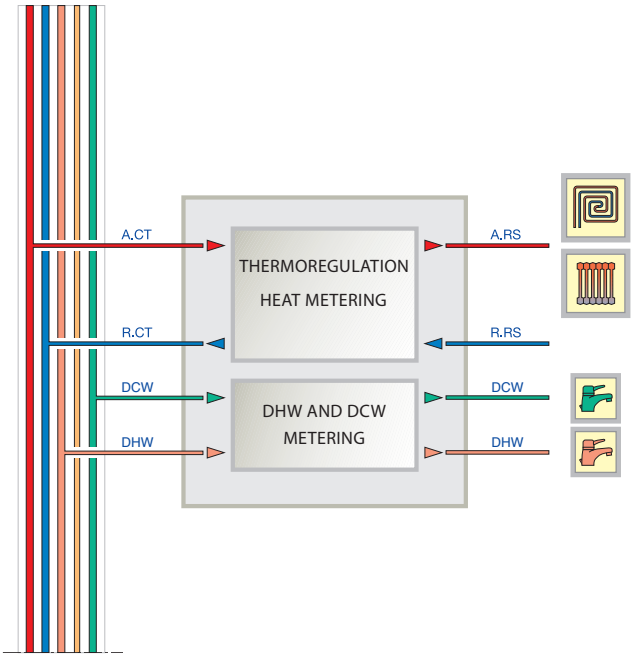
DHW production priority with respect to heating
In the case of a heating request simultaneous with a DHW tapping, priority is given to the production of DHW. In this way, performance and comfort are maximised, making all the primary flow rate available for a possible tapping peak.

Designed for integration with renewable energy sources
The two-way design, together with the electronic flow control, minimises the return temperature and makes it possible to integrate alternative energies and use low temperature heat sources.

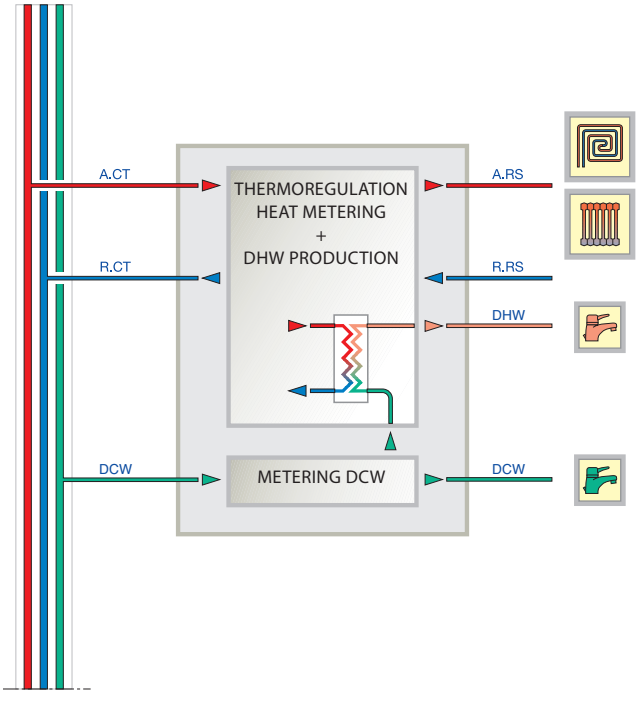
Simple and reduced maintenance
The greatest risk for an instantaneous DHW production system, either it consists in a domestic boiler or a heat interface unit, is the creation of limescale in the plate heat exchanger. The higher the temperature of the domestic hot water, the greater the risk of precipitation of limescale.
The electronic control ensures that DHW production is directly at the temperature of use set by the user (without using thermostatic mixing valves downstream of the exchanger), the water temperature in the exchanger is the minimum possible.
In addition to this, at the end of a tapping, the primary modulating valve closes in an extremely fast way and therefore ensures that there is no overheating of the water, at this point still, inside the exchanger. The exchange efficiency is therefore optimised, while the risk of limescale creation is minimised.

SATK series heat interface units are designed so that it is extremely easy to access the components during maintenance. The removal of the main components does not require the need to intervene on other parts of the product.

Metering in systems with centralised DHW

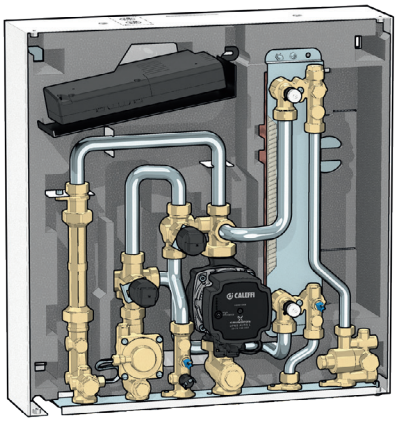


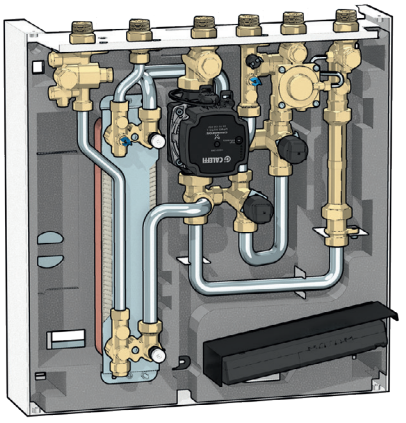
Metering in systems with instantaneous DHW



INSTALLATION

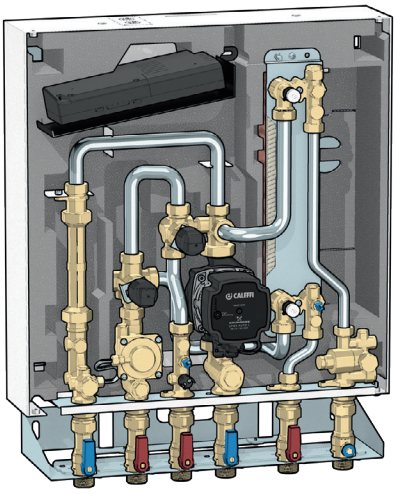
The SATK22 HIU, **with the exception of the LOW temperature version (SATK2210.)** can be installed with the connections facing either downwards or upwards.
This is possible thanks to the careful design choices guaranteeing maximum installation flexibility.

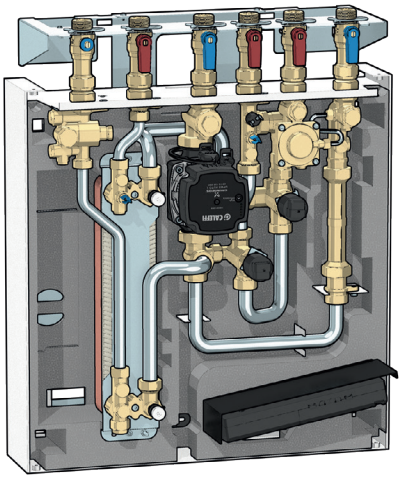




The installation is facilitated thanks to the use of a wall bracket, supplied in the package, and the optional template (code 789023) that is used for "plug and play" connection. The 789023 template is used to divide the installation into several steps:
- performing the hydraulic connections between the template and the system, without risking damage to the heat interface unit when doing the work;
- complete washing of the system, by creating a hydraulic short-circuit with flexible pipes applied to the template;
- installation of the heat interface unit only when the work is completed, quickly and easily due to the special telescopic joints.

The 789023 template is also reversible (top-bottom).





Remote control connection

The HIU control device performs the dual function of user interface and room chrono-thermostat. The control device can be installed on board the HIU or in the room in a position where the temperature measurements will be of significance for control of the heating function (in a heated room in a position where the temperature read by the thermostat is not affected by any nearby heat sources).

If the control device is fitted in the dedicated location on the cover of the HIU, the thermostat function can be disabled. Each zone in the apartment must have its own independent chrono-thermostat (drawing 1).

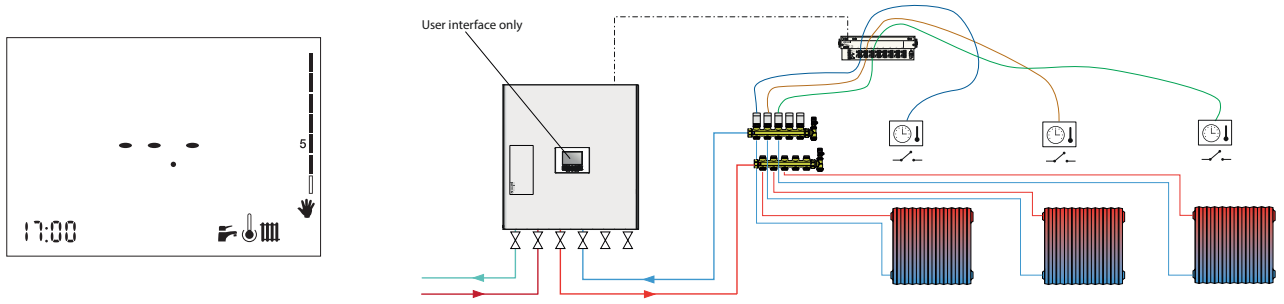
Alternatively, always leaving the remote control on the heat interface unit, it will be possible to keep the clock function active, in order to set the domestic heating system operating time bands (applicable to all the zones controlled by external thermostats) (drawing 2).

Finally, the remote control can be used as a single apartment chrono-thermostat or used to service a single zone in a multi-zone building unit (and, therefore, with a distribution manifold fitted with control valves) (drawing 3).

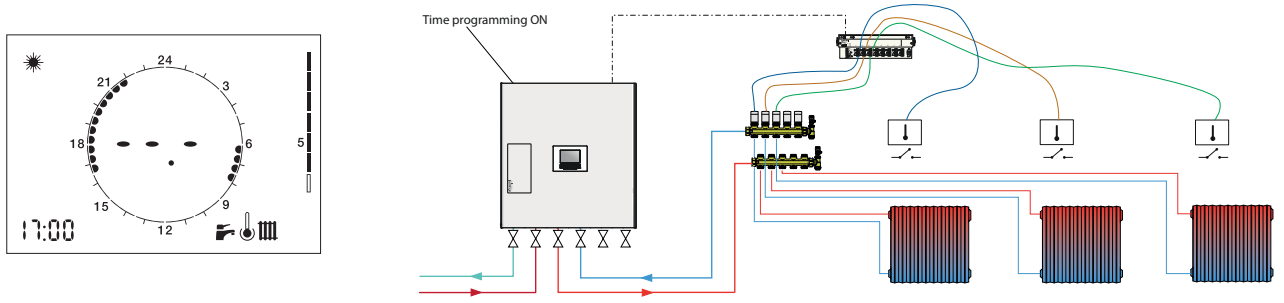
In the latter case, the control valve of the corresponding zone will be driven using the dedicated contact on the heat interface unit.
The "AUX" contact is normally programmed to close when the heating call comes from the remote control. The remaining external room thermostats can instead be connected as usual to the respective zone valves and, through a control bar, some relays, or through the auxiliary microswitch of the valve motor, a free contact will be sent to the heat interface unit for the consent to the heating function.

The remote control does not require a battery. The power supply is obtained from the same two wires used for data exchange, which are supplied in low voltage (3 V).

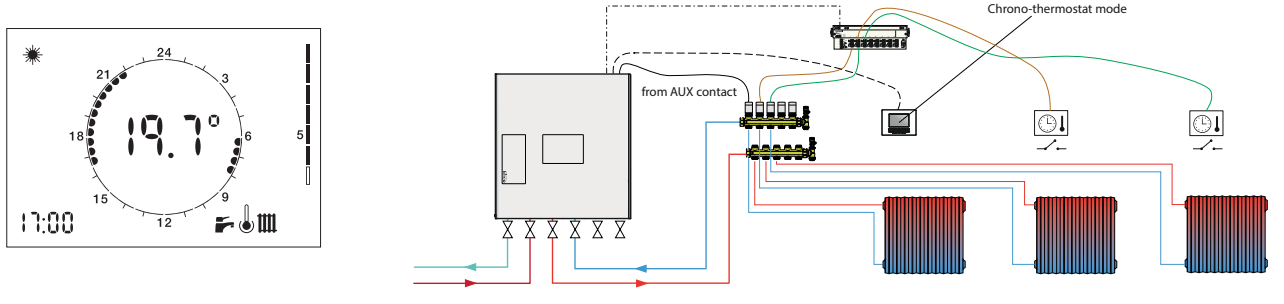
1 - HIU interface only (no clock, no thermostat)



2 - Remote control in clock mode (no thermostat)

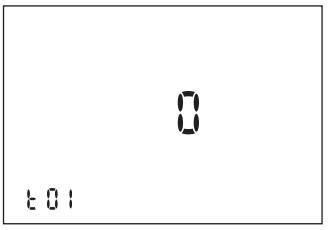


3 - Remote control in zone chrono-thermostat mode

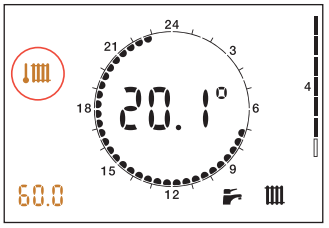


HEATING FUNCTION

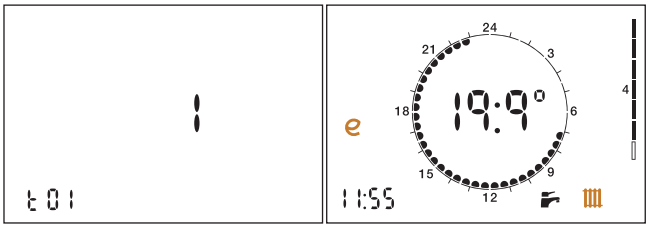
DEFAULT SETTING: set point regulation
When heating cycle activation is requested by the room thermostat, the circulation pump is powered while the modulating valve is opened gradually until the set point temperature is reached. In high temperature models (SATK2230.-SATK2240.), the valve is open as wide as permitted (see “Flow rate maximum limitation”, page 8).
At the end of the heating cycle, the circulation pump comes to a stop and the modulating valve is closed. The heating cycle ON condition is indicated by the blinking symbol.



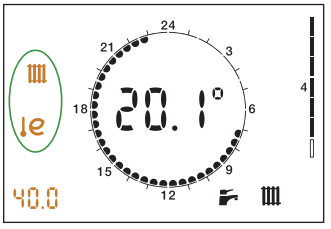
OPTIONAL SETTING: primary return temperature limit
When heating cycle activation is requested by the room thermostat, the circulation pump is powered while the modulating valve is opened gradually until the set point temperature is reached (in SATK2230. and SATK2240., the valve is fully open as wide as permitted), if the return temperature is lower than or equal to the set limit value. If this condition is not observed, the HIUs that control the flow temperature (SATK2210. and SATK2220.) have a reduced flow rate (by up to 15 °C in SATK2220., and up to 3 °C in SATK2210.) so as to bring the return value back within the limits. In SATK2230. and SATK2240. the circulating flow rate is reduced. When the function intervenes, the icon e appears on the display.



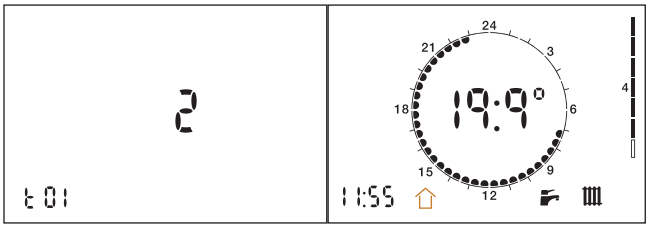
Flow/primary return limit temperature range
The flow temperature range, identified graphically by the symbol in the red circle, is:
25–45 °C for heat interface units in LOW temperature
45–75 °C for heat interface units in MEDIUM temperature
The primary return limit temperature range, identified by the symbols in the green circle, is:
15–42 °C for heat interface units in LOW temperature
30–70 °C for heat interface units in MEDIUM temperature

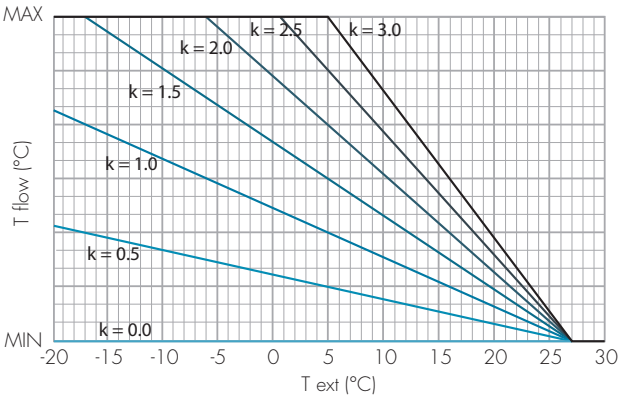


OPTIONAL SETTING: modulating temperature regulation with compensated set point (SATK2210. and SATK2220.)
When the function is enabled, the flow temperature is modified (±10 °C with respect to the set point for HIU in MEDIUM temperature, ±3 °C if in LOW temperature) according to the temperature detected by the return probe in order to keep this latter temperature value constant. This keeps the actual thermal efficiency of the slab under control, and consequently also the ambient thermal load. The thermal response time of the system is thus minimised.
The function should not be used in conjunction with thermostatic valves.
If the function is enabled the display shows the symbol ⌂.

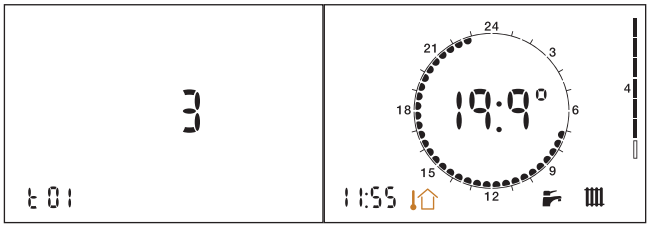


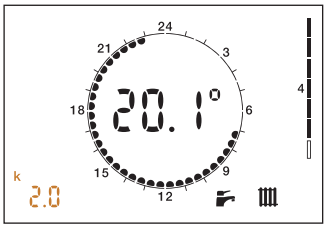
OPTIONAL SETTING: outside compensated temperature regulation (SATK2210. and SATK2220.)
When the function is enabled, the flow temperature is calculated based on the temperature detected by the outside probe, in accordance with the curve shown below.
The display shows the symbol ⌂.





T MAX is the set point that has been set.
T MIN is 45 °C for heat interface units in HIGH temperature, 25 °C for LOW temperature.





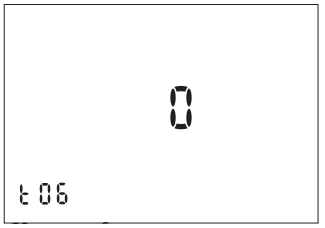
DHW FUNCTION

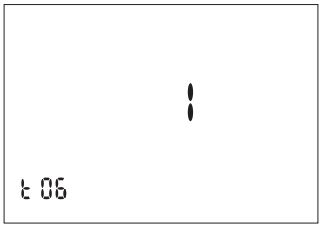
The DHW cycle always takes priority over the heating cycle.

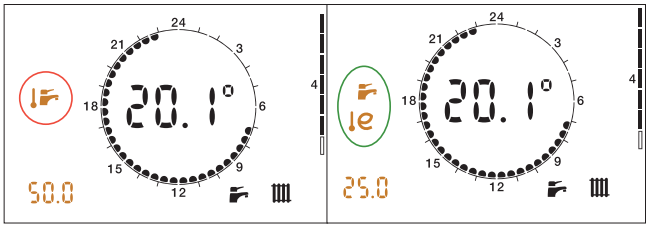
DEFAULT SETTING: fixed DHW set point
When DHW cycle is activated due to water request (detected by the domestic water flow meter), the controller pilots the opening of the modulating valve so as to keep the temperature detected by the domestic water probe at the selected set point value.
When tapping ends, the modulating valve is fully closed.
The DHW cycle ON condition is indicated by the blinking symbol.

OPTIONAL SETTING: primary return temperature limit
When DHW cycle activation is requested, due to DHW tapping by the user (detected by the domestic water flow meter), the regulator modulates the valve opening in order to adjust the temperature detected by the domestic water probe to the DHW set point value if the return temperature is less than or equal to the set limit. If this condition is not met, the flow temperature is reduced (by a maximum of 7 °C down to a temperature that can be no less than 40 °C), in order to restore the return temperature within the set limit values.

Flow/return limit temperature range
The settable DHW temperature (identified by the symbol in the red circle) is in the range 42–60 °C, the return temperature limit (symbol in the green circle) can be set in the range 15–45 °C.







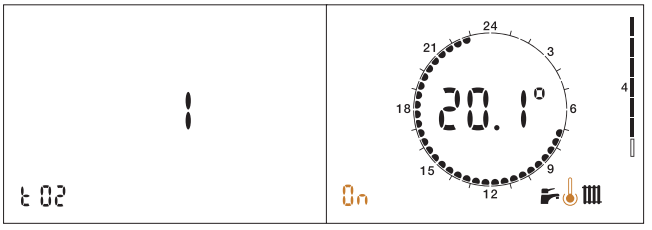
DHW COMFORT FUNCTIONS: PREHEATING/RECIRCULATION

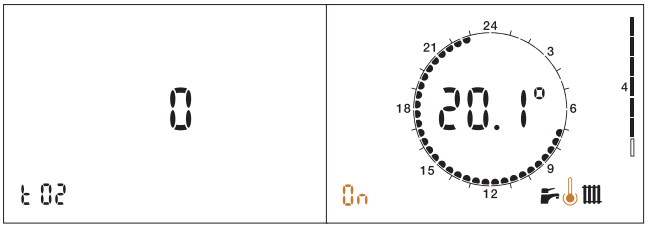
The comfort function can alternatively be DHW exchanger preheating or DHW recirculation management. They are activated by setting the comfort function to ON or PROG.

DEFAULT SETTING: domestic water heat exchanger preheating
During periods when the domestic water cycle is not used, if the DHW probe detects a low temperature with respect to the SET value, the regulator partially opens the domestic hot water modulating valve for the time required (maximum 5 min.) to bring the exchanger to the condition wherein it can assure rapid DHW production.
The active preheating cycle is indicated by the blinking symbol.
This function is less of a priority than any domestic water or heating cycles.

OPTIONAL SETTING: management of DHW recirculation in the apartment
As an alternative to the DHW comfort function, it is possible to manage DHW recirculation in the apartment through a similar logic. During periods of non-use of the domestic water cycle, when the DHW sensor detects a low temperature with respect to the SET value, the controller, by means of the auxiliary contact, powers the recirculation pump (not supplied) generating a DHW cycle that will be maintained active for a pre-set time (2 minutes). To change this time interval, it is possible to use parameter t09 in the technical menu (1 unit = 10 seconds).
The recirculation pump must necessarily be supplied through the auxiliary microswitch. This function disables the other functions of the AUX contact (see pages 4 and 8).

The comfort function can be enabled according to a time programming on a weekly basis, defined by the user.





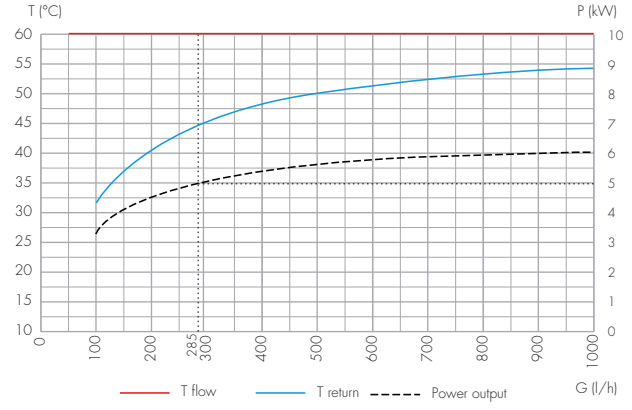
N.B.: A suitably sized expansion vessel must be provided for a DHW recirculation system.

Return temperature limitation in heating mode

A design aimed at containing the return temperature to the building central heating system or substation is essential for energy efficiency. A low return temperature means, for example:

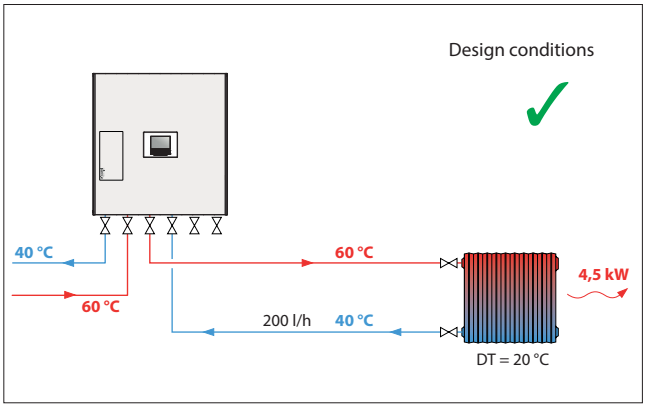
- that at the same power output, the thermal medium flow rate may be lower, thanks to the high temperature difference on the primary side. This results in pipes with in average smaller diameter, lower power pumps and consequent lower operating costs;
- less thermal losses, because of the lower temperature of the fluid and to the reduced tube surface;
- that it is possible to exploit low temperature heat sources (heat pumps, solar heat, waste heat from industrial processes) and, in the case of condensing generators, to maximise their efficiency.

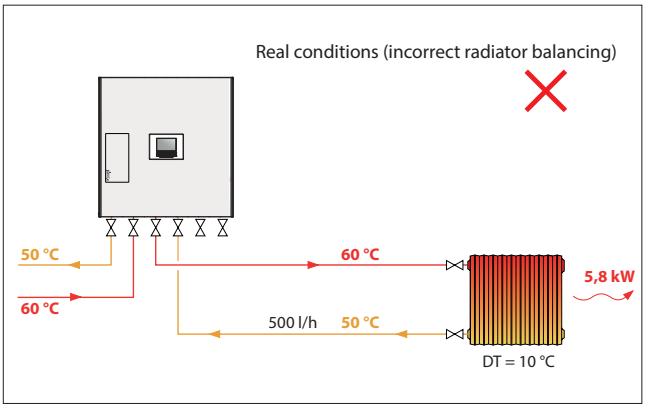
In the case of underfloor heating systems, the return temperature is naturally low and, normally, there are no particular balancing problems of the apartment circuits. The situation is completely different in the case of high temperature terminals such as radiators and convectors. The figure on the left shows the exchanged power trend (right axis) and the return temperature (left axis) in a radiator system with nominal power of 9 kW (ΔT_n = 50 °C), depending on the supply flow rate, with inlet temperature of 60 °C.
Assuming that such radiators have been chosen in order to obtain a exchanged power of 4,5 kW with a temperature difference of 20 °C, it is observed that the design flow rate would be approximately 200 l/h.



An incorrect balancing, due to the impossibility of measuring the effective flow rate to the radiator, causes a sharp reduction in the temperature difference. Low flow rates, in order of magnitude of some tens of l/h per radiator, are difficult to control by acting on the lockshield valve, normally the only available balancing device.

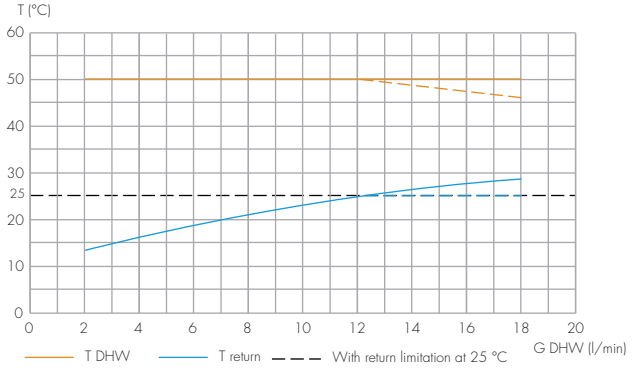
The return temperature control function available in the SATK22 heat interface unit provides a useful tool to compensate for an incorrect balancing. A limit for the return temperature can be set via the unit interface.
In HIUs with flow temperature regulation (SATK2210. and SATK2220.) this can be dynamically lowered if the return temperature is greater than the set limit. The temperature can be lowered by up to 15 °C for SATK2220. and 3 °C for SATK2210.
In models without flow temperature regulation (SATK2230. and SATK2240.), a modulating control logic is applied to the zone valve, which is otherwise operated with ON/OFF logic. The HIU will therefore modulate the flow rate so as to bring the return temperature to a value within the set limits.
In the previous example, incorrect balancing creating a flow rate significantly more than the design value, e.g. 500 l/h, the HIU would react by reducing the flow temperature to a suitable temperature to ensure that the design value of 40 °C is not exceeded (see adjacent drawings).
It should be noted, however, that this function does not replace hydraulic balancing of the apartment circuits, but is designed to compensate for inaccuracies due to practical difficulties.





Return temperature limitation in DHW mode

Even in DHW production mode it is possible to enable a similar function which, by acting on the DHW production temperature (with a maximum reduction of 7 °C with respect to the set point, and with DHW never less than 40 °C), allows to not exceed a pre-set limit on the primary return temperature.
As the demand for DHW increases, keeping the production temperature stable at the set value, the return temperature tends to increase. By setting a limit to the latter, it is possible to observe a behaviour like the one shown aside, with a slight reduction in temperature for high flow rates where, generally, the user requires a low temperature (use for shower/filling bathtub).

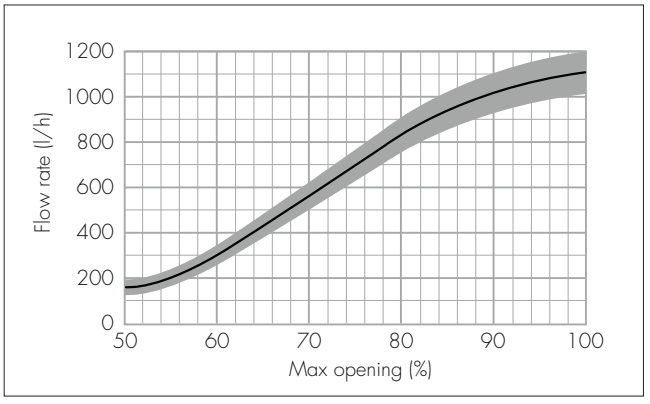


Flow rate maximum limitation
The SATK22 series heat interface unit has, on the primary side, a differential pressure regulating valve (DPCV) which ensures the downstream circuits (the DHW exchanger supply circuit and the apartment heating circuit) are subjected to constant head values as the primary network conditions change.

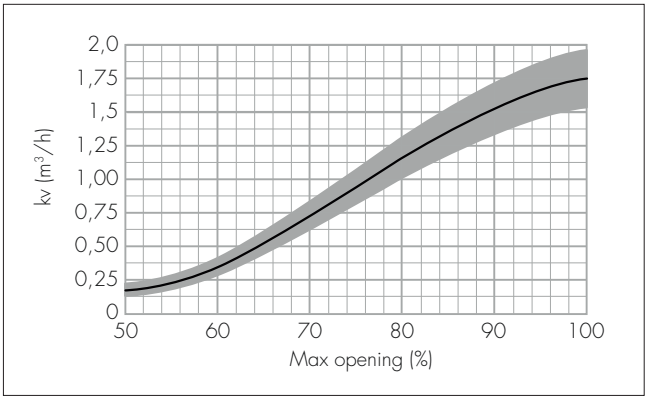
The remote control technical menu can be used to set an opening limit for the valves in order to limit the maximum flow rate drawn by the HIU, with different limits for DHW and heating operating modes.

This limitation has a particular meaning for the heating function: the modern building units are normally subject to low thermal loads and, consequently, require low flow rates during operation in heating mode. However, the heat interface unit is normally sized for the supply of domestic hot water, with typically higher flow rates.
A limit on the flow rate used in heating mode prevents situations in which, due to simultaneous activations of various users (typically in the morning or in the evening), with cold starts (for example with radiators off for several hours and, therefore, cold), there is a situation of hydraulic unbalancing due to flow rates well beyond the design values. In fact, when the heat interface unit is started, it would detect a high difference between set point and actual temperature, and would react by opening the modulating valve to service the heating exchanger far beyond the value that will be reached in stationary conditions.

The graphs below illustrate:
the correspondence (indicative) between the maximum degree of opening for the modulating valve serving the DHW heat exchanger supply circuit and the maximum flow rate drawn by the primary circuit (the characteristics of the HIU hydraulic circuit being known);
the correspondence (indicative) between the maximum degree of opening and the maximum kv coefficient for the modulating zone valve. This coefficient, combined with the hydraulic characteristics of the apartment circuit, will define the flow rate limit.



Flow rate vs. maximum motor opening - primary DHW



Kv vs. maximum motor opening - primary heating

Other functions of the electronic controller
• Auxiliary contact
The heat interface unit is provided with an output contact (max 230 V, max 3 A) which can be programmed to close when certain events occur. Each event linked to operation of the HIU is linked to a numerical value, according to the following table:

Event/condition	Value
DHW tapping in progress	1
Heating cycle in progress	2
DHW comfort cycle in progress	4
HIU OFF	8
Error not active	16
Error active	32

example Driving an external primary flow pump, normally OFF.
The contact must be closed if any HIU function is active (DHW production, heating, comfort)

The related parameter (see instruction sheet) must therefore be set to: 1 + 2 + 4 = 7

• Anti-Legionnaires function
It is possible, using the technical menu, to enable a daily thermal disinfection of the heat exchanger, carried out between 3:00 am and 3:30 am. If this function is enabled, it is necessary to use appropriate anti-scald devices to protect the user.

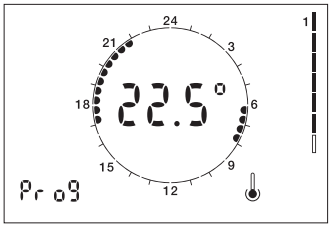
• Modulating/mixing valve reset to zero
Immediately after the power supply has been switched on, the position of the modulating/mixing valves is reset to zero.

• Pump anti-seizing
When the pump is not in use, it is powered on for a period of 5 seconds every 24 hours.

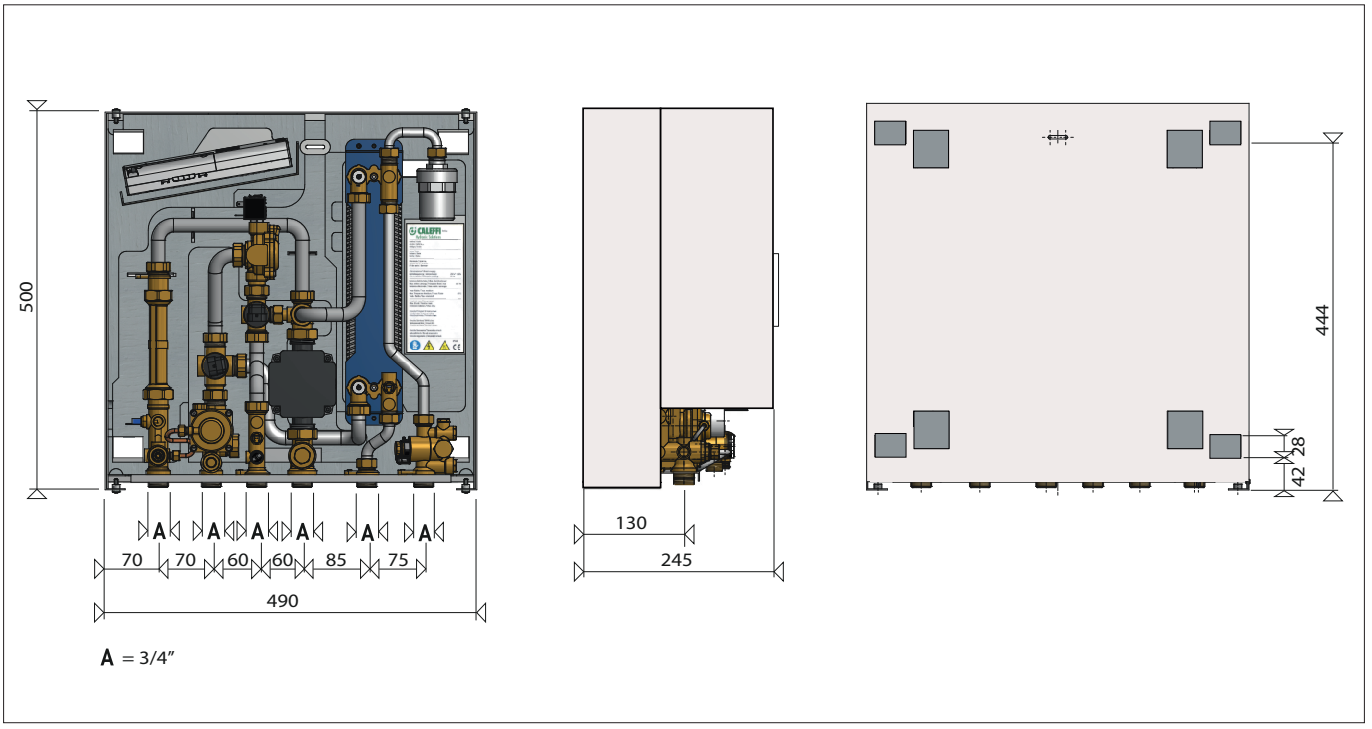
• Modulating valve anti-seizing
The anti-seizing cycle for the diverter/modulating valve is run every 24 hours.

• Error diagnostics
In the event of functional anomalies, the remote control shows an error code corresponding to the problem detected.

Comfort function programming
The comfort function (normally preheating of the domestic hot water exchanger) can be programmed weekly on a 30-minute basis, in order to limit it to the strictly necessary periods, obtaining the best compromise between comfort and energy saving.



Dimensions



SATK22 technical specifications

Medium:	water
Maximum percentage of glycol:	30 %
Maximum medium temperature:	90 °C
Maximum working pressure: - primary circuit:	1,0 MPa (10 bar)
- domestic circuit:	1 MPa (10 bar)
Primary circuit nominal flow rate:	1,2 m^3/h
Nominal pressure loss on primary circuit:	Δp 50 kPa (0,5 bar)
Maximum head on primary circuit:	Δp 600 kPa (6 bar)
Domestic water circuit maximum flow rate:	24 l/min (0,4 l/s)
Minimum flow to activate domestic water flow meter:	1,5 l/min ±0,3
Electric supply:	230 V (AC) ±10 % 50 Hz
Maximum power consumption:	80 W (20 W SATK2230.)
Protection class:	IP 40
Pump (not on SATK2230.)	UPM3 15–70
Motors:	24 V stepper
Probes:	NTC 10 kΩ
Safety thermostat (only SATK2210):	55 °C ± 3

Materials

Components:	brass EN12165 CW617N
Connecting pipes:	steel
Frame:	painted steel RAL 9010
Exchanger:	stainless steel brazed with copper

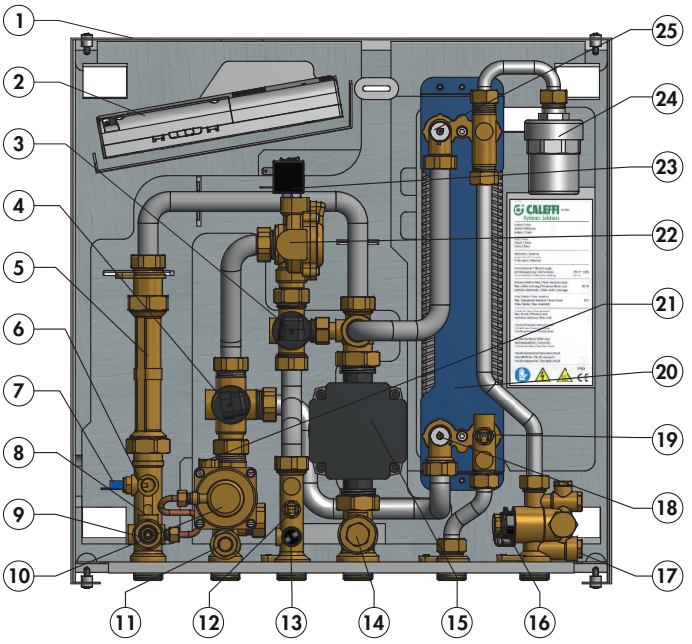
Insulation

Material:	PPE
Density:	45 kg/m^3
Working temperature range:	3–90 °C
Thermal conductivity:	0,04 W/(mK)

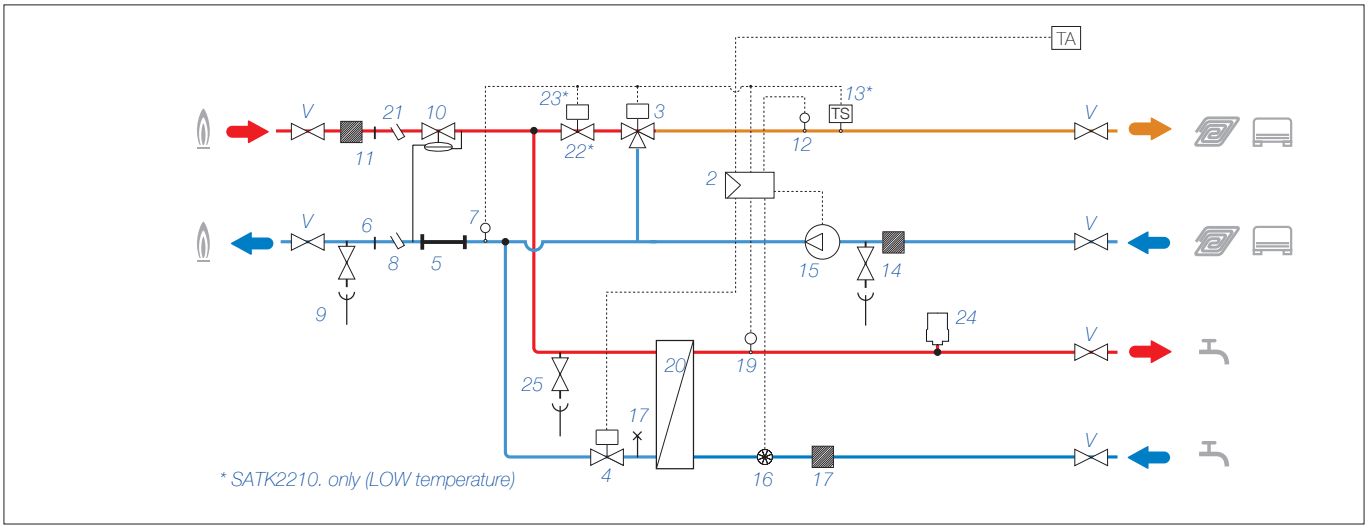
Characteristic components of SATK2210. (LOW temperature) and SATK2220. (MEDIUM temperature)

1. Frame
2. Electronic regulator
3. 2-way modulating valve - Heating
4. 2-way modulating valve - DHW
5. 130 mm heat meter template
6. 1/4" F pressure test port
7. Return temperature probe
8. Connection for M10x1 heat meter return probe
9. Primary drain cock
10. Differential pressure regulating valve
11. Mesh strainer + 1/4" F pressure test port
12. Heating flow temperature probe
13. (*) Safety thermostat
14. Secondary drain cock + mesh strainer
15. Pump
16. Flow meter (turbine + sensor)
17. Mesh strainer
18. Heating exchanger primary circuit air venting/drain
19. DHW temperature probe
20. DHW exchanger
21. Connection for M10x1 heat meter return probe
22. (*) Solenoid thermal safety relief valve (normally closed)
23. (*) Thermal safety relief valve motor
24. Water hammer arrester
25. DHW exchanger primary circuit air venting/drain

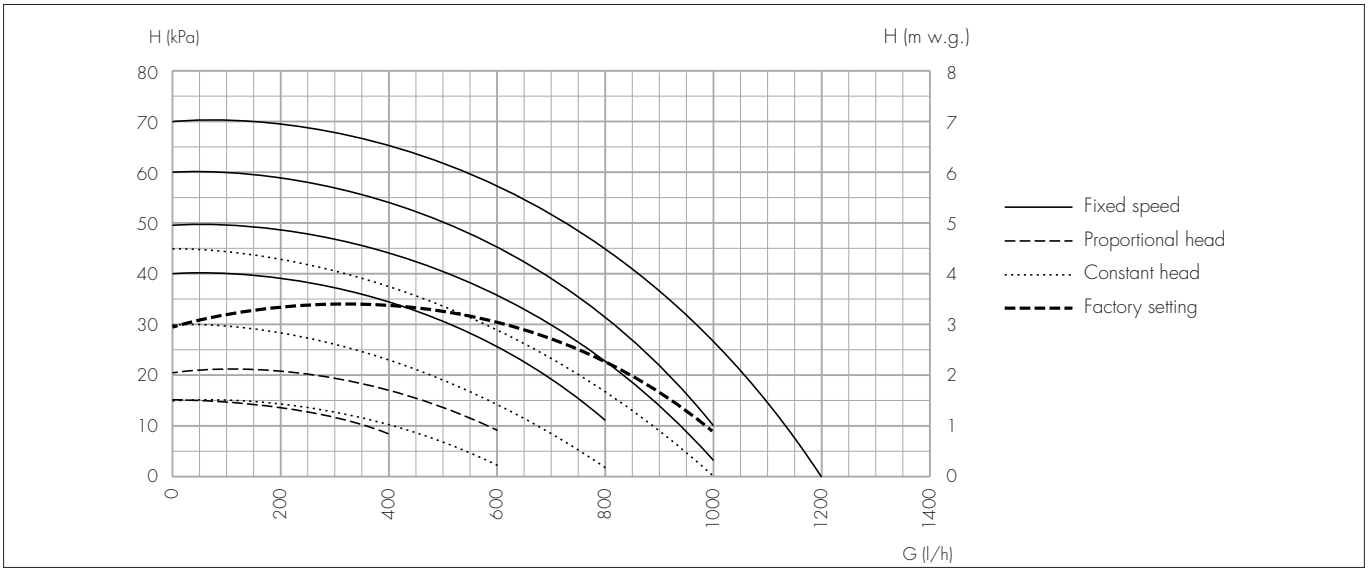
(*) SATK2210. only (LOW temperature)



Hydraulic diagram

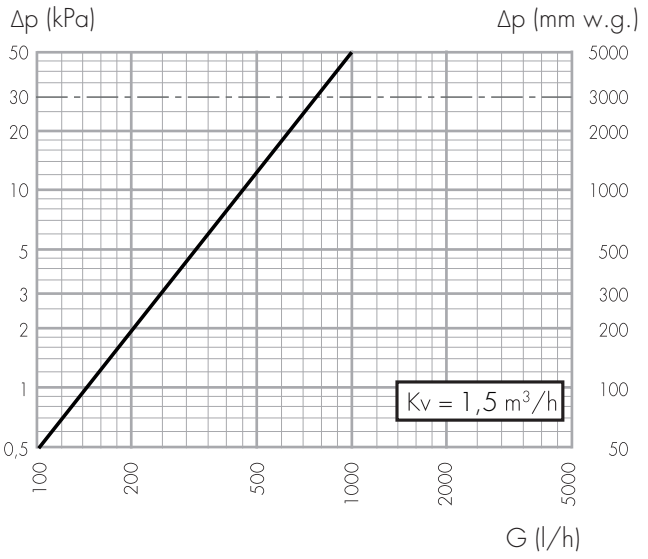


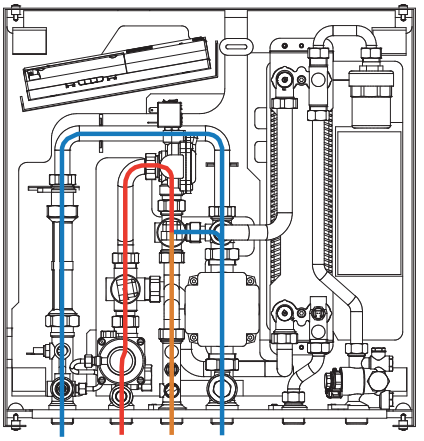
Pump residual head



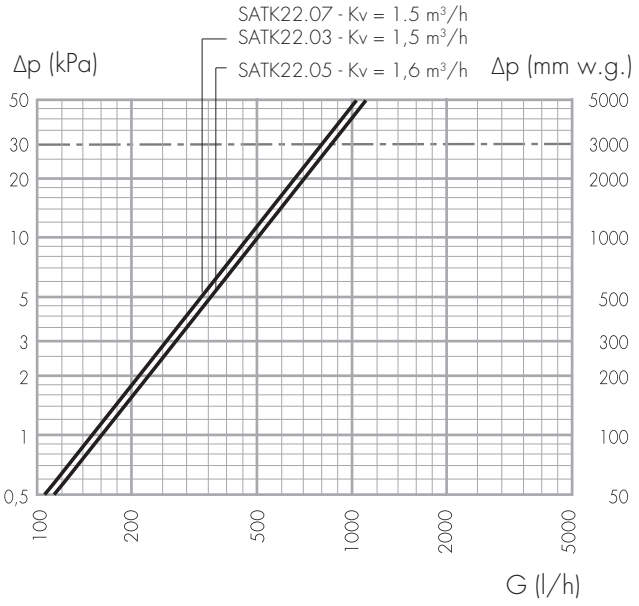
Hydraulic characteristics of SATK2210. (LOW temperature) and SATK2220. (MEDIUM temperature)

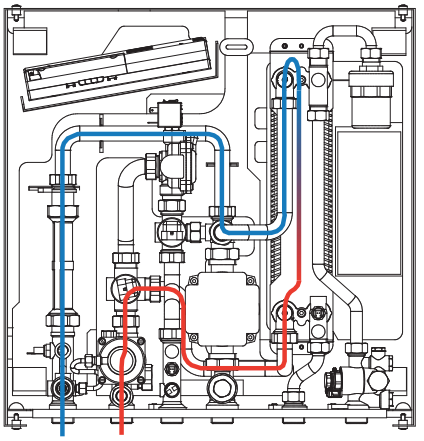
Heating function



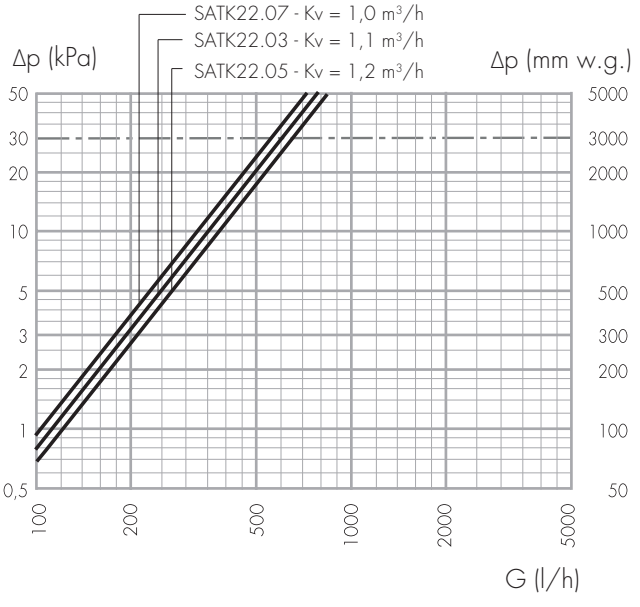


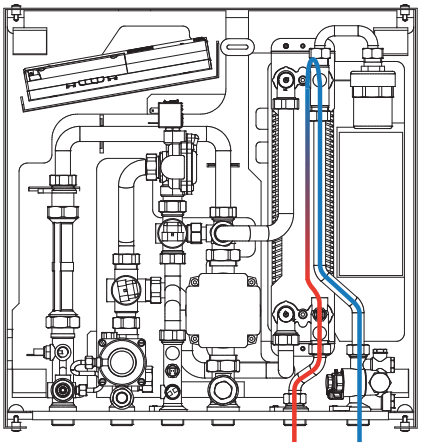
DHW function - primary





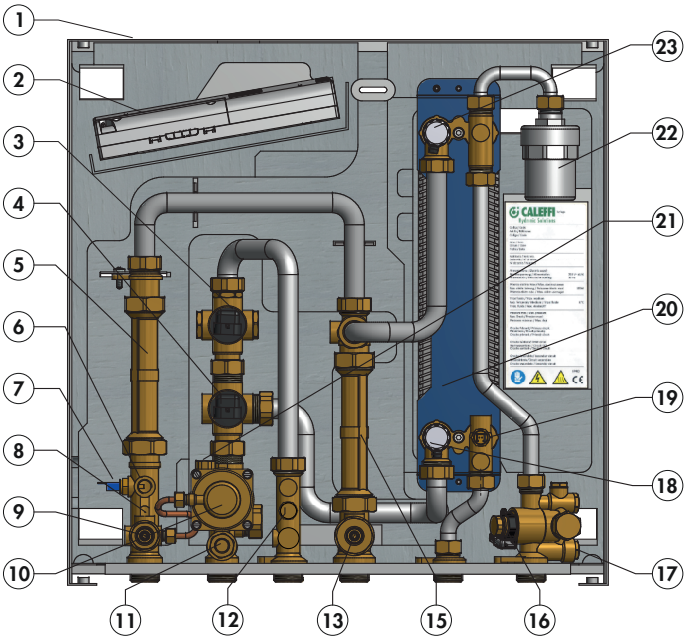
DHW function - secondary





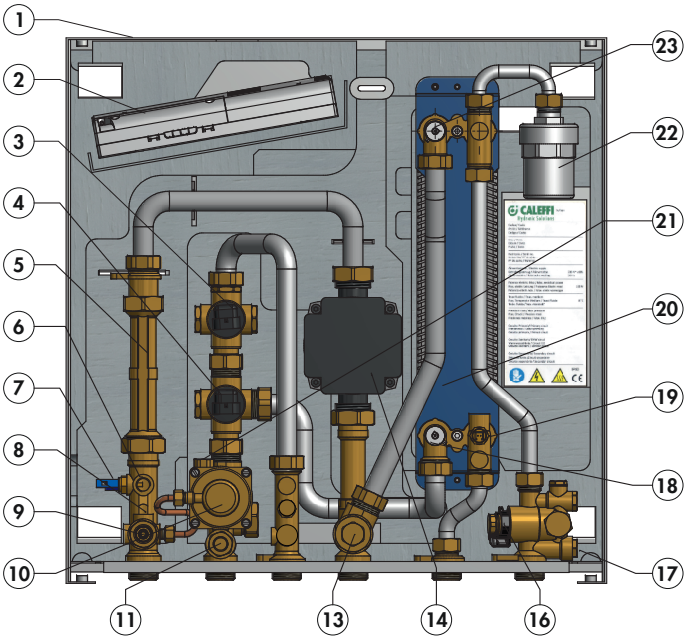
Characteristic components of SATK2230. (HIGH temperature)

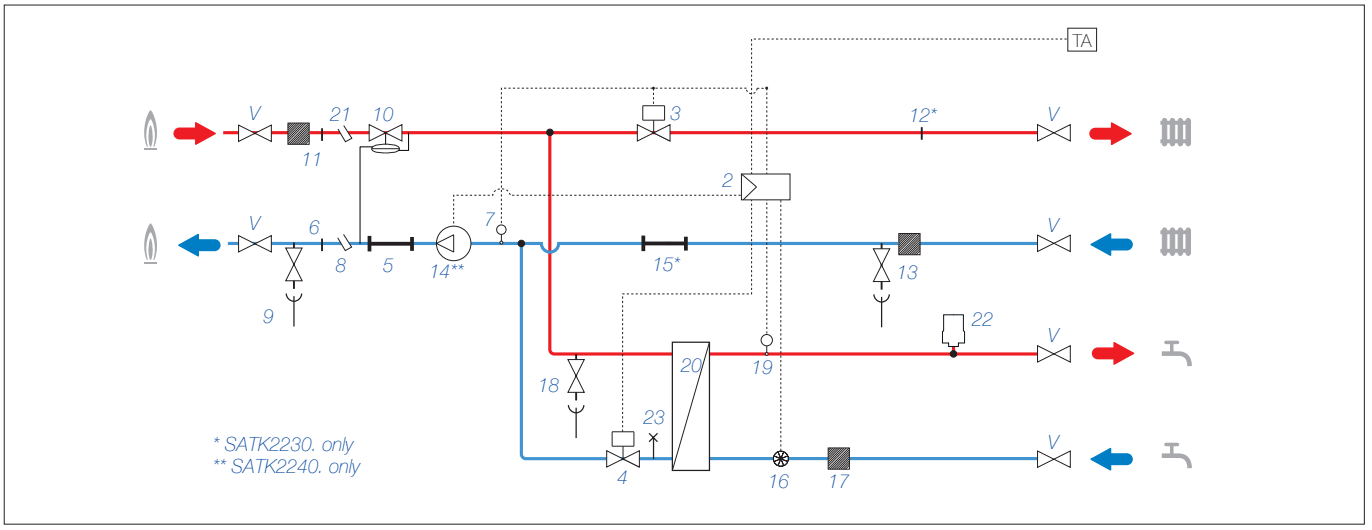
1. Frame
2. Electronic regulator
3. 2-way modulating valve - Heating
4. 2-way modulating valve - DHW
5. 130 mm heat meter template
6. 1/4” F pressure test port
7. Return temperature probe
8. Connection for M10x1 heat meter return probe
9. Primary drain cock
10. Differential pressure regulating valve
11. Mesh strainer + 1/4” F pressure test port
12. 1/8” connection for DPCV code 789122
13. Secondary drain cock + mesh strainer
15. Template for 789122
16. Flow meter (turbine + sensor)
17. Mesh strainer
18. Heating exchanger primary circuit air venting/drain
19. DHW temperature probe
20. DHW exchanger
21. Connection for M10x1 heat meter return probe
22. Water hammer arrester
23. DHW exchanger primary circuit air venting/drain



Characteristic components of SATK2240. (HIGH temperature with pump)

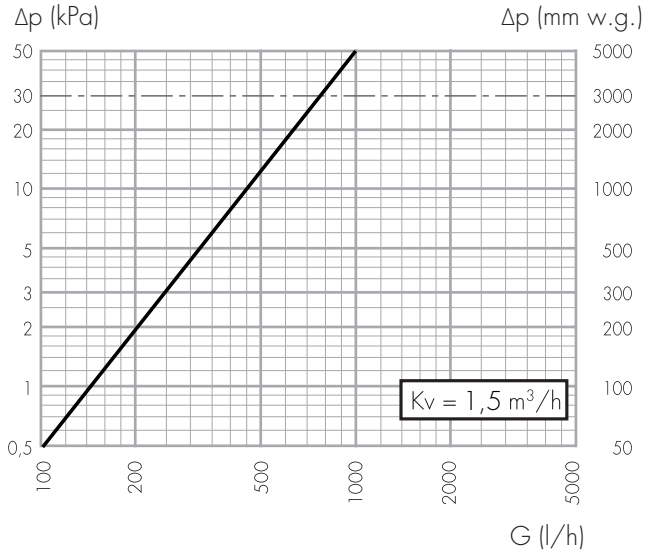
1. Frame
2. Electronic regulator
3. 2-way modulating valve - Heating
4. 2-way modulating valve - DHW
5. 130 mm heat meter template
6. 1/4” F pressure test port
7. Return temperature probe
8. Connection for M10x1 heat meter return probe
9. Primary drain cock
10. Differential pressure regulating valve
11. Mesh strainer + 1/4” F pressure test port
13. Secondary drain cock + mesh strainer
16. Flow meter (turbine + sensor)
17. Mesh strainer
18. Heating exchanger primary circuit air venting/drain
19. DHW temperature probe
20. DHW exchanger
21. Connection for M10x1 heat meter return probe
22. Water hammer arrester
23. DHW exchanger primary circuit air venting/drain

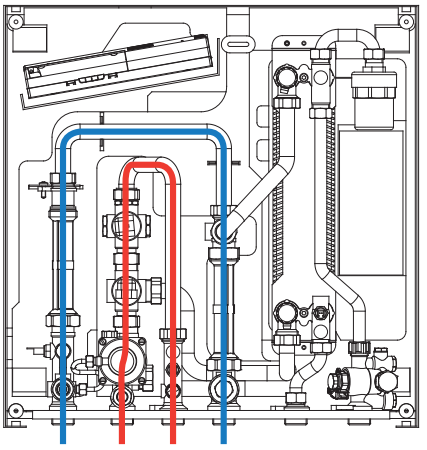




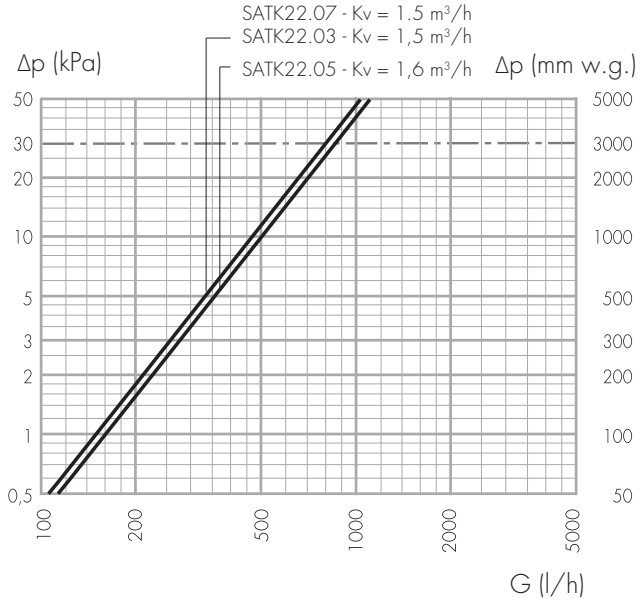
Hydraulic characteristics of SATK2230. (HIGH temperature) and SATK2240. (HIGH temperature with pump)

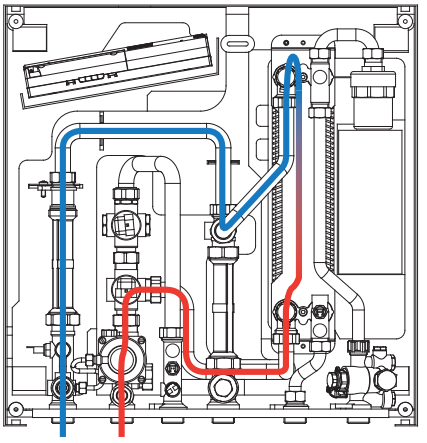
Heating function



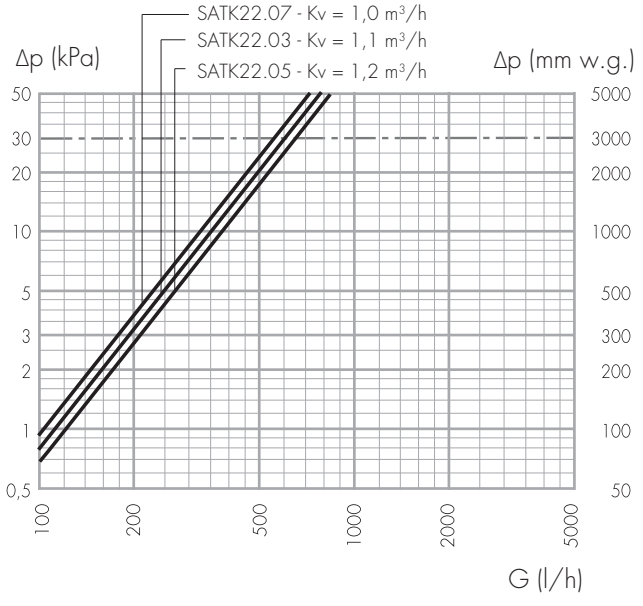


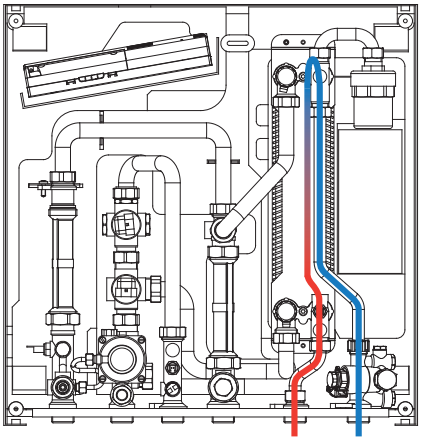
DHW function - primary



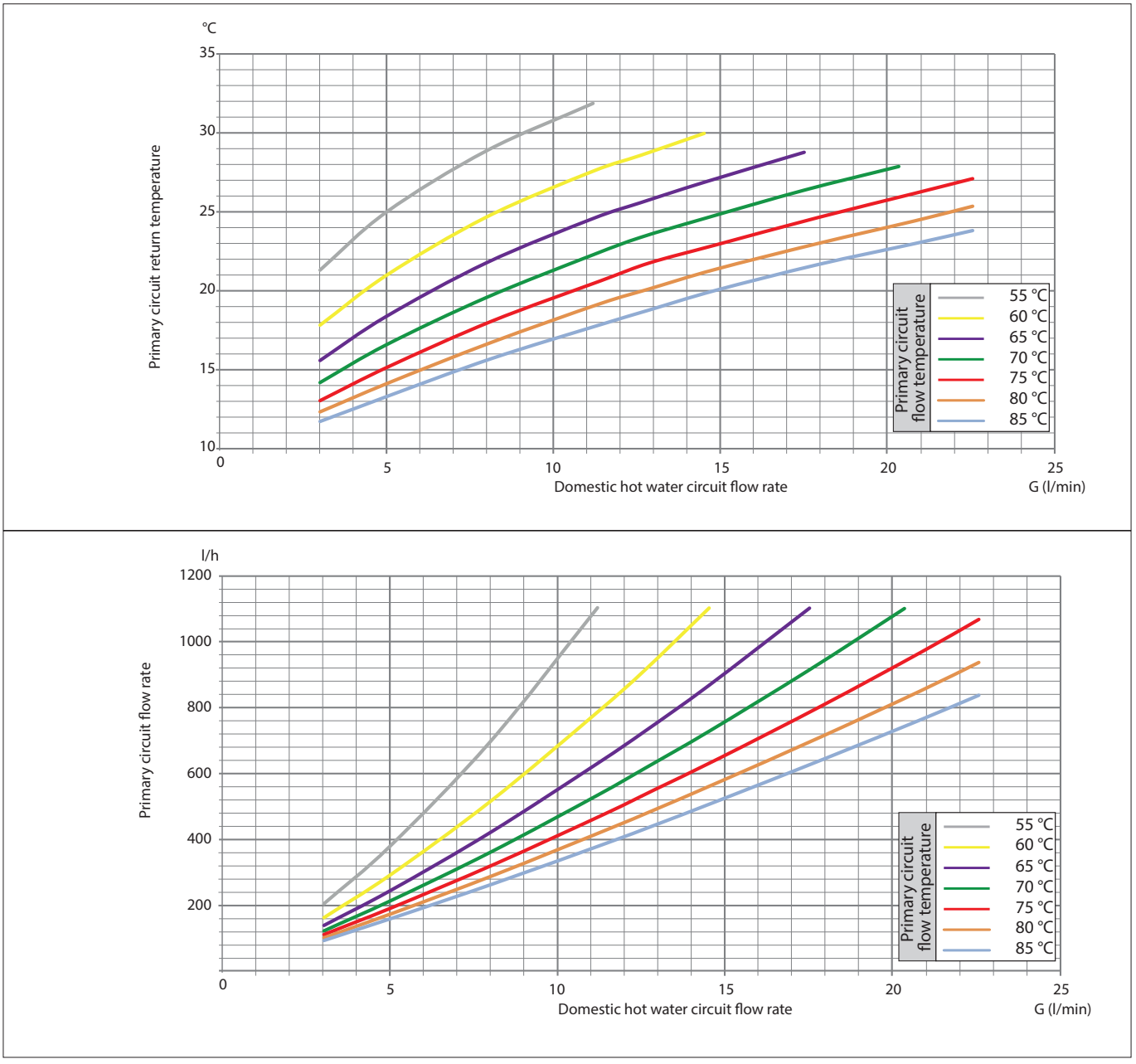


DHW function - secondary





SATK22.03 series domestic water production performance diagrams
DHW 10–48 °C, primary Δp > 50 kPa



SATK22.03 domestic water production performance tables
DHW 10–48 °C, max Δp on domestic side 1,5 bar

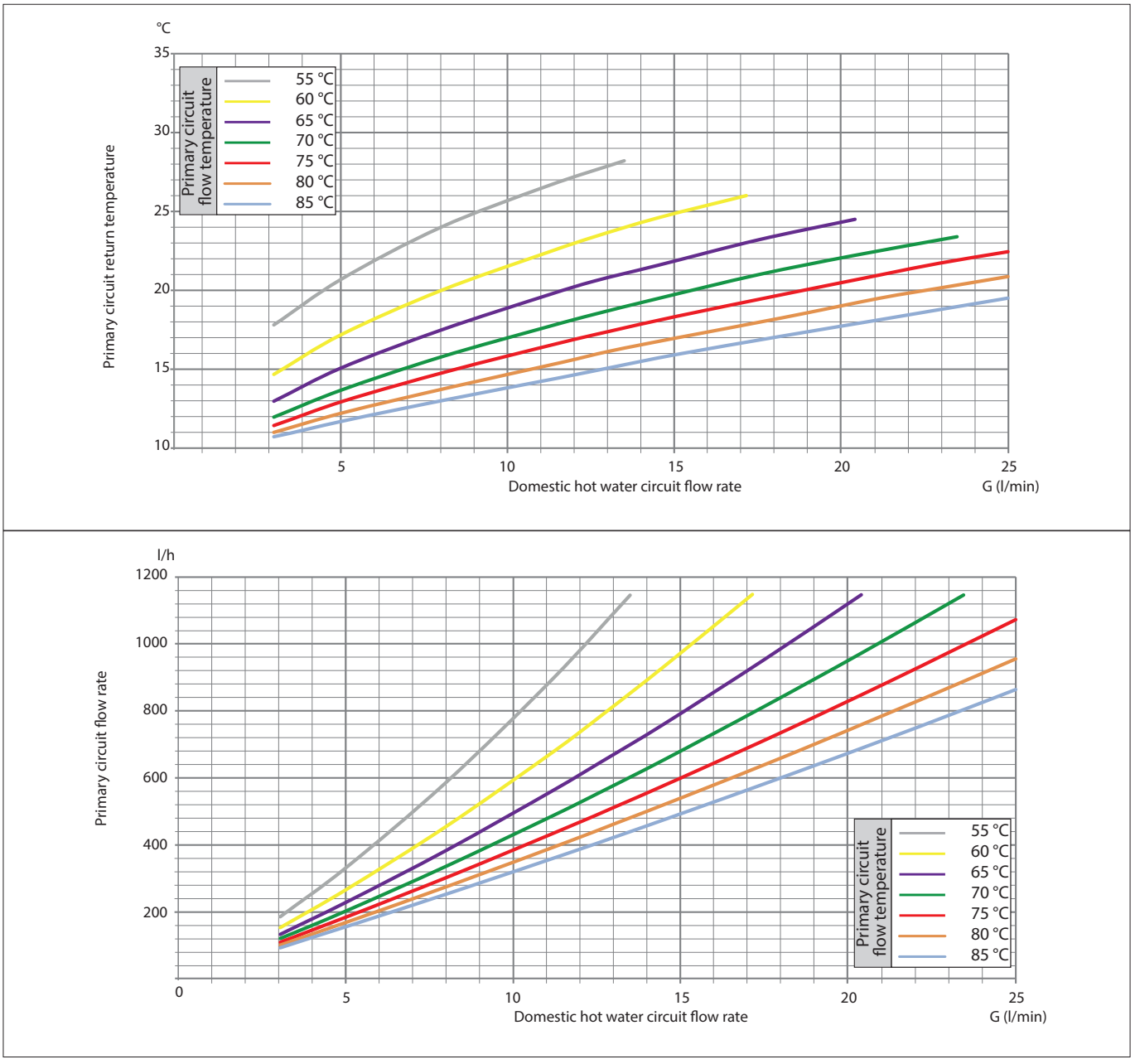
Primary circuit temperature (°C)	Domestic water flow rate (l/min)	Primary return temperature (°C)	Primary flow rate (l/h)	Power (kW)
55	11,2	32	1100	30
60	14,4	30	1100	38
65	17,4	29	1100	46
70	20,2	28	1100	54
75	22,5	27	1070	60
80	22,5	25	934	60
85	22,5	24	842	60

Performance with DHW flow rate 22,5 l/min
(Δp domestic hot water 1,5 bar)

Primary circuit temperature (°C)	Domestic water temperature (°C)	Primary return temperature (°C)	Power (kW)
55	36	23	41
60	39	24	46
65	42	25	51
70	46	26	56
75	49	28	61
80	52	29	66
85	55	30	71

SATK22.05 series domestic water production performance diagrams

DHW 10–48 °C, primary Δp > 50 kPa



SATK22.05 domestic water production performance tables
DHW 10–48 °C, max Δp on domestic side 1,5 bar

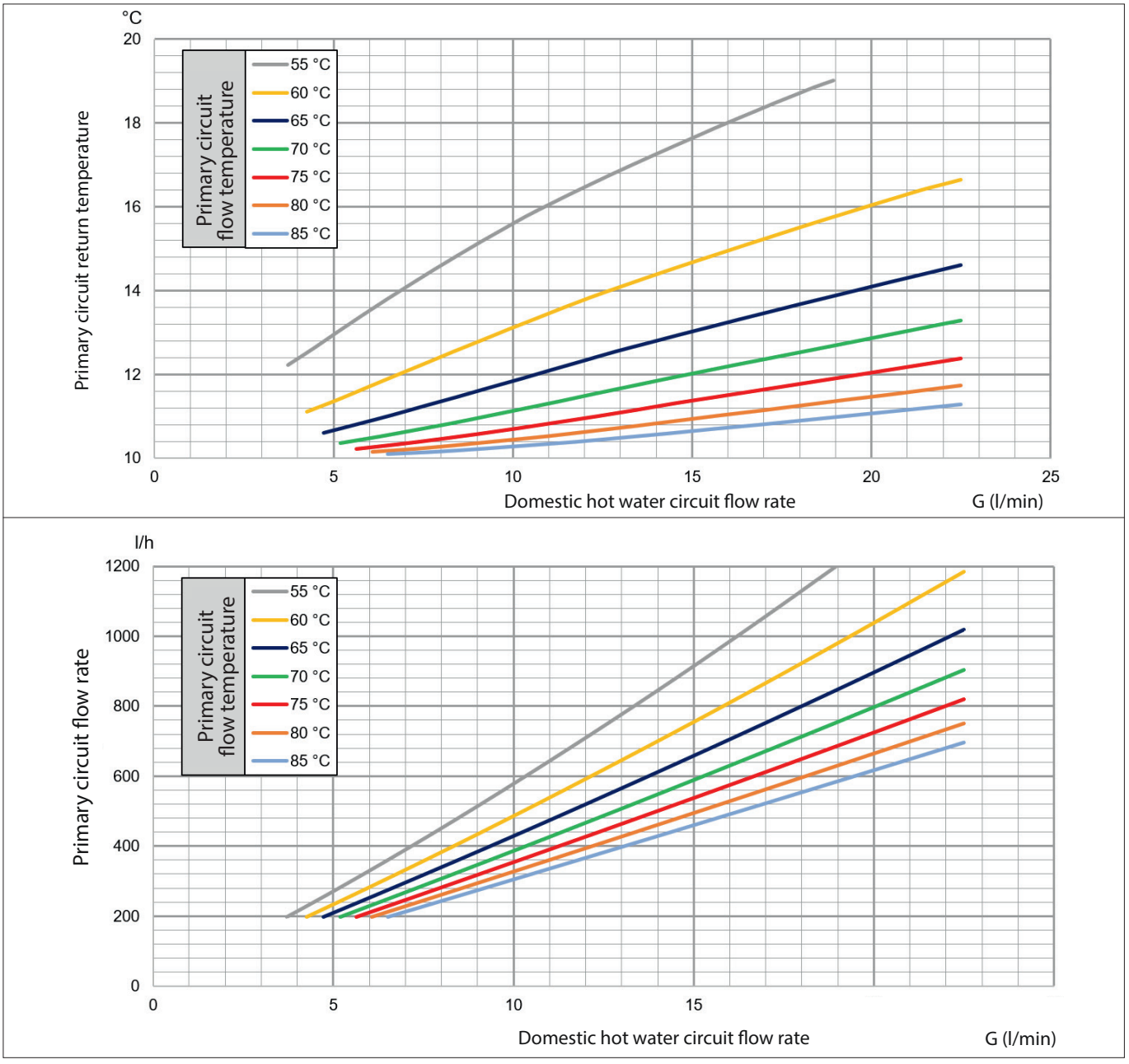
Primary circuit temperature (°C)	Domestic water flow rate (l/min)	Primary return temperature (°C)	Primary flow rate (l/h)	Power (kW)
55	13,5	28	1150	36
60	17,1	26	1150	45
65	20,3	24	1150	54
70	23,3	23	1150	63
75	24,0	22	1030	64
80	24,0	20	920	64
85	24,0	19	830	64

Performance with DHW flow rate 24 l/min
(Δp domestic hot water 1,5 bar)

Primary circuit temperature (°C)	Domestic water temperature (°C)	Primary return temperature (°C)	Power (kW)
55	38	20	46
60	41	21	52
65	44	22	57
70	47	23	63
75	51	24	68
80	54	25	74
85	57	26	79

SATK22.07 series domestic water production performance diagrams

DHW 10–48 °C, primary Δp > 50 kPa



SATK22.07 domestic water production performance tables
DHW 10–48 °C, max Δp on domestic side 1,5 bar

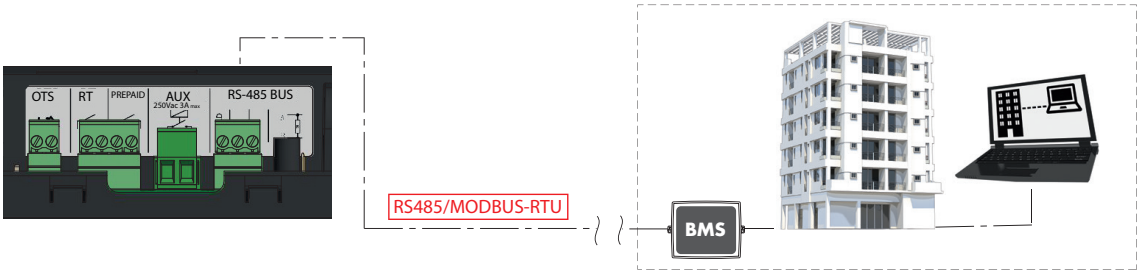
Primary circuit temperature (°C)	Domestic water flow rate (l/min)	Primary return temperature (°C)	Primary flow rate (l/h)	Power (kW)
55	11,2	16	664	30
60	14,4	15	731	38
65	17,4	14	783	46
70	20,2	13	822	54
75	22,5	12	837	60
80	22,5	12	770	60
85	22,5	11	715	60

Performance with DHW flow rate 24 l/min
(Δp domestic hot water 1,5 bar)

Primary circuit temperature (°C)	Domestic water temperature (°C)	Primary return temperature (°C)	Power (kW)
55	36	12	41
60	39	12	45
65	42	12	50
70	46	13	56
75	49	13	61
80	52	13	66
85	55	13	70

REMOTE CONTROL IN MODBUS-RTU PROTOCOL

The SATK32 heat interface unit is set up to communicate with BMS (Building Management Systems) through the Modbus RTU protocol, thanks to the RS-485 serial port integrated in the control unit.



Therefore all the settings available locally, as well as a series of additional information, are accessible through Modbus communication.

The information available on Modbus protocol is structured according to the following scheme:

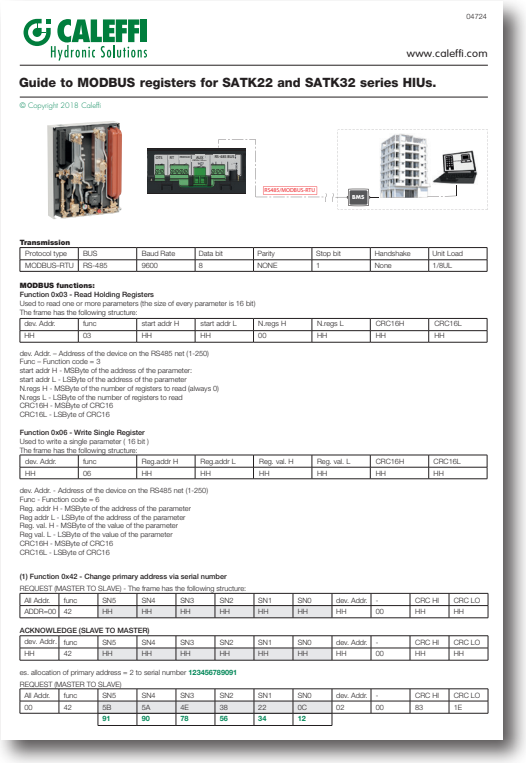
Status information (operating mode, errors, temperatures detected ...)
Room thermostat settings (set points, heating/comfort function programming, technical parameters);
Technical settings of the heat interface unit (parameters T00, T01 ...);
Technical information about the heat interface unit (serial number, firmware version);
Heat interface unit use data (life days, hours in heating mode, DHW cycles performed ...).

Each control unit has its own unique serial number that can be used to remotely set the Modbus primary address, on which the communication is based.
Therefore it is not necessary to make this setting locally, it only requires, during installation, a mapping of the controller serial number matching with the apartment where it is located.

The list of Modbus registers with description of their encoding and the telegram for setting the primary address by serial number are described in the document "Guide to MODBUS registers for SATK22 and SATK32 series HIUs", available on request.

The transmission parameters are as follows:

- databits: 8
- stop bit: 1
- parity: none
- baudrate: 9600 baud/s



04724

CALEFFI Hydronic Solutions

www.caleffi.com

Guide to MODBUS registers for SATK22 and SATK32 series HIUs.

Transmission

Protocol type	BUS	Baud Rate	Data bit	Parity	Stop bit	Handshake	Unit Load
MODBUS-RTU	RS-485	9600	8	NONE	1	None	1/8UL

MODBUS functions:

Function 0x03 - Read Holding Registers

Used to read one or more parameters (the size of every parameter is 16 bit)
The frame has the following structure:

dev. Addr.	func	start addr H	start addr L	N.regs H	N.regs L	CRC16H	CRC16L
HH	03	HH	HH	00	HH	HH	HH

dev. Addr. – Address of the device on the RS485 net (1-250)
Func – Function code = 3
start addr H - MSByte of the address of the parameter:
start addr L - LSByte of the address of the parameter
N.regs H - MSByte of the number of registers to read (always 0)
N.regs L - LSByte of the number of registers to read
CRC16H - MSByte of CRC16
CRC16L - LSByte of CRC16

Function 0x06 - Write Single Register

Used to write a single parameter (16 bit)
The frame has the following structure:

dev. Addr.	func	Reg.addr H	Reg.addr L	Reg. val. H	Reg. val. L	CRC16H	CRC16L
HH	06	HH	HH	HH	HH	HH	HH

dev. Addr. - Address of the device on the RS485 net (1-250)
Func - Function code = 6
Reg. addr H - MSByte of the address of the parameter
Reg addr L - LSByte of the address of the parameter
Reg. val. H - MSByte of the value of the parameter
Reg val. L - LSByte of the value of the parameter
CRC16H - MSByte of CRC16
CRC16L - LSByte of CRC16

(1) Function 0x42 - Change primary address via serial number

REQUEST (MASTER TO SLAVE) - The frame has the following structure:

All Addr.	func	SN5	SN4	SN3	SN2	SN1	SN0	dev. Addr.	-	CRC HI	CRC LO
ADDR=00	42	HH	HH	HH	HH	HH	HH	HH	00	HH	HH

ACKNOWLEDGE (SLAVE TO MASTER)

dev. Addr.	func	SN5	SN4	SN3	SN2	SN1	SN0	dev. Addr.	-	CRC HI	CRC LO
HH	42	HH	HH	HH	HH	HH	HH	HH	00	HH	HH

es. allocation of primary address = 2 to serial number **12345678909 1**

REQUEST (MASTER TO SLAVE)

All Addr.	func	SN5	SN4	SN3	SN2	SN1	SN0	dev. Addr.	-	CRC HI	CRC LO
00	42	6B	5A	4E	3B	29	0C	02	00	B3	1E
		91	**90**	**78**	**56**	**34**	**12**				

COMPLETION CODES

789110

Manual flushing by-pass for SATK32.
System side connections: 3/4” F.
Heat interface unit side connections: 3/4” M.

Code
789110

789023

Assembly template with shut-off valves for SATK32.

Code
789023

789540

Recess mounting meter box with galvanized base and door painted in **RAL 9010** for interior use.

Includes:
- pair of 3/4” manual shut-off valves,
- pair of temperature pockets,
- heat meter mounting template
- fittings for DCW meter.

Code	Connection	Size (mm)
789540	3/4”	350 x 380 x 110
789540 002	3/4”	276 x 400 only bottom plate

789122

Differential pressure regulating valve for SATK2230 secondary circuit.
Adjustable setting 5-30 kPa.
(50–300 mbar)

Code
789122

OPTIONS

789833	External probe for SATK22/32

SPECIFICATION SUMMARY

Code SATK2210.
Direct HIU for heating at low temperature (25–45 °C) and instantaneous domestic hot water production (42–60 °C) complete with: electronic controller, thermal safety thermostat, heating mixing valve, fail-safe solenoid valve for thermal safety, heating temperature probe, return probe, Grundfos UPM3 AUTO L 15–70 pump (EEI<0,20), fittings for heat meter, DHW production modulating valve, fast 24 V stepper motors, DHW flow meter, air vent cocks, drain cocks, primary flow and secondary return side strainer, fixed setting DPCV valve on primary side, 1/4" F pressure test ports for Δp testing, water hammer arrester, remote user interface with room thermostat function. Dimensions W 490 x H 500 x D 265 mm.

Electronic functions that can be activated: heat exchanger preheating with weekly programming on an hourly basis, return temperature control with differentiated set point for heating mode and DHW mode, flow temperature compensation based either on return temperature or on external temperature, primary flow limitation with differentiated set points for heating mode and DHW mode, anti-legionella function, programmable auxiliary contact. Remote management by Modbus protocol.

Medium: water. Maximum percentage of glycol: 30 %. Maximum primary medium temperature: 90 °C. Maximum working pressure: primary/secondary heating circuit: 10 bar, domestic circuit: 10 bar. Nominal DHW exchanger capacity: 50 kW (SATK22103) or 60 kW (SATK22105) (primary flow 70 °C, DHW 10–50 °C). Minimum flow to activate domestic flow meter: 2 l/min ±0,3. Electric supply: 230 V (AC) ±10 %, 50 Hz. Maximum power consumption 80 W. Protection class IP40. Motors: 24 V stepper with quick opening (< 4 seconds). Probes: NTC 10 kΩ. Materials: components: brass EN12165 CW617N. Steel connecting pipes. Complete insulation in black EPP. External frame and cover in RAL9010 painted steel.

Code SATK2220.
Direct HIU for heating at medium temperature (45–75 °C) and instantaneous domestic hot water production (42–60 °C) complete with: electronic controller, heating mixing valve, heating temperature probe, return probe, Grundfos UPM3 AUTO L 15–70 pump (EEI<0,20), fittings for heat meter, DHW production modulating valve, fast 24 V stepper motors, DHW flow meter, air vent cocks, drain cocks, primary flow and secondary return side strainer, fixed setting DPCV valve on primary side, 1/4" F pressure test ports for Δp testing, water hammer arrester, remote user interface with room thermostat function. Dimensions W 490 x H 500 x D 265 mm.

Electronic functions that can be activated: heat exchanger preheating with weekly programming on an hourly basis, return temperature control with differentiated set point for heating mode and DHW mode, flow temperature compensation based either on return temperature or on external temperature, primary flow limitation with differentiated set points for heating mode and DHW mode, anti-legionella function, programmable auxiliary contact. Remote management by Modbus protocol.

Medium: water. Maximum percentage of glycol: 30 %. Maximum primary medium temperature: 90 °C. Maximum working pressure: primary/secondary heating circuit: 10 bar, domestic circuit: 10 bar. Nominal DHW exchanger capacity: 50 kW (SATK22203) 60 kW (SATK22205) or 62 kW (SATK22207) (primary flow 70 °C, DHW 10–50 °C). Minimum flow to activate domestic flow meter: 2 l/min ±0,3. Electric supply: 230 V (AC) ±10 %, 50 Hz. Maximum power consumption 80 W. Protection class IP40. Motors: 24 V stepper with quick opening (< 4 seconds). Probes: NTC 10 kΩ. Materials: components: brass EN12165 CW617N. Steel connecting pipes. Complete insulation in black EPP. External frame and cover in RAL9010 painted steel.

SPECIFICATION SUMMARY

Code SATK2230.
Direct HIU for heating without flow temperature control (maximum 90 °C) and instantaneous domestic hot water production (42–60 °C) complete with: electronic controller, heating modulating valve, return probe, fittings for heat meter, DHW production modulating valve, fast 24 V stepper motors, DHW flow meter, air vent cocks, drain cocks, primary flow and secondary return side strainer, fixed setting DPCV valve on primary side, 1/4" F pressure test ports for Δp testing, water hammer arrester, remote user interface with room thermostat function. Dimensions W 490 x H 500 x D 265 mm.

Electronic functions that can be activated: heat exchanger preheating with weekly programming on an hourly basis, return temperature control with differentiated set point for heating mode and DHW mode, flow temperature compensation based either on return temperature or on external temperature, primary flow limitation with differentiated set points for heating mode and DHW mode, anti-legionella function, programmable auxiliary contact. Remote management by Modbus protocol.

Medium: water. Maximum percentage of glycol: 30 %. Maximum primary medium temperature: 90 °C. Maximum working pressure: primary/secondary heating circuit: 10 bar, domestic circuit: 10 bar. Nominal DHW exchanger capacity: 50 kW (SATK22303), 60 kW (SATK22305) and 62 kW (SATK22307) (primary flow 70 °C, DHW 10–50 °C). Minimum flow to activate domestic flow meter: 2 l/min ±0,3. Electric supply: 230 V (AC) ±10 %, 50 Hz. Maximum power consumption 20 W. Protection class IP40. Motors: 24 V stepper with quick opening (< 4 seconds). Probes: NTC 10 kΩ. Materials: components: brass EN12165 CW617N. Steel connecting pipes. Complete insulation in black EPP. External frame and cover in RAL9010 painted steel.

Code SATK2240.
Direct HIU for heating without flow temperature control (maximum 90 °C) and instantaneous domestic hot water production (42–60 °C) complete with: electronic controller, heating modulating valve, return probe, Grundfos UPM3 AUTO L 15–70 pump (EEI<0,20), fittings for heat meter, DHW production modulating valve, fast 24 V stepper motors, DHW flow meter, air vent cocks, drain cocks, primary flow and secondary return side strainer, fixed setting DPCV valve on primary side, 1/4" F pressure test ports for Δp testing, water hammer arrester, remote user interface with room thermostat function. Dimensions W 490 x H 500 x D 265 mm.

Electronic functions that can be activated: heat exchanger preheating with weekly programming on an hourly basis, return temperature control with differentiated set point for heating mode and DHW mode, flow temperature compensation based either on return temperature or on external temperature, primary flow limitation with differentiated set points for heating mode and DHW mode, anti-legionella function, programmable auxiliary contact. Remote management by Modbus protocol.

Medium: water. Maximum percentage of glycol: 30 %. Maximum primary medium temperature: 90 °C. Maximum working pressure: primary/secondary heating circuit: 10 bar, domestic circuit: 10 bar. Nominal DHW exchanger capacity: 50 kW (SATK22403) or 60 kW (SATK22405) (primary flow 70 °C, DHW 10–50 °C). Minimum flow to activate domestic flow meter: 2 l/min ±0,3. Electric supply: 230 V (AC) ±10 %, 50 Hz. Maximum power consumption 80 W. Protection class IP40. Motors: 24 V stepper with quick opening (< 4 seconds). Probes: NTC 10 kΩ. Materials: components: brass EN12165 CW617N. Steel connecting pipes. Complete insulation in black EPP. External frame and cover in RAL9010 painted steel.

CALEFFI Hydronic Solutions

Caleffi S.p.A.
S.R. 229 n. 25 · 28010 Fontaneto d'Agogna (NO) · Italy
Tel. +39 0322 8491 · Fax +39 0322 863723
info@caleffi.com · www.caleffi.com