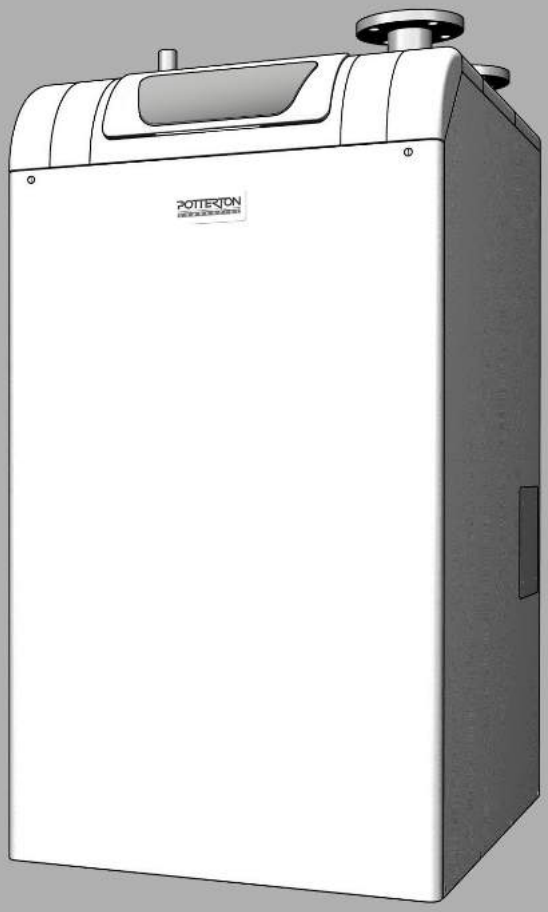
United Kingdom
en

POTTERTON
COMMERCIAL



Installation operation and maintenance manual

Condensing gas boiler

Eurocondense four

125 kW
170 kW
215 kW
260 kW
300 kW

Dear Customer,

Thank you very much for buying this appliance.

Please read through the manual carefully before using the product, and keep it in a safe place for later reference.

In order to ensure continued safe and efficient operation we recommend that the product is serviced regularly. Our service and customer service organisation can assist with this.

We hope you enjoy years of problem-free operation with the product.

Contents

1 Safety

1.1 General safety instructions

Danger
If you smell gas:
1. Do not use a naked flame, do not smoke, do not operate electrical contacts or switches (doorbell, light, motor, lift, etc.).
2. Shut off the gas supply.
3. Open the windows.
4. Trace possible leaks and seal them immediately.
5. If the gas leak is before the gas meter, contact the gas supplier.

Danger
Danger to life.
Observe the warnings affixed to the gas condensing boiler. Incorrect operation of the gas condensing boiler can lead to considerable damage.

Danger
Danger to life.
Commissioning, settings, maintenance and cleaning of gas condensing boilers may only be carried out by a qualified installer.

Danger of electric shock
Danger to life due to improper work.
All electrical work in connection with the installation may only be carried out by a trained electrician.

Danger
Risk of poisoning.
Never use water from the heating system as drinking water. It is contaminated by deposits.

Caution
Danger of freezing!
If there is a danger of freezing do not shut down the heating system; continue to operate it at least in economy mode with radiator valves open. You should only shut down the heating system and drain the boiler, domestic water storage tank and radiators if it is not possible to heat in frost mode.

Caution
Secure against unintentional switch-on.
When the heating system is empty, ensure that the boiler cannot be switched on unintentionally.

Danger
This appliance can be used by children aged 8 years and above and by persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge when they have been given supervision or instruction concerning the safe use of the device and understand the resulting risks. Children must not be allowed to play with the appliance. Cleaning and user maintenance must not be carried out by children without supervision.

Danger
The heating system must not continue to be operated if damaged.

Danger
Danger! Danger to life through modifications to the appliance.
Unauthorised conversions and modifications to the gas appliance are not permitted, as this can endanger persons and cause damage to the appliance. The appliance approval will become void if these instructions are not observed.

Caution
Replacement of damaged parts may only be performed by an installer.

Caution
Connections sealed with thread sealant must never be opened or modified by a non-specialist. The seals serve as proof that essential connections for safe, trouble-free operation have not been tampered with. The guarantee becomes void if the seals are damaged.

Warning
Risk of damage.
The gas condensing boiler may only be installed in rooms with clean combustion air. Foreign matter such as pollen must never filter through the inlet apertures to reach the inside of the appliance. The boiler must not be started up if there is heavy dust development e.g. during construction work. There could be damage to the boiler.

Caution
Keep the inflow area clear.
Never block or close off ventilation apertures. The inflow area for combustion air must be kept clear.

Danger
Danger to life due to explosion/fire.
Do not store any explosive or easily flammable materials close to the appliance.

Caution
Risk of burns!
For safety reasons, the discharge pipe from the safety valve must always be open so that water can escape during heating operation. The operating state of the safety valve must be checked from time to time.

1.2 Intended use

The gas condensing boilers of the EC four series are intended to be used according to DIN EN 12828 as heat generators in domestic water heating systems.

They conform to DIN EN 676, DIN 4702 Part 6 and DIN EN 677, installation type B_{23}, C_{33}, C_{53}, C_{63x} and C_{83}.

See
In case of the installation types C_{33}, C_{53}, C_{63x} and C_{83} the instructions supplied with the accessory kit must be observed

Country of destination GB: Category II_{2H3+}

1.3 Specific safety instructions

1.3.1 Liquid gas below ground level

The EC four complies with DIN EN 126 and DIN EN 298 and, therefore does not need an additional disconnector valve for operation with liquid gas below ground level.

1.4 Liabilities

1.4.1 Manufacturer's liability

Our products are manufactured in compliance with the requirements of the various Directives applicable. They are therefore delivered with the CE marking and any documents necessary. In the interests of the quality of our products, we strive constantly to improve them. We therefore reserve the right to modify the specifications given in this document.

Our liability as manufacturer may not be invoked in the following cases:
- Failure to abide by the instructions on installing the appliance.
- Failure to abide by the instructions on using the appliance.
- Faulty or insufficient maintenance of the appliance.

1.4.2 Installer's liability

The installer is responsible for the installation and initial commissioning of the appliance. The installer must abide by the following instructions:

- Read and follow the instructions given in the manuals provided with the appliance.
- Install the appliance in compliance with prevailing legislation and standards.
- Carry out initial commissioning and any checks necessary.
- Explain the installation to the user.
- If maintenance is necessary, warn the user of the obligation to check the appliance and keep it in good working order.
- Give all the instruction manuals to the user.

1.4.3 User's liability

To guarantee optimum running of the installation, you must abide by the following instructions:

- Read and follow the instructions given in the manuals provided with the appliance.
- Call on a qualified professional to carry out installation and initial commissioning.
- Get your installer to explain your installation to you.
- Have the required checks and services done by a qualified professional.
- Keep the instruction manuals in good condition close to the appliance.

2 About this manual

2.1 General

This manual is intended for installers of EC fourboilers.

Note
The user, installation and service manuals are also available on our internet site.

2.2 Additional documentation

Here is an overview of the further documents belonging to this heating system.

Tab.1 Overview table

Documentation	Contents	Intended for
Technical information	• Planning documents • Description of function • Technical data/circuit diagrams • Basic equipment and accessories • Application examples • Call-for-tender texts	Planner, installer, customer
Installation manual – Extended information	• Intended use • Technical data/circuit diagram • Regulations, standards, CE • Notes for installation location • Application example, Standard application • Commissioning, operation and programming • Maintenance	Installer
User manual	• Commissioning • Operation • User settings/programming • Fault table • Cleaning/maintenance • Energy-saving tips	Customer
Asset ledger	• Commissioning report • Check list for commissioning • Maintenance	Installer
Abridged instructions	• Operation in brief	Customer
Accessories	• Installation • Operation	Installer, customer

2.3 Symbols used

2.3.1 Symbols used in the manual

This manual uses various danger levels to draw attention to special instructions. We do this to improve user safety, to prevent problems and to guarantee correct operation of the appliance.

Danger
Risk of dangerous situations resulting in serious personal injury.

Danger of electric shock
Risk of electric shock.

Warning
Risk of dangerous situations resulting in minor personal injury.

Caution
Risk of material damage.

Note
Please note: important information.

See
Reference to other manuals or pages in this manual.

3 Technical specifications

3.1 Homologations

3.1.1 Regulations and standards

Beside the general technical rules, the relevant standards, regulations, ordinances and guidelines should be followed:
- DIN 4109; Noise protection in construction engineering
- DIN EN 12828; Heating systems in buildings
- EnEV - Energy saving regulation
- Federal Immission Control Ordinance 3. BImSchV
- DVGW-TRGI 2008 (DVGW worksheet G 600); Technical rules for gas installation
- TRF; Technical rules LPG
- DVGW code of practice G 613; Gas appliances - Installation, maintenance and operating instructions
- DIN 18380; Heating plants and central hot water plants (VOB)
- DIN EN 12831; Heating plants in buildings
- DIN 4753-6: Domestic hot water calorifiers Domestic hot water heating system and storage tanks for heated water
- DIN 1988; Technical Rules for drinking water installations (TRWI)
- VDE 0700-102, DIN EN 60335-2-102: Safety of electrical appliances for household use and similar purposes: Special requirements for gas-, oil- und solid fuel appliances with electrical connections
- Fuel Ordinance, State Ordinances
- Regulations of the local Electricity Board
- Obligation to register (possibly. Group Exemption Regulation)
- ATV-Code-of-practice M251 of the waste water technology association
- Regulations of the public authorities for the run-off of condensate.

3.1.2 Manufacturer's Declaration

Meeting the protection requirements according to guideline 2004/108/EC for electromagnetic compatibility (EMC) is only guaranteed when the boiler is operated according to purpose.

The ambient conditions according EN 55014 must be met.

Operation is only allowed with the casing fitted correctly.

Correct electric earthing must be ensured by regular checks (e.g. annual inspection) of the boiler.

When appliance parts need replacing, only original parts as specified by the manufacturer may be used.

The gas condensing-boilers fulfil the basic requirements of the Efficiency Guideline 92/42/EC as condensing boiler.

When natural gas is used, the gas condensing boilers emit less than 60 $^{mg}/_{kWh}$ NO_X corresponding to the requirements as per §6 of the Ordinance regarding small firing places dated 26.01.2010 (1st BImSchV).

3.2 Technical data

3.2.1 Technical data – Boiler space heaters in accordance with ErP guideline

Tab.2 Technical data for boiler space heaters in accordance with ErP guideline

Product name			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
Condensing boiler			Yes	Yes	Yes	Yes	Yes

Product name			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
Low-temperature boiler(1)			No	No	No	No	No
B1 boiler			No	No	No	No	No
Cogeneration space heater			No	No	No	No	No
Combination heater			No	No	No	No	No
Rated heat output	*Prated*	kW	122	166	210	255	294
Useful heat output at rated heat output and high temperature mode(2)	P_4	kW	121.6	165.8	210.1	254.5	294.0
Useful heat output at 30% of rated heat output and low temperature mode(1)	P_1	kW	40.5	55.2	69.7	84.4	97.3
Seasonal space heating energy efficiency	η_s	%	–	–	–	–	–
Useful efficiency at rated heat output and high temperature mode(2)	η_4	%	87.7	87.8	88.0	88.2	88.3
Useful heat output at 30% of rated heat output and low temperature mode(1)	η_1	%	97.4	97.5	97.4	97.5	97.4
Auxiliary electricity consumption							
Full load	*elmax*	kW	0.170	0.200	0.330	0.350	0.410
Part load	*elmin*	kW	0.031	0.034	0.040	0.046	0.051
Standby mode	P_{SB}	kW	0.004	0.004	0.004	0.004	0.004
Other items							
Standby heat loss	P_{stby}	kW	0.180	0.224	0.258	0.281	0.288
Ignition burner power consumption	P_{ign}	kW	0.0	0.0	0.0	0.0	0.0
Annual energy consumption	Q_{HE}	GJ	–	–	–	–	–
Sound power level, indoors	L_{WA}	dB	66	67	67	67	68
Emissions of nitrogen oxides	NO_X	mg/kWh	38	38	39	39	39

(1) Low temperature mode means for condensing boilers 30 °C, for low temperature boilers 37 °C and for other heaters 50 °C return temperature (at heater inlet).
(2) High temperature mode means 60°C return temperature at heater inlet and 80°C feed temperature at heater outlet.

See
The back cover for contact details.

3.2.2 Technical data

Model			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
Product ID no.			CE-0085 CL 0072				
VDE Reg. No.			40017550				
Gas category			II_{2H3+}				
Installation types			B_{23}, C_{33}, C_{53}, C_{63X}, C_{83}				
Software version			V 4.2				
Nominal heat input range							
Natural gas	Heating	kW	20.0-125.0	28.0-170.0	35.0-215.0	42.0-260.0	48.0-300.0
LPG	Heating	kW	35.0-125.0	35.0-170.0	48.0-215.0	58.0-260.0	58.0-300.0
Nominal heat output range							

Model			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
Natural gas	80/60°C	kW	19.2-121.6	26.8-165.8	33.5-210.1	40.2-254.5	45.9-294.3
	50/30°C	kW	21.3-133.1	29.8-181.3	37.4-229.6	44.9-278.1	52.3-322.1
LPG	80/60°C	kW	33.5-121.6	33.5-165.8	46.0-210.1	55.5-254.5	55.9-294.3
	50/30°C	kW	37.2-133.1	37.3-181.3	51.2-229.6	62.0-278.1	63.2-322.1
Standard utilisation (Hi/Hs)	75/60°C	%	106.5/95.5	106.6/95.6	106.6/95.6	106.7/95.7	106.7/95.7
	40/30°C	%	109.5/98.5	109.6/98.6	109.6/98.6	109.7/98.7	109.7/98.7
Data for design of the chimney to DIN EN 13384 (room air-dependant operation)							
Flue gas temperature	80/60°C	°C	57-61	57-61	57-60	57-61	56-60
	50/30°C	°C	30-37	30-37	30-37	30-38	30-37
Flue gas mass flow rate							
with natural gas	80/60°C	g/s	9.1-56.8	12.7-77.2	15.9-97.6	19.1-118.1	21.8-136.2
	50/30°C	g/s	8.2-52.3	11.5-71.1	14.4-89.4	17.4-108.3	19.7-124.5
For liquid gas	80/60°C	g/s	15.1-53.9	15.1-73.2	20.7-92.6	25.0-112.0	25.0-129.2
	50/30°C	g/s	14.2-49.4	13.9-67.1	19.2-84.4	23.3-102.2	22.9-117.6
NOx standard emission factor	75/60°C	mg/kWh	35				
CO standard emission factor	50/30°C	mg/kWh	15				
Supply pressure for natural gas			min. 18 mbar - max. 25 mbar				
CO_2 content natural gas		%	9.3 (9.1-9.5 allowed)				
Supply pressure LPG			min.42.5 mbar - max. 57.5 mbar				
CO_2 content LPG		%	11.0 (10.8-11.2 allowed)				
pH value condensed water before neutralisation			4-5				
Volume condensed water	40/30°C	l/h	3.0-16.6	4.3-22.6	5.4-29.9	6.0-36.5	7.6-42.4
Max. delivery pressure at flue gas outlet		mbar	1.0				
Flue gas connection		mm	160		200		
Connection values							
IP rating			IP 20				
Electrical connection			230 V~ / 50Hz, max. 6.3 A				
Max. electr. power consumption		W	170	200	330	350	410
EnEV-values		%	0.24	0.22	0.20	0.18	0.16
Standby losses q_B, 70		%	0.24	0.22	0.20	0.18	0.16
Efficiency η_{100}		%	97.3	97.5	97.7	97.9	98.1
Efficiency η_{100}		%	108.8	108.8	108.9	109.0	109.0
Demand on auxiliary energy P_{HE}, 100			170	200	330	350	410
Demand on auxiliary energy P_{HE}, 100			31	34	40	46	51
Max. water pressure			6.0 bar / 0.6 MPa				
Max. operating temperature (protection)		°C	110				
Max. flow temp		°C	90				
Volume flow							
ΔT = 20 K		kg/h	5375	7310	9245	11180	12900
ΔT = 10 K		kg/h	10750	14620	18490	22360	25800
Hydraulic resistance							
ΔT = 20 K		mbar	28	34	37	39	40

Model			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
ΔT = 10 K		mbar	109	132	146	154	156
Sound pressure level 1 m away							
room air-dependent		dB(A)	40-51	40-51	40-52	40-53	40-54
room air-independent		dB(A)	39-50	39-50	39-51	40-52	40-53
Boiler weight		kg	205	240	285	314	344
Boiler water content		l	29	34	38	45	53
Height above everything		mm	1455				
Width		mm	692				
Depth		mm	1008		1171	1264	1357

3.2.3 Tables of sensor values

Tab.3 Resistance values for outside temperature sensor ATF

Temperature [°C]	Resistance [Ω]
-20	8194
-15	6256
-10	4825
-5	3758
0	2954
5	2342
10	1872
15	1508
20	1224
25	1000
30	823

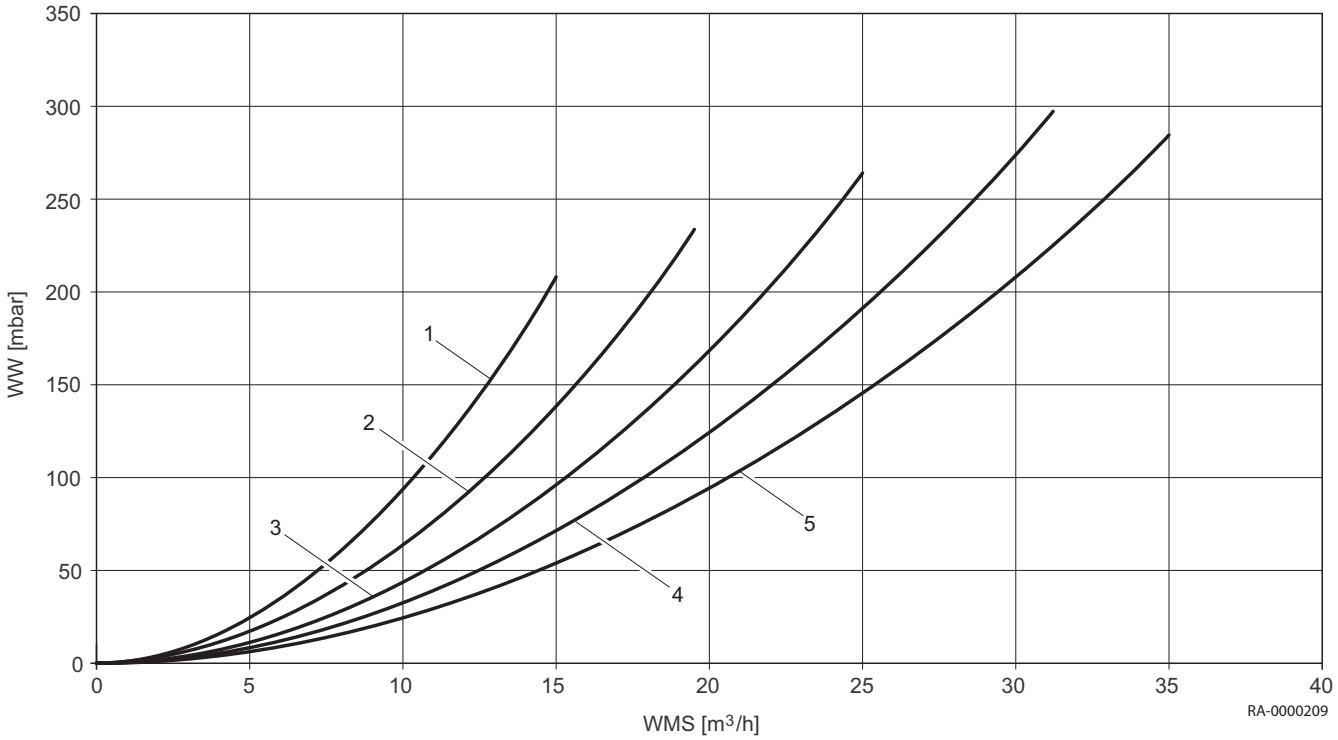
Tab.4 Resistance values for all other sensors

Temperature [°C]	Resistance [Ω]
0	32555
5	25339
10	19873
15	15699
20	12488
25	10000
30	8059
35	6535
40	5330
45	4372
50	3605
55	2989
60	2490
65	2084
70	1753
75	1481

Temperature [°C]	Resistance [Ω]
80	1256
85	1070
90	915
95	786
100	677

3.2.4 Pressure drop secondary circuit

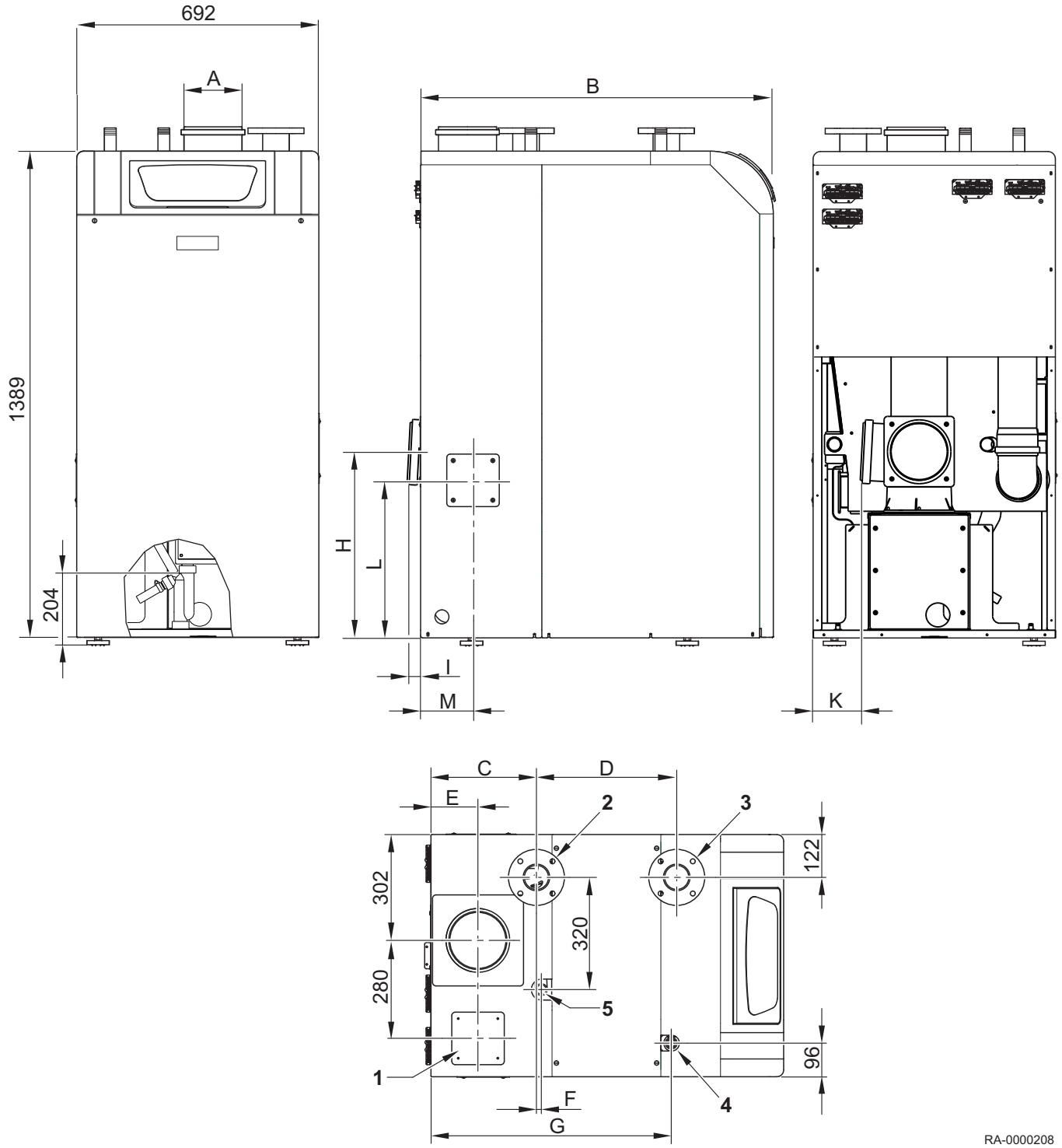
Fig.1 Pressure drop secondary circuit



WW Pressure drop secondary circuit
WM Water mass flow
S
1 EC four 125 kW
2 EC four 170 kW
3 EC four 215 kW
4 EC four 260 kW
5 EC four 300 kW

3.2.5 Dimensions and connections

Fig.2 Dimensions and connections



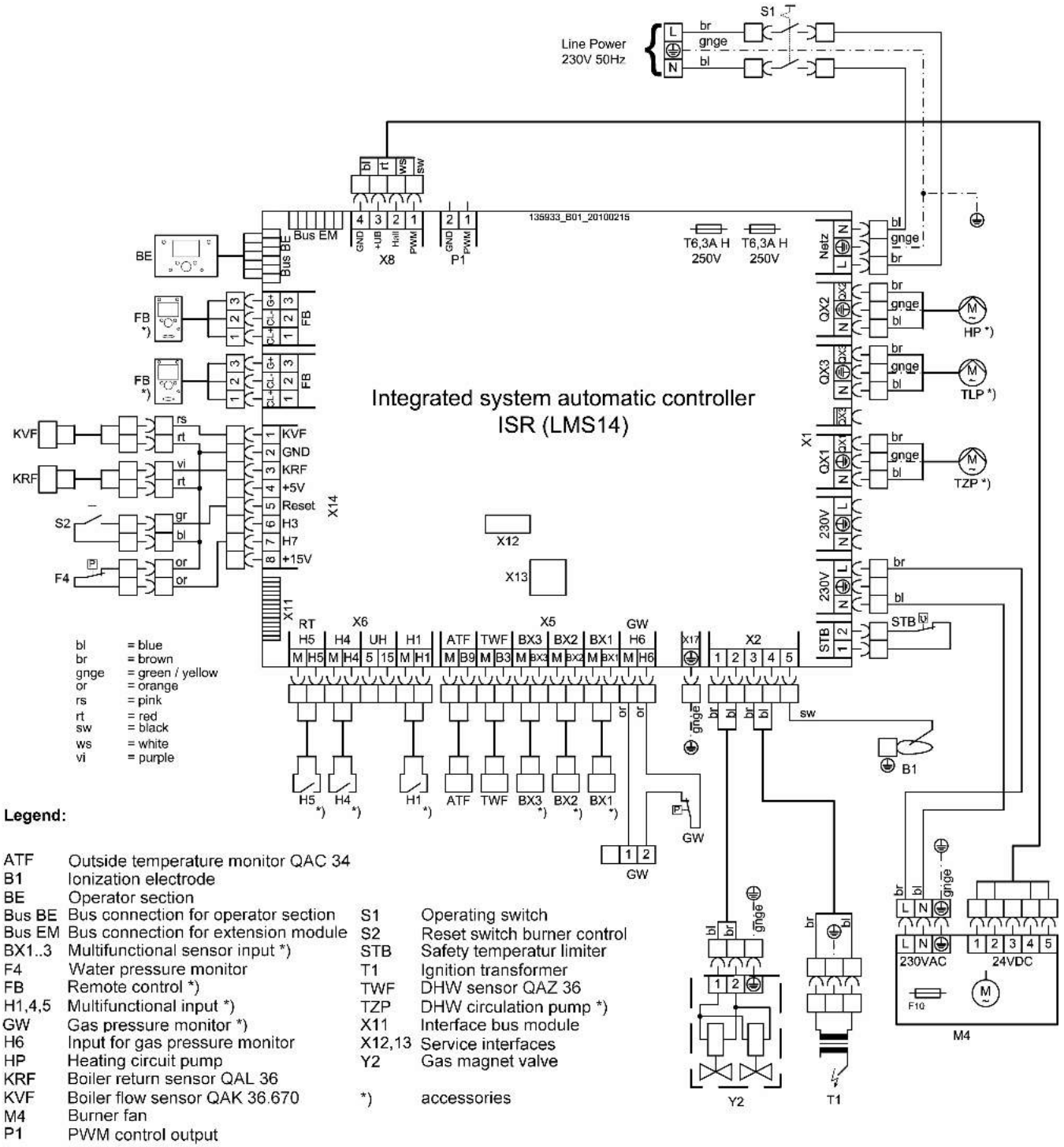
Tab.5 Dimensions

Model			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
1	Air supply duct	mm	Ø 110	Ø 110	Ø 125	Ø 125	Ø 125
2	Heating flow (HV)		Flange DN 65				

Model			EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
3	Heating return (HR)		Flange DN 65				
4	Gas connection		R 1"	R 1½"	R 1½"	R 1½"	R 1½"
5	Safety group connection		R 1"	R 1"	R 1¼"	R 1¼"	R 1¼"
Dimension A		mm	160	160	200	200	200
Dimension B		mm	1008	1008	1171	1264	1357
Dimension C		mm	301	301	351	351	351
Dimension D		mm	401	401	514	607	700
Dimension E		mm	134	134	163	163	163
Dimension F		mm	14	14	14	14	14
Dimension G		mm	687	687	851	944	1037
Dimension H		mm	530	530	530	630	630
Dimension I		mm	30	30	90	90	90
Dimension K		mm	139	139	50	50	50
Dimension L		mm	450	450	202	202	202
Dimension M		mm	150	150	167	167	167

3.2.6 Wiring diagram

Fig.3 Wiring diagram



Legend:

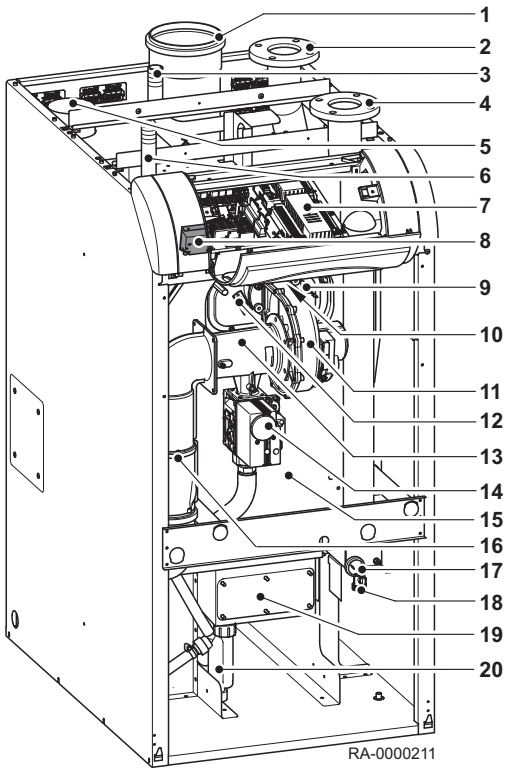
ATF	Outside temperature monitor QAC 34		
B1	Ionization electrode		
BE	Operator section		
Bus BE	Bus connection for operator section	S1	Operating switch
Bus EM	Bus connection for extension module	S2	Reset switch burner control
BX1..3	Multifunctional sensor input *)	STB	Safety temperatur limiter
F4	Water pressure monitor	T1	Ignition transformer
FB	Remote control *)	TWF	DHW sensor QAZ 36
H1,4,5	Multifunctional input *)	TZP	DHW circulation pump *)
GW	Gas pressure monitor *)	X11	Interface bus module
H6	Input for gas pressure monitor	X12,13	Service interfaces
HP	Heating circuit pump	Y2	Gas magnet valve
KRF	Boiler return sensor QAL 36		
KVF	Boiler flow sensor QAK 36.670	*)	accessories
M4	Burner fan		
P1	PWM control output		

4 Description of the product

4.1 Main components

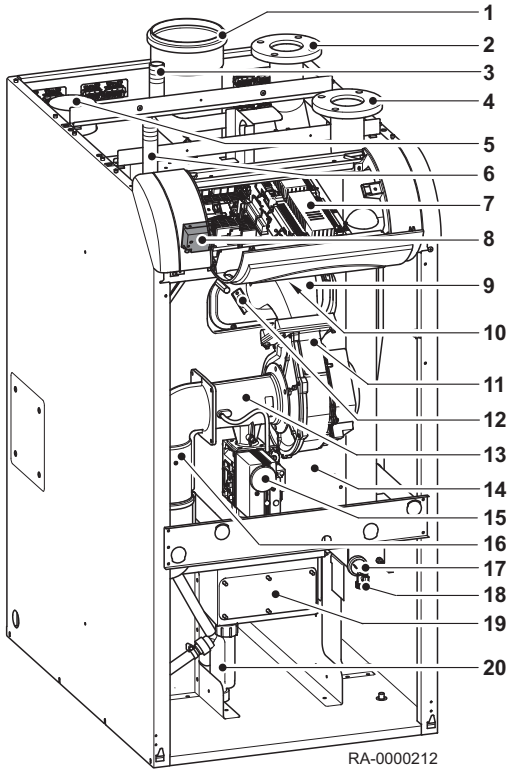
4.1.1 Boiler

Fig.4 Boiler view EC four 125 kW - 170 kW



1	Flue gas connection
2	Boiler flow (KV)
3	Safety group connection
4	Boiler return (KR)
5	Air supply duct
6	Gas connection
7	Boiler control LMS
8	Ignition transformer (below the control unit)
9	Ionization electrode
10	Flame inspection window (below the control unit)
11	Fan
12	Ignition electrode block
13	Venturi
14	Gas valve
15	Heat exchanger
16	Flue gas silencer
17	Pressure sensor
18	Filling and drain valve
19	Cleaning cover
20	Siphon

Fig.5 Boiler view EC four 215 kW - 300 kW

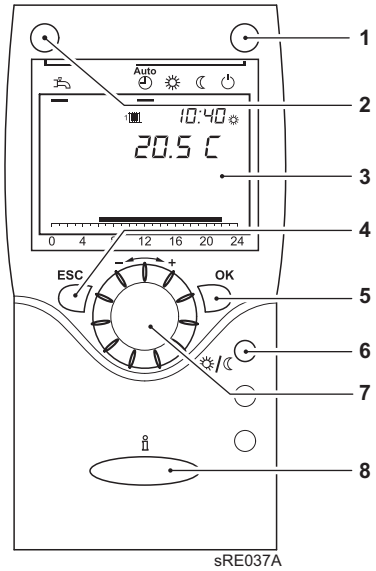


1	Flue gas connection
2	Boiler flow (KV)
3	Safety group connection
4	Boiler return (KR)
5	Air supply duct
6	Gas connection
7	Boiler control LMS
8	Ignition transformer (below the control unit)
9	Ionization electrode
10	Flame inspection window (below the control unit)
11	Fan
12	Ignition electrode block
13	Venturi
14	Heat exchanger
15	Gas valve
16	Flue gas silencer
17	Pressure sensor
18	Filling and drain valve
19	Cleaning cover
20	Siphon

4.1.2 Room device RGT

Remote setting of all adjustable control functions of the basic appliance is possible using the room device RGT (Figure 1, page 21).

Fig.6 Operating interface of the room device RGT



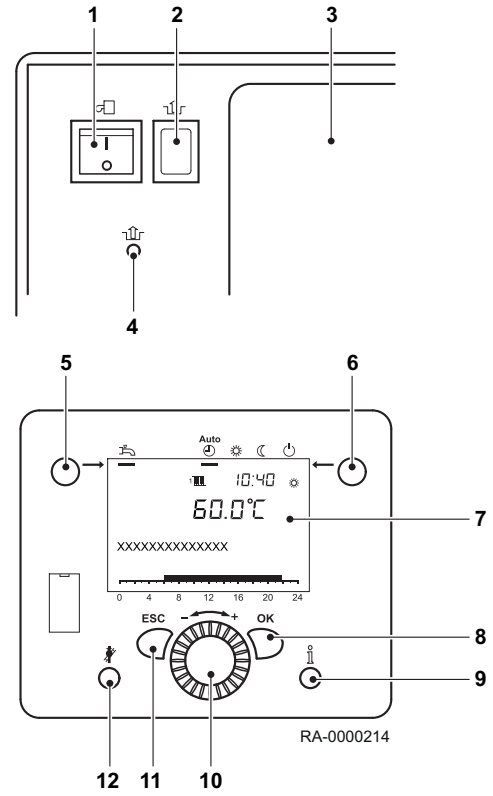
1 Operating mode key, heating mode
2 Operating mode key domestic water mode
3 Screen
4 ESC key (cancel)
5 OK key (acknowledgement)
6 Presence key
7 Control knob
8 Information key

Presence key
Manual switching over between heating operation at comfort nominal value and heating operation at reduced nominal value is possible with the presence key, irrespective of the set time programmes. The value switched over to stays active until the next modification by the time programme.

4.2 Control panel description

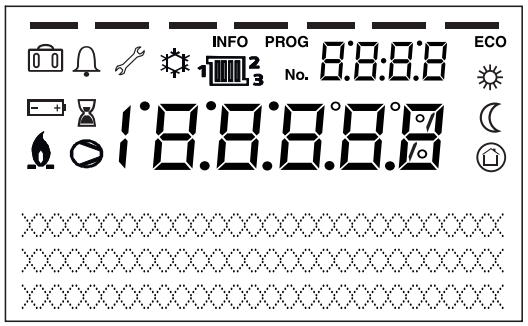
4.2.1 Operating elements

Fig.7 Operating elements



1 ON/OFF switch
2 Reset button burner control
3 Blanking plate
4 Reset safety temperature limiter (STB)
5 Operating mode key domestic water mode
6 Operating mode key, heating mode
7 Screen
8 OK key (acknowledgement)
9 Information key
10 Control knob
11 ESC key (cancel)
12 Chimney-sweep button

Fig.8 Symbols on the display



4.2.2 Displays

- Heating to comfort setpoint
- Heating to reduced setpoint
- Heating to frost protection setpoint
- Current process
- Holiday function active
- Reference to heating circuits
- Burner in operation (boiler only)
- Cooling active (heat pump only)
- Compressor in operation (heat pump only)
- Maintenance message
- Fault message
- INFO Information level active
- PROG Setting level active
- ECO Heating system switched off (automatic summer/winter changeover or automatic heating limit active)

4.3 Accessories and options

4.3.1 Accessories

A list of the accessories (selection) available for the EC four can be found below:

4.3.2 Installation of extension modules

More application options are available by installing up to 3 extension modules of the series EWM B (accessories) (mixer heating circuit, solar connection).

See
More information about the extension module EWM can be found in the *Installation instructions extension module EWM.*

5 Before installation

5.1 Regulations governing installation

Caution
Installation of the appliance must be done by a qualified engineer in accordance with prevailing local and national regulations.

5.2 Installation requirements

5.2.1 Corrosion protection

Caution
Risk of damage to the device!
The combustion air must be free from corrosive elements - especially vapours containing fluorine and chlorine which are found, for example, in solvents and cleaning agents, propellant gases etc. When connecting heat generators to under-floor heating systems employing plastic pipes which are not impervious to oxygen in accordance to DIN 4726, heat exchangers must be used for separation purposes. In the case of closed heating systems, the filling water does not usually need to be treating for corrosion. This depends on the water hardness and system volume for the respective boiler types. VDI directive 2035-2 specifies that a pH value of 9 must never be exceeded. The pH value can change during operation of the heating system due to CO_2 formation in connection with lime sediment, and must be checked once a year during maintenance. For heating systems and piping with is not impervious to oxygen, system separation between the boiler and other system components at risk of corrosion must be used.

5.2.2 Supply air openings

Caution
Keep the inflow area clear.
Never block or close off ventilation apertures. The inflow area for combustion air must be kept clear.

Warning
Risk of damage.
The gas condensing boiler may only be installed in rooms with clean combustion air. Foreign matter such as pollen must never filter through the inlet apertures to reach the inside of the appliance. The boiler must not be started up if there is heavy dust development e.g. during construction work. There could be damage to the boiler.

Where the EC four is operated based on room ventilation, there must be a sufficiently large opening for combustion air available in the installation room. The operator must be informed that this opening must never be closed or blocked and that the connecting piece for combustion air on the upper side of the EC four must be kept free at all times.

5.2.3 Heating water requirements

Caution
Observe the heating water quality requirements!
Requirements regarding heating water quality have increased in recent times as system conditions have changed:
- lower heat demand
- use of gas condensing boilers in cascade in larger projects
- increased use of buffer storage tanks in combination with solar thermal systems and solid fuel boilers.

The focus is always on designing systems that guarantee trouble-free service over a long period.

Generally speaking, the quality of drinking water is adequate, but it must be checked whether the drinking water actually filled into the system is suitable when its hardness is taken into consideration (see *water hardness diagram*). Where that is not the case, different steps can be taken:

1. Using an additive in the fill water to prevent the hardness (lime) separating inside the boiler and to ensure that the pH value of the system water remains stable (hardness stabiliser).
2. Use of a softening system to treat the fill water.
3. Use of a desalination system to treat the fill water.
   Desalination of fill and top-up water to obtain fully desalinated water should not be mistaken for softening down to 0 °dH. Corrosive salts remain in the water with softening.

Caution
Use only approved additives and processes.
When using additives, use only agents approved by Potterton.
Softening and desalination must also only be carried out with systems approved by Potterton and with observation of the specified limits.
Failure to observe this rule voids the warranty.

Caution
Check the pH value.
Certain conditions may result in automatic alkalisation (raising the pH value) of the system water. The pH value should therefore be checked annually.
The pH value must be between 8.2 and 9.0.

VDI Directive 2035 parts 1 and 2
- Generally, the requirements concerning heating water to VDI Directive 2035 parts 1 and 2 apply to all boiler sizes.
- A restricting factor to VDI 2035 is that the partial softening of the water below 6 °dH is not permissible. Apply full desalination only in conjunction with pH stabilisation.
- The under-floor heating circuit has to be treated separately. In this context, contact a manufacturer of water additives or the pipework supplier (see above).

Caution
Adherence to the conditions issued by Potterton is vital to safeguard the warranty.

Note
The water hardness of the heating water has to be checked within the scope of the recommended maintenance of the boiler and the corresponding amount of additive has to be added if necessary.

5.2.4 Further information on the heating water

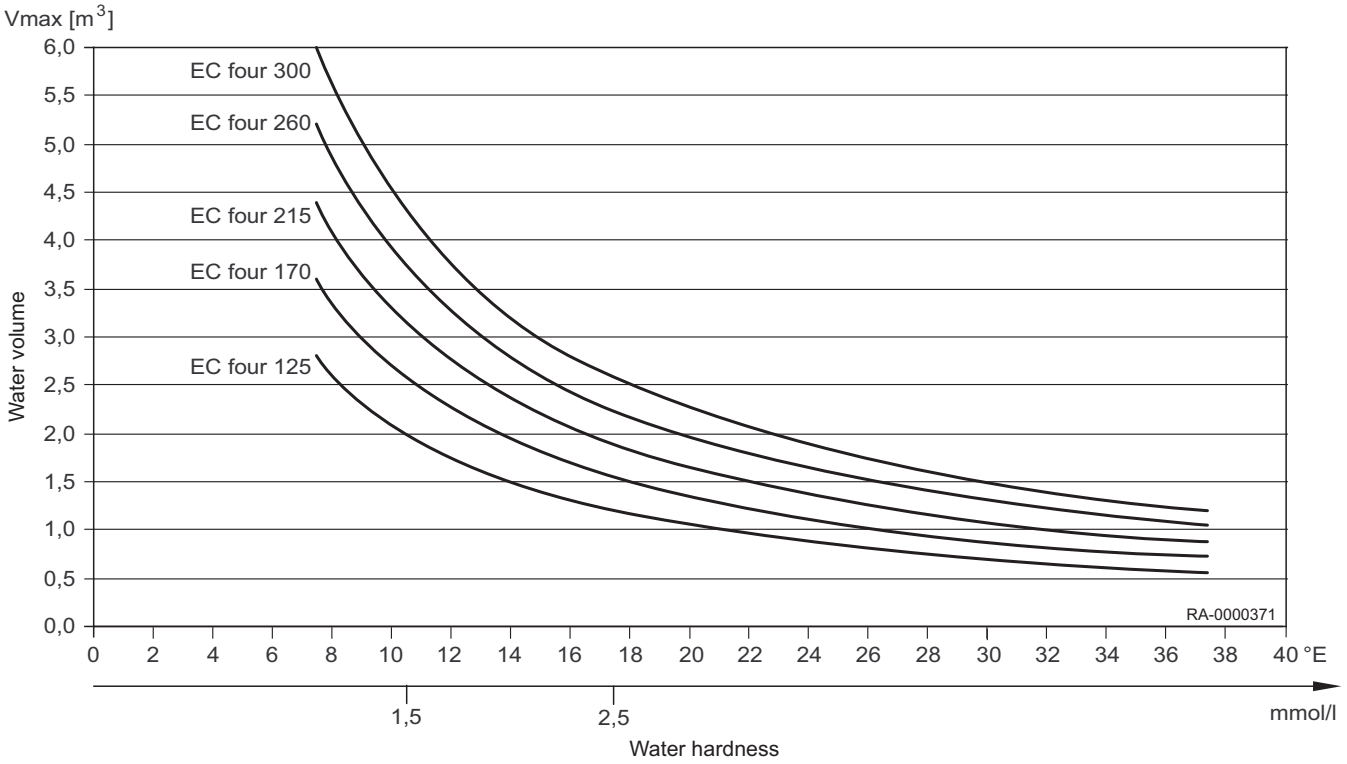
- The water must not contain any foreign matter, such as sweat beads, rust particles, scale or sludge. During commissioning, flush the system until only clean water runs out. When flushing the system,ensure that the water does not flow through the heat exchanger of the boiler, that

the thermostatic radiator valves are removed and the valve inserts are set to the maximum flow rate.

- If additives are used it is important to follow the instructions of the manufacturer.
  If, in a special case, it is necessary to use additives in a mixture (e.g. hardness stabiliser, frost protection agent, sealing agent etc.) care must be taken that the agents are compatible with each other and the pH-value is not altered. Preferably, agents from the same manufacturer should be used.
- For buffer storage tanks in combination with solar systems or solid fuel boilers the buffer contents must be taken into consideration when determining the fill water volume.

5.2.5 Diagram of water hardness

Fig.9 Diagram of water hardness



Description: The boiler type, the water hardness and the water volume of the heating system must be known. If the volume is above the curve, a partial softening of the tap water or addition of hardness stabiliser is required.

Example:

- EC four 125, water hardness 14 °E, system volume 1.5 m^3 → no additive required

The usual refill volume of the heating system has been taken into account.

5.2.6 Treating and preparing the heating water

■ Determining the system volume

The total water volume in the heating system is calculated using the system volume (= fill water volume) plus the top-up water volume. In the Potterton boiler-specific diagrams only the system volume is given to make them easier to read. Over the entire service life of the boiler, a maximum top-up volume of twice the system volume is assumed.

Released media

- Additives
  The following products are currently released by Potterton:The following products are currently released by Potterton:
  - “Full heating protection” from Fernox (www.fernox.com)
  - “Sentinel X100” from Guanako (www.sentinel-solutions.net)
  - “Jenaqua 100 and 110” from Guanako (www.jenaqua.de)
  - “Full protection Genosafe A” from Grünbeck
  - “Care Sentinel X100” from Conel (www.conel-gmbh.de)
- Complete desalination
  As a general rule, fully desalinated water can always be used, although a pH value stabiliser is also required. The following products for producing fully desalinated water have been tested and approved:
  - “Complete desalination (VE) GENODEST Vario GDE 2000" from Grünbeck (www.gruenbeck.de)
  - “Complete desalination cartridge SureFill” from Sentinel (www.sentinel-solutions.net)
  - more devices on request
- Partial softening
  The following products are currently released by Potterton:
  - Sodium ion exchanger “Fillsoft” from Reflex (www.reflex.de)
  - “Heifisoft” from Judo (www.judo-online.de)
  - “Heating water softening 3200” from Syr (www.syr.de)
  - “AQA therm” and “HBA 100” from BWT Wassertechnik (www.bwt.de)
  - “SoluTECH” from Cillit (www.gc-gruppe.de)

  It must be ensured with an automatic blending device that the min. hardness is not less than 6°dH .

See
The specifications of the manufacturer must be followed.

Further makes are currently undergoing testing. Please ask Potterton for more information.

Caution
If non-approved products are used, the guarantee becomes void.

Antifreeze agent

Note
The use of antifreeze agents with Potterton gas condensing boilers with aluminium heat exchangers.

The heat transfer medium (Lasacor® LS 1) offered for solar thermal systems is also used in heating systems (e.g. holiday houses) as an antifreeze agent, In the mixture supplied in the canisters (42 % Lasacor® LS 1, 58 % water), the freezing point ("crystal formation point") is -28°C. Due to the lower thermal capacity and higher viscosity compared with water, boiling noises can occur under unfavourable conditions.

For most heating systems, frost protection down to -28 °C is not required; -15 °C is usually sufficient. The heat transfer medium must be diluted 2:1 with water to set this operating point. This mixing ratio has been tested by Potterton in relation to its practical suitability for use with gas condensing boilers.

Note
Up to a mixing ratio of 2.5:1 the heat transfer medium Lasacor® LS 1 is approved as an antifreeze agent down to -15 °C for use with Potterton gas condensing boilers.

Caution
Keep the installation room frost-free.
If an antifreeze agent is used, pipework, radiators and gas condensing boilers are protected against frost damage. For the gas condensing boiler to be ready for operation at any time, suitable measures must also be taken to keep the installation room frost-free. If applicable, please also note special measures for any installed domestic hot water calorifiers.

The table shows the relevant amounts of heat transfer medium and water that need to be mixed together for varying volumes of water. If other frost protection temperatures are required in exceptional cases, individual calculations can be made on the basis of this table.

Water content of the system [l]	Amount Lasacor® LS 1 [l]	Water in the mixture(1) [l]	Frost protection down to [°C]
50	36	14	-15
100	71	29	-15
150	107	43	-15
200	143	57	-15
250	178	72	-15
300	214	86	-15
500	357	143	-15
1000	714	286	-15

(1) The water for the mixture must be neutral (potable water quality with no more than 100 mg/kg chlorine) or demineralised. Please also follow the manufacturer instructions.

5.2.7 Water hardness tips

1. With reference to the specific system volume (e.g. when using heating water buffer storage tanks), determine which requirements apply regarding total hardness of the fill and top-up water to VDI directive 2035 and the following table.
   If partial softening to 6°dH is insufficient according to the project-specific water hardness diagram, use either an additive or use only fully desalinated water (with pH stabiliser).
   If a boiler is replaced in an existing system, we recommend installing a dirt trap or filter in the system return, upstream of the boiler. Flush the system thoroughly.
2. Depending on the materials used, determine whether the addition of inhibitors, partial softening or full desalination is the best method.
3. Record the filling process (If an additive is used, note this on the boiler). To prevent gas pockets and bubbles, it is essential to fully vent the system at maximum operating temperature.
4. After 8 to 12 weeks, check and record the pH value. Offer and conclude a maintenance contract.
5. Once a year, check the system is operating correctly with regard to pressure maintenance, pH value and the volume of top-up water used.

Tab.6 Table to VDI 2035 Sheet 1

Total heating output in kW	Total hardness in °dH subject to the specific system volume		
	< 20 l/kW	≥ 20 l/kW and < 50l/kW	≥ 50 l/kW
< 50(1)	≤ 16.8	≤ 11.2	< 0.11
50 - 200	≤ 11.2	≤ 8.4	< 0.11
200 - 600	≤ 8.4	≤ 0.11	< 0.11

Total heating output in kW	Total hardness in °dH subject to the specific system volume		
	< 20 l/kW	≥ 20 l/kW and < 50l/kW	≥ 50 l/kW
> 600	≤ 0.11	< 0.11	< 0.11
(1) for system boilers (< 0.3 l/kW) and systems with electric heating elements			

5.3 Choice of the location

5.3.1 Notes for installation location

Caution
Danger of damage from water!
The following must be observed when installing the EC four:
In order to prevent damage due to water, particularly due to leakages in the DHW storage tank, suitable precautionary measures should be taken regarding installation.

Installation room
- The installation room must be dry, the room temperature must be between 0°C and 45°C.
- The installation location has to be selected particularly with respect to the routing of the flue gas pipes. When installing the boiler, the specified wall clearances have to be maintained.
- Along with the general rules of the technology, especially the regulations of the federal German states, such as fire and construction ordinances as well as heating room guidelines, must be observed. There should be sufficient space in front of the equipment to carry out inspection and maintenance work.

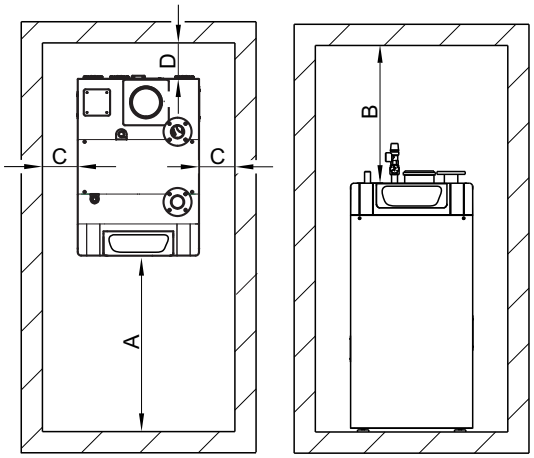
Caution
Risk of damage to the device!
Aggressive foreign substances in the combustion supply air can destroy or damage the heat generator. Therefore installation in rooms with high humidity (see also "Operation in wet rooms") or heavy dust accumulation is only allowed with room air independent operating modes.
If the EC four is operated in rooms in which solvents, cleaning agents containing chlorine, paints, glues or similar substances are worked with or in which such substances are stored, only room air independent operation is permissible. This applies especially for rooms in which ammonia and its compounds are heavily used, as well as nitrites and sulphides (animal breeding and recycling facilities, battery and galvanising rooms, etc.).
During the installation of the EC four under these conditions DIN 50929 (Corrosion probability of metallic materials with external corrosion loading) as well as information sheet i. 158; “German Copper Institute” is heeded.

Caution
Risk of damage to the device!
Furthermore it is to be observed that under aggressive atmospheres even installations outside the boiler can be corroded. This particularly includes aluminium, brass and copper installations. These must be replaced by plastic-coated pipes in the factory in accordance with DIN 30672. Fittings, pipe joints and shaped pieces must be appropriately made from shrink tube in the performance classes B and C.

For damages occurring due to the installation in an unsuitable location or based on improper combustion air supply, no warranty claims may be made.

5.3.2 Space requirement

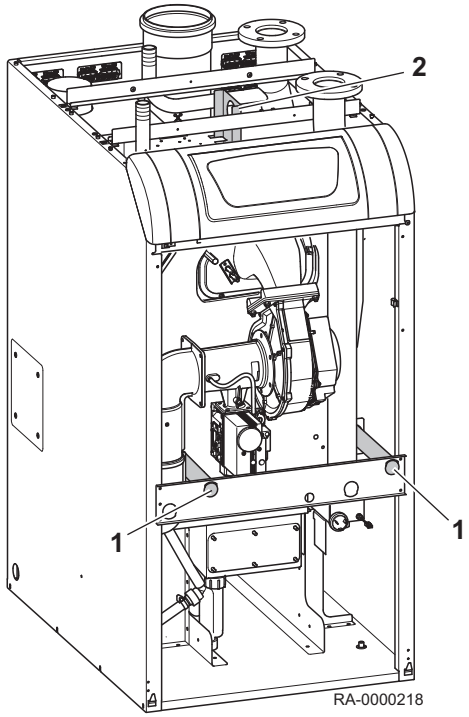
Fig.10 Recommended space requirement



	EC four 125 kW	EC four 170 kW	EC four 215 kW	EC four 260 kW	EC four 300 kW
Dimension A	60 cm	70 cm	80 cm	90 cm	100 cm
Dimension B	50 cm				
Dimension C	50 cm				
Dimension D	10 cm				

5.4 Transport

Fig.11 Transport equipment



1 Carrying fixtures
2 Eyebolt

For transporting the boiler to the installation location using a crane, the eyebolt located on the top of the boiler can be used. Remove the central casing cover of the EC four to do this.

For the transport of the boiler to installation location manually, push 2 sufficiently large steel pipes (Ø = 1", not included!) through the carrying fixture so that the boiler can be lifted and transported.

Danger
Risk of injury!
The boiler must be safely secured from any sliding on the steel pipes! Safety gloves must always be worn during manual transport. At least 4 people are required for transport with the aid of a carrying fixture.

5.5 Connecting diagrams

5.5.1 Application examples

Fig.12 EC four, one heating circuit and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

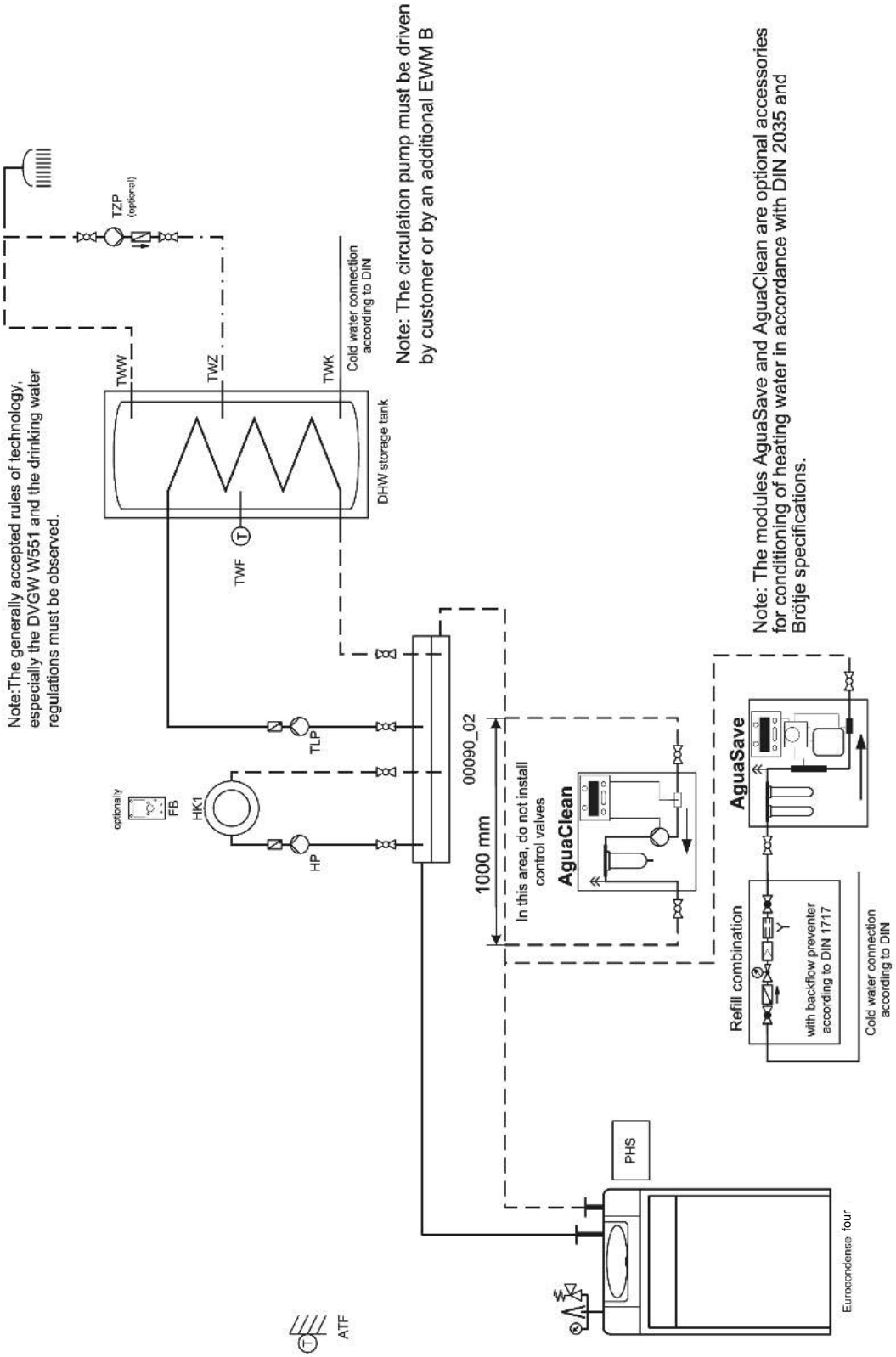


Fig.13 EC four, one heating circuit and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

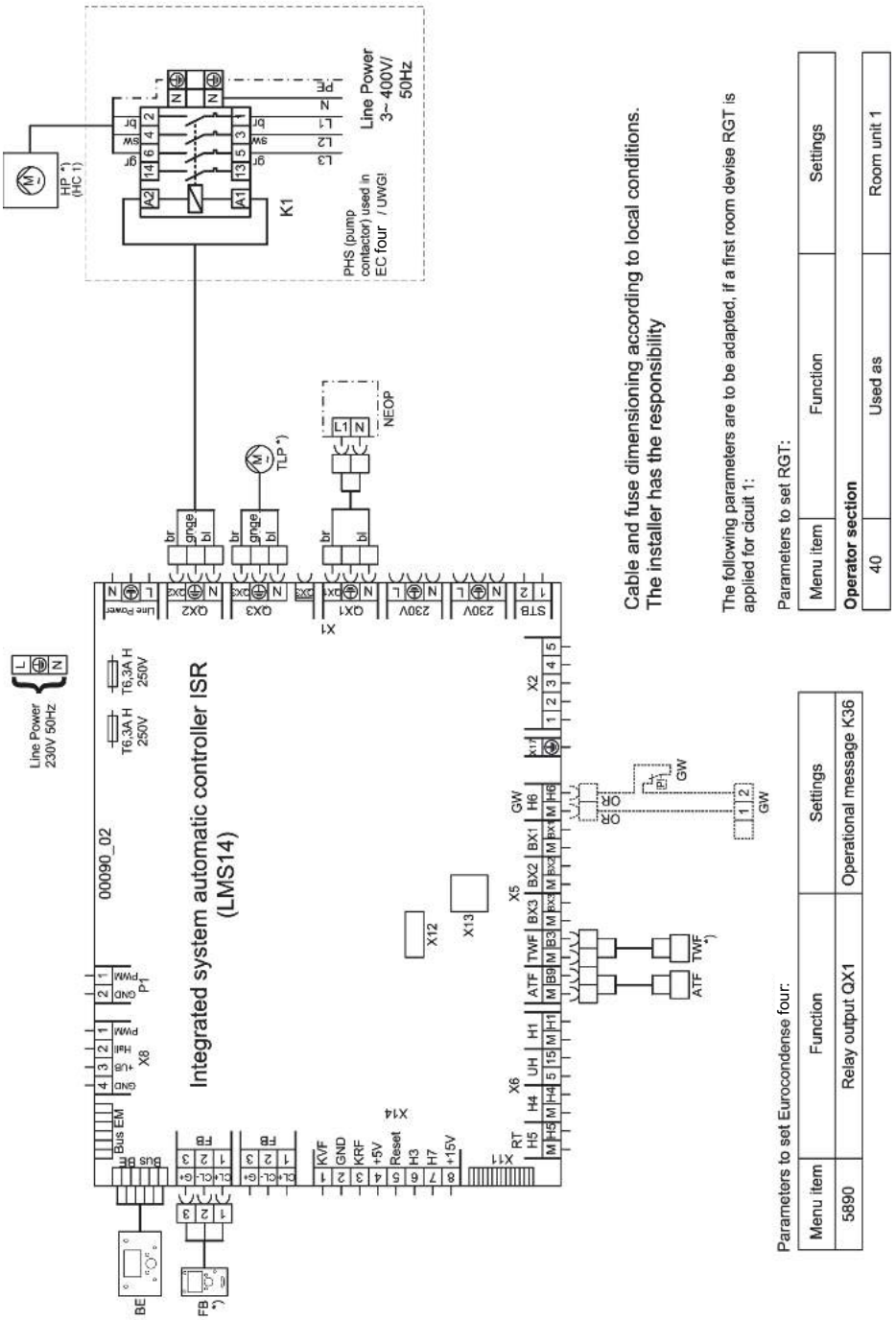


Fig.14 EC four, one mixed heating circuit and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

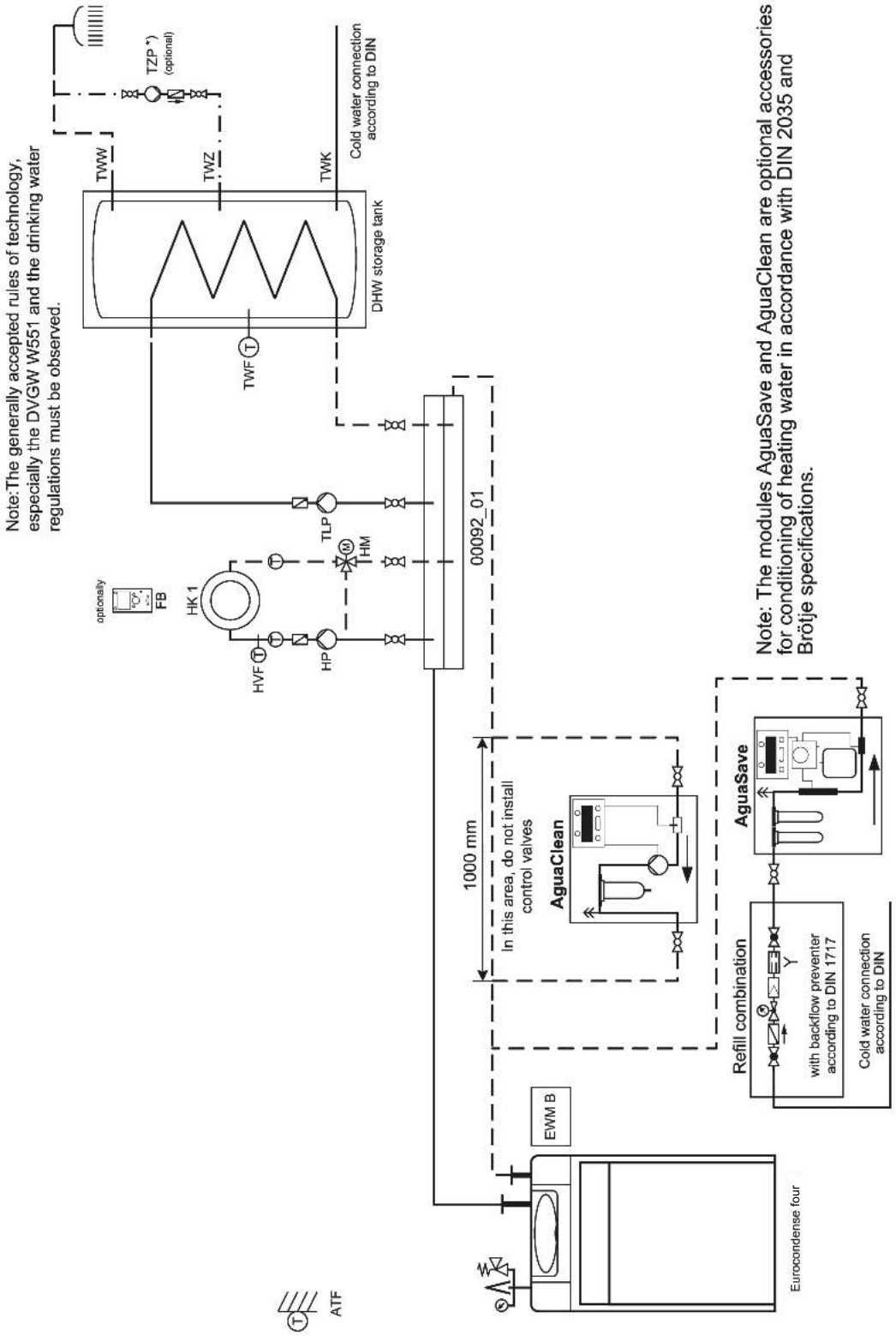
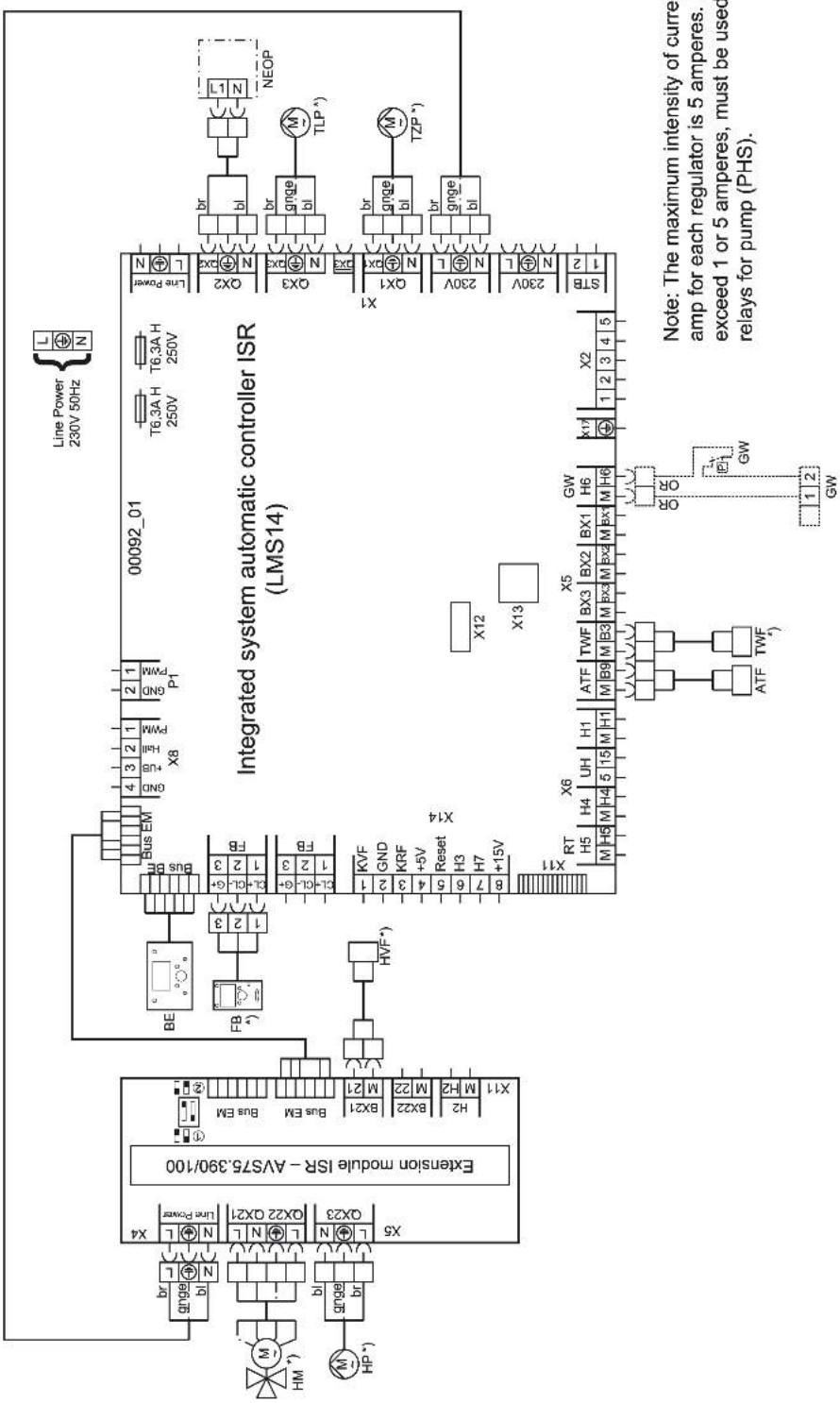


Fig.15 EC four, one mixed heating circuit and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)



Parameters to set EC four:

Menu item	Function	Settings
Configuration:		
5890	Relay output QX1	Heating circuit 1
5891	Relay output QX2	Operational message K36
6020	Function extension module 1	Heating circuit 1

The following parameters are to be adapted, if a first room devise RGT is applied for cicuit 1:

Parameters to set RGT:

Menu item	Function	Settings
Operator section		
40	Used as	Room unit 1

Fig.16 EC four, 3 mixed heating circuits and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

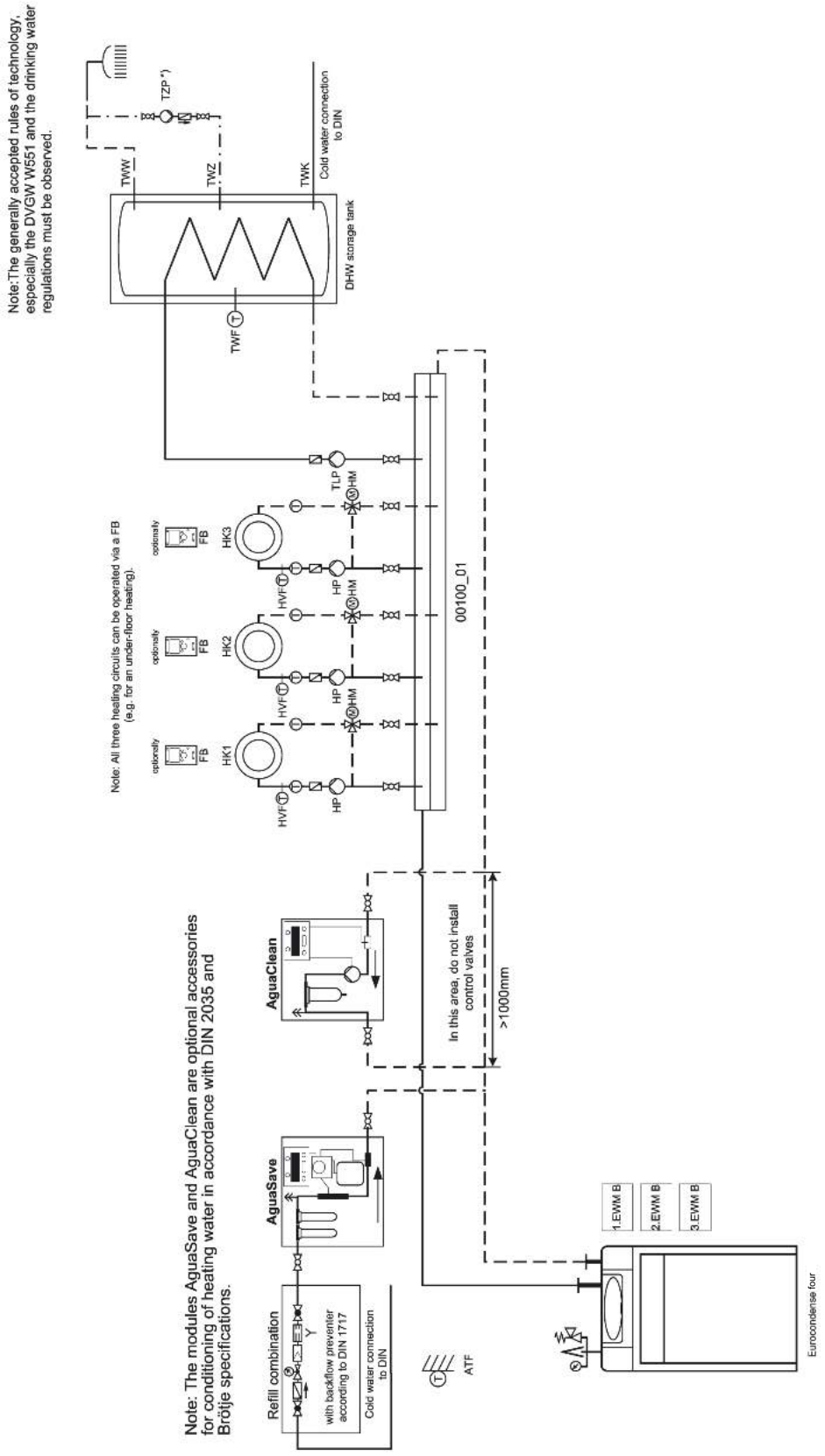
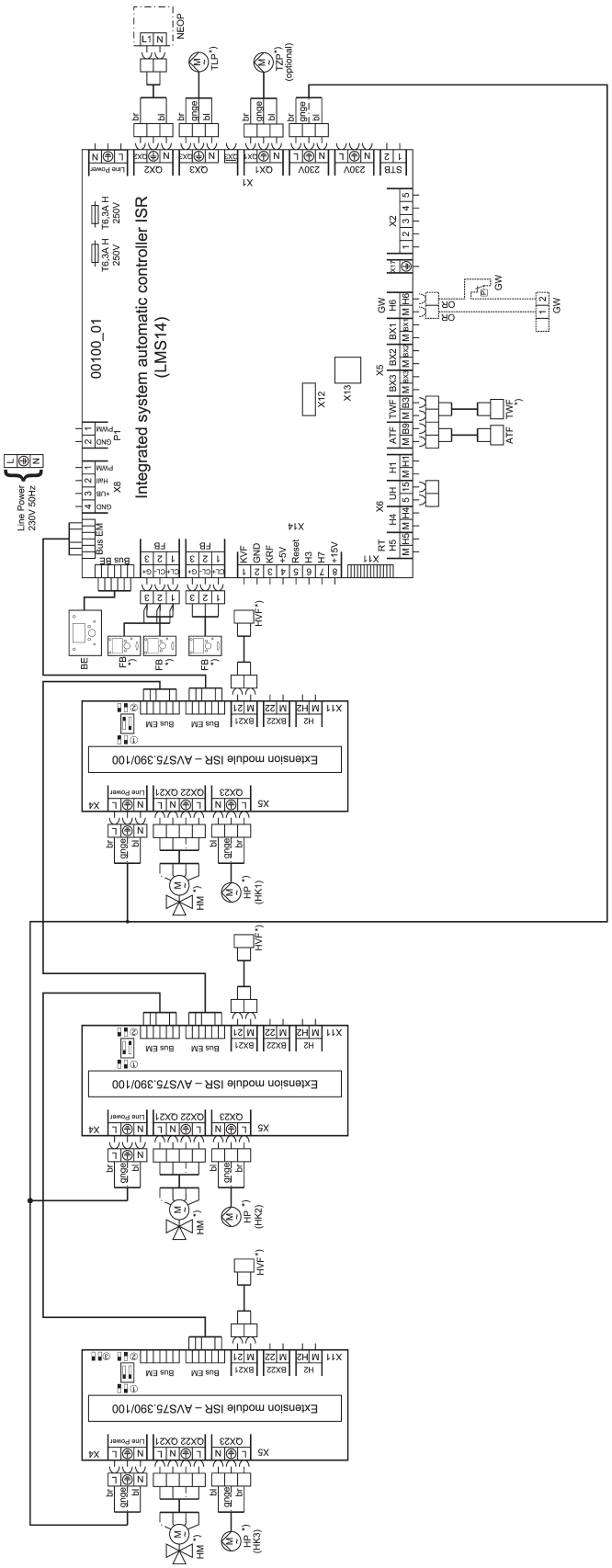


Fig.17 EC four, 3 mixed heating circuits and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)



Note: The maximum intensity of current for each output is 1 amp for each regulator is 5 amperes. If the loads should exceed 1 or 5 amperes, must be used on-site contactor relays for pump (PHS).

Fig.18 Boiler cascade with 2 EC four, 3 mixing heating circuits, hydraulic Bypass and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

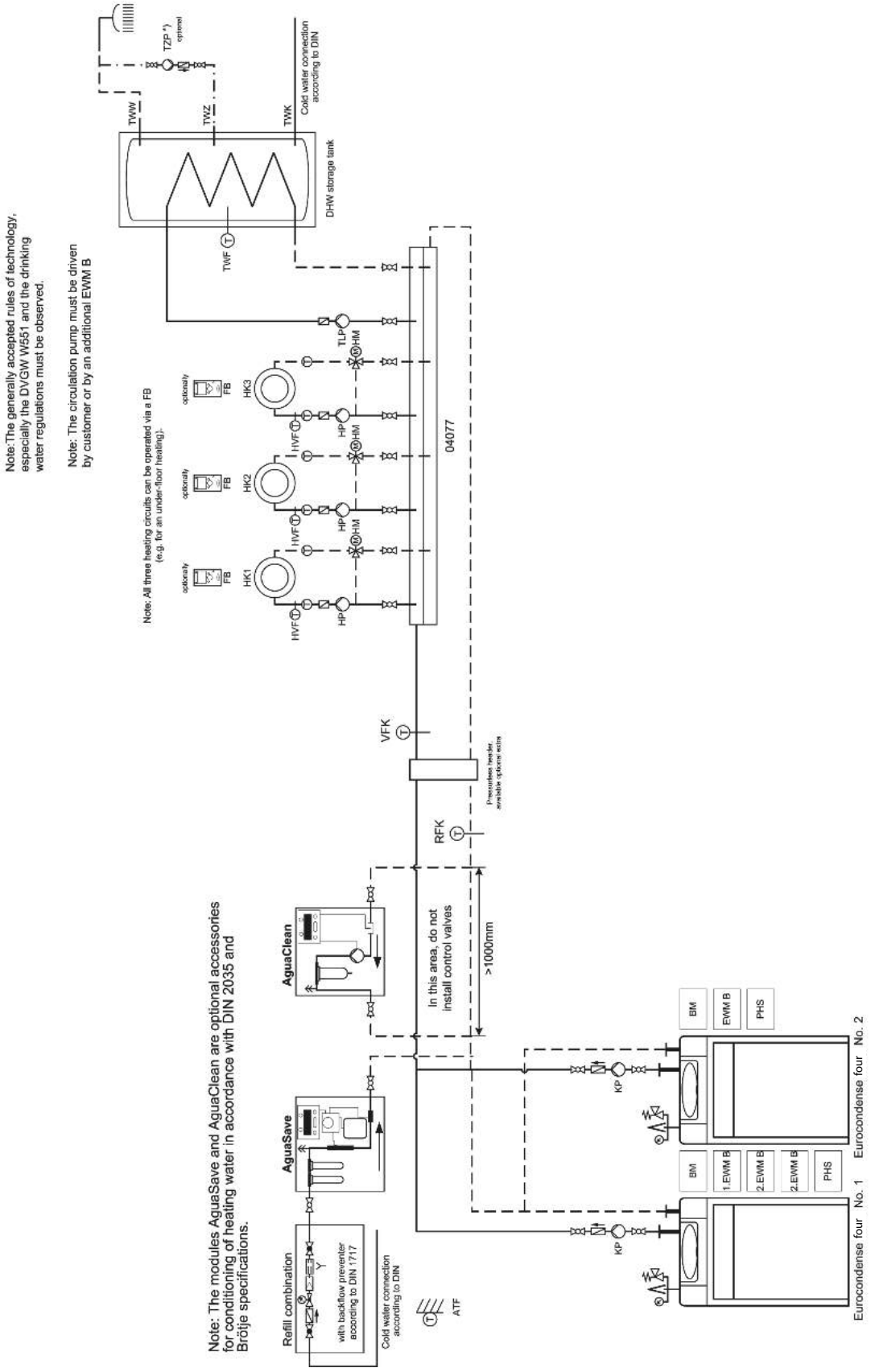


Fig.19 Boiler cascade with 2 EC four, 3 mixing heating circuits, hydraulic Bypass and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

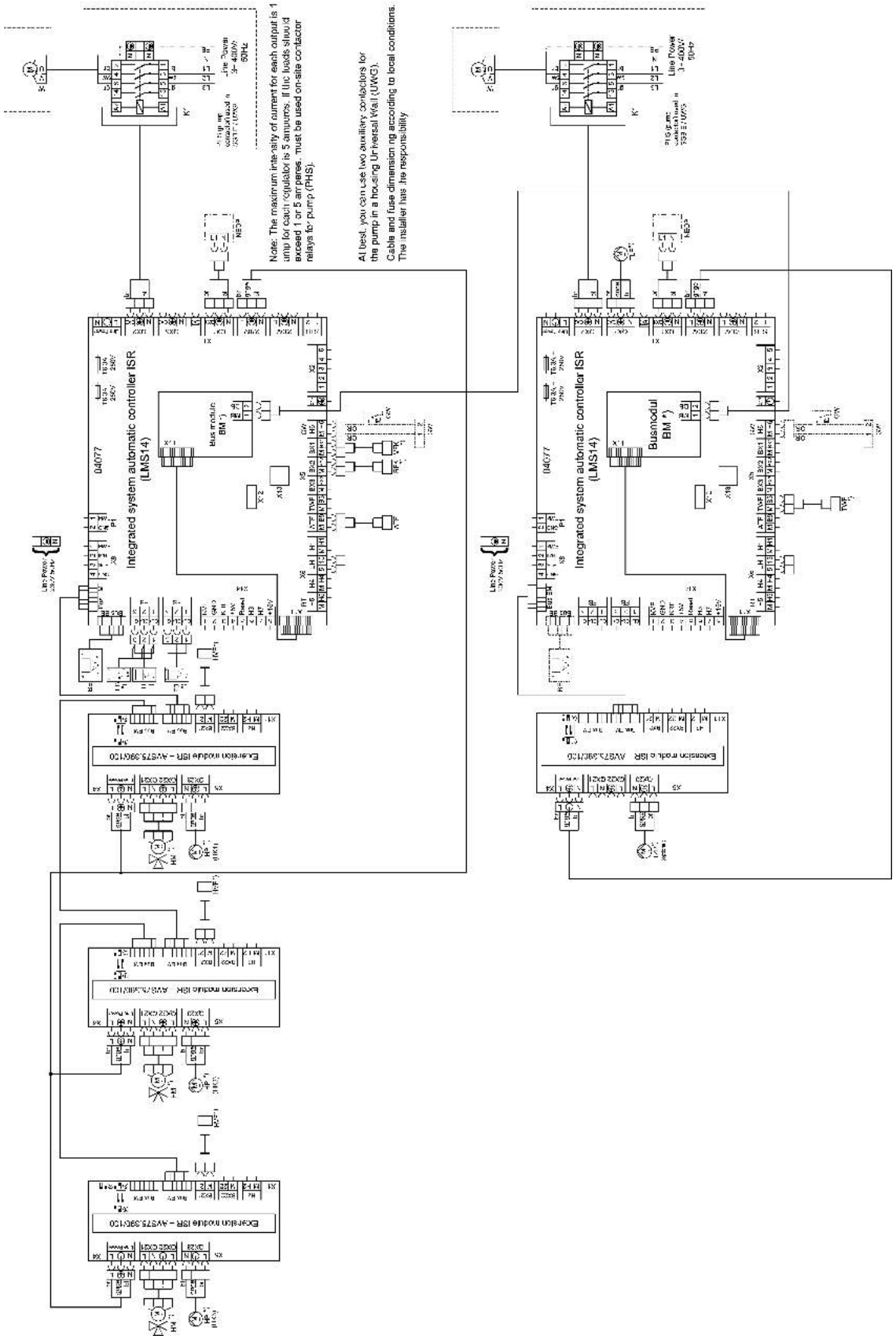


Fig.20 Boiler cascade with 2 EC four, 3 mixing heating circuits, hydraulic Bypass and hot water preparation, AguaSave and AguaClean optional (hydraulic diagram)

Parameters to set Eurocondense four No. 1:

Menu item	Function	Settings
Configuration:		
5715	Heating circuit 2	On
5721	Heating circuit 3	On
5890	Relay output QX1	Operational message K36
5891	Relay output QX2	Boiler pump Q1
5930	Sensor input BX1	Common flow sensor B10
5931	Sensor input BX2	Cascade return sensor B70
6020	Function extension module 1	Heating circuit 1
6021	Function extension module 2	Heating circuit 2
6022	Function extension module 3	Heating circuit 3
6117	Central setp compensation	e. g. 3° C
LPB system:		
6600	Device address	1
6640	Clock mode	Master
3) Adressing of the second extension module on address 2 (dip switch)		
4) Adressing of the third extension module on address (dip switch)		

The following parameters are to be adapted, if a first room devise RGT is applied for cicuit 1:

Parameters to set RGT:

Menu item	Function	Settings
Operator section		
40	Used as	Room unit 1

The following parameters are to be adapted, if a second room devise RGT is applied for cicuit 2:

Parameters to set RGT:

Menu item	Function	Settings
Operator section		
40	Used as	Room unit 2

The following parameters are to be adapted, if a third room devise RGT is applied for cicuit 3:

Parameters to set RGT:

Menu item	Function	Settings
Operator section		
40	Used as	Room unit 3

Parameters to set Eurocondense four No. 2:

Menu item	Function	Settings
Configuration:		
5710	Heating circuit 1	Off
5890	Relay output QX1	Operational message K36
5891	Relay output QX2	Boiler pump Q1
6020	Function extension module 1	Multifunctional
6032	Relay output QX23	Circulating pump Q4
LPB system:		
6600	Device address	2

5.5.2 Legend

Fig.21 Legend for application examples; part 1

Sensor designations:

Title in the hydraulic	Title in the regulation	Function / Declaration	Type
ATF	Outdoor temp. sensor B9	Measuring the outdoor-temperature	QAC34
HVF	Flow sensor B1/B12/B16	Sensor of mixing circuit	QAD 36
KRF	Boiler return sensor B7	Measuring return temperature, e.g. for elevation of return temperature	Z 36
RTF	Return sensor B73	Measuring return temperature of installation, e.g. for elevation of return temp. (Solar)	Z 36
VFK	Flow sensor B10	Measuring flow temperature of installation, e.g. for low loss header	Z 36
RFK	Return sensor B70	Measuring return temperature of cascade	Z 36
VRF	Primary controller sensor	Measuring the flow temperature in a primary controller	QAD 36
TWF	Tank sensor B3	Measuring of upper DHW tank temperature	Z 36
TWF2	Tank sensor B31	Measuring of lower DHW tank temperature / storage tank	Z 36
TLF	DHW charging sensor B36	Measuring of charging temperature of charging system LSR	QAD 36
TVF	DHW prim contr sensor B35	Measuring the charging temperature in the drinking water charging system LSR with mixer	QAD 36
TZF	DHW circulation sensor B39	Measuring the temperature of the hot water circulation return flow	QAD 36
SKF	Collector sensor B6	Measuring temperature of solar collector	Z 36
SKF2	Collector sensor B61	Measuring temperature of solar collector (secondary field)	Z 36
SVF	Solar flow sensor B63	Measuring of flow temperature solar circuit	Z 36
SRF	Solar return sensor B64	Measuring of return temperature solar circuit	Z 36
PSF1	Upper storage tank sensor B4	Measuring of upper storage tank temperature	Z 36
PSF2	Lower storage tank sensor B41	Measuring of lower storage tank temperature	Z 36
PSF3	Middle storage tank sensor B42	Measuring of storage tank temperature / mid - tank	Z 36
FSF	Solid fuel boiler sensor B22	Measuring of temperature of woood boiler	Z 36
SBF	Swimming pool sensor B13	Measuring of pool temperature	Z 36
KVF	Boiler flow sensor B2	Measuring of boiler temperatur	Z 36
Type D is a dockable sensor, Type Z is a diving sensor, the collector sensor has a black silicon cable, the sensor of the SOR S/M are Pt 1000 Fühler.			

Pumps:

Title in the hydraulic	Title in the regulation	Function / Declaration
TLP	DHW pump Q3	DHW charging pump
TZP	Circulating pump Q4	DHW circulating pump
SDP	DHW mixing pump Q35	Thorough mixing of DHW tank during legionella function
SUP	St tank transfer pump Q11	Shuffles DHW from storage to DHW tank
ZKP	DHW interm circ pump Q33	DHW pump in secondary circuit of tank charging system (e.g. LSR)
HP	Heating circuit pump Q2; Q6	Pump of a heating circuit
HKP	Heating circuit pump HCP Q20	Pump for circuit HKP
SKP	Collector pump Q5	Pump of solar circuit
SKP2	Collector pump Q16	Pump of 2nd solar circuit
FSP	Solid fuel boiler pump Q10	Boiler pump for wood boiler
ZUP	System pump Q14	Additionel pump for supply of distant circuit
SBP	Pump Hx Q15, Q18, Q19	Pump for swimmingpool
H1	H1 pump Q15	Pump for high temperature circuit e.g. ventilation
H2	H2 pump Q18	Pump for high temperature circuit e.g. ventilation
H3	H3 pump Q19	Pump for high temperature circuit e.g. ventilation
VKP 1	H1 Pump Q15	Pump for a consumer circuit as ventilation
VKP 2	H2 Pump Q18	Pump for a consumer circuit as ventilation
BYP	Bypass pump Q12	Pump for return temperature elevation
SET	Solar pump ext. exch. K9	Pump for secondary circuit of solar heat exchanger
KP	Boiler pump Q1	Boiler pump, in parallel to boiler operation

Fig.22 Legend for application examples; part 2

Valves:

Title in the hydraulic	Title in the regulation	Function / Declaration
DWV		Three way valve general
DWVP	Solar ctrl elem buffer K8	Switches solar circuit to storage tank
DWVS	Solar ctrl elem swi pool K18	Switches solar circuit to swimming pool
DWVE	Heat gen shutoff valve Y4	Separates boiler from circuits hydraulically
DWVR	Buffer return valve Y15	Switches return to elevation of return temperature (utilsation of solar energy)
HM	Heat circ mix valve Y1/2; Y3/4	Mixing circuit
VRM	Prim controller mixer	Mixer in a prim controller circuit
TVM	DHW prim controller mixer	Mixer in a prim controller cicuit DHW
USTV		Overflow valve (optionel extra)

General:

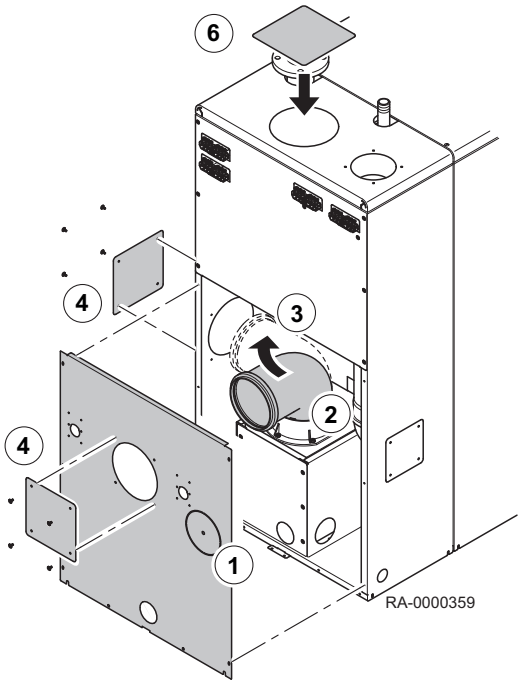
Shortcut	Function / Declaration
BE	Display of boiler or wall mounted control
Bus BE	Bus connection for display
Bus EM	Bus connection to extension module
FB	Connection distance control RGT; RGTF; RGTK
BXx	Input multifunctional (Sensor entrance)
QXx	Output multifunctional
H1; H2; H3	Input multifunctional (potential free)
SK	Safty chain
GW	Port for the gas pressure switch
WDS	Water pressure sensor
AGF	Flue gas temp sensor
TR	Thermostat
TWW	DHW hot
TWK	DHW cold
TWZ	DHW circulation
S1	Boiler switch
F1	Fuse
*)	Accessory to be orderd separately

6 Installation

6.1 Mounting

6.1.1 Converting the exhaust connection

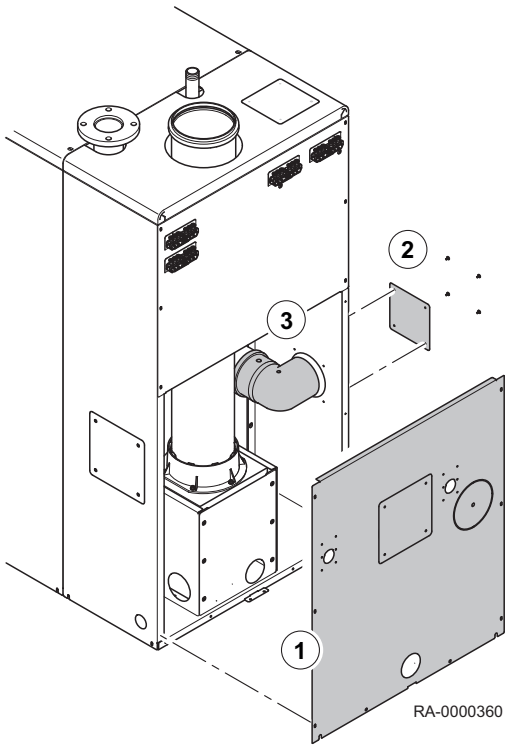
The conversion of the top passage to the side or rear passage of the flue gas connection is shown below.



1. Remove the lower rear wall.
2. Remove the flue gas connection leading upward and insert an 87° elbow
3. Turn 87° elbow to the desired position (side or towards the rear)
4. Remove either the rear cover plate or the side cover plate
5. Replace the lower rear wall
6. Glue the upper cover plate in place

6.1.2 Installing the air supply duct at the side

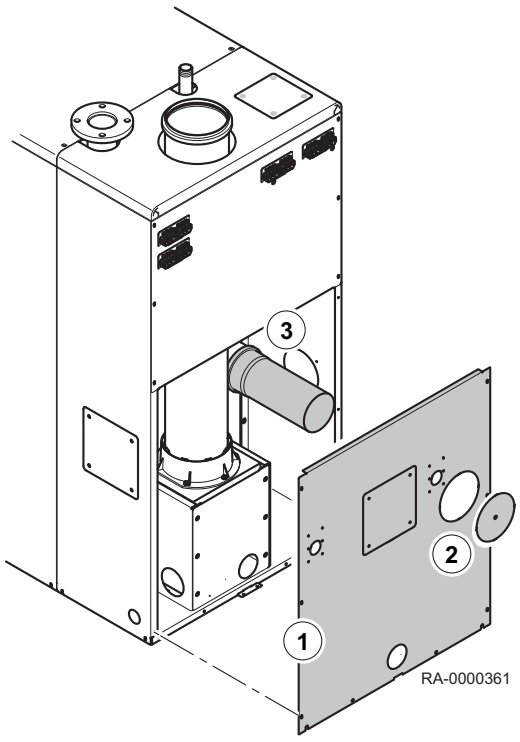
The installation of the air supply duct on the left-hand side of the boiler is shown below.



1. Remove the lower rear wall
2. Remove the side cover plate
3. Insert the intake pipe elbow onto the existing intake pipe and turn into the side position
4. Replace the lower rear wall

6.1.3 Installing the air supply duct at the rear

The installation of the air supply duct on the rear of the boiler is shown below.



1. Remove the lower rear wall
2. Remove the rear cover plate
3. Insert the intake pipe extension onto the existing intake pipe
4. Mount the lower rear wall

6.2 Hydraulic connection

6.2.1 Connecting the heating circuit

6.2.2 Safety valve

In the case of open heating plants, a safety supply and return pipeline must be connected; in the case of closed heating plants a membrane expansion tank and safety valve must be fitted.

Caution
The connecting pipe between boiler and safety valve must not be blockable. The installation of pumps and fittings or pipe reducer pieces is not permitted. The blow-off line of the safety valve must be designed in such a way that the pressure does not increase when the safety valve responds. It must not be routed to the outside, the opening must be clear and observable. Any heating water that may possibly escape should be safely drained off.

6.2.3 Condensate connection

A direct run-off of the condensate into the domestic drainage system is only allowed if the system only comprises corrosion resistant materials (e.g. PP-pipe, stoneware or similar materials). If this is not the case, the Potterton neutralisation plant must be installed (optional accessory).

The condensate must be able to flow freely into a funnel. A stench trap must be installed between the funnel and drainage system. The condensate hose of the EC four must be inserted through the opening in the rear or side wall. If there is no run-off facility underneath the condensate discharge, the use of the Potterton neutralisation and lifting system is recommended.

Note
Danger to life due to flue gas escaping!
Fill the condensate discharge with water before commissioning. For this, fill water into the flue gas outlet before assembly of the flue gas pipe until the siphon is completely filled. If this instruction is not followed, flue gas may escape to the installation room.

6.3 Gas connection

6.3.1 Gas connection

The gas-side connection may only be carried out by an approved installer. For the gas-side installation and setting, the factory setting data of the equipment and optional label should be compared with the local supply conditions.

An approved thermally activated disconnector valve must be installed upstream of the gas condensing boiler.

If old gas pipes still exist in the region, the installation of a gas filter is recommended.

Residues in pipes and pipe joints should be removed.

6.3.2 Check tightness

Danger
Danger! Danger to life by gas!
The entire gas inlet pipe, particularly the joints, must be checked for leakages before commissioning.
The gas burner valve on the gas burner must be pressure- tested at maximum of only **100mbar**

6.3.3 Venting the gas line

The gas line must be vented before initial commissioning.

For this, open the measuring nozzle for the connecting pressure and vent, taking the safety precautions into account. Check for tightness of the connection after venting.

Danger
Danger to life by gas!
The entire gas inlet pipe, particularly the joints, must be checked for leakages before commissioning.

6.4 Air supply/flue gas connections

6.4.1 Flue gas connection

For the operation of the EC four as a gas condensing boiler, the flue gas pipe should be designed with the flue gas temperature under 120°C (flue gas pipe type B). The flue gas piping system SAS approved in conformance with building regulations is intended for this purpose.

Compilation of the necessary basic construction kits

RLA:	SAS 160-2/SAS 160-4/SAS 200
RLUA:	SAS 160-2/SAS 160-4/SAS 200 + RLUA
RLUA with wall connection:	SAS 160-2/SAS 160-4/SAS 200 + RLUA + WAS

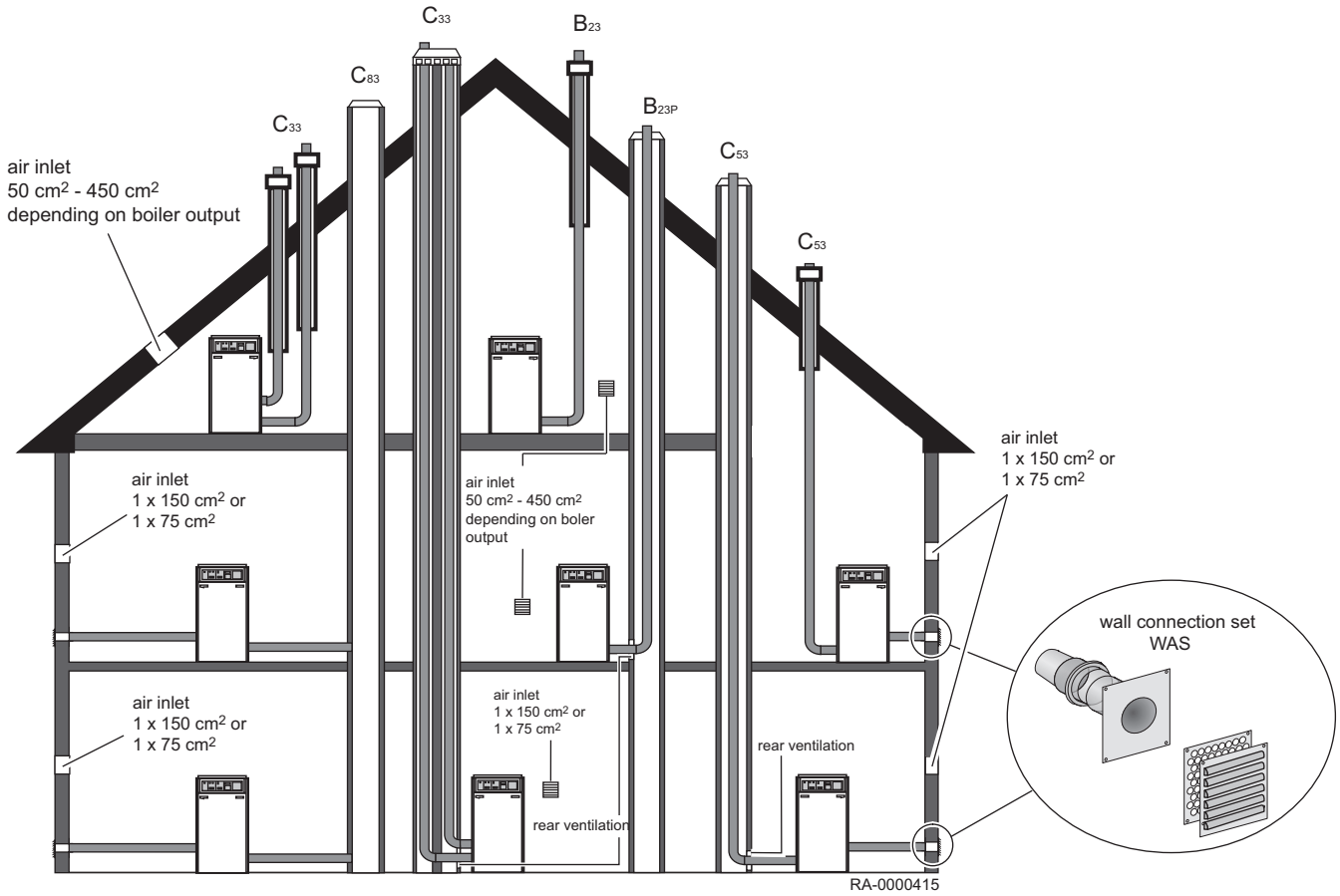
Note
Connecting the boiler as RLUA-version (RLUA-set and possibly WAS) may give rise to reduced output of the boiler, which is compensated by Potterton customer service.

Approval number

The SAS has been approved by the Deutsche Institut für Bautechnik (DIBt) (German Institute for Civil Engineering) in general conformance with building regulations:
- Approval Number Z-7.2.-1104

6.4.2 Flue gas system

Fig.23 EC four with flue gas piping system SAS for room air-dependent and room air-independent operation



- In case of roof central heating installations, the installation of the roof duct is only possible if the flue gas pipe can be routed directly (without going through other rooms) through the roof.
- In case of installation C_{33} (suction of the combustion air through vertical roof duct) the mouth of the air pipe must be fitted with a rain hood.
- In case of installation C_{53} and C_{83} (suction of the combustion air through the outer wall) the wall connection kit WAS with filter mat and air pressure monitors must be used.

Flue gas pipeline lengths for room air-dependent operation

Tab.7 Permissible exhaust gas pipeline lengths for room air-dependent operation

Model		EC four 125 kW	EC four 170 kW	EC four 215 kW		EC four 260 kW		EC four 300 kW	
Flue gas pipe-Ø	mm	160	160	160	200	160	200	160	200
Max. pipe length incl. 1 elbow 87°	m	60	50	30	60	18	60	8	60

These lengths only apply to single boilers.

For more elbows, the following deductions have to be made

1 elbow 87°: 5 m

1 elbow 45°: 2 m

1 elbow 15°: 1 m

A calculation by Potterton is required for individual cases of room air-independent operation of the EC four.

See
More information can be found in the *Technical information*

Flue gas pipe lengths for cascade systems

See
A table of permissible flue gas pipe lengths for cascade systems can be found in the *Technical information*. A calculation by Potterton is required for installations deriving from this.

6.4.3 General information about the exhaust gas piping system

Standards and regulations

Besides the general technical rules, the following should be particularly observed:
- Regulations of the accompanying certificate of approval
- Implementation rules of the DVGW-TRGI, G 600
- Planning laws of the German federal states in accordance with the Combustion Ordinance and the building regulations

Caution
Due to the different regulations in the individual federal German states and working (flue gas evacuation, cleaning and inspection openings etc.) varying from region to region, the district chimney sweep officer responsible should be consulted before assembly is started.

Contaminated chimneys

Combustion of solid and liquid fuels generates deposits and pollution in the respective flue gas tract. Soot contaminated with sulphur and halogenated hydrocarbons sticks to the inside walls. Such flue gas tracts are not suitable for the combustion air supply of heat generators without pretreatment. Contaminated combustion air is one of the main causes of corrosion damage and malfunctions on fuel-burning installations. If the combustion air has to be drawn via an existing chimney, this flue gas tract should be inspected by the district chimney sweep officer responsible and cleaned if necessary. Should structural deficiencies (e.g. old, broken chimney structures) oppose its use as a combustion air supply duct, suitable measures such as shake-out of the fireplace should be taken. It must be ensured that there is no contamination of the combustion air with foreign matter.

If an appropriate clean up of the existing flue gas tract is not possible, the heat generator can be operated on a concentric flue gas pipe independent of ventilation. The concentric flue gas pipe must run straight in the shaft.

Lightning protection

Danger of electric shock
Danger to life due to lightning strike.
The chimney head cover must be integrated in any existing lightning protection system and house-side potential equalisation. This work should be carried out by an approved company specializing in lightning protection and electrical work.

Shaft requirements

Inside buildings, exhaust gas system should be laid in suitable ventilated shafts. The shafts must be made of non-combustible, dimensionally stable materials.

Fire resistance duration of the shaft: 90 min.

Fire resistance duration of the shaft in case of buildings of lower building height: 30 min.

6.4.4 Chimneys already in use

If a chimney used before for oil or solid fuel-fired boilers is used as a duct for installation of a concentric exhaust gas pipeline, the chimney must be thoroughly cleaned first by a specialist.

Note
Concentric flue gas routing, also in the duct, also in the shaft, is absolutely necessary The concentric flue gas pipe must run straight in the duct.

- **Multiple usage of air/flue gas chimneys of different manufacturers**
  - The selected air/flue gas chimney must have approval by the building supervisory authority DIBt for multiple usage operation suitability.
  - Diameter, heights and maximum number of devices can be taken from the design tables of the approval certificate.
- **Height above the roof**
  - With regard to the minimum height above the roof, country-specific regulations regarding chimneys and flue gas systems are applicable.

6.4.5 Assembly of the flue gas system

Warning
Danger of injury by not wearing working gloves.
Working gloves must be worn during assembly of the flue gas system.

Mounting with gradient

The flue pipe must be routed at a gradient to the EC four so that the condensation from the flue pipe can drain from the flue pipe to the central condensation collector of the EC four.

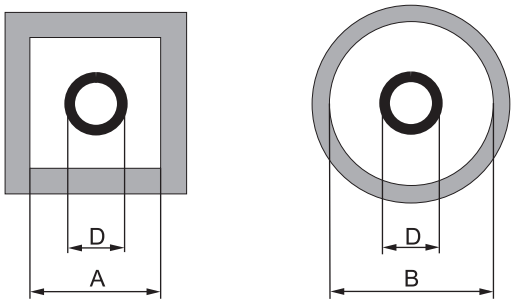
The min. downward slopes are:
- horizontal flue pipe: min. 3° (min. 5.5 cm per metre)
- external wall duct: min. 1° (min. 2.0 cm per metre)

Shortening of the pipes

All simple and concentric pipes may be shortened. After cutting, the ends of the pipes have to be thoroughly de-burred. When a concentric pipe is shortened, a piece of pipe at least 6 cm long must be cut off the outer pipe. The spring washer for centring the inner pipe becomes obsolete.

Minimum dimensions of the duct

Fig.24 Minimum dimensions of the duct



	Outer Ø coupling	Min. duct inner dimension	
System	D [mm]	short side A [mm]	round B [mm]
SAS 160 (DN 160)	184	225	245
SAS 200 (DN 200)	227	256	276

Back ventilation

For room air-depending operation of the gas condensing boiler with the SAS 160 and SAS 200 the duct below the flue gas connection in the installation room must be provided with back ventilation. The clear cross-section must be at least A_{min} = 125 cm^2. A respective air intake grid is available as accessory.

Assembly

1. The pipes and formed pieces have to be fitted together up to the connector basis. Only the original profile seals of the building kit or the original spare seals may be used between the individual elements. Before assembly, the seals must be treated with the silicone paste which is part of the scope of delivery. When routing the pipes care must be taken that the pipes are installed in line and without tension. In this way leaking of the seals is prevented.
2. For fastening the support rail in the opposite wall of the duct opening, a bore hole (d=10 mm) must be provided on the level of the opening edge. Then the pin of the support rail has to be hammered into the bore hole.

Fig.25 Assembly of the support rail

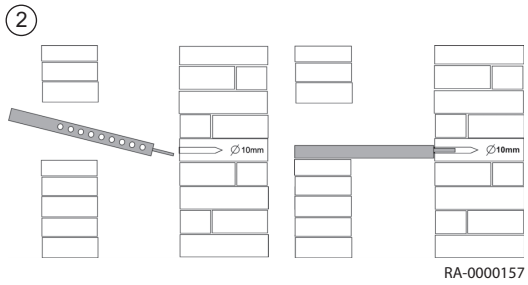
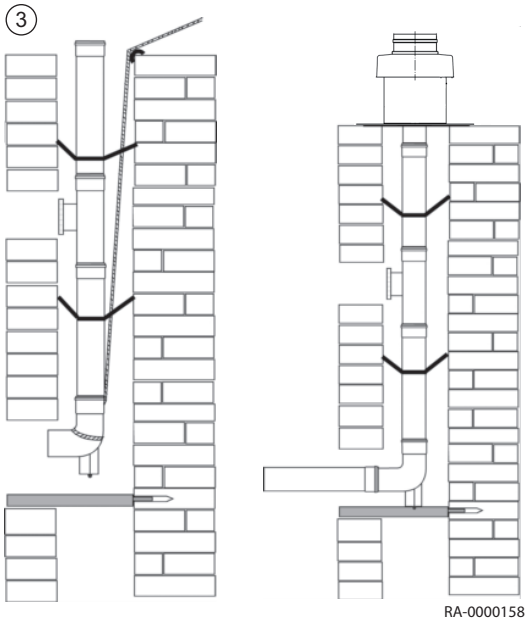


Fig.26 Insertion into the duct



3. The flue pipe is lowered from the top into the duct. For this, connect a rope to the support leg and insert the pipes, section by section, from the top. To prevent the components sliding apart during assembly, the rope must be kept on tension until the final assembly of the flue pipe. If spacers are necessary, these have to be fitted to the duct at least every 2 m.
   Cant the spacers at a right angle and align centric in the duct. Pipes and formed parts are to be installed in such a way that the connectors are arranged counter to the flow direction of the condensed water. After the pipes have been inserted, place the support leg in the support rail and align (flush and without tension). The duct cover at the chimney head must be assembled in such a way that no rainfall can get into the space between flue pipe and duct and the air for back ventilation can flow freely.

Caution
When replacing seals use new seals!
When the flue pipes are dis-assembled, new seals must be used for the reassembly!

6.4.6 Cleaning and inspection openings

Danger
Clean exhaust gas pipelines!
It should be possible to clean the flue gas pipes and inspect their free cross-section and leakproofness.

At least one cleaning and inspection opening must be installed in the installation room of the EC four.

Exhaust gas pipes in buildings, which cannot be cleaned or inspected from their port side must have an additional cleaning port in the upper part of the exhaust system or above the roof.

The exhaust gas pipelines at the outer wall must have at least one cleaning opening in the lower part of the exhaust gas facility. For exhaust gas facilities with building heights of < 15.00 m in the vertical section, a pipeline length of < 2,00 m in the horizontal section and a maximum pipeline diameter of 150 mm with a maximum deflection (except for deflection directly at the boiler and in the shaft) one cleaning and inspection opening in the installation room of the EC four is sufficient.

The ducts for exhaust gas facilities must not have any openings other than the necessary cleaning and inspection ports as well as openings for back ventilation of the exhaust gas pipe.

6.5 Electrical connections

6.5.1 Electrical connection (general)

Danger
Danger to life through incorrect work!
All electrical work in connection with the installation may only be carried out by a trained electrician.
- AC 230 V +6% -10%, 50 Hz

In Germany the VDE 0100 and local regulations must be followed during installation; in all other countries, follow the relevant regulations.

The electrical connection should be made with a correct and non-reversible polarity. In Germany the connection can be executed as an accessible plug and socket connection with non-reversible polarity or as a fixed connection. In all other countries, a fixed connection must be provided.

For the power supply, use the power cable attached to the boiler or cable types H05VV-F 3 x 1 mm^2 or 3 x 1.5 mm^2.

We recommend the installation of a mains isolator upstream of the EC four. This should isolate all poles and provide contact separation of at least 3 mm.

All connected components must comply with VDE [or local regulations]. Always apply strain relief to connecting cables.

Cable types

Danger
Danger to life. Risk of injury or a risk to life from electric shock!
The use of rigid lines (e.g. NYM) is not allowed because of the risk of cable damages! Flexible cables e.g H05VV-F must be used for mains voltage and e.g. LIYY for sensor/bus cables.

6.5.2 Cable lengths

Bus/sensor lines do not have mains voltage, but safety extra-low voltage. **Never** route them **in parallel to mains cables** (interference). Otherwise shielded cables must be installed.

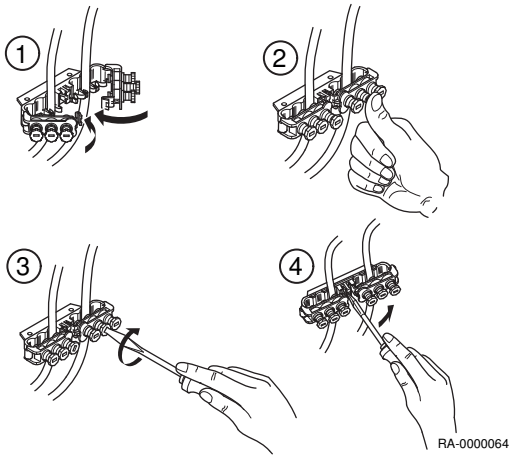
Permissible cable lengths for all sensors:
- Cu-cable up to 20m: 0.8 mm^2
- Cu-cable up to 80m: 1 mm^2
- Cu-cable up to 120m: 1.5 mm^2

Cable types : e.g. LIYY or LiYCY 2 x 0.8

6.5.3 Strain reliefs

All the cables should be fixed in the strain relief clamp of the control panel and connected according to the connection diagram.

Fig.27 Strain reliefs



6.5.4 Circulating pumps

The permissible current load per pump output is $I_{N\ max}$ = 1A.

6.5.5 Appliance fuses

Appliance fuse in the control unit ISR:
- Mains fuses: T 6.3A H 250V

6.5.6 Connect sensor / components

Danger
Risk of electric shock! Danger to life through incorrect work!
The wiring diagram must be followed! Optional accessories must be fitted and connected according to the instructions provided. Connect to the mains. Check earthing.

Outdoor temperature sensor (included in delivery)

The outdoor temperature sensor is located in the accessory bag. For connection see wiring plan.

6.5.7 Replacing cables

All connecting cables, except for the mains connection cable, have to be replaced by Potterton special cables in case of replacement. When replacing the mains connection cable, only cables of the types H05VV-F 3 x 1 mm^2 or 3 x 1.5 mm^2 may be used.

6.5.8 Protection against contact

After the EC four has been opened, the cladding parts to be screwed on should be screwed back on with the appropriate screws to ensure protection against contact.

6.6 Filling the system

1. Fill the heating system using the boiler fill and drain valve (BFD valve) of the EC four
2. Check the system for leaks (max. water test pressure: 6 bar)

For more information, see
Boiler, page 20

7 Commissioning

7.1 General

Danger
Commissioning may only be carried out by an approved installer. The installer checks the tightness of pipes, the correct function of all regulating, control and safety equipment, and measures the combustion values. If this work is not carried out correctly, there is a risk of considerable damage to persons, environment and property.

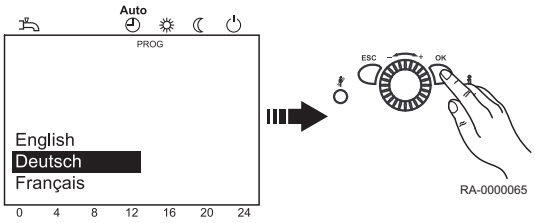
7.2 Checklist for commissioning

Tab.8 Checklist for commissioning

1.	System location			
2.	Customer			
3.	Boiler type/Designation			
4.	Serial number			
5.	Characteristic gas values	Wobbe index	kWh/m³	.....
6.		Operating heating value	kWh/m³	.....
7.	Have all pipelines and connections been checked for tightness?			□
8.	Exhaust gas system checked?			□
9.	Gas pipeline checked and vented?			□
10.	Static pressure measured at the gas valve inlet?		mbar	.....
11.	Free wheeling of pumps checked?			□
12.	Filling the heating plant			□
13.	Used water additives			.....
14.	Gas flow pressure measured at full load at the gas valve inlet?		mbar	.....
15.	Gas injector pressure measured at full load at the gas valve outlet?		mbar	.....
16.	CO_2-content at low load		%	.....
17.	CO-content at low load		ppm	.....
18.	CO_2-content at full load		%	.....
19.	CO-content at full load		ppm	.....
20.	Function test:	Heating mode		□
21.		Domestic water mode		□
22.	Programming:	Time /date		□
23.		Comfort setpoint heating circuit 1/2	°C	.....
24.		Setpoint DHW	°C	.....
25.		Automatic day time programme	Clock	.....
26.		Heating curve checked?		□
27.	Tightness of the flue system checked in operation (e.g. CO_2 test in annular gap)?			
28.	Customer instructed?			□
29.	Documents handed over?			□

Only components tested and marked according to the respective standard have been used. All system components have been installed according to the instruction of the manufacturers. The whole system conforms to the standard. To ensure the heat source operates reliably and economically for a long period, we recommend annual maintenance for the heat generator.		Date /signature Company stamp ....

7.3 Commissioning procedure



7.3.1 Commissioning menu

The commissioning menu will be shown once during initial commissioning.

1. Change Language must be selected and confirmed with the **OK button**.
2. Year select year and confirm.
3. Set time and date set and confirm.
4. Conclude by pressing the **OK button**.

Note
If the commissioning menu entry is terminated by pressing **ESC**, the menu will be shown again next time the appliance is switched on.

7.4 Gas settings

7.4.1 Factory settings

The EC four has been set at nominal input by the manufacturer.

7.4.2 CO_2 content

The CO_2content in the exhaust gas must be checked during commissioning and during regular maintenance of the boiler, as well as after reconstruction work on the boiler or on the exhaust gas system.

CO_2 content during operation see section *Technical data*.

Caution
Risk of damage of the burner!
Too *high* CO_2 values can lead to unhygienic combustion (high CO-values) and damage to the burner.
Too *low* CO_2 values can lead to ignition problems.

Caution
No manual setting of the gas valve possible.
The EC four automatically sets the CO_2 content during operation with the specified gas types. No manual setting of the gas valve is possible.

7.4.3 Changing over from natural gas to LPG and vice versa

Danger
Danger to life by gas!
The gas type of the EC four may only be changed by an approved heating specialist.

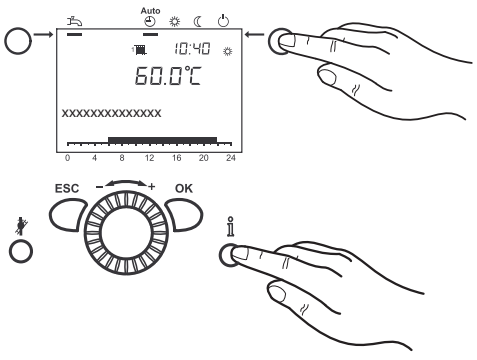
To change over to another type of gas, the CO_2 content must be reset by turning the adjustment screws on the gas valve. In addition, the parameters listed in the following table must be set according to the given values in the regulator LMS.

Function	Prog. no.	Setting level	EC four 125 kW		EC four 170 kW		EC four 215 kW	
			Natural gas	Propane	Natural gas	Propane	Natural gas	Propane
Boiler								
Output basic stage	2331	F	20	35	28	35	35	48
Burner control								
Required output prepurging	9504	F	73	73	94	94	96	96
Required output ignition	9512	F	59.3	66.3	75.5	86.8	77.1	89.3
Required output LF	9524	F	20.0	35.0	28.0	35.0	35.0	48.0
Fan output/speed slope	9626	F	37.1	33.9	27.6	24.1	26.4	23.0
Fan output/speed Y-section	9627	F	501.1	453.9	517.2	507.4	464.4	446.3
CO_2 content (± 0.2)			9.3	11.0	9.3	11.0	9.3	11.0

Function	Prog. no.	Setting level	EC four 260 kW		EC four 300 kW	
			Natural gas	Propane	Natural gas	Propane
Boiler						
Output basic stage	2331	F	42	58	48	58
Burner control						
Required output prepurging	9504	F	120	120	129	129
Required output ignition	9512	F	93.4	110.0	103.9	115.5
Required output LF	9524	F	42.0	58.0	48.0	58.0
Fan output/speed slope	9626	F	20.1	19.9	19.9	19.0
Fan output/speed Y-section	9627	F	488.0	305.7	431.7	306.1
CO_2 content (± 0.2)			9.3	11.0	9.3	11.0

Caution
Risk for the environment and the device if CO content is too high!
When a boiler set for natural gas is put into operation with LPG, the adjustment screw for full load on the gas valve must be turned clockwise (-) by half a turn before the boiler is switched on!

7.4.4 Manual adjustment of burner output (controller stop function)



For controlling the CO_2values theEC four operated in the **control stop function**

1. Press button**Operating mode button heating operation** for approx 3 s

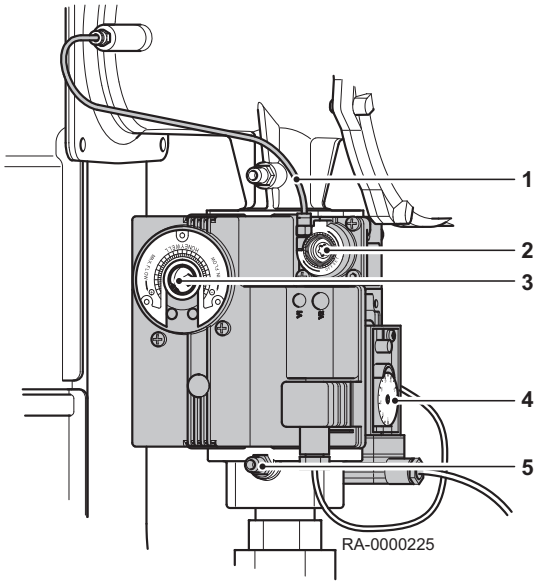
   The message Controller stop active is displayed.
2. Wait until the display has reached the basic display again.

3. Press the Info button
   The message Controller stop setpoint appears on the display. The actual modulation degree will be displayed on the display.
4. Press **OK**.
   The setpoint can now be changed.
5. Press **OK**.
   The setpoint displayed is then adopted by the controller.

Note
The regulator stop function is stopped by pressing the **operating mode button Heating Operation** for approximately 3 seconds, reaching the maximum boiler temperature or a time limit.
If there is demand for heat from a coiled tubing storage tank, this demand will continue to be met during the controller stop function.

7.4.5 Adjusting CO_2 content

Fig.28 Overview of gas valve



1 Compensation line
2 Adjustment screw for small load (Torx TX 40)
3 Adjustment screw for full load (Allen key 3 mm)
4 Gas pressure monitor
5 Measuring nozzle for inlet pressure

■ Setting CO_2 content at max. output

The CO_2 content at max. output is set at the gas valve as follows:

1. EC four In the control stop function (refer to the section *Control stop function*) operated at maximum value
2. Remove safety cap from the adjustment screw for full load
3. Use a 3 mm Allen key to set CO2 content at the adjustment screw for full load according to the *Technical data*
   - Clockwise: CO_2 content is decreased
   - Counter-clockwise: CO_2 content is increased
4. Replace safety cap on the adjusting screw for full load

■ Setting CO_2 content at min. output

The CO_2 content at min. output is set at the gas valve as follows:

1. EC four In the control stop function (refer to the section *Control stop function*) operated at minimum value
2. Remove safety cap from the adjustment screw for small load
3. Use a TX 40 Torx key to set CO_2 content at the adjustment screw for full load according to the *Technical data*
   - Clockwise: CO_2 content is increased
   - Counter-clockwise: CO_2 content is decreased
4. Replace safety cap on the adjusting screw for small load

Note
After successful adjustment of the gas valve, the CO_2 content must be controlled again at maximum and minimum output and corrected if necessary

For more information, see
Technical data, page 13

7.5 Final instructions

7.5.1 Instruction of the customer

The customer must be given full explanation of the heating system and how the protective installations work. He must be especially instructed about the following:

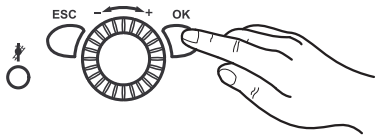
- The supply air opening must not be closed or restricted
- The connection nozzle for the combustion air at the top of the device must be accessible for the chimney sweep
- The following control checks himself that he has to perform himself:
  - Pressure check on the manometer
  - Check of the receiver under the blowpipe of the safety valve
- Only an approved heating specialist may carry out the inspection and cleaning work at intervals.

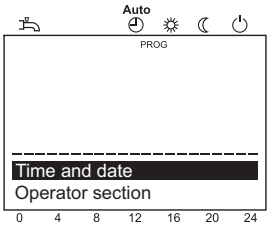
7.5.2 Documents

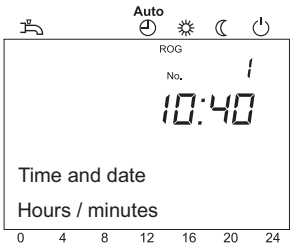
- The documents belonging to the heating plant must be handed over to the customer with the instruction that they have to be kept in the boiler installation room.
- System log with checklist for commissioning with confirmation and legally binding signature handed to the customer: Only components tested and marked according to the respective standard have been used. All components have been installed according to the manufacturer's instruction. The whole system conforms to the standard.

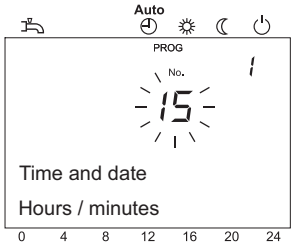
8 Operation

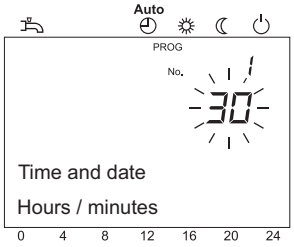
8.1 Use of the control panel

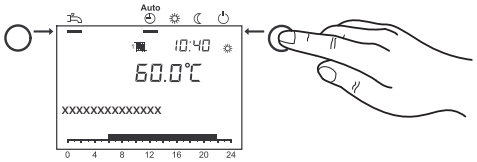












8.1.1 Changing parameters

Settings which are not directly changed via the operating panel must be carried out on the setting level.

The basic programming process is depicted in the following using the example of the setting of Set time and date.

1. Press **OK**.
   The *End user* display is shown.

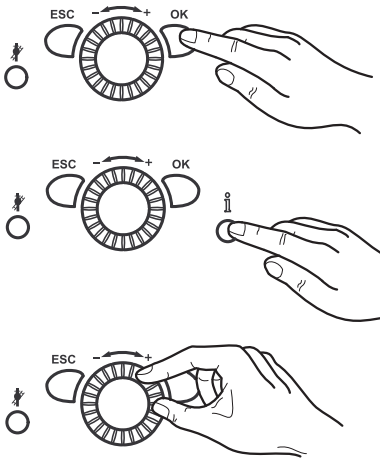
Note
If parameters are to be changed on a level other than the end user level, please see the note below.

2. Use the control knob to select the menu item Set time and date.
3. Press **OK**.
4. Use the control knob to select the menu item Hours / minutes.
5. Press **OK**.
6. Carry out hour setting (e.g. 15 h) using the control knob.
7. Press **OK**.
8. Carry out minute setting (e.g. 30 minutes) with the control knob.
9. Press **OK**.
10. Leave the programming level by pressing the **operating mode key for heating mode**.

Note
The previous menu item is retrieved by pressing the **ESC key** without applying previously modified values. If no settings are carried out for approximately 8 minutes, the basic display is called up without applying previously modified values.

8.1.2 Programming procedure

The selection of the setting levels and menu items is done as follows:



1. Press **OK**.
   The *End user* display is shown.
2. Press the **Info button** for approx. 3 s.
   The setting levels appear.
3. Select the required setting level using the control knob.

Setting levels
- End user (Eu)
- Commissioning (C), incl. end user (Eu)
- Engineer (E), incl. end user (Eu) and commissioning (C)
- OEM, includes all other setting levels (password-protected)

4. Press **OK**.
5. Select the required menu item (see parameter list) using the control knob.

See
Not all menu items will be visible, depending on the selection of the programming level and the programming.

8.2 Start-up

8.2.1 Checking water pressure

Caution
Before switching on, check whether the pressure gauge indicates sufficient water pressure. The value should be between 1.0 and 2.5 bar.

- Less than 0.5 bar: Top up water.

Caution
Observe the maximum permissible system pressure.

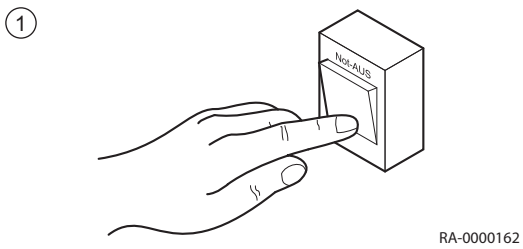
- Over 2.5 bar: Do not put the gas condensing boiler into operation. Drain the water.

Caution
Observe the maximum permissible system pressure.

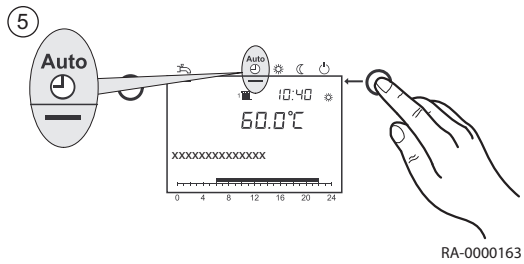
- Check that there is a drip pan below the discharge pipe from the safety valve. In the case of overpressure, it collects heating water as it is expelled.

8.2.2 Switching on

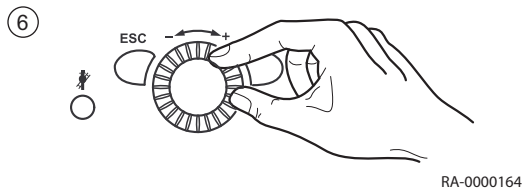
This section describes which steps are necessary to switch the boiler on.



1. Switch on heating emergency switch
2. Open gas shut-off device
3. Open the disconnector valves at the heating flow and heating return on the boiler.
4. Open the operating panel cover and switch the ON/OFF switch on the operating panel of the boiler to on.



5. Use the **operating mode key for heating mode** to select the automatic operating mode on the boiler control unit Auto



6. Set the required room temperature using the control of the control unit

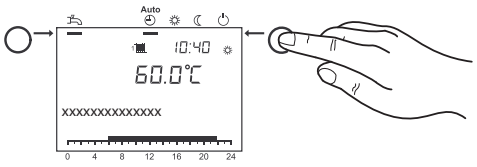
8.2.3 Setting necessary parameters

Normally, the parameters of the regulator do not need to be modified. Only date/time and individual time programs may need setting.

For DHW processing a setting of 55°C is recommended.

Note
Times for domestic water heating are set in time program 4 / DHW. **For reasons of convenience, domestic water heating should start approx. 1 h before central heating commences.**

8.2.4 Setting the heating mode



The **operating mode key for heating mode** enables a changeover between the various heating operating modes. The selected setting is marked with a bar underneath the operating mode symbol.

Automatic mode Auto

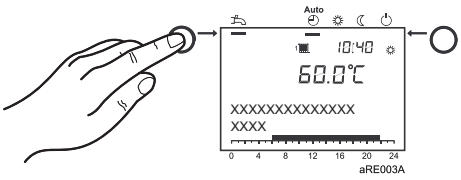
- Heating mode according to time program
- Temperature setpoints ☼ or ☾ according to time program
- Protection functions (plant frost protection, overheating protection) activated
- Automatic summer/winter changeover (automatic switching over between heating and summer operation from a certain outside temperature onwards)
- Automatic day heating limit (automatic changeover between heating and summer operation, if outside temperature exceeds the room setpoint value)

Continuous mode ☼ or ☾

- Heating mode without time program
- Protection functions activated
- Automatic summer/winter changeover is not activated
- Automatic day heating limit is not activated

Protection mode ⏻

- No heating operation
- Temperature according to frost protection setpoint
- Protection functions activated
- Automatic summer/winter changeover active
- Automatic day heating limit active



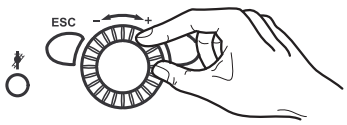
8.2.5 Adjusting domestic water mode

- Switched on Domestic water is prepared according to the selected switching programme.
- Switched off Domestic water preparation has been de-activated.

Note
- A setting between 50 and 60°C is recommended for domestic water heating.
- Times for domestic water heating are set in time program 4 / DHW.
  For reasons of convenience, domestic water heating should start approx. 1 h before central heating commences.

Note
Legionella function
Once a week every Sunday, the legionella function is activated; this means the domestic water is heated up to 65 °C once in order to eliminate any legionella bacteria in the water.

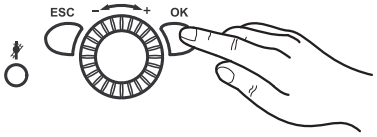
8.2.6 Adjusting comfortable room setpoint



How to adjust the comfortable room setpoint is described here.

1. Set the comfort setpoint using the control knob.
   => The value is taken over automatically.

8.2.7 Setting reduced room setpoint



How to set the reduced room setpoint is described here.

1. Press **OK**.
2. Select the Central heating menu item.
3. Press **OK**.
4. Select the Reduced temp setpoint parameter.
5. Press **OK**.
6. Set the reduced setpoint at the control knob.
7. Press **OK**.
8. Leave the programming level by pressing the **operating mode key for heating mode**.

8.2.8 Emergency mode (Manual control)

If the manual control function is activated the boiler is controlled to the set-point manual control. All the pumps are switched on. Additional requests e.g. for heating domestic water are ignored.

■ Activating emergency operation

1. Press **OK**.
2. Request the menu item Maintenance.
3. Press **OK**.
4. Request the parameter Manual control (prog. no. 7140).
5. Press **OK**.
6. Select the parameter On.
7. Press **OK**.
8. Leave the programming level by pressing the **operating mode key for heating mode**.

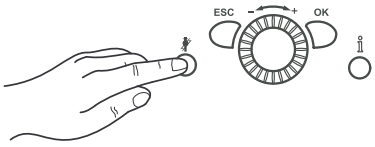
■ Adjusting setpoint for emergency operation

Using the operation mode "manual operation" you can choose a nominal temperature value for it:

1. Press the **information key**.
2. Press **OK**.
3. Adjust nominal value by using rotating knob
4. Acknowledge setting with **OK**.

8.2.9 Chimney sweep function

The chimney sweep function is activated or deactivated using the **Schornsteinfeger-Taste**.

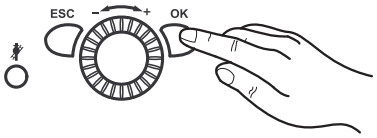


1. Press the **Schornsteinfeger-Taste**.
   The activated special function is displayed by the symbol in the display.

Note
If there is demand for heat from a coiled tubing storage tank, this demand will continue to be met while the emissions test function (chimney sweep function) is running.

8.2.10 Restoring factory settings

The factory settings are restored as follows:



1. Press OK button
2. Select setting level Engineer
3. Select parameter Activate basic settings (prog. no. 31)
4. Change setting to"Yes" and wait until setting returns to "No"
5. Press ESC button
   The factory settings have been restored.

9 Settings

9.1 List of parameters

See
- Subject to system configuration, not all parameters listed in the parameter list will be shown on the display.
- To reach the end user (Eu), Commissioning (C) and Engineer (E) setting levels:
  - Press the **OK-Taste**.
  - Then press the **Informationstaste** for approx. 3 s.
  - Select the circuit using the control knob.
  - Confirm with the **OK-Taste**.

Set time and date	Prog. no.	Level	Standard value
Hours / minutes	1	Eu	01:00 (h:min)
Day / month	2	Eu	01.01 (day.month)
Year	3	Eu	2030 (year)
Start of summertime	5	E	25.03 (day.month)
End of summertime	6	E	25.10 (day.month)

Operator section	Prog. no.	Level	Standard value
Change Language	20	Eu	German
Information Temporarily | Permanently	22	E	Temporarily
Display of errors Code | Code and text	23	E	Code and text
Contrast of display	25	Eu	—
Operation lock Off | On	26	E	Off
Programming lock Off | On	27	E	Off
Units °C, bar | °F, PSI	29	Eu	°C, bar
Save basic settings(1) No | Yes	30	E	No
Activate basic settings(2) No | Yes	31	E	No
Used as Room unit 1 | Room unit 2 | Room unit 3/P | Operator unit 1 | Operator unit 2 | Operator unit 3 | Service unit	40	C	Room unit 1
Assignment device 1(3) Temps / mode CH1 |Central heating 1 and 2 |Central Heating 1 and 3/P |All central heatings	42	C	Temps / mode CH1
Operation CH2 Commonly with HC1 | Independently	44	C	Commonly with HC1
Operation CH3/P Commonly with HC1 | Independently	46	C	Commonly with HC1
Room temp device 1 CH circuit 1 only | For all assigned HCs	47	C	For all assigned HCs
Occupancy button device 1 None | Temps / mode CH1 | For all assigned HCs	48	C	For all assigned HCs
Readjustment room sensor	54	E	0.0 °C

Operator section	Prog. no.	Level	Standard value
Software version	70	E	—

(1) This parameter is only visible in the room device.
(2) This parameter is only visible if a suitable standard setting is available in the operating unit.
(3) This parameter is only visible in the room device, as the operating unit in the boiler is programmed permanently to the operating unit.

Wireless[1]	Prog. no.	Level	Standard value
Outside sensor Missing | In operation| No recept'n | Change batt	133	C	Missing
Delete all devices No | Yes	140	C	No

(1) Parameters only visible if wireless room device exists.

Time program	Heating circuit 1 Prog. no.	Heating circuit 2[1] Prog. no.	Heating circuit 3 Prog. no.	Level	Standard value
Select Mon-Sun Mon-Sun | Mon-Fri | Sat-Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun	500	520	540	Eu	Mon
1st Time ON	501	521	541	Eu	06:00 (h/min)
1st Time OFF	502	522	542	Eu	22:00 (h/min)
2nd Time ON	503	523	543	Eu	--:-- (h/min)
2nd Time OFF	504	524	544	Eu	--:-- (h/min)
3rd Time ON	505	525	545	Eu	--:-- (h/min)
3rd Time OFF	506	526	546	Eu	--:-- (h/min)
Copy?	515	535	555	Eu	
Default values No | Yes	516	536	556	Eu	No

(1) Parameters only visible if heating circuit is installed.

Time program heating circuit 4 / DHW	Prog. no.	Level	Standard value
Select Mon-Sun Mon-Sun | Mon-Fri | Sat-Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun	560	Eu	Mon
1st Time ON	561	Eu	05:00 (h/min)
1st Time OFF	562	Eu	22:00 (h/min)
2nd Time ON	563	Eu	--:-- (h/min)
2nd Time OFF	564	Eu	--:-- (h/min)
3rd Time ON	565	Eu	--:-- (h/min)
3rd Time OFF	566	Eu	--:-- (h/min)
Copy?	575	Eu	
Default values No | Yes	576	Eu	No

Time program heating circuit 5	Prog. no.	Level	Standard value
Select Mon-Sun Mon-Sun | Mon-Fri | Sat-Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun	600	Eu	Mon
1st Time ON	601	Eu	06:00 (h/min)
1st Time OFF	602	Eu	22:00 (h/min)
2nd Time ON	603	Eu	--:-- (h/min)
2nd Time OFF	604	Eu	--:-- (h/min)
3rd Time ON	605	Eu	--:-- (h/min)
3rd Time OFF	606	Eu	--:-- (h/min)

Time program heating circuit 5	Prog. no.	Level	Standard value
Copy?	615	Eu	
Default values No | Yes	616	Eu	No

Holidays heating circuit	1 Prog. no.	2(1) Prog. no.	3(1) Prog. no.	Level	Standard value
Select Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 | Period 8	641	651	661	Eu	Period 1
Start	642	652	662	Eu	—.— (day.month)
End	643	653	663	Eu	—.— (day.month)
Operating level Off | Reduced	648	658	668	Eu	Off
(1) Parameters only visible if heating circuit is installed.					

Heating circuit	1 Prog. no.	2(1) Prog. no.	3(1) Prog. no.	Level	Standard value
Comfort setpoint	710	1010	1310	Eu	20.0 °C
Reduced temp setpoint	712	1012	1312	Eu	18 °C
Frost protection setpoint	714	1014	1314	Eu	10.0 °C
Heating curve slope	720	1020	1320	Eu	1,24
Heating curve displacement	721	1021	1321	E	0.0 °C
Heating curve adaption Off | On	726	1026	1326	E	Off
Summer/winter heating limit	730	1030	1330	Eu	18°C
24-hour heating limit	732	1032	1332	E	0 °C
Flow temp setpoint min	740	1040	1340	E	8 °C
Flow temp setpoint max	741	1041	1341	E	80 °C
Flow temp setpoint room stat	742	1042	1342	E	- - - °C
Swi-on ratio room stat	744	1044	1344	E	- - -
Delay heat request	746	1046	1346	E	0 s
Room influence	750	1050	1350	C	- - - %
Room temp limitation	760	1060	1360	E	0.5 °C
Central heating boost	770	1070	1370	E	- - - °C
Quick setback Off | Down to reduced setpoint | Down to frost prot setpoint	780	1080	1380	E	Down to reduced setpoint
Optimum start control max	790	1090	1390	E	0 min
Optimum stop control max	791	1091	1391	E	0 min
Reduced setp increase start	800	1100	1400	E	- - - °C
Reduced setp increase end	801	1101	1401	E	-15 °C
Continuous pump operation No | Yes	809	1109	1409	E	No
Overtemp protect pump circ Off | On	820	1120	1420	E	Off
Mixing valve boost	830	1130	1430	E	5 °C
Actuator running time	834	1134	1434	E	120 s

Heating circuit	1 Prog. no.	2(1) Prog. no.	3(1) Prog. no.	Level	Standard value
Floor curing function Off | Functional heating | Curing heating | Curing/ functional heating | Functional/curing heating | Manually	850	1150	1450	E	Off
Floor curing setp manually	851	1151	1451	E	25 °C
Floor curing setp current	855	1155	1455	E	- - - °C
Floor curing day current	856	1156	1456	E	0
Excess heat draw Off | Heating mode | Always	861	1161	1461	E	Heating mode
With buffer No | Yes	870	1170	1470	E	Yes
With prim contr/system pump No | Yes	872	1172	1472	E	Yes
Pump speed reduction Operating level | Characteristic	880	1180	1480	E	Characteristic
Pump speed min	882	1182	1482	C	10 %
Pump speed max	883	1183	1483	C	100 %
Curve readj at 50% speed	888	1188	1488	E	10 %
Flow setp readj speed ctrl No | Yes	890	1190	1490	E	Yes
Operating level changeover Off | Reduced | On	898	1198	1498	E	Reduced
Optg mode changeover None | Off | Reduced | On | Timed	900	1200	1500	E	Off
(1) Parameters only visible if heating circuit is installed.					

DHW	Prog. no.	Level	Standard value
Hot water temp setpoint	1610	Eu	55 °C
Reduced temp setpoint	1612	E	45 °C
Hot water temp setpoint max	1614	E	65 °C
Release 24h/day | Time setting central heating | Time hot water	1620	Eu	Time hot water
Charging priority Absolute | Shifting | None | MC shifting, PC absolute	1630	E	MC shifting, PC absolute
Legionella function Off | Periodically | Fixed weekday	1640	E	Fixed weekday
Legionella funct periodically	1641	E	3
Legionella funct weekday Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday	1642	E	Sunday
Legionella funct time	1644	E	- - -
Legionella funct setpoint	1645	E	65 °C
Legionella funct duration	1646	E	- - - min
Legionella funct circ pump Off | On	1647	E	On
Circulating pump release Time setting 3/CHP | Hot water release | Time hot water | Time auxiliary	1660	C	Hot water release
Circulating pump cycling Off | On	1661	C	On
Circulation setpoint	1663	E	55 °C

DHW	Prog. no.	Level	Standard value
Optg mode changeover None | Off | On	1680	E	Off

Consumer circuit / swimming pool circuit	Consumer circuit 1 Prog. no.	Consumer circuit 2 Prog. no.	Swimming pool circuit Prog. no.	Level	Standard value
Flow temp setp cons request	1859	1909	1959	C	70 °C
Hot water charging priority No | Yes	1874	1924	1974	E	Yes
Excess heat draw Off | On	1875	1925	1975	E	On
With buffer No | Yes	1878	1928	1978	E	Yes
With prim contr/system pump No | Yes	1880	1930	1980	E	Yes

Swimming pool	Prog. no.	Level	Standard value
Setpoint solar heating	2055	Eu	26 °C
Setpoint source heating	2056	Eu	22 °C
Charging priority solar Priority 1 | Priority 2 | Priority 3	2065	E	Priority 3
Swimming pool temp max	2070	E	32 °C
With solar integration No | Yes	2080	E	Yes

Primary control/feed pump	Prog. no.	Level	Standard value
Flow temp setpoint min	2110	E	8 °C
Flow temp setpoint max	2111	E	80 °C
Syst pump on heat gen lock Off | On	2121	E	Off
Mixing valve boost	2130	E	0 °C
Actuator running time	2134	E	120 s

Boiler	Prog. no.	Level	Standard value
Release below outside temp	2203	E	- - - °C
Full charging buffer Off | On	2208	E	Off
Setpoint min	2210	E	20 °C
Setpoint max	2212	E	90 °C
Setpoint manual control	2214	Eu	60 °C
Burner running time min	2241	E	1 min
Burner off time min	2243	E	3 min
SD burner off time	2245	E	20 °C
Pump overrun time	2250	E	2 min
Pump overr time after HW	2253	E	5 min
Syst frost prot boiler pump Off | On	2300	E	Off
Boiler pump on heat gen lock Off | On	2301	E	Off
Impact heat generation lock Heating mode only | Heating and HW mode	2305	E	Heating and HW mode

Boiler	Prog. no.	Level	Standard value
Temp differential max	2316	C	- - -
Temp differential nominal	2317	C	15 °C
Pump modulation None | Demand | Boiler setpoint | Temp differential nominal | Burner output	2320	E	Temp differential nominal
Pump speed min	2322	E	10 %
Pump speed max	2323	E	100%
Output nominal	2330	E	EC four 125 kW: 125 kW EC four 170 kW: 170 kW EC four 215 kW: 215 kW EC four 260 kW: 260 kW EC four 300 kW: 300 kW
Output basic stage	2331	E	EC four 125 kW: 20 kW EC four 170 kW: 28 kW EC four 215 kW: 35 kW EC four 260 kW: 42 kW EC four 300 kW: 48 kW
Output at pump speed min	2334	E	10 %
Output at pump speed max	2335	E	90 %
Fan output heating max(1)	2441	E	EC four 125 kW: 125 kW EC four 170 kW: 170 kW EC four 215 kW: 215 kW EC four 260 kW: 260 kW EC four 300 kW: 300 kW
Fan output full charging max(1)	2442	E	EC four 125 kW: 125 kW EC four 170 kW: 170 kW EC four 215 kW: 215 kW EC four 260 kW: 260 kW EC four 300 kW: 300 kW
Fan output DHW max(1)	2444	E	EC four 125 kW: 125 kW EC four 170 kW: 170 kW EC four 215 kW: 215 kW EC four 260 kW: 260 kW EC four 300 kW: 300 kW
Controller delay Off | Heating mode only | Hot water mode only | Heating and HW mode	2450	E	Heating mode only

Boiler	Prog. no.	Level	Standard value
Controller delay fan output(1)	2452	E	EC four 125 kW: 20 kW EC four 170 kW: 28 kW EC four 215 kW: 35 kW EC four 260 kW: 42 kW EC four 300 kW: 48 kW
Controller delay duration	2453	E	60 s
Switching diff on CHs	2454	E	4 °C
Switching diff off min CHs	2455	E	3 °C
Switching diff off max CHs	2456	E	5 °C
Switching diff on HW	2460	E	4 °C
Switching diff off min HW	2461	E	5 °C
Switching diff off max HW	2462	E	7 °C
Delay heat req special op	2470	E	0 s
Pressure switch shutdown Start prevention | Lockout position	2500	E	Start prevention
Gas energy metering Off | On	2550	C	Off
Gas energy metering correction	2551	C	1.0
(1) The kW settings are approximate values. Exact values can be determined by the gas meter for example.			

Cascade	Prog. no.	Level	Standard value
Lead strategy Late on, early off | Late on, late off | Early on, late off |	3510	E	Late on, late off
Release integral source seq	3530	E	50 °C*min
Reset integral source seq	3531	E	20 °C*min
Restart lock	3532	E	300 s
Switch on delay	3533	E	10 min
Auto source seq ch'over	3540	E	100 h
Auto source seq exclusion None | First | Last | First and last	3541	E	None
Leading source Source 1 | Source 2 | Source 3 | Source 4 | Source 5 | Source 6 | Source 7 | Source 8 | Source 9 | Source 10 | Source 11 | Source 12 | Source 13 | Source 14 | Source 15 | Source 16	3544	E	Source 1
Return setpoint min	3560	E	8 °C
Temp differential min	3590	E	- - - °C

Solar	Prog. no.	Level	Standard value
Temp diff on	3810	C	8 °C
Temp diff off	3811	C	4 °C
Charg temp min HW st tank	3812	E	- - - °C
Temp diff on buffer	3813	E	- - - °C
Temp diff off buffer	3814	E	- - - °C
Charging temp min buffer	3815	E	- - - °C
Temp diff on swi pool	3816	E	- - - °C
Temp diff off swi pool	3817	E	- - - °C

Solar	Prog. no.	Level	Standard value
Charging temp min swi pool	3818	E	- - - °C
Charging prio storage tank None | Hot water storage tank | Buffer storage tank	3822	E	Hot water storage tank
Charging time relative prio	3825	E	- - - min
Waiting time relative prio	3826	E	5 min
Waiting time parallel op	3827	E	- - - min
Delay secondary pump	3828	E	60 s
Collector start function	3830	E	- - -
Min run time collector pump	3831	E	20 s
Collector start function on	3832	E	07:00 (h:min)
Collector start function off	3833	E	19:00 (h:min)
Collector start funct grad	3834	E	- - - min/°C
Collector frost protection	3840	E	- - - °C
Collector overtemp prot	3850	E	- - - °C
Evaporation heat carrier	3860	E	130 °C
Antifreeze None | Ethylene glycol | Propylene glycol | Ethyl and propyl glycol	3880	E	Propylene glycol
Antifreeze concentration	3881	E	50 %
Pump capacity	3884	E	200 l/h
Pulse unit yield	3887	E	10 l

Solid fuel boiler	Prog. no.	Level	Standard value
Locks other heat sources Off | On	4102	E	Off
Setpoint min	4110	E	65 °C
Temp diff on	4130	E	8 °C
Temp diff off	4131	E	4 °C
Comparative temp Hot water sensor B3 | Hot water sensor B31 | Buffer sensor B4 | Buffer sensor B41 | Flow temp setpoint | Setpoint min	4133	E	Buffer sensor B41
Pump overrun time	4140	E	20 min

Domestic water storage tank[1]	Prog. no.	Level	Standard value
Forward shift charging	5011	E	01:00 min
Flow setpoint boost	5020	E	18 °C
Transfer boost	5021	E	10 °C
Type of charging Recharging | Full charging | Full charging legio | Full charg 1st time day | Full charg 1st time legio	5022	E	Full charging
Switching diff	5024	E	4 °C
Charging time limitation	5030	E	120 min
Discharging protection Off | Always | Automatically	5040	E	Automatically
Charging temp max	5050	E	65 °C
Recooling temp	5055	E	80 °C
Recooling collector Off | Summer | Always	5057	E	Off
El imm heater optg mode Substitute | Summer | Always	5060	E	Substitute

Domestic water storage tank(1)	Prog. no.	Level	Standard value
El immersion heater release 24h/day | Hot water release | Time hot water	5061	E	Hot water release
El immersion heater control External thermostat | Hot water sensor	5062	E	Hot water sensor
Hot water boost Off | On	5070	E	On
Excess heat draw Off | On	5085	E	On
With buffer No | Yes	5090	E	Yes
With prim contr/system pump No | Yes	5092	E	Yes
With solar integration No | Yes	5093	E	Yes
Pump speed min	5101	E	0 %
Pump speed max	5102	E	100 %
Speed Xp	5103	E	35 °C
Speed Tn	5104	E	120 s
Speed Tv	5105	E	45 s
Transfer strategy Always | Hot water release	5130	E	Always
Interm circ boost recharging	5139	E	5 °C
Intermediate circuit boost	5140	E	3 °C
Excess interm circ temp max	5141	E	2 °C
Flow setp compensation delay	5142	E	30 s
Flow setp compensation Xp	5143	E	60 °C
Flow setp compensation Tn	5144	E	30 s
Flow setp compensation Tv	5145	E	30 s
Full charging with B36 No | Yes	5146	E	Yes
Min start temp diff Q33	5148	E	-3 °C
Excess interm circ temp del	5151	E	30 s
(1) Parameters depend on the hydraulic system.			

Configuration	Prog. no.	Level	Standard value
Temps / mode CH1 Off | On	5710	C	On
Temps / mode CH2 Off | On	5715	C	Off
Temps / mode CH3 Off | On	5721	C	Off
Hot water sensor Hot water sensor B3 | Thermostat	5730	E	Hot water sensor B3
Hot water ctrl elem Q3 No charging request | Charging pump | Diverting valve	5731	E	Charging pump
Basic pos HW div valve Last request | Central heating | Hot water	5734	E	Central heating
Hot water separate circuit Off | On	5736	E	Off
Optg action HW div valve Position on CH | Position on HW	5737	E	Position on CH

Configuration	Prog. no.	Level	Standard value
Ctrl boiler pump/HW valve All requests | Request CH1/HW only	5774	E	All requests
Boiler pump at DHW Off | On	5775	E	On
Solar controlling element Charging pump | Diverting valve	5840	E	Diverting valve
External solar exchanger Commonly | Hot water storage tank | Buffer storage tank	5841	E	Commonly
Combi storage tank No | Yes	5870	E	No
Relay output QX1 None | Circulating pump Q4 | El imm heater HW K6 | Collector pump Q5 | Cons circuit pump VK1 Q15 | Boiler pump Q1 | Alarm output K10 | heating pump CH3 Q20 | Cons circuit pump VK2 Q18 | System pump Q14 | Heat gen shutoff valve Y4 | Solid fuel boiler pump Q10 | Time setting 5 K13 | Buffer return valve Y15 | Solar pump ext exch K9 | Solar ctrl elem buffer K8 | Solar ctrl elem swi pool K18 | Swimming pool pump Q19 | Cascade pump Q25 | St tank transfer pump Q11 | Hot water mixing pump Q35 | HW interm circ pump Q33 | Heat request K27 | heating pump CH1 Q2 | heating pump CH2 Q6 | Hot water ctrl elem Q3 | Status output K35 | Status information K36 | Flue gas damper K37 | Fan shutdown K38	5890	C	Alarm output K10
Relay output QX2 **See** Parameters see Relay output QX1 (prog. no. 5890)!	5891	C	
Relay output QX3 **See** Parameters see Relay output QX1 (prog. no. 5890)!	5892	C	Hot water ctrl elem Q3
Sensor input BX1 None | Hot water sensor B31 | Collector sensor B6 | HW circulation sensor B39 | Buffer sensor B4 | Buffer sensor B41 | Common flow sensor B10 | Solid fuel boiler sensor B22 | HW charging sensor B36 | Buffer sensor B42 | Common return sensor B73 | Cascade return sensor B70 | Swimming pool sensor B13 | Solar flow sensor B63 | Solar return sensor B64	5930	C	
Sensor input BX2 **See** Parameters see Sensor input BX1 (prog. no. 5930)!	5931	C	
Sensor input BX3 **See** Parameters see Sensor input BX1 (prog. no. 5930)!	5932	C	
Function input H1 None | Optg mode change CHs+HW | Optg mode changeover HW | Optg mode changeover CHs | Optg mode changeover CH1 | Optg mode changeover CH2 | Optg mode changeover CH3 | Heat generation lock | Error/alarm message | Consumer request VK1 | Consumer request VK2 | Release swimpool source htg | Excess heat discharge | Release swi pool solar | Operating level HW | Operating level CH1 | Operating level CH2 | Operating level CH3 | Room thermostat CH1 | Room thermostat CH2 | Room thermostat CH3 | Hot water thermostat | Pulse count | Checkb sign flue gas damper | Start prevention | Consumer request VK1 10V | Consumer request VK2 10V | Preselected output 10V	5950	C	None
Contact type H1 NC | NO	5951	C	NO
Voltage value 1 H1	5953	E	0 V
Function value 1 H1	5954	E	0
Voltage value 2 H1	5955	E	10 V

Configuration	Prog. no.	Level	Standard value
Function value 2 H1	5956	E	1000
Function input H4 None | Optg mode change CHs+HW | Optg mode changeover HW | Optg mode changeover CHs | Optg mode changeover CH1 | Optg mode changeover CH2 | Optg mode changeover CH3 | Heat generation lock | Error/alarm message | Consumer request VK1 | Consumer request VK2 | Release swimpool source htg | Excess heat discharge | Release swi pool solar | Operating level HW | Operating level CH1 | Operating level CH2 | Operating level CH3 | Room thermostat CH1 | Room thermostat CH2 | Room thermostat CH3 | Hot water thermostat | Pulse count | Checkb sign flue gas damper | Start prevention | Flow measurement Hz	5970	C	None
Contact type H4 NC | NO	5971	C	NO
Frequency value 1 H4	5973	E	0
Function value 1 H4	5974	E	0
Frequency value 2 H4	5975	E	0
Function value 2 H4	5976	E	0
Function input H5 None | Optg mode change CHs+HW | Optg mode changeover HW | Optg mode changeover CHs | Optg mode changeover CH1 | Optg mode changeover CH2 | Optg mode changeover CH3 | Heat generation lock | Error/alarm message | Consumer request VK1 | Consumer request VK2 | Release swimpool source htg | Excess heat discharge | Release swi pool solar | Operating level HW | Operating level CH1 | Operating level CH2 | Operating level CH3 | Room thermostat CH1 | Room thermostat CH2 | Room thermostat CH3 | Hot water thermostat | Pulse count | Checkb sign flue gas damper | Start prevention	5977	C	None
Contact type H5 NC | NO	5978	C	NO
Function output P1 None | Boiler pump Q1 | Hot water pump Q3 | heating pump CH1 Q2 | heating pump CH2 Q6 | heating pump CH3 Q20 | Collector pump Q5 | Solar pump ext exch K9 | Solar pump buffer K8 | Solar pump swi pool K18	6085	E	
Sensor type collector NTC | Pt 1000	6097	E	NTC
Readjustm collector sensor	6098	E	0 °C
Readjustm outside sensor	6100	E	0 °C
Time constant building	6110	C	10 h
Central setp compensation	6117	E	20 °C
System frost protection Off | On	6120	E	On
Save sensors No | Yes	6200	C	No
Reset to default parameters	6205	E	
Check no. heat source 1	6212	E	
Check no. heat source 2	6213	E	
Check no. storage tank	6215	E	
Check no. heating circuits	6217	E	
Software version	6220	E	
Info 1 OEM	6230	E	
Info 2 OEM	6231	E	
Parameter set number OEM	6236	E	

LPB system	Prog. no.	Level	Standard value
Device address	6600	C	1
Segment address	6601	E	
Bus power supply function Off | Automatically	6604	E	Automatically
Bus power supply state Off | On	6605	E	
Display system messages No | Yes	6610	E	Yes
System message to alarm relay No | Yes	6611	E	Yes
Alarm delay	6612	E	- - - min
Action changeover functions Segment | System	6620	E	System
Summer changeover Locally | Centrally	6621	E	Locally
Optg mode changeover Locally | Centrally	6623	E	Centrally
Manual source lock Locally | Segment	6624	E	Locally
Hot water assignment Local CHs | All CHs in segment | All CHs in system	6625	E	All CHs in system
Note OT limit ext source No | Yes	6632	E	No
Clock mode Autonomously | Slave without remote setting | Slave with remote setting | Master	6640	C	Slave with remote setting
Outside temp source	6650	E	

Fault	Prog. no.	Level	Standard value
Message	6700	Eu	
SW diagnostic code	6705	Eu	
Burn ctrl phase lockout pos	6706	Eu	
Boiler temp alarm	6743	E	- - - min
Hot water charging alarm	6745	E	- - - h
History 1 • Date / Time • Fault code 1	6800	E	
SW diagnostic code 1 • Burner control phase 1	6805	E	
History 2 • Date / Time • Fault code 2	6810	E	
SW diagnostic code 2 • Burner control phase 2	6815	E	
History 3 • Date / Time • Fault code 3	6820	E	
SW diagnostic code 3 • Burner control phase 3	6825	E	
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Fault	Prog. no.	Level	Standard value
History 20 • Date / Time • Fault code 20	6990	E	
SW diagnostic code 20 • Burner control phase 20	6995	E	

Maintenance/special operation	Prog. no.	Level	Standard value
Burner hours interval	7040	E	- - - h
Burn hrs since maintenance	7041	E	0 h
Burner start interval	7042	E	- - -
Burn starts since maint	7043	E	0
Maintenance interval	7044	E	- - - months
Time since maintenance	7045	E	0 months
Fan speed ionization current	7050	E	0 rpm
Message ionization current No | Yes	7051	E	No
Chimney sweep function Off | On	7130	Eu	Off
Manual control Off | On	7140	Eu	Off
Controller stop function Off | On	7143	E	Off
Controller stop setpoint	7145	E	
Compulsory heat draw-off DHW Off | On	7165	E	Off
Telephone customer service	7170	C	- - -
PStick storage pos	7250	E	0
PStick Reg data set	7251	E	
PStick command No operation | Reading from stick | Writing on stick	7252	E	No operation
PStick progress	7253	E	0 %
PStick status No stick | Stick ready | Writing on stick | Reading from stick | EMC test active | Writing error | Reading error | Incompatible data set | Wrong stick type | Stick format error | Check data set | Data set disabled | Reading disabled	7254	E	

Configuration of extension modules	Prog. no.	Level	Standard value
Function extension module 1 None | Multifunctional | Temps / mode CH1 | Temps / mode CH2 | Temps / mode CH3 | Rücklaufregler | Solar HW | Primary contr/system pump	7300	C	Heating circuit 2
Relay output QX21 module 1 None | Circulating pump Q4 | El imm heater HW K6 | Collector pump Q5 | Cons circuit pump VK1 Q15 | Kesselpumpe Q1 | Bypasspumpe Q12 | Alarm output K10 | heating pump CH3 Q20 | Cons circuit pump VK2 Q18 | System pump Q14 | Heat gen shutoff valve Y4 | Solid fuel boiler pump Q10 | Time setting 5 K13 | Pufferrücklaufventil Y15 | Solar pump ext exch K9 | Solar ctrl elem buffer K8 | Solar ctrl elem swi pool K18 | Swimming pool pump Q19 | Flue gas relay K17 | St tank transfer pump Q11 | Hot water mixing pump Q35 | HW interm circ pump Q33 | Heat request K27 | heating pump CH1 Q2 | heating pump CH2 Q6 | Hot water ctrl elem Q3 | Überhitzschutz K11	7301	C	None

Configuration of extension modules	Prog. no.	Level	Standard value
Relay output QX22 module 1 **See** Parameters see Relay output QX21 module 1 (prog. no. 7301)!	7302	C	None
Relay output QX23 module 1 **See** Parameters see Relay output QX21 module 1 (prog. no. 7301)!	7303	C	None
Sensor input BX21 module 1 None | Hot water sensor B31 | Collector sensor B6 | HW circulation sensor B39 | Buffer sensor B4 | Buffer sensor B41 | Common flow sensor B10 | Solid fuel boiler sensor B22 | HW charging sensor B36 | Buffer sensor B42 | Schienen-rücklauffühler B73 | Cascade return sensor B70 | Swimming pool sensor B13 | Solar flow sensor B63 | Solar return sensor B64	7307	C	None
Sensor input BX22 module 1 **See** Parameters see Relay output QX21 module 1 (prog. no. 7307)!	7308	C	None
Function input H2 module 1 None | Optg mode change CHs+HW | Optg mode changeover HW | Optg mode changeover CHs | Optg mode changeover CH1 | Optg mode changeover CH2 | Optg mode changeover CH3 | Heat source block | Error/alarm message | Consumer request VK1 | Consumer request VK2 | Release swimpool source htg | Excess heat discharge | Release swi pool solar | Operating level HW | Operating level CH1| Operating level CH2| Operating level CH3 | Room thermostat CH1| Room thermostat CH2| Room thermostat CH3 | Trinkwasser-thermostat | Limit thermostat HC | Start prevention | Consumer request VK1 10V | Consumer request VK2 10V | Leistungsanforderung 10V	7311	C	None
Contact type H2 module 1 NC | NO	7312	E	NO
Voltage value 1 H2 module 1	7314	E	0.5
Funct value 1 H2 module 1	7315	E	0
Voltage value 2 H2 module 1	7316	E	10
Funct value 2 H2 module 1	7317	E	1000
Function input H21 module 1 None | Optg mode change CHs+HW | Optg mode changeover HW | Optg mode changeover CHs | Optg mode changeover CH1 | Optg mode changeover CH2 | Optg mode changeover CH3 | Heat generation lock | Error/alarm message | Consumer request VK1 | Consumer request VK2 | Release swimpool source htg | Übertemperaturableitung | Release swi pool solar | Operating level HW | Operating level CH1 | Operating level CH2 | Operating level CH3 | Room thermostat CH1 | Room thermostat CH2 | Room thermostat CH3 | Circulating pump thermostat | Pulse count | Boiler return thermostat| Flow measurement Hz | Consumer request VK1 10V | Consumer request VK2 10V | Room temp 10V	7321	C	Optg mode change CHs+HW
Contact type H21 module 1 NC | NO	7322	C	NO
Input value 1 H21 module 1	7324	C	0
Funct value 1 H21 module 1	7325	C	0
Input value 2 H21 module 1	7326	C	10
Funct value 2 H21 module 1	7327	C	100
Funct input EX21 module 1 None | Counter 1st burner stage | Heat generation lock | Error/alarm message | Excess heatdischarge	7342	C	None

Configuration of extension modules	Prog. no.	Level	Standard value
Funct output UX21 module 1 None | Boiler pump Q1 | DHW pump Q3 | DHW intermediate circuit pump Q33 | Heat circuit pump HC1 Q2 | Heat circuit pump HC2 Q6 | Heat circuit pump HC3 Q20 | Collector pump Q5 | Solar pump ext. exchanger K9 | Solar pump buffer K8 | Solar pump swimming pool K18 | Solid fuel boiler pump Q10 | Boiler set-point	7348	C	None
Signal output UX21 module 1 10 V | PWM	7350	C	PWM
Funct output UX22 module 1 **See** Parameters see Funct output UX21 module 1 (prog. no. 7348)!	7355	C	None
Signal output UX22 module 1 10 V | PWM	7357	C	PWM
Function extension module 2 None | Multifunctional | Heating circuit 1 | Heating circuit 2 | Heating circuit 3 | Return temperature controller | Solar DHW | Primary control/system pump	7375	C	None
Relay output QX21 module 2 None | Circulation pump Q4 | El imm heater DHW K6 | Collector pump Q5 | Cons circuit pump VK1 Q15 | Boiler pump Q1 | Bypass pump Q12 | Alarm output K10 | Heat circuit pump HC3 Q20 | Consumer circuit pump VK2 Q18 | System pump Q14 | Heat gen shut-off valve Y4 | Solid fuel boiler pump Q10 | Time program 5 K13 | Buffer return valve Y15 | Solar pump ext. exchanger K9 | Solar actuator buffer K8 | Solar actuator swimming pool K18 | Swimming pool pump Q19 | Flue gas relay K17 | Storage tank transfer pump Q11 | DHW mixing pump Q35 | DHW intermediate circuit pump Q33 | Heat request K27 | Heat circuit pump HC1 Q2 | Heat circuit pump HC2 Q6 | DHW control element Q3 | Overheating protection K11	7376	C	None
Relay output QX22 module 2 **See** Parameters see Relay output QX21 module 2 (prog. no. 7376)!	7377	C	None
Relay output QX23 module 2 **See** Parameters see Relay output QX21 module 2 (prog. no. 7376)!	7378	C	None
Sensor input BX21 module 2 **See** Parameters see Sensor input BX21 module 1 (prog. no. 7307)!	7382	C	None
Sensor input BX22 module 2 **See** Parameters see Sensor input BX21 module 1 (prog. no. 7307)!	7383	C	None
Function input H2 module 2 **See** Parameters see Function input H21 module 1 (prog. no. 7321)!	7386	C	None
Contact type H2 module 2 NC | NO	7387	C	NO
Voltage value 1 H2 module 2	7389	E	0.5
Funct value 1 H2 module 2	7390	E	0
Voltage value 2 H2 module 2	7391	E	10

Configuration of extension modules	Prog. no.	Level	Standard value
Funct value 2 H2 module 2	7392	E	1000
Function input H21 module 2  See Parameters see Function input H21 module 1 (prog. no. 7321)!	7396	C	Operating mode change HCs+DHW
Contact type H21 module 2 NC | NO	7397	C	NO
Input value 1 H21 module 2	7399	C	0
Funct value 1 H21 module 2	7400	C	0
Input value 2 H21 module 2	7401	C	10
Funct value 2 H21 module 2	7402	C	100
Funct input EX21 module 2 None | Counter 1st burner stage | Heat Generation lock| Error/Alarm message | Excess heat discharge	7417	C	None
Funct output UX21 module 2  See Parameters see Funct output UX21 module 1 (prog. no. 7348)!	7423	C	None
Signal output UX21 module 2 10 V | PWM	7425	C	PWM
Funct output UX22 module 2  See Parameters see Funct output UX21 module 1 (prog. no. 7348)!	7430	C	None
Signal output UX22 module 2 10 V | PWM	7432	C	PWM
Function extension module 3 None | Multifunctional | Heat circuit 1 | Heat circuit 2 | Heat circuit 3 | Solar DHW | Primary control/system pump	7450	C	
Relay output QX21 module 3  See Parameters see Relay output QX1 (prog. no. 5890) except Flue gas damper K37!	7451	C	None
Relay output QX22 module 3  See Parameters see Relay output QX1 (prog. no. 5890) except Flue gas damper K37!	7452	C	None
Relay output QX23 module 3  See Parameters see Relay output QX1 (prog. no. 5890) except Flue gas damper K37!	7453	C	None
Sensor input BX21 module 3  See Parameters see Sensor input BX21 module 1 (prog. no. 7307)!	7457	C	None
Sensor input BX22 module 3  See Parameters see Sensor input BX21 module 1 (prog. no. 7307)!	7458	C	None

Configuration of extension modules	Prog. no.	Level	Standard value
Function input H2 module 3  **See** Parameters see Function input H21 module 1 (prog. no. 7321)!	7461	C	None
Contact type H2 module 3 NC | NO	7462	E	NO
Voltage value 1 H2 module 3	7464	E	0.5
Funct value 1 H2 module 3	7465	E	0
Voltage value 2 H2 module 3	7466	E	10
Funct value 2 H2 module 3	7467	E	1000
Function input H21 module 3  **See** Parameters see Function input H21 module 1 (prog. no. 7321)!	7471	C	None
Contact type H21 module 3 NC | NO	7472	C	NO
Input value 1 H21 module 3	7474	C	0
Funct value 1 H21 module 3	7475	C	0
Input value 2 H21 module 3	7476	C	10
Funct value 2 H21 module 3	7477	C	100
Funct input EX21 module 3 None | Limit thermostat HC	7492	C	None
Funct output UX21 module 3  **See** Parameters see Funct output UX21 module 1 (prog. no. 7348)!	7498	C	None
Signal output UX21 module 3 10 V | PWM	7500	C	PWM
Funct output UX22 module 3  **See** Parameters see Funct output UX21 module 1 (prog. no. 7348)!	7505	C	None
Signal output UX22 module 3 10 V | PWM	7507	C	PWM

Input/output test	Prog. no.	Level	Standard value
Relay test No test | Everything off | Relay output QX1 | Relay output QX2 | Relay output QX3 | Relay output QX4 | Relay output QX21 module 1 | Relay output QX22 module 1 | Relay output QX23 module 1 | Relay output QX21 module 2 | Relay output QX22 module 2 | Relay output QX23 module 2	7700	C	No test
Output test P1	7713	C	
PWM signal P1	7714	C	
Outside temp B9	7730	C	
Hot water temp B3/B38	7750	C	
Boiler temp B2	7760	C	
Output test UX21 module 1	7780	C	
Output test UX22 module 1	7782	C	
Output test UX21 module 2	7784	C	
Output test UX22 module 2	7786	C	

Input/output test	Prog. no.	Level	Standard value
Output test UX21 module 3	7788	C	
Output test UX22 module 3	7790	C	
Sensor temp BX1	7820	C	
Sensor temp BX2	7821	C	
Sensor temp BX3	7822	C	
Sensor temp BX21 module 1	7830	C	
Sensor temp BX22 module 1	7831	C	
Sensor temp BX21 module 2	7832	C	
Sensor temp BX22 module 2	7833	C	
Sensor temp BX21 module 3	7834	C	
Sensor temp BX22 module 3	7835	C	
Voltage signal H1	7840	C	
Contact state H1 Open | Closed	7841	C	
Voltage signal H2 module 1 Parameters see Contact state H1	7845	C	
Voltage signal H2 module 2 Parameters see Contact state H1	7848	C	
Voltage signal H2 module 3 Parameters see Contact state H1	7851	C	
Frequency H4	7862	C	
Contact state H5 Open | Closed	7865	C	
Contact state H6 Open | Closed	7872	C	
Input EX21 module 1	7950	C	
Input EX21 module 2	7951	C	
Input EX21 module 3	7952	C	

Status	Prog. no.	Level	Standard value
State central heating CH1	8000	C	
State central heating CH2	8001	C	
State central heating CH3	8002	C	
State hot water	8003	C	
State boiler	8005	C	
State solar	8007	C	
State solid fuel boiler	8008	C	
State burner	8009	C	
State buffer	8010	C	
State swimming pool	8011	C	

Diagnostics cascade	Prog. no.	Level	Standard value
Priority/state source 1 Missing | Faulty | Manual control active | Heat generation lock active | Chimney sweep funct active | Temporarily unavailable | Outside temp limit active | Not released | Released	8100	C	
Priority/state source 2 **See** Parameters see Priority/state source 1 (prog. no. 8100)!	8102	C	

Diagnostics cascade	Prog. no.	Level	Standard value
Priority/state source 3 **See** Parameters see Priority/state source 1 (prog. no. 8100)!	8104	C	
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.	.	.	
Priority/state source 16 **See** Parameters see Priority/state source 1 (prog. no. 8100)!	8130	C	
Cascade flow temp	8138	C	
Cascade flow temp setp	8139	C	
Cascade return temp	8140	C	
Cascade return temp setp	8141	C	
Source seq ch'over current	8150	C	

Diagnostics heat generation	Prog. no.	Level	Standard value
Boiler pump Q1	8304	E	
Boiler pump speed	8308	E	
Boiler temperature	8310	C	
Boiler setpoint	8311	C	
Boiler switching point	8312	C	
Boiler return temp	8314	C	
Fan speed	8323	C	
Set point fan	8324	C	
Current fan control	8325	C	
Burner modulation	8326	C	
Ionization current	8329	C	
Hours run 1st stage	8330	Eu	
Start counter 1st stage	8331	C	
Hours run heating mode	8338	Eu	
Hours run HW	8339	Eu	
Overall gas energy heating	8378	Eu	
Overall gas energy DHW	8379	Eu	
Overall gas energy	8380	Eu	
Gas energy heating	8381	Eu	
Gas energy DHW	8382	Eu	
Gas energy	8383	Eu	
Current phase number	8390	E	
Solar Gain 24 Hour	8526	Eu	
Total Solar Gain	8527	Eu	
Hours run solar	8530	Eu	
Hours run collector pump	8532	Eu	

Diagnostics consumers	Prog. no.	Level	Standard value
Outside temp	8700	Eu	
Outside temp min	8701	Eu	

Diagnostics consumers	Prog. no.	Level	Standard value
Outside temp max	8702	Eu	
Outside temp attenuated	8703	E	
Outside temp composite	8704	E	
Central heating pump 1 Off | On	8730	C	
Speed CH pump 1	8735	C	
Room temp 1	8740	C	
Room setpoint 1			
Flow temp setpoint 1			
Room thermostat 1 No demand | Demand	8749	C	
Central heating pump 2 Off | On	8760	C	
Heat circ mix valve 2 open Off | On	8761	C	
Heat circ mix valve 2 close Off | On	8762	C	
Speed CH pump 2	8765	C	
Room temp 2	8770	C	
Room setpoint 2			
Flow temp 2	8773	C	
Flow temp setpoint 2			
Room thermostat 2 No demand | Demand	8779	C	
Flow temp setp VK1	8875	C	
Common flow temp	8950	E	
Common flow temp setpoint	8951	E	
Relay output QX1 Off | On	9031	C	
Relay output QX2 Off | On	9032	C	
Relay output QX3 Off | On	9033	C	
Relay output QX21 module 2 Off | On	9053	C	
Relay output QX22 module 2 Off | On	9054	C	
Relay output QX23 module 2 Off | On	9055	C	
Relay output QX21 module 3 Off | On	9056	C	
Relay output QX22 module 3 Off | On	9057	C	
Relay output QX23 module 3 Off | On	9058	C	

Burner control	Prog. no.	Level	Standard value
Prepurge time	9500	E	20 s

Burner control	Prog. no.	Level	Standard value
Required output prepurging(1)	9504	E	EC four 125 kW: 73 kW EC four 170 kW: 94 kW EC four 215 kW: 96 kW EC four 260 kW: 120 kW EC four 300 kW: 129 kW
Required output ignition1)	9512	E	EC four 125 kW: 59.3 kW EC four 170 kW: 75.5 kW EC four 215 kW: 77.1 kW EC four 260 kW: 97.7 kW EC four 300 kW: 103.9 kW
Required output LF1)	9524	E	EC four 125 kW: 20 kW EC four 170 kW: 28 kW EC four 215 kW: 35 kW EC four 260 kW: 42 kW EC four 300 kW: 48 kW
Required output HF1)	9529	E	EC four 125 kW: 125 kW EC four 170 kW: 170 kW EC four 215 kW: 215 kW EC four 260 kW: 260 kW EC four 300 kW: 300 kW
Postpurge time	9540	E	20 s
Fan output/speed slope	9626	E	EC four 125 kW: 37.1 EC four 170 kW: 27.6 EC four 215 kW: 26.4 EC four 260 kW: 20.1 EC four 300 kW: 19.9

Burner control	Prog. no.	Level	Standard value
Fan output/speed Y-section	9627	E	EC four 125 kW: 501.1 EC four 170 kW: 517.2 EC four 215 kW: 464.4 EC four 260 kW: 488.0 EC four 300 kW: 431.7
(1) The kW settings are approximate values. Exact values can be determined by the gas meter for example.			

Info option(1)	Prog. no.	Level	Standard value
Fault message			
Maintenance			
Setpoint manual control			
Floor curing setpoint current			
Floor curing day current			
Room temperature			
Room temperature minimum			
Room temperature maximum			
Cascade supply temperature			
Boiler temperature			
Outside temperature			
Outside temperature minimum			
Outside temp maximum			
DHW temp 1			
DHW drawing temperature			
Collector temperature 1			
24-hour yield solar energy			
Total yield solar energy			
Solid fuel boiler temperature			
Buffer temperature 1			
Swimming pool temperature			
State central heating CH1			
State central heating CH2			
State central heating CH3			
State hot water			
State boiler			
State solar			
State solid fuel boiler			
State buffer			
State swimming pool			
Year			
Date			
Time			
Telephone customer service			

Info option(1)	Prog. no.	Level	Standard value
Water pressure			
(1) The display of the information values depends on the operating status.			

9.2 Description of the parameters

9.2.1 Time and date

■ Time and date (1–3)

The regulator has a year clock with setting possibilities for time, day/month and year. Time and date must be correctly set, so that the heating programs can operate to previously carried out programming.

■ Summer time (5/6)

The start of summer time can be set under prog. no. 5; the end of summer time is set under prog. no. 6. The time changing is carried out on the Sunday following the set date.

9.2.2 Operator section

■ Change Language (20)

This is where you can change the language of the users prompts.

■ Information (22)

- Temporarily: The information display returns to the basic display after 8 minutes.
- Permanently: The information display remains permanently displayed after call-up with the information button.

■ Contrast of display (25)

You can select the contrast of the display here.

■ Operation lock (26)

If this function is activated the following operating elements are locked:
- Operating mode buttons for heating and drinking water mode
- Rotary selector (room temperature comfort setpoint)
- Presence button (only room unit)

■ Programming lock (27)

If this lock is activated, parameters can be displayed but not changed.

- Temporary unlocking:
  Press OK and ESC simultaneously for at least 3 s. The lock will be reactivated after leaving the setting level.
- Permanent unlocking:
  First temporary unlocking, then prog.no. 27 to Off.

■ Units (29)

Here you can choose between SI units (°C, bar) and US-American units (°F, PSI).

■ Save basic settings (30)

The parameters of the regulator are written into the room unit/backed up (only available for room unit).

Caution
The parameters of the room unit are overwritten! With this, the individual programming of the regulator in the room unit can be ensured.

■ Activate basic settings (31)

The data of the operating unit or room unit are written into the control.

Caution
The control parameters are overwritten. The factory settings are stored in the operating unit.

- Activation of prog. no. 31 at the *operating unit*.
  The regulator is reset to **factory setting**.
- Activation of prog. no. 31 at the *room unit*.
  The individual programming of the room unit is written into the control.

Note
This parameter is only visible if a suitable standard setting is available in the programming unit.

Used as (40)

- Room unit 1/Room unit 2/Room unit 3: this setting establishes which heating circuit the room unit on which this setting is made is to be used. When Room unit 1 is selected, further heating circuits can be assigned under prog.no. 42, whereas when Room unit 2/Room unit 3 is selected only the relevant heating circuit can be operated.
- Operator unit 1/Operator unit 2/Operator unit 3: this setting is provided for pure operation without room functions and is note required in connection with this controller.
- Service unit: this setting is used, for example, to back up or save controller settings.

Assignment device 1 (42)

If setting Room unit 1 (prog. no. 40) was selected at the room controller, determine the heating circuits to which room controller 1 is assigned under prog. no. 42.

Operation CH2/Operation CH3/P (44/46)

When Room unit 1 or Operator unit 1 (prog.no. 40) is selected, it must be defined under prog.no. 44 or 46 whether the heating circuits HK2 and HK3/P are to be operated together with heating circuit 1 or independently of heating circuit 1.

Room temp device 1 (47)

The assignment of room unit 1 to the heating circuits can be selected here.

- CH circuit 1 only: The room temperature is sent exclusively to heating circuit 1.
- For all assigned HCs: The room temperature is sent to the heating circuits assigned under prog. no. 42.

Action occupancy button (48)

You can select the assignment of the presence key here.

- None: Pressing the presence key has no effect on the heating circuits.
- CH circuit 1 only: The presence key only affects heating circuit 1.
- For all assigned HCs: The presence key affects the heating circuits assigned under prog. no. 42.

Readjustment room sensor (54)

The temperature display of the value transmitted by the room sensor can be corrected here.

Software version (70)

Display of the current software version.

9.2.3 Wireless

List of devices (130-138)

The state of the respective device will be displayed under programme numbers 130 to 138.

■ Delete all devices (140)

The wireless connections to all units is cancelled here.

9.2.4 Time programs

■ General information about the time programs.

Note
Time programs 1 and 2 are always assigned to the respective heating circuits (1 - 3) and only displayed if these heating circuits are present and also turned on in the menu **Configuration** (prog.-no. 5710 and 5715).

Time program 3 can be used for heating circuit 3, for the DHW and for the circulation pump, depending on the setting, and is always displayed.

Time program 4 can be used for the DHW and for the circulation pump, depending on the setting, and is always displayed.

Time program 5 is not assigned a function and can be freely used for any application using an output QX.

■ Select (500 – 600)

Selection of weekday or day blocks. The day blocks (Mon-Sun, Mon-Fri and Sat-Sun) assist the adjustment. The set times are only copied to the individual weekdays and can be changed in the individual day settings as required.

The times of the individual weekdays always determine the heating program.

Note
If a time in a group of days is changed, all 3 start/stop phases will be copied to the day group automatically.
To call up groups of days (Mon-Sun, Mon-Fri or Sat-Sun), turn the control knob anti-clockwise; to call up individual days (Mon, Tue, Wed, Thu, Fri, Sat, Sun), turn the control knob clockwise.

■ Heating phases (501 — 606)

Up to 3 heating phases can be set per heating circuit. These are active on the days selected under Select (prog.no. 500, 520, 540, 560, 600). During the heating phases the system heats to the set comfort setpoint. Outside the heating phases, the system heats to the reduced setpoint.

Note
The time programs are only activated in Automatically operating mode.

■ Copy? (515–615)

The time switching program for one day can be copied and assigned to another or several other days.

Note
Day blocks cannot be copied.

■ Default values (516-616)

Setting of the default values given in the setting table

9.2.5 Holiday programs

■ Select (641 - 661)

Note
The heating circuits may be set to a selectable operation level with the holiday programme during a certain holiday period.

8 holiday periods can be selected with this preselection.

- **Start of holiday (642 - 662)**

Entering the holiday start.

- **End of holiday (643 - 663)**

Entering the holiday end.

- **Operating level (648-668)**

Selecting the operating level (Reduced or Off) for the holiday program.

Note
A holiday period always ends on the last day at 12:00 AM (00:00). The holiday programmes are only activated in the operation modeAutomatically .

9.2.6 Heating circuits

- **Comfort setpoint (710, 1010, 1310)**

Setting of the comfort setpoint in the heating phases. Without room sensor or with the room influence switched off (prog.no. 750, 1050, 1350), this value is used for calculation of the flow temperature, to theoretically reach the set room temperature.

- **Reduced temp setpoint (712, 1012, 1312)**

Setting of the desired room temperature during the reduced heating phase. Without room sensor or with the room influence switched off (prog.no. 750, 1050, 1350), this value is used for calculation of the flow temperature, to theoretically reach the set room temperature.

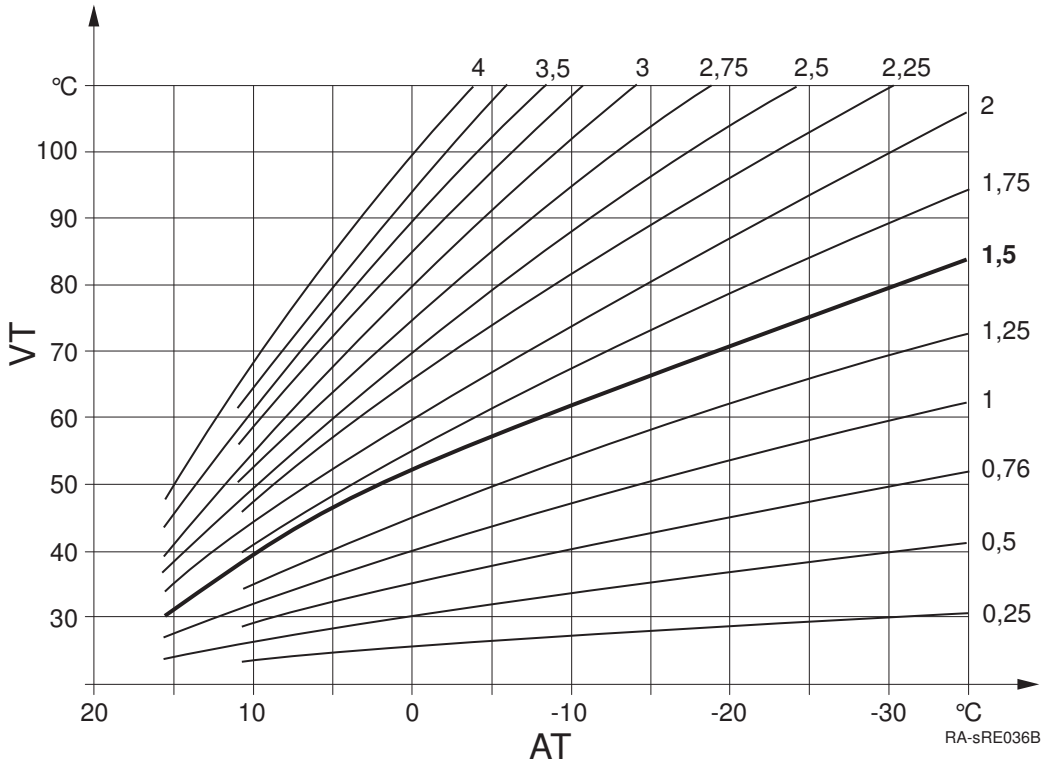
- **Frost protection setpoint (714, 1014, 1314)**

Setting of the required room temperature during frost protection mode. Without room sensor or with the room influence switched off (prog.no. 750, 1050, 1350), this value is used for calculation of the flow temperature, to theoretically reach the set room temperature. The heating circuit remains turned off until the flow temperature drops so far that the room temperature falls below the frost protection temperature.

- **Heating curve slope (720, 1020, 1320)**

Using the heating curve, the flow temperature setpoint is formed that is used to regulate the heating circuit, subject to the outside temperature. The gradient indicates how much the flow temperature changes by with changing outside temperature.

Fig.29 Heating curve diagram



AT Outdoor temperature

VT Flow temperature

Determination of the heating curve gradient

Enter the lowest calculated outside temperature according to climate zone (e.g. -12°C in Frankfurt) into the diagram (see Figure 1, page 87) (e.g. vertical line at -12°C). Enter the maximum flow temperature of the heating circuit, at which a room temperature of 20 °C is still calculated to be reached at -12 °C outside temperature (e.g. horizontal line at 60 °C).

The intersection of both lines provides the value for the heating curve slope.

■ Heating curve displacement (721, 1021, 1321)

Heating curve correction by parallel offset if the room temperature is generally too high or too low.

■ Heating curve adaption (726, 1026, 1326)

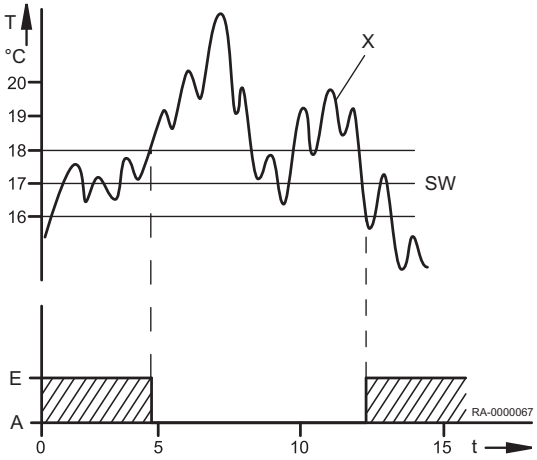
Automatic adaptation of the heating curve to the actual conditions, as a result of which no correction of the heating curve slope is required.

Note

Automatic adaptation of the heating curve requires the connection of a room sensor. The value for room influence (see prog. no. 750, 1050, 1350) must be set between 1% and 99%. Should there be radiator valves in the lead room (where the room sensor is installed), these must be fully opened.

■ Summer/winter heating limit (730, 1030, 1330)

Fig.30 Summer/winter heating limit



A Off
E On
SW Summer/winter heating limit
T Temperature
t Time
x Outside temp attenuated (prog.no. 8703)

The heating circuit switches to summer operation as soon as the average outside temperature over the past 24 hours rises 1°C above the value set here. As soon as the average of the outside temperatures of the last 24 hours drops 1°C below the value set here, the heating circuit switches back into winter mode.

■ 24-hour heating limit (732, 1032, 1332)

The 24-hour heating limit shuts off the heating circuit if the current outside temperature increases up to the differential set here to the current operating level (reduced or comfort setpoint). The heating switches on again if the current outside temperature falls again below the set differential minus 1 °C.

Note
In the operating mode **continuous mode** ☼ or ☾ this function is not activated.

■ Flow temp setpoint min (740, 1040, 1340) and Flow temp setpoint max (741, 1041, 1341)

With this function, a range can be defined for the flow setpoint. When the flow temperature setpoint reaches the respective limit, this remains constant, even if heat demand rises or falls.

If a pump heating circuit is operated parallel with other requirements, it can cause higher resulting temperatures in the pump heating circuit.

■ Flow temp setpoint room stat (742, 1042, 1342)

For room thermostat mode the flow setpoint set here applies.

With the setting **--°C**, the value calculated via the heating curve is used as the flow setpoint.

■ Delay heat request (746, 1046, 1346)

The boiler heat request is forwarded to the burner delayed by the time set here. In this way a slowly opening mixer can already start up before the burner goes into operation.

Note
If the option **Absolute** is selected under prog.no. 1630, the value **0** must be set under this prog.no. For special functions (e.g. chimney-sweep function) the delay does not have an effect (see prog.no. 2470).

■ Room influence (750, 1050, 1350)

The flow temperature is calculated by means of the heating curve subject to outside temperature. This type of control assumes that the heating curve is set correctly, since room temperature is not taken into consideration with this setting.

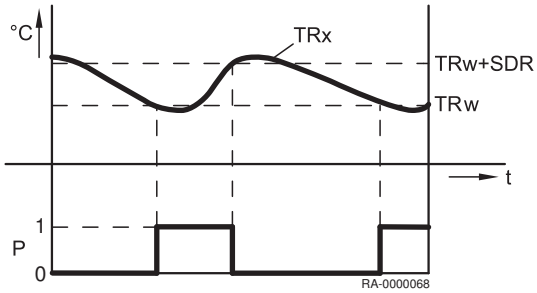
Note
However, if there is a RGT/RGTF or RGB room unit connected, and the setting “room influence” is set between 1 and 99%, the deviation of the actual and set room temperatures is captured and taken into account in the temperature control. In this way any external heat can be taken into account enabling a constant room temperature to be achieved. The influence of the deviation can be set in percentage. The more representative the lead room is (correct room temperature, correct installation location etc.), the higher the value can be set, giving the room temperature even greater relevance.

Caution
Should there be radiator valves in the lead room (where the room sensor is installed), they must be opened fully.

- Setting for weather compensation with room influence: 1% - 99%
- Setting for pure weather compensation: ---%
- Setting for pure room compensation: 100%

Room temp limitation (760, 1060, 1360)

Fig.31 Room temp limitation



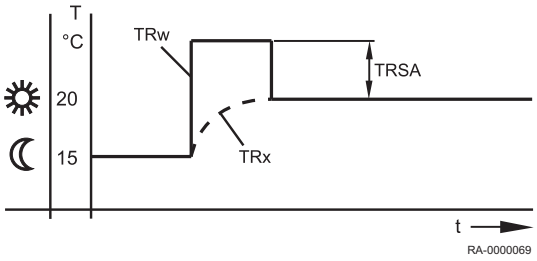
TRx Room temperature actual value
TRw Room temperature setpoint
SDR Room switching difference
P Pump
t Time
1 On
0 Off

The heating circuit pump is switched on or off subject to room temperature in line with the switching differential set here. The switch-off point of the pump is set as the difference to the set room setpoint. The pump switch-on point is 0.25 °C below the room setpoint. This function is only possible with the RGT/ RGTF or RGB room unit and active room influence.

Note
A room sensor must be connected. This function only applies to pumped heating circuits.

Central heating boost(770, 1070, 1370)

Fig.32 Boost heating



TRw Room temperature setpoint
TRx Room temperature actual value
TRS Room temperature setpoint-raised
A

The boost heating becomes active when the room temperature setpoint is switched over from protection or reduced mode to comfort mode. During the boost heating, the room temperature setpoint is increased by the value set here. This causes the actual room temperature to rise to the new temperature setpoint quickly. The boost heating ends when the actual room temperature captured by a RGT/RGTF or RGB room unit (*accessories*) rises to 0.25 °C below the comfort setpoint.

Without room sensor or without room influence, boost heating is implemented in accordance with an internal calculation. Due to the room setpoint acting as a basis, the effect of the duration of the boost heating and that of the flow temperature works differently for each outside temperature.

Quick setback (780, 1080, 1380)

Quick reduction becomes active if the room temperature setpoint is switched from comfort level to another operating level (reduced mode or protection mode). During quick reduction the heating circuit pump is switched off and the mixing valve is also closed in the case of mixed circuits. During quick reduction no heat requirement is sent to the heat generator.

Quick reduction is possible with or without room sensor: with room sensor the heating circle function is switched off until the room temperature has dropped to the reduced setpoint or frost protection setpoint. When the room temperature has dropped to the reduced setpoint or the frost protection setpoint, the heating circuit pump starts again and the mixing valve is

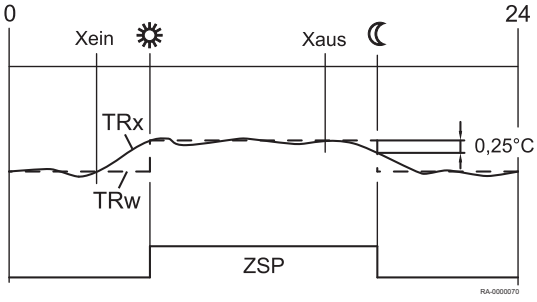
enabled. Without room sensor the quick reduction switches the heater off depending on the outside temperature and the building time constant (prog.no. 6110) until the temperature has theoretically dropped to the reduced target value or the frost protection value.

Tab.9 Duration of the quick reduction

Duration of the quick reduction for reduction by **2**°C in hrs:							
Outside temperature mixed:	Building time constant (configuration, prog.no. 6110)						
	0 hrs	2 hrs	5 hrs	10 hrs	15 hrs	20 hrs	50 hrs
15°C	0	3.1	7.7	15.3	23		
10°C	0	1.3	3.3	6.7	10	13.4	
5°C	0	0.9	2.1	4.3	6.4	8.6	21.5
0°C	0	0.6	1.6	3.2	4.7	6.3	15.8
-5°C	0	0.5	1.3	2.5	3.8	5	12.5
-10°C	0	0.4	1	2.1	3.1	4.1	10.3
-15°C	0	0.4	0.9	1.8	2.6	3.5	8.8
-20°C	0	0.3	0.8	1.5	2.3	3.1	7.7
Duration of the quick reduction for reduction by **4**°C in hrs:							
Outside temperature mixed:	Building time constant (configuration, prog.no. 6110)						
	0 hrs	2 hrs	5 hrs	10 hrs	15 hrs	20 hrs	50 hrs
15°C	0	9.7	24.1				
10°C	0	3.1	7.7	15.3	23		
5°C	0	1.9	4.7	9.3	14	18.6	
0°C	0	1.3	3.3	6.7	10	13.4	
-5°C	0	1	2.6	5.2	7.8	10.5	26,2
-10°C	0	0.9	2.1	4.3	6.4	8.6	21.5
-15°C	0	0.7	1.8	3.6	5.5	7.3	18.2
-20°C	0	0.6	1.6	3.2	4.7	6.3	15.8

■ Optimum start control max (790, 1090, 1390) and Optimum stop control max (791, 1091, 1391)

Fig.33 Optimum start and stop control



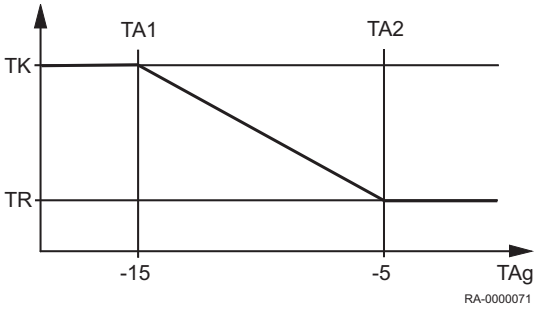
Xon Start time set forward
Xoff Stop time set forward
ZSP Time switching program
TRw Room temperature setpoint
TRx Room temperature actual value

The optimisation of the on/off switching times is a function of time and possible with or without room unit. With a room unit the changeover of operating level compared to the programmed time moves forward so that the building dynamics (heat-up and cool-down times) are taken into account. In this way the required temperature level is reached exactly at the programmed time. If this is not the case (too early or too late) a new switching time is calculated that is applied next time.

Without room sensor an advance time is calculated based on the outside temperature and the building time constant (prog. no. 6110). The optimisation time (advance) is limited here to a maximum value. By setting the optimisation time = 0, the function is switched off.

■ Reduced setp increase start (800, 1090, 1390) and Reduced setp increase end (801, 1101, 1401)

Fig.34 Reduced setpoint increase



TA1 Reduced setpoint increase start
TA2 Reduced setpoint increase end
TK Comfort setpoint
TR Room temperature reduced setpoint
TAg Outside temperature mixed

When only a small heating output is required to cover demand, the reduced room setpoint can be increased in the case of cold outside temperatures. This increase is subject to outside temperature. The lower the outside temperature, the higher the reduced room temperature setpoint will be increased. The start and end of the increase can be selected. Between these two points there is a linear increase of the "reduced setpoint" up to the "comfort setpoint".

■ Continuous pump operation (809, 1109, 1409)

This function is used to suppress the pump switching off during the quick reduction and when the room setpoint is reached (room thermostat, room sensor or room model).

- No: the heating circuit pump /boiler pump can be switched off by quick reduction or reaching the room set point.
- Yes: the heating circuit pump/boiler pump remains switched on even during the quick reduction and after the room setpoint has been reached.

■ Overtemp protect pump circ (820, 1120, 1420)

This function prevents overheating of the pump heating circuit by switching the pump on and off, if the flow temperature is higher than the flow temperature required according to the heating curve (e.g. in case of higher requests from other consumers).

■ Mixing valve boost (830,1130, 1430)

The heat demand of the mixer heating circuit to the generator is boosted to above the set value here. This boost is intended to correct temperature fluctuations to be able to be compensated with the mixer controller.

■ Actuator running time (834, 941, 1134)

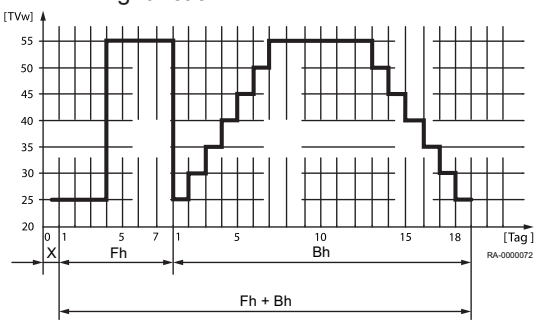
Setting the actuator running time of the mixing valve used.

For mixing circuits, a kick-start of the mixer drive is carried out after a pump kick-start (pump is OFF). In this case, the mixer is controlled in direction OPEN and CLOSED.

The time of activation in direction OPEN corresponds to the drive running time.

■ Floor curing function (850, 1150, 1450)

Fig.35 Temperature profile of the floor curing function



X Start day
Fh Functional heating
Ch Curing heating

The floor curing function serves controlled drying out of screed floors

- Off: The function is switched off.
- Functional heating: Part 1 of the temperature profile is run automatically.
- Curing heating: Part 2 of the temperature profile is run automatically.
- Functional/curing heating: The whole temperature profile is run automatically.
- Manually: Manual control to the screed setpoint.

Caution
Observe the requirements and standards issued by the screed manufacturer.

A correct function is only possible with a correctly installed heating system (hydraulic, electrical systems and settings).

Deviations can result in damage to the screed.

The screed function can be stopped prematurely by setting **0=OFF**.

■ Floor curing setp manually (851, 1151, 1451)

Setting of the temperature to which manual control is carried out with floor curing function activated.

Floor curing setp current (855, 1155, 1455)

Display of the current floor curing setpoint.

Days complete.current (856, 1156, 1456)

Display of the current floor curing function day.

Excess heat draw (861, 1161, 1461)

If the excess temperature draw is activated via input H1 to H5 or a maximum temperature is exceeded in the system, this excess heat energy can be dissipated by the central heating drawing off heat.

- Off: The function is switched off.
- Heating mode: The function is only limited to one draw-off during the heating times.
- Always: The function is generally released.

With buffer (870, 1170, 1470)

This parameter establishes whether the heating circuit can be supplied by a buffer or storage tank or only by a heat generator. The function also determines whether the system pump goes into operation when a heat demand is submitted.

- No: The heating circuit is supplied from the boiler.
- Yes: The heating circuit can be supplied from the buffer storage tank.

With prim contr/system pump (872, 1172, 1472, 5092)

This parameter establishes whether a zone system pump goes into operation with a heat demand of the heating circuit. This system pump is based on the segment in which this controller is located (LPB bus system) and which is controlled with a primary control.

- No: The heating circuit is supplied without primary controller/system pump.
- Yes: The heating circuit is supplied from the primary controller by the system pump.

Pump speed reduction (880, 1180, 1480)

Speed reduction of the heating circuit pump can be done acc. to operating level or acc. to pump characteristic curve.

- Operating level: With this option the speed of the heating circuit pump is calculated acc. to the operating level. The pump is controlled in operating level comfort (incl. optimization) or during active floor curing function with parameterized maximum speed. With reduced operating level the pump is controlled with the parameterized minimum speed.
- Characteristic The pump speed of the heating circuit pump is calculated based on the flow temperature actually received and the current flow setpoint. The common flow temp setpoint is used for the actual value. If no common flow temperature sensor is available the boiler flow actual value is used. The temperature actual value is attenuated with a filter (time constant for which parameters can be set).

Pump speed min (882, 1182, 1482)

The minimum speed for the heating circuit pump can be specified using this function.

Pump speed max (883, 1183, 1483)

The maximum speed for the heating circuit pump can be specified using this function.

Curve readj at 50% speed (888, 1188, 1488)

Correction of the flow setpoint with reduction of the pump speed by 50%. The correction is calculated using the difference from the flow setpoint according to the heating curve and current room setpoint.

Flow setp readj speed ctrl (890, 1190, 1490)

Here it can be specified whether the calculated flow setpoint correction is included in the temperature request or not.

- No: The temperature request remains unchanged. The calculated correction value is not added.
- Yes: The temperature request includes the flow setpoint correction.

Operating level changeover (898, 1198, 1498)

When an external timer is used above the inputs *Hx* selection of the operating level to which the heating circuits are to be switched is possible.
- Off
- Reduced
- On

Optg mode changeover (900, 1200, 1500)

With external change of operating mode via Hx it can be selected whether during automatic operation it is changed from comfort set point to the frost prevention setpoint or reduced setpoint.

9.2.7 Domestic water

Hot water temp setpoint (1610)

Setting the drinking water nominal value

Reduced temp setpoint (1612)

Setting the DHW reduced setpoint.

Release (1620)

- 24h/day: The DHW temperature is continuously controlled to the nominal drinking water temperature value independently of the time switching programmes.
- Time setting central heating: The DHW temperature will be switched over between the nominal DHW temperature value and the reduced nominal DHW temperature value depending on the time switching programs. Every time, the switching-on time is moved forward.
  - It is moved forward by 1 hour.

Fig.36 Release depending on the time switching programmes of the heating circuits (example)

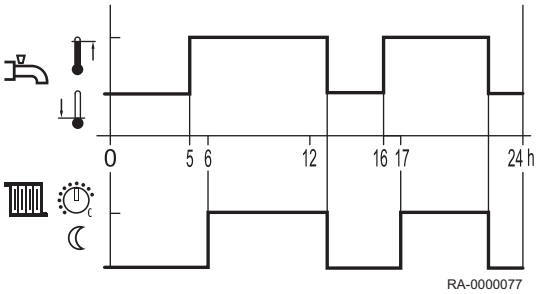
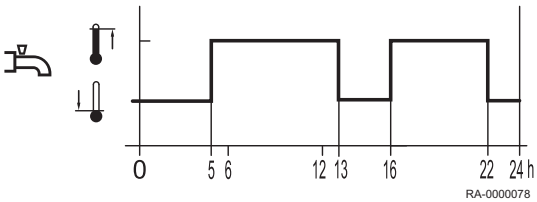


Fig.37 Release according to time switching programme 4 (example)



Time hot water: The DHW temperature is changed over between the DHW temperature setpoint and the reduced DHW temperature setpoint independently of time switching programs of the heating circuit. For this, time switching program 4 is used.

Charging priority (1630)

This function ensures that the boiler capacity is primarily made available for DHW in case of simultaneous capacity demand by room heating and DHW.
- Absolute: Mixer and pumped heating circuits are blocked until the DHW has been heated up.
- Shifting: Should the boiler capacity not be sufficient to heat up DHW, mixer and pumped heating circuits will be restricted.
- None: Charging DHW is carried out in parallel with heating operation.
- MC shifting, PC absolute: Pumped heating circuits are blocked until the DHW has been heated up. Should the boiler capacity not be sufficient, the mixer circuit will also be restricted.

Legionella function (1640)

Function to kill legionella germs by heating up to the set legionella function setpoint (see programme number 1645).
- Off: Legionella function is switched off.
- Periodically: Legionella function is repeated periodically, depending on the set value (prog. no. 1641).
- Fixed weekday: Legionella function will be activated on a certain weekday (prog. no. 1642).

Legionella funct periodically (1641)

Setting the interval for the legionella function periodically (recommended setting in case of additional drinking water heating by solar plant in connection with a storage tank mixing pump).

Legionella funct weekday (1642)

Selection of the weekday for the legionella function.

Legionella funct time (1644)

Setting the start time for the legionella function. With setting **---** the legionella function will be carried out the first time DHW heating is enabled.

Legionella funct setpoint (1645)

Selecting the set temperature required for killing the bacteria.

Legionella funct duration (1646)

With this function, the time is set during which the legionella function setpoint is activated to kill germs.

Note
If the colder storage tank temperature rises to above the **legionella function setpoint** -1 K, the **legionella function setpoint** is considered as met and the timer starts running. If the storage tank temperature drops by more than the switching difference +2K below the required **legionella function setpoint**, the duration has to be met again. If no duration has been set, the legionella function is met immediately when the **legionella function setpoint** is reached.

Legionella funct circ pump (1647)

- On: The circulation pump will be switched on in case of active legionella function.

Warning
When legionella function is active, there is a risk of scalding at the draw-off points.

Circulating pump release (1660)

- Time central heating CH3: The circulating pump is released subject to time program 3 (see prog. no. 540 to 556).
- Hot water release: The circulating pump is released when DHW heating is released.
- Time hot water: The circulating pump is released subject to time program 4.

Circulating pump cycling (1661)

To save energy, the circulation pump is switched on for 10 minutes and off for 20 minutes within the release time.

Circulation setpoint (1663)

If a sensor is placed in the drinking water distribution pipe, it monitors regulation and actual value during the legionella function. The setpoint set must be observed on the sensor during the dwell time set (prog.no. 1646). The maximum setting of the circulation value is limited by the nominal setpoint.

■ Optg mode changeover (1680)

Using external switching above the inputs H1-H5 it is possible to select which operating mode is to be switched into.
- Off: The function is switched off.

9.2.8 Consumer circuits/Swimming pool circuit

■ Flow temp setp cons request (1859, 1909, 1959)

Setting of the flow setpoint is done with this function, which is effective during active request of the consumer circuit.

■ Hot water charging priority (1874, 1924, 1974)

Setting as to whether domestic hot water charging takes priority over the consumer circuit/swimming pool circuit or not.

■ Excess heat draw (1875, 1925, 1975)

If an excess temperature discharge is activated, the excess energy can be discharged heat being drawn by the consumer circuits. This can be set separately for each consumer circuit.

■ With prim contr/system pump (1880, 1930, 1980)

- No: The consumer circuit is supplied without primary control unit/system pump
- Yes: The consumer circuit is supplied from the primary controller on/by the system pump.

9.2.9 Swimming pool

■ Setpoint solar heating (2055)

When solar energy is used, the swimming pool is heated to the setpoint set here.

■ Setpoint source heating (2056)

When using the generator heating, the swimming pool is heated to the setpoint set here.

■ Charging priority solar (2065)

Setting of which priority the swimming pool will be solar heated. The priority for the DHW and charging buffer is set under Prog. no. 3822.
- Priority 1: The swimming pool is heated **before** the buffer is charged.
- Priority 2: The swimming pool is heated **while** the buffer is charged.
- Priority 3: The swimming pool is heated **after** the buffer is charged.

■ Swimming pool temp max (2070)

This parameter sets whether the swimming pool heating by solar charging has priority or not. If the swimming pool temp reaches the heating limit set here, the collector pump is switched off. It is again released if the swimming pool temp has dropped by 1°C below the maximum heating limit temperature.

■ With solar integration (2080)

Setting, of whether the swimming pool heating can be done by solar energy or not.

9.2.10 Primary control/feed pump

■ Flow temp setpoint min (2110) and Flow temp setpoint max (2111)

With these boundaries a range for the flow setpoint can be defined.

■ Syst pump on heat gen lock (2121)

This parameter can set whether the system pump is also locked or not when the generator lock is active.

- Off: The system pump is not locked.
- On: When the generator lock is active the system pump is also locked.

Mixing valve boost (2130)

For the admixture the boiler flow temperature actual value must be higher than the requested setpoint of the mixer flow temperature, since this cannot be corrected otherwise. The controller forms the boiler temperature setpoint from the boost set here and the current flow temperature setpoint.

Actuator running time (2134)

Setting the actuator running time of the mixing valve used.

Primary contr/system pump (2150)

- Before buffer: The primary controller/feed pump is arranged with existing buffer storage tank hydraulically upstream of the buffer storage tank.
- After buffer: The primary controller/feed pump is arranged with existing buffer storage tank hydraulically downstream of the buffer storage tank.

9.2.11 Boiler

Release below outside temp (2203)

The boiler is only put into operation if the mixed outside temperature is below the threshold set here. The switching difference is 0.5°C.

Full charging buffer (2208)

Under prog. no. 4810 (full charging buffer storage tank) is selected, whether and when the buffer storage tank is fully charged despite automatic generator lock. Under prog.no. 2203 it is set whether the boiler takes part in the full charging or not.

- Off: The boiler does not take part in the full charging of the buffer storage tank.
- On: The boiler takes part in the full charging of the buffer storage tank.

Setpoint min (2210) andSetpoint max (2212)

As a protection function the boiler temperature setpoint can be limited below by the minimum setpoint (prog.no. 2210) and above by the maximum setpoint (prog.no. 2212).

Setpoint manual control (2214)

Temperature to which the boiler is controlled in manual control mode.

Burner running time min (2241)

Here, the period following the commissioning of the burner is selected during which the shutdown differential is increased by 50%. However, this setting can**not** guarantee that the burner remains operational for the selected period.

Burner off time min (2243)

The boiler minimum pause time only takes effect between heating requirements coming following in sequence. The boiler minimum pause time blocks the boiler for a set time.

SD burner off time (2245)

When a switching difference is exceeded,Burner off time min (prog. no. 2243) is aborted. The boiler starts despite pausing time.

Pump overrun time (2250) andPump overr time after HW (2253)

The delay times of the pumps are controlled according to heating mode or drinking water mode.

Boiler pump on heat gen lock (2301)

Stop of boiler pump in case of activated manual heat generation lock (e.g. via H1).

- Off: Switching off not activated

- On: Switching off activated

Impact heat generation lock (2305)

This parameter is used to set whether the heat generator lock should be effective only for heating requests or also for DHW requests.
- Heating mode only: Only heating requests are locked. DHW requests are still operated.
- Heating and HW mode: All heating and DHW requests are locked.

Temp differential max (2316)

When the pump reaches the maximum speed with the setting temperature rise nominal, the temperature difference increases via the boiler. The value set in temperature rise maximum is not exceeded. This is achieved by reducing the boiler setpoint to the current return temperature plus the value shown here.

Caution
The limit of the boiler rise may only be performed if a modulating heat circuit pump is configured, i.e. if prog. no. 6085 (Function output P1) is assigned to a heating circuit pump.

Temp differential nominal (2317)

The spread between boiler flow temperature and boiler return temperature is called the temperature rise.

For operation with a modulating pump, the temperature rise is limited with this parameter.

Pump modulation (2320)

- None: The function is switched off.
- Demand: Actuation of the boiler pump occurs at the speed calculated for the DHW pump during DHW mode or with the highest calculated speed for the max. 3 heating circuit pumps during pure heating mode.
  The calculated pump speed for heating circuit 2 and 3 is only evaluated if these heating circuits are also dependent on the setting of the diverting valve (parameter *boiler pump/DHW diverting valve control*).
- Boiler setpoint: The boiler pump modulates its speed so that the current setpoint (DHW or buffer storage tank) is achieved on boiler flow. The speed of the boiler pump should be increased within the specified limits until the burner has reached its upper output limit.
- Temp differential nominal: The boiler output is controlled to the boiler setpoint.
  The control of the pump speed controls the speed of the boiler pump so that the nominal rise between the boiler return and boiler flow is observed.
  If the actual rise is larger than the nominal rise, the pump speed is increased, otherwise the pump speed is reduced.
- Burner output: If the burner is operated with low output then the boiler pump should also run at low speed. During high boiler output the boiler pump should run at high speed.

Pump speed min (2322)

The working range can be defined in percent of output for the modulating pump. The control translates the percent data internally to speeds.

The value **0%** corresponds to the minimum pump speed.

Pump speed max (2323)

The pump speed and with it, the power consumption can be limited via the maximum value.

Output nominal (2330) and Output basic stage (2331)

The settings under prog.no. 2330 and prog.no. 2331 are necessary when setting up boiler cascades with boilers of different output.

■ Output at pump speed min (2334) and Output at pump speed max (2335)

If the option burner output is selected under prog. no. 2320, the boiler pump is operated up to the set burner output under prog. no line 2334 to minimum pump speed. From the burner output set under prog. no. 2335 the boiler pump is operated on maximum pump speed. If the burner output lies between these two values, the pump speed for the boiler pump is given by linear conversion.

■ Fan output heating max (2441),Fan output full charging max (2442) andFan output DHW max (2444)

- Prog.no. 2441: With this parameter the maximum boiler capacity can be limited in heating mode.
- Prog.no. 2442: With this parameter the maximum boiler capacity can be limited in full charging mode for stratification cylinders.
- Prog.no. 2444: With this parameter the maximum boiler capacity for the DHW mode can be restricted.

Note
These are calculated values. The actual output must be calculated using a gas meter, for example.

■ Fan shutdown heating mode (2445)

This function is used for switching off the supply voltage for the fan. The supply voltage for the fan is released as soon as the fan PWM actuation is active or a DHW request exists. The switch off is delayed following PWM actuation or discontinuation of the DHW request. The duration of the switch-off delay can be set with the fan switch-off delay function (prog.no. 2446). During a DHW request the voltage supply for the fan still remains released even if the PWM actuation is not active.

■ Fan shutdown delay (2446)

If no heating requirement exists the voltage supply of the fan is switched off. Here, the time during which the fan is still supplied with voltage is set.

■ Controller delay (2450)

The controller delay is used for a stabilisation of the combustion conditions, especially after a cold start. After release of the firing automation by the controller this remains on the set output for a specified time. Modulation is only released after this time has elapsed.

Prog. no. 2450 is used to set the operating mode at which the controller delay is active.

■ Controller delay fan output (2452)

Boiler capacity which is used during the duration of the control delay.

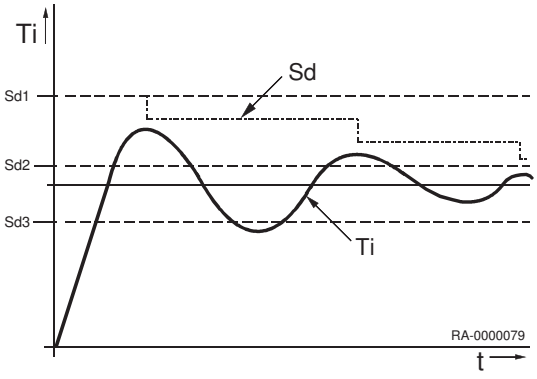
Note
For the calculated value see prog-no. 2444.

■ Controller delay duration (2453)

Duration of the control delay. The time duration starts as soon as a positive flame is detected after ignition.

■ Switching diff on CHs (2454), Switching diff off min CHs (2455), Switching diff off max CHs (2456), (2460), Switching diff on

Fig.38 Switching difference



HW (2461) and Switching diff off min HW (2462)Switching diff off max HW

Sd Switching difference off
Sd1 Switching diff off max CHs, Switching diff off max HW
Sd2 Switching diff off min CHs, Switching diff off min HW
Sd3 Switching diff on CHs, Switching diff on HW
t Time
Ti Actual temperature

To avoid unnecessary switch off during transient effects the switch-off difference adapts dynamically depending on the temperature profile (see fig.).

■ Delay heat req special op (2470)

The heat request during special operation (chimney-sweep function, controller stop, manual operation) is sent to the burner delayed by the time set here. In this way slowly opening mixers can already start up before the burner goes into operation. Thus a boiler temperature that is too high can be prevented.

■ Pressure switch shutdown (2500)

This function checks the static water pressure with the aid of the connected water pressure switch. Depending on the option set (*Start prevention* or *Lockout position*) a start prevention or lockout position is carried out with a corresponding diagnosis.

A closed water pressure switch releases the startup of the burner control and the actuation of the pumps. A start prevention or lockout position is triggered with the pressure switch open.

The pump actuation is also locked for protection against dry running. If the water pressure increases again and the switch closes again, this is automatically cancelled again with a start prevention and the pump actuation is released again.

■ Gas energy metering (2550)

This parameter is used to switch gas energy metering on or off. The counter values are not deleted during this process.

■ Gas energy metering correction (2551)

The gradient of the linear approximation function is adapted here.
- Value < 1: Leads to lower gas energy metering.
- Value > 1: Leads to increased gas energy metering.

A value of 1 means there is no change compared to the approximation function stored.

9.2.12 Cascade

■ Lead strategy (3510)

The heat generators are switched on and off acc. to the set lead strategy taking the specified output range into account. To switch off the effect of the output range, the limits must be set to 0% and 100% and the lead strategy to late on, late off.
- Late on, early off: Additional boilers are switched on as late as possible (output range max) and switched back off again as soon as possible (output range max). I.e. as few boilers as possible in operation or short running times for additional boilers.
- Late on, late off: Additional boilers are switched on as late as possible (output range max) and switched back off again as late as possible (output range max). I.e. as few switching on and off processes as possible for the boilers.

- Early on, late off: Additional boilers are switched on as early as possible (output range min) and switched back off again as late as possible (output range min). I.e. as many boilers as possible in operation or long running times for additional boilers.

Release integral source seq (3530)

A value generated from temperature and time. The lag boiler is switched on when the set limit is exceeded.

Reset integral source seq (3531)

The following boiler will be switched off in case of exceeding the setpoint

Restart lock (3532)

The restart lock prevents switching a switched off boiler being switched back on again. It is only released again after the set time period has elapsed. This prevents the boiler switching on and off too often and achieves a stable operating condition of the system.

Switch on delay (3533)

Too frequent forward and back switching (cycles) of the boiler are avoided by the switch-on delay and therefore a stable operating state is ensured.

Auto source seq ch'over (3540)

The sequence of lead boiler and following boiler is defined by the source sequence changeover and in this way, the utilisation of the boilers in a cascade is influenced. After the set time has elapsed, the boiler sequence is changed. The boiler with next higher device address operates as lead boiler.

The operating hours transferred from the generator to the cascade master are decisive for calculating the hours run.

Auto source seq exclusion (3541)

- None: The boiler sequence changes after expiry of the time set in prog. no. 3540.
- First: The first boiler in the addressing works as the lead boiler; for all the other boilers the boiler sequence is changed after expiry of the time set in prog. no. 3540.
- Last: The last boiler in the addressing always remains the last boiler; for all other boilers the boiler sequence is changed after expiry of the time set in prog. no. 3540.

Leading source (3544)

The setting of the leading generator is only used in combination with the fixed sequence of the generator sequence (prog. no. 3540). The generator defined as the leading generator is always put into operation first, and switched off last. The other generators are switched on and off in the sequence of the device address.

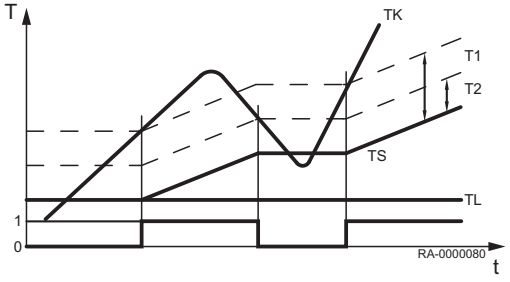
Return setpoint min (3560)

If the return temperature drops below the return setpoint set here, the return maintenance becomes active. The return maintenance enables influences on the consumers or use of a return controller.

Temp differential min (3590)

This function prevents too high cascade return temperatures and improves the switch off behaviour of the cascade. If the temperature difference between the flow and return sensor is smaller than the minimal temperature spread set here, a generator is switched off as early as possible independently of the set lead strategy. Once the temperature difference is sufficient again, the set lead strategy is switched over again.

Fig.39 Charging control /schematic)



9.2.13 Solar

■ Temp diff on (3810) and Temp diff off (3811)

1 / 0 On / off collector pump
T Temperature
T1 Temp diff on
T0 Temp diff off
TK Collector temperature
TL Charging temperature min buffer storage tank / swimming pool
TS Storage tank temperature
t Time

The switching-on and switching-off point of the collector pump is set with these functions. Basis is the temperature difference between collector temperature and storage temperature.

■ Charg temp min HW st tank (3812)

In addition to the temperature difference, reaching a certain minimum collector temperature is necessary for the storage charging process.

■ Temp diff on buffer (3813),Temp diff off buffer (3814) andCharging temp min buffer (3815)

The switching-on and switching-off point of the collector pump is set with these functions. Basis is the temperature difference between collector temperature and storage temperature of the buffer storage tank.

In addition to the temperature difference, reaching a certain minimum collector temperature is necessary for the buffer storage charging process.

■ Temp diff on swi pool (3816) andTemp diff off swi pool (3817)

The solar circuit pump starts or stops if the difference between the solar collector temperature and the swimming pool temperature is exceeded or undershot.

■ Charging temp min swi pool (3818)

Temperatures that the collector must have at the least in order to begin charging a swimming pool.

■ Charging prio storage tank (3822)

If several heat exchangers/indirect coils are tied into the system, the heating sequence for the connected cylinders can be determined by setting the heating process.

- None: Every storage tank is charged alternately with a temperature increase of 5 °C, until the setpoint has reached level A, B or C (tab. 1). Once all setpoints have been reached, the setpoints of the next level are applied.
- Hot water storage tank: The DHW storage tank is charged as priority during any heating with solar energy at any level (A, B or C). Other consumers with the same level will only be charged afterwards. Once all setpoints have been reached, the setpoints of the next level are applied. For this, heating the DHW cylinder still takes priority.
- Buffer storage tank: During any heating with solar energy, the buffer storage tank is charged first at any level (A, B or C). Other consumers with the same level will only be charged afterwards. Once all setpoints have been reached, the setpoints of the next level are applied. For this, charging the buffer cylinder still takes priority.

Tab.10 Storage tank setpoints

Level	Domestic water storage tank	Buffer storage tank	Swimming pool(1)
A	Nominal value (prog. no. 1610)	Buffer setpoint (drag-pointer)	Setpoint solar heating (prog. no. 2055)

B	Charging temp max (prog. no. 5050)	Charging temp max (prog. no. 4750)	Setpoint solar heating (prog. no. 2055)
C	Storage tank temp max (prog. no. 5051)	Storage tank temp max (prog. no. 4751)	Swimming pool temp max (prog. no. 2070)
(1) With swimming pool heating set as priority (prog. no. 2065), the swimming pool will be heated before the storage tanks.			

Charging time relative prio (3825)

If the preferred storage tank corresponding to the charging control not be charged, during the time set here the priority goes to the next storage tank or the swimming pool.

Waiting time relative prio (3826)

Transfer of priority is delayed by the time selected here.

Waiting time parallel op (3827)

Parallel operation is feasible when using solar primary pumps subject to there being sufficient solar energy available. For this, in addition to the storage tank currently being heated, the next storage tank in the priority order can also be heated in parallel. The storage tank switching on for parallel operation can be delayed and stepped by the value set here.

Delay secondary pump (3828)

Operation of the secondary pump of the heat exchanger/indirect coil can be delayed to enable any cold water that may be present to be flushed through the primary circuit first by the pump.

Collector start function (3830)

If the temperature at the collector with the pump turned off is not measured correctly (e.g. with vacuum tubes), then a periodic switching on of the pump is possible.

Caution
The temperatures at certain collectors cannot be measured correctly if the pump is switched off. For this reason, the pump must be activated from time to time.

Min run time collector pump (3831)

The collector pump is periodically switched on for the running time set here.

Collector start function on (3832) and Collector start function off (3833)

The time when the collector start function starts or stops is set here.

Collector start funct grad (3834)

As soon as there is a temperature increase on the collector sensor, the collector pump switches on. The higher the value selected here, the greater the temperature rise must be.

Collector frost protection (3840)

In order to prevent freezing of the collector, the collector pump will be activated in case of frost danger.

Collector overtemp prot (3850)

In case of overheating danger, charging of the storage tank is continued in order to remove heat. When the storage tank safety temperature has been reached, charging of the storage tank will be interrupted.

Evaporation heat carrier (3860)

Pump protecting function, to prevent overheating of the collector pump in case of evaporating danger of the heat carrying medium due to high collector temperature.

Antifreeze (3880)

Information of the antifreeze used.

Antifreeze concentration (3881)

Input of antifreeze concentration for usage measurement of solar energy.

Pump capacity (3884)

Input of the flow of the installed pump for calculation of the brought in volume for usage measurement.

Pulse unit yield (3887)

Defines the flow per pulse for the Hx input. The Hx input must be configured to pulse count for this.

9.2.14 Solid fuel boiler

Locks other heat sources (4102)

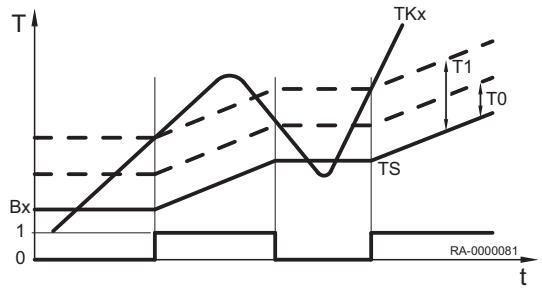
If the solid fuel boiler is activated, other heat generators, e.g. oil./gas boilers, are blocked as soon as an increase in the boiler temperature is established that indicates that the comparative temperature has been exceeded (prog. no. 4133).

Setpoint min (4110)

The boiler pump is only put into operation if the boiler temperature has reached the minimum setpoint set here in addition to the necessary temperature difference.

Temp diff on (4130), Temp diff off (4131) and Comparative temp (4133)

Fig.40 Storage tank charging



1 / 0 On / off boiler pump
Bx Comparative actual temperature
T1 Temp diff on
T0 Temp diff off
TKx Boiler temperature
TS Storage temperature
t Time

A sufficiently large temperature difference is necessary between the boiler temperature and the comparative temperature for start-up of the pump.

To maintain the comparative temperature, the following settings are available under prog. no. 4133:

- Hot water sensor B3 / Hot water sensor B31: The comparative temperature is supplied by the DHW sensor B3/B31.
- Buffer sensor B4 / Buffer sensor B41: The comparative temperature is supplied by the buffer storage tank sensor B4/B41.
- Flow temp setpoint: The flow temperature setpoint is used as comparative temperature.
- Setpoint min: The value set in prog.no. 4110 is used as comparative temperature.

Pump overrun time (4140)

Setting pump after-run time.

9.2.15 Buffer storage tank

Auto generation lock (4720)

The hydraulic separation of heat generator and buffer storage tank is achieved by the automatic heat generator lock. The heat generator is only put into operation if the buffer can no longer cover the current heat demand. The following settings are possible:

- None: The automatic heat generator lock is deactivated.
- With B4: The automatic heat generator lock is triggered by the buffer cylinder B4.
- With B4 and B42/B41: The automatic heat generator lock is triggered by the buffer cylinders B4 and B41/B42.

Auto heat gen lock SD (4721)

The heat generator is locked if the the temperature in the buffer storage tank is higher than the boiler setpoint+Auto heat gen lock SD.

Temp diff buffer/CH (4722)

If the temperature difference between buffer storage tank and heating circuit temperature request is large enough, the heat required by the heating circuit will be taken from the buffer storage tank. The heat generator is locked.

Min st tank temp heat mode (4724)

If the storage tank temperature of the buffer storage tank drops below this value, the heating circuit is switched of if no generator is available.

Charging temp max (4750)

The buffer storage tank is charged from solar energy up to the set charging temperature maximum.

Note
The collector overheating protection function can put the collector pump back in operation until the maximum storage tank temperature is reached.

Recooling temp (4755)

The collector overheating protection function can put the collector pump back in operation until the maximum storage tank temperature is reached.

Recooling HW/CHs (4756)

Two functions are available for recooling of the buffer storage tank down to the recooling temperature. The energy can be discharged via a heat draw by the room heating or the DHW storage tank. This can be separately set for each heating circuit.

Recooling collector (4757)

Recooling when the buffer storage tank temperature is too high by transmitting energy to the environment via the collector area.
- Off: Recooling has been deactivated.
- Summer: Recooling is only active in summer.
- Always: Recooling is always active.

With solar integration (4783)

Setting of whether the buffer storage tank can be charged by solar energy.

Temp diff on return div (4790),Temp diff off return div (4791) andCompar temp return div (4795)

At the appropriate temperature difference between the return sensor B73 and the selectable comparative temperature the return is re-routed to the lower buffer storage tank section. The function can either be used as return temperature increase or as return temperature decrease. The way this works is defined in prog. no.4796.

Using the definition of the temperature differences in prog. no. 4790 and 4791 the switch on and switch off point of the return redirection is established.

In prog.no. 4795 the buffer storage tank sensor is selected that delivers the value for the comparison with the return temperature, to switch on the return redirection with the aid of the set temperature differences.

Note
To activate the return redirection the relay outlet QX1, QX2, QX3 (prog. no. 5890-5892) for the buffer deflector valve and the sensor inlet BX1, BX2, BX3 (prog. no. 5930-5932) for the rail return sensor B73 must also be configured.

Optg action return diversion (4796)

The function can either be used as return temperature increase or as return temperature decrease.

- Temp decrease: If the return temperature of the consumers is higher than the temperature on the selected sensor (prog. no. 4795), the lower part of the storage tank can be preheated with the return flow. The return temperature drops even lower with this, which leads to a higher efficiency with a condensing boiler, for example.
- Temp increase: If the return temperature of the consumers is lower than the temperature on the selected sensor (prog. no. 4795), the return flow can be preheated by redirecting over the lower part of the storage tank. In this way, for example, return flow preheating can be implemented.

Full charging (4810)

The function *full charging* makes it possible for the released generator to be switched off first despite automatic generator lock if the buffer storage tank is fully charged. During active function the generator parameterized for the full charging function is only switched off when the full charging setpoint is reached or the boiler must be switched off because of burner control.

- Off: The full charging function is switched off.
- Heating mode: Full charging becomes active if the automatic generator lock blocks the heat source during valid heat request based on the buffer temperature. If the buffer storage tank reaches the requested temperature at the sensor parameterized for the full charging function, the function is ended.
- Always: Full charging becomes active if the automatic generator lock blocks the generator during valid heat request based on the buffer temperature or the heat request is invalid. If the buffer storage tank reaches the requested temperature at the sensor parameterized for the full charging function, the function is ended.

Full charging temp min (4811)

The buffer storage tank is charged minimally o the set value.

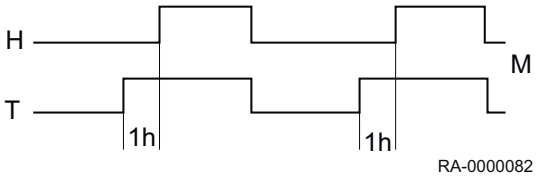
Full charging sensor (4813)

- With B4: For the full charging function the buffer storage tank sensor B4 is considered.
- With B42/B41: For the full charging function the buffer storage tank sensor B42, if not available buffer storage tank sensor B41, is considered.

9.2.16 Drinking water storage

Forward shift charging (5011)

Fig.41 Charge push forward time



H Heating program
M Several times during the day
T DHW release

The DHW release is pushed forward by the set charge push forward time compared to each heating circuit allocation and kept during the heating circuit allocation.

Flow setpoint boost (5020)

The boiler temperature setpoint for charging the DHW storage tank consists of the DHW temperature setpoint and the flow setpoint boost.

Transfer boost (5021)

Through the transfer, energy can be moved from the buffer storage tank into the DHW storage tank. For this the current buffer storage tank temperature must be higher than the current temperature in the DHW storage tank. This temperature difference is set here.

Type of charging (5022)

Charging a stratification cylinder (if available):

- Recharging : The cylinder is only recharged at every DHW demand.

- Full charging: The cylinder is fully charged at every DHW demand.
- Full charging legio: The cylinder is fully charged if the legionella function is enabled; otherwise it is only recharged.
- Full charg 1st time day: During the first charging of the day, the cylinder is fully charged, then recharged.
- Full charg 1st time legio: The cylinder is fully charged during the first charging of the day and if the legionella function is enabled; otherwise it is recharged

Explanations:
- Full charging: The stratification cylinder is fully charged. The heat demand is triggered by the top cylinder sensor TWF (B3), and ended by sensors TWF and TLF (B36) or TWF2 (B31). If only one B3 is installed, recharging takes place automatically.
- Recharging: The stratification cylinder is recharged i.e. only the area up to the cylinder sensor TWF (B3) is heated. The heat demand is triggered and ended by the top cylinder sensor TWF (B3).

Switching diff (5024)

If the DHW temperature is lower than the current setpoint minus the switching difference set here, the DHW charging is started. The DHW charging is ended if the temperature of the current setpoint is reached.

Note
At the first DHW release of the day, forced charging is performed. The DHW charging is also started if the DHW temperature is within the switching difference – as long as it is not less than 1 K under the setpoint.

Charging time limitation (5030)

During the DHW charging, the room heater - depending on the selected charging priority (prog.no. 1630) and the hydraulic switch – has too little or no power. It is therefore often practical to restrict the time of DHW charging.

Discharging protection (5040)

This function ensures that the DHW circulation pump (Q3) only switches on when the temperature in the heat source is high enough.
- **Application with sensor**
  - The charging pump is only switched on when the heat source temperature is above the DHW temperature plus half of the heating excess. If the boiler temperature drops below the DHW temperature plus 1/8 of the charging excess during the charging again, the charging pump is switched off again. If two DHW sensors for the DHW charging are parameterized, the lower temperature is considered for the discharge safety function (normally the DHW sensor B31).
- **Application with thermostat**
  - The primary pump is only switched on if the boiler temperature is above the set DHW temperature. If the boiler temperature drops below the DHW nominal setpoint minus the DHW switching difference, charging pump is switched off again.
- Off: The function is switched off.
- Always: The function is always active.
- Automatically: The function is only active if the heat generator cannot deliver heat or is not available (malfunction, generator lock).

Charging temp max (5050)

With this setting, the maximum charging temperature for the connected storage of the solar system is limited. If the DHW-charging value is exceeded, the collector pump switches off.

Note
The collector pump can be re-activated by the collector overheating protecting function (see programme number 3850) until the storage safety temperature has been reached.

Recooling temp (5055)

Setting the temperature for recooling the DHW-storage.

Recooling collector (5057)

Recooling of the overhaeted collector through giving off of the energie to the surrounding of the collector.

El imm heater optg mode (5060)

- Substitute: The DHW is only heated by an immersion heater if the boiler signals a malfunction or a boiler lock exists.
- Summer: The DHW is heated by an immersion heater if all connecting heating circuits have switched to summer mode. As soon at least one heating circuit is switched to heating mode, the DHW preparation is taken over by the boiler again. The conditions listed for the immersion heater under the substitute operating mode are also activated in summer mode.
- Always: DHW is heated exclusively by the immersion heater.

El immersion heater release (5061)

- 24h/day: Immersion heater permanently released
- Hot water release: Immersion heater released subject to DHW-release (see prog. no. 1620).
- Time hot water: Release of the immersion heater via the time switching programme 4 of the local controller.

El immersion heater control (5062)

- External thermostat: The storage tank temperature is achieved with an external thermostat without the controller providing a set temperature.
- Hot water sensor: The storage tank temperature is achieved with an external thermostat with setpoint control of the controller.

Hot water boost (5070)

The DHW-push can activated manually or automatically. It causes a one-time DHW charging to the nominal setpoint.

- Off: The DHW-push can only activated manually.
- On: If the DHW temperature drops by more than two switching differences (prog. no. 5024) below the reduced setpoint (prog. no. 1612), it will be recharged once to the DHW nominal setpoint (prog.no.1610).

Note
The automatic push only works when DHW operating mode is set.

Excess heat draw (5085)

Excess heat draw-off can be triggered by the following functions: Maximum storage tank temperature, automatic push, heating priority time push, excess heat draw-off, active inputs H1, H2, H3 or EX2, storage tank reverse cooling, solid boiler excess heat draw-off. If an excess temperature discharge is activated, the excess energy can be dissipated through the central heating drawing off heat. This can be separately set for each heating circuit.

With buffer (5090)

- No: The DHW storage tank is supplied directly by the boiler.
- Yes: The DHW storage tank is supplied by the buffer storage tank.

With prim contr/system pump (5092)

- No: The DHW storage tank is supplied without primary controller/feed pump.
- Yes: The DHW cylinder is supplied from the primary controller on/by the feed pump.

With solar integration (5093)

This function determines whether the DHW cylinder should be heated by solar energy.

Pump speed min (5101) andPump speed max (5102)

Setting of the minimum and maximum speed of the storage tank charging pump in percent.

Speed Xp (5103)

The P-band Xp defines the amplification of the controller. A smaller Xp value leads to a higher actuation of the charging pump with equal control difference.

Speed Tn (5104)

The reset time Tn determines the reaction speed of the controller when compensating for remaining controller differences. A shorter reset time Tn leads to faster compensating.

Speed Tv (5105)

The preholding time Tv determines how long a spontaneous change of the control difference continues to have an effect. A short time only influences the control variable only for a short time.

Transfer strategy (5130)

The transfer is always allowed or to the set DHW release times.

Interm circ boost recharging (5139)

Setpoint boost for charging setpoint on charging sensor B36 with recharging.

Intermediate circuit boost (5140)

Setpoint boost for charging setpoint on charging sensor B36 with full charging.

Excess interm circ temp max (5141)

With this parameter the end criterion of a full charging during control is specified on the charging sensor B36. If the contents of the stratification cylinder is charged to the bottom, the temperature increases on the charging sensor

Flow setp compensation delay (5142)

The filter time for the setpoint lead is set here.

Flow setp compensation Xp (5143)

The P-band Xp defines the amplification of the controller. A smaller Xp value leads to higher actuation of the charging pump with equal control difference.

Flow setp compensation Tn (5144)

The reset time Tn determines the reaction speed of the controller when compensating for remaining controller differences. A shorter reset time Tn leads to faster compensating.

Flow setp compensation Tv (5145)

The preholding time Tv determines how long a spontaneous change of the control difference continues to have an effect. A short time only influences the control variable only for a short time.

Full charging with B36 (5146)

Here it can be set whether the end of the full charging is detected via the temperature on the charging sensor B36.

- No: The end of the full charging is detected via the temperature on the upper and lower storage sensor B3 and B31.
- Yes: The end of the full charging is detected via the temperature on the upper storage sensor B3 and on the charging sensor B36.

Min start temp diff Q33 (5148)

This parameter determines the switch-on delay of the intermediate circuit pump depending on the boiler temperature. The intermediate circuit pump is switched on as soon as the boiler temperature has reached the boiler

setpoint plus the value set here. The setting -5°C results in the intermediate circuit pump being switched on as soon as the boiler temperature is 5°C below the boiler setpoint .

■ Excess interm circ temp del (5151)

Control of the burner output on the charging temperature is activated if the time set here has elapsed since switching on the intermediate circuit pump.

9.2.17 Configuration

■ Temps / mode CH1 (5710),Temps / mode CH2 (5715) andTemps / mode CH3 (5721)

The heating circuits can be switched on or off using this setting. Heating circuit parameters are hidden in the deactivated state.

Note
This adjustment only affects the heating circuits directly and has no influence on operation.

■ Hot water sensor (5730)

- None: No DHW sensor available.
- Hot water sensor B3: There is a DHW storage tank sensor available. The controller calculates the switching points with the corresponding switching difference from the DHW setpoint and the measured DHW storage tank temperature.
- Thermostat: Control of domestic hot water temperature as a function of the switching status of a thermostat connected to DHW sensor B3.

Note
No reduced mode is possible when a DHW thermostat is used. This means if reduced mode is active, the DHW preparation is blocked with the thermostat.

Caution
No frost protection for DHW! The domestic water frost protection cannot be guaranteed.

■ Hot water ctrl elem Q3 (5731)

- No charging request: DHW charging disabled via Q3.
- Charging pump: DHW charging via the connection of a charging pump to Q3/Y3.
- Diverting valve: DHW charging via the connection of a diverting valve to Q3/Y3.

■ Basic pos HW div valve (5734)

The base position of the diverting valve is the position in which the diverting valve (DV) is in if no request is active.

- Last request: The diverting valve (DV) remains after the last request has ended in this last position.
- Central heating: The diverting valve (DV) goes into the heating circuit position after the last request has ended.
- Hot water: The diverting valve (DV) goes into the DHW position after the last request has ended.

■ Hot water separate circuit (5736)

The DHW separate circuit can only be used in a boiler cascade.

- Off: The DHW separate circuit function is disabled. Each available boiler can feed the DHW storage tank.
- On: The DHW separate circuit function is enabled. The DHW charging is only done from the boiler defined for this.

Note
The DHW actuator Q3 must be set under prog. no. 5731 to "Diverting valve" for a DHW separate circuit to become effective.

Ctrl boiler pump/HW valve (5774)

With this parameter it can be defined for special hydraulic systems that the boiler pump Q1 and the diverting valve Q3 only are responsible for DHW and heating circuit 1, however not for heating circuits 2 and 3 or for the external consumer circuits.

- All requests: The diverting valve is connected hydraulically for all requests and switches between DHW mode and the remaining requests. The boiler pump runs for all requests.
- Request CH1/HW only: The diverting valve is connected hydraulically only for heating circuit 1 and DHW and switches between DHW mode and heat circuit 1 mode. All other requests are not connected hydraulically via the diverting valve (DV) and the boiler pump, but rather directly connected to the boiler.

Solar controlling element (5840)

The solar heating system can also be operated with charging pumps instead of with a collector pump and diverting valves for the storage tank connection.

- Charging pump: When used with charging pump all exchangers can be flowed through simultaneously. Parallel or alternative mode is possible.
- Diverting valve: When used with a diverting valve only one exchanger can be flowed through. Only alternative mode is possible.

External solar exchanger (5841)

For solar schemes with two storage connections it must be set whether the external heat exchanger is present and is used *together* for DHW and buffer storage or only *for one of the two*.

Combi storage tank (5870)

Combined storage-specific functions are activated with this setting. For instance, the buffer storage immersion heater can be used for heating as well as for DHW.

- No: No combined storage exists.
- Yes: A combined storage exists.

Relay output QX1 (5890), Relay output QX2 (5891) und Relay output QX3 (5892)

- None: Relay outputs deactivated.
- Circulating pump Q4: The connected pump serves as a DHW circulation pump (see prog. no. 1660).
- El imm heater HW K6: With the connected immersion heater, the DHW can be charged according to the operating side DHW storage operating line immersion heater.

Note
The operating mode is set under prog.no. 5060.

- Collector pump Q5: Connection of a circulating pump in case of solar collector use.
- Cons circuit pump VK1 Q15: Connection of a pump at the input Q15/18 for an additional consumer, which is requested via an Hx-input.
- Boiler pump Q1: The connected pump is used for recirculation of the boiler water.
- Alarm output K10: Any new fault will be signalled by means of this alarm relay. The contact is closed with the delay time selected under prog. no. 6612. If no fault message exists, the contact opens without delay.

Note
The alarm relay can be reset without having the fault remedied (see prog. no. 6710). The alarm relay can also be closed temporarily by a message which, for example, leads to restart.

- heating pump CH3 Q20: Activating the pump heating circuit HC3.
- Cons circuit pump VK2 Q18: Activating the consumer circuit VK2.
- System pump Q14: Connection of a feed pump.
- Heat gen shutoff valve Y4: Connection of a changeover valve for hydraulic de-coupling of the heat generator from the rest of the heating system.

- Solid fuel boiler pump Q10: Connection of a circulation pump for the boiler circuit for the connection of a solid fuel boiler.
- Time setting 5 K13: The relay is controlled by the time program 5 according to the settings.
- Buffer return valve Y15: This valve must be configured for the return temperature increase/reduction or partial charging of the buffer storage tank.
- Solar pump ext exch K9: The solar circuit pump for the external heat exchanger K9 must be set here.
- Solar ctrl elem buffer K8: If several exchangers are connected, the buffer storage tank must be set at the respective relay output and the type of solar regulating unit must be defined under prog.no.5840.
- Solar ctrl elem swi pool K18: If several exchangers are connected, the swimming pool must be set at the respective relay output and the type of the solar regulating unit must be defined in prog.no. 5840.
- Swimming pool pump Q19: Connection of a swimming pool pump at the input Q19 .
- Cascade pump Q25: Common boiler pump for all boilers in a cascade.
- St tank transfer pump Q11: The DHW storage tank can be heated by the buffer storage tank subject to it being hot enough. This transfer is brought about by transfer pump Q11.
- Hot water mixing pump Q35: Separate pump for storage circulation during active legionella function.
- HW interm circ pump Q33: Charging pump for DHW cylinder with external heat exchanger.
- Heat request K27: Output K27 is activated as soon as a heat demand exists in the system.
- heating pump CH1 Q2/heating pump CH2 Q6: The relay is used for actuating the heating circuit pump Q2/Q6.
- Hot water ctrl elem Q3: Depending on the hydraulics a connected DHW charging pump or diverting valve.
- Status output K35: The status output is operated when a command exists from the controller to the burner control. If there is a disturbance, which prevents the burner control from operating, the status output is switched off.
- Status information K36: The output is set when the burner is in operation.
- Flue gas damper K37: This function activates the flue gas damper control. If the flue gas damper control is activated the burner will only start operating when the flue gas damper is open.
- Fan shutdown K38: This output serves to switch the fan off. The output is activated when the fan is needed; otherwise it is not activated. The fan should be switched off as often as possible in order to minimise the total energy consumption of the system.

■ Sensor input BX1 (5930),Sensor input BX2 (5931) andSensor input BX3 (5932)

Functions in addition to the basic functions are made possible by configuring the sensor inputs.

- None: Sensor inputs deactivated.
- Hot water sensor B31: Second DHW sensor, which is used for full charging of the legionella function.
- Collector sensor B6: First solar collector sensor in a collector field.
- HW circulation sensor B39: Sensor for DHW circulation return.
- Buffer sensor B4: Lower buffer storage tank sensor.
- Buffer sensor B41: Centre buffer storage tank sensor.
- Common flow sensor B10: Common flow sensor for boiler cascades.
- Solid fuel boiler sensor B22: Sensor for the acquisition of the temperature of a solid fuel boiler.
- HW charging sensor B36: DHW sensor for DHW charging systems.
- Buffer sensor B42: Upper buffer storage tank sensor.
- Common return sensor B73: Return sensor for the return diversion function.
- Cascade return sensor B70: Common return sensor for boiler cascades.
- Swimming pool sensor B13: Sensor for measurement of swimming pool temp.

- Solar flow sensor B63: This sensor is required for the solar usage measurement.
- Solar return sensor B64: This sensor is required for the solar usage measurement.

■ Function input H1 (5950) Function input H4 (5970) and Function input H5 (5977)

- None: No function.
- Optg mode change CHs+HW: Changeover of the operating modes of the heating circuits to reduced or protection operation (prog.nos. 900, 1200, 1500) and locking of domestic hot water charging in case of closed contact at H1/H4/H5/H2.
- Optg mode changeover CH1 up to Optg mode changeover CH3: Operating mode changeover for heating circuits to protection or reduced operation.

Note
Locking of domestic hot water charging is only possible under the setting **Optg mode change CHs+HW**.

- Heat generation lock: Locking of the boiler in case of closed contact at H1/H4/H5/H2.
- Error/alarm message: Closing the inputs H1/H2 gives a control unit-internal fault message, which will also be signalled via a relay output, programmed as an alarm output or in the remote management system.
- Consumer request VK1/Consumer request VK2: The set flow temperature setpoint is activated via the connecting terminals (e.g. a ventilation heater function for door curtain units).

Note
The setpoint is set under prog.no. 1859/1909.

- Excess heat discharge: Active excess heat discharge enables, for example, an external source to force consumers (heating circuit, DHW storage tank, Hx pump) to draw off excess heat with a signal. For each consumer the parameter excess temperature discharge can be set to determine whether the forced signal is taken into account and should therefore take part in the heat discharge or not.
- Release swi pool solar: This function enables the solar swimming pool heater to be released externally (e.g. via a manual switch) or the solar charging priority to be specified as compared to the storage.
- Optg mode change CHs+HW: The operating level can be set via the contact instead of via the internal time switching program (external time switching program)
- Room thermostat CH1 up to Room thermostat CH3: With the input a room thermostat request can be generated for the set heating circuit.

Note
The quick decrease should be switched off for the corresponding heating circuits.

- Hot water thermostat: Connection of the DHW thermostat.
- Pulse count: By querying the input the low frequency pulse, e.g. for flow measurement is recorded.
- Checkb sign flue gas damper: Feedback via input H1 in case of activated flue gas damper control.
- Start prevention: With this input a burner start can be prevented.
- Consumer request VK1 10V/Consumer request VK2 10V: The application node external load x receives a voltage signal (DC 0-10 V) as heat request. The linear curve is defined via two fix points (voltage value 1/ function value 1 and voltage value 2/function value 2 (only applies to H1).
- Preselected output 10V: The generator receives a voltage signal (DC 0 - 10 V) as output request. The linear curve is defined via two fix points (voltage value 1/function value 1 and voltage value 2 / function value 2 (only applies to H1).

Contact type H1 (5951) Contact type H4 (5971) and Contact type H5 (5978)

With this function, the contacts can be set as resting contact (contact closed, must be opened for activating the function) or as working contact (contact opened, must be closed for activating the function).

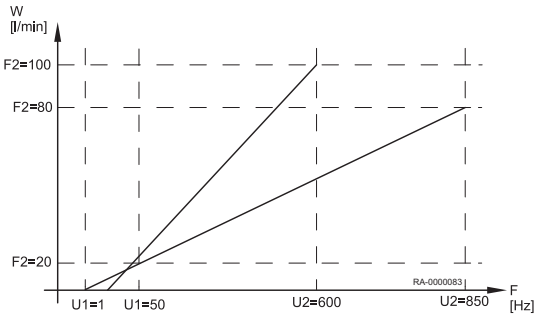
Voltage value 1 H1 (5953),Voltage value 2 H1 (5955), Function value 1 H1 (5954) andFunction value 2 H1 (5956)

The linear sensor curve is defined over two fixed points. The setting is made with two parameter pairs for **Function value** and **Voltage value** (F1 / U1 and F2 / U2).

The function value is specified to a factor of 10, i.e. if you require 100°C, you should select "1000".

Frequency value 1 H4 (5973), Function value 1 H4 (5974), Frequency value 2 H4 (5975) and (5976)Function value 2 H4

Fig.42 Example for two different sensor curves



F Frequency
W Water flow

The linear sensor curve is defined over two fixed points. The setting is done with two parameter pairs for **function value** and **frequency value** (F1 / U1 and F2 / U2).

Function output P1 (6085)

This parameter is used to specify the function for the modulating pumps.

- None: No output P1 exists.
- Boiler pump Q1: The connected pump is used for recirculation of the boiler water.
- Hot water pump Q3: Actuator for DHW storage tank.
- HW interm circ pump Q33: Charging pump for DHW cylinder with external heat exchanger.
- heating pump CH1 Q2: The pumped heating circuit HC1 is activated.
- heating pump CH2 Q6: The pumped heating circuit HC2 is activated.
- heating pump CH3 Q20: The pumped heating circuit HC3 is activated.
- Collector pump Q5: A circulation pump for the collector circuit is required for connection of a solar collector.
- Solar pump ext exch K9: If several exchangers are connected, the buffer storage must be set at the respective relay output. In addition, the type of the solar regulating unit must be defined in prog.no. 5840.
- Solar pump swi pool K18: If several exchangers are connected, the the swimming pool must be set at the respective relay output. In addition, the type of the solar regulating unit must be defined in prog.no. 5840.

Sensor type collector (6097)

Selection of used sensor types for measurement of the collector temperature.

Readjustm collector sensor (6098)

Setting a correction value for collector sensor 1.

Readjustm outside sensor (6100)

Setting a correction value for outside sensor.

Time constant building (6110)

The value set here influences the reaction speed of the flow setpoint in case of fluctuating outside temperatures as a function of the building design.

Example values (refer also to Quick setback):

- 40 for buildings with thick walls or outer insulation.
- 20 for buildings of normal building design.
- 10 for buildings of light building design.

Central setp compensation (6117)

The central setpoint lead monitors the heat generator setpoint to the required central flow temperature. With the setting the maximum corrector is restricted, even if a larger adaptation should be required.

System frost protection (6120)

The heating circuit pump is activated without heat request subject to outside temperature. If the outside temperature reaches the lower limit value of -4°C, the heating circuit pump is activated. The pump is activated every 6 hours for 10 minutes when the outside temperature is between -5°C and +1.5°C. When the upper limit value of 1.5°C is reached, the pump switches off.

Save sensors (6200)

Sensor modes can be saved under prog. no. 6200. This is done automatically; however, after change of the heating system (removal of a sensor) the state must be saved again to the sensor terminals.

Reset to default parameters (6205)

The factory setting of the regulator is written to the regulator.

Caution
The regulator parameters are overwritten. The factory settings are stored in the regulator.
- Activation of prog. no. 6205:
  The regulator is reset to **factory setting**.

Check no. heat source 1 (6212), Check no. heat source 2 (6213), Check no. storage tank (6215) and (6217)Check no. heating circuits

The standard device generates a check number to identify the system scheme; this comprises the numbers listed in the table below.

Tab.11 Check no. heat source 1 (prog.-no. 6212)

Solar					
A collector field with sensor B6 and collector pump Q5	Tank charging pump for buffer storage tank K8	Solar diverting valve for buffer storage tank K8	Solar charging pump for swimming pool K18	Solar diverting valve for swimming pool K18	External solar exchanger, Solar pump K9 DHW=DHW storage tank B=Buffer storage tank
0	No solar				
1					*
3					DHW/B
5	X				
6		X			
8	X				DHW+B
9		X			DHW/B
10	X				DHW
11		X			DHW
12	X				P
13		X			P
14			X		
15				X	

Solar					
A collector field with sensor B6 and collector pump Q5	Tank charging pump for buffer storage tank K8	Solar diverting valve for buffer storage tank K8	Solar charging pump for swimming pool K18	Solar diverting valve for swimming pool K18	External solar exchanger, Solar pump K9 DHW=DHW storage tank B=Buffer storage tank
17			X		DHW/B
18				X	DHW/B
19	X		X		
20		X		X	
22	X				DHW+B
23		X		X	DHW/B
24	X		X		DHW
25		X		X	DHW
26	X		X		P
27		X		X	P

Tab.12 Check no. storage tank (prog.-no. 6215)

Buffer storage tank		Domestic water storage tank	
0	No buffer storage tank	00	No DHW storage tank
1	Buffer storage tank	01	Immersion heater
2	Buffer storage tank, solar connection	02	Solar connection
4	Buffer storage tank, heat generation shutoff valve	04	Primary pump
5	Buffer storage tank, solar connection	05	Charging pump, solar connection
	Heat gen shutoff valve	13	Diverter valve
		14	Diverting valve, solar connection
		16	Primary controller, without heat exchanger
		17	Primary controller, 1 heat exchanger
		19	Intermediate circuit, without heat exchanger
		20	Intermediate circuit, 1 heat exchanger
		22	Primary pump/intermediate circuit, without heat exchanger
		23	Charging pump/intermediate circuit, 1 heat exchanger
		25	Diverting valve, intermediate circuit, without heat exchanger
		26	Diverting valve, intermediate circuit, 1 heat exchanger
		28	Primary controller/intermediate circuit, without heat exchanger
		29	Primary controller/intermediate circuit, 1 heat exchanger

Tab.13 Check no. heating circuit (prog.-no. 6217)

Heating circuit 3		Heating circuit 2		Heating circuit 1	
0	No heating circuit	00	No heating circuit	00	No heating circuit
1	DHW circulation via boiler circuit pump	01	DHW circulation via boiler circuit pump	01	DHW circulation via boiler circuit pump
2	Heating circuit pump	02	Heating circuit pump	02	Heating circuit pump

Heating circuit 3		Heating circuit 2		Heating circuit 1	
3	Heating circuit pump, mixer	03	Heating circuit pump, mixer	03	Heating circuit pump, mixer

Software version (6220)

Display of the actual software version.

9.2.18 LPB system

Device address (6600) andSegment address (6601)

The two-part LPB address of the controller consists of the 2-digit segment number and the 2-digit device number.

Bus power supply function (6604)

- Off: The controller does not provide the bus power supply.
- Automatically: The bus power supply is switched on and off by the controller in accordance with the power demand of the bus system.

Bus power supply state (6605)

- Off: The bus system power supply by the controller is currently inactive.
- On: The bus system power supply by the controller is currently active.

Display system messages (6610)

This setting allows system messages which are transmitted via LPB to be suppressed on connected operating elements.

Alarm delay (6612)

The transmission of the alarm to the BM module can be delayed in the basic device by an adjustable time. This allows the prevention of unnecessary messages to a service location caused by malfunctions which only occur briefly (e.g. temperature monitor queried, communication errors). However, it must be noted that malfunctions which occur briefly and quickly reoccur are also filtered out by this.

Action changeover functions (6620)

If the setting Central is activated under prog. no. 6221 and 6223 respectively, the action for this setting can be set. The following settings are possible:

- Segment: The changeover is done for all controllers in the same segment.
- System: The changeover is done for all controllers in the entire system (that is in all segments). The controller must be located in segment 0!

Summer changeover (6621)

- Locally: The local heating circuit is switched on and off depending on prog.no. 730, 1030 or 1330.
- Locally: Depending on the settings made in prog. no. 6620, either the heating circuits in this section or all heating circuits in the entire system are switched on and off.

Optg mode changeover (6623)

- Locally: The local heating circuit is switched on and off.
- Centrally: Depending on the settings made in prog. no. 6620, either the heating circuits in this section or all heating circuits in the entire system are switched on and off.

Manual source lock (6624)

- Locally: The local generator is locked.
- Segment: All generators in the cascade are locked.

Hot water assignment (6625)

This setting is only necessary if the DHW heating control is provided by the heating circuit time program (see prog. no. 1620 and 5061).

- Local CHs: DHW heating applies only to the local heating circuit.

- All CHs in segment: DHW heating applies to all heating circuits in this section.
- All CHs in system: DHW heating applies to all heating circuits in the system.

Note
For all settings the controllers which are in holiday status are also taken into account for the DHW preparation.

Clock mode (6640)

This setting determines the effect of the system time on the controller time setting. The following settings are possible:
- Autonomously: The time can be adjusted at the controller. The time of the controller is not adapted to the system time.
- Slave without remote setting: The time cannot be adjusted at the controller. The controller time is constantly synchronised to the system time.
- Slave with remote setting: The time can be adjusted at the controller. The system time is synchronised simultaneously as the change is adopted by the master. The time of the controller is then continually adapted to the system time.
- Master: The time can be adjusted at the controller. The controller time is defaulted to the system. The system time is adapted.

Outside temp source (6650)

In the LPB system only one single outside temperature sensor is necessary. This delivers the signal via the LPB to the controllers without a sensor. The first figure in the display is the section number, the second is the appliance number.

9.2.19 Fault

Message (6700)

A current existing error in the system is displayed here in the form of an error code.

Display SW diagnostic code (6705)

In case of a fault, the display fault is on permanently. In addition, the diagnosis code is displayed on the display.

Burn ctrl phase lockout pos (6706)

Phase during which the fault occurred which led to the failure.

Reset alarm relay (6710)

An output relay QX, programmed as an alarm relay can be reset via this setting.

Flow temp 1 alarm (6740),Flow temp 2 alarm (6741),Flow temp 3 alarm (6742),Boiler temp alarm (6743) andHot water charging alarm (6745)

Setting the time after which a fault message will be triggered in case of persisting deviation from temperature nominal and actual values.

Error history / Error codes (6800-6995)

The last 20 error messages with error codes and time of occurrence are saved to the error memory.

9.2.20 Maintenance / special operation

Burner hours interval (7040)

Setting of the interval for maintenance of the burner.

Burn hrs since maintenance (7041)

Burner hours since the last maintenance.

Note
The burner hours are only counted, when the maintenance message has been activated.

Burner start interval (7042)

Setting of the interval for burner starts for maintenance.

Burn starts since maint (7043)

Burner starts since the last maintenance.

Note
The burner starts are only counted, when the maintenance message has been activated.

Maintenance interval (7044)

Setting of maintenance interval in months.

Time since maintenance (7045)

Passed time since the last maintenance interval.

Note
The time is only counted, when the maintenance message has been activated.

Fan speed ionization current (7050)

Speed limit from which the ionisation current service alarm should be set (prog. no. 7051), if the ionisation current monitoring and therefore a speed increase based on too low ionisation current active is.

Message ionization current (7051)

Function for display and reset of the burner ionization current maintenance message. The maintenance message can only be reset if the reason for maintenance has been eliminated.

Chimney sweep function (7130)

The chimney sweep function is switched on or off under this prog no.

Note
The function is switched off by the setting**Off** or automatically if the maximum boiler temperature is reached.
It can also be directly activated via the chimney sweep button.

Manual control (7140)

Activation of manual control. If the manual control function is activated the boiler is controlled to the setpoint manual control. All the pumps are switched on. Additional request will be ignored!

Controller stop function (7143)

If the controller stop function is activated, the burner output set in the setpoint controller stop is directly requested by the device.

Controller stop setpoint (7145)

With activated controller stop function the output set here is requested by the device.

Telephone customer service (7170)

Here the desired telephone number of customer service can be entered.

PStick storage pos (7250)

The parameterPStick storage pos can be used to select the data set (data set number on the stick) to be written or read.

PStick command (7252)

- No operation: This is the basic state. As long as no operation is active on the stick, this command is displayed.

- Reading from stick: Starts reading the data from the stick. This operation is only possible with READ sticks. The data of the set data set is copied to the LMS control. First a check is carried out as to whether the data set may be imported. If the data set is incompatible, it must not be imported. The display resets toNo operation and displays an error message. The textReading from stick remains until the operation is completed or an error occurs. As soon as data transmission begins, the LMS control goes in a parameterization position. As soon as parameters are transferred, the LMS control must be unlocked transmission has ended. Fault 183 parameterization is displayed.
- Writing on stick: Starts writing the data from the LMS control to the stick. This operation is only possible with WRITE sticks. The data is written into the previously set data set. Before writing of the data begins, it is checked whether the stick has sufficient capacity for the data and that the respective customer number is correct. The textWriting on stick remains until the operation is completed or a fault occurs.

■ PStick progress (7253)

The read or write progress is displayed as a percentage. If no operation is active or a fault occurs, 0% is displayed.

9.2.21 Configuration of extension modules

■ Function extension module 1 (7300), Function extension module 2 (7375) und Function extension module 3 (7450)

When a function is selected, the inputs and outputs are occupied on the extension module with the functions according to the following table:

Connection terminal on module	QX21	QX22	QX23	BX21	BX22	H2/H21	H22
Multi-functional	*	*	*	*	*	*	*
Heating circuit 1	Y1	Y2	Q2	B1	*	*	*
Heating circuit 2	Y5	Y6	Q6	B12	*	*	*
Heating circuit 3	Y11	Y12	Q20	B14	*	*	*
Return sensor	Y7	Y8	Q1	B7	*	*	*
Solar DHW	*	*	Q5	B6	B31	*	*
Primary control/ system pump	Y19	Y20	Q14	B15	*	*	*
* Freely selectable in QX.../ BX... FS = DHW flow switch; AVS75.390 = H2; AVS75.370 = H21							

Tab.14 Legend

Q1	Boiler pump
Q2	1. Heating circuit pump
Q5	Collector pump
Q6	2. Heating circuit pump
Q14	System pump
Q20	Heating circuit pump HC3
Y1	1. Heating circuit mixer OPEN
Y2	1. Heating circuit mixer CLOSED
Y5	2. Heating circuit mixer OPEN
Y6	2. Heating circuit mixer CLOSED
Y7	Return maintenance valve OPEN
Y8	Return maintenance valve CLOSED
Y11	3. Heating circuit mixer OPEN

Y12	3. Heating circuit mixer CLOSED
Y19	Primary control mixer OPEN
Y20	Primary control mixer CLOSED
B1	Flow sensor HC1
B6	Collector sensor
B7	Return sensor
B12	Flow sensor HC2
B14	Flow sensor HC3
B15	Flow sensor primary control

■ Relay output QX21 module 1(7301), Relay output QX22 module 1, (7302), Relay output QX23 module 1, (7303), Relay output QX21 module 2, (7376), Relay output QX22 module 2(7377) und Relay output QX23 module 2 (7378) , Relay output QX21 module 3 (7451), Relay output QX22 module 3 (7452) and Relay output QX23 module 3 (7453)

- None: Relay outputs deactivated.
- Circulating pump Q4: The connected pump serves as a DHW circulation pump (see prog. no. 1660).
- El imm heater HW K6: With the connected immersion heater, the DHW can be charged according to the operating side DHW storage operating line immersion heater.

Note
The operating mode is set under prog.no. 5060.

- Collector pump Q5: Connection of a circulating pump in case of solar collector use.
- Consumer circuit pump VK1/2: Connection of a pump at the input Q15/18 for an additional consumer, which is requested via an Hx-input.
- Boiler pump Q1: the connected pump is used for recirculation of the boiler water.
- Bypass pump Q12: the connected pump is used as a boiler bypass pump, which is used for boiler return temperature control.
- Alarm output K10: Any new fault will be signalled by means of this alarm relay. The contact is closed with the delay time selected under prog. no. 6612. If no fault message exists, the contact opens without delay.

Note
The alarm relay can be reset without having the fault remedied (see prog. no. 6710). The alarm relay can also be closed temporarily by a message which, for example, leads to restart.

- heating pump CH3 Q20: Activating the pump heating circuit HC3.
- System pump Q14: Connection of a feed pump.
- Heat gen shutoff valve Y4: Connection of a changeover valve for hydraulic de-coupling of the heat generator from the rest of the heating system.
- Solid fuel boiler pump Q10: Connection of a circulation pump for the boiler circuit for the connection of a solid fuel boiler.
- Time setting 5 K13: The relay is controlled by time program 5 according to the settings.
- Buffer return valve Y15: This valve must be configured for return temperature increase/decrease or the buffer storage tank partial charging.
- Solar pump ext exch K9: The solar circuit pump for the external heat exchanger K9 must be set here.
- Solar ctrl elem buffer K8: If several exchangers are connected, the buffer storage tank must be set at the respective relay output and the type of solar regulating unit must be defined under prog.no.5840.
- Solar ctrl elem swi pool K18: If several exchangers are connected, the swimming pool must be set at the respective relay output and the type of the solar regulating unit must be defined in prog.no. 5840.

- Swimming pool pump Q19: Connection of a swimming pool pump at the input Q19.
- Flue gas relay K17: Relay K17 closes if the flue gas temperature exceeds the value set in the control line of prog. no. 7053.
- St tank transfer pump Q11: The DHW storage tank can be charged from the buffer storage tank providing it is hot enough. This transfer is brought about by transfer pump Q11.
- Hot water mixing pump Q35: Separate pump for cylinder content circulation whilst pasteurisation is active.
- HW interm circ pump Q33: Charging pump for DHW cylinder with external heat exchanger.
- Heat request K27: Output K27 is activated as soon as a heat demand exists in the system.
- Heating circuit pump HC1/HC2: The relay is used for actuating the heating circuit pump Q2/Q6.
- Hot water ctrl elem Q3: Depending on the hydraulics a connected DHW charging pump or diverting valve.
- Overheating protection K11: The relay switches the heating circuit pump on and off to protection the pump heating circuit from overheating.

■ Sensor input BX21 module 1 (7307), Sensor input BX22 module 1 (7308), Sensor input BX21 module 2, (7382), Sensor input BX22 module 2 (7383), Sensor input BX21 module 3 (7457) and Sensor input BX22 module 3 (7458)

Functions in addition to the basic functions are made possible by configuring the sensor inputs.

- None: Sensor inputs deactivated.
- Hot water sensor B31: Second DHW sensor, which is used for full charging of the legionella function (pasteurisation).
- Collector sensor B6: First solar collector sensor in a collector field.
- HW circulation sensor B39: Sensor for DHW circulation return.
- Buffer sensor B4: Lower buffer storage tank sensor.
- Buffer sensor B41: Centre buffer storage tank sensor.
- Common flow sensor B10: Common flow sensor for boiler cascades.
- Solid fuel boiler sensor B22: Sensor for the acquisition of the temperature of a solid fuel boiler.
- HW charging sensor B36: DHW sensor for DHW charging systems.
- Buffer sensor B42: Upper buffer storage tank sensor.
- Common return sensor B73: Return sensor for the return diversion function.
- Cascade return sensor B70: Common return sensor for boiler cascades.
- Swimming pool sensor B13: Sensor for measurement of swimming pool temperature.
- Solar flow sensor B63: This sensor is required for the solar usage measurement.
- Solar return sensor B64Solar return sensor B64: this sensor is required for the solar usage measurement

■ Function input H2 module 1 (7311), Function input H21 module 1 (7321), Function input H2 module 2 (7386), Function input H21 module 2 (7396), Function input H2 module 3 (7461) and Function input H21 module 3 (7471)

- Noneno function.
- Optg mode change CHs+HW: Changeover of the operating modes of the heating circuits to reduced or protection operation (prog.nos. 900, 1200, 1500) and locking of domestic hot water charging in case of closed contact at H21/H22/H2.
- Operating mode changeover HC1 to HC3: Operating mode changeover for heating circuits to protection or reduced operation.

Note
Locking of domestic hot water charging is only possible under the setting **Optg mode change CHs+HW**.

- Heat generation lock: the heat generator is locked through connecting terminal H2. All temperature demands for heating circuits and DHW are ignored. The boiler frost protection function is maintained.

Note
The chimney sweeper function can be applied in spite of the heat generation lock.

- Error/alarm message: Closing the inputs Hx results in a control unit-internal fault message, which will also be signalled via a relay output programmed as an alarm output or in the remote management system.
- Consumption requirement VK1/VK2: the set flow temperature setpoint is activated via the connecting terminals (e.g. a ventilation heater function for door curtain units).

Note
The setpoint must be set under progr. no. 1859/1909/1959.

- Release swimpool source htg: Closing the input Hx (e.g. manual switch) releases the swimming pool heater. Heating is by means of 'heat generator heating'.
- Excess heat discharge: an active excess heat discharge enables, for example, an external source to force the consumers (heating circuit, DHW storage tank, heating circuit pump) to draw off the excess heat using a signal.
- Release swi pool solar: This function enables the solar swimming pool heater to be released externally (e.g. via a manual switch) or the solar charging priority to be specified as compared to the storage.
- Operating level DHW/HCs: The operating level can be set via the contact instead of via the internal time switching program (external time switching program).
- Ambient thermostat HCs: With the input a room thermostat request can be generated for the set heating circuit.

Note
The quick decrease should be switched off for the corresponding heating circuits.

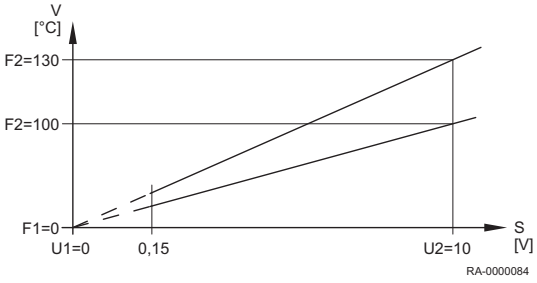
- Consumption requirement VKx 10V: The application node external load x receives a voltage signal (DC 0-10 V) as heat request. The linear curve is defined via two fix points (voltage value 1/function value 1 and voltage value 2/function value 2) (only applies to H1).

■ Contact type H2 module 1 (7312), Contact type H21 module 1 (7322), Contact type H2 module 2 (7387), Contact type H21 module 2 (7397)

With this function, the contact can be set as a resting contact (contact closed, must be opened for activating the function) or as working contact (contact opened, must be closed for activating the function).

■ Voltage value 1 H2 module 1 (7314) to Funct value 2 H2 module 1 (7317), Voltage value 1 H2 module 2 (7389) to Funct value 2 H2 module 2 (7392), Voltage value 1 H2 module 3 (7464) and Funct value 2 H2 module 3 (7467)

Fig.43 Example of heat demand 10 V



F1 Function value 1
F2 Function value 2
S Voltage to Hx
U1 Voltage value 1
U2 Voltage value 2
V Flow temperature setpoint

The linear sensor curve is defined over two fixed points. The setting is made with two parameter pairs for **Funktionswert** and **Spannungswert** (F1 / U1 and F2 / U2).

■ Funct input EX21 module 1 (7342) , Funct input EX21 module 2 (7417) and Funct input EX21 module 3 (7492)

- None: No function.
- Counter 1st burner stage: The counter values (operating hours and starts) for the first burner stage are counted using the signal at input EX21. If this function is not set, counter values are counted on the basis of the state of relay K5.

- Heat generation lock: The boiler is locked if contact at EX21 is closed.
- Error/alarm message: Closing the input EX21 results in a control unit-internal fault message, which will also be signalled via a relay output programmed as an alarm output or in the remote management system.
- Excess heat discharge: An active excess heat discharge enables, for example, an external source to force the consumers (heating circuit, DHW storage tank, heating circuit pump) to draw off the excess heat using a signal.

■ Funct output UX21 module 1 (7348), Funct output UX22 module 1 (7355), Funct output UX21 module 2 (7423), Funct output UX22 module 2 (7430) , Funct output UX21 module 3 (7498) and Funct output UX22 module 3 (7505)

- None: No function.
- Boiler pump Q1: The connected pump is used for recirculation of the boiler water.
- DHW pump: Actuator for DHW storage tank.
- DHW intermediate circuit pump Q33: Actuation of a charge pump for domestic hot water storage with external heat exchanger.
- Heating circuit pumps HCs: Activation of the pump heating circuits HC1-HC3.
- Collector pump: Actuation of a circulating pump when a solar collector is used.
- Solar pump ext. exchanger K9: The solar circuit pump for the external heat exchanger K9 must be set here.
- Solar pump buffer K8: If several exchangers are connected, the buffer storage tank must be set at the respective relay output and the type of solar regulating unit must be defined under prog.no.5840.
- Solar pump swimming pool K18: If several exchangers are connected, the swimming pool must be set at the respective output and the type of the solar regulating unit must be defined in prog.no. 5840.
- Solid fuel boiler pump Q10: Connection of a circulation pump for the boiler circuit for the connection of a solid fuel boiler.

■ Signal output UX21 module 1 (7350), Sign logic out UX22 module1 (7357), Signal output UX21 module 2 (7425) und Signal output UX22 module 2 (7432)

Specifies whether the signal is to be outputted as a 0..10V signal or pulse width modulated (PWM) signal.

9.2.22 Input/output test

■ Input/output tests (7700-7872)

Tests for checking the function of connected components.

9.2.23 Status

■ Status requests (8000-8011)

With this function the status of the selected system can be requested.

Tab.15 Status table heating circuit

The following messages are possible under **Heating circuit**:

End user (Eu)	Commissioning, Engineer (menu Status)
Limitter has tripped	Limitter has tripped
Manual control active	Manual control active
Floor curing function active	Floor curing function active
Heating mode restricted	Overtemp protect active
	Restricted, boiler protection
	Restricted, HW priority

End user (Eu)	Commissioning, Engineer (menu Status)
	Restricted, buffer
Forced draw	Forced draw HW
	Forced draw source
	Overrun active
On heating mode	Opt start ctrl+CH boost
	Optimum start control
	Central heating boost
	On heating mode
Reduced heating mode	Optimum stop control
	Reduced heating mode
Frost protection active	Frost prot room active
	Frost protection flow active
	System frost protect active
Summer operation	Summer operation
Off	24-hour Eco active
	Setback reduced
	Setback off
	Room temp limitation
	Off

Tab.16 Status table domestic water

The following messages are possible under **Drinking water**:

End user (Eu)	Commissioning, Engineer (menu Status)
Limitter has tripped	Limitter has tripped
Manual control active	Manual control active
Consumption	Consumption
Hot water preheat on	Hot water preheat active
	Hot water preheat on
Recooling active	Recooling via collector
	Recooling via heat gen/CHs
	Recooling via HW/CHs
Charging lock active	Discharging prot active
	Charg time limitation active
	Charging locked
Forced charging active	Forced, max st tank temp
	Forced, max charging temp
	Forced, legionella setp
	Forced, nominal setp
Charg el imm heater	El charging, legionella setp
	El charging, nominal setp
	El charging, reduced setp
	El charging, frost prot setp
	El imm heater released
Boost active	Boost legionella setpoint

End user (Eu)	Commissioning, Engineer (menu Status)
	Boost hot water setpoint
Charging active	Charging, legionella setp
	Charging, nominal setp
	Charging, reduced setp
Frost protection active	Frost protection active
	Frost prot instant heater
Overrun active	Overrun active
Standby charging	Standby charging
Charged	Charged, max st tank temp
	Charged, max charging temp
	Charged, legionella temp
	Charged, nominal temp
	Charged, reduced temp
Off	Off
Ready	Ready

Tab.17 Status table boiler

The following messages are possible under **Boiler**:

End user (Eu)	Commissioning, Engineer (menu Status)
SLT has tripped	SLT has tripped
Fault	Fault
Limitter has tripped	Limitter has tripped
Manual control active	Manual control active
Chimney sweep funct active	Chim sweep fct, full load
	Chim sweep fct, part load
Locked	Locked, manual
	Locked, solid fuel boiler
	Locked, automatic
	Locked, outside temp
	Locked, economy mode
Min limitation active	Min limitation
	Min limitation, part load
	Min limitation active
In operation	Protective start
	Protective start, part load
	Return limitation
	Return limitation, part load
Charging buffer	Charging buffer
In part load op for CH, HW	In part load op for CH, HW
In part load op for CH, HW	In part load op for CH, HW
Released for CH and HW	Released for CH and HW
In operation for HW	In operation for HW
In part load op for HW	In part load op for HW
Released for HW	Released for HW

End user (Eu)	Commissioning, Engineer (menu Status)
In operation for CH	In operation for CH
In part load op for CH	In part load op for CH
Released for CH	Released for CH
Overrun active	Overrun active
Released	Released
Frost protection active	Frost protection active
Off	Off

Tab.18 Status table solar

The following messages are possible under **Solar**:

End user (Eu)	Commissioning, Engineer (menu Status)
Manual control active	Manual control active
Fault	Fault
Frost prot collector active	Frost prot collector active
Recooling active	Recooling active
Max st tank temp reached	Max st tank temp reached
Evaporation prot active	Evaporation prot active
Overtemp protect active	Overtemp protect active
Max charging temp reached	Max charging temp reached
Charg HW+buffer+swi pool	Charg HW+buffer+swi pool
Charging HW+buffer	Charging HW+buffer
Charging HW+swi pool	Charging HW+swi pool
Charging buffer+swi pool	Charging buffer+swi pool
Charging HW	Charging HW
Charging buffer	Charging buffer
Charging swimming pool	Charging swimming pool
Radiation insufficient	Min charg temp not reached
	Temp diff insufficient
	Radiation insufficient

Tab.19 Status table solid fuel boiler

The following messages are possible under **Solid fuel boiler:**

End user (Eu)	Commissioning, Engineer (menu Status)
Manual control active	Manual control active
Fault	Fault
Overtemp protect active	Overtemp protect active
Released	Locked, manual
	Locked, automatic
Min limitation active	Min limitation
	Min limitation, part load
	Min limitation active
In operation for CH	Protective start
	Protective start, part load

End user (Eu)	Commissioning, Engineer (menu Status)
	Return limitation
	Return limitation, part load
	In operation for CH
In part load op for CH	In part load op for CH
In operation for HW	In operation for HW
In part load op for HW	In part load op for HW
In op for CH, HW	In op for CH, HW
In part load op for CH, HW	In part load op for CH, HW
Overrun active	Overrun active
In operation	In operation
Assisted firing active	Assisted firing active
Released	Released
Frost protection active	System frost protect active
	Boiler frost prot active
Off	Off

Tab.20 Status table burners

The following messages are possible under **Burner**:

End user (Eu)	Commissioning, Engineer (menu Status)
Lockout position	Lockout position
Start prevention	Start prevention
In operation	In operation
Startup	Safety time
	Prepurge
	Startup
	Postpurge
	Shutdown
	Home run
Standby	Standby

Tab.21 State table buffer storage tank

The following messages are possible under **Buffer storage tank**:

End user (Eu)	Commissioning, Engineer (menu Status)
Hot	Hot
Frost protection active	Frost protection active
Charg el imm heater	El charg, emergency mode
	El charg, source protection
	Electric charging defrost
	Electric charging, forced
	Electric charging, substitute
Charging restricted	Charging locked
	Restricted, HW priority
Charging active	Forced charging active

End user (Eu)	Commissioning, Engineer (menu Status)
	Partial charging active
Recooling active	Recooling via collector
	Recooling via HW/CHs
Charged	Charged, max st tank temp
	Charged, max charging temp
	Charged, forced temp
	Charged, required temp
	Part charged, required temp
	Charged, min charging temp
Cold	Cold
No request	No request

Tab.22 Status table swimming pool

The following messages are possible under **Swimming pool**:

End user (Eu)	Commissioning, Engineer (menu Status)
Manual control active	Manual control active
Fault	Fault
Heating mode restricted	Heating mode source
Heated, max swi pool temp	Heated, max swi pool temp
Heated	Heated, setpoint solar
	Heated, setpoint source
Heating mode	Heating mode solar off
	Heating mode source off
Cold	Cold

9.2.24 Diagnostics cascade/heat generation/consumers

- **Diagnostics cascade/heat generation/consumers (8100-9058)**

Displays of different setpoint and actual values, relay switching statuses and counter statuses for diagnosis purposes.

9.2.25 Burner control

- **Prepurge time (9500)**

Pre-venting time.

Caution
This parameter must only be changed by a heating specialist!

- **Required output prepurging (9504)**

Nominal output fan speed during preventing.

- **Required output ignition (9512)**

Nominal output fan speed during ignition.

- **Required output LF (9524)**

Nominal output fan speed under boiler in part load.

Note
If you change this value, please note that prog.no. 2452 (Controller delay fan output) is always higher.

■ Required output HF (9529)

Nominal output fan speed under boiler in HF

■ Postpurge time (9540)

After-venting time.

Caution
This parameter must only be changed by a heating specialist!

■ Fan output/speed slope (9626) and Fan output/speed Y-section (9627)

The speed of the fan can be adjusted with this. This is important for complex installations or change to LPG.

- Prog 9626 corresponds to the slope of the fan curve
- Prog 9627 corresponds to the displacement of the fan curve in Y-direction

9.2.26 Info option

Different information values are displayed depending on the operating conditions. In addition, information about the status is displayed.

10 Maintenance

10.1 General

10.1.1 General instructions

In heating and air conditioning systems, a regular inspection and maintenance as required by qualified personnel contribute to correct operation according to the product specification, and therefore to ensuring high efficiency and low environmental pollution in the long term.

Danger of electric shock
Before any work, switch off the mains supply to the boiler.
Before removing parts of the casing, the boiler has to be de-energised.
Work under voltage (removed casing) may only be carried out by a trained electrician.

Caution
Only a qualified professional is authorised to clean the inside of the boiler.

10.1.2 Inspection and service as required

Note
We recommend having the EC four inspected annually. If the need for maintenance work is found during inspection, this should be carried out according to need.

Maintenance work includes:
- EC four Cleaning the outside.
- The burner must be checked for soiling, and then cleaned and serviced if necessary.
- Clean burner areas and heating surfaces
- Replace wear parts (see *Spare parts list* section).

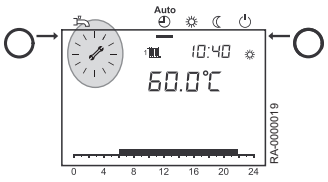
Caution
Only use original spare parts.

- Check connection and seal locations of water-filled parts.
- Check safety valves for correct function.
- Check operating pressure and top up the water if necessary.
- Bleed the heating system and return the gravity lock to operating position.
- Final check and documentation of performed service work

See
More detailed information about the inspection and service of heat generators is included in BDH/ZVSHK Info sheet 14.

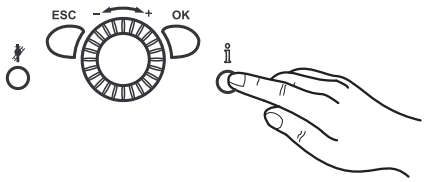
Note
In order to guarantee optimum operation of the heat pump we recommend concluding a service contract.

10.2 Maintenance messages



10.2.1 Maintenance message

If the maintenance sign appears in the display a maintenance message exists or the system is in special operation.



1. **Informationstaste** Press
   Further information is displayed.

See
Maintenance code table

Note
The maintenance message has not been activated by the setting in the factory.

10.2.2 Maintenance code table

Servicing code	Maintenance description
1	Burner operating hours exceeded
2	Burner starts exceeded
3	Maintenance interval exceeded

10.2.3 Operating phases of the Control Centre LMS

The operating phases are displayed after the **information key** has been pressed.

Phase number		
Display	**Operating state**	**Description of function**
STY	Standby (no heat demands)	Burner on stand-by
THL1	Fan start-up	Self-test for burner start and fan start-up
THL1A		
TV	Pre-purging time	Pre-purging, fan deceleration time to starting load speed
TBRE	Waiting time	Internal safety tests
TW1		
TW2		
VDE	Ignition phase	Ignition and start of safety time for flame formation, ionisation current build-up
TSA1	Safety time constant	Flame monitoring with ignition
TSA2	Safety time variable	Flame monitoring without ignition
TI	Interval time	Flame stabilisation
MOD	Modulating mode	Operating burner
THL2	Subsequent ventilation with last operating fan speed	Fan continues to run
THL2A	Subsequent ventilation with pre-purging fan speed	Fan continues to run
TNB	Burner shut-off delay	Permitted burner run-on time
TNN	Overrun time	Permitted fan run-on time
STV	Start prevention	No internal or external release exists (e.g. no water pressure, lack of gas)
SAF	Safety switch-off	
STOE	Fault position	The current fault mode is displayed.

10.3 Standard inspection and maintenance operations

10.3.1 Checking water hardness

The water hardness of the heating water has to be checked within the scope of the recommended maintenance of the boiler and the corresponding amount of additive has to be added if necessary.

10.3.2 Removing the burner

The following steps describe how to remove the burner:

1. Close gas shut off device
2. Remove front panel of the EC four.
3. Release ignition cable, ionization line and earthing cable.
4. Disconnect connection lines from fan and gas valve
5. Remove the screws on the flange on the venturi pipe
6. Loosen the flue gas silencer with seal (in the flange) from the venturi pipe

Fig.44 Loosening the flue gas silencer from the venturi pipe

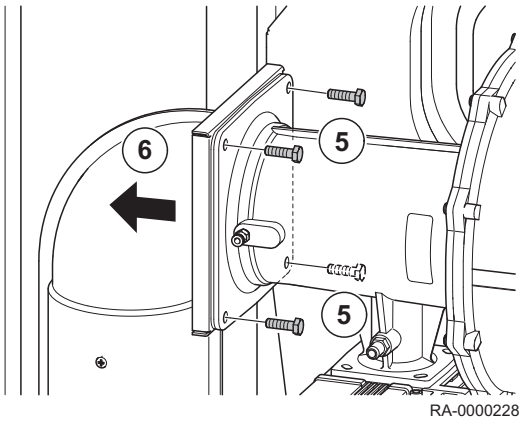


Fig.45 Loosening the gas connection hose

7. Release gas connection hose from the gas valve

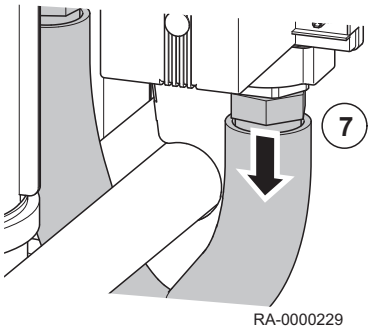
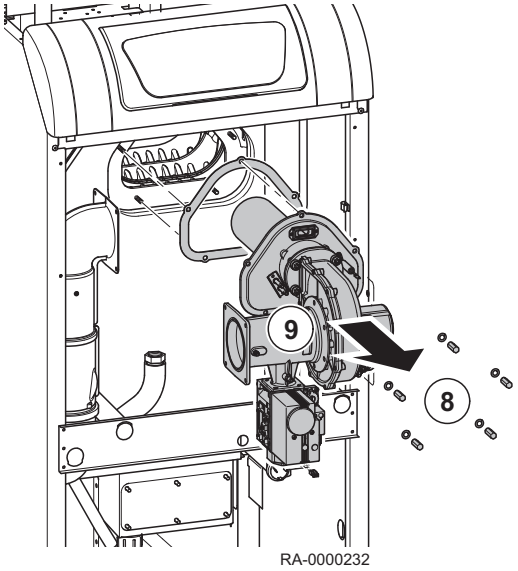


Fig.46 Removing the burner



8. Remove the nuts and washers
9. Pull the entire burner with burner seal forwards and out

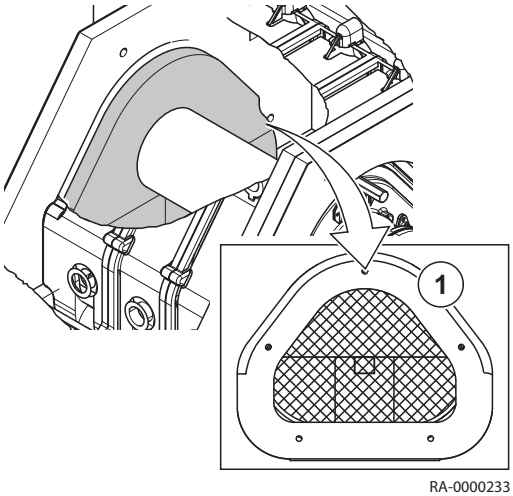
Note
The illustration shows removal of the burner from the EC four 125 kW - 170 kW. Removal of the burner from the EC four 215 kW - 300 kW is carried out in the same way.

Note
Installation of the burner is done in the opposite sequence. Use new seals when installing.

10.3.3 Checking combustion room insulation

Caution
Check combustion room insulation after burner removal.
After removing the burner the combustion room insulation must be checked for the correct position and increased wear. None of the panels should have slipped and caused large gaps. If in doubt, replace the insulation.

Fig.47 Position of the combustion room insulation.



1. Check the combustion room insulation to make sure it is in the correct position; if the insulation is torn, tipped forward or has large gaps, it must be replaced.

See
Observe the notes in the spare parts manual.

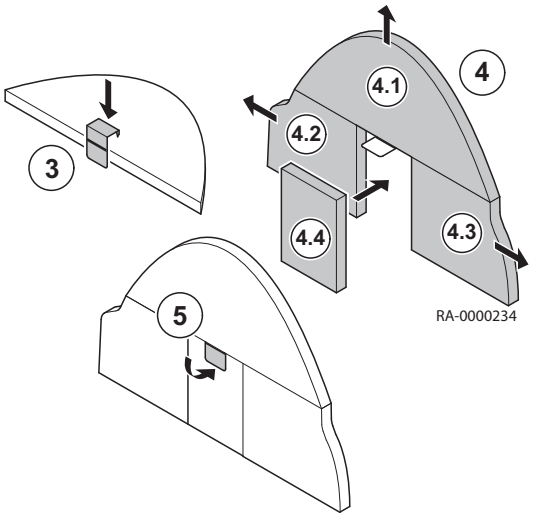
For more information, see
Removing the burner, page 132

10.3.4 Changing the combustion room insulation.

For the combustion room insulation to be fitted or replaced, the burner must have been removed (see section *Removing the burner*).

1. Remove the existing combustion room insulation from the rear wall of the heat exchanger
2. Use a vacuum cleaner to remove the residue of the insulation from the heat exchanger

Fig.48 Inserting the combustion room insulation.



3. Insert a retaining clip with the angled tips from behind into the upper insulating panel
4. Insert the insulating panels
   - Insert the upper insulating panel
   - Insert the left insulating panel
   - Insert the right insulating panel
   - Clamp the central insulating panel D in the remaining space
5. Bend the projecting retaining clip by hand over the central insulating panel D

Note
After installation of the burner the burner pipe is flush to the combustion room insulation.

For more information, see
Removing the burner, page 132

10.3.5 Cleaning the burner pipe

Note
For the burner pipe to be cleaned, the burner must have been removed first (see section *Removing the burner*).

The following steps describe how to clean the burner pipe:

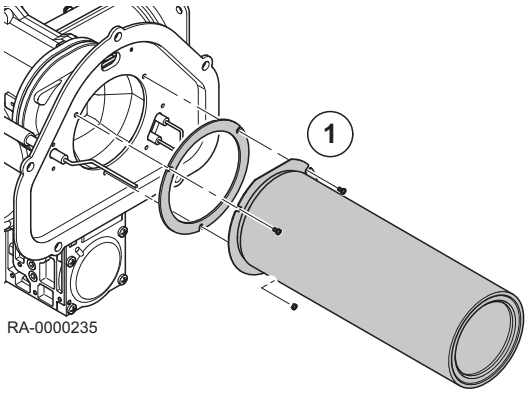
1. Loosen the screws and remove the burner pipe with the burner pipe seal
2. Clean the burner pipe with compressed air
3. Reinstall the burner pipe with burner pipe seal

Note
Use a new burner pipe seal when installing the burner pipe.

4. Reinstall the burner

For more information, see
Removing the burner, page 132

Fig.49 Removing the burner pipe

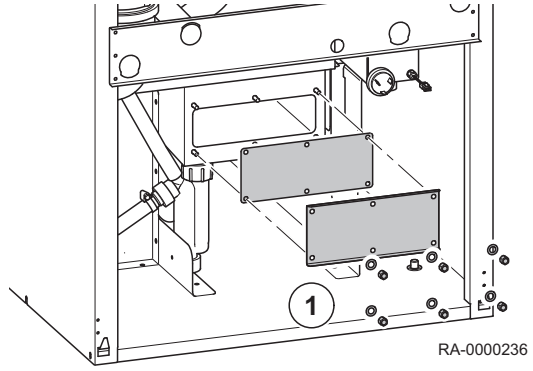


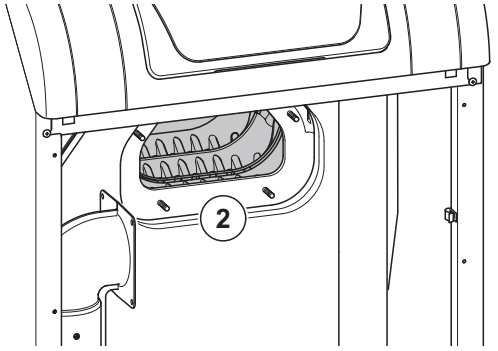
10.3.6 Cleaning the heat exchanger

Before the heat exchanger can be cleaned, the burner must be removed (see section *Removing the burner*).

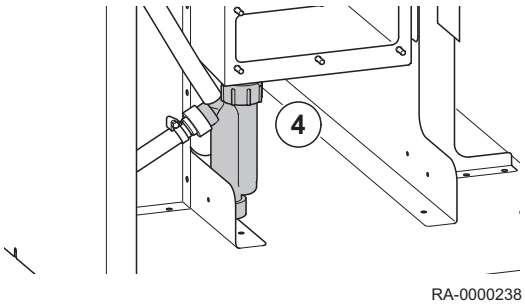
1. Remove screws and remove cover of the flue gas collection pan with seal

Fig.50 Removal of the flue gas collection pan cover





2. Clean the heat exchanger with a brush or rinse with water
3. Remove deposits from the exhaust collection pan



4. Remove the siphon and clean it
5. Reinstall the siphon
6. Replace the cover of the exhaust collection pan

Note
Use a new seal when installing the cover.

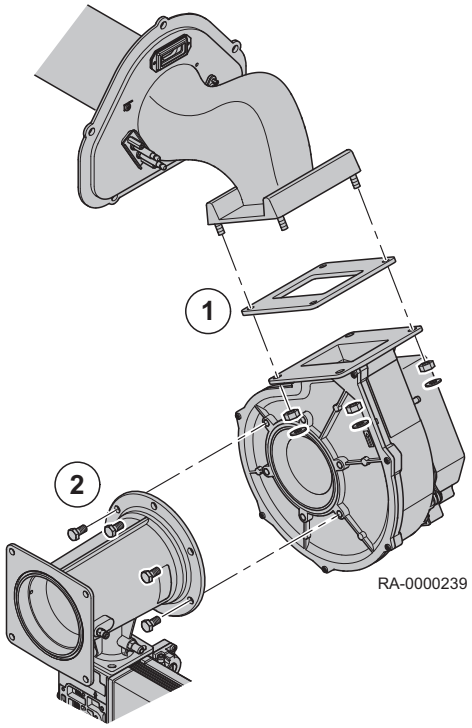
7. Reinstall the burner

For more information, see
Removing the burner, page 132

10.3.7 Cleaning the fan

Before the fan can be cleaned, the burner must be removed (see section *Removing the burner*).

Fig.51 Removing the fan



1. Remove nuts with washers and release the the fan with seal from the burner cover
2. Remove screws and release venturi pipe, incl. gas valve with seal from the fan
3. Clean fan with compressed air
4. Reassemble burner in the opposite sequence

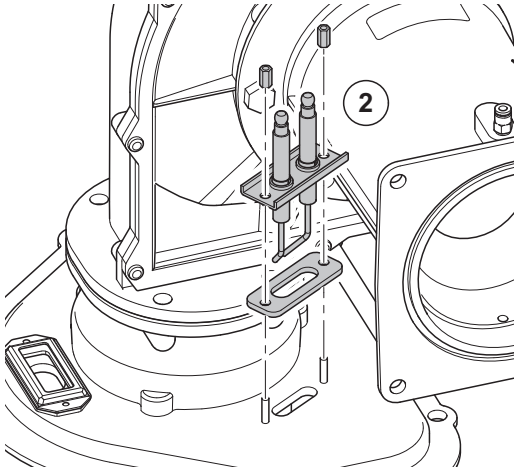
Note
Use new seals when reassembling the burner.

5. Reinstall the burner

For more information, see
Removing the burner, page 132

10.3.8 Changing the ignition electrodes

Note
To avoid an influence of the ionization current by the ignition, the ignition electrode must only immerse into the edge of the flame.



RA-0000240

Danger of electric shock
Danger to life due to electric current!
Before service work is started, the boiler has to be de-energised and secured from accidentally being switched back on.

The following steps describe how to change the ignition electrodes:

1. Loosen ignition cable
2. Loosen nuts and pull the ignition electrode block with seal out of the burner cover

Note
The illustration shows removal of the ignition electrodes from the EC four 125 kW - 170 kW. Removal of the ignition electrodes from the EC four 215 kW - 300 kW is carried out in the same way.

3. Insert the new ignition electrode block with seal and fasten with nuts

Note
Please note: The spacing and installation positions specified in the section *Electrode spacing and installation locations* must be heeded.

4. Reconnect the ignition cable

For more information, see
Electrode spacing and installation locations, page 137

10.3.9 Checking the ionization electrode

For measurement of the ionization current, pull plug from the gas burner control and connect ammeter between plug and electrode. Measurement must be carried out at full load and part load.

Danger of electric shock
Danger to life due to electric current!
Do not touch plug contacts during the ignition process!

The ionization electrode must always be in contact with the flame. During burner operation, the measured ionization flow must display the following values:
- at minimum power > 5 µA DC (switching threshold at 0.7 µA DC)
- at maximum power > 10 µA DC

If these values are not reached, the ionization electrode must be replaced.

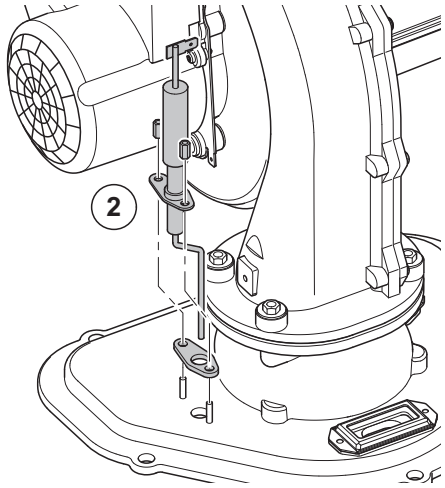
10.3.1 Changing the ionization electrode 0

Danger of electric shock
Danger to life due to electric current!
Before service work is started, the boiler has to be de-energised and secured from accidentally being switched back on.

The following steps describe how to change the ionization electrode:

1. Loosen ionization line

Fig.52 Removing the ionization electrode



2. Remove nuts and pull out the ionization electrode with the seal

Note
The illustration shows removal of the ionization electrode from the EC four 125 kW - 170 kW. Removal of the ionization electrode from the EC four 215 kW - 300 kW is carried out in the same way.

3. Insert the new ionization electrode with seal and fasten with nuts

Note
Please note: The spacing and installation position specified in the section *Electrode spacing and installation locations* must be heeded.

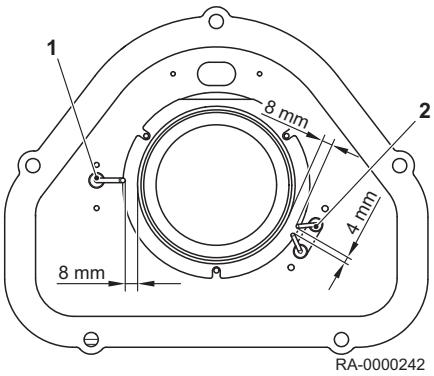
4. Reconnect the ionization line

For more information, see
Electrode spacing and installation locations, page 137

10.3.1 Electrode spacing and installation locations 1

The installation locations and electrode spacing for the ignition electrodes and the ionization electrode are shown in the following diagram:

Fig.53 Installation locations and spacing



1 Ionization electrode
2 Ignition electrodes

10.3.1 Protection against contact 2

Danger of electric shock
Danger to life due by missing shock-proof protection.
To ensure shock-proof protection, all parts of the boiler to be screwed on – the casing parts in particular – must be screwed on correctly after work has been completed.

10.4 Specific maintenance instructions

10.4.1 Replacing the safety valve

A defective safety valve may only be replaced by a genuine spare part. When replacing a safety valve, care must be taken that the hose connection is turned through about 10° downwards so that the water can flow away freely.

Caution
Drain off boiler water.
The boiler water has to be drained before removal of the safety valve, as otherwise water will leak out!

11 Troubleshooting

11.1 Fault code table

The following is an extract from the fault code table. If other fault codes are displayed, please inform the installer.

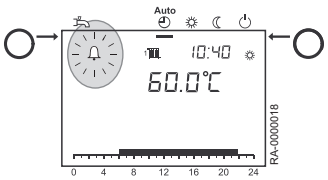
Fault code	Fault description	Explanations/causes
0	No fault	
10	Outside temp sensor fault	Check connection or outside temp sensor, emergency operation
20	Boiler temperature 1 sensor fault	Check connection, inform heating specialist(1)
25	Boiler temperature solid fuel sensor fault	
26	Boiler temperature solid fuel sensor fault	
28	Boiler temperature solid fuel sensor fault	
30	Flow temperature 1 sensor fault	
32	Flow temperature 2 sensor fault	Check connection, inform heating specialist1)
38	Boiler temperature solid fuel sensor fault	
40	Return temperature 1 sensor fault	Check connection, inform heating specialist1)
46	Boiler temperature solid fuel sensor fault	
47	Common return temp sensor fault	
50	DHW temperature 1 sensor fault	Check connection, inform heating specialist, emergency operation 1)
52	DHW temperature 2 sensor fault	Check connection, inform heating specialist1)
54	Flow temperature DHW sensor fault	
57	Drinking water circulation temperature sensor fault	
60	Room temperature 1 sensor fault	
65	Room temperature 2 sensor fault	
68	Room temperature 3 sensor fault	
70	Storage tank temp 1 (top) sensor fault	
71	Storage tank temp 2 (bottom) sensor fault	
72	Storage tank temp 3 (middle) sensor fault	
73	Collector temperature 1 sensor fault	
81	LPB short-circuit or no bus power supply	
82	LPB address collision	Check addresses of connected control modules
83	BSB wire short-circuit	Check connection of the room units
84	BSB address collision	2 room devices have the same assignment (prog.no. 42)
85	BSB wireless commissioning fault	
91	EEPROM fault: information of locking mechanism	Internal fault LMS, process sensor, replace LMS, heating specialist
98	Expansion module 1 fault (collective fault)	
99	Expansion module 2 fault (collective fault)	
100	Two time masters (LPB)	Check time master
102	Clock time master without backup	
105	Maintenance message	See maintenance code (press information button once) for detailed information
109	Boiler temperature monitoring	

Fault code	Fault description	Explanations/causes
110	Safety temperature limiter lockout	No heat removal, STB interruption, possible short-circuit in the gas valve(2), internal fuse faulty; allow device to cool down and carry out reset; if the fault occurs several times inform the installer(3)
111	Temperature monitor switching off	No heat supply; pump defect, radiator valves closed 1)
119	Fault pressure switch	Check water pressure and top up with water if necessary1)
121	Flow temperature 1 (Heating circuit 1) monitoring	
122	Flow temperature 2 (Heating circuit 2) monitoring	
126	DHW charging monitoring	
127	Legionnaire's disease germs temperature not reached	
128	Flame failure during operation	
132	Gas pressure monitor or air pressure monitor fault	Lack of gas, contact GW opened, external temperature monitor
133	No flame during the safety time	Reset, if the fault re-occurs several times contact installer, lack of gas, polarity of mains connection, safety period, check ignition electrode and ionization current 1) 3)
146	Configuration fault common message	
151	Internal fault	Check parameters (see adjustment table installer and/or call-up values), unlock LMS, replace LMS, installer 1) 3)
152	Parameterization fault	
160	Fan fault	Fan possibly defective, speed threshold set wrongly 3)
162	Air pressure monitor does not close.	
171	Alarm contact H1 or H4 activated	
172	Alarm contact H2 (EM1, EM2 or EM3) or H5 activated	
178	Temperature monitor heating circuit 1	
179	Temperature monitor heating circuit 2	
183	The device is in parameter setting mode	
217	Sensor fault	
218	Pressure monitoring	
241	Flow sensor solar sensor fault	
242	Return sensor solar sensor fault	
243	Swimming pool sensor fault	
260	Flow temperature 3 sensor fault	
270	Monitoring function	
317	Mains frequency outside of valid range	
320	DHW charging temp sensor fault	
322	Water pressure too high	Check water pressure and drain water if necessary1)
323	Water pressure too low	Check water pressure and top up with water if necessary1)
324	BX same sensors	
325	BX / extension module same sensors	
326	BX / mixer group same sensors	
327	Extension module same function	
328	Mixer group same function	
329	Extension module / mixer group same function	
330	Sensor BX1 no function	
331	Sensor BX2 no function	

Fault code	Fault description	Explanations/causes
332	Sensor BX3 no function	
335	Sensor BX21 no function (EM1, EM2 or EM3)	
336	Sensor BX22 no function (EM1, EM2 or EM3)	
339	Collector pump Q5 missing	
341	Collector sensor B6 missing	
342	Solar DHW sensor B31 missing	
343	Solar interconnection missing	
344	Solar actuator buffer K8 missing	
345	Solar actuator swimming pool K18 missing	
346	Solid fuel boiler pump Q10 missing	
347	Solid fuel boil comp sensor missing	
348	Solid fuel boiler address error	
349	Storage buffer return valve Y15 missing	
350	Storage buffer address error	
351	Primary controller/supply pump address error	
352	Low-loss header address error	
353	Common flow sensor B10 missing	
371	Flow temperature 3 (Heating circuit 3) monitoring	
372	Temperature monitor HK3	
373	Expansion module 3 fault (collective fault)	
378	Repetition counter internal fault expired	
382	Repetition counter fan fault expired	
384	External light	
385	Mains undervoltage	
386	Fan speed has left valid range	
387	Air pressure switch fault	
426	Feedback flue damper	
427	Configuration flue damper	
432	Functional earth X17 not connected	

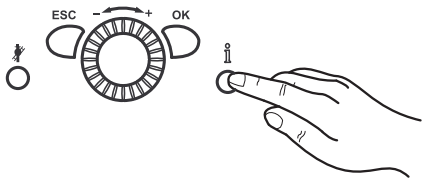
(1) Switch off, start prevention, re-start after elimination of fault
(2) Parameters according to table Check the installer adjustment table and program to the basic settings or query internal LMS SW diagnosis code and correct the corresponding parameter faults according to fault specification
(3) switch-off and locking; can only be unlocked by reset

11.2 Fault finding



11.2.1 Fault message

If the fault symbol appears on the display there is a fault in the heating system.



1. Press the **information key**.
   Further information about the fault is displayed

See
Fault code table

For more information, see
Fault code table, page 138

11.2.2 Fault switch-off

A fault switch-off is a safety-switch off in the case of flame failure during operation. After every safety switch-off a new ignition attempt is carried out as per program. If this does not result in flame formation a fault switch-off occurs.

In case of fault switch-off, the reset button on the control panel should be pressed.

In case of operation disturbances (bell symbol in the display), the digit in the display on the operating panel indicates the cause of the disturbance (see fault code table).

Burner does not start:
- No voltage at the control and regulating centre
- No “burner ON” signal from the heating circuit control (see *Fault code table*)
- Gas tap closed
- No ignition

Burner goes into fault mode:

Without flame formation:
- No ignition
- Ionization electrode has ground connection
- Ionization electrode is not connected
- No gas
- Gas pressure too low

In spite of flame formation the burner goes into fault mode after expiration of the safety time:
- Ionization electrode defective or soiled
- Ionization electrode does not penetrate the flame
- Ionization electrode is not connected
- Gas pressure not stable

12 Disposal/recycling

12.1 Packaging

As part of the packaging regulations, Potterton provides local disposal facilities for the specialist company to ensure correct recycling of all the packaging. In order to protect the environment, the packaging is 100% recyclable.

See
Please follow the legal requirements applicable to disposal in your country.

12.2 Appliance disposal

The appliance can be returned to Potterton for disposal via a specialist company. The manufacturer undertakes to recycle the appliance correctly.

Note
The appliance is recycled by a disposal company. If possible, the materials, especially the plastics, are identified. This enables correct sorting for recycling.

13 Appendix

13.1 Declaration of conformity

CE

POTTERTON COMMERCIAL

Declaration of conformity

Product	Condensing gas boiler
Trade mark	EuroCondense
Product ID number	CE-0085 CL 0072
Type, Model	EuroCondense four 125, EuroCondense four 170, EuroCondense four 215, EuroCondense four 260, EuroCondense four 300
EU directives	2006/95/EC, 2004/108/EC, 2009/142/EC, 92/42/EEC, 2009/125/EC
Standards	DIN EN 483 (1.6.2000), DIN EN 15420 (11.2011), DIN EN 656 (1.1.2000) DIN EN 15417 (1.11.2006), DIN EN 483 (1.6.2000) DIN EN 60335-1 (VDE 0700-1):2007-02; EN 60335-1:2002+A11+A1+A12+Corr.+A2:2006 DIN EN 60335-1/A13 (VDE 0700-1/A13):2009-05; EN 60335-1/A13:2008 DIN EN 60335-2-102 (VDE 0700 Teil 102) 2007-04; EN 60335-2-102:2006 DIN EN 62233 (VDE 0700-366):2008-11; EN 62233:2008 DIN EN 62233 Ber.1 (VDE 0700-366 Ber.1):2009-04; EN 62233 Ber.1:2008 DIN EN 55014-1 (VDE 0875 Teil 14-1):2007-06; EN 55014-1:2006 DIN EN 61000-3-2 (VDE 0838-2):2006-10; EN 61000-3-2:2006 DIN EN 61000-3-3 (VDE 0838-3):2009-06; EN 61000-3-3:2008 DIN EN 55014-2 (VDE 0875 Teil 14-2):2009-06; EN 55014-2:1997 + A1:2001 + A2:2008 Requirements of category II
EC type examination	DVGW Deutsche Vereinigung des Gas- und Wasserfaches e.V. 53123 Bonn Notified Body 0085
Surveillance procedure	Module D, EC Gas Appliance Directive DVGW CERT GmbH D-53123 Bonn

The producer states the following:

The above named products fulfil the requirements of the directives and standards. They are identical with the prototype examined. The production process follows the guidelines of the surveillance procedure. The above named products are only for installations in hot water heating systems. The installer has to assure that the directives for installation and operation are being followed.

ppa. S. Harms
R&D Manager

i.V. U. Patzke
Test Laboratory Manager and Delegate for Documentation

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POTTERTON
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PART OF BDR THERMEA