SIEMENS

LMU54... / LMU64...
Update Description V2.08 ⇨ V3.0
(Preliminary edition)

For use with Basic Documentation CC1P7494

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Siemens Building Technologies
HVAC Products

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3.1 Burner control

Sequence diagram

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Fan parameters accessible via QAA

Under certain conditions, the fan parameters for ignition load, low-fire and high-fire, prepurging and postpurging can also be set via the QAA73 (parameter «FaEinstellFlags3»).

Since these fan parameters are safety-related and - as a general rule - safety-related values cannot be readjusted via the QAA73..., following applies:

- The relevant parameters will be copied and the new parameters filed in the non-safety-related range
- Changeover between the 2 parameter groups can be parameterized via a safety-related flag («FaEinstellFlags3»)

Changeover to the QAA fan parameters is only permitted under certain preconditions:

1. Capacity range < 70 kW.
2. Changeover only possible on the OEM level or higher.

For the new parameters, the usual fan parameter checks are made (same as with the previous parameter group).

Listing of both parameter groups:

Parameters on QAA	Safety-related parameters
LmodZL_QAA	LmodZL
LmodTL_QAA	LmodTL
LmodVL_QAA	LmodVL
N_ZL_QAA	N_ZL
N_TL_QAA	N_TL
N_VL_QAA	N_VL
Tv_QAA	Tv
Tn_QAA	Tn

When setting these parameters, the following general conditions must be observed:

QAA parameters:		**CRC-protected parameters:**
LmodZL_QAA	≤	LmodZL
LmodVL_QAA	≤	LmodVL
LmodTL_QAA	≥	LmodTL
N_ZL_QAA	≤	N_ZL
N_VL_QAA	≤	N_VL
N_TL_QAA	≥	N_TL
Tv_QAA	≥	Tv
Tn_QAA	≥	Tn

3.2 Selection of compensation variants

(... ...)

Heating circuits

With HMI AGU2.310

RU QAA53/ QAA73	**RU for Hk1 active**	**RU for Hk2 active**	**Outside sensor**	**Setpoint Hk1 TkSoll**	**Setpoint Hk2 TvSoll**	**Heat demand heating circuit 1**	**Heat demand heating circuit 2**	**Compensation variant heating circuit 1** [1]	**Compensation variant heating circuit 2** [1]
Not present	–	–	Not present	TvSollMmi acc. to SU prog. HMI Hz1	TvSollMmi acc. to SU prog. HMI Hz2	RT1 / SU prog. HMI Hz1	RT2 / SU prog. HMI Hz2	Fixed value control	Fixed value control
Not present	–	–	Present	TvSollWf1	TvSollWf2	RT1 / SU prog. HMI Hz1	RT2 / SU prog. HMI Hz2	Weather compen-sation LMU	Weather compen-sation LMU
Present	No	No	Not present	TvSollMmi acc. to SU prog. HMI Hz1	TvSollMmi acc. to SU prog. HMI Hz2	RT1 / SU prog. HMI Hz1	RT2 / SU prog. HMI Hz2	Fixed value control	Fixed value control
Present	No	No	Present	TvSollWf1	TvSollWf2	RT1 / SU prog. HMI Hz1	RT2 / SU prog. HMI Hz2	Weather compen-sation LMU	Weather compen-sation LMU
Present	Yes	No	Not present	Tset / Tset2	TvSollMmi acc. to SU prog. HMI Hz2	RU1 / RU2	RT2 / SU prog. HMI Hz2	Room compen-sation RU	Fixed value control
Present	Yes	No	Present	Tset / Tset2	TvSollWf2	RU1 / RU2	RT2 / SU prog. HMI Hz2	Weather compen-sation RU	Weather compen-sation LMU
Present	Yes	Yes	Not present	Tset / Tset2	Tset / Tset2	RU1 / RU2	RU1 / RU2	Room compen-sation RU	Room compen-sation RU
Present	Yes	Yes	Present	Tset / Tset2	Tset / Tset2	RU1 / RU2	RU1 / RU2	Weather compen-sation RU	Weather compen-sation RU
Present	No	Yes	Not present	TvSollMmi acc. to SU prog. HMI Hz1	Tset / Tset2	RT1 / SU prog. HMI Hz1	RU1 / RU2	Fixed value control	Room compen-sation RU
Present	No	Yes	Present	TvSollWf1	Tset / Tset2	RT1 / SU prog. HMI Hz1	RU1 / RU2	Weather compen-sation LMU	Weather compen-sation RU

[1] For the compensation variant, following applies:
- If the heating curve slope is set to «0», the compensation variant of the heating circuit will be locked
- If the heating curve slope is set to a value other than «0», the compensation variant according to the table will be used

Legend

TvSollWf1	Flow temperature setpoint resulting from weather compensation for heating circuit 1
TvSollWf2	Flow temperature setpoint resulting from weather compensation for heating circuit 2
TsRaumMmi	Room temperature setpoint of HMI
TSet	Flow temperature setpoint of RU for heating circuit 1
Tset2	Flow temperature setpoint of RU for heating circuit 2
TrSet	Room temperature setpoint of RU for heating circuit 1
TrSet2	Room temperature setpoint of RU for heating circuit 2
TrSfix	Average of parameter values «TrSmin» and «TrSmax» (= (TrSmin+TrSmax) / 2)
RT / SU	Room thermostat / time switch
SU programm Hz1	Time switch program on the AGU2.310 for heating circuit 1
SU programm Hz2	Time switch program on the AGU2.310 for heating circuit 2
RU1 / RU2	Heat demand from RU for heating circuit 1 / heating circuit 2
–	Will not be evaluated

Room setpoint (... ...)

With HMI AGU2.310

RU QAA53 / QAA73	Room setpoint RU active	RU1 active for heating circuit	RU2 active for heating circuit	Outside sensor	Room setpoint HzA	Room setpoint HzB
Don't care	No	–	–	Not present	TrSfix	TrSfix
Don't care	No	–	–	Present	TrSollMmi, reduced acc. to SU program Hz1	TrSollMmi, reduced acc. to SU program Hz2
Present	Yes	No	No	Not present	TrSfix	TrSfix
Present	Yes	No	No	Present	TrSollMmi, reduced acc. to SU program Hz1	TrSollMmi, reduced acc. to SU program Hz2
Present	Yes	No	Yes	Not present	TrSfix	TrSfix TrSet2 [2)]
Present	Yes	No	Yes	Present	TrSollMmi, reduced acc. to SU program Hz1	TrSfix TrSet2 [2)]
Present	Yes	Yes	No	Not present	TrSet	TrSfix
Present	Yes	Yes	No	Present	TrSet	TrSollMmi, reduced acc. to SU program Hz2
Present	Yes	Yes	Yes	Don't care	TrSet	TrSfix TrSet2 [2)]

[2)] If the RU delivers the second room setpoint «TrSet2», «TrSet2» will be used, otherwise, «TrSfix».
The QAA73... delivers data point «TrSet2» with version 1.4 or higher.

DHW circuit

The plant components decisive for the DHW circuit's compensation variant are the following:

- The RU
- The HMI
- DHW sensor 1

Without HMI

DHW sensor 1 TbwIst1	RU QAA73	DHW setpoint TempAnfoVeBw	DHW demand	Compensation variant DHW circuit
Not present	Don't care	TbwSmin	Locked	Locked
Present	Not present	(TbwSmin+TbwSmax) / 2	Continuously or via the time switch 2)	Emergency operation
Present	Present	TdhwSet	RU-DHW	RU-compensated

With HMI AGU2.361 / AGU2.362, AGU2.303

DHW sensor 1 TbwIst1	RU QAA73	DHW setpoint TempAnfoVeBw	DHW demand	Compensation variant DHW circuit
Not present	Don't care	TbwSmin	Locked	Locked
Present	Not present	TbwSollMmi	Continuously or via the time switch 2)	Fixed value control
Present	Present	TdhwSet 3)	RU-DHW	RU-compensated
Present	Present	TbwSollMmi 3)	RU-DHW	RU- / HMI-compensated

With HMI AGU2.310

If the DHW operating mode of the AGU2.310 is on standby, the compensation variant in the DHW circuit is generally locked, with DHW setpoint «TbwSmin» and DHW demand locked.

If the operating mode is not on standby, the following table applies:

DHW sensor 1 TbwIst1	RU QAA73	DHW setpoint TempAnfoVeBw	DHW demand	Compensation variant DHW circuit
Not present	Don't care	TbwSmin	Locked	Locked
Present	Not present	TbwSollMmi	Continuously	Fixed value control
Present	Present	TdhwSet 3)	RU-DHW	RU-compensated
Present	Present	TbwSollMmi 3)	RU-DHW	RU- / HMI-compensated

Legend

TbwSmin	Minimum DHW temperature setpoint
TbwSmax	Maximum flow temperature setpoint
TbwSollMmi	DHW temperature setpoint of the HMI
TbwSollRva	DHW setpoint of the RVA...
TdhwSet	DHW temperature setpoint of the RU
TempAnfoVeBw	Resulting DHW temperature setpoint
RU-Bw	DHW demand from the RU
RVA-Bw	DHW demand from the RVA...

2) A time switch for the DHW demand must be released via prameterization (KonfigRg1.Schaltuhr2Bw =1 and KonfigRg1.Schaltuhr2 =1).
It is to be connected to the RU input. This function **cannot** be used in connection with a RU

3) Can be selected via parameterization «KonfigRg6.2»

Note

On a cascade application with the LMU... and device address 2, segment «0», the DHW setpoint of the RVA… will be preselected.

Also refer to → OCI420...-clip-in communication LPB interface / multiboiler plants with LMU… (cascade application).

3.3 Acquisition of actual values

All actual values are read in via AD conversion. A description of the individual channels is given below.

Assignment of analog sensors

The LMU… has 6 analog read-in channels that can be configured in different ways.

Configura-tion	Analog 1 (tested)	Analog 2 (tested)	Analog 3	Analog 4	Analog 5	Analog 6
1	B2	B7	B3	B8 *	B9	Ph2o
2	B2	B7	B3	B8 *	B4	Ph2o
3	B2	B4	B3	B8 *	B9	Ph2o
4	B2	B7	B3	B4 *	B9	Ph2o

* Variant (in parameterization **and** hardware version)

Legend

B2 → TkIst
B3 → TbwIst1
B4 → TbwIst2
B7 → TkRuec
B8 → Tabgas
B9 → TiAussen

(... ...)

3.4 Supervisory functions

(... ...)

Speed limitation

Speed limitation maintains the preselected speeds when the maximum or minimum heat output is reached. Disturbance variables with regard to fan speed are voltage variations and changes in flueway resistance (length of flueways).

In the case of crossings of the maximum or minimum speed thresholds, speed limitation acts like a one-sided speed control loop.

Depending on the demand for heat, the heat output range is thus as follows:

- With all types of heat demand: N_TL ≤ Nist ≤ NhzMaxAkt

The associated PWM setting range is: LmodTL...PhzMaxAkt

- With DHW demand: N_TL ≤ Nist ≤ N_VL

The associated PWM setting range is: LmodTL...LmodVL

LmodTL: Minimum modulation value at which the flame is not yet lost and combustion performance is still satisfactory

LmodVL: Maximum permissible PWM value (parameter)

Notes

- Speed limitation has 2 parameters («KpBegr» and «KpUnbegr»), which make it possible to set the dynamics of speed limitation.
  Parameter value 10 represents the default setting.

- In the case of load steps to low-fire («LmodTL»), the speed may drop below the minimum speed because the fan speed lags behind fan control (T ≈ 5 seconds).

  To prevent this, a PWM ramp in the low-fire range can be parameterized:

  KonfigRg6.7 = 0 without PWM ramp at PWM < LmodTL +5 %
  KonfigRg6.7 = 1 with PWM ramp at PWM < LmodTL +5 %

  This ramp only applies to falling PWM control values. Its maximum drop is as follows, depending on the PWM control value:

  Ramp = 0.2 % / s at a PWM control value of between «LmodTL + 2.5 %» and «LmodTL + 5 %»
  Ramp = 0.05 % / s at a PWM control value below «LmodTL +2.5 %»

- Speed limitation contains a neutral band whose parameters can be set. If the speed stays within the neutral band, the manipulated variable will not change.

  If there was no neutral band with the speed near the limit range, integration would continuously take place in one or the other direction. With the help of the neutral band, the manipulated variable near the speed limit can be smoothed.

Limitation of ionization current

With the help of parameter «IonLimit», the minimum speed is determined such that a faulty ionization current cannot cause the burner to shut down.
For that function, speed limitation must be active.

If parameter «IonLimit» is set to «0», the function is deactivated.

If the ionization current drops below «IonLimit», the minimum speed will be set to the current speed and the lower speed limit will be raised by 100 min^{-1} every 10 seconds.

When the function is activated, this speed will determine the lower limit of the speed limitation.

Speed limitation thus raises the PWM signal and the modulation, which leads to a higher ionization current.

If the lower speed limit reaches the maximum speed («NhzMax» or «N_VL»), the integrator will be stopped and a signal code delivered.

If the ionization current exceeds the limit, the speed limit will be dropped again by 100^{-1} per 10 seconds until the speed limit reaches the minimum speed («N_TL»).

Ionization current supervision

Ionization current limitation has been complemented by ionization current supervision. Both functions operate independently.

While ionization current limitation actively attempts to increase the current and to bring it into the permissible range, the supervisory function merely compares the present current with the limit value and initiates shutdown if necessary.

Function

The actual inonization current is continuously compared with parameter «IonLimitGrenz». If the current drops below that parameter value, safety shutdown with restart will be triggered and the repetition counter decremented.

When the repetition counter reaches «0», lockout will be initiated. If parameter «IonLimitGrenz» is set to «0», the current cannot drop below the limit so that the function will be deactivated.

If ionization current supervision triggers 3 successive shutdowns, lockout will be initiated.

3.5

3.6

3.7

3.8 Electronically controlled PWM heating circuit pump

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Summary of all ΔT parameters

No.	DPA no.	Parameter name	Function	Setting level	Mandatory settings	
					OEM	**Installer**
1	180	QmodDrehzStufen	Number of speeds of the modulating pump	OEM	**Yes**	If required
2	146	QmodMin	Minimum degree of modulation	OEM	**Yes**	If required
3	147	QmodMax	Maximum degree of modulation	OEM	**Yes**	If required
4	177	FoerderMin	Minimum pump head	OEM	**Yes**	If required
5	176	FoerderMax	Maximum pump head	OEM	**Yes**	If required
6	435	Klambda1	Filter time constant	OEM	If required	No
7	179	KtAbtastDt	Factor for sampling time	OEM	If required	No
8	182	KonfigRg7	Configuration byte			
		Bit 0	Heating circuit pump 0: Multispeed 1: Modulating	Installer	**Yes**	No
		Bit 1	ΔT limitation 0: Inactive; 1: Active	Installer	**Yes**	No
		Bit 2	ΔT supervision 0: Inactive; 1: Active	Installer	**Yes**	No
		Bit 3 Bit 4	Plant volume 1,0: Medium	Installer	No	**Yes**
		Bit 5	ΔT in reduced operation. 0: Inactive; 1: Active	Installer	**Yes**	No
		Bit 6	Not relevant	Installer	No	No
		Bit 7	Not relevant	Installer	No	No
9	174	NqmodNenn	Speed at the design point	Installer	No	**Yes**
10	175	NqmodMin	Minimum speed in heating operation	Installer	No	If required
11	188	NqmodMinBw	Minimum speed in DHW operation	Installer	No	If required
12	181	TkSnorm	Maximum boiler temperature setpoint	Installer	No	**Yes**
13	173	TiAussenNorm	Design outside temperature at the design point	Installer	No	**Yes**
14	172	dTkTrNenn	Design differential	Installer	No	**Yes**
15	116	dTkTrMax	Maximum temperature differential of ΔT control	OEM	**Yes**	If required
16	167	KpDt	Proportional coefficient	OEM	No	If required
	168	TvDt	Derivative action time	OEM	No	If required
	169	TnDt	Integral action time	OEM	–	If required
17	586	dTUeberhBegr	Limitation of flow temperature boost %	Installer	No	No

Behavior in different operating modes

(... ...)

DHW operation

Behavior with night setback or quick setback

If the LMU... knows about the states of the switching program, it is possible to run the heating circuit pump at minimum speed during night setback or quick setback.

Decisive for this function is the compensation variant used.

In that case, it is accepted that the room temperature drops below the nominal level. Energy savings are given priority.

Parameterization offers the following choices:

KonfigRg7.DtRedBetrieb =

XX0X XXXX: ∆T control is inactive in reduced mode, which means that the pump's speed is «NqmodMin»

XX1X XXXX: ∆T control is also active in reduced mode

Information about night setback is dependent on the compensation variant of heating circuit 1. Depending on the variant, the function is either locked or released:

Compensation variant HC1	**Criterion for night setback**
Emergency operation, fixed value control or weather compensation LMU...	Time switch is used and has made setback: «KonfigRg1.Schaltuhr1» = 1 **and** RT = 0 Operating section with parameterization and heating mode is «Standby» or «Reduced» or TSP1 at the reduced level
Room influence RU or weather compensation RU	Switching program of HC1 is in night setback mode: «BetrNiveauRh1»= 0 er 1*

* BetrNiveauRh1 = 0 means frost protection
BetrNiveauRh1 = 1 means reduced mode (this means that the minimum pump speed is also used in frost protection mode)

If the criteria for night setback are not met, ∆T control will be calculated and the calculated pump speed delivered.

(... ...)

Maximum limitation of the flow temperature in connection with ∆T control

The maximum flow temperature setpoint «teta_vl_max is derived from the active special functions:

Active special function	**Warm air curtain, ext. preselected output**	**Other**
Teta_vl_max	SdHzAusMin > 0: (TkSmax – SdHzAusMin) SdHzAusMin <= 0: (TkSmax)	TkSnorm (setting parameter of LMU…)

Limitation of boost

Delta T-control calculates a flow temperature boost depending on the reduced speed so that the energy level will be maintained. Using parameter «dTUeberhBegr», the boost can be adjusted in the range 0...100 %.

100 % means that the entire calculated boost of delta T-control will be adopted (as before).

0 % means that the flow temperature setpoint is maintained without giving consideration to delta T-control.

Since the pump always modulates according to the reduction calculated by delta T-control, heat shortage for the heating circuits will be greater the further away from 100 % the parameter is set.

Extension of pump modulation for hydraulic diagrams

With the hydraulic diagrams 51, 54, 55, 67, 70 and 71, pump modulation can be activated with flag «f_ModQ1alle» in «KonfigRg7».

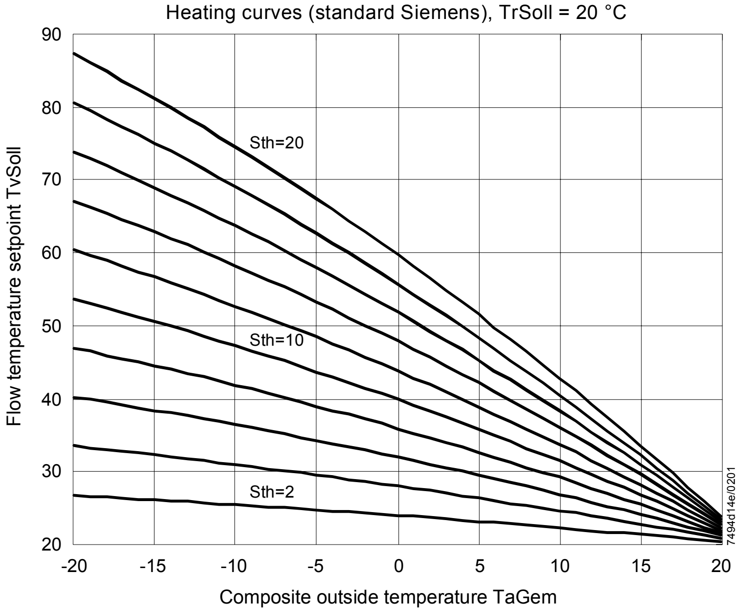
Only when this flag is set in connection with flag «f_ModQ1», will boost and modulation be calculated and delivered for these diagrams.

If pump modulation of delta T-control is activated for these diagrams, the heating circuits may not be supplied with sufficient heat due to parallel operation with several other heating circuits and, therefore, mixed return temperatures.

3.9 Heating circuit control

(... ...)

Heating curves



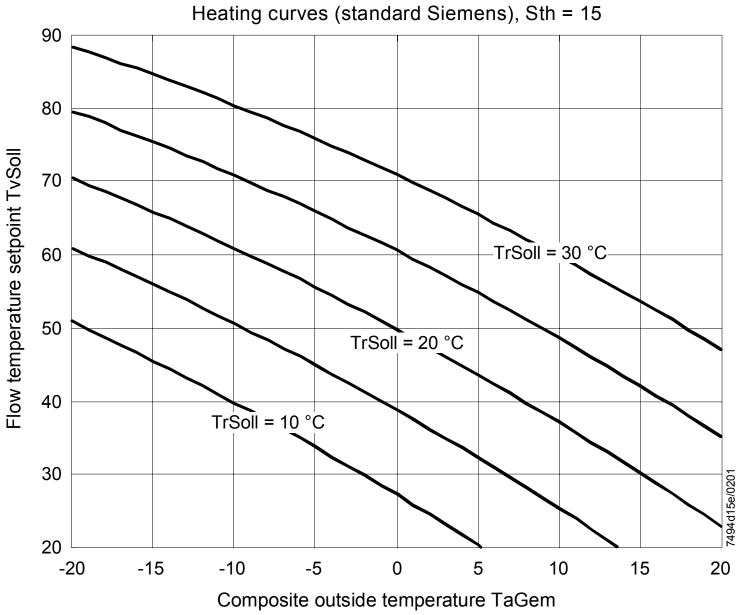
Heating curves of LMU...-internal weather compensation (impact of slope)

Legend

TvSoll:	Flow temperature
TaGem:	Composite outside temperature
Sth:	Heating curve slope (parameter)

The heating curve describes radiator systems with a radiator exponent of n =1.3 at a room temperature setpoint of 20 °C. For other systems with n = 1.1, for example, or different nominal flow / return temperatures, the slope can be appropriately adjusted.

In the case of room temperature setpoint changes, the heating curve is shifted on a 45 ° axis in relation to TvSoll = f (TaGem) graph.



Heating curves of LMU...-internal weather compensation (impact of room temperature setpoint)

Calculation of the heating curve is based on a maximum pump flow rate, which means that the pump's degree of modulation is 100 %.

When using a variable speed pump, a certain extra temperature is added.

With QAA73...

RU QAA73... calculates weather compensation completely (referred to a degree of pump modulation of 100 %). Input data from the RU's perspective are the following:

Toutside:	Actual outside temperature

As the results of weather compensation, the LMU... receives from the RU:

TSet:	Boiler temperature setpoint of HC1 of the RU
TSet2:	Boiler temperature setpoint of HC2 of the RU
CH1 enable:	Heat demand HC1 of the RU
CH1 enable:	Heat demand HC2 of the RU

To maintain the room temperature level with pump modulation, the LMU… calculates an extra temperature, which is added to the value of the RU.

With RU type QAA53

With the QAA53, compensation variant «Weather compensation» is not used. Nevertheless, to be able to adjust the flow temperature setpoint to weather conditions, the flow temperature setpoint can be adopted from the LMU's internal weather compensation.

With flag parameter «WFmitQAA53» in «KonfigRg2» set, the flow temperature setpoint is calculated by the LMU's internal weather compensation. In that case, the boiler temperature setpoint «TSet » of the RU will be ignored.

The room temperature setpoint and the heat demand will still be adopted from the RU.

Generating the demands for heat

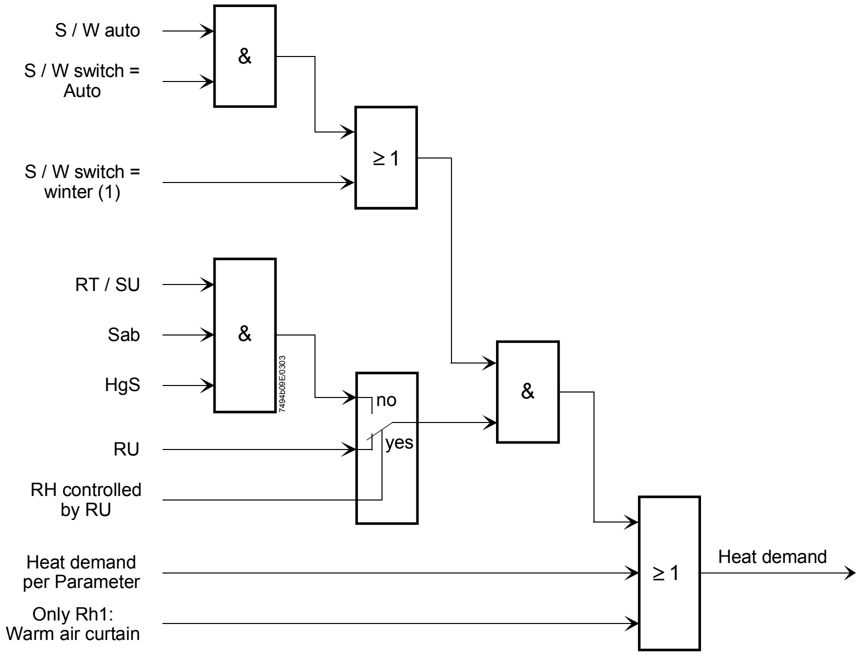
If there are several sources that call for heat, the following priorities apply:

1. Demand for heat via the RU.
2. Room thermostat or time switch with / without weather compensation.

For the different plant components that act on the demand for heat, refer to the table in chapter «Combinations of RU and room thermostat / time switch».

The → ECO functions also have an impact on the demand for heat.

In general, the heating circuits' demand for heat is that shown by the following diagram:



Generation of heat demand by heating circuits 1 and 2

Legend

RT / SU	Room thermostat / time switch
HgS	Heating limit switch
Rh	Space heating
RU	Room unit
S / W auto	S / W changeover by LMU…
S / W switch	S / W changeover on HMI
Sab	Quick setback

If certain plant components are not present (e.g. no S / W changeover), the input will enable the demand for heat.

4 Clip-in AGU2.500... for additional heating circuit

5.1.3 Multiboiler plants with LMU (cascade applications)

(... ...)

Separate DHW circuit in cascade applications

In a cascade application, a BMU can provide temporary DHW heating, in spite of an overriding controller.

In that case, the respective LMU... «disengages» itself from the cascade for the period of time DHW is heated and is then not available as a heat source.

This special case is extremely unfavorable for the RVA47… since its cascade control will be disturbed by the sudden switching actions of a boiler. But there are certain types of heating plant where this feature is required (e.g. plants with instantaneous DHW heaters).

Also, this special case can only be covered by the cascade user having device address 2.

In addition to the address, the correct hydraulic diagram must be parameterized on the LMU… that provides DHW heating. Depending on the type of DHW heating, diagrams 81 through 85 are available here.

The other cascade boilers remain set to 80. In addition, sensors, pumps and valves and an optional flow switch that are used in conjunction with DHW heating are to be connected to this special LMU... .

Although all relevant sensors and actuating devices are to be connected to a special unit from which they are also operated, the DHW setpoint is predefined by the overriding cascade controller.

In general, all settings in connection with DHW heating are to be made on the RVA47… (DHW operating mode, nominal and reduced setpoint, etc.).

With RVA...-dependent DHW heating with an instantaneous DHW heater, the «Comfort» function is generally permitted since the time program will not be evaluated.

The «Comfort» function can be deactivated by setting both comfort times to 0.

5.1.5 Accessing operating data via the ACS7...

The LMU... supports access to parameters and process values via the ACS7... software package. For that purpose, an additional interface is required which enables the PC to access the LPB bus.

Interface

The communication units OCI600, OCI611.XX or the communication interface OCI69 can be used for that, depending on the application.

- OCI600 and OCI611.XX afford remote operation and supervision of heating plants whose devices are interconnected via LPB
- OCI69 has limited functionality and can only be used for diagnostic purposes and for commissioning LPB devices

Note

Operation of OCI600 or OCI611.XX on a single LPB device is only possible if that device powers the bus. To switch on the bus power supply, the LMU… provides parameter «LPBKonfig0.ParLPBSpeisung».

DeviceDescription

To be able to access data of an LPB device, the PC program requires a device-specific description, the so-called DeviceDescription.

This is a file called «D0040XXX.apx» contained in the subdirectory «DeviceDescription».

Access to LMU... data via LPB is not fully supported. The parameters and actual values that can be displayed or changed are the same as those available via the QAA73.

It must also be ensured that the boiler controlled by the LMU... is not in operation (does not produce any heat) while parameters are changed via the operating software.

6 Clip-in function module AGU2.51x

Inputs

(... ...)

Predefined output

In this case, the relative boiler output is predefined via an analog signal.

This analog signal can be a current signal (0...20 mA, 4...20 mA) or a voltage signal (DC 0...10 V).

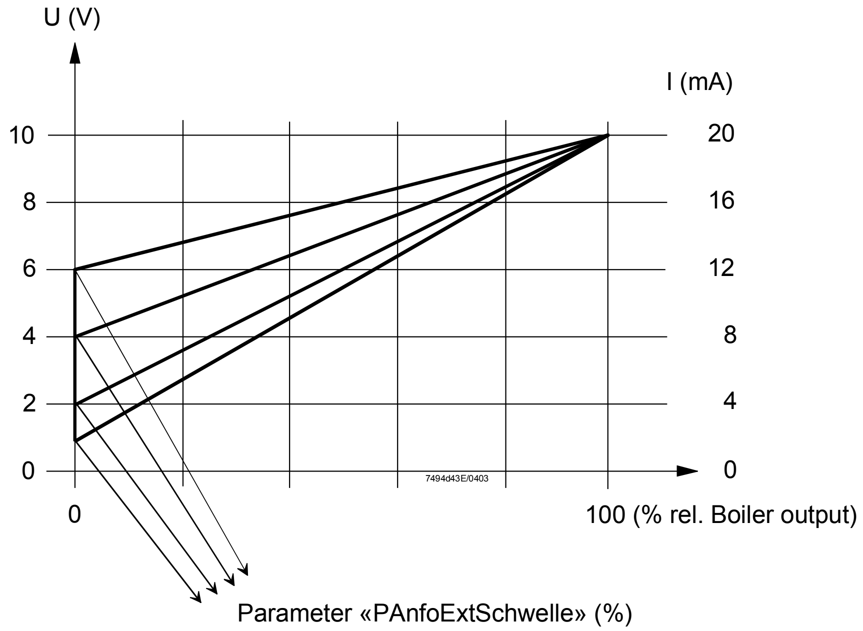
The analog signal is transmitted to the LMU… and applied to the possible output range as a percentage value.

The threshold from which the analog signal shall activate the predefined load is defined with the help of parameter «PanfoExtSchwelle». This parameter also defines the minimum value of the analog signal.

The range of the analog signal between threshold and maximum value is converted into an output signal in the range 0...100 %.

If the analog signal is near the parameterized threshold, the boiler will be operated at the minimum relative output. In the case of maximum value of the analog signal, control takes place with the maximum relative boiler output.

If the analog signal lies below the parameterized threshold, the predefined output will not be active.



Predefined output

The predefined output can be subordinated to a demand from the RVA...

Using flag parameter «f_RVAvorPAnfoExt» in «LPBKonfig0», a temperature demand from the RVA… can be given priority over the external predefined output.

If the flag parameter is set, the analog signal will be evaluated for the predefined output only if the RVA… removes the validity flag of its temperature demand («TempAnfoEMAttr_1_G»), or if no RVA… is connected.

7 DHW control (BWR)

7.1 DHW temperature control

(... ...)

7.1.1 Storage tank systems

With storage tank systems, there is a choice of boiler flow or boiler return temperature control during storage tank charging.

The control sensor is selected via parameter «SpeicherReglF» in «KonfigRg2». Boiler return temperature control is not possible when there is a zone demand with a set maximum attribute.

In that case, boiler flow temperature control is provided, independent of the selected type of control sensor.

Storage tank control via sensors

For DHW heating, the only storage tank sensor required is B3.
Sensor B4 can be used as an option.

With the storage tank, sensor B4 can only generate but not stop DHW demand, unless the legionella function has been activated.

When the legionella function is activated, following applies:

- Demand for heat is always stopped when sensor B3 or - if present - sensor B4 reaches or exceeds the value of «TbwSmaxLeg» (80 °C).
- The switch-on differentials are limited to a maximum of 1 K

The switch-on conditions for DHW demand are the following:

- If sensor B3 is connected:

  TbwIst1 < DHW setpoint – SdBwEin1

- If sensors B3 and B4 are connected, following also applies:

  TbwIst2 < DHW setpoint – SdBwEin2

  and

  DHW setpoint – SdBwEin1 < TbwIst1 < DHW setpoint + (SdBwAus1Max – SdBwMin)

When the legionella function is activated, the following switch-on conditions apply:

- If sensor B3 is connected:

  TbwIst1 < DHW setpoint – Max(SdBwEin1 | 1K)

- If sensor B3 and B4 are connected:

  TbwIst2 < DHW setpoint – Max(SdBwEin2 | 1K)

  and

  TbwIst1 < TbwSmaxLeg – 1K

  OR

  TbwIst1 < DHW setpoint – Max(SdBwEin1 | 1K)

  and

  TbwIst2 < TbwSmaxLeg – 1K

The minimum switching differential «SdBwMin» (2 K) ensures that there is a minimum interval between the switch-on and the switch-off point of sensor B3.

The demand for DHW will be generated when the switch-on condition is satisfied.

The demand for DHW causes activation of the relevant pump. In the case of a modulating speed pump, DHW charging takes place with the maximum volumetric flow (minimum degree of modulation):

Degree of modulation of pump = QmodMin

DHW demand is stopped when, at sensor B3:

TbwIst1 > DHW setpoint + SdBwAus1Max

When the legionella function is activated and B3 and B4 are present, following switch-off condition applies :

TbwIst2 > DHE setpoint + SdBwAus2Max

or

TbwIst2 > TbwSmaxLeg

or

TbwIst1 > TbwSmaxLeg

When the demand for DHW is stopped, pump overrun starts. In the case of a modulating speed pump, pump overrun is executed with the maximum volumetric flow (minimum degree of modulation):

Degree of modulation of pump = QmodMin

The burner is started up when «TkIst < (TkSoll – SdHzEin1)» in the case of boiler flow temperature control, or when «TkRuec < (TkSoll – SdHzEin1)» in the case of boiler return temperature control (TkSoll = DHW setpoint + TuebBw).

The output demand on the burner is controlled between «LmodTL» and «LmodVL» or, in the case of active speed limitation, between «N_TL» and «N_VL».

Storage tank control via thermostat

Storage tank systems can also be operated with an external thermostat.
Storage tank control by a thermostat is released when a storage tank system has been parameterized (systems 2, 3, 34, 35, 44, 50, 51, 60, 66, 67, 76, 81 and 85).

The thermostat is to be connected to the DHW flow switch or, in place of the DHW sensor 1 to the LMU… The input to be used must be selected via parameterization:

KonfigRg4.2 = 0: DHW thermostat to be connected to the input of the DHW flow switch

KonfigRg4.2 = 1: DHW thermostat to be connected to input «DHW sensor 1»

Connecting to the DHW sensor input

When connecting the thermostat to the DHW sensor input, high-quality contact material is mandatory (e.g. gold-plated contacts) since the signal voltage at that input is DC 5 V. The second DHW sensor must not be present.

If a short-circuit is detected at the input, no status code will be delivered. The signal is interpreted directly as a DHW demand signal.

Read-in value ≤ open-circuit threshold	Stopping the demand for DHW
Read-in value ≥ short-circuit threshold	Triggering the demand for DHW

Connecting to the DHW flow switch input:

When using this connection, no DHW sensor may be connected to the LMU... (neither «Bw1» nor «Bw2»). Otherwise, the demand for DHW will be suppressed.

The demand for DHW follows from the state of the «Bw-Flow-Switch» input:

0: Stopping the demand for DHW
1: Triggering the demand for DHW

With both types of connection, the maximum DHW setpoint is used for calculating the boiler temperature setpoint (during storage tank charging) when there is an active demand for DHW:

DHW setpoint = TbwSmax

In that case, the DHW settings made on the HMI, RU or RVA… are of no importance. The setting value on the QAA73... will be locked.

Control of the pump is the same as with «Storage tank control by sensor».

7.1.2 Stratification storage tanks

Stratification storage tank systems require a modulating pump in the DHW charging circuit. That pump is controlled in accordance with the criteria described below.

The following table shows when modulating control of heating circuit 1 without the clip-in module is possible with the LMU... basic unit.

Plant diagram	Heating circuit 1
9, 41, 43, 57, 59, 73, 75	Multispeed
10, 42, 58, 74	Multispeed or modulating

In the case of the stratification storage tank, a differentiation is made between 2 types of DHW charging modes:

1. Full charging.
2. Recharging.

The criteria for these 2 operating modes are dependent on the compensation variant of DHW.

- **With compensation variant Bw = «RU-dependent»**

Full charging is released only when the switching program is in the first DHW forward shift period of the respective day.
This is transmitted from the QAA73... via bus interface.

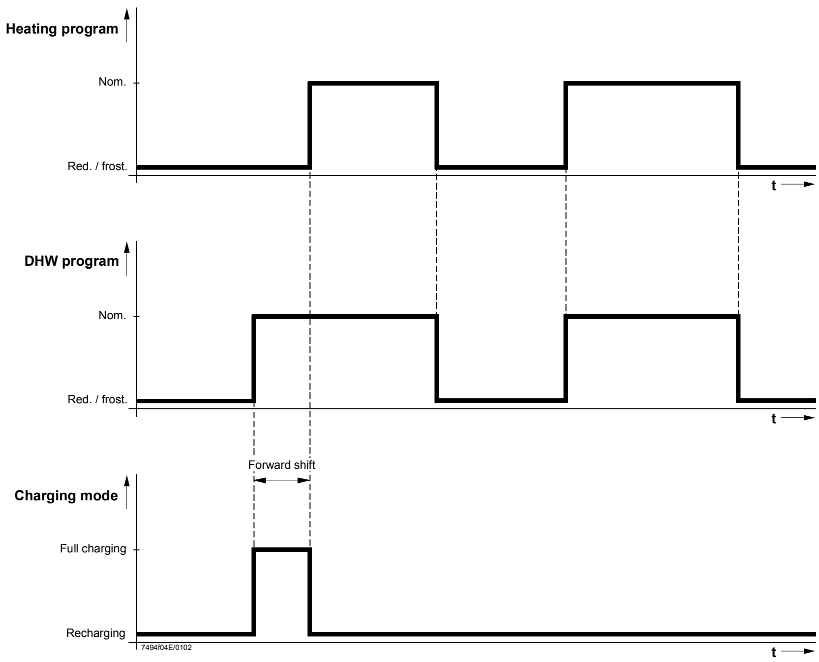
Note: Other types of OpenTherm RU do not support this function. This means that when using an RU of other manufacture, only recharging will be activated.

Release of full charging:

0: Full charging of stratification storage tank locked
1: Full charging of stratification storage tank released

Depending on the DHW mode on the RU (heating program with forward shift of DHW or own DHW program), full charging is released in 1 of 2 different ways.

1. Full charging during the DHW forward shift against the heating program:



Charging of stratification storage tank with DHW forward shift

During the DHW forward shift time, the QAA73... sends:

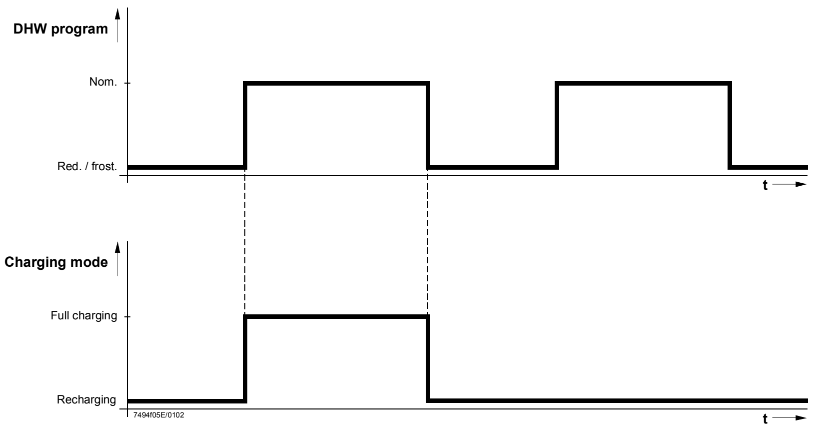
FreigabeDurchladung = 1

This gives rise to the release of the stratification storage tank’s full charging. If there are further changes from «Reduced» to «Nominal level» on the same day, there will be no more forward shifts. After the first forward shift:

FreigabeDurchladung = 0

This gives rise to the release of the stratification storage tank’s recharging.

2. Full charging during the first DHW phase of the day:



Charging of stratification storage tank with own DHW program

Full charging will be released during the first nominal phase of the DHW program:

Release of full charging = 1

If additional charging is required on the same day, only recharging takes place.

Release of full charging = 0

If no DHW program is selected on the QAA73... (continuously frost protection, reduced or nominal level), following applies:

Release of full charging = 0

This means that recharging is continuously used.

- **With DHW compensation variant = «RVA-dependent, fixed value control or emergency operation»**

Full charging is only released during the setback periods of heating circuit 1. The setback period can be predefined either by an operating section with parameterization or, alternatively, an external time switch.

If heating circuit 1 is controlled by an operating section with parameterization, full charging will be locked as long as heating circuit 1 operates at the nominal level. Otherwise, full charging will be released.

If heating circuit 1 is not controlled by an operating section with parameterization, full charging is only possible when an external time switch is used for heating circuit 1.
This will be predefined via parameterization.

KonfigRg1.Schaltuhr1:

0 No time switch present, it is always recharging that is released
1 A time switch for heating circuit 1 is connected to the room thermostat

When a time switch is present, full charging will be released during the setback period of heating circuit 1.

State of room thermostat input:

0 Full charging released
1 Recharging released

- **With DHW compensation variant = «Locked»**

Charging of the stratification storage tank is locked.

With stratification storage tank systems, either boiler flow temperature control (sensor B2) or DHW charging temperature control (sensor B4) is used. The selection is made via parameter «SpeicherReglF» in «KonfigRg2».

Stratification storage tank with boiler flow temperature control

With stratification storage tanks, both sensors (B3 and B4) must be connected. If sensor B3 has a short-circuit or open-circuit, the demand for recharging or full charging the tank will be locked and appropriate error codes delivered.

If sensor B4 has a short-circuit or open-circuit, full charging of the stratification storage tank is no longer possible.

To ensure that DHW can still be provided when sensor B4 is faulty, only recharging takes place, using sensor B3.

In the case of DHW charging, the DHW setpoint is limited to a minimum of 50 °C.

This is a requirement because there is a temperature-controlled valve in the water circuit of the stratification storage tank, which only opens at temperatures above 50 °C.

The minimum boiler temperature must be raised accordingly in order to get heat into the stratification storage tank.

The boiler temperature setpoint is determined by the boiler temperature setpoint = BwSollwert + boost, whereby the minimum limitation is

boiler temperature setpoint = 50 °C + TuebBw.

Full charging of the stratification storage tank

When using full charging, the complete storage tank is brought to the setpoint temperature while the pump is running at low speed. When temperatures acquired by sensor B3 at the top are too high (> TbwSmax), the demand for heat will be stopped .

When the legionella function is activated, following applies:

- Heat demand is always stopped when one of the sensors B3 or B4 reaches or exceeds the value of «TbwSmaxLeg» (80 °C)
- The switch-on differential of both sensors is limited to a maximum of 1 K

DHW demand is triggered when, at sensors B4 and B3:

TbwIst2 < DHW setpoint – SdBwEin2

and

TbwIst1 < TbwSmax – SdBwEin1

When the legionella function is activated, following applies:

TbwIst2 < DHW setpoint – Max(SdBwEin2 | 1K)

and

TbwIst1 < TbwSmaxLeg – 1K

OR

TbwIst1 < DHW setpoint – Max(SdBwEin1 | 1K)

and

TbwIst2 < TbwSmaxLeg – 1K

DHW demand is stopped when, at sensor B4 or B3:

Tbwlst2 > DHW setpoint + SdBwAus2Max

or

Tbwlst1 > TbwSmax + SdBwAus1Max

When the legionella function is activated, following applies:

Tbwlst2 > DHW setpoint + SdBwAus2Max

or

Tbwlst2 > TbwSmaxLeg

or

Tbwlst1 > TbwSmaxLeg

During full charging, the charging pump runs at low speed.
This speed can be adjusted independently of heating operation, which means that it has its own parameter «NqmodMinBw».

The burner is put into operation when TkIst < (TkSoll – SdHzEin1) (TkSoll = TbwSoll + TuebBw).

The output demand on the burner will be adjusted between «LmodTL» and «LmodVL» or, with active speed limitation, between «N_TL» and «N_VL».

If, during active full charging, the release criterion for full charging becomes obsolete, the demand for DHW will be stopped based on the criteria of recharging.

Recharging of the stratification storage tank

With recharging, it is only the upper part of the storage tank that is brought to the setpoint temperature while the pump runs at full speed.

Function «Recharging of stratification storage tank» will be activated when the conditions for full charging are not satisfied or when, during full charging, a fault occurs at sensor B4.

The evaluation of DHW demand is only made based on the temperature acquired by sensor B3.

DHW demand is triggered when, at sensor B3:

Tbwlst1 < BwSoll – SdBwEin1

DHW demand is stopped when, at sensor B3:

Tbwlst1 > BwSoll + SdBwAus1Max

In the case of DHW demand or pump overrun, the modulating pump runs at maximum speed or with the minimum degree of modulation.

«QmodMin»: Minimum degree of modulation, that is, maximum pump speed

The burner is put into operation when «TkIst < (TkSoll – SdHzEin1)» (TkSoll = TbwSoll + TuebBw).

The output demand on the burner will be adjusted between «LmodTL» and «LmodVL» or - with speed limitation active - between «N_TL» and «N_VL».

If, during active recharging, the release criterion for recharging becomes obsolete, the demand for DHW will be stopped based on the criteria of full charging.

Stratification storage tank with control of the DHW charging temp.

Control of the DHW charging temperature ensures better temperature stratification when charging the stratification storage tank. This kind of control requires the following arrangement of sensors:

- Sensor B4 installed at the charging pipe
- Sensor B3 installed in the center of the stratification storage tank

With this kind of control, the temperature demand is not limited to a minimum of 50 °C.

Type of charging

Whether the stratification storage tank is charged through recharging or full charging depends first of all on whether full charging is released (level of heating circuit 1 or input of time switch 1 or RU).

In addition, the type of charging is affected by the state of sensor B3: If that sensor is faulty, only full charging will be possible. For this reason, if sensor B3 is defective, full charging will be provided, even if not actually released.

When the legionella function is activated, following applies:

- Heat demand is stopped in any case if 1 of the 2 sensors B3 or B4 reaches or exceeds the value of «TbwSmaxLeg» (80 °C)
- The switch-on differential of both sensors is limited to a maximum of 1 K

Full charging of the stratification storage tank

In the case of full charging, the complete storage tank is brought to the setpoint temperature while the pump is running at low speed.

In full charging operation, the demand of sensor B4 (charging sensor) will be set:

ON: TbwIst2 < TbwSoll – SdBwEin2

If last time the storage tank was charged through full charging, B4 can set a demand only if the temperature at B3 had already dropped:

ON: TbwIst2 < TbwSoll – SdBwEin2

and

TbwIst1 < TbwSoll – SdBwEin1

If the temperature at sensor B4 is maintained due to **wrong circulation,** full charging shall also be started by sensor B3:

ON: TbwIst1 < TbwSoll – SdBwEin1

and

TbwIst2 < TbwSoll + SdBwAus2Min

When the legionella function is activated, DHW demand will be generated as follows:

TbwIst2 < TbwSoll – Max(SdBwEin2 | 1K)

and

TbwIst1 < TbwSmaxLeg – 1K

OR

TbwIst1 < TbwSoll – Max(SdBwEin1 | 1K)

and

TbwIst2 < TbwSmaxLeg – 1K

During full charging, sensor B4 ensures control of the charging temperature T_{DL}:

T_{DL} = TbwSoll + SdBwAus2Min

Full charging will be stopped when, at sensor B4, the DHW setpoint + maximum switch-off differential is exceeded:

OFF: TbwIst2 > TbwSoll + SdBwAus2Max

When the legionella function is active, following applies:

OFF: TbwIst2 > TbwSoll + SdBwAus2Max
OR
TbwIst2 > TbwSmaxLeg
OR
TbwIst1 > TbwSmaxLeg

During full charging, the charging pump is controlled at low speed. This speed can be set independent of heating mode since it has its own parameter «NqmodMinBw».

The burner is started up when the DHW charging temperature lies below the DHW charging setpoint – SdBwEin2».

The output demand placed on the burner is to be set between «LmodTL» and «LmodSchDL» or - with speed limitation active - between «N_TL» and «N_SchDL».

Parameter «LmodSchDL» can be selected between «LmodTL» and «LmodVL» while parameter «N_SchDL» can be set to a value between «N_TL» and «N_VL».

If, during active full charging, the release criterion for full charging no longer exists, the heat demand from DHW will be stopped based on the criteria of recharging.

Recharging of the stratification storage tank

In the case recharging, only the upper part of the storage tank will be brought to the setpoint temperature while the pump runs at full speed.

In recharging operation, sensor B3 sets the demand:

ON: TbwIst1 < TbwSoll – SdBwEin1

During recharging, sensor B4 ensures control of the charging temperature T_{NL}»:

T_{NL} = TbwSoll + SdBwAus1Max + TuebSchNL

Recharging will be terminated when, at sensor B3, the DHW setpoint + switch-off differential» is exceeded:

OFF: TbwIst1 > TbwSoll + SdBwAus1Max

With DHW demand or DHW overrun, the modulating pump operates at maximum speed or with the minimum degree of modulation.

«QmodMin»: Minimum degree of modulation, that is, maximum pump speed

The burner is started up when the DHW charging temperature lies below the «DHW charging setpoint – SdBwEin2».

The output demand placed on the burner is set between «LmodTL» and «LmodVL» or, with speed limitation activated, between «N_TL» and «N_VL».

If, during active recharging, the release criterion for recharging no longer exists, the heat demand from DHW will be stopped based on the criteria of full charging.

Control of the DHW charging pump:

The DHW charging pump is only switched on when the boiler temperature lies above the DHW charging setpoint minus the switch-on differential («SdHzEin»).

If, subsequently, the boiler temperature drops below that value, it has no impact on the pump.

First, the boiler temperature is controlled (sensor B2). 30 seconds after the DHW charging pump has switched on, control changes over to the DHW charging temperature (sensor B4).

Coil storage tank:

If a hydraulic system with a stratification storage tank is parameterized, but sensor B4 is not present, the charging temperature cannot be controlled.

In that case – as with normal storage tanks – the boiler flow temperature is controlled, provided sensor B3 is fitted.

The setpoint of the boiler flow temperature is calculated based on the DHW setpoint and the boost (as with normal storage tank systems):

TkSoll = TbwSoll + TuebBw

Heat demand is started and stopped solely by sensor B3.

With coil storage tanks, no DHW charging pump is used, but the output for the DHW charging pump is nevertheless switched (because the diagram used is that of the «Stratification storage tank»).

In that case, however, switching-on takes place independent of the boiler temperature, that is, with no delay.

Instantaneous DHW system

Notes

- If, due to the flow switch, startup is aborted before the fuel valve opens (DHW flow switch open again), no overrun will be triggered
- If DHW heating is switched off by the QAA73... or AGU2.310, no DHW heat demand will be generated, even if a flow switch signal is active
- If, in standby or reduced DHW mode, the frost protection setpoint is entered as a temperature demand, this temperature will no longer be additionally limited to «TbwSmin»
- If the DHW temperature falls below 5 °C, the frost protection function for the instantaneous DHW heater will be activated. When the DHW temperature exceeds 7 °C, the frost protection function will be deactivated.

  During the time the frost protection function for the instantaneous DHW heater is active, the heat exchanger for DHW is heated up at the minimum rate. When the flow temperature exceeds parameter «TkFrostAus», the 2-position controller will be switched off. When the flow temperature returns to a level which lies 2 °C below that value, the 2-position controller will switch the burner on again.

  The frost protection function has a higher priority than heat demand from the heating circuits, but the priority of DHW outlet temperature control is even higher
- In systems with primary heat exchangers, there is neither frost protection for DHW nor DHW comfort
- Timer values for the DHW flow switch:
  - «ZFlowSwitchBw» for «DHW heating» mode
  - «ZFlowSwitchComfort» for «Comfort» mode

  DHW demand is generated only if the flow switch is closed for a longer period of time than «ZFlowSwitchBw».

  «Comfort» mode is only started after «DHW heating» mode if the flow switch is closed for a longer period of time than «ZFlowSwitchComfort», provided all other preconditions are satisfied.

  Exception: Continuous «Comfort» mode (not dependent on a preceding DHW demand)

Operating mode

End of demand

(... ...)

DHW standby for instantaneous DHW heater («Comfort» function)

For instantaneous DHW heaters using a secondary heat exchanger, a «Comfort» function can be activated. With the aqua-booster, the «Comfort» function cannot be switched off. As long as the function is active, the standby function keeps the heat exchanger at the standby temperature.
If the 2-position controller shuts the burner down during the «Comfort» function, the pump can be deactivated (see below).

If DHW heating is completely released, the «Comfort» function can be performed. In ECO mode, the «Comfort function can be deactivated.

ECO can be selected on the QAA… or the AGU2.310. If both operator units are used, selection can only be made on the QAA…

If time programs for DHW are active and if the DHW level is «Reduced», the «Comfort» function will be locked.

Activation of the «Comfort» function depends on the type of hydraulic system

Aqua-booster: Activation is dependent on the temperature acquired with the Bw1 sensor. After DHW heating, the «Comfort» function is active for at least the period of time «Z_BwComfort2».

Instantaneous DHW heater with second DHW sensor: Activation is dependent on the temperature acquired with the Bw2 sensor.

Instantaneous DHW heater without the second DHW sensor: Activation is time-dependent.
The «Comfort» function is started at the end of DHW consumption (with the exception of continuous «Comfort» mode) and is active for the period of time «Z_BwComfort1», if there is no additional demand (Hz1, Hz2, Zone).
or
for the period of time «Z_BwComfort2» when there is additional demand.

If the period of time «ZFlowSwitchComfort» is set to a value other than «0», the «Comfort» function will be started only if the flow switch is closed for a period of time exceeding «ZFlowSwitchComfort».

If the «Comfort function has just been activated and the flow switch is closed for a period of time shorter than «ZFlowSwitchComfort», the former comfort time will continue to elapse.

- Parameter «Z_BwComfort1» can be set to a value in the range 0... 1440 minutes in 10-minute increments (no comfort until continuous «Comfort» mode is reached)
- Parameter «Z_BwComfort2» can be set to a value in the range 0... 30 minutes in 1-minute increments

If continuous «Comfort» mode is parameterized, the «Comfort» function is continuously active. If there is additional demand, the time will switch over to «Z_BwComfort2» and the additional demand satisfied on completion of that period of time. If, during «Comfort» mode, there is a demand of higher priority, it will immediately be satisfied.

For the «Comfort» function with instantaneous DHW heaters, the following special features are to be considered:
- There is no «Comfort» function with primary heat exchangers
- With aqua-boosters, the «Comfort» function is always active
- With RVA... control, the «Comfort» function is always active

2-position control for DHW standby

The output in «Comfort» mode is always the minimum output. For «Comfort» mode, the sensor used for 2-position shutdown can be parameterized.

Here, there is a choice of boiler, return and DHW sensor. The associated switching differentials are always «SdBwEin2» and «SdBwAus2Max», independent of the type of sensor used.

For the **aqua-booster**, following applies in addition:

If, with the «Comfort» function, the DHW sensor is used for control, the return temperature will also be checked.

If the return temperature lies above the threshold «Setpoint + switch-off differential1», the 2-position controller will shut the burner down (this also corresponds to the switch-off threshold of the 2-position controller during outlet control).

If this measure is not taken, there could be a risk of scalding in the case of low water consumption.

Shutdown of pump

For «DHW Comfort» mode, pump shutdown can be activated.

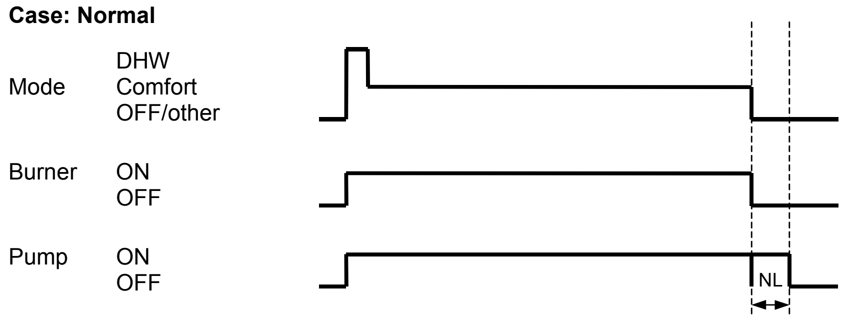
If pump shutdown is activated, the pump will overrun for the period of time «ZqComfortAus» while the burner is switched off. Then, the pump will be deactivated.

- If the 2-position controller does not switch off the burner during «Comfort» mode, the pump will continue to run (Case: Normal)
- If the 2-position controller switches the burner on again, the pump will also be switched on again (Case: Cycling 1)
- If «Comfort» mode is terminated while the burner is already off and the shutdown time is about to elapse, it will be terminated and normal pump overrun is started (Case: Cycling 2)
- If the shutdown time (parameter «ZqComfortAus») has already elapsed and the pump is off when «Comfort» mode is terminated, there will be no additional pump overrun (Case: Cycling 3)
- If the 2-position controller shuts down the burner already during outlet control, the shutdown time starts from the change to «Comfort» control (Case: Cycling in outlet temperature control)

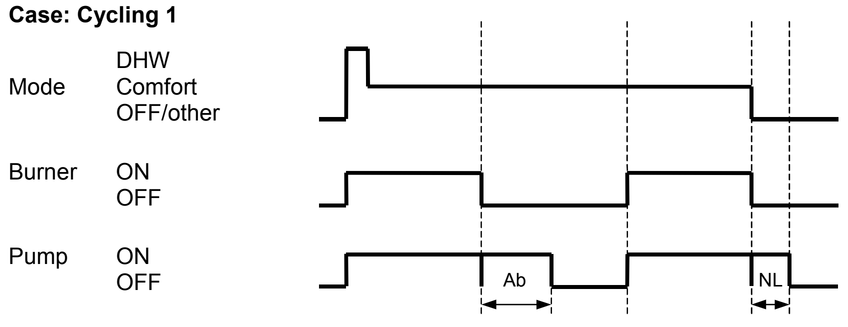
If the shutdown time is set to 255 minutes, pump shutdown will be activated and the pump continues to run.

The following diagrams show the above mentioned cases and the pump function.

A demand for heat during the «Comfort» function only has an impact on the comfort time, not on pump shutdown.



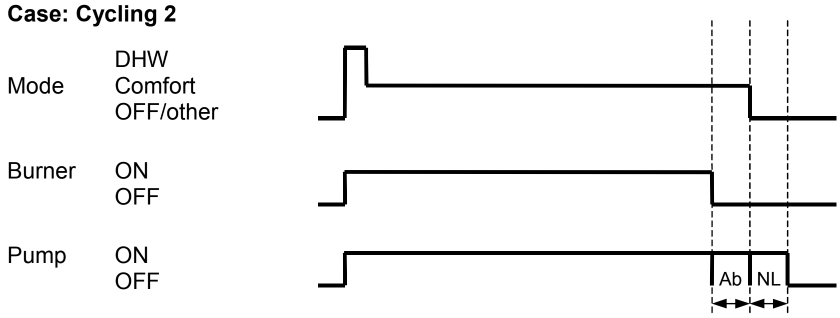
There is no difference if the burner operates continuously.



When the burner is switched off, the pump shutdown time starts. On completion of that period of time, the pump will also be switched off. When the burner is started up, the pump will be activated again.

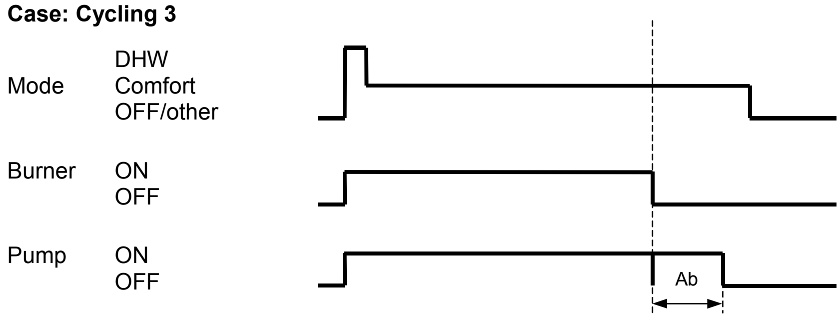
Pump overrun does not change.

Case: Cycling 2



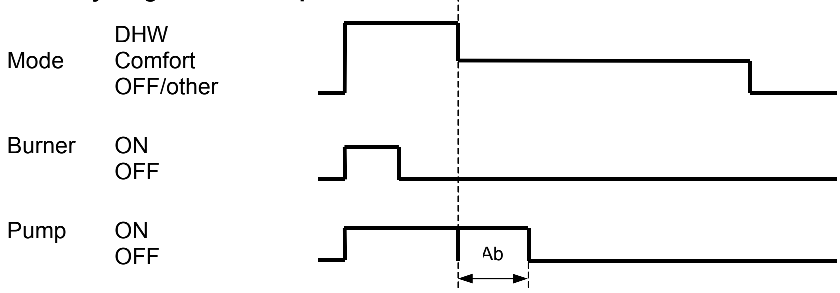
If «Comfort» mode is terminated during the shutdown time, the shutdown time will be aborted and pump overrun started.

Case: Cycling 3



If «Comfort» mode is terminated after the pump has already been deactivated, no additional pump overrun will be triggered.

Case: Cycling in outlet temp. control



If the burner already cycles during outlet control and is already off when changing to «Comfort» mode, the shutdown time will start from the change from outlet control to «Comfort» mode.

Ab	Shutdown time comfort «ZqComfortAus»	NL	Overrun time

The above graph applies to «Z_BwComfort1» and «Z_BwComfort2».

If «ZqComfortAus» is parameterized longer than the longest time of «Z_BwComfort1» and «Z_BwComfort2», the pump will run as long as comfort mode is active.

Aqua-booster system

Hydraulic diagram

(... ...)

Operating mode

(... ...)

«DHW Comfort» with the aqua-booster

With the aqua-booster, the «Comfort» function is not performed depending on time but depending on temperature. This means that the heat exchanger temperature is always maintained at the DHW setpoint.

ECO mode is **not** possible here. This is a requirement since the aqua-booster needs a fast temperature change to be able to detect a demand for DHW.

If the temperature dropped slowly but continuously instead of maintaining the DWH setpoint, the outlet could be no longer detected at some point in time since the heat exchanger temperature is at the level of the inlet temperature and a fast temperature drop would not be possible.

Although the «Comfort» function with the aqua-booster is temperature-dependent, demand for heat after a DHW outlet demand will be suppressed for the period of time «Z_BwComfort2».

This means that after an outlet demand, the «Comfort» function always lasts for the period of time «Z_BwComfort2», even if temperature conditions are already satisfied. The purpose of this is to suppress continuous cycling between DHW heating and space heating (e.g. when taking a shower).

7.2 Special functions

(... ...)

Programmable input of the LMU...

The input for the air pressure switch (LP / X10-04) can also be used for other functions, provided the burner control does not evaluate this input as an LP contact!

The LP contact is **not** evaluated by the burner control if **«LPKon» = 1 («Input signal as a programmable input»)** is set in parameter «FaEinstellFlags2».

Parameter **«KonfigEingang»** determines the function to be assigned to the programmable input.

Using parameter «KonfigEingang», the following functions can be assigned to the programmable input:

- 0 Default, programmable input function is not used
- 1 Modem function active when contact is closed
- 2 Modem function active when contact is open
- 3 Warm air curtain function
- 7 Feedback signal from the flue gas damper

Feedback signal flue gas damper

When flue gas damper control is activated (→ programmable output), the DHW flow switch is evaluated per default as an input for the feedback signal from the flue gas damper.

Alternatively, the feedback signal can also be fed to the programmable input.

This means that flue gas damper control can also be implemented on applications where the DHW flow switch is evaluated by DHW heating.

Note

Internally, the function is not safety-related.

Programmable output of the LMU...

Relay K2 is used as a programmable output of the LMU… Its function will be defined via parameter «**KonfigAusgang»**.

This parameter is on the «Installer» level and can also be accessed via the QAA73... .

With a number of hydraulic systems, output K2 is already assigned a basic function.

This can be the system pump, for example, the shutoff valve, or a DHW pump.

If output K2 is assigned one of the following functions using parameter «KonfigAusgang», the basic function will **no longer** be available at this output.

If required, the basic function of output K2 can be transferred to one of the outputs of the clip-in function module.

Another alternative is offered by the hydraulic diagrams that include a diverting valve.
If the diverting valve is a stepper motor valve, the basic function of output K2 can be transferred to the relay output (AC 230 V) for the diverting valve, which is not required in that case.

For that purpose, parameter «**K2aufUV»** in «KonfigRg4» is to be set to «On».

It is always only **one** of the following functions that can be performed.

The following functions can be transferred to output K2 of the LMU... via parameter «KonfigAusgang»:

- **0** Default (function according to the hydraulic diagram)
- **1** Status output
- **2** Alarm output
- **3** Operational signal
- **4** Switching off external transformer
- **5** Pump of the second heating circuit
- **6** DHW circulating pump
- **7** Actuating device with warm air curtain activated
- **8** Pump of the pressureless header (on / off for pump on the consumer side)
- **9** System pump Q8
- **10** Basic function K2 (like default, function according to the hydraulic diagram)
- **11** Actuating device with full DHW charging activated, in connection with stratification storage tanks
- **12** Actuating device when analog signal (at the clip-in function module) has exceeded the threshold
- **13** Control of the flue gas damper

Status output

Control of an additional valve when using liquefied gas.

The status output is non-safety-related and is not supervised.
It is activated when the controller passes a command to the burner control.

If there is a lockout which does not allow the burner control to be started up, the status output will be deactivated.

Exception: Lockout caused by open GP contact.

Precisely speaking, activation of the status output depends on the operating state of the burner control and the diagnostic code.

Operating state of LMU	**Phase**	**Status output**
Standby	PH_STANDBY	Active when command from controller is received
Startup or in operation	PH_THL1_1, PH_THL1_2, PH_TV, PH_TBRE, PH_TW1, PH_TW2, PH_TVZ, PH_TSA1_1, PH_TSA1_2, PH_TSA2_1, PH_TSA2_2, PH_TI, PH_MODULATION	Active
Start prevention: Caused by open GP contact (Alba code 132)	PH_STARTVER	Not active
Start prevention: Not caused by open GP contact	PH_STARTVER	Not active
Shutdown or lockout	PH_TNB, PH_TLO, PH_TNN, PH_THL2_1, PH_THL2_2, PH_TN_1, PH_TN_2, PH_STOER	Not active

Switching off the external transformer

This output is used for switching off the external transformer. The output is active when the external transformer is required; otherwise, it is inactive.

The objective is to switch off the external transformer as often as possible in order to minimize the system's overall energy consumption.

The external transformer is required for the DC 24 V fan and the 2 stepper motors.

There are thus 3 potential reasons for switching on the external transformer:

- Fan
- Stepper motor required for optimization of combustion
- Stepper motor of the diverting valve (if present)

If at least one of these components calls for power, the external transformer will be switched on.

The demand for power from the fan and the stepper motor for combustion optimization is met in that the external transformer is always switched on when the burner control's operating state is any but standby.

If parameter «LmodNull» is not equal to zero, the fan mut also operate in standby, that is, the external transformer always remains on.

In standby mode, there can still be commands delivered by the stepper motor to the diverting valve. Here, a check is made first of all to see whether the diverting valve is driven by a stepper motor.
If that is not the case, the signal for the diverting valve is not present.

If the stepper motor is used for the diverting valve – this also includes the click function – the external transformer will be switched on for the time the stepper motor operates.

DHW circulating pump

This function is used for controlling a DHW circulating pump. It necessitates a QAA73… of software version 1.4 or higher.

The criteria for switching on the DHW circulating pump (e.g. time switch program) are determined by the QAA73… .

Alternatively, the time program for the circulating pump can also be filed in an operating section that can be parameterized.

But prerequisite is the availability of an operating section that can be parameterized and that supports this function.

If the circulating pump is controlled by both the QAA73 and the operating section, the 2 control functions will be logically interconnected (OR connection). This means that the circulating pump will be activated as soon as it is controlled by the QAA **or** the operating section.

System pump Q8

This function provides control of the system pump. Precondition is that the system pump function has been activated with parameter «WAnfoQ8» → System pump Q8.

Control of flue gas damper

This function serves for activating flue gas damper control. When activated, the burner will be started up only after the flue gas damper has opened.

The feedback signal from the flue gas damper is delivered via the input of the DHW flow switch or the → Programmable input.

The flue gas damper will be closed after the burner has shut down and the fan has come to a standstill.

Note

Internally, the function is not safety-related.

Maintenance alarms

Maintenance alarms are automatically triggered, indicating that maintenance jobs are due. In the LMU…, the following reasons for maintenance alarms are defined:

1. Interval of burner hours run since last regular service visit exceeded.
2. Interval of the number of startups since last regular service visit exceeded.
3. Number of months since last regular service visit exceeded.
4. Ionization current maintenance threshold exceeded (preventive maintenance).

The alarm displayed is always the maintenance alarm that occurred first. There is no storage for the maintenance alarms since all pending alarms can be checked at any time via the counter readings or the relevant parameters.

ALBATROS code «Maintenance»

If a maintenance alarm occurs, an ALBATROS error code «105 maintenance» appears on the local operating section and / or room unit. (This code does not give precise information on maintenance but is only a general maintenance note).

At the same time, the fault is displayed throughout the system on all ALBATROS devices, provided there is a connection between LMU... and LPB (via OCI420).

ALBATROS error code «Maintenance» is event- / alarm-capable.

The error code can thus be displayed via the OCI6x communication interface.

The priority is lower than that of the error codes to ensure the error codes prevail.

ALBATROS code «Maintenance» (cannot be acknowledged or reset) is sent until the enduser has acknowledged the message or the service engineer has rectified the fault.

Special display of maintenance alarms:

- AGU2.361, AGU2.303 — Codes «1» and «05» are displayed alternately (red fault LED not lit)
- AGU2.310 — Code «E105» and the «Spanner» are displayed («Bell» not lit)
- QAA73 — Code «E105» and the «Bell» are displayed

Maintenance code

The ALBATROS error code does not provide detailed information about the reason for the maintenance alarm. Details can be displayed separately using parameter «WartungsCode».

This parameter is used to specify the cause, that is, it indicates the cause in the form of an enumeration.

If there is no maintenance alarm, the content is «0.

Note

RVA… controllers with display can only display the ALBATROS error code. Parameter «WartungsCode» cannot be interrogated.

In extended info mode, «b0» (visible on all LMU... operating sections, not on QAAxx) shows the internal error code. There, the pending maintenance code can also be viewed, but with a different enumeration value.

Coding of maintenance alarms

ALBATROS error code	Maintenance code	Internal error code	Meaning
–	0	–	No maintenance alarm
105	1	560	Burner hours run
105	2	561	Startups
105	3	562	Months service
105	4	563	Ionization current

General activation of maintenance alarms

Parameter «WartungsEinstellungen» permits or suppresses the generation of maintenance alarms.

The subdivision of parameter «WartungsEinstellungen» by bit is shown in the following table:

General activation of maintenance alarms

Bit0	1 = general activation of maintenance alarms
Bit1	1 = single reset of hours run maintenance alarm
Bit2	1 = single reset of startup maintenance alarm
Bit3	1 = single reset of months service maintenance alarm
Bit4	1 = single reset of ionization current maintenance alarm
Bit6	1 = total reset for all maintenance alarms

Activation of the individual maintenance alarm

Every cause can be individually activated or deactivated by entering the associated limits. These parameters are also on the heating engineer level. All limit values can be edited via OpenTherm and LPB.

1. Burner hours run

Burner hours run maintenance is activated by setting parameter «BetrStdWartGrenz» to a value other than «0».

This value represents the target number of hours run. When this limit is reached, a maintenance alarm will be delivered (interval since last service visit).

2. Number of startups

Startup maintenance is activated by setting parameter «InbetrSetzWartGrenze» to a value other than «0».

This value represents the target number of startups. When this limit is reached, a maintenance alarm will be delivered (interval since last service visit).

3. Months (service)

Service maintenance is activated by setting parameter «MonatWartGrenze» to a value other than «0».

This value represents the target number of months. When this limit is reached, a maintenance alarm will be delivered (interval since last service unit).

Note

The month counter is only active when the device is connected to power.

4. Ionization current

Ionization current maintenance is activated by the installer by setting parameter «GeblaeseWartGrenze» to a value other than «0».

If this limit is exceeded by the minimum fan speed, a maintenance alarm will be delivered. Assessment of the maintenance fan speed limit is made as follows:

GeblaeseWartGrenze = ((N_Vollast – N_Teillast) x factor) + N_Teillast

whereby the factor shall lie between a maximum of 0.3 and 0.5. The precise value must be determined in tests, depending on customers requirements.

Function «Ionization current maintenance»

The purpose of maintenance alarm «Ionization current maintenance» is to detect a «slow» ionization current drift.

For that purpose, a new parameter «GeblaeseWartGrenz» is introduced. It is higher than «N_Teillast» and also higher than «Nmin», which occurs in normal situations.

If, due to ionization current drift, the value of «Nmin» is raised above the value of «GeblaeseWartGrenz» (by the function «Ionization current limitation»), a maintenance alarm will be triggered.

To ensure that a maintenance alarm will not be triggered instantly or when the limit is exceeded only once, 2 filters are used:

- The first filter counts the number of times the limit is exceeded in a 24-hour period.

  If that number exceeds 10, a maintenance alarm will be triggered. Here, a hysteresis (150 rpm) is used to ensure that, for example, control oscillations will not be detected
- The second filter acquires the period of time the limit is exceeded.

  If that time exceeds 10 minutes, a maintenance alarm will be triggered

Both filters operate independently. This means that other types of devices with different characteristics can also be taken into consideration (e.g. cycling).

Note

Maintenance alarm «Ionization current» is active only if the functions → Speed limitation and → Limitation of ionization current are active.

Calling up the maintenance code

➢ Standalone

If maintenance alarm occurs in a standalone system, the enduser shall call in the service engineer.

If required, the service engineer may ask the enduser on the phone to display the maintenance code in order to find out what the reason for maintenance is and to possibly make preparations for a service visit.

- **AGU2.310, QAA73**: Here, there are 2 choices to call up the reason for maintenance:
  - Via parameter «WartungsCode» on the enduser level
  - Via the internal error code when there is a pending maintenance alarm, but only as long as no acknowledgement has been made.
- **AGU2.361, AGU2.303**: Here, the reason for maintenance can only be called up via display value «b0» (diagnostic code or internal error code), but only as long as no acknowledgement has been made

➢ Remote diagnosis

If the OCI6x triggers a maintenance alarm at the remote service center, the relevant PC with ACS700 software will display ALBATROS error no. 105 in the pop-up window.

After acknowledgment in the pop-up window, an entry in the error list is made. Using transparent remote access to the LMU…, the reason for the maintenance alarm can be identified via the LPB process value «Code of maintenance alarm» and a service engineer can be asked to make a service visit.

The reason for maintenance can also be called up via the LPB process value «Internal error code», but only as long as no acknowledgement has been made.

If, due to an acknowledgement or a reset, the maintenance alarm disappears, a display is again generated via pop-up window followed by «0: No error» in the list (this setting must be made on the ACS7…).

Checking the pending maintenance alarms

To check whether several maintenance alarms have already been generated, the counter readings can be displayed at any time via parameters on the heating engineer level.

Since the ionization maintenance alarm has no counter readings, it can be checked in analog form via heating engineer parameter «IonStromWart»:

0 = no ionization current maintenance alarm
1 = ionization current maintenance alarm

The check can be made either on site or at the remote service center.

Note

Because of the 4-digit display of the AGU2.310, both the hours run counter and the startup counter are limited to a reading of 10 000.

If, with these counters, the AGU2.310 indicates overflow (°°°°), or if the QAA73 / ACS420 / ACS7… displays 10 000, the actual value will be above 10 000.

Acknowledgement of maintenance alarms

The enduser can acknowledge a pending maintenance alarm. This is made by editing parameters on the enduser level. Then, the fault status message will disappear throughout the system.

The acknowledgement sets the internal error code «b0» and the ALBATROS code to «0», but the maintenance code still gives the precise reason for the maintenance alarm.

This means that it is only the fault status message that is removed. The cause of the fault can still be queried via the «WartungsCode».

➢ **Acknowledgement via AGU2.310, QAA73 and ACS420 / ACS7..:**

In LMU… parameter «WartungsQuittierung» (default value: 0) on the enduser level, the enduser enters the value of «1». This edit operation acknowledges the maintenance alarm currently displayed.

The fault status message can also be acknowledged by the heating engineer in the service center via parameter «WartungsQuittierung».

If, due to the acknowledgement by the enduser, the maintenance alarm disappears, a message is sent simultaneously to the service center (setting via ASC7... required).

After that, the service center can still access the «WartungsCode» to make a detailed diagnosis.

If no repetition is required, all maintenance alarms after this acknowledgement will be locked, even if other reasons for maintenance occur. In that case, parameter «WartungsQuittierung» remains constantly at 1.

➢ **Acknowledgement via AGU2361 or AGU2.303:**

An exception is acknowledgement via the AGU2.361 or AGU2.303. Here, parameterization is **not** possible.

For this reason, acknowledgement is implemented via a function trigger: The displayed value P3 is set to «2» and saved, whereupon the acknowledgement sequence is triggered.

Note

On the AGU2.361 or AGU2.303, the reason for maintenance can only be called up prior to acknowledgement, because entry in «b0» will be canceled.

(Entry in the «WartungsCode» object will not be canceled, but cannot be called up via AGU2.361 or AGU2.303).

Activation or repetition after acknowledgement

After acknowledgement, the maintenance alarm will disappear throughout the system.

If required, a timer (duration of repetition) can be started, that is, the maintenance alarm will reappear on the display after a certain period of time. An acknowledgement can also be made then. This period of time starts after each acknowledgement.

The repetition can be set via parameter «WartungsRepetitionsDauer» on the heating engineer level.
Contents of parameter «WartungsRepetitionsDauer» is the desired period of time (in days) until the maintenance alarm appears again.

If a value other than «0» is entered there, a repetition is made within the entered duration of the repetition time.

During this period of time, no more maintenance alarms will appear, even if other reasons for maintenance occur.

Resetting the maintenance alarms

Final resetting of the maintenance alarm takes place by bit-to-bit editing of an OpenTherm parameter on the heating engineer level (parameter → «WartungsEinstellungen»).

A reset can also be made from a remote service center (transparent access). Resetting can take place at any time, even after acknowledgement or during the repetition sequence.

A reset can be made in 1 of 2 ways:

1. **Total reset**

   Here, all maintenance alarms can be reset at the same time. If, in parameter «WartungsEinstellungen», «1» is entered in «b6», all maintenance counters and the ionization current maintenance alarm will be set to «0» when the parameter is saved.

   The maintenance counters of the hours run, startups and months maintenance alarms will be newly started.

2. **Individual resert of a certain maintenance alarm**

   Individual maintenance alarms can also be reset. In that case, parameter «WartungsEinstellungen» will again be addressed bit by bit.

   There is a bit available for each maintenance alarm via which this maintenance alarm can be reset. It is thus possible to also reset other reasons for maintenance although they have not yet occurred (after a service visit, the service engineer can reset certain reasons for maintenance).

When resetting the maintenance alarm, ALBATROS code «Wartungsmeldung» and the internal error code (b0) will automatically also be reset.

The maintenance alarm will automatically disappear as soon as the reason is reset. The maintenance code will also be set to «0».

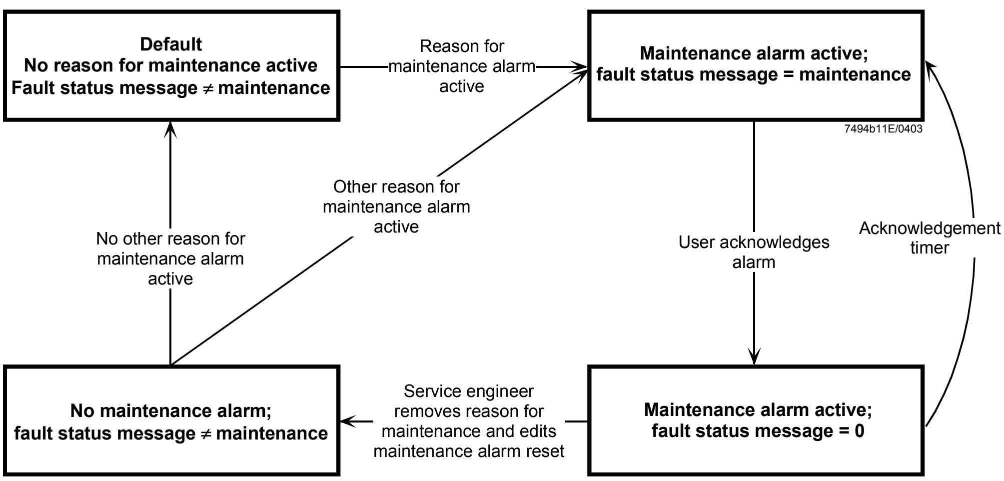
Note

If only AGU2.361 and AGU2.303 are connected to the system, the service engineer must carry a suitable tool for making the parameter settings (e.g. QAA73).

Only then can the reasons for the maintenance alarms be checked and a reset via parameter be made.

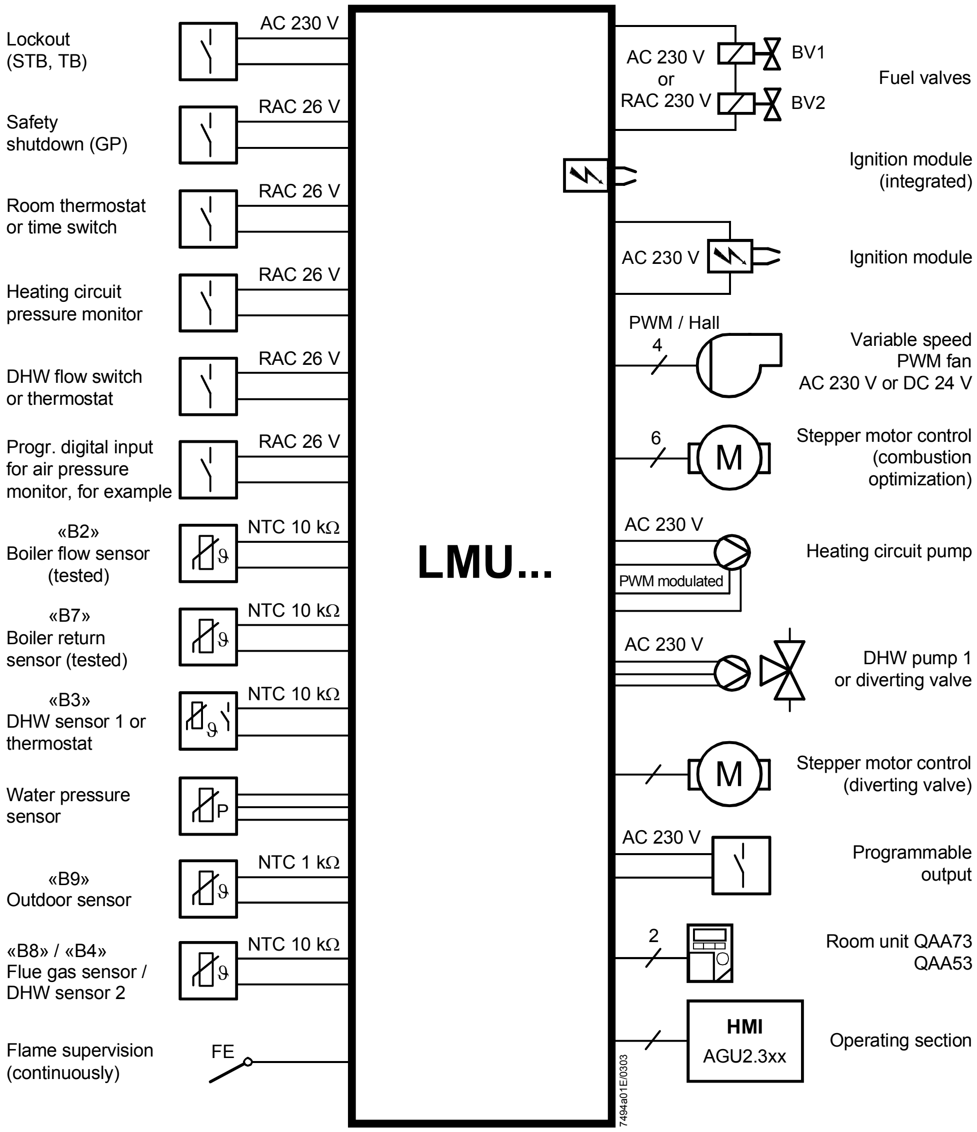
«Maintenance alarm» diagram

The following diagram shows the «Maintenance alarm» function:



8 Basic diagram

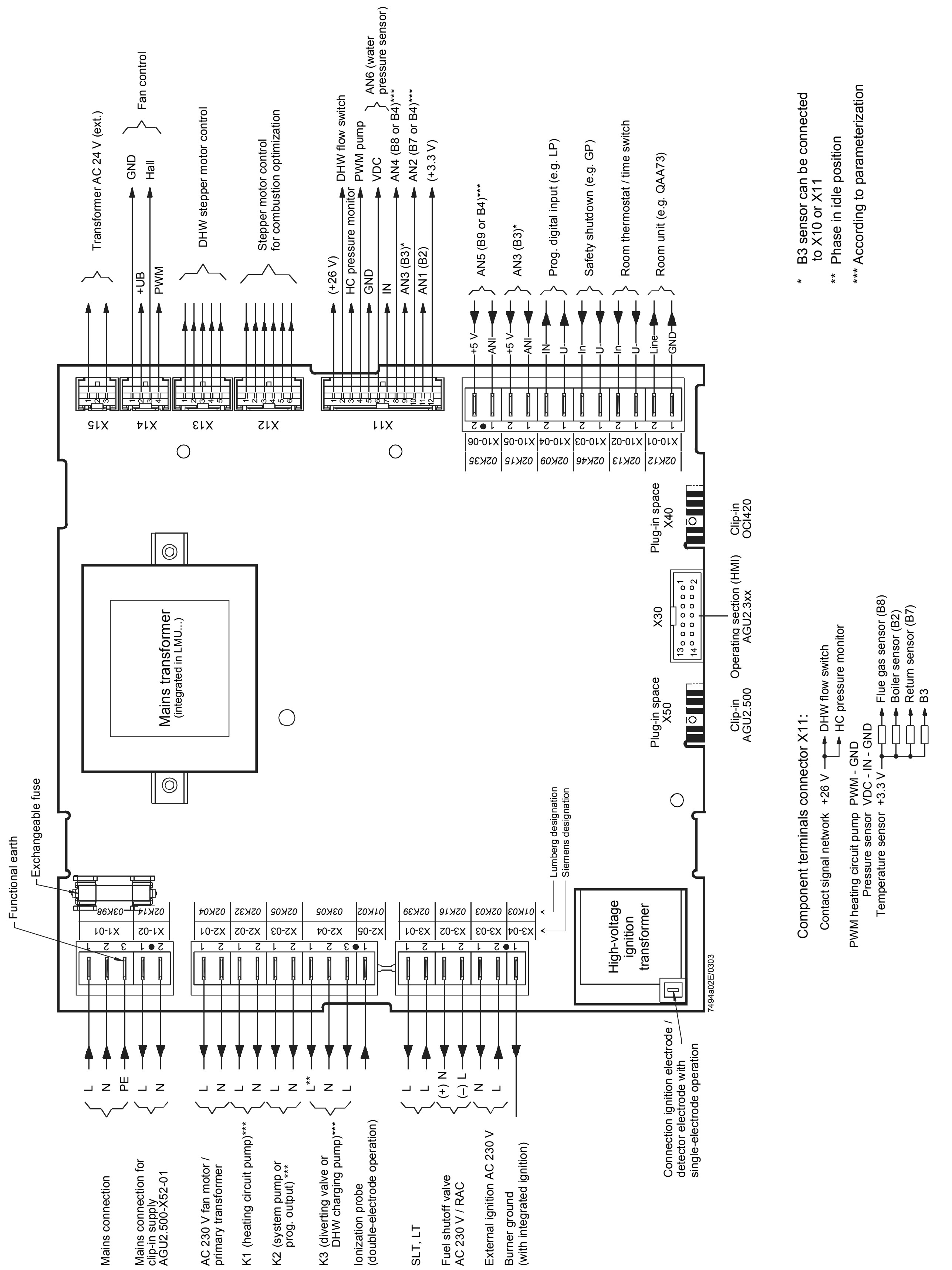
8.1 LMU...



The diagram shows the **maximum functionality** of the LMU... system. For the specific scope of functions, refer to the relevant version / configuration !

9 Connection diagrams

9.1 LMU...



The diagram shows the **maximum functionality** of the LMU... system. For the specific scope of functions, refer to the relevant version / configuration !

10 Technical data

10.1 LMU...

General	(... ...)

Electrical connection data

- Maximum overall current of all mains components connected to the LMU… and the clip-in modules (at UN = AC 230 V; Tu = 60 °C) — 5 A
- Mains extension (X1-02)
  - Current: depending on the current draw of the heating circuit pump, programmable AC 230 V output, fuel valve, DHW charging pump, external ignition module and clip-in modules used
- Primary transformer / AC 230 V fan (X2-01)
  - Voltage: AC 230 V +10 % -15 %
- K1 (X2-02)
  - Voltage: AC 230 V +10 % -15 %
  - Current: 5 mA ... 1 A, cos φ > 0.8
- K2 (X2-03)
  - Voltage: AC 230 V +10 % -15 %
  - Current: 5 mA ... 1 A, cos φ > 0.8
- K3 (X2-04)
  - Voltage: AC 230 V +10 % -15 %
  - Current: 5 mA ... 1 A, cos φ > 0.8
- Flame supervision / ionization probe (X2-05)
  - Switching threshold (required DC): min. 1.3 µA
  - Current: typ. 1.7 µA, max. 2.2 µA
  - Response time in the event of loss of flame: < 1 s
  - Electric shock hazard: cannot be touched
  - Flame detector cable length: ≤ 1 m

Note

Conductors L and N must be correctly connected!

- Safety temperature limiter (X3-01)
  - Voltage: AC 230 V +10 % -15 %
  - Current: 5 mA ... 1 A, cos φ > 0.8, power supply for fuel valve and ignition
- Fuel valve (X3-02)
  - AC output: AC 230 V +10 % -15 %, valve must still open at AC 175 V
  - Current: 5 mA ... 0.5 A, cos φ > 0.8

Note

If a fuel valve with rectifier shall be connected to the fuel valve output, it can only be made with the approval of Siemens!

In that case, additional protective measures inside the LMU... will be required (optional electronic components).

RAC output	RAC 230 V +10 % -15 % 100 Hz valve must still open at RAC 175 V
- Pmax	20 W, cos $\varphi > 0.9$

General information about connection of the fuel valve:

- Max. cable length	3 m
- Max. leakage current at 1.06 x UNenn	$\leq$ 0.5 mA
- Additional capacitive circuitry or protective elements for limiting surge voltages	not permitted

11 Dimensions

12 Parameter list / legend of parameter bit fields LMU...

12.1 Parameter list

Modified and new parameter lines are highlighted in grey.

Parameter list LMU...

Temperatures

No	Name	Group	Function	Range	No QAA73 AGU2.310	Level QAA73 AGU2.310	LevelNo PC_Tool	Level PC_Tool
			Setpoints, actual values and limit values					
96	TkSmin	Boiler	Minimum boiler setpoint temperature (20 °C<=TkSmin<=TkSmax)	20 ... 90 °C	503	Engineer	5	Installer
97	TkSmax	Boiler	Maximum boiler setpoint temperature (TkSmin<=TkSmax<=90 °C)	20 ... 90 °C	504	Engineer	5	Installer
181	TkSnorm	Heating mode HC1	Boiler setpoint at design outside temperature	20 ... 90 °C	505	Engineer	5	Installer
98	TvSmin	Heating mode AGU2.500	Minimum flow setpoint temperature (20 °C<=TvSmin<=TvSmax)	20 ... 90 °C	506	Engineer	5	Installer
99	TvSmax	Heating mode AGU2.500	Maximum flow setpoint temperature (TvSmin<=TvSmax<=90 °C)	20 ... 90 °C	507	Engineer	5	Installer
100	TbwSmin	DHW	Minimum DHW setpoint temperature (10 °C<=TbwSmin<=TbwSmax)	10 ... 80 °C	508	OEM	4	OEM service
101	TbwSmax	DHW	Maximum DHW setpoint temperature (TbwSmin<=TbwSmax<=80 °C)	10 ... 80 °C	509	OEM	4	OEM service
250	dTbwKomf40	DHW-inst DHW heater	Setpoint readjustment in Comfort mode and setpoint of 40 °C	-20 ... 20 K	580	Engineer	5	Installer
251	dTbwKomf60	DHW-inst DHW heater	Setpoint readjustment in Comfort mode and setpoint of 60 °C	-20 ... 20 K	581	Engineer	5	Installer
252	dTbwAusl40	DHW-inst DHW heater	Setpoint readjustment with outlet temperature control and setpoint of 40 °C	-20 ... 20 K	582	Engineer	5	Installer
253	dTbwAusl60	DHW-inst DHW heater	Setpoint readjustment with outlet temperature control and setpoint of 60 °C	-20 ... 20 K	583	Engineer	5	Installer
94	TrSmin	Weather compens	Minimum room setpoint (10 °C<=TrSmin<=TrSmax)	10 ... 30 °C	501	Engineer	6	Enduser
95	TrSmax	Weather compens	Maximum room setpoint (TrSmin<=TrSmax<=30 °C)	10 ... 30 °C	502	Engineer	6	Enduser
103	TkSfrostEin	Boiler	Boiler frost protection switch-on temperature (5 °C<=TkSfrostEin<TkSfrostAus)	5 ... 50 °C	511	Engineer	5	Installer
104	TkSfrostAus	Boiler	Boiler frost protection switch-off temperature (TkSfrostEin<TkSfrostAus<=50 °C)	5 ... 50 °C	512	Engineer	5	Installer
105	TqNach	DHW	Switch-off temperature for pump overrun (after DHW heating)	20 ... 90 °C	513	OEM	4	OEM service
114	TgradMax	No meaning	Maximum temperature gradient of boiler setpoint ramp in heating mode (0: no setpoint ramp)	0 ... 255 K/min	518	OEM	4	OEM service
112	THG	Heating mode	Summer / winter changeover temperature (30 °C: S / W changeover deactivated)	8 ... 30 °C	516	Enduser	6	Enduser
113	dTbreMinP	Boiler	Maximum control differential; when exceeded, minimum pause time will be aborted	0 ... 90 K	517	Engineer	5	Installer
108	TuebVor	Heating mode AGU2.500	Boiler temperature setpoint boost with mixing circuit	0 ... 30 °C	514	Engineer	5	Installer
106	TbwBereit	DHW-inst DHW heater	Setpoint for readiness temperature	10 ... 60 °C	607	Engineer	6	Enduser
102	TuebBw	DHW	Flow temperature setpoint boost with DHW heating	0 ... 30 °C	510	Engineer	5	Installer
611	TuebSchNL	DHW	Charging temperature setpoint boost for recharging the stratification storage tank when controlling to charging temperature	0 ... 30 °C	644	OEM	5	Installer
107	TkBegr	No meaning	Boiler temperature limitation with instantaneous DHW heater	60 ... 95 °C			4	OEM service
115	dTrAbsenk	Heating mode time switch	Reduction of room setpoint when using time switch (dTrAbsenk=0: acting on heat demand)	0 ... 10 K	520	Enduser	6	Enduser
173	TiAussenNorm	Weather compens	Design outside temperature (for sizing the heating plant)	-50 ... 20 °C	519	Engineer	5	Installer
172	dTkTrNenn	PWM pump	Delta flow / return temperature at TiAussenNorm, 2. 5 <=...<= dTkTrMax	2.5 ... 20 K	521	Engineer	5	Installer
116	dTkTrMax	PWM pump	Maximum dT of boiler flow and return for dT supervision	2.5 ... 35 K	522	OEM	3	OEM (production)
462	dTkTrSTB	Boiler (S) LT	Maximum dT of boiler flow and return above which the electronic SLT cuts out	2.5 ... 50 K			3	OEM (production)
111	TaBegr	Boiler flue gas supervision	Triggering threshold for output reduction at high flue gas temperatures (limitation)	0 ... 125 °C	593	OEM*	3	OEM (production)
438	TaAbschalt	Boiler flue gas supervision	Triggering threshold for boiler shutdown at high flue gas temperatures	0 ... 125 °C	592	OEM*	3	OEM (production)
109	TkMax	Boiler TL	Maximum limitation of boiler temperature (TL function 1)	0 ... 100 °C	515	OEM*	3	OEM (production)
110	Tstb	Boiler (S) LT	Cutout temperature of SLT	0 ... 110 °C			3	OEM (production)
389	TempGradMax	Boiler (S) LT	Maximum rate of flow temperature rise	0 ... 20 K/s			3	OEM (production)
528	TAnfoExtMax	AGU2.51x	Maximum value of heat demand with external predefined temperature setpoint (5 °C< = TAnfoExtMax< = 130 °C)	5 ... 130 °C	622	Engineer	5	Installer

7494t01_Param_Liste.xls

Switching differentials

No	Name	Group	Function	Range	No QAA73 AGU2.310	Level QAA73 AGU2.310	LevelNo PC_Tool	Level PC_Tool
			Switch-on / -off thresholds					
117	SdHzEin	Boiler	Switch-on differential of burner in heating mode	0.5 ... 32 K	523	Engineer	5	Installer
118	SdHzAusMin	Boiler	Minimum switch-off differential of burner in heating mode	0.5 ... 32 K	524	Engineer	5	Installer
119	SdHzAusMax	Boiler	Maximum switch-off differential of burner in heating mode	0.5 ... 32 K	525	Engineer	5	Installer
120	SdBwEin1	DHW	Switch-on differential of burner in DHW heating mode (sensor 1)	0.5 ... 32 K	526	Engineer	5	Installer
121	SdBwAus1Min	DHW	Minimum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	527	Engineer	5	Installer
122	SdBwAus1Max	DHW	Maximum switch-off differential of burner in DHW heating mode (sensor 1)	-32 ... 32 K	528	Engineer	5	Installer
123	SdBwEin2	DHW	Switch-on differential of burner in DHW heating mode (sensor 2)	0.5 ... 32 K	529	Engineer	5	Installer
124	SdBwAus2Min	DHW	Minimum switch-off differential of burner in DHW heating mode (sensor 2)	-32 ... 32 K	530	Engineer	5	Installer
125	SdBwAus2Max	DHW	Maximum switch-off differential of burner in DHW heating mode (sensor 2)	-32 ... 32 K	531	Engineer	5	Installer
323	Sd_RL_groesser_VL	Boiler (S) LT	Threshold switch-off temperature when comparing boiler flow / return temperature (el. LT)	5 ... 20 K			3	OEM (production)

Controller functions

			Configuration					
126	Sth1	Weather compens HC1	Heating curve slope heating circuit 1	1 ... 40	532	Enduser	6	Enduser
127	Sth2	Weather compens AGU2.500	Heating curve slope heating circuit 2	1 ... 40	533	Enduser	6	Enduser
128	DtR1	Weather compens HC1	Room setpoint readjustment heating circuit 1	-31 ... 31 K	534	Enduser	5	Installer
129	DtR2	Weather compens AGU2.500	Room setpoint readjustment heating circuit 2	-31 ... 31 K	535	Enduser	5	Installer
135	PhzMax	Heating mode	Maximum degree of modulation in heating mode (LmodTL <= PhzMax <= LmodVL)	0 ... 100 %	541	Engineer	4	OEM service
137	NhzMax	Heating mode	Maximum speed at maximum output in heating mode (maximum speed limitation)	0 ... 9950 rpm	536	Engineer	4	OEM service
144	PminHuKw	Boiler INFO value	Minimum boiler output in kW (lower calorific value)	0 ... 9999 kW	542	Engineer	5	Installer
145	PmaxHuKw	Boiler INFO value	Maximum boiler output in kW (lower calorific value)	0 ... 9999 kW	543	Engineer	5	Installer
175	NqmodMin	PWM pump	Minimum pump speed permitted for the heating plant	10 ... 100 %	538	Engineer	5	Installer
188	NqmodMinBw	PWM pump	Minimum pump speed for full charging of stratification storage tank	10 ... 100 %	539	Engineer	5	Installer
174	NqmodNenn	PWM pump	Pump speed at heating plant's design point	1 ... 50	537	Engineer	5	Installer
180	QmodDrehzStufen	PWM pump	Number of speeds of modulating pump (supplier specification)	2 ... 50	540	OEM	4	OEM service
146	QmodMin	PWM pump	Minimum degree of modulation of modulating pump (supplier specification)	0 ... 70 %	548	OEM	4	OEM service
147	QmodMax	PWM pump	Maximum degree of modulation of modulating pump (supplier specification)	10 ... 100 %	549	OEM	4	OEM service
435	Klambda1	PWM pump	Filter time constant of actual values of flow / return temperature of dT control	0 ... 100 %	586	OEM	4	OEM service
148	Kon	Heating mode	Constant for quick setback without room influence	0 ... 20	551	Engineer	5	Installer
179	KtAbtastDt	PWM pump	Sampling factor of dT control (as a factor for TabtastK)	0 ... 50	550	OEM	4	OEM service
149	HydrSystem	Boiler	Hydraulic system adjustment	0 ... 255	552	Engineer	5	Installer
193	KonfigHks	Heating mode	Configuration of heating circuits	0 ... 255	553	Engineer	5	Installer
194	KonfigRg0	Boiler	Setting flags: status code open-circuit sensor for ANx channel suppressed / not suppressed	0 ... 255	554	OEM	4	OEM service
150	KonfigRg1	Boiler	Setting flags	0 ... 255	555	Engineer	6	Enduser
151	KonfigRg2	DHW-inst DHW heater	Instantaneous DHW heater setting flags	0 ... 255	556	Engineer	5	Installer
152	KonfigRg3	Boiler	AD converter configuration and heat demand	0 ... 255	557	Engineer	5	Installer
153	KonfigRg4	Boiler	Setting flags	0 ... 255	558	Engineer	5	Installer
154	KonfigRg5	Boiler	Setting flags	0 ... 255	559	OEM	4	OEM service
155	KonfigRg6	Boiler	Setting flags	0 ... 255	560	OEM	4	OEM service
182	KonfigRg7	Boiler	Setting flags	0 ... 255	561	Engineer	5	Installer
328	KonfigRg8	DHW-inst DHW heater	Setting flags for instantaneous DHW heater	0 ... 255	587	Engineer	5	Installer
427	dTzapfEnde	DHW-inst DHW heater	Response threshold for detection of end of DHW consumption with instantaneous DHW heater	-2 ... 1,984375 K/s	599	Engineer	5	Installer
428	dTzapfKomf	DHW-inst DHW heater	Response threshold for detection of DHW consumption with instantaneous DHW heater in Comfort mode	-2 ... 1,984375 K/s	600	Engineer	5	Installer
429	dTzapfHz	DHW-inst DHW heater	Response threshold for detection of DHW consumption with instantaneous DHW heater in heating mode	-2 ... 1,984375 K/s	601	Engineer	5	Installer
433	LmodRgVerz	Boiler	Output during controller delay time (LmodTL <= LmodRgVerz <= LmodVL)	0 ... 100 %	598	Engineer	5	Installer
18	LmodRgStartDLH	DHW-inst DHW heater	Output-related start on controller release in instantaneous DHW heating mode (LmodTL <= LmodRgStartDLH <= LmodVL)	0 ... 100 %	624	Engineer	5	Installer

Controller functions (cont'd)

No	Name	Group	Function	Range	No QAA73 AGU2.310	Level QAA73 AGU2.310	LevelNo PC_Tool	Level PC_Tool
439	ZeitKoLrelGedStand	Boiler OCI420	Time constant for filtering the relative burner output delivered via LPB bus	0 ... 2550 s			3	OEM (production)
440	Kalibrationsfaktor	Boiler OCI420	Calibration of LMU for load signal delivered via LPB to match effective output	-128 ... 127			3	OEM (production)
470	KonfigEingang	Boiler	Progr input LMU basis	0 ... 255	614	Engineer	5	Installer
526	KonfigEingangR	AGU2.51x	Progr input on clip-in function module	0 ... 255	618	Engineer	5	Installer
471	KonfigAusgang	Boiler	Function programmable output K2 LMU	0 ... 255	615	Engineer	5	Installer
523	KonfigAusgang1R	AGU2.51x	Function output1 clip-in function module	0 ... 255	619	Engineer	5	Installer
524	KonfigAusgang2R	AGU2.51x	Function output2 clip-in function module	0 ... 255	620	Engineer	5	Installer
525	KonfigAusgang3R	AGU2.51x	Function output3 clip-in function module	0 ... 255	621	Engineer	5	Installer
529	PAnfoExtSchwelle	AGU2.51x	Threshold of analog signal from which the external demand for output will be accepted (percentage of maximum value of analog signal)	5 ... 95 %	623	Engineer	5	Installer
574	WAnfoQ8	Boiler	Heat demand to be supported by the system pump Q8	0 ... 255	632	Engineer	5	Installer
586	dTUeberhBegr	PWM pump	Limitation of temperature boost by dT control	0 ... 100 %	639	Engineer	5	Installer

Controller times

			All non-safety-related time parameters					
130	ZqNach	Heating mode	Overrun time of pumps, max. 210 min (setting 255: continuous operation of Q1)	0 ... 255 min	544	Engineer	5	Installer
134	ZkickFkt	Boiler	Time for kick function of pump / diverting valve outputs	0 ... 51 s	584	Engineer	5	Installer
139	ZBreMinP	Boiler	Minimum burner pause time (heat demand-dependent switching hysteresis)	0 ... 3600 s	545	Engineer	5	Installer
140	ZBreMinL	No meaning	Minimum burner running time (heat demand-dependent switching hysteresis)	0 ... 255 s	546	Engineer	5	Installer
141	ZReglVerz	Boiler	Controller delay after burner is started up	0 ... 255 s	547	Engineer	5	Installer
136	ZAueRuec	Boiler flue gas supervision	Reset time of flue gas supervision equipment	10 ... 218 min			3	OEM (production)
329	ZsdHzEnde	Boiler	Period of time until switch-off differential is reduced to SdHzAusMin	0 ... 210 min	588	OEM	4	OEM service
330	ZsdBwEnde	DHW	Period of time until switch-off differential is reduced to SdBwAusMin	0 ... 210 min	589	OEM	4	OEM service
331	ZSperrDynAusSd	Boiler	Locking time of dynamic switch-off differential after a change of heating<->DHW	0 ... 51 s	590	OEM	4	OEM service
430	Z_BwComfort1	DHW-inst DHW heater	Time for instantaneous DHW heater Comfort function after consumption (when there is no demand for heat) (0 = deactivated; 1440 = continuously)	0 ... 1440 min	602	Engineer	5	Installer
460	Z_BwComfort2	DHW-inst DHW heater	Time for instantaneous DHW heater Comfort function after consumption (when there is demand for heat) (0 = deactivated; 30 = 30 min)	0 ... 30 min	603	Engineer	5	Installer
475	ZqComfortAus	DHW-inst DHW heater	Time for pump overrun in instantaneous DHW heater Comfort function with burner off (0 = pump off with burner off; 255 = pump always on)	0 ... 255 min	631	Engineer	5	Installer
570	ZFlowSwitchBw	DHW-inst DHW heater	Timer flow switch	0 ... 255 s			5	Installer
571	ZFlowSwitchComfort	DHW-inst DHW heater	Timer flow switch	0 ... 255 s			5	Installer
587	Z_PumpeAusUv	DHW	Duration of pump shutdown when diverting valve changes from space heating to DHW heating	0 ... 10 s	637	Engineer	5	Installer
588	Z_PumpeVerzUv	DHW	Delay of pump shutdown when diverting valve changes from space heating to DHW heating	0 ... 10 s	638	Engineer	5	Installer
619	ZReglVzBwTakten	DHW-inst DHW heater	Duration of «Controller delay» after startup when cycling in instantaneous DHW outlet operation: output delivered now is that prior to shutdown	0 ... 50 s	648	Engineer	5	Installer

Controller coefficients

			Setting the controller's dynamics					
158	KpBw	DHW	Proportional coefficient of DHW controller	0 ... 9.9375	566	OEM	4	OEM service
159	TvBw	DHW	Derivative action time of DHW controller	0 ... 9.9375 s	567	OEM	4	OEM service
160	TnBw	DHW	Integral action time of DHW controller	0 ... 4000 s	568	OEM	4	OEM service
161	KpHz1	Heating mode HC1	Proportional coefficient of heating circuit controller	0 ... 9.9375	569	OEM	4	OEM service
162	TvHz1	Heating mode HC1	Derivative action time of heating circuit controller	0 ... 9.9375 s	570	OEM	4	OEM service
163	TnHz1	Heating mode HC1	Integral action time of heating circuit 1 controller	0 ... 4000 s	571	OEM	4	OEM service
167	KpDt	PWM pump	Proportional coefficient of dT control	0 ... 9.9375	575	OEM	4	OEM service
168	TvDt	PWM pump	Derivative action time of dT control	0 ... 9.9375 s	576	OEM	4	OEM service
169	TnDt	PWM pump	Integral action time of dT control	0 ... 4000 s	577	OEM	4	OEM service
170	ZAbtastK	Boiler	Sampling time of temperature control loop in heating mode and with storage tank charging	1 ... 4 s	578	OEM	4	OEM service
171	ZAbtastDlh	DHW-inst DHW heater	Sampling time of temperature control loop with instantaneous DHW heater	1 ... 4 s	579	OEM	4	OEM service

Pressures

No	Name	Group	Function	Range	No QAA73 AGU2.310	Level QAA73 AGU2.310	LevelNo PC_Tool	Level PC_Tool
			Setpoints, actual values and limit values					
436	pH2OAbschalt	Boiler water pressure supervision	Water pressure above which boiler and pump will be shut down	0 ... 25.5 bar	594	Engineer	5	Installer
156	pH2Omin	Boiler water pressure supervision	Minimum boiler water pressure	0 ... 25.5 bar	562	Engineer	5	Installer
157	pH2Omax	Boiler water pressure supervision	Maximum boiler water pressure	0 ... 25.5 bar	563	Engineer	5	Installer
437	SdpH2O	Boiler water pressure supervision	Switching differential of water pressure	0 ... 25.5 bar	595	Engineer	5	Installer
177	FoerderMin	PWM pump	Min head of modulating pump (supplier specification)	0 ... 25.5 m	565	OEM	4	OEM service
176	FoerderMax	PWM pump	Max head of modulating pump (supplier specification)	0.5 ... 25.5 m	564	OEM	4	OEM service
479	dpH2OminPuOn	Boiler water pressure supervision	Minimum pressure differential to be reached after pump was switched on	0 ... 5 bar	616	Engineer	5	Installer
480	dpH2OmaxPuOn	Boiler water pressure supervision	Maximum pressure differential that can occur when pump is switched on	0 ... 5 bar	617	Engineer	5	Installer

Burner control fan

			Burner control parameters in connection with the fan					
37	LmodVor	Boiler	Modulation air during prepurging	0 ... 100 %			4	OEM service
38	LmodZL	Boiler	Modulation air at ignition load	0 ... 100 %			4	OEM service
464	LmodZL_QAA	Boiler	Setting value QAA73: modulation air at ignition load	0 ... 100 %	608	OEM	5	Installer
39	LmodTL	Boiler	Modulation air low-fire, lower limit of modulating range	0 ... 100 %			4	OEM service
465	LmodTL_QAA	Boiler	Setting value QAA73: modulation air at low-fire; lower limit modulating range	0 ... 100 %	609	OEM	5	Installer
40	LmodVL	Boiler	Modulation air high-fire, upper limit modulating range	0 ... 100 %			4	OEM service
466	LmodVL_QAA	Boiler	Setting value QAA73: modulation air at high-fire; upper limit modulation range	0 ... 100 %	610	OEM	5	Installer
41	LmodNull	Boiler	Modulation air when burner control is not operating	0 ... 100 %	646	OEM	4	OEM service
42	LmodStart	Boiler	Threshold value modulation air for start / stop	0 ... 100 %			4	OEM service
43	NoG_Max	Boiler	Maximum speed	0 ... 12750 rpm			4	OEM service
44	N_Vor	Boiler	Speed required during prepurging	0 ... 12750 rpm			4	OEM service
45	N_Vor_Delta	Boiler	Tolerance band for N_Vor	0 ... 12750 rpm			4	OEM service
46	N_VL	Boiler	Speed required at high-fire	0 ... 12750 rpm			4	OEM service
469	N_VL_QAA	Boiler	Setting value QAA73: speed required at high-fire	0 ... 9950 rpm	613	OEM	5	Installer
47	N_VL_Delta	Boiler	Tolerance band for N_VL	0 ... 12750 rpm			4	OEM service
48	N_ZL	Boiler	Speed required at ignition load	0 ... 12750 rpm			4	OEM service
467	N_ZL_QAA	Boiler	Setting value QAA73: speed required at ignition load	0 ... 9950 rpm	611	OEM	5	Installer
49	N_ZL_Delta	Boiler	Tolerance band for N_ZL	0 ... 12750 rpm			4	OEM service
434	Nachstell_Zaehler	Boiler	Counter for speed readjustment on startup (tolerance limit of speed overshoot)	1 ... 50			3	OEM (production)
390	N_Nachstell_Delta	Boiler	Speed readjustment on startup and shutdown: band within which speed should lie	50 ... 12750 rpm			4	OEM service
50	N_TL	Boiler	Speed required at low-fire	0 ... 12750 rpm			4	OEM service
468	N_TL_QAA	Boiler	Setting value QAA73: speed required at low-fire	0 ... 9950 rpm	612	OEM	5	Installer
51	N_TL_Delta	Boiler	Tolerance band for N_TL	0 ... 12750 rpm			4	OEM service
52	NoG_Null	Boiler	Maximum fan speed on standstill	0 ... 12750 rpm	645	OEM	4	OEM service
53	VmLauf	Boiler	Rate of change of fan control (PWM) rising	0 ... 100 % / s			4	OEM service
54	VmLab	Boiler	Rate of change of fan control (PWM) falling	0 ... 100 % / s			4	OEM service
55	VmLaufBetr	Boiler	Speed mod air rising in operation	0 ... 100 % / s			4	OEM service
138	ZGebNach	Boiler (S) LT	Maximum overrun time when TL / LT cuts out	0 ... 10 min	585	OEM	4	OEM service
56	VmLabBetr	Boiler	Speed mod air falling in operation	0 ... 100 % / s			4	OEM service
546	KpBegr	Boiler	Parameter for dynamics of speed limitation. Action in the direction of limitation	1 ... 40			4	OEM service
547	KpUnbegr	Boiler	Parameter for the dynamics of speed limitation. Action against the direction of limitation	1 ... 40			4	OEM service
607	Lmod_SchDL	Boiler	Modulation air during full charging of stratification storage tank (charging control)	0 ... 100 %	642	OEM	5	Installer
608	N_SchDL	Boiler	Set speed during full charging of stratification storage tank (charging control)	0 ... 9950 rpm	643	OEM	5	Installer
609	N_Neutral	Boiler	Width of neutral band for speed limitation	0 ... 150 rpm			4	OEM service

Burner control sequence

No	Name	Group	Function	Range	No QAA73 AGU2.310	Level QAA73 AGU2.310	LevelNo PC_Tool	Level PC_Tool
			Parameters for configuring the burner control					
58	Ti	Boiler	Interval ignition load; transition time operation with ignition load	0 ... 10 s			3	OEM (production)
59	Tvz	Boiler	Preignition time	0 ... 25 s			3	OEM (production)
60	Tn	Boiler	Postpurge time	0 ... 51 s			3	OEM (production)
606	Tn_QAA	Boiler	Setting value QAA73: postpurge time	0 ... 51 s	641	Engineer	5	Installer
61	Tv	Boiler	Prepurge time	0 ... 51 s			3	OEM (production)
605	Tv_QAA	Boiler	Setting value QAA73: prepurge time	0 ... 51 s	640	Engineer	5	Installer
62	Tsa	Boiler	Satety time total	1.8 ... 9.8 s			2	L&S temp
63	Tsa1	Boiler	Safety time	0.2 ... 9.6 s			2	L&S temp
64	FaProgFlags1	Boiler	Setting flags of burner control section internally (control sequence)	0 ... 255			1	L&S service (Development)
65	FaEinstellFlags1	Boiler	Setting flags of burner control section external components1	0 ... 255			2	L&S temp
66	FaEinstellFlags2	Boiler	Setting flags of burner control section external components2	0 ... 255			4	OEM service
463	FaEinstellFlags3	Boiler	Setting flags of burner control section	0 ... 255			4	OEM service
67	RepZaehler	Boiler	Number of permitted repetitions for restart	0 ... 15			2	L&S temp
317	TB_Konfig	Boiler (S) LT	Flags for configuring the LT functions	0 ... 255			2	L&S temp
319	GrenzeNacherwaermung	Boiler (S) LT	Counter limit for triggering lockout in the event of faulty postheating	0 ... 50			3	OEM (production)
320	GrenzeGradient	Boiler (S) LT	Counter limit for triggering lockout in the event of faulty gradient	0 ... 50			3	OEM (production)
321	GrenzeDeltaT	Boiler (S) LT	Counter limit for triggering lockout in the event of faulty dT	0 ... 50			3	OEM (production)
322	GrenzeRL_groesserVL	Boiler (S) LT	Counter limit for triggering lockout in the event the return is higher than the flow	0 ... 50			3	OEM (production)
612	BlindZeit_RLgrVL	Boiler (S) LT	Dead time for comparison return higher than flow after start of DHW demand	0 ... 51 s			3	OEM (production)
476	IonLimit	Boiler	Limit value for limiting the ionization current. 0 = function inactive	0 ... 25 µA			4	OEM service
583	IonLimitGrenz	Boiler	Limit value for ionization current supervision	0 ... 25 µA			4	OEM service

Burner control identification

			Production data and version					
289	KundeNr	INFO values	Official L & S customer number	0 ... 255			1	L&S service (Development)
5	ParaVersNr	INFO values	Parameter set version number	0 ... 65535			1	L&S service (Development)
6	ParaSatzNr	INFO values	Parameter set number	0 ... 65535			1	L&S service (Development)
527	P_Kenn	Parameterization	Identification of parameter set. PC tool programmed from OEM level only when this parameter is identical	0 ... 255			2	L&S temp
7	FabJahr	INFO values	Production year	0 ... 255			0	L&S production
8	FabMonat	INFO values	Production month	0 ... 255			0	L&S production
9	FabTag	INFO values	Production day	0 ... 255			0	L&S production
10	FabNr	INFO values	Production number	0 ... 2147483647			0	L&S production
11	Pruefer	INFO values	Inspector code	0 ... 255			0	L&S production
348	GerFam	INFO values	Device family	0 ... 255			5	Installer
416	LPBGeraeteVariante	Boiler OCI420	Device variant within LMU6x family	0 ... 255			1	L&S service (Development)

Operating data

			Operating data, learn adaption range					
68	BetrStd	INFO values	Hours run burner	0 ... 131070 hrs	718	Engineer*	1	L&S service (Development)
69	BetrStdHz	INFO values	Hours run heating mode	0 ... 131070 hrs	719	Engineer*	1	L&S service (Development)
70	BetrStdBw	INFO values	Hours run DHW heating	0 ... 131070 hrs	720	Engineer*	1	L&S service (Development)
71	BetrStdZone	INFO values	Hours run zone	0 ... 131070 hrs	721	Engineer*	1	L&S service (Development)
72	InbetrSetz	INFO values	Start counter	0 ... 327675	722	Engineer*	1	L&S service (Development)
74	MmiStatus	HMI	Selection of summer / winter operating modes	0 ... 255	724	Engineer*	1	L&S service (Development)
73	Pmittel	No meaning	Mean boiler output	-	723	Engineer*	-	-
474	SwVersion_LMU	INFO values	SW version of LMU for presentation on the OT parameter setting level	-	725	Engineer*	-	-
240	IonStrom	INFO values	Measured value of ionization current	-	755	Engineer*	-	-

* Read only

Maintenance

No	Name	Group	Function	Range	No QAA73 AGU2.310	Level QAA73 AGU2.310	LevelNo PC_Tool	Level PC_Tool
			Maintenance alarms					
560	BetrStdWart	Maintenance	Operating hours (interval) since last service visit	0 ... 10000 hrs	634	Engineer	5	Installer
561	InbetrSetzWart	Maintenance	Startups (interval) since last service visit	0 ... 10000	635	Engineer	5	Installer
564	MonatWart	Maintenance	Months (interval) since last service visit	0 ... 255 months	636	Engineer	5	Installer
562	BetrStdWartGrenz	Maintenance	Set limit for the number of operating hours (interval) since last service visit	0 ... 9998 hrs	625	Engineer	5	Installer
563	InbetrSetzWartGrenz	Maintenance	Set limit for the number of startups (interval) since last service visit	0 ... 9995	626	Engineer	5	Installer
565	MonatWartGrenz	Maintenance	Set limit for the number of months (interval) since last service visit	0 ... 255 months	627	Engineer	5	Installer
566	GeblaeseWartGrenz	Maintenance	Set limit of fan speed for service visit	0 ... 9950 1/min	628	Engineer	5	Installer
567	Wartungscode	Maintenance	Maintenance code contains enumeration value of maintenance alarm (precise cause)	0 ... 255	726	Enduser	6	Enduser
568	WartungsQuittierung	Maintenance	Enduser can acknowledge a pending maintenance alarm via this parameter	0 ... 1	629	Enduser	6	Enduser
569	WartungsEinstellungen	Maintenance	Setting flags of maintenance alarms	0 ... 255	630	Engineer	5	Installer
579	WartRepDauer	Maintenance	Selected period of time for repetition of maintenance alarm after acknowledgement	0 ... 255 days	633	Engineer	5	Installer
581	MonatWartZaehler	Maintenance	Auxiliary meter for 'MonatWart' (incremented by 1 every 12 hours)	0 ... 15500			5	Installer
580	WartQuitRepZaehler	Maintenance	After acknowledgement, counter will be loaded with the (double) value of WartRepDauer (decremented by 1 every 12 hours)	0 ... 255			5	Installer
610	IonStromWart	Maintenance	0 = ionization current maintenance alarm did not occur 1 = ionization current maintenance alarm occurred	0 ... 255	647	Engineer	5	Installer

MMI - HMI

			MMI objects					
247	TrSollMmiEeprom	Initialization	Room setpoint of MMI / HMI (pot pos)	10 ... 30 °C			1	L&S service (Development)
246	TvSollMmiEeprom	INFO values	Flow temperature setpoint of MMI / HMI (pot pos)	20 ... 90 °C			1	L&S service (Development)
248	TbwSollMmiEeprom	Initialization	DHW temperature setpoint of MMI / HMI (pot pos)	10 ... 80 °C			1	L&S service (Development)
512	TrSollRedMmiEeprom	Initialization	Room setpoint of HMI reduced level	10 ... 30 °C			1	L&S service (Development)
511	TvSollRedMmiEeprom	Initialization	Setpoint of reduced flow temperature of HMI	5 ... 90 °C			1	L&S service (Development)
513	TbwSollRedMmiEeprom	Initialization	DHW setpoint of HMI reduced level	10 ... 80 °C			1	L&S service (Development)

MCI

			Mixing valve clip-in					
441	XpHz2	Heating mode AGU2.500	P-band of heating circuit 2 controller	1 ... 100 K	597	OEM	4	OEM service
166	TnHz2	Heating mode AGU2.500	Integral action time of heating circuit 2 controller	10 ... 873 s	574	OEM	4	OEM service
442	ZeitAufZu	Heating mode AGU2.500	Running time of actuator in heating circuit 2 (TimeOpening / TimeClosing)	30 ... 873 s	596	Engineer	4	OEM service
443	SdHz2	Heating mode AGU2.500	Switching differential of 3-position controller in heating circuit 2 (<= neutral zone (2 K))	0 ... 2 K			4	OEM service
445	KoeffSperr	Heating mode AGU2.500	Weighting factor for locking signal in heating circuit 2	0 ... 200 %			1	L&S service (Development)

LPB

			LPB clip-in					
17	LPBKonfig0	Boiler OCI420	Setting flags for time synchronization and power supply on LPB	0 ... 255	604	Engineer	5	Installer
380	LPBAdrSegNr	Boiler OCI420	LPB segment number of LMU	0 ... 14	606	Engineer	5	Installer
381	LPBAdrGerNr	Boiler OCI420	LPB device number of LMU	0 ... 16	605	Engineer	5	Installer
415	LPBErrorGerAlarm	Boiler OCI420	Setting flags for configuring the device alarm on LPB	0 ... 255			1	L&S service (Development)

12.2 Lockout position storage

No QAA73... AGU2.310	Name	Function	Level QAA73... AGU2.310
700	Stoer1	1st past value of lockout code counter	Engineer *
701	StrPn1	1st past value of lockout phase	Engineer *
702	StrDia1	1st past value of internal diagnostic code	Engineer *
728	StrAlba1	1st past value of ALBATROS error code	Engineer *
703	Stoer2	2nd past value of lockout code counter	Engineer *
704	StrPn2	2nd past value of lockout phase	Engineer *
705	StrDia2	2nd past value of internal diagnostic code	Engineer *
729	StrAlba2	2nd past value of ALBATROS error code	Engineer *
706	Stoer3	3rd past value of lockout code counter	Engineer *
707	StrPn3	3rd past value of lockout phase	Engineer *
708	StrDia3	3rd past value of internal diagnostic code	Engineer *
730	StrAlba3	3rd past value of ALBATROS error code	Engineer *
709	Stoer4	4th past value of lockout code counter	Engineer *
710	StrPn4	4th past value of lockout phase	Engineer *
711	StrDia4	4th past value of internal diagnostic code	Engineer *
731	StrAlba4	4th past value of ALBATROS error code	Engineer *
712	Stoer5	5th past value of lockout code counter	Engineer *
713	StrPn5	5th past value of lockout phase	Engineer *
714	StrDia5	5th past value of internal diagnostic code	Engineer *
732	StrAlba5	5th past value of ALBATROS error code	Engineer *
715	Stoer_akt	Current value of lockout code counter	Engineer *
716	StrPn_akt	Current value of lockout phase	Engineer *
717	StrDia_akt	Current value internal diagnostic code	Engineer *
733	StrAlba_akt	Current value of ALBATROS error code	Engineer *

* Read only

With the ACS420, the lockout position storage is accessed via a specific menu.

Phase designations / Phase numbers

PH_TNB	0	PH_TSA1_1	12
PH_TLO	1	PH_TSA1_2	13
PH_TNN	2	PH_TSA2_1	14
PH_STANDBY	3	PH_TSA2_2	15
PH_STARTVER	4	PH_TI	16
PH_THL1_1	5	PH_MODULATION	17
PH_THL1_2	6	PH_THL2_1	18
PH_TV	7	PH_THL2_2	19
PH_TBRE	8	PH_TN_1	20
PH_TW1	9	PH_TN_2	21
PH_TW2	10	PH_STOER	22
PH_TVZ	11		

Note

For meaning of the phase designations, refer to → Sequence diagrams

12.3 Legend of parameter bit fields LMU...

Controller functions

KonfigRg0	**Setting flags:**	**Status code open-circuit sensor channel Anx suppressed / not suppressed**
	MeldAN2	Status code open-circuit sensor channel AN2 XXXX XXX0 suppress XXXX XXX1 deliver
	MeldAN3	Status code open-circuit sensor channel AN3 XXXX XX0X suppress XXXX XX1X deliver
	MeldAN4	Status code open-circuit sensor channel AN4 XXXX X0XX suppress XXXX X1XX deliver
	MeldAN5	Status code open-circuit sensor channel AN5 XXXX 0XXX suppress XXXX 1XXX deliver
	MeldAN6	Status code open-circuit sensor channel AN6 XXX0 XXXX suppress XXX1 XXXX deliver
	MeldVLHz2	Status code open-circuit flow sensor HC2 XX0X XXXX suppress XX1X XXXX deliver
	MeldFueRelCl	Status code open-circuit sensor on clip-in function module X0XX XXXX suppress X1XX XXXX deliver
KonfigRg1	**Setting flags**	
	BwVor	DHW priority XXXX XX00 absolute XXXX XX10 no priority
	Schaltuhr1	Terminal assignment RT (X10-02; can also act on heating circuit 2, if RU is connected) XXXX X0XX RT XXXX X1XX time switch
	Schaltuhr2	Terminal assignment OT (X10-01; if RU is connected, terminal RT can also act on heating circuit 2->time switch) XXXX 0XXX RT XXXX 1XXX time switch
	AnlagenFrost	Frost protection for the plant XXX0 XXXX OFF XXX1 XXXX ON
	Schaltuhr2Bw	Assignment of second time switch to OT terminals (X10-01) XX0X XXXX time switch acts on HC XX1X XXXX time switch acts on DHW

KonfigRg2	**DHW heater setting flags**		
	DlhNachlInBw	Pump overrun into the heating circuit or into the inst. DHW heat exchanger	
		XXXX XXX0	overrun into the heating circuit
		XXXX XXX1	overrun into the inst. DHW heat exchanger
	DlhKomfTemp	Definition of comfort temperature level	
		XXXX XX0X	same level as outlet temperature
		XXXX XX1X	parameter «TbwBereit»
	DlhKomfReglF	Comfort PID control sensor	
		XXXX 00XX	boiler sensor (flow)
		XXXX 01XX	DHW1 sensor (abortion criterion: time)
		XXXX 10XX	return sensor (B7)
	SpeicherReglF	PID control sensor for (stratification) storage tank	
		XX00 XXXX	boiler flow (B2)
		XX01 XXXX	boiler return (B7), not with stratification storage tank
		XX10 XXXX	Second DHW sensor (B4), only with stratification storage tank
	ZSP1aufHz2	Impact of TSP1 of HMI on heating circuit 2 of the LMU…	
		X0XX XXXX	TSP1 with no impact on heating circuit 2 of the LMU…
		X1XX XXXX	TSP1 also to be applied to heating circuit 2 if TSP2 inactive
	WFmitQAA53	Weather compensation of LMU… active if HC controlled by QAA53	
		0XXX XXXX	flow temperature setpoint directly from QAA53
		1XXX XXXX	LMU… weather compensation calculates flow temperature setpoint from «TrSet» of QAA53
KonfigRg3	**AD converter and HC demand**		
	ADkon0	Configuration AD converter inputs	
		XXX0 0001	configuration 1
		XXX0 0010	configuration 2
		XXX0 0011	configuration 3
		XXX0 0100	configuration 4
	Hz1set	Heat demand 1	
		XX0X XXXX	internal
	Hz2set	Heat demand 2	
		X0XX XXXX	internal
	HzZoSet	Heat demand zone	
		0XXX XXXX	internal
KonfigRg4	**Setting flags**		
	Q8Fkt	System function (with SW V3.0 or higher with no meaing, new: «WAnfoQ8»)	
		XXXX XXX0	OFF
		XXXX XXX1	ON
	GebBauweise	Type of building construction	
		XXXX XX0X	light
		XXXX XX1X	heavy

	Bw-Thermostat	Selection of terminals on DHW thermostat	
		XXXX X0XX	DHW thermostat connected to X11 (digital input)
		XXXX X1XX	DHW thermostat connected to X10-05 (analog input)
	H2OUmlaufVor	Location of water pressure sensor in relation to the pump	
		XXXX 0XXX	pressure increase due to pump on
		XXXX 1XXX	pressure decrease due to pump on
	K2aufUV	Transfer of basic function from K2 to K3 (only with stepper motor diverting valve)	
		XXX0 XXXX	default (K3 unchanged)
		XXX1 XXXX	transfer of basic function from K2 to K3,
	UvKon	Configuration of diverting valve	
		000X XXXX	no diverting valve
		001X XXXX	magnetic valve (0 = HC; 1 = DHW)
		010X XXXX	motorized valve (0 = HC; 1 = DHW)
		011X XXXX	mototized valve (1 = HC; 0 = DHW)
		100X XXXX	stepper motor valve, unipolar
		101X XXXX	stepper motor valve, bipolar
KonfigRg5	**Setting flags**		
	H2Oueb	Water shortage switch (input X11-3)	
		XXXX XX00	flow switch -> lockout
		XXXX XX01	flow switch -> start prevention
		XXXX XX10	pressure switch -> lockout
		XXXX XX11	pressure switch -> start prevention
	DrehBegr	Speed limitation	
		XXXX X0XX	OFF
		XXXX X1XX	ON
	H2OUebSens	Water pressure supervision with pressure sensor	
		XXX0 0XXX	deactivated
		XXX0 1XXX	activated with start prevention
		XXX1 0XXX	activated with lockout
	AbgasUeb	Flue gas temperature supervision	
		X00X XXXX	deactivated
		X01X XXXX	activated with start prevention
		X10X XXXX	activated with lockout
	H2OUmlauf	Water flow supervision with pressure sensor	
		0XXX XXXX	error leads to start prevention
		1XXX XXXX	error leads to a lockout position
KonfigRg6	**Setting flags**		
	PIDinit		
		XXXX XXX0	internal
	KundenRU	Locking RU of other manufacture	
		XXXX XX0X	OFF
		XXXX XX1X	ON
	BwSoll	Source of DHW setpoint	
		XXXX X0XX	RU (if connected)
		XXXX X1XX	MMI (also when a RU is connected)
	Sperrsignal	Calculation of locking signal	
		XXXX 0XXX	calculation of locking signal deactivated
		XXXX 1XXX	calculation of locking signal active

ReglStopSave	Output can be stored at end of controller stop function	
	XXX0 XXXX	output cannot be stored
	XXX1 XXXX	output can be stored
DrehGrWechsel	Activation of fast speed limit changes	
	XX0X XXXX	normal handling
	XX1X XXXX	accelerated handling of fast changes
PIDinit2		
	X0XX XXXX	internal
MinPWMRamp	PWM fan ramps at minimum speed limitation	
	0XXX XXXX	off
	1XXX XXXX	on

KonfigRg7 **Setting flags**

ModQ1	Heating circuit pump	
	XXXX XXX0	multispeed
	XXXX XXX1	modulating
DtBegr	dt limitation	
	XXXX XX0X	OFF
	XXXX XX1X	ON
DtRegelung	dt control	
	XXXX X0XX	OFF
	XXXX X1XX	ON
AnlVol	Plant volume	
	XXX0 1XXX	medium
DtRedBetrieb	dT control in reduced mode	
	XX0X XXXX	OFF
	XX1X XXXX	ON
BetrArtRgVerz	Operating modes with active controller delay: Heating mode or all modes (except inst. DHW heater)	
	X0XX XXXX	controller delay only active in heating mode
	X1XX XXXX	controller delay active in all modes
ModQ1alle	Pump Q1 also modulates with systems 51, 54, 55, 67, 70 and 71	
	0XXX XXXX	Pump Q1 also modulates with the systems as before
	1XXX XXXX	Pump Q1 also modulates with systems 51, 54, 55, 67, 70 and 71

KonfigRg8 **Setting flags for instantaneous DHW heater and standby position for diverting valve**

Wärmetauscher	Type of heat exchanger on the secondary side	
	XXXX 0000	plate heat exchanger
	XXXX 0001	coil heat exchanger on the primary side
	XXXX 0010	coil heat exchanger on the secondary side
SmaxIgnor	Suppression of first maximum for control of the inst. DHW heater	
	XXX0 XXXX	first maximum after startup will be evaluated
	XXX1 XXXX	first maximum after startup will be ignored

	DlhAuslAnfo	Inst DHW heat demand with aqua-booster systems	
		XX0X XXXX	demand via DHW1 sensor or flow switch
		XX1X XXXX	demand via flow switch only
	UVSetHz	Position of diverting valve after DHW heating	
		X0XX XXXX	diverting valve maintains last position
		X1XX XXXX	diverting valve after DHW heating to space heating position

KonfigRg9

		XXXX XX01	internal

WAnfoQ8 **Heat demand signals to be supported by system pump Q8**

HzZone	Zone		
	XXXX XXX0	zone demand not supported by Q8	
	XXXX XXX1	zone demand supported by Q8	
Hz2	Heating circuit 2		
	XXXX XX0X	heating circuit 2 demand not supported by Q8	
	XXXX XX1X	heating circuit 2 demand supported by Q8	
Hz1	Heating circuit 1		
	XXXX X0XX	heating circuit 1 demand not supported by Q8	
	XXXX X1XX	heating circuit 1 demand supported by Q8	
Bw	DHW		
	XXXX 0XXX	DHW demand zone demand not supported by Q8	
	XXXX 1XXX	DHW demand zone demand supported by Q8	

Burner control program

FaProgFlags1 **Setting flags of burner control section internal (sequence)**

TsaKon	Duration of safety time («tsa»)	
	XXXX XXX0	end of flame detection
	XXXX XXX1	fixed sequence time
Lber	Boiler output	
	00XX XXXX	≤ 70 kW
	01XX XXXX	70...120 kW
	10XX XXXX	≥ 120 kW

FaEinstellFlags1 **Setting flags of burner control section external components1**

Zdg_dyn	Feedback signal from ignition	
	XXXX XXX0	static (internally)
	XXXX XXX1	dynamic (externally)
VO_Aktiv		
	XXXX XX0X	internal
Vcc_3V3		
	XXXX 1XXX	internal

FaEinstellFlags2 Setting flags of burner control section external components2

LPKon	Function of free contact input (APS)	
	XXXX X000	not permitted
	XXXX X001	input signal as a programmable input
	XXXX X010	APS configuration2 (sequence diagram)
	XXXX X011	APS configuration3 (sequence diagram)
	XXXX X100	APS configuration4 (sequence diagram)
	XXXX X101	contact open -> start prevention
GPKon	Function of contact input GP	
	XXXX 0XXX	no GP connected
	XXXX 1XXX	GP open -> start prevention
NLKon	Level of postpurging	
	XXX0 XXXX	prepurge level
	XXX1 XXXX	after the last operation control command
N_NachstellKon1	Speed readjustment on startup	
	XX0X XXXX	OFF
	XX1X XXXX	ON
N_NachstellKon2	Speed readjustment on shutdown	
	X0XX XXXX	OFF
	X1XX XXXX	ON
N_Nachstell_lern	Learning function with speed readjustment	
	0XXX XXXX	OFF
	1XXX XXXX	ON

FaEinstellFlags3 Setting flags of burner control section

Gebl_QAA	Release or use of fan parameters of QAA73...	
	XXXX XXX0	no use of QAA fan parameters
	XXXX XXX1	use of QAA fan parameters
Gebl_Impulse	Number of pulses of fan’s Hall feedback signal per revolution	
	XXXX X00X	2 pulses per revolution
	XXXX X01X	3 pulses per revolution
	XXXX X10X	4 pulses per revolution
CheckAnzAusg	Number of outputs on clip-in function module for adaption to current balance	
	XXXX 1XXX	internally

TB_Konfig Flags for configuring the TL functions

TW_EIN	TW ON / OFF	
	XXXX XXX0	TW OFF
	XXXX XXX1	TW ON
Gradient_EIN	Test exceeding temperature gradient ON / OFF	
	XXXX XX0X	test exceeding temperature gradient OFF
	XXXX XX1X	test exceeding temperature gradient ON
DeltaT_1_EIN	Checking excessive dT (> dTkTrSTB) ON / OFF	
	XXXX X0XX	checking OFF
	XXXX X1XX	checking ON
DeltaT_2_EIN	Checking excessive dT (> dTkTrSTB + 8K) ON / OFF	
	XXXX 0XXX	checking OFF
	XXXX 1XXX	checking ON

		DeltaT_3_EIN	Checking excessive dT (> dTkTrSTB + 16K) ON / OFF XXX0 XXXX checking OFF XXX1 XXXX checking ON
		RL_groesser_ VL_EIN	Checking return temperature > boiler / flow temperature ON / OFF XX0X XXXX checking OFF XX1X XXXX checking ON
		TW_Check_EIN	Checking TW ON / OFF X0XX XXXX checking TW OFF X1XX XXXX checking TW ON
		el_STB_EIN	Electronic SLT ON / OFF 0XXX XXXX electronic SLT OFF 1XXX XXXX electronic SLT ON

Note: If the electronic (S)LT is parameterized as active, all checks must be switched active!

Operating modes

MmiStatus **Selection of S / W operating modes** (after startup)

S_W_Einst	Summer / winter selection	
	XXXX XX00	manually summer
	XXXX XX01	manually winter
	XXXX XX10	automatically summer
	XXXX XX11	automatically winter

Maintenance

WartungsEin-stellungen **Setting flags of the maintenance alarms**

WartAKTIV	Flag for general activation of the maintenance alarms	
	XXXX XXX0	maintenance alarms generally inactive
	XXXX XXX1	maintenance alarms generally active
WartReset BetrStd	Flag for individual reset of the hours run maintenance alarm	
	XXXX XX0X	no reset
	XXXX XX1X	individual reset of hours run maintenance alarm
WartReset Inbetr	Flag for individual reset of startup maintenance alarm	
	XXXX X0XX	no reset
	XXXX X1XX	individual reset of startup maintenance alarm
WartReset Monat	Flag for individual reset of ionization current maintenance alarm	
	XXXX 0XXX	no reset
	XXXX 1XXX	individual reset of ionization current maintenance alarm
WartReset Ionstrom	Flag for individual reset of ionization current maintenance alarm	
	XXX0 XXXX	no reset
	XXX1 XXXX	individual reset of ionization current maintenance alarm
WartReset TOTAL	Flag for total reset of all maintenance alarms	
	X0XX XXXX	no reset
	X1XX XXXX	total reset of all maintenance alarms

LPB

LPBKonfig0 **Setting flags for LPB connection**

ZeitSynchro	Response of LMU... with regard to local time / system time	
	XXXX XX00	autonomous
	XXXX XX01	slave without remote adjustment
	XXXX XX10	system time master
	XXXX XX11	free
ParLPBSpeisung	Operating mode distributed bus power supply on LPB	
	XXXX X0XX	distributed bus power supply OFF
StatLPBSpeisung	Status distributed bus power supply on LPB	
	XXXX 0XXX	distributed bus power supply OFF
	XXXX 1XXX	distributed bus power supply ON
EventControl	Flag for nonvolatile storage of event behavior of LMU... on LPB	
	XXX0 XXXX	events disable, not permitted
	XXX1 XXXX	events enable, permitted
ParBwZuordnung	DHW heating for own HC, own segment, all	
	X00X XXXX	locally
	X01X XXXX	segment
	X10X XXXX	system
RVAvorPAnfoExt	Priority of RVA… demand over external predefined output	
	0XXX XXXX	RVA… without priority
	1XXX XXXX	RVA… demand has priority over external predefined output

LPBErrorGerAlarm **Setting flags for configuring the device alarm on LPB**

LPBAlarm Acknowledge		
	XXXX XXX0	alarm acknowlegdement OFF
LPBAlarmEvent		
	XXXX XX0X	event capability OFF (as supplied)

13 Glossary of abbreviations

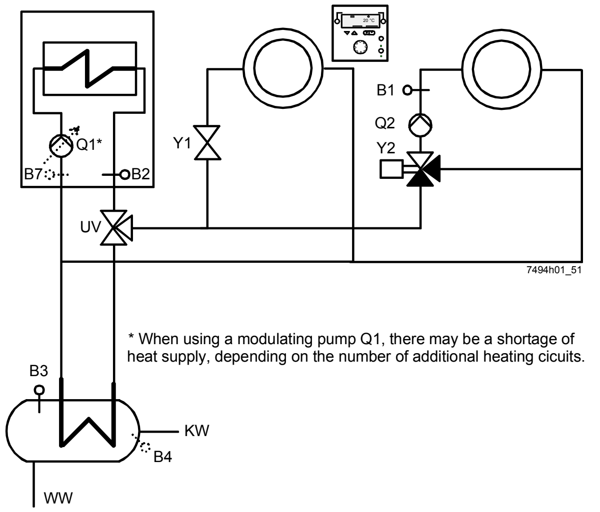
14 Addendum: Hydraulic diagrams BMU

14.1 Hydraulic diagrams

(... ...)

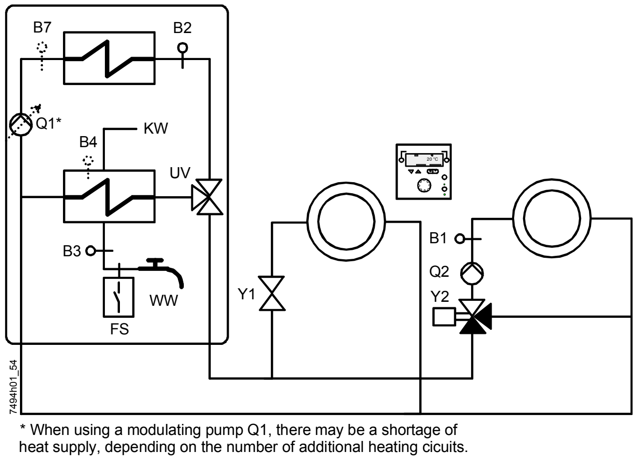
Mixing circuit extensions via AGU2.500...

Diagram 51



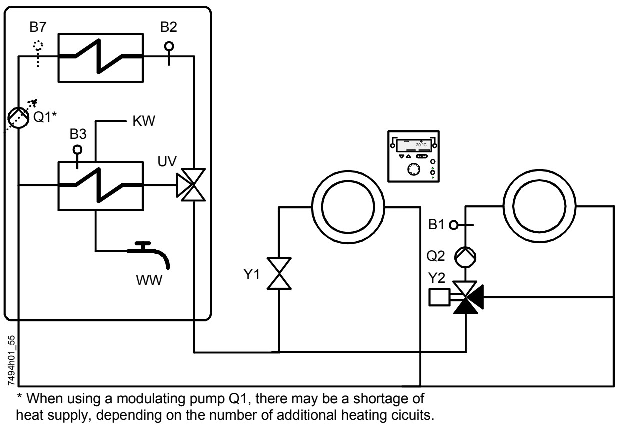
Storage tank system with diverting valve (electromotoric or electrohydraulic), pump circuit and mixing circuit

Diagram 54



Instantaneous DHW heater with secondary heat exchanger, diverting valve (electromotoric or electrohydraulic), pump circuit and mixing circuit

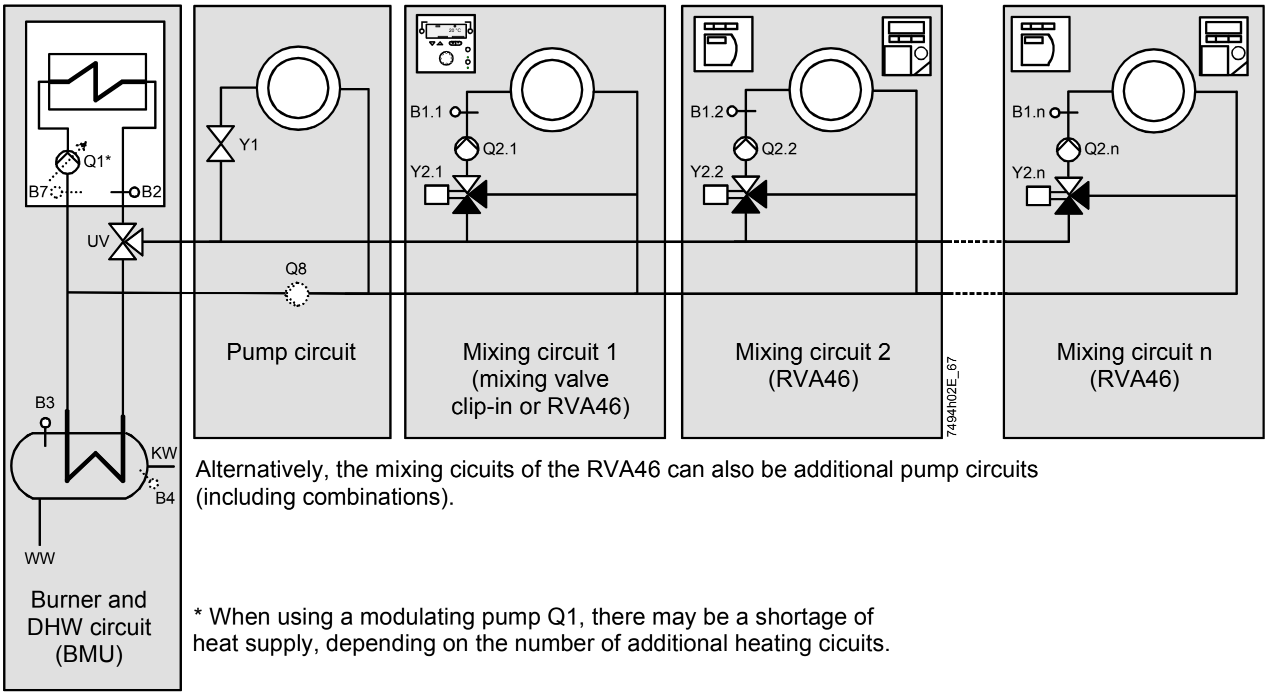
Diagram 55



Aqua-booster with diverting valve, one pump circuit and one mixing circuit

Zone extensions

Diagram 67

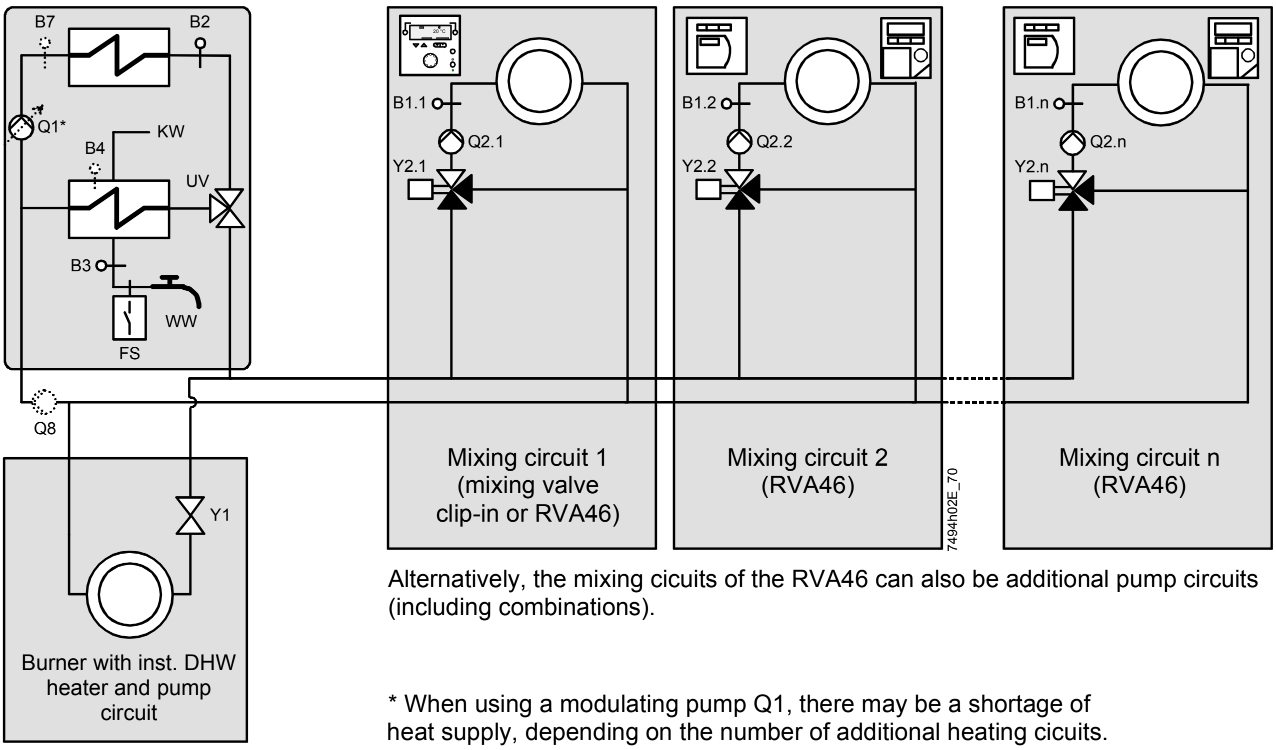


Alternatively, the mixing cicuits of the RVA46 can also be additional pump circuits (including combinations).

* When using a modulating pump Q1, there may be a shortage of heat supply, depending on the number of additional heating cicuits.

Storage tank system with diverting valve and zone control with RVA46...

Diagram 70

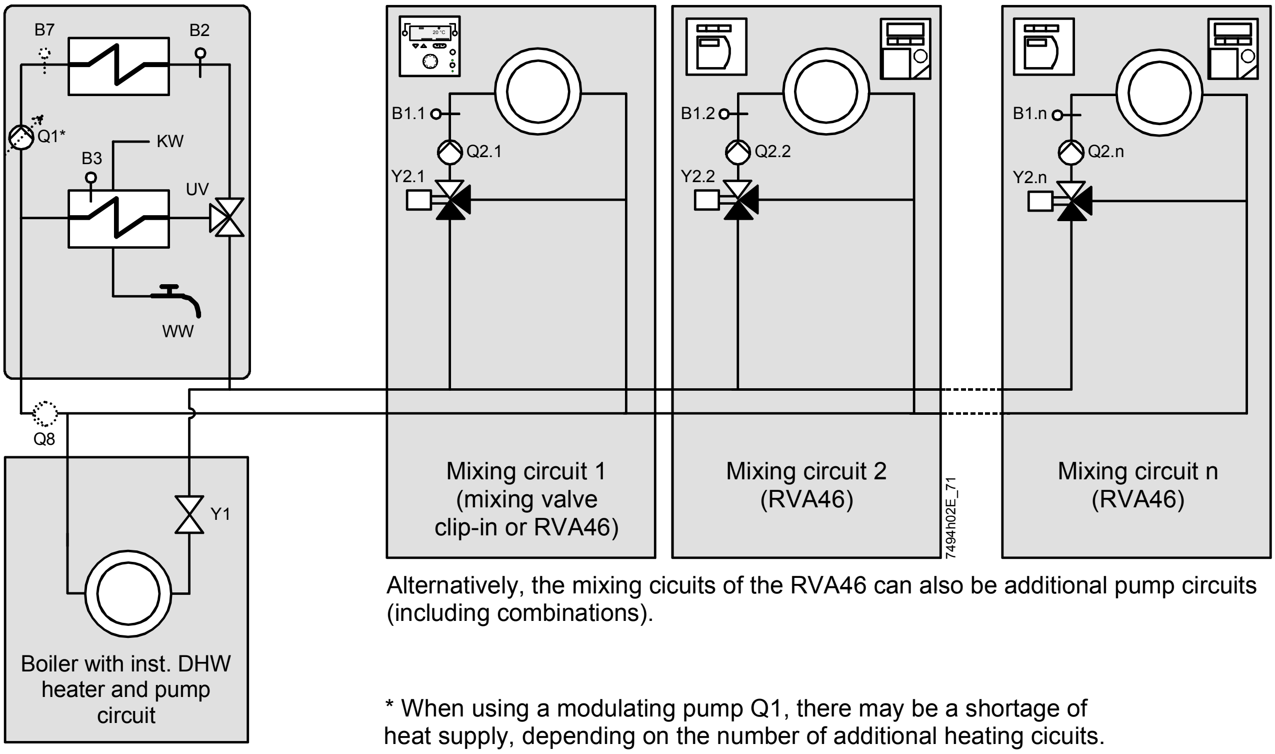


Alternatively, the mixing cicuits of the RVA46 can also be additional pump circuits (including combinations).

* When using a modulating pump Q1, there may be a shortage of heat supply, depending on the number of additional heating cicuits.

Instantaneous DHW heater with secondary heat exchanger, diverting valve and zone control with the RVA46...

Diagram 71



Alternatively, the mixing cicuits of the RVA46 can also be additional pump circuits (including combinations).

* When using a modulating pump Q1, there may be a shortage of heat supply, depending on the number of additional heating cicuits.

Aqua-booster with zone control with the RVA46...

(... ...)

Legend

B1 Flow sensor
B2 Boiler flow sensor
B3 DHW sensor 1
B4 DHW sensor 2
B5 Room sensor HC1
B6 Room sensor HC2
B7 Boiler return sensor
B8 Flue gas sensor
B9 Outdoor sensor
PWM pump, mandatory
PWM pump, optional
Multispeed pump, single-speed (**no** PWM pump)

Q8 System pump, optional (can be used in different places of the hydraulic diagram, depending on parameterization and type of application)

Room thermostat e.g. REV
Room controller e.g. QAA73...
Room unit (QAA70)
Heating controller (RVA)

7494h01legE

14.2 Assignment of hydraulic diagrams to the outputs of the LMU…

The LMU… has 3 relay outputs (K1 - K3) for pumps and valves.

In addition, a pump can be modulated via the PWM output (if required, a pump can be connected externally to AC 230 V mains voltage).

Additional outputs are provided by the mixing valve clip-in module. The outputs are assigned depending on the hydraulic system used:

Hydraulic system	K1	K2	K3	PWM pump	AGU2.500 (mixing valve clip-in module) X52-02
Diagram 4	Q1	Q8 1)	–	Q1	–
Diagrams 2, 5	Q1	Q8 1)	Q3	Q1	–
Diagrams 3, 6, 7	Q1	Q8 1)	UV	Q1	–
Diagram 9	Q1 4)	Q3.2	Q8 5)	Q3.1	–
Diagram 10	Q8 3)	Q3	UV	Q1	–
Diagram 36	Q1	Q8 1)	–	Q1	Q2
Diagrams 34, 37	Q1	Q8 1)	Q3	Q1	Q2
Diagrams 35, 38, 39	Q8 3)	Y1	UV	Q1	Y2
Diagram 41	Q1 4)	Q3.2	Q8 5)	Q3.1	Q2
Diagram 42	Q8 3)	Q3	UV	Q1	Q2
Diagram 43	Q1 4)	Q3.2	UV	Q3.1 2)	Q2
Diagram 44	Q1	Q8 1)	UV	Q1	Q2
Diagram 48	–	Q8 1)	–	–	Q2
Diagram 52	Q1	Q8 1)	–	Q1	Q2
Diagrams 50, 53	Q1	Q8 1)	Q3	Q1	Q2
Diagrams 51, 54, 55	Q1	Y1	UV	Q1	Q2
Diagram 57	Q1 4)	Q3.2	Q8 5)	Q3.1	Q2
Diagram 58	Q8 3)	Q3	UV	Q1	Q2
Diagram 59	Q1 4)	Q3.2	UV	Q3.1 2)	Q2
Diagram 60	Q1	Q8 1)	UV	Q1	Q2
Diagram 64	–	Q8 1)	–	–	Q2
Diagram 68	Q1	Q8 1)	–	Q1	Q2
Diagrams 66, 69	Q1	Q8 1)	Q3	Q1	Q2
Diagrams 67, 70, 71	Q1	Y1	UV	Q1	Q2
Diagram 73	Q1 4)	Q3.2	Q8 5)	Q3.1	Q2
Diagram 74	Q8 3)	Q3	UV	Q1	Q2
Diagram 75	Q1 4)	Q3.2	UV	Q3.1 2)	Q2
Diagram 76	Q1	Q8 1)	UV	Q1	Q2
Diagram 80	Q1	Q8 1)	–	–	–
Diagrams 81, 82, 84	Q1	Q8 1)	UV	–	–
Diagram 83	Q8 3)	Q3	UV	Q1	–
Diagram 85	Q1	Q8 1)	Q3	–	–

Legend

Q1	Heating circuit pump
Q2	Flow pump
Q3	DHW pump
Q8	System pump
UV	Diverting valve
Y1	Shutoff valve first heating circuit
Y2	Shutoff valve second heating circuit

1) System pump Q8 is controlled only if activated via parameter «WAnfoQ8» (WAnfoQ8 ≠ 0)

2) Pump is only switched off via PWM control, AC 230 V connection externally

3) If the function of system pump Q8 is parameterized (WAnfoQ8 ≠ 0), pump Q8 will be controlled via output K1, in place of pump Q1. In that case, pump Q1 will only be deactivated via PWM control.

   AC 230 V power supply must be provided externally.

   However, if control of system pump Q8 takes place via a programmable output (LMU… or clip-in function module), pump Q1 will be controlled via output K1.

4) Q1 cannot be modulated

5) If the function of system pump Q8 is parameterized (WAnfoQ8 ≠ 0), pump Q8 will be controlled via output K3, in place of pump Q3.1. In that case, pump Q3.1 will only be deactivated via PNM control.

   AC 230 V power supply must be provided externally.

   However, if control of system pump Q8 takes place via a programmable output (LMU… or clip-in function module), pump Q3.1 will be controlled via output K3.

14.2.1 Pump shutdown when diverting valve changes over from space heating to DHW heating

With systems using a diverting valve / stepper motor, the pump shall be switched off when changing over from space heating to DHW heating.

In the case of systems 43, 59 and 75, this is pump Q3.1; with the other systems using a diverting valve, this is pump Q1.

The pump can be switched off with a certain delay in relation to the diverting valve's changeover action.

The duration of pump shutdown when changing from space heating to DHW heating can be parameterized («Z_PumpeAusUv»).

Another parameter («Z_PumpeVerzUv») determines by how much pump shutdown will be delayed in relation to the diverting valve's changeover action.

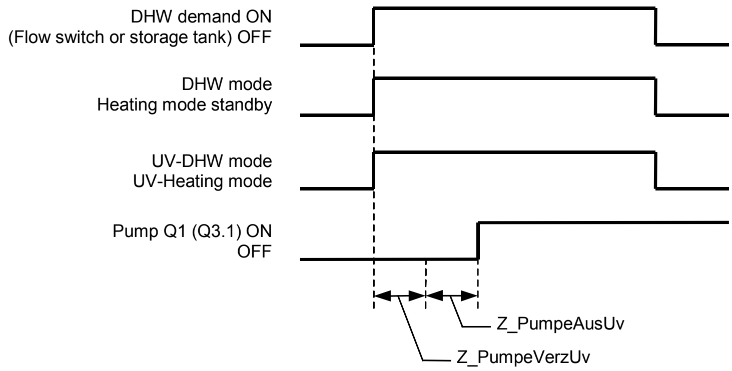
Parameter for pump shutdown

«Z_PumpeAusUv»
Resolution 0.2 seconds
0... 10 seconds; 0 = no pump shutdown (as before)

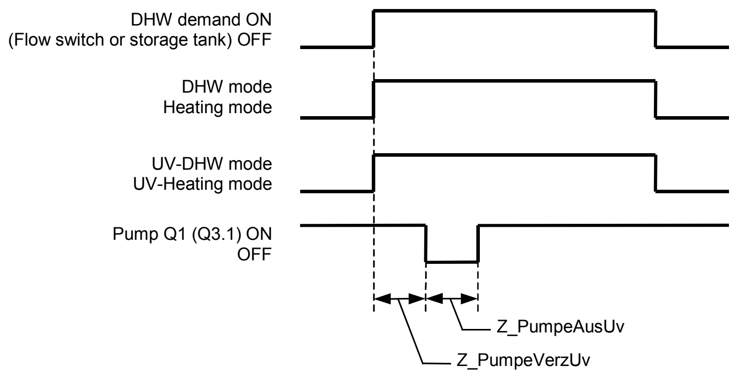
«Z_PumpeVerzUv»
Resolution 0.2 seconds
0... 10 seconds; 0 = no delay with pump shutdown

Function

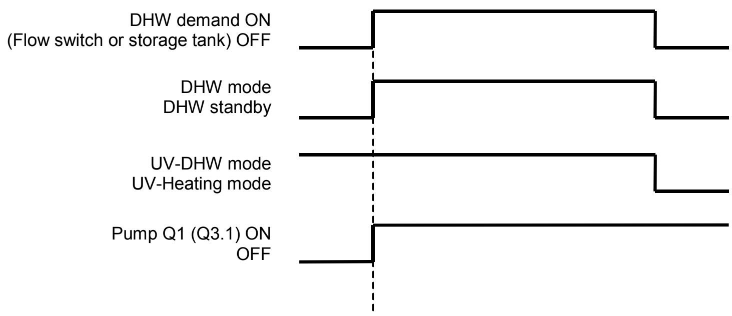
Changeover of diverting valve: Heating, from standby to DHW heating



Changeover of diverting valve: Heating, from space heating to DHW heating



Changeover of diverting valve: DHW, from standby to DHW heating



There is no further intervention in modulation or burner control.

14.2.2 System pump Q8

Function

The function of system pump Q8 can be activated via parameter, independent of the hydraulic diagram.

The system pump can principally be used for supporting the heating circuits but also for supporting the DHW circuit.

The type of heat demand to be supported by the system pump is also defined via parameterization of the system pump.

Note

If the system pump is operated in combination with a modulating pump, this may have an adverse effect on the modulating pump.

Parameterization

The system pump is to be parameterized via parameter «WanfoQ8». This parameter defines the type of heat demand to be supported by the system pump.

The following heat demand choices are available:

- Heating zone
- Heating circuit 1
- Heating circuit 2
- DHW (instantaneous DHW heater, or storage tank, or stratification storage tank)

The parameter consists of 4 flags each of which defines the type of heat demand. If a certain type of heat demand shall be supported by the system pump, the relevant flag is to be set. Otherwise, this type of heat demand is not supported by the system pump.

Parameter «WanfoQ8» is structured as follows:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
---	---	---	---	BW	HZ1	HZ2	HZZone

The 4 flags can be set in any combination. If none of the 4 flags is set, the function of system pump Q8 is deactivated.

System pump Q8 should be parameterized for the type of heat demand that can actually occur with the selected hydraulic diagram. Otherwise, the system pump is assigned to the relevant output and the output will also be kicked.

For every type of hydraulic diagram, there is a standard assignment of the control signals for the pumps / valves to the outputs.

With some of the hydraulic diagrams, assignment of the outputs depends on the parameterization of the system pump.

With hydraulic diagrams 10, 35, 38, 39, 42, 58, 74 and 83, the control signal for system pump Q8 takes the place of the AC 230 V output for pump Q1. In that case, the AC 230 V connection for pump Q1 must be made externally.
If control of the system is assigned to a programmable output, the AC 230 V output for pump Q1 will be maintained, however.

With hydraulic diagrams 9, 41, 57 and 73, the control signal for system pump Q8 takes the place of the AC 230 V output for pump Q3.1. In that case, the AC 230 V connection for pump Q3.1 must be made externally.

If control of the system pump is assigned to a programmable output, the AC 230 V output for pump Q3.1 will be maintained however.

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Siemens Building Technologies AG
Landis & Staefa Division
Berliner Ring 23
D-76437 Rastatt
Tel. 0049-7222-598-0
Fax 0049-7222-53182
www.landisstaefa.com