

60 - 80 - 100 - 120 - 150 - 180

<u>Wall hung high efficiency boiler</u> with energy saving pump

Mounting, user and service instructions





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TABLE OF CONTENTS

	INTROD	UCTION	.6
1	SAFETY	GUIDELINES	6
2	TECHNI	CAL DATA AMBASSADOR ⁺ BOILERS	7
	2.1	FUNCTIONAL INTRODUCTION.	. 7
	2.2	TECHNICAL SPECIFICATIONS DATASHEET	. 8
	2.3	GAS TYPE I2EK	. 9
	2.4	ERP SPECIFICATIONS DATASHEET	10
2			11
3	3.1	AMRASSADOR+ 60-120	11
	3.7	AMBASSADOR 00-120	12
	5.2		12
4	ACCESS	SORIES AND UNPACKING	.13
	4.1		13
	4.2	FLUE GAS AND AIR SUPPLY PARTS - I WIN PIPE:	13
	4.3	FLUEGAS AND AIR SUPPLY PARTS - CONCENTRIC:	14
	4.4	UNPACKING	14
5	INSTALI	LATION OF THE AMBASSADOR ⁺	15
	5.1	GENERAL NOTES	15
	5.2	MOUNTING THE BOILER	16
6	CONNE	CTIONS WATER SIDE	.17
-	6.1	BOILER CONNECTIONS	17
	6.2	CONDENSATE DRAIN CONNECTION	17
	6.3	FLOW AND RETURN CONNECTIONS	18
	6.4	THE EXPANSION VESSEL	18
	6.5	PRESSURE RELIEF VALVE	18
	6.6	BYPASS	18
	6.7	PUMP FUNCTIONALITY	18
	6.8	FROST PROTECTION	19
	6.9	INSTALLING A STRAINER AND/OR DIRT SEPARATOR	19
	6.10	WATER QUALITY	19
	6.11	PLASTIC PIPING IN THE HEATING SYSTEM	20
	6.12	AUTOMATIC AIR VENT	20
	6.13	AUTOMATIC WATER FILLING SYSTEMS	20
	6.14	WATER PRESSURE	20
	6.15	CHEMICAL WATER TREATMENT	21
	6.16		21
	6.17	FLUSH THE SYSTEM WITH FRESH WATER	21
	6.18	INSTALLATION EXAMPLES	21
	6.1	8.1 Example of a low-resistance neating circuit	21
	0.1	8.2 Example of a normal single boiler heating circuit with low loss header (preferable)	22
	0.1		22
7	PUMP C	HARACTERISTICS	23
	7.1	HYDRAULIC GRAPHS	23
	7.2	PUMPS: MAXIMUM ELECTRICAL POWER	26
8	FLUE G	AS AND AIR SUPPLY SYSTEM	.26
	8.1	GENERAL	26
	8.2	BOILER CATEGORIES - TYPES OF FLUEGAS SYSTEMS.	27
	8.3	C63 CERTIFIED	28
	8.4	AIR SUPPLY	29
	8.4	1.1 Combustion air quality	29
	8.4	Air supply through humid areas	29
	8.5	A+60 TWIN PIPE VERSION	30
	8.6	PIPE HEIGHTS AND MUTUAL DISTANCES ON A FLAT ROOF	30
	8.7	FLUE GAS AND AIR SUPPLY RESISTANCE TABLE	31

3

	8.8	SIX TY	PICAL EXAMPLES	32
	8.8	8.1	Example A: Twin pipe system (C63)	32
	8.	8.2	Example B: Twin pipe system with concentric roof terminal (C33)	32
	8.8	8.3	Example C: Single flue gas outlet. Air supply from boiler room	34
	8.	8.4	Example D: Concentric flue gas/air supply pipe (roof-mounted)	35
	8	85	Example F: Concentric system Wall outlet C13(wall-mounted)	
	8	8.6	Example E: Senarate air supply duct & flue duct in different pressure zone (C53)	00
	0.0	0.0		07
9	ELECT	RICAL	INSTALLATION	38
	9.1	Genei	RAL	38
	9.2	ELECT	RICAL CONNECTIONS	38
	9.3	Expla	NATION OF THE CONNECTIONS	38
	9.4	ELECT	RICAL SCHEMATICS	40
	9.5	SENSO	DR VALUES	42
10	USER II	NTERF		43
	10.1	CONT	ROL PANEL / DISPLAY UNIT	43
	10.2	CONT	ROL PANEL MENU STRUCTURE	44
	10.3	DISPL	AY DURING OPERATION	46
	10.4	Monit	OR SCREENS	47
	10.5	Servi	CE FUNCTION	49
	10.6	SCHO	RNSTEINFEGER FUNCTION	50
	10.7	Prog	RAMMING IN STANDBY MODE	51
	10.8	SETTI	NG THE TIME & DATE	51
	10.9	SETTI	NGS	52
	10.10	SETTI		53
	10.10			56
	10.11			50
	10.12			00
	10.13	CHECK		01
	10.14	SEIIII		62
	10.15	SETTI	NG THE USER LOCK	65
	10.16	SETTI	NG THE PARAMETERS AT THE CONTROL PANEL	66
	10.17	FAULT	CODES DISPLAY	73
	10).17.1	Lock-out codes	73
	10).17.2	Blocking codes	74
	10).17.3	Maintenance attention messages	75
11	CONTR			76
••	11 1			70
	11.1		Cutro boilor control	70
	11			70
	11	1.1.Z	Max cooling time	70
	11	.1.3	Temperature display on/off	76
	11	.1.4	Water pressure	76
	11	.1.5	Gas type selection	76
	11	1.1.6	Soft start option	77
	11	1.1.7	Pump mode (EC technology)	77
	11.2	HEATI	NG	78
	11	1.2.1	Controlling behaviour settings	78
	11	.2.2	Room thermostat on/off	79
	11	1.2.3	Room thermostat OPEN-THERM	79
	11	1.2.4	Outdoor temperature related flow control	. 79
	11	25	0-10 Vdc remote flow temperature set point	79
	11	126	0-10 Vdc Remote hurner input control	80
	11	127	Timer contect function	00
	11 2			00
	د. د <i>د</i>		Dump and 2 way value control	01 •04
	11	.3.1	rump and 3-way valve control.	01
	11	.3.2		81
	11	.3.3	I ank sensor	81
	11	.3.4	Low/high flow temperature to tank coil	82
	11	.3.5	Heating and hot water switching time	83
	11	.3.6	Heating and hot water switching at sudden temperature drop	83
	11	.3.7	Anti-Legionnaires' disease function (pasteurisation)	84

	11.4 CASCADE CONTROL	85
	11.4.1 Parameter settings for cascaded boilers	85
	11.4.2 Monitor screens	87
	11.4.3 Output control and boiler sequence	87
12	COMMISSIONING THE BOILER	88
	12.1 FIRST: FLUSHING THE BOILER WITH WATER	88
	12.2 SECOND: FILLING & VENTING THE BOILER AND THE SYSTEM	88
	12.3 THIRD: CHECK THE WATER FLOW	88
13	STARTING THE BOILER	90
	13.1 GENERAL	
	13.2 FIRING FOR THE FIRST TIME	90
14	ADJUSTING AND SETTING THE BURNER	91
	14.1 INTRODUCTION	
	14.1.1 Adjustment tables	
	14.1.2 Adjustment values	92
	14.1.3 Setting screws gas valve(s): drawings	
	14.1.4 Gas valve classes A+C and B+J (B+J only for Poland)	
	14.1.5 Adjustment actions: general scheme	
	14.2 ADJUSTING IN CASE OF A NEW BOILER, OR AFTER MAINTENANCE (CASE A)	
	14.2.1 General remark	
	14.2.2 Checking and adjusting at maximum load	
	14.2.3 Checking and adjusting at minimum load	
	14.3 ADJUSTING IN CASE OF VALVE REPLACEMENT OR GAS CONVERSION (CASE B)	
	14.3.1 General remains	
	14.3.2 Checking and adjusting at maximum load A+120 / A+150 / A+180	
	14.3.4 Checking and adjusting at minimum load A 120/ A 150/ A 160	
	14.4 ADJUSTING PROCEDURES	
4 5		101
15		101 101
	15.1 OUT OF OPERATION: OWOFF FUNCTION	101
40		400
10		
	16.2 BLOCKING CODES:	102
	16.3 MAINTENANCE ATTENTION FUNCTION	
17		
	17.1 GENERAL	
	17.2 INSPECTION & MAINTENANCE	
18	USER INSTRUCTIONS	115
19	INSTALLATION EXAMPLES	116
21	INDEX	121

INTRODUCTION

This manual is written for:

- The installer
- System design engineer
- The service engineer
- The user

abbreviations	EHS NB	Eco Heating Systems Groningen B.V. NOTICE
symbols		Warning: important information related to the safety of persons and/or the appliance
terminology	Flow Return	Water heater hot water out Water heater cold water in

Eco HS is not accountable for any damage caused by incorrect following the mounting instructions. For service and repair purposes use only original EHS spare parts.

All documentation produced by the manufacturer is subject to copyright law.

1 SAFETY GUIDELINES

Carefully read all the instructions before commencing installation.

Keep these instructions near the boiler for quick reference.

The appliance should be installed by a skilled installer according to all applicable standards. Failure to comply with these regulations could deem the warranty invalid.

Without written approval of the manufacturer the internals of the boiler may not be changed. When changes are executed without approval, the boiler certification becomes invalid.

Commissioning, maintenance and repair must be done by a skilled installer/engineer, according to all applicable standards and regulations.



- Don't use any electrical equipment.
- Don't press any switches.
- Close the gas supply.
- Ventilate the room (open the windows and/or outdoor boiler room doors).
- Immediately warn the installer.



The manufacturer/supplier is not liable for any damage caused by inaccurately following these mounting instructions. Only original parts may be used when carrying out any repair or service work.



This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

2 TECHNICAL DATA AMBASSADOR⁺ BOILERS

2.1 Functional introduction

The Ambassador⁺ boilers are central heating boilers with a maximum high efficiency. Such a performance can be reached by, amongst other things, using a special heat exchanger made of stainless steel. This allows the flue gases to cool down below the condensation point, and so release extra heat. This has an immediate positive impact on the efficiency, exceeding the 100%.

The Ambassador boiler is standard set for Natural gas G20 / G25.3

Gases used must meet the European standard EN 437.

Fuel used should have sulphur rates according to the European standard, a maximum annual peak over a short period of time of 150 mg/m³ and an annual average of 30 mg/m³.

Boiler control includes:

- Cascade control for up to twelve boilers
- Remote operation and heat demand indication from each boiler
- Weather compensation control
- Calorifier control

Connections for:

- 0-10 VDC remote flow temperature (set point) control
- 0-10 VDC remote burner input control
- Outdoor temperature sensor
- External calorifier pump or diverter valve

Cascade control

When using the integrated cascade control, a maximum of twelve boilers can be controlled in a cascade configuration. By the use of an appropriate external control, this number may be increased at will.

0-10 VDC connection available

The boiler flow temperature or power input can be controlled by an external 0-10 VDC signal. When a number of boilers are cascaded, and controlled by the integrated cascade control, the signal should be directed to the master boiler only. If an alternative control is used, more than one boiler may be controlled by a 0-10 VDC signal. A signal of 1,48 Volt will switch on the boiler(s), less than 1,4 Volt will switch off the boiler(s).

Time program

For both central heating and hot water function of the boiler, time programs with three programmable periods per day are available. These time programs are set and activated by entering the desired settings directly at the boiler control panel.

2.2 Technical specifications datasheet

GEN	IERAL									
Product Identification Number			-	CE 0063 BP3254						
Classification			-	II2EK3B/P (Country depending)						
Gas	Appliance Type		-	B23, B23P, C13, C33, C43, C53, C63, C83						
Туре	e boiler			A+60	A+80	A+100	A⁺120	A⁺150	A+180	
Dime	ensions (h x w x d)		mm		842 x 47	76 x 486		898 x 47	76 x 677	
Wate	er content estimate	ed	litre	3,9	5,0	6,5	8,3	10,4	12,9	
Weig	ght (empty)		kg	46	73	78	83	92	101	
Flow	/return connectior	ı (boiler)	inch	R 1"	R 1"	R 1"	R 1"	R 1¼"	R 1¼"	
Flow	/return connectior	ı (T-piece)	inch	Rp 1¼"	Rp1¼"	Rp 1¼"	Rp 1¼"	Rp 1½"	Rp 1½"	
Gas	connection		inch	R ¾"	R ¾"	R ¾"	R ¾"	R 1"	R 1"	
Flue	duct flue/air inlet		mm	80/125	80/125	100/150	100/150	100/150	100/150	
Para	Illel connection		mm	80-80	80-80	100-100	100-100	130-130	130-130	
HEA	TING			Values r	nin-max:					
Nom	inal input (Net)		kW	12,5 - 55,6	14,6 - 74,3	17,2 - 92,2	26,0 - 111	34,0 - 138	45,0 - 166	
Nom	inal input (gross)	(G20, G25.3)	kW	13,9 - 61,8	16,2 - 82,5	19,1 - 102	28,9 - 123	37,8 - 153	50,0 - 184	
Nom	inal input (gross) ((G31)	kW	13,6 - 60,4	15,9 - 80,8	18,7 - 100	28,3 - 121	37,0 - 150	48,9 - 180	
Nom	inal input (gross) ((G30/G31)	kW	13,5 - 60,3	15,8 - 80,2	18,6 - 99,7	34,7 - 120	36,8 - 150	48,8 - 180	
Nom	. output 80/60°C		kW	12,0 - 53,5	14,0 - 71,2	16,5 - 88,4	24,7 - 106	32,6 - 132	43,3 - 160	
Nom	. output 50/30°C		kW	12,9 - 57,4	15,2 - 77,5	18,0 - 96,2	27,2 - 116	35,5 - 144	47,3 - 175	
Nom	. output 37/30°C		kW	13,5 - 59,8	15,7 - 80,1	18,6 - 99,5	28,1 - 120	36,7 - 149	48,5 - 179	
Effic	iency 40/30°C DIN	4702-8	%		up to 110,6	6 % within th	ne Ambassa	dor⁺ range		
GAS	CONSUMPTION	[EN437]		Values n	nin-max:					
Natu	Iral gas G25.3		m³ _{st} /h	1,50 - 6,69	1,76 - 8,94	2,07 - 11,1	3,13 - 13,4	4,09 - 16,6	5,41 – 20,0	
Natu	iral gas G20		m³ _{st} /h	1,32 - 5,88	1,54 - 7,86	1,82 - 9,76	2,75 - 11,8	3,60 - 14,6	4,76 - 17,6	
Prop	ane gas G31 ¹		m³ _{st} /h	0,51 - 2,27	0,60 - 3,04	0,70 - 3,77	1,06 - 4,54	1,39 - 5,65	1,84 - 6,79	
Buta	ne/Propane (B/P)	G30/G31 ¹	m³ _{st} /h	0,39 - 1,72	0,45 - 2,29	0,53 - 2,85	0,99 - 3,44	1,05 - 4,28	1,40 - 5,15	
		G25.3	mbar			25				
Gas	supply pressure	G20	mbar			20				
nom	. 2	G31 ¹	mbar	30/37						
		G30/G31 ¹	mbar			50				
NOT	ES									
1 (Jsing propane or t	outane/propane	mixtures	(B/P), maxir	num fan spe	ed needs to	be reduced	parameter F	24BD)	
² Min. and max. gas supply pressures according to EN437:						,				
p nominal [m			nbar]	p min [mbar]	p max [mbar]				
G25.3 25		-	20)	30					
	G20	20		17	7	25				
	G31	30		25	5	35	5			
		37		25	5	45				
	G30/G31	50		43	3	57	/			

Type boiler				A+60	A⁺80	A+100	A+120	A⁺150	A+180	
EMISSION [EN4	37]			Nomina	Nominal values at min-max load:					
	G25.3/G20		%	8,7 - 9,0	8,7 - 9,0	8,7 - 9,0	8,7 - 9,0	8,7 - 9,0	8.7 - 9.0	
CO ₂ flue gas ³	G31		%	9,3 - 10,3	9,3 - 10,3	9,3 - 10,3	9,3 - 10,3	9,3 - 10,4	9.3 - 10.5	
	G30/	G31 (B/P)	%	9,3 - 10,4	9,3 - 10,4	9,3 - 10,4	9,3 - 10,4	9,3 - 10,5	9.3 - 10.6	
NOx class (EN15	502-1)	-			į	5			
Flue gas tempera air temperature =	ature a 20°C	t combustion	°C			~ 85	5-95			
Mass flow flue ga	as [mir Q _{fluega}	n-max] as condensing	g/s	5,59-28,9	6,52-38,6	7,69-47,9	11,6-57,7	15,2-71,7	20,1-86,2	
Available pressure for the flue system ⁴			Ра			20	00			
INSTALLATION	INSTALLATION									
Available pressu	re for	ΔT = 20 K	mWC	5,9	3,1	2,3	1,5	6,0	4,8	
the installation at		ΔT = 25 K	mWC	7,0	5,5	5,0	4,4	9,0	7,9	
Pressure boiler n	nin-ma	IX.	bar	1,0 - 4,0 5						
Max. flow temper	ature		°C	90						
ELECTRIC										
Maximum power	consu	mption	W	240	265	270	280	505	520	
Power supply			V/Hz	230/50						
Protection class			-	IPX4D						
NOTES										
³ CO ₂ of the unit measured/set without the boiler front panel in place ⁵ When the built-in water pressure <u>sensor</u> is replaced by a water pressure <u>switch</u> , water pressure may go						eplaced may go				
⁴ Maximum all gas and air s	owed upply	combined resis piping at high f	stance of ire	flue	up to 6,0	bar				

2.3 Gas type I2EK

Only applicable to the Dutch manual

2.4 ERP specifications datasheet

Technical parameters according the European ERP (Energy Related Products) legislation:

Type Boiler:		A⁺60	A⁺80	A⁺100	A ⁺ 120	A⁺150	A⁺180
Condensing boiler:		Yes	Yes	Yes	Yes	Yes	Yes
low temperature boiler:		Yes	Yes	Yes	Yes	Yes	Yes
B11 boiler:		No	No	No	No	No	No
Cogeneration space heater:		No	No	No	No	No	No
Combination heater:		No	No	No	No	No	No
	Unit:	Value	Value	Value	Value	Value	Value
Rated heat output	kW	53,5	72,1	89,4	107,7	132,9	159,9
P-rated (P4) at 60-80°C	kW	53,5	72,1	89,4	107,7	132,9	159,9
Heat output (p1) 30% at 30-37 ^o C	kW	17,9	24,1	29,8	36,0	44,7	53,7
Seasonal space heating energy effi- ciency (ηs).	%	91,9	92,3	92,4	92,6	92,3	92,3
energy efficiency (η4) at 60-80ºC	%	86,8	87,4	87,4	87,4	86,8	86,8
energy efficiency (η 1) at 30-37 ^o C	%	96,9	97,2	97,2	97,5	97,2	97,1
Auxiliary electricity consumption							
At full load (elmax).	kW	0,111	0,136	0,142	0,151	0,214	0,229
At part load (elmin)	kW	0,024	0,025	0,025	0,032	0,041	0,041
In standby mode (Psb)	kW	0,004	0,004	0,004	0,004	0,004	0,004
Other							
Standby heat loss (Pstby)	kW	0,063	0,067	0,071	0,076	0,084	0,094
Ignition burner power consumption (P _{ign})	kW	0,000	0,000	0,000	0,000	0,000	0,000
Annual Energy consumption (Q _{HE})	Gj	112	х	х	х	х	х
Emissions (Nox) of nitrogen oxides (EN15502-1:2012+A1:2015)	mg/kWh	38	46	40	45	41	44
Sound power level, indoors (EN 15036-1:2006)	dB	65	67	65	62	66	69

3 DIMENSIONS

3.1 Ambassador⁺ 60-120

<u>TWIN PIPE</u>





CONCENTRIC







Connections		twin pipe				concentric				
		A⁺60	A⁺80	A+100	A+120	A⁺60	A⁺80	A⁺100	A⁺120	
FG Al	flue gas air inlet	80-	-80	100·	-100	80/	(125 100/150		(150	
size " A "		112			155	112				
siz	e "B "	135				150	50 135			
siz	e " C "	308			N.A.					
F	flow	F	R 1¼" (n	nale)						
С	condensate	fl	lexible h	ose Ø25	/21 x 750	mm				
R	return	F	R 1¼" (n	nale)						
G	gas	R ¾" (male)								

TWIN PIPE







CONCENTRIC





C	onnections	twin pipe	concentric
FG Al	flue gas air inlet	130-130	100/150
F	flow	R 1½" (male)	25/21 x 750 mm
R	return	R 1½" (male)	25/21 x / 50 mm
G	gas	R 1" (male)	

E93.0802EN.C Ambassador⁺ manual

4 ACCESSORIES AND UNPACKING

4.1 Accessories

Depending on the selected controlling behaviour for the central heating system and/or the optional use of a calorifier, the following items can be supplied with the boiler. Ask your supplier for the specifications.

Item	Part N⁰.
Outdoor (air) temperature sensor: 12kOhm@25°C (Connect to 1/2 of the boiler connections)	E04.016.585
External flow temperature sensor for behind the low loss header: 10kOhm@25°C (Connect to 3/4 of the boiler connections)	E04.016.304
Calorifier temperature sensor: 10kOhm@25°C (to be mounted to the boiler connections)	S04.016.303
Room Controller "OpenTherm" RC (Modulating) with room sensor	S04.016.355
Room Controller "OpenTherm" RC (Modulating) no room sensor/to be used with E04.016.359	S04.016.358
External room sensor for the RC and RCH controller: 5kOhm@25°C	E04.016.359
External flow sensor for one heating zone: 5 kOhm@25°C	E04.016.363
Software + interface cable for programming the boiler with a computer/laptop	S04.016.586

4.2 Flue gas and air supply parts - <u>TWIN PIPE</u>:

Boiler type:	A60	A80	A100 + A120	A150 + A180
Twin pipe air and flue diameters:	Ø80	Ø80	Ø100	Ø130
Conversion kit concentric to twin pipe	E61.001.162	E61.001.163	E61.001.164	E61.001.165
Flue gas pipe stainless steel L=1000mm	E04.018.055	E04.018.055	E04.018.061	E04.018.036
Flue gas pipe stainless steel L=500mm	E04.018.054	E04.018.054	E04.018.060	E04.018.037
Flue gas pipe stainless steel L=250mm	E04.018.053	E04.018.053	E04.018.059	E04.018.038
Flue gas pipe PP L=1000mm	410085502	410085502	410085482	410070242
Flue gas pipe PP L=500mm	410085501	410085501	410085481	410070241
Flue gas pipe PP L=250mm	410085500	410085500	410085480	410070240
Adjustable pipe PP	410085027	410085027	410085127	410070250
All-purpose lead tile roof terminal	E04.018.031	E04.018.031	E04.018.013	E04.018.092
Concentric roof terminal SS.	E04.018.015	E04.018.015	E04.018.001	E04.018.074
Single pipe roof terminal PP	410086883	410086883	410084853	410070279
Tile roof terminal	E04.018.032	E04.018.032	E04.018.014	E04.018.079
Condensate drain stainless steel	E04.018.058	E04.018.058	E04.018.064	E04.018.065
Condensate drain PP	410085048	410085048	410085130	410070247
Wall pipe clamps	E04.018.083	E04.018.083	E04.018.084	E04.018.086
Roof deck pipe clamps (included in roof term.)	Incl. in terminal	Incl. in terminal	Incl. in terminal	Incl. in terminal
Seal ring rubber	S07.004.023	S07.004.023	S07.004.024	S07.004.025
Bend stainless steel 43-45°	E04.018.057	E04.018.057	E04.018.063	E04.018.041
Bend stainless steel 87-90°	E04.018.056	E04.018.056	E04.018.062	E04.018.042
Bend PP 43-45°	410085042	410085042	410085142	410070252
Bend PP 87-90°	410085041	410085041	410085141	410070251
Concentric wall terminal	E04.018.019	E04.018.019	E04.018.002	410072131
Air supply wall terminal	410082856	410082856	410087931	410087550
Manifold Air-Flue gas	E04.010.161	E04.010.161	E04.018.033	Included in roof terminal

4.3 Fluegas and air supply parts - <u>CONCENTRIC</u>:

Boiler type:		A60	A80	A100, A120	A150, A180
Concentric pipe diame	eters air and flue:	Ø80/125	Ø80/125	Ø100/150	Ø100/150
Conversion kit twin pip	pe to concentric	E61.001.187	E61.001.170	E61.001.171	E61.001.172
Flue gas pipe SS L=10	000mm	E04.018.016	E04.018.016	E04.018.005	E04.018.005
Flue gas pipe SS L=50	00mm	E04.018.067	E04.018.067	E04.018.004	E04.018.004
Flue gas pipe SS L=2	50mm	E04.018.066	E04.018.066	E04.018.003	E04.018.003
Adjustable pipe SS		at request	at request	410031724	410031724
Flue gas pipe PP L=10	000mm	E04.018.020	E04.018.020	410084302	410084302
Flue gas pipe PP L=50	00mm	E04.018.025	E04.018.025	410084301	410084301
Flue gas pipe PP L=2	50mm	E04.018.024	E04.018.024	410084300	410084300
Adjustable pipe PP		410084457	410084457	410084307	410084307
All-purpose lead tile ro	oof terminal	E04.018.031	E04.018.031	E04.018.013	E04.018.013
Concentric roof termin	al SS	E04.018.015	E04.018.015	E04.018.001	E04.018.001
Roof pipe flashing		E04.018.032	E04.018.032	E04.018.014	E04.018.014
Concentric roof termin	al PP	E04.018.018	E04.018.018	410084863	410084863
Air sealring concentric	roof terminal	08 1078 00	08 1078 00	08 1078 00	410075439
Concentric condensate	e drain SS	E04.018.069	E04.018.069	E04.018.009	E04.018.009
Concentric condensate	e drain PP	E04.018.028	E04.018.028	410084318	410084318
Wall pipe clamps		E04.018.085	E04.018.085	E04.018.087	E04.018.087
Roof deck pipe clamp	S	E04.018.030	E04.018.030	E04.018.012	E04.018.012
Sool ring gummi	Inner flue gas pipe	E07.004.023	E07.004.023	E07.004.024	E07.004.024
Searning guinnin	Outer air pipe	E07.004.026	E07.004.026	E07.004.027	E07.004.027
Conc. bend SS 43-45°	þ	E04.018.068	E04.018.068	E04.018.007	E04.018.007
Conc. bend SS 87-90°	þ	E04.018.017	E04.018.017	E04.018.006	E04.018.006
Conc. bend PP 43-45°	0	E04.018.027	E04.018.027	410084313	410084313
Conc. bend PP 87-90°	0	E04.018.021	E04.018.021	410084312	410084312
Concentric wall termin	al stainless steel	E04.018.019	E04.018.019	E04.018.002	E04.018.002

4.4 Unpacking

The Ambassador⁺ boiler will be supplied with the following documents and accessories:

- One "Mounting Instructions" manual for the installer
- One suspension bracket with locking plate and bolts
- Three spare nuts for mounting the burner plate, two spare fuses for the boiler control and a gas conversion sticker (all in a bag attached to the front of the gas valve)
- Bottom part of the siphon
- Two T-pieces for the flow and return connections of the boiler

After delivery, always check the boiler package to see if it is complete and without any defects. Report any imperfections immediately to your supplier.

5 INSTALLATION OF THE AMBASSADOR⁺

5.1 General notes

At every side of the boiler at least 50 mm of clearance should be applied to walls or wall units, 350 mm above the top side of the boiler and 250 mm from the bottom of the boiler.

The installation area/room must have the following provisions:

- 230 V 50 Hz power source socket with earth connection.
- Open connection to the sewer system for draining condensing water.
- A sound-deadening wall.

Note:

The wall used for mounting the boiler must be able to hold the weight of the boiler. If not, it is recommended to mount the boiler by means of a (cascade) frame.

Other considerations related to the boiler location.

- The ventilation of the boiler room must meet local and national standards and regulations, regardless of the selected supply of fresh air to the boiler.
- Both the air supply and the flue gas pipes must be connected to the outside wall and/or the outside roof.
- The installation area must be dry and frost-free.
- The boiler has a built-in fan that will generate noise, depending on the total heat demand. The boiler location should minimise any disturbance this might cause. Preferably mount the boiler on a brick wall.
- There must be sufficient lighting available in the boiler room to work safely on the boiler.
- When a boiler is positioned at the highest point of the installation, the supply and return pipes must first protrude 0,5 m above the top of the boiler, before these pipes go to the installation side. In other words, the water level must always be 0,5 meter above the top of the boiler and an automatic air vent must be installed in the supply or return pipe. A low-water level protection should also be installed at the installation side.
- Remind the positioning of electrical components in relation to the temperature sensitivity.
- Make sure there is an open connection with the sewer to drain the condensate. This connection should be lower than the condensate drain level of the boiler.

The boiler must be positioned and installed by a skilled installer in accordance with all applicable standards and regulations. Commissioning of the boiler must be done by a skilled service/commissioning engineer, who is trained for this type of boiler.

5.2 Mounting the boiler

Before mounting and installing the boiler the following connections should be considered:

- Flue gas system and the flue gas pipe connections
- Air supply system and connections
- Flow and return pipe connection
- Condensate and pressure relief valve drainage
- Power supply (preferably the power connection positioned above the boiler)
- Gaspipe.



All lines/piping must be mounted free of tension. The weight of the installation components should be supported separately from the boiler so there will be no standing forces on the connections.

This might influence the mounting position of the boiler.

Determine the position of the flow and return pipes by using the included suspension bracket or a suspension frame (when supplied).

While marking the holes, ensure that the suspension bracket or frame is <u>perpendicular and the boiler does not lean</u> <u>forward</u>. If necessary adjust the position with the adjusting bolts at the lower rear side of the back panel (see drawing). When the adjusting bolts aren't sufficient, fill the gap behind the bolts to get the boiler in position. The exact boiler position lies between the boiler hanging level and hanging slightly backwards.

The boiler should not lean forward in the mounted position.

Lock the suspension bracket with the security cover before making any other connections to the boiler. This security cover will prevent the boiler from falling off the bracket. Don't use excessive force during the mounting of the boiler connections.



6 CONNECTIONS WATER SIDE

FRONT VIEW



Open connection to the sewer.

6.1 Boiler connections

- 1 Flow CH
- 2 Condensate drain
- 3 Siphon cleaning point
- 4 Return CH
- 5 Gas

6.2 Condensate drain connection

The condensate drain is placed at the centre and at the bottom of the boiler and has a $\frac{3}{4}$ inch hose discharge. Connect this flexible hose to the sewer system.

Use only plastic parts with the condensate drain. Metal lines are not allowed.

Blockage of this drain might damage the boiler. The drain connection is correct when the condensate can be seen flowing away, e.g. using a funnel. Any damage that might occur, when the drain is not installed correctly, is not covered by the warranty of the boiler.

There should be an <u>open</u> connection of the condensate hose into the sewage system. A possible vacuum in the sewage system must never give the opportunity to suck on the boiler's condensate drain hose.



When mounting the bottom part of the siphon, before commissioning the boiler and/or after maintenance, the siphon must **ALWAYS** be <u>completely</u> filled with water.

This is a safety measure: the water in the siphon keeps the flue gases from leaking out of the heat exchanger via the condensate drain.





6.3 Flow and return connections

Two separate T-pieces are shipped with the boiler. These are applied for externally mounting the pressure relief valve and the boiler bleed valve for servicing the boiler. We advise to install two service valves in the flow and return pipes underneath the boiler, so the boiler can be isolated from the heating system and eventually disconnected, when needed.

When using a system pump, this pump should <u>always</u> be mounted in the return pipe of the heating system. Do not use chloride-based fluxes for soldering any pipes of the water system.

6.4 The expansion vessel

The capacity of the expansion vessel must be selected and based on the capacity of the central heating system and the static pressure. Suggested is to fit the expansion vessel in the return pipe of the central heating system. It can be combined with the drain valve for service. See the above drawing.

6.5 Pressure relief valve

The boiler has no internal pressure relief valve. This should be installed close to the boiler in the flow pipe of the heating system. When having cascaded boilers, each boiler should have its own pressure relief valve. It is advised to use the T-piece that is supplied with the boiler, for this.

Advice is always to install service valves, so the boiler can be isolated from the heating system, when needed. Make sure that the pressure relief valve is mounted between the boiler and the service valves.

The specifications and size of the relief valve should be determined by the installer and must comply with all applicable regulations and boiler capacity.

6.6 Bypass

The boiler has no internal bypass. When many thermostatic valves are being used, the system should have a bypass to allow an adequate flow when all thermostatic valves are closed. Instead of a bypass also a low-loss header can be used for this function.

The boiler flow will also be influenced when a pipe of the heating system is frozen / blocked. Make sure all heating pipes are free from the risk of frost. If there is the risk of freezing of the heating system, all the pipe section must be insulated and/or protected with the help of a tracing.

6.7 Pump functionality

Controlling the pump:

The pump speed is controlled by a PWM signal provided by the burner controller at a value causing a Delta T across the heat exchanger of 20°C at the whole burner modulation range.

When the boiler modulates down or up, also the pump speed decreases or increases, keeping delta T at 20°C until it reaches the end of its modulation range.

Delta T monitoring:

The delta T monitoring parameters are active. A to high Delta T (caused by a defective pump, or a high resistance in the hydraulic system e.g.) will therefore be detected by the burner controller. The display shows "dT Block" or "FlowReturn dTfault".

6.8 Frost protection

6.9

The boiler has a built-in frost protection that is automatically activating the central heating pump when the boiler return (water) temperature drops below the 5°C (programmable). When the boiler return temperature drops below the 3°C (programmable), the burner is also ignited. The pump and/or burner will shut down as soon as the return temperature has reached the 10°C (programmable). The mentioned temperatures are related to the temperatures measured by the RETURN sensor of the boiler. This frost protection function will not fire up the boiler in case of a "general blocking" of the burner demand.

NOTICE: This "Frost Protection" function is only useable for the boiler and not for the whole central heating system. Because it concerns a programmable setting, a boiler damaged by frost is not covered under warranty.

SYSTEM WITH DIRT SEPARATOR WATER DIRT SEPARATOR WATER FLOW RETURN TO BOILER(S) FROM DIRT BLEED VALVE SYSTEM WITH STRAINER AIR WATER BLEED RETURN VALVE FROM WATER FLOW SYSTEM TO BOILER(S) VALVE STRAINER (WATER FILTER) SYSTEM WITH STRAINER AND DIRT SEPARATOR WATER AIR RETURN BLEED FROM VALVE WATER DIRT SE-FLOW TO SYSTEM PARATOR BOILER(S) VALVE VALVE STRAINER DIRT (WATER FILTER) BLEED VALVE

Installing a strainer and/or dirt separator

Always install a strainer (water filter) and/or a dirt separator in the return pipe of the boiler; in such a way that the water going to the boiler is free of any debris/particles. When using a water filter always check a week after installation to determine the strainer cleaning interval. Advice is to mount valves before and after the strainer, including an air bleed valve, so the strainer can be isolated from the heating circuit for service operations. Clean water is very important, blocked and/or polluted heat exchangers, including failures and/or damages caused by this blockage are not covered by the warranty.

6.10 Water quality

The pH value of the water must be within the following limits: 7,5 < pH < 9,5. This pH value is reached with the steady conditions. These steady conditions will occur, when after filling the heating system (pH around 7) with fresh water, the water will lose its air because of the air bleeding operation and heating up (dead water conditions).

Water hardness must be within the following limits: 3,5° Clark (50 ppm CaCO₃) < total hardness < 10,5° Clark (150 ppm CaCO₃)

When the water might contain aluminium particles, this should be of a maximum of 0.2 mg/litre. If there is the risk of contamination of the water by any kind of debris/chemicals in the period after installing, a plate heat exchanger should be used to separate the boiler circuit from the heating circuit (see drawing below).

It is advised to prevent the possible air intake and water leakage of the central heating system. Fresh oxygenated water might damage the heat exchanger of the boiler and should therefore be prevented! Usual spots where air is most likely to seep in are: suction gaskets, pumps, air valve working as a venting pipe, O-rings / gaskets in stuffing box, under floor heating pipes.

6.11 Plastic piping in the heating system

When plastic pipes are used in the central heating system, these should be separated from the boiler system by using a plate heat exchanger. Diffusion (through the plastic) can cause air to enter the heating system. This could damage the boiler, pumps and other components in the system. Be aware that plastic piping is often used in under floor heating systems. When no measures have been taken to prevent the entrance of air into the boiler system, the warranty of the boiler and any boiler part may be deemed invalid.



6.12 Automatic air vent

An automatic air vent is mounted on the boiler to remove the air from the water circuit.

NOTICE: This automatic air vent is only used for bleeding the air in the heat exchanger of the boiler. One or more external automatic air vent(s) and/or air separators must always be mounted in the heating system to take out the air trapped in the heating circuit.

DE-AERATION PROGRAM. When the unit is fired for the first time the unit starts a de-aeration program. One cycle means 5 seconds pump running and 5 seconds pump off. A complete de-aeration program consists out of three cycles. The de-aeration program can be interrupted/stopped by briefly pressing the service button.

6.13 Automatic water filling systems

When using an automatic water refill system some precautions should be taken (fresh water is bringing fresh oxygen into the system), like installing a water meter to measure and evaluate the total water volume that is added to the system. This to detect and eliminate any water leakage as soon as possible.

When an automatic water refill system is used, some form of logging should take place to prevent continuously filling of the system with large amounts of oxygenated fresh water. This can happen when a leak in the system is not detected and the total added water amount is not being logged.

6.14 Water pressure

First and for all, the installation should be designed and built conform all applicable regulations and standards, including the right safety valves. IMPORTANT: Always keep the pressure in the boiler lower than the value at which its safety valve opens.

Sensor

A water pressure sensor has been built into the boiler. With this sensor, the minimum water pressure in the boiler is 0,8 bar and the maximum pressure is 4,0 bar (sensor values). The normal water pressure is supposed to be between 1,5 and 2,0 bar.

The pressure sensor will stop the boiler from firing when the water pressure drops below 0,8 bar, and start the boiler firing again when the water pressure reaches above the 1,0 bar. These values can be changed in the boiler control settings.

Higher pressure systems (e.g. in high buildings)

If pressures higher than 4,0 bar occur in the heating system, the best solution is to separate the system from the boiler by means of a plate heat exchanger. Now the boiler pressure can still be under 4,0 bar and the boiler control remains as described above.

Without plate heat exchanger, above 4,0 bar, a water pressure switch has to be built into the boiler instead of the water pressure sensor - the <u>maximum</u> allowed value in the boiler now is <u>6,0 bar</u> and the boiler control needs to be adjusted.

6.15 Chemical water treatment

The chemical compatibility of several products for treatment of the central heating equipment has been tested on the heat exchangers and the boilers. A list with the corrosion inhibitors in preventative and curative treatment for gas fired central heating boilers can be supplied by ECO HSG.

6.16 Under floor heating

When using an under floor heating system, the boiler circuit must be separated from the heating circuit with a plate heat exchanger.

6.17 Flush the system with fresh water

The water of the boiler and heating circuit should be free of any particles, debris and pollution. Therefore the complete installation must always be thoroughly flushed with clean water before installing and using the boiler(s).

6.18 Installation examples





6.18.2 EXAMPLE OF A NORMAL SINGLE BOILER HEATING CIRCUIT WITH LOW LOSS HEADER (PREFERABLE)



6.18.3 EXAMPLE OF A MULTIPLE BOILER HEATING CIRCUIT WITH LOW LOSS HEADER



E93.0802EN.C Ambassador⁺ manual

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7 PUMP CHARACTERISTICS

7.1 Hydraulic graphs



Boiler and pump graph A60. UPML 25-105PWM:

Boiler and pump graph A80. UPML 25-105PWM:





Boiler and pump graph A100. UPML 25-105PWM:

Boiler and pump graph A120. UPML25-105 PWM:





Boiler and pump graph A150. Wilo Stratos Para 30/1-12 PWM:

Boiler and pump graph A180. Wilo Stratos Para 30/1-12 PWM:



Explanation pump graph:

The Ambassador+ range is equipped with high efficiency pumps, in the hydraulic graph there is a minimum and maximum head for the pump. This is the range in which the pump will modulate. The pump speed is controlled by a PWM signal provided by the burner controller at a value causing a Delta T across the heat exchanger of 20°C at the whole burner modulation range.

7.2 Pumps: maximum electrical power

General

- The inrush current of a conventional pump is approximately 21/2 x its nominal current.
- The maximum switch current of the PCB is 5 A.

Combining both above statements: the current of pumps, controlled by the PCB, may not exceed 2 A.

Pump P1 - boiler pump.

This modulating pump is part of the appliance. The speed and power consumption depends on the Delta T accros the heatexchanger and is controlled by the burner controller.

Pump P2 - calorifier pump.

Pump P2 is a DHWi pump and is used when P4AA = 1, meaning the appliance is an indirect calorifier. Pumps P1 and P2 are connected to one fuse of 5 A, so their total nominal current may not exceed 5 A. To limit the inrush current, the switching sequence has been modified so pump P2 always switches 100 ms later than pump P1. The maximum nominal current of pump P2 must also be 2 A, again due to the inrush current.

3 way valve.

The combined nominal current of pump P1 and the 3 way valve must be smaller than 5 A. So, the inrush current of the 3 way valve must be lower than 3 A.

Pump P3 - system pump.

The nominal current of pump P3 must be equal to or lower than 2 A.

Warning (EC pumps):

In case of using an electronic commutating pump, the relays 1, 2 or 3 <u>may not be used</u> for the power connection, because of the inrush current of the electronics of the pump.

Directly connect the pump to an external power supply.

Control connections of an EC pump can be established in several ways, set by parameter P5BN. See § 11.1.7 on page 77.

8 FLUE GAS AND AIR SUPPLY SYSTEM

8.1 General

The boiler has a positive pressure flue system. The available combined pressure drop for the inlet and outlet system is 200 Pa for the complete boiler range.

Notice:

- Install the horizontal flue components with an angle of 3° downwards in the direction of the boiler (roughly equal to five centimetres for every linear meter). When not installed accordingly, it may result in condensate buildingup in the flue gas tube, eventually causing component failure.
- Wall flue terminals are generally used up to 60-80 kW. Using these terminals with larger capacities will give unpleasant large condensate clouds.
- When using a wall terminal, there is the possible risk of ice building-up on surrounding parts/structures, because the condensate will freeze. This risk should be taken into account during the design phase of the heating installation.

Note

Because the flue gases can have a low temperature, the boiler needs to have a high efficiency approved stainless steel or plastic flue system. These materials, including the gaskets, should be usable for positive pressure flue gas systems and have a temperature class of **T120**.



Before installing, read the installation manual(s) of the supplier of the flue gas and air supply parts included with the parts. Manuals for parts supplied by ECO can be found at: <u>http://burgerhout.nl/documenten/handleidingen/</u> (Only Dutch language available).

Undermentioned manuals for parts supplied by ECO HS are applicable:

- Regulations regarding fluegas systems PP(s)
- Installation instructions clamps: Checklist
- Installation instructions Skyline 3000

8.2 Boiler categories - types of fluegas systems.

For C43 and C83 see cascade manual: http://www.ecohs.nl/products/ambassador-/documentation/



27



8.3 C63 certified

In general, boilers are certified with their own flue gas material. For type B23, C13, C33, C43, C53, C83 systems, only use flue gas and air supply parts approved according §4.2 en §4.3.

If a boiler is C63 certified, no specific type flue gas material has been certified in combination with the boiler. In this case the flue gas and air supply parts should comply with the applicable European standards (EN14989). So, for type C63 systems flue gas and air supply parts from other suppliers can be used. It must be able to handle the condensate forming (W) and transport, overpressure (P1) and must have a minimum temperature class of **T120**. Also it has to meet the requirements in the following chapters "air supply" and "flue terminal".

CE string flue gas material	European standard	Tempera-ture class	Pressure class	Resistance to condensate	Corrosion re- sistance class	Metal: liner specifications	Soot fire resis- tance class	Distance to combustible ma- terial	Plastics: location	Plastics: fire be- haviour	Plastics: enclosure
min. eis PP	EN 14471	T120	P1	W	1		0	30	I of E	C/E	L
min. eis RVS	EN 1856-1	T120	P1	W	1	L20040	0	40			

A few examples of flue gas material suitable for ECO boilers:

CE String for Plastic PPs: EN14471 T120 P1 W 2 O(30) I C/E L

CE String for Stainless Steel: EN1856-1 T250 P1 W V2-L50040 O (50)

When selecting flue gas systems, be aware that the minimum requirements are met. So only select flue gas materials having the same or better properties than this table.



Never use allumnium containing fluegas pipes in these boilers.

Connecting diameters and tolerances:

mat	boiler	d _{nom}	Doutside	dinside	Linsert
SS	A60, A80	80	80 +0,3/ -0,7	81 +0,3/ -0,3	50 +2/ -2
SS	A100, A120	100	100 +0,3/ -0,7	101 +0,3/ -0,3	50 +2/ -2
SS	A150, A180	130	130 +0,3/ -0,7	131 +0,5/ -0,5	50 +2/ -2
PP	A60, A80	80	80 +0,6/ -0,6		50 +20/ -2
PP	A100, A120	100	100 +0,6/ -0,6		50 +20/ -2
PP	A150, A180	130	130 +0,9/ -0,9		50 +20/ -2

Multiple boilers can be connected to a common duct. These flue gas systems for multiple boiler installations must always be engineered as zero or negative pressure systems; this to prevent the risk of recirculation of the flue gases. Consult the flue gas supplier for detailed information and engineering. See also the cascade manual for these multiple boiler installations.

More information about these common fluegas systems can be found at the cascade-installation manual. You can find the cascade manual at the website: http://www.ecohs.nl/products/ambassador-/documentation/

8.4 Air supply

When an air supply duct is connected from the outside of the building to the boiler, the boiler will operate as a roomindependent boiler (closed boiler).

The air supply duct can be made of:

- PVC / PP
- Thin-walled aluminium
- Stainless steel

8.4.1 COMBUSTION AIR QUALITY

Combustion air must be free of contaminants. For example: chlorine, ammonia and/or alkali agents, dust, sand and pollen. Remind that installing a boiler near a swimming pool, a washing machine, laundry or chemical plants does expose combustion air to these contaminants.

8.4.2 AIR SUPPLY THROUGH HUMID AREAS

When the supply duct will be placed in a boiler room with moist air (for example: greenhouses), a double walled supply duct or an insulated duct must be used to prevent the possible condensation at the outside of the duct. It is not possible to insulate the internal air pipes of the boiler and therefore condensation at the internal air canals must be prevented.

When roof mounted, the air supply duct needs to be protected against rain, so no water will be entering the boiler.

8.5 A+60 Twin pipe version



The A+60 boiler as shown in the picture below, is a <u>twin pipe</u> boiler with separate air inlet and flue outlet pipes. <u>Do NOT connect a concentric pipe to this boiler</u>.

Note the sticker on the flue pipe, indicating that this is a <u>twin pipe</u> boiler.



The twin pipe version is recognized by the two pipes, one of which has a **RED** ring cap.

8.6 Pipe heights and mutual distances on a flat roof

Height A

This is the height of the air inlet. A rain hood should prevent rainwater entering the air supply system.

When the inlet and outlet are mounted on a flat roof, the inlet should be at least 60 cm above the roof surface and at least 30 cm above the maximum snow level.

Example 1:

When the maximum snow level on the roof surface is 45 cm then the air inlet should be at 45+30=75 cm. 75 cm is more than the minimum 60 so the height will be 75 cm.

Example 2:

When the maximum snow level on the roof surface is 15 cm then the air inlet should be at 15+30=45 cm. 45 cm is less than the minimum 60 cm so the height will be 60 cm.

Height difference B

This is the distance between the flue outlet and the air inlet.

The flue gas outlet should be at least 70 cm above the air inlet. It is advised to be equipped with a conical outlet.

When no air inlet connection is applied on the roof, the flue outlet should be situated at least 100 cm above the roof surface.

Distance C

The horizontal mutual distance at roof level. This distance should be at least 70 cm.



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8.7 Flue gas and air supply resistance table

In the next section, for six typical flue gas outlet & air inlet configurations the maximum lengths of the straight pipes will be calculated. First all component resistance values are given in the next table:

		A+60	A+80	A+100	A⁺120	A⁺150	A+180
FLUE GAS PIPING	Ø [mm] *		F	RESISTA	NCE [Pa]	
straight tube/m	80	5,0	8,0	-	-	-	-
	100	2,0	3,5	4,0	6,5	-	-
	130	0,45	0,8	1,2	1,8	3,8	6,0
	150	-	-	0,5	0,8	1,7	3,0
45° bend	80	2,5	4,0	-	-	-	-
	100	1,0	1,7	2,0	3,2	-	-
	130	0,2	0,4	0,6	0,8	1,9	3,0
	150	-	-	0,2	0,4	0,8	1,5
90° bend	80	5,0	8,0	-	-	-	-
	100	2,0	3,5	4	6,5	-	-
	130	0,4	0,8	1,2	1,8	3,8	6,0
	150	-	-	0,5	0,7	1,7	3,0
Flue outlet zeta=0,05	80	0,7	1,2	-	-	-	-
	100	0,3	0,5	0,8	1,1	-	-
	130	0,1	0,18	0,3	0,4	0,6	0,9
	150	-	-	0,15	0,2	0,35	0,5
Flue outlet zeta=1	80	13,8	24,0	-	-	-	-
	100	5,6	9,8	15,2	22,1	-	-
	130	2,0	3,5	5,3	7,8	12,0	17,3
	150	-	-	3,0	4,4	6,8	9,8
Flue outlet zeta=1,5	80	20,6	36,0	-	-	-	-
	100	8,5	14,8	22,8	33,2	-	-
	130	3,0	5,2	8,0	11,6	18,0	26,0
	150	-	-	4,5	6,6	10,2	14,7
AIR SUPPLY PIPING	Ø [mm] *		F	RESISTA	NCE [Pa	l	
straight tube/m	80	4,0	7,5	-	-	-	-
	100	1,2	3,0	3,5	4,0	-	-
	130	0,35	0,75	0,8	1,1	1,2	2,0
	150	-	-	0,3	0,4	0,6	1,2
45° bend	80	2,0	3,5	-	-	-	-
	100	0,6	1,5	1,7	2	-	-
	130	0,2	0,4	0,4	0,5	0,6	1,0
	150	-	-	0,15	0,2	0,3	0,6
90° bend	80	4,0	7,0	-	-	-	-
	100	1,2	3,0	3,5	4,0	-	-
	130	0,3	0,7	0,8	1,1	1,2	2,0
	150	-	-	0,3	0,4	0,6	1,2
Air inlet zeta =1	80	10,4	18,1	-	-	-	-
	100	4,2	7,4	11,4	16,7	-	-
	130	1,5	2,6	4,0	5,8	9,1	13,1
	150	-	-	2,3	3,3	5,1	7,4
CONCENTRIC PARTS	Ø [mm] *		F	RESISTA	NCE [Pa]	,
roof terminal	80/125	34	61	-	-	-	-
	100/150	-	-	39	45	69	86
	130/200	-	-	-	-	15	23
wall terminal	80/125	13	22	-	-	-	-
	100/150	-	-	19	24	40	48
straight tube/m	80/125	9	12	-	-	-	-
5	100/150	-	-	8	10	14	16
45° bend concentric	80/125	5	7	-	-	-	-
	100/150	-	-	8	9	14	16
90° bend concentric	80/125	8	13	-	-	-	-
	100/150	-	-	11	13	22	28
conc./par. adaptor	80/125	10	14	-	-		
conception adaptor	100/150	-	-	16	22	40	56
	100/100	1	I			.0	







* Never reduce pipe diameters relative to boiler connections

Values printed in grey applicable for larger pipe diameters than boiler connection

NOTICE: This table may only be used for a single flue/air system for one boiler. Do NOT use this table for common flue systems with cascaded boilers.

8.8 Six typical examples

- **A**: Twin pipe system with separate pipes for flue gas and air supply C63
- Twin pipe system with separate pipes and concentric roof terminal B: C33
- C: Single pipe for flue gas outlet only (air supply from boiler room) **B23** C33
- D: Concentric pipe for flue gas/air supply (roof-mounted)
- Concentric pipe for flue gas/air supply (wall-mounted) C13 E:
- F: Separate air supply duct & flue duct in different pressure zone C53

8.8.1 EXAMPLE A: TWIN PIPE SYSTEM (C63)



	Boiler type:		A ⁺ 180						
	Diameter: 1	30 mm	Number	Ра	Pa total				
gas	Straight tube m ¹	total	9	6	54				
Flue (Bend	90°	2	6	12				
	Flue outlet	conical 1		0,9	0,9				
	Total res	66.9							
У	Diameter: 1	30 mm	Number	Ра	Pa total				
jdc	Straight tube m ¹	total	8	2	16				
sup	Bend	90°	2	2	4				
vir :	Air inlet	H/D = 1,0	1	13,1	13,1				
4	Total re	33,1							
-	Total resistance flue	e gas outlet	and air su	oply:	100 Pa				

Calculation example with given lengths: checking resistance

The total resistance is less than 200 Pa. This flue gas / air supply system is functional.

Be aware: Eco specific resistance values are used in this example. Flue and air pipes of other supplier can have other values

8.8.2 EXAMPLE B: TWIN PIPE SYSTEM WITH CONCENTRIC ROOF TERMINAL (C33)



Calculation example with given lengths: checking resistance

	Boiler type:		A* ′	120	
	Diameter: 10	00 mm	Number	Ра	Pa total
6	Straight tube m ¹	total	6	6,5	39
Flue ga:	Bend	90°	2	6,5	13
	Roof terminal	concentric 150/100	1	45	45
	Adaptor conc./par.	150/100	1 22		22
	Total resi	119			
>	Diameter: 10	00 mm	Number	Ра	Pa total
lddn	Straight tube m1	total	6	4	24
vir sı	Bend	90°	2	4	8
*	Total re		32		
	Total resistance flue	e gas outlet	and air sup	oply:	151 Pa

The total resistance is less than 200 Pa. This flue gas / air supply system is functional.

Part number. roof terminal: E04.018.001 - Inox

Part number. adaptor conc/twin: E04.018.033 - Inox/PP



Example A (C63)										
boi	ler type $ ightarrow$	A+ 60	A⁺ 80	A ⁺ 100	A+ 120	A⁺ 150	A+ 180			
Diameter air inlet	[mm]	80	80	100	100	130	130			
Diameter flue outlet	[mm]	80	80	100	100	130	130			
Diam. roof terminals	[mm]	80	80	100	100	130	130			
Maximum pipe length (inlet + outlet together)	n [m]	27,5	18,0	31,5	24,0	44,5	30,0			

Example B (C33)									
boiler	type \rightarrow	A+ 60	A+ 80	A+ 100	A+ 120	A⁺ 150	A+ 180		
Diameter air inlet	[mm]	80	80	100	100	130	130		
Diameter flue outlet	[mm]	80	80	100	100	130	130		
Concentric roof terminal	[mm]	80/125	80/125	100/150	100/150	130/200	130/200		
Maximum pipe length (inlet + outlet together)	[m]	21,0	12,0	23,0	16,5	40,5	25,5		
Part no. concentric roof terminal		E04.018.015		E04.018.001		E04.018.074			
Part no. adaptor conc/twi	n:	E04.010.161		E04.018.033 -		included in terminal			



Calculation example with given lengths: checking resistance

	Boiler type:	A⁺ 100						
	Diameter: 1	00 mm	Number	Ра	Pa total			
	Straight tube m ¹	total	13	4	52			
gas	Bend	90°	2	4	8			
lue	Bend	45°	2	2	4			
ш	Flue outlet	H/D = 1,0	1	15,2	15,2			
	Total res		79,2					

The total resistance is less than 200 Pa. This flue gas / air supply system is functional.

Part number. roof terminal: E04.018.001 - Inox, concentric Part number. roof terminal: 410084853 - PP, concentric



Example C (B23, B23P)									
	boiler type $ ightarrow$	A+ 60	A+ 80	A⁺ 100	A+ 120	A⁺ 150	A⁺ 180		
Diameter air inlet	[mm]	80	80	100	100	130	130		
Diameter flue outlet	[mm]	80	80	100	100	130	130		
Diam. roof terminal	[mm]	80	80	100	100	130	130		
Maximum pipe length (total outlet length)	[m]	36,5	21,5	46,5	27,5	49,5	30,0		
Part no. roof terminal: Inox, conc: (same as concentric)		E04.018.015		E04.018.001		E04.018.074			
Part no. roof terminal: PP, conc:		410086883		410084853		410070279			

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8.8.4 EXAMPLE D: CONCENTRIC FLUE GAS/AIR SUPPLY PIPE (ROOF-MOUNTED)



Calculation example with given lengths: checking resistance

	Boiler type:	A ⁺ 60 (C33)						
ntric	Diameter: 80/12	5 mm.	Number	Ра	Pa total			
	Straight tube m	total	11	9	99			
	Bend	90°	3	8	24			
nce	Bend	45°	2	5	10			
ပိ	Concentric terminal	roof	1	34	34			
	Total resistance flu (c	supply	167					

The total resistance is less than 200 Pa. This flue gas / air supply system is functional.

Part number concentric roof terminaL: E04.018.015 – Inox E04.018.018 - PP

8.8.5 EXAMPLE E: CONCENTRIC SYSTEM WALL OUTLET C13(WALL-MOUNTED)



Calculation example with given lengths: checking resistance

	Boiler type:	A+ 60						
Concentric	Diameter: 80/12	5 mm	Number	Ра	Pa total			
	Straight tube m	total	9	9	81			
	Bend	90°	1	8	8			
	Concentric terminal	wall	1	13	13			
•	Total resistance flu (c	supply	102					

The total resistance is less than 200 Pa. This flue gas / air supply system is functional.

Part number concentric wall terminal: E04.018.019 - Inox

Examples D and E maximum pipe lengths



Example D (C33)									
boiler type \rightarrow		A+ 60	A+ 80	A⁺ 100	A⁺ 120	A⁺ 150	A⁺ 180		
Diameter concentric pipe	[mm]	80/125	80/125	100/150	100/150	NOT			
Concentric roof terminal	[mm]	80/125	80/125	100/150	100/150	RECOMMENDED			
Maximum pipe length	[m]	13,5	6,0	12,0	7,5	(choose B,C or E)			
Part no. conc. roof terminal inox		E04.018.015		E04.018.001					
Part no. conc. roof terminal PP		E04.018.018		410084863					

Example E (C13)							
boiler type \rightarrow		A+ 60	A⁺ 80	A⁺ 100	A⁺ 120	A⁺ 150	A⁺ 180
Diameter concentric pipe	[mm]	80/125	80/125	100/150	100/150	100/150	100/150
Concentric wall terminal	[mm]	80/125	80/125	100/150	100/150	100/150	100/150
Maximum pipe length	[m]	18,5	12,5	19,0	14,0	7,0	4,0
Part no. conc. wall terminal inox		E04.018.019		E04.018.002			


		Exa	ample F (C5	3)			
ł	poiler type \rightarrow	A+ 60	A+ 80	A⁺ 100	A⁺ 120	A⁺ 150	A⁺ 180
Diameter wall terminal	[mm]	80	80	100	100	130	130
Diameter air inlet	[mm]	80	80	100	100	130	130
Diameter air inlet/ flue o	outlet [mm]	80	80	100	100	130	130
Diameter roof terminal	[mm]	80	80	100	100	130	130
Maximum pipe length (inlet + outlet together)	[m]	30	14	38	19	42	23
Dort no, roof torminal:	Inox, conc:	E04.0 ⁻	18.015	E04.01	18.001	E04.01	18.074
	PP, conc:	41008	36883	41008	34853	41007	70279
Part no wall terminal:	Inox, conc:	E04.0	18.019	E04.01	18.002	41007	/2131
	PP:	41008	82856	41008	37931	41008	37550

9 ELECTRICAL INSTALLATION

9.1 General

All the wiring is connected to a separate connector that is fitted in a socket. The connector can be taken from the sockets without loosening the wiring. The connections are placed on top of the display panel and can be accessed by removing the boiler front door and the connector protection cover.

- For operation the boiler needs a power supply of 230 Vac 50Hz.
- The boiler connections are not life/neutral sensitive (the boiler is not phase-sensitive).
- The wiring for the connections can be entered at the bottom of the boiler through the cable glands.
- NOTICE: Before starting to work on the boiler, it must be switched off and the power supply to the boiler must be disconnected.
- Electrical wiring should be installed according to all applicable standards and regulations.
- Working on the boiler should only be done by a qualified service engineer that is skilled in working on electrical installations and according to all applicable standards.



9.2 Electrical connections

9.3 Explanation of the connections

1-2	OUTDOOR SENSOR
When an outdoor te	emperature sensor is connected, the boiler will control the flow water temperature by
using a calculated s	setting, which is relative to the outdoor temperature.
PARAMETER: No	parameter settings needed.
3-4	EXTERNAL FLOW SENSOR
When a low loss h sensor must be mo TICE: The sensor r PARAMETER: No	eader is used, this sensor measures the flow temperature at the system side. The bunted on the supply pipe at the system side, just behind the low loss header. No- nust be used when boilers are cascaded with the internal cascade manager. barameter settings needed.
5-6	CALORIFIER SENSOR or THERMOSTAT
When an indirect h terminals. In case of thermostat can also	ot water tank / calorifier is installed, a hot water sensor must be connected to these of a DHW heat demand, the set point will be shown in the display. An external on/off to be connected to these terminals. When there is heat demand (terminals 5 and 6

are bridged) the flow temperature going to the heating coil(s) will be shown in the display.

7-8	GENERAL BLOCKING
A heat demand that connection is for the fire).	at will start the burner will be blocked when terminals 7 and 8 are not bridged. This ne use of external safety devices (terminals must be bridged for allowing burner to
9-10	EMPTY
11-12	EXTERNAL WATER PRESSURE SWITCH
A water pressure s The sensor can be terminals 11-12 are	ensor is mounted in the boiler. As an option a water pressure switch can be installed. replaced by the water pressure switch, which can be wired to the terminals. When not bridged, the boiler will lock-out. PARAMETER: A parameter change is needed.
13-14	ON/OFF STAT OR OPENTHERM HEATING CIRCUIT
OPTION 1: An ON/ perature for the heat OPTION 2: An Op software will detect	OFF thermostat can be connected. The boiler will use the set/programmed flow tem- ating system when these terminals 13 and 14 are bridged. enTherm (OT) controller can be connected to the terminals 13 and 14. The boiler and use this OpenTherm signal automatically.
15-16	0-10 VDC CONTROL SIGNAL
These terminals ar is needed. NOTICE	e used for an external 0-10 VDC control signal. PARAMETER: A parameter change : Terminal 15 [+] (positive) and terminal 16 [-] (negative).
17-18	CASCADE CONNECTION
These connections ling the total casca between these term	are used when boilers are cascaded with the internal cascade manager for control- ide. NOTICE: Connect all terminals 17 and all terminals 18 together, do not switch ninals.
19-20	LOCK-OUT OR PUMP ON/OFF
This contact is N.O This contact can al a parameter chang	. (normally open). When the unit is in lock-out this contact will close. so be used for the switching of a pump with a separate control input connection; then e is needed.
21-22	BURNER BURNING OR EXTRA BOILER OR PUMP ON/OFF
This contact is N.O will be closed. This with a separate cor	. (normally open). When the unit starts the burner and detects the flame, this contact contact can also be used to control an external boiler or for the switching of a pump ntrol input connection; in both latter cases a parameter change is needed.
23-24	HEAT DEMAND OR PUMP ON/OFF
This contact is N.O This contact can als a parameter chang	. (normally open). When the unit receives any heat demand this contact will close. so be used for the switching of a pump with a separate control input connection; then e is needed.
25-26-27	CH SYSTEM PUMP P3
Connections for a c Nominal pump curr § 7.2.	central heating system pump (P3). rent of P3 may not exceed 2 A, therefore its power may not exceed 460 W, see also
28-29-30-31	DIVERTER VALVE CALORIFIER
When using a calor the heating coil of t rifier has a heat de	rifier/hot water tank, a 3-way valve or a pump (P2) can be used to divert hot water to the calorifier/tank. This 3-way valve will open, when the hot water storage tank/calo-
The inrush current	ng position); 29 = Neutral wire; 30 = Ground wire; 31 = L2 wire (hot water position). of the 3-way valve may not exceed 3 A, see also § 7.2.
20 = L1 wre (real) The inrush current 29-30-31	ng position); 29 = Neutral wire; 30 = Ground wire; 31 = L2 wire (hot water position). of the 3-way valve may not exceed 3 A, see also § 7.2.
20 = L1 wife (nearly The inrush current 29-30-31 When using a calor the heating coil of t ates a hot water de Nominal pump curr § 7.2.	rifier/hot water tank, a 3-way valve or a pump (P2) can be used to divert hot water to he calorifier/tank. This pump will start when the hot water storage tank/calorifier cre- mand. PARAMETER: A parameter change is needed.
20 = L1 wife (nearly The inrush current 29-30-31 When using a calor the heating coil of t ates a hot water de Nominal pump curr § 7.2. 32-33-34	Infand. PARAMETER. A parameter change is needed. ng position); 29 = Neutral wire; 30 = Ground wire; 31 = L2 wire (hot water position). of the 3-way valve may not exceed 3 A, see also § 7.2. CALORIFIER PUMP P2 rifier/hot water tank, a 3-way valve or a pump (P2) can be used to divert hot water to he calorifier/tank. This pump will start when the hot water storage tank/calorifier cre- mand. PARAMETER: A parameter change is needed. 'ent of P2 may not exceed 2 A, therefore its power may not exceed 460 W, see also POWER SUPPLY

9.4 Electrical schematics



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E93.0802EN.C Ambassador⁺ manual

9.5 Sensor values

SENSOR	SENSOR TYPE	SENSOR VALUE
S1	internal flow sensor	NTC-10K-B3977
S2	internal return sensor	NTC-10K-B3977
S3	external flow sensor	NTC-10K-B3977
S4	calorifier/tank sensor	NTC-10K-B3977
S5	outdoor sensor	NTC-12K-B3740
S6	flue gas sensor	NTC-10K-B3977

Conversion table temperature vs. resistance outdoor sensor NTC-12k B3740

Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)
-50		0	36130
-45		5	28600
-40		10	22800
-35		15	18300
-30	171800	20	14770
-25	129800	25	12000
-20	98930	30	9804
-15	76020	35	8054
-10	58880	40	6652
- 5	45950	45	5522

Conversion table temperature vs. resistance all sensors except outdoor sensor. NTC-10k B3977

Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)
-30	175203	20	12488	70	1753	120	387
-25	129289	25	10000	75	1481	125	339
-20	96360	30	8059	80	1256	130	298
-15	72502	35	6535	85	1070	135	262
-10	55047	40	5330	90	915	140	232
-5	42158	45	4372	95	786	145	206
0	32555	50	3605	100	677	150	183
5	25339	55	2989	105	586	155	163
10	19873	60	2490	110	508	160	145
15	15699	65	2084	115	443	165	130

10 USER INTERFACE

10.1 Control panel / display unit







45

10.3 Display during operation

During normal operation the text in the display shows the status of the boiler. In the following graphs the several displays during normal operation are explained.

n c A i i N O d e m a n d i i i i i N O d e m a n d i i i i i N O d e m a n d i

communi- cation indi- cator control sensor showing the measured temperature. Can be turned off by P5 BJ When heat is needed for the calorifier the text "HEATING" changes into "HOTWATR". When there is no heat demand it always shows heating. Display at HOT WATER DEMAND Heat demand type: Actual status: H O T W A T R : N o d e m a n d > > > : 1 2 3 . 4 ° C (1 2 3 . 4 ° C) cascade communi- cation indi- cator Cascade communi- cator temp. set point Thermostat > coil flow temp. Sensor > water temp. control sensor showing the measured temperature Can be turned off by P5 BJ Explanation "Actual status" screen Actual status: F Mon d e m a n d No d e m a n d No f No d e m a n d Sensor > water temp. Can be turned off by P5 BJ Explanation "Actual status" screen Actual status: B o i I e r o f f No d e m a n d No o f g ma n d No a n d No a n d No b y No b y Room thermostat & calorifier sensor/thermostat detect heat demand but set point is reached.
cation indicator measured temperature. Can be turned off by P5 BJ When heat is needed for the calorifier the text "HEATING" changes into "HOTWATR". When there is no heat demand it always shows heating. Display at HOT WATER DEMAND Heat demand type: Actual status: H O T W A T R : N O d e m a n d > > > : 1 2 3 . 4 ° C (1 2 3 . 4 ° C) cascade communi- cator cascade communi- cator temp. set point cascade temp. set point Thermostat > coil flow temp. Sensor > water temp. Explanation "Actual status" screen Actual status: B o i I e r o f f When boiler is switched off (only text in the display during this status). N o d e m a n d N o d e m a n d Mo b heat demand signal coming from the room thermostat and calorifier sensor (oper S t a n d - b y Room thermostat & calorifier sensor/thermostat detect heat demand but set point is reached.
cator Outrice on by rode When heat is needed for the calorifier the text "HEATING" changes into "HOTWATR". When there is no heat demand it always shows heating. Display at HOT WATER DEMAND Heat demand type: Actual status: HOTWATR'. Actual status: Cascade temp. set point Communi- Thermostat > coil flow cator Sensor > water temp. Sensor > water temp. Can be turned off by P5 BJ Explanation "Actual status" screen Actual status: Boiiiii f When boiler is switched off (only text in the display during this status). No heat demand signal coming from the room thermostat and calorifier sensor (oper Stian ndoing for the room thermostat detect heat demand but set point is eached.
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changes into "HOTWATR". When there is no heat demand it always shows heating. Display at HOT WATER DEMAND Heat demand type: Actual status: HOTWATR". Actual status: Cascade temp. set point Communi- Thermostat > coil flow cator Sensor > water temp. Control sensor showing the measured temperature Can be turned off by P5 BJ Explanation "Actual status" screen Actual status: BoitII er When boiler is switched off (only text in the display during this status). No demal n d No demal n d No demal a n d Room thermostat & calorifier sensor/thermostat detect heat demand but set point is reached.
When there is no heat demand it always shows heating. Display at HOT WATER DEMAND Heat demand type: Actual status: HOTWATER DEMAND Colspan="2">Call of the main discourse of the main discours
Display at HOT WATER DEMAND Heat demand type: Actual status: HOTWATER DEMAND Heat demand type: Actual status: HOTWATER DEMAND HoTTWATER DEMAND HoTWATER DEMAND HoTWATER DEMAND HoTWATER DEMAND HoTWATER DEMAND HoTWATER DEMAND Cascade temp. C (1 2 3 . 4 ° C) cascade temp. Set point Cascade te
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H O T W A T R : N o d e m a n d > > > > : 1 2 3 . 4 ° C (1 2 3 . 4 ° C) cascade communi- cation indi- cator temp. set point Thermostat > coil flow temp. Sensor > water temp. control sensor showing the measured temperature Can be turned off by P5 BJ Explanation "Actual status" screen Actual status: Sensor > water temp. control sensor showing this status). No d e n d f f When boiler is switched off (only text in the display during this status). No o f f No d e m a n d a o No heat demand signal coming from the room thermostat and calorifier sensor (oper S t a n d - b y Room thermostat & calorifier sensor/thermostat detect heat demand but set point is reached. calorifier sensor/thermostat detect heat demand but set point is
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cation indicator Internostat > connormation measured temperature cator Sensor > water temp. Can be turned off by P5 BJ Explanation "Actual status" screen Actual status: B o f Mo d e No d e No heat demand signal coming from the room thermostat and calorifier sensor (oper S t a No d - b y Room thermostat & calorifier sensor/thermostat detect heat demand but set point is reached.
CatorCan be turned off by P5 BJExplanation "Actual status" screenActual status:BoileroffWhen boiler is switched off (only text in the display during this status).NodemandNodemandddddddNo heat demand signal coming from the room thermostat and calorifier sensor (oper Stand-byddcRoom thermostat & calorifier sensor/thermostat detect heat demand but set point is reached.
Explanation "Actual status" screen Actual status: 3 o i i e r o f f When boiler is switched off (only text in the display during this status). When boiler is switched off (only text in the display during this status). No d e m a n d No heat demand signal coming from the room thermostat and calorifier sensor (oper S t a n d Soom thermostat & calorifier sensor/thermostat detect heat demand but set point is eached. eached. a b y a
Actual status: 0 f f B 0 i l e r o f f Vhen boiler is switched off (only text in the display during this status). Vieta is switched off (only text in the display during this status). Vieta is switched off (only text in the display during this status). Vieta is demand signal coming from the room thermostat and calorifier sensor (oper is t a n d - b y Vieta is the status i
B O I P P O F F When boiler is switched off (only text in the display during this status). Image: Constraint of the status of the status). Image: Constraint of the status of the st
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No heat demand signal coming from the room thermostat and calorifier sensor (oper S t a n d - b y b y c c c c c c c c c c
S t a n d - b y
Room thermostat & calorifier sensor/thermostat detect heat demand but set point is reached.
reached.
F I E F P U I Y E
anition starts before opening of the gas valve
The ignitor is igniting.
Pojst - purge
The fan is purging after burner is switched off.
ם u r n r n g 1 0 0 %
P r e - p u r g e The fan is purging before a burner start attempt. P r e - i g n i t i o n Ignition starts before opening of the gas valve. I g n i t i o n Ignition starts before opening of the gas valve. I g n i t o n Ignition starts before opening of the gas valve. I g n i t o n The ignitor is igniting. Image: the start of the gas valve. The fan is purging after burner is switched off. Image: the start of the gas valve. Image: the start of the gas valve. Image: the start of the gas valve. P u

10.4 Monitor screens

During normal operation and stand-by, the $[\blacktriangleleft]$ and $[\blacktriangleright]$ buttons can be used to show some boiler information, including measured temperatures, settings and data. In the following graphs is explained which values can be shown in the display. When no button is activated for 2 minutes, the display will return to its status display.

Pre	essi	ing	[◀]	or [▶]	whi	ile b	pein	g a	t the	e "o	pera	ating	g so	cree	en" t	ogg	les	thr	ough the screens below.
VVI	nen	pre	SSI	ng [ON/	OF	⊢],	ĮΚΕ	SE	<u>],</u>	EN	IEF	۲] O	r [IV	IEN	U] a	at a	ny t	me	e the display returns to the base menu.
SC	RE	EN:		1]															
т	1		F	Ι	0	w				ľ			1	2	3		9	•	С	Measured value by the internal flow sensor.
Ť	2		R	e	t	u	r	n					1	2	3	,	9	0	C	Measured value by the internal return sensor.
				-	-								0	p	e	'n	-		-	Shown when controller doesn't detect this sensor.
													S	h	0	r	t	е	d	Shown when sensor wires or sensor itself is shorted.
SC	RE	EN		2	1															
т	3		E	×	+	•	r	n	2				1	2	2		٥	0	C	Measured value by the external sensor
T	3		<u>с</u>	^ 2	ι Ι	6	r	; ;	a f	:			1	2	2	,	9	0		Measured value by the calorifier sensor
	-		U	a		U	•	•	•				$\dot{0}$	n	5	, n	3		0	Shown when controller doesn't detect this sensor
													S	р h	0	r	ŧ	•	Ь	Shown when sensor wires or sensor itself is shorted
60	סר			2	1								U		U			C	u	
50				3			1	r –		i				_						1
T	5		0	u	t	d	0	0	r				1	2	3	,	9	•	C	Measured value by the outdoor sensor.
I	6		F	I	u	е							1	2	3	,	9	Ŭ	C	Measured value by the flue gas sensor.
													0	р	е	n				Shown when controller doesn't detect this sensor.
													S	h	0	r	t	е	d	shown when the sensor wires of the sensor itself is shorted.
SC	RE	EN:		4																Temp, difference between internal flow & return sen-
d	Т	F	Ι	0	w	R	е	t	u	r	n		1	2	3	,	9	٥	С	sor.
d	Τ	F	I	u	е	R	е	t	u	r	n		1	2	3	,	9	٥	С	Temp. difference between flue gas & internal return
SC	RF	EN		5	1															
d	T	F	×	t	R	Δ	ŧ		r	n			1	2	2		Q	0	C	Temp. difference between external & internal return $(\Delta T \text{ LLH}).$
S	i	a	n	۰ a		C		u					•	-	P	, 0	w	е	r	External supplied 0-10 Volt dc signal.
-		3	••	ŭ	-									S	e.	t	p	0	i	"Power" = power input control or "Setpoi" = set point
					1								I							control.
SC	RE	EN:		6																
F	а	n		S	р	е	е	d					9	9	9	9	r	р	m	Actual fan speed in rpm.
F	а	n		S	р	е	е	d						1	0	0	%			Actual fan speed % of maximum allowable fan speed.
Fa	n n	naxi	mu	m F	RPN	/ :TI	he r	max	imu	ım a	actu	ıal r	рm	ma	v b	e lo	wer	tha	n t	he maximum rom set point. The fan may not
be	ab	e to	re	ach	the	m	axin	num	n rp	m s	et p	ooin	t, b	eca	use	of	the	uni	ťs	resistance, which is still correct according to
the	e de	sigr	ו of	tha	t sp	eci	fic u	unit.	•				,							,
				_	1															
SC	RE	EN:		1					1	r										1
F	I	а	m	е	S	i	g	n	а	Ι				-	1	0	0	μ	Α	Flame signal given in µA.
W	а	t	е	r	Ρ	r	е	S	S	u	r			1	,	0	b	а	r	Shows water pressure when sensor is connected.
SC	RE	EN:		8	1															
Ρ	u	m	р	1		Н	е	а	t	е	r				0	f	f			Pump 1 (HEATER PUMP) On or Off.
Ρ	u	m	p	1		S	i	g	n	а	Ι			1	0	0	%			Modulating signal Pump 1 in (%).
60	יסר		_	•	1															
50	RC			9			I		1	ï		1	I							
<u>Р</u>	u	m	р	2		C	a	1	0	r	1	_			0	1	t			Shows when the caloritier pump is "ON" or "OF".
3	-	W	а	У	V	а	I	V	е	н	е	а	t	1	n	g				TER".
SC	RE	EN:		10																
Ρ	u	m	р	3		S	у	s	t	е	m			0	f	f				Shows when the system pump is "ON" or "OF".
h	h	:	m	m	D	D	1	Μ	Μ	1	Υ	Υ	Υ	Υ	D	а	у			hh=hour; mm=minutes; DD=day; MM=month;
																				YYYY=yr; Day o/t week

SC	RE	EN	l:	1	1										_	_				
С	а	s	С		D	е	s	i	g	n					0					0 = MASTER, 1 11 = SLAVES
С	а	s	I	n	f			0	1	2	3	4	5	6	7	8	9	Α	В	Displays number, priority and state of cascade boilers.

DESCRIPTION "CASCINFO" Screen 11

Shows the number of boilers connected with the cascade. The Master/Lead boiler is designated as 0. Slave/Lag boilers will be designated 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B. When a "-" is used instead of a number, then that boiler is either not connected, or in a lockout mode and not available for the cascade. When an "x" is used instead of a number, then that boiler is connected, but in lockout mode.

When a "d" is displayed instead of a number, then that boiler is handling a DHW demand.

When the number is flashing, then that boiler is providing heat to the cascade. When the leading boiler is changed according to the set priority change time, then that boiler's address will be shown first in the row of numbers.

Example 1: "3 4 5 - - - - 0 1 2"

Six are boilers present and nr. 3 has priority.

Example 2: "3 4 x - - - - - d 1 2"

Six boilers are present and nr. 3 has priority. Boiler 0 is heating up an indirect DHW tank. Boiler 5 is present, but in a lock-out.

SC	RE	EN	:	1	2															
С	а	s	С		Ρ	0	w	е	r		9	9	9	%		9	9	9	%	% heat demand of total (cascade) power available (%).
D	u	а	Ι		В	u	r	n	е	r	:				Ν	0				Heat exchanger equipped with two burners: "Yes" or "No".
SC	RE	EN	l:	1	13												-			
Μ	а	x		Т	h	е	r	m						0	р	е	n			Status of the maximum thermostat: "Open" or "Closed".
G	е	n		В	-	ο	С	k						С	Ι	0	s	е	d	Status of the general blocking contact: "Open" or "Closed".
SC	RE	EN	l:	*	14															
S	i	р	h	ο	n		р	r	е	s	s			С	I	0	s	е	d	Status of the siphon pressure switch: "Open" or "Closed".
Ν	R	۷		С	0	n	t	а	С	t				0	р	е	n			Status of the non-return valve contact: "Open" or "Closed".

* REMARK: at screen 14: No NRV used in this type of boiler.

10.5 Service function

The following graphs describe how to use the service function.

1 E	EA	\ 	•	I	Ν	G		Ν	0		d	е	m	а	n	d			
> >	> >	. :		1	2	3		4	0	С	(1	2	3		4	٥	С)
	7																		
res	ss [\$	SEI	۲۱	/IC	E]	and	l hc	old 1	for	3 se	eco	nds	S.						
he	bui	ne	٢V	vill	sta	art a	nd	sho	DW 1	the	dis	pla	y be	elow	/.				
•																			
Jpe	rati	ng	SC	ree	en:			•											~ (
1 6	= /		_	1	N	G	:	S	e	r	V	1	C	е			2	6	%
• >	> >			9	0	-	0	Ů	С		(6	0	•	0	v	С)
90, 60,	0°C	": A	/la \C	ax. tua	allo I m	owa neas	ble sure	wa ed v	iter wate	ten er t	np. em	dui p. (\	ring wher	ser P5l	vic 3J a	e. activ	e).		
60,			//a AC Pre Pre By ha	ax. tua ess ess usi ang	allo I m [S 3 : ing	owa neas ER\ s. [C I the I.	ble sure /IC DN/	wa ed v E] f OF	ter wate to e F] t	ten er ten exit. o e	np. em Th xit. utto	dui p. (v e u Th	ring when nit v e ur the	ser P5I will hit w	vic BJ a go vill I	e. active to t be s	e). he swi ing	ope tch	erat ed o
60,			AC Pre Pre by Pre Pre	ax. tua esss ess us ang esss	allo I m [S 3 jed [N [N	owa neas ER\ s. [C I the I. IEN	ble sure /IC DN/ [▲ U] 1	E] 1 OF	to e F] t	rn to	Th xit. the o th	dui p. (\ e u Thi ons	ring when nit \ e ur the ain r ervi	ser P5I will hit w bur mer	yic BJ a go vill I rne	e. activ to t be : r fir nu.	^{e).} he swi	ope tch	erat ed e%
90,, 60,			Ac Pre Pre Sy Pre Pre	ax. tua ess ess usi ess ess ess ess e [-	allo I m [S 3 : ing jed [N [N ■]	owa neas ER\ s. [C I the I. IEN! & [I IEN!	ble sure /IC)N/ [▲ U] 1 U] 1 U] 1	is a variable of the second se	to e F] t (Vatore F] t (F] t	rn to s to z z z z z z z z z z z z z z z z z z z	Th xit. uttc the o th brc e o	dui p. (\ e u The ons e ma ne s per	ring when nit v e ur the ain r ervi se th atio	ser P5i will bur bur bur nror nror	go yill I me ugh nen	e. active to t be s r fir nu. the u o	e). he swi ing e m f th	ope tche rat	erat ed e% tor erv

10.6 Schornsteinfeger function

The following graphs describe how to use the Schornsteinfeger function.

NOTICE: This function is required for Germany and can be activated by parameter (P5 BK). The standard factory setting for this function is "OFF".

The purpose of this function is to have an easy interface for the "Schornsteinfegers" in Germany, to be able to do their required testing on the boiler. This is a simplified function similar to the normal service function of the boiler.



PoWhenthe heIn thisFIPOWhen	w the eate s sta u w	e bu ^r r wi te t e	r ttor II fii he	n is re a	: pre		Μ	i	n	i	m		3					
When the he In this F I P o	the eate s sta u w	bu ^r r wi te t e	ttor II fii he	n is re a	pre							u	m					
F I P o When	u w	е		disp	it <u>50</u> blay	sse <u>)%</u> / sh	ed (b <u>firin</u> ows	orie ng i s:	fly) r ate	aga	ain:							
P o When	w			s	е	r	V	i	С	е		m	0	d	е			
When		е	r		:		5	0	%									
	W	е	r				IVI	а	X		m	u	m					
vyhen the he The "S NOTE	i the eate Scho E S :	bu r wi orns	ttor II re stei	n is etur nfe	pre n to ger'	sse the " fu	ed b e nc ncti	rief orm on i	iy a al o s s\	gair pera witc	n: atioi hed	n m l off.	ode					
When (wher is pres the no be sw	n the n top ssec orma vitch	he dis fo al op ed o	ate spla r 12 pera off.	r is ay li 2 m atio	bur ne : inut n m	nin sho es, od	g du ws the e. T	urin "Flu bo The	g S ie s iler "Sc	cho ervi will hor	ice i retu nste	teint moc urn einfe	fege de") auto eger	er fu and oma " fu	inct d no atica nct	tion b bu ally ion	utto to wil	n

10.7 Programming in standby mode

Standby

Use the standby mode for modifying boiler settings without interaction with the boiler control. Changes are effectuated by leaving standby mode.

Properties of standby mode:

- Keys are active and the menu is accessible.
- Burner does NOT respond to an external heat demand.
- All control functions are active: pumps, fans and cascade are operational, recirculation and frost protection are working.

How to programme the boiler:

- First disconnect or shut down the room thermostat and/or other external controllers from the boiler. The CH pump and fan will stop after a short delay time.
- Switch the boiler in standby mode by pressing [ON/OFF] for three seconds.
- The next display screen should appear:

Display message	н	Ε	Α	Т	Ι	Ν	G	:	b	ο	i	Ι	е	r		0	f	f		
	>	٨	٨	••	1	2	3	-	4	0	С	(1	2	З	-	4	0	С)

- Program the boiler at the control panel (see the following sections).
- Reactivate the boiler by pressing [ON/OFF] for three seconds again.

10.8 Setting the time & date

The following graphs describe how to programme the time and date of the unit.

Н	Ε	Α	Т	I	Ν	G	:	b	ο	i	I	е	r		0	f	f		
>	>	>	:	1	2	3	•	4	٥	С	(1	2	3		4	٥	С)
Dr	V	ГN Л		1 11															
	2 35 •			J															
Ma	ain I	me	nu :	scre	een	:													
Μ	а	i	n		Μ	е	n	u											
С	I	ο	С	k															
	¥																		
Th	e d	ispl	ay	sho	ows	"CL	.00	CK"	pre	ess	[EI	NTE	[R]						
Se	▼	π	ime	ar	d L)ate													
с С		y ı ↓		+	iu	m		1	Ь	2	+			Δ	Q	-	2	2	
S	0	ι /	•	נ ה	•	····	6 0	1	u o	a	ι F	с 		U	0	•	5	3	
2								-					-						
3	U ▼	/	U	3	/	2	Ú		U			u			-		_	_	-
3 Th Us Us	● ● d e [, e [[,]	ay [▲]8 ◀] √	is n & [1 & [1	ow 7]ti ▶]†	blir o ch to s	nkin nang elec	g/s ge t ct a	ele he not	cteo val	d ar ue. val	nd o	can	be	cha	ingi	əd.			
3 Us Us Pre	● e d e [, e [[,] ● ess ne.	ay i ▲]& ◀] √	is n & [\ & [I	ow 7] t ▶]1 ER]	blir o ch to s for	nkin hang elec the	g/so ge t ct a	eleo he not	cteo val her ma	d ar ue. val tion	nd o lue.	can	be n af	cha	all	ed. cha	nge	es a	are
3 Th Us Us Pre do	e d e [, e [, e [. • • • • • • • • • • •	ay i ▲]& ◀] √	is n & [V & [I	ow 7] tr ▶]1 ER]	blir o ch to s for	nking nang elec the	g/so ge t co	eleo he not	cteo val her ma	d ar ue. val	nd o lue.	can	be n af	cha iter	all	ed. cha	nge	es a	are
3 Th Us Us do Co A	e d e [, e [, € ess ne. •	ay i ▲]& ◀] ↓ [El	is n k [1 NTE	ow 7] tr ▶]1 R]	blir o ch to s for	the	g/so ge t ct a	eleo he not	cteo val her ma	d ar ue. val tion	nd o lue. sc	can	be n af	cha	all	ed. cha	nge	es a	are
3 Th Us Us do Co A	e d e [, e [. esss ne. ▼ nfir r C	/ ay i ▲]& [EI ma e a	is n & [1 & [I NTE	ow y] ti [] 1 [] 1 [] 1 [] 1 [] 1 [] 2 [] 2 [blir o ch to s for cree o	nkin hang elec the n: u	g/se ge t ct a co	elee he not	u	d ar ue. val tion	e o	ree n	be n af	cha iter	all	ed. cha	nge	es a	are
3 Th Us Us Co Co A < Pre	e d e [, e [, e [] eess ne. v nfir r C eess era	ay i ▲]& ◄] [El œ a [◀	tior n] tc] sc	ow y c can can can can can can can	blir o ch to s for cree o e nce en).	nkin hang elec the n: u l the	g/sige t ge t a co ; e ch	eleche not nfir	u vali her ma	d ar ue. val tion r C	e ade	rree	be n af	cha iter i ay (all r	ed. cha m s ba	nge	es a	

10.9 Settings

The following graphs describe how to program the heating and hot water set points.

NOTICE: The hot water set points are only displayed, when the boiler is programmed as an indirect hot water boiler or direct hot water boiler. See parameter P4 AA for the exact boiler configuration.

Or	orc	tin	7.00		<u>.</u>															7				
Uр Н	F	Δ	у эс Т	100	N	G	-	h	0	i		6	r		0	f	f							
<u>.</u>		()		1	2	3	•	1	•	- C	1	1	2	3		1	•	C	1	<u> </u>				
<u>/</u>	-	-	•	•	2	5	•	-		U	(•	2	5	•	-		U		'				
Pre	ess	[M	EN	UI																				
¥		•																		_				
Ma	ain I	mei	าน ร	scre	en																			
Μ	а	i	n		Μ	е	n	u																
S	е	t	р	ο	i	n	t	s																
•			<u> </u>									-	-		-					_				
Se	lec	t "S	et p	ooir	nts"	usiı	ng [[▲]	&	•]	an	d p	ress	s [E	NT	ER								
			Bv	nre	aeei	na	[]	<i>8</i> . 1	•	the	o fo		vina	801	-001		ner	ho	6	مامد	hat			1
			By	nre	2001	ng ng		21		the	hl	inki	na v	valu		in t	he	seli	90 90	ted .	scri	Þer	<u> </u>	1
		-	ca	n b	e ch	nand	bed	.∽ı	. • 1	un			ng	vaic	100			001			001		•	
			Pre	ess	[M]	ENI	J] to	o ex	kit.	The	e ui	nit v	vill r	ese	et a	nd	retu	Irn	to	the	ope	era	t-	İ
			ing	l sc	ree	n.	-														•			
			Pre	ess	[EN	NTE	R]	for	cor	nfirr	nat	ion	scr	een	ı wł	nen	all	the	e C	han	ges	ar	е	
		ļ	ma	ade		,																		J
					Co	nfir	mai	tion	50	ree	n.													
					Δ	r	P		v	0			S	11	r	6								
					~	•	0	а	y n	с С	6	1	•	ŭ	÷	C	C	0	n) f	i	r	m	-
					Pre	255	 [◀]	l to	ca	nce	l th	e c	, han	aes	m	ade	(UI	hit v	vi	ll res	et)	•	•••	
					Pre	255		1 to	col	nfir	m t	hei	chai	nde	s T	he	va	lue	Se	et in	the	SC	ree	n
					wh	en	pre	ssir	nge	ente	er v	vill k	be s	hov	vn f	or	a fe	w s	se	cond	ls.	Aft	er th	nis
					the	dis	pla	y re	etu	ms	to t	he	nor	mal	ор	era	ting	g so	re	en.				
<u>*</u>																				-1				
Не	atır	ng s	set		nt n	orm	al/o	day	tim	ne:	1	r	r .	r		r	1	1	r	_				
н	е	а	t	İ	n	g		S	е	t	р	0	Ì	n	t					_				
		8	0		°	С																		
Th	e fl	ow	tem	npe	ratu	ire s	set	poi	nt t	hat	wil	l be	e ac	tive	du	ring	g th	е						
pro	ogra	amr	nec		- р	erio	ds.																	
He	atir	na r	niah	t st	nift	rela	ted	to	the	no	rm:	h/le	av t	ime	SP	t nr	oint			7				
0	н	.9 '	N	i. 01	a	h	+		e	h	1	f		Ι		- p(-						
<u> </u>	-	1	0	•	y °		·		3		•	-								_				
TL	-	- I.		n -	£ 4 br					41.00					<u>ام: م</u>		4	lier						
ie i	e re	երո հ թ	utei	n 0 de	n (N the		ore OIII	al/(uay nor	urr I CI	ie S Hin		hoiu Nga	ιι. Ι	nis	160	JUC	uon	I					
Pa	ran	u U netr	ar P	00 16 F	BB	più	yıc				٩ı	GIIC	<i>i</i> us.											
. u																								
He	atir	ng p	bara	alle	sh	ift:																		
Н	е	а	t	i	n	g		Ρ	а	r		s	h	i	f	t								
			5		۰	С																		
Se	ttin	g th	ne n	ara	llel	shi	ft of	f the	e h	eat	ina	cur	vei	rela	ted	to	the	ou	t-					
do	or t	em	per	atu	re c	ont	rol	(pa	ran	nete	er F	26 E	3C).	2.04										
T													,											

E93.0802EN.C Ambassador⁺ manual

D	Η	W		S	е	t	р	0	i	n	t								L
		6	0		0	С													
Th	IS İ	s the	e w	ate	r te	mp	era	atur	e s	et p	DOI	nt th	nat	IS a	acti	ve	dui	ng	J
the	e pr	ogra	ami	me	d D	ΗW	/ p	eric	bds	(pa	arai	met	er	P4	AA	. =	1/2).	
V																			
Dŀ	łW	set	poi	int ı	ed	ucti	on	(p	ara	me	eter	r P4	1 A	A =	: 1/	2)			
DF D	HW H	set W	poi	int ı R	ed e	ucti d	on: u	(р с	ara e	ime	etei	r P4	1 A	A =	: 1/	2)	ľ	1	Ι
DH D	HW H	set W	роі 0	int ı R	ed •	ucti d C	on: u	(p c	ara e	ime	etei	r P4	1 A	A =	: 1/	2)			

NOTICE:

The max. actual DHW temperature will never exceed the value set at "Heating Setpoint" regardless the set DHW setpoint.

If higher DHW setpoints are needed the Heating Setpoint has to be set higher also.

10.10 Setting the timer programs

Three different programs can be set with the boiler, these are:

- CH program
- DHW program
- Anti-Legionnaires' disease (pasteurisation) program

HEATING PROGRAM

Three programmed periods each day can be set (period 1, period 2 and period 3). During these periods the unit will use the normal CH and DHW set points. Outside the programmed period(s) the unit will use the reduced temperature as set point. When no time is programmed for a period, it will not be used.

(Example: no time programmed in period 3 on Monday > "Mon 3 --:-- ---:--").



HOT WATER PROGRAM



ANTI LEGIONNAIRES' DISEASE PROGRAM

The anti-Legionnaires' disease (pasteurisation) program of the boiler can only be used when the boiler is set as an "indirect" boiler configuration or a "direct" hot water boiler configuration. Only these configurations can activate the day and time program of the anti-Legionnaires' disease function. See the following graphs. The standard factory setting for this function is "OFF".



10.11 Setting the outdoor specifications

PARAMETERS FOR SETTING THE OUTDOOR GRAPH

When using this function the flow temperature is calculated based on the measured outdoor temperature. The relation between the outdoor temperature and the flow temperature can be programmed with the following parameters. This setting creates the so called "heating curve".

The boiler will recognise an outdoor sensor when it is connected. When the sensor is detected the boiler controller will control the flow temperature based on the heating curve that is programmed.

P5 AA OutsidPres. (1=On 0=Off)

Outside sensor present.

Setting this parameter to "On" a fault message will be displayed in case of a interrupted connection to the outdoor sensor or if the measured outdoor temperature exceeds 60°C (defective sensor).

0 => No fault message at interrupted outdoor sensor connection. Boiler keeps burning using the value of the external or internal flow sensor instead of the outdoor sensor.

1 => Interrupted sensor wiring causes a fault message to occur at the display Boiler keeps burning using the value of the external or internal flow sensor instead of the outdoor sensor.

OUTDOOR GRAPH (see also next page)



Curve and values only for illustration purposes, programmed parameter values can deviate!

P5 AC Heat curve minimum outdoor temperature (°C)

This sets the minimum outdoor temperature at which one wants the maximum flow temperature that is set.

P5 AD Heat curve flow temperature at minimum (°C)

This sets the desired maximum flow temperature at the set minimum outdoor temperature.

P5 AE Heat curve maximum outdoor temperature (°C)

This sets the maximum outdoor temperature at which one wants the minimum flow temperature that is set.

P5 AF Heat curve flow temperature at maximum (°C)

This sets the desired minimum flow temperature at the set maximum outdoor temperature.

P6 BC Heat curve parallel shift (°C)

The heating curve is set by the parameters. Next to these setting done by the installer, the end user has the freedom to influence the flow temperature by doing a parallel shift setting. In this parameter the margins are set within which the user can increase and decrease the calculated flow temperature relative to the calculated flow temperature by the heating curve that is set.

Additional settings of the heating curve p.t.o. \rightarrow



Curve and values only for illustration purposes, programmed parameter values can deviate!

P5 AG Heat curve minimum flow temperature (°C)

The flow temperature will never be lower than the flow temperature set in parameter P5AG. The minimum temperature is limited, even if the calculated set temperature, according to the heating curve, would be lower.

P5 AH Summer outdoor temperature central heating (°C)

If the outdoor temperature is higher than set in P5AH the heat demand for heating will be blocked.

P5AR Outdoor sensor 10K or 12K resistance (1 or 0)

Depending to the used type of sensor this parameter can be set. Set to '0' when using a so called 12k NTC sensor (sensor resistance is 12 kohm at 25°C) Set to '1' when using a so called 10k NTC sensor (sensor resistance is 10 kohm at 25°C) Default the parameter = 0, so the used sensor is assumed to be 12 k Ω .

P2 HA Outdoor sensor hysteresis (°C)

If the outdoor temperature reaches the temperature set in P5 AH (warm weather shutdown) the unit won't start for heating. If the measured outdoor temperature drops P5 AH minus P2 HA the boiler can start up for heating again.

P6 BA CH user setting (°C)

The flow temperature will never be higher than the flow temperature set in parameter P6BA. The maximum temperature is limited, even if the calculated set temperature, according to the heating curve, would be higher.

P6 BB Heat curve night shift (°C)

The temperature reduction during the night, relative to the setting determined by the heat curve

DISPLAY

The following graphs describe how to program the outdoor graph settings.

Ор	era	ting	g so	ree	en:															
H	Ε	Α	T	Ι	Ν	G	:	b	0	i	I	е	r		0	f	f			
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Pre	ess	[M	EN	U]																
Se	lect	t "O	utd	oor	." นร	sing	[<] &	[►]] ar	id p	res	s [E	ENT	ER]					
Ma	ain r	ner	าน ร	scre	en:															
M O	a II	i t	n d	0	M	e r	n	u				_								
•	Pr	ess	∝ .[∢	11 &		1 to	bro	ows	e th	rou	ah	the	SCI	reer	ns th	at a	are	sho	wn	below.
	Pr	ess	5 [A	.]['		o cl	nan	ge t	the	blir	ikin	g va	alue	e in	the	sele	ecte	ed s	cre	en.
	Pr Pr	ess	; [M		U] t FR1	to e	xit.	The	e ur nati	nit w	vill r	ese	et a aft	nd g	jo to	the		oera are	ating m	g screen. ade
		035	י <u>י</u> ן, 	Co	nfir	me	tion	50	- - - - - - - - - - - - - - - - - - -	ייטיו ריטי	301	CGII	ait			an	კლა	are		
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	0	4				Η	С	m	а	X	0	u	Т	m	р					P5 AE
		_	-							2	0		°	С		_	_			
	0	5				Η	С	m	а	X	F	Ι	Т	m	р					P5 AF
										2	0		0	С						
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										2	0		•	С						
	0	7				S	u	m	S	h	D	W	n	0	u					P5 AH
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10.12 Checking the operating history

The following graphs describe how to check the operating history of the boiler.

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an	d s'	witc	che		n.														
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10.13 Checking the fault history

The following graphs describe how to check the fault history of the boiler.

	Е	Α	Т	Т	Ν	G	:	b	ο	i	Т	е	r		ο	f	f		
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10.14 Setting the maintenance specifications

The following graphs describe how to check and program the maintenance settings. The standard factory setting for this function is "OFF".

MAINTENANCE SETTINGS

The unit can be programmed in such a way that an automatic maintenance message is displayed.

There are three options that can be selected. A maintenance message appears after:

* A programmed date is reached.

* An amount of burning hours is reached.

* An amount of ignition cycles is reached.

One single option can be activated or all three options.







BE AWARE : This function is standard turned OFF. We offer this programmable function to the installer to use as a reminder. Because it concerns a free programmable function, the application of it cannot be used as an argument in warranty cases.

Our units must be maintained every twelve months whatever the settings/working of this function.

It is and remains the responsibility of the end user to have the unit maintained every twelve months.

10.15 Setting the user lock

The following graphs describe how to activate the user lock of the display. The standard factory setting for this function is "OFF".

The " USER LOCK " menu. In this menu the boiler can be locked for (end-)users. 0 = UNLOCKED 1 = LOCKED	
When the boiler is unlocked, the user can enter the MENU by pressing the menu button and all screens will show up.	/
When the boiler is locked, the user has to push the [MENU] button together with the $[\Psi]$ button for 5 s. to access all menu screens.	u
This function is to prevent accidental changes! NOTICE : The PARAMETER screen always accessible.	
Operating screen:	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $)
Press [MENU]	
Select "User lock" using [◀] & [▶] and press [ENTER]	
User lock screen:	
S e t U s e r I o c k = 0 I 0 I	
The "0" is now blinking/selected and can be changed. Use [▲] & [▼] to change the value. 0 = User lock function OFF 1 = User lock function ON Press [ENTER] for the confirmation screen after the selectior has been made.	١
Confirmation screen:	
A r e y o u s u r e	
< Cancell; > Confirm	
Press [◀] to cancel the changes (the unit will reset and the display returns to the operating screen). Press [▶] to confirm the changes. The changed value will be blinking for a few seconds. After this, the display returns to the operating screen.	e
NOTICE: Using the [MENU] button during the User lock display, will re- set the boiler and the boiler will return to the operating screer	- า.

10.16 Setting the parameters at the control panel

The functions of the controller are embedded in de electronics by means of parameters. The values and settings hereof can be programmed by a skilled and trained service engineer with the help of a computer (laptop), the correct software and an interface cable. A selection of these parameters can be programmed at the control panel of the unit itself, without the use of a computer.

The following table gives a list of these last mentioned parameters. NOTICE: Only the password for level 1 is issued in this manual. "More advanced" parameters need to be programmed by a skilled and trained service engineer with access to level 2.

				When 'Medify - ne' the peremeter can only be pre-	rommo	4 ~	6 10	امر	r							PASSWORD:
				when modify = no , the parameter can only be proj	gramme	u a	t ie	vei	2							1342
МЕ	NU		PARA-	DESCRIPTION	UNITS			Т	EX-	ΓD	ISP	LA	Y			LEVEL 1 Modify
		1	PSRE	Step modulation (1-on 0-off)		S	t	6	n		m	0	Ь		I	no ,
		י 2		Blocking offset flow temperature control	°C	ц	Ē	C	4		0	f	u f	1	2	110
		2		Biocking offset now temperature control	°C	п			2			-	۱ ۲	1	с С	yes
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E		4	POIC	Integration time temperature control	0				2	C	-	-	1	1	с С	yes
X	A	5	PZIC	Regulation time temperature control	S S				S	_	-	n 4	ſ		с С	no
Ξ		0	PZIVII	Blocking onset System CH temperature control		н				C	0	T	T		3	yes
		1	PZIVIJ	Proportional range System CH temperature control	-0	н				C	P -	r	D		3	no
		ð	P2IMK		S	н	E			С		n	τ		3	no
		9	P5AB	Timer Contact (1=on)	-		I	m	е	r	C	0	n	t		yes
		1	P4AB	DHW Pump Config 0=Pump 1=TWV	-	D	Н	i	р	m	р	1	t	w	v	yes
		2	P5CB	Flow temperature DHW tank low	°C	D	Н	i	f	I.	0	w		L	0	yes
		3	P5CK	Flow temperature DHW tank hi	°C	D	Н	i	f	L	0	×		Н	-	yes
		4	P5CL	Low Flow temperature time DHW	min	D	Н	i		L	0	t	i	m	е	yes
		5	P5CD	Legionella temperature	°C	L	е	g	i	0		t	е	m	р	no
		6	P5CI	Legionella hyst DHW tank temperature	°C	L	е	g	i	0		h	у	S	t	no
		7	P5CJ	Legionella hold time (0=off)	min	L	е	g	i	0		h	0	I	d	no
≥	Б	8	P2KI	CH interrupt by Legionella (0=yes)(1=no)	-	L	е	g	i	0		i	n	t	r	no
E	Р	9	P2LC	Regulation temperature offset DHWd	°C	D	Н	d	s	С	0	f	f	2		yes
		Α	P2MN	Proportional range DHWd modulation	°C	D	Н	d	s	С	Ρ	r	b	2	3	no
		В	P2LD	Regulation temperature hysteresis DHWd	°C	D	Н	d	s	С	D	i	f	2		yes
		С	P2MO	integration time DHWd modulation	S	D	Н	d	s	С	Ι	n	t	2	3	no
		D	P2ML	Sys temp blocking offset DHW tank	°C	D	Н	d	s	С	0	f	f	3		yes
		Ε	P2MM	Sys temp blocking hysteresis DHW tank	°C	D	Н	d	s	С	D	i	f	3		yes
		F	P5CA	Hysteresis DHW tank temperature	°C	D	Н	i	s	С	D	i	f	4		yes
		G	P2KH	Gradient heat demand detect DHW tank temperature	°C	D	Η	i	d	е	t	g	r	а	d	yes
		1	P2MA	Max number extra boilers	-	Μ	а	X	С	а	S	С	U	n	t	no
ш		2	P5DA	Bus address boiler	-	В	u	s		а	d	r	е	s	s	no
Ō		3	P5DC	Dhw on entire cascade(0) only master(1)	-	D	Н	i	С	а	s	1	m	а	s	no
S	С	4	P5DE	Extra Boiler output enable(1)	-	Ε	х	t	r	а		u	n	i	t	yes
AS		5	P5DF	Cascade detection (0=standalone 1=Leader)	-	С	а	s		S	i	1	Μ	а		no
S		6	P5BL	Power off total cascade (1)	-	Ρ	w	r	0	f	f	Т	0	С	а	no
		7	P5DB	Number of boilers with common flue 0=None	-	С	0	m	F	Т	u	Ν	u	m		no
		1	P5BB	Analogue input Config (0=off 1=temp 2=power)	-	Α	n		Ι	n	р		С	0	n	ves
		2	P5AI	Minimum Temperature 0-10V input	°C	0	-	1	0	Μ	i	n	Т	m	р	yes
		3	P5BI	Altitude (in amounts of 100 ft.)	100 ft	Α	Т	t		*	1	0	0	f	t	ves
Ļ		4	P2LK	Max cooling time	min	М	а	х	С	ο	0	Ι	Т	i	m	ves
R.	_	5	P5BJ	Temperature display 1=on	-	Т	е	m	p	0	n	D	i	s	р	ves
۳	ט	6	P4AA	DHW 0=off 1=Indirect 2=Direct	-	D	н	W		1	=	i	2	=	d	no
В		7	P4AD	pressure 0=off 1=sensor and 2=switch	-	С	0	n	f	i	a					no
<u>ا</u>		8	P4BD	Gas type values 0-2	-	q	а	s	t	v	p	е				no
		9	P4BE	Soft start type values 0-2	-	C	0	n	f	i	a					no
1		Δ	P5BN	Pump modes 0-4	-	C	0	n	f	i	a					no

For extensive explanation see Ch. 11: 'Controlling options and settings', page 76 ff.

IMPORTANT: Do not change the parameters P2LC, P2LD, P2ML, P2MM and P5BI; they are present in the controller for different purposes than CH control. <u>Changing these parameters may affect boiler operation negatively.</u>

Parameter screens + concise explanation see next pages \rightarrow

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	С	5				С	а	S		S	i	1	М	а			-		-
Fu Th ali 0 = 1 =	Function for the cascading of the boiler(s). This parameter sets the function of the boiler at a cascade alignment D = Single / Slave unit = Master unit																		
M	Menu C: Cascade																		
	С	6				Ρ	W	r	0	f	f	Т	0	С	а				
_											0		<u> </u>						
	С	7				С	0	m	F	I	u o	Ν	u	m					
_	Function for the cascading of the boiler(s). This parameter determines the number of cascaded boilers hat are implemented with a common flue system.														-	<u> </u>	_		Ļ
Fu Th tha	inct nis p at a	tion bara ire	i fo am imp	r th ete olen	e c r de ner	asc eter ntec	adi mir I wi	ng c nes ' th a	of th the co	ne b nui mm	boil mb ion	er(s er c flue	s). of ca e sy	asca ster	ide n.	d k	oile	ers	
Fu Th tha	inct nis p at a enu	ion bara re D:	i foi am imp Ge	r th ete olen	e c r de ner	asc eter ntec	adi mir I wi	ng c nes that 1	of th the coi	ne k nui mm	ooil mb ion	er(s er c flue	s). of ca e sy n	asca ster	nde n.	d k		ers	
Fu Th tha Me	incl nis p at a enu	ion bara re D: 1	fo am imp Ge	r th ete olen ene	e c r de ner	asc eter ntec 0	adi mir I wi	ng c nes th a 1	of the con		c opiliand o	er(s er c flue	s). of ca e sy n	asca ster	n.			ers	
Fu Th tha Mo Fu Vo 0 = 1 = 2 =	inct nis p at a enu D lt s = N = C = C	tion Dara Ire D: 1 1 ion ign o e ont	Ge Ge Ge foi al (al (axte rol	r th ete oler ene r th (Co erna bas	e c r de ner ral e e nne sec sec	asc eter ntec 0 xte ecti ontr I on	adi mir l wi l wi l wi l wi l n rnal ons ons ol ter	ng c nes th a th a l coi t 15 mpe wer	of the con con tro -16) eratu	v I of Ling	ooil mb ion c 0 set	er(s er c flue e bo	i). of ca e sy n biler	asca ster t	nde m. r usi	d t	a (ers	
Fu Th tha Mo Fu Vo 1 : 2 : Mo	enu enu D Inct blt s = N = C = C	tion Dara I D: I D: I D: I D: I D: I D: I D: I D:	Ge Ge Ge Ge Ge Ge	r th ete pler ene r th (Co erna bas bas ene	e c r de ner ral e e nno sec sec	asc eter ntec 0 xte ecti ontr 1 on	adi mir wir wir wir ons ons ons ons ons	ng cones th a line th a line th a line the second s	of the contro -16) rratu	V I of).	c ooil non c o the set	er(s er c flue e bo). of ca sy n biler	asca ster t	nde m. usi	d t	a ()-1(
Fu tha Mo Fu Vo 0 : 1 : 2 : Mo	Incl nis p at a enu D Incl S S S S S S S S S S S S S S S S S S S	tion para ire D: 1 D: 1 1 1 1 0 e ont ont ont 0 1 D: 2	Ge Ge Ge Ge Ge Ge	r th ete pler ene r th (Co bas bas bas	e c r de ner ral e e e e nne sec sec	o o o xte ecti ontr l on l on o	rnal rnal ons ol ter	th a th a l con to s 15 mpe wer	0 0 0 0 0 0 0	V I of). M	c ooili mb ion c c c c c c c i the set g i i 0	er(s er c flue o e bo). of ca e sy n Diller Diller	t by	nde n. vusi	d k)-1(
Futha Fu	\mathbf{D} \mathbf{D}	tion Dara Ince Ince Ince Ince Ince Ince Ince Ince	Ge Ge Ge Ge Ge Ge Ge Ge Ge Ge Ge Ge Ge G	r th ene cr th (Co rna bas bas bas r th (Co rna bas bas r th (Co rna bas	e c ner aral e e e nne al co sec ral e e e nne on (de al.	o o o o o o o o o o o o o o	rnal ons rol rnal ons ons ons ons ons ons ons ons ons ons	ng c nes th a 1 1 col 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0	V I of). Ure tting 2 (set i of).	inn inn inn inn inn inn inn inn inn inn	o er (s flue o e bo ttting n e bo g 1)	n biler biler biler	t by m C by	n. r usi p usi	d k ng ng)-1(
Futha Futha	unct inis μ at a enu D unct bit s = N = C enu D unct inis μ at a enu D unct bit s = N = C unct D unct = N = C = C	tion are D: 1 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0	George Ge	r th ete plen r th (Co bas bas bas bas bas bas bas bas bas bas	e e e e e e e e e e e e e e e e e e e	asc eter ntec 0 xte ecti tontr 1 on 1 on 1 on 1 on 1 on 1 on 1 on 1 on	adi mir mir i wi i wi ons rol i ter po rnal ons npe ed)	ng c nes th a 1 con 15 npe wer 1 con 15 con 1 1 con 15 co 1 con 1 1 1 con 15 con 15 con 15 con 15 co	of the the contro -16 oratu see 0 ntro -16 ire (wat	V I of). M 2 I of). (set (set).	i the set of the set o	er(s er c flue e bo e bo tting g 1) npei). of ca e sy n oiler oiler ratu	m C by re w	r usi usi)-1()-1()-1(

M	eni		Ge	ne	ral															-1		The core toxte o	n that
141	D	4				Μ	а	X	С	0	0	I	Т	i	m	1						pages are standard	l part
											2		Μ	i	n							the software and a	apply
Fι	Inc	tior	foi	se	ttin	g th	ne n	nax	imu	Im	ove	rrui	n tin	ne	of th	ne '	fan	(n	nax	i-		CH systems (boiler
m	um	10	mii	nute	es).																	and/or DHW devic	es (wa
0	= 3	wit	ch d	ш																		ter neaters).	
Μ	enu	I D:	Ge	ene	ral								1			_	_	_					
	D	5				Т	е	m	р	0	n	D	i	S	р								
F .			4.0				(-1) 4	1				6 41-				- 1	_			
th	unci e di	tior ispl	to av	sno	ow t	ne	(me	eas	ure	a) t	em	ber	atur	e o	n th	еc	011	era	at				
	0 0	iop.	α.γ.																				
M	enu		Ge	ene	ral	_				4				1			-		_				
	U	6				U	н	V	v	1	=	1	2	=	a		+	+					
Fi	Inc	lior	to	sot		the		- 		-1///	hoi	lor	ont	ion		ļ			_				
0	= C	H	nlv	v (d	irec	t)	5 01	ı aı	iu i	100	00		υρι		э.								
1 :	= C	H/H	١Ŵ	fur	nctic	ón ((ind	irec	t)														
2	= H	W	only	y (d	lirec	ct)																	
Me	enu	D:	Ge	ne	ral															Τ			
	D	7				С	0	n	f	i	g												
0 = 1 = 2 =	= of = se = s\	f ens vitc	or h																				
Me	enu	D:	Ge	ne	ral																		
	D	8				g	а	s	t	у	р	е											
						Γ																	
Fu	inct	ion	to	sel	ect	the	ga	s ty	pe*	-	•		•	-			-						
0 =	= G	20,	G2	25.3	3 an	d f	or F	ola	nd	G2	7, G	62.3	350										
1 =	= G	31																					
2 =	= B/	P/P					*^~	oor	din	a to		1/2	7										
							AC	COL	uni	y io		143	1										
Me	enu	D:	Ge	ne	ral								_				_						
	D	9				С	0	n	f	i	g												
Fu	Inct	ion	for	se	tting	g th	ne 's	oft	sta	rt' c	ptic	n											
0 = 1 -	= no	orm	als	star	t-up) mn		00	~~d	'n													
2 :	= re = re	du	ced	fai	וומ ra	mp mn	-up	spe	eeu eed	(1)													
	- 10	au		Tu	IIu	mΡ	ЧР	opv	000	(")													
Me	enu	D:	Ge	ne	ral	-									-	-	-	_	_				
	D	Α				С	0	n	f	i	g												
_																				_			
Fu	Inct	ion	: Pı	Jm	o m	ode	Э																
0 = 1 =	= 110 = re	lav	1	cor	neo	cto	r 19	an	d 21	0 (1	ock	-011	t)								1		
2 =	= re	lav	2 .	cor	neo	ctor	r 21	an	d 22	2 (k	ourn	er	buri	nind	q)						1		
3 =	= re	lay	3,	cor	nneo	cto	r 23	an	d 24	4 (ł	neat	de	ema	nd)									
4 =	= D	o n	ot ι	ise	(res	ser	ved	for	fut	ure	ap	olic	atio	ns)							1		
																					1		
10.17 Fault codes display

The following graphs describe the lock out codes of the boiler. A lock out code can only be removed by a manual resetting of the boiler.

NOTICE: Before resetting the boiler always check the boiler, central heating system and all components corresponding to the related lock out description. Never just reset the boiler, before analysing the possible cause of failure.

10.17.1 LOCK-OUT CODES

Having a lockout means that the boiler needs a manual reset to start operating again. When the boiler is in lockout the backlight of the display is blinking on and off.

Explanation >	9	9	9	,	5	•	h	r	S	= ti	me	ela	ose	d af	ter	faul	t & I	mes	ssag	je.		
Explanation >	P		m	n	1		~	n		- 9	tatu	is of	the	ווח נ	mn	dur	ina	faul	lt			
		u		μ	•		0			- 3	latu	13 01	unc	, ba	mp	uui	ing	lau				
Display message	Explanation > 9 9 9 , 5 : h r stime elapsed after fault & message.Explanation > P u m p 1 o n= status of the pump during fault.iplay messageC 1 i x o nF a u 1 t5p u m p o ni y 9 9 9 , 5 h r sasonHeat exchanger fuse or burner door clixon exceeded maximum allowed value.iplay messageF a i 1 e db u r n e r s t a r tp u m p o n9 9 9 , 5 h r sasonBoiler is not starting after the programmed starting attempts.splay messageF a 1 s e f 1 a m e s i g n a 1p u m p o n9 9 9 , 5 h r sasonFlame signal is detected while it cannot be expected.splay messageF a n s p e e d i n c o r r e c t1p u m p o np u m p o n9 9 9 , 5 h r sasonFlame signal is detected a correct fan speed.splay messageF 1 a m e 1 o s tp u m p o n9 9 9 , 5 h r sasonFlame detected during normal operation, but was lost while running.splay messageF 1 o w h i g h T e m pp u m p o n9 9 9 , 5 h r sasonFlame detected during normal operation, but was lost while running.splay messageF 1 o w k e t u r n d t f a u 1 t6p u m p o n9 9 9 , 5 h r sasonFlow temperature exceeds the limit which has been set in the parameters.splay messageF 1 o w s e n s o r e r r o rr d block or delta direct block' has occurred three times.splay messageF 1 o w s e n s o r e r r o rr d block or delta direct block'																					
F15			р	u	m	р		ο	n					9	9	9	,	5		h	r	S
Reason Hea	t exc	han	nger	fuse	e or	bur	ner	doc	or cl	lixor	n ex	cee	dec	l ma	axin	num	allo	owe	d v	alue	۱.	
Display message	е		F	а	i	I	е	d		b	u	r	n	е	r		s	t	а	r	t	
F8			р	u	m	р		0	n					9	9	9	,	5		h	r	S
Reason Boile	er is	not	star	ting	afte	er th	e p	rogr	am	me	d sta	artin	ig a	tten	npts	5.	<u>.</u>		-	-		
Display message	p unpunpnnn <t< td=""><td></td></t<>																					
F10			р	u	m	р		0	n					9	9	9	,	5		h	r	S
Reason Flan	ne si	gna	l is c	lete	cteo	d wł	hile	it ca	anno	ot b	e ex	cpec	cted	•	-		-		•	-		
Display message	е		F	а	n		S	р	е	е	d		i	n	С	0	r	r	е	С	t	
F11			р	u	m	р		0	n					9	9	9	,	5		h	r	S
Reason The	cont	rolle	er do	bes	not	dete	ecta	a co	orre	ct fa	an s	pee	d.									
Display message	splay message F a i I e d b u r n e r s t a r t ason Boiler is not starting after the programmed starting attempts. splay message F a I s e f I a m e s i g n a r t n s i g n a r t n s t n t n s n t n s n t n s n<																					
F9			р	u	m	р		ο	n					9	9	9	,	5		h	r	S
Reason Flan	ne de	etec	ted	duri	ng r	norr	nal	ope	rati	on,	but	was	s los	st w	hile	run	ining	g.				
Display message	e		F	Ι	ο	w		h	i	g	h		Т	е	m	р						
F1			р	u	m	р		0	n					9	9	9	,	5		h	r	S
Reason Flow	/ tem	per	atur	e e>	cee	eds	the	limi	t wł	nich	has	s be	en	set	in th	ne p	ara	met	ers	•		
Display message	е		F	I	0	w	R	е	t	u	r	n		d	t		f	а	u	I	t	
F16			р	u	m	р		ο	n					9	9	9	,	5		h	r	S
Reason Tel or	mpei 'dT b	atu locl	re di k or	ffer delt	enc a di	e be rect	etwe blo	een ock'	flov has	v an s oco	id re curr	eturi ed t	n ex hre	cee e tir	eds nes	limi [.]	tatic	on v	alue	Э,		
Display message	е		F		0	w		s	е	n	s	ο	r		е	r	r	ο	r			
F0			р	u	m	р		ο	n					9	9	9	,	5		h	r	s
Reason Flow	/ sen	sor	not	det	ecte	d b	y th	e bo	oilei	r ca	use	d by	/ fai	ulty	con	nec	tior	/se	nso	r.		¥
Display message	e		F	I	u	е		S	е	n	S	0	r		е	r	r	0	r			
F6			р	u	m	р		0	n					9	9	9	,	5		h	r	S
Reason Flue	gas	ser	nsor	not	det	ecte	ed b	y th	e b	oile	r ca	use	d b	y fa	ulty	cor	nee	ctior	n/se	nso	r.	
Display message	e		F	Ι	u	е		t	е	m	р		t	0	0		h	i	g	h		
F7			р	u	m	р		0	n	1				9	9	9	,	5		h	r	S
Reason Flue fram	gas ie.	ten	nper	atur	e ex	ce	eds	the	lim	it m	ore	tha	n 3	tim	es v	with	in a	ce	rtair	n tim	ie	

Display message	Ρ	а	r	а	m	1	Η	а	r	d	w		f	а	u		t			
F13	р	u	m	р		0	n					9	9	9	,	5		h	r	s
		-	-		-										-					

Reason Fault during programming of the boiler software parameters.

Display mes	ssage	р	r	0	g	r	а	m	m	i	n	g		е	n	d				
F12		р	u	m	р		0	n					9	9	9	,	5	h	r	S
_	A 4																			

Reason Software parameters have been programmed.

Display message	R	е	t	u	r	n		h	i	g	h		Т	е	m	р			
F1	р	u	m	р		0	n					9	9	9	,	5	h	r	S

Reason The maximum return temperature as set in the parameters is exceeded.

Display message	R	е	t	u	r	n		S	е	n	S	0	r		е	r	r	0	r	
F3	р	u	m	р		0	n					9	9	9	,	5		h	r	S

Reason Return sensor not detected by the boiler caused by faulty connection/sensor.

Display message	S	i	р	h	0	n		S	w	i	t	С	h						
F19	р	u	m	р		0	n					9	9	9	,	5	h	r	S

Reason The pressure switch detects a high pressure in the flue/siphon system.

Display me	ssage	W	а	t	е	r		h	i	g	h		Ι	i	m	i	t			
F17		р	u	m	р		0	n					9	9	9	,	5	h	r	S
Decen		-	+ -	+ / -	live of	a)				40.0	h i a	. L. LI		-		. 4	-			

Reason Maximum thermostat (clixon) measured a too high flow temperature.

10.17.2 BLOCKING CODES

The following graphs describe the blocking codes of the boiler. A blocking code is only a temporary blocking of the boiler, because of an extraordinary situation. The boiler will continue to operate after stabilisation of this situation.

The display is not blinking, but is lightened up during the blocking period.

The boiler is blocking an action because of an extraordinary situation. This action will be continued after elimination of the extraordinary situation.

Display mess	Display message A n t i c y c l e i m e i m m i m																				
Display message A n t i c y c l e t i m e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m i m i m i m i m i m i m i m i m i m i m i m i m m i m m m m m i m																					
Reason	The contro mand.	oller	rec	eive	ed a	ne	w h	eat	den	nan	d to	o qu	uick	aft	er tl	ne la	ast e	end	ed o	de-	
Display mess	sage	С	а	s	С	а	d	е		В	I	0	С	k							
	isplay message A n t i c y c l e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m i m e i m i m i m i m i m i m i m i m m i m i m														s						
Reason	One of the	e ca	isca	dec	l bo	ilers	s ca	use	es a	n er	ror,	bec	aus	se c	of a	lock	ou	t.			
Display mess	isplay message A n t i c y c l e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m i m i m i m i m i m i m i m i m i m																				
Display message A n t i c y c I e t i m e i i m e i i m e i i m e i i m e i m e i m e i m e i m i m i m i m i m i m i m i m i m i m i m i m i m i m i m														s							
Reason	The boiler s tion. This fu	stari inct	ts it: ion	s de can	aira be	atior acti	n fur vate	nctio ed b	on a by p	and ara	afte met	er wi er F	ll re 24A	eturr J.	n to	nor	mal	ор	era-		
Display mess	isplay message A n t i c y c l e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m e i m i m e i m e i m e i m e i m i m e i m i m i m i m i m i m i m i m i m i m i m i m i m i m i m i m m i m i m i m i m i i m m i m m m m m m m m m m																				
	isplay message A n t i c y c I e i m e i m e i m i m i m i m i m i m i m i m i m m m m i m														S						
Reason One of the cascaded boilers causes an error, because of a lock out. Display message D e a r a t i o n r s Display message D e a i o n g 9																					
Display mess	Image: controller received a new near demand too quick after the last ended demand. isplay message C a c a d g <																				
	Pason The controller received a new heat demand too quick after the last ended demand. splay message C a s a d e B l o c k r s splay message C a s c a d e B l o c k r s splay message D e a i n i n r s splay message D e a i r a i n r s splay message D e a i r a i n r s splay message D e a i i n n r s splay message d T b i o c k i n r s geason The boiler starts its deairation function and after will return to normal operation. This function can be activated by parameter P4AJ. isplay message d T b <t< th=""><th>S</th></t<>														S						
Reason	Flow temper ceeded the	erati loc	ure k-oi	has ut va	exc alue	ceed	ded	the	blo	ckir	ng te	emp	era	ture	e, bu	ut it	has	no	t ex	-	

.																				
Display message	F	I	u	е		t	е	m	р		h	i	g	h						
												9	9	9	,	5	Ι	h	r	s
Reason Flue gas te	mp	erat	ure	has	s ex	cee	ded	l the	e lim	nit.						•				
Display message	G	е	n		В	I	ο	С	k											
												9	9	9	,	5		h	r	s
Reason The gene	ral I	bloc	kinę	g cir	cuit	is a	activ	/ate	d di	urin	g ol	bera	atior) = נ	cont	tact	7-8			
Display message	L	i	n	е		f	а	u	I	t										
												9	9	9	,	5		h	r	s
Reason Wrong ele	ectr	ical	pov	ver	sup	ply	is c	onn	ecte	ed (I	not	50 c	or 6	0 H	z, 2	20-2	240	Vo	t).	
Display message	0	u	t	d	0	0	r		S	е	n	s	0	r		f	а	i	I	
												9	9	9	,	5		h	r	S
Reason Outdoor t	emp	pera	ature	e ha	is e	xce	ede	d th	e bl	lock	ing	tem	per	atu	re.					
Display message	R	е	t	u	r	n		t	е	m	р		h	i	g	h				
												9	9	9	,	5	ľ	h	r	s
Display message L i n e f a u l t g																				
Display message	isplay message G e n B I o c k 9 9 9 5 h r s eason The general blocking circuit is activated during operation = contact 7-8 isplay message L i n e f a u 1 t u u t u u t u u u t u																			
												9	9	9	,	5		h	r	S
Reason Temperatu	re d	liffe	reno	се Т	2-T	1 ha	as e	exce	ede	ed th	ne b	locł	king	val	lue.					
Display message	W	а	t	е	r	р	r	е	s	s	u	r	е		f	а	u	I	t	
												9	9	9		5		h	r	s

Reason Water pressure is too low or too high.

10.17.3 MAINTENANCE ATTENTION MESSAGES

The following graphs describe the messages at the boiler display. Depending on the selected and activated options for the boiler, it is possible that some messages will show up at the display. For example a maintenance message after a certain programmed date has been reached. The boiler will operate independently of these messages.

The display shows alternating the base screen and this message, while the backlight is blinking. The boiler is operating, but will count the exceeding hours.

A parameter must be changed, after service, to remove this message.

Display message	Ν	е	е	d	S		Μ	а	i	n	t	е	n	а	n			0		0
	I	g	n	i	t	i	0	n		С	У	С	Ι	е	s		h	r	S	
Reason Mainten	anc	e op	otior	n of	tota	l an	nour	nt of	ign	itior	і су	cles	has	s be	en	read	chec	ł.		
Display messageNeedsMaintenan0.0IgnitioncycIeshrsReasonMaintenance option of total amount of ignition cycles has been reached.Display messageNeedsMaintenn0.0DatedsMaintenn0.0Display messageNeedsMaintenn0.0Burninghoursann0.0BurninghoursahrsReasonMaintenance option of total amount of burning hours has been reached.Maintenance option of total amount of burning hours has been reached.Display messageNeedsMaintenn0.0Display messageNeedsMaintenan0.0Display messageNee																				
Display message N e e d s M a i n t e n a n n n 0 . 0 Reason Maintenance option of total amount of ignition cycles has been reached. Maintenance option of total amount of ignition cycles has been reached. Display message N e e d s M a i n t e n n n s n<																				
Display message N e e d s M a i n t e n a n n n 0 . 0 Reason Maintenance option of total amount of ignition cycles has been reached. Maintenance option of total amount of ignition cycles has been reached. Display message N e e d s M a i n t e n n n s n<																				
Display message	Ν	е	е	d	s		Μ	а	i	n	t	е	n	а	n			0		0
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Display message N e e d s M a i n t e n a n a n a n a n a n a n a n a n a n a n a n a n a n a n a n a n													U							
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11 CONTROLLING OPTIONS AND SETTINGS

11.1 General

The following paragraphs describe some general functions of the boiler and their possible use.

11.1.1 EXTRA BOILER CONTROL

When all units (cascaded) are firing at their maximum it is possible to start an extra "external" heating source. This unit can be connected to the "Burner Burning" contacts (connection 21-22).

P5DE Extra Boiler output enable (1) (display C4)

When this parameter is set 1, the contact "Burner Burning" will close, but only when all units are firing at a certain (programmable) input percentage. The standard factory setting for this function is "OFF".

11.1.2 MAX COOLING TIME

The fan will cool down the heat exchanger according to the temperature settings (parameters) of the software. With this cooling parameter the maximum run time of the fan can be programmed.

P2LK Max cooling time (display D4)

This function is not used for central heating boilers.

11.1.3 TEMPERATURE DISPLAY ON/OFF

Selection for showing the measured temperatures at the operation display of the boiler.

P5BJ Temperature display 1=on (display D5)

The measured temperature at the operation display. 0 = not visible 1 = visible

11.1.4 WATER PRESSURE

P4AD pressure 0=off, 1=sensor, 2=switch.

When the water pressure exceeds 4 bar a pressure switch must be used instead of the sensor (suitable till 4 bar). With the switch, pressure can go up to 6 bar.

In this case, remove the pressure sensor and replace it by the pressure switch. Now set the parameter at the control panel by changing "D7 config" from 1 into 2.

11.1.5 GAS TYPE SELECTION

Settings for gas types: natural gas, propane or butane-propane mixture (B/P).

P4 BD Gas type (0=standard, 1=propane, 2=B/P) (display D8)

This parameter is set 0 for the common used gas types such as natural gas G20 or G25.3. By setting this parameter 1 for propane, fan speed is reduced. Set this parameter 2 for B/P.

- 0 = standard gas (e.g.: natural gas), Lw, Ls (Lw and Ls only for Poland)
- 1 = propane
- 2 = B/P

By each setting, the relevant Soft start settings are automatically adjusted, depending on its main setting P4BE, see next section § 11.1.6.



In case of gas conversion, paste the corresponding sticker at the appropriate position in the boiler and mark the square for the used gas type. Also mark the square, indicating that the correct value has been set for parameter P4BD.

G31 P	PROPANE PROPAN PROPANO PROPAAN	P4BD = 1
G30/G31 B/P	BUTANE/PROPANE BUTAN/PROPAN BUTANO/PROPANO BUTAAN/PROPAAN	P4BD = 2

(In the example on the right, 'propane' and 'P4BD = 1' have been marked).



11.1.6 SOFT START OPTION

Start parameters can be modified to achieve better start behaviour, in case of noise or other difficulties. This is done by reducing the fan ramp-up speed. Two reduced settings are available (I and II).

P4 BE Soft start (0=normal, 1=reduced fan ramp-up speed (I), 2=reduced fan speed ramp-up (II)) (display D9).

- 0 = normal start-up
- reduced fan ramp-up speed (I) 1 =
- 2 = reduced fan ramp-up speed (II)

11.1.7 PUMP MODE (EC TECHNOLOGY)

When using a pump with Electronic Commutation technology and start-stop function, with a separate control connection, this parameter determines the relay for switching the pump on and off.

P5 BN Pump mode (0=modulating, 1=relay1, 2= relay2, 3= relay3) (display DA)



Do not use the 230 Vac relay for the main power supply of the pump, but directly connect the pump to an external power supply.

A modulating pump with PWM control: the power supply is directly connected to the mains, the PWM connection is connected to CN10, contacts 9 and 18.

Pumps with an on/off control can be switched by one of the relay connections "lock-out", "burner burning" or "heat demand". Choose a connection which is not yet used.

- 0 =PWM 0-100% modulating pump, connection CN10, connectors 9 and 18
- Start-stop through relay 1, connectors 19 and 20 (lock-out) 1 =
- 2 = Start-stop through relay 2, connectors 21 and 22 (burner burning)
- Start-stop through relay 3, connectors 23 and 24 (heat demand) 3 =
- Do not use (reserved for future applications). 4 =

11.2 Heating

The following paragraphs describe the different functions of the boiler and their related "controlling behaviour settings" as a central heating boiler.

11.2.1 CONTROLLING BEHAVIOUR SETTINGS

The factory settings for all heating applications are working fine and it is therefore advised not to change these settings. Always consult the manufacturer for advice if changes to parameter settings are needed.

P5 AO Blocking offset flow temperature control (display A2)

The amount of degrees the measured temperature exceeds the active flow temperature set point before the heat demand stops. Only active when the unit is controlled by the internal flow sensor (S1) and used for single unit control.

P5 AL Hysteresis CH flow temperature control (display A4)

The amount of degrees that the measured temperature must drop, relative to the active flow temperature set point + Offset (Parameter **P5 AO**), before the heat demand starts. This function is active when the unit is controlled by the internal flow sensor (S1) and used for single units. When controlling cascaded units with an external flow sensor (S3), this sensor will be used.

P5 AP Proportional range single heating boiler (display A3)

The proportional range for controlling the flow temperature of the boiler. This function is active when the unit is controlled by the internal flow sensor (S1) and used for single units. When controlling cascaded units with an external flow sensor (S3), this sensor will be used.

P2 MI Blocking offset system CH temperature control (display A6)

The amount of degrees the measured temperature exceeds the active flow temperature set point before heat demand stops. Only active when the unit is controlled by an external flow sensor (S3).

The following graph shows the relation between the several parameters.



Graph and values only for illustration purposes, programmed parameter values can deviate!

Cooke Industries - Phone: +64 9 579 2185 Fax: +64 9 579 2181 Email: sales@cookeindustries.co.nz Web: www.cookeindustries.co.nz

11.2.2 ROOM THERMOSTAT ON/OFF

A room thermostat with a fixed set point and using an ON/OFF control can be connected to the boiler (Connections 13-14). Changing the flow temperature set point and activation of a timer program can be done by this room thermostat or by programming the boiler settings. See chapter 10.10

11.2.3 ROOM THERMOSTAT OPEN-THERM

An RC Open Therm controller can be connected to the boiler for temperature reading(s) and remote programming (connections 13-14).

11.2.4 OUTDOOR TEMPERATURE RELATED FLOW CONTROL

The flow temperature can be calculated by using the measured outdoor temperature for controlling the boiler. See for detailed information § 10.11.

11.2.5 0-10 VDC REMOTE FLOW TEMPERATURE SET POINT

The flow temperature is controlled by connecting an external 0-10 Vdc signal to the boiler (connections 15-16).

P5 BB Analogue input config (0=off 1=temperature 2=power) (display D1)

This parameter must be set at "1" so the supplied 0-10 Vdc signal will control the temperature set point. Possible settings are:

- 0 = 0-10 V control off
- 1 = 0-10 V temperature set point control active
- 2 = 0-10 V burner input control active

P5 AI Minimum temperature 0-10V input (display D2)

The standard starting temperature of the heat demand, when the minimum voltage signal is sent to the boiler. The factory settings for all heating applications are working fine and it is therefore advised not to change these settings. Always consult the manufacturer for advice if parameter changes are needed.

See also the following graph for the relation between the temperature and the control signal



Curve and values only for illustration purposes, programmed parameter values can deviate!

11.2.6 0-10 VDC REMOTE BURNER INPUT CONTROL

The burner input is controlled by connecting an external 0-10 Vdc signal to the boiler (connections 15-16).

P5 BB Analogue input config (0=off 1=temperature 2=power) (display D1)

This parameter must be set at "2" so the supplied 0-10V dc signal will control the burner input. The standard factory setting is "1", temperature set point control. Possible settings are:

- 0 = 0-10V control off
- 1 = 0-10V temperature set point control active
- 2 = 0-10V burner input control active

See also the following graph for the relation between the burner input and the control signal.



Curve and values only for illustration purposes, programmed parameter values can deviate!

11.2.7 TIMER CONTACT FUNCTION

This function can be activated when using an external night reduction timer for heating. This timer contact can be connected to the thermostat terminals (connections 13-14).

P5 AB Timer contact (1=on) (display A9)

When this parameter is activated and...

- ...the thermostat terminals are bridged (timer contact closed), the normal daytime temperature is used as set point.

- ... the thermostat terminals are not bridged (timer contact open), the night reduced temperature is used as set point.

11.3 Indirect hot water/calorifier

The following paragraphs describe the different functions of the boiler and their related "controlling behaviour settings" as a central heating boiler with an indirect hot water function.

11.3.1 PUMP AND 3-WAY VALVE CONTROL

See chapter 19 for several installation examples of the boiler and the preferred functions. When the boiler is used as an indirect boiler for both central heating and hot water function, this hot water function can be activated by u-sing a DHW pump (calorifier pump (pump 2)) or a 3-way valve.

P4 AB DHW Pump config 0=Pump 1=TWV (display B1)

With this parameter it is programmed if the flow to the indirect water tank (calorifier) is controlled by a pump (0 = pump) or a 3-way valve (1 = TWV).

11.3.2 TANK THERMOSTAT

An external thermostat can be connected to the boiler (connections 5-6). When there is a hot water demand and the tank thermostat closes, the boiler will start for the hot water demand. The calorifier/tank pump will be activated or in case of a 3-way valve, this valve will turn to the position to supply heat to the tank coil(s). In case of a heat demand and hot water demand, the (central) heating pump will switch off until the hot water demand ends.

P4 AB DHW pump Config 0=Pump 1=TWV (display B1)

With this parameter it is programmed if the flow to the indirect water tank (calorifier) is controlled by a pump (0 = pump) or a 3-way valve (1 = TWV).

11.3.3 TANK SENSOR

A tank sensor can be connected to the boiler. The tank (hot water) set point and related controlling parameters are set in the boiler controller. A hot water demand is detected by the boiler, when the sensor (water) temperature drops below the set point. The calorifier/tank pump will be activated or in case of a 3-way valve, this valve will turn to the position to supply heat to the tank coil(s). In case of a heat and hot water demand at the same time, the hea-ting pump will switch off until the hot water demand is stopped (water temperature is reached).

P5 CA Hysteresis DHW tank temperature (display BF)

The amount of degrees that the hot water temperature in the indirect water tank/calorifier needs to drop relative to the hot water set point, before the heat demand is send to the boiler.

11.3.4 LOW/HIGH FLOW TEMPERATURE TO TANK COIL

This function can only be used for an "indirect" programmed boiler (parameter **P4 AA** = 1). Normally for a regular calorifier a fixed flow temperature of 85° C is supplied to the calorifier heat exchanger in case of a heat demand. This hot water flow will indirectly heat up the water in the calorifier tank.

The parameters for this function can be configured for both low and high calorifier operation.

This function operates as follows:

When there is a heat demand, the boiler supplies water to the heat exchanger of the calorifier, according to the flow temperature set in parameter **P5 CB**. When the heat demand remains for the period set in parameter **P5 CL**, the flow temperature set point will change to a higher temperature, which is set in parameter **P5 CK**. This situation continues until the heat demand ends.



The reason for this function is that the boiler by supplying a lower flow temperature to the heat exchanger of the calorifier, can stay in its condensing mode (if the temperature is low enough) and thus operate at a higher efficiency level. When it takes too long (> P5 CL) to heat up the tank with this low temperature mode, the flow temperature set point will change to a higher setting to make sure that the hot water set point is reached.

P5 CB Flow temperature DHW tank low (display B2)

The low level flow temperature to the tank coil(s) in case of a calorifier/indirect hot water demand. This "two staged" function is added to keep the boiler in the condensing mode as long as possible.

P5 CK Flow temperature DHW tank high (display B3)

The high level flow temperature to the tank coil(s) in case of a calorifier/indirect hot water demand.

P5 CL Low flow temperature time DHW (display B4)

The programmed period for changing the set point of the water flow temperature from low to high. The standard factory setting for this function is "OFF".

11.3.5 HEATING AND HOT WATER SWITCHING TIME

This function can only be used for an "indirect" programmed boiler (parameter P4 AA = 1).

In case there is a heating demand and the unit is operating for this heating demand, also a hot water demand can be activated. A hot water demand always has priority, this means that the unit will switch to hot water operation. When the hot water demand remains for a longer period, there will be no heat supply for/to the central heating system during this period. Not supplying any heat for/to the central heating system might cause undesirable temperature fluctuations. The following parameters can be used to program the preferred settings.

P5 CL Low flow temperature time DHW (display B4)

The period during which the set point of the water flow temperature (to the heating coil(s) of the calorifier) will switch from "low" to "high".

P5 CF Max runtime DHW during CH demand

The programmed period for the boiler to operate for DHW demand in case of a CH demand. After this period the boiler will switch to operate for CH demand, even when there is still a DHW demand.

P5 CM Max runtime CH during DHW demand

The programmed period for the boiler to operate for CH demand in case of a DHW demand. After this period the boiler will switch to operate for DHW demand, even when there is still a CH demand.

The standard factory setting for this function is that the hot water demand always has priority and that no switching between the heat and hot water demand happens, when both are active.

11.3.6 HEATING AND HOT WATER SWITCHING AT SUDDEN TEMPERATURE DROP

This function can be used to detect indirect water tank/calorifier heat demand in case of a sudden temperature drop within the range between the set point and the (minimum) value at which the boiler is normally switched on. For this parameter is chosen the value of the temperature drop detected within one second, at which an immediate indirect hot water demand is activated.





11.3.7 ANTI-LEGIONNAIRES' DISEASE FUNCTION (PASTEURISATION)

This function can only be used for an "indirect" programmed boiler (parameter **P4 AA** = 1), on which a DHW program is active.

To prevent Legionnaires' disease the boiler (software) provides a function for heating up the hot water storage tank (once a week) to a higher water temperature then the normal active hot water set point. Also the period, that this "higher" water temperature function must be active, can be programmed.

NOTICE: The standard factory setting for this Legionnaires' disease (pasteurisation) function is "OFF". To activate this Legionnaires' disease function some parameters must be programmed by the manufacturer/supplier. The starting day and time of this Legionnaires' disease function can be programmed at the control panel of the boiler.

There are several parameters being used for this function. Three of these parameters are shown in the following graph.

With parameter P2 KI the heating (CH) demand can be interrupted to provide heat for the anti-Legionnaires' disease demand. When no interruption is activated the boiler will wait for the end of the heat demand before the anti-Legionnaires' disease function starts. The standard factory setting for this function is "OFF".



Curve and values only for illustration purposes, programmed parameter values can deviate!

The settings of these parameters **P5 CI**, **P5 CJ** and **P5 CD** must be programmed according to the national and/or local anti-Legionnaires' disease preventing regulations.

The setting of these parameters can only be done by the manufacturer/supplier of the boiler or by a technician with access to programming level 2, at the control panel of the unit without the use of a computer.



11.4 Cascade control



The following information is also found in the specific cascade manual, supplied standardly with EHS cascade accessories or on request.

Before commissioning a cascade installation, a number of parameters have to be changed. These parameters can be programmed on the unit itself, without the use of a computer.



Changes in parameter may only be carried out by a skilled commissioning/service engineer, who has had specific training for setting up the Ambassador⁺ range boilers. He will be able to check whether the installation functions correctly after the parameter change has been done.

For programming **all parameters** of the boilers one needs to have a laptop with the appropriate EHS software and an interface cable for connecting the laptop to the boiler control (one Part number.: S04.016.586). This software is used for programming but also shows all measured temperatures and cascade behaviour during operation and service/fault history.

11.4.1 PARAMETER SETTINGS FOR CASCADED BOILERS

Before programming the cascaded boilers, make sure that all boilers are connected (wire) with each other. Use connection 17 and 18 of each boiler.

Remind: do not alternate these connections, so always connect 17 to 17 and 18 to 18.

After connection every boiler must be programmed. This can be done at the control panel. Press the [MENU] button and select the [PARAMETER] menu. See graphics below.



After this, use the password for installer's level 2.

Pa	ran	nete	er n	nen	u:													
Ι	n	S	t	а	Ι	Ι	е	r		С	0	d	е					
								0	0	0	0							
	↓ ↓ ↓ Enter the 4-digit code with the [◄] & [▶] and the																	
Er	$\downarrow \qquad \qquad \downarrow \downarrow \downarrow \downarrow \downarrow$ Enter the 4-digit code with the [\blacktriangleleft] & [\blacktriangleright] and the																	
[▲] &	[▼] bı	utto	ns	anc	l se	lec	t [Ē	NŤ	ER							
Th	e c	ode	iw	ll bl	ink	a f	ew	sec	con	ds a	and	wh	nen	ent	tere	ed		
со	rrec	ctly,	the	e fo	llov	ving	g pa	arar	net	ers	wil	l be	dis	spla	ye	d.		



Now for every single boiler of the cascade the following two parameters must be selected and programmed according to the above drawing.

Master:	Me	enu	C:	Ca	asca	ade	;												
C5 P5 DF 1		С	5				С	а	s		S	i	1	Μ	а				
C2P5 DA 0												0							
Slave 1: C5 P5 DF0 C2 P5 DA 1	Fu Th ca 0: 1:	inct nis p isca = Si = M	ion bara ide ngl ast	for ame alie e / er	r the eter gnn Sla unit	e ca r se ner ave	asc ets f nt uni	adi the it	ng fur	of t	he on	bo of t	iler he	(s). boi	ler	at a	a		-
Slave 2:																			
C2P5 DA 2																			
And so on	Me	enu	C:	Ca	asca	ade	•												
		С	2				В	u	s		а	d	d	r	е	S	s		
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	Fι	Inct	ion	for	r the	e ca	asc	adi	ng	of t	he	bo	iler	(s).					
	Th	nis p	ara	ame	ete	r de	eter	mir	nes	the	e ao	ddr	ess	s of	the	e bo	oiler	-	
	fo	r the	e to	tal	cas	sca	din	g c	ont	rol.									
	Ma	aste	er =	0,	Sla	ave	1 =	1,	etc										

When the correct parameter is set, this must be confirmed at the confirmation screen. After activation, the value will blink for a few seconds while the parameter is programmed into the boiler.

When cascade connection is programmed correctly the boiler display will show the following.

Explanation "Cascade communication indicator" NO CASCADE COMMUNICATION



Always showing the fixed ">>>"

CORRECT CASCADE COMMUNICATION



Showing alternating no.1 & no.2 with 1 second interval.

11.4.2 MONITOR SCREENS

To obtain cascade information, see § 10.4 on page 47.

11.4.3 OUTPUT CONTROL AND BOILER SEQUENCE

The total cascade set-up will act as one single big boiler, switching on- and off boilers, depending on the total load necessary to adjust and keep the flow temperature at the calculated value.

When the heat demand rises, more boilers are switched on, and when heat demand falls, one or more boilers will be switched off. The boiler that was switched on last, will be switched off first, see table below.

To distribute operating hours equally over all boilers, the working sequence of the boilers will change every two hours.

Hour	Switching ON sequence	Switching OFF sequence
х	Master – Slave 1 – Slave 2 – Slave 3 – Slave 4 – Slave 5 – Slave 6 – Slave 7	Slave 7 – Slave 6 – Slave 5 – Slave 4 – Slave 3 – Slave 2 – Slave 1 – Master
X+2	Slave 7 – Master – Slave 1 – Slave 2 – Slave 3 – Slave 4 – Slave 5 – Slave 6	Slave 6 – Slave 5 – Slave 4 – Slave 3 – Slave 2 – Slave 1 – Master – Slave 7
X+4	Slave 6 – Slave 7 – Master – Slave 1 – Slave 2 – Slave 3 – Slave 4 – Slave 5	Slave 5 – Slave 4 – Slave 3 – Slave 2 – Slave 1 – Master – Slave 7 – Slave 6
X+6	Slave 5 – Slave 6 – Slave 7 – Master – Slave 1 – Slave 2 – Slave 3 – Slave 4	Slave 4 – Slave 3 – Slave 2 – Slave 1 – Master – Slave 7 – Slave 6 – Slave 5

Table: boiler sequence example of an eight boiler cascade.

In this table a total of eight boilers (one master, seven slaves) is mentioned as an example, in practice the maximum number in a cascade, without extra (external) control, is twelve boilers.

12 COMMISSIONING THE BOILER

12.1 First: flushing the boiler with water

After installation of the boiler the first step, before commissioning, is to flush the boiler and the whole heating installation with fresh water to remove pollution, debris and other materials that might cause a blocking. This must also be done with heating installations, where only the boiler is replaced.

12.2 Second: filling & venting the boiler and the system

After flushing the boiler and the installation the system can be filled with fresh water. Fill the boiler and the heating system by using the appropriate filling valve. The water pressure of the system normally lies between 1,5 and 2,0 bar – see § 6.14 'Water pressure' on page 20.

NOTICE: Use the following aspects to prevent corrosion of the central heating system:

- Filling water: Do not use any additives for the water of the central heating system. The pH value of the water should be more than 5 (If this pH value is less, please contact the supplier).
- Ensure that any used "plastic" pipes are oxygen diffusion-proof in accordance with DIN 4726/4729. If not, make sure that the boiler circuit is separated from the heating circuit by a plate heat exchanger. This way no oxygen that entered the heating system through these pipes can reach the boiler.
- Check the total heating system for any leaks. This to prevent oxygen entering the system through these leaks.

The boiler has an automatic air vent situated on top. This vent must be opened during the filling of the boiler and the heating system to make sure that no air/oxygen is trapped in the heat exchanger of the boiler. NOTICE: Check that the screw cap has been loosened at least one twist. Shortly after putting the boiler into operation, check the water pressure and add or lose some water to obtain the required pressure.

During these proceedings, make sure that no water can enter the boiler and make contact with the electrical parts.

12.3 Third: check the water flow

Before the boiler will be started it must be sure that the boiler pump is functioning and that there is a water flow over the heat exchanger. Check the electrical power supply of the boiler; if this is connected correctly, the display will show:

Display message	В	ο	i	I	е	r		ο	f	f										
Reason Boiler second	is ı ds.	not	act	ive.	То	ac	tiva	te t	he	boil	er p	ores	s [ON/	/OF	F]	butt	on	for	<u>six</u>
Display message	Η	Ε	Α	Τ	Ι	Ν	G	:	b	0	i	I	е	r		0	f	f		

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Activate the boiler by pressing the [ON/OFF] button for six resp. three seconds. After this the following display will appear:

Display message	Н	Ε	Α	Т	I	Ν	G	:	Ν	0		d	е	m	а	n	d			
	>	۷	>	:	1	2	3	-	4	0	С	(1	2	3	-	4	0	С)
Reason Boile	r is a	activ	/e. I	but	the	re is	s no	he	at c	dem	anc	<u>.</u>								

_____, _____

When no water is present in the boiler or the water pressure is too low or high, the boiler will go into lock-out and will show a corresponding message in the display.

Display message	W	а	t	е	r	р	r	е	S	S	u	r	е		f	а	u	Ι	t	
												9	9	9	,	5		h	r	s
Reason	Wa	ater	pre	รรเ	ıre	is to	oo le	ow (or h	nigh										

By pressing the [SERVICE] button of the boiler, the boiler can be started without a heating demand. The boiler will start to fire and also the pump will start to run. Firing of the boiler without water flow (but filled with water!) will cause the so called "boiling noises". Check during this "service function" operation also the flow and return temperatures of the boiler by pressing the [◀] button once. The temperature difference of the flow and return must be between 13°C and 25°C at high fire. This temperature difference indicates that there is a sufficient water flow over the boiler; this water flow protects the heat exchanger against possible damage caused by a thermal overload.

Another safety feature of the boiler, to make sure that there is enough water flow over the boiler, is the monitoring of the flow and return temperatures (T1 and T2). When the temperature difference (delta T) between the flow and return exceeds a certain (set) value, the following warning messages will be shown in the display.

Display messa	age	Т	2	I	Т	1		h	ï	g	h										
													9	9	9	,	5		h	r	s
Reason	Temp	erat	ure	diff	fere	nce	T2	2-T1	ha	s e	xce	ede	d th	ne b	loc	king	a va	lue.	, as	set	t in

the parameters.

Display message	d	Т		В	I	ο	С	k										
										9	9	9	,	5		h	r	s
Beesen Temm			:۲			T 4	TO		 	ما ۲ ام					la			

Reason Temperature difference T1-T2 has exceeded the blocking value.

When the T1-T2 value exceeds the lock-out setting, the boiler will switch off and the following lock out code will be shown at the display.

Display mess	age	F	I	0	w	R	е	t	u	r	n		d	t		f	а	u	I	t	
F16		р	u	m	р		ο	n					9	9	9	,	5		h	r	S
Reason	Temp	erat	ure	dif	fere	ence	be	twe	en	flov	v ar	nd re	etur	n e	xce	eds	lim	itat	ion	valı	ue.

Temperature difference between flow and return exceeds limitation value, or 'dT block or delta direct block' has occurred three times.

When these messages appear and/or the boiler will lock out, it means that there is not enough flow over the boiler. In this case check the functioning of the pump.

The boiler has no built in water-flow switch. If there is the possible risk of a water-flow blockage of the (external) heating system, the following pre-cautions can be taken to ensure a water flow over the boiler:

• Separate the boiler circuit from the (external) heating circuit by using a low loss header or plate heat exchanger.

During and after the commissioning of the boiler, the operation of the boiler pump must be checked, before leaving the installation room.

NOTICE: Always check the running of the pump before firing the boiler.

13 STARTING THE BOILER

13.1 General

Check the gas pressure available at the gas connection pipe of the boiler. Use the pressure nipple (3) of the gas safety valve for this measurement.

The graphs on page 96 show the position of the pressure nipple (3) for the complete boiler range.

The gas input pressure for the boiler to operate properly under the correct load must be **more than 20 mbar at high** fire.



For Ls gas G2.350, used in parts of Poland, a B+J gas valve must be installed in the A+80, A+100, A+150 and A+180 boilers. See also page 91 ff. and page 96.

13.2 Firing for the first time

After the commissioning of the boiler and the described previous actions, the boiler display will show the following graph.

Display message	Н	Ε	Α	Т	Ι	Ν	G	:	Ν	ο		d	е	m	а	n	d			
	>	۷	٧	:	1	2	3	-	4	0	С	(1	2	3	-	4	0	С)
Reason	Bo	oiler	is a	activ	/e.	but	the	re i	s no	o he	eat o	dem	nano	d.						

The display describes:

- The actual operation for heating or hot water
- If there is a heat demand activated
- The temperature setting
- The temperature measured

When mounting the bottom part of the siphon, before commissioning the boiler and/or after maintenance, it must **ALWAYS** be <u>completely</u> filled with water.

This is a safety measure: the water in the siphon keeps the flue gases from leaking out of the heat exchanger via the condensate drain.



When the boiler receives a heat demand the electronics will start the operation of the boiler. Before the boiler is used, the boiler burner must be adjusted and set at the minimum and maximum load.

14 ADJUSTING AND SETTING THE BURNER



Before carrying out any adjusting of the burner, carefully read this complete chapter.

14.1 Introduction

The burner must <u>always</u> be adjusted in the next situations:

- A. A new boiler is installed
 - As part of a service/maintenance check, in case the CO₂ values turn out to be incorrect.
- B. The gas control safety valve has been (re)placed
 - Another type of gas is applied: gas conversion

Adjustment procedures for situation A are described in § 14.2 And for situation B § 14.3.

In either of the four cases described in **A** and **B**, <u>always</u> check the gas/air ratio of the combustion figure (CO_2) at maximum and minimum input. First set the boiler at max. load and subsequently at min. load, and repeat if necessary.

Gas types and valves

The right type of valve must be selected, depending on the gas type. Gas types G20, G25.3 and G31 are commonly used; the boilers are standard equipped with the A+C-class valves required for these types of gas. **Poland**

Gas types G27 and G2.350 are Lw and Ls gases, used in some parts of Poland. For Ls gas G2.350, the boilers A*80, A*100, A*150 and A*180 must be equipped with B+J-class valves, see table 3 and see the pictures on page 96.

Set-up of this chapter:

First, all necessary values are given in three tables in § 14.1.1. A drawing of the gas valve(s) and setting screws is given in § 14.1.3. In § 14.1.5 a general scheme, conform which the adjustments must be carried out, is presented in table form. In §§ 14.2 and 14.3, a description is given of how to proceed in cases **A** and **B** respectively. In § 14.4, finally, two main procedures used in the previous sections are described in detail.

14.1.1 ADJUSTMENT TABLES

Table 1: CO₂ values for maximum and minimum load.²⁾

gas type 1)		CO	2 [%]	O ₂ [%]
C30 C35 3	boiler type	max load	min load	max load	min load
020, 025.5	A ⁺ 60-180	9,0 - 9,2	8,5 - 8,7	4,5 - 4,8	5,4 - 5,7

		CO	2 [%]	O ₂ [%]
	boiler type	max load	min load	max load	min load
propano C21 ³⁾	A⁺ 60-120	10,3 - 10,5		4,9 - 5,2	
propane 051	A⁺ 150	10,4 - 10,6	9,1 - 9,3	4,7 - 5,0	6,7 – 7,0
	A ⁺ 180	10,5 - 10,7		4,6 - 4,9	

		CO	2 [%]	O ₂ [%]
	boiler type	max load	min load	max load	min load
	A⁺ 60-120	10,4 - 10,6		5,1 - 5,4	
D/P / (050/ 051	A⁺ 150	10,5 - 10,7	9,1 - 9,3	4,9 - 5,2	7,0 – 7,3
	A ⁺ 180	10,6 - 10,8		4,8 - 5,1	

1 Cf. EN437.

2 All values measured without front door. The CO_2 / O_2 values should always be between the values set in this table. Nominal values can be found in Technical specifications datasheet page ...

3 Fan settings must be changed by altering parameter P4BD (display D8). (only by a skilled mechanic). 4 B/P: Propane/butane mixture.



Using propane or butane/propane mixtures (B/P), maximum fan speed needs to be reduced by changing parameter P4BD.

14.1.2 ADJUSTMENT VALUES

To make adjustments easier, values of table 1 are presented in the following figures. The CO_2 / O_2 values should always be between the values set in this figure.

Nominal values can be found in the Technical specifications datasheet at the beginning of this manual. All values are measured without frontdoor.

Gas type G20, G25.3

The CO₂ level may never be in the hatched area.



A60 - A180

Propane G31:

Fan settings must be changed by altering parameter P4BD (display D8). (only by a skilled mechanic). The CO_2 level may never be in the hatched area.



A60 - A120

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>>> cont. Propane G31:

The CO₂ level may never be in the hatched area.





A180

B/P: propane/ butane mixture G30/ G31:

Fan settings must be changed by altering parameter P4BD (display D8). (only by a skilled mechanic). The CO_2 level may never be in the hatched area.



94

E93.0802EN.C Ambassador* manual

boiler	number	of turns open (counter c	lockwise)
type	nat. gas G20 / G25.3 / G27	propane G31	Butane/Propane B/P G30/G31
A+ 60	1	0,5	0,25
A+ 80	1,5	0,75	0,5
A⁺100	3,5	1,5	1,25
A⁺120	2,25 *	1 *	0,75 *
A⁺150	2,25 *	1 *	0,75 *
A+180	4,25 *	2,25 *	2 *

Table 2 pre adjustment settings gas valves (G27 for Poland)

* Both gas valves must be opened this number of turns.

Table 3 Gas valve settings for Ls gas G2.350 (for Poland)

	numbe	er of turns open (counter cloo	ckwise)
boiler type	natural gas Ls G2.350	gas valve class	gas valve part nº:
A+ 60	1,25	A + C	No replacement
A+ 80	1,75	B + J	S04.000.393
A+ 100	4	B + J	S04.000.393
A⁺ 120	*2,5	A + C	No replacement
A⁺ 150	*2,5	B + J	S04.000.393
A⁺ 180	*4,5	B + J	S04.000.393

* Both gas valves must be opened this number of turns.

Table 4 Pressure adjustment settings LEFT valve

Contact you boiler supplier for the right settings when converting to a not mentioned type of gas

boiler		"p-out" pressure at gas valve)
type	nat. gas G20 / G25.3	propane G31	Butane/Propane B/P G30/G31
A⁺ 120	-2 to 0 Pa	-4 to -2 Pa	-5 to -3 Pa
A⁺ 150	-2 to 0 Pa	-7 to -5 Pa	-8 to -6 Pa
A⁺ 180	-2 to 0 Pa	-7 to -5 Pa	-8 to -6 Pa



Maximum fan speed has to be reduced to convert the boiler into a propane or B/P appliance. Setting of parameter P4BD.

A sticker has to be pasted after converting the boiler into a propane or B/P appliance. Mark the used gas and the parameter setting on this sticker.

G31 P	PROPANE PROPAN PROPANO PROPANO	P4BD = 1
G30/G31 B/P	BUTANE/PROPANE BUTAN/PROPAN BUTANO/PROPANO BUTAAN/PROPAAN	P4BD = 2

See § 14.3 on page 98.

ſŢ

NOTICE: Do NOT mistake the screw marked 'PILOT' for screw 2. \rightarrow Screw 2 is the SMALL screw immediately next to the pilot screw.



14.1.4 Gas value classes A+C and B+J (B+J only for Poland)



These pictures show the difference between an A+C and a B+J valve. Notice the class being denoted on the ID plate of the valve.

14.1.5 ADJUSTMENT ACTIONS: GENERAL SCHEME

General scheme for adjustment of the gas valve(s). Check this scheme for an overview.

To complete all necessary adjustments in right order, follow case **A** <u>or</u> **B** top-down through the scheme (**B** involves a few extra steps (grey text blocks)):

	GENERAL SCHEM		S STEPS
	case A new boiler or service check		case B valve replacement or gas conversion
	continue ↓	first close them in ac	(both*) screw(s) [2], then set ccordance with table 2
	SWITCH TO S	ERVICE MO	DDE
	continue ↓	If burner d screw[2] ½	loesn't start, open (RIGHT*) 4 turn extra
	setting at ma	aximum loa	ad
	[▲] set burner a	it maximum	load
procedure 1	measure CO₂ a use (RIGHT* adjust according co2↓ co2↑	t flue gas of) screw [2] table 1 or fig	utlet; to gures.
	setting at m	inimum loa	ıd
	continue ↓	<u>only</u> → A+120, 150, 180	[▼] set burner at minimum load use LEFT screw [1] to match "p-out" with table 4
	[▼] set burner at minimum load		
procedure 2	measure CO₂ a use (RIGHT* adjust according co2↓ co2↑	t flue gas of) screw [1] t table 1 or fig (1) (1)	utlet; to gures.
	repeat proce	edure 1	
	repeat proce	edure 2 natch table	values best
	Boiler returns to NORMAL MODE after 40 n	nin. OR by	pressing [SERVICE] button

* in case of a double valve (A+120, A+150 and A+180)

For an extensive description consult the next two sections (choose which is applicable, A or B):

14.2 Adjusting in case of a new boiler, or after maintenance (case A)

14.2.1 GENERAL REMARK

For all adjusting steps under A the measured CO2 values shall be according table 1 or figures

14.2.2 CHECKING AND ADJUSTING AT MAXIMUM LOAD

Adjust at maximum load by carrying out procedure 1 on p.100.

14.2.3 CHECKING AND ADJUSTING AT MINIMUM LOAD

Adjust at minimum load by carrying out procedure 2 on p.100.

14.3 Adjusting in case of valve replacement or gas conversion (case B)



Maximum fan speed has to be reduced to convert the boiler into a propane or B/P appliance. Setting parameter P4BD.

14.3.1 GENERAL REMARKS

In case **B**, a distinction is made between the setting of boilers containing a single valve (A^+60-A^+100) and boilers with a double valve (A^+120-A^+180).

All adjustments must result in CO2 according table 1 or figures.

Checking and adjusting at maximum load A+60 / A+80 / A+100 The boilers A60, A80 and A100 all have single gas valves, see the drawings on page 95.

- First, turn setting screw [2] of the gas valve clockwise until you feel resistance. This means that the valve is closed, *do not try to tighten the screw any further*.
- Now turn screw [2] counter clockwise (open), according to the number of turns in table 2 or 3 for the used boiler and gas type.

After this, adjust at maximum load by carrying out procedure 1 on page 100. If the burner doesn't start up in service mode, turn screw [2] a quarter turn counter clockwise open, and try again.

14.3.2 CHECKING AND ADJUSTING AT MINIMUM LOAD A+60 / A+80 / A+100

Adjust at minimum load by carrying out procedure 2 on page 100.

IMPORTANT: Toggle between high fire and low fire to make fine-tuning adjustments (adjusting the minimum setting affects the maximum setting and contrariwise).



In case of gas conversion, paste the corres-ponding sticker at the appropriate position in the boiler and mark the square for the used gas type. Also mark the square, indicating that the correct value has been set for parameter P4BD.

(In the example on the right, 'propane' and 'P4BD = 1' have been marked).

G01 P



For adjusting double gas valves A+120 / A+150 / A+180 see next page \rightarrow

P480

14.3.3 CHECKING AND ADJUSTING AT MAXIMUM LOAD A+120 / A+150 / A+180

The boilers A+120, A+150 and A+180 all have double gas valves, see the drawings on page 95.

First connect a manometer to "p-out" = measuring point [4] of the **left** gas valve (see drawing).

- Now, turn setting screws [2] of <u>both gas valves</u> clockwise until you feel resistance. This means that the valves are closed, do not try to tighten the screws any further in the closed position.
- After this, turn screws [2] of <u>both left and right hand gas valve</u> counter clockwise (open), according to the number of turns in table 2 or 3 for the used boiler and gas type.

From now on **only** use the **right hand** gas valve for adjustments on high fire.

Adjust the right value at maximum load by carrying out procedure 1 on page 100. If the burner doesn't start up in service mode, turn screw [2] a quarter turn counter clockwise further open, and try again.

14.3.4 CHECKING AND ADJUSTING AT MINIMUM LOAD A+120 / A+150 / A+180

Adjusting these boilers at minimum load in case B involves extra measurements, to get both valves balanced:

Use the [▼] button to decrease the actual load of the service (percentage) to the minimum. The following screen will appear:

Display message	Н	Ε	Α	Т	Ι	Ν	G	:	S	е	r	v	i	С	е			2	6	%
	٨	٧	٨		1	2	3		4	0	С	(1	2	3	-	4	0	С)

Boiler is activated and operates at service mode at 26% (minimum).

See table 4 for pressure settings "p-out" gas valve for the used boiler and gas type. Use screw [1] on the **left hand** gas valve to adjust the measured pressure at "p-out" to the right value according to table 4. Be sure the manometer has been zeroed out prior to making this setting. Below, the influence of turning screw [1] is described.

Turning counter clockwise Turning clockwise	\rightarrow \rightarrow	less gas more gas	\rightarrow \rightarrow	a drop in CO ₂	\rightarrow \rightarrow	a drop in measured pressure at "p-out" a rise in measured pressure at "p-out"
0		0		a rise in CO ₂		

After "p-out" has been set according table 4, the CO₂ level at low fire has to be set again. Use values of table 1 and/or figures.

Adjust srew [1] of the **RIGHT hand** valve to set the CO₂ at minimum load by carrying out procedure 2 on page 100. Again, toggle between high fire and low fire to make fine-tuning adjustments (adjusting the minimum setting affects the maximum setting and contrariwise).

If the valves have been set correctly, "p-out" left should equal "p-out" right. As an additional test, one could check this by measuring "p-out" at the RIGHT valve, i.e. at measuring point 4 on the right valve (not denoted in the drawings on page 96).

This pressure should be in the same range of pressure as the left valve, so in accordance with table 4 again.

If, after all setting steps have been carried out properly, the values of left and right "p-out" are still very different, contact your supplier.

14.4 Adjusting procedures

Procedures 1 and 2, referred to in the previous sections 14.2 and 14.3, are described here:

Procedure 1: adjust at maximum load

In case **B** (replacement of gas valve or gas conversion): consult § 14.3. before starting procedure 1 below.

Carry out the next 4 steps:

1. Press [SERVICE] button for about 3 seconds.

Display message	н	Ε	Α	Т	Ι	Ν	G	:	S	е	r	v	i	С	е			2	6	%
	٨	٨	٨		1	2	3	•	4	0	С	(1	2	3	-	4	0	С)
										/				· ·						

Boiler is activated and operates at service mode at 26% (minimum). (example)

2. Press [▲] button until maximum load is reached:

Display message	Н	Ε	Α	Т	Ι	Ν	G	:	S	е	r	v	i	С	е		1	0	0	%
	٨	>	٨		1	2	3	•	4	0	С	(1	2	3	-	4	0	С)

Boiler is activated and operates at service mode at 100% (maximum). (example)

- 3. Measure the CO₂ percentage at the flue gas outlet.
- 4. By setting screw [2], adjust the gas valve to obtain the CO₂ value of table 1 or the figures. NOTICE: For the A⁺120, 150 and 180 boilers use only the RIGHT side gas valve for adjusting.

Decrease CO₂ percentage



Turn screw [2] right (clockwise)

Turn screw [2] left (counter clockwise)

Increase CO₂ percentage

The service operation of the boiler will be active for 40 minutes. After this period the boiler will return to normal operation.

Procedure 2: adjust at minimum load

In case **B** (gas conversion or replacement of gas valve): consult § 14.3. before starting procedure 2 below.

Carry out the next three steps:

1. Press [▼] button until minimum load is reached.

Display message	Н	Ε	Α	Т	I	Ν	G	:	S	е	r	V	i	С	е			2	6	%
	٨	>	٨		1	2	3	•	4	0	С	(1	2	3	-	4	0	С)

Boiler is activated and operates at service mode at 26% (minimum).

- 2. Measure the CO₂ percentage at the flue gas outlet.
- 3. By setting screw [1], adjust the gas valve to obtain the CO₂ value of table 1.
 - NOTICE: For the A+120, 150 and 180 boilers use only the RIGHT side gas valve for adjusting.

Decrease CO₂ percentage



Turn screw [1] left (counter clockwise)

Turn screw [1] right (clockwise)

Increase CO₂ percentage

The service operation of the boiler will be active for 40 minutes. After this period the boiler will return to normal operation.

100

15 PUTTING THE BOILER OUT OF OPERATION

It is recommended to have the boiler operational all year round to prevent any frost damage during the winter and/or rotating parts getting jammed during other times of the year (built in boiler safety features).

15.1 Out of operation: on/off function

To be used when the appliance must be put out of operation for a long period because of a defect or another safety risk.

Act as follows:

- Disconnect or switch off the room thermostat and/or other external controllers from the boiler. The CH pump and fan will stop after a short time.
- Switch off the boiler by pressing the [ON/OFF] button for six seconds.
- Make sure that the following display screen is visible.

Display message	В	0	i	I	е	r	0	f	f					

Properties of the 'off' function:

- The keys do NOT respond and the menu is NOT accessible.
- The burner does NOT respond to an external heat demand.
- The boiler CAN, however, be switched on again by pressing the [ON/OFF] button.
- Pumps, fans and cascade (if applicable) are operational, and so are both recirculation protection (if applicable) and frost protection.
- NOTICE: Pump 3 (CH pump) is switched OFF, but this is NOT the case when the boiler is in a cascade.
- To reactivate the boiler, switch on the burner by pressing [ON/OFF] for six seconds again.

The frost protection module can still activate the burner. To prevent this, switch off this protection or put the boiler in 'power off' mode.

15.2 Out of operation: power off

To assure that the boiler cannot become active at all anymore, power should be cut off completely.

Act as follows:

- Disconnect or switch off the room thermostat and/or other external controllers from the boiler. The CH pump and fan will stop after a short time.
- Switch off the boiler by pressing the [ON/OFF] button for six seconds.
- Make sure that the following display screen is visible.

Display message	В	0	i	Ι	е	r	0	f	f					

- Switch off the electrical power supply of the boiler (remove connection from the wall socket, or switch off the main power).
- Close the gas valve / gas supply.
- In case of possible frost damage: drain both the boiler and the heating system.

NOTICE: Before starting to drain the boiler, first start draining the heating system and subsequently open also the two drains of the boiler.

16 FAULT CODES.

16.1 Lock-out codes

IMPORTANT:

To avoid electric shocks, disconnect electrical supply before performing troubleshooting. To avoid burns, allow the unit to cool before performing troubleshooting.

Be aware that a fault code is an indication that the unit or the system needs attention. When repeatedly having faults these should not be neglected.

The first step is to check if the unit is installed according to the instructions. If not, first make sure the installation complies with the installation manual.

Always check the fuses on the control board before replacing any major components. A blown fuse can prevent the controller or other components from operating.

Most faults can also be caused by a bad wiring and/or connections, even if it is not specifically mentioned. With every fault it is wise to check wiring and connections (at both ends) that connect to the safety device/component that generates the fault.

LOCK-OUT CODES:

Having a lockout means that the boiler needs a manual reset to start operating again. When the boiler is in lockout the backlight of the display is blinking on and off.

Explanation >	9	9	9	,	5	:	h	r	s	= time elapsed after fault/mes-
										sage.
Explanation >	Ρ	u	m	р	1		0	n		= status of the pump during fault.

	-	-	-					_			-									
Display message	С		i	X	0	n		F	а	u		t								
F15	р	u	m	р		0	n					9	9	9	,	5		h	r	s
Reason	He lov	eat ved	excl I val	nan ue.	ger	fus	e o	r bu	irne	r do	or	clix	on e	exc	eed	ed ı	max	kimu	um	al-
Cause:																				
The thermal fuse of th	e he	at	exc	han	ger	ha	s op	bene	ed p	bern	nar	ent	ly.							
Corrective action:					-				-				-							
Switch off the electrica	al po	we	r ar	id g	as :	sup	ply	anc	l co	ntad	ct s	upp	lier							
Cause:																				
The burner door clixor	n ha	s o	pen	ed.																
Corrective action:																				
Remove the burner do leakage.	or c	of th	ne h	eat	exc	chai	nge	r ar	nd c	hec	k tł	ne b	ourn	ero	lool	r ga	ske	et fo	r	
Check the burner door Check the heat exchange	for nae	de [:] r fo	forn r dir	natio t ar	on; nd c	whe hec	en it sk th	t de nat f	forr he	ns i flue	t m	ust not	be blo	repl cke	lace d.	ed.				

If heat exchanger is clean, reset manually the clixon itself and reset the boiler.

Display message	F	а	i		е	d		b	u	r	n	е	r		s	t	а	r	t	
F8	p	u	m	b	-	0	n			-		9	9	9		5	-	h	r	s
Reason	Bo	iler	no	t op	era	tion	al a	after	for	ur sta	arti	na	atte	mp	ts.	-			-	-
Cause:				-																
No spark.																				
Corrective action:																				
Check the ignitor/ignitic Check the state of the the end of the electrod Check the distance be Check the state of the Check the state of the Check the state of the Check power supply. V Check for proper electric Bad ignition transformed	on e cer twe igni ear spa /olta rica	elec ami en t ition th w urkp age I gro	troc c in the c ca vire lug mu cun	de a isula elec ble /cor cap ust b iding	and ator ctro and o an o an o a g of	rep A de d re ctio d re 30 un	lac sm pin, pla n o epla Vac it.	e/cle all c , ea ce if f the ace c nc	ean crac rth f f ne e igr if ne om.	if ne k ca oin a cess nitor aces	ece n p and sar an	essa prev l bu y. id re ry.	ary. vent rne epla	: the r. ace	e sp	ark ece	to f	[:] orn ry.	n at	:
	51.1	vep	laci	e ui			51 0	ont			s u									
Ignition spark is preser	nt k	nut r	ი f	lam	e re	2011	lts													
Corrective action:	π, τ	Juli		am		550														
Check if the gas valve does not open, the gas Check if the gas valve gas valve wiring/conne Check if the gas valve Check if the gas press Check if the air supply	ope s va ope ctic set ure is c	ens. lve ens. ons. ting is c	wi mu Wi s a corr	hen st b hen re c ect ot b	the the the corre	ere i epla ere i ect a l su	s p iceo s n and ffici	owe d. o po l ad	just	if ne	y to	y to	o the	as v e ga	valv as v	e, b alve	eut t	he v iecł	valv k th	/e e
Cause:																				
Frame, but not enough	ior	iisa	lion	τΟ	esta		sn t	ne 1	iam	ie.										
Check the ignitor/ignitic Check the state of the Check the distance be Check the state of the Check the state of the Check for proper elect Check power supply. V Check the state of the	on e cer igni ear rica /olta spa	elec ami en t ition th w l gro age arkp	troc c in the vire oun nu lug	de a sula re (/cor din ust b cap	and ator ctro also nne g of pe 2 o ar	rep de the ctio 30 30 d re	lac pin e io n o it. Va epla	e/cle nisa f the c nc ace	ean rth p ation e ign e ign om. if ne	if ne pin a n wir nitor eces	and re) ar	essa l bu anc id re ry.	ary. rne d re epla	r. place	ce if if n	f ne ece	ces ssa	sar ry.	y.	
Display message	F	а	I	s	P		f	1	а	m	e		9	i	a	n	а	I		
F10	n	u U	m	n		0	n	† ·	-			9	9	9	3	5	~	h	r	S
Reason	Fla for	ame op	e siç era	gnal tion	de	tect	ed,	wh	ile k	oile	rs	hou	ıld r	not	, fire			••		3

The flame detection circuit detects a flame which is not supposed to be present.

Corrective action:

Check the ignition/ionisation electrode and make sure it is clean (or replace it).

Check the power supply voltage for a correct polarity.

Check the power supply for bad frequency or voltage peaks.

Check external wiring for voltage feedback.

Check the internal wiring for bad connections.

Check if the gas valve is closing correctly.

Replace the burner control.

Display message	F	а	n		s	р	е	е	d		i	n	С	0	r	r	е	С	t	
F11	р	u	m	р		ο	n					9	9	9	,	5		h	r	S
Reason	Ac	tua	far	n sp	eed	d di	ffer	s fro	om t	the	unit	t rpr	n s	et p	oint	t.				
Cause:																				
An incorrect fan speed	is d	dete	ecte	d.																
Corrective action:																				
Check the 4 wired wirin Check the 3 wired pow Replace the fan. Replace the main cont	ng a ver s rol l	and sup boa	cor oly rd.	nneo wiri	ctio ng a	ns a and	at th coi	ne fa nne	an a ctio	and ns a	at t at b	he i oth	mai end	n co ds.	ontr	ol b	oar	d.		

Display message	F	I	а	m	е		I	0	s	t										
F9	р	u	m	р		ο	n					9	9	9	,	5		h	r	s
Reason	Fla	ame	sic	gnal	los	st du	Irin	g op	bera	ation	۱.									
Cause:								<u> </u>												
Bad gas supply pressu	re.																			
Corrective action:																				
Be aware that the spec Check if all gas valves Check if the dirt filters in Check if the external d Check if an external gas Check the gas pressur	cifie in t mes irt fi as p e th	d g he sh ii ilter ores nat i	as p sup n th in t sure s su	ores ply e ga he e re upp	ssur line as v gas gul lied	e m are valv s su ator to	nust e co e ir pply is the	t be omp ilet y lin sele bui	me lete is cl e is ecte lding	t du ly o lean not d/ins g > (ring per blc stal call	g al n. ocke lled the	l op ed. coi e su	rrec	tior tly. ier i	i co if ne	ndit	ions	s. ·y.	
Cause:																				
Bad gas valve or gas v	alv	e se	ettin	igs.																
Corrective action:																				
Check and set gas value	ve s	setti	ngs	5.																
Cause:																				
Bad electrode, electroc	de v	virir	ng/c	onr	nect	ion	(ba	nd ic	onisa	atior	n si	gna	al).							
Corrective action:																				
Check ionisation signa Check the ignitor/ignition Check the state of the Check the distance bet Check the state of the Check the state of the Check for proper electro	I. cera twe igni igni rica	elec ami en f itior itor I gro	troc c in the wi ear oun	de a sula elec re (i th v ding	and ator ctro is a vire g of	rep de lso /cor	lac pin, ion ine it.	e/clo ea isat ctio	ean rth p ion n ar	if ne oin a wire nd re	ece and e), a epla	bu bu nd ace	ary. rne rep if n	r. Iac	e if essa	nec ary.	ess	ary		
Cause:																				
Bad flue gas and/or air	้รน	pply	/ sy	ste	m.															
Corrective action:																				
Check if the design of the bined resistance as spectra of the flue gas at tice by a skilled installer. Check all seals in the f	the ecif nd a er. lue	flue ied air s gas	e ga supp s an	is a oly : nd a	nd a sys [:] ir s	air s tem upp	is i Iy s	ply : insta syste	syst alleo em.	em d ac	cor	npl din	ies g a	with goo	n th od i	e m nsta	ax. allat	con ion	n- pra	C-
Cause:																				
External factors.																				
Corrective action:																				
Check if there were ex Check if the boiler roor outlet (when combustion	trer n p on a	ne v ress air is	wea sure s dra	the is awr	r/w equ n fro	ind ual t om t	con o th he	nditi ne p boil	ons ores: er r	whe sure oom	en t e at n).	he the	fau e po	lt oo sitio	ccui on c	rred of th	l. Ie fl	ue g	gas	

104

Display message	F		ο	w		h	i	g	h		Т	е	m	р						
F1	р	u	m	р		ο	n					9	9	9	,	5		h	r	s
Reason:	Ma	ax. I	low	ter	npe	erati	ure	exc	eec	ls li	mita	atio	n (lo	ock∙	-out) va	alue			-
Cause:																				
The water flow is restri	cte	d.																		
Corrective action:																				
Check functioning of th Check/open all valves Check for an external s Check if the system res	ne p that syst sista	um t mi em anc	p. ght pui e e	res np xce	tric tha eds	t the t inf t the	e wa luei e sp	ater nce are	flov s flo cap	w th ow t oaci	irou hro ity c	igh ugh of th	the i the ie u	uni e ur nit	t. nit. pum	۱p.				

Display message	F	I	ο	w	R	е	t	u	r	n		d	t		f	а	u		t	
F16	р	u	m	р		ο	n					9	9	9	,	5		h	r	s
Reason:	Ter tior tim	npe n va es.	erati lue,	ure or	diffe 'dT	erer blo	nce ck c	be or c	twe delt	een a d	flov	w ai t ble	nd r ock'	etu ' ha	rn e s oc	xce ccur	reds	thr	ita- ee	
Cause:																				

The water flow through the unit is too low.

Corrective Action:

Check functioning of the pump.

Check/open all valves that might restrict the water flow through the unit.

Check for an external system pump that influences the flow through the unit.

Check if the system resistance exceeds the spare capacity of the unit pump.

Make sure the heat exchanger is clean. Heat exchanger fouling (partly blockage) will increase the resistance causing the water flow to drop.

Display message	F	I	0	w		s	е	n	s	ο	r		е	r	r	0	r			
F0	р	u	m	р		0	n					9	9	9	,	5	-	h	r	s
Reason:	Flo	ow s	sens	sor	is n	ot o	dete	cte	d.		-									
Cause:																				
Bad wiring/connection	in t	he	low	se	nso	r ci	rcui	t.												
Corrective action:																				
Check for loose wiring	/cor	nne	ctio	ns i	n th	e fl	ow	ser	sor	circ	cuit									
Cause:																				
Bad temperature sense	or c	aus	sing	a fa	ault	sig	nal													
Corrective action:																				
Replace flow sensor.																				

Display message	F	—	u	е		s	e	n	s	0	r		e	r	r	0	r			
F6	р	u	m	р		ο	n					9	9	9	,	5		h	r	s
Reason	FΙι	le s	ens	or	is n	ot d	ete	cte	d by	/ the	e bo	biler	PC	B.	_	-				-
Cause:																				
Bad wiring/connection	in t	he f	lue	gas	s se	enso	or ci	ircu	it.											
Corrective action:																				
Check for loose wiring/	′cor	nne	ctio	ns i	n th	le fl	ue	gas	ser	nso	r cir	cuit								
Cause:																				
Bad temperature sense	or c	aus	ing	a fa	ault	sig	nal													
Corrective action:																				
Replace flue gas sense	or.																			

Display message	F	I	u	е		t	е	m	р		t	0	0		h	i	a	h		
F7	р	u.	m	q		0	n		٣		-	9	9	9		5	9	h	r	s
Reason	Flu	ue g cert	jas ain	terr per	nper iod.	atu	re e	exce	ed	ed 3	3 tir	nes	s lim	itat	ion	valu	le v	vithi	n	
Cause: Heat exchange	er p	ollu	iteo	d an	d no	ot a	ble	to t	rans	sfer	en	ou	gh h	eat	to s	syst	em	wat	er.	
Corrective action:																				
Check and clean heat	exc	har	nge	er.																
Cause: Bad flue gas se	ens	or	or s	sens	or c	con	nec	tion	(pa	artly	' sh	orte	ed).							
Corrective action:																				
The sensor is of the typers. A partly shorted separature when actually Check for moist in the second	be N enso the sen	NTO or v ere sor	C. T vill is r co	This drop none onne	me b its b. ctio	ans res ns (if t sista	he t ance epla	em e ar ace	pera nd th ser	atu her hso	re r efoi r.	ises re 'n	, th nea	e re sur	e' a	tanc rais	e lo se ir	ow- n te	m-
Cause: There is no wa	ter	in t	he	unit	wh	ile f	irin	g.												
Corrective action:								0												
This is an unlikely situal detect anything. Only a pressure switch to swit did not react. Bleed all the water and won't dis	ation a lot ch air air	n w ∷of whi froi cea	hile air le r m t r th	e all in th no w he u nrou	the ne s vate init s gh t	saf yste r is so t he	etie em/ pre he flue	es fo /unit ser hea sys	or cl t (ur it. A it fro ster	nec nde Iso om n.	kin r pi the cor	g th ress e wa nbu	e w sure ater istio	ate) ca lea n ca	r pro an c k de an b	ese aus etec be ti	nce e th tior rans	did ne w n sferi	n't vate red	er to
Cause: Heat exchange	er fa	ailu	re.																	
Corrective action:																				
This is an unlikely situa	atio	n bi	ut v	vher	n the	ere	is s	seve	ere o	dan	nag	e to	o the	e he	eat e	excl	nan	ger,	the)
combustion product will	ll no	ot b	e a	ble	to tr	ans	sfer	all	hea	t to	the	e sy	ste	m w	ate	r. T	hel	nea	t th	at
is not transferred will co	onv	ert	to	an ir	ncre	ease	ed f	lue	gas	ter	npe	erat	ure							
Display message	n	r	•	a		2	m	m	:	n	a			n	А					
F12	2		5	y n	-	a	n		•		y	0	0	0	u	5		h	-	•
Passan	P	u		p		0	n					9	9	9	,	5		n	1	5
Reason	Pro	ogra	am	mini	y or	the	e pa	lata		ers (ipie	etea	Suc	ces	SSIU	iliy.			
Cause: Programming of		ie p	Jai	ame	lers	5 00	mp	iete	u s	ucc	ess	siuli	у.							
This massage occurs t	~ ~	onfi	rm	tho	000		nro	aro	mm	ina	D	roci	ning	DE		т м	ill r	stur	n th	
unit in normal operating	n st	atu	nn S	uie	enc		pro	yıa		iirig	. г	162	sing		SE.	I VV	111 1 6	stur	n u	le
	9 01	ara	0.																	
Display message	Ρ	а	r	а	m	1	Н	а	r	d	w		f	а	u	I	t			
F13	р	u	m	р		0	n					9	9	9	,	5	1	h	r	s
Reason	Fa	ilur	e d	urin	a pi	oai	am	mir	a o	f the	ер	ara	met	ers.						
Cause: Programming	of th	ne p	bar	ame	eters	5 N(ТС	suc	ces	sful	lly d	com	plet	ted						
Corrective action:		-				-	-				,		1 -							
Unit is not in standby m Check programming w Check if the software c Replace the programm Replace the display PC	nod ire a om ing CB.	e (f and plie wir	an I co es v re.	mus onne vith	st no ectio the	ot ru ins PC	un d and B.	durii I try	ng p ag	orog ain.	grai	nm	ing)	•						

Display message	R	е	t	u	r	n		h	i	g	h		Т	e	m	р				
F1	р	u	m	р		ο	n					9	9	9	,	5		h	r	s
Reason:	Ма	xim	um	retu	Irn	tem	per	atu	re e	exc	eed	s lir	nit v	valu	ie.					
Cause: Systems that	pre-	hea	ats th	ne b	oile	er re	etur	n te	mp	bera	ature	e to	o m	uch	n/hig	h.				
Corrective Action:																				
Reduce pre heat temp	bera	ture	e of e	exte	rna	al he	eat s	sou	rce	•										
Cause:																				
The need for heat in the	ne s	yste	em s	udc	len	ly d	rop	s ca	aus	ing	hot	ret	urn	wa	ter to	o th	e b	oile	er.	
Corrective Action:																				
Dampen external heat	ting	sys	tem	cor	ntro	l to	pre	ven	t s	udd	len	boil	er t	em	pera	ture	e ris	se.		

Display message	R	e t	u	r	n		S	е	n s	0	r		е	r	r	0	r	
F3	р	u m	р		ο	n				9	9	9	,	5		h	r	s
Reason	Ref	turn se	enso	or is	s no	t de	etec	ted	by the	boi	ler	PCI	З.					
Cause: Bad wiring/cor	nec	tion in	the	ret	turn	se	nso	r cir	cuit.									
Corrective action: Ch	eck	for loo	ose	wiri	ing/	con	nec	tion	ns in th	e re	eturr	n se	enso	or ci	rcu	it.		
Cause: Bad temperatu	ire s	ensor	cau	ısin	g a	fau	ılt si	gna	al.									
Corrective action: Re	plac	e retu	rn s	ens	sor.													
Display massage	9	in	h	•	n		6	147	i +	6	h							
F10	5	<u>гр</u>		0		-	3	vv	1 1		0	0	-	5		h	-	•
Decem	p	u m	р		0	n				9	9	9	,	Э		n	Γ	5
Reason	Sip	hon p	ress	sure	e sw	/itch	n de	tect	ts high	pre	SSU	ire						
Causai			5/SIL		11 5 9	/510												
There is too much resi	etan	co in t	ho		0.0		rcui	tca	usina	hiah	nr	200	Iro	in tl	ho h	000	ot ov	
changer at the flue gas	sid	e.		lue	ya	5 01	lcui	i ca	using	iigi	i pro	533	uie	iii u		100		-
Corrective action:	. 010	0.																
Check if the flue gas s	vste	m is b	lock	ed.														
Extreme failing of the h	ieat	excha	inge	er a	lso	cau	ises	the	e resist	anc	e to	o ris	e. (Che	ck t	he	stat	e
of the heat exchanger	and	clean	if n	ece	ssa	ry.												
Check the flue gas sys	stem diameter & length (most likely in a new system).																	
Cause:	stem diameter & length (most likely in a new system). system is blocked. The condensate will build up above the measuring are switch and creates a static pressure larger than the measuring																	
The condensate drain	heat exchanger also causes the resistance to rise. Check the state and clean if necessary. stem diameter & length (most likely in a new system). system is blocked. The condensate will build up above the measure are switch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is open n flow freely to the siphon.														ur-			
ing point of the pressui	system is blocked. heat exchanger also causes the resistance to rise. Check the state and clean if necessary. stem diameter & length (most likely in a new system). system is blocked. The condensate will build up above the measu irre switch and creates a static pressure larger than the measuring atte drain hose between the heat exchanger and the siphon is open <u>n flow freely to the siphon.</u> free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in <u>n. Condensate must be able to flow freely.</u>																	
Corrective action:	ystem is blocked. heat exchanger also causes the resistance to rise. Check the state and clean if necessary. stem diameter & length (most likely in a new system). system is blocked. The condensate will build up above the measu re switch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is open n flow freely to the siphon. free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in n. Condensate must be able to flow freely.																	
Check if the condensat	system is blocked. heat exchanger also causes the resistance to rise. Check the state and clean if necessary. stem diameter & length (most likely in a new system). system is blocked. The condensate will build up above the measure witch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is open n flow freely to the siphon. free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in on. Condensate must be able to flow freely.														0			
so the condensate can	s side. system is blocked. heat exchanger also causes the resistance to rise. Check the state and clean if necessary. stem diameter & length (most likely in a new system). system is blocked. The condensate will build up above the measure ure switch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is oper n flow freely to the siphon. free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point ir n. Condensate must be able to flow freely. hose must have an open connection to the external system. If not in the building drainage system can have effect on the pressure in f the boiler.														١,			
Check if the siphon is f	n system is blocked. The condensate will build up above the measu sure switch and creates a static pressure larger than the measuring sate drain hose between the heat exchanger and the siphon is open an flow freely to the siphon. s free of debris that might block the condensate flow and clean the te drain hose between the siphon and the condensate drain point in ion. Condensate must be able to flow freely.																	
siphon if necessary.	r and clean if necessary. rstem diameter & length (most likely in a new system). n system is blocked. The condensate will build up above the measuring ure switch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is open in flow freely to the siphon. Free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in on. Condensate must be able to flow freely. n hose must have an open connection to the external system. If not in the building drainage system can have effect on the pressure in f the boiler.																	
Check the condensate	r and clean if necessary. rstem diameter & length (most likely in a new system). rstem diameter & length (most likely in a new system). rstem system is blocked. The condensate will build up above the measuring ate drain hose between the heat exchanger and the siphon is oper in flow freely to the siphon. Free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in the boller. The boller is an open connection to the external system. If not in the building drainage system can have effect on the pressure in f the boller.														า			
the external installation	ate drain hose between the heat exchanger and the siphon is open in flow freely to the siphon. free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in on. Condensate must be able to flow freely.																	
Cause:	n system is blocked. The condensate will build up above the measuring are switch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is oper an flow freely to the siphon. If the siphon is free of debris that might block the condensate flow and clean the re drain hose between the siphon and the condensate drain point in the condensate must be able to flow freely. In hose must have an open connection to the external system. If no in the building drainage system can have effect on the pressure in f the boiler.																	
The condensate drain	n system is blocked. The condensate will build up above the measuring ure switch and creates a static pressure larger than the measuring ate drain hose between the heat exchanger and the siphon is open in flow freely to the siphon. Free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in on. Condensate must be able to flow freely.														t,			
the heat exchanger of	ate drain hose between the heat exchanger and the siphon is open in flow freely to the siphon. If free of debris that might block the condensate flow and clean the e drain hose between the siphon and the condensate drain point in on. Condensate must be able to flow freely. In hose must have an open connection to the external system. If not in the building drainage system can have effect on the pressure in f the boiler. Is an open connection between the siphon hose and the drainage g installation. The condensate should flow in the drainage system																	
Corrective action:	s free of debris that might block the condensate flow and clean the te drain hose between the siphon and the condensate drain point in on. Condensate must be able to flow freely. In hose must have an open connection to the external system. If not, in the building drainage system can have effect on the pressure in if the boiler.																	
Make sure that there is	an	open	con	nec	tior	n be	etwe	ent	the sip	hor	n ho	se	and	the	dra	ain	ade	
system of the building	insta	allation	η. ΤΙ	ne d	con	den	sat	e sh	nould fl	ow	in tł	ne c	Irai	nag	e sy	/st	em	
through a freely "breat	hing	" conr	ect	ion,	so	pre	SSU	re f	luctuat	tion	s of	the	ex	tern	al c	Ira	inag	е
system cannot affect th	е р	ressur	e in	the	e he	eat e	excl	nang	ger of	the	boil	er.						
Cause: Blockage of th	e pr	essure	e sig	gna	l ho	se (goir	ig to	o the p	ress	sure	e sw	/itch	۱.				
Corrective action:				- 1-					:6									
Check the pressure sig	jnai	nose	and	cie	an	orr	epia		If nece	essa	ary.							
Cause: Bad pressure s	SWILL	ch cau	ISINQ	ja	lau	t Si	gna	Ι.										
Corrective action:		h																
Cause: Bad wiring/con		in. tion in	the	nr	000	uro	owi	tch	circuit									
Corrective action:	mec		trie	: pre	255	ure	5101	ICH	CIICUIL									
Check for loose wiring	/con	nectio	ne i	n th		roe	eur	2 614	vitch ci	rcui	t							
Check for loose winny/			115 1		ie p	163	Suit	5 3 1		lcui	ι.			1				
Display message	W	a t	е	r		h	i	g	h	I	i	m	i	t				
F17	р	u m	р		ο	n				9	9	9	,	5		h	r	s
Reason	Maximum thermostat exceeds limitation value.																	
Cause: The water flow	er flow is restricted.																	
Corrective action:	prrective action:																	
Check functioning of th	ie pi	ump.																
Check/open all valves	that	might	res	tric	t the	e wa	ater	flo	w throu	ıgh	the	uni	t.					
Check for an external s	an external system pump that influences the flow through the unit.																	
Check if the system rea	sista	ince e	хсе	eds	s the	e sp	are	cap	bacity	or th	ie u	nit	pun	ıp.				

107

16.2 Blocking codes:

The display is not blinking, but is lightened up during the blocking period. The boiler is blocking an action, because of an extraordinary situation. This action will be continued after stabilisation of this situation.

Display message	Α	n	i	С	V	С	I	е		t	i	m	е							
					Ĺ						9	9	9	,	5		h	r	s	
Reason	Th	e cor	ntrol	er re	ecei	vec	lar	new	hea	at d	em	and	too	o fa	st a	fter	the	las	st	
	en	ded o	lem	and.																
Cause:																				
Opening and immediately thereafter closing of the external thermostat.																				
Corrective action:																				
Controlled water flow cools down too quickly after loss of heat demand.																				
Controlled water flow neats up too quickly after start of neat demand.															л					
of the ON/OFF thermostat															.1					
Controller settings need to be changed. Be aware that the standard settings work fine for															or					
all common systems. W	Vhe	en an	i-cy	cling	j is i	acti	ve,	bec	aus	se o	f im	me	dia	te h	eat	ing	or o	cool	-	
ing of the controlled water flow/temperature, it concerns an unconventional system.																				
Display message	С	a	S C	а	d	е		В	I	0	С	k								
											9	9	9	,	5		h	r	S	
Reason	Or	ne of	the I	poile	ers c	of th	e ca	asca	ade	is i	n a	loc	k-o	ut.						
Cause:																				
The unit is programme	d in	such	nav	vay	that	no	ne c	of th	e b	oile	rs ii	na	cas	cac	le v	/ill f	ire,	if o	ne	
nas a lockout. One uni	t na	is a io	оскс	ut a	na t	ner	eror	e tr	ie v	vno	le c	asc	ade	e is	DIO	ске	J.			
Troublooboot the foult	of t		it in			+														
Troubleshoot the fault		ne ur		IUCK	-0u	ι.														
Display message	d	Т	b		0	С	k													
				+-							9	9	9		5		h	r	s	
Reason	Те	mpei	atur	e di	ffere	enco	e be	etwe	en	flov	v ar	nd r	etui	n h	as	exc	eed	ed	-	
the blocking value, but not the lock out value.																				
Cause:																				
The water flow through	n the	e unit	is to	oo lo	w.															
Corrective action:																				
Check functioning of the pump.																				
Check/open all valves that might restrict the water flow through the unit.																				
Check for an external system pump that influences the flow through the unit.																				
Make sure the heat exchanger is clean. Heat exchanger fouling (partly blockage) will in-																				
crease the resistance causing the water flow to drop.																				
								- 1												
Display message	F		o w	1	t	е	m	р		h	i	q	h							
											9	9	9		5		h	r	s	
Reason:	Flo	ow te	npe	ratu	re h	as	exc	eed	ed [·]	the	blo	ckir	ng te	emr	bera	ture	e, b	ut if		
has not exceeded the lock-out value.																				
Cause:																				
The water flow is restricted.																				
Corrective action:																				
Check functioning of the pump.																				
Check/open all valves	that	t mig	nt re	stric	t th	e w	ater	flo	w th	nrou	ıgh	the	uni	t.						
Check for an external s	syst	em p	ump) tha	it inf	lue	nce	s th	e fl	WO	thro	bugł	n th	e ui	nit.					
Check if the system re	sist	ance	exc	eeds	s the	e sp	bare	ca	bac	ity o	of th	ne u	Init	pun	np.					
	F				1	4			-		h	:	-	h		<u> </u>	1			
---------------------------	--	-------	-------	--------	-------	------------	-------	-------	-----------------	--------------	------	---------------	----------	--------------	-------	------------	-------------	-------	-------------	----
Display message	F		u	e		τ	е	m	р		n		g	n	-	-				
												9	9	9	,	5		h	r	S
Reason	Flu	le č	jas	tem	pe	ratu	re l	nas	exc	ee	ded	the	e lim	it.						
Cause:																				
Heat exchanger pollute	ed a	and	no	t ab	le to	o tra	ansi	ier e	enol	Jgh	he	at t	o th	e s	yste	۱m	vate	er.		
Corrective action:																				
Check and clean heat	exc	har	nge	r.																
Cause:																				
Bad flue gas sensor or	se	nso	r c	onne	ectio	on (par	tly s	shor	tec	1.)									
Corrective action:																				
The sensor is of the type	pe l	NTC	C. T	his	me	ans	s wh	nen	the	ten	npe	ratu	ire i	rise	s, it	s re	sist	and	e d	e-
creases. A partly short	ed	sen	soi	' will	dro	op i	ts re	esis	tand	ce a	and	the	erefo	ore	'me	ası	ire'	a ra	ise	in
temperature when actu	Jally	/ th	ere	IS r	none	Э.	~ " "	امم		<u>م</u> ا 1										
	sen	ISOI	CO	nne	Clio	ns		epia	ace	the	se	nso	ſ.							
There is no water in the	<u> </u>	oit y	whi	lo fir	ina															
Corrective action:	e ui	IIL V	VIII		ing.	•														
This is an unlikely situr	otio	n w	hild		tho	0.01	otic	oc fr	or of		kin	a th	<u> </u>	oto	r nr	000	n	did	n't	
detect anything Only a	a lot	t∩f	air	in th	110	sai vst	em	/uni	h Ci t (i ir	nde	r nr	9 III 'PSS	e w	aiei) ca	n n c	ວຍ ຊາເຊ	nce e th	ne w	n i vate	۲
pressure switch to swit	ch	whi	le r	າດ ທ	ate	ris	nre	ser	nt A	lso	the	2000 9 W2	ater	lea	k de	etec	tior		aic	,1
did not react. Bleed all	air	froi	m t	he u	init	so f	the	hea	t fro	om	con	nbu	stio	n ca	an t	be ti	rans	sferi	red	to
the water and won't lea	ave	thre	ouc	ah th	ne fl	ue	SVS	tem					00							
Cause:				,			,													
Heat exchanger failure																				-
Corrective action:																				
This is an unlikely situa	atio	n bı	ut v	vher	ו th	ere	is s	seve	ere	dan	nag	e to	the	e he	eat e	excl	nan	ger,	the	Э
combustion product wi	ll no	ot b	e a	ble	to ti	rans	sfer	all	hea	t to	the	e sy	ster	n w	ate	r. T	he l	hea	t th	at
is not transferred will c	onv	'ert	to	an ir	ncre	ease	ed f	lue	gas	te	mpe	erat	ure.							
Disular message																				
Display message	G	е	n		в		0	С	K			-	ļ				ļ			
												9	9	9	,	5		h	r	S
Reason	Ge	ene	ral	bloc	king	g ci	rcu	it is	acti	vat	ed	duri	ing	ope	rati	on	(ger	nera	d I	
	blo	ocki	ng	con	tact	ts 7	-8).													
Cause:																				
The circuit connected t	o th	ne g	jen	eral	blo	cki	ng t	erm	ina	ls is	s no	ot cl	ose	d.						
Corrective action:																				
Check all external com	check all external components that are connected to the general blocking terminals and																			
check why the contact	is r	not (clo	sing	du	ring	he	at d	ema	anc	1.									
Cause: if used in con	nbir	nati	ion	wit	h fl	ow	sw	itcł):											
The water flow through	n the	e ur	nit i	s to	o lo	w.														
Corrective action:																				
Check functioning of th	ne p	um	ра	and t	he	flov	v sv	vitch	າ.											
Check/open all valves	tha	t mi	igh	t res	stric	t th	e w	atei	flo	w tl	nrou	ıgh	the	uni	it.					

Check for an external system pump that influences flow through the unit.

Check if the system resistance exceeds the spare capacity of the unit pump.

Make sure the heat exchanger is clean. Heat exchanger fouling (partly blockage) will increase the resistance causing the water flow to drop.

Display message	L	i	n	е		f	а	u		t									
	р	u	m	р		0	n					9	9	9	,	5	h	r	s
Reason	Ba	d p	owe	er s	upp	ly		-					-	_	_	_			
Cause:																			
The supplied power does not comply with the specifications.																			
Corrective action:																			
Corrective action: Check if the power supply is connected correctly to the unit. Check the voltage and frequency (should be Life Neutral, Gnd > 230 Vac / 50 Hz). Make sure there is no signal failing or voltage peaks in the power supply.																			

Display message	0	u	t	d	ο	0	r		s	е	n	s	0	r		f	а	i	I	
												9	9	9	,	5		h	r	s
Reason	No	o ou	itdo	or s	sens	sor	det	ecte	ed.											
Cause:																				
The unit is programme	The unit is programmed to check if an outdoor sensor is present and does not detect an																			
outdoor sensor.																				
Corrective actions																				

Corrective action:

Check for loose wiring/connections in the outdoor sensor circuit. Check the state of the outdoor sensor and replace if necessary.

Display message	R	е	t	u	r	n		t	е	m	р		h	i	g	h				
												9	9	9	,	5		h	r	s
Reason	Re	eturi	n te	mp	erat	ure	ha	s ex	cee	ede	d th	ie b	locł	king	, ter	npe	erati	ure,	bu	t it
	ha	s no	ot e	хсе	ede	ed tl	ne l	ock	-out	t va	lue									
Cause:																				
Systems that pre-heats the boiler return temperature too much/high.																				
Corrective action:																				
Reduce pre heat temp	erat	ture	of	exte	erna	al h	eat	sou	rce											
Cause:																				
The need for heat in the system suddenly drops causing hot return water to the boiler.																				
Corrective action:							-			-										
Dampen external heat	ing	sys	tem	l CO	ntro	ol to	pre	ever	nt si	udd	en	boil	er t	em	pera	atur	e ris	se.		

Display message	Т	2	-	Т	1		h	i	g	h										
												9	9	9	,	5		h	r	s
Reason	Dif wh flo	fere iich w)	enc ha	e be s be	etwe een	een set	T2 in t	ano he	d T1 para	l ha ame	as e eter	xce s.(r	ede etur	ed tl rn te	he k emp	oloc o hig	kiną ghei	g va r tha	ilue an	
Cause:																				
The water flow through the unit is too low.																				
Corrective action:																				
Check functioning of the pump.																				
Check/open all valves that might restrict the water flow throught the unit.																				
Check/open all valves that might restrict the water flow throught the unit. Check for an external system pump that influences flow through the unit.																				
Check if the system re-	sist	anc	e e	xce	eds	the	e sp	are	cap	bac	ity c	of th	le u	nit	pun	٦p.				
Make sure the heat exe	cha	nge	er is	cle	an.	He	at e	exch	nang	ger	fou	ling	(pa	artly	blc	ocka	ige)	wil	l in-	-

crease the resistance causing the water flow to drop.

Display message	W	а	t	е	r	р	r	е	s	s	u	r	е		f	а	u	I	t	
												9	9	9	,	5		h	r	s
Reason	Wa	ate	r pre	รรเ	lre	is to	oo le	ow	or h	igh										
Cause:																				
The water pressure in	the	sys	stem	ı is	too	hig	h.													
Corrective action:																				
Check if the system pressure is too high after (re)filling. Make sure that there is a pressure relief valve and expansion vessel installed in the system, according to the applicable standards. Check if there is an open connection between the unit and the relief valve plus expansion vessel. Be aware that if the unit is installed in the basement of a tall building, only the static pressure of the water column above the units can raise above the maximum allowable limits. Make sure that this is not the case. Cause:																				
Cause:	Cause:																			
The water pressure in the system is too low.																				
Corrective action:																				
Check if there is no lea age and fill the system	akag	ge i	n th	e sy	yste	em t	hat	cau	uses	s th	e pi	ress	sure	e to	dro	р. F	ix a	any	lea	k-

Check if there is an external system pump that sucks water through the boiler, causing an under pressure (bad installation design).

16.3 Maintenance attention function

The display shows alternately the base screen and this message, while backlight is blinking. The boiler is operating, but will count the exceeding hours.

A parameter must be changed, after service, to remove this message.

Display message	Ν	е	е	d	s		Μ	а	i	n	t	е	n	а	n			0		0
	-	g	n	i	t	i	0	n		С	у	С		е	s		h	r	S	
Reason	Ma rea	ainte ach	ena ed.	nce	ор	tion	of	tota	ıl ar	nou	int c	of ig	niti	on d	cycl	es l	has	bee	en	
Display message	Ν	е	е	d	s		Μ	а	i	n	t	е	n	а	n			0		0
	D	а	t	е													h	r	S	
Reason	Ma	ainte	ena	nce	ор	tion	of	the	dat	e h	as b	bee	n re	ach	ned	-				
Display message	Ν	е	е	d	s		Μ	а	i	n	t	е	n	а	n		I	0		0
	В	u	r	n	i	n	g		h	0	u	r	S				h	r	S	
Reason	Ma rea	ainte ach	ena ed.	nce	ор	tion	of	tota	ıl ar	nou	int c	of b	urni	ng	hou	irs ł	nas	bee	en	
Display message	Ν	е	е	d	s		Μ	а	i	n	t	е	n	а	n			0		0
	Α	Ι	Ι														h	r	S	
Reason	Or rea	ne o ach	f th ed.	e al	bov	em	enti	one	ed m	nain	iten	anc	e o	ptic	ons	has	be	en		



This function/message is standard not activated, but can be activated/set by a trained engineer. This function does not overrule the need for annual maintenance. The end user is always responsible for arranging annual maintenance.

17 MAINTENANCE

17.1 General

For a good, safe and long-time operation of the boiler it is advised to carry out maintenance and service on the boiler at least once a year.

Maintenance and inspection of the boiler should be carried out at the following occasions:

- When a number of similar error codes and/or lock-outs appear.
- At least every twelve months maintenance must be done to ensure safe and efficient operation.
 Damage caused by the lack of maintenance will not be covered under warranty

MAINTENANCE REMINDER FUNCTION.

← See previous page.

BE AWARE : This function is standard turned off. We offer this programmable function to the installer to use as a reminder. Because it concerns a free programmable function the use of it cannot be used as an argument in warranty cases. Our units must be maintained every twelve months whatever the settings/working of this function. It is and remains the responsibly of the end user to have the unit maintained every twelve months.

For more information about this maintenance mode see section 10.14, 'Setting the maintenance specifications', page 62.

Service intervals

The normal service frequency for the boiler is once a year. Every year the boiler should be cleaned and checked, according to the maintenance procedures. If there is doubt whether the boiler is operating with the correct water and/or combustion air quality, it is advised that a first check is already executed after six months. This check serves to determine the frequency of the future services. The maximum interval between two services is a year.



INSPECTION AND MAINTENANCE MUST BE EXECUTED FOR A SAFE AND EFFICIENT OPERATION OF THE BOILER.

17.2 Inspection & maintenance

Inspection, maintenance and the replacement of boiler parts should only be done by a skilled service engineer. Apart from the maintenance proceedings it is advised to have a log chart for every boiler that describes the following aspects:

- Serial number
- Date and time of maintenance
- Name of maintenance engineer
- Which parts were exchanged during maintenance
- Which settings (software) were changed during maintenance
- Special remarks / findings
- Future aspects that need extra attention
- Additional aspects: measurement reports, complaints by the (end)-user, lock-out codes, etc.

During maintenance the following parts and aspects of the boiler should be checked and inspected. NOTICE: Before starting to work on the boiler:

- Switch off the electrical power to the boiler (service switch and/or unplug boiler)
- Close the gas valve to block gas supply to the boiler

Customer comments

Comments and remarks from the customer should be analysed and used to find possible causes for any occurring problems and complaints.

Service history

The operational and fault history (total amount and since the last service) of the boiler can be retrieved with the help of a computer, correct software and an interface cable. This information can be used to specify the maintenance and service proceedings in relation to the boiler (parts).

Water leakage

The water pressure of the heating installation should be more than 1.0 bar and at a maximum of 2.0 bar in normal operation. When the water pressure drops below the minimum occasionally, there might be a water leak. Check the boiler and the complete heating installation for any water leakages and have these repaired.

Flue gas & air supply

The flue gas pipes and the air supply pipes must be checked for gas tightness. Also check if the mounting of these pipes is correct, safe and not damaged. Check the rooftop of the boiler housing for signs of water leakage and traces of water coming from the air supply pipe, the air vent or any condensate coming from the flue gas pipes.

Gas supply & safeties

The gas pipes must be checked for gas tightness. Also check if the mounting of these pipes is correct, safe and not damaged. Any built in safeties should be checked for a correct functioning.

Remove complete burner unit

The complete burner unit consists of the fan, the burner plate and the internal burner. To remove this part for an internal heat exchanger check: remove the six M6 nuts, the ignition cable and the thermal fuse cables. After this, take out the complete burner unit by moving it forward out of the boiler housing. NOTICE: Watch out not to damage the burner plate insulation during this operation. While removing the complete burner unplug both of the electrical and controlling cables of the fan. After all this dismantle the air gas mixing box on the suction side of the fan and check the blade wheel of the fan.

Burner

Check the burner surface to see if it has damages, signs of rust and/or cracks. When the burner surface is damaged the burner must be replaced. The burner can be cleaned by using a soft (non-metallic) brush. The dust can be removed with a vacuum cleaner or pressurized air.

Ignition / ionisation electrode

When the complete burner is removed, it is very easy to check the ignition electrode. First check if the distances between the electrodes and between the electrode and the burner are according to the graph below. When these are not correct, try to bend the electrodes in the right position. Notice: the electrodes undergo high temperatures, therefore the electrodes become hard and are difficult to bend. While bending used electrodes they might break or burst. Check the electrode, after bending, for any tear/crack and signs of rust. When they are burst/cracked or rusty, replace the electrode. Also replace the electrode when there is a crack in the ceramic insulation of the electrode. When the electrode is replaced, also the gasket should be renewed.



Burner door gaskets

When these gaskets have changed colours at some parts, the rubber has cured and/or has damages, these gaskets must be replaced. Notice: only use the gaskets that are supplied by the boiler manufacturer.

Fan

When the fan blades are polluted and dirty, carefully clean the blades with a soft brush. Notice: do not use too much force on the blades or else the fan might be out of balance and run irregularly, causing noises and fan failures. Check the fan also for any water damages. In doubt always replace the fan of the boiler.

Insulation

The insulation of the heat exchanger (located on the rear wall inside the heat exchanger and burner door) must be inspected. If this insulation disk shows any signs of (water) damage or degradation it should be exchanged. Also check if there are any indications in the burner room of a high condensate level (caused by a blocked siphon) that might have wetted the rear wall insulation. When this has happened the rear wall insulation should also be replaced. Only use the insulation disk that is supplied by the boiler manufacturer.

The same procedure must be applied on the insulation and gaskets fitted on the burner door.

Siphon

Disassemble the siphon and clean every part of it. Check the siphon connection of the heat exchanger for any blocking or pollution and clean it (if necessary). Check the functioning of the siphon by pouring clean tap water in the burner room (when burner door is removed). This water will exit the heat exchanger by the siphon. Notice: don't wet the rear wall insulation.



When mounting the bottom part of the siphon, before commissioning the boiler and/or after maintenance, the siphon must **ALWAYS** be <u>completely</u> filled with water.

This is a safety measure: the water in the siphon keeps the flue gases from leaking out of the heat exchanger via the condensate drain.



Heat exchanger and burner room

After the removal of the complete burner unit check if there is any debris and dirt in the heat exchanger. The coils of the heat exchanger can be cleaned by using a **non-metallic** brush. After this the dirt and dust can be removed with a vacuum cleaner and by flushing the burner room with water. Don't forget afterwards to clean the siphon once again.

Gas/air ratio

With every service check and/or maintenance of the boiler always check the gas/air ratio by measuring the CO₂ percentage (flue gas) at the maximum and minimum load of the boiler. If necessary adjust these values. See for information chapter 14 "Adjusting and setting the burner".

Pump

Check the electrical parts and the motor of the pump for a correct functioning. The pump must generate a sufficient water flow over the (heat exchanger of) the boiler. When the pump produces noise, is operational for more than five years or has signs of water leakage it is recommended to replace the pump as a precaution.



When defects and abnormalities are found by the service engineer during service and maintenance and these are not repairable, this information should be reported to the owner/end-user of the installation. Also the owner/end-user should be advised how to fix these defects and these defects should be reported in the service report / log file of the boiler.



During service and maintenance the gas, supply air, flue gas and condensate connections are disconnected, checked and replaced. Make sure that all these components are mounted correctly before commissioning the boiler again.



Cleaning the burner room with acid or alkali products is prohibited.

Mounting the burner door correctly back onto the heat exchanger:

IMPORTANT:

Before mounting the burner door, make sure that its gaskets and insulation are in excellent shape.

If any signs of damage or ageing are present, these parts must be replaced.

The burner door must be mounted back on the heat exchanger as follows:

- Place the burner door with its holes over the six threaded studs.

Careful! When handling too rough or misplacing the holes over the threaded studs, the burner door insulation and/or gaskets can be damaged.

Assure yourself that the door is well positioned with respect to the threaded studs, before pushing it onto the exchanger.

- Now keep the burner door firmly in place by pushing the gas/air nose with one hand at the middle at point A.
- Then turn-tighten the flange nuts with the other hand as far as possible onto the threaded studs.

Now the burner door is in place and the nuts can be tightened with a torque key.

- Tighten the nuts in the order given in the picture
- The specified torque value for tightening the burner door flange nuts is **8 Nm**

tighten in given order.

torque value = 8 Nm



18 USER INSTRUCTIONS

After installing and commissioning of the boiler, demonstrate the operation of the entire central heating system to the end-user. The user should be made familiar with all safety precautions of the boiler and the installation. The user should be instructed that service and maintenance of the boiler is required every twelve months. Regular service and maintenance is essential for a safe and proper operation of the boiler. Hand over the documents supplied with the boiler.

19 INSTALLATION EXAMPLES

The following schematics present several ways of mounting the heating installation:



All schematics are purely functional. Safety components must be added conform all applicable standards and regulations.

System Type 1



Code 1	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
No parame	eter change needed		

System Type 2



Code 2	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
	place bridge	13-14	
OS	outdoor temperature sensor	1-2	E04.016.585
No parame	ter change required		

System Type 3



Code 3	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
OS	outdoor temperature sen- sor	1-2	E04.016.585
No parame	ter change required		

System Type 4



Code 4	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
Т	calorifier		
ST	calorifier thermostat or tank sensor	5-6	S04.016.303
OS	outdoor temperature sensor	1-2	E04.016.585
DV	diverter valve (3-way-valve)	28-29-30-31	
Parameter c	hange required		

System Type 5



Code 5	Name	Wire terminal	Part nr.
P1	Built-in Boiler Pump		
P3	Optional Heating Pump	25-26-27	
RT	Modulating Room unit with timer	13-14	S04.016.355
Т	Calorifier		
ST	Calorifier thermostat or tank sensor	5-6	S04.016.303
P2	HWS Primary Pump	29-30-31	
OS	Outdoor temperature sensor	1-2	E04.016.585
SNV	Non Return Valve		
Parameter	change required		

System Type 6



Code 6	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
FS	flow temperature sensor	3-4	E04.016.304
ОН	H low loss header		
OS outdoor temperature sen- sor 1-2 E04.016.		E04.016.585	
No parameter change required			

System Type 7



Code 7	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
Т	calorifier		
ST	calorifier thermostat or tank sensor	5-6	S04.016.303
ОН	low loss header		
FS	flow temperature sensor	3-4	E04.016.304
DV	diverter valve (3-way-valve)	28-29-30-31	
OS	outdoor temperature sensor	1-2	E04.016.585
Parameter change required			

System Type 8



Code 8	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
Т	calorifier		
P2	HWS primary pump	29-30-31	
ST	calorifier thermostat or tank sensor	5-6	S04.016.303
OH	low loss header		
FS	flow temperature sensor	3-4	E04.016.304
SNV	non return valve (low resistance type)		
OS	outdoor temperature sen- sor	1-2	E04.016.585
Parameter change required			

System Type 9



Code 9	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
P2	HWS primary pump	29-30-31	
т	calorifier		
ST	calorifier thermostat or tank sensor	5-6	S04.016.303
ОН	low loss header		
FS	flow temperature sensor	3-4	E04.016.304
SNV	non return valve (low resistance type)		
OS	outdoor temperature sensor	1-2	E04.016.585
Parameter change required.			

E93.0802EN.C Ambassador* manual

For the cascade installations see the special Cascade Manual.

System Type 10



Code 10	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump 25-26-27		
RT	modulating room unit with timer	13-14	S04.016.355
SNV	non return valve (low resistance type)		
ОН	low loss header		
FS	flow temperature sensor	3-4	E04.016.304
OS outdoor temperature sensor 1-2 E04.016.		E04.016.585	
Parameter change required			

System Type 11



Code 11	Name	Wire terminal	Part nr.
P1	built-in boiler pump		
P3	optional heating pump	25-26-27	
RT	modulating room unit with timer	13-14	S04.016.355
SNV	non return valve (low resistance type)		
P2	HWS primary pump	29-30-31	
Т	calorifier		
ST	calorifier thermostat or sensor	5-6	S04.016.303
ОН	low loss header		
FS	flow temperature sensor	3-4	E04.016.304
OS	OS outdoor temperature sensor 1-2 E04.016.5		E04.016.585
Parameter change required.			

21 INDEX

0-10 vdc remote burner input control, 79 0-10 vdc remote flow temperature set point, 79 3-way valve (diverter valve), 7, 38, 81 accessories, 13 accessories and unpacking, 10 adjusting and setting the burner, 91 air separator, 21 ff. air supply, 15, 28 air venting, 19, 20 Ambassador+ 60-120, 11 Ambassador+ 150-180, 12 anti-Legionnaires' disease (pasteurisation) function, 83 article numbers, 13 automatic air vent, 20 automatic water filling systems, 20 B23P boilers, 30 blocking, 19, 38, 73, 78, 88, 102, 112 boiler connections, 17 boiler room, 15 by-pass, 18 C63 boilers, 30 checking the fault history, 61

checking the operating history, 60 cleaning of the burner, 112 closed boiler, 15, 28 combustion air quality, 29 commissioning the boiler, 85 connections gases miscellaneous, 25 ff. connections water miscellaneous, 17 ff. control panel / display unit, 43 control panel menu structure, 44 controlling behaviour settings, 78 controlling options and settings, 76

dimensions, 10 dirt filter, 21 ff. dirt separator, 21 ff. display during operation, 46 diverter valve (3-way valve), 7, 38, 81

e-bus interface, 13 efficiency, 7 electrical connections, 38 electrical installation, 38 electrical schematics, 40 expansion vessel, 18 extra boiler control, 76

fan, 15, 49, 76, 101, 112 fault checking, 61, 73 fault codes display, 73 fault codes. blocking codes, 102 firing for the first time, 90 flue gas and air supply examples, 30 flue gas and air supply systems, 25 flue gas duct, 29 flushing with clean water, 21 frame, 16 frost protection, 19

gas conversion, 98 gas valve, 13, 91 ff, 101, 112

hanging level, 16 heat exchanger, 7, 82 ff, 112 heating, 76 ff. heating and hot water switching at sudden temperature drop, 83 heating and hot water switching time, 83 hydraulic graphs, 23 hysteresis, 78

ignition, 112 indirect hot water / calorifier, 81 inspection & maintenance, 112 installation examples, 21, 116 ff. installation of the Ambassador⁺, 15 installing a strainer and/or dirt separator, 19 introduction, 7

legonnaires' disease, 53, 83 low loss header, 18, 21, 88 low/high flow temperature to tank coil, 82 low-water level protection, 15 Ls and Lw gases, 91 ff, 96

maintenance, 112 master, 7, 56 max cooling time, 76 modulation, 13, 116 ff. monitor screens, 47

night shift, 56, 80 non return valve, 116 ff.

offset, 78 outdoor graph, 56 outdoor sensor (outdoor temperature), 13, 38, 39, 56 outdoor temperature control, 56 oxygen, 19 ff. oxygen diffusion proof, 88 oxygen tight, 88

password, 66 plastic piping in the heating system, 20 positioning the boiler, 16 power (supply), 7, 18, 38, 88 pressure relief valve, 18 pressure safety valve, 88 printed circuit board, 40 pump, 18 pump and 3-way valve control, 81 putting the boiler out of operation, 101

quality of combustion air, 29 quality of used water, 19

reset, 73 roof mounted duct, 29 room thermostat on/off, 78 room thermostat open therm, 79

safety guidelines, 6 schornsteinfeger function, 48 sensor, 13, 19, 20, 38, 56, 78, 81, 116 ff. sensor values, 39 service function, 49 set points, 52 setting at the maximum load, 91 ff. setting at the minimum load, 91 ff. setting the maintenance specifications, 62 setting the outdoor specifications, 56 setting the parameters with the display menu, 66 setting the time & date, 51 setting the timer programs, 53 starting the boiler, 90 stationing the boiler, 16 status, 46

tank sensor, 81 tank thermostat, 81 technical data Ambassador⁺ boilers, 7 temperature display on/off, 76 timer contact function, 80

under floor heating, 21 unpacking, 14 user instructions, 115 user manual, 7, 15

valve, 90 ff, 91 ff, 112 ventilate, 6, 15 venting, 6, 15, 19, 20, 112

wall mounted duct, 16, 21 water pressure, 20 water pressure switch, 38, 88 water quality, 19 water side connections, 17 water treatment, 21 weather dependent control, 56, 79

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