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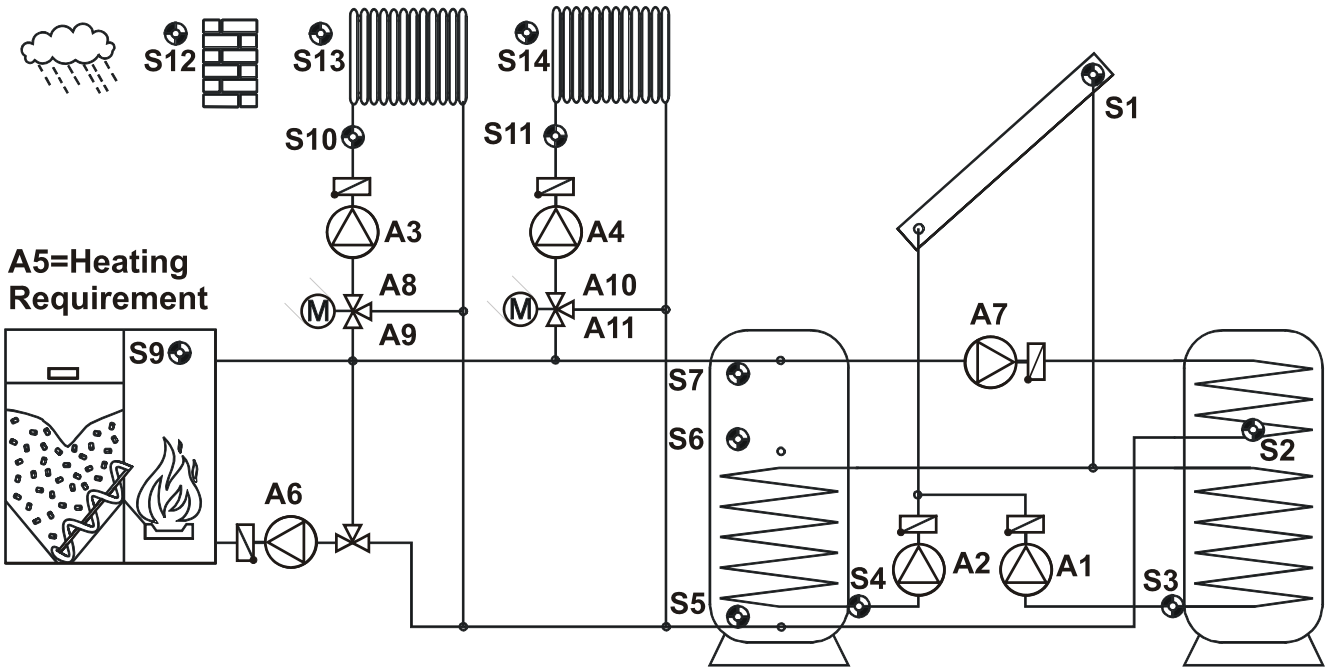
CE

Factory setting

UVR1611 EN

Typical hydraulics as factory setting

The TA factory setting can be loaded by simultaneously pressing the two input keys and scroll wheel when starting up the controller. The factory settings are based on the following hydraulic diagram for solar warm water system with a buffer and service water tank, a boiler fired with wood pellets or oil/gas, and two heating circuits:



The assignments of sensors in outputs according to the diagram are based on the special properties of the various inputs and outputs. The following sensors are not used:
S8: input for all sensor types or control voltage 0-10V or current 4-20 mA.
S15, 16: input for all sensor types including volume flow encoder (pulse input)
They are thus available for other functions, such as the heat quantity counter.
Outputs with speed control properties were assigned to the solar and load pumps to ensure that any PID function blocks can be switched.

The diagram above has the following desired functions:

A **solar control** from S1 > S3 ⇨ A1 and another one from S1 > S4 ⇨ A2
Solar priority, with S1 > S3 ⇨ A1 having priority over S1 > S4 ⇨ A2
Two **heating circuit controls** with S10, S12, S13 ⇨ A3, A8, A9 and S11, S12, S14 ⇨ A4, A10, A11, and the two flow nominal temperatures ⇨ **analog module**
Requirement warm water with S2 ⇨ **analog module**
Requirement heating based on a greater flow nominal temperature in both heating circuits and the effective nominal temperature of the **requirement warm water** compared to the tank temperature of S7 ⇨ A5
Three **load pumps** with S9, S5 ⇨ A6 and S9, S2 ⇨ A7 and S7, S2 ⇨ A7 - an additional service water load is thus possible from the buffer and the boiler.

The "**requirement heating**" shows that the ◆ **analog function** (MAX = look for the highest temperature in the input variables) is required to determine the greater flow nominal temperature of the two heating circuits and the effective nominal warm water temperature.
The two heating circuit pumps A3 and A4 should not be released unless the temperature in the boiler or the buffer is high enough. Therefore, a ◆ **comparative function** is needed at boiler sensor S9 and buffer sensor S7. They are designed as simple thermostat functions (= compare the sensor to an adjustable temperature). However, it is also possible to use the compare function of buffer sensor S7 to compare the sensor with the flow nominal temperature of the respective heating control unit via two separate comparison functions.
Only one input variable is available to enable the heating circuit pumps in the respective function. However, as the temperature in either the boiler or the buffer has to be high enough and this information is gathered from two functions (comparison), the information has to be gleaned via the ◆ **logic function** (output variable = input variable 1 or 2).

In other words, the following functions are added:

Analog function (MAX) with two flow nominal temperatures and the effective nominal warm water temperature as an input variable and the result ⇨ heater requirement (nominal value for the temperature comparison)
Two **comparison functions** with S7 and S9 ⇨ logic function
A **logic function** (OR) with the comparison functions and input variable and the result ⇨ heater regulator 1 and 2 (Enable pump). If S7 is divided up across two comparison functions as described in a comment above, separate logic functions are required for the two heating circuits.

If the system that is planned only deviates slightly from the one described here, the functions not needed should be deleted (such as only one heating circuit) or the functions should be changed (such as for a warm water system with a pump / valve system) or new functions added (such as an additional boiler fired by solid fuel).
If the differences are great, it makes most sense to delete all of the functions and then start a new function list with new parameters.

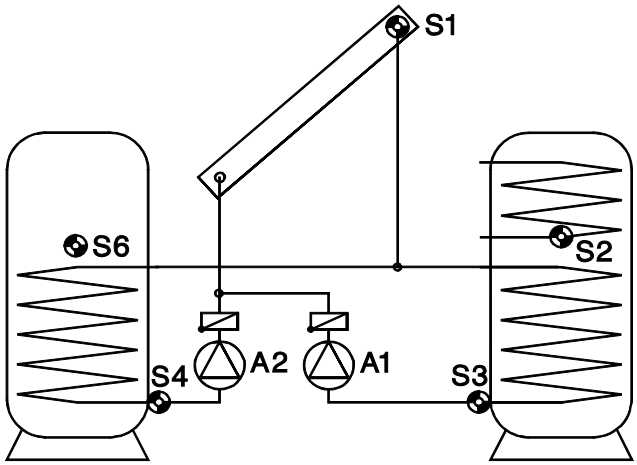
Factory settings via TAPPS

On the manufacturer's homepage (http://www.ta.co.at), the development tool TAPPS (technical alternative planning and programming system) is available under download link to program the controller using a PC and the Bootloader. Here, the data record of the factory settings described is available as a completely programmed example.

Detailed description of the factory setting

The solar part:

Function modules:
Solar thermal control / SOLAR 1
Solar thermal control / SOLAR 2
Solar priority / SOLPRIOR.



Solar thermal control / SOLAR 1

Input variables:	**Output variables:**
Enable Solar Circuit = User ON (constantly enabled) **Collector Temperature** = Source: Input 1: T.Collector **Reference Temperature** = Source: Input 3: T. Warm Water 2 Limit Temperature = Source: Input 2: T. Warm Water 1	Status Solar Circuit = Output 1

Simple description of the function:
Release of the solar pump A, if the temperature in the collector S1 is greater by a difference than the reference temperature S3, which is the temperature of the (outlet) of the tank. In addition, S2 must not have reached its upper limit yet.

Entire menu view:

DES: SOLAR1	
INPUT VARIABLE:	
OUTPUT VARIABLE:	
COLLECTOR TEMP.:	
T.Coll.ACT: 74.3 °C	Current collector temperature
T.Coll.MAX: 130 °C	Pump is blocked when T.Coll.MAX has been reached
Hysteresis: 10 K	Release at T.Coll.MAX minus hysteresis
REFERENCE TEMP.:	
T.Ref.ACT: 65.7 °C	Current tank temperature (bottom/return)
T.Ref.MAX: 70 °C	Tank limit
Hysteresis: 3.0 K	Release at T.Ref.MAX minus hysteresis

DIFFERENCE COLL-REF:	
DIFF.ON: 7.0 K	Switch-on differential T.Coll – T.Ref
DIFF.OFF: 4.0 K	Switch-off differential T.Coll – T.Ref
LIMIT TEMPERATURE:	
T.Lim.ACT: 54.0 °C	Current temperature of the additional sensor
T.Lim.MAX: 70 °C	Blocked by the additional sensor
Hysteresis: 3.0 K	Release at T.Lim.MAX minus hysteresis

Options / special features:

- The system comes to a standstill when the collector exceeds the temperature of 130°C to prevent damage from steam. This means that the heat medium is no longer circulated, so that T.Coll has an adjustable maximum limit (T.Coll.MAX) including hysteresis.
- If no additional limit sensor is used, it suffices to indicate *User* as the "source:" in the input variables.

The function SOLAR 2 is not described as it has the same parameters except for the MAX values and only has different input and output variables (sensor and output assignment).

Solar priority / SOL PRIORITY

Input variables:	**Output variables:**
Enable Solar Priority = User ON (constantly enabled) Radiation = User / unused (no radiation sensor) **Functions Involved** = SOLAR 1 (first solar function) SOLAR 2 (second solar function)	Status Rinsing Process = Indication of the output A1 for the rinsing

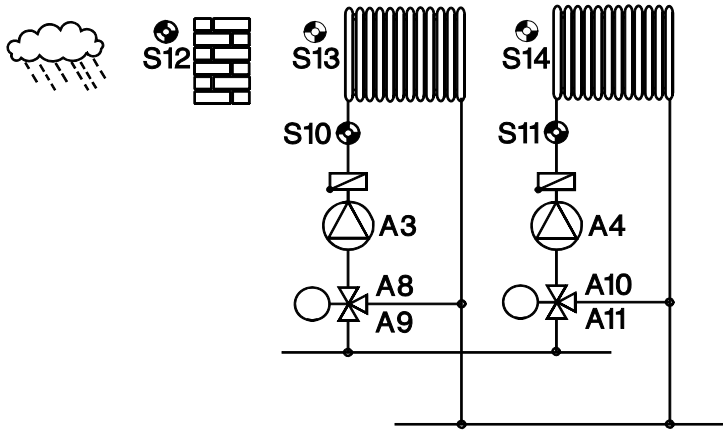
Entire menu view:

SOLAR1 1	Solar 1 has top priority
SOLAR2 2	Solar 2 has second priority
RANKING TIMER:	
From Pri Stage 1	
Run Time: 20 Min	Run-time for the consumer of next-lower priority until timer starts
Waiting: 5 Min	The collector must reach the temperature of the priority tank within five minutes; otherwise, the tank of lower priority will be charged

As described above in the basic description of functions for solar priorities, the priority function automatically affects the blockage and enable of the "Involved Functions" (SOLAR 1 and SOLAR 2) without assignment of other variables.

The heating control unit part:

Function modules:
Heating circuit control / HEAT.CIR. 1
Heating circuit control / HEAT.CIR. 2



Heating circuit control / HEAT.CIR. 1:

Input variables:	**Output variables:**
Enable Heating Circuit = User ON (constantly enabled) Enable Pump = Source: OR (from the logic function) Enable Mixer = User ON (constantly enabled) Room Temperature = Source: Input 13: T.Room1 Flow Temperature = Source: Input 10: T.Heat.Cir.P 1 Outdoor Temperature = Source: Input 12: T.Outdoor	Nominal Temp. of the Flow = Temperature of the pre-run calculated by the control unit T.FlowNOM Status Heating Circuit = Output A3 Status Mixer = Output A8 (open) and A9 (enclosed)

Simple description of the function:
Release of heating circuit pump A3 if there is a command from comparison function 1 or an appropriate boiler or buffer temperature via the logic function (OR). The mixer control is not affected by the room temperature and works with two time programs, each with three time windows. The heating circuit switches to lowering mode if the calculated flow temperature T.FlowNOM is less than MIN.

Entire basic menu overview:

OPERATE: RAS NORMAL	The heater is controlled by a room sensor currently running in heating mode (*NORMAL*)
ROOM TEMPERATURE:	
T.Room.ACT: 20.7 °C	Current temperature that the room sensor is measuring
T.Room.LOWER: 16 °C	Desired room temperature doing lowering time
T.Room.NORMAL: 20 °C	Desired room temperature doing heating time
TIME PROG:	Opens the Time menu (normal - lowering mode) with two programs, each with three windows

Rate time: 0 Min	Always at the beginning of the heating period according to time program
T.Room.EFF: 20°C	Current desired room temperature = 20°C (current heating operation)
FLOW TEMPERATURE:	
T.FlowACT: 58.4 °C	Current flow temperature
T.FlowNOM: 58.2 °C	Calculated flow temperature
HEAT CURVE:	Settings for the calculation of the flow temperature
OUTDOOR TEMPERATURE:	
T.Out.ACT: 13.6 °C	Current outdoor temperature
AVG.TIME:	Settings for calculation of outdoor temperature for the calculation of flow temperature and switch-off of the pump
SWITCH-OFF COND.:	Close switch-off of heating circuit pump and mixer if T.FlowNOM < T. FlowMIN
FROST PROTECTION:	Below an average outdoor temperature of 0°C, the room is kept at 5°C

HEAT CURVE:

The following in entries are found in this submenu:

HEAT.CIR.1	
MODE:	
CONTROL : Out.Temp	Control using the outdoor sensor
HEAT CURVE: Temp.	Heating curve via temperature points +10°C and -20°C
Room Infl.: 0%	Room temperature not taken into consideration for calculation of the flow
Increasing on Start 0%	The previous lowering time does not lead to an increase in the flow temperature, decreasing over time
T.Flow+10°C: 35 °C	Desired flow temp. at +10°C outdoor temp. (heating curve)
T.Flow-20°C: 60 °C	Desired flow temp. at -20°C outdoor temp. (heating curve)
T.FlowMAX: 65 °C	The flow must not exceed this limit
T.FlowMIN: 20 °C	The flow must not fall below this limit

AVERAGE outdoor temperature:

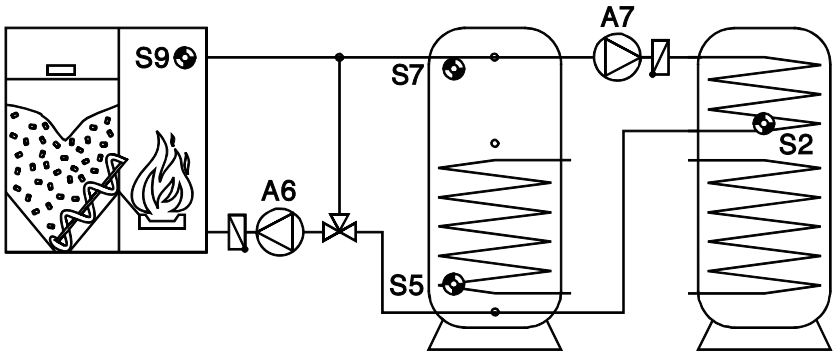
The outdoor temperature is averaged for the calculation of the heating curve for 10 minutes and for 30 minutes for the switch-off condition of the pump. The switch-off condition of the pump via the average outdoor temperature is, however, not activated. The heating circuit pump is only switched off: 1. via the input variable "Enable Pump" linked to the logic function OR or 2. if the flow temperature falls below T.FlowMIN.

Heating circuit control / HEAT.CIR. 2:

The function heating circuit 2 has the same values in all parameters as circuit 1 and only has different input and output variables (sensor and output assignment).

The load pump section:

Function modules:
Load pump / LD PUMP 1
Load pump / LD PUMP 2
Load pump / LD PUMP 3



Load pump / LD PUMP 2:

Input variables:	**Output variables:**
Enable Pump = User ON (constantly enabled) **Feeder Temperature** = Source: Input 7: T.ST.Upper **Reference Temperature** = Source: Input 2: T. Warm Water 1 Minimum T.Feed = Source: User (simple MIN threshold) Maximum T.Ref = Source: User (simple MAX threshold)	Status of the Load Pump = Output A7

Simple description of the function:
Release of load pump A7 if the temperature on the buffer S7 (feed temperature T.Feed) is higher than the minimum temperature and one differential higher than reference temperature T.Ref. = S2. In addition, T.Ref = S2 must not have reached its maximum limit yet.

Entire menu view:

FEEDER TEMPERATURE:	
T.Feed.ACT: 74.3 °C	Current temperature of buffer S7
T.Feed.MIN: 60 °C	Basic switch-on threshold at sensor T.Feed = S7
DIFF.ON: 5.0 K	Switch-on differential to T.Feed.MIN (here, 65°C)
DIFF.OFF: 1.0 K	Switch-off differential to T.Feed.MIN (here, 61°C)
REFERENCE TEMP.:	
T.Ref.ACT: 65.7 °C	Current tank temp. of S2
T.Ref.MAX: 90 °C	Tank limit at S2
DIFF.ON: 1.0 K	Switch-on differential to T.Ref.MAX (here, 91°C)
DIFF.OFF: 5.0 K	Switch-off differential to T.Ref.MAX (here, 95°C)
DIFFERENCE FEED-REF:	
DIFF.ON: 5.0 K	Switch-on difference FEED - REF = S7 - S2
DIFF.OFF: 2.0 K	Switch-off difference FEED - REF = S7 - S2

LD PUMP 3 also switches A7 but with the difference S9 to S2.
LD PUMP 1 switches A6 with the difference S9 to S5 with parameters similar to those described above. This module is prepared for the inclusion of a solid fuel-fired tank to charge the whole buffer volume (S5) if necessary.

The burner requirement warm water:

Function module:
Requirement WW / WW_REQ.

Input variables:	**Output variables:**
Enable Req WW = User ON (constantly enabled) **Warm Water Temp**. = Source: Input 2: T. Warm Water 1 Nominal Temp = Source: User (simple MAX threshold)	Effective Nominal Temp = Desired warm water temp. T.WW.EFF Status Requirement = No output assignment Burner Performance = No output assignment

Simple description of the function:
Output of effective nominal warm water temperature if the temperature in tank S2 (warm water temperature T.WW) drops below the specified nominal temperature T.WW.NOM within a time window or below the specified nominal temperature T.WW.MIN outside the time window. When the desired tank temperature is reached, the module outputs the effective nominal warm water temperature of 5°C. The analog module transfers the nominal temperature to the module requirement heating for a comparison to the buffer temperature and does not make a direct burner requirement.
Another method is direct triggering of burner output A5 and no transfer of the nominal warm water temperature to the analog module. It is assumed that if the buffer temperature is high enough the load pump function LD PUMP 2 will always refill the warm water tank fast enough to 60°C so that S2 only drops below 50°C if the buffer is cold and sends a burner requirement via this function.

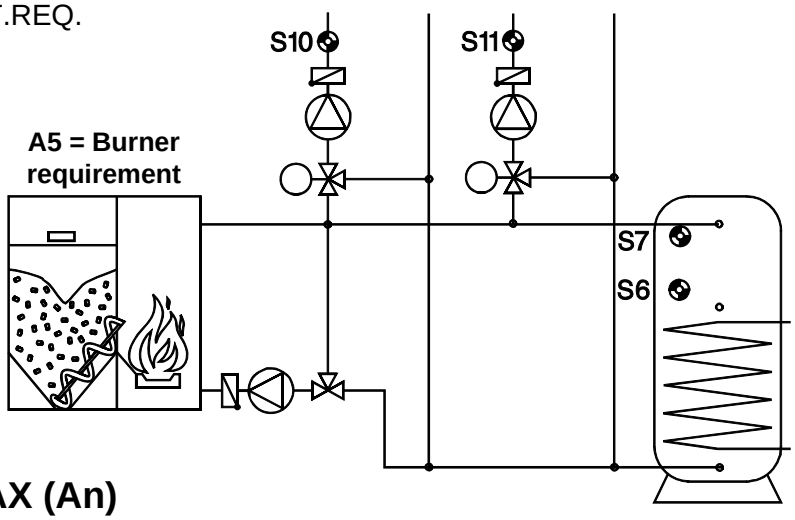
Entire menu view:

`WARM WATER TEMP.:`	
`T.WW.ACT:  58.3 °C`	Current temperature of the warm water tank
`T.WW.NOM:  50 °C`	Nominal temperature at S2 of the warm water tank
`TIME PROG:`	Opens the Time menu (see Time programs)
`T.WW.MIN:  40 °C`	Minimum temperature of the warm water tank
`DIFF.ON:  2.0 K`	Switch-on diff. to T.WW.NOM and T.WW.MIN (52°C; 42°C)
`DIFF.OFF:  5.0 K`	Switch-off diff. to T.WW.NOM and T.WW.MIN (55°C; 45°C)
`Burner Perf.: 100 %`	Specification for burner performance

The burner requirement heating:

Some modules such as: HEATING CIRCUIT CONTROL or REQUIREMENT WW provide the current demand temperature as an output variable. The boiler (burner) should only be running if the buffer cannot cover one of the demand temperatures.

Function modules:
Analog function / MAX (on)
Heating requirement / HEAT.REQ.



Analog functions/MAX (An)

Input variables:	**Output variables:**
Enable Analog Function = User ON (constantly enabled) Input Variable 1 = Source: HEAT.CIR.1 Flow nom. temp. Input Variable 2 = Source: HEAT.CIR.2 Flow nom. Temp. Input Variable 3 = Source: WW REQ Effective Nominal WW Temperature	This result does not have a direct assignment (= input variable of the requirement heating)

Entire menu view:

`FNCT.VAR: Temperat.`	All inputs are temperatures
`FUNCTION: MAX`	Output of the highest temperature of the inputs
`VAR. 1: 53.6 °C`	Nominal flow temperature of the function HEAT.CIR.1
`VAR. 2: 66.4 °C`	Nominal flow temperature of the function HEAT.CIR.2
`VAR. 3: 5.0 °C`	Effective temperature of the function WW REQ
`If ENABLE = Off 1 °C`	If the analog mode has not been released, module outputs 1°C (user issues release)
`RESULT: 66.4 °C`	The module HEAT.REQ takes over this result for a comparison to the upper buffer temperature

The analog function therefore uses the command MAX to provide the greater calculated temperature and input variable for the function "requirement heating."

Requirement heating/HEAT.REQ.

Input variables:	**Output variables:**
Enable Requirement Heating = User ON (constantly enabled) **Requirement Temperature** = Source: Input 7: T.ST.Upper Switch-off temp = Source: Input 6: T.ST.Center Nominal Value Requirement = Source: MAX(An) from previous function Nominal Value Switch-off = Source: MAX(An) from previous function	Status Requirement = Output A5

Simple description of the function:
Release of burner A5 if the temperature in the top of buffer tank S7 (requirement temperature T.Req) falls below the higher flow nominal temperature of the two heating control units or the effective nominal WW temperature. Switch off if the temperature S6 in the middle of the tank (shut-off temperature T.Off) rises above the greater flow nominal temperature of the two heating control units or the effective nominal WW temperature.
The same sensor S7 could be used for the shut-off temperature. In addition, *User* can be indicated as the source of the input variable “nominal value switch-off”. The requirement is then based on need (result from the analog module) and switches off when the buffer reaches a maximum temperature set by the user.

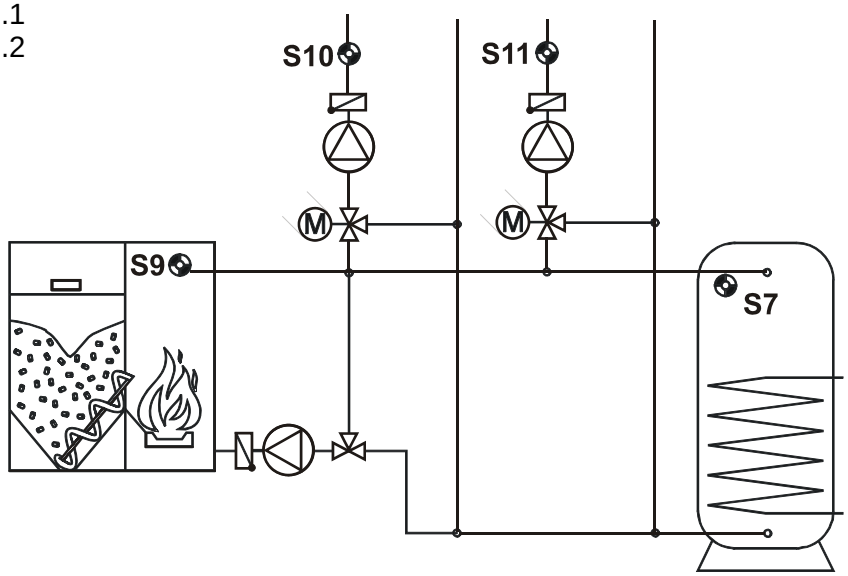
Entire menu view:

REQ.TEMPERATURE:	
T.Req.ACT: 74.3 °C	Current temperature of sensor S7
T.Req.NOM: 61.4 °C	The greater flow nominal temperature
DIFF.ON: 1.0 K	Switch-on differential to T.Req (here, 62.4°C)
SHUT-OFF TEMP.:	
T.Off.ACT: 44.3 °C	Current temperature of sensor S6
T.Off.NOM: 61.4 °C	The greater flow nominal temperature
DIFF.OFF: 9.0 K	Switch-on differential to T.Off (here, 70.4°C)
Base Temperature:	
T.Req.MIN: 0 °C	No minimum tank temperature
Minimum Runtime	
Burner: 0 Sec	

Release of the heating circuit pumps:

NOTICE:
The method described below with comparison and logic functions is intended to explain the technology of linked modules and releases. This is the main reason it is included in the factory settings. In many cases, the free decision made by the heating control units suffices without a release of the feed temperatures. Set *User* ON in "Enable pump" for the heating circuit control units.

Function blocks:
Comparison function / MIN FUNC.1
Comparison function / MIN FUNC.2
Logic function / OR



Comparison function / MIN FUNC.1:

Input variables:	**Output variables:**
Enable Comparison user ON (constantly enabled) **Comparative Value a** = Source: Input 9: T.Boiler Flow Comparative Value b = Source user	Status Va > Vb + diff = No direct assignment (= input variable of logic function OR)

Simple description of the function:
A simple minimal thermostat function on the boiler temperature S9 (comparison S9 = VALUE a with an adjustable threshold = VALUE b) releases via the logic function OR the heating circuit pumps.

Entire menu view:

FNCT.VAR: Temperat.	Comparison of two temperatures
VALUEa: 39.1 °C	Current temperature at boiler flow S9
VALUEb: 60 °C	Minimum temperature at boiler flow S9
DIFF.ON: 5.0 K	Pump enabled if boiler flow S9 rises above 65°C
DIFF.OFF: 2.0 K	Pump blockage if boiler flow S9 falls below 62°C

Comparison function / MIN FUNC.2:

Input variables:	**Output variables:**
Enable Comparison user ON (constantly enabled) **Comparative Value a** = Source: Input 7: T.ST.Upper Comparative Value b = Source user	Status Va > Vb + diff = No direct assignment (= input variable of logic function OR)

Simple description of the function:
A simple minimal thermostat function on the top buffer temperature S7 (comparison S7 = VALUE a with an adjustable threshold = VALUE b) releases via the logic function OR the heating circuit pumps.

Entire menu view:

FNCT.VAR: Temperat.	Comparison of two temperatures
VALUEa: 74.3°C	Current temperature at top of buffer S7
VALUEb: 30°C	Minimum temperature at top of buffer S7
DIFF.ON: 5.0 K	Pump release if S7 (top of buffer) rises above 35°C
DIFF.OFF: 2.0 K	Pump blockage if S7 (top of buffer) falls below 32°C

Logic function / OR:

Input variables:	**Output variables:**
Enable Logic Function = User ON (constantly enabled) Input Variable 1 = Source: MIN FUNC.1 1: Va > Vb + diff Input Variable 2 = Source: MIN FUNC.2 1: Va > Vb + diff	The result does not have a direct assignment (= input variable of the heating circuit pump enable for the two heating circuit control units)

Entire menu view:

FUNCTION: OR	(Output = Input Variable 1 / ON or Input Variable 2 / ON)

The heating circuit pumps are therefore released when either the boiler temperature S9 exceeds 65°C or sensor S7 at the top of the buffer exceeds 35°C. The input variable "Enable pump" of the two heating control units contains the entry: source: OR
This entry merely allows you to release. Each heating control unit then decides separately whether it makes sense to have a pump running.